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Prospects of Integrating Biodiversity Offsets in Japan's Cooperation Projects: A Review of Experience from Developing Countries

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Prospects of Integrating Biodiversity Offsets in Japan's Cooperation Projects: A Review of Experience from Developing Countries

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Abstract

Development-induced biodiversity losses continue unabated because most developments invariably result in some residual biodiversity loss. Mitigation measures in traditional environmental impact assessment (EIA) can rarely achieve the goal of No Net Loss (NNL). Biodiversity offsets are applied to the field of international development assistance to achieve NNL in accordance with mitigation hierarchy. However, there are few available references for planning offset projects for the aid practitioners in charge of cooperation projects in developing countries. The purpose of this working paper is to present a practical approach for incorporating offsets in Japan's cooperation projects. The paper is based on a review of publications in academic journals and experience drawn from the four recent case studies on preparation of offset projects in developing countries. The paper advocates the need to integrate offset planning within the EIA framework. Based on the analysis of the case studies, prospects of biodiversity offsets in achieving NNL are analysed. The paper concludes that the introduction of offset policy, the political will for policy operation, and the long-term support to developing countries are important for the success of biodiversity offsets in cooperation projects. Japan's initiatives toward biodiversity offsets can positively influence in promoting conservation of biodiversity and ecosystem services in developing countries.

Keywords: Biodiversity offsets, cooperation projects, No Net Loss, environmental impact assessment, ecosystem services

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Introduction

Biodiversity refers to the variety of life on earth at all its levels, from genes to ecosystems (CBD 2006) and biodiversity is the life insurance of life itself (CBD 2005). The importance of biodiversity for influencing human welfare is widely recognized (Carpenter et al. 2006; de Groot et al. 2010; Cardinale et al. 2012), but the global trends of biodiversity loss are significant (Tittensor et al. 2014; Pimm et al. 2014; Roque et al. 2018). The direct drivers of these changes are changes in land and sea use; direct exploitation of organisms; habitat loss degradation and fragmentation; climate change; pollution; and invasion of alien species (IPBES 2019). Halting global biodiversity loss is central to the Convention on Biological Diversity (CBD 2010) and United Nations Sustainable Development Goals (UN 2015). In most cases, the impacts induced by development projects such as roads or power plants are not always fully avoided, minimized or restored and invariably result in some residual biodiversity losses (Bigard et al., 2017). Moving beyond the environment versus development debates may lead to more positive efforts towards a sustainable future (Rajvanshi and Mathur 2010).

Biodiversity offsets are mechanisms to compensate unavoidable impacts of a project or plan on biodiversity (Bull et al. 2013) for incentivizing biodiversity conservation through business initiatives (Rajvanshi 2015). The goal of biodiversity offsets is to achieve No Net Loss (NNL) and preferably a Net Gain (NG) of biodiversity in accordance with mitigation hierarchy (Figure 1), beyond traditional mitigation measures on the ground with respect to species composition, habitat structure, ecosystem function and people's use and cultural values associated with biodiversity (BBOP 2009a; BBOP 2012a; Gardner et al. 2013; Maron et al. 2018). Impact avoidance and minimization are vital to achieving NNL/NG goals (Pilgrim and Ekstrom 2014; Hayes et al. 2015). These early mitigation components have merits in reducing the technical, social, and political risks; reducing the cost per unit of biodiversity and ecosystem services; and increasing confidence and trust among key stakeholders (Ekstrom et al. 2015).

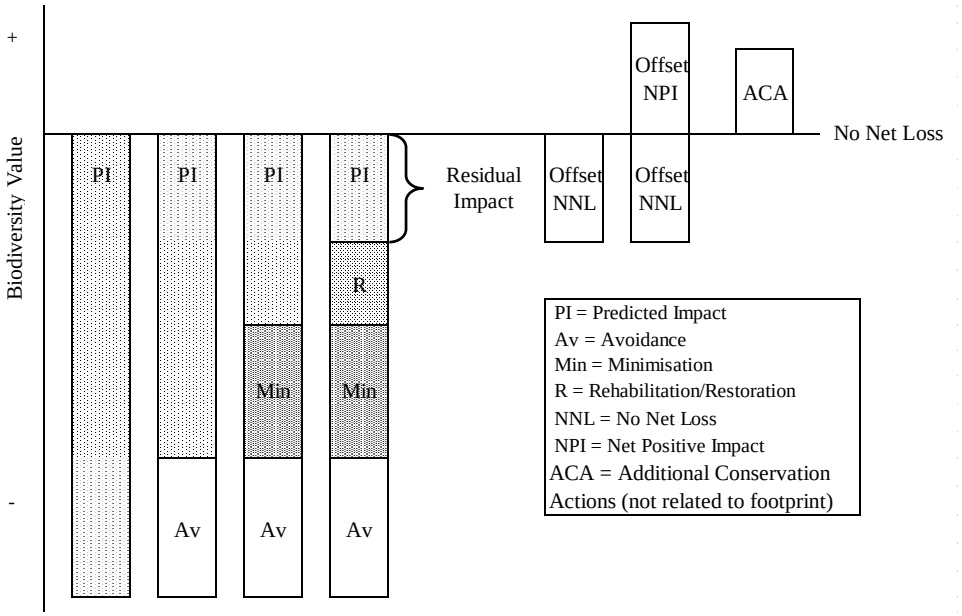

Figure 1. Mitigation hierarchy.

Source: BBOP 2012a.

Biodiversity offsets have been adopted all around the world (Madsen et al. 2010; BBOP 2018a) with increasing interest in development of public policy (ICMM 2013; Villarroya et al. 2014). Thirty-nine countries have existing laws or policies on NNL/NG and the most common setting is integrating provisions on offsets into the regulations of environmental impact assessment (EIA) (ten Kate and Crowe 2014). The offset projects number 12,983 across 37 countries (e.g. Mexico (n=5,970), Brazil (n=2,514), South Africa (n=32)). The majority of offset projects were implemented in forests (66.7%) or wetlands (17.5%) (Bull and Strange 2018). In addition to public policy, a major driver has been the requirement for NNL/NG within safeguard policies of financial institutions such as the Asian Development Bank (ADB 2009), the International Finance Corporation (IFC) (IFC 2012), the African Development Bank (AfDB 2013), the European Bank for Reconstruction and Development (EBRD 2014), and the World Bank (WB 2017).

The IFC Performance Standard 6 (PS6) on Biodiversity Conservation and Sustainable Management of Living Natural Resources adopted in 2006 and updated in 2012 (IFC 2012),

requires IFC borrowers to take steps to conserve biodiversity and achieve NNL following the guidance on biodiversity offsets provided by the Business and Biodiversity Offsets Partnership (BBOP) (BBOP 2012a and 2012b). The IFC PS6 is increasingly influential to investment in low-income countries from any financial institutions that have signed up to the Equator Principles (Anon 2013; EPFIs 2013). One of the difficulties in implementing offsets is assessing ecological equivalence between losses and gains (Quétier and Lavorel 2011). The challenges discussed in the literature are choice of metrics (area, quality, condition, ecological function, etc.), offset location, timing, longevity, compliance, monitoring, transparency, and credit release (Gonçalves et al. 2015). The G7 Ministers of the Environment recognized the biodiversity offsets and adherence to the mitigation hierarchy in May 2016 (G7 Toyama 2016) and adopted the Metz Charter on Biodiversity to intensify the efforts to halt the biodiversity loss in May 2019 (G7 France 2019). Following the current initiatives by financial institutions and developed countries, the Japan's official development assistance (ODA) may introduce biodiversity offsets in the near future.

Japan's gross ODA disbursements in 2017 amounted to $18,461.20 million (the third rank among major donor countries) and supported 152 countries and international organizations (MOFA 2020). Asia is the primary region and key sectors of assistance are transportation, power, water and regional development (Kamijo 2019). Introduction of biodiversity offsets can be a powerful motivation to improve the mitigation measures. However, offset projects have still not been instituted in Japan and Japan's ODA. Despite that extensive literature on biodiversity offsets is available in the context of developed countries (Bull et al. 2013; Pilgrim and Ekstrom 2014; Maron et al. 2015; Bennett et al. 2017; Maseyk et al. 2017; zu Ermgassen et al. 2019), there are few practical references available for Japan's aid practitioners to prepare offset projects in developing countries. It would be useful to clarify the process of offset planning integrated in the EIA process based on a review of recent offset projects in developing countries. This working paper aims at displaying the process of offset planning to aid practitioners based on a

review of IFC and BBOP standards, an overview of literature relevant to biodiversity offsets, and an analysis of recent case studies to highlight the experience of IFC related to specific projects in developing countries.

1. Literature review

The first step involved an extensive review of the IFC PS 6 and the BBOP standards to deepen the understanding of offset planning (Section 1.1). The published literature on offset projects in different stages of implementation in four developing countries, South Africa, Madagascar, Brazil, and Mexico was also reviewed to understand the status of their offset initiatives (Section 1.2). Additionally, the author reviewed the costs involved in biodiversity conservation (Section 1.3) to understand the necessity to integrate ecosystem services in offset planning.

1.1 Guidance for offsetting based on IFC PS 6 and the BBOP Standards

IFC's Environmental and Social Performance Standards define clients' responsibilities for managing their environmental and social risks. The PS6 more specifically recognizes that protecting and conserving biodiversity, maintaining ecosystem services, and sustainably managing living natural resources are fundamental to sustainable development. The PS6 applies to projects (i) located in Modified, Natural or Critical Habitats; (ii) that potentially impact on or are dependent on ecosystem services over which the client has direct management control or significant influence; or (iii) that include production of living natural resources. While in Modified Habitats, the PS6 only requires application of the mitigation hierarchy (avoidance, minimization, restoration, and offset) as appropriate, in Natural Habitats, a NNL outcome is required where feasible, and in Critical Habitats, a NG of the affected critical biodiversity is required (IFC 2018a). BBOP standards assist with the assessment of whether an offset has been designed and subsequently implemented in conformance with the Standard on Biodiversity

Offsets, which is structured according to the widely accepted Principles on Biodiversity Offsets. These principles establish a framework for designing and implementing biodiversity offsets and verifying their success. The BBOP Principles are: (i) adherence to the mitigation hierarchy; (ii) limits what can be offset; (iii) landscape context; (iv) no net loss; (v) additional conservation outcomes; (vi) stakeholder participation; (vii) equity; (viii) long-term outcomes; (ix) transparency; and (x) science and traditional knowledge.

The process of planning offsets is integrated within the EIA process (BBOP 2009b). When there are residual adverse effects on biodiversity remaining after appropriate application of the mitigation hierarchy, a developer needs to calculate the residual losses and gains required using appropriate methods. Habitat-based approaches generally rely on area and habitat conditions to calculate losses and gains. The BBOP offset design handbook (BBOP 2012c) provides guidance for calculation of residual losses and gains in Australia, United States, South Africa, and New Zealand. The prediction of background rates of biodiversity loss is a prerequisite for calculation of NNL/NG (BBOP 2012d). Other important considerations are potential offset locations and activities for comparisons to select preferred options for more detailed offset planning (BBOP 2012c). It is necessary to decide the on-site (within the same development site) or off-site (in different area away from the development site) offsets (BBOP 2012c) as well as the activities whether an 'in-kind' (biodiversity losses compensated with gains for exactly same species, habitats, biotopes etc.) or 'out-of-kind' (gains accepted for biodiversity features different from those impacted) offset is most appropriate (Bull et al. 2014). There are two major approaches of producing offset gains, habitat restoration and the so-called averted loss (Moilanen and Kotiaho 2018). Averted loss offsets secure the protection of a proposed offset sites currently unprotected, which would remain unprotected if it were not for the offset. Protection is generally achieved by a change in tenure (Maseyk et al. 2017).

Implementation of biodiversity offsets generally follow one of the following primary mechanisms. First, mitigation banks involve selling compensatory mitigation credits to

developers whose obligation is to provide compensatory mitigation then transferred to the mitigation bank sponsor. Mitigation banks operate only in few countries (US, Australia, Canada, Germany, and France). Secondly, financial compensation schemes involve collecting and administering fees from developers to make a contribution towards offsetting their impacts to biodiversity. Financial compensation schemes were found in 19 countries in 2016. Thirdly, permittee-responsible offset is a 'do-it-yourself' offsetting conducted by a developer or a subcontractor. Permittee-responsible offsets are the only option for compensatory mitigation in many countries. Each of these mechanisms has strengths and weaknesses (Bennett et al. 2017). Effective stakeholder participation is critical at the stages of offset planning and implementation (BBOP 2012a) to decide and agree offset locations and activities to address the impacts on the use and cultural values of biodiversity (BBOP 2009c).

1.2 Biodiversity offsets in developing countries

1.2.1 South Africa: Biodiversity offsets in the Western Cape Province

A draft national biodiversity offset policy produced in 2012 and revised in 2015 (DEA and DP 2015) is yet to be formally endorsed (Brownlie et al. 2017). The Western Cape Province was the first province to develop offset guidelines (DEA and DP 2015; Lukey et al. 2017). Several actions are undertaken in the process of planning and implementing the offsets in the Western Cape Province. In South Africa, averted loss offsets dominate with exception of wetlands. Based on the national biodiversity assessment conducted by the South African National Biodiversity Institute, offset receiving areas are identified in priority areas for biodiversity conservation. The local authority subsequently reviews the biodiversity impacts and determines the requirements for offsets. The consultant calculates offset requirements using a basic offset ratio linked to the threat status of the affected ecosystem (e.g. 5:1 ratio for vulnerable ecosystems, 20:1 ratio for endangered ecosystems) (Koh et al. 2019). Consultation with key stakeholders (authorities,

conservation agencies, farmers' associations and other community-based organizations) proves helpful in influencing the design and location of offsets and for generating project support (Jenner and Balmforth 2015).

With a willing offset provider found, the developer explores opportunities for creating a stewardship agreement with a landowner. Alternatively, the developer purchases the land and donates it to a conservation agency for its management in perpetuity. Finding willing offset providers in South Africa has been especially difficult (Brownlie et al. 2017). Lengthy negotiations between landowners and developer have led to significant time delays, even up to several years. A developer submits a development project application and offset project proposal to the local authority, who consults the Provincial Biodiversity Conservation Agency on suitability of the offset proposal in compensating for negative impacts (Brownlie et al. 2017). If the offset project proposal were acceptable, permission for the development project would be granted with the offset included as a condition of authorization. The developer pays the offset costs. Management and monitoring of the offset site is then passed on to the conservation agency, who reports to the local authority. Every three years, the local authority evaluates the performance of offset projects (RSA 2017). Potential solutions to improve offsets are introduction of the national policy on offsets, improving EIA practice, improving decision-making, capacity building to deal with offsets, financial and institutional arrangements, and communication and transparency (Brownlie et al. 2017).

1.2.2 Madagascar: The Rio Tinto QMM offset

There are no national offset requirements in Madagascar (Koh et al. 2019). In 2004, Rio Tinto QIT Madagascar Minerals (RTQMM) which is engaged in mining of ilmenite in Madagascar set its own corporate environmental goal of a net positive impact on biodiversity. The goal is to achieve a NG of littoral forest and high priority species by 2065 to correspond with the

anticipated date of mine closure (Temple et al. 2012). The mine spread out in three sites is estimated to have a direct impact on 6,000 hectare (ha) over its lifetime. A group of biodiversity experts was assembled to form a Biodiversity Committee to give independent external advice to RTQMM on how best to conserve and enhance biodiversity within the project area. The Committee operates with full autonomy and is free to publically criticize RTQMM (Temple et al. 2012, RTQMM 2016). With inputs from the government and biodiversity experts, three sites to represent averted loss offsets were identified in the region. Sainte Luce Forests (500 ha) and Mahabo (1,500 ha) are in-kind (littoral forest), and Bemangidy (4,000 ha) is out-of-kind (lowland humid forest) (Bidaud et al. 2015).

RTQMM prepared long-term management plans for these offset sites with environmental nongovernmental organizations (NGOs). The Committee provided guidance on the biodiversity valuation metrics and offset management plans. After consulting with the Committee on the offset plan, RTQMM financed the offset project. The environmental NGOs collaborated with local communities to develop a long-term management plan for the forest and implement a community-based conservation project in the Bemangidy offset site (Temple et al. 2012). In May 2015, some of the offset sites were officially designated by the government as protected areas to ensure gains in natural forest cover and conservation of priority species (RTQMM 2016). RTQMM monitors the rates of forest loss occurring across the mining lease sites and the gains on the offset sites to achieve averted loss at the time of mine closure in 2065 (Koh et al. 2019). On the other hand, the project has received criticism with its impact (e.g. land access conflicts, displacement with low compensation, and land use restrictions) on societal equity (Kraemer 2012; Seagle 2012; Koh et al. 2019). One of the lessons learned is that early engagement with stakeholders and development of partnership are essential for the success of mitigation and offset programs (WB 2016).

1.2.3 Brazil: Biodiversity offsets in limestone quarries

The Atlantic Forest Act (2006) is a federal law in Brazil that aims at protecting the high biodiversity value biome (biodiversity hotspot) and allows suppressing vegetation only in exceptional cases (e.g. public utility or social interest). The Act requires mining and quarrying projects to implement offsets. The unit of measure is hectare-habitat and a survey is needed to measure the quality and quantity of native vegetation to be suppressed and to determine the conservation status of the offset target. In the case of the three limestone quarries both protection and restoration offsets were applied at area ratios from 1:1.1 to 1:5. Offset implementation costs varied ranging from 3 to 8% of quarry investment total. The offset sites were selected based on the availability of suitable sites. Two sites (113 ha and 79 ha) were within the same watershed of the projects and another site (114 ha) was within the different watershed. It was not possible to present evidence to demonstrate NNL due to the limited assessment of residual impacts and monitoring to ensure NNL. The main difficulties reported by offset practitioners included finding suitable offset areas, a lack of methods to calculate residual losses, and uncertainties about the success of restoration. The important lessons are that the quality of offset (adherence to BBOP principles and steps) is directly related to the quality of EIA, and that appropriate assessment of impacts, integration of relevant information, and stakeholder engagement can generate better designed offsets (Souza and Sánchez 2018).

1.2.4 Mexico: Forest funds

The General Law on Sustainable Forestry Development (2003) requires developers causing biodiversity loss in forest areas to pay an in-lieu environmental compensation fee to the Mexican Forest Fund, which is managed by the National Forestry Commission (NFC). The fees are used to carry out the compensation activities through the Program of the Environmental Compensation for Land-Use Changes in Forested Areas (2005). A developer prepares a study

report to justify the need for land-use change and propose mitigation measures. The Ministry of Environment and Natural Resources determines the in-lieu compensation fee after approval of the report (Lazo 2016). The in-lieu compensation fee is calculated by the formula (reference costs for reforestation and restoration hectare by ecosystem type) × (equivalence ratio) × (land area affected in hectares) (NFC 2011). A land-use change in well-preserved areas is applied by a higher ratio and requires a higher compensation fee. The landowners of forested areas selected by NFC carry out the compensation activities, which are designed to take into account the location and the ecosystem type where the land-use change occurs. From 2005 until 2013 the number of authorization for land-use change was 3,745 with a total area of 108,209 ha. The compensation activities consist of reforestation, soil restoration, and maintenance works on restored forested areas. The duration of compensation activities is up to three years. The main difficulties are limited monitoring and evaluation of the environmental effectiveness; limited technical capacity for compensation activities; and no mechanism to ensure the permanence of compensations (Lazo 2016).

1.3 Costs of biodiversity offset

Biodiversity conservation often adversely affects local communities benefiting from ecosystem services (Rosa and Sánchez 2016). Some biodiversity threats come from the livelihood activities of local people such as agricultural expansion, hunting or wild-product harvesting. Biodiversity offsets which seek to reduce these threats negatively affect their livelihoods and bring them the cost of biodiversity conservation (Bidaud et al. 2017; Bidaud et al. 2018; Sonter et al. 2018). The costs of conservation-related land use restrictions are well recognized even in the protected areas (Brockington and Wilkie 2015; Holmes and Cavanagh 2016; Oldekop et al. 2016). According to the IFC PS6 "*where socioeconomic and cultural uses of biodiversity (i.e., ecosystem services) are at issue, biodiversity offsets may include the provision of compensation packages for*

Affected Communities impacted by the project and offset" (IFC 2018a, Guidance Note 6, GN32). Integrating ecosystem services in offset proposals and the EIA process may help to link human activities and amenities to affected ecosystems (Baker et al. 2013; Jax et al. 2013; Jacob et al. 2016). Future offset projects in low-income countries need to work closely with local communities from the start to identify appropriate mechanisms to maximize social benefits from biodiversity (Rajvanshi et al. 2011) and to ensure that some of the poor people do not bear the cost of biodiversity conservation (Bidau et al. 2018).

2. Review of selected cases

The step involved a review of four case studies reflecting offset preparation based on recent IFC projects that were documented from 2017 onwards (Table 1). These case studies were reviewed to adequately understand the actual process of planning offsets in developing countries. The specific cases were selected to represent the main region (Asia) and sectors (power and transportation) of Japan's ODA, and represent the experience gained by IFC so far. Each case merits value as it reflects interesting features in terms of geographic spread, diversity of development sector, and the nature of biodiversity impacts. The learning from these cases could be very useful when preparing Japan's ODA offset projects in similar countries and/or sectors. The four projects are:

• Case study 1: Shwe Taung Cement Plant and Associated Facilities Project in Myanmar;

• Case study 2: Riau 275 MW Gas Thermal Power Plant Project in Indonesia;

• Case study 3: Lekela North 250 MW Wind Power Plant Project in Egypt; and

• Case study 4: Big Almaty Ring Road Project in Kazakhstan.

Table 1. Outline of case study projects.

Source: IFC website (https://disclosures.ifc.org/#/landing, accessed July 10, 2019.

Number	Case 1	Case 2	Case 3	Case 4
Country	Myanmar	Indonesia	Egypt	Kazakhstan
Sector	Cement	Gas thermal power	Wind power	Highway operations
Category	A	A	A	A
Biodiversity impacts	Loss of critical and natural habitats	Loss of modified habitats	Collision risk to migratory birds	Loss of endemic fish species
Status	Active	Pending disbursement	Pending signing	Pending approval
Events	Approval July 31, 2017 Signed August 23, 2017 Invested January 4, 2018	Approval February 15, 2019 Signed March 20, 2019	Approval June 12, 2019	

The key documents (e.g. reports of environmental and social impact assessment (ESIA), fauna and flora surveys, habitat assessments, ecosystem service assessments, biodiversity offset strategy, and stakeholder engagement plans) for all four case studies were reviewed in the light of eight criteria: 1) conservation goal; 2) applicable standards; 3) adherence to mitigation hierarchy; 4) baseline survey and habitat assessment results; 5) ecosystem service assessment results; 6) calculation of residual losses and gains; 7) offset site, activity, period, and cost; and 8) stakeholder engagement. The completeness and appropriateness of information was evaluated in terms of four stages (success, partial success, no success, and no information) under each evaluation criterion. The case study was based only on the written information from publicly available documents and did not include results of field surveys or interviews with proponents, concerned authorities, communities, and offset experts. Although all the four cases were of recent origin and did not have their performance tested yet, these provide useful starting point for Japan's aid practitioners in planning offsets.

2.1 Case study results

Case study 1: Shwe Taung Cement plant and associated facilities project in Myanmar

Project profile and site description

The proposed expansion of the Shwe Taung Cement plant will occur within the confines of the existing plant on land previously cleared and will include a new 4,000 tons per day capacity kiln with a 8.8 megawatt (MW) waste heat recovery unit, an additional limestone crusher, a new limestone storage area, a clinker silo, another cement grinding mill, and a staff accommodation village. The expansion of plant will require an additional 260,000 tons per annum (pa) of mudstone and an additional 2.9 million tons pa of limestone. The cement plant is located on 184 ha within a valley in the Tha Pyae mountain range. A mudstone quarry is located immediately west of the cement plant and covers an area of some 68 ha. A limestone quarry is located 800 meters (m) east of the plant and covers an area of 243 ha. The closest community is Ku Pin village (56 households) located some 3 km north of the plant. The larger community is Pyin Nyaung (598 households) located 7 km south of the site (IFC 2017).

Proposed mitigation measures and biodiversity offset

The IFC PS6 (2012) was applicable to the offset projects for conservation of Critical and Natural Habitats. The cement plant, quarry concessions, and mine concession overlap the part of the Indo-Burma Biodiversity Hotspot. The biodiversity assessments were initiated as part of the ESIA. The mammal survey identified the presence of 17 and 21 species of mammals (2 International Union for Conservation of Nature (IUCN) Red-Listed Critically Endangered (CR), 4 Endangered (EN), 8 Vulnerable (VU), 6 Near Threatened (NT), and 18 Least Concern (LC)) in the project area of the cement plant and coal mine, respectively. The proposed mitigation measures were a ban on hunting by staff; alternative road alignments; patrolling to reduce hunting or logging; and mine rehabilitation with indigenous species. The losses of Critical,

Natural and Modified Habitats area were 1,136 ha, 33 ha, and 205 ha within the limestone and mudstone quarry concessions and coal mine concession (Table 2).

The consultants prepared the biodiversity offset strategy. The offset management period proposed was 25 years (the length of the concession period) and a compound interest rate proposed was 1.35% (forest cover loss pa for the period 2000-2015 in Myanmar). The offset area was 6,840 ha of Critical Habitat for NG and 127 ha of Natural Habitat for NNL calculated using an averted loss metric (Table 2). The estimated offset costs was 1,664,187 US dollars over 25 years. The company pre-selected two potential offset sites. The next steps were to determine the suitable offset sites and to establish a management system to achieve measurable conservation gains. The ecosystem service assessment identified priority ecosystem services to be protected. These were timber and wood products, fresh water used by local communities, and erosion regulation associated with forested areas in the mine concession. The proposed mitigation measures to address impacts related to the extraction of forest products were regulating access to roads to prevent illegal removal of forest resources and providing support to local communities for aiding transition from illegal extraction of forest products to more sustainable livelihoods through job training and sustainable forest product harvesting programs (STC 2017).

Table 2. Loss of Habitats and offset area using an averted loss metric (ha).

Source: Data from STC, 2017.

Project area	Critical Habitat	Natural Habitat	Modified Habitat	Net Gain	No Net Loss
Limestone concession	236		119	1,420	
Mudstone concession		33	83		127
Coal mine concession	900		3	5,420	
Total	1,136	33	205	6,840	127

Note: No further information on calculation was given in the cited document.

Stakeholder engagement

The public consultation was undertaken in October 2016 with village leaders during scoping. In January 2017, the community briefing, a 100 household survey, and focus group discussions

with women and farmers were conducted in five villages of the Kubyin/Pyi Nyaung cement/quarrying area and the Chaungzon/Paluzawa/Nanmawke coal mining area. The outcome of consultations were well incorporated in the mitigation measures: air and water monitoring; procedural controls to minimize the auto-ignition of stockpiled coal; engineering control to prevent erosion and runoff; and the setting up of a code of conduct for imported workers and a formal grievance procedure. In addition, the project held consultations with Flora and Fauna International and Wildlife Conservation Society for biodiversity offsets in January 2017. The public forum was organized in Yangon on 18 July 2017 that was attended by some 150 persons including representatives of civil society organizations and communities, Government officials, and members of the general public.

The villagers stated the positive impacts of the development (upgrading of roads and clinics), job opportunities, and their concerns about the ill effects of pollution (air, water, noise, dust and foul odor) and the influx of outsiders. The company supported the establishment of local health clinics and local schools; water purification units and ground water extraction points in communities; and provided local access to electricity in households that previously lacked access to filtered water and electricity. Community members expressed positive views about the social works in addressing their urgent livelihood needs. Furthermore, the company prepared the stakeholder engagement plan (SEP) that included overall objectives, stakeholder analysis and mapping, implementation procedures, budget and resource plans, key performance indicators and targets, assigned roles and responsibilities, incentives, and a grievance redress mechanism (IFC 2017). Significant involvement took place with communities, other stakeholders and international conservation NGOs during project preparation. Consultation outcomes were incorporated into the design of mitigation measures and the biodiversity offset strategy.

Case study 2: Riau 275 MW Gas Thermal Power Plant Project in Indonesia

Project profile and site description

The project consists of a 275 MW gas-fired combined cycle gas turbine power plant, a 40 km long gas pipeline, transmission line, and attached facilities. The power generated by the project will be transmitted to the existing 150-kilovolt (kV) transmission line via a new 750 m long 150 kV transmission line. The project site is located in 10 km east of Pekanbaru City, Province of Riau in Central Sumatra; 3 km south of the Siak River; and 2 km south of the existing 2 x 110 MW Tenayan Coal Fired Power Station. The power plant is situated on a plot of 9.1 ha currently used as an oil palm plantation. The distance from the proposed power plant site to the nearest residential settlement of Bencah Lesung is approximately 3 km and the distance to the Tuah Negeri settlement is about 5 km. The alignment of 40 km gas pipeline route follows the easement of existing roadways and intersects other roads, two rivers and a small creek. About 10 km of the route passes through palm oil plantation land. An area of 14.6 ha is required as an offsite for the gas pipeline; transmission line towers and rights of way; a temporary jetty, an access road, water intake structures and pipeline, and a wastewater discharge pipeline (IFC 2018b).

Proposed mitigation measures and biodiversity offset

The applicable standards were the ADB Standard Policy (2009) and the IFC PS6 (2012) for protection of threatened species. The project area (8,793 ha), which is mostly covered by palm oil plantations, overlaps the Sumatran lowland rain forests ecoregion, which forms part of the Sundaland biodiversity hotspot. The project area is potentially a Critical Habitats for threatened species (IUCN CR Sunda pangolin and EN Agile Gibbon). The key project induced impacts on these species include disturbance during construction (e.g. noise), risk of collection by contractors, and destruction of habitats during construction. The impacts from induced access would be limited as all related infrastructure is located adjacent to existing settlements and roads.

The impact on habitats from gas pipeline is likely to be temporary and limited to the construction period as the gas pipeline will subsequently remain buried.

The management plan recommended measures such as minimum clearance of vegetation; rehabilitation with indigenous species; siting construction camps away from sensitive areas; burial of pipelines; maximum rehabilitation of the right of way, and awareness raising of construction staff. The loss of Critical and Natural Habitat was 33.1 ha and 0.3 ha respectively (no further information on calculation was given in the cited document). The offset site was one part of the power plant site for NNL action. The offset specific activities were replanting and reforestation. Activities (e.g. support to existing NGOs and educational programs on biodiversity conservation) under Corporate Social Responsibility are seen to deliver net gains. Areas of cleared oil palm plantation would be rehabilitated with indigenous species. The disrupted uses of the Siak River for fishing or navigation are likely to impair some priority ecosystem benefits such as fisheries. Measures recommended to reduce impacts to fisheries include design of intake structures (e.g. screens, low intake velocity) to reduce fish mortality, the location of jetties, and other infrastructure away from known fishing and spawning sites (IFC 2018b; Jacobs 2018a).

Stakeholder engagement

The first public consultation, conducted on October 11, 2016 targeted 78 participants (67 male and 11 female). Three more public consultations were conducted during 11 to 15 December 2017 as part of the social survey. The majority of local people favored the project, as it would provide benefits to local communities. The main suggestions offered by the communities were obtaining prior permission for cutting of trees, appropriate compensation for their losses but refusing resettlement, economic benefits for the public, and information about the project's induced impacts. The communities expressed concerns about the security of power supplies in the region, job opportunities and other supports, adverse impacts on settlements and public

facilities, public health and safety, the secrecy of personnel data, and the greater risk to vulnerable people. In addition, the project consulted with four researchers and three specialists on biodiversity offsets. The project prepared the SEP including grievance mechanisms. Appropriate stakeholder engagement took place with communities and biodiversity experts during project preparation. The consultation outcomes were incorporated into the design of mitigation measures and the biodiversity action plan (Jacobs 2018a; Jacobs 2018b).

Case study 3: Lekela North 250 MW Wind Power Plant Project in Egypt

Project profile and site description

The project consists of a 250 MW wind power plant (96 Siemens-Gamesa 2.6 MW turbines with a tower hub height of 63 m and rotor diameter of 120 m), a substation, and a network of site access roads. The project involves constructing two contiguous high-voltage transmission lines to connect this project and other future projects in the vicinity to the national grid. The project area is located on the western bank of the Gulf of Suez, about 150 km north of Hurghada. The project area and its surrounding area is uninhabited, undeveloped desert land. The nearest residential area is Ras Gharib, 28 km to the south. The main economic activity in the area is the crude oil production. No protected areas, historical or archaeological sites are found in or near the project area (IFC 2019a).

Proposed mitigation measures and biodiversity offset

The IFC PS6 (2012) and the EBRD PR6 (2014) were applicable to this project with particular emphasis on collision risks of migratory birds. The northernmost boundary of the Gabal El Zeit Important Bird Area (IBA) is located 12 km south of the project site. This IBA comprises a stretch of the Gulf of Suez coastline regarded as a very important migration corridor for migratory soaring birds, particularly raptors and storks. The cumulative impacts of several large

wind farms on migratory birds were determined based on the strategic and cumulative environmental and social assessment (SESA). The SESA covered the spring 2016-17 and autumn 2017 bird migration periods. In spring, 2016 a total of 66,211 birds from 26 target species (including 2 EN, 2 VU, and 2 NT) were observed. In autumn 2016 a total of 2,437 birds from 23 target species (1 EN and 3 NT) were recorded. In addition, in spring 2017 a total of 147,611 birds from 27 targeted species (2 EN, 2 VU, and 2 NT) were observed. The analysis of cumulative effects identified 13 priority bird populations to be at the highest risk from the cumulative impacts of wind power projects (Table 3).

The SESA identified collision risk and barrier effects as major potential hazards to these birds. Proposed mitigation measures were: 1) shutdown during the critical migration period in spring and shutdown on demand (SOD); 2) sufficient space between wind farms; and 3) fatality monitoring. In addition to human observers, the company committed to implement its SOD program using a radar. The SOD approach has shown success at existing wind farms at the Gulf of Zayt. Furthermore, the project will take part in an area-wide Active Turbine Management Program (ATMP). The ATMP consists of a coordinated approach to SOD applied to the wind power projects located north of Ras Gharib. In addition, the European Bank for Reconstruction and Development (EBRD) planned to contribute to the development of the coordinated post-construction monitoring aspects of the ATMP through the development of a regional cumulative effects assessment (CEA). The company has committed to undertake all activities including the ATMP and EBRD's regional CEA with other companies. According to the Critical Habitat assessment, the project area does not qualify as Critical Habitat. The area broadly appears to be a Natural Habitat. Accordingly, the project would prepare offset measures in project-specific ESIA studies to achieve NNL for Natural Habitat (RCREEE 2018; Serckx et al. 2018; Lekela 2019).

Table 3. Priority migratory birds found at the project site.

Source: Data from RCREEE, 2018.

IUCN status	Raptors	Water birds
EN	Steppe Eagle, Egyptian Vulture	
VU	Greater Spotted Eagle	
NT	Pallid Harrier	
LC	Booted Eagle, Eurasian Buzzard, Black Kite, European Honey-buzzard, Levant Sparrowhawk	Common Crane, White Stork, Black Stork, Great White Pelican

Note: EN: endangered, VU: vulnerable, NT: near threatened, LC: least concern

Stakeholder engagement

The public consultation meeting was held at Hurghada on October 16, 2017 after the disclosure of the second draft report with the objective of conducting a review of the results of the draft SESA report. The announcement of the meeting was made in Arabic in a national newspaper on September 14, 2017. The project proponents conducted the subsequent public meeting on April 4, 2018 at the project site near Ras Gharib. Around 50 participants representing governmental organizations, NGOs, media, neighboring communities, the private sector, consultants, developers and international lenders attended the meeting in Hurghada. The consultants presented the project overview and highlighted the key findings and recommendations of the cumulative assessment study and also of the specific study on the assessment of the impacts on bird migration. Relevant comments and feedback were incorporated to the extent possible in developing the final version of the SESA report.

The project prepared the SEP, which provides details of the engagement to be undertaken during pre-construction, construction, and operation. The project updates would be produced at least on a semi-annual basis and made available in the project office, the project website, and Facebook of higher level members. The annual project report would be prepared and disseminated electronically and made available in public places. Appropriate stakeholder engagement took place during project preparation with the communities. The local people have been made aware of their rights to monitor project implementation progress. Further

consultation between stakeholders and relevant experts would take place on offset measures (Lekela 2018).

Case study 4: Big Almaty Ring Road Project in Kazakhstan

Project profile and site description

The project includes the construction and operation of a 66 km long, 4 to 6 lane tolled motorway; a road maintenance facility; auxiliary structures (147 culverts, 20 bridges, 7 interchanges, and 22 overpasses) and 1,300 m reinforced concrete retaining walls in the road cuts and noise barriers (IFC 2019b). The project will run around Almaty from the west to the east, along the city's northern border, in order to create a bypass route at the junction of two international highways. The motorway will traverse a densely populated area. Agricultural lands and pastures occupy about 90% of this area (BAKAD 2019a).

Proposed mitigation measures and biodiversity offset

The ADB Safeguard Policy (2009), the IFC PS6 (2012), and the EBRD PR6 (2012) were applicable to this project for protection of endemic fish species. According to the Red Book of Kazakhstan the rivers in the area are inhabited by five endemic fish species (Balkhash marinka, Balkhash perch, Seven River's minnow, Balkhash minnow, and Severtsov's loach). The permanent realignments of riverbeds would narrow their beds and disturb portions of their benthic habitats, which are forage areas for fish.

Field observations carried out in the project area during the migratory period (late September – beginning of October) of birds identified the presence of two species - steppe eagle (EN) and osprey (LC) listed in the Red Book of Kazakhstan and IUCN Red List. The priority ecosystem services of the area include agriculture (farming, grazing and forage), recreation and aesthetic values, and provisioning services such as freshwater. The mitigation measures for

addressing the impacts on fishes were prohibition of construction works during spawning and breeding; maintenance of the natural riverbed width and levels using culverts; and construction of new sinuous channels and dredging for habitat creation. The ESIA identified a moderate risk associated with the accidental loss of birds hit by vehicular traffic along the ring road and prescribed relevant mitigation measures. The loss of agricultural crops has been compensated. It is expected that the implementation of the mitigation measures identified in the ESIA will significantly reduce the residual impacts. Habitats in the project area were classified as either Natural (2,331 ha, 16%) or Modified (12,453 ha, 84%). The location of Natural Habitats is sporadic. To achieve NNL in the area of Natural Habitats, restoration of habitats during and/or after operation would be carried out (BAKAD 2019a).

Stakeholder engagement

The public hearings to review the draft ESIA were held in two districts on March 12 and July 20, 2018 and targeted 13 and 40 residents, respectively. A field social survey was undertaken between June 22 and July 19, 2018. Public consultations were again held between 2 and 10 August 2018 at 12 locations. These were attended by 306 participants in total (172 male and 134 female). The main points of discussion and concerns included limited information about the project, further public engagement, suitable compensation, noise and dust impacts on the residential area, access to houses and local roads, fences around the construction camp, safety during construction, provision of irrigation and drainage canals, and community support. The vast majority of the population evaluated the project positively. The project prepared the SEP in 2019. According to the SEP, the full ESIA report, the land acquisition and resettlement report, and the grievance forms are available to the public through the project website and at the district offices and construction camps (BAKAD 2019b). Appropriate stakeholder engagement took place with communities during project preparation. The consultation outcomes were incorporated into the design of mitigation measures. The communities have been made aware of

their rights to monitor project implementation progress and to make use of established grievance redress mechanisms.

2.2 Evaluation of case studies

The completeness and appropriateness of information was evaluated against criteria and accordingly the case was assigned one of the four levels of successful, partially success, no success, and, no information (Table 4). The above four projects explained the conservation goals clearly. IFC PS6 and other safeguard policies of financial institutions were applied to them. Mitigation measures were proposed but it was not clear how far the developers could avoid, minimize, and remedy impacts on biodiversity in accordance with the mitigation hierarchy. In particular, the explanation of avoidance and minimization was not enough. The baseline surveys and habitat assessments identified threatened and/or target species and the Critical and Natural Habitats in four cases. The ecosystem surveys identified the priority ecosystem services in three cases (except in the case study from Egypt) and mitigation measures were proposed.

Table 4. Evaluation of four case studies.

Source: Prepared by author.

Evaluation criteria	Cement Plant (Myanmar)	Gas Thermal Power Plant (Indonesia)	Wind Power Plant (Egypt)	Highway Project (Kazakhstan)
Conservation goal	○ Conservation of protected species of mammals	○ Protection of Sunda Pangolin and Agile Gibbon	○ Conservation of migratory birds	○ Protection of endemic fish species
Applicable standards	○ IFC PS6 (2012)	○ ADB SP (2009), IFC PS6 (2012)	○ IFC PS6 (2012), EBRD PR6 (2014)	○ ADB SP (2009), IFC PS6 (2012), EBRD PR6 (2014)
Application of mitigation hierarchy (avoidance, minimization, restoration)	△ Hunting ban for staff, alternative road alignments, patroling to reduce hunting or logging, mine rehabilitation plan	△ Minimum clearance of vegetation, burial of pipelines, rehabilitation with indigenous species, staff training	△ Fixed shutdown, shutdown on demand, fatality monitoring, sufficient space between wind farms	△ Prohibition of construction work during sprawning and breeding, maintenance of natural riverbed width and level
Baseline survey and Habitat assessment results	○ 38 IUCN red-listed species, and existence of Critical and Natural Habitats	○ 2 threatened species, and existence of Critical and Natural Habitats	○ 27 target species and 13 priority birds, no existence of Critical Habitat, and existence of Natural Habitat	○ 2 thretened bird and 5 endemic fish species, no existence of Critical Habitat, existence of Natural Habitat
Ecosystem survey results	○ Priority ecosystem services (timber, wood products, frest water, and erosion regulation)	○ Priority ecosystem services (fishing or navigation)	— No description because of no inhabitant area	○ Priority ecosystem services (farming, grazing, forage, recreation, bee farming, freshwater)
Calculation of residual losses and gains	△ Losses and gains of Critical Habitats were 1,136 ha and 6,840 ha, and those of Natural Habitats were 33 ha and 127 ha.	△ Losses of Critical and Natural Habitats were 33.1 ha and 0.3 ha. No calculation of gains	— Loss and gain of Natural Habitat will be calculated in project-specific ESIA studies.	— NNL in Natural Habitat will be achieved but no calculation of losses and gains
Offset site	△ Pre-selected two sites	△ Power plant site for NNL action	—	—
Offset activity	○Averted loss	△Replanting and restoration	—	△ Restoration
Offset period	○ 25 years	—	—	—
Offset cost	○US$ 1,664,187	—	—	—
Stakeholder engagement	○Positive influence, SEP was prepared.	○Positive influence, SEP was prepared.	○ Positive influence, SEP was prepared.	○ Positive influence, SEP was prepared.

Note: ○ Successful, △ Partially successful, × No success, － No information

The project in Myanmar calculated the residual losses and gains of Critical and Natural Habitats using the averted loss metric and the offset cost. The offset site would be finalized through offset suitability assessment. The project in Indonesia calculated the losses of Critical and Natural

Habitats but did not calculate the gains, and showed the offset site for NNL action only. The projects in Egypt and Kazakhstan set out the NNL policy for Natural Habitats but did not indicate the losses and gains or the offset sites. The four projects prepared the SEP. The stakeholder engagement resulted in a positive influence on mitigation efforts in four projects and offset planning in two projects in Myanmar and Indonesia. The overall description of baseline survey results and stakeholder engagement was adequate. On the other hand, challenges that were identified included a limited adherence to mitigation hierarchy, as in the USA (Clare et al. 2011) and Latin America (Villarrova et al. 2014), and insufficient planning of offsets (calculation of losses and gains, finding of sites, planning of activities, period, and cost), as in the USA (Gonçalves et al. 2015).

3. Discussion

3.1 Offsets planning integrated in EIA process

Considering offsets early to ensure their integration in the mitigation hierarchy, the timing of involvement of biodiversity specialists is critical for application of the mitigation hierarchy and offset feasibility (de Witt et al. 2019). The EIA process and offset planning are shown in Figure 2. At the screening stage, project proponents and in-house environmental specialists should consider the need to assess the feasibility of offset based on the biodiversity profile of the area and the likely nature of losses of protected species and their Critical/Natural Habitats based on the IUCN Red List and national conservation list and any losses of ecosystem services. At the scoping stage, offset specialists can help guide the development of the scope and methodology for conducting biodiversity assessment that form the basis for exploring the feasibility of planning an offset scheme to deliver NNL/NG, and in exploring the potential sites for offset locations. In developing countries, the priority assigned to the protection of threatened species and habitats is much higher. The cases from South Africa, Madagascar, and Myanmar used

averted loss offsets because the success of restoration was uncertain as in the cases from Brazil and Mexico. On the other hand, no evidence was found for NNL achievement using averted loss offsets in primarily in wetlands in Australia, USA, UK, Canada and France (zu Ermgassen et al. 2019). The offset activities (averted loss and/or restoration) are determined taking into account the respective conditions of projects such as habitats in offset sites, technical capacity, costs and uncertainties. The form of offset scheme implemented can depend on several factors. The permittee-responsible offsets typically operate with far less public transparency than banking or financial compensation, and often enjoy lower standards set by regulators (Bennett et al. 2017). Sites for offset, offset activities and implementation mechanism should be finalized at an early stage to secure the most suitable sites and operate in a transparent manner.

At the stage of baseline studies, all four case studies amply demonstrate the importance of conducting intensive surveys for identification of fauna and flora values in project areas. The fauna and flora surveys conducted under the cement project in Myanmar identified 12 mammalian species and 22 plant species that are included in IUCN listed species of flora and fauna and helped in critical habitat screening assessment and ecosystem service assessment. The biodiversity surveys for the wind power project in Egypt similarly helped in identifying IUCN listed migratory bird species that commanded high conservation priority and in implementing appropriate actions for bird monitoring. At the prediction and evaluation stage, the residual losses and gains of Critical and Natural Habitats and priority species and ecosystem services need to be accounted for. In line with this approach, in the Australian study, the gap between the baseline assumption and the woody vegetation loss was identified (Maron et al. 2015), while the average background rates of loss and risk of loss over a 20 year time period was calculated (Maseyk et al. 2017).

At the mitigation stage, the rehabilitation of habitat for indigenous species must be secured. Education and awareness of staff, workers, and local people, regular patrolling of the offset area, and acceptance of the offset sites (on-site or off-site) and activities (in-kind or

out-of-kind, restoration or averted loss) by all stakeholders (local people, offset specialists, land owners and EIA and conservation authorities) are other vital factors for the positive outcome of offsets. The success in achieving NNL in high-income countries is generally attributed to implementing offsets in areas that are relatively larger than the impacted area (zu Ermgassen et al. 2019). In developing countries where the rate of biodiversity loss and metrics are usually unclear and uncertain, success in implementing offsets can be achieved by arriving at an agreement on the rate and metric after consultation with offset specialists and by targeting larger offset areas.

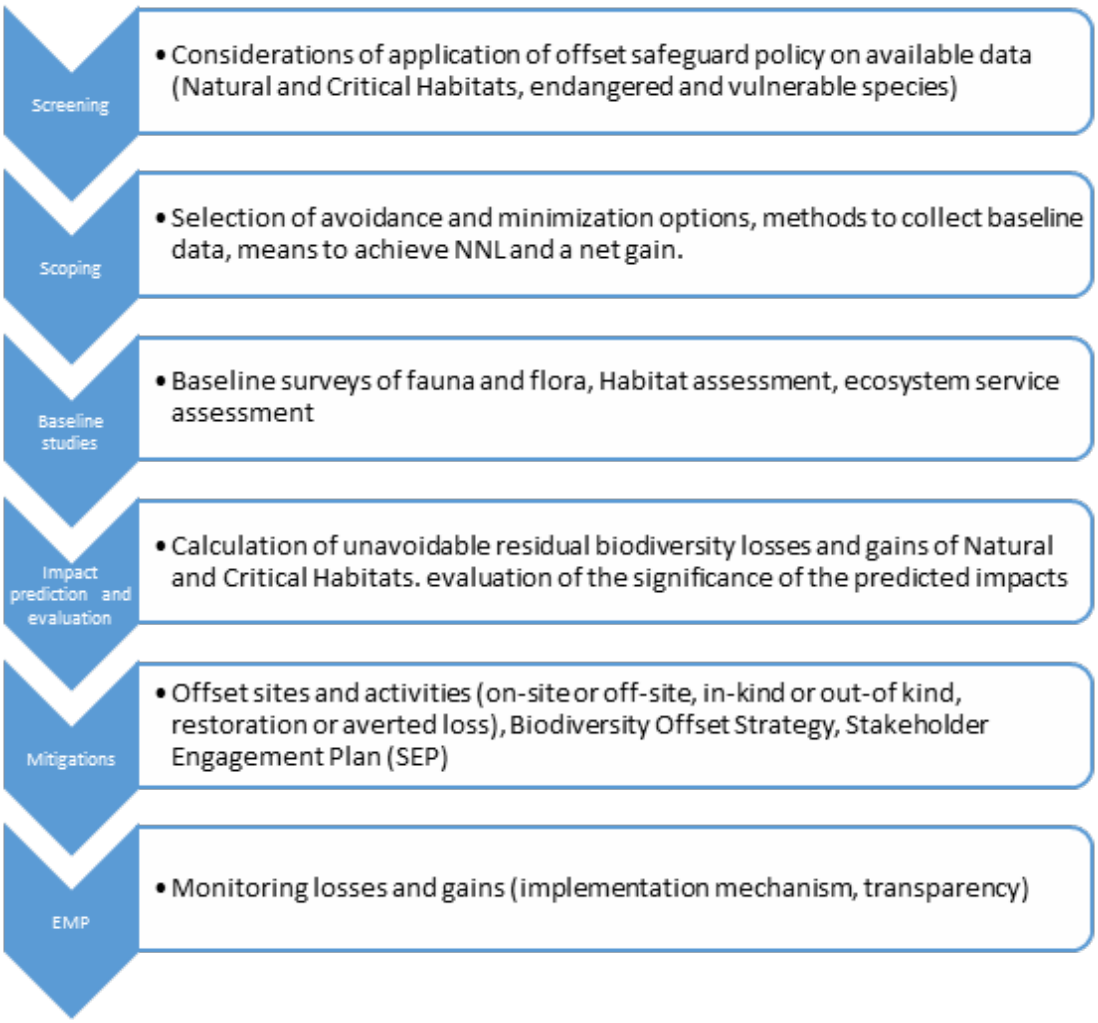

Figure 2. EIA process and offset planning.

Source: Prepared by author.

3.2 Avoidance and minimization of Critical and Natural Habitats

Implementation of NNL/NG is a big challenge in most developing countries. It is the best way to compare plural alternatives to avoid and minimize the loss of Critical and Natural Habitats and to select better options minimizing a portion of residual impact as small as possible for achieving NNL goals (Hayes et al. 2015). Moreover, avoidance and minimization contribute to significant impact reduction (Sahley et al. 2017). Yet, in practice the avoidance and minimization of biodiversity impacts are often overlooked, misunderstood and poorly applied (Clare et al. 2011; Villarroya et al. 2014; Kamijo 2018). The ineffective avoidance and minimization leads to less effective protection of biodiversity, reputational damage from stakeholders, and increased costs associated with project delays (Hays et al. 2015).

For companies that are well established and are renowned, reputational risk is an incentive to promote the political will to ensure that impacts are avoided (Dawkins and Fraas 2010). Conservation groups also play an important role in cultivating political will, improving the processes of impact assessment and avoidance and minimization of impacts (Phalan et al. 2018). This is because a lack of political will to conserve wildlife invariably constrains the option of exercising effective alternatives and selection of better options of impact avoidance and minimization. Involvement of conservation organizations and the public can perhaps effectively influence the political will for the serious consideration of avoidance and minimization options in protecting biodiversity.

3.3 Compensation for impact on ecosystem services

Biodiversity conservation has cost implications for local people. The case studies except the wind power plant project in Egypt (because of an uninhabited area) assessed the impact on ecosystem services and proposed monetary compensation for cultivated crops, the use of bricks and cement for timber and wood products, bottled water for drinking, and careful management

and regulation of soil erosion. In addition to the compensation measures, the cement company in Myanmar delivered social welfare benefits through the setting up of a health clinic, school, infrastructure for water purification and extraction, and the provision of electricity. One of the important lessons that emerge from these case studies is that under future offset projects, local people dependent on ecosystem services are not made to bear the costs of conservation of biodiversity and ecosystem services generated in a project area.

3.4 Finding offset sites for biodiversity conservation at an early stage

Finding suitable sites and appropriate area for offset projects is one of the major challenges (Gonçalves et al. 2015). Most offset sites remain currently unprotected and such sites must be protected in the future by a change in tenure (Maseyk et al. 2017). The three offset sites in Madagascar are in the same region of the project (on-site). The two sites in Brazil are in the same watershed of the projects (on-site) and another site is in the different watershed (off-site). The on-site offsets will compensate residual impacts close to the impact site and the benefits will accrue in the same area of the project. On the other hand, off-site offsets will provide great conservation benefits in the offset receiving area like the priority areas for biodiversity conservation in South Africa by integrating several offset projects. However, without a pre-determined offset receiving area, NNL/NG may be achieved from on-site offsets combined with off-site offsets depending on the availability of adequate sites.

3.5 Stakeholder engagement

For offset projects to be accepted by local people who would be involved in their management in the long term, their engagement through a well laid consultation process is a critical requirement. In all four case studies, consultations with local communities at different stages right from the earliest stage of sharing the draft ESIA to the subsequent stages of sharing the activities

visualized under offset schemes had a positive influence. Assurance of schemes to ensure welfare, livelihood and ecosystem service dependent benefits helped in building trust and seeking support in favor of the projects. In all four cases, the stakeholder engagement plan was prepared. Sharing of all relevant information related to the construction and operation stages of the project and responding to the concerns expressed by local people was well received by stakeholders.

3.6 Capacity building

A lack of capacity about offsets is a challenge for Japan's aid agencies and their counterparts in the developing countries, among EIA practitioners, and academia. All need to learn from the experience of IFC and other offset projects in developing countries. Expertise and understanding of offsets, specifically the legal, financial and management requirements for delivering biodiversity outcomes, is essential in the formulation of practical, measurable, auditable and enforceable offset conditions (Brownlie et al. 2017). The capacity for managing offset projects often requires that EIA, which examines the first three steps of the mitigation hierarchy, works well (Koh et al. 2019). The capacity and competency of aid agencies must be enhanced for preparing, reviewing, monitoring and evaluating offset projects. The establishment of an offset panel involving aid agencies, practitioners, consultants and researchers should prove a useful forum to exchange ideas and share lessons learned. Capacity building could be further strengthened by inputs from this offset panel as the experience of implementing offset grows. The execution of offset projects in developing countries can also improve the capacity of agencies in Japan.

4. Conclusions and a way forward

This paper provides a convincing ground to promote the planning of biodiversity offsets in the context of Japan's cooperation projects. It becomes amply clear from the literature on offsets across the globe that offsets offer tremendous merit in mainstreaming biodiversity in development decisions and achieving conservation gains through mitigation hierarchy approaches. It also becomes obvious that offsets in developing countries face several challenges, such as lack of a national policy on offsets, adherence to mitigation hierarchy, the calculation of residual losses and gains, the availability of offset sites, implementing mechanism, monitoring, and capacity building. These challenges must be overcome to implement offsets in Japan's ODA. In particular, the following three points are very important for ensuring the success of offset in Japan's cooperation projects.

First of all, Japan has to introduce an offset policy for development cooperation to drive and shape offset implementation. The policy needs to work together with financial institutions, which have practiced offsets for improving the conservation of biodiversity. Secondly, the political will of decision-makers is crucial for policy operation. In the absence of political will, policies are less likely to be enforced and conservation interests are typically less powerful than development interests (Phalan et al. 2018). Thirdly, long-term support to developing countries is needed for implementing and monitoring offset projects. Japan needs to support the capacity of counterpart agencies to deal with offset projects during the long offset period. This may range from 25 years in the Myanmar case to 50 years in the Madagascar case. Japan's commitment to the serious implementation of offset projects in cooperation projects would be influential in the promotion of conservation of biodiversity and ecosystem services in developing countries.

Collaboration with other aid agencies where offset practices have become an accepted norm for improving the conservation of biodiversity and improving the sustainability of development projects can provide enabling support. It is extremely important to understand that

at its core a biodiversity offset is a conservation project that involves undertaking an integrated set of conservation activities. Offsets planning should be included as an inherent component of the corresponding original project. Some of the prerequisite preparatory tasks would also require needs assessment for enhancing capacity to implement offsets. This would be helpful in making appropriate changes in impact assessment procedures in Japan's ODA for better accounting of impacted biodiversity values for implementing offsets and monitoring outcomes.

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Glossary

Averted loss	Averted loss offsets secure the protection of a proposed offset site that is currently unprotected. They would remain unprotected if it were not for the offset. Protection is generally achieved by a change in tenure (Maseyk et al. 2017).
BBOP (Business and Biodiversity Offsets Program)	An international collaboration of more than 100 leading organizations and individuals, which tested and developed best practice on the application of the mitigation hierarchy, including biodiversity offsets and conservation banking worldwide (BBOP Glossary 2018b).
BBOP Principles	The ten BBOP Principles agreed on 3 December 2008 are: (i) adherence to the mitigation hierarchy; (ii) limits what can be offset; (iii) landscape context; (iv) no net loss; (v) additional conservation outcomes; (vi) stakeholder participation; (vii) equity; (viii) long-term outcomes; (ix) transparency; and (x) science and traditional knowledge (BBOP 2012a).
Biodiversity offset	A mechanism to compensate unavoidable impacts of a project or plan on biodiversity through conservation or restoration actions (BBOP 2013; Bull et al. 2013). Measurable conservation outcomes resulting from actions designed to compensate for significant residual adverse biodiversity impacts arising from project development after appropriate prevention and mitigation measures have been taken. The goal of biodiversity offsets is to achieve no net loss, and preferably a net gain of biodiversity on the ground with respect to species composition, habitat structure, ecosystem function and people's use and cultural values associated with biodiversity (BBOP 2012a).
Critical, Natural, and Modified Habitats	Critical Habitats as 'a subset of Natural or Modified Habitat identified by the presence of high biodiversity values (including (i) Critically Endangered and/or Endangered species; (ii) endemic and/or restricted-range species; (iii) globally significant concentrations of migratory species and/or congregatory species; (iv) highly threatened and/or unique ecosystems; and/or (v) areas associated with key evolutionary processes) as defined by IFC PS6'. Natural Habitats as 'areas composed of viable assemblages of plant and/or animal species of largely native origin, and/or where human activity has not essentially modified an area's primary ecological functions and species composition'. Modified Habitats as 'areas that may contain a large proportion of plant and/or animal species of non-native origin, and/or where human activity has substantially modified an area's primary ecological functions and species composition'(IFC GN6 2018).
Equator Principles	Adopted in June 2003 by ten international commercial banks, the Equator Principles are a voluntary set of guidelines for managing environmental and social issues in project finance. The Principles are based on the International Finance Corporation's (IFC) environmental and social standards and were developed with its advice and guidance. As of October 2008, 63 financial institutions had adopted the Principles, and it is estimated that they now cover approximately 80 percent of global project lending. On July 6, 2006, a revised version was adopted, reflecting recent revisions to International Finance Corporation's own Performance Standards on Social and Environmental Sustainability. The new Equator Principles apply to all countries and sectors, and to all project financings with capital costs above US$ 10 million (IFC Glossary 2018b). See http://equator-principles.com/.
IFC (International Finance Corporation)	A member of the World Bank Group, the IFC is the largest global development institution focused exclusively on the private sector in developing countries (IFC 2019). See https://www.ifc.org/wps/wcm/connect/corp_ext_content/ifc_external_corporate_site/home.
IFC's Performance Standard	IFC's strategic commitment to sustainable development and is an integral part of its approach to risk management. Originally adopted in 2006, the updated Framework became effective on January 1, 2012. The Performance Standards are directed towards IFC clients, providing guidance on how to identify risks and impacts, and are designed to help avoid, mitigate, and manage risks and impacts as a way of doing business in a sustainable way, including stakeholder engagement and disclosure obligations of the client in relation to project-level activities. Performance Standard 6 (PS6) is especially relevant to biodiversity offsets, since it requires clients to demonstrate no net loss of biodiversity for impacts on natural habitat, where feasible, and a net gain for impacts on critical habitat (BBOP Glossary 2018b).

In-kind and out-of-kind offsets	In-kind offset means that biodiversity losses are compensated with gains for exactly the same biodiversity (species, habitats, biotopes etc.). Out-of-kind offset means that gains can be accepted for biodiversity features different from those suffering damage (Bull et al. 2015).
Mitigation Hierarchy	The sequence of actions to anticipate and avoid, and where Avoidance is not possible, Minimize, and, when impacts occur, Restore, and where significant residual impacts remain, Offset for biodiversity-related risks and impacts to affected communities and the environment. a. Avoidance: measures taken to avoid creating impacts from the outset, (including direct, indirect and cumulative impacts), such as careful spatial or temporal placement of elements of infrastructure, in order to completely avoid impacts on certain components of biodiversity. b. Minimisation: measures taken to reduce the duration, intensity and / or extent of impacts (including direct, indirect and cumulative impacts, as appropriate) that cannot be completely avoided, as far as is practically feasible. c. Rehabilitation / restoration: measures taken to rehabilitate degraded ecosystems or restore cleared ecosystems following exposure to impacts that cannot be completely avoided and / or minimised. d. Offset: measures taken to compensate for any residual significant, adverse impacts that cannot be avoided, minimised and / or rehabilitated or restored, in order to achieve no net loss or a net gain of biodiversity. Offsets can take the form of positive management interventions such as restoration of degraded habitat, arrested degradation or averted risk, protecting areas where there is imminent or projected loss of biodiversity (BBOP Glossary 2018b).
Mitigation bank, compensation fund, and permittee responsible mitigation	Mitigation bank: A site, or suite of sites, where resources (e.g., wetlands, streams, habitat, species) are restored, established, enhanced, and/or preserved for the purpose of providing compensatory mitigation for future impacts. In general, a mitigation bank sells compensatory mitigation credits to developers whose obligation to provide compensatory mitigation is then transferred to the mitigation bank sponsor. Compensation fund: A third-party mechanism that collects and administers fees from developers to make a contribution towards offsetting their impacts to biodiversity. The money may go directly towards compensating biodiversity loss or to more indirect biodiversity-related projects (i.e., funding protected area management or research). Permittee responsible mitigation: “Do-it-yourself” offsetting conducted by the developer or a subcontractor (as opposed to a third party). Permittee-responsible offsets are typically conducted concurrently with the development project or projects resulting in negative residual impacts (Bennett et al. 2017).
No net loss and net gain	A goal for a development project, policy, plan or activity in which the impacts on biodiversity it causes are balanced or outweighed by measures taken to avoid and minimise the impacts, to restore affected areas and finally to offset the residual impacts, so that no loss remains, and preferably the gain exceeds the loss. (BBOP Glossary 2018b).
On-site and off-site offsets	On-site offset: where a developer secures and improves biodiversity values within the same development zone. Off-site offset: where the developer secures and improves biodiversity values in another piece of land, for example, creation of an alternate habitat for endangered species (Rajvanshi and Mathur 2010).
Sustainable Development Goals (SDGs)	Adopted by all United Nations Member States in 2015, provides a shared blueprint for peace and prosperity for people and the planet, now and into the future. At its heart are the 17 SustainableDevelopment Goals (SDGs), which are an urgent call for action by all countries - developed and developing - in a global partnership. They recognize that ending poverty and other deprivations must go hand-in-hand with strategies that improve health and education, reduce inequality, and spur economic growth - all while tackling climate change and working to preserve our oceans and forests (UN 2019). See https://sustainabledevelopment.un.org/?menu=1300.

Abstract (in Japanese)

要約

開発行為に伴う生物多様性の喪失は継続している。なぜなら、大半の開発行為で必ず生物多様性の喪失が生じるためである。現行の環境アセスメントにおける緩和策では、ノーネットロス（マイナスの影響をプラスの影響により相殺してプラスマイナスをゼロにすること）の目標を達成することは、ほとんどできない。ミティゲーション・ヒエラルキー（開発によって生じる影響を回避・最小化・復元した後に残る影響に対してオフセットを適用する）に沿ってノーネットロスを実現するために、国際開発援助分野において生物多様性オフセットが適用されている。しかし、途上国における援助事業を担当する実務者を対象とした、オフセット事業計画用の参考資料はほとんど存在しない。本ワーキングペーパーの目的は、日本の開発援助事業にオフセット事業を組み込むための実際的な方法を示すことである。本ペーパーでは、学術論文のレビューと開発途上国における最近の 4 つのオフセット事業のケーススタディを踏まえている。本ペーパーは、環境アセスメントの枠組みにオフセット計画を組み込む必要性を提唱し、ケーススタディ分析を踏まえてノーネットロスを達成する生物多様性オフセットの展望を分析している。オフセットポリシーの導入、ポリシーを運用する政治的意思、及び途上国への長期的な支援が、オフセットの成功にとって重要であると結論している。オフセットへの日本の取組は、途上国における生物多様性と生態系サービスの保全の推進に大きな影響を与えることになろう。

キーワード：生物多様性オフセット、援助事業、ノーネットロス、環境影響評価、生態系サービス

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