

Ambatovy Project: From Impact Assessment to Offsetting.

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Abstract

Ambatovy is a nickel / cobalt mining project located in Madagascar, one of the world's high biodiversity and endemism areas. Main impacts on biodiversity predicted in the 2006 ESIA were from forest clearing on presumed local endemic flora and fauna (species of concern only known from the project area). Mitigation and onsite and offsite biodiversity offset programs are being implemented with the goal to produce no net loss of biodiversity and preferably net gain (according to the guiding principles of the Business and Biodiversity Offset Program (www.forest-trends.org/biodiversityoffsetprogram)). Here we show how biodiversity understanding has increased from the time of ESIA development and how the project's biodiversity management program has developed compared to that envisaged in 2006. Areas compared include impact avoidance and mitigation, management of species of concern, offset design and the integration of social issues in biodiversity management. Lessons learned will be emphasized, which could be useful for other assessments in high biodiversity areas.

The Impact Assessment

The Ambatovy project is a large-tonnage nickel mining and refining project in Madagascar, a hotspot in terms of biological diversity and endemism. Baseline studies and environmental assessment were conducted during 2004 – 2006; an environmental permit was obtained in December 2006. The Environment & Social Impact Assessment (ESIA) included the assessment of impacts to flora, fauna, aquatic ecology and biodiversity overall. Main potential impacts were associated with construction of pits and related infrastructure at the mine site in an azonal forest habitat (atypical forest type in terms of species abundance and structure not characteristic of the zone). The assessment used the then draft IFC Performance Standard 6 as a main reference against which to assess biodiversity impacts. Unavoidable high consequence impacts after applying the mitigation hierarchy would need to be compensated through biodiversity offsets, in order to meet IFC guidelines. Compensation activities aiming at producing positive conservation outcomes to achieve no net loss and preferably net gain on biodiversity were put in place following the Business and Biodiversity Offsets Program (BBOP¹) guidelines.

A key concept that aided impact analyses for individual taxa and biodiversity overall was that of Priority Species or species of concern (SOC). For the ESIA, Priority 1 species were potentially endemic to the project footprint. These species had the potential to go extinct if the project proceeded before range extension could be confirmed beyond the footprint. There were commitments therefore to “de-list” all such species prior to construction, through a program to search for them in proposed nearby on-site conservation areas, or if necessary further afield in secure areas. Should these species not be found away from the project footprint in advance of construction, then species-specific management programs, including no-go areas, would be required, to ensure viable populations remain secure at safe sites in the mine area. Priority 2 species were potentially endemic to the Local Study Area (LSA) which included the project footprint plus a buffer zone that would include on-site conservation areas and surrounding forest that would be managed with help from the project. Priority 3 species were endemic to Madagascar.

Two main flora and fauna mitigation strategies were adopted. First, species salvage and relocation into similar habitats with associated monitoring and second, ex-situ strategies, such as seed collection and propagation. The setting aside of on-site azonal conservation areas constituted a very important in-situ mitigation strategy. Continued investigation and development of additional off-site azonal conservation areas to serve as a biodiversity offset also remained a priority. The commitments with respect to offsets for the whole project were as shown in Table 1. It was emphasized that these efforts were in addition to other on-site reclamation efforts proposed as part of the closure plans for each project component.

Within ESIA commitments, on-site and off-site biodiversity offsets represented about 4 times the area to be lost through clearing. This sizing of the offset was in line with a precautionary principle within offset planning (i.e. ten Kate et al 2004), which considers the risk that the offset will not exactly compensate for the species assemblages to be impacted.

¹ www.forest-trends.org/biodiversityoffsetprogram/

Table 1. Summary of Commitments to Proposed Forest Management Zones, Rehabilitation Areas and Conservation Zones

Project Component	Conservation Efforts		Loss of Forest Cover	Net Loss or Gain (ha)
	Description	Area (ha)	Area (ha)	
Mine	On-site azonal conservation areas	305	1,697	5,447
	Forest management zone	2,989		
	Off-site azonal conservation area (Ankerana)	Approx. 3,850		
Slurry pipeline	Zonal forest restoration	60	116	-56
Process plant	n/a	0	29	-29
Tailings facility	n/a	0	34	-24
Port expansion	n/a	0	0	0
Total		7,204	1,876	5,328

Implementation of Biodiversity Management

Biodiversity management for the project was initiated in January 2007, after award of the permit in December 2006. A series of workshops with fauna and flora specialists in January 2007 helped define key action items for a Biodiversity Action Plan for the project, based on commitments in the ESIA. That action plan was then expanded to form a Biodiversity Management Plan (BMP).

The BMP provided a comprehensive overview of required pre-construction survey activities, mitigation measures and monitoring for all project components, including the Ankerana biodiversity offset site. Some action items were noted for all project sites, but most priority actions were required in the mine area and included flora Species of Concern (SOC), lemurs, small mammals, birds, amphibians and reptiles, insects, fish and aquatic ecology. Fish and aquatic ecology were also a priority along the slurry pipeline. The BMP remains the umbrella document, but has been complemented with detailed taxa-specific management plans and additional supporting documents, which have been produced for flora, lemurs, *Mantella* frog spp. and fish. Examples of some main achievements and challenges to date focusing on just flora and the offset program include:

- **Flora:**

- Flora remains a high priority, given the large number of species in the mine local study area (which rose from approximately 1300 during baseline surveys to approximately 1700² by November 2009). Much work has been done to clarify the priority status of

² Exact species numbers remain to be confirmed by the Missouri Botanic Garden (MBG)

SOCs, with numbers starting at 232 SOC (all priority levels included) in 2006, then increasing in 2008 to 377 as studies continued on and off the footprint and finally decreasing in late 2009 to 209, as species from within the footprint were located offsite and taxonomic questions were resolved.

- Main challenges have been:
 - Ensuring adequate human resources (skilled workers and scientists) to undertake all needed activities over large areas and within short timelines; and
 - Achieving a common understanding of the commitments needed to ensure species conservation between stakeholders of different backgrounds and perceptions, including corporate management, flora experts, site managers and the local community.
- **Biodiversity Offsets and Business Biodiversity Offset Program (BBOP):**
 - From its inception, the Ambatovy project has adopted the concept of biodiversity offsets to compensate for residual impacts and has become a pilot project of the Business and Biodiversity Offset Program (BBOP);
 - The project's multifaceted offset program now includes seven components:
 - The Ankerana offset: the off-site offset area now with 11,600 hectares (ha) of endangered forest, is larger than that envisaged in the impact assessment; the project aims to ensure its long term protection through legal arrangements, financing and community consensus.
 - Two azonal forest sites: two on-site (mine) azonal forest conservation areas occur partially over the ore body footprint; the project aims to ensure their long term protection through legal and management commitments.
 - The mine area conservation forest: the conservation forest area around the mine footprint is now 4,900 ha, again larger than provisionally set in the impact assessment; the project aims to ensure its long term conservation as part of a priority species management program and maintenance of ecological services for local communities.
 - The Analamay-Mantadia forest corridor: the project is spearheading the establishment of a forest connection between the mine area forests and the nearby Ankeniheny-Zahamena Corridor; the forest connection aims at long term landscape level connectivity for the protection of mine area biodiversity through partnerships with government, NGOs and local communities.
 - The Torotorofotsy wetland ecosystem: as envisaged in the impact assessment, the project is supporting management plan design and implementation for this Ramsar site in conjunction with government and local NGOs; these efforts aim to ensure the permanency of legal and managerial commitments.
 - The pipeline right-of-way reforestation program: the program aims at enhancing forest connectivity in targeted areas of the Ankeniheny-Zahamena Corridor through expanded reforestation activities along the slurry pipeline right of way by conducting targeted reforestation in partnership with government and local NGOs.
 - Thus the offset program now aims to contribute to the direct conservation of over 16,500 hectares of primary rain forest.
 - Main challenges have been:
 - Building the technical skills to efficiently manage the implementation of the still developing BBOP guidelines;

- Ensuring protection of the candidate offset sites in conjunction with current land use; and
- Understanding the importance of the socio-economic value of biodiversity to local people adjacent to the offsets and the people's need to utilize these resources not always based on sustainable principles.

Discussion and Lessons Learned

- Maintaining the involvement of many of the same local specialists from the ESIA phase has helped to ensure continuity of effort and data management. However, it was also necessary to expand the skills range and bring in new experts.
- Having the continuous input of an environmental manager with expertise in biodiversity and forest management has helped to ensure compliance with commitments relating to biodiversity conservation in conjunction with mining appropriate to an endemism and biodiversity hotspot such as Madagascar.
- The two year baseline for the ESIA provided a good basis for understanding biodiversity – including habitat interrelationships and designing mitigation actions, monitoring and offset requirements. However, much additional information has been acquired through pre-construction surveys, including data useful for expanding and fine-tuning biodiversity management during construction.
- The SOC system has provided a simple basis on which to make biodiversity management decisions during construction, including as needed delaying forest clearing while species are salvaged and relocated. A major challenge has been to complete pre-clearing surveys and salvage programs in advance of construction works.
- Moving from the concept of a biodiversity offset area to reality has involved much effort with local stakeholders, government and project staff. Developing a solid co-management framework has proved to be as important as meeting the technical challenges of offsetting, since the offset program encompasses a balance between innovative biodiversity strategies, local social realities, government support and the technical requirements of a successful mining project.

Conclusion

Achieving no net loss, or preferably net gain, of biodiversity in the context of a large mining project requires an innovative and precautionary combination of mitigation measures and conservation offsets, demanding substantial corporate and stakeholder commitment. The long term nature of the Ambatovy project investment should allow for continued support for on and off-site offset programs over several decades.