The Role of Traditional Knowledge in Technology Development and Landscape Management: Lessons from the GEF Satoyama Project

Devon Dublin[1,*] and Yoji Natori[2]

[1]Program Advisor, Hokkaido University of Education, 1 Chome-15-55 Shiroyama, Kushiro, Hokkaido 085-0826 Japan (Presenting/corresponding author)

[2] Associate Professor, Global Studies Program, Faculty of International Liberal Arts, Akita International University, Akita, Japan

[*]e-mail: devdub@yahoo.com

Abstract

The objective of the GEF-Satoyama Project was to mainstream conservation and sustainable use of biodiversity and ecosystem services, while improving human well-being in Socio-Ecological Production Landscapes and Seascapes (SEPLS). SEPLS are production landscapes and seascapes that integrate the values of biodiversity and social aspects harmoniously with production activities, such that production activities support biodiversity and vice versa. SEPLS have been created throughout the world largely as results of long interactions between people and nature giving rise to and on the basis of traditional knowledge and culture. SEPLS are under threat in part due to disappearing traditional knowledge. We found that the project was able to strengthen the preservation, documentation and promotion of local and indigenous knowledge which led to improved management of the landscapes and seascapes and the development of appropriate technologies that are culturally appropriate.

Keywords: Indigenous, Culture, SEPLS, Sustainability, Governance

Introduction

Indigenous and local knowledge is an integral part of SEPLS that enables people to use and manage various resources sustainably. This is threatened due to a number of factors such as the exclusion of indigenous knowledge in school curriculum and decreased knowledge exchange between elders and youths.

Governance in these landscapes and seascapes are premised on local traditions which can be weakened due to this loss of traditional knowledge thus negatively affecting effective collaborative management schemes and decision-making processes. This paper seeks to explore the role of traditional knowledge in landscape management and the development of technology on the basis of the outcomes of the three Asian project sites of the GEF-Satoyama Project.

Case Studies

There were ten project sites under the GEF-Satoyama Project, three of which were in Asia, namely India, Myanmar and Thailand (Figure 1). These three projects have strong components of indigenous and local knowledge which has a bearing on the type of governance and the technology developed and employed in the landscapes and seascapes (Table 1).

The Energy and Resources Institute (TERI) created the network of Community Conserved Areas (CCAs) with villages in Nagaland where wildlife hunting is an important part of their cultural identity. TERI supported villagers in alternative livelihood means, including ecotourism, and trained youths in biodiversity monitoring. Fauna & Flora International (FFI) promoted the conservation and sustainable use of freshwater ecosystems by establishing fish conservation zones (FCZs) with local communities. FFI also supported alternative livelihood initiatives in these communities to reduce the dependency on the freshwater ecosystems. Inter-Mountain Peoples' Education and Culture in Thailand Association (IMPECT) demonstrated Karen communities to be models of sustainable development by building on their traditional knowledge and natural resource management systems. IMPECT also worked for a broad recognition of Karen culture.

We documented indigenous and local knowledge that the three projects used to manage SEPLS, and examined its relation with landscape management and technology development.

Results and Discussion

Local people have detailed knowledge of taxonomy, ecology, harvest and the uses of valuable wild species and crop varieties, particularly those directly used for food and medicine. They also knew how ecosystems were regulated which they inherited from their elders and from their own direct observations. They established resource management systems such as sustainable harvest of non-timber forest products (NTFPs) in India, organic, rotational agriculture in Thailand, and species-specific fishing methods in Myanmar. They possess customary laws on forest management and taboos on land and resource uses in and around sacred forests and water sources. Traditional religious belief also played a factor as in the Karen's integrated spirituality, knowledge and practices in rotational farming in Thailand. These factors collectively enabled local communities to effectively access, utilize and sustainably manage various eco-system goods and services derived from SEPLS.

The driving force behind the use of modern technology were the young people. They were largely responsible for the promotion of ecotourism in the landscapes through photography and social media. They also played a significant role in documenting traditional knowledge through audio and video. This exercise generated more interest on the part of the youth in traditional knowledge.

The decline in traditional knowledge was attributed to changing values and lifestyles, modern education, rural to urban migration, land transformation and the limited recognition by governments. The project attempted to address these attributers through a number of ways. In Thailand, reciprocal knowledge ex-change among generations was facilitated through capacity building activities which brought together elders and youth and most notably the local school in the Karen communities adopted curriculum which incorporates traditional Karen knowledge.

They also made efforts to integrate traditional knowledge and modern knowledge and technologies for their advanced applications in changing social, economic and ecological contexts. In Thailand, the revitalization of traditional agricultural systems premised on traditional land use planning against expanding commercial mono-cropping is noteworthy. The technology used to reinforce these measures and demarcate the boundaries of the traditional lands is Global Information System (GIS). Additionally, integrating traditional and modern knowledge and techniques was employed to create added value to their products, thus enhancing the community's economic self-reliance as was done in honey production.

The project in Myanmar demonstrated another important measure of obtaining recognition from local government entities. The elders of the communities held meetings and obtained the agreement of the members to formulate rules and guidelines for the establishment of Fish Conservation Zones (FCZ) based on traditional knowledge of freshwater ecosystems. The technology employed was a network of floats which are used to demarcate the spawning grounds and the no take zones. The regional parliaments recognized these FCZs which were essentially self-established by local communities who rely on freshwater fish as an essential source of protein. This type of recognition is useful since it can easily generate further support such as technical (in the form of agriculture and fishery specialists), security (police for enforcement of rules), and social (assistance in developing alternative livelihoods).

The project in India provides an example of effective resource management scheme that are rooted in traditional social structure. The Tizu Valley Biodiversity Conservation and Livelihood Network (TBCLN) was established by the Gukhuyi, Kivikhu and Sukhai communities to oversee and manage the community conserved areas under its purview which include the banning of hunting and fishing. The TBCLN is premised on the tradition of the Gaon burrhas who are hereditary village chiefs with a long tradition among the Naga tribes. With the TBCLN being established in this way, it commanded the respect of the community members who consider the Gaon burrhas as authentic leaders. The creation of community conserved areas (CCAs) are also important and effective outcomes of local governance schemes that have the strength of building on local level consensus.

Conclusions

The review and analysis of these three projects showed that the existence of robust traditional knowledge is key to the sustainability of SEPLS. Where the knowledge held by local communities is not sufficiently recognized, there is a need to create opportunities for an exchange of knowledge held by communities and scientists or government officials as a first step towards mainstreaming this knowledge into the development of technology and landscape management.
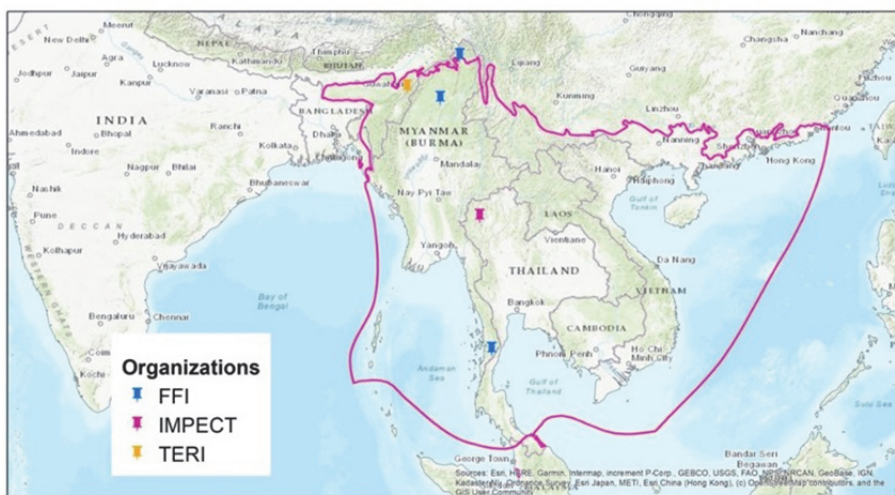
Fig. 1. Location of project sites in Asia

Table 1. Description of project sites in Asia

Project site location	Proponent	Ecosystems / Land Use	Project Title	Size of Project Area (hectares)	Size of Area Benefiting (hectares)	# of Direct Benificiaries (persons)	# of Indirect Benificiaries (persons)
Myanmar	Fauna & Flora International (FFI)	Freshwater lakes	Conservation and sustainable use of freshwater ecosystems in Myanmar	891	347,915	1,200	100,000
Thailand	Inter Mountain Peoples' Education and Culture in Thailand Association (IMPECT)	Forest, rotational farming	Promoting and Enhancing the Karen Indigenous Sustainable Socio-ecological Production System in Northern Thailand	6,057	90,237	2,136	27,808
India	The Energy and Resources Institute (TERI)	Forest	Mainstreaming Community-Conserved Areas for Biodiversity Conservation in Nagaland	3,751	2,043	1,185	2,347

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傳統知識在技術發展與地景經營所扮演的角色：以全球環境基金里山倡議計畫為例

Devon Dublin[1] and Yoji Natori[2]

[1] 北海道教育大學專案顧問（發表/通訊作者）

[2] 日本秋田國際教養大學國際博雅教育學院全球研究計畫副教授

摘要

全球環境基金里山倡議計畫（The GEF-Satoyama Project，以下簡稱里山倡議計畫）旨在推廣生物多樣性與生態系統服務的保育和永續利用觀念，並提升人類在社會-生態-生產地景和海景（Socio-Ecological Production Landscapes and Seascapes，以下簡稱 SEPLS）的幸福感。SEPLS 意指整合生物多樣性與社會因素等不同價值觀的生產地景與海景，其中的生產活動與生物多樣性為互利關係。世界各地 SEPLS 的設立，多半是由於人類長期與大自然互動，進而形成在地傳統知識與文化，亦或是基於在地傳統知識與文化的互動也會促成 SEPLS 設立。然而，許多 SEPLS 飽受威脅，一部分是因為許多傳統知識不斷失傳。本研究發現，里山倡議計畫可以加強保存、文件化、推廣在地原住民族知識，進而改善地景海景管理，並開發契合在地文化的技術。

關鍵詞：原住民、文化、社會-生態-生產地景和海景 (SEPLS)、永續、治理

為使多數讀者可清楚瞭解本研究內容，本場特委託專業翻譯團隊將原文譯為中文，為利閱讀流暢，部分語句可能與原文直譯略有差異。

前言

　　原住民族知識與地方知識是構成社會-生態-生產地景和海景 (SEPLS) 不可或缺的元素，有助於人們以永續方式應用和管理多項資源。然而，這些知識飽受各種威脅，譬如學校課程排除原住民族知識的傳授，族中長老與年輕一輩的知識交流也比以往更少。由於地景和海景治理必須仰賴地方傳統，傳統知識的失傳會使治理效果大打折扣，進而降低協作管理方案與決策的成效。透過分析「全球環境基金里山倡議計畫（The GEF-Satoyama Project，以下簡稱里山倡議計畫）」在亞洲的三項計畫成果，本研究旨在探索傳統知識於景觀管理和科技發展中的定位。

個案研究

　　里山倡議計畫底下包含了十項計畫，其中三項位於亞洲，分別在印度、緬甸、泰國進行（圖 1）。此三項研究場址都與原民在地知識有很深的淵源，影響了地景海景的治理方式、發展及採用的技術（表 1）。

　　印度的能源與資源研究所 (The Energy and Resources Institute) 與那加蘭邦 (Nagaland) 聚落一起建構聚落保育區 (Community Conserved Areas) 網路。對那加蘭邦的人來說，狩獵是文化認同的重要元素之一，因此，能源與資源研究所協助在地村民尋找其他的維生方式，例如發展生態旅遊、教導當地青年監測生物多樣性等。在緬甸，國際野生動植物保護組織 (Fauna & Flora International) 透過與在地聚落一起成立魚類保育區，藉以推行淡水生態系統的保育和永續利用。該組織也支援這些地區的生計替代倡議，藉此降低居民對淡水生態系的依賴程度。泰國山地住民教育文化協會（Inter-Mountain Peoples' Education and Culture in Thailand Association，以下簡稱 IMPECT）建立了克倫族傳統知識與自然資源管理系統，讓克倫族部落成為永續發展的典範。此外，IMPECT 也致力於推廣認識克倫族文化。

　　本研究收集了上述三項研究管理 SEPLS 時所使用到的原民與在地知識，並檢驗這些知識與景觀管理和科技發展間的關係。

結果與討論

　　在地居民對於當地的生物分類、生態、收成時機、稀有野生物種用途、作物品種等知之甚詳，尤其對於食物與醫藥相關的知識更是豐富。從老一輩口中與實際觀察的經驗，在地居民非常清楚生態系統的調節機制是如何運作的，並以此建立起一套資源管理體制，例如印度的非木質林產物 (non-timber forest products) 永續收成方式、泰國的有機輪作農業、緬甸的特定魚種捕撈 (species-specific fishing)方式。在地原民擁有一套約定俗成的森林管理法則，且對於土地與資源和神聖的森林與水源的使用有特定禁忌。其中，傳統宗教信仰也扮演重要角色，像是泰國

克倫族的靈性結合、知識、宗教行為，在有機輪作農業中皆有重要的地位。上述因素讓在地聚落得以有效取得、使用、永續管理各類從 SEPLS 衍生出來的生態系統產物與服務。

結合傳統模式與現代科技的重要推手是年輕一輩的族人，他們透過照片與社群推廣生態旅遊，更利用影音作品紀錄傳統知識。這樣的作法激起年輕人對傳統知識的興趣。

價值觀與生活習慣改變、現代教育方針、城市化、土地變革、政府的忽視等原因造成傳統知識式微。為此，里山倡議計畫嘗試透過新的方式解決上述問題。在泰國，利用能力建構活動將年長與年輕一輩的族人凝聚在一塊，成功促進代間知識交流。其中最重要的，是克倫族聚落的學校將克倫族的傳統知識納入課程當中。

克倫族聚落嘗試結合現代知識科技，讓傳統知識得到更進一步的應用，以改變社會、經濟、生態脈絡。值得注意的是，泰國的案例顯示以傳統土地利用計畫為基礎來恢復傳統農業系統的做法，有別於商業化的單一作物模式。全球資訊系統 (Global Information System) 可用來強化傳統作法，劃出傳統土地的邊界。此外，傳統與現代知識技術結合後，創造出相關產物的附加價值，因而可提升聚落的經濟自立程度（例如：生產蜂蜜）。

緬甸的計畫採用了一種獲得地方政府重視的有效方法。聚落長老在會議中達成共識，決定以淡水生態系統的傳統知識為基礎，制定魚類保育區的規範與準則。實際的作法為利用浮標劃定魚類的產卵地與禁漁區。隨後，當地的議會發現這些保育區是在地聚落自行成立的，且這些聚落將淡水魚視為主要蛋白質養分來源。這種獲得地方政府關注的方式很有用，可以為聚落帶來後續的支援，如技術（延請農漁專業顧問）、保全（派駐警力執法）、社會（協助居民尋找替代生計）等方面的支援。

在印度的計畫，證明了傳統社會結構可以成為有效資源管理方案的骨幹。Tizu 谷生物多樣保育與生計網路（The Tizu Valley Biodiversity Conservation and Livelihood Network ，以下簡稱 TBCLN）由那加蘭邦的 Gukhuy、Kivikhu、Sukhai 三個部落組成。TBCLN 的目的是要監管聚落保育區裡所禁止的狩獵與漁獵行為，該網路的成立是建立在那加部落世襲長老（Gaon burrhas）的悠久傳統上，正因為 TBCLN 是以傳統為基礎所建立的，那些視 Gaon burrhas 為真正領導者的族人對 TBCLN 表達尊重。聚落保育區的建立，也展現獲得共識的在地治理方案的重要性與效用。

結論

　　藉由回顧、分析上述三項計畫，本研究發現嚴謹的傳統知識是 SEPLS 永續的重要關鍵。在不重視在地知識的地區，第一步必須想辦法促進當地居民與科學家和政府官員交流彼此擁有的知識，如此才能使在地傳統知識成為主流，進而在科技發展與景觀管理中佔有一席之地。
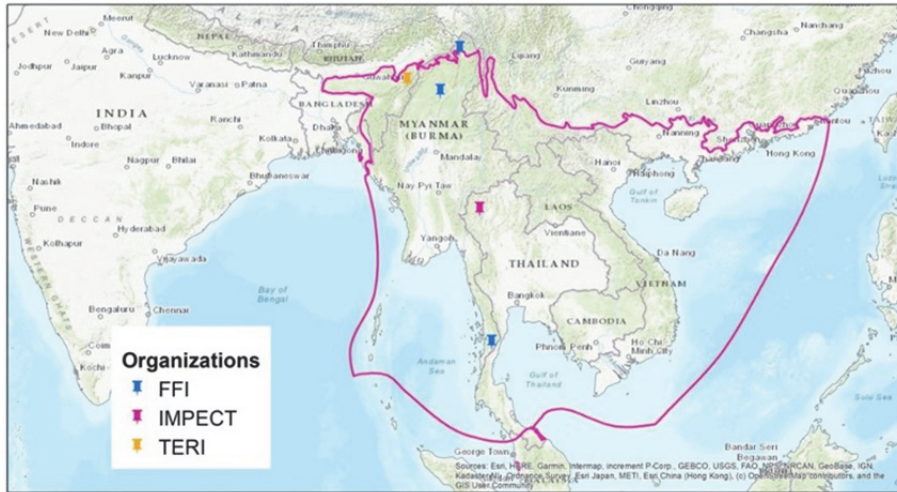

圖 1、位於亞洲的計畫場域位置圖

表 1、位於亞洲的計畫資料簡述

研究場域位置	計畫提倡組織	生態系統／土地利用類型	計畫名稱	計畫場域面積（單位：公頃）	受惠區域規模（單位：公頃）	直接受惠人數（人）	間接受惠人數（人）
緬甸	國際野生動植物保護組織	淡水湖	緬甸淡水生態系統保育與永續利用	891	347,915	1,200	100,000
泰國	山地住民教育文化協會	森林、輪作農耕	推行並提升泰北克倫族原民社會-生態-生產永續系統	6,057	90,237	2,136	27,808
印度	能源與資源研究所	森林	透過聚落保育區主流化提升那加蘭邦生態多樣性	3,751	2,043	1,185	2,347