FROM ECONOMICS TO RESOURCES: TEACHING ENVIRONMENTAL SUSTAINABILITY IN PERU'S PUBLIC EDUCATION

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By

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ABSTRACT

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This dissertation examines the teaching of environmental awareness in Peru's public educational system and how it needs to be consciously taught and improved in order to overcome contamination and pollution of resources and decrease poverty. This is a situation afflicting a significant percentage of Peruvians, who face difficulty in surviving and living well because the scarcity of clean air and water, unpolluted land, and affordable energy, which are basic environmental resources. The teaching of environmental awareness, as mandated by Educational Peruvian Laws and curriculum, should be redesigned to promote environmental ethical awareness and sustainability to guard Peru's natural and cultural resources, bounty and beauty before it is too late. In this way, education will promote a better level of life for the majority of Peruvians. Peruvian public education is presently in a state of emergency, as has been

recognized by the former minister of education Javier Sota Nadal (2004-2006). Only 10% of students leaving high school understand what they read and only 4% do well in mathematics. A number of reasons contribute to this tragedy. Among them is principally the low quality of teaching and the inadequate budget available for public education. Peru's laws, echoing the Universal Declaration of Human Rights, and mandate good and free education and guarantee the right to live well. The reality is that none of these rights are properly given to the majority of poor Peruvians.

This dissertation offers a course of action to teach and spread out not only environmental awareness, but also environmental ethics and sustainability from a personal perspective. This rounded concept, if applied, will form citizens able to guard, protect, and preserve natural and cultural resources. The needed environmental ethics and sustainability education will gradually guarantee, from early in life, a truthful way to love, care, protect and preserve the ecosystem. Also encompassed within this concept is to positively influence the behavior of professionals, economists, politicians, and citizens. It envisions interconnectedness between humans and the environment based on the teaching of environmental ethics and sustainability, educating children to develop critical thinking, and creativity, as well as adopting eco-design principles. This different approach could definitely better the new generation's contribution to preserve natural and cultural resources and to reduce poverty as well as contribute an example to other countries. Present and future Peruvian

generations will be able to connect, care, protect, and sustain resources, so when it comes to sustainable development, they will be fully aware of the consequences of their actions toward the environment, themselves and their children's well being. In this way, education would truly fulfill its responsibility.

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Introduction

Teaching environmental awareness is defined and mandated by Peru's Educational Law No 22044 and Curriculum, and is also supported by Peru's Civil Law, the General Law of the Environment, and other important educational, environmental and ecological laws. These documents envision the implementation of one of the most transcendental educational objectives: to help protect the environment and diminish hunger and poverty, harsh realities that afflict almost half of Peru's ecosystem and population, in spite of the country's significant natural and cultural resources. The Social Development National Conference, CONADES (Conferencia Nacional sobre Desarrollo Social) notes that levels of poverty in different degrees of severity affect a great number of Peruvians. This is evidenced in a newspaper article, "Sociedad civil marcha contra la pobreza": "De cada diez peruanos cuatro son pobres y uno extremadamente pobre" (La República, 9 Sept. 2005). ["Four out of ten Peruvians are poor, and one is extremely poor" (my translation)]. What seems to be lacking in the environmental awareness education field are the links to understand the profound relationship between ecological elements and resources and the inadequate use of those resources that lead to pollution and poverty.

Teaching environmental awareness is not sufficient. Instead, the present study proposes a more profound way to teach environmental ethics and resource sustainability by inculcating in students the habit to integrate and reconnect themselves with the ecosystem by constantly considering the consequences of their actions on resource preservation and sustainability. This approach will help young Peruvians to connect, protect, and preserve the environment and its resources for them and future generations. This would reduce the misuse, overuse, and abuse of Peru's natural resources. Unless environmental ethics and sustainability are internalized, the Peruvian ecosystem will continue to be polluted while Peruvians who live in poverty will continue living in dire conditions. It is important that reconnection with the ecosystem be taught and applied, beginning in the first years of schooling for all Peruvians.

Currently, public education, as acknowledged by the Peruvian Ministry of Education's Statistical Unit, is in a state of emergency. It has failed to accomplish its elemental educational requirements. The document Indicadores de la Educación: Perú 2004 explains that: "la baja calidad de los resultados de la educación, expresada en el rendimiento académico de quienes concluyen primaria o secundaria es el problema principal"(11) ["The low quality of educational results reflected in the academic performance of those finishing primary or secondary schools is the problem" (my translation)]. That crisis is not yet overcome according to Javier Sota Nadal, Minister of Education from February 2004 to July 2006. He also commented on the poor educational results of the last national evaluation of 2004 that comprised 14,500 primary and

secondary students. Sota Nadal observed that only 3% of secondary grade students in their final year got the grades expected in mathematics and barely 10% understood what they read (qtd.in Caretas reporter, Zenaida Solís). Two of the reasons for these distressing results are the teachers' poor quality of instruction and the limited budget of the Ministry of Education.

Teachers need to count on revised curriculum guidelines and training that will provide them with the appropriate environmental knowledge, ethics, and sustainability consciousness. Then, they can become environmental advocates and present these issues to their students in the most accessible manner. For example, the current teaching of environmental awareness should be superseded in the Peruvian sillabi by a deeper and more nuanced approach – teaching environmental ethics and sustainability as a personal commitment. It is extremely important that public school teachers in Peru get adequate remuneration and better professional training. A gread deal of responsibility is placed on the Peruvian Ministry of Education and in the hands of teachers. Both need to accomplish at least what Peruvian education laws dictate in order for these laws to be more than library decorations.

It is imperative that environmental ethics and sustainability of the resources be taught. These topics should not be foreign to Peruvians; they inherited outstanding examples of environmental sustainability such as the Machu Picchu buildings, the Colca terraces, and the domestication and preservation of potatoes. Pre-Incan and Incan ancestors of modern Peruvians understood environment sustainability well enough so as to leave for posterity a

significant patrimony and heritage of buildings, highways, ceremonial centers, aqueducts, and bridges. They also left well-preserved ceramics, textiles, metal work, and customs of respect to Mother Nature, as embodied in the mythical figures of Mother Earth and Mother Water. However, after nearly 500 years of Spanish presence, Peruvians have been behaving very differently toward nature. The result is a scarcity of good soil, air, and water. These factors exacerbate unemployment, corruption, and pollution. Moreover, Peru is trying desperately to fit in the global market and achieve sustainable development, but social uneasiness and environmental problems are constantly the matter of every day news and information.

In a country where the rich get richer and the poor poorer every day, Peruvian parents dream of empowering their children with the best education they can get, so their children will be better off. By receiving a good education, good working opportunities and a good life are within reach. Of great concern is the fact that thousands of young Peruvians leave Peru in search of a better life, because the socioeconomic situation and the system do not give them a great likelihood of employment. Oddly, the newspaper article "George Bush reconoce el aporte de peruanos en los EEUU" published in La República, 7 Aug. 2006, mentions that approximately 2.5 million Peruvians live in the United States, and they make an important addition to America. The president of the United States, George W. Bush, praised those Peruvians by saying: "Hacen nuestra nación más vibrante y optimista cada día. Su trabajo duro y valores hacen de nuestro país un lugar mejor y sus logros enriquecen la experiencia americana" ["They

make our nation more vibrant and optimistic every day. Their hard work and values make our country a better place and their success enriches the American experience" [my translation)].

The transcendental value of education and environmental instruction lies in the effect it can have on the future leaders of the country. Currently Peruvians with political and economic clout and the power to set the national agenda often forget their responsibility to preserve the environment. It is pertinent to point out, that both Peru's educational and environmental laws address the subject of environmental awareness and strongly promote economically sustainable development as an important objective. In reality, those in power mainly pursue profit and power, without really and truthfully caring if that economical development endangers, pollutes, or overexploits fresh water, air, soil, oceans, and rain forests. This disconnection between the politicians' expected duties, their civic and moral obligations to protect Peru's patrimony and resources, and the outcomes of those actions, is a sign of lack of environmental education and ethics. It could be argued that politicians and economists know the ethical dimension of their responsibilities, but choose to ignore it for profit. The fact that the Peruvians have not been taught environmental ethics and sustainability of the resources in school, this ignorance contributes to the destruction and plundering of the ecosystem and makes it easier to further enrich a few rich Peruvians and benefit just a handful of national, international, and transnational enterprises. When Peruvian society and individuals, in whatever post, care, respect, protect, and preserve the ecosystem as personal ethical endeavors, then we may

contemplate better living standards, better air, water, land, and energy for Peruvians. In that way, what the laws so masterfully explain in theory, would be reflected in the practical social arena. The newest (CONAM) Ley del Consejo Nacional del Medio Ambiente No 28611 of 16 Nov. 2005, provided a very sound and valuable effort intended to direct and control sustainable development in favor of the environment. However, disturbing information about scandalous environmental problems continue to provide reasons to plead for the integration of this directive within other ministries, especially the Ministry of Education.

Citizens and professionals from all walks of life need to integrate and reconnect with the ecosystem, not as dominant and exploitative agents, but as part of that living system, in order to keep it clean, protected, and productive. This is only feasible through education. Peruvians need to make progress in developing their ethical conscience, so they may adopt a more caring sense of environmental responsibility. Scientists, technocrats, or professionals can be creative in building and designing ecologically friendly processes, machines, or projects. These would function better if the creators were educated in environmental ethics and sustainability. One may envision that through the practice of caring and preserving the environment, the "ethics of care" practices, that would be enough so Peruvians would not plunder their very own welfare and their children's future.

Because environmental ethics and sustainability could be perpetuated culturally and they are new topics in Peruvian education, teachers need to become the best allies and advocates of the environment. They do so by first

becoming knowledgeable and then becoming strong defenders of the ecosystem. In pursuing this objective, a set of guidelines called "Environmental Ethics and Sustainability Learning Spaces" has been developed as part of this dissertation's contribution to train Peruvian teachers. Through them, the Ministry of Education, NGOs, or any other institution could help promote the teaching of this important content, not only for the good of the children, but also for the population at large. With the guidelines based on philosophical, educational, and environmental principles, the curriculum can be readjusted so teachers may be able to teach more effectively. These guidelines may also help other Colleges of Education in other Latin American countries such as Bolivia, Ecuador, etc., to prepare teachers in the areas of environmental ethics and sustainability.

Recently, José Chang Escobedo, the current Peruvian Minister of Education, listed as one of his objectives, if the budget allows it, a new policy to decentralize primary education. He would give the municipalities and their mayors, local authorities, parents, teachers, and the community the management and the power to govern local primary schools. First, a pilot plan would be adopted to make decisions as local committees of action. This was reported in the article "Ministro y alcaldes tratarán municipalización de Educación": "El alcalde, los docentes, los padres de familia – explicó Chang – estarán unidos en un Comité Local de Gestión Educativa a través del cual se tomarán decisiones" (La República,1 Aug. 2006) [The mayor, the teachers, the parents, explained Chang, will be united in a Local Committee of Educational Action, through which decisions will be made" (my translation)].

It is a nice beginning in an attempt to solve the problem of teaching and education, but it is questionable to entrust education to committees and municipalities that may not have a budget or the knowledge to take on such a significant task. Nevertheless, perhaps it will be an opportunity to beckon the participation of communities, senior citizens, businesses, and corporations. Some of them could be called on to help the new generations to become environmentally ethical and sustainable. They could do so by donating time, money, space, and books to libraries where teachers and students could have the opportunity to read and get involved with the ecosystem and its preservation; but overcoming poverty through environmental, ethical, and sustainable education is in the hands of the teachers and the Ministry of Education of Peru.

This dissertation has following chapters:

Chapter 1 discusses Peru's significant environmental, geographic, and historical issues.

Chapter 2 discusses Peru's educational and environmental laws versus reality.

Chapter 3 presents the theoretical support for teaching environmental ethical sustainability from the personal perspective in Peru's public educational system.

Chapter 4 presents four pedagodical modules called "Environmental Ethics and Sustainability Learning Spaces." To reinforce these teachings, this project offers a set of suggested ideas for the community, and several children's short stories created so children will have a reading source to learn about environmental ethical sustainability of the resources in Peru within the public education system.

Finally, the conclusion will sum up the main ideas embodied in this dissertation and its contribution toward teaching environmental ethical sustainability.

Chapter One

Peru's Significant Environmental, Geographical, and Historical Issues

While Peruvian natural and cultural resources are remarkable, at present Peruvians demonstrate a thorough obliviousness toward environmental contamination and indifference to the fact that half of the country's population lives in poverty. Therefore, it is imperative to redirect education to teach students to care, restore and preserve the environment. It is inexcusable that out of the 10,000 years of Peru's cultural development the last 500 years have brought a wave of disregard and mistreatment to the ecosystem. Peru's environmental condition is the integrated outcome of a wonderful and unique ecosystem and the history of what mankind has done to it. In this chapter, the focus is essentially on the most distinctive characteristics of Peru's geography and history related to environmental awareness. The country's current environmental status is the consequence of the interaction of two patterns of human environmental behaviors, the Pre-Hispanic and the Hispanic. Peru is recognized as a land of diversity, beauty, and magic; privileged with great wealth of natural, archaeological, and cultural resources.

Peru is a blend of spectacular landscapes and microclimates including the Andean mountain range and the three well-known and distinct natural regions: the Coast, the Highland, and the Jungle; it is this complex ritchness that is

threatened by contamination and pollution. Peru also is home to the outstanding Amazon Rain Forest, Lake Titicaca, (the highest in the world), and the navigable Amazon River. According to the Oficina Nacional de Evaluación de Recursos Naturales de Perú ONERN (1985), natural resources have the following meaning:

> Recursos naturales constituyen el patrimonio nato de la humanidad en la Tierra . . . son fuente de abastecimiento de la oferta natural y modificada de los bienes y servicios de la naturaleza . . . e integran los ecosistemas en el entorno global donde la sociedad desarrolla sus actividades. Su manejo y conservación dependen de decisiones humanas, donde los criterios políticos, técnicos, económicos, sociales, culturales y tradicionales juegan un rol dentro de la ecología de enorme trascendencia para la evolución de la tierra. El objetivo del uso de los recursos naturales, es el bienestar del hombre. Por lo tanto, las condiciones de vida que generen sus actividades humanas sobre los recursos naturales y su entorno, son causa y efecto del hombre mismo. [1]

Despite the resources' richness in Peru, poverty, misery, and desperation affect half of the population. Knowing that Peru possesses abundant natural resources is of capital consideration because it helps to understand how ethical behavior

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[1] [Natural resources constitute humanity's rightful patrimony on Earth . . . they are the supplying source of the natural and modified offer of the services and goods of Nature . . . and they integrate the ecosystems within the global environment in which society develops its activities. Its management, and preservation depend on human decisions, in which political, technical, economical, social, cultural, and traditional criteria play a role within the ecology of transcendental importance for the evolution of the Earth. The objective of the use of natural resources is the well being of man. Therefore, the life conditions that human activity generates over the resources and their souroundings are the cause and effect of man himself (my translation)].

and human ability and intelligence to handle them can be used to advance and promote the well being of the majority of the population. The 1985 ONERN report, Los recursos naturales del Perú directed by Javier Pulgar Vidal, explains that poverty is an old evil, and that in today's wealthy and sophisticated technological era represents an intolerable and unjust situation, but the advances could offer the possibility of eradicating poverty totally. Instead, there are groups of people who live in misery, and these people do not live in poverty because the planet imposses that, but because they do not have the opportunity to take advantage of those resources:

> Si el aprovechamiento de los recursos naturales es fundamental para la planificación del desarrollo de un país, se yergue la conservación de los mismos como la única acción que asegure o perpetúe dicho desarrollo. . . Lamentablemente, en la explotación de los recursos naturales el hombre ha tenido frecuentemente poca visión del futuro. La explotación irrestricta de algunos recursos con el objeto de satisfacer necesidades a corto plazo, ha tenido consecuencias desastrozas: la erosión, la salinización, el mal drenaje, la impureza de las aguas y la contaminación son algunas expresiones graves del uso inadecuado de ciertos recursos o el deterioro de ecosistemas, reduciendo paulatinamente la capacidad de la tierra para mantener la vida. (Introducción) [2]

[2] [If the utilization of natural resources is fundamental in the planning development of a country, it is clear that the conservation of natural resources is the only action that could secure and perpetuate such development. Unfortunately, mankind has had little vision of the future when exploiting natural resources. The unrestricted exploitation of some resources to satisfy shorttime

It is in its land and its resources, where Peru's millenary inheritance lays. At the time of the discovery and exploration of the New World, as stated by Hugh Thomas in his Rivers of Gold: The Rise of the Spanish Empire from Columbus to Magellan, Spain's territories were recognized as being among the richest in the newly discovered world, America, of which Peru was and still is an integral part. The New World was described to the Spanish King, Fernando, in a letter sent by Vasco Núñez de Balboa, who in 1513 wrote about how immensely rich were the peoples of these lands in these terms: "they had more gold . . . than health, and indeed they were more short of food than of gold" (qtd. in Thomas ix). Yet, there is a great contrast between those rivers of gold of those lands of bounty of yore and the poverty and lost hope of today's millions of Peruvians. To explain why such a high percentage of Latin America's and specially Peru's populations have been hit by poverty and misery, Eduardo Galeano provides further reasons to elucidate the situation. In his book, Open Veins of Latin America: Five Centures of the Pillage of a Continent, he notes that:

> Latin America is the region of open veins. Everything, from the discovery until our times, has always been transmuted into European—or later United States—capital, and as such has accumulated in distant centers of power. Everything: the soil, its fruits, and its mineral-rich depths, the people and their capacity to work and to consume, natural resources and human resources. . .

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needs, has had devastating consequences: erosion, salinization, bad drainage, water impurity, and contamination are some of the severe consequences of the inadequate use of some resources or the damage to the ecosystem, slowly reducing the earth's capacity to maintain life (my translation)].

> To each area has been assigned a function, always for the benefit of the foreign metropolis and the endless chain of dependency has been endlessly extended . . . Our defeat was always implicit in the victory of others, our wealth has always generated our poverty, by nourishing the prosperity of others—the empires and their native overseers, in the colonial and neocolonial alchemy, gold changes into scrap metal and food into poison. (12)

Since the early time of "mestizaje," miscegenation or the mixing of races between Spaniards and Inca Empire peoples, Peru's population has been forced throughout history to be involved in about five centuries of disengagement with nature. The overexploiting behavior over the ecosystem was systematically carried out, but not for the well being of common Peruvians, but for an elite and the Spanish Crown. These lands were subjugated and looted by economic and political interests from the outside. The new mestizo population witnessed that plunder, obeyed the laws, and saw the lands and the resources become the property of the Spanish Crown and the Pope. Peru's natives were taught to admire and be submissive to a foreign culture, religion, and government. They were unable to do anything to control or detain that plunder which has come to be the primary explanation of the current dire environmental state and poverty.

According to the CIA -The World Factbook: "Peru's territorial area is 1,285,220 sq. km., is bordering the South Pacific Ocean, and as of July 2006 had an approximate population of 28,305,603 inhabitants ("Peru"). Regarding poverty, the article "Comité de EEUU cuestiona legislación laboral peruana"

notes: "el demócrata Sander Levin afirmó que el mandatario peruano [Alejandro Toledo] no ha podido cumplir con sus promesas de combatir la pobreza y abolir las prácticas de gobierno de Alberto Fujimori, caracterizado por autoritarismo y corrupción" (La República) ["Sander Levin, a democrat, affirmed that Peru's president (Alejandro Toledo) could not comply with his promises to combat poverty and do away with Alberto Fujimori's authoritarian and corrupt governmental practices" (my translation)]. Moreover, the impact of chronic hunger and poverty attacks without pity children who live in mountain caves in extreme need and abandonment in Lima, Arequipa, and other cities. The newspaper El Comercio of 24 Jan. 2006, in its "El patético caso de los niños topo arequipeños" tells the sad tale of 300 children:

> el caso de los niños topo arequipeños vuelve a poner sobre el tapete la dramática situación de muchos menores que tienen que trabajar diariamente en condiciones riesgosas, sin que el Gobierno y el Estado se inmuten siquiera, como si ésta fuera la cruda realidad de otro planeta. Sólo en el distrito de Mariano Melgar, 300 niños, pasan la vida en socavones abandonados, que pueden derrumbarse en cualquier momento sobre ellos, bajo un polvo que contamina sus ojos y vías respiratorias. En otras palabras, una antesala a la muerte. [3]

[3] [Arequipa's mole children brings again to the surface the dramatic situation of many youngsters who have to work daily in risky conditions, without the Government and the State even blinking an eye, as if this cruel reality were from another planet. Just in the Mariano Melgar district, 300 children between the ages of 6 and 13 live in abandoned caves that can fall any minute, under dust that contaminates their eyes and respiratory systems. In other words, they are at death's throes (my translation)].

The heartbreaking situation of poverty contrasts with the richness of Peru's biodiversity and resources; making clear the need to educate Peruvians in a different manner in order to change their understanding of how they can relate, behave, know, care, integrate, and preserve the resources and the ecosystem, so poverty can be reduced. It is imperative to undo the 500 years of irrational resource plundering.

Peru is located on the western part of South America, bordering the South Pacific Ocean. From the coastal beaches to the highlands, Peru's territory exhibits a range of altitudes and climates, including the extremely warm regions of the ecuatorial line and the frigid ones from the Pole. In fact, according to Javier Pulgar Vidal, (15) Peru's natural environment encompasses all the planet's geographical regions. Its border countries are Bolivia, Brazil, Chile, Ecuador, and Colombia. Peru's climate varies from tropical in the east, to dry in *the west; temperate to frigid in the Andean Western coastal plain or coast; high and rugged cold in the Andes in the center or highlands; and in the East, humid* lowland jungle and the Amazon basin. Peru has eight regions according to their altitude, which have special microclimates and allows the growth of diverse vegetation, crops, and animal life. Today, this great biodiversity has shown the presence of some invasive species because of the use of pesticides and fertilizers.

Issues of centralism, divisionism, and possible regionalism fluster Peru's public administration so that while Lima, the capital and a few other important cities receive governmental money and help, many distant and rural cities lack

that support. Politically and administratively, Peru is divided into twenty-four departments and each department has its local authorities and organization. They are: Lima, Amazonas, Ancash, Apurimac, Arequipa, Ayacucho, Cajamarca, Cuzco, Huancavelica, Huanuco, Ica, Junin, Lambayeque, La Libertad, Loreto, Madre de Dios, Moquegua, Pasco, Piura, San Martin, Tacna, Tumbes, Ucayaly, and one Constitutional Province: Callao. Other areas are considered important because they have archeological, natural, or commercial significance, and they are: Cusco (the Incan Empire capital), Chimbote (fishing industry), Chincha Alta (natural fertilizer center), La Oroya (mining company), Pisco (natural and marine landscape), Sullana-Talara (petroleum companies), Toquepala, Cuajone, Quellaveco and Cerro Verde (copper mines). Due to this departmentalization, Peru faces the centralization in Lima and in other important cities, which is reminiscent of the colonial political structures of viceroyalties. Despite the noted demarcation, the clashing of political, economic, judicial, and administrative powers leave small departments with poor municipal budgets and causes the central government's delays in attending the faraway cities' programs and needs. (See Appendix 1- Map)

The categorization of Peru as an Andean Country is relevant due to its 10,000 years of Andean civilization and the presence of the Great Andean Mountain Range, which influences the civilization, tradition, climate, landscape, and transportation. The Andean chain is the central core for mineral resources and is the source of water for the Coastal, Highland, and Amazonian Rain Forest rivers, as well as thermal-mineral water fountains. The Andes Nevados or snow-

peaks are of significance because they feed the rivers. At the moment, some of these peaks are beginning to show the effects of global warming as their seemingly eternal ice peaks melt. Peru is part of the world's ecosystem. Global warming is not just occurring in Alaska or Antarctica, it is also affecting Peru's Andean chain. Peruvians need to be educated and become aware of the urgency and become proactive because the ecosystem is one, and it is interconnected. Such awareness could be principally done by teaching about the care and responsibility toward the environment as a whole. As noted in the work An Inconvenient Truth: The Planetary Emergency of Global Warming and What We Can Do About It, Al Gore presents examples of the effects of global climate change, and he informs of the process of the melting of one of the eternal ice peaks in the Peruvian Highland. Gore's work conveys how Earth is an interconnected being, as advanceed countries massive consumption affects the poor Andean regions, which face melting snow peaks. Qori Kallis glacier's dated and chronological pictures show the change in the last 15 years, from 1978 to 2006, in that Peru's glacier. Gore notes "everywhere in the world the story is the same, including in the Andes in South America" (52-53).

The rich and diverse minerals and fishery inventories of Peru attract corporations who want to explore and exploit these resources, but who see these important resources as means of profit and power rather than as sources of well being. Mineral deposits and fishery inventories are central to the economic investments of the mining and fishing industries, which constitute large sectors of Peru's economy. The variety of resources and climates results from the influence

of the Andean Chain, the Pacific Ocean, and the marine currents. 60% of the territory belongs to the tropical Amazonian region, and 30% is highland with high plains, valleys and rough grounds, high elevations and perpetually iced mountaintops. 10% is coast considered desert-like with hillocks interrupted by small rivers that form valleys.

In the northern coast, the presence of algarrobos is another sign of the kindness of the Peruvian soil. Algarrobos are strong trees that defied time and dryness and keep the terrain strong by preventing erosion. From the algarrobos' *fruits comes a product called algarrobina, a nutritious honey-like molasses, exquisite with milk and liquor. Some of those trees are as old as the Pre-Incan Chimus, a culture that lived in this coastal area. Algarrobos' areas constitute an unusual case of big plantations in these dry desert areas.*

*The territory nurtured the flourishing of different cultures in the Pre-Hispanic times. The Pre-Incas and the Incas before the creation of Spanish-*Peruvian cities and departments founded villages and towns. Geographic diversity has provided Peru with a multiplicity of ecological factors such that Peru *has a sample of every climate and landscape on Earth.*

Coastal desert extreme drought, contrary to the desert-like coast area has small fresh, fertile valleys, green oases formed with waters that come from the highlands, snow-capped mountains or from the water retribution influenced by the Humboldt and El Niño currents. There are three types of rivers in the Coast, according to Roger Ravines's article "Recursos naturales" in Tecnología andina:

> Los ríos de la costa son de tres clases: a. Los que se originan en la zona de lluvias regulares de la cordillera, son los más numerosos, de mayor caudal y drenaje superior. b. Los que sin originarse en la *línea divisoria continental reciben afluentes de esa procedencia. c.* Los ríos que nacen lejos de la divisoria continental, pero que conectan aguas pluviales de las partes bajas de la cordillera. (7) [4]

The Peruvian valley's agricultural production includes: sugar, fruits, cotton, beans, squashes, olive trees, etc., and even in the arid deserts, as mentioned before, grow the algarrobo trees. Humboldt's marine stream runs through Peru's coastal seas, and thanks to it the country has become an important fish hatchery of the world. The Pacific Ocean holds its ichthyologic richness producing a great selection of fish as a source of food for people. In 1965, Peru became the world's second exporter of fishmeal made from anchovies, thus making fishery an important sector of its economy.

Coast valleys run from North to South like 52 little green veins in the long, hot, dry strip desert close to the shores of the Pacific Ocean. Some of the rivers descend torrentially in the summer and are almost dry in other seasons. The coast is located up to a height of 1,000 to 1,200 meters above sea level. The Coast is, according to the authors of the bilingual work Imagen del Perú en el mundo:

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[4] [There are three kinds of coastal rivers: a. Those that originate in the zones of regular rain in the Andean Mountain Range are more numerous, carry more water and have better drainage. b. Those that without originating in the continental dividing line receive tributaries form that source. c. The rivers that are born far away from the continental dividing line but collect rain water from the lowest part of the Andean Mountain Range (my translation)].

> The most important zone of agricultural and industrial production in the country, because of the economic density of its villages (sugar-cotton) and the installations of large industrial plants, especially in the capital, Lima. Since old times, the Peruvian man has undertaken a titanic struggle in the Coast, because of the lack of water, building remarkable irrigation works. His ambitious projects consist of trying to bring to the Coast waters of the copious rivers descending through the eastern draining of the Andes, generating additionally, electric power. (14)

The Mountain Range of the Andes runs from North to South, its many tops of snow-capped mountains giddily elevate from the shore of the sea to the edge of the narrow Coast stripe, forming a rampart in the volcanic belt of the Earth. The Huascarán is one of the highest Peruvian peaks, reaching a height of 6,768 meters and is all capped with eternal ice. From those snow-covered peaks, rivers flow down forming the so-called *pongos*. They are sometimes torrential and run deep creating abysses every now and then. Rivers carrying their crystal waters favor the growth of valleys and cities giving generous life to people around them. Numerous lakes and ponds are the result of waters that came from the snow peaks. The ones in Llanganuco, Parón, and Callejón de Huaylas that rest like gigantic mirrors close to the White and Black Mountain Ranges merit special mention. These landscapes are of exceptional beauty.

One the last and most important water resources is found in the Titicaca Lake, it is one of last water frontiers to quench the thirsty Peruvian and Bolivian

inhabitants, but due to lack of awareness of the consequences of reckless polluting this lake is been contaminated with mining wastes. In the immense Highland of Puno, in the high plains of Collao, at 3,812 meters above sea level, is the site of Lake Titicaca, the world highest navigable lake and cradle to the Inca Empire. Lake Titicaca still is one of the most valuable sources of spring and fresh waters and has a rich fauna worth cleaning and preserving. Dr. Emilio Romero, quoted by Cortázar Chueca, explains that:

> El hecho de existir una sola divisoria continental de aguas es fundamental para la Geografía del Perú . . . pues de ese hecho parte todo el sistema de comunicaciones, del establecimiento, fijación y migración demográfica del Perú, así como el del aprovechamiento económico de su territorio. (15) [5]

The Sierra Highland still embraces communities of natives, Quechuas and Aymaras, who work with cattle and agriculture. This area is good for growing cereals which high levels of protein, among them the quinua, kihuicha, cañihua, and corn. In this region, ancient Peruvians had undertaken the long process of the domestication of potatoes, managing to cultivate approximately 3,000 varieties. Moreover, in the cool Highland, the natives had developed a natural system to preserve potatoes. In cold temperatures, potatoes can be dehydrated and kept for a long time as dry potatoes or *chuño* helping in that way to preserve food for use at a later time.

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[5] [The existence of a sole continental dividing line of waters is fundamental for human geography of Peru, . . . it defines the whole of the system of the establishment, fixing the demographic migration of Peru, as well as the economic advantage of its territory (The book's own translation)].

The Pre-Hispanic shepherds' legacy allowed Peru to have the Vicuña's, Alpaca's, Guanaco's and Llama's wools, the basis for a strong wool and fashion industry. The Vicuña and baby Alpaca fine wool are renowned because of the fine, silk-like quality of their yarns. They came to be known as The Gold of the Andes, *today*, a very important economic resource. The camelidos, the South American siblings of the camels of the Far East, grazed in Peru for a very long time, around 7,000 years ago. The domestication process began, but the *vicuñas still remain undomesticated. Unfortunately, the vicuñas are in danger of* extinction. Furtive hunters covet their fine wool and kill them extensively. Jorge Flores Ochoa, Kim MacQuarrie, and Javier Portús noted in the introduction of the work, Oro de los Andes: las llamas, alpacas, vicuñas y guanacos de Sudamérica, that:

> Durante cientos de miles de años . . . los guanacos y las vicuñas se extendieron y multiplicaron sobre la accidentada *superficie de la zona occidental de América del Sur,* alimentándose por los ilimitados valles . . . hace unos diez mil años . . . un grupo de hombres desharrapados que vestían pieles de animales . . . [dieron] comienzo a la época de los antiguos cazadores de guanacos y vicuñas, [de] un período que duraría más de siete mil años. (43) [6]

[6] During hundreds of thousands of years, guanacos and vicuñas multiplied in the ragged surface of the occidental side of South America, grazing in its interminable valleys . . . 10,000 years ago a group of shabby men covered with animals' skins . . . [began] the ancient guanaco and vicuña hunters' period [that] would last for more that 7,000 years (my translation)].

Most of the mineral deposits are located in the Sierra; this is the reason why most of the rich and productive mines are in the highland. In The History of the Conquest of Mexico and History of the Conquest of Peru, William H. Prescott describes masterfully Peru's topography and its relationship with the mineral resources:

> A strip of land, rarely exceeding twenty leagues in width, runs along the coast and is hemmed in through its whole extent by a colossal range of mountains, which, advancing from the Straits of Magellan, reaches the highest elevation—indeed, the highest on the American continent—about the seventeen degrees south, and after crossing the line gradually subsides into hills of considerable magnitude, as it enters the Isthmus of Panama. This is the famous Cordillera of the Andes, or "copper mountains," as termed by the natives, though they might with more reason called [them] "mountains of gold." (734)

Peru produces gold, silver, mercury, zinc, copper, tin, gas, copper in conjunction with zinc, and lead. Some of the important mining zones are: Querubilca, Cerro de Pasco, Morococha, La Oroya, Camisea, Casapalca, Toquepala, Cuajone, Quellaveco, and Cerro Verde.

One of the few remaining lungs of the world, the Amazonian forest is part of Peru's territory. Today it is menaced by rampant burning and cutting, perpetrated by business people who do not understand or care about the consequences of damaging this important resource. The Amazonian Sylvan is

home to the Amazonian rain forest and has two components: the Upper Sylvan and the Lower Sylvan, both beautiful, green, mysterious, and promising. The barriers of the oriental face of the Andean Range go to rest in the Lower Amazonian Sylvan, known as the Sylvan "eye brow." Its terrain is on rocky soil and ground and so is not inundated by overflowing rivers or rain showers. The valleys are large, hot, and full of vegetation, exceedingly plentiful, and are without doubt the richest and the most impressive of this region of Peru. This area has agricultural and cattle-raising importance and is immensely fertile because coca leaves, coffee, cacao-beans, sugar, tea, timber, precious woods, and a variety of medicinal plants and herbs are grown here. There are plants, trees, and herbs that have not been studied yet and which may have medicinal properties, but whose discovery may never occur if the depredation of the Amazonian Rain Forest continues.

The Lower Sylvan is the land of the most plentiful river of the world, the Amazon, which is located in the Far Eastern side of Peru, where the last counter fork of the Mountain Range of the Andes comes to an end. This area contains the huge Amazonian plain, the gigantic and untamable forest, which is one of the few important green lungs of the whole world. This is also a region of great sea rivers: Amazonas, Ucayali, Marañon, Urubamba, Madre de Dios, Napo, and Putumayo. These rivers, flow into the Atlantic Ocean, they are navigable and guard the virgin forests whose plants, herbs, flowers, and roots hold unknown and potential remedies to cure the maladies of the world. The Rain Forest of Peru is a green pharmacy with medicinal herbs not yet evaluated but that through

some research could become the safe, healthy, and practical way to heal in a natural and safe manner. The Amazon River has in Peru the port of Iquitos that is also the capital of the department of Loreto, the largest in Peru. In Loreto, oil was found and it is transported through pipes to Bayovar on the Coast.

The Amazon River is by itself one special ecosystem inside another ecosystem. Pedro Cortázar Chueca and José and Rosa Cortázar explain how this river flows like a gigantic sea:

> [The Amazon River] crosses a good part of Peru and Brazil, its basin is the hughest of the world, with more than 6 million square km., it is not only the Amazon River itself, but its tributaries and effluents that conform the hydrologic frame of this area that covers about 70% of the Peruvian territory. Its depth is of 30 m., however sometimes it reaches 250 meters deep . . . the Amazonian Basin "Cuenca" comprises a system of 18 large rivers ranging from 1,500 to 3,000 m length and over 200 important effluents. (21)
>
> [Another Internet source claims] that the Amazon stretches long and wide to nurture its large rainforest home to 250 species of mammals, 3,000 fresh water fish, 1,800 birds, 10,000 trees, and 70,000 other plant species . . . the Amazon Basin holds two-thirds of all the flowing water in the world . . . the fact [is] that the Amazon river flows through the Amazon rainforest, the largest and wettest rain forest in the planet. ("Amazonas River")

The cultural and traditional resources of Peru, in particular those of Cuzco and other cities, are of archeological importance and serve to reconnect modern-day Peruvians to their ancestors, whose remains and artifacts attest to their survival skills and their care for the enviroment. In remaining sites, tombs, and buildings archeologists have found evidence of the extraordinary development of science, technology, and traditions, which helped to reconstruct important facts of life and civilization of ancient Peru. To study and preserve that heritage is of consequence, because among the numerous nations that are part of the New World, Peru constitutes, along with Mexico, one of the two most advanced empires in political power, knowledge, refinement, development, and wealth. José Matos Mar in the introductory pages to Tecnología andina explains that:

> Más de 20,000 años de fecunda existencia independiente no pueden dejar de tenerse en cuenta . . . hay que reconocer que en ese lapso el hombre andino domesticó un medio duro y desarrolló estrategias adecuadas a sus diversas regiones, que logró—dentro de esa concepción colectivista y comunitaria—una alta calidad de vida para una sociedad de más de 10 millones de habitantes. Se impone, pues, recoger sus enseñanzas. (xii) [7]

Because Peru's biodiversity is terrestrial and marine, one has to make an effort to understand how Peru's bio-geographical magnitude has been developed throughout 16 provinces, and is influenced by the microclimates of those different

[7] [More than 20,000 years of an independent, productive existence have to be taken into consideration . . . one has to recognize that in that period of time, the Andean man domesticated a harsh environment and developed strategies adequate to its most diverse regions, and that he got—within that communitarian collectivist conception—a high quality of life for a society of more than 10 million inhabitants. Then, it is imperative to collect his teachings (my translation)].

altitudes and landscapes. Peru's biodiversity stretches over a very complex territory of more than 1,284,216 square kilometers and its jurisdictional waters in the Pacific Ocean. The multiple variety of living organisms that inhabit Peru is outstanding. It is transcendent to try to protect and preserve them for the future of Peru and the world.

The article "Biological Diversity in Peru," a 1997 Peruvian national report, explains that:

> Peru has an impressive variety of native species including birds, mammals, butterflies, flowering plants and marine organisms . . . Despite the fact that barely 2/3 of Peru's national territory has been sampled, the country is widely recognized as one of the twelve mega-diverse countries of the world. Known species of birds, mammals, amphibious, reptiles and vascular plants from Peru represent about 15% of the world's biodiversity and rank among the 10 highest in the world. Peru is also one of the five world centers of origin of cultivated plants and is an immense natural germ-plasma bank for useful wild species. Peru has a wild population of tomatoes, potatoes, sweet potatoes, and many types of corn, cassava, beans, etc., and over 4,217 species of native plants which have 42 different uses (tannin, food, medicinal plants, etc.), of which at least 1,005 are cultivated and 222 domesticated. As concerns *ex situ* conservation, Peru has 70,860 accessions of 126 crops in different institutions. (8)

History is an important source to study facts, techniques, methods, and informations regarding specific issues. In this case, Peru's history allows us to review and rethink how Inca and Spanish ancestors' develop their roles involving environmental respect, care and preservation. It is in this search that Peru's environmental awareness history teaches lessons of great value, and without trying to say that the past was always better, a glance over Peru's environmental awareness accounts takes into consideration two well-defined periods: one, Pre-Hispanic and sustainable, and the other after the Hispanic conquest, unreasonably exploitative and not sustainable. Around 200 years ago, in 1821, Peru proclaimed its independence from Spain, but before that, 500 years ago Peru was the great empire of the Incas, was independent, and controlled almost half of South America. The Incas were self-sufficient, wise, and creative. Ancient Peruvians were diligent workers, and there is sufficient proof that regarding the ecosystem they protected the resources, they worked with nature in the friendliest way, and their labor almost qualifies as rituals of respect and veneration towards the land of contrast and variety. Prescott asserts that in this land "broken by precipices, furious torrents, and impassable *quebradas* . . . [The Inca's master-work made Andean difficult land productive, yet] the industry, we might almost say, the genius, of the Indian was sufficient to overcome all of the impediments of Nature" (735).

Without a doubt, the Incas knew how to preserve food, clothing, and seeds for times of drought, famine, or natural disasters. Numerous examples of environmental respect and stewardship that still exist as Incan heritage in their

master crafts and arts include: ceramic, textiles, metalwork, architecture, warehouses, water irrigation, domestication of plants, processes of preservation and elaboration, agricultural methods, highways, cities, bridges, fortresses, temples, and buildings. Machu Picchu, Caral, Choquequirau, Pisac, and Pachacamac still stand as eloquent lessons in science, technology, and environmental sustainability. Special agricultural techniques were worked out in the treatment of high mountains, today decorated by terraces and united by hanging bridges. The methods or treatments for the preservation of chuño—dry potatoes—and the elaboration of chicha—corn beer—are present today defying 500 years of history.

Surviving rituals of respect, care, and preservation of the environment in the treatment of the land, animals, and plants can still be found today in the Andes. The Incas' veneration for the environment survives in some customs from their times, for example, the way they treat the Pachamama—Mother Earth, the Cochamama—Mother Water, the Apus—mountains, and their herds of llamas. Still present to this day is the Pukllay—Andean carnival, which makes clear the respect and the love for Mother Earth and the animals. Inge Bolin, in her work Rituals of Respect: The Secret Survival on the High Peruvian Andes, writes about the shepherds of Chillihuani in the Vilcanota valley in Cuzco and explains how the ritual practices are still alive in the intimacy of each family, and they are performed for the health of everybody in the family, the animals, and the economic well being. Bolin explains how she came to discern the rituals of respect and celebration as basic to social interaction in the Pukllay:

> Respect is the essence of life, and like the life force itself, it knows no boundaries. Respect is owed to other human beings, to animals, to the deities . . . sacred places, rocks, springs, lakes, and meadows. Respect is a moral code that permeates all thought and action . . . . The people of Chillihuani are aware of the tremendous importance of respect, without which they feel society cannot be sustained. . . Animals are considered inferior beings, but are also treated with kindness and respect . . . The ancient customs and the ideology of the people of Chillihuani reflect on the way Inca and Pre- Inca societies lived and thought. . . . [The Chillihuani have] an indomitable spirit that resides in these people, who have strong ties to their ancestors. Energetic and dynamic, they know their worth. "We are Incas, true Incas" they exclaimed when asked about their heritage. (xiv)

It is significant to mention that the role of education in the Inca times was oriented to practical day-to-day life, and the well being of the individual and the communities. The example of the Chillihuani proves that Peruvians had resources sustainability traditions that benefited Inca descendants even today. Incan education and codes of law carried lessons of environmental sustainability because they were formulated to ensure the good administration of the empire, were oriented to simplicity and to the application of practical matters, and appear to have been responsible for the government's success in the political and economical expansion of the Inca empire.

Incan formal education was designed to form and develop dexterity in personal defense and arts, in emotional, moral, and physical endurance, in tradition, as well as in practical matters, such as being able to craft a pair of sandals, a weapon, and to endure hunger and thirst with dignity. It was intended for the nobles and was given in the Yachay Huasi or House of Knowledge to prepare only Incan heirs and noble men. They were educated to become administrators, warriors, officials, priests, and Incas. The royal offspring along with nobles of royal blood were entrusted into these military schools into the care of the amautas, or Wise Men, to learn the art of good will, war, and religion. Prescott recounts that, at the age of sixteen, the pupils underwent a public examination, previous to their admission to what may be called the order of nobility or manhood. This examination was directed by some of the oldest and most illustrious Incas, and if they passed they were to have their ears pierced to be able to wear big gold earrings, their feet were dressed with sandals, they were allowed to wear *huara* short pants, or pants symbol of manhood, and be called *hijos del sol,* children of the sun. Finally, on the prince head a fillet or tasseled fringe was placed. The fringe was yellow in color with an insignia of the heir-apparent. This Llautu or fringe of distinction had two feathers of the bird called *coraquenque*. The examination ended with a public ceremony called Waracu, where dancing and singing celebrated the passing of the examination. As Prescott explains:

> The candidates were required to show their prowess in the athletic exercises of the warrior; in wrestling and boxing, in running such

> long courses as to fully try their ability and strength, in severe fasts of several days' duration, and in mimic combats, which, although, the weapons were blunted, were always attended with wounds, and sometimes with death. During this trial which lasted thirty days, the royal neophyte fared no better than his comrades, sleeping on the bare ground, going unshod, and wearing a mean attire—a mode of life, it was supposed, which might tend to inspire him with more sympathy with the destitute. With all this show of impartiality, however, it will probably be doing no injustice to the judges to suppose that a politic discretion may have somewhat quickened their perceptions of the real merits of their heir-apparent. (742)

And in the *Aclla Huasi* or House of the Chosen Women directed by the *Mamaconas* or venerable guides, young noble women were educated to became Virgins of the Sun, and wives to the Incas or to noble men. They were employed in spinning, weaving, and embroidering clothing with fine vicuña wool for the Inca and the Temple of the Sun. The great establishment in Cuzco consisted entirely of maidens of the royal blood, who amounted, it is said, to no less than fifteen hundred. The provincial convents were supplied with the daughters of *curacas* and inferior nobles, and, occasionally with a girl from the lower classes was recommended because of her great physical attraction. The House of the Virgins of the Sun consisted of low ranges of stone buildings, covering a large extent of ground, surrounded by high walls, which entirely excluded those within from outside observations. Though Virgins of the Sun, they were brides of the Inca,

and, at a variable age, the most beautiful among them were selected for the honors of his bed and transferred to the royal seraglio. The laws of the Inca Empire were few, simple, and exceedingly severe: do not steal, do not lie, and do not be lazy—Ama Sua, Ama Kella, Ama Llulla. Incan law required, according to Prescott, "a decision within five days" (755). Knowing that in the empire there was no money, little trade, and hardly anything that could be called fixed property, the laws protected the social and collective goods, such as bridges, the habitat, and the environment.

> Removing landmarks, turning the water away from the neighbor's and, burning a house, were all severely punished. To burn a bridge was death. The Inca allowed no obstacle to those facilities of communication so essential of public order. A rebellious city or province was laid waste, and its inhabitants exterminated" (Prescott 754).

The Spanish conquest of the Inca Empire clearly disregarded the environment and the Inca establishment that supported its care for the Earth and the well being of society. The empire underwent a drastic reversal in the way of the care of the Earth, the resources, and Inca society. The lessons of the conquerors were reinforced by sheer ambition and the lust for gold and silver, a hypocritical mission to spread the good news of Christ's Cross and gospels tied to the hilt of a sword that resulted in seas of tears and blood, the plunder of the land, and decimation of the Inca inhabitants. The Spaniards in Peru blatantly disobeyed the Leyes de las Indias, Laws of the Indies, and any other laws in

favor of Inca peoples, environment, and resources. All together, this was clearly a huge, unethical, 500-year environmental sustainability lesson.

Francisco Pizarro began the conquest of Peru on the Isla del Gallo, Island of the Rooster, and invited his 13 followers to go South, meaning to the Inca empire, to become rich. Following the conquest, we find another instance which one can call cunning, others may call it cruel: the killing of the last Inca, Atahualpa in 1532. After negotiating the liberation of the Inca and receiving the ransom of a room full of gold and two rooms full of silver, Pizarro nonetheless ordered the death of Atahualpa. According to Pablo Macera in his book Historia del Perú: la colonia: "El rescate de Atahualpa consistía en 6,087 kg de oro; y 11,793 kg de plata" (36) [Atahualpa's ransom consisted of 6,087 kg. of gold; and 11,793 kg of silver" (my translation)].

The first mestiza, Doña Francisca Pizarro (1534-1598), the daughter of Don Francisco Pizarro and Doña Inés Huaylas Yupanki, (Atahualpa's sister), inherited the conqueror's fortune, which by right was her mother's, because Francisco Pizarro had acquired his possessions by conquest. Doña Francisca Pizarro became the richest heiress in Lima, Peru. But by the royal decree of 11 March 1550 all of Francisco Pizarro's children were ordered to go to Spain, because it was not to the Crown's advantage to have the children of an Inca princess and Francisco Pizarro in Peru. So Doña Francisca traveled to Spain with her fortune. According to María Rostworowski, Doña Francisca, after arriving in Spain, went to live to La Motta castle, and married her uncle Don Hernando Pizarro in 1552. They frequented the city of Trujillo in Extremadura

and ordered the construction of a "castle of the conquest." As Rostworowski explains: "El Palacio de la Conquista fue construido por Hernando y Francisca y ellos debieron posar para el artista que esculpió sus rostros" (96) ["The Castle of the Conquest was built by Hernando and Francisca, and they may have been the models for the artist who sculpted their faces" (my translation)].

Doña Francisca had five children, but after a few generations none of her children survived, and all of her mother's and father's fortune stayed in Spain, as Rostworowski comments: "Sólo bastó una cuantas generaciones para agotar y dejar exhausta la fecunda savia proveniente del conquistador del Incario y el herático Hijo del Sol. (79) [8]

Even though Doña Francisca was ordered to go to Spain, it is not exaggerating to say that her life and fortune also left Peru, and remained in Spain; thus establishing a pattern of external control regarding the destiny of her resources, herself, and Peru. Her wealth, which was extremely large at that time, became the first example of giving up to outsiders what were Inca resources and treasures.

Colonial Peru's mining techniques are also an example of over exploitation and a loss not only of natural resources, but a waste of human resources. Work in the mines or *mita* was compulsory work for the indigenous people. The textile *obrajes* or workshops were another type of compulsory work in the colonial textile facilities, where female textile workers were tied up to their looms unable to move away not even to relieve themselves. Both represent the

[8] [It only took a few generations to dry up the fecund sap of with the Inca Empire's conqueror, and the Son of the Sun (my translation)].

most abusive exploitation, that Peruvians endured. Metals were mined and tapestries were woven to be shipped to the Spanish Crown. So much for the ideal portrayal that Spaniards came to the New World to make Christians out of the Infidels of the New World. What they instituted was a modern, ugly lesson of repugnant unethical behavior against human beings and the plundering of natural resources. They came in the name of the "Cross" to plunder even to the point of annihilation and total destruction of the resources, a behavior of sheer greed, to earn prestige, riches, pleasure, and power over Peruvian peoples and lands. Nonetheless, it is impossible to forget or set aside the contributions of Spain: the Spanish language, the Catholic religion, and some good religious men and women. For example, Fray Bartolomé de las Casas advocated the "Indian cause." In turn, the Spanish Crown enacted the Leyes de las Indias, but these laws served to set an unethical trend, or bad example of accepting the law, but not complying with it. There we have the first strong and unethical way of behaving against the Peruvian environment and the establishment of a wealthy elite and the onset of poverty for the majority of Peruvians. Today, there is a great need to correct this behavior by educating the new Peruvian generations first about their past and the real environmental ethics present in their Inca history.

Peru's archeological patrimony encompasses part of the cultural and traditional identity of the Pre-Hispanic past. The archaeological remains are found mainly in tombs that preserve the best offerings of the Pre-Inca and Inca people. Because of the type of burials, the climate, and the terrain in which they

were done, the textiles still show the fine colors in which their dead were wrapped for burial sites. There one finds all the necessary objects, dresses, seeds, products, and ceramics that that person would need to live a future life. These remains are very valuable because they would lead present generations not only to recognize their heritage, but also find scientific and technological discoveries from Peruvian ancestors that would benefit today's world. So, not only did the Inca Empire have a way of living, which respected the ecosystem, but they also believed in the after life. These are two venues through which is possible to see lessons of environmental sustainability.

Following the arrival of the Spaniards, Peru was a rich Spanish colony for many years. After it proclaimed its independence in July 28th 1821, Peru became a republic and presently is a democratic republic. Very important aspects of the republican history of Peru are: recurring poverty, disproportionate profits for a few members of the elite, neocolonialism, over exploitation of resources by transnational enterprises, injustice, unemployment, illiteracy, and corruption. Peru is a developing country, desperately seeking to become part of the global market and economy. As Peru tries to enter into the global economy, poverty does not ameliorate, and the public governmental sphere is at a disadvantage in trying to control investors and global enterprises. The government does a precarious job of negotiating what is best for Peru, because it lacks sufficient knowledge about how to control the sustainable development in order to benefit Peru. Some politicians are elected to power, but they lack education and information. Corruption blinds the economists, ministers, and officials in power

about their true obligations and duties, and their lack of awareness in doing their duties generates consequences for them, for the poor Peruvian people, for the ecosystem, and for the world.

Peru's most relevant enviromental problems

Most of the important environmental problems that are occurring now within Peru's ecosystem reveal that despite the laws and regulations in place, the investors and their transnational companies are being extremely negligent with the environment, the population, and Peru. Some of the outstanding every day observed problems are:

Massive over extraction of the anchovy's fish school around the coastline, which has decimated the fish, whereas in 1965 Peru was the 2nd largest world exporter of fish. The nation finds itself in a vulnerable status today. In La República of 31 May 2006, the article "Lenor niega 30% de pesca negra," the Minister of Production, David Lenor, emphatically denied that 30% of the fishing in the Peruvian Coast was illegal, but other denunciations said that enormous quantities of fish were being extracted form the sea and were taken out through the ports, even though the Minister had specified that he had 600 fishing inspectors and satellite control.

In La República's articles "Anchoveta: una solución para el hambre y la desnutrición crónica," and in "La 'pesca negra,' una evasión millonaria," Juan Rebaza Carpio explains that Peru is privileged ecologically and geographically on its Pacific coast and produces important fish varieties. One of them, the anchovy, has been used to produce fish meal or "harina de pescado" for more

than 50 years. This product is destined for the poultry, cattle, and pork industries, for animal consumption, but has high percentages of protein, and Omega fatty acids, minerals, potassium, iron, and phosphorous, that could be better used to nourish Peruvians if there were more education and information.

> El mar peruano cuenta con una enorme biomasa de anchoveta, que es fuente de ingentes cantidades de proteínas y otros nutrientes pero no son utilizados por prejuicios del consumidor. Para mejorar la alimentación y contribuir a la buena salud de la población es tiempo de derrotar la ignorancia y los prejuicios. [9]

Also Rebaza Carpio explains that the lack of fish conservation systems benefits the big fishing industries because they take advantage by tinkering with the fish price or lowering its weight. Both situations serve only to the advantage of those companies, they do not pay taxes to the state and do not make fish available to the people; they would rather burn the fish and convert it into fish meal.

The mining of gold, silver, iron, copper, and other metals takes a serious toll on the environment and on human life, but generates great dividends and profit for the mining companies. For over 25 years, foreign investors in the copper mines in the southern part of Peru have contaminated the land, the air, and the ocean with mining activities and negligent, inappropriate dumping and disposal of remaining chemical liquids and solid wastes or "relabes." In the agricultural areas close to these mines, in Moquegua, Tacna, and Arequipa the

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[9] [Peru's sea has an enormous anchovy biomass, which is a source of extraordinary quantities of proteins and other nutrients; but it is not used because of consumer prejudice. To better the nourishment and contribute to the good health of the population, it is time to put and end to ignorance and prejudice (my translation)].

damage is done. We do not know who is going to pay for the ecological degradation of the environment. If the government actively promotes the increase of foreign investment, and the investors seek to take advantage of Peru's resources as well as paying lower wages and taxes, it is uncertain who is going to clean the water they use and overuse in their processes. For example, for nearly 12 years, the Yanacocha Mining Company, in the Department of Cajamarca, has been polluting the land, the air, and, particularly, the water, through its overuse of fresh waters available in lakes, springs, and rivers; leaving people without drinking water.

In La República's 26 Aug. 2006, article "Yanacocha paraliza operaciones en Combemayo por los conflictos," Alonso Ramos informs that the Yanacocha Mine administrators can no longer guarantee the safety of their workers and the population and decided to stop indefinitely operations on the expansion project of Carachugo. The Yanacocha mine is located in Cajamarca and is one of the biggest gold mines in Latin America. Yanacocha's stokeholders and owners are USA Newmont and in Peru Buenaventura Company. These transnational companies hired Peruvians to avoid the consequences of their decisions, to earn as much profit as they could, and to pay the least to the state and to the workers. The problem began a year ago when the company began an expansion and promised to invest in development projects, give work to the community members, and offer solutions to the scarcity and contamination of the water. The conflict began because the decontamination of the water was never done, and the workers of Combemayo, who worked in the project, were not going to be

employed by the Yanacocha Mines. In the same article, Welmer Cabrera a Peruvian congressman said: "Hay un vacío del Estado. Necesitamos soluciones integradas al tema minero. Yanacocha no respeta a las comunidades. Están contaminando sus aguas y nadie dice nada" ["There is a vaccum in the State. We need integrated mining solutions. Yanacocha does not respect the communities, and they are polluting the water and nobody says anything" (my translation)].

On 7 June 2006, the La República's article "Marcha contra la contaminación de plomo" denounced the constant damage and the contamination due to the shipping of lead concentrate from the Cormin and the Centromin mines that affect the population of Puerto Nuevo in Callao:

> Los manifestantes demandaron que la Corte Superior del Callao aceptara la denuncia de 300 vecinos presentada el 11 de agosto del 2005. La demanda se estuvo acompañada de pruebas médicas y de laboratorio acreditando los efectos de contaminación. [10]

On May 9 2006, El Comercio's article "Continúan estudios de nivel de plomo en la sangre de población en Pasco" informs that the Ministry of Health continues to do studies to determine the levels of lead in the blood of the population and environmental contamination in Pasco. Specifically, the article talks, about children ages 5 to 12 years old.

The Doe Run Mining Corporation had acquired the metallurgical complex La Oroya from Centromin, which was taken from the Northern Peru Corporation.

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[10] [Protesters demanded Callao's Superior Court to accept the demand presented by 300 inhabitants on August 11, 2005. Their demand was presented along with medical and lab tests proving the effects of contamination (my translation)].

In La República's article "Doe Run dice ahora que analizará la prórroga: lujos de una empresa consentida" ["Doe Run Now Says That It Will Now Analyze the Extensions: Luxuries of a Consented Enterprise"(my translation)], it is explained that Doe Run has since 1997 promised to install three plants to treat the gases of the mines, but has not done it. This situation is allowing sulfuric acid to contribute to the high levels of contamination in La Oroya. Moreover, in another La República 31 May 2006 article, "Escepticismo en el Congreso," it is noted that there were doubts in Congress that Doe Run would comply with its request of an extension to comply with the requirements for the treatment of toxic gases (already extended), produced by their sulfuric acid plants. In that same article, Walter Alejos, congressman and president of the ecological commission declared: "Nada garantiza que la empresa minera Doe Run cumpla con la prórroga solicitada al Ministerio de Energía y Minas" ["Nothing guarantees that the mining company Doe Run will comply with the extension solicited from the Ministry of Energy and Mines" (my translation)].

In La República's 20 August 2006, article "Que los óbolos se queden en la iglesia," Humberto Campodónico expresses his doubts about the contributions that the mining corporations are giving to the state for the exploitation of resources and their profits. This time the government did not negotiate the taxes; the corporations had decided how much to give. Six regions, Cajamarca, Ancash, Moquegua, Tacna, Puno, and Arequipa, are due to receive the "canon minero" taxes, and not donations. These companies will still be growing and so will their earnings but what they offer is unjust considering their profits and the

damage they do to the environment, which they do not repair. For that matter Campodónico suggests:

> Dejar de lado el óbolo y establecer un ingreso tributario extraordinario negociado en la mesa con las empresas . . . el óbolo está bien en la iglesia y las obras de caridad, pero no puede ser una política gubernamental. Un atributo claro de un estado digno es que cobre los tributos que le corresponden, sin concesiones a ningún poder económico. [11]

Another critical environmental situation is the destruction of the Amazon Rain Forest, which leads to the extinction of known species and the destruction of unheard number of species that as yet need to be studied. In El Comercio's 14 July 2006 article "Se depredaron más de ocho millones de hectáreas en los bosques del Perú: Hay un enorme daño ambiental y económico" Carlos Necochea Florez explains that according to the estimates of the National Institute of Natural Resources (INRENA) in the year 2000, 8 million hectares of forest had disappeared. The felling and the burning done for an irrational wood exportation operation and a change in the use of the land in the last 30 years has produced a dangerous reduction of the wooded areas. This is generating severe consequences in the environment and contributing to the global warming. Necochea Florez notes that:

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[11] [Leave the donations aside and establish a tax negotiated together with the mining companies . . . the donations are good for the church and for charity, but cannot be a governmental policy. A clear attribute of a state with dignity is that this state could charge taxes to which it is entitled, without concessions to any economic power (my translation)].

> *Lanzan plan de reforestación con plantaciones comerciales . . .* Perú es considerado uno de los países con mayor potencial de bosques en el mundo, pues el noveno en la escala global y el segundo en Sud América después del Brasil . . . pese a algunos esfuerzos que han frenado el ritmo de la depredación forestal en los últimos años continuó la informalidad y la tala ilegal. [12]

El Comercio of 21 August 2006 brings discouraging environmental news: "Denuncian desaparición de peces en tres ríos de la selva central." It informs that authorities do not act because they do not know anything about the problem. Until 1993, in the valley of Chanchamayo in the Tulumayo y Perené rivers there was a diverse variety of fish that came up the Ipoke and Pichanaki rivers, but today it is impossible to find a fish in those rivers. The villagers of this area speak of a contamination that may be related to the lead waste that comes from the mines of San Vicente, in the district of Vitoc in the province of Jauja. For about 8 years, such waste has been running through the Tulumayo, Chanchamayo, and Perene rivers. The waste, according to the villagers, arrived in the rivers mentioned above through a branch of the Aynamayo River, which is close to the installations of the San Vicente mining company. The San Vicente mine is owned by the San Ignacio de Morococha S.A. Company, that also owns the Volcan of Yauli and San Ignacio de Morococha mines. These mines produce zinc and lead

[12] [A reforestation plan with commercial plants is launched . . .Peru is considered one of the countries with the greatest wood potential in the world, it is 9th globally and the 2nd in South America after Brazil . . . despite some efforts to slow down the rhythm of the forest's ravaging depredation in the last few years, informality and illegal felling has continued (my translation)].

that sometimes use strong acids, called "deprimentes," to separate the zinc from the lead.

> Los deprimentes son ácidos muy fuertes y altamente contaminantes, por lo que es peligrosa su presencia en las aguas que se usan para el consumo humano . . . Los niños de Vitoc según el personal médico de la posta de salud de la zona, sufren de problemas de la piel, como dermatosis, además de complicaciones gatrointestinales. ("Denuncian")[13]

The Intraoceánica Highway, whose construction is about to conclude, penetrates the Amazon Rain Forest to connect and support trade and commerce between Brazil, Peru, and Bolivia. But who is educating the users about the importance of one of the important lungs (the green forest) of the whole world? It is quite difficult to ensure ways of controlling and educating in order to avoid the destruction of the soil, pollution, irrational cutting of trees, and the destruction of the Rain Forest forever. But it must be done. The educational sector should start a process of raising conciousness.

The construction of the Camisea gas pipeline in the Cuzco area exhibits lack of ecological design, lack of responsibility, as well as precarious preparation for such a project. It seems that money and political payoffs were primarily at stake. No one cared about the communities, the rivers, the water, the soil, and the air contamination. The communities have also seen an outbreak of syphilis in

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[13] [The by products are very strong and highly contaminating acids, and for these reasons, their presence in the waters consumed by humans is very dangerous . . . Vitoc's children, according to medical personnel, suffer dermatitis in addition to gastrointestinal complications (my translation)].

the Machiguenga and other native groups. Despite the enormous costs to Peru's environment and human life, Peruvian gas is cheaper in Chile than in Peru.

The purchase and use of dangerous goods and the misuse of technological data, specifically in the mining and paper industries (chemicals, compounds, and gases), is a very serious environmental problem. Any company that purchases dangerous goods is obliged to respond for the consequences that may occur in the use of such products. In the United States, and now throughout the world, it is a known requirement that a safety data sheet should accompany reactives, colorants, acids etc. not only for managers plants to read, but for the protection of the humans involved in the use of, or work with, those ingredients. Engineers, managers, and plant of production chiefs are liable for the use of these materials. Moreover, careless use is considered negligent, unprofessional, and criminal because of the devastating consequences to children, unborn children, and pregnant women, not to mention the health of the workers.

Water

Water, the indispensable element that sustains life, is in a state of emergency in Peru because it is overused and poisoned. Negligent enterprises, extracting companies, and public and private organizations pollute springs, rivers, lakes, and oceans. The poor population constantly pleads for water and complains, but water is extremely scarce for the poor. On August 8, 2006, La República in "El reclamo de los 'sin agua'," Derry Díaz informs that hundreds of people marched to reclaim water, the basic and vital element, for the seven million Peruvians who live in dry places and meadows that do not have water.

They demanded that the government comply with its promise of "water for everybody." The poor, thirsty people of Lima had come from every corner to ask for the promise to be fulfilled. Ten villages or pueblos had come to ask for water to the Ministry of Housing and Construction. In the same article Abel Cruz Gutiérrez explains:

> En todo el Perú somos 7 millones y en Lima más de dos millones los que no tenemos agua ni desagüe en los diversos asentamientos. Vivimos en condiciones infrahumanas, pues consumimos agua contaminada y 10 veces más cara que aquellos que cuentan con el servicio de SEDAPAL [Servicio de agua potable y alcantarillado de Lima]. Mientras ellos pagan por un metro cúbico S/. 1.40, los "sin agua" pagamos S/. 10.00. Pero no sólo es cara, es insalubre tal como lo ha comprobado el Ministerio de Salud y también la Defensoría del Pueblo. [14]

The government has tried to find a solution to the scarcity of water, but has not solved the problem. According to a La República 17 August 2006 editorial "El debate del agua":

> En reiteradas ocasiones, a lo largo del gobierno Toledista, esta columna editorial trató el tema de las indispensables obras públicas que en materia de agua potable y saneamineto necesita esta

[14] [In Peru, there are 7 million and in Lima more than 2 million people who do not have water in the diverse new sites. We live in subhuman conditions, because we consume contaminated water and it is 10 times more expensive than that of the people who have the SEDAPAL service. While they pay S/. 1.40, per cubic meter, we the ones "without water" pay S/. 10.00. But, not only is it expensive; it is also unhealthy, as the Ministry of Health and the People's Defense Office has verified (my translation)].

> capital, respecto de las cuales fue muy poco lo que se hizo, principalmente debido a, PPK, [Pedro P. Kusingki] y el grupo de asesores neoliberales del MEF [Ministerio de Economía y Finanzas] apostaron siempre a una privatización de SEDAPAL, hecho que quedó demostrado, cuando dejaron vencer el plazo de crédito nipón otorgado para Marca 2, pese al clamor público. [15]

Water contamination is another problem examined by the CONAM. On July 22, 2006 El Comercio published "Doce ríos tienen altos índices de contaminación" after analyzing 12 rivers (Rimac, Chira, Huallaga, Chili, Mantaro, Utcubamaba, Requey, etc. and two bays), E. coli bacteria from fecal matter were found in 12 of the rivers and lead contamination in five cuencas–river basins, besides contamination, the waste of water is absurd:

> El Perú desperdicia el 42% del agua potable y Lima pierde aproximadamente el 40% del total. El 25% de los peruanos no tiene acceso al agua potable y el 43% no tiene acceso a servicios de saneamiento. Solo el 23.4% del agua residual se trata adecuadamente.[16]

Negligent sewage dumping in the ocean is contaminating the marine fauna, flora, and beaches in Lima, Callao, Arequipa, and Chimbote. The

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[15] [On numerous occasions, throughout the Toledo government, this editorial column dealt with the public works that are indispensable for the capital [Lima] to obtain drinking water for which very little has been done, mainly because of PPK [Pedro Pablo Kusingki] and the neo-liberal group of the MEF [Ministry of Economy and Finances] that gambled on the privatization of SEDAPAL. This fact was demonstrated when they allowed the Japanese credit for MARCA 2 to lapse despite the popular uproar (my translation)].

[16] [In Peru, 42% of the drinking water is wasted, Lima loses approximately 40% of its water. 25% of Peruvians do not have access to drinking water and 43% do not have access to sanitary facilities. Only 23.4% of the residual waters are treated correctly (my translation)].

coastline and beaches are dangerously polluted and contaminated. The contaminated air and atmosphere affect most of the important cities. Heavy traffic, green house gases, and careless dumping of industrial waste create air pollution. Accumulated years of biological and dangerous waste have deficient and negligent disposals. Immense dumping sites of organic, non-organic, and dangerous waste products attract dogs, poor people, and child trash pickers. The disposable culture and a society of instant rewards and pleasures are generating tons of waste. The waste has to be dumped somewhere. We need to think that all which was initially manufactured as packaging, disposable ware, plastic bags, boxes and containers was fabricated from resources: trees, cloth, electricity, colorants, inks, and so much more. Those goods are designed to be used for minutes and then tossed away. Tons of organic and inorganic wastes end up in growing landfills. Those landfills are polluted, but could be used for agriculture. We need to think about the manufacturing of what is destined to become waste and the consequences, of discarding it. Time, resources, health consequences and scarcity of food are related to the production of waste. In the end, waste amounts to resources and food. El Comercio of July 22, 2006 article, "Doce ríos tienen altos indices de contaminación" informs that solid residues and the situation at the municipal dumpsters are adecuately disposed 65% of the time, and 17% of the time the disposal is inadecuate. Nonetheless, it is important to remember that plastic containers and bags are still a serious problem for the Peruvian environment.

Titicaca Lake holds an important fresh water reservoir, but the mining companies do not understand that the water of this lake is vital for life. Ananea's, Rinconada's, and Aruntani's small mining centers do not care about the lake. These companies work for profit, and are careless. Pollution and contamination are affecting Lake Titicaca's water and its vicinities. In La República of September 21, 2006, the following article "Alistan para salvar el Titicaca" notes that:

> Las comunidades de Azángaro y Carabaya en Puno, demandaron declarar en emergencia todas las cuencas y microcuencas del Lago Titicaca por los graves problemas ambientales. Piden que se declare la zona en "calamidad pública" debido a la contaminación producida por los centros mineros artesanales de los pueblos Ananea, Rinconada y Aruntani . . . El lema que usan es "Salvemos el Titicaca."[17]

Despite the noted situations, Peru is trying to enter the global economy and promote sustainable development, but is indifferent to the evils of dumping hazardous material into the land, the water, and the atmosphere. The cities are growing and relying extensively on oil-dependent land, air, and water transportation, which deplete resources and pollute our land, water and atmosphere. A 2002-2004 national study, following the Program of the United Nations for Development methodology, has found that the concentration of

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[17] [The Azángaro and Carabaya comunities in Puno demanded Lake Titicaca's sylvans and semi-sylvans to be declared in a state of emergency due to serious contamination problems. They ask that this zone be declared a "public calamity" because of the contamination caused by the mining around Ananea, Rinconada, and Aruntani. . . they have a slogan: "Let's save Lake Titicaca" (my translation)].

contaminants in the air has risen by 30% with respect to 2001. According to this report, Lima and La Oroya have the highest sulfur and lead contamination. The other cities that follow are: Ilo, Huancayo, Chimbote, Cuzco, Arequipa, Trujillo and Cerro de Pasco. Knowing that the air is contaminated is troubling.

La República of 1 June 2006 in the article "Pulmón de Lima está en peligro," Derry Díaz informs that the swamps of Villa in Lima could disappear because of waste. It seems that this situation was provoked by illegal fishermen and the presence of a slaughter - house which endangered this ecological reserve and natural refuge. Díaz explains:

> Pero un agente que todos los días atenta contra el ecosistema es un camal de propiedad del congresista Marcial Ayaipoma, según César Marquina, funcionario de Prohvilla, quien explicó que en el lugar donde se sacrifican a decenas de reses se vierten sus desechos en los canales que alimentan las lagunas de los pantanos.[18]

Some solutions

It is a blessing that Peruvian reporters, media writers, and academics have begun to denounce the mining companies, the scarcity of water, lead contamination, non-breathable air, and the levels of lead in the population. This opening of public opinion has brought to light unknown facts not accessible before. For instance, regarding the high levels of lead in the systems of the

[18] [But an agent that every day works against the ecosystem is a slaughterhouse owned by congressman Marcial Ayaipoma, according to César Marquipa, a Prohvilla official, who explained that in this place dozens of cows are slaughtered, and the remains are dumped in the canals that nourish the ponds of the swamps (my translation)].

population in Pasco, what one sees is that all these problems are generated because some authority gives permission to produce, exploit or work, without agreeing to be friendly to the environment, to clean up, to protect human, animal, plants, and aquatic life.

In an interview with Peruvian writer Jaime Baily entitled "La política se ha petrificado" [The Political System has turned to Stone] Jaime Bayly is quoted as saying that: "Cada vez hay un desafecto mayor por la política que es considerada despreciable" ["More and more there is greater disaffection for politics which is considered despicable" (my translation)].

The environment in Peru is in a state of emergency because there is overuse, misuse, and massive extraction of resources, and disregard for the long-term consequences of these actions, behaviors, and attitudes. Furthermore, this dissertation's central concern revolves around the effectiveness of Peru's public educational system in implementing environmental awareness in order to better the living standards of Peruvians. Their health and well being are at stake because of lack of education and deficient environmental education. It seems that information about the state of resources and of environmental education appears in two ways: the first amounts to an abundant creation of laws and decrees, programs, plans, and methodological guides to regulate education, taxes, production and sustainable development; and the second informs on constant degradation of the ecosystem, corruption, non transparency, non compliance of laws, tax evasion, injustice, sickness, poverty, and misery. Only by reorienting our environmental awareness to support

environmental ethics and sustainability will the Peruvian nation begin to tackle poverty and all its disconnection in the ecosystem. To change the approach in education, the Ministries of Education, Environment, and Economy and Peruvian teachers need to make the ethical choice to work together and add effective, clear, and strong new dimensions to the curriculum. This is not a threat to economic sustainable development. In reality, it will only aid the concept, making way for millions of Peruvians to call Peru their country and benefit because of better standards of living, better air, soil, water, and energy. It is a challenge for all Peruvians, in all jobs, to really apply environmental ethics to protect and sustain the environment, and to use their creativity and capacity to become environmental advocates. In whatever environmental direction we look in Peru, we find a lack of education, the sickening weight of large corporate profits on one side and poverty on the other. It is a great challenge for the government to be vigilant and defend the natural, cultural, and human resources of the nation. It is a challenge for every educational institution and for professionals to be able to use their knowledge to design new products, which will not damage human life and environment. It takes ethical principles, environmental ethics and sustainability, education, and creativity to bring about a better balance between nature and the population of Peru.

Chapter Two

Peru's Educational and Environmental Laws Versus Reality

In Peru's public educational system, environmental awareness instruction and curriculum are under the aegis of the Ministry of Education. The stated goal is to attain compliance with all educational laws and documents. The origins of this concept began in 1970 due to the last Education Reform. One of whose educational objectives was to live in harmony with nature. Presently, environmental awareness, as stated in thestatutes and books, is about caring and preserving the environment and its elements, but daily the news media report the overuse, the abuse, and the misuse as well as scarcity of those elements. So, it is questionable whether the Ministry's educational mandate is accomplishing what the law describes as environmental awareness instruction. Indifference or negligence to complying with environmental awareness instruction effectively is more than just not doing a good job; the consequences of not teaching about the environment properly generate pollution and poverty.

Without doubt, the instruction given to thousands of Peruvians has not been and is not good enough to protect the ecosystem. Overexploitation and pollution of resources ensure the collateral circumstances of spoiling the environment and other types of social maladies such as corruption,

unemployment, underemployment, injustice, child labor, and growing levels of hunger and misery. Moreover, just the concept of environmental awareness is not enough; it needs to be reconfigurted as Environmental Ethical Awareness and Sustainability and seen from a personal perspective. Teachers need to be instructed not only on how to teach reading and mathematics. They require much more than a book. They need to be taught how to think critically about environmental issues, and perhaps need to attend hands-on workshops about the significance of every human action and the consequences of those actions to the environment. They need to understand why such a beautiful country with so many resources has over half of its population living in poverty. Teachers need to become the best environmental advocates to really change behaviors and teach actions to heal, clean, care, and preserve the environment for future generations.

Peru's Ministry of Education was created as a central organism to be in charge of all the processes of education, and as such bears the entire responsibility of all teaching processes, teachers' education and preparation, hiring, supervising and evaluation of educational processeses's results. Ultimately, this ministry is responsible for the teaching of enviormental awareness in Peru. By constitutional mandate, it organizes, regulates, directs, finances, supervises, and evaluates the pedagogical activity at all levels and modalities throughout the entire country. This Ministry, created in 1832, is a complex system with structured areas, departments, and specialists for each level and modality. After Alan García Pérez won the last elections in July 2006, José Antonio Chang Escobedo succeeded Javier Sota Nadal as Minister of

Education. As recently as September 15, 2006, Chang Escobedo began implementing most of the projects and programs initiated before July 2006 by Sota Nadal such as: Hacia un Proyecto-Educativo Nacional, which had been proposed as the Hacia un Proyecto Educativo Nacional: Propuesta del Consejo Nacional de Educación, on August 2005. This document exhorted the people of Peru to mobilize resources, good will, and ideas. In turn, it summed up the recommendations of the Foro del Acuerdo Nacional (Law No 28044) proposed at the International Conference on Education for All, and which proposed the participation of all the social, educational and economic sectors and organizations. The Plan Nacional Educación para todos 2005-2015, -Perú: Hacia una educación de calidad con equidad, signed by president Alejandro Toledo on September 2005, is a collective effort to plan the future of education based on the diagnosis related to the six main objectives of education for all, and prepared under the government's directions in relation to civil society. In the words of Sota Nadal,

> brindar a todas las personas oportunidades educativas de aprender con calidad es la propuesta permanente del MED [Ministerio de Educación] y, por ello, el Plan Nacional de Educación para todos 2005-2015 - Perú constituye un referente y pieza central de nuestro accionar. (9)[19]

Since August 2006 to present, there has been plenty of information coming from the MED (Ministry of Education) about activities, plans, contests,

[19] [to offer to all educational opportunities to learn with quality is the MED's [Ministry of Education] permanent proposal, and for that, The National Educational Plan for All 2005-2015 - Peru constitutes a central and referential part of our actions (my translation)].

crusades, and conferences. Some of them are: the Math Olympics, Education for Work, Municipalization of Education, Reading National Plan, and the National Crusade Against Illiteracy. These activities are important steps to improve the low quality of teaching in public education. Beyond these actions, perhaps the main long-standing educational problem is related to the scandalous figures that 69 to 74% of teachers are not meeting their professional pedagogical preparation according to the document Indicadores: de la Educacion-Peru 2004. The fact that some 210 Institutes of Higher Education have been closed because of their lack of accreditation to prepare teachers represents an extremely serious situation that involves budget, ethics, and employment issues. The low quality of teaching and the hiring of unqualified teachers are the most representative issues of the pedagogical crisis and are some of the problems described in the 2004 document: Indicadores de la Educación-Perú 2004 (127). These two main problems have not been properly addressed yet, which shows a profound failure to address pedagogy, which is at the heart of the learning processes.

Teaching environmental awareness has been carried on by other institutions that are motivated and care about resources, pollution, and contamination. Also, a great number of environmentalists and NGOs have published guides and recommendations on the environment. The Consejo Nacional del Medio Ambiente (CONAM) has been working diligently in the environmental and educational arenas. Many other international and national advocates consider "environmental awareness" necessary, but most of them link their guides to sustainable development. Among the good news, La República

and the Ministry of Education Transparency Portal on July 31, 2006 in the article: "Maestros y alumnos aprenderán a cuidar el medio ambiente" informed that the Ministry of Education had presented the book Perú: país maravilloso guía de educación ambiental, written by Antonio Bragg Egg, who a few days later was appointed President of the CONAM, but unfortunately by September 23, 2006 he was no longer in that post, and by January 31, 2007 the book was not available. The book intends, to promote an education, which supports sustainable development, as the article states:

> promover una educación para el desarrollo sustentable y sostenible . . . [el libro] está dividido en once unidades: ecosistema, agua, aire, suelo, energía, biodiversidad, eco negocios, salud ambiental, gestión ambiental, residuos sólidos y desarrollo sostenible. [20]

This is by far, one of the most promising steps in teaching environmental awareness in Peru, but still it is not good enough because it deals mainly with the economic sustainable development of business and corporations, as the press article describes. This work touches on some of the issues presented on April 18, 2006 in the proposal of this dissertation, but does not touch the core of it. As of December 2006, in Lima, or in Arequipa and in Moquegua and in Tacna, the promised free book was not yet available as our seach to find it proved futile through bookstores, La República, the Ministry of Education itself, or the CONAM. Then, it was presented, but has not yet been distributed, nor available

[20] [to promote education for sustainable and sustained development . . . [the book] is divided into 11 units: ecosystem, water, air, soil, energy, biodiversity, eco business, environmental heath, environmental management, solid waste, and sustainable development" (my translation)].

at the same Basic Education Direction of the Ministry of Education, which was contacted to get the information.

The Ministry of Education generates the laws, educational methodological guides, curricular designs, and has a complex administrative and strategic planning. Besides all of these important functions, this ministry has a group of functionaries that work as bridges between the Ministry of Education and schools, teachers, and daily teaching; they are the principals. The Ministry of Education should count on principals' decisive contribution and conscious work to lead and supervise teachers. Principals manage schools and should secure the ethical compliance of educational and instruction performance, not only of teachers but of students, looking after the minimum essentials of punctuality, preparation, teaching, evaluation, and role modeling in class, school, and the community. The teaching and learning processes are clearly detailed not only in the Nueva Ley General de Educación No 28044 but also in the Diseño Curricular Nacional de Educatión Básica Regular: Proceso de Articulación of November, 2005. Both regulations count on the teacher's input, but as mentioned earlier, the quality of teaching is still a problem. It is very important to remember that education does not deal with parts, machines, or mechanical processes. Education deals with human beings in developmental processes, who have rights and hopes. If one generation is ill educated three or more generations will carry that misfortune, so educational damage goes beyond an individual's and a generation's lifetime. The Ministry of Education's personnel is busy in issuing documents, decrees, projects, activities, and crusades, but is not really attacking

the two main unsolved educational problems: to invest time, efforts, and monies on effective teaching done by qualified teachers and to retrain teachers who are not qualified to teach. To blame teachers for all the sins of bad teaching is totally unfair and irresponsible. The responsibility to choose candidates to become teachers. and then, prepare them for this important profession "was, is, and should be" in the hands of the Ministry of Education, because education in all its forms is the main function of this Ministry.

The Council of Education, Congress, Ministry officials, specialists, and functionaries need to attack and solve the problem of the quality of education by starting to supervise principals and teachers. Enacting more laws and providing documents is a step, but the Ministry instead needs to fill the huge gap between theory and practice, that is why it is absolutely necessary to train teachers and educate them again, and again, if needed.

Education in Peru is regulated by a set of laws and documents that depend on a central law, the Nueva Ley General de Educación, No 28044. Around this law other regulations and proposals have been promulgated, such as the November 2005 Diseño Curricular Nacional de Educación Básica Regular: Proceso de Articulación. Besides these two main documents, there are others that complement the progress and planning of Education for the next ten to fifteen years. In the 2005 documents Propuesta del Consejo Nacional de Educación: Hacia un Proyecto de Educación Nacional, the Plan Nacional de Educación para todos 2005-2015, and Perú: Hacia una educación de calidad con equidad, one finds regulations on Peru's education in general and on

environmental awareness education in particular. Law No. 28044 outlines the Peruvian State's attributions and obligations, the individual and society's rights and their responsibilities of the educational process. In its conception and design, this law is a very inclusive instrument. Article 2 explains the scope of the concept of education:

> La educación es un proceso de aprendizaje y enseñanza que se desarrolla a lo largo de toda la vida y contribuye a la formación integral de las personas, al pleno desarrollo de sus potencialidades, a la creación de la cultura, y al desarrollo de la familia y de la comunidad nacional, latinoamericana y mundial. Se desarrolla en entidades educativas y en diferentes ámbitos de la sociedad. (163) [21]

This law clarifies that education is a public service given by the state. It is free in all forms, levels, and modalities; basic education in the initial and primary levels is universal, compulsory, and supported by programs in nutrition, health, and free educational materials. The state, according to the law, guarantees quality and integral education for individuals and society. In this process, society also has the responsibility of contributing to education and has the right to participate in its development. The law recognizes the parents' freedom to choose education according to articles 3, 4, and 5 (163).

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[21] [Education is a learning and teaching process that develops throughout one's life, and contributes to people's entire formation and to the full development of their potential, to the creation of culture, and to the development of the family and the community at the national, Latin American and world levels. It develops in educational entities and in different societal spaces (my translation)].

The principles and goals of education contain strong points related to environment, work and poverty, harmony with the environment, preparation for work, and overcoming poverty. They clearly address sustainable development and environmental awareness, which are detailed and developed in other documents. Article 8 explains that Peru's education nourishes its process through the guiding principles of ethics, equity, quality, multicultural inclusion, democracy, environmental awareness, creativity, and innovation (164). Article 9 points out that educational ends are geared to individuals in their relationship with society.

As individuals, Peruvians are entitled by the law of education, to receive an education to fulfill their ethical, intellectual, artistic, cultural, affective, physical, spiritual, and religious realization, as well as to promote their identity, self-esteem, adequate and critical integration with society, to exercise their citizenship in harmony with the environment, to develop capacities and skills to unite their life with work, and to be able to face the continious changes in society and knowledge. Education should contribute to develop a democratic, solidary, just, inclusive, prosperous, tolerant individual and create a culture of peace to reaffirm the national identity sustained in the cultural, ethnical, and linguistic diversity in order to overcome poverty and prompt the country's sustainable development and foment Latin American integration having in mind the challenges of the globalized world (165).

Educational Peruvian Law and the environment

In relation to Ethics and Environmental Awareness, the General Law of Education No. 28044 offers the basis for understanding this competence in education. In relation to ethics, the article 8 establishes that:

> La ética que inspira una educación promotora de los valores de paz, solidaridad, justicia, libertad, honestidad, tolerancia, responsabilidad, trabajo, verdad y pleno respeto a las normas de convivencia; que fortalece la conciencia moral individual y hace posible una sociedad basada en el ejercicio permanente de la responsabilidad cuidadana . . . La formacion ética y cívica es obligatoria en todo proceso educativo; prepara a los estudiantes para cumplir sus obligaciones personales, familiares y patrióticas y para ejercer sus deberes y derechos ciudadanos. (164) [22]

The Law also defines Environmental Awareness Education as:

> La conciencia ambiental, [es aquella competencia educativa] que motiva el respeto, cuidado y conservación del entorno natural como garantía para el desenvolvimiento de la vida. (165) [23]

In spite of the robust and abundant legislation and the Ministry of Education's scope, presence, influence and budget, the 2004-2006 Minister of Education, Javier Sota Nadal, commented on the distressing results of the bad quality of

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[22] [Ethics inspires an education which promotes peace, solidarity, justice, liberty, honesty, tolerance, responsibility, work, truth and total respect for norms that allow us to live together: that strengthens individual moral consciousness and makes possible a society based on the permanent exercise of civic duty . . . Ethical and civic formation is compulsory in all educational processes. It prepares students to comply with all their personal, family, and patriotic duties and to exercise their civic duties and rights (my translation)].

[23] [Environmental Awareness [is the educational competence] that motivates respect, care, and conservation of the natural environment as a guarantee for the development of life (my translation)].

education found on a representative percentage of students leaving high school, this students could hardly understand what they read and were unable to do simple mathematics. It is no wonder that a good percentage of young Peruvians who are ill prepared for work, are hopeless and wrestle to find a good job and attain acceptable standards of living. Unemployment, underemployment, child labor, and young professionals' exodus to other countries make clear that for many years schools have been failling to prepare Peruvians for work and employment. Growing poverty levels, scarcity of clean water and air, contamination and corruption in Peru point to a simple fact, that for many years the bad quality of the environmental awareness education has been feeding poverty and environmental neglect.

The spirit of the actual law and all educational documents resonate in the UN's 1948 Universal Declaration of Rights and Peru's 1970 Educational Reform. The Universal Declaration of Rights recognizes the right to work, the right to live well, and the right to an education. Specifically and clearly, article 23 addresses the right to work, to choose employment freely, to just and favorable conditions of work and to protection against unemployment, and all people, without discrimination, have the right to equal pay for equal work. Article 25 delineates the right to an adecuate standard of living for the health and well-being of every person and family, including food, clothing, housing, and medical care, etc.; and article 2, declares that the right to an education is for everyone, and emphasizes that, at least in the elementary and basic stages, education should be compulsory and free.

Peru's current educational law have ingrained into their roots some of the principles of the 1969-1970 Reforma de la Educación, that already touches on the same aspects: work, poverty, and betterment of education. The 1969 Reforma de la Educación Peruana: Informe General offers a diagnosis of education up to 1969, which is approximately 37 years ago. The diagnosis acknowledged an enormous breach between the education provided and the needs of society, recognizing the urgency of a total reform of education. That reform involved educational foundations, curriculum, methodology, and professional preparation of teachers. The 1969-1970 educational reform was geared to meet three final goals: education for work and development, for social structural transformation, and for self-affirmation and independence for the Peruvian nation. Conspicuously, this "report" gives importance to education as an instrument against poverty, by emphasizing "employment or work" as relevant, and as a right desirable to every Peruvian:

> [La educación,] reivindica el deber y el derecho de trabajar por el progreso y el ascenso de toda comunidad, la nueva educación se convierte en arma indispensable de la lucha contra la pobreza y el atraso contra el inmovilismo económico. (47) [24]

The 1969 -1970 educational reform considers that "rational dignified human work" is a conscious operation done in a cooperative and creative manner over nature and society and is at the root of every human endeavor (46). The reform challenged, among other aspects, the disconnection with reality, absence of

[24] [(Education) replevies the duty and right to work for the progress and rise of the entire community, the new education becomes an indispensable tool to fight against poverty and backwardness, against economic immobility (My translation)].

Peruvian sentiment, repetition, and inadequate formation and selection of teachers. Those concepts and situations are still present in all actual educational legislation and the problems of unemployment, poverty and misery, and a precarious quality of education persist in today's social arena. Many generations to this day, despite educational laws and the profusion of regulations, have been forgotten by the educational system. Millions of poorly educated Peruvians are a liability for the environment. They do not understand, relate, care, or protect the environment; and some of them somehow get elected end up in the politic, economic spheres and because they lack environmental awareness, easily misunderstand the toll that sustainable development and corporations exert on the ecosystem. Not only should younger generations be required to study environmental awareness, but also adults are in need of some other alternative way to understand this concept and change their behavior. All of them need to see that the time to protect the ecosystem, health, and life is running out fast and we all need to learn about environmental ethics and sustainability.

The Nueva Ley General de Educación Peruana No 28044 points to the formation and importance of human capital in order to build a competitive country and form professionals to be able to work in any place in the world. The law discusses the essential basis of universality, equity, and quality of education for everybody. Besides confirming that basic education is free and compulsory for all Peruvians, it includes clear definition principles to be undertaken: ethics, equity, inclusion, quality, democracy, multiculturalism, environmental consciousness, creativity, and innovation. These essential orientations are linked

to a practical objective referred to as education for work. Chapter V of law No 28044 explicitly states that a student is preparing to become part of the world's work force and to play a role in the economy of today's globalized world. In this way, education is closely linked to the country's economy. According to this same law, education should function: "as a base of support for the whole nation" (my translation) (28). Teaching and learning are the leading factors for the future worker's capacity to succeed in Peru's difficult and scarce labor market. The school should prepare students to: "saber aprender, saber convivir, saber ser, saber hacer y emprender" (119); [To know how to learn, to know how to live well with others, to know how to be, to know how to do, and to know how to undertake" (my translation)]. The final chapter of the law No 28044 expresses the need for the means to accomplish this objective that is closely related to Peru's position in the macroeconomic world and its ability to maintain a: "crecimiento económico sostenido y niveles de productividad crecientes" (122); ["sustained economic growth and growing levels of productivity" (my translation)].

While education has an advocate in General Law of Education No 28044, La Constitución Nacional del Perú of 2003 provides the foundation for all the laws of the land. The Constitution's articles 13 and 14 are relevant to this topic. Both clearly explain what is expected from the educational system and educated citizens. Although education and environmental consciousness are not mentioned, these ideas are embeded in them. These articles address the need to form future citizens for the workforce and remark that work offers the best opportunity for young people to become good citizens. Article 13 recognizes that

education is essential to the integral development of a human being: "La educación tiene como finalidad el desarrollo integral de la persona humana. El Estado reconoce y garantiza la libertad de la enseñanza" (154) [education has as its final objective the entire development of the human being. The state recognizes and guarantees educational freedom" (my translation)]. In article 14, La Constitución Nacional del Perú delineates the State's expectations of the *educational system:*

> La educación promueve el conocimiento, el aprendizaje y la práctica de las humanidades, la ciencia, la técnica, las artes, la educaciôm física y el deporte. Es deber del Estado promover el desarrollo científico y tecnológico del país. La formación ética y cívica y la enseñanza de la Constitución y los derechos humanos son obligatorios en todo proceso educativo civil o militar. La educación religiosa se imparte con respeto a la libertad de las conciencias. La enseñanza se imparte en todos sus niveles con sujeción a los principios constitucionales y a los fines de la correspondiente institución educativa. Los medios de comunicación social deben colaborar con el Estado en la educación y en la formación moral y cultural. (155) [25]

[25] [Education promotes knowledge, learning, and practice of the humanities, science technology, arts, physical education, and sports. It is the State's duty to encourage the scientific and technological development of the country. Ethical and civic formation and the teaching of the Constitution and human rights are compulsory in every civil and military educational process. Religious education is given respecting the freedom of conscience. Teaching is given at all levels obeying constitutional principles and the corresponding goals of the educational institution. The social means of communication should cooperate with the State in the education and the moral and cultural formation (my translation)].

Despite the written assertions of the law that education is a human right for all, Peruvian reality suggests otherwise. It suggests that Education as per the laws is far from fulfilling them in the areas of teaching, preparation for work, environmental awareness, and decreased poverty. As Luis Jaime Cisneros explains in "Mirando al horizonte" dated September 10, 2005 in La República: "más de dos millones de peruanos son analfabetos y medio millón no han concluído su escuela" ["more than two million Peruvians are illiterate, and half a million have not finished their schooling" (my translation)].

Regarding poverty, some sources point out that Peru is not yet winning over this massive problem. The Library of Congress of the United States, in its website essay "Peru-Poverty" explains that: "A comprehensive analysis of poverty in Latin America for 1970 concluded that fully 50 percent of Peruvian families were below the poverty line and 25 percent were below the destitution level." And the FAO-UNESCO 2003 report according to Eliana Ramírez Arce de Sánchez Moreno notes: "El 54% de la población peruana es pobre" (332) [54% of Peru's population is poor" (my translation)]. There are discrepancies and *controversies about the poverty's percentages and the growing number of poor people. On the site Perú Político: la pobreza en números, the National Institute* of Statistics and Informatic in Peru (INEI) explains that poverty, is a condition in which:

> un ciudadano no puede cubrir la canasta de bienes y servicios mínimos esenciales, . . . y pobreza extrema es la imposibilidad de conseguir nutrición adecuada de 2318 calorías de acuerdo a la

> Organización Mundial de la Salud (OMS) . . . Farid Matuk jefe de INEI indica que la pobreza extrema presenta una disminución de 2,7 puntos porcentuales 2001-2006. [26]

Concerning poverty and objectives for the millennium, Pedro Francke in the article "Objetivos del milenio: socavados por el TLC" in La República explains that around September 2005 many presidents including Toledo met at the United Nations, in New York, to discuss their commitment to reduce poverty, improve education and health, and the environment:

> Darán buenos discursos resaltando la lucha contra la pobreza. Pero si al mismo tiempo se refuerzan las reglas económicas internacionales completamente injustas, eso sólo será un gran ejercicio de hipocresía . . . que respalden sus palabras con realidades cambiando las reglas económicas internacionales para mejor no para peor. [27]

It is naïve to believe that offering technical education will lead Peruvians out of poverty, because even with a good education, the job market is very competitive to the point that thousands of young Peruvians choose to leave in search of work because of inflation, economic crisis, and lack of opportunities. As El Comercio of April 26, 2006, states in the article "¿Hay esperanza de que estas elecciones detengan el éxodo?" refers to job opportunities:

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[26] [a citizen is unable to come up with the minimal essential family basket of goods and services . . . extreme poverty according to World's Health Organization is the impossibility to get at least 2318 calories for nutrition . . . Farid Matuk, National Institute of Statistics director, notes that extreme poverty has dimished by 2.7 % in 2001-2006 (my translation)].

[27] [They will give good speeches pointing out their fight against poverty. But at the same time they will reinforce unjust economic international laws, which is an exercise in hypocrisy and demagogy, . . . they should back up their words with actions changing the economic rules for better not for worse (my translation)].

> educación, trabajo y seguridad cuidadana son las demandas más urgentes de la población entre los 18 y 29 años de edad . . . los peores problemas que afectan al país son desempleo, drogadicción, pandillaje y delincuencia . . . en la realidad se observa una importante salida de jóvenes del país, sobre todo de varones con secundaria o que han alcanzado un grado de educación superior . . . Eduardo Ponce [22 años] . . . expresa: "Queremos una educación de calidad pues somos el país con la menor calidad educativa en Sudamérica" . . . Para los expertos en educación, como Carlos Aramburu, esto representa "una estafa diferida," en donde el discurso que prima es: estudia ahora y paga ahora, aunque mañana no tengas trabajo, pues no eres lo suficientemente competitivo. . . En el ámbito netamente laboral, la población juvenil es la más golpeada, pues se enfrenta a puestos de trabajo donde prima la informalidad, la precariedad y un alto nivel de rotación . . . [Los jóvenes en un 50%] creen que la democracia es importante, pero se muestran escépticos y expresan un alto grado de desconfianza con respecto a las autoridades, "necesitamos que [las autoridades] nos apoyen, porque entran y después no cumplen con la población. Al final se quedan sentados, hacen obras para ellos y no cumplen. Hay gente que se muere de hambre. Hay chicos pobres que no tienen para vestirse. Están marginados sobre todo en lugares alejados" dice David Soto [19 años]. [28]

Despite the above mentioned reality described by El Comercio, the Vice Minister of Education, Víctor Raúl Díaz Chávez, in a Sept. 232006 article "Educación técnica nos ayuda a salir de la pobreza" says:

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[28] [Education, work and citizens' safety are most important demands of those in the 18-29 age group . . . the worse problems the country confronts are unemployment, drug addiction, gangs, and delinquency . . . in reality, we can observe an important exodus of youth leaving the country, specially men, with a high school education or who have attained higher levels of education . . .Eduardo Ponce (22 years old) notes . . . "we want quality education, since we are the country with the lowest level of educational quality in South America" . . .For experts in education like Carlos Aramburu this represents a "delayed blackmail" where the predicament is "study now and pay now" although tomorrow you will not have work, because you are not competitive enough . . . in the real work environment, the young generation is the most punished because it faces jobs in which informality, precariousness, and a lot of rotation are common . . . [50% of the young people] believe that democracy is important. But they are skeptical and do not trust the authorities . . . "we need authorities to help us, because they enter their posts and then don't comply with the population . . . they think only of themselves and do not deliver. People die of hunger. There are poor youngsters who do not have anything to wear. They are marginalized specially if they live far away" says David Soto (19 years old) (my translation)].

> Sí la educación técnica no prepara a nuestros niños y niñas para afrontar con éxito el mundo del trabajo seguiremos viviendo en la pobreza . . . [en su visita a la institución educativa Ricardo Palma] creo que éste es el mejor ejemplo de lo que los maestros, alumnos y padres de familia deben hacer por una buena educación para las futuras generaciones. [29]

It seems that educational authorities are totally distant and indifferent to reality. They do not see, for example, that some corporations seek above all to profit and care little for human and natural resources as far as their profits keep growing. It appears as though, there are no ethical principles when authorities make statements that are far from the painful reality that Peruvian young people confront. For example, during the first four months of 2006, the number of Peruvians leaving Peru had increased by 4% with respect to the previous year. Looking for opportunities and a better life, 150, 775 Peruvians left Peru not to return; according to the Instituto Nacional de Estadística e Informática (INEI) as reported in La República's July 11,2006 article "Crece el número de compatriotas que salen del país para no volver" which says that: "los peruanos se van especialmente a: Estados Unidos 25.5%, Bolivia 12.2%, Chile 11.5%, España 10.1%, Ecuador 6.8%, Colombia 5.8%" ["Peruvians go principally to the USA 25.5%, Bolivia 12.2%, Chile 11.5%, Spain 10.1, Ecuador 6.8%, Colombia 5.8%" (my translation)].

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[29] [If technical education does not prepare children to face successfully the work market, we will keep living in poverty . . . (during his visit to Ricardo Palma school) I believe that this is the best example of what teachers, students, and parents should do for a good education for future generations (my translation)].

The cruel, daily reality reminds us that poverty, lost hope, and search for a better life force young Peruvians out of the country, in spite of La Constitución Nacional del Perú, the Nueva Ley General de Educación No 28044 and the Universal Declaration of Human Rights. From the previous numbers, we deduce that education has failed. One can clearly see the connection between the lack of ethics, no defense of the environment, and little active regard for education, and the fact that education is non-sustainable in the caring and preserving of natural resources, especially the most precious of all, human resources: Peru's children and young people. The Ministry of Education is not fulfilling the law's objectives of providing quality education, educating for the work place, or offering the basics for finding jobs in order to lower the levels of poverty. Because environmental awareness is oriented to economic sustainable development, environmental consciousness has not been fully adopted.

Along with the Nueva Ley General de Educación No 28044, the supporting basic document for the development of all the learning processes is the Diseño Curricular Nacional de Educación Básica Regular: Proceso de Articulación which oversees all the competencies, capacities, and basic contents of the three levels of basic public education: initial, primary, and secondary. It is not a new curriculum, but it seeks pedagogical and curricular coherence, with the idea of advancing an education of quality and equity and according to the tenets of law No 28044. This law calls for the need to have a basic, common, and articulated curriculum for the entire country in whatever location education is

given in its different levels and modalities, while taking into account human, cultural, and linguistic diversity. This document has three parts:

> La primera parte contiene fundamentos y orientaciones sobre la organización de la Educación Básica Regular, así como las características y logros educativos de los estudiantes, el plan de estudios y los lineamientos para la evaluación del aprendizaje. La segunda parte presenta las áreas curriculares de EBR articuladas mediante logros de aprendizaje previstos para los siete ciclos. La tercera parte comprende el Diseño Curricular Nacional por nivel educativo: Educación Inicial, Primaria y Secundaria. (5) [30]

The primary level works toward giving a complete education. It has three cycles and six grades:

> Promueve la comunicación integral en todas las áreas, el manejo operacional del conocimiento, el desarrollo personal, espiritual, físico, afectivo, social, vocacional y artístico, el pensamiento lógico, la creatividad, la adquisición de habilidades necesarias para el despliegue de potencialidades del estudiante, así como la comprensión de los hechos cercanos a su ambiente natural y social. (7) [31]

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[30] [The first part contains the basis and the guidelines for the organization of Regular Basic Education (RBE), as well as the characteristics and the educational gains of the students, the study plan and the guidelines for the evaluation of learning. The second part presents the curricular areas articulated by the RBE through the learning gains envisioned in the seven cycles. The third part comprises the National Curricular Design by educational level: Initial, Primary and Secondary (my translation)].

[31] [It promotes an integrated communication in all areas, the operational management of knowledge, of the personal, spiritual, physical, affective, social, vocational and artistic

The assesment of a student at the end of the RBE studies are based on four areas: personal, civic duty, knowledge of society, and relationship with the work world. Based on these areas, the student's expected characteristics are:

> Ser ético, moral, sensible y solidario; investigador e informado, crítico y reflexivo, creativo y comunicativo, flexible y resolutivo, cooperativo y organizado, empático y tolerante y democrático y finalmente proactivo y autónomo. (14) [32]

The expected outcomes of a student of the third level and with regards to the aspect of environmental awareness this document notes Environmental Awareness are as follows:

> Se identifica con su realidad natural y sociocultural, local, regional y nacional y con su historia, y es consistente de su rol presente y futuro, en el proceso de desarrollo y defensa del patrimonio y de la biodiversidad ambiental del país. (16)[33]

In the primary education cycle III, encompassing first and second grades, the curricular areas that involve the environment are science and environmental studies. The students are approximately six and seven years old. From the four curricular axes, the one related to learning to live together involves having an

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development, logical thinking, creativity, the acquisition of the necessary abilities for the unfolding of a student's potentials as well as the understanding of facts closely related to his/her natural and social environment (my translation)].

[32] [To be ethical, moral, sensible, and solidary, investigative and informed, critic and reflexive, creative and communicative, flexible and resolvent, cooperative and organized, empathetic, tolerant and democratic, and finally, proactive and autonomous (my translation)]

[33] [The student identifies himself or herself with the natural and sociocultural reality, local, regional, and national and with his or her history, and is conscious of his/her present and future role in the development and defense of the country'spatrimony and its biodiverseenviroment (my translation)]

environmental consciousness, and it is considered a theme that crosses over other national and world problems.

The expected outcomes of the III cycle offering learning environmental science are that the child:

> Explora e identifica los cambios que se producen en el medio ambiente valorando su importancia para la vida. Identifica, compara y diferencia el funcionamiento de los órganos y sistemas de los seres vivos en interrelación con el medio ambiente, desarrollando hábitos de cuidado para conservar la salud. (41) [34]

Clearly, the Diseño Curricular provides the competences, values, and objectives geared to the enrichment of the intellectual capacities and development of the student's personality. In the third cycle, the learning activities lean toward the exploration of the environment recognizing it as part of an attitude of curiosity, interest, and respect toward nature while developing capacities of perception, experimentation, and the establishment of relationships and the application of solutions to problems.

This Diseño Curricular was published in April 2006, and teachers need to be trained for the programs in science and environmental science. These programs relate not only to environmental awareness, but also are to be carried out in class with the direction of the teacher. Some questions need to be asked. What about teachers who are not qualified, children who work, those who live far

[34] [Explores and identifies the changes that are produced in the environment valuing their importance to life. Identifies, compares, and differentiates the functions of the organs and systems of human beings in correlation to the environment, developing care habits in order to preserve health (my translation)].

away in the highlands and do not attend school because they live faraway or in non-accessible places in the highlands? "Indifference" is the culprit that forgets two million children who work. Some of them go to work as early as 5.30 AM in markets and in the streets, and some work in jobs dangerous to their health. In La República of August 13, 2006 in the article, "Nada que celebrar en el Día del niño" Derry Díaz informs that approximately two million Peruvian children (according to the INEI, Instituto Nacional de Estadística e Informática) perform jobs dangerous to their health:

> La hinchazón de las manos de Rubencito es la mayor evidencia de su mal estado de salud . . . lustra zapatos con tanto entusiasmo que pareciera olvidar el dolor de la inflamación . . . el trabajo de Julio Quispe es aún más duro. Tiene 10 años y carga 50 kilos de verduras cada media hora todos los días desde las 5:30 de la mañana. Sin embargo asegura que lo hace con mucho gusto porque ayuda a sus padres. [35]

Malnutrition is another factor that hinders children's learning and prevents them from succeding in school. A hungry student is not able to learn. According to La República's August 8, 2006 article, "Desnutrición crónica puede evitarse," about 24.1% of children under 5 suffer malnutrition, because the parents lack basic knowledge about nutrition:

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[35] [The swelling in Rubencito's hands is the best evidence of his bad health, but he shines shoes with so much enthusiasm that he seems to forget the inflammation's pain . . . Julio Quispe's work is harsher. He is 10 years old and carries 50 kilos of vegetables every half hour every day from 5.30 AM on. But he asserts that he does it with pleasure because that way he helps his parents (my translation)].

> "El alto índice de niños desnutridos se debe a que la población tiene poco conocimiento de una cultura alimenticia. Esta debe iniciarse desde el nido" dijo Victoria Chimpen, decana del Colegio de Nutricionistas del Perú . . . La falta de interés de las autoridades ha traído cola en sectores como la educación: "de cada 3 niños, sólo uno culmina los estudios a los 16 años, mientras que uno de esos tres ha repetido de año y otro abandonó el colegio" explica Unicef en su informe "El estado de la niñez en el Perú." Por esta razón, la decana del CN exhortó al nuevo gobierno a que impulse una mayor cultura alimenticia en todos los niveles escolares y refuerce los programas sociales . . . En el Perú, en Cajamarca la desnutrición alcanza el 50%. En Junín 3 de cada 10 la padecen.[36]

Poverty is deeply ingrained in Peru's education, economics, politics, and society. It is possible to lose sight of the fact that it revolves around the lack of ethical principles, such as the case of the last president's campaign, who was bragging that poverty was lowered during his presidential term. Javier Díez Canseco in his article "Pobreza y debates bizantinos" in La Republica of 13 July 2006, clarifies:

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[36] ["The high index of malnourished children is due to the population's lack of knowledge regarding nutrition. This knowledge should begin in the kindergarten" said Victoria Chimpen, Dean of the College of Nutrition of Peru. . . The authorities lack of interest has consequences in the educational sectors: "one out of 3 children, completes school by the age of 16, meanwhile, one of those three has repeated a school year and another has abandoned school" explains UNICEP in its report "The Condition of Childhood in Peru." For this reason the Dean of the College of Nutritionists called on the new government to promote a better teaching of nutrition at every school level and to reinforce the social programs . . . In Peru, in Cajamarca malnutrition reaches 50%, and in Junin three out of ten suffer form it (my translation)].

> Más allá de lo que diga el gobierno, el aumento de la riqueza solo ha favorecido a pocos privilegiados. Estos cinco años de toledismo han sido buenos para las grandes empresas, las transnacionales mineras, el oligopolio bancario y las AFP [Asociaciones Financieras Privadas], pero malos para la enorme mayoría de la población, que *sigue viviendo en necesidad y carencia. La pobreza de acuerdo a* los datos de Apoyo entre 2001 y el 2005 apenas disminuyó en *0.7% en términos porcentuales, pero en términos absolutos, el número de pobres se ha incrementado considerablemente.*[37]

It is a well published fact that in the 2006 electoral campaigns, all candidates addressed every possible economic problem, buy there were 3 great topics which were absent: education, poverty, and the environment. It is arguable that their campaigns were paid to address the interests of the benefactors, not the population or the environment. These candidates require a course on duty, ethics, and real transparency, not to mention that they have to update themselves on the real issues that affect Peru's population. Most of the candidates are representative of the upper class, and as they are looking to govern Peru they may have to be aware that the Consejo de Educación is open to all citizens. They had to be informed about these 3 topics, because not to discuss these three essential problems leads us to conclude that either the

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[37] [Far from what the government says, the economic growth has only favored a privileged few. Toledo's 5 years were good only for the big corporations, the mining transnationals, the banking oligopolies, and the private financial associations, but bad for the vast majority of the population who lives in need and scarcity. Poverty, according to Apoyo between 2001and 2005 barely went down 0.7% percentage wise, but in absolute terms, the number of poor people has grown considerably (my translation)].

education they received was sadly incomplete, that they may be unethical, or that the intent of Peru's legislation's is only on paper. Regardless of which ones are correct, one has to admit that it is most urgent to begin environmental awareness and sustainability from a personal perspective. Peruvian history has many antecedents of resistance to laws and decrees. It goes back to the colonial times when the attitude toward Las nuevas leyes de las Indias, or The New Laws of the Indies that favored the native Indians and were brushed aside with an attitude of acknowledging the laws, but not enforcing them. So that it become customary to say: "obedezco, pero no cumplo" (in Burkholder and Johnson 75), ["I obey, but I don't comply" (my translation)]. This cultural and historical attitude must be overcome by Peruvians if they are to improve the lives of future generations.

Peru's Congress finally signed the Ley General del Ambiente No 28611 in October 2005, which regulates the Peruvians' fundamental rights to live in a healthy environment in equilibrium. The law also delineates the duty of how to protect the environment by using it in a sustainable way and to be part of a sustainable development throughout the country. This law was recognized by all political leaders and parties and calls on society to comply with the economic capital and development. The scope of this law is environmental control, but it does not have strong connections with the law of education or with the NGOs that are working with the environment. This law controls and regulates the productive and economic development, but because it requires personal civil participation, the citizen needs to be educated in the environment, its sustainability, and the responsibility that everyone and, principally, the economic

directives ought to govern the environment. Even though Article 11 of the La Ley General del Ambiente establishes the need to promote environmental education, there is yet no connection on the need to promote environmental education and the citizens' environmental awareness, sustainability, and responsibility. Moreover, the law significantly favors "sustainable development" which in the real world is politically and economically driven, oriented to profit and power. It is a concept that departs greatly from "environmental sustainability," which calls for an ethical personal and responsible environmental dimension. Nevertheless, this law is a thoughtful stepto underscoring into the centrality of the environment in the economic, political, and social arenas. However what is missing is tp require the link to the actual teaching of Peruvian stewardship on the environment and sustainability.

There are other Peruvian institutions and numerous individuals working with and in favor of the environment. El Consejo Nacional del Ambiente (CONAM) today is as big as the Ministry of Education, but it would be desirable for it to be able to enforce mandates with more authority to really help Peru deal with the big national and international corporations that evade taxes and obligations and pollute Peru's environment. NGOs, National and international institutions, Care-Peru, the OAS, the UNESCO, the UN, and the U.S. Department of State all have projects in Peru to help preserve and clean the environment. Their programs are beneficial, but again, there is a disconnection between their objectives and values and those that should be taught in Peru's educational system. It is important to integrate all efforts into one objective of

environmental awareness and sustainability. It is necessary to speak the same environmental language, to teach and direct every human being to act ethically, whether high government officials or peasants in the highland's smallest village. It is important to be careful not to copy or accept the very popular saying "business as usual" which has already been questioned and challenged because of corporations that were unethical, big polluters, and environmentally unfriendly. Not only will this effort help Peruvians to live better, but also, it is in the interest of the whole world to begin changing habits to really sustain the environment.

Teaching and learning about ecosystem sustainability should be the link to better living standards for an improved future. Peruvian educational legislation mandates that education should be extended to all Peruvians without distinction or exceptions. Considering it as such, according to the law, environmental awareness and sustainability should reach all Peruvians as well. In Linda Darling-Hammond's words, the right to learn is a hard-earned conquest of mankind, as she explains in her book The Right to Learn: A Blueprint for Creating Schools That Work: "Of all the civil rights for which the world has struggled and fought for 5,000 years, the right to learn is undoubtedly the most fundamental . . . the freedom to learn . . . has been bought by better sacrifice" (1). Learning is an ongoing process throughout a person's life. It is crucially important because: "Teaching and Learning secure the foundations of civilization . . . Learning . . . is as essential as breathing" (xi) remarks Darling-Hamond. If the actual practice of teaching in Peru were to follow Peruvian law and teach environmental awareness

as well as environmental sustainability, Peruvians would be on the way toward a superior standard of living.

Peruvian teachers and the educational system cope with the need to respond to well-defined territorial zones: some cities are well off economically and the rural sectors, mostly in the highland and the jungle are very poor. There are approximately a total of 320,000 teachers in Peru. About 33,000 are affiliated with the national union called Sindicato único de Trabjadores de la Educación (SUTEP). This statistic was presented by Minister Sota Nadal, when he claimed that the SUTEP's strikes should not profoundly affect school work (La República, June 23, 2005). Nontheless, strikes affect rural schools more because the public urban schools tend to have more faculty members, while rural schools mostly have a single teacher in multi-grade classes. It has been mentioned before that education was in a state of emergency and still is. The reason for this is mainly the teachers, because the teachers will still be the group responsible for the formal teaching-learning process required by law and by tradition, but the situation is difficult because teachers in Peru need help, motivation, respect, and better salaries.

Teachers in Peru join the union because they are afraid to lose their jobs, and they are struggling for economic survival. The former Minister of Education [2001-2002], Nicolás Lynch, in his book, El pensamiento arcaico en la educación peruana, has described the ideology of SUTEP teachers as archaic. He explains that the ideology is alien and old, and it is based on the "Leninist, Marxist and Maoist philosophy" [my translation] (21)]. He also comments on the teachers'

salaries that reflect Peru's "severely scarce economic situation, which has deepened its roots in stagnation. This does not provide work opportunities for persons who have chosen the path of education" [my translation (75)]. These two conditions, archaic ideology and teachers' poverty, are the reason for the confrontation between SUTEP and the government, a confrontation that has being ongoing since 1972-73. Teachers defend their jobs and protest against poor salaries to avoid misery. This cruel reality is mentioned by Lynch, when he says that: "En el fondo, el argumento sigue siendo la pobreza del maestro: un docente sin recursos no tiene cómo capacitarse, por lo tanto no cabe pedirle méritos académicos ni evaluar el desarrollo de sus conocimientos." (65) [In the end, the argument remains as the teacher's poverty: a teacher without economic resources does not have the possibility to get more education and thus one cannot ask them to raise their academic merits or be evaluated for the development of their knowledge. (my translation)

Ironically, the education teachers had received had been given by the same Ministry of Education in institutes of higher education, that not only did not perform their job well, but sometimes were very expensive for those who became teachers. To let a group of key professionals become confrontational and make schools places for politics grounded in extremism does not make sense for education. Although the economic frustration of these teachers is understandable, this situation does not provide fertile ground to teach the new area of environmental awareness and sustainability.

Presently, there is a newly elected representative for what is now known as the Colegio de Profesores del Perú (Peru's Teachers' College) and they have elected a new dean. The new dean promised to create a teachers' implementation plan to better education and later on try to work with SUTEP. The article "CPPe oficializó a primer decano" in La República informs that as of August 3, 2006, the first representative of the teachers had been elected:

> Con 98,674 votos válidos el Movimiento Democrático Magisterial (MDM) que representa la lista 2 de Carlos Gallardo, superó a su máxima competidora, la lista 1 de Soledad Lozano del Frente Amplio Gremial Magisterial (FRAGMA) que obtuvo 93,404 votos a su favor, según ratificó ayer el Comité Electoral que encabeza Yeny Gamarra.[38]

Still, one needs to attack the fast "conversion" of workers of education into teachers. Looking deeply into the situation, the major complaint of the teachers is their poverty and the lack of good formation as teachers. Teachers' poverty has proven to weaken their teaching mission. While they deserve to enter a professional career, they also need to be motivated and elevated in their quality of life and receive the corresponding respect. The Ministry of Education needs to make a decision to change once and for all the cliché phrase, "there is no money" to pay better salaries or prepare teachers. There has to be a better way to treat teachers, students, the majority of the population, and the environment.

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[38] [With 98,674 valid votes the TDM (Teachers' Democratic Movement) represented by Carlos Gallardo's list # 2 surpassed his competitor represented by Soledad Lozano's list # 1 from the Extensive Front of the Magisterial Guild, which obtained 93,404 votes according to the electoral Committee headed byYeny Gamarra (my translation)].

Peru's reality and the present problems of poverty, hunger, pollution, evasion of taxes, unethical behavior, and corruption are more than enough proof to see that education, in general, fails the law and the population. Until the problems of poverty and environmental degradation are addressed, rather than discussed, it will be impossible to find solutions. Education and life in Peru will only go backwards.

Chapter Three

Teaching Environmental Ethical Sustainability of Resources from a Personal Perspective Within Peru's Public Educational System

The misuse, overuse, and abuse of the environment and natural resources have at their root the lack of environmental awareness by the average Peruvian. These acts of recklessness toward the environment are beginning to reveal their dangerous costs to human health. However, attempts to teach environmental consciousness in the nation's public schools and higher education institutions have not yet made any discernible impact in the amelioration of poverty and contamination. The biggest obstacle to teaching environmental awareness successfully lies in the alarmingly low quality of teaching endemic at all levels of public education in Peru. Another difficulty in teaching environmental awareness is that laws promoting environmental education initiatives focus on notions of sustainable economic development, with an emphasis on global marketing and economic competitiveness rather than on environmental health and preservation. Moreover, the government grants exceptional opportunities to transnational and national corporations, allowing them to overexploit carelessly the country' s environment and human capital while evading the payment of

taxes or levies and their responsibility to expand workers' benefits and work conditions and improve the geographical surroundings that host their industries.

Thus, current approaches to teaching environmental awareness in Peru have failed. What Peru needs instead is to teach environmental ethics and sustainability from a personal perspective, in other words it is necessary to adopt personal integrity that will derive into effective environmental stewardship. Following Lisa Newton's suggestions this commitment will encompass:

> wisdom (including sensibility to natural processes), courage (including patience), temperance (including frugality), justice (including respect for that which is other than ourselves), love or fidelity (including care and compassion), community, simplicity, humility, and above all responsibility, accountability, a disposition to carry out effective stewardship of that which is placed in our care. (3)

It is necessary to introduce this new perspective into the curriculum as early as the first level of primary education. This approach need not be limited only to students in public education, it is equally well suited for other audiences such as students who attend private schools, state representatives, professionals, adults, and citizens in general who may receive it from other media, such as television, newspapers, and public campaigns. Education and ethics would help government officials and authorities improve their negotiating skills when dealing with corporations' contracts and investments, as news constantly comment about poor negotiations between big corporations representatives and government

officials on the one hand; and these big corporations careless and irresponsible treatment to the environment and the surrounding human communities on the other hand. Government officials who could adopt this personal perspective in their dealings with environmental issues would be more likely to protect the sustainability of resources for future generations; acting as a corrective counterbalance to those individuals in their roles as corporate managers and representatives, who seek to secure their company's profits by refusing to pay good salaries, clean the environment, and fulfill their social responsibility.

The Ministries of Economy and Education regard economic development as one of their most important objectives, blindly trusting that when major corporations come to Peru their investments will expand the country's economic and financial development and prove a social boon to all Peruvians. A case in point is that of Peru's Consejo Nacional de Competitividad, (Peru's National Council of Competitiveness). The 2006 Annual Plan defines its goals with reference to economic and financial markets, science, technology, and innovation as a way to increase competitiveness. Education and environmental laws also seem motivated to further economic competitiveness. The National Council's plan calls on the Ministry of Education to join it in its strategy. To track the improvement in education, the Council proposes to:

> Difundir metas, indicadores y resultados de los programas educativos del sector (181), [and]—Difundir en la página Web del

MED [Ministerio de Educación] [definir] documentos actualizados de los principales indicadores educativos (182) [39]

Given its emphasis on economic competitiveness, the Council's involvement with and monitoring of educational performance indicators may have a distorting influence on the kind of environmental education that gets taught in Peru, because it reinforces the environmental awareness as a tool for sustainable development.

The Ministries of Education, Finance, Economy, Agriculture, and Consejo Nacional del Medio Ambiente (CONAM) have defined their objectives in terms of economic and sustainable development. For them, environmental awareness is a strategic move to protect economic growth, production, import, exports, and trade transactions as they currently exist. In fact, the Ministry of Education itself, in its law and curriculum assert that one of the aims of education is to help Peru integrate successfully into the global economy. Inserting Peru in the global economy is critical, but it is also urgent to protect human and natural resources. The rhetoric of environmental awareness, ethics, preparation for work, and fight against poverty mandated by law and in teachings has thus far failed to change environmentally detrimental practices: poverty levels have not changed significantly over the last 30 years; pressing environmental problems are ignored, and corruption and lack of ethics are routinely exposed in the governmental and public spheres.

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[39] [Make public the goals, the indicators, and the results of educational programs (and)—Make public by way of the Ministry of Education's Web page the updated documents on the main educational indicators (my translation)].

One of the worst failings of the Ministry of Education, however, has been its inability to improve the quality of teaching, a problem that is at the root of the disconnection and the obliviousness toward the environment. The whole educational system, including education laws, decrees, and curriculum, advance an economic model based on consumerism, marketing, global competitiveness, and technological advancement, promoting sustainable development rather than ethical sustainability of the environment.

The misuse of resources in the name of economic development is clearly illustrated in the case of soda companies in Peru. Water is a critical resource that is extremely scarce and inadequately distributed in Peru: millions of Peruvians suffer from skin and digestive problems because the towns they live in lack access to clean drinking water. Soda production involves water-intensive processes that result in a nutritionally empty product made up of sugar and water. Despite the wastefulness of such a product, international soda companies have for many years enjoyed great profit margins in South America. Coca Cola is said to be expanding its plants: "The Coca Cola system in Peru operates 12 bottling plants, 29 distribution centers and a fleet of nearly 735 trucks, serving more that 440.000 retail customers nation-wide" (Coca-Cola's website).

Coca Cola has recently had to face competition from a Peruvian rival. The article on the website "Peru-Kola Real: Terrorismo en su origen y en sus prácticas" tells the story of the Añaños brothers who came from Ayacucho to Lima in 1990. Their company Kola Real had a modest beginning but is now successfully dominating the market through impressive price cutting, and selling

by the liter at half the price of Coca Cola. It is the sort of story that can make any average Peruvian smile, a "homegrown industry started in a backyard with 30,000 soles" (Peru- Cola-Real website) is now shaking the world's biggest soda company; and, of course, advocates of economic development can point out that the average consumer benefits by this healthy competition. But do Peruvians really benefit from being able to buy more of a nutritionally empty product, while the industries that produce it continue to compromise critical environmental resources? No. It is the task of educators to teach young Peruvians to look for environmental sustainability in the actions of corporations and to overcome indiscriminate thinking that equates corporate success with social good.

The goal of environmental ethics and sustainability of resources teaching is not to retard economic development, but to make Peruvians responsible for the consequences of their acts, imparting on them the motivation to be protective of resources and the environment for this generation and the next until the seventh generation to come as explained by Newton: "It requires that we use our world in a way that will not detract from the future—the seventh generation's— ability to derive the same benefits from similar activities." (2) Thus, environmental ethics and sustainability teaching objective seeks to perfect the concept of economic sustainable development by emphasizing resources preservation. In teaching environmental sustainability, it is necessary to integrate the different aspects of the ecosystem, including humans, because the actions of humans have consequences over the whole interconnected living ecosystem. The Peruvian environmental curriculum needs to be revised and better implemented to serve,

as a guide for teachers to instruct in urgently needed environmental ethics and sustainability.

Teaching environmental ethics and sustainability from a personal perspective is an ideal way to prepare each individual to become a steward and caregiver of the environment. The reader "Environmental Ethics and Sustainability Learning Spaces" fills the need in the national Peruvian curriculum for a program or course that prepares the younger generations to be ethical and environmentally-conscious citizens. The "Environmental Ethics and Sustainability Learning Spaces," proposed here, can also be useful in teaching environmental education to other groups. As part of the state government, the Ministry of Education is charged with the broad responsibility to influence "all educational matters" at every level, modality, and location. Therefore, the State and the Ministry of Education have the opportunity, perhaps even the obligation to assume a central role in environmental education and the fight against poverty. Presently NGOs are doing the job of the Ministry of Education: boldly working on protecting the environment. It is time for them to do lead rather than trail other institutions and ministries with respect to the environment. Finally, in the struggle for a better environment, it is imperative that the Ministry of Education coordinates with other entities such as the Ministries of Agriculture, Finance, Commerce and Economics, and the Environment.

Peruvians must learn to consider how the consequences of every informal and formal consumer's act affect the survival of future generations. With this in mind, Peruvians may come to think and behave more ethically about the

environment. Environmental education does not need expensive books or materials. The disconnection that Peruvians currently demonstrate with their reality and their personal surroundings can be remedied with a simple straightforward approach: Peruvians need to be responsible and do their share in caring, cleaning, and protecting the environment in which they live. The environmental pedagogical practices proposed here deal with an individual's sense of personal ethics and how she or he applies it in a manner that is environmentally sustainable.

The key to this educational project is first to train teachers by making them aware of best practices, and supporting the ideas and the philosophy behind environmental sustainability, so that they are able to teach it to their students. Steady and competent teaching can overcome personal habits and attitudes that lead to behavior harmful to the environment. Peruvians need to know that there are already great examples of environmental ethics and sustainability, such as those of Switzerland and Costa Rica and, of course the works of NGOs. Peru would not be alone. Peru can take the chance to lead in this approach.

The pedagogical approaches advanced here are informed by Lisa H. Newton's formulation of environmental ethics and sustainability. I argue that these can be effectively applied to Peru's environmental and educational situation. In her work Ethics and Sustainability: Sustainable Development and the Moral Life, Newton maintains that environmental ethics and sustainability are a personal endeavor. To live a good life in one's own community and generation and to preserve the natural environment for future generations requires a

fundamental understanding of sustainability from the "personal point of view." No practice should be regarded as sustainable unless it can be continued without degrading the environment that nurtures it from its initiation through its seventh generation. She concludes that a commitment to sustainability entails a worldview of stewardship related to every facet of society:

> The steward's job is to protect it [the ecosystem] from loss or injury, care for it, enhance it if possible. Responsibility entails stewardship. . . . with what have we been entrusted? . . . We have first ourselves, our minds, and our bodies to take care of. Second, we have our families, our communities, our inheritances of culture and tradition. Third, we have our laws, rights of citizens, courts, polity, and the whole infrastructure of freedom to protect. Fourth, we have the natural world to protect. All of these are so many manifestations of shells, of houses, of the soul. They are all ours. . . [and also] It is the responsibility of a scientist to act on the results of his or her research . . ."we can't hide out in an ivory tower anymore" . . .the point is that what he does, he does for good, and whatever difference he makes, is positive. Living a good life needs no further consequences . . . [engineers around the world should be] insuring that future generations are not overwhelmed by global climate change and economic dislocations from declining oil supplies. We all share the responsibility for carrying out this project for the assumptions of responsibility is part of the dignity of human beings.

A related but economic conception of the sustainability concept is expressed by William McDonough in his work, Hannover Principles : The Design for Sustainability. McDonough defines sustainability as the "meeting of needs of the present without compromising the ability of future generations to meet their own needs" (3). The website of the UN Department of Economic and Social Affairs, Division for Sustainable Development (August 2 2005) offers the same definition of sustainable development: "Development [is the one] that meets the needs of the present without compromising the ability of future generations to meet their own needs." McDonough and the United Nations General Assembly and the Department of Economic and Social Affairs drown the notion of sustainability presented in Our Common Future in the Gro Harlem Brundtland's Report from the World Commission on Environment and Development meetings in 1987. These positions, the Brundtland's Report, McDonough's and the United Nations' Sustainable Development concepts share the same ideas and present no differences. Newton's definition of sustainability stresses ethics and the individual, while McDonough and the UN's definition redefine economics and development in terms of economical sustainability. The economic sustainable development position gears to keep going the economic development which encompasses production, extraction, and profit; while the Environmental Ethical Sustainability directs its efforts to the preservation and stewardship of resources from the personal perspective bearing in mind the imperative to preserve the

possibility to derive the same benefits from similar activities to the seventh generation. In contrast, the Peruvian laws examined here all advocate economic development and sustainable economic development without making any connections to environmental sustainability.

Since colonial times, Peru has had a strong mining sector; this is still the case today. Peru is no longer a colony but it is has not achieved the level of a developed country anticipated by the richness of its natural resources, because it has not managed to reverse the trend of outsiders coming in to exploit its natural riches. Most Peruvians are aware of their country's magnificent richness of resources and biodiversity since these are portrayed even in "Peru's coat of arms." This important national emblem is divided into three spaces depicting the richness of natural resources. One shows the Quina tree (Peruvian bark) representing the flora, the other depicts the vicuña, representing the fauna, and the central space presents a great cornucopia full of precious metals, representing the mineral resources. (See Appendix 4). While emblems, geography books, and tourist guides portray Peru as a land of magnificent beauty and abundant resources, there are no signs or symbols depicting resistance to the plunder Peru has experienced throughout its history, and it continues to encounter exploitation in its dealings with investors, transnational, and national corporations. Most politicians are eager to sell Peru's image and attract investors but make no provisions for a third party to enforce the investors' pledge of social responsibility. Although many corporations have signed promising agreements, they do not comply. Often when an investor or

corporation fails in its commitments to the environment, there is no government official who knows the details of the contract and those lawyers in government are untrustworthy, or simply the politician who drafted the agreements is no longer available. Despite the rhetoric of transparency, which is fashionable these days, there are often excuses and delays when it comes to complying with the contract agreements. The corporate world and global corporations prefer to emphasize the sustainable development approach, but what is at stake for them is not Peru's environment or its resources but their profits. This lack of stewardship on the part of corporations and the passive response of the Peruvian state perpetuates poverty, the depletion of resources, and pollution of the environment.

At the moment, there are efforts to modify the understanding of sustainable development, orienting it into a more environmentally-friendly direction. For example, the article "The Viable Alternative: Sustainable Development" featured in the website of the Rocky Mountains Institute explains that:

> The term "sustainable development" would be doomed to the scrap heap of short-lived and overused buzzwords were it not rooted in a traditional value, stewardship—the careful, economic, long-term management of land, community, and resources. It's a value that some towns have recently let fall by the wayside. But it's alive and well in many others, even if they don't notice it. People who care deeply about their community and who think conscientiously about

the long-term implications of their actions are working for sustainability and stewardship, whether or not they use those words.

Just as sustainable economic development must be expanded to include environmental sustainability of the resources, the notion of the corporation, its rights and responsibilities, the way it is designed to operate, and our own understanding of it need to be profoundly reexamined. Joel Bakan's study The Corporation: The Pathological Pursuit of Profit and Power describes corporations' actual characteristics and behavior in the economic world. Joel Bakan's work is relevant to the environmental challenges faced by Peru, particularly those presented by the mining industry. The mining corporations that work in Peru fit Bakan's profile precisely, having polluted for decades the land, water, and air of many cities and villages in Peru without concern or correction. Bakan points out that a corporation is a legal entity but also a very special kind of legal person with no "moral barometer" (measurement of morals), solely concerned with generating the maximum profit possible for its owners. Bakan concentrates on the adverse effects of corporations in America depicting the harm they inflict upon workers (in the form of sweatshops, layoffs, miserly salaries, bad working conditions) and the environment (in the form of production of toxic wastes, synthetic chemicals, and pollution which harm animal, human, and plant life; and damage the air, land, and water). Regarding corporations, Bakan draws a comparison between institutional psychopaths with corporations that would remove any obstacle that get into their way:

> Regulations that limit their freedom to exploit people and the natural environment are such obstacles, and corporations have fought, with considerable success over the last twenty years, to remove them. Through lobbying, political contributions, and sophisticated public relations campaigns, they and their leaders have turned the political system and much public opinion against regulations. (85)

In his book, Bakan presents the clinical definition of a psychopath as given by Dr. Robert Hare, an FBI consultant on psychopaths. According to Hare, a psychopath exhibits the following behavior:

> Callous unconcern for the feelings of others, incapacity to maintain enduring relationships, reckless disregard for the safety of others, deceitfulness: repeated lying and conning of others for profit, incapacity to experience guilt, and failure to conform to the social norms with respect to lawful behaviors. (56-57)

Though a corporation is an organization and not a person, Bakan draws a parallel between the behavior of corporations and that of human psychopaths who are notorious for their ability to use charm as a mask to hide their dangerously self-obsessed personalities. "For corporations, social responsibility may play the same role. Through it they may present themselves as compassionate and concerned about others when, in fact, they lack the ability to care about anyone, or anything, but themselves" (57).

The corporate world in Peru copies and/or follows the capital model of sustainable development pursued by its American counterparts. Education is key

to forming ethical governmental negotiators, politicians, economists, financiers, workers, professionals, authorities, and citizens. Thus, the introduction of Environmental Ethics and Sustainability into the education system is crucial because it will not be long before Peru's overexploited resources virtually disappear. As David Orr explains in his Ecological Literacy: Education and the Transition to a Postmodern World:

> *The crisis of sustainability [of resources] has to do with the* propensity of all industrial societies to grow beyond the limits of natural systems. Economic growth is commonly regarded as the best measure of government performance. It has come to be the central mission of all development and developing societies . . . The most striking aspect of arguments for unending growth is the presumption that it is the normal state of things. Nothing could be further from the truth. The growth economy along with much of the modern world is, in a larger view, an aberration. (7)

However, the time has come for the corporate world to change its ways. In a reply to Bakan's work, Milton K. Wong, chairman of HSBC Asset Management Canada Inc., observes in his article "Towards Sustainability: Rewriting the Script" that corporations will not be able to avoid sustainability for long. A decisive impact is wrought by increasing public pressure, complaints, and protests that are readily and massively disseminated by global telecommunications, Internet, satellite TV and fiber optics. Wong notes that he no longer believes it is feasible

to think that infinite growth is possible given limited natural resources, whether on a broad economic level or at the individual business level since:

> when there is nothing else left on earth that can be bought, or sold, what shape will their next incarnation take? In what ways might "the Corporation" as an entity substantially change or reinvent itself? My guess and my hope is that the new drive will be towards sustainability . . . Conserving resources is also, obviously good for the bottom line, and so is thinking long-term about the availability and management of resources . . . Our economic models are not holistic, but they should be; they don't deal with human values, but they should. (Wan's www.alcan.com.)

Because economics, capitalism, and technology are so predominant but their goals are incompatible with ecology, environmental ethics and sustainability their inclusion in education is even more necessary. In his work The Nature of Design: Ecology, Culture, and Human Intention, Orr explains that capitalism and corporations may need more than reform because capitalism is a system that thrives only when people buy and buy more than they need. "Even if they make "green" products and recycle all of their wastes, corporations for reasons of scale and power, will act to undermine political participation, weaken the sense of community, and subvert democracy" (108) Orr points out that even "logic, data, and evidence notwithstanding, mainstream economists hold with remarkable tenacity to beliefs that technology can substitute for the loss of natural capital, economics can grow without limits, and human desires are insatiable" (109).

As students grow into professionals they have the responsibility and the obligation to find ways to improve the overall living standards of their country. It is challenging, but the new professionals must embrace this responsibility. Their education must encourage them to reverse the damage unregulated economic growth and consumerism has caused to the environment and mankind. As Orr explains we have an obligation to equip our students to do the hard work ahead of them: learning to power civilization by current sunlight, reducing the amount of materials, water, and land use per capita, growing food and fabric sustainably, desinventing the concept of waste, preserving biological diversity, restoring ecologies ruined in the past century. Orr advocates; "rethinking the political basis of modern society, developing economies that can be sustained within the limits of nature, and distributing wealth fairly within and between generations (Nature of Design 134).

Higher Education and Natural Design

The time has come for higher education institutions to educate future professionals by challenging them to use their creativity to design new products, machines, and processes that are friendly to the Earth. It is important to start this initiative in primary school at the time when students are fresh and eager to learn. In their examination of environmentally sustainable design, William McDonough and Michael Braungart observe that designing new products or systems that are friendly to the ecosystem is a challenge to human creativity because it breaks with established patterns of thought. In Cradle to Cradle: Remaking the Way We Make Things, they explain how today's industrial

infrastructure is designed to chase economic growth. It does so at the expense of other vital concerns, particularly human and ecological health, cultural and natural richness and even enjoyment and delight.

> Except for a few generally known positive side effects, most industrial methods and materials are unintentionally depletive . . . The waste, pollution, crude products, and other negative effects . . . are the consequences of outdated and unintelligent design . . . Poor design in such a scale reaches far beyond our own life span [affecting future generations]. (43)

The way science and technology serve the economy in some ways is viewed by William McDonough and Michael Braungart as a cruel oppression that perpetuates what they call intergenerational remote tyranny–our tyranny over future generations through the effects of our actions today.

The main reason to reconnect teachers with the ecosystem is because they are natural connectors between environmental sustainability and the next generation. Furthermore, the entire society is intertwined with the ecosystem, and if we become aware of the wrong doing connected with the well being of future generations and do not do something to correct it, the neglect and oversight are ethically wrong. As McDonough and Braungart explain:

> Once you understand that destruction is taking place, unless you do something to change it, even if we never intended to cause such destruction, you become involved in a strategy of tragedy. You can

> continue to be engaged in that strategy of tragedy, or you can design and implement a strategy of change. (44)

Education is the fundamental way to address one of the greatest imperatives to begin enhancing the practices of both environmental awareness and environmental sustainability in elementary schools; and teachers are the agents who can begin to solve this problem. To accomplish this however, they first have to understand their ethical obligations to believe in that mission and their capacity to improve the situation: they need curricular guidelines. The Ministry of Education can add, change, or attach these pedagogical practices to the curriculum; but teachers need to know them and master their key principles.

Fundamental Theoretical Support for the Environmental Ethics and Sustainability Learning Spaces

In order to support teachers what is needed is a tool in the form of curriculum. The present supportive framework for "Environmental Ethics and Sustainability Learning Spaces" is aimed at the second level, first cycle, of primary public education, from first to fourth grades. It combines process and praxis, and it is also oriented toward the Ministry's Curriculum Design, in order to support the corresponding teaching of six-to nine-year-old students in the competence of environmental ethics and sustainability of the resources.

This supportive background considers three areas: Educational sustainability based on constructionist and eco-social theories. Constructionists and constructivists theories are linked together; these two theories are closely

related. Environmental theories in ecological sustainability theory and current ecological design promote the production of systems, machines, and projects benign to the ecosystem. Ethical: environmental ethics, consequentialist and practical philosophy theories are the support for linking education to the environment. These three aspects establish a strong link between education, ethics, sustainability, and Peru's reality. They speak "truth" to power and bring the study of four branches of knowledge to try and solve a major problem for a great majority of Peruvians: poverty. After seeing the consequences between the corporations' development and the scarcity of the environmental elements they use on the survival of millions of individuals, we see the need to establish a better plan to care for those precious eco-elements. Peru's dramatic water scarcity contrasts with the success and profits of Coca Cola and Kola Real, as well as those of hundreds of other big corporations, such as those engaged in the beer, paper, mining, and potato chips industries just to name some. They have an immense impact on the water and environment since they use vital elements that are needed for survival. It is understandable to emphasize the importance of becoming environmentally ethical and sustainable from a personal perspective, starting from the immediate environment, and growing to be responsible by beginning to work that way at home, then in school, then in the community, and finally throughout the whole country, not only protecting the environment, but also being connected to other human beings.

Educational Sustainability Based on the Constructionist and Eco-Social Theories: Traditional and contemporary educational constructionist and eco-

social theories guide this pedagogical effort toward a new direction in Peru's environmental ethics and sustainability education supported by the analysis of actual social and educational problems. Taking into consideration the constructionist and eco-social approaches, this study proposes some inclusion and changes in the educational goals, the teachers' roles, the students' realities, the course content scope, and the socio-cultural relevance to the instruction of pertinent subject's instruction. To understand the utility of constructionist theories in urban and environmental settings, it is important first to understand the use and efficacy of the concept in its traditional application. Alan Shaw states in his Internet site that his academic usage of the word constructionism expands on the concept known as constructivism. In social and developmental psychology, constructivist models view the subject as a builder of knowledge, not a passive receptor, but an active constructor. Through constructivism theorists such as Jean Piaget attempt to describe how this building process takes place in order to better understand childhood learning and development.

Shaw also explains that in educational settings, this model goes against the idea of the student as a "tabula rasa" and the teacher as an authority that must force the student to learn by imposing knowledge on the student. Instead, constructivism argues that teachers should understand the active nature of the learning process in which students are already engaged, so that the teacher can enhance and facilitate that process, rather than impose unnatural learning experiences on the student:

> Constructionist thinking adds to the constructivist viewpoint. Where constructivism casts the subject as an active builder and argues against passive models of learning and development, constructionism places a critical emphasis on particular constructions of the subject which are external and shared. (http://Xenia.media.mit)

By directing particular attention to the external constructions of the active learner, constructionism reveals that childhood development involves more than just creative action; it involves recreational action as well. Shaw further explains that: "social constructionism takes constructionism out of the classroom and out of the realms of education priorities. In doing so, it takes the constructivist viewpoint even farther into socio-cultural perspectives bringing with it the same insights concerning the cycle of internalization and externalization."

Elizabeth Murphy explains in her Internet site that there are educators actively engaged in: "constructivist principles [which] serve to design and implement new learning environments." This theoretical approach's most remarkable characteristic is that it is situated in cognition, anchored instruction, apprenticeship learning, constructionism, and exploratory learning. Murphy gives some of main characteristics of this approach:

> Activities, opportunities, tools and environments are provided to encourage meta-cognition, self-analysis—regulation, reflection and awareness. Primary sources of data are used in order to ensure authenticity in real-world complexity. This construction takes place

> in individual contexts and through social negotiation, collaboration and experience. Knowledge complexity is reflected in an emphasis on conceptual interrelatedness and interdisciplinary learning. (in http://edli,ca/~wtmurphy)

Eco-Social educational theories that stress the teacher's and students' activities, and readjust the subject's content, are applicable to Peru's social and environmental reality. As Ives Bertrand explains in Contemporary Theories and Practices in Education; the Eco-Social theories of education are concerned with social change and macro-problems generated by our social, economic, political, and cultural structures:

> The changes that they advocate in the educational system are based on a global vision of relationships among the individual, society and the universe [ecosystem] . . . we must make major changes if we want to ensure a healthy evolution of society, the individual and nature. The serious ecological problems that face us as we approach the twenty-first century indicate to what extent we must think in ecological terms about the global organization of the Earth. (174)

Nature is finally imposing limits on our activities over the Earth. The solution to this problem, explains Bertrand: "does not merely lie in showing greater concern for the environment . . . the solution lies in inventing a new vision of the world – and the new educational institution will have to contribute to its collective construction" (174). Education should not be reconsidered from an industrial

perspective, but rather from a more global vision of taking into account the evolution of our planet. Education should be used to invent a new future for the planet. Bertrand following what Edgar Morin's ideas about ecological events notes that:

> It is no longer a time for assessing the effects of ecological disasters. Nor should we delude ourselves with the thought that the rise of technologies could remedy them by itself and even less so overcome the major dysfunctions that threaten to wreck the planet and its biosphere forever. Salvation can come only from a radical transformation in our relationships with other human beings, with other forms of life, and with nature. An ecological consciousness of solidarity must take the place of the culture of competitiveness and aggression currently governing world relationships. (175)

So, for a new eco-social competence the best educational theory is the one that encourages students to acquire competence based on an understanding of ecological, social, and cultural problems. Students need an education that allows them to solve the social, ecological, cultural, and political problems that they inherit. This is what Bertrand calls eco-social competence. To accomplish this competence, it is also important to develop critical thinking, which Bertrand defines as:

> students become aware of the problems of the society in which he or she lives. This focus on problems should be critical and should bear upon the experience of the student, for the point is ultimately

> *to take control of one's culture and history, and . . . students should* become conscious of the values that they have internalized. Students should remove the mystery from the dominant ideology, liberate themselves from the values of the dominating class, and give themselves and "admiring" vision of their own culture. (150)

Building on these concepts, this curriculum will establish five goals:

Environmental literacy: Of great importance is a new basic environmental language that needs to be developed and used to explain Peru's environmental issues and its state of emergency. The meaning and consequences of environmental awareness, environmental ethics and sustainability have to be clear to every individual. Students need to know the meaning and the context of significant terms that include: pollution, organic and inorganic waste, plunder, overuse, misuse, reuse, and recycling.

Integration and interconnection: Peru's living ecosystem is integrated in all its natural and cultural components. Its integration reflects negative consequences when one of its components is affected by overuse, misuse, or plunder. Curriculum and teaching need to interconnect with the eco-system in all areas, such as communication, mathematics, social studies, science, and religion. Every Peruvian should recognize that land, water, air, and energy form a single interconnected living ecosystem; and any individual, communitarian, or economic action that affects the environment also has serious implications for the whole ecosystem and actual survival of life itself.

Vision: Environmental Sustainability advocacy should yield greater dividends in better living standards as one envisions all students becoming caring citizens that protect and preserve the resources for their own generation and for the future. In that way teaching will serve an urgent purpose to live better and ameliorate poverty; insuring in that way that education serves its role. This educational vision should also guide all future professionals, scientists, technologists, and politicians to be advocates of environmental ethical sustainability.

Creativity: Education and motivation of creativity are inseparable. Educational programs and curriculum must view the designing processes, inventions, and artifacts of scientists, engineers and practitioners as projects that protect the ecosystem.

Memory: Education transmits knowledge and includes history of past generations. One should introduce a socio-historical-environmental memory that recognizes historical patterns that are detrimental to the environment and should be avoided in the future. To recognize Pre-Hispanic environmental sustainability in teaching Peruvian history will underscore the contrast of that approach with the subsequent plundering of the conquering Spaniards that still persists in new guises.

Theories of Environmental Awareness, Environmental Ethics, and Sustainability from a Personal Perspective and the Peruvian Laws:

Environmental awareness, environmental ethics, and sustainability, are the three supporting sets of ideas that inspire this study. These principles are the

best approach for Peru's reality, because to be involved in the preservation of the Environment becomes a part of one's a personal integrity and is a duty to keep resources for the future.

Environmental Awareness is present in Peruvian Laws and the Environmental awareness as a concept has been defined clearly by the General Law of Education No 28044 or Nueva Ley General de Educación No 28044, by the Consejo Nacional del Ambiente Law No 28611 or Environmental National Council and by the Diseño Curricular de Educación Básica Regular: Proceso de Articulación based on article 29 of the Ley General de Educación Peruana as the knowledge and conservation of the surroundings and as "La exploración del ambiente reconociéndose parte de él, así como, en las acciones sobre los objetos y seres, propiciando una actitud de curiosidad, interés y respeto hacia la naturaleza" (Diseño Curricular 135) ["The exploration of the environment and recognizing oneself as part of it, as well as in the actions over objects and beings, generating a curious, interested, and respectful attitude toward nature" (my translation)].

Most of Peru's official educational objectives and goals are geared to get the nation interested in creating sustainable development. It is education suited for the work place and the consciousness of the environment, or in Spanish "conciencia del entorno." As such, it is part of the science and technology and innovation objectives. The Consejo Nacional del Medio Ambiente (CONAM) delineates the commitment to protect the environment by using the environment in a sustainable way and to be part of a sustainable development for the country.

This law encompasses environmental control and connections while it relates to educational measures reinforcing the same objective of sustainable development. It also includes NGOs working on projects in favor of the environment. This relates to CONAM's legal controls and regulates productive and economic development, but because it requires civil participation, the citizens need to be educated in the environment and sustainability. Even though CONAM is an institution of control it has an educational program with pilot schools that signed up to impart environmental awareness programs, and those programs are set up to give schools and students the opportunity to implement the CONAM approach to instruct in this matter.

Environmental Ethics

Environmental ethics explores the ideas of humanity and nature and the effects of human actions over the environment. As Anna L. Peterson explains, there are connections among ideas about nature, humanity, and environmental ethics. These relations are culturally and historically variable, theoretically complicated, and politically vital. The environment may suffer due to human intervention, and this depends on the quality of human actions:

> In exploring them, [the ideas] we face central issues regarding the shape of our communities, the destruction of our natural environment, and the character of moral discourse. Rethinking our different natures can illuminate both the need for and the *possibilities of transformation. (2)*

Peterson emphasizes two aspects that any idea of human nature has ethical implications and that all ethical systems rest upon certain ideas of human nature, in other words human and ethics are closely related (Peterson 3). The relationship between humans and ecology leads us to specify conclusions about human nature and society or community, and Peterson explains that a person is part of nature to the extent that he or she too is a relational junction within the total field. This represents, perhaps, the logical extreme of the more general ecological insistence that humans, like all other individual organisms, exist only within tightly and connected webs of interdependence (Peterson 179).

Aldo Leopold, in his work A Sand County Almanac and Sketches Here and There comments that ethics refers to the integration of the individual to society and extends that integration to humans and the environment. For him, land is not merely soil; it is a fountain of energy flowing through a circuit of soils, plants, and animals. In his idea of "Land ethics," Leopold's view is clarified in the following statement related to Earth and how humans should preserve nature and land: "A thing is right, when it tends to preserve the integrity, stability, and beauty of the biotic community. It is wrong when it tends otherwise" (225). Clare Palmer in her work, Environmental Ethics and Process Thinking, notes that Leopold and Baird J. Callicott state that ethics is reflected in behavior: "ethical behavior is behavior aimed at achieving certain states of affairs . . . [and] this is characterized as the good of the community, albeit the human, mixed or biotic community" (155).

Furthermore, Lisa H. Newton brings an inclusive explanation about environmental ethics and sustainability, which involves the preservation and stewardship of the environment in a most complete set of ideas, directed toward understanding the personal duty to preserve the environment for future generations. She states: "No practice shall be regarded as sustainable unless it can be continued without degrading the environment that nurtures it through their seventh generation from its initiation" (5). Newton also stresses that "laws and regulations are weak reeds on which to lean the preservation of the world . . . the point of environmental ethics is precisely to extend the sphere of moral concern to an indefinitely (not infinitely) large community of living things" (19). The importance of bringing up human beings to be strong and self-controlled rather than weak and self-indulgent plays a role in the definition of preserving the environment from the personal perspective. So every person, whether he or she is at home, work, governmental office, laboratory, in a managing position, or as a technological advisor, should feel the duty to preserve the environment ensuring that the environment is preserved and does not interrupt its cycle of connectedness and harmony. If we were to obey only the law, we have two options: either to be rewarded because we comply, or to receive punishment because we do not comply. Environmental ethics does it from a personal perspective; the behavior or actions over the environment do not require punishment or reward. One does it because it is a duty, it is good, and it is ethical and ingrained in the personal or individual ethical character.

This Proposed Curriculum Will Address Four Areas of Environmental Ethics

Education and environmental awareness require the ethical and philosophical support to make to the sustainability status work. Humans are the only ones able to distinguish what is right and what is wrong, so it is basic to instill early in life ethics and understand well the consequences of our acts since we have in Peru a case of 500 years of environmental indifference toward the resources.

Personal responsibility: Responsibility comes from knowing, understanding, developing attitudes, and being actively involved with the environment. Education is the key needed to install in each individual the responsibility to help reduce poverty and provide for himself / herself better standards of living as well as for future generations, by defending and protecting resources.

Caring: *Through the curriculum, students will be taught to care for Peru's integrity, stability, and beauty. Teachers need to develop in students an attitude* of caring, protecting, and preserving natural resources, following Leopold's advise to protect the environment in its "integrity, stability and beauty" (225). Moreover, Nel Noddings in The Challenge to Care in Schools: An Alternative Approach to Education explains that: "to care and be cared for are fundamental human needs . . . we need to be understood, received, respected, recognized" (xi). In relation to the environment, she suggests that schools can be organized as centers of care. Noddings also points out that:

> Caring for the soil is one part—a major part—of caring for the environment. We live in an age of increasing concern about air and water, pollution, ozone depletion, overpopulation, loss of forest, and extinction of species and subspecies. But, our commitment is undermined by a continual press for progress and expansion, by demand for resources, and of course by greed. Schools give some attention to environmental problems, but they are not giving enough to the development of caring human beings . . . students need to be involved in a personal, concrete way. (135)

Defense of resources: To teach how to care and preserve water, air, land, energy, and resources in Peru is urgent. To care for natural resources will guarantee the defense of human and environmental health. The absence of cleanness, care, and order will have negative effects on the quality of the environment and all of Peru's ecosystem and human health.

Reduction of pollution and waste: Education should teach how to apply the principles of reducing, recycling, and reusing to avoid polluting vital resources such as water, land, air, and biodiversity.

The Ethical: Environmental Ethics, Consequentialist and Practical Philosophical Theories:

If ethical considerations were at the core of everything we do, we would have a renewed and improved vision of our people, community, world, and the ecosystem's well being. There are some basic notions we need to revive for Peru. We need to review the virtues and values forgotten, or not considered by,

our present society. It is appalling to observe that actions and behaviors in Peru's economic, political, and administrative spheres do not take into consideration many actual or future consequences of their acts and decisions over the environment and life itself. The indigenous Aymara people still today are living around the Lake Titicaca Basin continue to respect the three golden rules of the Empire of the Sun they "have well kept: Ama suwa, Ama quella, Ama llulla (do not steal, don't be idle, and do not lie) the contact with other civilizations has not been able to destroy the profound identity of the Inca way" (qtd. in LakeTiticaca). So, it is wise to remember that the Incas had a code of behavior, which emphasized the following behavior: Thou shall not lie, thou shall not steal, and thou shall not be lazy. These simple basic moral rules were supplanted by opposite rules and behaviors during the Conquest. We need to clarify that to lie is not acceptable, not transparent, not moral, and not ethical. In Peru, as in any part of the capitalist world, there is a specific dilemma: to employ (or not) aggressive marketing. Marketers, as individuals, need to challenge their creativity and recall or learn ethical principles to advertise honestly not inflating qualities or selling only instant reward or pleasure. There is no excuse for marketing tactics that go against people's health and the integrity of the environment. It can be argued that today this is the way of business as usual, but as we have already discussed, business as usual is losing cachet, prestige, and credit.

Mark Timmons explains the role of moral principles within his concept of moral theory in Conduct and Character: Readings in Moral Theory, as the "general moral statement that purports to set forth conditions under which an

action is right or wrong, or something is good or bad" (6). He adds that: "we now know that ethics is concerned with the moral evaluation of conduct (rightness and wrongness) and with character (goodness and badness of persons). In addition we have learned that ethics is also concerned with the moral value (goodness and badness) of things, experiences and states of affairs" (7).

According to Jeremy Bentham's principle of utility, "the morality of an individual action depends on how much utility that action would produce, where utility is mentioned in amounts of pleasure or pain. Because the focus is on the effects of concrete actions, this view is 'act utilitarianism' (qtd. in Timmons 102). It is reflected in the: "property of any object to produce benefit, advantage, pleasure, good or happiness to prevent the happening of mischief, pain, evil, or unhappiness to the party whose interest is considered; if that party is a community, if a particular individual, then the happiness of that individual" (qtd. in Timmons 103).

The consequentialist and utilitarian view starts not with moral rules but with goals. Peter Singer proposes the following: "Let us take first the oft-asserted idea that ethics is relative to the society one happens to live in" (4). He clarifies that:

> They [consequentialists] assess actions by the extent to which they further these goals. The best known, though not the only, consequentialist theory is utilitarism. The classical utilitarian regards an action as right if it produces as much or more of an increase in the happiness of all affected by it than any alternative

> *action, and wrong if it does not. The consequences of an action* vary according to the circumstances in which it is performed . . . a utilitarian can never properly be accused of lack of realism, or of a rigid adherence to ideals in defiance or practical experience. (3)

Environmental Ethics and Sustainability Learning Spaces or Curriculum will address six areas of ethical emphasis.

Truth: Education should establish the connection between truth and personal responsibility.

Personal responsibility: Education must reinforce the idea that acts and behavior affect the environment. This encompasses not only personal actions, but also actions taken in the economic, corporate, and political spheres.

Critical thinking: Education must cultivate critical thinking skills to pursue the truth and be able to assess the consequences of one's own personal acts over the environment.

Transparency: Education should cultivate in students the traits of goodness and transparency, and highlight how these values are lacking in Peru's present culture and how such deficiency imperils the nation's resources. It is different slightly different from truth, since in Peru the economic, politic, and educational systems make a point that everything should be transparent regarding open information and disclosure. We look to get across effectively the resources and environment transparent care.

Strength of character: Education should cultivate strength of character, so that students who are interested in a career in politics have the ability to avoid corruption and resist the temptation to accept political bribes.

Ecological Design: Harness human creativity for the good of the environment: Every class or home space is a laboratory in which to teach students to understand the power of creativity within themselves, which then they can employ to craft and built environmentally sustainable entities, processes, projects, and machines. The recognition of good design requires direction. Education has a privileged position because it can give students examples / cases of mistakes of design or designs whose sole objectives, were profits or plunder. A discussion of "superficial" design can also be broached as well as the notion of "facilismo and indiferencia peruana" ("Peruvian easiness and indifference"). Scientific-technological creativity needs to be rooted early in life in school. If men have gone to the moon, it is because some educators and curriculum helped them to get there. Peru's educational system should challenge the routine in teaching and prepare future and present engineers, scientists, designers, and technocrats to exert their knowledge, skill, and creativity to craft environmentally-friendly industrial machinery, equipment, and technologies. The study of history and archaeology should enable these professionals to team up with other professionals and find what Peru's ancestors did to manage agriculture, environment, and hunger, for these are areas where the Inca's successful traditional technologies are still alive. Teachers need to motivate and guide students because these goals are within students' reach.

Summing up this curriculum intends to answer the urgent need to educate Peruvians in the preservation of resources, emphasizing thinking about the consequences of disrespect, irresponsibility and carelessness with regards to the valuable water, air, and land resources. It seems that environmental elements and resources are scare or misused, and human health is at peril. That is why this curriculum seeks its support in educational, environmental, and ethical theories that could someway educate the new generations to stop the dire state in which the environment is these days.

Chapter Four

Environment Ethics and Sustainability Learning Spaces: Curriculum, Guidelines, Pedagogical Practices, Readings and Suggested Ideas

This Curriculum is organized into "Environment Ethics and Sustainable Learning Spaces" and it is intended to aid Peru's public primary education teachers to teach the theory and practice of Environment Sustainability and Ethics to first cycle students and perhaps, the community as well.

Each segment is divided into three sections:

"**Pedagogical Practices,**"

"**Reading Materials**," and

"**Suggested Ideas.**"

The program can be used in a traditional classroom, through televised lessons, or Websites, which may facilitate the diffusion of the Curriculum to neighboring countries who share the Inca Heritage, Lake Titicaca, and the Amazonian Rain Forest.

Even though article 33 in the Peruvian Education Law specifically establishes the Ministry of Education's responsibility in creating the National curricular structure for the whole nation, this dissertation will contribute these Pedagogical Practices for Environment Ethics and Sustainability Learning

Spaces education with the hope that they will be taken into consideration by the ministry. The ministry's directive is also explained in the Diseño Curricular Nacional de Educación Básica Regular of November 2005:

> El Ministerio de Educación es responsable de diseñar los currículos básicos nacionales . . . el Diseño Curricular Nacional constituye un documento normativo y de orientación válido para todo el país, que sintetiza las intenciones educativas y resume los aprendizajes previstos. (10) [40]

The Pedagogical Practices are central in this dissertation and cover the important area of "Environmental Ethics and Sustainability of the Resources" because of its transcendental role and the relationship between ethical sustainability of resources and poverty. This area correlates with other areas because of the linkage with the entire natural and cultural resources of Peru.

"Four Pedagogical Practices" for Peru's Public Education are designed for primary teachers of second level, first cycle students, relating environmental aspects in their daily relationship with the ecosystem

The equivalent in the United States would be the first four years of elementary school. These pedagogical practices target Peru's major environmental problems: **waste, water, land, and air.**

Development of Environmental Literacy, Ethics, and Sustainability Curriculum Guidelines:

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[40] [The Ministry of Education is responsible for designing basic national curricula . . . [and] the National Curricular Design constitutes a normative and guiding document applicable to the entire country; it synthesizes the educational goals and summarizes all the knowledge expected (my translation)].

Objective: To assure progressive pedagogical and curricular coherence in the integral formation of students based on the use and understanding of the words' and concepts' real meaning, their ethical weight, and their orientation to sustain the environment. Since these are related to students' immediate survival they are connected to the preservation of natural resources. It is intended that the individual apply them at every moment, in any space where he or she carries out his or her daily endeavors, always thinking about the future consequences of those actions.

1-Area: Environmental Ethics and Sustainability and Environmental Literacy.

2-Timetable: corresponds to one school year in Peru during the first four of primary; ages 6 to 9 years. (Equivalent in the United States to the first four years of elementary schooling.)

3-Learning Outcome: Understand in every-day life, location, and situation what is affecting the ethical environmental sustainability and not be mislead by actions, words, or concepts that are not sensible to the environment. For example: understand the meaning of ecosystem, elements, trash-waste, pollution, rain forest destruction, highland, coast, deserts, gas, development-production, work offer. In more practical terms, to define and explain accurately these terms so they are readily applicable to everyday life and be sure to avoid unwanted consequences in the environment.

4-Subject contacts: The area "Environmental Ethical Sustainability of the

Resources" needs to establish connections with other areas such as communication, science, social studies, and religion.

5-Competencies:

A-Students achieve knowledge and understanding of the ecosystem's components, which means that every element is related and connected to each other. Any human action exerted on the ecosystem will necessarily influence the environment in some way. That is why students need to relate to the environment constantly.

B-This understanding allows students to speak of and participate actively in the care, cleanness, and conservation of their surroundings in the classroom, school, home, community, shantytown (poor human settlements), city, and nation.

6-Capacities and attitudes:

A-Students observe, discover, and identify different main elements of their surroundings, knowing their names and identifying different elements of their landscape and habitat. On the coast: oceans, deserts, valleys, peninsulas, beaches, Humboldt current, el Niño current; in the highlands, peaks, mountains, streets' main squares, avenues; in the jungle: rain forest, rivers, lakes, ponds. Students will learn about seasons and atmospheric conditions: dry, rainy, humid, cool, and hot climate.

B-Students observe, understand, and identify the life cycles of human beings: childhood, adolescence, young adulthood, maturity, and old age. They will examine social or ethnic groups: native, Indian, mestizo, Spanish, and European. They will explore stages of health: healthy, sick, and closeness to dead. They will

understand gender: man and woman (male and female) as well as masculine / feminine roles.

C-Students observe, understand, and identify forms of animal life. From the *coast: fish, mollusks, shrimp, birds, mammals, domestic and farm animals, such* as cattle, sheep, pigs, horses, donkeys. From the highlands: llamas, vicuñas, alpacas, and native species. From the rain forest: insects, butterflies, leopards, pumas, toucans, snakes, spiders, etc.

D-Students observe, value, and care for sites related to mineral resources: gold, silver, coal, gas, and other minerals.

E-Students observe, understand and identify cycles and life of plants: flowers, produce, fruit-trees, timber, vegetation, fodder, native plants, and medicinal plants.

F-Students should be able to know, speak, understand, cherish, and cultivate their environment and cultural heritage, identity, art, and traditions, such as: myths, legends, popular sayings, dances, songs, archaeological sites, popular art, typical food dishes, special religious processions, and rituals for social ceremonies, and ritual ceremonies for Mama Pacha, (mother earth) the forest, land, crops, lakes and oceans, and mountain peaks or "apus."

G-Students can address actions or activities to help restore quality, integrity, health, and beauty of human beings, animals, and plants. They should know about natural disasters and how to get protection, as well as to learn to protect others and the habitat of animals and plants as well.

Suggested year-round activities with the students:

- Maintain in the school a corner for ceramics or other remains that may be found in the area.
- Keep a record of places known as Inca or Pre-Inca cemeteries in Spanish "Gentilares."
- Record and comment on practices that were known to their Peruvian ancestors especially if they were related to the protection of the environment or preservation of the resources. For example, in Lima it was possible to have fresh tasty "Lisa" fish year-round, because of the knowledge and fishing practices at the Pacific entrance of the Rimac River.
- At home raise guinea pigs or "cuys" and once a year have a celebration having for lunch "Cuy Chactao" or guinea pigs cooked over hot stones.
- Revive the pit cooking "pachamanca" where the entire school can enjoy a delicious and natural lunch. The Inca kitchens or ovens **do not** produce green house gases, and human creativity can develop simple methods to control cooking smoke.
- Practice the typical Peruvian dances, the Huayño (Inca dance) and the marinera (Mestizo Dance).
- Sing and listen to Peru's music. Play Peruvian musical instruments, pututos, sampoñas, quenas.
- Choose a day when students can bring some of the vegetables they grow at their small home gardens, and make a salad with them, get the parents involved.

- Keep a record and the seeds of the region's native plants that could feed hungry people in the future. Plants such as maca, quinua, quihuicha, ocas, racachas, llicchas should be protected from biological engineering and manipulation.
- Inform and discuss the nutritional value of potato chips and coca cola in contrast to potatoes cooked or grilled over a pit.
- Bring to foreground or emphasize how the Incas practiced mutual cooperation and solidarity in times of emergency.

7-Class activities with the students:

A- Suggested hands-on pedagogical modules such as the waste module for the first four years of primary school.

B- Reading stories that support not only environmental awareness but also fundamental environmentally ethical sustainability from a personal perspective.

Pedagogical Practices Modules about Waste

1-Objetives: Teach, educate, and familiarize students with the types and sources of residues, waste, and trash.

2-Methodology:

Through experience, participation, exposition, and demonstration.

3-Concepts and Knowledge:

What are solid residuals?

Where are they manufactured?

What are organic wastes?

What are non-degradable wastes?

Make distinctions and separate: paper, carbon, plastic, aluminum, stainless steel, glass, organic matters, and others.

WASTE Module (In the classroom) First Grade

1-Discuss environmental misuses, overuse, and waste of paper, plastic, and what is inorganic and organic waste. (connect with communication, science, and mathematics)

2-Explain how paper and plastic are produced. (connect with science)

3-What is the resource used to make paper? (connect with science)

4-Why should paper not be wasted? (establish ecological consequences and connect with science)

5-How do the paper and cardboard industries work? (connect with sustainable development: Pollution and extermination of trees, science and social studies)

6-How can we save trees? How do trees affect human health and participate in ecological equilibrium (connect with care, responsibility, preservation, connect with social studies)

7- How have plastics and the production of plastics contaminated our land, water and air? (effects of contamination over the ecosystem, connect with science, and social studies)

8-Why is it important to separate plastic and inorganic waste such as cans, bottles, and containers from organic waste? (connect with social studies)

9-Students, with the teacher's help, formulate solutions to waste problems. (connect with religion and ethical consequences)

WASTE Module (at Home) Second Grade

1-Direct students to closely observe their surroundings and make an inventory of the misuse, overuse, and waste of resources that they can identify. Pay particular attention to the handling of organic and inorganic waste at home. (connect with science, and mathematics)

2-Guide students in finding better ways to use, reduce, reuse, and recycle. Use and come up with creative ways for improving the disposal of organic waste. For example, they could start a project where they take care of a little plant or garden using organic fertilizers and reused water. As far as inorganic waste goes, students should learn to take this waste to recycling centers. (connect to science, mathematics, and with ethics, design, and creativity)

WASTE Module (in the Community) Third Grade

A-Students should become familiar with the waste disposal sites in their community.

B-Design a project where the students along with their teachers, parents, and family do something that helps their community. Such as: "Adopt a Tree" ("Adopta un árbol") or "Create a Green Corner" ("Crea una zona verde").

C-Students make a project to plant trees around the community; preferably native species that can adjust to the local environment.

D-Students consider and locate the Pre-Hispanic or Inca warehouses that preserved goods and materials for future needs. (connect with history)

WASTE Module (Connecting the classroom, home, community, authorities, and school for the benefit of the present generation and learn responsibility to care for the future well-being of the country) Fourth Grade

A-Organize a campaign to collect, in a little warehouse, things students no longer want or need such as paper, pencils, erasers, notebooks and deliver them to help other students in need.

Pedagogical Practices Module about WATER

1-Objective: Familiarize students with the types and sources of water. Understand that water is one of the most vital elements in the conservation of human health and that it influences other elements of the ecosystem. Familiarize students with the undesirable situation of polluting water and with the care and protection of each drop of water.

2-Methodology: Through experience, observation, participation, and demonstration.

3- Concepts and Knowledge:

What is water?

What are water's characteristics?

What types of water can we find?

What is scarcity of water?

What is contaminated water?

What is the influence of water on life?

Make clear the uses of water by industries, corporations, and private homes.

Make clear the need to protect water.

WATER Module (In the classroom) First Grade

1-Discuss absence of water related to sickness and health. (connect with science)

2-Discuss water misuse, waste, and contamination. (connect with science)

3-Explain where water comes from to the school. (connect with social studies)

4-Discuss and give real examples why and how water is wasted. (connect with social studies and science)

5-Who uses water in industry and for what purposes? (connect with social science)

6-How does water get contaminated, what are domestic contaminants? (connect with science)

7-Establish the difference between fresh, potable, ocean, and contaminated water. (connect with science)

8-Encourage students to offer solutions to the scarcity of water in their own community counting on the water that the region, city, or villages have. (connect with science)

WATER Module (At Home and in the Community) Second and Third Grades

1-Direct students to observe closely their surroundings and make an inventory and conditions of water faucets, bathrooms, washing activities, and spaces where water is used. (connect with science)

2-Guide students to check on bad or malfunctioning connections on faucets and in bathrooms that have waste water leaks. (connect with science and social studies)

3-Guide students to be aware of the potential absence of water and what containers are best to keep water the longest and in the best possible condition. (connect with science)

4-Guide students in how to sanitize water by boiling, adding chlorine and/or filtering methods. (connect with science)

WATER Module (Connecting the classroom, home, community, authorities and school for the benefit of the present generation and accept responsibility to care for the future well being of the country) Fourth Grade: Organize a small campaign to protect water from waste by checking around what is wrong with pipes, faucets, hoses, and bathrooms. Form a small pool of parents who know how to repair those imperfections and return them to an acceptable condition. The campaign can be called:

"I ♥ Water"

"Remember Water Day March 22."

"A Vital Drop of Water"

"I Love a Drop of Clean Water"

"Protect Water and Share Water"

Pedagogical Practices Modules about Land

1-Objective: Care for the small piece of land we live on. Teach about and note the buildings, houses, facilities, highways, landfills, soil, surface, oceans, atmosphere, forests, deserts, beaches, and river shores. Know where there are agricultural areas, industrial areas, and military areas; public and private spaces and buildings; contaminated or sick lands.

2-Methodology: Through experience, visits, exploration, exposition, participation, and demonstration.

3-Concepts and Knowledge:

What is the Earth?

How do oceans, lakes, ponds, marshes, and rivers connect with the soil?

How is the atmosphere a part of the earth?

How highways unite but pollute?

What are urban, rural, agricultural, and green forest environments?

What are residential, commercial, and industrial zones?

What is volcanic land?

What are coasts, highlands, and jungles?

What is the green forest?

What are natural disasters such as landslides, earthquakes or volcanic activity?

What are flooding and tsunamis?

How do these parts interact in the earth ,water, air, oceans, rivers, ponds, lakes and forests,?

LAND Module (In the classroom) First Grade

1-Discuss the piece of earth where the class is located. See what organic beings and inorganic properties there are in your area. (connect with social studies)

2-Explain why there are or there are no trees, flowers, birds, or other animals in some areas. (connect with science and social studies)

3-Discuss why the land is productive or not productive. (connect with science)

4-Discuss local land disasters. (connect with science)

5-Discuss how people protect themselves from those disasters. (connect with science)

LAND Module (at home and in the Community) Second and Third Grades

1.Make an inventory to recognize urban, agricultural, archaeological sites. (connect with social studies, history and science)

2-Make a recognizing inventory of resources that the land and communities in your area have.

(connect with social studies and science)

3- Recognize how commercial and industrial facilities treat the land. Do they pollute the land? Do they use toxic substances or elements? (connect with science and social studies)

4-Guide students to repair and beautify any spot that needs a clean up or help to promote a special site. (connect with science and social studies.)

LAND Module: (Connecting the classroom, home, community, authorities, and school for the benefit of the present generation and learn the responsibility to care for the well-being of the country) Fourth Grade

1-Organize a campaign to help to be responsible, overcome indifference, or let someone else do it, or "facilismo." (The Spanish word "facilismo" conveys the same sense as the English expression "Let George do it.) One avoids responsibility by expecting someone else to solve a problem.

"United we can clean, plant, care for, and protect our animals, plants, and land." (Nosotros unidos podemos limpiar, plantar, cuidar y proteger nuestras plantas, animales y tierra.)

"We can help others to rebuild their houses."

"We can help after an earthquake."

"Let's celebrate Earth Day on the 22nd of April."

"Let's eat salads and fruits from our small orchards."

"Let's plant a small orchard."

"Let's have one cactus in every house."

"Let's have an eucalyptus in every yard."

Pedagogical Practices Module about AIR

1-Objectives: teach, educate, and familiarize students with the atmosphere and good, healthy air.

2-Methodology: Through experience, participation, exposition, and demonstration.

Concepts and Knowledge.

What is the earth's atmosphere?

What are the parts of the atmosphere?

What is air pollution?

What is air radiation exposure?

What is the altitude effect in the highland and in the coast?

What is indoor and outdoors air quality?

What is industrial, mining, or cement production pollution?

What is smoke in the cities and factories?

How does air pollution relate to health problems?

How did air get polluted by vehicle emissions in cities such as: Lima, Arequipa, Chiclayo, Trujillo?

AIR Module (In the classroom) First Grade

1-Discuss the quality of air that the classroom has. (connect with science)

2-Discuss the natural illumination the classroom and the school have. (connect with science)

3-*Discuss whether the air in the classroom and in the school is clean or not, and if not what to do about it.* (connect with science)

4-Discuss why the air is so unclean and heavy in streets where there are many cars. (connect with science)

AIR Module (At Home and in the Community) Second and Third Grades

1-Discuss how one can prevent fainting if there is fire, too much smoke (or a tear gas bomb.) (connect with science, social studies)

2- Direct students to feel and breathe unpolluted air and know why polluted air has bad consequences for the respiratory system. Try to go on an excursion to a clean air location. (connect with science and social studies)

AIR Module: (Connecting the classroom, home, community, authorities and school for the benefit of the present generation and the responsibility to care for the well-being for future needs) Fourth Grade

1-Establish and practice a drill in order to evacuate in case of *fire, earthquake or volcano eruption. (connect with social studies and science)*

2-*Help to protect trees, plants, and flowers.* (connect with science)

3-Lobby with authorities to have mining, cement, and paper industries adopt *effective technologies to clean the air for the sake of the population respiratory* system. (connect with science and social studies)

4-Lobby with authorities and newspapers for the cleanness of air by asking to have car engines in good condition. Point out the importance of constant

mandatory inspections and lobby for them to prevent accidents as well as respiratory infections. (connect with social studies and science)

5-Lobby for the installation or reinstallation of trains or trolleys for mass transportation. (connect with social studies, and science)

Readings: Short Stories written by this dissertation's author for students 6-12 years old to be used at the teachers' discretion to motivate environmental ethics and sustainability

Pasña and Lake Titicaca

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[For the module on water's importance]

First part.

It has been more or less 2,000 years!

. . .

And . . . from mouth to mouth, comes the story of Sacred Lake Titicaca, the highest lake in the world, which lies between Peru and Bolivia. From its transparent Andean immensity, from its pure, cold, and serene waters, the first Inca couple, Manco Capac and Mother Ocllo, arose and became Peru's first ancestors. Their father, the Sun, asked them to come out of the depths of the lake. He gave Manco Capac a golden rod and told him: "There, where this rod
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sinks, you will found an empire. And you will teach men to protect and care for their families; how to build and keep up their houses; how to build roads, palaces, warehouses, temples, plazas, bridges, aqueducts, cultivation terraces; how to cultivate the land, how to make tools and weapons; how to take care of animals." And to Mother Ocllo, her father, the Sun, said: "You will teach women how to raise and take care of their children; how to cook, knit, and clean; how to take care of the house and small animals; and how to grow and harvest plants." And then, Father Sun told Manco Capac and Mother Ocllo: "You will teach men and women how to adore 'Inti,' their Father Sun, and 'Killa,' the Moon, and the 'Chascas,' the Stars, and thunder and lightning; and to take care of and honor Mother Earth, 'Mother Pacha,' and Mother Water, 'Mother Cocha,' the hills, the mountain peaks (Apus), the seas, all trees, the plants, the fish, the birds, all animals, and all living creatures nourished by Mother Pacha."

And Manco Capac and Mother Ocllo founded the Inca Empire and obeyed all of their father's Sun Commands. They took good care of the earth, the waters, the hills, and Mother Nature. And . . . they worked in solidarity and in mutual cooperation, and they had enough so as not to go hungry or thirsty, and they had so much that they were able to save food for the times of drought, war, catastrophe, or unexpected events.

The Inca Empire founded by Manco Capac and Mother Occllo lasted several centuries.

And . . . their government flourished and more than fourteen Incas reigned. The Mother Tradition of the Incas can be seen today in cities and

towns, in their roads, temples, plazas, and monuments; in the arts and crafts of Peru. This tradition is also evident in history, alive in burial grounds and temples, painted in ceramics, and multicolored textiles, as well as in architectural remains. Some Peruvians have not lost their memory, and in their hearts beats, and still beats the essence of their Inca blood.

Second part:

And toward the year 1530 of our era . . . it happened that other people and other gods came from faraway lands, and they brought different customs and ways of life, and they got mixed with the inhabitants of the Inca Empire . . . and it happened that many of the mestizos born of the Incas and the foreigners forgot the promises their ancestors had made to Father Sun, promises which had allowed them to become a powerful nation to live without being thirsty or hungry, and to live harmoniously and with the support of others. . .

Third part:

. . . it has been four years that I dream, and in the stupor of my dream, I hear the voices of the waters of the Sacred Inca Lake and of Pasña, the Andean girl. They have an important message.

. . . It took four years for this message to make it to this paper and to **the ears of four guardian angels—two men and two women, two have golden hair, and two have dark hair—today,** they too read the message that Mother Water and Pasña explained as follows:

"I am the voice of Mother Water: of lakes, and fountains
of the water in the rivers, streams, and oceans;
I flow as one current!! I am water!! I am life!!
I am one with the earth and the stars!!

I am the voice of the tears shed by the Incas
and that are stored in Lake Titicaca;
I am the voice of the tears shed by her children,
and I repeal those who blemish, who pollute the lake!!
I am a whole together with the earth and the stars!!

I am the mother-of-pearl shell horn whose call can be heard,
throughout the four corners of her people's world:
that there are irreverent beings who have signed
against the life of Peru's and Bolivia's thirsty children!!!
I am a whole together with the earth and the stars.

I know no boundaries.
I am the present voice of the tears of the eyes
of those who saw the last assassinated Inca;
I am the voice of the Inca blood that lives in all of Peru's blood.
I am the voice of truth that calls out to the forgetful child:

I am one with the earth and the stars. . .

I call out to the absent one, the deaf one, the indifferent one, the liar, . . .

So that they may respect, clean and preserve the lake's waters

and all the waters, pure waters, living waters, clean waters

I am one with the earth and the stars.

I am the limpid voice of memory's eternal spring

that looks for the last pure and clean drops of Lake Titicaca.

and hands them out to the boys and girls of Peru and Bolivia,

and multiplies them for the mothers who nurse their children!!!

I am Mother Water's voice, my life is their life:

Listen to my voice!!!!"

And it came to be that Pasña, the youngest of the children of the peasants who lived between Peru and Bolivia, went out to gather bulrushes along the shores of the Sacred Lake of the Incas, and she also heard the voices of the wind, the earth, and the mystic cool mist of Titicaca's water and having as witness the Sun, who burns the bones and the blizzard that cuts through the lips, asked her the following: "Tell the miners to stop poisoning my shores and my waters, that their children will drink poison instead of water if they do not stop polluting my depths and my shores."

And so it came to happen that Pasña, the rosy-cheeked girl with eyes as beautiful as stars in a dark night, with braids as long as plaited bulrush vines, the swift runner who is as quick as the high tableland's wind, the one who is strong

as the high peaks of the Andean mountain range: Pasña told the truth and shouted it out to the four winds; and asked for the last remains of clean water for the poor who live around Peru and Bolivia. Pasña speaks out for girls of Inca blood, asks for waters to be taken care of, for the cycle of life to be protected before it's too late.

Questions to answer after reading this story:

1- What types of people lived in Peru before the Spaniards came?

2- Did Inca people go hungry and thirsty?

3- What kind of command did father Sun give the Incas regarding the ecosystem?

4- How did the Inca people work?

5- Who came to the Inca Empire in 1530?

6- What happened with the advice father Sun gave to the Inca people?

7- Why did Mother Water call herself Mother Life?

8- Is it true that water is an element interconnected with land and air?

9- Why did Mother Water cry for the children of Peru and Bolivia?

10- What consequences did Mother Water anticipate as a result of contamination?

11-What action or behavior did Mother Water order to stop?

12- Is it good to protect and care for water? Why or why not?

13- What consequences are to be expected if Lake Titicaca's water is contaminated?

The 500-Year-Old Hanging Inca Bridge

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Small, hanging Bridge, Inca Bridge,

that weaves and keeps the lost steps of the Chasquis,

their races of carrying fruit;

or the Incas going through with their litter,

the Inca in a golden litter.

Big Bridge, bridge on equal terms

between the mountain range

that scrapes the light-blue sky

and the profound, powerful river that moves restlessly,

and the defying echo of the mortal Andean abyss.

One of the most magnificent lessons in Inca creativity and technological inventiveness is the Hanging Bridge of Apurimac, Peru. It is a symbol of ethical sustainability protecting the environment because of the valuable service it offers the community, because of the low cost of the materials used to build it, and because of the organized nature of the community labor force. Moreover, it's a rare example of individual and teamwork in which the distribution of chores is impeccable and allows for the reconstruction or the maintenance of this hanging bridge in the short span of three days. The bridge is located in an area that is hard to connect, but the bridge is extremely needed in the life, transportation, and communication of these people. This important bridge is built without polluting

the environment, and the design and work management fall in the hands of a "Master Constructor of Bridges," who inherited this trade form his father, who in turn had inherited it from his father.

Once a year, this Master puts out a call to the inhabitants of three nearby communities to come and work for three days in order to do maintenance work or repair the bridge while the Apurimac River's volume of water is low and work can be done without too much danger. The technological cleverness is inherited from the Incas and has survived for over 500 years in Apurimac, Peru. This Hanging Bridge unites the highest zones along the Apurimac River and undergoes maintenance once a year during a working festival.

Just by looking at the depth of the Apurimac River's bed, a person feels vertigo. That is why the members of these village communities, after the reencounter with their neighbors and surrounding nature, enjoy the fact that they are together and venerate nature with respect and love. They respect her structure and do not alter it, do not destroy it, they adjust to it, and they overcome the difficulties and go about maintaining the bridge that connects these villages.

When the Master Constructor of Bridges puts out the call, members of these three villages communities come. They start by gathering natural materials from the area, the Andean wild or bunchgrass that grows in the vicinity, and which women with great dexterity turn into cords or ropes and make them in the same way they were made in pre-Hispanic times.

They weave the bunchgrass with the palms of their hands like the Inca weavers used to do. The weaving techniques used in Inca times are used to make cords or ropes for the bridge. By twisting together two of these thin ropes, a thicker and stronger rope is made. With the double rope made by all those women, men can weave four thick cables that serve to build the base and the lateral supports of the bridge. These cables are stretched over the lower part of the river, and when the Master gives the order, they are hoisted, adjusted, and secured to big stones that help to secure firmly the bridge at the upper extremes. The space between the four cables is filled with more material woven into the walls as the open spaces of the floor and sides of the Bridge. In this way, there will be enough support for one year for the goings and comings of the nearby villagers and their goods. The Master oversees the entire construction process. Once the work is done, the bridge is dedicated and crossed for the first time.

The Hanging Bridge that connects the edges of the peaks of this dangerous geographical area remains as an offering from these communities and proof of noteworthy human ingenuity. It is an example of environmental sustainability of great ethical value, in which the needs of all the inhabitants and respect for Mother Earth are taken into account.

This short story serves to demonstrate the greatness of Andean technology whose fundamental characteristic has been to work with nature and the environment using ingenuity and intelligence in an ecologically responsible way in spite of the difficulties of geography. The uses of ecological design find

here a good example with which to illustrate the possibility of working with and for nature. The natural elements, the techniques, and the work spirit are as equally hard and tough to work with, but the able hands of those Inca women are not easily disheartened, and once this bunchgrass is woven, it is as strong as steel. We must recover those unforgotten age-old techniques in order to fight against misery and poverty. It is important to live with, and in favor of, the environment's sustainability in an ethical and communitarian way.

Questions: [to be answered by students after reading the story].

1- Do you think that the 500 year-old Inca technology can be improved upon by younger generations?
2- How can the example of individual or group work be applied in your school today?
3- Can we try to recover those Incan technological methods that did not contaminate the ecosystem? If so, how?
4- Can we try to recover and better the Incan approach to ecosystem sustainability? If so, how?

The Incas' Three Moral Rules

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[For the revaluation of ethical principles]

Ama suwa, don't steal.

Ama quella, don't lie.

Ama llulla, don't be lazy.

These were the golden moral rules of the Incas. Under these codes, the Inca Empire grew, and its greatness can be appreciated in the construction of works of great beauty, durability, and functionality.

A humming bird told me that:

If an inhabitant of the Inca empire drank chicha (fermented ground corn drink) and left his work, he was called to order and reprimanded and asked to change this behavior. If he repeated the offense, he was called to order again and was admonished, but this time, he was physically punished and was warned not to repeat this behavior. If he repeated it a third time, a few big jars were filled with chicha and the addict was forced to drink until he died by having his fill of it.

An eagle informed me that:

If someone burned down a bridge, a temple, or a public welfare good, not just the arsonist received a very severe punishment because those facilities and services were constructed by and for the community.

One puma told me that:

In the Inca Empire there we were no doors with locks. When the Spaniards came, people began to put locks on their doors.

The Inca Empire's punishments were proportional to the crime committed, and all judicial cases had to be solved very quickly. If the moral code of the

Incas were put to use in today's Peru, how different everything would be: to have no liars, or bums, or thieves would make a big difference in all aspects of life.

Student, think: Even though these kinds of punishments were done in the Incan times and now seem primitive, these three principles, their acceptance and practice are still valuable. *How would today's people in your home, your school, your neighborhood, your government, and your country change, if only these* three Incan rules were to be applied?

Questions:

1- What are the consequences of stealing?

2- Would you trust a liar?

3- What would be like to live in a country full of lazy people?

4- Would you trust people who lie, steal, and are lazy? Why?

Pedro and the Chonta Tree

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[Some consequences of the green forest's destruction]

Pedro, give me the blow gun.

Hand me the chonta blow gun.

It has to be strong and light!!!

With it, I'll go hunting and fishing!!!!

No, there is no more chonta

with which to make blow guns.

All the trees were burned down.

And all the trees were cut down

Including the chonta trees.

The mechanical saws cut them down,

Traders tools took them away. . .

The indifferent ones cut them down, cut them down!!!

There is quiet weeping . . .

In the green forest, in the green jungle, there is crying and sorrow, and their daughters, their leaves and branches: cry. They're streams cry, their flowers cry, greenness cries, grayness cries, the smoke of destruction cries, ALL natural things cry.

THE WORLD cries!!!

Where can one find a chonta tree?

Where do birds with their clamorous songs find shelter? Where have the insects that lulled the rain at night gone?

Where have the chattering noise parrots gone?

Where have the little baby parrots gone?

And what about the hanging monkeys who swung from the formidable branches of the chonta tree?

Are they gone? They're not coming back?

Oh! What deep sorrow: I sigh for the green color, dark green, light green!

Oh! FOR MY GREEN, my greenness, green lemon, my little green, lime green, bluish green, green COME BACK . . . !!!

Pedro and his father, Don Luis, survived . . .

And they have complained, and cried, and asked for help . . .

Their family is gone,

What happened? They ask themselves. They ask the policeman, the lieutenant, the colonel, and the mayor, what happened, what had happened, Why; they asked, with a big voice, with a crying voice, with desperation, WHY?

They know little about this case.

THEY KNOW everything about this case!!!!

And their huts were burned down and the trees were burned down.

And what about the chonta tree?

The majestic chonta trees were cut down,

The evildoers left.

It's hard to breathe, oh, your lungs daddy!!! Oh my lungs, DAD!!!

A glimmer of hope,

Green of hope!!!! Friend, let's look for a chonta tree, deep into the woods.

Pedrito, run fast. When you find it, you will know that the chonta tree is strong, it's husky, it's fortitude, it's a strong green, and it's the source of green hope.

Let's go Pedrito.!!!!

Questions:

1- Do you know that Peru's green forest works as a gigantic cleaning air system?

2- What are the consequences to animal and human health If trees are burned and cut down?

3- If trees are cut and burned down and the green forest's ecosystem is destroyed, will it be a challenge to regain life in that destroyed ecosystem?

4- Do you have any idea how many medicinal species we will lose if we destroy the green forest's ecosystem?

5- If you were an authority in Peru, what would you do to avoid destruction of the green forest?

6- Why is the chonta tree important?

The Whispers of Paracas's Weaves

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[Respect for archaeological places and remains]

Fast, hard–working hands, hands that weave:
One barely hears their voices,
more clearly here are their colors, their designs,
Their image, their embroidery, their laces,
their gauzes, their dyes, their weaves are multicolored,
sculpted wools, and the wool is almost like silk after more than 4,000 years,
woman weaver, male weaver, weaving life on and on

weaving death on and on.

Who would say that in the peaceful enclosures of Peru's Paracas peninsula, where afternoon winds cloud the sight, earth lovingly keeps her children who have gone on to rest and live in the other life? Sitting down, in a row, our ancestors are safe and undisturbed. They are the ones who died before the arrival of the Spaniards. They made their beautiful robes and their seven layers of dresses of cotton, of wool, of wool-cotton, of feathers, of semiprecious stones, and gold and silver, necklaces and earrings. These are all the wares they will need to live a new life in there, silently and apart from our lives, we who are their children.

The clothes that cover these bodies pierced by decades and centuries quietly tell that the men and women knew the weaving loom, and between trams and warp, between colored threads of cotton or wool, they left all of us a formidable legacy. Our ancestors were supreme masters at spinning and twisting threads, at dyeing and weaving all sorts of clothes and personal items. They also wove baskets, weapons, bridges, and roofs for their houses, rafts, and kitchenware.

Through the weaving, we know that our ancestors waited for death without problem, without anxiety; they believed it was the antechamber of the next life; and they were buried with everything: from seeds to fruits, pins made out of cactus, to looms and spindles, everything: all the necessary items to take care of all their future needs. Every piece of Paracas cloth quietly tells us about plants that existed, about symbols, about insignias, ranks, positions, diseases, surgical

advances, and many other aspects of those who remained under the earth's protection.

We know, for example, that in the empire both men and women wove and that they sat at the loom for more than five hours every day. We know that they *were specialists, masters in the use of natural dyes and the embroidery on their clothes. Their works represents Paracas's mythological world.*

Students, *if one day you find some of the wares or clothes of Paracas,* remember that we have to respect our ancestors and that relics found inside graves are part of the patrimony of all Peruvians and offer us lessons on how to face hunger and scarcity.

Questions:

1- How would you feel if your family graves were opened and robbed?
2- Do you recognize that Paracas's mummies are your ancestors just like your grandparents are?
3- If you were to find the remains of your ancestors' art and belongings, would you take the opportunity to form a small museum in your school?
4- How would you try to benefit from knowledge found in your ancestors' remains?
5- What are the consequences of selling the remains from archaeological sites?
6- Do you know that Paracas weavers are world masters in the art of textile weaving?

7- Could you defend and respect your ancestors' final resting places?

Don Quijote's Three Vows

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The year 1605 saw the publication of Don Miguel de Cervantes's work that narrates the fascinating life of Don Quijote de la Mancha, a nobleman who became mad because he had read many books about chivalry and decided to wander through Spain as a knight with his squire, Sancho Panza, and his horse, Rocinante. **Don Quijote set out to help and do good to anyone in need.** His solidarity with his fellow human beings cost him much pain and sorrow. However, he kept trying to help any human being he met along the way. It is particularly noteworthy to point out that Don Quijote had taken three vows when he was knighted; he offered his arm and his lance:

To honor God.

To defend his country.

To defend and protect his lady.

Together, these three vows are clear signs of a vision to protect religious tradition, land, and close fellow human beings, in the case of a knight's lady. The vow to fight for the country encompasses the land and its sovereignty. The Knight-errant acted as a military man who patrolled all corners of the Spanish

realm. The connection between God, country, and lady points to the following three aspects:

Spiritual: This relates to religious beliefs, faith, and certainty in God's existence—quite an idea that one man decides to defend as a concept of incommensurable magnitude.

Environmental: A person protects the land and its surroundings through the sublime concept of Spain's national identity. Protecting the land and putting the integrity of his sword and goodwill at the service of the land make Don Quijote one of the first defenders of the environment or the ecosystem.

Protective: A knight is decidedly male and genteel when it comes to protecting his lady. It is perhaps one of the most beautiful examples of protection and appreciation toward a woman's presence in the life of a man, a family, and a nation.

Clearly, Don Quijote's three vows constitute a model for human behavior vis-à-vis the role of an environmental protector who takes into account spiritual and human components. These vows from our Spanish ancestors are part of some of Peru's most important antecedents, which relate to sustainability and environment ethics.

Questions:

1- Do you agree that the duty of the strong and powerful is to protect the weak such as children, women, students, elderly, or the sick?

2- How would you protect your country and the ecosystem from being damaged?

3- What consequences come when we don't speak, act, and behave according to our duty?

4- If you know Don Quijote's moral code, would you choose to behave accordingly knowing that your behavior would not damage the ecosystem and other people's heath and well being?

Let's Follow the Trail of the Plastic Bag and the Plastic Bottle

[To avoid pollution: Eco-design]

It's been 60 years since the formula for making plastic was discovered. Today, big corporations manufacture plastic products for domestic use, for international markets and industrial sectors, as well as for the medical sector. PVC, a plastic material, is a synthetic product born in a laboratory and today is used to produce millions of items used daily. It replaces paper, cardboard, wood, and cotton. Plastic bags are used to carry or contain all sorts of medicines, food, liquids, juices, alcohol, sodas, garbage, and currently they are produced worldwide in the billions.

The demand for plastic bags and bottles continues to grow, and there are no businesses, offices, households, hospitals, or institutions that do not ask for plastic bags or bottles for a myriad needs and uses. The characteristics of plastic make it special:

It's cheap.

It's disposable.

It does not decompose or dissolve in water or soil, but rather harms and contaminates them. Plastic bags and bottles have the following characteristics:

- They are produced in a factory.
- They are offered, sold, and distributed.
- They spend limited time in the hands of their users.
- They are thrown away in the garbage at home or in dumps.

Furtively or carelessly thrown away, plastic bags become scattered throughout the dump, and make their way to other lands, waters, forests, and cultivated fields.

Plastic bags become discolored in an unsightly manner: they become full of bubbles, rust, worms, and germs. In this way, they continue to pollute areas, waters, beaches, rivers, shores, and cultivated fields. What seemed like a great solution has become a serious threat to the environment because plastic pollutes the eco-system. Plastic, be it as a bag or a bottle, does not decay, and plastic specimens have been found as far as Antarctica and as deep as the sea's bottom. Plastic bags have suffocated babies and small children; have been responsible for the death of pets, big and small fish and have hampered the growth of trees and flowers. Whales and even crocodiles die of rare diseases because they unknowingly swallow plastic bags floating in oceans, rivers, or swamps.

What can we do? We can start by using an ecological design. Today's generations of scientists, technocrats, and inventors can effect a change and provide an answer. They should start by using their inventive and creative capacities in order to transform the harmful characteristics of plastic bags and bottles. They can create and substitute bags made from biodegradable materials. This way, we can put a stop to this process that harms and pollutes land, water, seas, plants, animals, and even help us to prevent the pollution of our last frontier: space.

Questionnaire:

1- Knowing the truth about plastics, would you challenge technology to use plastic in combination with other materials such as cotton, to make these plastic bags reusable until they wear out totally?

2- Would you recycle and/or return plastic bags and bottles to the manufacturer?

3- Would you help in a campaign to clean beaches, land, and homes from plastic bags and bottles?

4-If one day you become an engineer, would you work to make manufacturing technology friendlier to the ecosystem?

5-What are the consequences of the plastic invasion and contamination of land, water, plants, and animals?

Suggested Ideas: Learning Spaces for Public Education. Also Encourage Creative Problem Solving

Basic public adult and technical initiation for work education should seriously consider teaching environmental ethics and sustainability from a personal perspective. This would be based on the understanding of the ethical consequences of either harming the ecosystem or human life. Incorrect behaviors and attitudes are so ingrained in Peru's population, that if we do not make clear the connections and consequences, no one notices that it is not acceptable to pollute, not to recycle, or not to reuse. For example, during the 2006 elections around 20 political parties dirtied cities all over Peru. Some of them covered traffic signs with their propaganda, which led to unnecessary accidents. It is possible to say that these political candidates should know better, but they did not. To toss trash away without responsibility should be addressed, not just from the point of just tossing the trash, but because of the consequences and bad role models this sets for others. Ethical consciousness at every educational level should maintain the same environmental language and meaning.

Suggested Ideas

Higher Education, Universities, and National and Private Institutes should establish programs across all professional specialties addressing environmental ethics and sustainability. This understanding should be available to every student. Professionals, specifically, need to understand the connection between ethical responsibility and sustainable development.

Law, political, marketing, economics, business management, and finance majors, who later become professionals, need to be able to speak the truth, but *they need also to be ethical and responsible for the consequences of their professional activities. They need to challenge their knowledge and creativity to* find ways to be environmentally friendly and to help the ecosystem remembering that they are dealing with resources that do not belong to them, but to the people of Peru.

Science and technological majors and other professionals have a great challenge because they called to use their creativity in favor of the environment, bearing in mind the need to be ecologically creative in every design, plan, and project they envision.

Newspapers, television, and radio programs carry a responsibility far beyond the scope of the present generation. In many ways they impart ideas inculcated through the advertisement and messages they spread. They are the ones that allow sellers to present the content of their advertisement, which may or may not be environmentally supportive. Some programs not only take away the attention and time of young people, but deform the education they receive at school. The news media should report every day the national indices of pollution and contamination of basic resources. Just like they inform about the weather, information on pollution is needed in order to be able to establish environmental literacy among Peruvians who are not attending schools. The Ministry of

Education, following the Peruvian Constitution, has the authority to use television channels and radio time to redirect content or spread new content to educate people. They could review advertisements and give continuous messages on the *negative effects on water, air, land contamination, and pollution. Every* advertisement should respond to the truth, especially those messages that companies target to children when they want to sell products that are not healthy, or they do not fully divulge all of the consequences of a product. Unethical marketing harms the land and its people.

Peru's neighboring countries and tourists need to be advised that there are places, monuments, and geographical areas that are unique and are the patrimony of Peruvians and the world. Some of these places are Machu Picchu, Caral, Pisac, Chokekirau, El Colca, el Valle del Fuego, Lake Titicaca, the Amazon River and the Amazonian green forest. These are all natural sanctuaries that still keep environmental values. If lost, humanity will have lost a valuable inheritance and Peruvians will have lost part of their identity.

Peru's Coat of Arms has a role in developing the new generation's environmental consciousness

This important symbol could serve to educate on how it portrays that Peru is ready to be taken but carefully. It functions as an advertisement to attract investors, nationally and internationally, **but it also presents** an idea, or image, to convey a message that Peruvians care, protect and want to preserve their natural resources. (See Appendix D)

With these modules this study intends **to help** Peruvian teachers deliver instruction on environmental ethics and sustainability of the resources from the personal perspective to every one of their students, without distinction or reserve. The short stories use poetry, fiction, and elements of reality to portray and convey the suffering of Mother Nature and to highlight her resources (water, trees, historical figures and archeological remains), which are Peru's heritage. Our Peruvian Pacha Mama, or Mother Earth, is sick. Her children have behaved very badly, because of bad influences, but it is in the hands of some of her children to help her rejuvenate, be clean, bountiful, and fecund to feed her (now) poor children, and her (not so poor) future generations. This work is intended to awaken the noble feelings of Peru's population to their great culture and to be protective of this great and marvelous country, which is full of contrasts. This study strives to make Peruvians understand that every one of them can contribute a grain of sand to bring all of Peru's resources to future generations.

Conclusion

Peru is now confronting problems of contamination, pollution, and scarcity of water, land, air, and energy. Its exceptionally rich natural and cultural resources are being plundered as if they were inexhaustible. This 500-year-old behavior has contributed social ills poverty, unemployment, social and economic inequality, and injustice now suffered by half of Peru's population.

Peru's Public Education System legally mandates the teaching and learning of environmental awareness. So far, this teaching does not seem to have reversed the problem of contamination and pollution of resources nor has it raised the population's living standards. Teaching environmental ethics and sustainability of resources, as proposed in this project, will encourage that younger generations recognize the ecosystem to be an integrated living being. They will understand that the ecosystem is affected by what is done to a single one of its elements, such as water for example will resonate in the entire ecosystem. Moreover, it will lead students to develop a deep understanding of their part in the ecosystem and their duty to constantly evaluate the consequences of their actions. This is especially true when they involve the preservation of resources for their own well being, as well as that of future

generations. There is a need to teach the principles of this type of ecosystem stewardship to Peruvians from all walks of life—professionals working in the private or public spheres, as well as ordinary citizens. Throughout their entire lives, people behave as agents in favor or against the ecosystem depending on their actions.

Presently, Peruvian public education is in a state of emergency regarding the general quality of teaching and the training it gives to its teachers as well as the salary and economic status it accords them. An improvement in the quality of teaching must first target the areas of reading and math since these are quite critical. Then the New General Law of Education No. 22044 regarding the teaching of environmental awareness must be implemented and hopefully, reworked, to include the concept of environmental ethics and the sustainability of resources. This concept needs to be theoretically grounded in strong philosophical, ethical, environmental, and educational guidelines.

A consensus must exist between the laws regarding the teaching of sustainability and the actual teaching practice at schools: both must speak the same language and both must have as their mission the care and preservation of the environment. This dissertation challenges the professionals, economists, financiers, technocrats, scientists, and corporate leaders of Peru to use their creativity to work for the environment. After all, outside of Peru there is already a strong movement striving toward sustainability of resources; Peruvians cannot be left behind.

This dissertation contributes a set of ideas and guidelines to help Peru's teachers improve their knowledge and instruction of environmental ethics and the sustainability of resources. It also includes a set of readings for students regarding environmental issues, and another set designed for use by universities, professional fields, and communication networks. If we redirect Peruvians to honor, respect, protect, and preserve the ecosystem and its resources, there is a better chance to raise living standards while guaranteeing a clean, healthy, and economically prosperous environment for many generations to come.

Appendix A

Fig.1. Map of South America Showing Peru's location. Fedor's. Perú. 2006. 9-13.

Appendix B

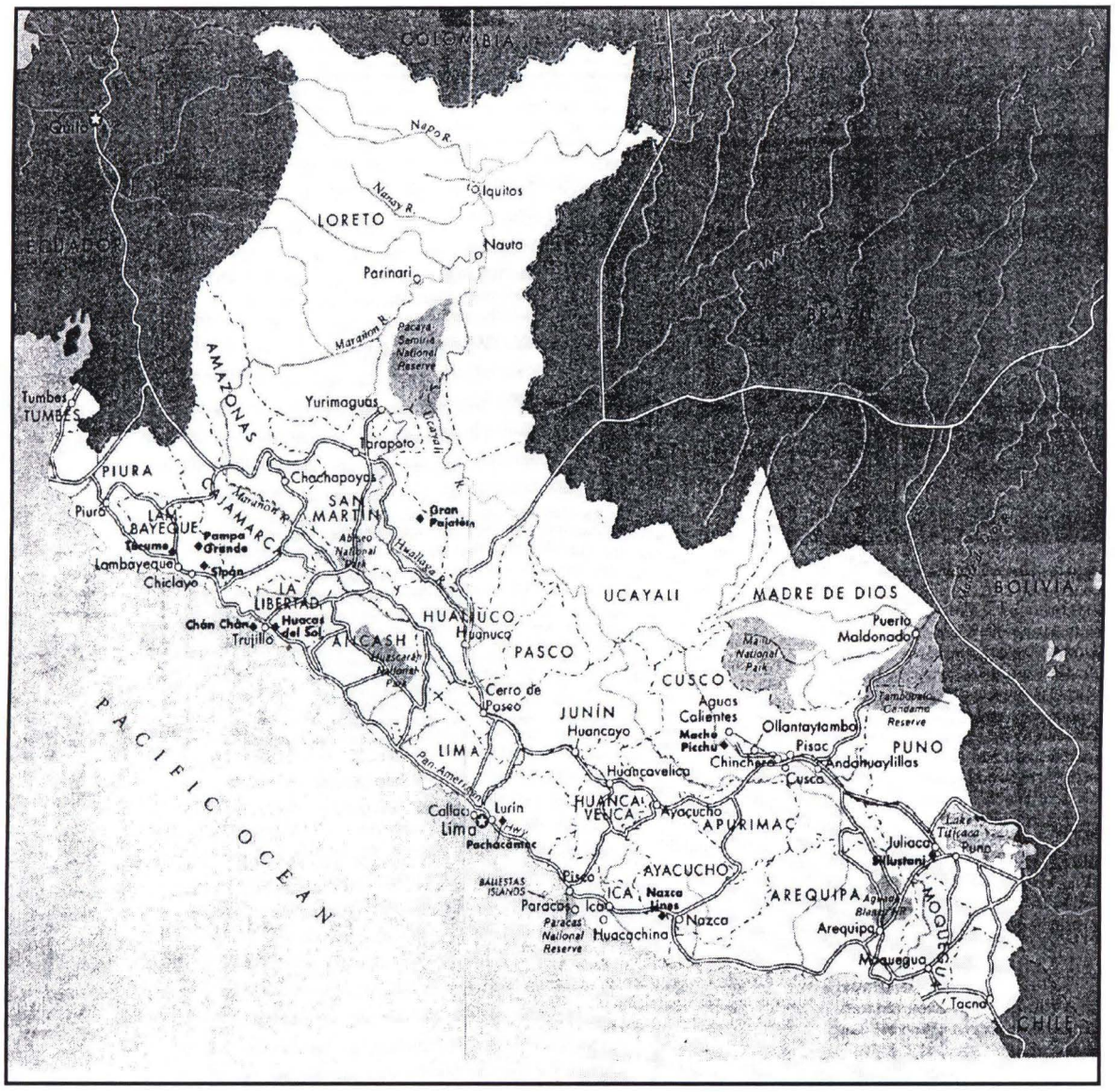

Fig.2. Peruvian map showing all political departments. Fedor's. Perú. 2006. 9-13

Appendix C

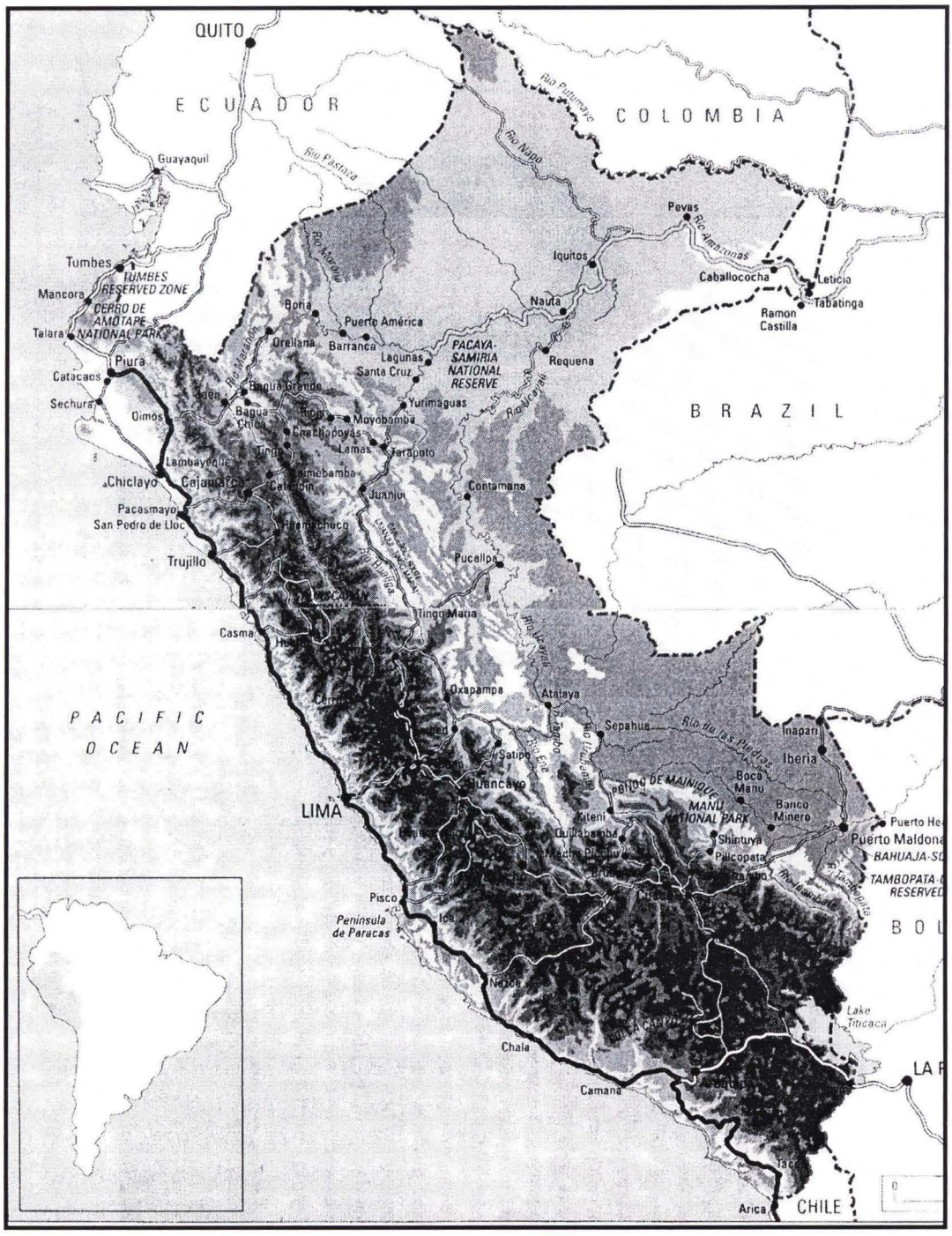

Fig. 3. Map showing Peru's Geographic Regions. Jenkins, Dilwyn. The Rough Guide to Peru. 2006. 4-5.

Appendix D

Fig. 4. Peru's Coat of Arms. Wikipedia. Feb.2006.
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Biographic Sketch

Ana Adriazola-Rodríguez was born in Perú. She was awarded a Fulbright Scholarship to study conservation and exposition of Pre-Columbian textiles in the Textile Museum of Washington, the Guggenheim Museum and the Natural History Museum of New York. (1969-1971). She earned a Doctoral Degree in Education (1985) and a Doctoral Degree in History and Anthropology (1989) from the Universidad Nacional de San Agustín, Arequipa, Perú. In 2000, she earned a Master Degree of Arts from Florida Atlantic University, Florida USA. On December 15, 2006, the Universidad Nacional de San Agustín in Arequipa, Perú awarded her an Honorary Professorship for her creative academic contributions to the field Social Sciences Studies in Arequipa, Perú.

Her work experience in education encompasses teaching primary, and secondary educational levels (1966-1971). She has also worked in the administrative educational sphere as a principal and as pedagogical counselor for the Southern Peru Copper Corporation educational system. (1972-1982). From 1984 to 1989 she was professor at both the Education, and Social Sciences Colleges in San Agustín University in Arequipa, Perú, and from 1990-2003 she taught Spanish culture and language at the University of North Carolina at Charlotte, and Florida Atlantic University.