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應用 OECM 標準作為信託土地經營管理策略架構－以
阿里磅生態農場為例
Applying the OECM Criteria as Strategic Framework for
Trust Land Management: A case study of Alibang
Ecological Farm

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Abstract

With the increasing threats to global biodiversity, individuals, communities and organisations are taking conservation measures into their own hands through the creation of private and non-governmental conserved areas, such as nature trusts. However, the varying governance and management of these sites has resulted in varying efficiency of management and conservation. The ‘other effective (area-based) conservation methods’ (OECM) category identifies effective conservation in areas outside of protected areas, like nature trusts, by using eight recognition criteria. This study uses the case of Alibang Ecological Farm in Taiwan, a potential nature trust, to explore how the OECM criteria can be used as a framework to inform trust land management. This study aims to contribute to OECM and nature trust literature in Taiwan, and to the case study’s management. Participant observation, interviews and supplementary documents were used to form a management plan, which was assessed against the OECM criteria. The criteria were also compared to four common issues in nature trust discourse. Criteria 3, 4, 7 and 8, identified areas of improvement for the case study’s management. And the assessment addressed the four issues in nature trust discourse. Financial sustainability was one issue identified for both the case site and nature trust discourse that was not covered in the OECM criteria. Overall, the OECM criteria was identified as a potential tool for nature trusts, particularly those that are new or lack site information, to use as a guide to create effective management plans, or inform existing ones.

Key words:

OECM, nature trust, conservation management framework, conserved areas.



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Background:

I was first introduced to the TEIA while doing an assignment for a course. The concept of OECMs was introduced to me by my supervisor.

As the researcher, I am a mid-20s, female, Master's student from Aotearoa, New Zealand. My personal research interests include holistic conservation and decolonial environmentalism. Acknowledging researcher reflexivity (Olmos-Vega et al., 2023), this stance on conservation may be apparent in the importance I have placed on the discourse on nature trusts and the 'ethical considerations' section of the OECM criteria.

My supervisor is a member of the case study's committee of advising experts and academics, and is an executive director at the Taiwan Environmental Information Association. Prior to the start of my thesis, he had already introduced the concept of OECMs to the case study management team. My supervisor therefore provided contacts with the case study and participants; and played a key role in facilitating the management workshops.



Chapter 1: Introduction

Area-based conservation has long been recognised as one of the most effective means of conservation (Watson et al., 2014). Since first mentioned in the Convention of Biodiversity (CBD) 10th Conference of Parties (COP), the recognition of OECMs ('other effective area-based conservation measures') has become a way to acknowledge conservation work done outside of protected areas (Dudley et al., 2018). OECM status is determined by a set of 8 criteria that cover the governance and management of conserved sites (Jonas et al., 2023). If a site meets these criteria, it can be recognised and contribute to national conserved areas, and the international "30x30" target set by the CBD in 2022.

Nature trusts (conservation land trusts) are one form of conserved area that can be recognised as an OECM (IUCN-WCPA Task Force on OECMs, 2019). Due to the varied nature of the entities that manage trust lands (eg. individuals, non-governmental organisations, and other organisations), the methods and effectiveness of nature trust management varies (Graves et al., 2019). Nature trusts have faced additional issues with longevity and value conflicts (Gooden & 'T Sas-Rolfes, 2020). Compared to nationally protected areas, conserved areas managed by non-governmental organisations (NGOs) are not held to voter accountability (De Santo, 2012). Instead, donors may shape the priorities of NGOs, which rely heavily on donations for financing management activities (Cooke et al., 2023; Pasquini et al., 2011). Since meeting the OECM criteria is a reflection of effective management, the OECM criteria could therefore be used as a set of goals for nature trust managers to work towards. Finally, the OECM criteria can be used as a quick and brief management effectiveness evaluation for nature trusts. The results of the OECM evaluation can then be used as a tool for nature trusts to report to donors and secure financial stability.

This thesis looks at the case study of Alibang Farm, a potential nature trust in Taiwan, and applies the OECM criteria as a strategic management framework to identify areas of improvement for the site specifically, and to explore how the process of OECM recognition can be used increase management effectiveness for nature trusts.



1.1 Aims

Since official implementation of the OECM framework is still being planned, the literature on OECMs in Taiwan is limited. This is also the case for nature trusts. The first aim of this study is to contribute to the literature for both nature trusts and OECMs in Taiwan. Furthermore, the second aim is to provide a case study for both a nature trust and an OECM in Taiwan. The third aim is to explore the OECM criteria as a strategic framework for trust land management. Finally, it is hoped that through the process of the study, the case study Alibang Farm can work towards being identified as an OECM in the future, and recognised and supported for their conservation work.

1.2 Research Questions

1. What is the current status and operation mechanism of Alibang Farm?
2. Does Alibang Farm currently meet the OECM criteria?
3. How does the process of OECM recognition inform the management of trust land?



Chapter 2: Literature Review

2.1 Area-Based Conservation Management

In Western area-based conservation protected areas (PAs) have been a key conservation strategy since the creation of Yellowstone National Park (Cumming, 2016; Woodley et al., 2019). This model of Western area-based conservation was based on the idea that, if undisturbed, nature would heal itself (Pickett et al., 1992). The ‘national park’ model features three characteristics, a large area, no permanent residents and management by the central government (Phillips, 2003). These “fortress”-like protected areas became the foundation of area-based conservation, resulting in many indigenous people and local communities being removed from their homes (Domínguez & Luoma, 2020). This paradigm faced issues when it became apparent that disturbance (human or otherwise) was integral to natural systems, and that undisturbed ecosystems could not be conserved in an ‘ideal state’ (Pickett et al., 1992).

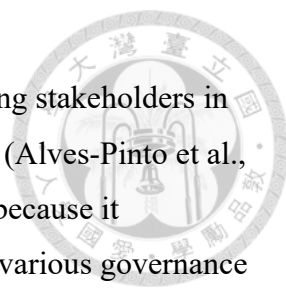
Conservation then began to adopt a more holistic approach, where ecosystem contexts and processes were emphasised, focusing on protecting ecosystem services (Christensen et al., 1996; Phillips, 2003). These ecosystem services no longer focused only on the biological aspects of ecosystems, but also on the processes and characteristics that humans rely on socially and culturally; some of which may be intangible and hard to quantify (Cheng et al., 2019; Kenter et al., 2011). In 1993, the Convention on Biological Diversity (CBD) was signed with three objectives: 1) The conservation of biological diversity; 2) The sustainable use of the components of biological diversity; and 3) The fair and equitable sharing of the benefits arising out of the utilization of genetic resources (Secretariat for CBD, 2011). It has become increasingly recognised that humans have inhabited and altered most parts of the world, and therefore cultural landscapes are an important part of biodiversity conservation (Ellis, 2021). This shift paved the direction of global conservation work for the following decades. The holistic approach has resulted an increase in focus on the root causes and drivers of biodiversity loss, in addition to addressing equity and justice that is inherently linked to biodiversity and climate issues (Gurney et al., 2023; Obura et al., 2023).



Finally, with the approach of major environmental shifts associated with climate change, another paradigm shift towards different approaches to conservation has begun. The “ecological renovation” approach (Prober et al., 2019), steps away from aiming for a direct return to the historic state of an ecosystem, and instead to “*conserve... historical values of ecosystems...while also accommodating the inevitability of ecological change associated with climate and other global changes*” (Prober et al., 2019, p. 2). This means looking for currently unconventional “interventions” to restore ecosystem function. For example, removing trees that require large amounts of water from areas projected to become drier; or assisted colonisation through helping species to “*establish in projected suitable habitat outside their current range*” (Prober et al., 2019, p. 14). The “transformative” approach is similar but looks at the goals of projects, rather than the actions they take (Peterson St-Laurent et al., 2021). New approaches are being explored with caution, as there is little empirical evidence to support many of the interventions (Peterson St-Laurent et al., 2021). Additionally, with more climate change based paradigm shifts, the trap of “anything goes” may be used as an excuse for extreme interventions or to avoidance of intervention all together (Higgs et al., 2014). Therefore, as new approaches step away from current restoration and resilience goals, it is important to keep in mind the importance of historical ecosystems, not only for reference, but also in enriching cultural connections and revealing insight into the future (Higgs et al., 2014).

2.2 Other Effective Area-Based Conservation Measures

OECMs (‘Other Effective Area-Based Conservation Measures’) was first mentioned in the Convention of Biodiversity (CBD) 10th Conference of Parties (COP), and has now become a way of acknowledging the conservation work of areas outside of protected areas (Dudley et al., 2018; Jonas et al., 2014). OECMs were born out of the shift towards holistic, ethical, and effective area-based conservation management. Additionally, PAs are being downgraded, downsized, and degazetted (PADDD) due to various pressures (Golden Kroner et al., 2019; Qin et al., 2019). This increases the need for OECMs contribute to the CBD target of 30% of terrestrial and marine ecosystems protected or conserved by 2030 (WWF & IUCN WCPA, 2023). Along with contributing to national targets, other benefits of OECM recognition according to the



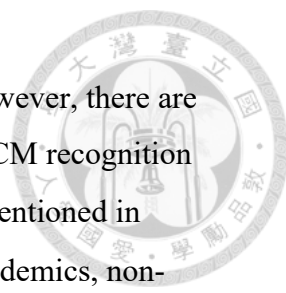
IUCN are: recognition of conservation work outside of PAs, increasing stakeholders in conservation efforts, and potential increased support for OECM sites (Alves-Pinto et al., 2021; Jonas et al., 2023). Additionally, OECM recognition is useful because it delineates a standard of effective conservation that can be applied to various governance types and management goals (Gurney et al., 2023). Finally, since its inception, different countries have begun to formalise their own policies and screening criteria for OECMs (Gray et al., 2018; Lu, 2023; Sharma et al., 2023).

Table 1 OECM Criteria, from Jonas et al. (2023). Shaded boxes are 'screening' criteria which are required to be met before the full assessment.

1	The site is <u>not</u> a protected area.	5	Institutions or mechanisms exist to govern and manage the site.
2	There is reasonable likelihood that the site supports important biodiversity values.	6	Governance or management of the site achieve or are expected to achieve the <i>in-situ</i> conservation of biodiversity values.
3	The site is a geographically defined area.	7	In-situ conservation of important biodiversity values is expected to be for the long term.
4	The site is <i>confirmed</i> to support important biodiversity values.	8	Governance and management arrangements address equity considerations.

2.2.2 OECMs in Asia and Taiwan

As with the rest of the globe, Asia has also begun exploring OECMs as an area-based conservation strategy (Sharma et al., 2023). Though most Asian countries do not have any current legislation on OECMs, many areas have been recognised as potential OECMs (Sharma et al., 2023). However, progress is slow and there are four key barriers linked to the slow implementation of OECM policy strategies across Asia. These are: “*‘Lack of political will to develop these’, ‘Lack of knowledge on how to develop these for OECMs’, ‘Lack of financial resources’, and ‘Lack of understanding on the importance/relevance of OECMs’*” (Sharma et al., 2023, p. 69).



Similarly, in Taiwan there is currently no legislation for OECMs, however, there are plans by the Forestry and Nature Conservation Agency to create OECM recognition policy by 2025 (Lu, 2023; 游昇俯, 2023). Additionally, since first mentioned in COP10, OECMs have been promoted and explored in Taiwan by academics, non-governmental groups and others (Chao & Lee, 2020; Friends of Daan Park Foundation, No Date; Lu, 2021; Ocean Affairs Council, 2023). Some sites have also have been independently identified potential OECMs such as the Gongrong Community in New Taipei City (Chao et al., 2018).

2.3 Nature Trusts

Land trusts are organisations that conserve land for environmental, cultural heritage or familial reasons (Cheever, 1995; Merenlender et al., 2004; Parker & Thurman, 2019). Nature trusts, (also known as environmental or conservation land trusts) are specifically managed for conservation (Merenlender et al., 2004). Nature trusts vary in size, operation and goals (Parker, 2004), they are often terrestrial, but can also be marine sites (De Santo, 2012; Portman, 2008). The exact definition of what a nature trust is depends on the policy of each country. Depending on the country and site governance, nature trusts can be similar to private protected areas (PPAs), or community protected areas, if communities engage with or create NGOs for their management (Stolton et al., 2014). It is key to note that under the IUCN definition, nature trusts are only considered private protected areas if they are legally recognised by the government or law as being protected (Stolton et al., 2014). Additionally, PPAs will have the primary goals of conservation, while nature trusts may have other primary goals such as agriculture. While PPAs and nature trusts can have similar goals and methods of land conservation; this thesis will only focus on nature trusts that are governed by non-governmental organisations. This is because since PPAs are protected areas, they cannot be identified as OECMs (Mitchell, Fitzsimons, et al., 2018).

The benefits of nature trusts, aside from protection from development, other benefits include: connectivity with other protected and conserved areas through the diversification of landscape mosaics and through social-economic factors (Kremen & Merenlender, 2018; Leménager et al., 2014; Rissman & Merenlender, 2008); higher

flexibility compared to protected areas (Leménager et al., 2014) and finally, the tax deductions or other incentives provided by some national or regional governments for donated land (Parker, 2004).



The first nature trust, ‘The National Trust,’ was created in the United Kingdom and is the largest in all of Europe; initially created to conserve natural scenery for all people to access (Gwin et al., 2019; The National Trust, No Date). Comparatively in the US, there are many small land trusts that operate locally, some of which form larger associations (Parker & Thurman, 2019). One example is the Land Trust Alliance, a network that advocates for land conservation and aims to increase and improve the quality of land trusts in the US (Land Trust Alliance, 2018). Nature trusts can be found in other parts of the world including Australia, Canada, South Korea, and New Zealand (Logan & Wekerle, 2008; Robertson; et al., 2016; The National Trust of Korea, 2016).

2.3.1 Nature Trust Governance and Management

Nature trusts use several methods to conserve land, such as full ownership, or conservation easements that are particularly popular in the United States (Parker, 2004). Conservation easements are created through the separation of land ownership and land use rights, where legal conditions are set by the landowners to limit the activities of land managers (Owley & Rissman, 2016; Parker, 2004). The most common conditions are restrictions in development, hunting or mining (Cheever, 1995). These restrictions are often perpetual and remain in place even if the land changes ownership (Cheever, 1995; Parker, 2004). Another aspect of nature trusts are the tax incentives associated with donated land and lands held in trust (Logan & Wekerle, 2008).

Because nature trusts are usually run by NGOs, they rely on donations to support management work. Without sustained funding, NGOs may have difficulties in carrying out management plans (Pasquini et al., 2011). While funding may be a limiting factor, for some nature trusts such as the ‘The National Trust’ in the UK, being a donor is very common and popular in the population (Gwin et al., 2019).

2.3.2: Current Status of Nature Trusts in Taiwan.

Though Taiwan has trust laws and policies (Wang et al., 2013), currently, Taiwan does not officially acknowledge nature trusts as a category of conserved areas. This is

because all protected areas are governed by the government in Taiwan. Additionally, while nature trusts may be considered ‘private protected areas,’ in other countries (Mitchell, Fitzsimons, et al., 2018), in Taiwan, due to legislation differences, nature trusts do not fit into that category.

Furthermore, due to the indivisible nature of land ownership in Taiwanese law (Wang et al., 2013), conservation through conservation easements cannot be used as they are in the UK and US. There have been some local studies done on the applicability of nature trusts and conservation easements in Taiwan (Kao, 2013; Chen, 2012). However, in Taiwan’s case, the current property law does not allow for non-real-estate easements, therefore easements for conservation do not exist (Kao, 2013).

Currently, there is only one nature trust in Taiwan: Nature Valley in Hsinchu (TEIA, n.d.-b). This nature trust is run by the Taiwan Environmental Information Association (TEIA). The TEIA is heavily involved in a range of environmental actions in Taiwan and also currently manages the case study for this thesis, Alibang Ecological Farm.

2.3.3: Discourse on Nature Trusts

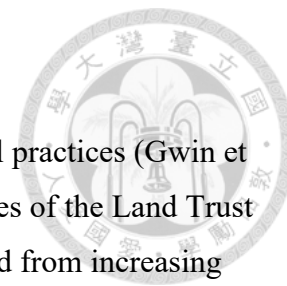
Discourse around nature trusts is similar to that of protected areas, in which nature trust management followed the paradigm shifts of area-based conservation management. Initial nature trusts shared the ‘no-touch’ approach to conservation by prohibiting human disturbances, however other management methods were minimal (McLaughlin, 2007). Criticisms of land trusts have shared three common themes; *Implementation effectiveness*, *Value conflict*, and *Economic Inefficiency* (Gooden & ‘T Sas-Rolfes, 2020).

‘Implementation effectiveness,’ includes management and governance effectiveness, financial sustainability and permanence (Gooden & ‘T Sas-Rolfes, 2020). Because each nature trust is unique to the site and governing organisation, the effectiveness of management or governance structures varies (De Santo, 2012). This being said, guidance is still provided by the IUCN for private protected areas, which includes NGO managed nature trusts (Stolton et al., 2014). Additionally, due to lack of planning, organisations may acquire enough funds to purchase the land, but run into financial problems when carrying out management plans (McLaughlin, 2007; Pasquini et al.,

2011; Stolton et al., 2014). This is a problem particularly with NGOs due to their reliance of donor funds. Land purchase is attractive to donors because it is a tangible milestone, however for sites that are protected permanently, long term regular donations for management are less common (Pasquini et al., 2011). Donors may also shape how nature trusts manage or prioritise their work (Cooke et al., 2023).

Furthermore, even with the use of conservation easements, the permanence of land trust conservation was questioned. In the 2000s, many NGOs in the United States with conservation easements could no longer afford to manage the lands they were in charge of (McLaughlin, 2007). Additionally, if the site does not use legal protections, any transfer of ownership may lead to a loss of conservation management (Leménager et al., 2014). Conversely, perpetual area-based conservation has also raised an issue on the other end of the temporal scale (Cheever, 1995). Environmental shifts due to climate change mean that permanently protected or conserved areas may see their key biodiversity features, such as endangered animals, shifting their range outside of the site's boundaries (Murray et al., 2015).

Nature trusts also face ethical issues, such as the removal of potential land for housing, external organisations working in local areas, and the influence of tax incentives given to land donors, adding to wealth inequality and the neoliberalism of environmental governance (Cooke et al., 2023; Gooden & 'T Sas-Rolfes, 2020; Gwin et al., 2019; Logan & Wekerle, 2008; Van Sant et al., 2020). Furthermore, NGOs that manage conserved areas may lack accountability compared to government groups which may be held accountable by voters (De Santo, 2012). This being said, one group that does hold NGOs accountable are their donors. Since most trusts receive donations from the public, the effectiveness of management is important for both conservation, and for public support (Aldashev & Vallino, 2019). If nature trusts are deemed as ineffective, they may receive less income from donations and this can affect management (Gooden & 'T Sas-Rolfes, 2020; Jepson, 2005). Furthermore, donors may have differing opinions on what they deem is important conservation work, causing issues with NGOs that might want to carry out more equitable and holistic projects (Aldashev & Vallino, 2019; Cooke et al., 2023).



Currently, nature trusts are moving towards more holistic and ethical practices (Gwin et al., 2019). Being localised and community-based, are two core values of the Land Trust Alliance (2018). Additionally, ‘The National Trust’ in the UK shifted from increasing its ownership of land, to helping communities conserve their own land (Gwin et al., 2019). Conservation easements, if used, are also becoming more complex to account for changes over time (Owley & Rissman, 2016).

2.3.4: Nature trusts and OECMs

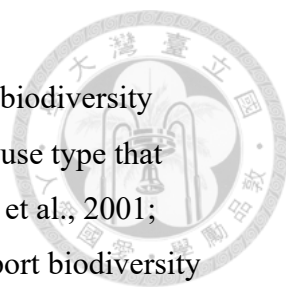
The different governance mechanisms of nature trusts around the globe means that the recognition of nature trusts as OECMs is country and site dependant. Additionally, OECM recognition includes the IUCN recognition process but requires meeting each country’s national OECM guidelines (Sharma et al., 2023). In Australia some nature trusts, such as pastoral leases or conservation covenants are nationally recognised as PPAs, while others are not (Fitzsimons et al., 2024). This means that only the non-PPA nature trusts can be recognised as OECMs (Fitzsimons et al., 2024). In South Korea a nature trust has been identified as a potential OECM and the site is owned by The National Trust of Korea and managed by the Cheorwon Crane Protection Association (IUCN, 2023; Sharma et al., 2023). In Canada, The Island Trust is a land trust organisation based on Prince Edwards Island that holds several United Nations Environment Programme, Protected Planet recognised OECMs, such as the St Nicholas Woodland Conservation Area (Island Nature Trust, 2022; UNEP-WCMC, 2024). From these examples the demonstrate the ability of nature trusts to be recognised as OECMs.

2.4 Conserving Working Landscapes and Novel Ecosystems:

As the effort to conserve biodiversity increases, different strategies have risen in area-based conservation. One of these is the conservation of sites outside of fully natural and ‘intact’ areas (Hobbs et al., 2014; Kremen & Merenlender, 2018).

2.4.1 Working Landscapes and Satoyama Landscapes

Working landscapes such as farms and timber forests are often seen as the middle ground between the natural “wilderness” and urban development (Abrams & Bliss, 2013; Maestas et al., 2001). As urban development spreads around the world, these



production landscapes have become recognised as areas that support biodiversity (Kremen & Merenlender, 2018). Working landscapes are also a land use type that environmental NGOs look for to protect from development (Maestas et al., 2001; Merenlender et al., 2004; Rissman et al., 2007). These areas can support biodiversity directly, but also act as buffers between urban and protected areas (Maestas et al., 2001; Rissman et al., 2007).

One related concept is the *Satoyama* landscape, which describes the interface between the surrounding natural wooded areas of traditional agricultural sites in Japan (Suzuki et al., 2015; Takeuchi, 2010). These areas are linked to sustainable resource use and ecosystem services (Suzuki et al., 2015). While working landscapes might delineate natural areas to conserve within their boundaries (Garibaldi et al., 2020), the natural areas of Satoyama landscapes are considered part of the production landscape and therefore are still utilized through traditional methods (Suzuki et al., 2015; Takeuchi, 2010). The international term for these types of landscapes (often used interchangeably) is ‘*social-ecological production landscapes and seascapes*’ (SEPLS). Like Satoyama landscapes, they consist of traditional production areas that can be managed through traditional use of ecosystem services (International Partnership for the Satoyama Initiative, No Date; Natori & Hino, 2021). The International Partnership for the Satoyama Initiative (IPSI) was formed in 2010 and works with governments, academics, NGOs, and local and indigenous communities to promote the culturally informed and community based cyclical use of resources (Suzuki et al., 2015). SEPLSs have also been recognised as being a land-use type that can be identified as OECMs, particularly in Japan (Natori & Hino, 2021).

Taiwan’s working landscapes such as farmland, agricultural ponds and rice paddies are disappearing (Liou et al., 2013; Yen & Liu, 2019). Due to the changes in lifestyle and productivity, these landscapes in Taiwan are decreasing (Chou et al., 2013; Liou et al., 2013). Particularly, agricultural ponds that were excavated to hold water for irrigation or aquaculture (Chou et al., 2013). These areas are also known to support biodiversity such as birds (Wu et al., 2023; Wu et al., 2022), amphibians (Juang et al., 2017; Lin et al., 2008) and aquatic plants (Chou et al., 2013). Small waterbodies, such as agricultural

ponds, are being recognising for their conservation value and contribution to biodiversity, acting as refugia in agricultural and urban landscapes (Biggs et al., 2016; Scheffer et al., 2006).

The Taiwan government has a running partnership with the Satoyama Initiative to promote the concept and conservation of SEPLs and Satoyama landscapes (Forestry and Nature Conservation Agency, 2021). Several groups in Taiwan are aiming to conserve these landscapes through the promotion of organic farming practice, contributing multiple case studies in academic literature (Chao et al., 2018; Chen et al., 2023; Karimova et al., 2022; Lee & Yan, 2019).

2.4.2 Novel ecosystems:

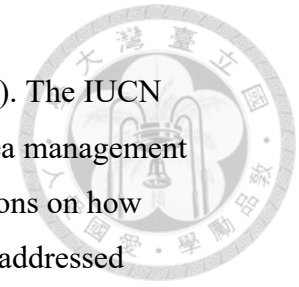
Novel ecosystems are those that can no longer be easily reverted back to their historical ecological function, while hybrid ecosystems have a mix of both historical and novel biodiversity or function (Hobbs et al., 2014). Created out of human disturbance, these novel ecosystems may positively contribute to ecosystem services, and require little to no maintenance to do so (Higgs, 2016). Though defined as novel ecosystems by some, Higgs (2016) specifies that ‘designed ecosystems’ are ecosystems that were created for a human centred function, such as filtration, social ecosystem services, biodiversity, and aesthetics, and usually require some form of management to be created and maintained (pg. 10).

There has been ongoing concerns with where and how novel ecosystems fit into current conservation and restoration discourse (Higgs, 2016; Hobbs et al., 2014), with concerns that novel (and designed) ecosystems will allow for the reduction in restoration projects or loosening of conservation goals (Hobbs et al., 2014). However, the value of novel ecosystems lies in how they fit within the historical landscape context, and should be managed as such (Hobbs et al., 2014).

2.5 Management Effectiveness

As international and national bodies look at the costs, benefits and longevity of management plans, management effectiveness has increasingly become a key part of area-based conservation (Geldmann et al., 2015). Without a guideline for effective management, these areas may be inefficiently using resources while not meeting

conservation goals (Hockings et al., 2006; Moore & Hockings, 2013). The IUCN recommends an ‘adaptive management’ framework for protected area management planning which involves regular assessments and systematic reflections on how effectively a management plan is meeting its goals; with gaps being addressed accordingly (Hockings et al., 2006).



There are several management effectiveness evaluation tools based on WCPA Framework for protected areas. The Management Effectiveness Tracking Tool (METT) created by the WWF (Worldwide Fund for Nature), is one of the most popular protected area management effectiveness (PAME) evaluation tools and is used globally (Leverington et al., 2010; Stolton et al., 2019). This evaluation tool, like others created by the IUCN follow the adaptive management cycle to determine effectiveness across six ‘elements’ of management (Hockings et al., 2006; Stolton et al., 2019). These elements are context, planning, inputs, processes, outputs and outcomes (Hockings et al., 2006). The METT was originally made for forested areas (Munguia & Heinen, 2021), but is now used across ecosystem types. The latest version, METT4, can be completed through a detailed spreadsheet of questions covering the six elements, including, site characteristics; threats and pressures on biodiversity and management; and governance (Stolton et al., 2020). Another PAME evaluation is the Rapid Assessment and Prioritization of Protected Area Management (RAPPAM) which also is used for protected areas, but evaluates protected area networks on regional or national scales (Munguia & Heinen, 2021).

Literature review summary:

As people are increasingly taking conservation measures into their own hands, strict protected areas are no longer the only options for area-based conservation. This can be seen through the rise in independent and community initiatives to create private and non-governmental conserved areas such as nature trusts. While these initiatives are a promising step towards the goal of 30x30, these sites must ensure conservation for the long term through effective governance and management. Furthermore, the way we view and value human altered, and cultural landscapes is changing; with these areas also becoming important for conservation. Finally, the OECM criteria recognises effective conservation management in areas that are not protected areas, such as nature trusts.

Therefore, the OECM criteria could be used, not only in recognition of effectively managed nature trusts, but also as goals for nature trust managers to work towards.





Chapter 3 Research Methods and Case Study

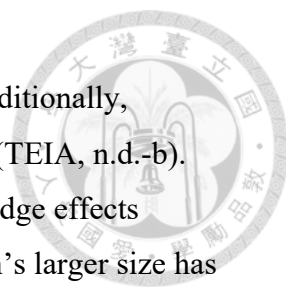
3.1 Study Design and Process

Initial contact with the case study was made during a previous assignment. From then, two management tools were used as a base for inquiry (see **section 3.1.2**) in the interviews and in the workshops. The interviews were thematically coded based on the management tools, and were used to form a management plan for the case study, and to answer the first research question. The development of the management plan was also done during the participatory workshops. Once a draft management plan was created, the plan was then compared against the OECM criteria using qualitative content analysis methods. This was used to answer the second and third questions. Though the draft management plan was created and compared to the OECM criteria, it is very much still in development and discussion after data collection for this thesis was finished. Data collection began mid 2023 and ended in April 2024.

The case study method was chosen for this thesis as it is a common research method in the area-based conservation field. Case studies are often used in social research (Priya, 2020; Yin, 2009) but are also used in conservation and environmental research and teaching (Terrado et al., 2023). The case study method allows insight into more complex situations such as organisation management or structure (Yin, 2009). Therefore, it was chosen to provide a detailed and practical example of a nature trust and potential OECM in Taiwan, to contribute towards the discourse of nature trusts and OECMs. Similarly, participant observation, particularly the “observer as participant” perspective was used because it allows for a holistic initial exploration and understanding of the case site (Kawulich, 2005). Furthermore, through participant observation, an insight into both the site visitor’s and site manager’s perspectives could be gained (Alta de Vos et al., 2021).

3.1.1 Case study selection:

The case study was selected because it is one of the two nature trusts in Taiwan; the other being Nature Valley in Hsingchu (TEIA, n.d.-b). Although Alibang Farm is not officially recognised as a nature trust, since the site is managed as, and is intended to be,



a nature trust; it was deemed to still be an appropriate case study. Additionally, compared to Nature Valley, Alibang Farm's site area is much larger (TEIA, n.d.-b). Since area-based conservation often favours large areas to decrease edge effects (Porensky & Young, 2013; Volenec & Dobson, 2020), Alibang Farm's larger size has the increased potential for conservation and meeting the OECM criteria. The final reason for the case study selection was due to accessibility to both the physical site, and language (English) with the site managers.

3.1.2 Management Tools

The first management tool used in this study was the '*Wetland Management Planning: A Guide for Site Managers*' (hereafter, Wetland Management Planning Guide or WMPG) created by the WWF, Wetlands International, the IUCN and the Ramsar Convention (Chatterjee et al., 2008).

The WMPG provides a summarised guideline for creating a management system for both Ramsar-certified wetlands and other managed wetlands (Chatterjee et al., 2008). The guidelines were used for the initial data collection on the case study, and were adopted into an agenda for one of the participatory workshops (**PO5**). The WMPG was chosen to explore this case study as the site features an agricultural pond wetland system. Additionally, the important biodiversity value species for the site are all wetland species. The planning tool provides ecosystem-specific indicators and tracking criteria, such as water input, water quality and aquatic system ecosystem services.

The second management tool was the Management Effectiveness Tracking Tool (METT), 4th edition (Stolton et al., 2020). The Taiwan adapted Chinese language METT, was used specifically for its threats and pressures analysis. The WMPG does have a similar 'factors' section; however, the METT threats and pressures analysis was chosen due to its detailed and structured format and output. Only the threats and pressures analysis section ("*Detailed assessment of threats*" in the English version, and "*B: 威脅壓力表*" in the Taiwan adapted version) of the METT4 was used, no other sections were completed. The resulting combined framework informed data collection and was used to answer question 1 of this thesis.

3.1.2 Participant Observation

Table 2 Participant observation events and their codes and participants (P= Professor; OS= Individual Onsite Staff of Alibang Farm; AOS= All onsite staff; S= Student; TEIA = Taiwan Environmental Information Association representative and/or staff).

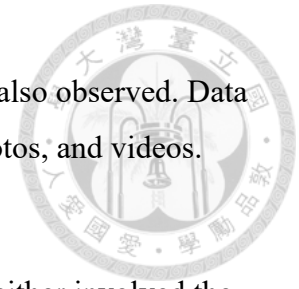


Code	Date	Type	Topic	Participants
POI		Online Interview (Not part of the thesis)	The Taiwan Environmental Information Association	OS1
POII	11/01/2023	Visit to Alibang Farm (Not part of the thesis).	Introducing OEMs	P-1, AOS, S-1
PO1	28/06/2023	Visit to Alibang	Assist with Plant Survey. Species identification from plots in areas with low exotic/ornamental species and no gaps in canopy cover.	S-1, S-2
PO2	22/07/2023 - 01/08/2023	10 Day Stay at Alibang Farm	Volunteering, Participant Observation	
PO3	09/08/2023	In-Person Meeting	Situation of the Taipei Frog at Alibang Farm and Aerial Monitoring of Alibang.	P-1, P-2, P-3.
In1	22/09/2023	In-Person Interview	Governance, Management and History of Alibang	OS1
PO4 In2	13/10/2023	Visit to Alibang Farm and In-Person Interview	Observe Frog Surveys. Interview on the conservation of the Taipei Frog.	P-2
PO5	03/11/2023	Workshop: Online Meeting	Ecological Value of Alibang Farm using the WMPG as a base for meeting discussion.	AOS, TBRI representative, P-1
PO6	18/01/2024	Workshop: Online Meeting	WMPG continued and METT Threats and Pressures Analysis.	AOS, P-1
PO7	31/03/2024	Workshop: In-Person Meeting	Alibang Farm's current and future management actions and budget.	AOS, P-1, TEIA
PO8	25/04/2024	Workshop: Online Meeting	Completion of evaluation of Alibang Farm as an OEM.	AOS, P-1, TEIA

Volunteering / 10-day on-site stay

Volunteering was done during a 10-day stay at the case study. During this stay, the onsite manager daily activities were observed and participated in, such as site

maintenance. One school visit and two public ecological tours were also observed. Data was gathered in the form of daily journal accounts, digital notes, photos, and videos.



Workshops

In-person and online participatory workshops were attended. These either involved the onsite managers or members of the advisory committee. **PO7** included the higher management of the Taiwan Environmental Information Association (see table above). For **workshops PO5** and **PO6**, the WMPG was used as a framework for the workshop discussion. The main discussion topic of **PO5** was to understand all of the site monitoring that had been done at Alibang Farm, and to qualify the biodiversity value of Alibang Farm. **PO6** continued this discussion and the METT4, Threats and Pressures Analysis was completed.

In **workshop PO7** the draft management plan created through this research was presented to members of the TEIA and discussed.

3.1.3 Interviews

Two semi-structured interviews were done during the exploration phase. The interview method was used to gain a more detailed understanding of the site and the management actions done by the onsite staff and advising committee. Questions were created before the interview, based on the WMPG, and were provided to the participants prior to the interview.

The first interviewee was with an onsite manager (**OS1**). This interviewee was selected using convenience selection. Convenience selection was chosen firstly because there was already a standing relationship with the interviewee, and secondly, because the interviewee could be interviewed in English. The interview took place in person at the TEIA office in Wanlong, Taipei. The purpose of the interview was to clarify the management actions observed during the **PO2** stay, and to gain more historical and contextual information on the management of Alibang.

The second interview was done with a key expert for amphibians (**P-2**), particularly Taipei frogs (*Hylarana taipehensis*). This interviewee also monitors the frog populations at Alibang Farm.

The purpose of this interview was to gain insight into the situation of the Taipei frog at the site. The Taipei frog was originally the flagship species of Alibang Farm, however, during the course of the study, the management goals for Alibang Farm shifted towards an ecosystem approach focusing multiple wetland taxa.



Initially, interviews with multiple experts were planned, however, due to time constraints, there was only one expert interviewed. This being said, the opinions of other experts were gathered during **workshops PO5** and **PO7**.

3.1.4 Analysis

Data from the site stay (**PO2**) was manually coded for information based broadly on the goals of management, '*biodiversity*,' '*environmental education*,' and '*community partnerships*.' Additional information collected were general site information; data related to monitoring, threats; and management actions not directly related to the management goals. These codes were chosen in order to build an understanding of the current management work and to form the draft management plan.

The interviews were coded in the same way; however, the second interview was focused on monitoring of the Taipei frog therefore most of the content centred on this topic.

Because of the structure of **workshop PO5** and **PO6**, management goals and actions were directly mentioned and discussed. During the discussion, topics that were emphasised during discussions were identified (e.g. financial sustainability).

After describing the value and management of Alibang, and the creation of the draft management plan, the plan was compared to the OECM requirements using IUCN-WCPA's '*Site-level tool for identifying other effective area-based conservation measures (OECMs)*' (Jonas et al., 2023). For each of the 8 criteria, the case study's current management was compared to identify whether the plan met the criteria or whether there were any gaps. This was supplemented with additional knowledge gathered during the participant observation stages but not included in the management plan.

This was done twice, first by myself (labelled, "individual" in results), using information gathered during the exploration stage. The process was then completed

again through a workshop with the onsite-management staff to see if there are any differences in the results, and to reflect on the process of OECM identification (labelled “group” in results).



Triangulation

Triangulation of data (Thurmond, 2001), was addressed through the multiple methods of data collection, namely, participant observation, interviews, management workshops and supplementary documents (annual work report, annual budget, meeting notes, websites etc.). For example, aggressive aquatic plant control was partaken in during the participant observation period, and the purpose and routine of this management action was described in an interview, in the site’s annual report, and in the management workshops, thus reflecting the reliability of the data. Additionally, the participatory workshops included individuals from various backgrounds and who were not part of the onsite management team. Therefore, a range of perspectives on the management of the case study were able to be represented. Finally, comparisons to relevant literature contextualise the data and discussions provide additional support to findings.

3.2 Language

During the 10-Day stay, both English and Mandarin Chinese were used. If there was a misunderstanding, clarification would be made or uncertainty indicated. Workshops were conducted in Chinese and translated into English, either simultaneously in notes or via recordings. The interviews were conducted in English with Chinese occasionally. The second interview was assisted by a native Chinese speaker.

Other language tools such as the Chinese-English dictionary Pleco, Google Translate and DeepL were used to translate transcripts, supplementary documents and Chinese literature where needed.

3.3 Case Study Introduction

Alibang Ecological Farm is a potential nature trust, situated in the Shimen district off the North Coast of Taiwan. It sits in between the Shimen River and the Alibang River,

surrounded by agricultural land. At its highest elevation, Alibang reaches 169.86 meters above sea level (RTK: X-TWD97: 308786.9, Y-TWD97: 2795142.159), and at its lowest, just outside of its boundary is 132.231 meters in elevation (RTK: X-TWD97: 308597.5, Y-TWD97: 2795622.825). Alibang Farm has a catchment size of approximately 7.4ha. The local landscape was formed from the flowing lava of the Tatun (大屯) Volcanic Group, resulting in long ridges and valleys fanning out from the Southern volcanoes (New Taipei City Government Education Bureau, 2017).

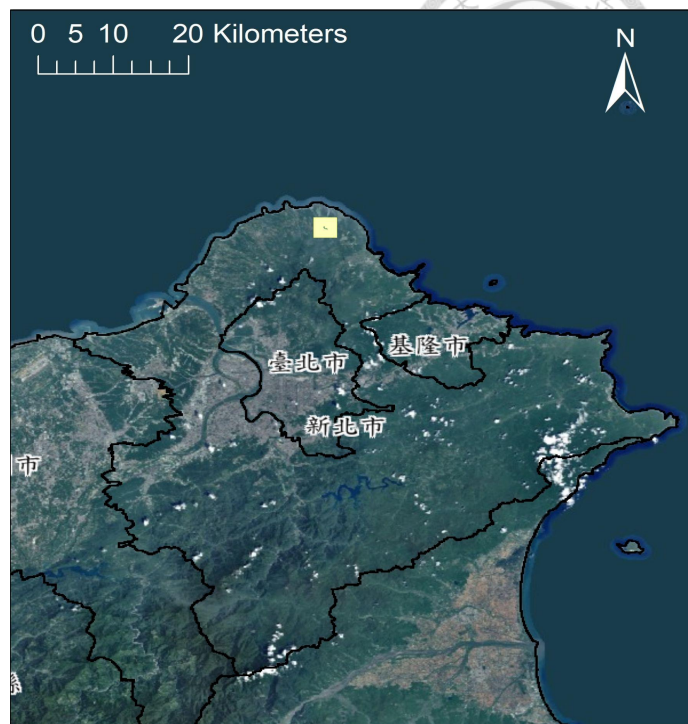


Figure 1 Map of Northern Taiwan, showing the location of the case study (yellow square).

Alibang can be found off 尖鹿里 road, South of the Shimen township (Address: Number 84, Alibang, Shimen District, New Taipei City, 253 (253 新北市 石門區 阿里磅 84 號)). Alibang can be visited via the Huanhe North-South Speedway (環河南北快速道路) or along the North Eastern coast via the North Coast Highway (北部濱海公路), taking between 1 hour 20 minutes, to 2 hours on either route from Taipei Main Station.

The Shimen and nearby Keelung area has been occupied by humans since prehistoric times and pre-colonisation, was occupied by the Basay (Basai) indigenous groups (New Taipei City Education Bureau, 2017). These people were expert shipbuilders and actively traded with other indigenous groups around Taiwan, in addition to the Han Chinese, Japanese and Dutch. It was not until the Qing Dynasty that Northern Taiwan changed to a Han Chinese majority (New Taipei City Education Bureau, 2017).



3.3.1 History

Alibang Farm was purchased in the late 1990s by a group of environmentally conscious citizens, led by Mr Wang, wanting to save the site's natural integrity for future generations (TEIA, n.d). Like the surrounding area (New Taipei City Government Education Bureau, 2017), Alibang Farm was originally a tea farm, before becoming a general farm and plum orchard. Once purchased, additional ponds were made to create the wetland. After a period of development, Alibang was opened to the public in 2003, quickly becoming a popular ecotourism location with 2,805 visitors on average per year for the first five years (Zhang, 2009, p. 66, table 3-2-3).

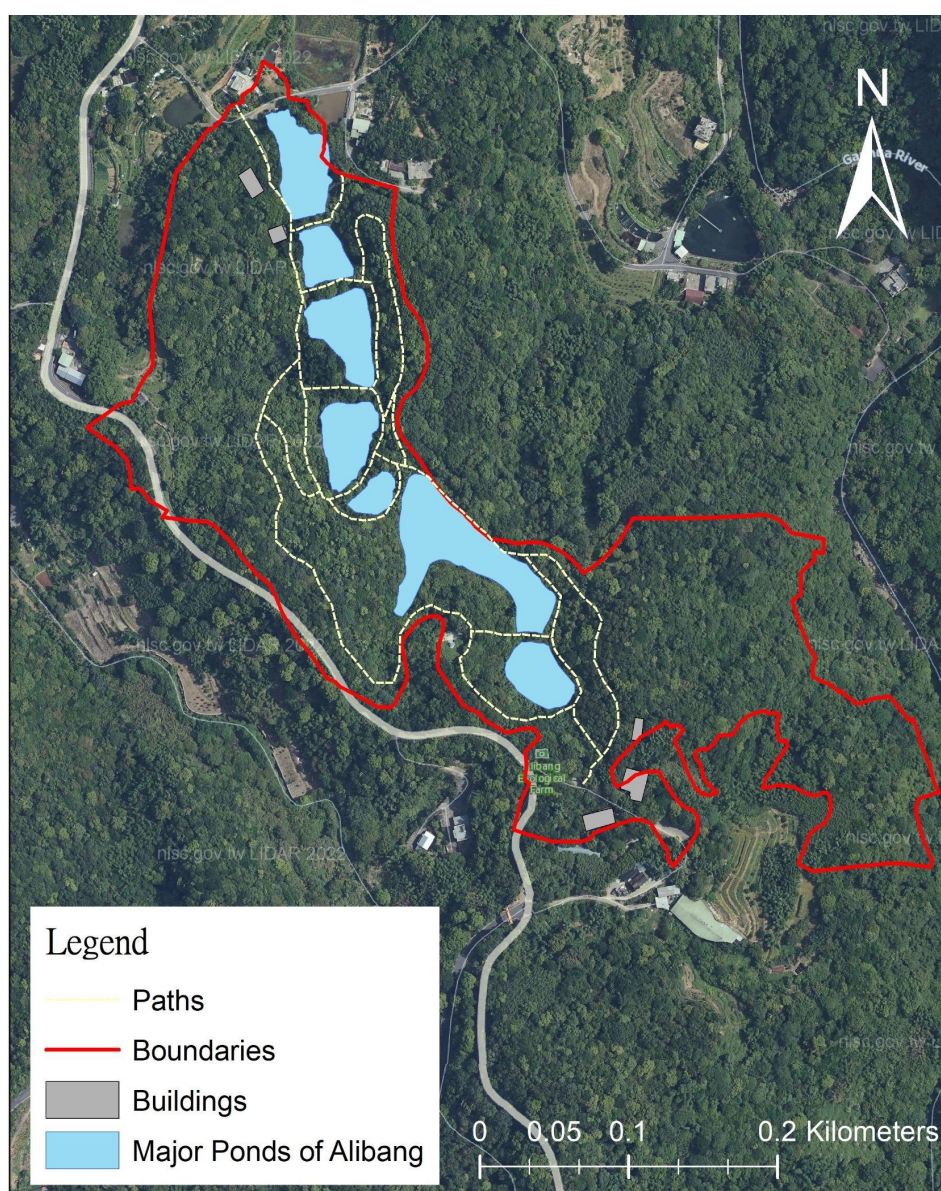
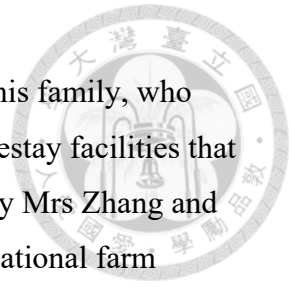


Figure 2 Map showing an aerial view of Alibang Farm's boundaries, paths, buildings and large ponds. The road featured (wide white line) is 尖鹿里 road.

For the first 20 years, Alibang Farm was managed by Mr Wang and his family, who developed and ran the ecological tours, volunteer activities, and homestay facilities that are still provided today. The majority of the site is currently owned by Mrs Zhang and her family. Mr Wang also owns a small section of the farm (the recreational farm homestay).



3.3.2 Taiwan Environmental Information Association:

Since 2022, Alibang's management and operations have been passed to the Taiwan Environmental Information Association (TEIA) for a trial period of 5 years. The TEIA hopes to develop Alibang Farm into a nature trust and continue the legacy of safeguarding nature for future generations.

The Taiwan Environmental Information Association (TEIA; 台灣環境資訊協會) is a non-profit organisation that was created in 2001, with a focus on enhancing the distribution of environmental information and promoting nature trusts (TEIA, n.d.-a). The TEIA first began as an email newsletter, distributing environmental news and information, later the Environmental Information Centre (環境資訊中心) was created. The TEIA is regularly involved with environmental campaigns and initiatives such as the white dolphin campaign and the reef survey (TEIA, n.d). In 2014 the TEIA became the managing organisation of the first nature trust in Taiwan, Nature Valley (TEIA, n.d.-b). The TEIA has also been involved in lobbying for change land policy firstly, to recognise land trusts as conserved areas and therefore decrease tax (TEIA, 2023a), and additionally, for nature trusts to be recognised on agricultural lands. In order to promote nature trusts, the TEIA has recently transformed into a foundation; Trust in Nature Foundation (Chen, 2024).

3.4 Research Limitations

The first limitation of this research is that due to the unique situation of the case study site and of Taiwan, the findings cannot be generalised for nature trust sites globally. This means that the points of improvement identified from the OECM assessment results are specific to the case study. And while the findings cannot be generalised to other sites, the main contribution of this thesis will be providing an example of using the

process of OECM site recognition as a management strategy, and adding to the overall discussion of OECMs and nature trusts.

The limited number of nature trusts in Taiwan, and limited research time also means that the results of this research could not be compared to another similar case, which may limit the rigidity of the findings.

In the research process, one key limitation is that due to the complexity of the current governance situation of Alibang Farm, the data collection process and OECM assessment did not include all stakeholders. Namely, the key site owner Mrs Zhang; partial owner and site manager Mr Wang; and the local community members. Due to this, the findings of this research are lacking key perspectives, particularly regarding the future of the site. Additionally, since the OECM assessment requires all key stakeholders to be involved; and, due to the lack of authority of the author and OECM policy in Taiwan, the OECM site assessment was an unofficial process aimed to help develop Alibang Farm's management plan, rather than for OECM recognition.

Finally, while all efforts were made to translate documents and meetings correctly, however there is still a potential for some errors in interpretation due to language barriers.

Chapter 4: Alibang Farm's Management

Data was collected from participant observation, interviews and supplementary documents. This chapter summarises the information and looks to answer the first research question: *What is the current status and operation mechanism of Alibang Farm?* This chapter also represents the draft management plan created during the research process.



4.1 Management Goals

According to the previous management action plans, and **Int 1**. The three main goals of management for Alibang Farm are to:

1. Conserve the flora and fauna of the Northeastern coastal monsoon agricultural pond wetland ecosystem; such as amphibians, crustaceans and snakes.
2. Promote environmental education.
3. Promote Satoyama Partnerships with the local community.

These goals were based on both the original aims of Alibang Farm and the aims of the TEIA (**Int 1**; TEIA, n.d.-a). Mr Wang who conceptualized Alibang farm, has reflected on the goal of preserving childhood memories of enjoying nature and creating an outdoor classroom (Zhang, 2009, p. 64). Mr Wang was aware of these aligning goals with the TEIA;

...he wanted someone or a group organization to continue his work and still preserve the area. So, he know[s] our organization for a long time. And we've been working with working holidays volunteers for many years... we are also promoting environmental trust, then maybe Alibang can be an environment of trust. That's why last year he signed the contract with us.

- **Int 1**



4.2 Governance

During the OECM workshop (**PO8**) Alibang Farm's complicated governance was discussed, it had been mentioned in earlier workshops, however it wasn't fully understood. Though the group purchase of the Alibang Farm site was led by Mr Wang, Mrs Zhang provided the majority of the funding for the site when several donors fell through, due to the 1999 Jiji earthquake. In addition to conceptualizing Alibang Farm, Mr Wang also managed the site for the last 20 years and gained a Master's degree in environmental management to do so (**Int 1**). Mr Wang does not have ownership rights to the whole site. Instead, Mrs Zhang owns the majority of the ownership rights. This affects the legitimacy of the TEIA's management, since the contract for the whole of

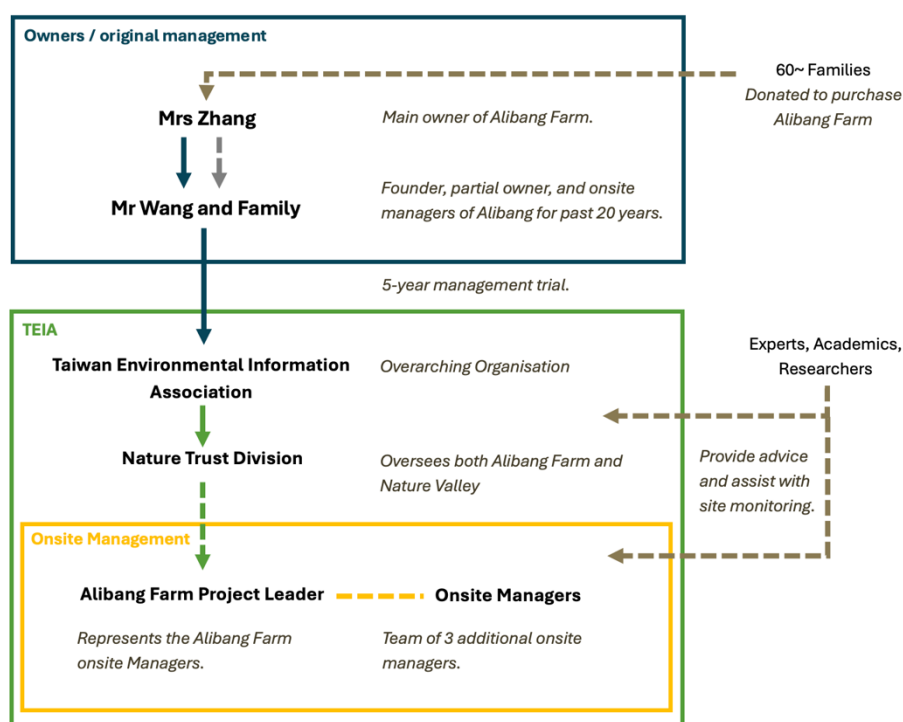
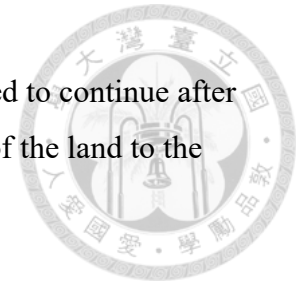


Figure 3 Diagram of Alibang Farm's governance structure. Arrows indicate a hierarchical relationship (solid) or connection (dashed).

Alibang Farm was only signed with Mr Wang. Additionally, all current contact has been made with Mr Wang alone. The TEIA is currently arranging to discuss with Mrs Zhang in the future about the current management agreement and actions.

The current contract is set for five years since 2022, and it is expected to continue after 2027 either through an extension of the contract or the entrustment of the land to the TEIA as a nature trust if possible.



4.2.1 Legality:

Alibang Farm is privately owned and there are no legal protections over it. Alibang Farm is categorised as ‘general agricultural land,’ therefore it legally cannot become a nature trust managed by an association (Trust in Nature Foundation, 2024). To solve this problem, the TEIA has recently created a foundation (Trust in Nature Foundation, TNF) in order to successfully manage Alibang as a nature trust. This being said, the dual ownership of the site may be a barrier for the TEIA to make Alibang an official nature trust, unless an agreement can be made with both owners of the site.

4.2.2: Staff

Alibang Farm is managed under the TEIA Nature Trust Division. Within this division, the Alibang project leader represents all onsite managers. The four onsite staff (including the project leader) live and work on rotating shifts at Alibang Farm. Alibang is open five days a week and closed on Mondays and Tuesdays. Each of the four staff are assigned a role (e.g. reception and communications) for a period of 21 days before rotating to another (**PO2**). For management planning, the project leader usually makes decisions for the team, however other staff provide input, particularly regarding their own specializations and interests (**Int 1**). Within the onsite staff group, one member is specialised in insects, and another is specialised in freshwater river and pond ecology. Though the staff were not formally trained on conservation management, they attend webinars and classes in order to increase their knowledge (**Int 1**).

Along with the onsite staff, a team of experts, academics, and researchers regularly give management and conservation advice, such as through the workshops that occurred during this study. Members of this advisory team have also carried out site monitoring, either regularly or at single events.

While the Alibang Farm onsite managers operate independently in regards to daily site management activities, higher management within the TEIA still have a say in management plans, as they provide the majority of funding for Alibang’s activities.



4.2.3 Finance:

Alibang farm receives the majority of its funding from the TEIA. This funding pays for the staff salary and management. Additional funding comes from the activities and accommodation that Alibang farm provides, and local products can also be bought by visitors to the site. Direct donations can also be made via the Alibang Farm website (<https://www.albeecofarm.com/>), TEIA and TNF websites. Finally, Alibang receives funding from the Hometown and Farmers Association (愛鄉護農會) to provide environmental education to local students and teachers, and recently from a nearby Buddhist school. Though Alibang Farm receives donations from these other sources, and income from environmental education activities, it still relies heavily on the funding from the TEIA. Currently the operation expenditure is higher than Alibang Farm's budget, therefore it is hoped that Alibang Farm can become self-sustaining in the future.

4.3 Site Value

During **workshops PO5** and **PO6** Alibang Farm's ecosystem services (based on the METT4 categories) were identified as water security, entertainment and tourism; and education and research. During **PO5** the site values of Alibang Farm were therefore identified as:

1. **Biodiversity**; particularly the ecosystem was identified as a "*northeastern coastal monsoon forest agricultural pond wetland system.*"
2. **Environmental Education**
3. **Natural Scenery**

4.3.1 Biodiversity:

Alibang Farm's biodiversity is a selling point for those visiting. Visitors to the wetland can now see multiple ponds, filled with aquatic plants, fish and frogs. It is hard to tell that the site used to be a tea farm, lacking trees and with large areas of grass land (**Int 1**). Now, the wetland trails are covered by trees and the only signs of the tea farm are the rock terraces hidden below the regrown forest (**PO2**). Though Alibang farm has been identified as a "northeastern coastal monsoon forest agricultural pond wetland system," during **workshop PO7**, the validity of this definition was questioned by experts and members of the TEIA. This was due to the lack of monitoring and site data

that would support this definition. However, the current definition will be kept until another definition is found, or the current one is confirmed. The first part '*northeastern coastal monsoon*' refers to the location of the area. It is expected that Alibang Farm is likely to feature similar biodiversity to the surrounding landscape, and be affected by the northeastern monsoons. One forest survey of Alibang was done (**PO1**), covering the areas of regrowth; avoiding areas with a high number of ornamental plants; and staying away from paths and buildings (**S-1**). After the survey, the plot compositions were compared to a survey of the vegetation done at a nearby decommissioned nuclear plant as a reference of another regrowth forest in the area. Similarities were found between the power plant vegetation and those found in the plots of Alibang Farm. Additionally, Alibang Farm appeared to be in a later successional stage due to the presence of late successional plants (**S-1**).



Figure 4 A tree covered pathway at Alibang Farm. A vegetated pond can be seen on the left and part of the outdoor cafe space can be seen on the right. Photo taken during **PO2**.

Though this survey was done, there was still concern in **workshop PO7** because there was no comparison with historical forests of the area, or further to other Taiwanese forest literature. Furthermore, there is still a lack of understanding of how the surrounding forest influences the pond ecosystem; particularly in regards to input from

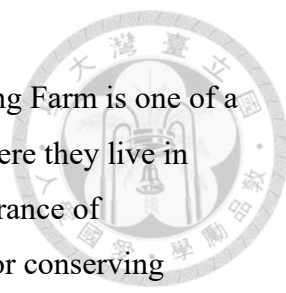


Figure 5 Photos taken during **PO5** stay at the site. Left: A crab carrying eggs found by the main farmhouse. Centre: A caterpillar found on a tree at night. Right: Young softshell turtle relocated to the site.

rainfall and runoff. This was also a concern raised earlier by an advising researcher during **workshop PO5**. In both workshops it was stressed that a proper understanding of the plant composition; landscape connectivity; and historic ecology of the area was needed to determine the forest's influence on the important biodiversity factors (wetland habitat and species), and also to inform site management.

Though not the main focus of management, there are still noteworthy species present in Alibang Farm's forest. Mammals include the pangolin (*Manis pentadactyla*), masked palm-civet (*Paguma larvata*), small Indian civet (*Viverricula indica*) and Taiwanese serow (*Capricornis swinhoei*). Other animals include the Chinese green snake (*Ptyas major*), endemic owl, *Otus lettia glabripes* and bat species (data from **P-1**, iNaturalist and **PO1**). Due to the nature of some of these species, however, some of the observed individuals may not be residents of Alibang specifically.

The second part of the current ecosystem description, '*agricultural pond wetland*' refers a specific type of wetland that used to be commonly found in productive areas around Taiwan. Because the ponds, excluding the largest, were excavated during Alibang Farm's creation, they share similarities with agricultural ponds created for irrigation and rice cultivation, found in Taiwan's plains (Yen & Liu, 2019). For example, the Taipei frog that was the flagship species of Alibang Farm until recently, and is commonly



found in agricultural ponds and rice paddies (Lin et al., 2008). Alibang Farm is one of a few northern sites that still have Taipei frogs, another is Taoyuan where they live in shallow agricultural ponds (Jang-Liaw & Chou, 2015). The disappearance of agricultural ponds around Taiwan, makes Alibang Farm a key area for conserving species that rely on the ecosystem type and they have worked with the Taipei City Zoo and Forestry and Nature Conservation Agency in the past for breeding and re-introduction (**Int 1; Int 2**).

One difference between Alibang Farm and these agricultural ponds is hydrology and the presence of the surrounding forest. For hydrology, Alibang may be different from agricultural ponds because they are connected together by pipes that flow “downstream.” Even with this difference, Alibang Farm is still able to sustain a range of wetland species. Some wetland species found at Alibang farm are the yellow pond turtle (*Mauremys mutica*), yellow margined box-turtle (*Cuora flavomarginata*), Chinese soft-shelled turtle (*Pelodiscus sinensis*), Chinese water snake (*Myrrophis chinensis*), Chinese tree toad (*Hyla chinensis*), Taipei green tree frog (*Zhangixalus taipeianus*), small snake head fish (*Channa asiatica*), Chinese mystery snail (*Chinese mystery snail*), dragonfly *Anotogaster klossi* and water scavenger beetle *Peltochares atropiceus* (**PO5**, Liu et al., 2023). There are also 15 species of frogs recorded on the site (**PO5**).

The closest natural area to Alibang Farm is the Alibang stream, which runs to the northeast of the site. Alibang stream is a natural flowing stream that has not been modified or channelized (**PO2**), and is lined with thick forest. From the stream to the Northeastern boarder of Alibang Farm is a steep incline of continuous forest. This connectivity may be a reason why the survey of Alibang Farm’s flora showed late successional plants and the surveyed areas were mostly native (**PO1**). Further connectivity of the wetland ecosystem can be seen in the agricultural fields outside the northern boundary of Alibang Farm, where Taipei frogs have been found. These local farmers are incentivised through the national ecological green network program (國土綠色生態網絡) to keep their fields submerged to protect the species (**PO4**). The national ecological green network program supports farmers to use organic and environmentally friendly methods of farming (Liao, 2020).

4.3.2 Environmental Education and Scenery

Compared to the value of biodiversity, identifying the site values of environmental education and scenery is both more straightforward and more complex to quantify. Environmental education is provided through Alibang's ecological tours and partnerships with research groups. Additionally, Alibang Farm receives extra funding especially for school groups to come and learn about the environment and wetland ecosystems (**PO7**). The main way that the quality of these tours are evaluated is through feedback from the participants at the end of the tour (**PO2**).

Natural scenery is an intrinsic value of Alibang Farm, and it is also linked to the biodiversity of Alibang Farm. Because natural scenery is intrinsic, it is difficult to evaluate, however it can be assumed that experiencing the natural scenery of Alibang is valuable for visitors because of the

aesthetic, health and stress-relieving benefits (Rojas-Carvajal et al., 2022; Summers & Vivian, 2018). Both of these ecosystem services involve nature experience, which, especially in children, is known to shape environmental behaviours later in life (Soga & Gaston, 2016). Therefore, though these ecosystem services may not have a quantitative evaluation, their value can still be identified through the existence of Alibang as a natural site and location for environmental education.



Figure 6 Photos taken at Alibang Stream while on an ecological tour lead by the Alibang Farm staff. Top: Tour group exploring the stream. Bottom: A local woman can be seen in the distance, fishing in a large pool.



4.4 Management Actions

This section describes the management actions of the Alibang Farm on-site managers and advisory committee. The sections are divided by the goals of management and related threats and pressures.

4.4.1 Goal 1: Conserving the Flora and Fauna of the Northeastern Coastal Monsoon Agricultural Pond Wetland Ecosystem

The following describes the current management actions that are done at Alibang Farm to achieve their goal of wetland biodiversity conservation.

Monitoring Regime of Biodiversity:

The monitoring at Alibang Farm is conducted by both the Alibang Farm onsite staff and by groups from the advisory committee (**PO2**; **PO5**). The onsite staff conduct amphibian surveys twice a month and also collect observation data (presence) of other animals. These observations are recorded in their own records and occasionally on iNaturalist. Due to the high numbers of visitors to the site, there is also a large number of observations recorded on iNaturalist by members of the public.

Through external groups, one survey of aquatic invertebrates has been conducted at Alibang and nearby Alibang stream (Liu et al., 2023). Additionally, one survey of water quality has been done by a group from the TBRI (Taiwan Biodiversity Research Institute), and one hydrology survey by a hydrology expert (**P-3**). Finally, monthly and bi-monthly (during peak season) amphibian surveys have been conducted by **P-1** and his students, mainly for the Taipei frog, but also for other amphibians. During these surveys the invasive spotted-legged frog (*Polypedates megacephalus*, 斑腿樹蛙), is also removed from the site (**PO2**). These surveys have been conducted for the past 5 years and are funded by the government through the government's ecological protection compensation (生態服務給付) and national ecological green network program (國土綠色生態網絡; **In 2**). These surveys also include the neighbouring fields where Taipei Frogs are also found (**PO2**).

There are plans for regular long-term monitoring of the water levels of several ponds, however this has not been implemented yet (**PO5**). Additional water quality surveys are also needed to get a seasonal understanding of the site, however more funding is needed

for this. Finally, further forest surveys are needed but no plans were made before the end of the data collection period of this thesis.



Habitat Maintenance:

Habitat maintenance is focused on the key biodiversity features, mainly the Taipei frog and other amphibians (**Int 1**). According to previous years management action plans, the majority of maintenance work involves clearing aggressive aquatic plants from ponds; clearing pond boundaries of high vegetation; and clearing leaves and debris from the pipes that supply water to the ponds (**Int 1; PO2**). There is little management of the forest regrowth areas, except for removing dangerous overhanging branches from paths. This was identified as a potential problem for biodiversity, as the expanding forest reduces the area of grassland habitat that may be utilized by insects and reptiles (**Int 1**). Therefore, maintenance was focused on expanding grass areas and reducing tall vegetation around the ponds to support amphibians and reptiles (**Int 1**).

Other maintenance includes clearing paths of leaves and slippery algae; removing aggressive ornamental garden plants, removing excess fish from ponds; and building maintenance. Habitat maintenance is done by the 4 onsite staff and by volunteer groups (**PO2**).

Species cultivation plan:

In addition to protecting the species present at the site, the Alibang Farm team has begun a species cultivation plan for aquatic plants and native Taiwanese fish. The aquatic plants chosen are either endangered or those known to be utilised by wetland species. For the fish, those chosen to be raised are all native with varying degrees of endangerment. The plan is to raise the fish in tanks on behalf of the Native Fish Conservation Society, and they will not be released into Alibang Farm's ponds. Though this plan is underway, there were mixed opinions of the viability and the costs of the species cultivation plan during workshop **PO7**. The main concerns were the costs of raising the plants and fish; how the species cultivation plan contributes to the main goals and income of Alibang farm; and how potential surpluses of populations will be managed. It was agreed that the fish and plants could be used as an educational resource, and income could be received from the TBRI or other government agencies for protecting and supporting native species (**PO7**).



4.4.1.1 Threats to Goal 1:

The following figures show the results of the METT4 threats and pressures analysis completed in **PO6**. Many of the threats are outside of the site's scope or management capabilities. All threats identified were related to the biodiversity of the site. Key threats of Alibang include invasive species (both plant and animal), pollution and geological events.

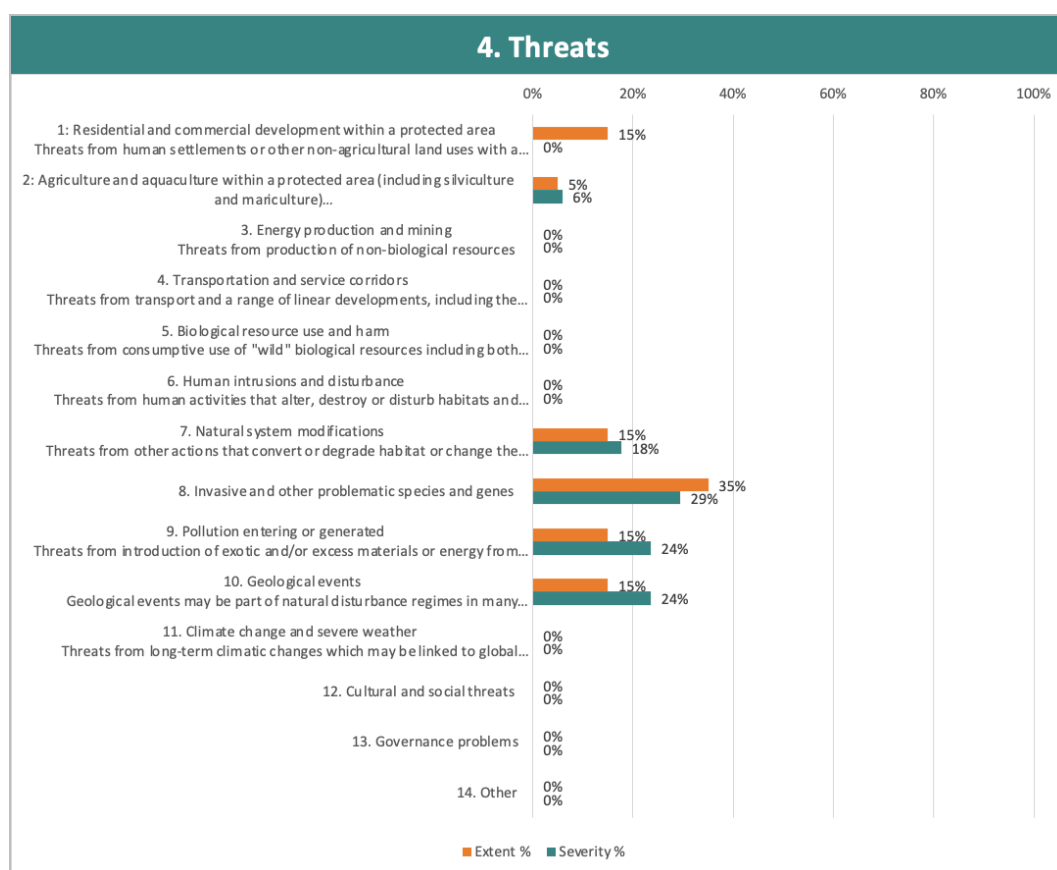


Figure 7 Results of METT Threats and Pressures Analysis done during management workshop (**PO6**). 'Extent' refers to the amount of area within the site that the threat is present. 'Severity' refers to the likelihood that the threat will destroy the affected biodiversity value(s).

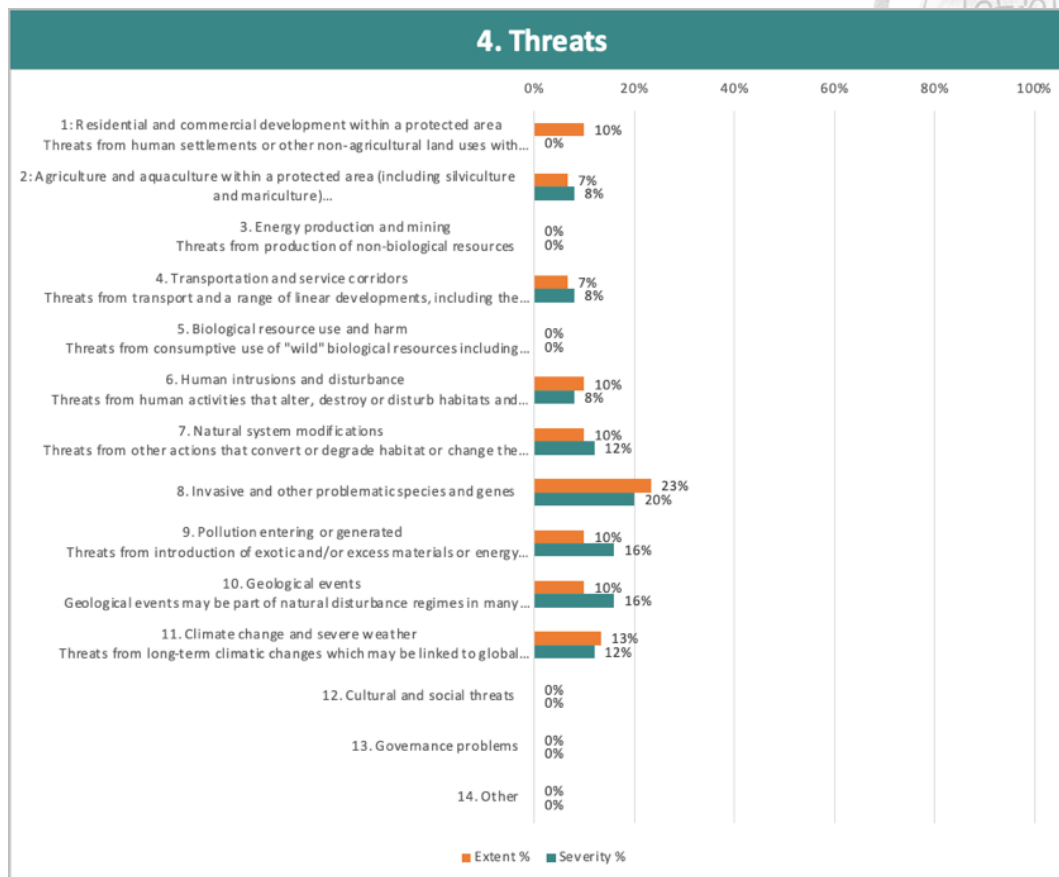


Figure 8 Results of METT4 threats and pressures analysis after additional threats identified individually. ‘Extent’ refers to the amount of area within the site that the threat is present. ‘Severity’ refers to the likelihood that the threat will destroy the affected biodiversity value(s).

Table 3 Table of the threats and pressures identified in the METT assessment and their associated management action taken from a combination of mitigation actions mentioned directly during management workshops, observed during the site stay (PO2), or written in previous management reports. The ‘Additional Remarks’ column and ‘Additional threats’ row are observations or suggestions made by the author.

Key site features and related goals:	Related threat and pressures	Current Management Action	Additional Remarks
1 Conserve Northern Monsoon Wetland and forest biodiversity	Agriculture, animal husbandry and aquaculture: 2.4 Animal husbandry and pasture management The nearby neighbour raises pigs.		
	Ecological Change: 7.3 Dams and Water Management Blocks upstream of irrigation channel may affect the rate of water input. Additionally, blocks at the site may affect the water flow downstream to neighbours which could cause some social pressures.	Keep waterways clear of blockages both on-site and close to site boundaries.	
	Invasive or other problematic species or genes: 8.1 Invasive Species <i>Salvinia molesta</i> (人厭槐葉蘋), <i>Pistia stratiotes</i> (大萍), <i>Aquarius cordifolius</i> (心葉鐵樹蕨/象耳澤瀉) and <i>Hydrocotyle verticillata</i> (銅錢草). The threat extent of these aquatic plants is ordinary. They are likely to persist for a medium term, between 5-20 years. For fauna, <i>Polypedates megacophalus</i> (斑腿樹蛙) has been identified as invasive. 8.2 Local problems There are stray cats and dogs in the area, they are a slight threat to the biodiversity of the site. They are a medium-term threat, between 5-20 years	8.1 Maintain and aquatic plant populations and cull invasive frogs. 8.2 Monitor stray animal populations and address if needed.	
	9. Pollution: 9.1 Household sewage and urban wastewater Risk of pollution via the irrigation channel, additionally, a bigger threat of run-off from the nearby area and road after heavy rain. 9.2 Sewage and wastewater from own facilities There is a small risk of sewage infiltration into the pond system. The water quality of this pond has been tested and it was ‘good’ on the pollution index.	9.2 Wastewater is filtered before it enters the first pond and is treated with aquatic plants. 9.1.9.2 Continue monitoring water quality.	
	Residential and commercial development: 1.2 Commercial and industrial areas Factories being built nearby, does not have an effect on the site yet. 1.3 Tourism, leisure and entertainment areas There is a golf course nearby.		Most of the development is happening North (downstream) of the site.
Additional threats not mentioned in the assessment:	10. Geological events 10.1 Volcanic activity. 10.4 Erosion or sedimentation Erosion and sedimentation are threats to the ponds because they can be filled in. Sedimentation can also change the depth and the species composition. This is a long-term threat (20-100 years).	10.4 The sedimentation of the ponds will be monitored, and maintenance may be done.	
	2.1 Annual and non-timber crops Surrounding areas are general agricultural areas such as tea farms. Low risk because nearby tea farm is organic.		Continue work with local community to encourage organic farming.
	4.1 Roads and Railroads There is a road running along the Western edge of the site and another on the Northern boundary. There is also a road running from the entrance of Albang to the main buildings. There is a risk of road-kill along these roads, however, there is very little traffic on them so the risk is not too large.		
	6.1 Recreation and Tourism. There is a small pressure of visitor numbers. Increased numbers may put pressure on the waste system and disturb the wildlife if large groups regularly pass through the site.		Control the number of visitors per month. Make sure visitors stick to the set paths during their visits to avoid disturbance of inner forest areas.
	6.5 Destructive activities Additionally, there may have been some intentional damage to the site’s water system by members of the wider community, concerned about water usage.		Maintain a good relationship with the wider community to address concerns around water usage.
	11.1 Habitat shifting and alteration Currently present populations may move outside of the site with shifting environmental conditions.		Make sure that management plans are made for the long term, but are also adaptive to changes.

As seen in the **Table 3** above, six of the 10 threats identified by the onsite staff during the threats and pressures analysis have been addressed in the site's management plan. The remaining four threats identified by the staff are out of the scope of their management, such as nearby development and volcanic activity. The additional threats by the author were identified through the data collected during participant observation and interviews. The threat 11.1 was identified by interviewee **P-W (Int 2)**, who identified a trend of for the decrease in the numbers of Taipei frog at the site and a shift in population towards the northern ponds, including the neighbouring agricultural fields. The exact reason for this shift is unknown, as is the reason for the recent decrease in Taipei frog population at the site, though the loss of grassland areas is one reason suspected by the onsite staff (**Int 1**).

Finance:

One pressure to management that arose during the multiple management workshops was the income generated by Alibang farm. According to the previous two years finance statements of Alibang Farm, the management of Alibang Farm resulted in a financial deficit.

In order to sustainably manage Alibang Farm for the long term, **workshop PO7**, which included key leadership of the TEIA, discussed how Alibang farm's management team could generate more income to balance the costs of management. Currently, the TEIA is providing extra funding to support the transition to managing Alibang Farm, however it is intended for Alibang to eventually become self-sustaining, or at least to run on a lower budget. Some suggestions included small scale agricultural ventures (**PO7**). Eventually during the discussion, it was acknowledged that Alibang Farm is a representative project of the TEIA, therefore it is likely that donors consider the management of Alibang Farm when donating funds to the NGO. Because of this, it was



Figure 9 Removing overgrown aquatic filtration plants from the first pond during **PO1**.

agreed that Alibang Farm could be given a larger portion of the TEIA donations. Additionally, the species cultivation plan could be another way to draw in more visitors. Finally, more effort will be done in advertising for the winter and summer camps offered at Alibang Farm.

Another issue that is related to finance is the lack of tax deductions in Taiwan for nature trusts, which something that the TEIA has been working to change for several years (TEIA, 2023b). If the TEIA (via the TNF) eventually holds the land of Alibang, they will still have to pay normal land tax instead of the land being classified as preserved for conservation or as a ‘public good.’ This will result in another cost to management that must be accounted for.

4.4.2 Goal 2 & 3 Environmental Education and Local Satoyama Alliance Action Plan

The second and third management goals are inter-linked, and are the main public facing roles of Alibang Farm. They have, therefore, been combined into one section.

Environmental Education

Alibang Farm organises several activities for the public that were created by Mr Wang while he was managing the site. The main activities are the ecological tours and volunteer work. There are four types of day tours, and one ecological night tour. The themes of the day tours are wetland ecology, moss and ferns, river ecology (summer) and wild vegetables (winter). The moss and ferns tour was developed by the TEIA management team. These tours can be half-day or full-day sessions, with most involving a small activity in addition to afternoon tea and/or lunch.

These tours are open for members of the public to book and are led by the Alibang onsite managers. Other environmental education activities are the summer and winter camps and the school tours. School tours are similar to the half day wetland ecology tours around Alibang Farm.

Table 4 Itinerary of the 'Full Day Ecological Tour,' which included the river tour, as observed during PO2.

Item	Activity Description
Introduction to Alibang Farm and nature trusts	The onsite staff briefly introduce themselves and the map of Alibang Farm. Visitors hear about the story of how Mr Wang noticed the land use changes in the rural areas of Taiwan and decided to create and protect Alibang Farm for future generations to enjoy.
Tour of Alibang Farm	While walking through Alibang Farm, tour leaders point out ecological features to explain. For example: - Indigo plants that were an important cultural commodity in the past; visitors can crush and try to dye their hands blue. - A 'human-faced' spider, explaining their mating behaviours and the common Chinese naming convention of animals. - Pangolin holes and foraging behaviour. - The 'ecosystem services' pond which filters grey water from the farmhouses.
A frog's lifecycle game	Onsite staff use a game to describe a frog's life cycle and the different dangers that frogs face during their lifetime. Part 1: Visitors are tadpoles and must run away from the 'snake' or 'fish' that catches them with a rope. Part 2: Visitors need to eat to grow into adult frogs. They must use a special frog method to catch the moving 'fly.' Part 3: Frogs are now adults and must find a mate. A blindfolded 'female frog' must listen to the Taipei frog calls of their team to find them all, while another other team can distract with their own calls. Part 4: Frog life cycle, visitors start as tadpoles and play 'paper, scissors, rock' to win and grow into the next stage of frog development, or lose and return to the previous form.
Lunch	Meals are provided by a local restaurant and eaten onsite at the dining area. Visitors help wash their dishes using sugar, an environmentally friendly alternative to strong detergents.
River tour	Visitors go to the Alibang Stream. At the stream, visitors are asked to compare Alibang stream to other rivers they've seen to understand features of a natural stream and why channelized streams are bad for biodiversity. Visitors can look for small invertebrates, shrimp, fish and crabs, using small nets, plates and a small plastic tank to get a closer look. Visitors are given time to relax, explore and enjoy the fresh water.
Afternoon tea and closing reflections	Visitors return to Alibang Farm and have afternoon tea at the outdoor café. Onsite staff talk about local products for sale before encouraging the visitors to share their reflections of their experience and what they learnt during the day.



Figure 10 Photos from an ecological tour. Left: visitors observe the aquatic invertebrates they found in Alibang Stream. Right: The evolution and ecology of plants is briefly introduced using native tree ferns as an example after one of the visitors pointed them out. It is explained that Taiwan has over 700 fern species, and many people come to Taiwan to study them.



Partnerships and Volunteering

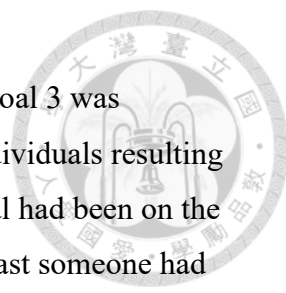
Alibang farm has three types of partnerships. The first is funding partnerships; the second is Satoyama partnerships and the third is volunteer and ESG partnerships. Funding partnerships are similar to donations; however, most funding is given for a specific reason. Alibang works with the Hometown and Farmers Association (愛鄉護農會) to provide outdoor environmental education for local students and teachers in the Shimen and Jinmen district.

While Alibang Farm is no longer an agricultural site, it is part of a wider landscape of agricultural lands. Through Satoyama partnerships, Alibang farm has formed a business cooperative with local farmers to sell and promote their products on site (**PO2**). Alibang does this by spending time to talk about the history of the area and Satoyama partnerships on their ecological tours; giving visitors the opportunity to purchase the local products during a tea break. One example is the black tea that visitors are served is grown by a nearby organic farmer, which can be purchased from Alibang. Alibang also promotes organic and sustainable farming methods (**PO2**).

The third partnership, though not local, involves working with sustainable organisations and companies that wish to meet ESG goals and partnering with them for regular volunteer work. Volunteer work at Alibang Farm usually involves habitat maintenance; either removing aggressive aquatic plants species and sometimes animal species (such as fish). Volunteers can also help with nighttime frog surveys (Alibang Ecological Farm, 2022).

4.4.2.1 Threats to Goals 2&3

Because the METT4 assessment used for identifying threats to Alibang farm; all threats identified were related to the biodiversity of the site. However, the financial pressures for biodiversity are also a pressure for goals 2 and 3. In order to meet the financial demands, Alibang promotes their ecological tours, environmental education and volunteer opportunities through popular blogs, working holiday and ecotourism websites such as 'Nice Day' (<https://play.niceday.tw/en>) and 'Walk in Taiwan' (<https://walkin.tw/tour/1240/>). The corporate volunteer opportunities also generate income for Alibang Farm, while also assisting in management through habitat maintenance.



Additionally, one threat in the METT4 assessment that is related to goal 3 was identified individually by the author. This threat is intrusion from individuals resulting in damage to the site. During **PO1** we were notified that an individual had been on the site and had dumped items in Alibang's forest. Additionally, in the past someone had been caught fishing at the largest pond (**PO7**). During **PO2** there was a confrontation with a member of the local community who was upset about the amount of water that was in their portion of irrigation channel, which is downstream of Alibang Farm. Since the water from the irrigation channel is shared, blockages or other inputs upstream will affect those downstream. According to Alibang staff, water is a concern in the area and particularly recently, as the previous summer had no rain for 6 months. Finally, the water buckets and leaf strainers that are used between the irrigation channel and Alibang's ponds were also found to be damaged that year. Though these instances may be once offs, they are important to keep in mind especially if intrusions begin to affect the biodiversity of the area, or tensions persist and affect the goal of promoting Satoyama Partnerships with the wider community.

4.5 Monitoring of Management

The Alibang Farm onsite staff have internal meetings every week to discuss and track the activities on site. Feedback from the ecological tours are given during the closing reflections. The TEIA nature trust department has meetings every two weeks and large TEIA wide meetings are held once a month. During the TEIA wide meetings, the lead onsite manager will represent Alibang Farm. Meetings with the advisory committee are held two to three times a year.

...We will report how we're doing and what kind of question we have face and maybe how we're going to solve it. And we'll have some counsel from the teachers or the special guests to help if they have any ideas... So, the meaning for that meeting is to solve the problems we face and also to let the people know what we are doing. And also we're keeping on track with the contract. So, we don't go beyond or go over what the contract didn't want us to do.

- OS1 (Int 1)

As mentioned in the staff section, the Alibang Farm team also attends workshops and conferences around Taiwan to learn about conservation and wetland management (**Int 1**). Mr Wang also attended meetings to offer advice on what worked with managing Alibang Farm previously.



Chapter 5: Applying the OECM criteria to Alibang

This chapter discusses Alibang Farm's OECM assessment results and their implications for the management of the site.



In order to complete the OECM site-level assessment, a range of site, monitoring and management data had to be collected. This is highlighted in the ‘information needed’ sections of the site-level identification tool (Jonas et al., 2023). Within these ‘information needed’ sections, are specific questions, for example: for site and biodiversity, one question asks “*Describe how the site’s size and configuration relate to the conservation of its important biodiversity values*” (Jonas et al., 2023, p. 9), while it is often assumed that a large site area is better for conservation (Volenc & Dobson, 2020), this question requires a more detailed understanding of the site and important biodiversity values to be answered, rather than only the site’s area. This process of gathering more detailed knowledge was particularly useful for Alibang Farm as most of the site information was either only known to the previous managers, or had not been collected systematically in the past 20 years. Additionally, it highlighted aspects of governance and management that had not been considered as deeply before, particularly the definition of the site’s ecosystem as a whole, in relation to landscape connectivity, and the site’s dual ownership. Furthermore, since Alibang Farm did not have a formal management plan, information needed for the OECM site-level assessment is also information needed to create an effective management plan, as outlined by the IUCN (Hockings et al., 2019).



5.1 Results of Alibang Farm OECM assessment:

There were some slight discrepancies between the individual assessment (done by the author) and the assessment done during **Workshop PO8**.

Table 5 Results of Alibang Farm's OECM Assessment through both individual assessment and participatory group workshop (**PO8**).

Criterion Description		Indv.	PO8	Brief Reasoning (PO8)
1	The site is <u>not</u> a protected area.	✓	✓	In Taiwan, only sites managed by the government are considered protected areas.
2	There is reasonable likelihood that the site supports important biodiversity values.	✓	✓	Alibang Farm meets the categories a) rare, threatened, or endangered species and ecosystems; and c) high-level of ecological integrity or intactness.
3	The site is a geographically defined area.	Partially Met	✓	The site's boundaries are based on the property boundaries of the cadastral map.
4	The site is <i>confirmed</i> to support important biodiversity values.	✓	✓	Yes, though monitoring and population data should be increased to support the confirmation.
5	Institutions or mechanisms exist to govern and manage the site.	✓	✓	Yes, because the site is a private property, any activities occurring onsite are regulated and on-site threats minimised.
6	Governance or management of the site achieve or are expected to achieve the <i>in-situ</i> conservation of biodiversity values.	✓	✓	Yes, biodiversity conservation is one of the main goals of management of the site. A threats and pressures analysis has been carried out and there is a management plan to address them.
7	In-situ conservation of important biodiversity values is expected to be for the long term.	Partially Met	Partially Met	Due to the management trial situation, the TEIA's long term management of Alibang Farm is not confirmed. This being said, unless the property is sold, it is likely to continue to be conserved.
8	Governance and management arrangements address equity considerations.	Partially Met	✓	Yes, because Alibang Farm is private property, equity considerations do not apply.

5.1.1 Criterion 3: Boundaries

This criterion refers to the physical boundaries of the site. Alibang Farm's site boundaries are defined by the property lines of the cadastral map. The reason why this criterion was defined as 'partially met' from the individual assessment is due to the

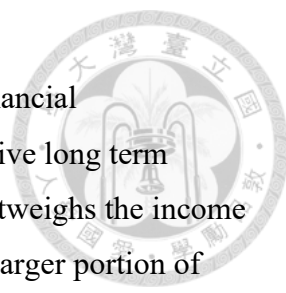
governance issue mentioned in **Section 4.2**. Since the land is currently split in ownership, the cadastral boundaries are not the true boundaries of management. This problem of legitimacy will be fixed in the case that both Mrs Zhang and Mr Wang entrust of their sections of land to the TEIA to create a proper nature trust with the combined section.

The OECM site level assessment tool also includes ecological boundary as a potential descriptor of the site. This is not a gap in Alibang's management, but it raises something to consider in management. Alibang Farm's ecological influence extends further downstream, particularly into the neighbouring residential pond and fields across from the northern boundary of Alibang Farm. Both of these areas are included in the amphibian surveys done by interviewee **P-2**. Staff at Alibang Farm already have a standing relationship with their neighbour across the road and, as the Taipei frogs appear to be moving Northward (**Int. 2**), the connection is likely to be increasingly important. In addition to the Taipei frogs, movement between the sites increases the risk of roadkill for all animals, for example during **PO4** a Murphy's mud snake (*Hypsiscopus murphyi*), was found killed on the road between Alibang Farm and the neighbouring fields. Roadkill was a threat identified individually, but it does not appear to be severe yet. And while connectivity of flora was focused on in workshops, connectivity of fauna may be another aspect to consider.

5.1.2 Criterion 7: Long-Term Management

Criterion 7 highlights two issues in relation to Alibang Farm; the first being the current governance of Alibang farm. Currently, Alibang's agreement is only signed for five years, and though the TEIA intends to continue to manage Alibang farm, it is not guaranteed. One of the key barriers for the TEIA was the fact that the association could not legally create a nature trust on agricultural land (**Int 1**). Now that the TEIA has created the Trust in Nature Foundation, it is legally able to make Alibang Farm an official nature trust, under the TFN. If and when Alibang Farm is handed over to the TEIA and TNF, then long term rights to management the site will be secured.

Though long term management rights may be secured, the second limitation to meeting criteria 7 is Alibang Farm's lack of financial sustainability. OECM criteria 7 focuses on

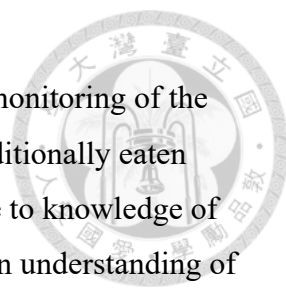


long term governance and legal protections, however the issue of financial sustainability is also one that will affect the ability to carry out effective long term management of the site. Alibang's costs of management currently outweighs the income than the site generates. Though there was an agreement to arrange a larger portion of donations to Alibang Farm as mentioned in **Section 4.4.1.1**, whether this will be enough to maintain long term management is still yet to be seen.

5.1.3 Criterion 8: Ethical Considerations

In regards to the individual assessment, criterion 8 was deemed as 'partially met' for two reasons. Drawing from the assessment tool, the first reason that criterion 8 was 'partially met,' was in relation to '*procedure*' and '*participation*' (Jonas et al., 2023). Though Alibang Farm is involved with some members of the local community through business partnerships; other ethical considerations, such as participatory decision making, are not expressed directly in the management plan. From the Alibang Farm staff's perspective, Alibang Farm is private property, therefore ethical considerations do not apply as they would in other conserved areas (**PO8**). Moreover, the OECM criteria does specify that ethical considerations should be included "where applicable" (Jonas et al., 2023). However, involving the local community is important for the third goal of management, Satoyama partnerships, and therefore including involvement in management planning may help build those partnerships and relationships; particularly because the onsite managers are not locals themselves. Furthermore, involving the community more in management and decision-making aspects of Alibang Farm, may decrease some of the tensions mentioned in the **Section 4.4.2.1** and improve social outcomes (Young et al., 2013).

One idea that arose during writing, was a partnership between Alibang Farm and members of local community for reducing the fish population in the ponds. Fish were identified as a threat to biodiversity in both **Int 1** and **Int 2**, because they eat frog eggs. Fish are present in several of the ponds and are already caught by management. Therefore, since someone was already caught fishing at the site, why not invite members of the community to fish (under suitable and specific conditions) for the site management. In this way, a relationship could be built with the members of the community, and open a door to learning more about Alibang Farm and the conservation



work being done there. This could also help Alibang Farm with the monitoring of the species and populations. There are some potential issues, such as traditionally eaten endangered species like the soft-shell turtle being at a higher risk due to knowledge of their presence at the site. But it is hoped that through a partnership, an understanding of the biodiversity value of the species and the site in general could be appreciated and respected.

The second part of criterion 8, is an important first step before the equity considerations above are taken. This is the full participation and consent of all stake holders, particularly the site owners. This was not met at Alibang Farm, due to the current lack of communication and involvement of the main ownership rights holder, Mrs Zhang. Once again, in the case that an agreement is made with both owners of the site, criterion 8 is likely to be met.

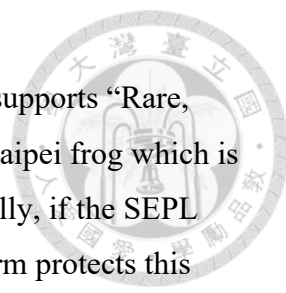
5.1.4 Criterion 4: Confirmation of Biodiversity Support

Though OECM criterion 4 was met by Alibang, more monitoring is needed to understand the baseline population data and to track population trends and general site characteristics, such as the influence of the surrounding forest on the ponds mentioned in **workshops PO5** and **PO7**. Regular monitoring of key biodiversity values is still needed to the ‘*confirmed* support of important biodiversity values,’ and effectiveness of management (IUCN-WCPA Task Force on OECMs, 2019). Some areas identified for further monitoring were hydrology, particularly the monitoring of water levels of the ponds, water quality, and the surrounding forest.

5.2 Further Exploration of the OECM Criteria

Identifying Biodiversity Value

The OECM assessment criteria 2 and 4 both mention conservation of important biodiversity values. Though it is undeniable that Alibang Farm has important biodiversity factors, it has been the reliable quantification and definition of the site’s values that has proven difficult for Alibang Farm. This section explores the complexities of Alibang Farm’s unique situation.

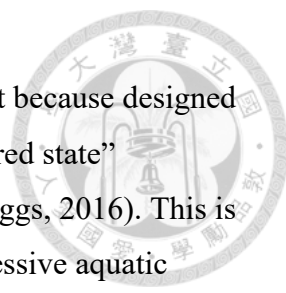


Alibang Farm was identified as meeting criterion 2 and 4 because it supports “Rare, threatened or endangered species and ecosystems,” specifically the Taipei frog which is on the Taiwan Red List (Catalogue of Life Taiwan, 2024). Additionally, if the SEPL ecosystem type of agricultural pond wetland is accepted, Alibang Farm protects this threatened wetland ecosystem (Yen & Liu, 2019). This being said, the current population of Taipei Frogs has been decreasing (**Int 2**), and Alibang Farm itself is *not* an SEPL, since the ponds were not made, or used for agriculture. Furthermore, the surrounding forest is likely to have unique influences on the pond system that would not be present for other agricultural ponds.

From further research of the literature, the location of Alibang Farm places it within the climate suitability range of the ‘*Pyrenaria-Machilus winter monsoon*’ forest type as identified in Li et al. (2013); (Lin et al., 2020). Additionally, roughly 33.3% of the plant species surveyed in **PO1** are from the representative genera of the forest type (Li et al., 2013). Though this is not a confirmation of the forest type of Alibang Farm, this category does give more insight into the potential historical state of Alibang Farm’s forest, and can be a starting point for further inquiries.

One key topic, though not mentioned directly during the workshops, is that Alibang Farm can be considered as a novel or artificial ecosystem, due its multiple land use transitions and the combination of both the forest and wetland ecosystems. Often the aim of management for novel and altered ecosystems is to return and restore it to its historic function (Hobbs et al., 2014). This is a reason why understanding the historic state of Alibang farm was important in management workshops (**PO5, PO7**). This being said, the historic state of Alibang did not include agricultural wetlands, so there is a limit to what the historic state of the site can provide. With the shift in value of novel ecosystems in conservation (Hobbs et al., 2014), Alibang Farm provides “*ecological and social values that need to be preserved*” (pg. 560). Therefore, restoration to the historic state may not be necessary, and the management of Alibang Farm as a wetland is still valuable.

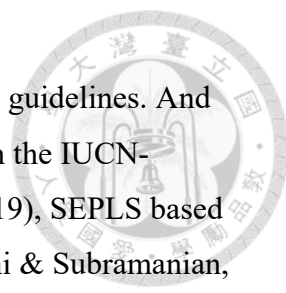
The fact that the ponds at Alibang Farm were created to conserve wetland species, means that Alibang Farm could be more appropriately categorised as a ‘designed



ecosystem’ (Higgs, 2016). This distinction is of note for management because designed ecosystems often need constant maintenance to keep it in the “preferred state” particularly due to them being easily invaded by invasive species (Higgs, 2016). This is already seen at Alibang Farm with the constant need to remove aggressive aquatic plants and fish from ponds, and invasive frogs from the site. Additionally, while novel ecosystems are often categorized as “self-sustaining” (Yaynems, 2022), this is likely not the case for Alibang Farm; due to the large water input from the irrigation channel, and the declining number of Taipei frogs (**Int 2**). This decline in Taipei frogs may be representative the current dynamic relationship between the wetland ecosystem and the regrowing forest (**Int 2**). The constant maintenance needed to sustain the wetland ecosystem is a concern for management because it will likely add to the long-term financial pressure. This ecosystem dynamic and need for maintenance is important to consider in the focus and goals of management.

Though the purpose of this thesis is to explore the *process* of OECM recognition, the biodiversity value is also important to consider if Alibang Farm wants to be officially recognised. OECM criteria and guidelines do not include mention of novel or designed ecosystems, instead focusing on natural or restored ecosystems (IUCN-WCPA Task Force on OECMs, 2019). Additionally, recently restored sites will not be considered OECMs until they display that they can support biodiversity values for the long term (Sharma et al., 2023). This is understandable from a conservation point of view, particularly because it is based on the Aichi Target 15 (Ecosystems restored and resilience enhanced) (IUCN-WCPA Task Force on OECMs, 2019). Additionally, there is still contention in the ecology community about the value of novel ecosystems (Yaynems, 2022). Conversely, Hobbs (2014) states that novel ecosystems may become key points of connectivity *between* natural landscapes. And while their value may be in connectivity, whether this qualifies them to be OECMs in their own right is still in question.

The OECM site level tool does, however, accept sustainably used sites that have “*Sustainable traditional or low-impact management of natural resources as long as this is consistent with the in situ conservation of important biodiversity values*” (Jonas et al.,



2023, p. 13). This is the closest mention of SEPLS within the OECM guidelines. And while there is no direct mention of SEPLS or Satoyama landscapes in the IUCN-WCPA's OECM concept (IUCN-WCPA Task Force on OECMs, 2019), SEPLS based research often includes OECMs into theirs (Dunbar et al., 2022; Nishi & Subramanian, 2023; Subramanian et al., 2018; Takahashi et al., 2022).

Furthermore, the IUCN-WCPA does recognise urban or municipal parks that are *“managed primarily for public recreation but which are large enough and sufficiently natural to also effectively achieve the in-situ conservation of biodiversity (e.g. wild grassland, wetlands),”* as OECMs (IUCN-WCPA Task Force on OECMs, 2019, p. 11). These types of parks may have similar anthropogenic characteristics as artificial or SEPLS systems, but still, there is an emphasis on “natural” biodiversity. This disconnect between OECMs and SEPLS is due to some considering SEPLS to be part of Aichi target 10 (Pressures on vulnerable ecosystems reduced); while in Japan (particularly the University Institute for the Advanced Study of Sustainability which publishes a large portion of SEPLS research) includes SEPLS into their OECM definition (Sharma et al., 2023). The recognition of Alibang Farm as an OECM may depend on whether Taiwan will follow Japan in including SEPLs into their OECM identification guidelines, and if Alibang Farm's biodiversity value is determined to be natural enough to be considered an OECM.

The biodiversity value of Alibang Farm's ecosystem status is important to consider, not only for eventual recognition as an OECM, but also for considering what types ecological interventions such as restoration and maintenance are needed to ensure long-term conservation. Looking into the recognition of novel, designed and other human altered ecosystems as OECMs may be an area of future research.

Chapter 6: OECM Recognition as a strategic framework for the management of nature trusts



The following chapter explores how the OECM criteria can be applied as a strategic tool for nature trusts by comparing the OECM criteria to nature trust discourse. Many of these issues are related and interlinked.

6.1 Topics Addressed by the OECM Criteria

6.1.1 Site Value

With the rapid increase of nature trusts and nature trust sites, particularly due to tax incentives in the US, the quality of some nature trust sites came into question due to their minimal biodiversity value (McLaughlin, 2013; Parker & Thurman, 2018). Furthermore, the increase in non-conservation related allowances and potential greenwashing raised questions of ‘self-serving motives’ within privately protected areas (Gooden & ‘T Sas-Rolfes, 2020, p. 1026; Rissman et al., 2007). Site value is identified in the OECM criteria screening criterion 1, and criterion 4. These criteria outline six important biodiversity values, one of which must be present in the potential OECM site. This focus on the logic behind site creation is useful for nature trusts because it takes into account the quality of the site being conserved. If a potential nature trust site does not meet one of the biodiversity values in criteria 1 and 4, then it may not be a good allocation of resources for the NGO who may need to expend large amounts of effort to restore the site. Furthermore, it may raise a red-flag to the true intentions behind donation and conservation of the site.

6.1.2 Site Information

A lack of site data and effective management plans is a common limitation of nature trusts, particularly those managed by smaller NGOs and conservation easements (Alexander & Hess, 2012; Peters et al., 2017; Rissman et al., 2007). This can be for multiple reasons such as lack of monitoring, limited resources and people; and will affect the overall implementation effectiveness of the site (Gooden & ‘T Sas-Rolfes, 2020; Parker & Thurman, 2019; Rissman et al., 2007). This could be seen in our case study, which was limited by funding and people power.



The process of the OECM assessment, guides the gathering of site and management information needed to complete the assessment, but also mirrors what is needed to create a management plan (Mitchell, Stolton, et al., 2018). Without efficient monitoring, management actions cannot be reviewed for their effectiveness. This is covered in OECM criterion 4: “*there should be a clear association between the management and biodiversity outcomes, with mechanisms in place to address existing or anticipated threats*” (IUCN-WCPA Task Force on OECMs, 2019, p. 5). This criterion accounts for the need of both monitoring of important biodiversity values, and the creation of management plans for nature trusts. Additionally, it requires a link between management actions and biodiversity outcomes; addressing this issue for nature trusts.

6.1.3 Long term management:

Discourse on long term management for nature trusts sits on two sides of the spectrum; the first is that nature trusts lack reliable long-term protection, even when in “perpetual” conservation easements (Langholz & Krug, 2004; McLaughlin, 2013; Merenlender et al., 2004). Conversely, the perpetuity of conservation easements may also be *too permanent*, particularly if NGO management fails or environmental conditions change (Cheever, 1995; Merenlender et al., 2004; Murray et al., 2015). If a change in ecological conditions require a change in management, conservation easements must include some degree of flexibility (Merenlender et al., 2004; Rissman et al., 2014). While not all nature trusts are protected using conservation easements or their equivalents, effective protection and adaptive management planning are still important for effective outcomes (Leverington et al., 2010). Particularly, as planning for climate change is also becoming increasingly important for area-based conservation (Tanner-McAllister et al., 2017; Thomas & Gillingham, 2015).

The OECM criteria’s section for long-term management is criterion 7. Within the ‘*Guidance on criteria 7,*’ section, the first two points focus on governance, in regards to the reversibility and legitimacy of protection measures. This directly links to the first issue of the longevity of nature trusts, reducing the risk that the site may stop being managed for conservation. The last point of the guide refers to the second issue of nature trust longevity, where the potential OECM site ‘*governance and management arrangements can be expected to effectively respond to future threats*’ (Jonas et al.,

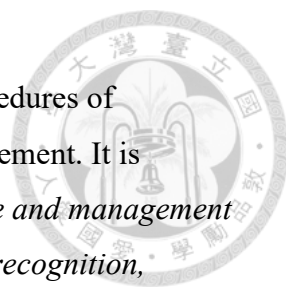
2023, p. 14). Though not explicitly stated, these future threats are likely to include climate threats, and reflect the need for flexible management.



6.1.4 Value Conflict:

Gooden and 'T Sas-Rolfes (2020) identified a key theme of *value conflict* that encompasses a range of issues for private protected areas, including nature trusts. These issues include cultural conflict, inequity, exclusion, neocolonialism and the neo-liberalization of conservation; all of which are also general issues for area-based conservation (Domínguez & Luoma, 2020; Gurney et al., 2023; Langholz & Krug, 2004). Cultural conflict arises when site managers (usually outsiders) and local communities view land and management differently and, or, have different goals for the conserved site (Ancrenaz et al., 2007).

The issue of equity, particularly of exclusion, is one that has plagued area-based conservation across governance types (Gurney et al., 2023). Nature trusts vary in their accessibility, with some countries such as New Zealand having public access as a common feature (Rodgers & Grinlinton, 2020), while other in other countries public access is heavily restricted (Bastian et al., 2017; Beckman et al., 2023; Rissman & Merenlender, 2008). This is particularly an issue when nature trusts may be created on land that, while privately owned now, have a history of dispossession from indigenous or local communities and therefore contribute to continued exclusion, colonial violence and neo-colonialism (Beckman et al., 2023; Cooke et al., 2023; Domínguez & Luoma, 2020; Massé & Lunstrum, 2016). Exclusion can be mitigated through the inclusion of local and indigenous communities in management planning, which can also have benefits to the success of conservation projects (Ancrenaz et al., 2007). Furthermore, the tax incentives and removal of land for development by wealthy donors can perpetuate wealth inequalities, and add to the neo-liberalisation of conservation (Domínguez & Luoma, 2020; Langholz & Krug, 2004; Van Sant et al., 2020). This neo-liberalism stems from the monetization of the conservation of 'public goods' (Massé & Lunstrum, 2016), and is linked to the potential 'self-serving' act of landowners preferring conservation easements agreements that have higher benefits (Bastian et al., 2017); or creating areas for monetary gain, such as from ecotourism (Langholz & Krug, 2004). Within the OECM criteria, equity considerations are addressed in criterion 8. This criterion is focused on 'recognition,' 'procedure,' and 'benefits' which refers to the



recognition of indigenous or local stakeholders, inclusion in the procedures of management, and a sharing of the benefits of the outcomes of management. It is important to note the questioning of the criterion “*Do the governance and management arrangements include **efforts to address the three aspects of equity** (recognition, procedure, distribution), **where applicable?***” (emphasis added, Jonas et al., 2023, p. 16). While equity is included into the OECM criteria, it is fairly gentle in wording, allowing space for potential “paper management” which, like paper parks, are only exist in writing, rather than real effort. Though it is hoped that this will not be the reality, inclusion of equity considerations within the OECM criteria may highlight the issue for nature trusts that may otherwise ignore them all together.

6.2 Topic not addressed by the OECM criteria

6.2.1 Finance

Financial sustainability was identified as a pressure for all three of the management goals, and is a highlighted issue for land trusts (Gerber, 2012; Gooden & ‘T Sas-Rolfes, 2020) and for OECMs (Alves et al., 2021; Sharma et al., 2023). However, financial sustainability is not mentioned in the OECM site level assessment tool, or in the guidelines on site recognition (IUCN-WCPA Task Force on OECMs, 2019; Jonas et al., 2023). This is important to note because without a sustainable source off funding, management actions will be limited. Financial sustainability is mentioned in the IUCN guidelines for privately protected areas (Mitchell, Stolton, et al., 2018), and for area-based conservation in general (Maxwell et al., 2020). This lack of mention of financial stability could be because OECMs allow for non-conservation related management, particularly in OECMs with ‘ancillary conservation’ (IUCN-WCPA Task Force on OECMs, 2019), therefore profit gaining activities can contribute to financial sustainability of site management. For nature trusts, financial stability is an important factor, as nature trusts will often receive a donations for land acquisition or projects, but lack long term and regular contributions to sustain management (Gerber, 2012; Pasquini et al., 2011). If the OECM criteria were to be used as a strategic framework for nature trusts, financial sustainability must be added as an extra requirement to meet criterion 7 of long-term management.

6.2.2 OECM as a management effectiveness evaluation:

Through the comparison of the case study against the OECM criteria, a snap shot of the effectiveness of management could be seen. From our case study, the OECM criteria highlighted the complicated governance of the site as an area that needs clarification. Additionally, the lack of monitoring and equity considerations were also areas requiring further input by management.

From the IUCN-WCPA framework for assessing (PA) management effectiveness (Hockings et al., 2006), most of the elements are included at least briefly in the OECM criteria: *Context* (criteria 1, 2, 3, and 4), *planning* (criteria 5 and 6), *inputs and process* (criteria 6, 7 and 8); *outputs* (criteria, 4, 6, 7, and 8) and *outcomes* (criteria 6 and 7). Some of the links are stronger than others, particularly the for the contexts and planning (site value, threats, and governance) and outputs (in-situ conservation and for the long-term). *Inputs* and *process* factors are less obvious. For inputs, the lack of financial sustainability in the OECM criteria was identified earlier in this chapter. Additionally, there is a lack of assessment of management actions within the OECM criteria which mostly focus on output, namely, long-term in-situ conservation of important biodiversity values. While this may decrease the power of the criteria as an evaluation tool, this openness allows for the range of governance types and management goals that may fall under the OECM categorisation but still achieve the outcome of long-term biodiversity conservation.

Compared to the popular METT4 assessment tool, the detail of out-put of the OECM criteria is also much less. The METT4 assessment tool provides a detailed description of each aspect of management and governance, including financial sustainability (section 12 “*current budget*”). For the creation of the management plan for Alibang Farm, only the threats and pressures analysis was used. The analysis was helpful because it categorises a range of threats to management and governance and provides examples of each. Additionally, it includes spatial and temporal scales for the extent of each threat. The wide range of threat categories can inform managers of threats that may not otherwise be considered, and the additional severity measurement can help managers identify priorities for management actions.



Conversely, the OECM site-level assessment tool has three information gathering questions related to threats and pressures. The most analogous to the METT4 threats and pressures analysis is: *“List any current pressures on the biodiversity values and ecosystem services of the site. These pressures may originate inside the site (e.g., illegal logging) or outside the site (e.g., pollution)”* (Jonas et al., 2023, p. 11). The OECM criteria also includes future threats. The OECM site-level assessment tool’s lack of detail in this section may not be a disadvantage, as during the METT4 threats and pressures analysis of Alibang Farm, there was not enough site information to answer most of the questions of severity and extent. Additionally, the site-level assessment’s overall simplicity means that the process may take 1-2 hours, as opposed to the length of the full METT4 assessment that may take multiple days (Stolton et al., 2019). In this way, nature trusts that may be new and lack site information, and, or, management plans may be able to use the OECM assessment as a quick effectiveness tool to evaluate the major areas they need for improvement.

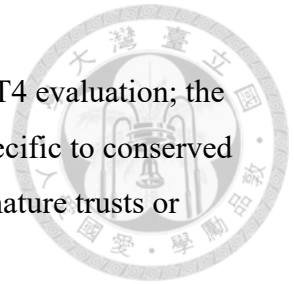
6.3 Building the framework:

This chapter shows that the OECM criteria addresses some of the key issues of site value, site information and value conflict within nature trust discourse. Additionally, OECM criteria is based on the key elements needed for effective management. Since the OECM criteria are outcome based, the site-level assessment tool can provide guidance on what meeting each of the criteria looks like. Therefore, OECM criteria can be used as goals for nature trusts to create effective management plans. This being said, there many other issues associated with nature trusts not addressed in this study (Gooden & ‘T Sas-Rolfes, 2020), therefore further research into the applicability of the OECM criteria for other nature trust issues is needed.

As seen for our case, the process of the OECM assessment can help identify the key information needed for effective management and guide data collection. In order to be most useful, nature trusts should consider financial sustainability within criteria 7, long-term management. For sites that already have management plans, the OECM criteria could act as a brief management effectiveness evaluation tool that can be used to identify areas for improvement as done with our case study. While the power of the

OECM criteria as an evaluation tool is less than others like the METT4 evaluation; the OECM criteria requires less detailed information, less time and is specific to conserved areas. This means it could be a helpful strategic framework for new nature trusts or those with less capacity or information for other evaluations.

Finally, as nature trusts rely heavily on donations for management, the results of OECM assessments could be used as accountability reports for nature trusts to present to donors. Though this was not explored in the current study, this could be an area for future research. For example, the OECM assessment results could be presented in annual reports, to show the status of the nature trust for the year, and OECM criteria not met could become the focus of management for the next year. The simple 8 criteria format could make it accessible and quick for donors to determine the current effectiveness of the nature trust, and inform their decision to start or continue financial support.





Conclusion:

In the years since the handover of management to the TEIA, the Alibang Farm management team have been working towards generating a solid understanding of the biodiversity of the site and creating an effective management plan. Though aspects of the site's biodiversity value, namely its ecosystem type are still yet to be confirmed, a management plan was formed and compared to the OECM criteria. Alibang Farm met 5 of the OECM criteria in the individual assessment, with the criteria not met highlighting key complications with the site's governance. The OECM assessment also highlighted potential areas where equity considerations may improve social tensions, decrease threats and contribute to the management goal of Satoyama partnerships. Alibang Farm's unique 'designed ecosystem' could affect Alibang Farm's actual recognition as a OECM in the future; however, the value and goal of the assessment process for this study is in the information gathering process and evaluation of effectiveness of Alibang Farm's current management plan.

One key threat to Alibang's management that the OECM criteria did not cover was financial sustainability. Since financial sustainability is a common issue for nature trusts, for the OECM criteria to be used as a strategic management framework, financial sustainability should be considered within the current long-term management criteria. The unique dependence of NGOs, on donations compared to other governance types can be a major limiting factor for effective management, as seen in the case study.

Otherwise, the OECM criteria covers a range of critiques of nature trusts such as site value and information; long-term, flexible management; and value conflicts. Through this case study the OECM criteria and assessment was found to be a useful strategic framework for management. Further case studies of other nature trusts can be used to support the findings of this research, as well as research into the use of the OECM assessment as a reporting tool to present to current and potential donors.

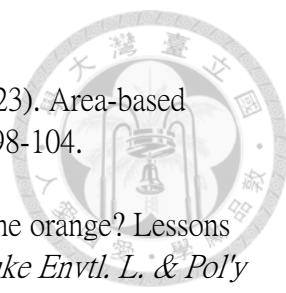


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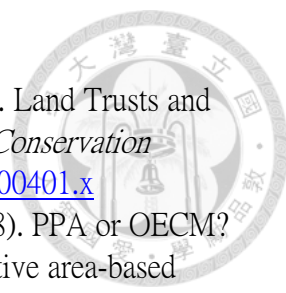
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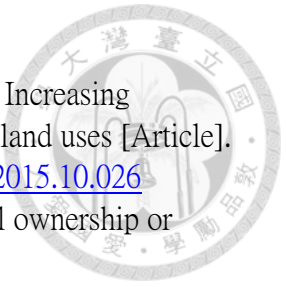
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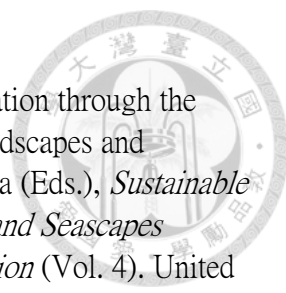
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