

FutureGenerations

Graduate School

Applied Community
Change and Conservation

PERU'S INTER-OCEANIC HIGHWAY

Robert L. Fleming Jr.

February 2010

Occasional Papers of the Future Generations Graduate School explore community-based approaches to social development, health, nature conservation, peace building, and governance. Faculty, alumni, and partner organizations present their field studies and applied research.

www.future.org

Comments on the CARRETERA INTEROCEANICA SUR, the INTER-OCEANIC HIGHWAY SOUTH, IN PERU

Robert L. Fleming, Jr.
Future Generations Graduate School
Future.org

Roads are vital for overall development and the access afforded by these can be both extremely beneficial as well as hugely damaging. The road network in Peru includes the Inter-Oceanic Highway South [Carratera Interoceania Sur], a route linking the Pacific Ocean in Peru with a highway in Brazil that continues east to the Atlantic. This artery, already completed in Brazil but not totally finished in Peru, brings substantial social and environmental change to many areas. And it also provides an opportunity for Peru to develop a world-class showpiece that highlights conservation working with development for the benefit of all.



Young llamas crossing the Highway near the pass above Junicunca at an elevation of about 4,000m/13,120ft.

In Peru, the highway's social and environmental impact will differ substantially from section to section as the route passes through dramatically variable terrain

and biotope which include the Amazon lowlands, the cloud forests of the eastern slopes of the Andes, the high altitude inner valleys of the Andes, and the near-desert slopes on the western aspect of the range, as well as a coastal belt along the Pacific. In the lowlands, the Inter-Oceanic is one passageway but at high altitude it splits at Puente Inambar, with one section running through the population center of Cusco and the other heading rather directly across the mountains to branch again through Arequipa and Puno. In addition, a future Inter-Oceanic North will pass through similar ecosystems to link Ecuador with Peru and then east to Brazil.



Participants in the Sunday Market at Ccatcca take a late morning break in the shade.

During our short visit to Peru in 2008 we traveled over two sections of the Inter-Oceanic South. On 02 November, we surveyed the highland stretch from Cusco south to Urcos and then east through Ocongate to a point above Tinke. On 09 November we visited the lowland section that lies immediately west of Puerto Maldonado.

The overall impression gained along the upper Inter-Oceanic Highway South near Cusco was of picturesque towns and impressive Andean vistas encompassing deep, inner valleys and high ridges. The brown nature of these views coincided with the end of the dry season. With the commencement of the rains later in November the mountain slopes below the snow line will turn green and remain so during the summer growing season.

We found that slopes up to about 3,900m/12,800ft often exhibited non-terraced farming with occasional herds of llamas and sheep dotting non-agricultural areas. Crops greened the valley floors. It appears that at one time, slopes and valleys below the tree line, at about 4,000/13,120m, were covered with *Polylophus* and other native forests but we saw no natural stands. However, some hillsides, immediately above agricultural valleys, were lightly forested with two species of Eucalyptus, primarily *Eucalyptus globules*.

Despite Eucalyptus's reputation for being hard on water tables, these fast-growing trees have been favored here since the early 1900s (see Walker, et al., p 30) with wood used extensively for building and fuel. In addition, a pine (sp?) is now being tried on the outskirts of Cusco and above Ccatcca.

In amazing contrast to the browns of the high country, the low-elevation Inter-Oceanic Highway cuts through a variety of greens, with shades typical of the humid tropics. Immediately west of Puerto Maldonado, for example, small herds



North of Junicunca Village the landscape displays agricultural patterns including tree plantations with two species of Eucalyptus. Photographed from 3572m/ 11,720ft.

of cattle graze in the light green of clear cuts while dark green forest patches rise in the background. The original vegetation along this section of the highway was cleared in the 1980s for cattle ranching, à la Brazil.



Asian cattle graze on nutrition-poor grasses along the Highway some thirty minutes west of Puerto Maldonado.

A major concern with all new roads is their social and environmental impacts. Authorities in Peru are certainly aware of existing and potential problems of the Inter-Oceanic and sorting out the environmental and social needs brought on by the new highway is a balancing act of high order.

Roads through forest can be especially damaging as they affect the environment of the local, forest-dwelling people, who are often hunter-gatherers. Marc Dougojeanni regional environmental advisor for the Inter-American Development Bank [IDB] noted that "... social and environmental impacts of the entire Inter-Oceanic Highway will be enormous..." (see BIC, Bank Information Center website). He goes on to say that he feels "the Peruvian government does not even have the capacity to ensure compliance with its own weak social and environmental laws" (BIC website).



The Inter-Oceanic under construction to the west of Puerto Maldonado.
09 November 2008.

Some reports warn that the Highway will wreck environmental destruction of an “unprecedented” nature and images on Google Earth certainly show a “fishbone” pattern in the Brazilian Amazon where the devastation of the original forest along many roadways is dramatically conspicuous.

While the impact of the Inter-Oceanic will be enormous in the lowlands, its effect on the wild fauna and flora of the highlands will likely be minimal as the original ecosystems have long since been massively transformed by people who have been settled here for over a thousand years.

Thus today’s major concern is for the lowlands, where the impact of the road on the environment will be severe *unless* planning and mitigation gains widespread official and local community support. While the actual roadway through a forest can be a partial barrier to woodland species, it is often the widening of this impediment that comes with the secondary ballooning of human settlements and additional clearing that may reach a point where shy animals such as jaguar and tapir, and tree-dwelling species such as sloths and monkeys, cannot cross. Then there are hosts of lesser-publicized creatures such as ground-based amphibians and invertebrates that are also severely affected.

Dr Renata Pitman, writing about the Inter-Oceanic, has made several important points including the suggestion of an elevated toll highway with limited exits. In

this way, travelers could see the forest while the forest creatures could cross beneath. And new settlements would be restricted to area around the exits (see Pitman). And beyond passageways, there is an urgent need to ensure that large tracts of original forest remain close to both sides of the road so that many mobile creatures might continue to fly across.

As it is, most of our natural world is already sectioned into ecological islands, the latter often produced by crisscrossing road systems and expanding urban centers. However, in recent years, some authorities have spent enormous sums trying to link disjunct populations in an attempt to improve ecological connectivity.

As an example, the Canadian Parks system, has spent millions of dollars in the Banff National Park in Alberta to bridge the Trans-Canadian Highway. Efforts here include two overpasses across the Trans-Canada, each bridge some 50 meters wide with side berms to reduce disturbance from traffic noise and lights. And each structure cost over a million dollars to build. Elk, Moose, Wolves and Grizzly Bears tend to use these overpasses. Underpasses, though, are favored by Mountain Lions and Black Bears and the park system has constructed or enhanced 21 of these. Of the underpass designs, the two most appealing are tunnels of open-span concrete that measure at least 3m high by 11m wide and wide-span bridges over streams where spacious stream banks are retained. When thinking about the placement of these passageways, Canadian wildlife authorities considered, among other things, favorable terrain configuration, preferred wildlife travel routes, the engineering and construction considerations, and driver safety requirements (see Parks Canada website). How sensible it would be to work passageways into the initial phase of road planning. And while it is already too late to do this for the southern highway in Peru, others roads, including parts of the Inter-Oceanic North are still on the drawing boards.

Students of wildlife ecology have come to realize that large tracts of land connected by corridors are essential to the health of many species. Today, much of the Amazonian forest of Peru is in tact but without planning and mitigation this will likely not last forever. In other parts of the world, officials are looking to tie landscape-size segments together and for efforts here one may refer to the Yellowstone to the Yukon Conservation Initiative effort in north America (see www.y2y.net/), and the Terai Arc Landscape Project in South Asia (see World Wildlife Fund website).

Today Peru has an opportunity to achieve a remarkable feat, one rarely duplicated elsewhere, of planning and implementing programs *before a total disruption* of the environment occurs, and the Inter-Oceanic could be showpiece where conservation with development working together benefits both local communities and their surrounding natural world.

People across the world appreciate roadways. A major benefit is access to markets or facilities such as schools, extension services, and health centers.



A health mural in the local Quechua language
at the CLAS health center in Ccatcca.

Health programs with an environmental agenda are a natural. For example, maintaining water delivery and seeing to sanitary conditions surrounding water is a combined health and environmental issue. Expanding beyond the immediate water system is the understanding that forested watersheds help stabilize water supply. And at yet another level, improved animal husbandry leads to less overgrazing with reduced slope degradation and thus to a more sustained water supply.

Also, enhancing income-generating activities that do not damage the environment helps relieve some pressures on the land. In the case of the Inter-Oceanic Highway, a major increase in income might come from improving cash crops that could be taken over the road to suitable markets (witness the vegetables grown near Cusco). Similarly, meat supplies, including alpaca (rather recently included on Cusco menus, we were told) would benefit from improved animal husbandry as would the production of wool, a commodity that is already a major source of income.

Throughout the country, the government of Peru already maintains numerous Health Centers with CLAS, Community Association for Health Administration, involvement (see Altobelli, L.). Programs in these health outposts could be expanded to include environmental dimensions. Future Generations has been

long involved with CLAS programs and has also had a multi-year presence in Tibet where the rural health care delivery system has very successfully incorporated environmental components.



A sign for the CLAS center at Ccatcca under the Ministry of Health.

Another revenue source along the Inter-Oceanic could be cash from outside visitors. Most tourists would likely be Peruvians, often from the densely settled coastal regions, while others might come from Brazil and urban centers towards the east. In addition, other foreign visitors could augment these numbers.

There is already a strong visitor infrastructure in Cusco, Ollayantaytembo and Agua Caliente to service the Inca heartland and nearby Machu Pichhu. The latter, which hosted some 400,000 people in a recent year, is surely South America's number one tourist attraction (see BBC website). To accommodate this flow of outsiders there are many excellent places to stay, fine restaurants, and splendid guide services. And conveniently, the northern branch of the Inter-Oceanic Highway passes through Cusco so new tourist programs aimed at sites along the Inter-Oceanic could easily dovetail into this already existing framework.

Still, during our November 2008 visit, we noted a need for folks living along the Inter-Oceanic to develop a visitor infrastructure. For example, on our day trip from Cusco, we saw no signs for a restaurant or indications of a place for lunch. As most of the many attractions along the highways have not generated significant income for local communities, one envisions local folk using their energy and resources to open small restaurants, readying houses for homestays, and building small, community-run hotels.

There are many aspects of the Andes that could be tapped for visitor income. As an example, the towns of Huacarpay and Lucre near Cusco could additionally benefit from the proximity of Huacarpay Lake, a wetlands renowned



“Pepper Trees” (*Schinus molle*) frame Lake Huacarpay’s near shore. This outstanding wetlands lies only 19 kilometers south of Cusco.
Elevation of the lake is 3,050m/10,000ft.

in the birding world (around the area one can see special species found only in the Andes, including the Puna Teal, the Andean Gull and the Andean Lapwing). Beyond the natural history of Huacarpay, one finds traditional customs still being followed with men in reed boats fishing on the lake. Huacarpay lies only 19 kilometers south of Cusco and thus forms a wonderful resource for city citizens who could come in contact with aspects of our natural world.

Sunday markets are marvelously colorful events in highland towns and these could be more widely promoted. Visitors could come to a town, say Ccatcca, stay over night in a home, visit the Sunday market, and then embark on a hiking or riding excursion into the surrounding countryside to learn about agriculture practices, or spend time with herdsman hearing about the herding and care of llamas, or search for Andean wildflowers and birds. In addition, many places have historical legacies left from previous empires.

Another example of a town with tremendous potential along the Inter-Oceanic is Tinke, a settlement close to the glaciers and snowfields of both the Nevado Jollyepunco mountain area and the massive Ansungate Mountains. The beautiful Laguna Singrenacocha, at 4350m, is easily accessed from Tinke. Trained guides from Tinke could organize half-day or day hiking trips (riding horses might be a possibility). Multi-day hikes in this high country are already



Corn snow settling on a clump of old man cactus (*Oreocereus*) in alpine terrain above Tinke. Elevation is about 4,200m/ 13,800ft; 02 November 2008.

run out of Cusco by outfits such as Inka Explorers (www.incaexplorers.com/english/ie_corvi.html). But with training and suitable equipment the citizens of the Tinke area could also organize tours, using their llamas for transport, and the income they accrue would come into the local area. In today's world, one may sit beside a magnificent site but marketing from such a location can be impossible - unless, that is, there is a nearby Internet connection. And it is amazing how the latter are spreading.

In addition to the mountain country, the Amazon Basin is connected by jet plane with Cusco and Lima. For example, in just thirty minutes after lift off from Cusco one lands at the all-weather airport in Puerto Maldonado; the flight from Lima takes two hours and thirty-five minutes including a stop in Cusco. In reverse, urban Brazilians driving the Inter-Oceanic would have access to Cusco from Puerto Maldonado. And before flying into the Inca heartland, Brazilian visitors might consider putting some days aside for rainforest excursions. A trip into the Manu area north from Puerto Maldonado or west along the Tambopata River is a natural.

While established ecotourism structures already exist in and around the Puerto Maldonado area, tourism there currently forms only about five percent of the



Sandoval Lodge is easily accessed from Puerto Maldonado via a short boat ride downstream and then a 3km/2mi hike through tropical jungle past many butterflies and monkeys.

town's economic picture (Oscar Cáceres, pers. com.). Eventually some of the economic underpinnings of Puerto Maldonado could shift from extractive industries (primarily gold mining) to sustainable, long-term activities such as supervised, selective logging, harvesting secondary forest products such as Brazil Nuts, and ecotourism.

Cattle ranching is currently important in the Puerto Maldonado area but animals are raised only for local consumption. However, with a new all-weather road, this could easily change with meat shipped to the highlands as well over to population centers in Brazil. Much of lowland Peru is still forested so should these trees be removed to augment cattle ranching? Not likely.

Of the biomass and plant nutrition in a tropical forest, over 90% (figures range up to 95%) is in the living vegetation. Should this be removed through clear-cutting, little of value remains in the soil for agricultural or ranching purposes. Already, many forest areas exist in tropical areas around the world where rainforest soil

exposed to the sun has solidified into a red, rock-hard laterite, a composite that is totally unsuited for plant growth. Indeed, laterite is good for building temples (in Angkor for example) but not for growing crops or pasture grasses. Clearing tropical rainforest for cattle ranching is almost always a very poor use of the land.

But what about tracts around Puerto Maldonado that are already cleared of forest? Is running cattle in these areas the best use of this tropical terrain, or might there be sources of animal protein from animals better suited to this environment than cattle from Eurasia? There certainly are possibilities. In Peru, the Guinea Pig, an Andean rodent, has long been a prized food item. A large painting of the "Last Supper" in the main cathedral in Cusco has Jesus and the twelve disciples assembled around a table on which the centerpiece is roast guinea pig. Thus it is possible that the meat of rodents such the Paca or the Capybara, both native to the Amazonian climate, could be promoted. Both are currently eaten in some circles and, in addition, Capybara leather is prized and would become more valuable were it suitably marketed. For general problems associated with ranching in former rainforests see MIT's Project Amazonia website.

Beyond ranching, there are agroforestry practices that would be economically sustainable under Amazonian conditions. Indigenous people already practice a form of sustainable agroforestry when they use a slash and burn rotational system. Burning the slash does tend to replace some nutrients via the leftover ash but the soil on these farms gives out rather quickly so farmers have to move after three to five years. And they do not return to the same tract for another thirty or so years (see the MIT website for the Agriculture and Ranching section of Project Amazonia).

New arrivals, say folks recently settling along roadways, could neither move every few years nor stay off a plot of land for thirty. Thus it is often the new population that massively alters soils, not the indigenous people. However, if outside, organic sources augment the nutrients in the soil (one source could be leaf mulch from a nearby forest), both food and cash crops including beans and cassava that do well in an Amazon climate along with guava, papaya, and mango could be grown in the already cleared tracts near the highway. As an example of farming in a tropical area, one can turn to the Western Ghats in India, where the bird biodiversity in *Areca* palm plantations is as high as 90% of the nearby forest. Here local farmers plant not only the palms for their valuable nuts but obtain additional cash from black pepper and vanilla vines that climb up the palms. Moreover, they augment income and biodiversity by planting trees such as mangos along the edges of the palm plantations (Ranganathan, et al.).

Spurred by conservation issues in rainforest areas, the field of agroecology is expanding rapidly. This discipline seeks to understand the importance of an area's physical components and natural biodiversity as well as the effects that

the human presence has in it, all with the aim of developing an integrated plan to sustain a fragile environment.

Environmentally, there is no question that most of the Peruvian lowlands would best support activities appropriate to rainforest conditions and, rather than clear cutting the forest for ranching or agroforestry, strenuous efforts might best be invested in searching for alternative, sustainable uses of the ecosystem.



Red-and-Green Macaws arrive at a clay lick on the banks of the Heath River, about four hours by boat WSW of Puerto Maldonado. These big birds gather after many smaller parrots have come and gone.

The Amazonian rainforest, is of huge, worldwide interest and the basin draws visitors from around the globe, but one should recognize that tourism is not a totally steady source of income and plans should prepare for fluctuations. Marketing to a Peruvian-Brazilian client base could help lessen world tourism market swing.

Already “Macaw Tourism” is active in the lowlands. In addition, the overall experience of being in this amazing rain forest and learning about its complexity could be further promoted. Many sites not far from the Inter-Oceanic Highway have fine potential. A large vegetation-choked wetland harboring many Amazonian species, for example, lies just ten minutes from the edge of Puerto

Maldonado. This area could be developed into an outdoor experience for local town folk as well as outside visitors.



This remarkable wetlands grows near the banks of the Rio Madre de Dios just ten minutes west of Puerto Maldonado.

In other countries, people have attempted to use tourism as an income source and by looking at these efforts Peru might well gain valuable insight. For example, Andrew Lepp's report on a community project in Bigodi, in central Uganda, is informative and shows that the success of an ecotourism project cannot be taken for granted (see Lepp). In addition, one might look at the history of tourism in the Sherpa homeland of Nepal. Here the Sherpas saw little benefit from the Sagarmatha (Everest) National Park when it was initially inaugurated in 1976, but this has greatly changed in recent years as 50% of the park entrance fees now go directly to community management committees who decide how to spend the money. As it is, Peruvian tourism companies, led by Inkanatura (Inkanatura.com) with offices in Puerto Maldonado, Cusco and Lima, are already using Peru's natural resources in a sensitive and non-exploitive way.

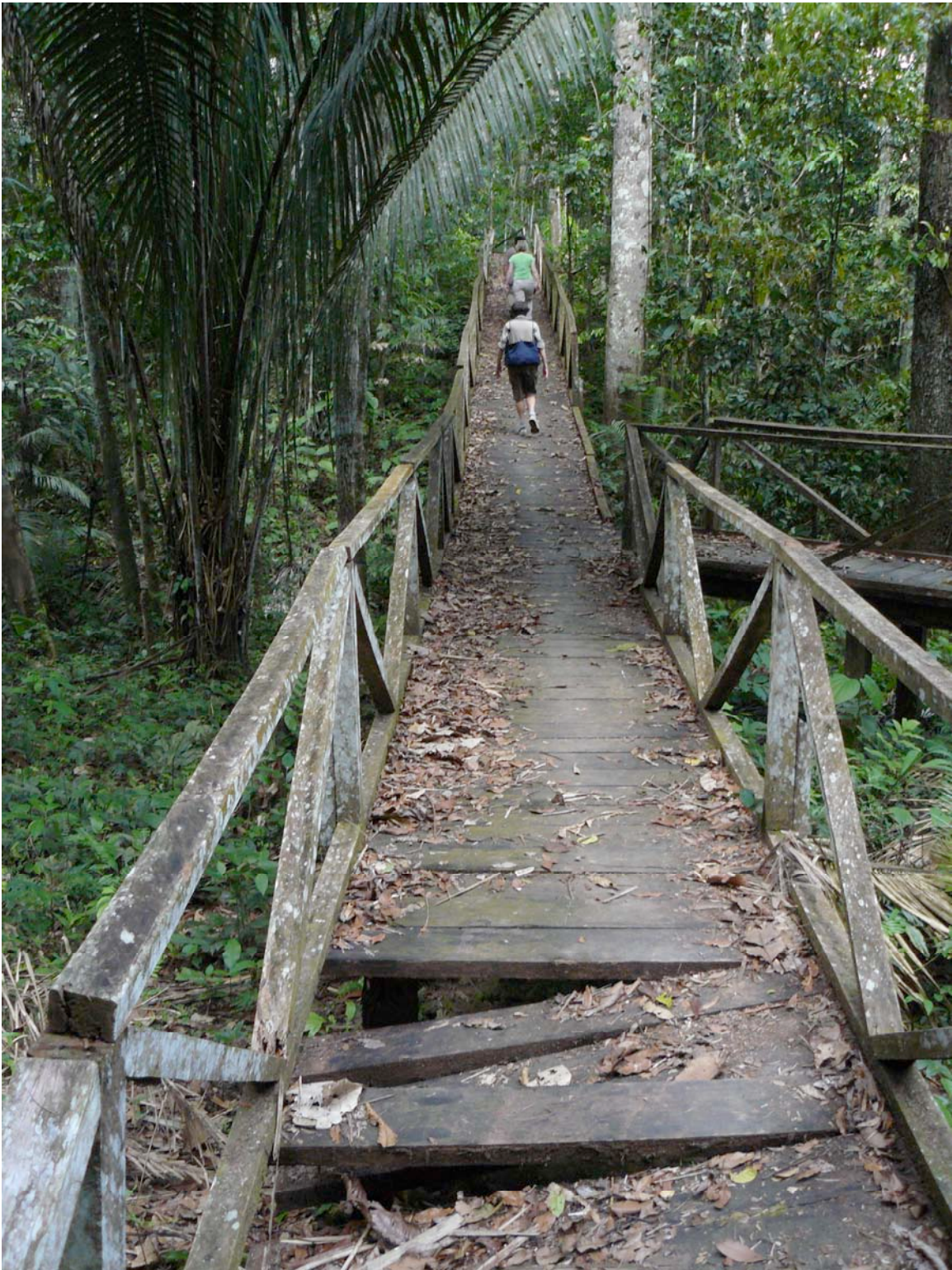
Peru harbors over 1,800 bird species, which is more than any other country on the planet and Manu Biosphere Reserve, up the Madre de Dios River from Puerto Maldonado, hosts an almost unbelievable 1,000 species in just one



The juvenile Rufescent Tiger-Heron (*Tigrisoma lineatum*) is one of more than a thousand species of birds found in the Manu area.

reserve. Birding, a small but lucrative niche within ecotourism, is active in the country and Manu Expeditions (manuexpeditions.com) based in Cusco, has tapped into this natural resource to arrange birding trips to Manu as well as to other special spots throughout Peru. Over the last fifteen years, Manu Expeditions, and others, have trained splendid Peruvian birding guides and well-rounded naturalists who, besides leading tours, could be hired to hold community workshops to teach locals about their birds and other natural resources.

Not all eco-tourism projects are successful - at least not in the short term. One example is the Ese'Eja Lodge some four hours by boat from Puerto Maldonado. This complex, built in 2001, on the banks of the Heath River was initiated by an outside company that, before building, consulted extensively with the local forest folk (the Ese'Eja) but apparently the latter did not "buy into" all arrangements. Today termites and rot are consuming the main lodge and stand-alone cabins.



A walkway at the now defunct Ese'Eja Lodge complex, Heath River.

However, concepts of jungle tourism are alive and well and we hope that this site, with community support and a revised business plan, might revive in the future.

The impact of the highway on the environment in Peru has engaged worldwide interest and a number of projects to help direct the impact are underway. One of these is Conservation International's Interoceanic Highway Across Southern Peru: a Conservation and Sustainable Development Initiative (see conservation.org). Conservation International, a non-government organization, is particularly good at coordinating with businesses and high levels of government. This initiative, a five year project, has already seen substantial success with the establishment of five Local Development Centers that address five areas of special interest, including a number mentioned in this paper. For example, a tourism section has already implemented an interpretive center in Ccaccta and established viewing areas along the Highway. In addition, among a host of other accomplishments, the Initiative has completed a study to determine the market potential for fruit and fruit products.

The Future Generations vision is also geared to harnessing local energy but suggests channeling these efforts through pathways already in place, often government departments. Over the past fifteen years Future Generations has successfully field tested this approach in Tibet and elsewhere, and found that working through existing structures involves far less additional expense than in maintaining stand-alone operations. Moreover, enhancing and expanding a framework already in place tends to be long term. Over the years far too many projects such as private hospitals, schools, and social uplift programs have collapsed after outside financing terminated and their stand-alone infrastructure and administrations collapsed. Working within the system, Future Generations suggests a seven-step Seed-Scale process that among other things, recommends strengthening a three-way partnership that genuinely includes local communities in decisions, that develops work plans based on data gathered on site, and that builds from successes however small they may be. This Seed-Scale method helped establish the CLAS health care delivery in Peru and could assist with environmental issues.

In the case of the Inter-Oceanic Highway, adding an environmental component to already established health centers would be a Future Generations approach. And these government posts could coordinate with non-governmental efforts, including the five Local Development Centers mentioned above, to ensure that benefits are truly long-term and accrue to the local people living along the highway.

Development and conservation are two aspects of the same coin, not two opposing factions. Both working together can enhance the lives of many in this wonderful country.



We feel that combining development with conservation will surely help this young Ese'Eja girl in her coming years.

With thanks to Future Generations for sponsoring our October-November visit to Peru and to Javier Sócola, of FutureGenerations, Peru, for showing us terrain to the south and southeast of Cusco. Inkanatura did a fine job with travel arrangements in the Amazon Basin and naturalist Oscar Cáceres was splendid as he shared information and insights with us. Sal Werner, Mike Stranahan, and Wendy Gulick were enthusiastic companions who contributed greatly to the overall experience.

References:

Altobelli, Laura. (2004). Cost-Efficiency of CLAS Association for Primary Health Care in Peru. www.future.org/publications/cost-efficiency-clas-associations-primary-health-care-peru

BBC news Online. (27 Dec 2003).
<http://news.bbc.co.uk/2/hi/americas/3335315.stm>

BIC: Bank Information Center. (28 July 2005). IIRSA Projects: Some Facts about the Inter-Oceanic Highway. www.bicusa.org/en/Article.2226.aspx

Conservation International. Interoceanic Highway Across Southern Peru: Conservation and Sustainable Development Initiative.
<http://www.conservation.org>

Canada Parks. (April 2009). Trans-Canada Highway Twinning Project.
www.pc.gc.ca/pn-np/ab/banff/docs/routes

Lepp, Andrew. (2008). Tourism and dependency: An analysis of Bigodi village, Uganda. *Tourism Management*, 29[6]:1206-1214.
www.sciencedirect.com/science?_ob=PublicationURL&_cdi=5905&_pubType=J&_acct=C000059323&_version=1&_urlVersion=0&_userid=2956891&md5=d9ec9d029a2d3fde9df0bf545a2165d0&jchunk=29#29

MIT: (2006). Project Amazonia.
web.mit.edu/12.000/www/m2006/final/site_index.html

Pitman, Renata. (26 July 2007). livinginperu.com/news/4352

Ranganathan, Jai, R. J., Ranjit Daniels, M.D., Subash Chanddran, Paul R. Ehrlich, and Gretchen C. Daily. (2008). Sustaining biodiversity in ancient tropical countryside. *Proceeding of the National Academy of Science* 105(46):17852-17854

Walker, Barry, Huw Lloyd and Gerard Cheshire. (2007). *Peruvian Wildlife: A visitor's guide to the Central Andes*. Brandt Travel Guides Ltd, UK.

World Wildlife Fund. Tarai Arc Landscape Project [TAL]. www.wwf.org/

Yellowstone to Yukon Conservation Initiative. www.y2y.net/