Institution: University of Manchester

Unit of Assessment: UoA5

Title of case study: Conservation activities and biodiversity training in Sumaco National Park, Ecuador

1. Summary of the impact

Preziosi and his research group have taken a leading role in conducting biodiversity research in the Ecuadorian Amazon, working in collaboration with national and local governments and indigenous communities. It is critical to monitor and conserve biodiversity in the Ecuadorian Amazon and preserve this unique habitat for local, national and international benefit. Preziosi's research group have demonstrated that indigenous people can be trained to monitor biodiversity accurately. The impact of introducing these new skills to local people in the Payamino community is that they have been empowered to locally monitor and adaptively manage their own resources. By educating local people about the importance of biodiversity, Preziosi's research group have changed the behaviours and attitudes of the community, leading to reduced participation in environmentally harmful practices.

2. Underpinning research

The impact is based on the work of University of Manchester (UoM) researchers that took place from 2006 to date. The key researchers were:

Professor Richard Preziosi (2006 to date)
Professor Tony Bebbington (2007-2011)
Dr Jennifer Rowntree (Research Associate, 2006-2010; Research Fellow, 2012 to date)
Dr Johan Oldekop (PhD student, 2007-2011)
Dr Sharon Zytynska (Research Associate, 2006-2011)
Mr Nathan Truelove (Field Technician and PhD student, 2008 to date)

The key aims of the research conducted in Sumaco National Park, Ecuador were, and continue to be, to enable local landowners to use their land in a sustainable way, to protect it from exploitation and to monitor biodiversity in an area with many unique species. The key research outputs can be divided into two categories.

1. Defining the important factors in successful conservation and development projects and the benefits of these projects. This has been achieved by demonstrating that:
   - Governing institutions that are developed collaboratively between researchers, landholders and government are an effective method of biodiversity conservation. Community managed forests can be as successful as protected areas [1,2].
   - Environmental degradation can act as a trigger for communities to self-organise and manage their resources. Awareness of limited resources (i.e., scarcity perception) is useful to encourage local management [2].
   - By decentralising government, communities may be able to make decisions and respond quicker to changes in the availability of local resources.
   - Non-experts are as accurate as researchers in terms of monitoring biodiversity and can successfully pass information on to other community members [3,4].
2. Working to identify new species and monitor the biodiversity of this unique area. The achievements are:
   - Showing that indicator species can be used as an effective measure of total biodiversity and also that genetic diversity is a determinant of community diversity [5,6].
   - Demonstrating that genetic variation in a tropical tree species influences the associated epiphytic plant and invertebrate communities in a complex forest ecosystem [6].
   - Identifying new species, including the *Mesomerodon gilletti* beetle [A], and significant range expansion of the species described in the area.

3. References to the research

Research from this project has resulted in publications in high impact journals.

1. **Oldekop J.A**., **Bebbington A.J**., Hennermann K., McMorrow J., Springate, D.A., Torres, B. **Truelove N.K.,** Tysklind, N. Villamarín S., **Preziosi R.F**. (2013) Evaluating the effects of common-pool resource institutions and market forces on species richness and forest cover in Ecuadorian indigenous Kichwa communities. Conservation Letters (6:107-115). DOI: 10.1111/j.1755-263X.2012.00297.x
2. **Oldekop, J.A**., **Bebbington, A.J.**, **Truelove, N.K**. Holmes, G., Villamarin, S. and **Preziosi, R.F**. (2012) Environmental impacts and scarcity perception influence local institutions in indigenous Amazonian Kichwa communities. Human Ecology (40:101-115). DOI: 10.1007/s10745-011-9455-2
3. **Oldekop J.A., Truelove, N.K.,** Villamarin, S., **Preziosi, R.F**. (2012). Information Flows in Community-Based Monitoring Exercises in the Ecuadorian Amazon. International Journal of Zoology. Article ID 980520. Doi:10.1155/2012/980520
4. **Oldekop, J.A., Bebbington, A.J.,** Berdel, F., **Truelove, N.K.**, Wiersberg, T., **Preziosi, R.F.** (2011) Testing the accuracy of non-experts in biodiversity monitoring exercises using fern species richness in the Ecuadorian Amazon. Biodiversity and Conservation (20:2615-2626). DOI: 10.1007/s10531-011-0094-0
5. **Oldekop J.A., Bebbington A.J., Truelove N.K**., Tysklind N., Villamarín S., **Preziosi R.F.** (2012) Co-occurrence patterns of common and rare leaf-litter frogs, epiphytic ferns and dung beetles across a gradient of human disturbance. PLoS ONE 7(6): e38922. DOI:10.1371/journal.pone.0038922
6. **Zytynska, S.E.**, Fay, M.F., Penney, D., **Preziosi, R.F.** (2011). Genetic variation in a tropical tree species influences the associated epiphytic plant and invertebrate communities in a complex forest ecosystem. Phil. Trans. R. Soc. B. 366:1329-1336. DOI: 10.1098/rstb.2010.0183

4. Details of the impact

Context

The Timburi-Cocha research station is located in the Sumaco National Park (a UNESCO Biosphere Reserve). The combination of mountain and lowland habitats means that this area has a high level of endemism (i.e. species specific to the location). The Payamino River is a major tributary to the Amazon and, unlike many other rivers in the area, has remained unpolluted by oil spills, mining, human waste and erosion.

Before the research station provided employment opportunities in 2010, the Payamino community were making money by selling bush meat and through harmful logging [B]. Areas were deforested to allow for agricultural expansion and many members of the community left to find work in neighbouring areas [B]. Gold companies were operating in the area and had shown an interest in Payamino, and oil companies had also bought concessions nearby for up to $10,000 [B].

The lowland Kichwa people, including the Payamino community, are among the poorest in Ecuador. They generally have poor public health with an average 50% mortality rate for children up to the age of 2 years and high adult mortality from disease. The eldest community member is 53 years old.

Pathways to impact

Establishment of a charity to support local people and the research station:

Aalborg Zoo (Denmark) sponsored the initiation of a field station in Sumaco in 2002 and provided financial support until December 2011. Recognising the research potential and importance in preserving the area, Preziosi established a funding stream for the Timburi-Cocha research station by making it an independent charity in 2010. Universities and individuals pay into the charity to use research station facilities and the money is reinvested in the research station or used to support the indigenous people. Preziosi is chair of the charity and Rowntree is the charity secretary [B].

Preziosi holds the research permits for the field station.

Disseminating information to policy makers and the general public:
Preziosi and colleagues sent an advisory policy document to the Ecuadorian Ministry of the Environment to outline research showing the need for local institutions to control the use of undeveloped forest. It is anticipated that monitoring data will form baseline information for the development of future policies.

To increase public understanding of biodiversity and the need for conservation, thousands of specimens from the research station are made freely available to the Ecuadorian Museum of Natural History. The museum sends samples to leading experts for identification, for example, a new beetle has recently been identified by a taxonomist in France [A].

An exhibition on the complex relationships between humans and the environment in the Ecuadorian Amazon was held at Manchester Museum from September 2012 to June 2013 called 'All Other Things Being Equal'. This involved photographs, sounds, graphical representations of socio-economic data and specimens provided by Oldekop.

Reach and significance of the impact

The activities at the research station affect all 300 members of the Payamino community, as discussed below. The Timburi-Cocha research station is used by teaching and research groups from Ecuador, Colombia, USA, Canada and Europe. UK researchers come from UoM, Glasgow, Sheffield, York, Royal Botanical Gardens Kew and the Natural History Museum.

Facilities have expanded to accommodate larger numbers of researchers. The research station has grown from the original three buildings to 11, including a large dormitory for 30 students, a smaller dormitory for six teachers, a lab for biodiversity monitoring, a kitchen and a storage warehouse.

Changing behaviours and local attitudes to conservation:
Preziosi wrote and coordinated the signing of a general Memorandum of Understanding in March 2011 with the Ecuadorian Ministry of the Environment, the Ecuadorian Museum of Natural History, Chimborazo high school and the Payamino community [C]. This led to a formal agreement being signed on 14 August 2012 between UoM and the Amazon State University of the Republic of Ecuador (UEA) [D].

The Payamino community also signed an agreement with UoM to specify that they will not allow oil or gold exploration, or exploit the forest and animals for financial gain (i.e., fishing with dynamite, hunting primates, selling plants, wood and meat) [E]. The community had the confidence to sign such an agreement because of the financial security offered by employment opportunities at the research station.

The Timburi-Cocha Research Station Manager stated that, '*The Timburi-Cocha Research Station has changed the attitude of the people of the community in terms of how to obtain an income without hunting, logging or indiscriminate fishing practices'* [B, translated from Spanish]. Similarly, the Payamino Community President states that '*The Timburi research station is now a thriving community project that had helped to keep oil companies and illegal meat hunting at bay, while enabling the Payamino community to preserve their culture and way of life'* [F, translated from Spanish].

Providing employment opportunities and income for the local community:
Over 100 university researchers and more than 400 students visited the area in 2008-2012 to study biodiversity. The annual turnover of the research station is $65,000 with 100% surplus being invested in the local community or the research station itself. The research station provides 'at cost' visits for local university groups.

Members of the local community are employed at the research station to monitor biodiversity, act as expert guides and to maintain and develop the research station (drivers, cooks etc.) [G]. The research station actively promotes the conservation of cultural identity and gender equality, being the first employer of women in the area.

The Research Station Manager describes the benefits to the community: *'Members of the community have obtained additional economic income by students, scientists and tourists visiting*

the station. These revenues have been invested to buy school supplies, purchase medical equipment and for loans to members of the community due to illness, accident, or damage to their homes, etc.' [B, translated from Spanish].

In May 2013, an agreement was signed by UoM and UEA to secure the future of the research station until 2018 [H]. UEA hire a senior administrator, six members of a support team and a community coordinator to manage the research station. UoM provide mobilisation and living costs and insurance for these members of staff [H]. This agreement was made with the approval of the Payamino community, who also signed an agreement with UoM [E].

Enabling access to medical clinics:
The research station charity provides money and transportation for employees to use western medicine, complementary to services provided by the local shaman [B]. Free water filtration systems have been provided for the local school and medical clinics have been established, with an average of 3 – 6 patients per day [I]. The medical clinics play an important role since the nearest medical centre is a few hours away [F]. The research station doctor (hosted by and travelling with UoM researchers) conducts home visits and accompanies less able patients to town for medical care, liaising with anaesthetic and surgical teams on their behalf as necessary [I]. The doctor obtains blood from the Red Cross for transfusions [I].

Providing education bursaries for the local community:
The research station charity provides education bursaries for employees and their families to attend courses that enhance career prospects. The President of the Payamino Community was awarded two bursaries totalling $90 to complete an ecotourism course at Loretto College of Tourism and to attend leadership training at the School of Leaders before taking up his current post.

5. Sources to corroborate the impact

A. Marc Soula, 2008, Les Coléoptères du Nouveau Monde, volume 2, page 21, '*Mesomerodon gilletti'. Book entry stating the discovery of the beetle, Mesomerodon gilletti.*
B. Letter and Case Study from Timburi-Cocha Research Station Manager, *corroborating the benefits of the charity to the local community.*
C. Memorandum of Understanding signed by stakeholders (UoM, University of Glasgow, Ministry of the Environment, Ecuadorian Museum of Natural History, Chimborazo high school and the Payamino community), 24 March 2011.
D. Full agreement between UoM and UEA, signed as per the Memorandum of Understanding [C], 14 Aug 2012.
E. Signed agreement between UoM and the Payamino community to agree administration of the Timburi-Cocha Research Station, 3 May 2013. *Specifies that the community will not allow oil or gold exploration, or exploit the forest and animals for financial gain.*
F. Letter from Community President, *corroborating the importance of the research station for the native community.*
G. Letter from Payamino Community Coordinator, *corroborating the importance of the research station for the native community.*
H. Signed agreement for the administration of the Timburi-Cocha Research Station 2013-2018, between UEA and UoM.
I. Email from Expedition Medic, *verifying the number of patients and medical services provided.*