

Rainforest Biodiversity – the Management Challenges: Case Study of the Tambopata Region, South-East Peru

Tropical rainforests across the globe face a range of threats to their existence even in remote regions. There is a spectrum of management approaches that can be employed to try to conserve them. These range from total protection from interference, at one extreme, to significant integration into the local economy, at the other. Conflicting interests, accessibility and limited funding make determining the most suitable approach a challenging task.

The Tambopata tropical rainforest region, in the department of Madre de Dios, in south-east Peru, is one such region. Tambopata is located at the western extremes of Amazonia where it meets the foothills of the Andes, long a barrier to the development of the region. The Bahuaja-Sonene National Park (BSNP) and Tambopata National Reserve (TNR) lie at the heart of the Amoro-Vilcabamba conservation corridor (Figure 1).

Tambopata is a continental biodiversity hotspot. Figure 2 summarises the number of species identified in the 5,500 ha area of the original Tambopata Reserved Zone (TRZ). Many are endemic and are included on the International Union for Conservation of Nature and Natural Resources (IUCN) Red data list of endangered species,

Figure 2: Tambopata v UK comparison (no. of species)

Tambopata species	No.	UK species	No.
Birds	587+	Birds	592
Butterflies	1234+	Butterflies	58
Mammals	91	Mammals	74
Amphibians/Reptiles	127	Amphibians/Reptiles	6
Ants (canopy only)	135	Ants (all)	62
Trees	150+	Trees	33

Sources: www.tambopata.org.uk/www.wikipedia.com

such as the harpy eagle, jaguar, giant river otter, bush-dog and the spectacled caiman. In the wider Tambopata region, species lists are far longer once the more diverse habitats ascending into the Andean foothills, such as bamboo, terra firme and cloud forests, are included.

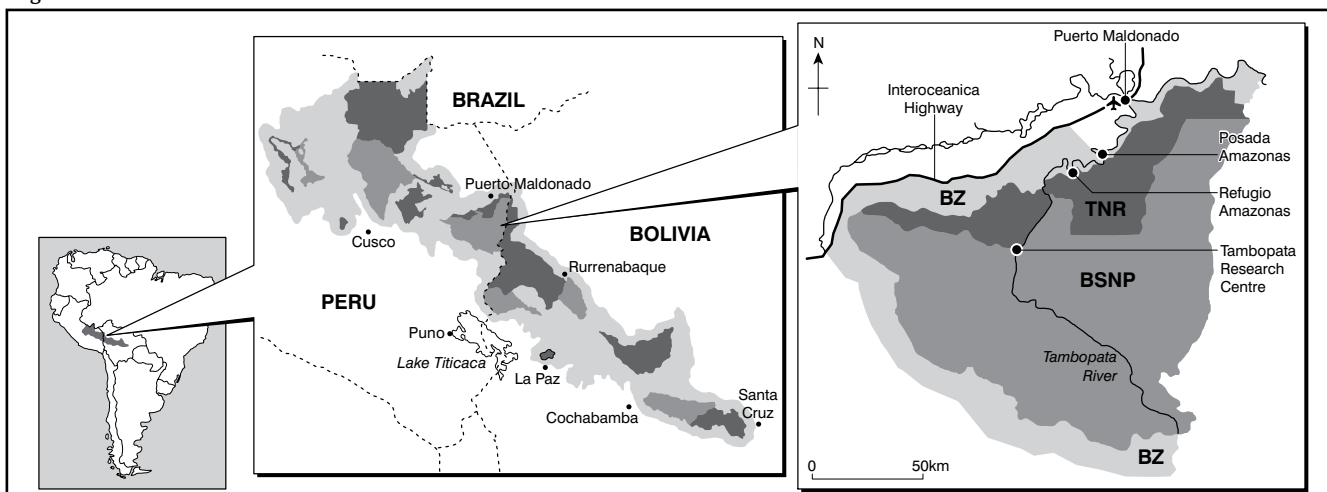
The Madre de Dios region is also home to a number of small indigenous groupings, such as the Matsigenka, Nahua, Harakmbut and Ese'ejá. They are represented by the Federation of Native Peoples of Madre de Dios (FENAMAD). The Federation also represents small groups of 'uncontacted' indigenous peoples living in voluntary isolation along the Peru/ Brazil border.

The threats

Despite its remoteness, the Tambopata region is threatened by a range of activities.

Inter-Oceanic Highway – the long-planned highway linking the heart of Amazonia to the Pacific coast of Peru is nearing completion. This 4,000-km highway will greatly reduce the time and costs involved in opening up trade between Amazonia and Far Eastern markets. Up to eight vehicles a minute are projected to pass along the Highway, once the bridge over the river Madre de Dios, in Puerto Maldonado (Figure 3), is fully operational in 2012. The principal cargoes exported will be rough-cut timber and soya beans, with western consumer goods coming in. The

Figure 1: Vilcabamba-Amboro Conservation Corridor



Source: www.ci-peru.org/www.sernanp.gob.pe

highway passes only a few kilometres to the north of the Tambopata region and, potentially, will facilitate the arrival of thousands of new migrants annually to the region.

Logging for timber – mahogany has long been extensively logged from the forests of Madre de Dios. It is such a valuable timber that it is often flown out of the departmental capital, Puerto Maldonado. The remaining trees lie as far as three weeks upriver in areas where loggers can come into conflict with indigenous peoples living in voluntary isolation. Few mature mahogany trees remain in the Tambopata area, but the Highway may facilitate the logging of those that remain, as well as other valuable timber species such as tornillo and cedro. Logging has increased in Peru in recent years, as stricter controls on unsustainable logging have been applied in Brazil. The value of the rough-cut timber on the dock in Puerto Maldonado will be several thousand times greater once available as sawn timber in North America or the Far East.

Mining – alluvial and fluvial gold-mining occurs extensively along the rivers Madre de Dios, Iñambari and Malinowski, the latter forming the western boundary between the BSNP and the TNR (Figure 1). Over 60,000 hectares (7.38% of the department) are affected, mostly by informal activity. Fluvial mining is undertaken using raft-mounted pumps which suck up and filter river-bed and bank deposits. The largest of these operate 24 hours a day, moving unregulated along the banks. Elsewhere, extensive areas of forest are cut and then the alluvial deposits are filtered to a depth of many metres, such as at Huaypetue, a short distance north-west of the Tambopata region, creating a lunar landscape. Production is difficult to quantify but it is estimated that Madre de Dios produces over 50 tonnes of gold per year. Peru's impressive economic growth (8% in 2010) is closely linked to the mining sector.

Farming – the lack of significant local markets has restricted the areas of rainforest cleared for farming and ranching. However, the new Highway and the increasing global demand for soya are likely to see an increase in farming, to mirror clearance in Brazil. Hitherto, small-scale subsistence farming has been confined to parcels (chacras) along the river banks, rarely

Figure 3: Trans-Oceanic Highway: bridge nearing completion in Puerto Maldonado



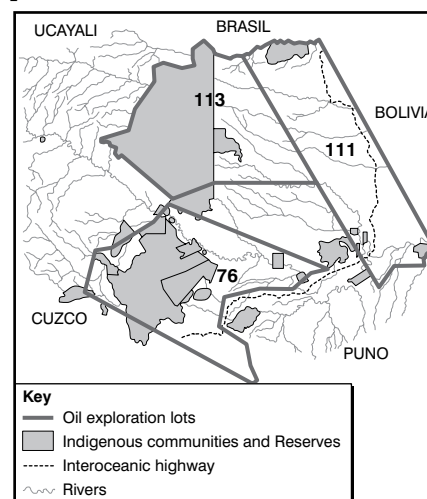
Source: J. Forrest (TReeS)

extending more than 50 metres back from the river frontage or more than 30 km up tributary rivers. The tourist honeypot of Cusco lies more than a day's journey away by road, and in the absence of a major market, commercial farming does not warrant the investment. However, the land used for cattle ranching along the Highway is increasing to meet the growing local demand for beef, a reflection of increasing social affluence even in towns such as Puerto Maldonado.

Oil and gas extraction – in the 1980s Shell undertook initial explorations in the area, followed by Mobil in the 1990s. On both occasions they concluded that deposits were not commercially viable to exploit in such a remote area, in the market conditions prevailing at the time. The current exploration lots (Figure 4) cover most of Madre de Dios to the north and west of the Tambopata region. They were awarded to the US company Hunt Oil and the Chinese state oil company, in 2008. Recent oil price rises are likely to make exploitable reserves more attractive, despite the logistical difficulties and the lengthy pipelines needed to cross the Andes to coastal cities. However, the enormous Camisea gas project, further north in central Peru, has already proved that it is possible.

Globalisation – Peru has signed free trade agreements (FTAs) with the USA (2009), China (2010) and the European Union (2011), facilitating the operations of transnational companies in Peru. Theoretically, FTAs provide some additional environmental protection by discouraging the over-exploitation of resources in environmentally sensitive

Figure 4: Oil exploration lots superimposed over indigenous peoples' protected areas and communities



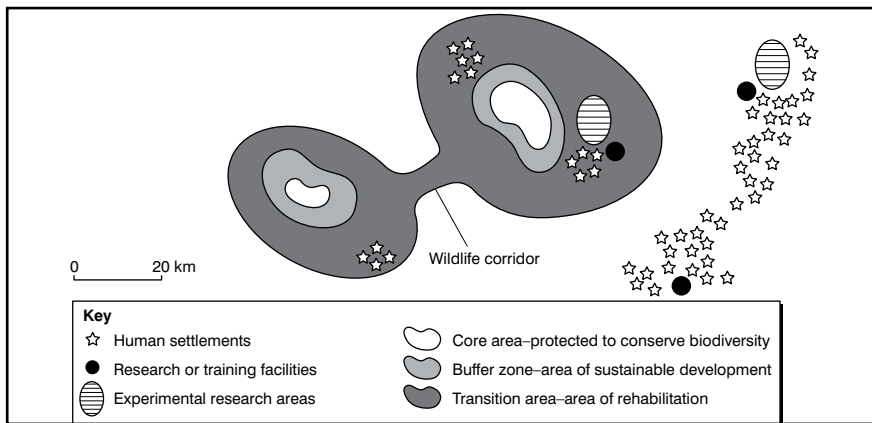
Source: www.tambopata.org

areas. Nevertheless, the concern is that national environmental laws will be easily bypassed by TNCs.

Global warming – the two driest years on record in Amazonia occurred in the last decade, in 2005 and 2010. In 2005, 37% of Amazonia experienced rainfall levels significantly below the average and in 2010, 57%. Some rivers fell to the lowest levels on record. Drought kills trees, which releases additional CO₂ into the atmosphere, while the capacity to absorb CO₂ is also reduced. Tambopata lies on the fringes of the worst drought-stricken areas, but significantly below-average rainfall was recorded in both years.

In Madre de Dios logging, oil exploration and mining concessions have been issued in recent decades without reference to the existing conservation status of the areas concerned.

Figure 5: Biosphere Reserve and conservation corridor model



A comparison of socio-economic indicators for Peru with those for HICs suggests a pressing need for Peru to continue to develop its resources and generate wealth. In his 1998 Kew Environmental lecture, the then Peruvian President, Alberto Fujimori, stated that environmental priorities would have to take a back seat while such a high proportion of Peru's population still lived in severe poverty. The policies of successive governments have continued to be directed by this approach.

Conservation management

A spectrum of conservation strategies are available to try to limit the exploitation of tropical rainforests.

A multiple land use zoning approach such as a Biosphere Reserve is likely to be most effective, if an extensive area is involved. A Biosphere Reserve model (Figure 5) commonly integrates a core national park, with a surrounding reserve and buffer zones.

In Peru, prospective conservation units are, initially, defined as 'Reserved Zones' and new activities are (theoretically) restricted while the long-term conservation options are considered. The Tambopata region went through this process over a 25-year period, starting in 1977 with the designation of the Tambopata Reserved Zone (TRZ) (5,500 ha). In 1990 the designation of the much larger Tambopata-Candamo Reserved Zone (TCRZ) (1.345 million ha) paved the way for a long-term integrated conservation management approach.

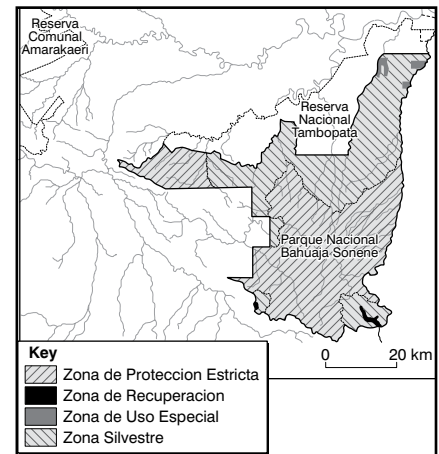
A Biosphere Reserve approach to conservation management usually involves the establishment

of a national park in which only scientific research and indigenous access to pursue traditional resource-gathering activities are permitted, together with a national reserve within which tourism, sustainable activities such as brazil-nut harvesting and small-scale farming are permitted, and a buffer zone where the remaining rainforest is managed sustainably and degraded land restored. The Tambopata region is not classified as a Biosphere Reserve, but has many of the characteristics of such a management approach.

Peru's Ministry of the Environment was only established in 2009. Until then, issues of protected areas and wildlife conservation were handled by sub-departments within the Ministry of Agriculture, where there were often clear conflicts of interest. The new Ministry has a small budget and a low status in the ministerial pecking order, while others have suggested that its establishment was purely a measure to appease FTA opponents. Protected areas across Peru are administered by SERNANP (National Service of Protected Areas). Logistical difficulties mean that visitors are rarely charged to visit protected areas and, consequently, SERNANP's funding is derived from central government. In the past this has included 'debt for nature swap' funds from the Dutch government, when the Tambopata region first received protected status.

The 1.091 million ha Bahuaja-Sonene National Park (BSNP) was declared in 2000. It has no permanent settlements within it, but there is a small permanent population of researchers at the Tambopata Research Centre, while

Figure 6: Bahuaja-Sonene National Park – proposal to redesignate to account for oil exploration lot extension (2007)



Source: www.sernanp.gob.pe

all tourists must camp. Indigenous people are permitted to enter the area, but only to undertake defined traditional activities. The Park is further subdivided (Figure 6) in to zones of:

- strict protection (Zona de protección estricta) across most of its southern half;
- specialist use (Zona de uso especial) linked to indigenous communities;
- wilderness (Zona silvestre) across most of its northern half, which both indigenous peoples and tourists may access.

In 2007 the Peruvian government, possibly pre-empting the signing of the FTAs, proposed a re-designation of the BSNP, reducing its size by a third to allow the eastward expansion of oil exploration lot no. 76 (Figure 6). National and international opposition led to the withdrawal of the proposal.

The Tambopata National Reserve (TNR) covers 0.254 million ha, including extensive brazil-nut concessions. The trail systems of many lodges extend into the area, as do areas traditionally utilised by indigenous peoples. A series of guard posts are located on the three main rivers entering the area, but guards have only very limited powers to act and insufficient resources to mount extensive patrols to counter illegal activities. In effect they undertake a monitoring operation. The buffer zone (Zona de amortiguamiento) (0.262 million ha), though designated, has no specific status, and few restorative projects are currently being undertaken within it.

A new management plan for the Reserve and buffer zone is currently being prepared by SERNANP. This involves a range of local representative organisations and national institutions, as well as support from foreign institutions such as the Frankfurt Zoological Society and Tambopata Reserve Society.

Conservation corridors

Conservation corridors are crucial for many larger mammal and migratory species. Research suggests that each jaguar needs a hunting territory of several hundred hectares. The Amboro-Vilcabamba conservation corridor links a mosaic of 16 protected areas, covering over 16 million ha, along the western Amazonia/eastern Andean foothills boundary for 1,500 km. The Tambopata region lies between the Manu Biosphere Reserve, to the north, and the Madidi National Park (Bolivia), to the south, cutting across a political boundary for which nature has no regard.

Indigenous peoples

Three communities of the Ese'ejá peoples about the TNR (the international frontier now separates them from other Ese'ejá communities in Bolivia). The semi-nomadic Ese'ejá were settled in the 1950s and received title to their community lands in the 1970s. They use the forest on a small-scale sustainable basis to fish, for medicinal plants, timber, etc but, occasionally, need to generate additional income by, for example, collecting and selling turtle eggs. Their awareness of the need for a sustainable approach to forest management is deep but their involvement in decision-making has tended to be peripheral. This highlights the incompatibility of a strongly protectionist approach in areas where there are indigenous peoples.

Extractive activities

The principal sustainable crop in the area is brazil nuts. Brazil nuts are unsuited to plantations, trees lie scattered through the forest and are grouped into concessions. Despite their high protein value, the local wholesale price is low. They are also strictly governed by international food hygiene rules, principally concerning fungal content, which are costly to meet.

Tourism

There are now over 25 tourist lodges in the Tambopata area, ranging from those at the luxury end: Explorer's Inn, Posada Amazonas and Wasai lodge, to more basic community or family-run operations such as the Baltimore Community lodge. They are mainly located on the periphery of the Tambopata National Reserve. In all cases, lodges conserve an area of adjoining forest and its associated wildlife. Tourist company operations in the area make them significant players and stakeholders as custodians of the Tambopata forest. Most operate under the banner of ecotourism, but few adhere strictly to internationally published guidelines with respect to the purchasing of local produce, employment of local people, waste disposal, keeping of 'pets', etc. However, some such as the Explorer's Inn and Posadas Amazonas have taken greater steps to host scientific research and work with the local community.

Scientific research

Research is undertaken at many of the lodges, but dedicated stations allow scientists to focus on specific species and long-term projects. On the upper Tambopata river, within the BSNP, the Tambopata Research Centre – sited next to one of the largest macaw colpas (salt-licks) in Amazonia – is the principal focus for research.

Conclusion – key points

- Tambopata contains enormous biodiversity and lies at the heart of an internationally important conservation initiative.
- The presence of significant tourist numbers and scientific research projects is helping to maintain its status.

- Funding to administer conservation projects and protected areas within the Tambopata region is limited.
- Tambopata was fortunate to achieve its protected status in the 1990s prior to the full onset of the impacts of globalisation.
- The threats from globalisation are being exacerbated by oil and gold price rises, the signing of FTAs, and construction of the Inter-Oceanic highway.
- Tropical rainforests are no longer seen as being the wild, inhospitable and inaccessible environments to the same degree as they were only 30 years ago.
- The conservation of the Tambopata region depends on the integration of diverse economic, cultural, social and political demands at a variety of levels – a major challenge.

Useful websites

www.ci-peru.org
www.iucn.org
www.sernanp.gob.pe
www.survivalinternational.org
www.uncontactedtribes.org
www.tambopata.org.uk

Focus Questions

1. Why is Tambopata a biodiversity hotspot?
2. What global and local factors threaten the Tambopata region?
3. Research the route of the Inter-Oceanic Highway. Why could it lead to greater trade links between Amazonia and Pacific rim countries?
4. Can long-term sustainable tropical rainforest management ever replace short-term extractive practices?
5. Evaluate the conservation of biodiversity and economic development, with reference to specific examples.