Asia-Pacific
Economic Cooperation

APEC YOUTH CAMP 2008

"Caring for the Sustainable Development of the Asia Pacific Region"

Human Resources Development Working Group

FINAL REPORT

October, 2008

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Welcome Remarks
Ambassador Gonzalo Gutierrez
Som Chair

Youth Participants of APEC 2008 Youth Camp!

It is a great honour for Peru to host APEC, this year we will host a total of 126 APEC related meetings. Peru has chosen as the motto for APEC 2008 the theme “A New Commitment to the Asia Pacific Development”, a theme that holds as one of its intentions to underscore the importance of education in our economies. The Youth Event represents the opportunity to further strengthen economic and friendship ties among member economies by involving the younger generations in the APEC process.

Peru is concerned with the participation of youth in the forum, we want to give to APEC future leaders the opportunity to interact with members of other APEC economies in the APEC 2008 YOUTH CAMP through two phases, one virtual and another personal to be carried out in Puno from 1 to 6 October in Puno.

Today's youth are living in globalized era of digital technology, which makes it possible to communicate and share information simultaneously, transcending time and space. Taking advantage of the resources that we have available nowadays I would like to introduce to you this website, a place where you will have the opportunity to submit an essay versed about your concerns for sustainable development, interact on a virtual forum, and share your experiences in economic, environmental and socio-cultural issues with other participants with the aim to pursue an APEC Youth declaration that would be presented to APEC Leaders this November.

This event constitutes a unique chance for students to build a cooperative and supportive network and learning community.

For the physical seminar, Peru has selected the city of Puno to host the APEC Youth meeting, a favourable occasion for the APEC community to visit Lake Titicaca, the highest navigable lake in the world. It has an area of 8,560 square kilometres an altitude of 3,812 m or 12,507 feet above sea level, this place could be your initial point of study to see how inhabitants of Puno can profit of this water area to develop economic, social and cultural activities.

During these six days, youth from all APEC member economies will share some memorable moments together, transcending all boundaries, cultures, and religions; discussing and promoting topics while learning about APEC and its working process.

Our work during this event is not just about getting youth to listen. It is also about getting Leaders to hear what youth have to say, this will constitute the deliverables of your labour in Puno.

I would like to conclude by stressing that the collective action of economies on all sides of the Pacific Ocean will continue to deliver results in making our societies more prosperous and allowing for all of our citizens to share in that prosperity.

Young friends, you are invested with the task of building the future an identity of regional and global community, an awareness of shared responsibility to meet the common long-term challenges of sustainable development and peaceful coexistence, promote a better understanding of APEC matters in the Region, as well as continuing the path to achieve APEC goals.

Presentation by the Viceminister of Institutional Management of the Ministry of Education of Peru
Dr. Victor Raul Diaz Chavez

Dear APEC Youth,

It is a great honor to welcome you to Peru,

The Asia-Pacific Region is home to the most diverse and rich ecosystems in the world, equaled only by its historical and cultural heritage. The challenges that our economies face in order to preserve them are great.

Historically, humanity has based its economy on the direct use of natural resources. The transformation of these resources into goods has, unfortunately, damaged them.

Well into the 21st century we are part of the information and knowledge society which represents an opportunity and a challenge for us all: we must establish a balance between the use and the conservation of our region's natural resources as an essential element for economic development. We need capable young men and women to deal with this difficult task.

Peru's main theme as the host of APEC 2008 was “A New Commitment to the Asia Pacific Development”. It emphasizes and promotes sustainable development while fostering respect for each other's culture and the environment.

Within this framework, Peru hosted the 4th APEC Education Ministerial Meeting, on 11 and 12 June. In this meeting, the importance of developing the competencies and skills of our youth, our most important and valuable resource, was highlighted through its main theme: “Quality Education for All: Achieving Competencies and Skills for the 21st Century”. Quality education in our region will provide APEC youths the necessary tools to tackle future challenges in rapidly changing and demanding societies.

The 2008 APEC Youth Camp, “Caring for the Sustainable Development in The Asia-Pacific Region”, reflects this growing concern among leaders and societies. The proper management of natural and human resources to achieve the delicate balance for sustainable development will help enhance our people's well being and the economic growth of our economies, while helping to reduce the effects of pollution and global warming.

Respecting our nature, and our cultures, thus ourselves, is the only path towards growth, development and well-being in our region. Through this important meeting the APEC Youth you represent will contribute to show us the way. Thank you.

Acknowlegements by the National Youth Secretary Attorney Maeg Arriola Escalante

Dear young participants of the APEC YOUTH CAMP 2008

The National Youth Secretariat acknowledging the significance of the APEC Youth Camp 2008 “Caring for the sustainable development of the Asian-Pacific region” as an opportunity to strengthen friendship bonds among APEC Youth community, to strengthen capabilities, encourage discussion and reflection scenarios on environmental topics, common to the economies of the region, would like to thank, firstly, the participation of the young delegates from APEC economies, who have made it possible the development of this event.

We expect that the knowledge, ideas and experiences exchanged has allowed the gain of new ideas and the strengthening of ideals. Many of these are stated in their Joint Declaration. The Youth message taken to the APEC leaders, reports essential conditions needed to achieve social, economic and cultural development in our economies.

Although the Asia-Pacific Economic Cooperation Forum – APEC has become the most important and the most dynamic mechanism for intergovernmental cooperation in the trade area, it has also created other scenarios. This is the reason why the APEC Forum agenda tries to ease a better integration among the economies within the globalization, which offers advantages, but at the same time, challenges. For that reason, it is worth to point out the acknowledgement of Youth as future leaders. Their engagement and participation shall ensure that the Asia-Pacific community develops based on the understanding and cohesion, as it was expressed during the Ministers' meeting in 2003.

The learning community that has been created shall allow the maintenance of dialogue and cooperation. Also young people's participation in APEC shall be strengthened by developing a sense of regional community.

We thank the people, institutions, organizations, public and private ones that allowed the success of this event. In particular, we thank the Puno APEC Committee, presided by the Province Mayor, Eng. Luis Butron Castillo, as well as the Province Municipality San Roman de Juliaca, the businessmen of Puno, the Peruvian Network for Asia-Pacific Studies – REDAP, represented by its coordinator, Mr. Braulio Vargas.

On behalf of the National Youth Secretariat, I would like to express a sincere gratitude to all those who have made possible this event, the APEC Youth Camp 2008, thanks to your contribution and ideas, especially to the population of Puno.

Thank you very much.

Joint Declaration of the 2008 APEC Youth

APEC Youth Camp: Caring for the Sustainable Development of the Asia - Pacific Region

Joint Statement

Puno, Peru, October 1 - 6, 2008

1. We, The APEC Youth Camp delegates of Canada; Chile; the People's Republic of China; Indonesia; the Republic of Korea; Malaysia; Mexico; Peru; Philippines; the Russian Federation; Republic of Singapore; Chinese Taipei; Kingdom of Thailand; the United States of America; and Viet Nam, convened for the 2008 APEC Youth Camp in Puno, Peru on October 1 to 6, 2008, under the Chairmanship of the Ministry of Foreign Affairs, the National Youth Secretariat of Ministry of Education.

2. The APEC Peru 2008 theme **"A New Commitment to Asia Pacific Development"** implies the need to strengthen our resolve in caring for the environment while balancing the need for economic development. The theme of the APEC 2008 Youth Camp is **"Caring for the Sustainable Development in the Asia-Pacific Region"** and reflects the growing concern among leaders and youths about the proper use of natural resources and how they affect everyday life of APEC's 21 Economies. As a result of meeting in Puno at Lake Titicaca, we were able to observe that the issues related to the care of the lake are common to many water problems that exist in our economies.

3. As participants of the APEC Youth Camp 2008, we ask that the APEC leaders will take our ideas into consideration and provide opportunities for youth worldwide to participate in environmental action projects, which work towards sustainable development, in order to help them to develop skills needed to address complex social, economic, and environmental challenges.

Climate change:

Recognize:

- International cooperation is very important because climate change is a global and urgent issue.
- Education and access to information are the starting points to transform the societies´ behavior towards the environment – children and youth should be the main focus of environmental education policies.
- There is a necessity for economies to adopt green technologies in their current industries in order to reduce their negative impacts on the environment.
- Incentives are needed to motivate the private sector to address environmental issues.

Recommend:

- Developed economies must invest more into green technologies to make them easily accessible to other developed and developing economies, as well as within their own market.

- International environmental agreements, whereby each economy shares the burden of othe transformation, will ensure the simultaneous participation in the development of green industries.
- Intellectual property rights issues on green technology may prevent its transfer. In that sense, cooperation among economies at the private, public, and governmental level are very important to ensure accessibility to its population.
- Private sector and civil society need to play a more critical role by practicing social responsibility.
- Campaigns are needed to create awareness and consciousness for the people; they should focus on specific topics that are immediately recognizable in their everyday life and the means to address the said problems.
- Climate change may generate business opportunities to be identified and developed by the private sector in conjunction with governmental agencies. Additionally, national frameworks are pivotal to the sustainable development of the socio-economic environment.
- For the benefit of future generations, adoption of green technologies should be considered as long-term investments.

Water Pollution:

Recognize:

- Water pollution affects access to clean water for APEC economies and has direct consequences on human development.
- Water pollution also directly impacts agricultural activities and fisheries by contaminating food sources, diminishing economic productivity, and affecting human health.
- Polluted water disrupts ecosystems, causes the extinction of species, and thus affects biodiversity.
- Due to financial constraints and lack of commitment by the government, some communities do not have access to the appropriate disposal management systems, including efficient wastewater and solid waste treatment.
- Synthetic materials, such as pharmaceuticals and other industrial products, are accumulating in the aquatic ecosystems due to ineffective waste treatment of direct, polluting sources.
- Water pollution directly affects the tourism sector by damaging natural landscapes.
- Byproducts from economic activities like manufacturing, agriculture, transportation, and mining, among others, provide a significant source of pollution.

Recommend:

- Implement sustained educational campaigns so that all citizens become aware of the causes and consequences of water pollution in order to improve individual and corporate practices.
- Promote responsible water resource consumption by households and industries.
- Proactively identify polluted water resources with the aim of restoration.
- Implement regional programs to improve water quality through appropriate water treatment systems, waste management systems, and sustainable land management practices.
- Facilitate the collaboration between APEC member economies in areas of water treatment technology and practices.
- Promote sustainable economic practices by establishing regulatory standards for run-off, pollutants, and discharge.

- Require environmental impact assessments (EIA) in private and public projects in all APEC member economies.

Water culture:

Recognize:

- Water quality has degraded over the last few years. Currently, in many places drinking water is significantly contaminated.
- In some regions people are suffering from a lack of water. Even in these areas, people are still not conscious enough about water conservation.
- People take it for granted that technology ensures water availability. They incorrectly assume that paying for water is all that is necessary to ensure its availability and that only technology will provide water at a quality necessary for living.
- In general, water availability within a region is restricted by both natural and socio-economic factors. Water can be a disproportionately added expense to people with a low income.

Recommend:

- Water culture should involve different levels of participation: Governmental, Non-Governmental Organizations (NGOs), businesses, and individuals.
- It is necessary to promote the integration of knowledge and information, education to raise awareness of the importance of water, and ethical consumption.
- Governmental incentives for people that appropriately use water resources by basing the per unit price on the amount of consumption.
- Communication plays a key role in water culture. Dialogue among stakeholders is necessary to develop relevant solutions and strategies.
- Adopt or strengthen the usage of a green Net National Product (NNP), which is a measure of growth that includes the depreciation of not only the stock of physical capital, but that of natural capital as well.

Commitment

- Respect water and to be supportive of both cultural and technological innovations towards an improvement of water usage.
- Create a water-conservation attitude through the use of information and education of individuals.
- Promote involvement in water as a culture: Governments, the private sector, and individuals must be aware of their contribution to improve practices and habits related to water.
- Incorporate the knowledge through multidisciplinary collaboration; this will develop sustainable and integrated water culture from different perspectives, involving people with a common goal, attitude and action for the future.

Selected Essays

Selected Essays

The following works are a selection of the essays submitted by the delegates, representatives of the APEC economies that attended the APEC Youth Camp 2008.

This selection corresponds to the awarded essays by a Committee comprised by the following professionals of the Education Network of the Asia-Pacific – EDNET:

1. Angela Castillo (Escuela Superior de Administracion de Negocios)
2. Jacqueline Barrantes (Universidad Peruana de Ciencias Aplicadas)
3. Christian Rodriguez (Universidad Peruana de Ciencias Aplicadas)
4. Albino Ruiz (Instituto Fernando Braudel)
5. Carlos Del Castillo (Escuela Superior de Administracion de Negocios)
6. Braulio Vargas (Escuela Superior de Administracion de Negocios)

The defined and used criteria by the Awarding Committee to evaluate the essays were:

1. Compliance with the requirements set forth in the notice to participants
2. Clearness in the topic presentation.
3. Accurate definition of the water body, subject matter and its problematic.
4. Setting out of real solutions
5. Proper and fluid Language in the essay

As a result of this evaluation process, the following essays were the award winners:

1st place
"Renovation of Love River to Build Up a Sustainable City. Urban Planning and Water Resources Management "
Cheng Yu Hsuan (Chinese Taipei).

2nd place
"The Ogallala Aquifer and Its Role as a Threatened American Resource"
Nicole Ceci (USA)

3rd place
"The Tiny Island That Could: An Investigation into the Potential of Koh Tao"
Marcus Taylor (USA).

Renovation of Love River to Build Up a Sustainable City

Urban Planning and Water Resources Management

Cheng Yu Hsuan,
Chinese Taipei

Summary

Kaohsiung, a thriving harbor city located in Chinese Taipei, has scores of natural advantages in terms of watery geography. Love River that crosses the city has promising potential to make Kaohsiung even more exceptional.

There is a mixture of environmental, economic and social strategies suggested to develop the city's potential, while the effects are evaluated from those three aspects.

The ultimate goal of sustainable development is to make Kaohsiung a "watery metropolis" and educate citizens about "water culture" and emphasize an attitude of giving weight to water resources.

Introduction

River as Lifeblood of Sustainable City

1. Background of Kaohsiung City

Kaohsiung city is a municipality directly under the jurisdiction of the central government of Chinese Taipei. Located in southern Chinese Taipe, it is considered the second most developed city in Chinese Taipei. Kaohsiung has the second largest population, as well as the second largest share of the domestic general budget and is the second largest economy in Chinese Taipei. Kaohsiung has one of two international airports in Chinese Taipei. It also has a harbor that has the sixth largest freight handling capacity in the world in 2007.

In Chinese Taipei, Kaohsiung City used to be nicknamed the "Harbor City" because of its geography, connecting the city with the shoreline. Recently, Love River, a popular spot in Kaohsiung has gained popularity because of its decorations, colorful lights and developing riverbank area. Kaohsiung city is gradually building up its image as a "watery metropolis"

However, compared with Hong Kong, a city that has breathtaking night scenes in Victoria Harbor, Shanghai that exquisitely blends history and modernity in The Bund, Seoul, that has seen dramatic renovations of Cheonggyecheon or even its contending counterpart, Taipei that embraces its fame for beauty and romance in Tamsui townships, the cityscape of Kaohsiung seems not worth mentioning.

2. Background of Love River

Love River is an area that is full of potential. It used to be heavily polluted during the period of Chinese Taipei's fast tracked industrialization and urbanization. It was once mocked as

"Stinky River", and people were not willing to go close to it because of the stench of pollution. In the wake of citizen's rising consciousness about environmental issues, the municipal government started dredging and cleaning the river in the late 80's. The Wastewater Sewer System and The Works of Household Connection are built so that domestic sewage can be concentrated into treatment plants. Plenty of floodgates are set up in the middle of the river in order to separate trash, fluid and natural water coming from rainfall and mountainous fountainheads. After decades of continuous efforts, the irritating odors disappeared; joggers and strollers began to use the area along the river for recreation.

Now, Love River not only has important environmental functions, such as preventing floods and adjusting temperature, it also provides a hotbed of small-scale tourism. The annual dragon boat competition is hosted here on the fifth day of the fifth lunar month. More and more people have positive feelings toward Love River while the tourism agencies are promoting it as one of the best resorts in Kaohsiung.

3. A Great Chance to Advance

With Mass Rapid Transit under construction and the hosting of the World Games in 2009, Kaohsiung has an extremely great opportunity to advance the appeal of the city. The next steps for Kaohsiung should be to respect water, then proclaim the city on behalf of water. Kaohsiung needs to build up a "Water Culture" to cultivate its citizens and instill an attitude of treasuring water resources and thinking highly of hydrology. The city must also promote its image with the different features of water, like "pure, fresh and dynamic". Kaohsiung has the potential for being a world attraction, as well as the chance to be the prototype of a sustainable city. Love River is undoubtedly the lifeblood of the entire project.

Now the essay will probe into the methodology of how Kaohsiung City can make the most use of Love River and live up to its name of a "Watery Metropolis"

Body

Strategies for Watery Metropolis

1. Business, Culture and Environment fusion along the River Bank

(1). Extension of Pedestrian Precinct plus Cycle way

The bank of Love River is not right along downtown; it takes about 15 minutes to walk from the business district to downtown. This makes it difficult to attract tourists and shoppers to Love River.

However, its weakness in location could be twisted into a strength. First, it is located away from modern influences, such as tons of garbage, light damage and noise from the city. This would help to maintain the river bank's serenity and tranquility. Second, lighter traffic would allow for the extension of the pedestrian precinct and perhaps a bikeway. It creates more space for people instead of vehicles, which is a good example of a low-polluted and healthy life style.

(2). Business Themes about Water and Eco-friendliness

The business here must be unique. Since the goal is a "Watery Metropolis", each of the vendors or stores along the bank should be licensed to have a theme in relation to "water", while eco-friendly approaches are adopted to do business. For instance, using recycled materials rather than disposable ones, not offering high-polluted products like plastic bags, selling natural and handmade goods, merchandising water-saving or electricity-saving household devices, etc.

(3). Stages for Exhibition and Performance

Cultural and artistic presentations ought to be taken into account. Designing an environment for exhibitions or performances gives the river more vitality and makes it worthy of being the “nucleus” of the city.

Senior high school or university students who are active in extracurricular activities need to voice their opinions and show off. It is going to mean a lot to them once a public space is provided for free. Additionally, audiences will attract more audiences. A stage for creative presentations will increase popularity and diversify the landscape of the river bank.

(4). Theatric Museum

There is an “Ancient Movie Theater” beside Love River, but it does not have adequate visitors due to its dull exhibitions and scarce marketing. In addition to the need to innovate the movie museum, a “River Museum” which introduces the background and vision for Love River is also needed so that the river culture can be understood by its citizens.

Commercials and marketing tools should be involved in promoting the museum. Interesting concepts such as outdoor events, theatric films and documentaries could be carried out along the river. In a word, creativity should be practiced for the sake of making people come and stay. The museum would then be able to reach its purpose of education, and playing a supporting role for specific cultural issues.

2. Education out of Recreation

A fountain-based plaza near Love River needs to be added with sports facilities, such as a skating rink or basketball court. Families would also be attracted to the area because of the cycling and exercise concept promoting a healthy life.

Myriads of fountains could also spurt out water columns for the people playing there. Kaohsiung city used to be notorious for its poor quality of drinking water. Now the alfresco bathhouse can have information about the background of Kaohsiung’s improved tap water.

3. Ecological Park and Greenbelt

Love River harbors hundreds of species of plants, fish, birds, insects and many kinds of amphibians, thus a protected area would be crucial to foster the proliferation of these creatures.

Regardless of how the land is used along the side of the river, an ecological park, as well as a sufficient greenbelt should be built across the upper reaches of Love River where the surroundings are more primitive.

In the park, water from Love River can be drawn to irrigate trees. Paths for visitors ought to be paved so that the ecosystem of park is available for observation. By demonstrating sustainable development through an ecological park, the conservation of soil and the protection of the river system can be properly pushed forward.

4. Blue Network across Harbor City

Kaohsiung city is rich in watery geography, Cheng Ching Lake has a camp site for wilderness activities; The Port of Kaohsiung has magnificent views, Hsitzuwan provides a romantic area to view the sunset, Cijin has an abundance of outdoor facilities for fun and great seafood to enjoy.

These fascinating vacation spots should be advertised altogether in an all-round blue network so that the theme of water throughout the city is prominent. As long as convenient transportation is provided, natural qualities are sustained, infrastructures are settled and integrated marketing tactics are practiced, Kaohsiung has a bright future using its watery resources.

Conclusion

A River Is Able To Change A City.

Positive impacts will be created after realization of strategies for a watery metropolis. The entire plan could be analyzed in three aspects.

From environmental aspects, a number of eco-friendly approaches are adopted within the improving project of Love River. Thematic stores promoting water culture and environmental protection, information about improved tap water and the establishment of an ecological park will bring more green elements to Love River.

From an economic aspect, the connection with other hot spots in Kaohsiung, as well as innovative construction along the river bank will be able to revitalize the economic development of the area.

From a social perspective, when the concrete body of water is integrated with the abstract attitude toward the ecology under cultivation of green sceneries and education given out by museums, a higher citizen's participation of "water culture" is stimulated.

Combining all these efforts for Love River, it is possible in the foreseeable future that Kaohsiung city becomes a real "Watery Metropolis" of sustainable development and world class charm. Heading toward the World Games in 2009, we are looking forward to Kaohsiung's renovations along Love River, and waiting for the proof that a river is able to change a city.

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The Ogallala Aquifer and Its Role as a Threatened American Resource

Nicole Ceci,
USA

The Ogallala formation is home to the High Plains aquifer in the Midwestern United States. The High Plains aquifer, often referred to as the Ogallala aquifer because it is located in the saturated portion of the formation, is one of the most agriculturally important water sources in America. The sediments of the Ogallala formation date largely to the Pliocene and Miocene when the Great Plains were an inland sea and the Rocky Mountains were tectonically active, producing what became the Ogallala sediment. Sand, silt, coarse gravel, and clay were deposited up to 900 feet deep in some areas, filling in valleys that had been eroded in Permian, Triassic, Jurassic, and Cretaceous rock. Today the water is anywhere from zero to 400 feet deep, averaging about 100 feet1, and it covers an area of 174,000 square miles across eight states—shown as the shaded region in the figure to the right.2 The aquifer holds over 978 trillion gallons of water3, but quality and depth of the Ogallala groundwater is rapidly declining as water is being pumped from its reservoirs far faster than fresh water can replace it.

http://www.npwd.org/images/
Misc.%20images/aquifer.gif

The Ogallala aquifer was virtually untouched until the 1910s, but the post-depression wartime government of the 1940s readily subsidized irrigation projects drawing from the aquifer as drilling technology improved. The dry grassland states of the central United States were quickly developed into major crop producing regions. As of 1980, “20% of the irrigated land in the United

[1] US Geological Survey, "High Plains Aquifer." Ground Water Atlas of the United States. USGS. 14 Sep 2008 <http://pubs.usgs.gov/ha/ha730/ch_e/E-text5.html>.
[2] "Ogallala Aquifer." North Plains Groundwater Conservation District. North Plains Groundwater Conservation District. 14 Sep 2008 <http://www.npwd.org/Ogallala.htm>.
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States overlay the Ogallala, 30% of the irrigation ground water in the United States was being pumped from it, and 40% of the grain-fed beef cattle slaughtered in the United States were being fattened in the six states of the High Plains."4 The aquifer's use for irrigation supports significant fractions of the nation's economy, 15% of the domestic corn and wheat as well as 25% of the cotton crop are raised on Ogallala water.5 This extreme reliance on the Ogallala aquifer has taken a dramatic toll on the ground water supply, both quantitatively and qualitatively.

The Ogallala lies under one of the driest portions of the United States. The plains states cannot support profitable agriculture without irrigation because dry farming there would be economically unfeasible. [5] Today the aquifer is being drained at such an alarming rate that an alternative source will have to be found in the next fifteen years at most. [4] In most areas covering the Ogallala the water table has dropped 10-50 feet since groundwater mining began, with drops of over 100 feet recorded in several agricultural regions. [1] Two main factors are contributing largely to this observed drop in the water table.

The first main cause for the Ogallala's drying up is that the Midwest has a naturally dry climate. The native plant species in the region are dry grasses and the plains states receive little rainfall most years, so profitable agriculture is only possible with intense irrigation. Water is being pumped out and recharged to the aquifer at different annual rates across each region covering it. One of the most critical sites is in the Texas High Plains, where roughly ten times as much water is being pumped out of the aquifer as is being replaced by rainfall. [4] Second, the composition of the aquitards also hinders refilling of the aquifer. "Lacustrine deposits, consisting primarily of clay and silt, line the bottom of the many playa lakes on the High Plains. The sediments are virtually impermeable, thus restricting natural recharge to the underlying formation." [2] Although the Ogallala Formation is home to many of these playa lakes that collect rainwater and runoff during rainy periods,[2] the calcium carbonate and caliche upper aquitard hinders that water from seeping down to the water table.

The water deficit in the hardest hit portions of the aquifer can be visualized as one teacup of water being replaced for every gallon being removed because of this imbalance[6], which is clearly not sustainable. Educational programs have been successfully implemented in some regions to reduce peak daytime irrigation in favor of irrigating when the sun in lowest in the sky. Irrigating at high noon can lead to a greater than 30% loss of water to evaporation, essentially throwing away this dwindling resource. Irrigating a similar field in the early morning and evening instead leads to about 15% in losses, which is a notable improvement. The most efficient method to continue growing crops in this dry environment would be to switch to drip irrigation. Drip irrigation reduces evaporation losses to around 5% by distributing water directly at the soil surface, but it is not currently used in large-scale agricultural operations. [7] Government subsidies may encourage that technology to be refined and scaled-up, which would significantly reduce strain on the Ogallala aquifer. Educational and subsidy programs may save the government money in the long run by helping farmers adopt sustainable practices to avoid water shortages.

The omnipresent state of agriculture in the region is also causing the waning groundwater supply to become contaminated by runoff. A recent study performed by the USGS in the High Plains region of the Ogallala showed that the groundwater contained numerous contaminants including arsenic, radon, chloroform and pesticides to name a few. [8] These

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6 Yamada, Louise. Market Magic: Riding the Greatest Bull Market of the Century. John Wiley and Sons, 1998.
7 Smith, W. "Irrigation Systems." Home & Garden Information Center. Clemson University Extension. 12 Sep 2008 <http://hgic.clemson.edu/factsheets/HGIC1705.htm>.
8 US Geological Survey, "High Plains Regional Ground Water Study." National Water-Quality Assessment Program. 16 Feb 2007. USGS. 14 Sep 2008 <http://co.water.usgs.gov/nawqa/hpgw/>.

chemicals are all specifically outlined in the Safe Drinking Water Act as having adverse health effects, and they are all present in the aquifer at rates that exceed EPA guidelines. [9] Even if drastic measures are taken to preserve the Ogallala in its already heavily damaged state, the numerous Midwestern communities drawing their municipal water supply from the aquifer will face extremely high costs of purifying the water or, in the probable case, they will continue to consume poisoned water instead.

The Ogallala aquifer is being used today to supply residential and agricultural communities across eight Midwestern states. For nearly 80 years the nation's breadbasket has been irrigated from Ogallala groundwater—a practice so unsustainable it severely threatens an aquifer that had flourished for over a million years. Farmlands are already shrinking on some portions of the Ogallala that have been mined of water. As the water table continues to plummet the High Plains will have to take drastic measures, whether communities import costly water or abandon the most profitable farming in the nation. Either way the decision has to be made soon because the aquifer that once held enough water to cover the entire United States under 1.5 feet of water is rapidly running out.

9 104th Congress of the United States, "Safe Drinking Water Act Amendments of 1996." EPA Ground Water and Drinking Water. 06 Aug 1996. US EPA. 14 Sep 2008 <http://www.epa.gov/safewater/sdwa/text.html>.

The Tiny Island That Could: An Investigation into the Potential of Koh Tao

Marcus Taylor,
USA

Millions of years ago, the Earth had yet to be molded by human beings, their thoughts, actions, creations, or destructions. Thousands of years ago, the forests of the Amazon had yet to be trod upon by the feet of human beings. Hundreds of years ago, Antarctica was virtually unknown to the geographic advances and explorations of human beings. Tens of years ago, the tiny island of Koh Tao in the Gulf of Thailand was also essentially untouched by human endeavors, a pristine paradise of white sandy beaches, clear blue waters, incredible coral reefs and impressive marine life that was all still slightly beyond the scope of human fascination in the middle of the twentieth century.

Today, this same island, as with the other aforementioned locales, is being trod upon, utilized, and made to cater to human wishes. Consequentially, it serves as a dumping ground for the products left over after these activities take place. Koh Tao is located approximately 70 kilometers east of the coast of Suratthani in the Thai peninsula, and is one of the country's, and the world's, major dive destinations. It is a center for education and certification for divers from the world over, as well as rock climbers, water skiers, beach bums and many others. Because of this, the water resources of Koh Tao, ever so precious to the economy of the island, the inhabitants and tourists, the flora, fauna, and marine life, and the ambience of the locale, are in a precarious position; threatened, but not lost.

There are serious and dedicated efforts in existence to protect the environment of Koh Tao. These activities not only engage the inhabitants of the island, but the visitors as well. Furthermore, there are several existing partnerships with foreign universities, like Queensland University in Australia and Newcastle University in the United Kingdom, to study the status of the coral reefs through a program called Reef Check (as well as a plethora of diving opportunities with ecological aspects to educate new divers while they are obtaining their certification). The island also maintains several active ecological groups which initiate and carry out various projects to preserve the environment of the island and the surrounding waters. In general, these groups have full support from local businesses, islanders, tourists, and, most importantly, local government officials.

Two of the most active organizations are Eco-Koh Tao and Marine Conservation Koh Tao, both of which have had and continue to provide significant programs on the island related to the sustainability of the available water resources. Some of the projects worth mentioning are their regular beach and underwater clean-up days, which remove trash from the beaches before it makes its way into the bays, as well as that which does make it to the ocean, there are serious research efforts that monitor and document the status of the local coral reefs, experimental (as well as established) technologies being employed to restore these reefs, protection and re-release projects for a variety of turtle species, water quality monitoring studies, and recycling initiatives designed to combat the environmentally insensitive practices used to deal with the constantly increasing influx of waste products onto the island and into its water resources.

With such a well-established community of environmental activists, concerned islanders, a supportive local government, educated ecologists dedicated to education, existing programs and continuing efforts, Koh Tao is well on its way to dealing with the threats that face the island from the ever-increasing flow of tourists onto the island, the businesses and buildings that are springing up to meet this demand, and the money, material goods, food, and water that accompany these things. However, there are aspects of the water resources on Koh Tao that are still being seriously threatened despite the existing efforts.

A plan that is in serious need on the island, and that is being investigated for the future, is how to deal with the runoff and wastewater created on the island. Before 1980, there were virtually no buildings or inhabitants on Koh Tao, and less than thirty years later, the island is teeming with people, one of the most popular tourist destinations in a economy renowned for its tourism. In part due to the rapid development of the island, there is no centralized wastewater treatment plant, and the wastes from individual businesses, houses, bungalows, and hotels are dealt with in an unsanitary fashion, if at all. The wastes of the humans of the island are, very probably, the most serious local threat to the coral in the surrounding areas. With a treatment plant and a system of waste removal from existing sites, as well as established norms for new construction, the local government could feasibly assuage this monumental threat to their local waters. The undertaking would temporarily employ a variety of Thai citizens, from construction workers to planning officials to wastewater experts, as well as a number of permanent employees to maintain the plant. Ideally the new plant would utilize an ecological machine or some form of natural wastewater treatment. Additionally, the local government could opt to distribute wastewater treatment not from a single centralized location, but instead with a series of smaller facilities, or an ecological machine for each building or series of buildings that produces waste. While this would be a more expensive option, it would provide more autonomy in the realm of new construction as well as taking a good deal of economic burden off of the government itself.

Diver education is also an incredibly important aspect of maintaining the precious water resources of Koh Tao. While there are plenty of existing opportunities for interested parties to enhance their knowledge of ocean ecology on the island, the majority of divers do not participate in these activities. What's more, the divers that are not engaging themselves in ecological informational sessions are the ones that pose the most serious threat to the beaches, bays, waters, reefs, and ocean life. By setting up a series of mandatory standards for instructors to include in their sessions with new and previously trained divers, the problem of environmental negligence by tourists could be seriously curtailed. A partnership between the environmental organizations and the local government on this issue could provide a team of individuals to monitor the success of this campaign and issue repercussions if the standards were not being followed through.

Along these lines, establishing an ecological branch within the local government would be one of the most progressive steps that the island could take in ensuring the safety and future of its water resources. As discussed above, there is a clear and apparent interest in the issue, as well as definite existing cooperation from the local government. With this in mind, it would not be a big challenge or a difficult undertaking to establish a committee within the government to oversee projects, assist local environmental groups, allocate funds, develop and implement new projects, and suggest more environmentally responsible methods for existing or proposed parts of the local government.

Finally, the island is in serious need of a method for water purification to provide inhabitants of the island and visitors to the island with a source of fresh, local water. Currently, all of the water on the island is shipped in by boat, with the water from the taps not being potable. There is no water purification plant on the island to service the need for water, which leads to a serious problem with waste disposal, as nearly everyone on the island consumes water from plastic bottles. The creation of a water purification plant would, similar to the wastewater treatment proposal, create jobs while providing a

sustainable solution to a growing and important need. This undertaking could be funded by the local government, or accomplished as a joint endeavor between the government and the local businesses, who are the ones who provide the largest demand for clean, potable water on the island.

All of these suggestions, if employed, could make the tiny, beautiful island of Koh Tao serve as a model for other islands in similar situations (of which there are certainly many, not only in the same archipelago, or the same economy, but all of the Asia-Pacific region and much of the world). There are currently a multitude of problems facing islands such as Koh Tao, problems of ecological background, of economic background, of human background. So many of these problems are related to the critical water resources that not only keep these islands afloat (metaphorically speaking), but that make them what they are. There are sustainable solutions to problems of water contamination, endangered coral reefs and turtle populations, and fresh water sources, and Koh Tao, or Turtle Island, has the opportunity, the resources, the know-how, a dedicated community and a willing government, that can unite to serve as a catalyst of change in how developing islands treat their increasingly precious water resources.

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Essays presented at the Universidad Nacional del Altiplano

The following essays were presented during the Colloquium developed with the participation of students from the Universidad Nacional del Altiplano and the delegates of the APEC Youth Camp.
Two essays corresponding to students from this university were selected by this institution to participate in the meeting; the other two, belong to the delegates.

Environmental restoration and sustainable revitalization in Chiayi Coast region

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Chinese Taipei

Abstract:

In this essay I'm going to discuss about one specific regional phenomenon case in Chinese Taipei - planning for environmental restoration and sustainable revitalization in Chinese Taipei Chiayi Coast region. In this essay, I'll mainly focus on the "land subsidence" water issue in Chinese Taipei. And compare Chiayi's situation with Netherlands, which also have subsidence problem because of nature conditions. Chinese Taipei can learn form some of Netherlands water control methods, and their attitude about "how to living with nature" and figure out how to apply in Chiayi's situation. By looking at the south-west coast "Chiayi coast" in Chinese Taipei, there are 250km^2 of area which are located at the west of Provincial Road 19. In this region, most of area had been pointed out as the severe area, which has serious subsidence problem, that means development and engineering practices in those area were may hard to restrained.

Due to the frequent and serious inundated in either from geographic aspect or from the serious water situation in this region, national land restoration action plan had been proposed to earn flood relief, environment restoration and production revitalization at the same time. It has been measured out that nearly 5,559.87 acres of this area were already below the sea level and 18,162.25 acres below the average elevation of daily tidal level currently. This kind of low land will rapidly increase due to continuous land subsidence and sea level rise effect.

Traditional engineering practices may not enough to serve in this worsen and unique situation or solve as flood relief in this type of area. Therefore, master planning of this regional land use and landscape reformation was introduced especially for this region. By this case also reveals that, it presents also the process of decision supporting system, which conducted for understanding of effects in flood relief practices. Firstly, index of flood relief was established as the reduction of inundation area. Besides, recovery of water harvest for fishery was established. For domestic wastewater, natural treatment capacity was also included. And land price raise was last partial to be calculated.

Three scenarios were compared as No Change, As Usual and Live with Nature. And according to land subsidence, sea level rises and the waves getting higher etc. three different effect factors, we may simulate among scenarios conducted in four different situations: current condition, low impact condition (which has been symbolized as Year 2013, the height of land will have 0.4meter lower), medium impact condition (as Year 2019, the total impacts of the height is approximately 0.9 meter) and high impact condition (as Year 2032, the number of height is about 1.6 meter already). So the number here has been previously presented, we can tell that the condition of the floods in that area is getting worse by years.

After simulations, the suggestions of master planning were concluded into four categories: 1.flood control measures 2.village and road 3.environmental friendly practice 4.land use reformation. Duration of the four plans implementation estimated from year 2008 to year 2019. And the overall budget of this suggestion project was approximately close to 16.3 billion NT dollars.

Another I regarded as a very important factor is Public participation. From the first beginning stage of conceptual plan, public participation should be naturally supposes to be emphasized. To almost each environmental transform project, the interactions between the public(mainly local residences I mean here) and the project team are important point to decide this project will succeed or not. Even a proper basic public education is necessary as the government or professional team process a project in local. To us, each place we want to transform, we want "make it better" the place to us is maybe still just a place, which urge or need to be transformed, but when we talk about the people who live, there is the place where their heart belongs, a place they name there as a home. So this project should have direct dialogue, small group workshops, professional debating seminars, and medium size conference, were conducted in various locations and within stakeholders. Discussions of flood control facilities, local livelihood and production, landscape reformation, and land use adjustment, have been all practiced and reviewed in each site, which are going to be demonstrated.

Now refers to Netherlands experience and see what we can learn from them and how to apply to the situation in Chiayi, Chinese Taipei:
Netherlands total square measure is about 34,000km2, if includes Epicontinental Sea, lakes and territorial Sea is about 41,000km2, and they have approximately 25% under sea level. If they didn't have any protections, ex. Sea walls or build sand hills, once they have strong windstorm or monstrous waves, 65% land of Netherlands will disappear. The submerged part, call Laag-Nederland, and not submerged part, they call it Hoog-Nederland. It's not hard to imagine how important for the scientists in Netherlands to measure the heights of Netherlands topography it is. They also have their own special standard to measure the average sea level, Normaal Amsterdams Peil. Ocean is the key factor to decide Netherlands weather. So the hinterlands and the lands along the coast in Netherlands have obvious different weather conditions.
Because the topography of Netherlands is flat, the average rainfall doesn't extremely different. There are mainly two strong factors to cause serious flood in Netherlands, they are fierce storm and climate change. Globally climate change makes the rivers in Netherlands experience huge change, in both increase and decrease way. And Netherlands also faces three major threats: dwelling places decrease, not enough potable water and the floods problem, and the flood is also a problem may continue to the next century.

Latest in Netherlands they have five main methods to do water control. Firstly, they innovate the land usage plan, integrate the residence area and the park, to maintain the living quality and doing the water control in the same time. Secondly, they try to be friends with the waters. For example, they build "floating house", and when flooding, to the Netherlanders may not such a suffering anymore, because they still can live on it. Thirdly, they have enforce their sea coast management, ex. they make activate seawall, keep them open or activate water gates, so they can control them easily. Last is not the least for Netherlanders to present their sincerity, they return the land, called Oostvaardersplassen back to the ocean, and transform to a wetland, become the most important nature landscape and birds habitat. They predict to complete their whole restoration plan in 2030.

After refer to the Netherlands situation, we back to the Chiayi's situations in Chinese Taipei. Some problems we may face directly. And here are some conclusions and suggestions from the sites which are already demonstrated: firstly, about 18,000 people living in 2488 acres area will be directly being affected. And from these sites, the protection level of inundation for villages and fish ponds will be improved from currently less than

2-year storm event up to 25-year at least. Secondly, the good is approximately water utilization of 1,873.06 acres of aqua farm can be switched from groundwater pumping to retention storage. And nearly 54 CMD of domestic wastewater, in terms of 18,000 persons, may be conducted in natural treatment by 17.4 acres constructed wetland. Thirdly, gross budget of these practices will be summed up to 5.6 billion NTD.

Overall benefit over cost for contents of master planning suggestion and demonstrated sited were 1.757 and 1.361, respectively. Dongshi site has the most priority of implementation, but average investment per capital, transferable groundwater usage and public common consensus.

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Installation of a Digital Control System of an Anaerobic Biodigestor to produce Biogas from the Lemna Sp in the Inner Bay of Titicaca Lake

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1. SUMMARY

Due to the problem of the environmental impact due to the growth of Lemna sp (water lentils) caused by the sewage in the inner bay of Lake Titicaca and mining tailings into the Ramis River and other tributaries; causing eutrophication of the lake that prevents sunlight from coming through, and thus hinders the proper oxygenation of native species (wildlife). This causes a horrible smell and visual pollution that is perceived by tourists. It is also emits greenhouse gases that cause Global warming. This will implement an adaptive digital control system to optimize the production of biogas from the Lemna in the inner bay of Lake Titicaca, the operation of the system was carried out using renewable energy (solar), taking advantage of organic waste to generate biogas, biol and biofertilizer, (Stage I) and in each of the tributaries of the Lake (Phase II) through a process of sewage treatment in each collector, with a distributed digital control system called SCADA.

The purpose of the three final products mentioned above is to obtain importance of sustainable development, which provides a clean development mechanism for the highest navigable lake in the world (water reserve in our region). The Lake houses native species of fish, amphibians and birds. Finally, this paper shows the sustainability of the project by processing waste and an automation system that uses organic waste to produce useful energy for economic development by improving living conditions, by minimizing the environmental impact through the use of renewable energies (Kyoto Protocol).

2. TRIAL BODY

Introduction

The proposed Project shall implement the digital control system of an anaerobic biodigestor that produces biogas from the Lemna SP in the inner bay of Lake Titicaca. This will contribute to the process of sustainable development by improving the quality of people's lives, and the waters of Lake Titicaca (which have been proclaimed a National reserve), reducing the devastating algal blooms, taking advantage of renewable energy, and helping the clean development mechanism. It became impossible to count on initiatives to take advantage of organic waste, which could be used as renewable energy

sources, due to the lack of knowledge in our region and the absence of advanced technology: Biogas, biol and biofertilizers. will contribute with the environmental decontamination, transforming this waste into products that improve the economy of our region, whose purpose is to decrease the poverty rate. Therefore, it is a priority to consolidate the processes of modernization, building automation technology to provide efficient complicated processes such as digital control for the operation of Anaerobic Biodigestor, which will sustain a backbone of biogas production.

Development

Nowadays, water scarcity is a big problem worldwide. Emissions of six gases responsible for global warming: (CO2), (CH4), (N2O), are causing climate changes around the planet. The Kyoto Protocol fosters a reduction of pollutant emissions (mainly C02).

The Environmental Pollution by Solid Waste in the city of Puno is one of the most urgent problems that both the authorities and the general population face. This is a result of a series of social and economic factors, mainly the lack of an environmental culture in Puno which is one of the cities that has major problems caused by mishandled solid waste, 73.4% of the solid waste is at the municipal dump site. The culture of cleanliness, is considering actions to strengthen environmental awareness in our community beginning in the schools, both public and private, so that from the 74.7 metric tons that were generated per day in the city, 26% was being carried untreated, by the winds and the main sewage directly out to the lake and the lake tributaries. This has also contributed to the growth of Lemna SP generating a process of eutrophication covering an extensive area of the Lake. But it creates another problem when it prevents the passage of sunlight into the depths of the lake for proper oxygenation of the aquatic beings and also creates a horrible smell and visual pollution that affects the tourism, by the magnitude of its size.

However, some research has been done stating that the Lemna contains high amounts of nutrients that are not effectively used. At the same time, you have other applications such as those being used as organic fertilizer. The problem continues due to the quantity of toxic elements such as sulfur and phosphorus that affects the health of living beings.

The central problem is the pollution of the inner bay of Lake Titicaca. The three potential causes are: Issuance of sewage from the city of Puno into the bay. The lack of a comprehensive plan for the management and conservation of Lake Titicaca and the mining waste and rainwater from the 19 rivers flowing into Lake Titicaca, resulting in fatal consequences for flora and fauna because of the Eutrophication of water and the spread of the Lemna SP. This prevents the sunrays from entering into the depths of the Lake, High contamination of organic and inorganic waste in the bay of Lake Titicaca, contributes to the propagation of lung and gastrointestinal diseases. Also, we can find contamination of water resources by energy mining toxic elements that cause animal mortality.

This also impacts the water resources: such as ispi or carachi, etc. The final effect of the emission of greenhouse gases is a lawer quality of life.

The overall goal is to reduce pollution of the Bay of Titicaca Lake, and the specific objectives are:

- To install a digital control system of an anaerobic biodigestor to produce biogas from the Lemna
- To create a comprehensive plan for the management and conservation of Lake Titicaca
- To create Mining Waste and Rain Water Treatment Plants in order to not harm the fauna

The objectives of the project are:

- To harness the energy and reduce the propagation of lentils
- To reduce pollution caused by organic and inorganic waste
- To improve the quality of the hydro-energy use (suitable for consumption)

The ultimate goal of the project is to reduce the greenhouse effect and improve the quality of life.

From the alternative solutions mentioned in the objectives, to the project is proposed in two phases the first of which targets the two goals and then the third specific objective.

The temperature in Puno is very low and fluctuates a lot. There is the development of digital controlled systems to control the adaptation. This is an Electronic Engineering design that belongs to the branch of automation and control. It is used to accelerate the biodigestion process by controlling temperature and pH levels, which are required for a shorter period of retention of organic matter. It also accelerates the production of biogas, biodiesel, and biofertilizer, which through the acquisition of variables representative of the process and action on the Ground Biodigestor, keep track of the values of these variables. A circuit card-based digital data acquisition and the design of a control software is used, while for an asynchronous communication between the control system and a Computer data logging, establishing to turn that timely data and a distributed system for communication timing of the 19 treatment plants.

The importance of Installing Digital Control System is that it optimizes production using temperature controls, with solar energy due to changes in sunlight and cold clouds that cause an average temperature of 10 ° C in Puno. This is not an optimal range for the production of biogas, and because the Lemna has an unbalance in PH levels, for its high content of nutrients that can inhibit the action of anaerobic bacteria to produce biogas.

It would be an inefficient production process without the controlling parameters such as temperature, and pH level of liquid in a biogas plant, this is the fundamental essence of the project.

Digital control or advanced controls are: Predictive Monitoring, Control adaptation, Robust Control, Optimal Control, etc.

Adaptable Control: "An adaptable system is a physical system that has been designed in terms of adaptability."

ANAEROBIC BIODIGESTOR: It is an airtight chamber that processes organic matter to produce biogas in the absence of air (anaerobic). It has the ability to withstand high temperatures (40 C thermophilic ranges).

BIOGAS: mainly consists of methane gas (55% -65%) produced by anaerobic digestion (in the absence of molecular oxygen) of organic matter. It is a mixture of gases that primarily consists of: Methane (CH4) 40-70% by volume, carbon dioxide (Co2) 30-60% by volume, other gases 1-5% by volume. Like any gas, property characteristics depend on the pressure and temperature. The optimum temperature for biogas production is 40 ° C. If the temperature is below 20 ° C, the production tends to diminish.

LEMNA SP: This family comprises tiny free-floating Lemnaceae aquatic plants in the water (macrophytes) with little blossoms, belonging to the group of angiosperms monocots. It is the product of a high concentration of nutrients from drains and sewerage

service. It contributes to the decontamination of wastewater due to its great capacity to absorb nutrients, such as phosphorus and nitrogen. The chemical composition of this plant-s dry weight varies from one researcher to the next: the variables are as follows: Protein: 6.8 to 45.0, crude fiber: 5.7 to 16.2, Ash: 12.0 to 27,6.

Control System. The biodigestor control system is based on controlling temperature and pH levels, along with the gas pressure.

Sensors: The indicators are very important in the measurement of temperature, and the pH levels of the liquid.

Plant: It is the set of valves and pumps that controls the circuits of cold and hot oil to adjust the internal temperature of the biodigestor. The biodigestor has a gas extraction system, controlled by a mechanical pressure switch.

Isolation and Conditioning circuit: It adjusts the digital signals of the Data logger that drives the pumps and valves it also provides the necessary isolation within the high powered system of the plant.

Data logger: The data recorder is where the sensors are connected to send data to the computer. The Campbell Scientific data logger is a robust and reliable data acquisition system. It is known for its flexibility, accuracy and reliability. It measures even in remote and harsh environmental conditions.

Computer Registry: This is a computer, which frequently records quantities taken by the data logger.

The plant, where the adaptive control shall be implemented, will be located on the shores of the millennial world's highest navigable lake: Titicaca. The plant shall have a parabolic cylinder sensors field with a solar tracking of the elevation. The reception tubes, located at the focal line, will use the concentrated solar flux to heating the oil from the bottom of a storage tank by thermal stratification whose party returned higher oil once its temperature increased. The tank is concentrated in a number of ways to use the energy stored in it, taking advantage of the principle of thermal stratification. The plant is subject to disturbances in the energy input, which can be slow, due to changes in sunlight over a clear day, or abrupt due mainly to the appearance of clouds and temperature variations at the entrance of the field in the launching of power conversion system. Solar energy is stored in large surplus deposits of hot oil to supply the plant at night. A synchronized operation of the 19 collectors will be implemented into the system, a distribution system will also be placed in each sewage collector. This will treat the sewage entering into the lake, taking advantage of the solid matter to generate biogas, as well as biofertilizer and biodiesel.

BUDGET (PHASE I).

The net budget needed for the implementation of the project amounts to S/.2'392,411.36 (equivalent to US $ 824, 969.43.)

The deployment will take 12 months prior to the environmental assessment, the investment cost for training and digital control systems such as "adaptive control" is S/. 2,392, 411.36 for the first stage.

For the second phase of the distribution systems, the cost for each biodigestor is roughly

the same amount, with the only difference that it will conduct a transmission system at SCADA, the extra cost of which is: S/ 500,000.00. With the condition to not use the satellite in order to avoid further costs, the appropriate implementation process is the same as in the other case.

Gas production, with a daily average of 80 tons with deficiencies reaches a daily extraction of 50 tons of Lemna, combined with organic waste. And the retention time with the digital control system of adaptive rate control is 20 days and will produce 50000 liters in 20 days, which amounts to 2,500 liters per day, 75,000 liters per month which could meet the needs of 3750 families. And sold at approx. 20 soles per tank, will generate a monthly income of S/ 75000.00. It achieves the goal of improving the quality of life, a clean lake, improvement in the economy, and by working with solar energy it complies with the Kyoto Protocol. It is expected that when this plant is built, it will obtain factual data to demonstrate that besides eliminating nuclear proliferation and climate change, this renewable energy technology will also be cost-effective.

We also need solid waste management handling in the city of Puno. We also need to show the benefits of efficiently implemented programs for urban environmental management to prevent polluting the bay of Puno, and improve the city's scenery with the direct involvement of civilians and military personnel through inter-agency coordination, organized groups, social organizations and others.

The "Universidad Nacional del Altiplano" (Public University of the Highlands) as the facilitator, promoter and manager; raises, s, and gathers along with the entire population, the money necessary to achieve the objectives and goals that have been proposed in a short time. College students are committed to preserve, conserve and protect our water resources as a historical legacy, the cultural profile that traditionally identifies the city of Puno, and the role must carried out by the high-level administrative Local Government, which shall determine the special status of the city, based on what is set up, a parallel demand and a wide opportunity to undertake a process of gradual improvement of the Public cleaning service. In addition, such attributes properly channeled, will benefit the Urban Environmental Management of our city.

CONCLUSION

- The "installation of digital control systems of an Anaerobic Biodigestor To Produce Biogas from the Lemna In the inner Bay of Titicaca Lake" will improve the community's economy by taking advantage of renewable energy (solar), and sustainable development with the decontamination of the national reserve of Titicaca Lake.
- This will optimize the use of these organic elements (Lemna SP, solid waste) to obtain three products: Biogas, biofertilizer and biol, rather than as a single case of fertilizer and food for fish used in Vietnam.
- Therefore, the positive impact in the short term would be:
  - Reduction of pollution and gastrointestinal diseases, lung, allergies, skin and so on.
  - Increase of income by increased tourism flow, thereby improving the quality of people's lives.
  - Contribution to a clean development mechanism also favors reducing emissions of greenhouse gases in compliance with the Kyoto Protocol.

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Environmental conscience in Universities

A project to sustain water resources through the use of greywater

Javiera Flores,
Chile

Would you flush your toilet using previously used water? That question has become part of a heated international debate about water recycling, as people try to find solutions to the lack of water supplies brought about by climate change and a growing population.

Introduction

Greywater, also known as sullage, is non-industrial wastewater generated from domestic processes such as dish washing, laundry and bathing. The project presented as follow is to use greywater in urban universities.

In recent years several organizations has generated much interest in the reuse or recycling of greywater.

For this particular project, the universities infrastructure requirements are:

- Located in urban areas with access to fresh water
- Based-on boilers heating system
- Non extensive green areas

The social structure requires that:

- A robustly committed community of young people with the knowledge that the benefits of optimizing water resources have an impact not only in their universities alone, but into the whole geographic immediate area, that will receive the winnings of most advantageous use of water in the local sector.
- The president of the class should have enough skills like to make pressure to the university headmasters, with the aim of modifying the usual way of using water resources, even though this implies at the beginning pecuniary costs for the institution. Should have the ability to convince that the effects at the future are strongly positive like to have economic savings in a short-medium term.
- The community must replicate the experience so as to generate a full learning in the vicinity which they belong, in order to imitate a successful technology that had the opportunity to be implemented in an organization before.

The plan

The plan consist into install a massive system to treat and re-use greywater.

Greywater gets its name from its cloudy appearance and from its status as being neither fresh (white water from groundwater or potable water), nor heavily polluted.
This table shows the types of greywater and the waste per liter, person and day:

BLACKWATER	LITRES/PERSON/DAY
Toilet	22
GREYWATER	**LITRES/PERSON/DAY**
Shower	56
Hand Basin	6
Kitchen tap	12
Dishwasher	5
Laundry tap	7
Washing Machine	27
Total - Greywater	**113**
Total - Overall	**135**

The plan is divided into three different uses of greywater.

1. Greywater to be used for flushing toilets

The system collects the water from the bathroom sinks and filters and disinfects it before it gets re-used as flush water for adjacent toilets.

This system is expected to save between 10 and 20 liters of fresh water per day for two person bathrooms with normal activities. This represents between 3,650 and 7,300 liters of fresh water saved per year, and this should be multiplied for the number of students that currently go to the bathroom per hour/per day. Also an important amount of wastewater cost is saved.

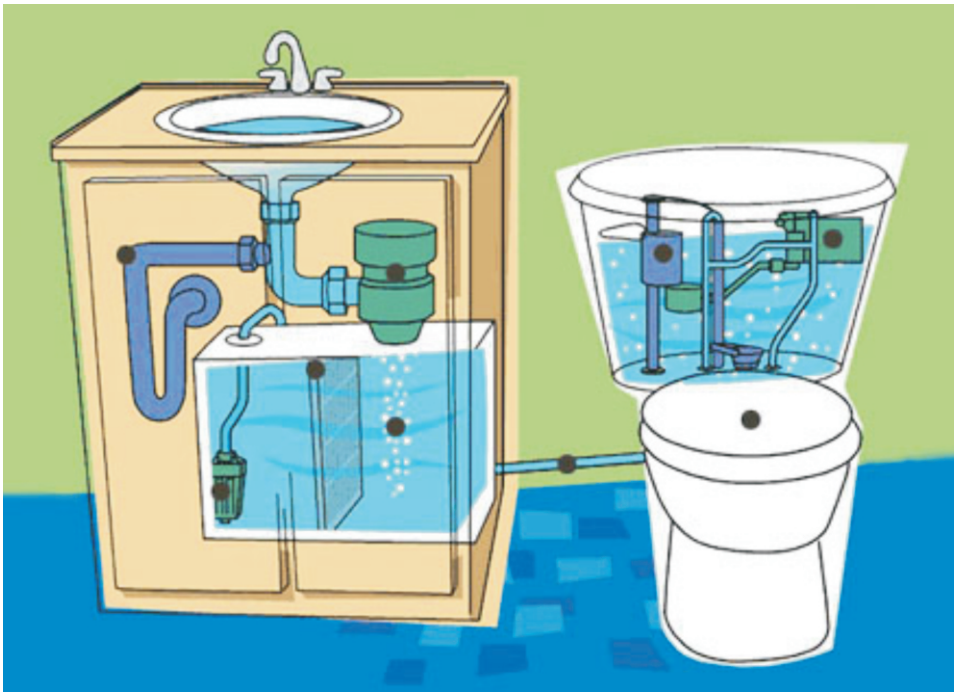


Photo by Phillip Swensson

The system can be retrofitted to an existing toilet without great difficulty. The picture shows how it works in a family scale model

2. Greywater to be used for irrigation of green areas

Reusing wastewater outdoors can reduce potable water use by 30 to 50 percent.

Treated wastewater can be re-used to water gardens either by subsurface or above ground irrigation. Only treated and disinfected wastewater should be used for above ground irrigation due to potential presence of pathogens.

The greywater used in this case comes from showers and the water used in the kitchen.

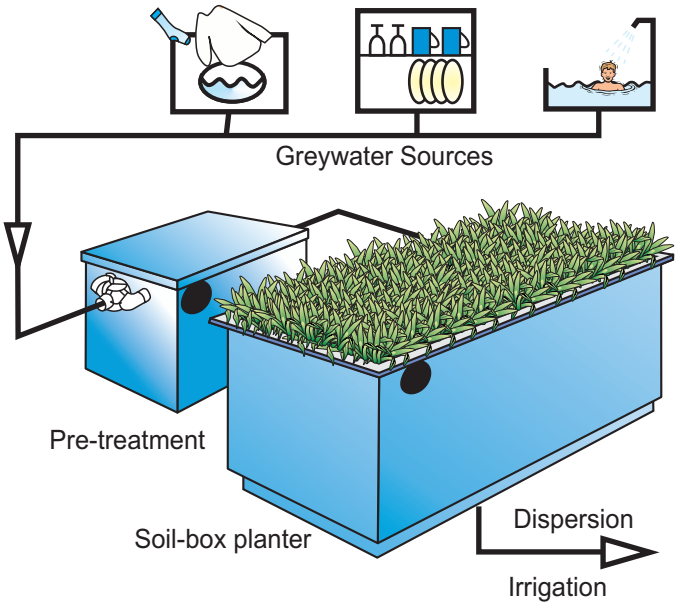


Photo by Lifegoggles

The level of re-use of wastewater in the garden needs to be balanced with the amount of water, solids and nutrients that the plants and soil in your garden can absorb.

Wet composting systems treat all household wastewater and also allow the composting of other household organic wastes (kitchen and green waste). Compost must be removed periodically and disposed of carefully underground. The effluent from wet composting systems typically requires further treatment and/or disinfection if it is to be re-used above ground.

3. Greywater to be used for heating

Heating through the use of boilers: A boiler is a closed vessel in which stored water or other fluid is heated. The heated or vaporized fluid exits the boiler for use in various processes or heating applications. The greywater can be used as the fluid needed for the boiler to works.

Reusing wastewater in the green areas needs to have a method of either disposing or storing the wastewater you do not require during periods of high rainfall. Storage is recommended as it maximizes the usefulness of wastewater. Thus, using greywater into boilers not only works for heating, but also for storing the greywater that wasn't used for irrigation.

Conclusions: Move towards ecologically sustainable development

Because greywater use, especially domestically, reduces demand on conventional water supplies and pressure on sewage treatment systems, its use is very beneficial. In times of drought, especially in urban areas, greywater use on gardens or in toilet systems helps to achieve Ecologically Sustainable Development by helping to meet its principles.

The potential ecological benefits of greywater recycling include:

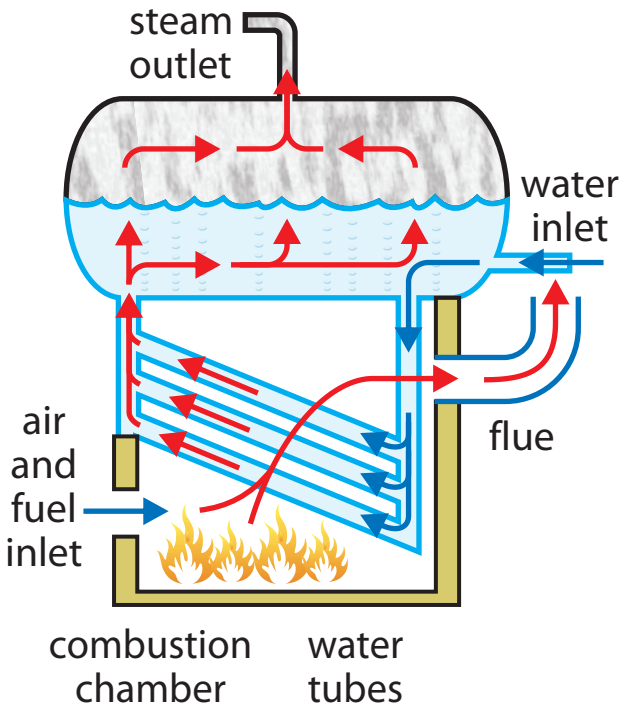


Photo by Barthleby

- Lower fresh water extraction from rivers and aquifers
- Less impact from septic tank and treatment plant infrastructure
- Topsoil nutrification
- Reduced energy use and chemical pollution from treatment
- Groundwater recharge
- Plant growth
- Reclamation of otherwise misdirected nutrients

With water conservation becoming a necessity in a growing number of jurisdictions, business, political and community pressure has made regulators seriously reconsider the actual risks against potential benefits. It is now recognized and accepted by an increasing number of regulators that the microbiological risks of greywater reuse at the single dwelling level where inhabitants already had intimate contact with that greywater are in reality an insignificant risk, if properly managed without the need for complex, expensive and onerous red tape approval processes.

Economic Evaluation of the Boats Moved with Photovoltaic Solar Energy and Its Environmental Benefits in the Interior Bay of the Titicaca Lake

* Proofreading: Luisa Portocarrero / D´ Origen Traducciones

Ludwin W. Castillo Quispe,
Said A. Umetzu Caballero,
and Jose Carlos Vilcherrez Arrollo,
Peru

Advisors:
Teddy A. Flores and
Edward Alvarez Vengoa

1. Thematic Axis:

Locality	District	Province	Departament	Length	Latitude	Altitude (m)
PUNO	PUNO	PUNO	PUNO	70° 01 38	15° 50 08	3875

2. Technical Area

- Renewable energies:
  Photovoltaic solar energy

3. Coverage of the Essay

Interior bay of the Titicaca Lake

4. Institution of origin:

UNIVERSIDAD NACIONALDELALTIPLANO
Professional School of Mechanical-Electrical engineering

The model part of the structure

The increasing worldwide development of science, into a non-pollution environment and the non-stopping change of technology concerns us and keeps us from staying out of this world problem. This is why we have written the paper named "Economic Evaluation of the boats moved with photovoltaic solar energy and its environmental benefits to the interior bay of Lake Titicaca".

Scope: To highlight the importance of avoiding contamination of our Lake Titicaca with a new technological alternative by changing the energy counterfoil of the boats that are currently using 84 octane Oil.

It is worth mentioning that nowadays, in the interior bay of Lake Titicaca, there are about 130 boats and only by changing their living standards can they help improve the life of the fauna and flora in our lake, a cleaner life for the residents of the city of Puno and the islands on the lake. The major benefit would be that we will be contributing with the pollution reduction in our planet.

2. BODY OF THE ESSAY.

2.1 INTRODUCTION:

Most of the pollution on Lake Titicaca is caused by the by-products of the boat engine combustion. That is why we have found it necessary to change the energy counterfoil of Lake Titicaca

The constant rise in the price of oil and its derivatives, to more than 100 %, concerns the owners of cars, factories, thermal plants, etc.

In Puno we have the highest navigable lake of the world, navigable? The question arises about what type of crafts may navigate. We already have a rustic, handcrafted but innovative navigating form: raft of totora (reef). We can also find boats, some yachts, ships of the Navy Coast Guard of Peru, there might be other types of crafts but our study focuses on the boats that we currently see on the shores of our Lake Titicaca.

According to information provided by The Navy Coast Guard of Peru: there are about 130 boats within the interior Bay of the lake. It is a considerable number since all of them use fuel-oiled engines. It is also true that the number of cars in the city largely surpasses the number of boats on the Lake. However, our Lake Titicaca has been polluted for decades by the sewage waters from the city of Puno. This is not the end of the story. It is also being used as a disposal for garbage, rubbish, and other forms of waste. Additional ingredients to this tailings soup are all the combustion by-products that pollute the surrounding air of the bay. It is a disaster, without local or regional authority intervention and very little from the native population.

We as *Puneños* (People from Puno) and university students propose:

To carry out the sewage water treatment study to be used in the irrigation of parks and gardens of our city. This way, we don't have to continue paying EMSA Puno for drinking water to be used to irrigate the parks and gardens. In addition, we will be providing our small contribution to decontaminate our dear lake.

Develop a strategic employment plan of trash collectors or to intensify the gathering of trash in the bay. Better yet would be to recycle it and not throw it out in the outskirts of the city.

Change the energy counterfoil of the boats that navigate in the bay of the Lake.

Natural gas- This type of hydrocarbon is much cleaner than oil and all its byproducts. Another option may be to change the oil-fueled engine for a natural gas-fueled engine.

This is a viable approach since the Southern Gas pipeline will become a reality within the next three years.

Photovoltaic Solar Energy.

The cleanest and most pure energy than I have studied about up to now is another alternative to conventional energy counterfoil. Studies of this type of energy are developing at an extremely rapid pace. Still, sun cells are not efficient enough to be competitive with a gas fueled engine, but, solar panels can be competitive on a price basis.

In this little essay we state that the second best option is the photovoltaic solar energy. Please, find our work proposal as follows:

2.1 DEVELOPMENT:

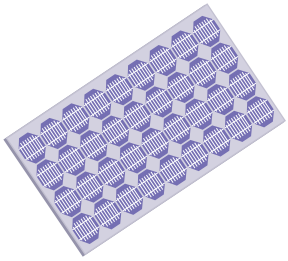
THE SUN

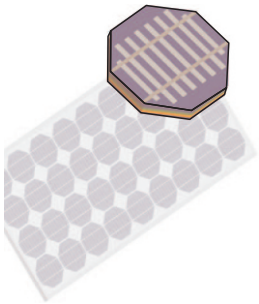
The study of the solar power system has been carried out by analyzing all the indicators that are involved in said system, beginning with the analysis of the solar radiation, paying close attention to its spectral distribution, given the importance that this aspect has in the photovoltaic conversion, the extenuation in its way across the atmosphere and the geographical - astronomic variables that determine the variability of the solar incident depending on the inclination and orientation of the solar panel.

SOLAR RADIATION CHARACTERISTICS:

The Sun sends its energy as electromagnetic radiation that travels at the speed of light and is delayed by a little more than 8 min when entering the Earth's atmosphere.

The solar beam is also the overlapping of electromagnetic waves at a different frequency





Photovoltaic solar power.

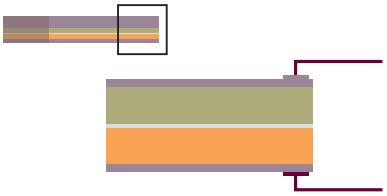
We would like to briefly explain what a photovoltaic panel is.

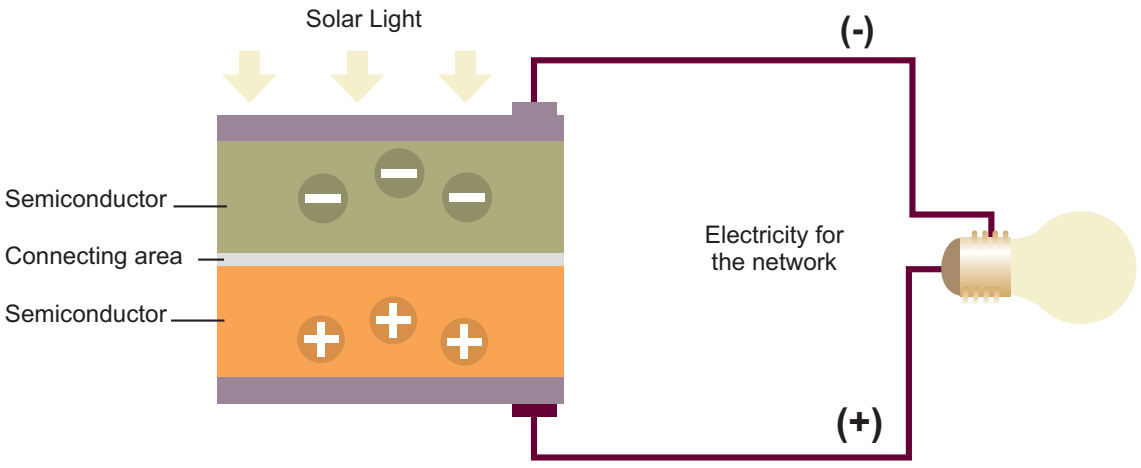
The top part of the plate is covered with a transparent glass that allows the passage of radiation and helps minimize heat loss.

The panel is formed by a certain amount of photovoltaic cells. The number will depend on the voltage needed.

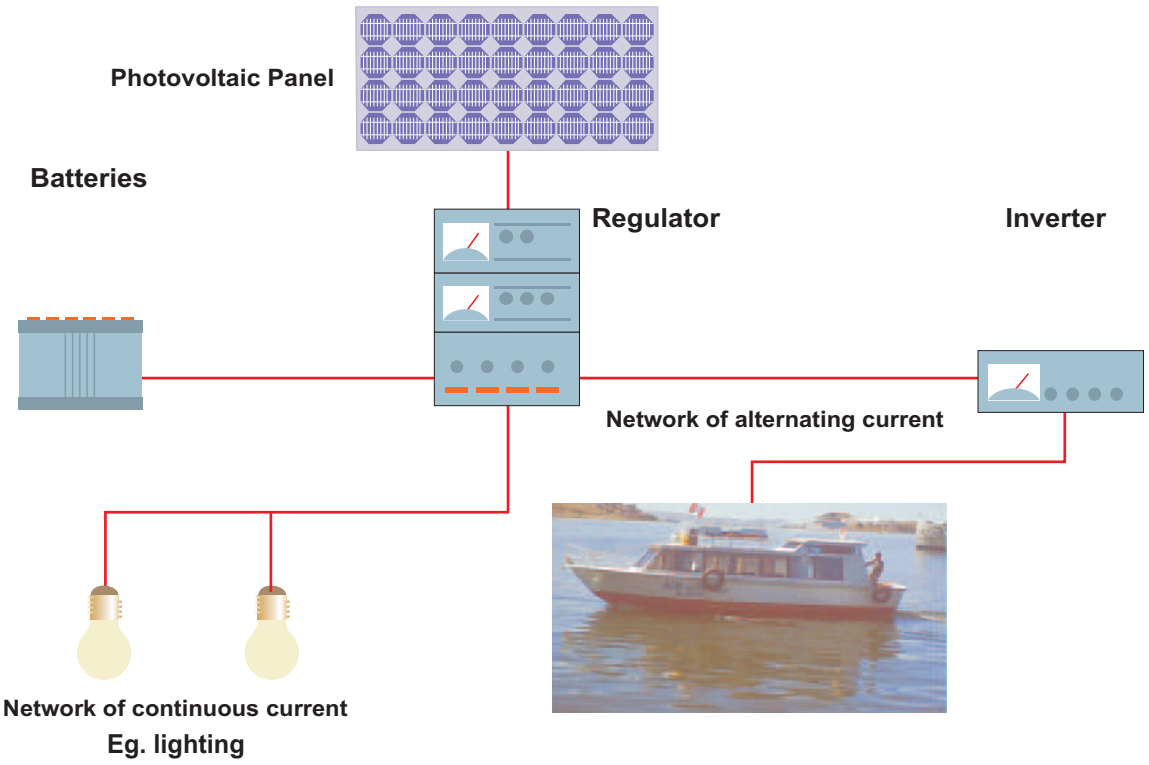
The photovoltaic cell is the element that transforms the solar power into electricity. Every cell produces approximately between 0.4 and 0.5 volts (V)

The solar light is absorbed by the conduits provoking a tension between both caps and the current flows between the negative pole and the positive pole generating electricity.





INSTALLATION OF THE PHOTOVOLTAIC PANELS



REGULATOR:

It prevents the batteries from receiving more energy once they reach their maximum capacity.

BATTERIES:

They accumulate the energy that will be used when the sunrays are low.

INVERTER:
It transforms the direct current into alternating current

NETWORK OF ALTERNATING CURRENT:

Here we find what we want, the energy to power our boat's engine.

BOUNCE **DESCRIPTION:**
All these boats are traditionally made with wood from the city of Puno

Most of the engines in the boats are car or truck engines.

Characteristics:

Engine Power: 350 HP

8 cylinders

Disposition of the cylinders in "V"

Consumption of fuel: 1 Gallon per every 8 Km of 84 octane Oil
Boats with a capacity of 30 people
Approximate weight of the boat with passengers on board: 4 tons

130 boats that sail the interior bay of Lake Titicaca whose main destination are the Uros, Taquile and Amantani islands.

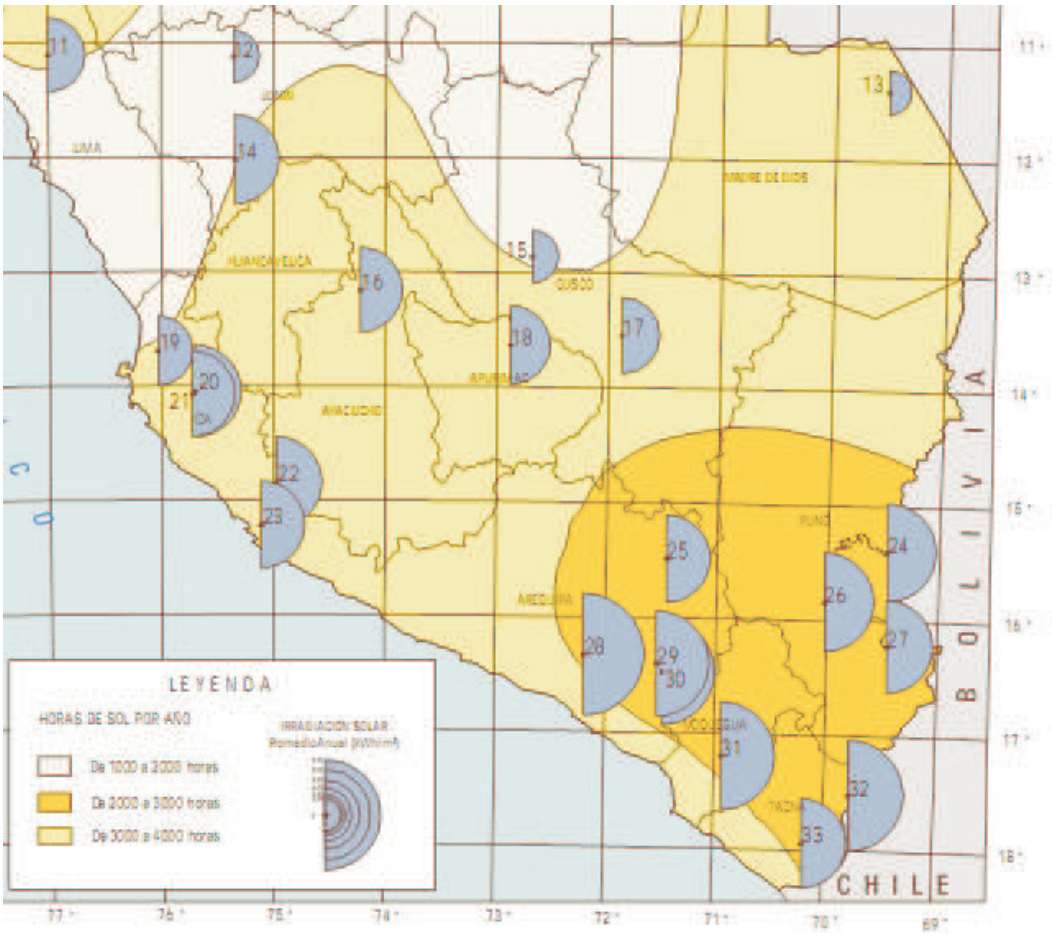
The ride to the Uros' Islands takes approximately 40 min. The approximate distance of the tour is 7 km.

Location of the solar panels:

Most of the boats in the bay of Lake Titicaca have an area of 45.00 m2, which is enough to implement the photovoltaic panels. However, it may not comply with the aesthetic parameters if they are installed on the roof of the boat. Unfortunately, it is the best place for the collection of the solar power needed to activate the electrical engines that move the boat

Advantages.

- Does not have any type of emissions since it does not use any type of fossil fuels.
- It is noiseless.
- No oil or other pollutants spill risks. The solution is not new but it is innovative.



Finally, we would like to show the map of the city of Puno

2.3 CONCLUSION:

As we have seen in this essay, the use of photovoltaic panels to power the boats that currently work in Lake Titicaca might be a great solution to reduce the Lake pollution index in the short and long term as well as the air polluted with CO2, bothersome noise and most importantly, it will provide better scenery for the Tourists visiting our lake, teaching them that the technology is of the utmost importance in order to preserve the environment.

3. BIBLIOGRAPHICAL REFERENCES.

- Formulation of a model of study for the utilization of the solar power by means of the photovoltaic conversion in electric power for systems of small power.
- Http: // www.seacleaner.com/solemar/
  www.consumer.es

4. LIST OF DOCUMENTARY MATERIAL THAT HAS BEEN USED TO DEVELOP THIS ESSAY.

http://www.seacleaner.com/solemar/
http://es.youtube.com/watch?v=6eYrPTe5M9o
http://es.youtube.com/watch?v=SEGTUl2fHdg&feature=related
http://es.youtube.com/watch?v=w2MFMSDTxEU&feature=related

Thematic
Final Report

Executive Summary

The APEC Youth Camp 2008 took place in Lima and Puno, Peru from 30 September to 6th October, 2008. The main theme of the seminar was “Caring for the Sustainable Development of the Asia-Pacific Region”. Lake Titicaca in Puno was used as a case study to take a close look at water issues common to each of the APEC economies. The main product of the event was the Declaration of Youth which will deliver the message of APEC Youth on sustainable development to the APEC Leaders Meeting in November.

This project was carried out in 2 stages:

1. Virtual stage: it involved the exchange of ideas and information on sustainable development and water issues; and the selection process utilized to attend the Seminar in Puno.
2. APEC Youth Camp Seminar: took place in Lima and Puno, Peru, from September 30 - October 6 with a total of 35 delegates from 15 economies.

1. Introduction

Considering young people as future leaders it is considered important to continue pursuing the goal of Ministers stated in 2003:

> **"Youth form the foundation of APEC's future. Engaging the youth of APEC economies and bringing them together in cooperation activities will ensure that the Asia Pacific community develops on the basis of understanding and cohesiveness." (APEC Ministerial Meeting 2003)**

On the basis of the main theme of the 16th APEC Economic Leaders Meeting held in Lima, 2008: **"A new commitment to the Development of the Asia-Pacific"**, the Peruvian National Youth Secretariat (SENAJU), the Ministry of Education and the Ministry of Foreign Affairs proposed and hosted APEC Youth Camp 2008. The main theme of which was **"Caring for the Sustainable Development of the Asia-Pacific Region".** The to the APEC Leaders' instructions:

> **"Promoting open, efficient, transparent and flexible economies is vital to continuing economic growth and the building of a strong and sustainable future for our Asia-Pacific community".**
> (15th APEC Economic Leaders' Meeting)

2. Phase 1 - APEC YC Website/Selection

The objective of the first stage of the project was to select the delegates who would attend the Youth Camp; provide them with information to prepare them for the seminar and in doing so, enable the elaboration of the APEC Youth Declaration on sustainable development and water resources.

This stage was virtual and therefore the APEC Youth Camp 2008 Website was created www.apecyouth2008.com. The web site acted as a space where participants could exchange ideas and opinions. It is important to mention that this web site allowed the delegates the opportunity to learn more about the similarities and differences of the various APEC economies in terms of sustainable development issues and water.

The website included the following:

a) Information about the Youth Camp (description, objectives, location, activities, agenda, etc.).
b) Administrative Circular (more specific recommendations for the delegates and appropriate information).
c) APEC information and activities.
d) Additional information about Puno, Lake Titicaca and sustainable development.
e) Rules for the essay competition and the registration of applicants. The registration included a specific user name, a password and a new e-mail address.
f) A system where the participant uploaded their essays.
g) A forum where the participants exchanged opinions related to their essays and other themes of interest and specific queries about the project.
   There were 2 kinds of virtual interaction:
   - Discussion forums. Each week an expert posed a question concerning a specific theme of the seminar to which the participants exchanged their views and opinions. Themes included – sustainable development and water, climate change and water, water pollution, water culture, APEC and the Declaration.
   - Programmed live chat sessions with experts about the specific themes mentioned above.

h) Links of interest.

To obtain a place in the seminar an essay competition was held. Each economy could send a maximum of 4 youth delegates, aged between 20 and 25. The specification of the essays were to present solutions to the problem of water pollution in an economically active area in any of the APEC economies.

The chosen geographic area had to contain the following characteristics:

- be considered economically active
- contain a water source (a lake, a river, a bay) which is vital for the commercial development of the area
- have environmental risks that involve water resources
- propose a solution that assures sustainable development taking into consideration the economic, environmental and socio-cultural aspects.

The summons to participate in the contest was made by e-mail and in coordination with Ednet Focal Points and the embassies of each economy.

3. Phase 2 – Seminar

In 2008, Peru decided to de-centralise the APEC meetings and hold them in the different regions of Peru. Through a public contest Puno was selected to host the Youth Camp therefore Lake Titicaca, the highest navigable lake in the world, was chosen as the case study and water as the main topic of the seminar.

The seminar utilised both plenary and working sessions so that delegates could share directly their knowledge and experience on sustainable development and environmental issues in each of the APEC economies. An important element of these exchanges were the comparison of problems and investigation of both current and potential solutions. Theoretical information was provided by local, national and international experts and practical information was sought through site visits and personal interviews conducted by the delegates themselves. From these interactions the APEC Youth Declaration on sustainable development for the APEC region as a whole was developed. The declaration guidelines have been written in such a way that they could be replicated in any other economy within the APEC region.

3.1 Participants

In total 35 delegates from the following 15 economies attended the seminar Canada; Chile; the People's Republic of China; Indonesia; the Republic of Korea; Malaysia; Mexico; Peru; Philippines; the Russian Federation; Republic of Singapore; Chinese Taipei; Kingdom of Thailand; the United States of America; and Vietnam. 2 delegates from each travel-eligible economy received APEC funding.

3.2 Program and Activities

Day 1 (Tuesday 30 September): Most of the delegates arrived in Lima and all were registered by the afternoon session that consisted of the Welcome and introductory presentations to APEC. A presentation was also given by an internationally-recognized Peruvian ecotourism company on how it has successfully managed to incorporate CSR (Corporate Social Responsibility) into its management system. This was felt as particularly relevant to the proceedings as Peru has introduced the concept of Corporate Social Responsibility (CSR) to the APEC agenda in 2008 as part of the theme “A New Commitment to the Development of the Asia Pacific.”

Day 2 (Wednesday 1 November): The delegates were transported to the city of Puno where the main part of the seminar took place. Puno is found at an altitude of 3,850m, and as new arrivals often experience unpleasant affects of the high altitude the delegates were

allowed to rest for part of the day. In the afternoon there was an introduction to the seminar objectives and agenda and participated in an icebreaker session.

Day 3 (Thursday 2 November): In plenary session the main body of theoretical information was presented on this day. Local presenters from Puno and Lima were invited to talk about the various climate change, water pollution and water culture aspects of the case study Lake Titicaca, the Peruvian region and the global context. Following the presentations the delegates gathered to form the first working session. In order to allow time for each of the delegates to speak and exchange opinions, three discussion groups were formed to discuss the following themes – climate change and water resources, water pollution and water culture. Each group consisted of delegates, an expert to provide specialist information and 2 Youth Experts to help facilitate the group. To maximize cultural interaction, delegates from the same economies were distributed amongst different groups.

In the afternoon plenary session delegates listened to further presentations on sustainable development, specifically in terms of APEC, Youth Leaders and finally, the making of a declaration. In the evening 3 of the delegates were awarded for writing the best essays of the seminar.

Day 4 (Friday 4 October): The practical information-gathering part of the seminar commenced with site visits to the floating islands of the ethnic Uros and the island of Taquile, both on Lake Titicaca. During the visits delegates were encouraged to gather information and conduct interviews with the local inhabitants.

Day 5 (Saturday 6 October): The practical part of the seminar continued with a city tour of Puno, a visit to the archeological site of Sillustani. In the afternoon the delegates were invited to the University of the Altiplano (Highlands) to attend the presentation of 2 environmental projects by local university students and 2 essays by APEC delegates, followed by comments from a water expert and a question and answer session.

Day 6 (Sunday 7 October): Once again the discussion groups officially convened, facilitated by the Youth Experts, to discuss the perceptions, advances and information gathered on the previous days. All of this information was put together along with the delegates' own ideas and opinions to form the Declaration of Youth. To fine edit the document a Drafting Committee of 6 delegates was assembled, (made up of 2 representatives from each discussion groups). In the afternoon the final Declaration was presented to the plenary session replicating the official Ministerial meetings.

4. Outputs

The Youth Camp 2008 Declaration on **"Caring for the Sustainable Development of the Asia-Pacific Region",** which will deliver the message of APEC Youth on sustainable development to the APEC Leaders meeting in November, can be found in Attachment 1 of this document.

The Declaration and photos from the seminar have been posted on the official APEC Peru 2008 website www.apec2008.org.pe. Presentations and the best essays have been posted on the Youth Camp website. A documentary video of the youth camp is also available.

The Youth Camp website is a virtual output of the project and became active in July 2008, it will be kept available until July 2009. Its creation is perceived as invaluable to the project both in terms of preparation of delegates for the seminar and information dissemination of sustainable development issues. It has received a wide audience and between July 2008 and the end of the seminar in October 2008 it has been visited 6,167 times by 3,548 visitors from 61 different countries and territories.

5. Results

This project has not only allowed the involvement of young people in APEC activities, it has also provided opportunities for the youth to build a cooperative and supportive network and learning community. Through this project participants have been able to develop ICT skills and widen their knowledge-base concerning sustainable development issues. As a result they have been able to develop a sense of regional and global community and become aware of a shared responsibility to meet the common long-term challenges of sustainable development, peaceful coexistence, and promote better understanding of these matters in the APEC Region.

During the seminar delegates expressed how they had benefited from the project:

- the rich cultural exchange
- the exposure to different perspectives and realities which exist in the various APEC economies,
- learning from eachother about sustainable development and water issues and how
- they are being confronted in each economy
- being allowed the opportunity to take initiative,
- being encouraged to investigate
- having the opportunity to be heard and being able to shape the Declaration
- developing better debating skills and
- learning about the development of the Declaration

Although delegates generally felt positive about the seminar they did express concern that the Declaration should be applied to be effective.

6. Conclusion

The seminar presented much opportunity for capacity building and developing leadership among the participants and it served as an excellent introduction to the potential of networking and community building within APEC.

The attendees, in general, were very knowledgeable about the issues being discussed at the seminar: climate change, water pollution and water culture. The small group discussions were extremely interesting and the participants got quite involved in defending their issues and expressing their views. For these reasons it seemed that the selection process by each of the economies worked out well in getting the appropriate target group to attend the Camp.

The final product of the seminar - writing the “APEC Youth declaration” is a solid piece of work which reflects the understanding among participants about sustainable development and climate change, water pollution and water culture, their commitment to work on solutions, their respect for different points of view and their capacity to reach consensus and articulate their knowledge in clear and precise language. Since the delegates put so much work into the elaboration of the document it should be ensured that their views will reach the leaders meeting.

7. Recommendations by the Thematic Consultant

- The event must be fostered in a more effective manner and for a longer prior period of time to have a better participation during the first stage. Likewise, it is necessary to do a better communication and information tools promoting the communication among the participants, experts and organizers. In summary, the first stage needs to

be better profited to ensure more participants and to have them more involved with the topics during the second stage.

- An “APEC Youth Camp Participants Network” should be created to have the attendants sharing experiences, proposing discussion on several topics, attending virtual meetings with experts, exchanging cultural information, among other feasible activities to create a robust Young People Network of the APEC Economies. APEC Secretariat or a Working Group (could be HRDWG) should be responsible for the maintenance of the network.

8. Recommendations by the Organizing Committee

- The attendance and success of Young People call for participation in future APEC Youth Camps, needs the strengthening of the communication networks among the APEC Economies through the corresponding Focal Points. In this sense, we also recommend to maintain the APEC Youth Camp Website as a gathering space of the young people of the region to:
  - Spread the Asia-Pacific Economic Cooperation Forum information
  - Share and exchange information on APEC interest matter
  - Encourage the use of ICTs
  - Foster the development of 21st Century competencies and skills
  - Develop the mutual understanding through a multicultural exchange
- Promote the institutionalization of the Annual Event of Youth at APEC level and the creation of a strategy to include the Youth topics within APEC through a permanent Working Group.

List of Participants
APEC Youth 2008

N°	Last name	Name	Economy
1	Hc Chow	Philip	Canada
2	Anais Salas	Andrea Anais Salas	Chile
3	Flores	Javiera Flores	Chile
4	Cheng	Yu-Hsuan Cheng	Chinese Taipei
5	Lin	Chih-Chi	Chinese Taipei
6	Hsieh	Tsung Han	Chinese Taipei
7	Wang	Chih-Hua	Chinese Taipei
8	Kuo	Wei-Yun	Chinese Taipei
9	Narulita	Matilda	Indonesia
10	Amalia	Herma	Indonesia
11	Yu	Sekeun	Korea
12	Lee	Changha	Korea
13	Kim	Jun Gun	Korea
14	Bo Kyung	Lee	Korea
15	Andiappan	Anitha	Malaysia
16	Cevallos	Julio	Mexico
17	Romero	Nancy	Mexico
18	Cheng	Xin Cheng	People´s Republic of China
19	Wang	Yi Wang	People´s Republic of China
20	Chen	Weiling Chen	People´s Republic of China
21	Benavides	Carla	Peru
22	Nina Yana	Marcial	Peru
23	Alvarado	Silvia	Peru
24	Alegre	Jona	Philippines
25	Cordova	Jasmin	Philippines
26	Belomestnova	Yulia	Russia
27	Tan	Peng Ting November	Singapore
28	Loo	Deliang	Singapore
29	Tran Viet	Son	Thailand
30	Ceci	Nicole	USA
31	Drahen	Ellen	USA
32	Taylor	Marcus	USA
33	Manh Cong	Tran	Viet Nam
34	Thi Dao	Thuy	Viet Nam