Trends on Biodiversity Offsets and Obstacles for mandating offsets in Japan

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1. Background and Purpose

Biodiversity offsetting refers to compensating for the adverse impacts of development projects by creating, maintaining, and protecting the natural environment outside the project site. According to the mitigation hierarchy, it is only appropriate after avoidance and minimization of biodiversity impacts have been considered. Currently, 108 countries have institutionalized or are considering biodiversity offsetting (IUCN, 2019).

In 2017, the Ministry of the Environment of Japan (MOEJ) published "Reference Case Studies on Biodiversity Conservation in Environmental Impact Assessment" and collected similar examples of biodiversity offsetting in Japan. Furthermore, in 2018, the MOEJ published the "Report of the Technical Review Committee on Basic Matters Based on the Environmental Impact Assessment Law," which pointed out the need to organize basic matters and collect case studies on biodiversity offsetting. In light of the above, Japan is currently reviewing the institutionalization of biodiversity offsetting.

Tanaka (1999) and Isoyama et al. (2010) have analyzed trends and obstacles in cases related to biodiversity offsetting in Japan, but no analysis has been conducted on trends since 2015.

Therefore, this study aims to analyze the trends of biodiversity offsetting in Japan and the obstacles to its institutionalization, based on the similar systems and cases after 2015, and to determine the points to be considered for the institutionalization of biodiversity offset banking in countries and regions consisted mainly of *Satoyama*-like landscapes.

2. Methodology

2.1 Case collection

We collected similar cases of biodiversity offsetting in Japan through an Internet-based survey, with interviews conducted as necessary. The cases were divided into three categories: 1) institutions related to biodiversity offsetting (ordinances, guidelines, and plans of the Japanese government and local governments) (hereinafter "institutions"), 2) development projects in which biodiversity offsetting-like activities (nature restoration) have been or will be carried out (hereinafter "projects"), and 3) activities related to biodiversity offset banking (hereinafter "activities").

Table 1: Offset perspectives, conditions, and their criteria

Perspectives	Conditions and Criteria
1. Offset quality	Whether the affected and compensated environments are the same (in-kind) or different (out-of-kind)
2. Spatial arrangement of the conservation area	Whether the compensated location is near the development site (onsite) or remote (offsite)
3. Relationship with conservation areas	Whether the compensated site is subject to development restrictions (designated as a protected area, etc.)
4. Area	Whether or not the conservation is equal to or greater than the developed area
5. Quality Perspective	Whether the compensated quality/quantity exceeds the developed quality/quantity (no net loss) or is less than it (net loss)
6. Timing	Whether offsetting was done before or after construction began
7. Quantitative Biodiversity Assessment	Whether adverse effects on biodiversity and conservation effects have been quantitatively assessed by HEP, etc.
8. Implementing entity	Who the offset was made by
9. Investor	Who contributed to the cost of the offset
10. Mitigation Hierarchy and Multiple Proposal Evaluation	Whether offsets have been implemented after consideration through multiple proposal evaluation of avoidance and minimization
11. Relationship with environmental assessment	Whether offsetting was carried out within environmental assessment procedures.
12. Target action	Whether offsetting was done by spatially securing the natural environment (direct) or providing funds to research institutions (indirect).
13. Corrective management of the site	Whether there will be long-term management of the compensated environment
14. Legal obligation	Whether the action is based on a legal obligation or a voluntary one.

2.2 Trend analysis

We classified the situations of collected cases based on the perspectives presented in Tanaka (2014) shown in Table 1 and analyzed the trends.

2.3 Identification of obstacles

Based on the results obtained in Section 2.2, we identified the obstacles to the institutionalization of biodiversity offsetting in Japan for each case group.

3. Results

3.1 Case collection

We collected 19 case studies from the national government and eight prefectures. These include 11 institutions, five projects, and three activities (Table 2).

3.2 Trend analysis

Table 3 shows the number of cases that correspond to each perspective in each case group.

Table 2: Location, name, and type of cases collected.

No.	Location	Name	Year of implement ation	Type of cases
1	Japanese government	Basic Concept of Climate Change Adaptation on Biodiversity in Japan	2016	institutions
2	Japanese government	Reference Case Studies on Biodiversity Conservation in Environmental Impact Assessment	2017	institutions
3	Japanese government	Establishment of the new Type II Species of Domestic Rare Wild Fauna and Flora in the Law for the Conservation of Species	2017	institutions
4	Japanese government	Revision of the Basic Policy on Nature Restoration of the Law for the Promotion of Nature Restoration	2019	institutions
5	Iwate prefectur	Karumai-cho Plan for Revitalization of Rural and Mountain Villages through Promotion of Renewable Energy Generation	2015	institutions
6	Yamanashi prefecture	Yamanashi Prefecture Environmental Impact Assessment Ordinance	1999	institutions
7	Saitama prefecture	Shiki City Natural Regeneration Ordinance	2001	institutions
8	Kanagawa prefecture	Zushi City Ordinance for Creating a Good Urban Environment	1992	institutions
9	Shizuoka prefecture	Shimizu City Okitsu River Seiryu Ordinance	1993～2003	institutions
10	Aichi prefectur	Aichi mitigation	2013	institutions
11	Osaka prefectu	Minoh City Development Project Greening Burden Tax	2015	institutions
12	Gunma prefecture	Sanden Forest Akagi Plant Development Project	2002	projects
13	Yamanashi prefecture	Showa-cho Jyoei District Land District Planning Project	2006	projects
14	Chiba prefectur	Further functional enhancement of Narita Airport	2018～	projects
15	Kanagawa prefecture	(Provisional name) Kamigo Development Project	2006～	projects
16	Kanagawa prefecture	Miura City Mito District Soil Generated Disposal Site Construction Project	2008	projects
17	Chiba prefectur	Satoyama Banking Pilot Project	around 2010～	activities
18	Kanagawa prefecture	A Study of Urban Mitigation Banking in Hyakudan Park	2018～	activities
19	Kanagawa prefecture	An Experiment on the Formation of Ecological Network by Creating a Distributed Biotope in Tsuzuki-ku, Yokohama	2018～	activities

Table 3: Analysis results by case group

Perspective	Situation	Institutions	Projects	Activities
1. Quality	in-kind	2	4	0
	out-of-kind	0	1	0
	both	4	0	0
	uncertain	5	0	3
2. Spatial arrangement	onsite	1	4	0
	offsite	4	1	3
	both	2	0	0
	uncertain	4	0	0
3. Relationship with conservation areas	preservation of the area	1	2	1
	outside the preservation area	0	2	2
	both	2	1	0
	uncertain	8	0	0
4. Area	above the same level	1	2	0
	below the same level	0	3	0
	both	4	0	0
	uncertain	0	0	3
5. Quality * Area perspective	no net loss or more	3	0	0
	net loss	0	1	0
	both	1	0	0
	uncertain	7	4	3
6. Timing	before work	0	1	0
	after work	6	4	0
	both	1	0	0
	uncertain	4	0	3
7. Use of quantitative biodiversity assessment	use	1	3	1
	not use	4	2	2
	both	1	0	0
	uncertain	5	0	0
8. Implementing entity	developer	5	5	0
	third party	3	0	3
	both	1	0	0
	uncertain	2	0	0
9. Investor	developer	8	5	0
	third party	0	0	3
	both	0	0	0
	uncertain	3	0	0
10. Planning decisions along the mitigation hierarchy	along the mitigation hierarchy	3	3	0
	none	7	2	0
	both	1	0	0
	uncertain	0	0	3
11. Relationship with environmental assessment	procedural	2	4	0
	out of procedure	0	1	0
	both	5	0	0
	uncertain	4	0	3
12. Target action	direct	6	5	3
	indirect	0	0	0
	both	2	0	0
	uncertain	3	0	0
13. Corrective management	long-term management	4	5	3
	no-long-term management	0	0	0
	uncertain	7	0	0
14. Legal obligation	duty	4	0	0
	voluntary	7	5	3
	both	0	0	0
	uncertain	0	0	0

4. Discussion

Based on the results of 3.3, the following trends and obstacles can be considered for each case group.

4.1 Institutions

A growing number of voluntary and regional or local programs are expected to contribute to the promotion of biodiversity offsetting. Furthermore, a system like the in-lieu fee program, in which a monetary payment is used to fulfill the offset obligation, has appeared in Japan since 2015. It suggests that the system is changing from a one-to-one correspondence between development and conservation to the utilization of mitigation banking and in-lieu fee programs.

However, the lack of legal obligation to comply with mitigation leaves a possibility that the loss of crucial habitats and the adverse biodiversity impacts from development projects might continue. While the MOEJ (2018) revealed its intention to institutionalize offsetting by publishing the case studies, the current absence of a national provision on offsetting also raises unique concerns from the local governments. According to the interview with a former local government official, they fear that implementing a local offsetting scheme before that of the national scheme would lead to the drainage of development projects to the nearby prefectures that have more lenient environmental regulations, resulting in a decrease in local tax revenue. Such a phenomenon prevents the accumulation of effective cases at a local level, which can then provide a reason for the national government to take a passive stance on the issue of biodiversity offsetting.

4.2 Projects

In Japan, the voluntary restoration of nature by developers has mainly been done through onsite mitigation in and around the developed area. However, the study found that there are also cases of offsite mitigation conducted outside of the developed

area. In addition, there were some cases of out-of-kind mitigation, in which an environment different from the developed environment was restored based on the city's basic green plan, indicating that mitigation is being carried out according to local needs.

On the other hand, this case could only be realized as it was related to a local government, and it would be difficult for a private project to do the same. Also, there is no guarantee that the land will not be developed in the future because developers do not own it. Thus, the quality and quantity of green space may decrease over time.

4.3. Activities

It was found that offsetting projects in Japan are increasingly incorporating new concepts such as adopting quantitative biodiversity evaluation and the reconstruction of ecological networks in urban areas. While site management is being implemented, the quality and quantity of green space may decline in the future due to the lack of long-term planning.

Although it is not a perspective in this analysis, it is important to note that the economic effects of biodiversity offset banking have not been assessed. Such a lack of understanding may act as a disincentive for its introduction in Japan.

5. Conclusion

There are four major obstacles that have become apparent in this study.

First, there is no system of Strategic Environmental Assessment (SEA) to comply with the mitigation hierarchy. Second, there is a lack of knowledge on the application of quantitative biodiversity evaluation methods to conservation activities. Third, mitigation outside the development area (offsite mitigation) has not been adopted as the primary means of compensatory mitigation. Additionally, the economic benefits of biodiversity offset banking have not been clarified.

The adoption of SEA process, quantitative biodiversity assessment methods, and strategic offsite compensatory mitigation, i.e., a trial of a biodiversity banking system in which the government decides in advance on areas where monetary and human resources should be concentrated and invests money and human resources are deemed necessary to tackle these obstacles. Furthermore, it is essential to estimate the economic impacts of biodiversity offset banking in the Japanese context.

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