



Ecotourism as a Tool for Mangrove Conservation

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Abstract

Intertidal mangrove forests cover much of the coastline of Southeast Asia, provide crucial ecosystem services to millions of people living in the coastal zone, and are some of the most biodiverse in the world. However, they are one of the most threatened ecosystems in the tropics due to land cover conversion to agriculture (rice, oil palm) and aquaculture. Several conservation tools have been suggested to reduce mangrove deforestation, with many recent tools based on financially valuing the mangrove ecosystem and using that money to incentivize habitat protection. An important set of ecosystem services that can potentially be paid for under some settings are cultural values, such as recreation, tourism, spiritual value and aesthetic value. Ecotourism potentially represents a set of sustainable tourism principles that utilize the cultural ecosystem services of habitats to provide income to tourism operators and local communities. While we don't yet have a comprehensive and large-scale overview of the full extent of mangrove ecotourism activities in the region, numerous case studies suggest the importance of these activities in bringing mangroves and people together. However, ecotourism must be implemented correctly in order to minimize the adverse impacts of tourists on local habitats. These impacts can be physical, including increased shoreline erosion, noise and pollution, or social, including the exclusion of local tour operators and communities. We need to understand these impacts, and how to reduce them, if we want to better conserve mangrove forests using neoliberal approaches such as ecotourism.

Keywords: Ecotourism, Mangrove, Conservation

Introduction

Mangroves are a coastal forested ecosystem found in the intertidal zone across the tropics (see Spalding *et al.*, 2010; Friess, 2016a for introductory texts describing the mangrove ecosystem). Mangroves are a hugely biodiverse ecosystem, home to unique vegetation species that are adapted to living in the dynamic coastal zone, and a range of terrestrial and aquatic fauna such as insects, crabs, snakes, and charismatic megafauna such as otters, crocodiles, deer and the Royal Bengal tiger. Covering an estimated 137 500 km² in 2001 (Giri *et al.*, 2011), mangroves in Southeast Asia were being lost at 0.2% per year in the last decade, with Indonesia losing almost 50 000 hectares between 2000 and 2012 (Richards & Friess, 2016; Figure 1). Much of the mangroves lost in Southeast Asia were converted to rice agriculture (Webb *et al.*, 2014) aquaculture and oil palm, due to economic incentives and government policies promoting food security. Mangroves also face future threats related to climate change, including increasing storm intensity (Ward *et al.*, 2016) and accelerated sea-level rise (Lovelock *et al.*, 2015; Sasmito *et al.*, 2016; Figure 2) that pushes the mangrove ecosystem beyond species-specific thresholds of tolerance to tidal inundation (Friess *et al.*, 2012). Mangroves have been under government protection in much of Southeast Asia for decades to centuries (Friess *et al.*, 2016a). However previous protection measures have often not balanced mangrove conservation with the opportunity costs of other economic land uses that could replace mangroves. To address this, a number of neo-liberal economic tools have been promoted for mangrove conservation, including Corporate Social Responsibility, Payments for Ecosystem Services (PES) and ecotourism. These tools utilize the benefits provided by mangrove systems to provide the ecosystem with financial value in order to offset alternative land uses.

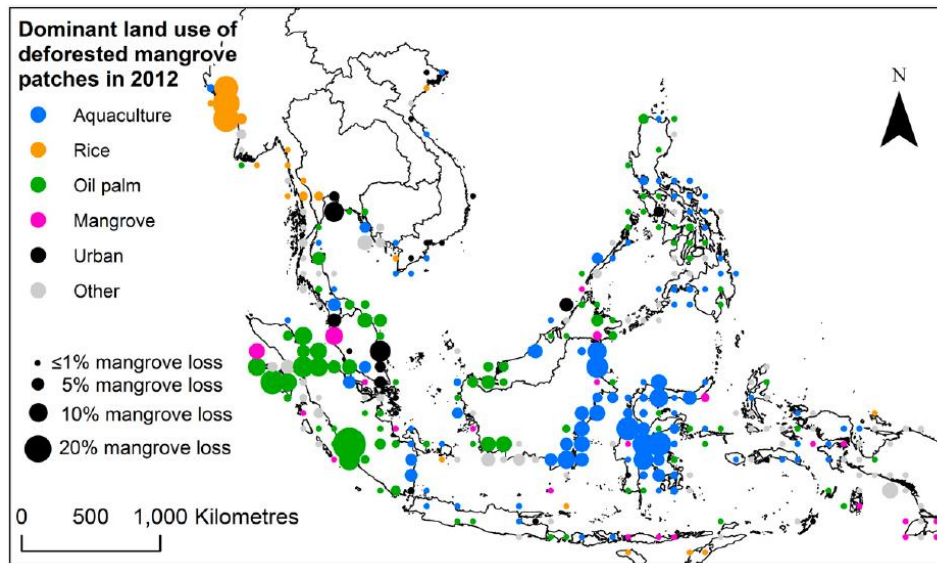


Figure 1. Recent (2000-2012) Mangrove Conversion in Southeast AsiaSource (Richards & Friess, 2016)

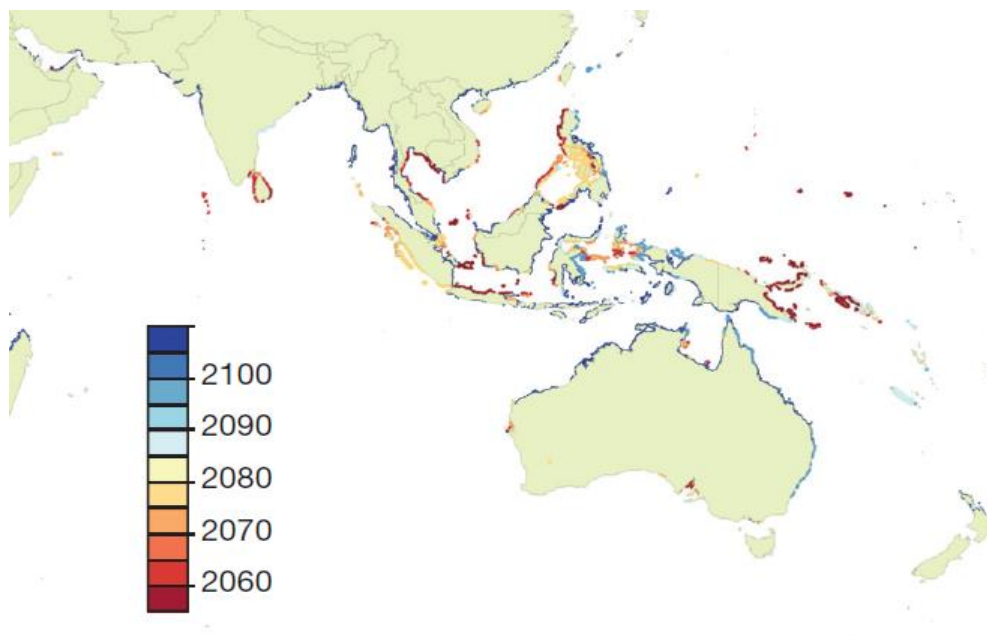


Figure 2. Projected year of inundation of Indo-Pacific mangroves under the RCP8.5 scenario from the Intergovernmental Panel on Climate Change (Source: Lovelock *et al.* 2015)

In this paper I discuss the various benefits, or ecosystem services that mangroves provide to coastal populations, with a focus on cultural ecosystem services such as tourism and recreation. I then discuss how these ecosystem services can be paid for through various neo-liberal tools, such as ecotourism. Finally, I focus on the potential benefits of ecotourism, and the potential impacts it can have on the mangrove ecosystem.

Ecosystem Services of Mangroves

Mangroves provide a wide range of ecosystem services (Mukherjee et al., 2014; Figure 3), which refers to the goods and benefits that ecosystems provide to human populations. Ecosystem services were popularized through the Millennium Ecosystem Assessment (MEA, 2005), who considered ecosystem services in 4 categories of provisioning, regulating, supporting and cultural services. Ecosystem services provide a framework for quantifying, and potentially valuing or monetizing ecosystem benefits. Mangroves have been tentatively estimated at an average of US\$4185 per hectare per year (Brander et al. 2012), though huge issues exist around ecosystem quantification and valuation, and such averages hide huge local variations in ecosystem service value.

<p>Provisioning services</p> <ul style="list-style-type: none"> • Raw materials for building construction and fishing equipment • Seafood caught or gleaned in mangroves (e.g. fish, crustaceans, bivalves) • Tannins and waxes acquired from trees • Forest food products such as honey, seeds 	<p>Regulating services</p> <ul style="list-style-type: none"> • Climate regulation through carbon storage and sequestration • Coastal protection through wave attenuation • Erosion control through sediment stabilization and soil retention • Water purification through pollutant assimilation and nutrient filtering
<p>Supporting services</p> <ul style="list-style-type: none"> • Maintenance of fisheries as safe nursery grounds and reproductive habitat • Soil formation • Photosynthesis and nutrient production 	<p>Cultural services</p> <ul style="list-style-type: none"> • Recreation and leisure • Educational opportunities • Aesthetic contribution • Cultural heritage (e.g. community traditions and folklore) • Spritual and religious contributions

Figure 3. The range of ecosystem services provided by mangrove forests
(Source: Friess & Thompson, 2016)

Provisioning Services

Mangroves have long provided multiple provisioning services to local populations (Uddin *et al.*, 2013) which are products that are derived directly from the forest. Provisioning services are generally of most benefit to local coastal communities that live close to the mangrove, and may include food resources (such as fish and shellfish), timber and non-timber forest products (Dahdouh-Guebas *et al.*, 2000; Walters *et al.*, 2008; Lau & Scales, 2016). Several mangrove forests across Southeast Asia are managed explicitly for their provisioning services, especially timber and charcoal.

Regulating and Supporting Services

Mangroves provide a range of services that either support the production of other ecosystem services (e.g., photosynthesis, nutrient production), or regulate physical and ecological processes that occur in the mangrove environment. Mangroves gained a lot of attention in 2005 after the Southeast Asian tsunami for their perceived role in protecting coastal communities and reducing damage from natural hazards. This has led to huge funding opportunities for mangrove restoration in order to reduce coastal population vulnerability, though more research is needed to fully understand the role of mangrove vegetation in regulating incoming hydrodynamic energy. More recently, mangroves have been strongly valued for their



role in sequestering and storing atmospheric carbon, as a potential way to absorb atmospheric carbon dioxide and mitigate anthropogenic climate change. Carbon dynamics have been studied in the mangrove ecosystem for decades, though rose to prominence in the NGO and policy communities after the publication of an important study that showed that the degree of carbon storage in Indo-Pacific mangroves exceeded that of most of terrestrial ecosystems (Donato *et al.*, 2011). Since the publication of this article, a number of studies have measured carbon stocks using field Method (e.g., Phang *et al.*, 2015) or satellite remote sensing (Jachowski *et al.*, 2013; Friess *et al.*, 2016b). These studies have shown that Singapore's mangroves can store the annual carbon dioxide emissions of 621 000 residents (Friess *et al.*, 2016b) and Indonesia's mangroves contribute up to 31% of Indonesia's annual carbon emissions from land use change, despite accounting for only 6% of all deforestation in the country (Murdiyarto *et al.*, 2015).

Cultural Ecosystem Services

Cultural ecosystem services refer to a broad range of tangible and abstract cultural benefits that mangroves provide to people. These can include quantifiable services such as tourism, recreation and education, and unquantifiable services such as spirituality, sense of place and aesthetic considerations (MEA, 2005). There is little emphasis on cultural ecosystem services generally, and this is especially true for mangrove ecosystems (James *et al.*, 2013), where there are significant knowledge gaps. The cultural value of mangroves was recorded in the academic literature as early as 1857 (Friess, 2016b), where stories and legends were recorded from indigenous groups in Fiji, with particular gods associated with different areas of the mangrove forest (MacDonald, 1857). Mangroves can still have important spiritual and ceremonial use today (James *et al.*, 2013), even in heavily urbanized locations such as Singapore (Thiagarajah *et al.*, 2015).

Tools to pay for ecosystem services

Conservation actions are chronically underfunded in many parts of Southeast Asia, especially for marginalized ecosystems such as mangrove forests. Thus, many decision makers have begun to move conservation away from state-managed protected areas towards neoliberal conservation approaches that financially incentivize conservation and promote the establishment of private-public partnerships (Friess *et al.*, 2016a).

Corporate Social Responsibility

Companies are increasingly willing to fund conservation activities through Corporate Social Responsibility (CSR) initiatives. These are generally voluntary initiatives that are designed to have a positive environmental or sustainable development impact. Several examples of mangrove CSR exist, such as the replanting of mangroves by the Japanese insurance company Tokio Marine, where they used the carbon storage ecosystem service of mangroves to contribute to making their operations carbon neutral. The ecosystem service value of this scheme has been estimated at almost 340 million USD (Tokio Marine, 2016). Other examples of CSR in the region include companies funding mangrove visitor and education centres in Thailand. CSR can be a method for companies to prove their green credentials, to gain publicity, or to offset negative aspects of their industrial operations.

Payments for Ecosystem Services

The conservation intervention of Payments for Ecosystem Services (PES) is broadly defined as the transfer of resources to improve natural resource management or conservation, with such transfer conditional on agreed rules (e.g., Wunder, 2015; Figure 4). This generally means that a 'buyer' pays money for ecosystem service provision to a 'seller', who either conserves that ecosystem service or changes their practices that were impinging on the provision of that ecosystem service. Payments are conditional on proving that the action has had a beneficial impact on the ecosystem service, so requires a robust monitoring

arrangement. PES may be a more effective tool than CSR because it requires conditionality, with payments only given once an ecosystem service has been delivered. In CSR, payments may be given to a local community, but often no expectation of ecosystem service delivery (or monitoring) is required. However, PES faces a number of challenges in terrestrial ecosystems where they have most often been trialled. Challenges exist in quantifying many ecosystem services, and PES may exclude local communities from traditional lands, ignore local land tenure and recentralize habitat governance (e.g., Phelps *et al.*, 2010). Similar issues have been noted in mangrove PES (e.g., Beymer-Farris & Bassett, 2012; Friess, 2013), though we would expect even greater challenges in mangrove systems due to their position in the dynamic coastal zone. The provision of mangrove ecosystem services in a PES scheme can be reduced by a range of aquatic stressors such as pollution, changing wave conditions and sea level rise, which cannot be controlled by a PES scheme (Friess *et al.*, 2015), and it may be difficult to clearly identify distinct and different ecosystem service buyers and sellers (Friess & Thompson, 2016).

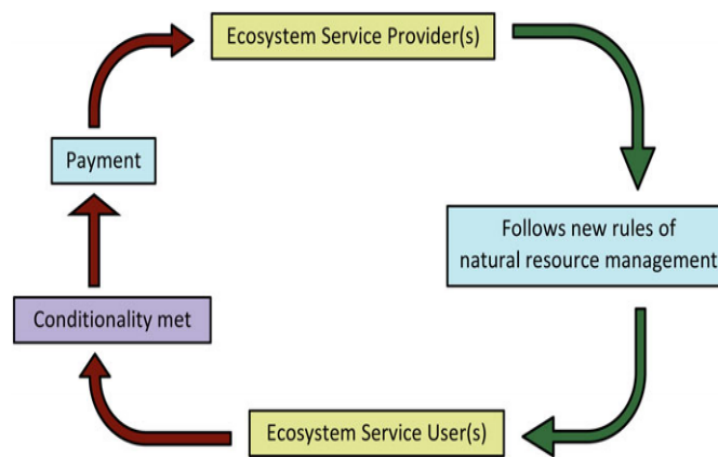


Figure 4. A framework Outlining the Main Steps in a Payments for Ecosystem Services (PES) Scheme
(Source: Friess & Thompson, 2016)

The potential for mangrove ecotourism

A third neoliberal conservation approach, loosely linked to PES is ecotourism. Ecotourism activities are broadly defined by the International Ecotourism Society as “*responsible travel to natural areas that conserves the environment, sustains the well-being of the local people, and involves interpretation and education*” (TIES, 2015), though definitions can vary between different stakeholders and management tiers within a single ecotourism scheme (Thompson *et al.*, *in review*). The Food and Agriculture Organization (FAO, 2004) make a number of recommendations about what constitutes an ecotourism site. These recommendations make a useful checklist to assess whether an activity should be considered ecotourism or not.

1. *Nature-based setting*: ecotourism sites should be rich in natural attractions; have diverse flora and fauna; be conducive to adventure and travel; have unique features and some historical and cultural values, which may be interesting and educational; not be frequented by mass tourists and not threatened by destructive activities; have untouched native or tribal tradition; and be suitable for rehabilitation and conservation by tourism activity. The area should be ideal for walking, hiking, bird watching, swimming and similar activities. Ecotourism involves travelling to relatively undisturbed natural areas to study/appreciate and enjoy the scenery and its flora and fauna. It is an environmentally sound tourism activity in a given ecosystem that yields socioeconomic benefits and enhances natural/cultural



conservation. It is a means to generate income and employment for the local population, to help develop rural infrastructure, to raise funds and to build political support for nature conservation. However, ecotourism may alter norms, beliefs and the lifestyle of the host community.

2. *Educational value*: ecotourists normally seek educational experiences to learn more about the environment. Through interpretative programs such as high-quality guided tours, ecotourism can also promote environmental awareness and cultural understanding.
3. *Local participation and benefits*: the underlying concept is the reduction of local dependence on consumptive use of natural resources through benefits from tourism. By participating in ecotourism activities (such as guiding, providing camel rides and food services), local people can earn supplementary income while at the same time ensuring the conservation of biodiversity. Sustainable resources are essential for sustainable ecotourism. To achieve both resource conservation and sustainable economic use, ecotourism must have a wide variety of groups who directly or indirectly determine the use of an ecotourism area, a strong local and hotel and resort operators' cooperation and support, some mechanisms for the involvement of different groups in the planning and management process and education of various groups.
4. *Encouraging conservation awareness*: ecotourists are normally willing to volunteer or contribute to conservation or development projects within the area. This can include identifying birds and wildlife, participating in ecosystem restoration projects and assisting in trash collection. In return, tourists receive a sense of satisfaction for conserving nature or assisting in the development of an area or community. Providing awards or certificates showing that they have contributed to the protection of the environment or assisting in community development can enhance these initiatives.
5. *Low impacts and sensitivity to the environment*: strategies to minimize the impacts of ecotourism activities include:
 1. Identifying appropriate locations for ecotourism development;
 2. Identifying proper ecotourism activities that do not harm the environment;
 3. Managing visitors;
 4. Controlling the number of visitors per trip;
 5. Controlling impacts by taking in all necessities needed as well as bringing out all trash to remote areas; and,
 6. Designing the facilities, which emphasize blending with the natural surroundings.(Text from FAO, 2004)

Much like PES, ecotourism relies on ecosystem services, particularly the explicit and implicit inclusion of various cultural ecosystem services. However, since PES has many issues (discussed above), ecotourism may be a more realistic and effective option in many locations in Southeast Asia, as conditionality may not be a prerequisite. Ecotourism has a number of potential benefits to local communities:

- *Finance and livelihood diversification*. Ecotourism attracts a range of participants, from local tourists to international tourists of varying socioeconomic levels, from young backpackers and students, to high end tourism clients. Ecotourism thus has the potential to bring in substantial new revenue sources into an area, though the exact level of revenue will depend in part on the type of participant it attracts. Financial benefits may be direct, e.g., money that is paid directly to the ecotourism operator, or indirect, through businesses that service the tourists. For example, food producers and construction companies will benefit from the need to expand facilities and feed an increased (temporary) population of visitors. Ecotourism, if successful, will also encourage livelihood diversification by providing more and different employment opportunities. Several job types are created during ecotourism operations, including service roles (maids, food serving), construction and maintenance and leisure operations (e.g., diving). Diversifying livelihoods contributes to local village resilience as financial sources are not reliant on only a few industries that may



be susceptible to sharp changes or may be financially unproductive (Nazaruddin & Armugam, 2012). However, challenges remain to livelihood diversification. First of all, adequate training must be provided in the new occupation to keep staff fulfilled and tourists happy. Secondly, there must be a desire in the local community to want to take the new jobs. Would an elderly fisherman, with little formal education and decades of experience fishing, have the skills or motivation to work in the hotel industry, for example?

- *Encouraging entrepreneurship.* Small scale tourism operations are heavily dependent on the concept of entrepreneurship (Su, 2015), and some international-level ecotourism designations (such as UNESCO Geo Park status) explicitly require stimulation of local enterprises and small businesses (UNESCO, 2014).
- *Increase in local skills and training.* Depending on the type of ecotourism operation, local communities may be trained and educated in various ways. For example, training may be given in spoken English in order to better facilitate communication with international tourists. These skills can then be used in other settings to improve livelihoods outside of the ecotourism operation.
- *Maintenance of local culture.* Some authors (e.g., Nazaruddin & Armugam, 2012) describe how ecotourism activities promote local cultures and traditions, so help to keep alive cultural aspects that may otherwise disappear with other economic developments.
- *Empowerment of marginalized sections of the community.* Many members of local communities are not empowered in natural resource governance and decision making, especially women. Ecotourism operations can involve these sections of the community, empowering them and involving them in mangrove governance. For example, ecotourism operations in Bohol Province, the Philippines were shown to increase the participation of women in environmental awareness activities and local environmental politics (Pleno, 2006). In Kelantan, Malaysia, interviews with local communities who were participating in ecotourism showed how they felt more empowered to participate in local decision making (Nazaruddin & Armugam, 2012). Empowerment is probably most successful if the ecotourism operation is community-based and managed (*sensu* Walter, 2009), though this is not necessarily a key requirement for an activity to be classed as ecotourism.

Benefits are also received by the tourists who undertake mangrove ecotourism activities (Ayob et al., 2009). In addition to relaxing and having fun, tourists will hopefully increase their awareness and education of local socioeconomic and environmental issues. Tourists will also see a significant increase in their access to the environment. This has several health benefits, and regular environmental access is also linked to a stronger and more diverse appreciation of the environment. This has been observed in mangroves in Singapore, where a disconnection from nature due to urbanization between the 1980s and 2014 led to a change in the type of cultural ecosystem services that were valued by the community (Thiagarajah *et al.*, 2015).

The Regional Scope of Ecotourism

We are currently unsure about the broad scope of ecotourism for mangroves in Southeast Asia, as we do not have a regional view or a quantitative database of mangrove ecotourism ventures. This limits our knowledge of the true scale of ecotourism, its potential contribution to local and national Gross Domestic Product (GDP), and the number of jobs it has created for local communities. This is a key research gap and needs much more attention in the future, if we are to support mangrove ecotourism and to understand its impact on local economies. New concepts of 'big data' could help us to understand the spatial extent of mangrove ecotourism, and several public, crowd-sourced databases and social media platforms exist that could be used achieve this. Websites such as Tripadvisor (Figure 5) provide a platform for ecotourism operators to advertise their business, and for tourists to comment on and recommend ecotourism activities.

The platform also includes user-generated social media photographs, so we can analyse what aspects of ecotourism are of most interest to visitors.

Flickr and other social media websites and applications could also be mined for information on mangrove ecotourism. These databases can be searched for stored and tagged photographs using Keywords such as “mangrove” and “tour”, and the number of returned photos quantified. A brief search using these Keywords in Flickr in August 2016 returned over 12 700 photographs. Importantly, photos on platforms such as Flickr are geotagged (Figure 6), so the spatial distribution of mangrove ecotourism activities can be visualized. This has already been achieved over small scales (Wood et al., 2013; Richards & Friess, 2015) and could be upscaled to national and regional levels. Importantly, techniques exist to classify the subject of photographs uploaded on such platforms, creating information on exactly what type of cultural ecosystem service is most valued by tourists (Richards & Friess, 2015). This study undertook a sensitivity analysis that showed that only ~100 photographs need to be classified in order to accurately represent the main cultural ecosystem services being valued at a site. Thus, such big data approaches allow us to very rapidly assess cultural ecosystem service value. While previous studies have focused on Flickr as a data source, other social media platforms do exist

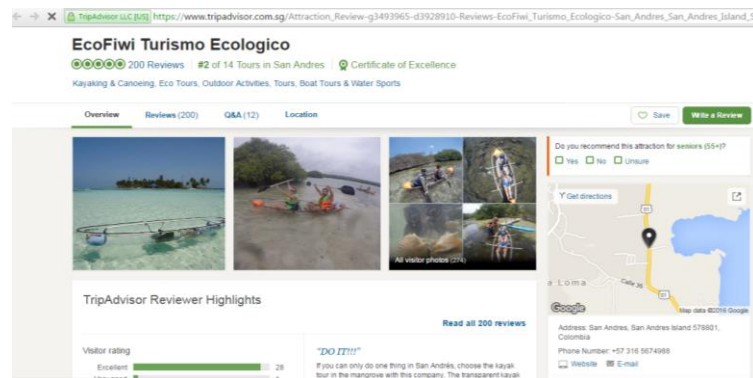


Figure 5. An example of a Mangrove Ecotourism Activity on Tripadvisor

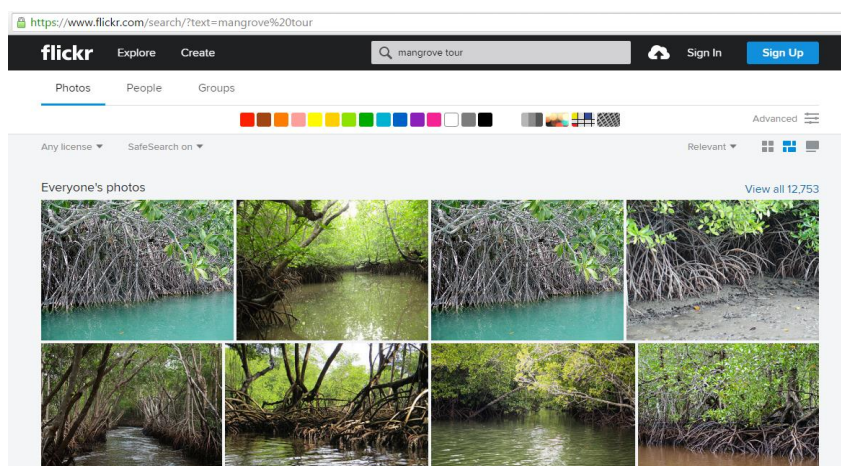


Figure 6. An Example of Search Results Using the Social Media Photography site Flickr



The Impacts of Mangrove Ecotourism

Direct impacts of ecotourism

An influx of visitors beyond the baseline normally experienced in a locale can have several negative environmental impacts if adequate safeguards and regulations are not in place. These can include a substantial increase in organic waste, sewage and litter. This is especially common because many ecotourism operations are located in rural areas where waste management facilities may be absent or poorly funded. All of these issues are important to manage as they may impact on visitor satisfaction. Ecotourism can also have observable impacts on mangrove areal extent. Remote sensing analyses by Shabudin *et al.* (2012) showed several causes of direct mangrove loss that could be attributed to ecotourism activities. Firstly, mangroves were cleared for hotel and residential development to house tourists. Secondly, mangrove were lost due to jetty construction, as increasing tourist numbers and demand for boat tours exceeded the available capacity. This caused a linked impact; increasing boat traffic caused ship wake, which undercut and eroded the mangrove river banks. While speed limits and traffic control measures were introduced to reduce ship wake-induced erosion, interviews with boat operators suggest that these measures are hard to enforce. Interestingly, in a study of tourist preference in Langkawi, Malaysia, environmental damage did not rank highly on tourist satisfaction ratings, with only 14.5% of tourists interested in environmental management (Ayob *et al.*, 2009). This is important because it may encourage tour operators to continue causing environmental damage, since their customers do not care about this factor as much as others such as marketing and business ethics (Ayob *et al.*, 2009). It also shows a distinct need to have an honest conversation with tourists about the negative impacts of ecotourism, which requires educational and awareness training.

Social Impacts of Ecotourism

Most ecotourism studies focus on the direct and readily observed environmental impacts of tourism, so our knowledge of how ecotourism may affect social and political systems is less well understood. One of the more recent studies on this topic is presented by Thompson *et al.* (*in review*). The authors under participant observation and interviewed a range of small to large tour operators undertaking various mangrove ecotourism activities in Kilim Geopark, Langkawi, Malaysia. These interviews noted several issues and sources of tensions between tour operators, which is to be expected in a competitive tourist market. For example, small tour operators considered larger tour operators to provide a poor ecotourism service. Instead of nature education, they were considered to rely on gimmicks and high speed thrill rides. Thus, the smaller operators considered themselves as undertaking 'real ecotourism'. These interviews further showed resentment between operators due to market dominance, and the inability of small operators to compete in terms of marketing and tourist access. The majority of tourists signed up to tours through Tripadvisor reviews or website bookings, which require a business infrastructure (websites, online payment facilities) that small operators were unable to afford, or did not have the knowledge or capacity to create or run. Thus, local entrepreneurs were pushed out of the market by large, commercial operators, which often originated from outside Langkawi. Both of these issues highlight how the introduction of ecotourism to an area can change local operator dynamics and interactions, and cause tensions between different businesses. Importantly, our current views of ecotourism theory do not adequately consider supplier (operator) demand and practices, so more research on this aspect of ecotourism is required.

Incorrect Labelling of Ecotourism Activities

Many operations can be assessed as 'ecotourism lite' (Duffy, 2015), Referring to the recommendations by FAO (2004) presented above, operations may be in a nature-based setting, but may not fully engage with the other recommendations such as local participation and benefits, educational value or conservation awareness. Improper operations misusing the ecotourism label may tarnish the reputation of other ecotourism operations that are abiding by ecotourism principles.



Conclusions

With mangroves facing continued decline in Southeast Asia, we urgently need to develop a set of tools that can allow their stronger protection and conservation. A range of neo-liberal tools exist to pay for ecosystems and the benefits to coastal populations that they provide, which can be used to balance the opportunity costs of other land uses that have a negative impact on the mangrove ecosystem. Ecotourism is one such tool, and numerous local case studies show that tourist activities can have several important benefits for mangrove education, protection and conservation. However, the benefits of ecotourism must be balanced against its direct and indirect negative impacts on the mangrove ecosystem and the local communities that use them. If ecotourism is to successfully conserve mangrove forests, then we have to be aware of and mitigate the direct environmental impacts of increased tourist numbers and boat traffic, and the indirect impacts that a sudden and large source of tourism income can have on local communities and economic enterprises. Geographical research is crucial to understanding human-environment interactions in mangrove ecotourism in Southeast Asia. This is currently an under-researched area, and several knowledge gaps remain. If we are to improve our knowledge of mangrove ecotourism, we need to do the following:

1. *Understand the regional scope of ecotourism*

Our knowledge of mangrove ecotourism is based overwhelmingly on local case studies. While this is an important foundation, it means that these case studies are largely considered in isolation. There is great power in quantifying ecotourism benefits and impacts at larger scales.

2. *Utilize novel social media tools*

Most ecotourism studies rely on traditional interview and questionnaire techniques conducted upon local communities and visitors. New big data tools and analysis techniques are now beginning to emerge that allow us to quantify regional ecotourism trends. We need to capitalize on these novel tools and utilize their full potential.

3. *Quantify environmental impacts*

Local case studies in the region generally focus on the socio-economic impacts of ecotourism operations. However, ecotourism can have real environmental impacts, as has been observed in Langkawi (Malaysia) and elsewhere. We cannot continue to present a view of ecotourism that is skewed towards socio-economic research and that doesn't robustly quantify environmental degradation (and potential environmental improvements) caused by ecotourism activities.

4. *Integrate human and physical geography*

Ecotourism clearly shows the importance of an interdisciplinary, geographical approach that encompasses human and physical processes. While we generally study ecotourism either through distinct human or physical geography lenses, we need to move beyond this to understand processes and interactions that cross this divide. Importantly, we need to show why geography, compared to other subjects (ecology, economics, tourism studies), is best placed to truly understand the benefits and impacts of ecotourism.

If we can balance socio-economic and environmental concerns through the 4 recommendations above, then ecotourism has the potential to provide much needed conservation finance for threatened mangrove systems.

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