Discover Resilience in Practice:

From Assessment to Action in Taiwan's SEPLS

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A Practitioner-Oriented Case Study Booklet

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INTRODUCTION

Resilience Assessment in Taiwan's SEPLS

How can resilience indicators be applied across diverse SEPLS settings?
How can resilience assessment move beyond a checklist to drive real action on the ground?
How can resilience indicators support monitoring of management effectiveness in SEPLS — and even OECMs?

These questions lie at the heart of this booklet.
Across Taiwan today, SEPLS face multiple, overlapping challenges: climate change, extreme weather events, biodiversity decline, aging rural populations, shifting agricultural markets, and increasing land-use pressures. In this context, resilience is no longer a concept requiring special explanation. Our communities often express it simply: "A resilient SEPLS is a healthy SEPLS."
Yet a practical challenge follows: how can SEPLS resilience be understood, discussed, and assessed? Unlike human health, SEPLS do not require thermometers or laboratory tests. Instead, community-based resilience assessment workshops (RAWs), built around five social-ecological perspectives (ABCDE) and twenty Indicators of Resilience in SEPLS, provide a structured way for communities and practitioners to reflect collectively on ecological, social, cultural, governance, and economic conditions.

Five (5) social-ecological perspectives and twenty (20) indicators of resilience in SEPLS

A) Ecosystem health and connectivity

A1. Diversity and multifunctionality in SEPLS
A2. Connectivity among SEPLS elements
A3. Capacity to cope with natural hazards
A4. Capacity to cope with human-induced threats

B) Sustainable resource use

B1. Diversity and use of local foods
B2. Conservation and breeding of native varieties
B3. Environmentally friendly and circular production practices
B4. Sustainable use of common resources

C) Traditions and innovation

C1. Transmission of TEK
C2. Documentation of TEK
C3. Appropriate technologies for production and conservation
C4. Recognition of gendered knowledge

D) Collaborative governance

D1. Resource access and use rights
D2. Integrated SEPLS governance
D3. Community social capital
D4. Participation and benefit sharing

E) Sustainable livelihoods

E1. Local public infrastructure
E2. Human and environmental health (One Health)
E3. Biodiversity-based income diversity and marketing capacity
E4. Adaptive use of SEPLS across time and space

Note:
SEPLS – socio-ecological production landscape and seascape
TEK – traditional ecological knowledge
Adapted from Bergamini et al. (2014)

RAWs to ACM: From Resilience Assessment to Adaptive Co-Management

Between 2021 and 2025, National Dong Hwa University and the Forestry and Nature Conservation Agency (FANCA, formerly the Forestry Bureau) pioneered a nationwide approach known as RAWs-to-ACM — from resilience assessment workshops to adaptive co-management.

Implemented through eight regional branches of FANCA — each supporting two SEPLS sites over a five-year period — the initiative was facilitated through the Taiwan Partnership for the Satoyama Initiative (TPSI), with strong coordination provided by its regional exchange bases: the Dharma Drum Institute of Liberal Arts (TPSI-North), Taiwan Biodiversity Research Institute (TPSI-West), National Pingtung University of Science and Technology (TPSI-South), and National Dong Hwa University (TPSI-East). Together, these institutions played key roles in coordination, facilitation, and cross-regional learning, helping translate resilience assessment from a shared framework into locally grounded practice across diverse SEPLS contexts.

Building on The Toolkit of Indicators of Resilience in SEPLS (Bergamini et al., 2014) and lessons from the first pilot site in the coastal Xinshe SEPLS, Hualien County, Taiwan, the approach evolved into a practical three-step process designed to connect assessment with action.

Step 1 — Localization of indicators

The five perspectives and twenty indicators were adapted to Taiwanese SEPLS contexts. Language was simplified, graphics introduced, and place-based examples developed to help communities relate the framework to daily experience.

Step 2 — Community-based resilience assessment

RAWs were facilitated by trained teams supported by TPSI regional exchange bases and FANCA, with training-of-trainers and cross-site learning playing a key role. The focus was on dialogue, shared interpretation, and collective reflection rather than technical scoring alone.

Step 3 — From assessment to action

RAWs results were translated into ACM through local action planning, stakeholder engagement, and the development of multi-stakeholder partnerships.

Over five years, sixteen SEPLS communities completed this RAWs-to-ACM process, demonstrating how resilience indicators can become catalysts for learning and adaptive practice rather than static assessment tools.

RAWs to ACM to TEN: Linking Local Action to Wider Landscape Conservation

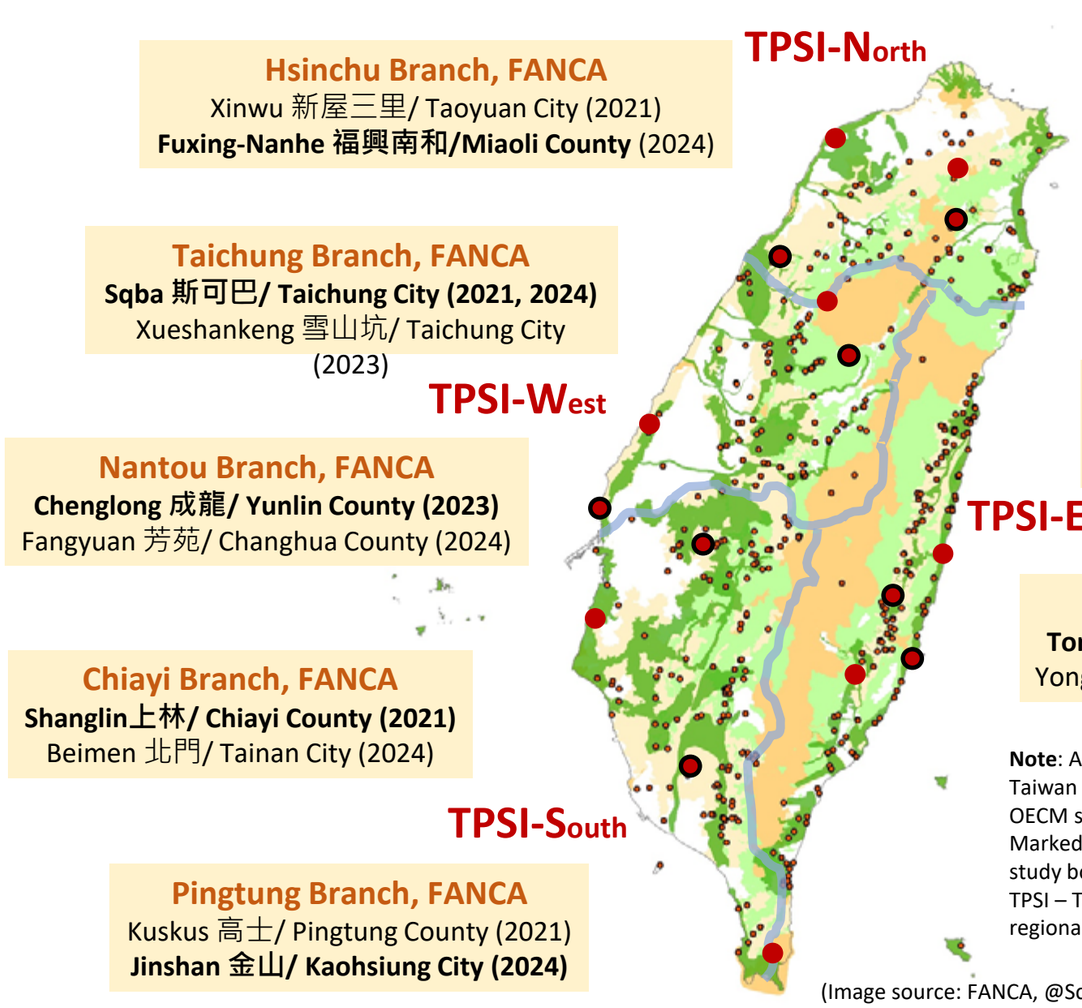
These experiences also take place within a broader ecological and policy context. Each SEPLS forms part of the Taiwan Ecological Network (TEN), where living landscapes and seascapes are recognized as important ecological connectivity nodes. Positioning SEPLS within this biodiversity-focused spatial planning strategy helps link local management priorities (e.g., water management, eco-friendly production, biocultural diversity conservation) with wider landscape-scale conservation objectives, creating opportunities for coordination between community initiatives and national policy.

At the same time, resilience assessment has increasing relevance for other effective area-based conservation measures (OECMs). The assessment process can provide a structured way to understand how governance, biodiversity values, and socio-ecological functions interact within a SEPLS, supporting

reflection on its potential role as an OECM. Repeated assessments may also contribute to tracking management effectiveness over time, offering a practical basis for adaptive management within living landscapes.

Meet the Case Studies

This booklet presents eight SEPLS from across northern, western, southern, and eastern Taiwan, illustrating how resilience assessment can evolve into adaptive action in diverse socio-ecological and production contexts. Below is a brief preview of the cases



Hsinchu Branch, FANCA
Xinwu 新屋三里/ Taoyuan City (2021)
Fuxing-Nanhe 福興南和/Miaoli County (2024)

Taichung Branch, FANCA
Sqba 斯可巴/ Taichung City (2021, 2024)
Xueshankeng 雪山坑/ Taichung City (2023)

Nantou Branch, FANCA
Chenglong 成龍/ Yunlin County (2023)
Fangyuan 芳苑/ Changhua County (2024)

Chiayi Branch, FANCA
Shanglin上林/ Chiayi County (2021)
Beimen 北門/ Tainan City (2024)

Pingtung Branch, FANCA
Kuskus 高士/ Pingtung County (2021)
Jinshan 金山/ Kaohsiung City (2024)

Yilan Branch, FANCA
Shuanglianpi 雙連埤/ Yilan County
Yong'An 永安/ New Taipei City

Hualien Branch, FANCA
Gangkou 港口/Hualien County (2021)
Luoshan 羅山/Hualien County (2023)

Taitung Branch, FANCA
Torik 都歷/ Taitung County (2021)
Yong'An永安/ Taitung County (2024)

Note: All 16 SEPLS are located within conservation corridors of Taiwan Ecological Network and are potential and/ or candidate OECM sites. The year of resilience assessment is listed in brackets. Marked in **bold font/ bold outline** are 8 SEPLS selected for this case study booklet.
TPSI – Taiwan Partnership for the Satoyama Initiative and its four regional exchange bases.

(Image source: FANCA, @ScapesLab, 2026©)

TPSI-North (supported by the Dharma Drum Institute of Liberal Arts)

Shuanglianpi SEPL, Yilan County (FANCA, Yilan Branch)

A nationally protected wetland embedded within a working agricultural landscape, where resilience assessment helped move beyond long-standing conservation conflict toward collaborative approaches linking wetland protection, water management, and farming livelihoods.

Fuxing-Nanhe SEPL, Miaoli County (FANCA, Hsinchu Branch)

A biodiversity-rich healing landscape where forests, farms, and leisure agriculture converge. RAWs helped communities recognize ecological strengths while identifying the institutional, monitoring and innovation gaps needed to sustain well-being-oriented livelihoods.

TPSI-West (supported by Taiwan Biodiversity Research Institute)

Chenglong SEPLS, Yunlin County (FANCA, Nantou Branch)

A coastal wetland shaped by land subsidence and environmental change, where communities reframed flooding and aquaculture challenges into adaptive wetland stewardship grounded in experimentation and learning.

Sqba SEPL, Taichung City (FANCA, Taichung Branch)

An Indigenous Atayal mountain orchard landscape where farming, forests, and cultural continuity remain deeply intertwined. Repeated RAWs cycles (2021 and 2024) helped strengthen community capacity and refine practical responses to agriculture, conservation, and cultural transmission.

TPSI-South (supported by National Pingtung University of Science and Technology)

Shanglin SEPL, Chiayi County (FANCA, Chiayi Branch)

A bamboo Satoyama landscape where frog-friendly farming practices connect biodiversity conservation with agricultural livelihoods, demonstrating how species-focused stewardship can mobilize wider landscape management.

Jinshan SEPL, Kaohsiung City (FANCA, Pingtung Branch)

A striking mudstone badlands landscape where guava farming, geobiodiversity, and community identity intersect. Resilience assessment helped local groups reframe environmental challenges into opportunities for learning, interpretation, and future livelihood pathways.

TPSI-East (supported by the National Dong Hwa University)

Luoshan SEPL, Hualien County (FANCA, Hualien Branch)

Taiwan's first organic village, where resilience assessment helped transition from a production-focused model toward integrated governance and landscape-level coordination.

Torik SEPLS, Taitung County (FANCA, Taitung Branch)

An Indigenous Amis ridge-to-reef landscape-seascape, where elders and youth used resilience assessment to strengthen biocultural stewardship linking forests, rivers, paddies, and coastal ecosystems.

How to Read This Booklet

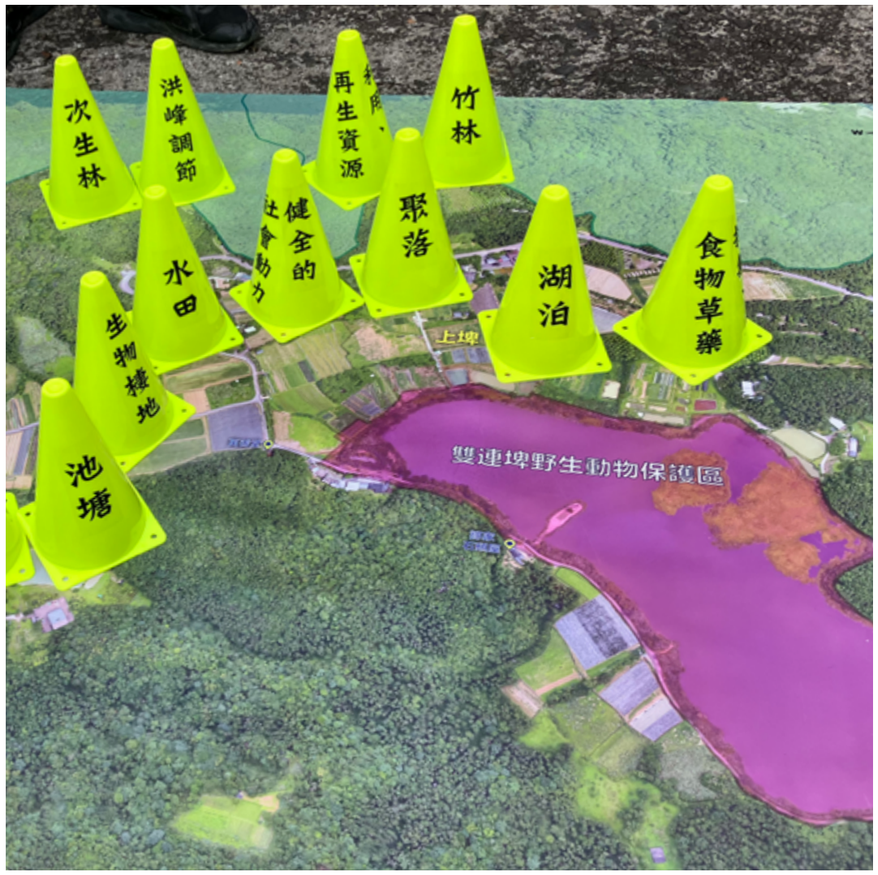
Each case study invites readers to explore how resilience assessment was translated into adaptive action across diverse SEPLS contexts. To support comparison while respecting local uniqueness, all cases follow a shared structure: introducing the ecological, socio-cultural, and economic context of the SEPLS; describing the RAWs process and its outcomes; showing how assessment informed ACM; and presenting community visions and lessons learned.

The booklet concludes with a synthesis of practitioner takeaway principles designed to support readers in designing, facilitating, or accompanying resilience assessment processes.

We hope this booklet serves as a reflective companion for SEPLS practitioners — and as a practical resource for those exploring resilience assessment as a pathway toward biodiversity conservation and sustainable landscape and seascape management.

Shuanglianpi SEPL

Yilan County



Reconciling National Wetland Conservation with Farming Livelihoods

CASE SNAPSHOT

SEPL Type:

Shallow-mountain wetland-agricultural landscape

Location:

Yuanshan Township, Yilan County, Taiwan

Location within the Taiwan Ecological Network:

Lanyang Plain Wetland and Stream Conservation Corridor (northern Taiwan)

What Makes This SEPL Distinctive:

Nationally protected wetland embedded in a farming landscape

RAWs-to-ACM Timeline:

2021–2022 onward

RAWs Facilitation Team:

Environmental Ethics Foundation of Taiwan

Supporting Agencies:

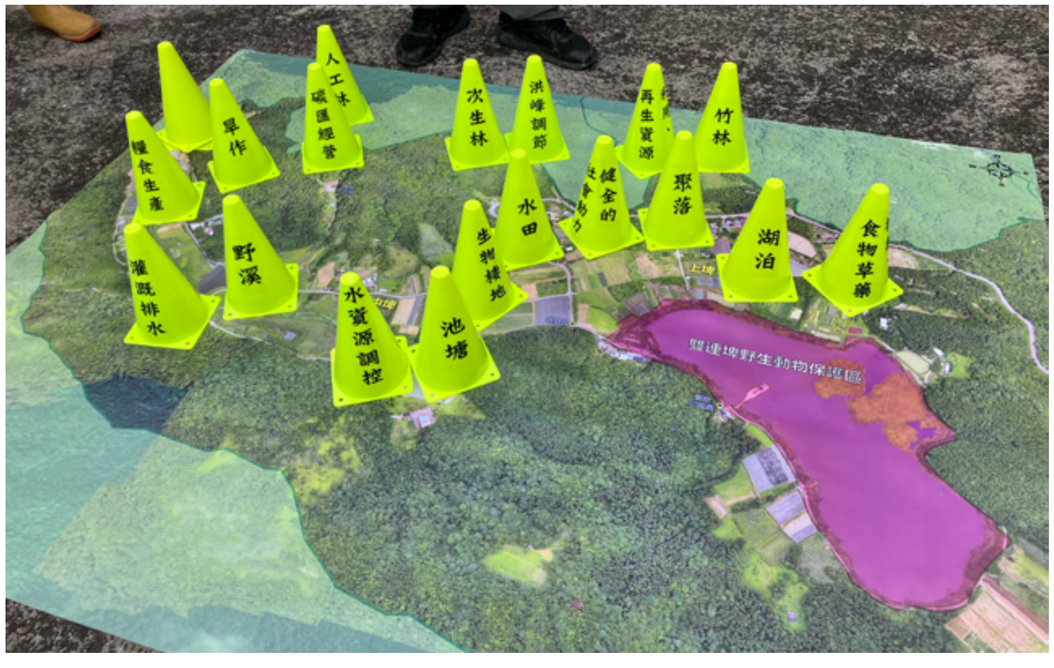
Forestry and Nature Conservation Agency, Yilan Branch

CASE SUMMARY

Shuanglianpi is a shallow-mountain wetland landscape in Yilan County where nationally mandated conservation overlaps with fragmented farmland, complex land tenure, and declining agricultural viability. Through resilience assessment workshops (RAWs), residents and government agencies were able to reframe long-standing tensions around water use, land management, and trust into shared priorities, creating a starting point for adaptive co-management. Located within the Lanyang Plain Wetland and Stream Conservation Corridor of Taiwan's Ecological Network (TEN), Shuanglianpi illustrates how wetland conservation can move beyond site-based protection toward landscape-scale collaboration rooted in everyday land use.

Shuanglianpi is located in the mountainous area of Yuanshan Township, Yilan County. The community takes its name from Shuanglianpi Lake, a low-elevation landslide-dammed wetland formed between the Cukeng and Wushi stream watersheds. Water from the lake drains into Cukeng Stream, supplying drinking water to nearly 200,000 people downstream—making Shuanglianpi a critical upstream water source.

Human use of the landscape dates back more than a century. While Atayal Indigenous peoples historically used the area, permanent settlement expanded mainly during the Japanese colonial



Shuanglianpi WIldlife Refuge (in pink colour) – a defining element of the Shuanglianpi SEPL, Yilan County. Source: FANCA-Yilan.

period, when irrigation canals were constructed to divert water from Cukeng Stream for agriculture. At its peak, irrigated farmland covered roughly 35 hectares. These canals once structured collective life and landscape management, but severe typhoon damage more than two decades ago left them unrepaired, triggering a decline in agricultural production and weakening local cooperation.

Ecologically, Shuanglianpi is nationally known for its floating plant islands formed by accumulated Leersia hexandra. Over time, woody species colonized these mats, stabilizing them. Historically, the wetland supported nearly one-third of Taiwan's native aquatic plant species. In recognition of this significance, Shuanglianpi was designated a Wildlife Refuge in 2003, with freshwater aquatic plants identified as key conservation targets.

However, the designation process involved limited community consultation and included privately owned land, generating strong opposition and long-lasting distrust toward public institutions. Although the protected area was later reduced to the lake body, tensions persisted. Meanwhile, aquatic vegetation declined and water quality remained under pressure from non-point agricultural runoff and household wastewater—highlighting the limits of site-based protection when surrounding land use is left unaddressed.

Today, Shuanglianpi has

Diversified farming in Shuanglianpi: vegetables, shiitake mushrooms, and herbal plants adapted to a cool, misty climate. Source: @ScapesLab.

a small, aging population and highly fragmented land ownership involving both local and non-local owners. Labor shortages and declining farm viability have led to land abandonment, chemical-intensive leasing, and weakened collective action. Farming has shifted from rice to vegetables, shiitake mushrooms, and herbal plants suited to the area's cool, misty climate. While much production remains conventional and tenant-operated, friendly and organic farming areas are gradually increasing, supported by policy incentives and growing local awareness. Several small restaurants using local ingredients have emerged as complementary livelihoods.

Shuanglianpi is now recognized as a key shallow-mountain wetland node within the Lanyang Plain Wetland and Stream Conservation Corridor within TEN. Its emphasis on wildlife-friendly production and waterbird conservation places it at the intersection of national conservation goals and everyday farming realities. Since 2018, trust-building efforts—beginning with symbolic and practical restoration of historic irrigation canals—have created an entry point for renewed collaboration, paving the way for RAWs as a collective tool to reassess resilience and explore pathways toward adaptive co-management.

2 *RAWs: The Process*

RAWs in Shuanglianpi were carried out between 2021 and 2022, led by the Environmental Ethics Foundation of Taiwan and supported by the Yilan Branch of the Forestry and Nature Conservation Agency (FANCA-Yilan). The five-dimension, twenty-indicator framework was introduced through a series of thematic workshops designed to balance individual reflection with collective learning.

Participants first completed individual assessments, followed by facilitated World Café discussions. These conversations focused on describing current conditions and identifying key challenges for each indicator, with insights recorded visually and shared across groups. A second round of scoring allowed participants to reassess conditions after hearing others' perspectives. This two-step process helped reduce bias caused by uneven access to information and encouraged participants to view the landscape as an interconnected system rather than a set of isolated problems. Indicators showing large shifts between pre- and post-discussion scores flagged areas where shared understanding was still forming.

Introduction of the resilience concept by Mr. Bo-Wen Hsueh from the Environmental Ethics Foundation of Taiwan, 2021. Source: FANCA-Yilan.

Because resilience concepts were unfamiliar to many participants, additional time was devoted early on to explanation and open discussion. In total, six full-day workshops were required to complete the process. Results were then synthesized into a consolidated issue list and shared in a joint results workshop with relevant government agencies.

3 *RAWs: The Results*

Hydrology and land use are among the central priority issues in the Shuanglianpi SEPL. Source: @ScapesLab.

RAWs revealed a set of interconnected risks rather than isolated problems. Environmentally, simplified plantations on surrounding slopes increased landslide risk, while downstream farmland remained vulnerable to flooding during heavy rainfall. Seasonal contrasts between drought and intense rainfall were becoming more pronounced. Socio-economically, water overuse, labor shortages, and complex land tenure arrangements constrained both farming viability and collective decision-making.

At the same time, participants identified important strengths. The wetland ecosystem remains highly distinctive and of national conservation importance, with an intact ridge-river-village structure. There is also growing alignment with national conservation policies, and the presence of younger and middle-aged residents willing to engage in governance and on-the-ground action.

Overall, RAWs helped make clear that Shuanglianpi's challenges stem from the cumulative interaction of hydrology, land use, governance history, and social trust—or the lack thereof—rather than from technical shortcomings alone.

4 RAWs-to-ACM: From Insight to Action

Early RAWs discussions generated a wide range of concerns, which were gradually consolidated into four priority areas for adaptive co-management (ACM):

1. Organic agriculture promotion, linked to ecosystem service payments, Satoyama-style forest management, and community-led organic initiatives.

2. Nature-based solutions, including satellite wetland surveys, restoration of flood-prone farmland, and monitoring of indicator species such as rice fish and dragonflies.

3. Water sourcing and management, focusing on ecological irrigation, wastewater reduction, wetland certification expansion, and the restoration of traditional irrigation canals supported by collective maintenance mechanisms.

4. Multifunctional learning and care, positioning Shuanglianpi as an ecological learning site integrating caregiving, Green Care, and rural well-being.

A distinctive feature of the RAWs-to-ACM process in the Shuanglianpi SEPL is how these priority issues have been actively used beyond the workshops themselves. On one hand, the community and facilitation partners have used the agreed priorities as a practical basis for applying to funding programs and project calls from different government agencies. On the other hand, the same priorities have functioned as a task identification tool for government agencies seeking collaboration pathways with Shuanglianpi—helping them quickly understand community needs, entry points, and roles. This has created a two-way process, in which RAWs results guide both community-driven initiatives and agency-led engagement.

Given that these priorities cut across sectors, coordination was established with the Yilan County Government. A dual-track governance arrangement emerged: a county-level Satoyama Platform convening cross-agency dialogue, and internal coordination within FANCA-Yilan to integrate RAWs priorities into routine management.

5 *Looking Ahead*

Looking ahead, Shuanglianpi prioritizes adaptive, low intensity use over fixed development plans. Residents frame resilience through the idea of “three-life sustainability” —production, ecology, and livelihoods—seeking to live with environmental change rather than attempt to control it.

During the third phase of TEN (2026–2029), the Shuanglianpi SEPL will continue to play a critical role in strengthening connectivity between the Xueshan Mountains and the Lanyang Plain. Wildlife-friendly farmlands function as ecological stepping stones, translating corridor-scale conservation goals into everyday land-use practices. The case also demonstrates how the“wise use”principle of Taiwan’s Wetland Conservation Act can be put into practice through adaptive co-management, rather than through rigid protection alone.

“Three-life”（三生）sustainability concept in the Shuanglianpi SEPL: production, ecology, and livelihoods. Source: @ScapesLab.

6 *Lessons Learned and Reflections*

Shuanglianpi's experience shows that many of the challenges surfaced through RAWs were rooted less in technical gaps than in the area's history of land use, fragmented tenure, and long-standing distrust toward public institutions. These factors strongly influenced who participated, how information was understood, and which issues could realistically move forward.

RAWs also proved to be a resource-intensive process. In Shuanglianpi, productive dialogue required repeated meetings, continuity of facilitators, and space to work through past conflicts. Over time, RAWs priorities began to serve a practical function beyond the workshops themselves: the community and facilitation partners used them to shape project proposals, while government agencies used the same priorities to identify concrete entry points for collaboration. This two-way use helped translate assessment results into coordinated action on the ground.

Finally, the case highlights the importance of upstream governance and long-term accompaniment in wetland landscapes like Shuanglianpi. Addressing water quality, land use, and conservation pressures at their sources—rather than relying on downstream fixes—proved more effective. The dual-track approach, combining internal coordination within government with cross-agency and community platforms, has helped keep both institutional alignment and local engagement moving forward over time.

Fuxing–Nanhe SEPL

Miaoli County

Building a Biodiverse and Healing Satoyama Landscape

CASE SNAPSHOT

SEPL Type:

Shallow–mountain agroforestry and leisure agriculture landscape

Location:

Tongxiao Township, Miaoli County, Taiwan

Location within the Taiwan Ecological Network:

Miaonan Hills Shallow–Mountain Conservation Corridor (northwestern Taiwan)

What Makes This SEPL Distinctive:

Biodiversity–rich Satoyama healing landscape with butterfly monitoring

RAWs-to-ACM Timeline:

September 2023 onward

RAWs Facilitation Team:

Barba Creative Development and Management Consulting Co., Ltd.; National Chung Hsing University

Supporting Agencies:

Forestry and Nature Conservation Agency, Hsinchu Branch

CASE SUMMARY

Fuxing-Nanhe is a leisure agriculture area in Miaoli County where dense forests, diverse farming systems, and nature-based tourism converge in a Satoyama transition landscape. Through RAWs, local operators and residents clarified both the ecological strengths underpinning their success and the institutional and innovation gaps limiting long-term resilience. As a node within Taiwan's Ecological Network, Fuxing-Nanhe illustrates how biodiversity, well-being, and livelihoods can be gradually integrated into a healing-oriented Satoyama pathway.

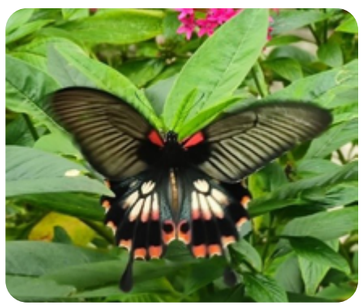
The Fuxing-Nanhe Leisure Agriculture Area is located in Tongxiao Township, Miaoli County. Officially designated in 2006, it encompasses three rural communities—Fuxing, Chengnan, and Nanhe. The area is predominantly Hakka, alongside Han Chinese and Indigenous residents, and is known for historic mountain trails, traditional pit dwellings, fermentation jar (jianggang) culture, leisure farms, and eco-friendly guesthouses.

Agriculture in the area remains highly diverse. Rice is the primary crop, alongside citrus, sweet potato, corn, forage grasses, sugarcane, wine grapes, watermelon, vegetables,

pomelo, peanuts, and other seasonal produce. SEPL partners increasingly use local ingredients to develop value-added food products linked to hands-on visitor experiences. Across these activities, a shared ethos of "low carbon, sustainability, and green living" guides the integration of ecotourism with environmentally responsible leisure industries.

Biodiversity is a defining feature of the landscape. Butterflies and fireflies are especially abundant, and several accommodation operators have voluntarily carried out long-term biodiversity monitoring. The results are compiled into field guides used for visitor interpretation and local school education, reinforcing a feedback loop between conservation, learning, and livelihoods.

High forest cover and clean water underpin a wide range of ecosystem services. In recent years, forest-based activities—particularly forest therapy—have become an important way for visitors to engage with the landscape, combining environmental education, low-impact



recreation, and well-being-oriented experiences.

Situated within the Miaonan Hills Shallow-Mountain Conservation Corridor of Taiwan's Ecological Network (TEN), Fuxing-Nanhe forms a critical link between upland forests and the coastal plains. Its production landscape is characterized by agroecosystems and mixed agroforestry systems embedded within well-preserved forest cover, creating a classic forest-farm mosaic. This corridor context highlights the area's role in maintaining ecological connectivity and provides a clear rationale for using RAWs as a platform to reflect on resilience, coordination, and future adaptive management.

Biodiversity-rich Satoyama healing landscape of the Fuxing-Nanhe SEPL. Source: FANCA-Hsinchu.

RAWs in Fuxing-Nanhe began in September 2023 and were facilitated by Barba Creative Development and Management Consulting Co., Ltd., in collaboration with National Chung Hsing University, and with support from the Hsinchu Branch of the Forestry and Nature Conservation Agency (FANCA-Hsinchu). Six workshops were held, with eleven community members participating consistently through the full assessment process.

The process was introduced gradually, with early sessions focused on building a shared understanding of the Satoyama Initiative and resilience concepts. Rather than starting from theory alone, facilitators used the nearby Liyu Community in Sanyi Township as a concrete reference point, helping participants visualize how the RAWs framework could apply to a real landscape. Together, participants clarified assessment boundaries, mapped key stakeholders, and agreed on how participation would work in practice.

Subsequent workshops worked through the five SEPLS resilience dimensions. Over time, discussions shifted from learning what the indicators meant to exploring what they revealed about Fuxing-Nanhe's strengths, risks, and future options. Participants repeatedly noted that RAWs mattered less as a scoring exercise and more as a structured space for collective reflection. By discussing ecological, economic, social, and governance dimensions together, the community began to see how its many activities—farming, accommodation, education, and conservation—fit together, and where gaps and vulnerabilities remained.

Reflections on the RAWs process, May 2025. Source: @ScapesLab.

3 *RAWs: The Results*

The localized SEPLS assessment revealed a clear pattern: strong ecological foundations paired with emerging institutional and innovation constraints. Ecological resilience and human–nature relationships scored relatively high, reflecting dense forest cover, clean water, and long-standing stewardship practices. Participants also highlighted the area's ridge-to-sea geography as a defining Satoyama–Satoumi transition feature that supports biodiversity and recovery after disturbance.

Long-term biodiversity monitoring—especially of butterflies and fireflies—stood out as both a strength and an opportunity. These efforts already support environmental education and visitor engagement, and participants saw clear potential to further link

monitoring data with place-based branding and nature-based livelihoods.

At the same time, RAWs surfaced important weaknesses. Appropriate innovation for agriculture and conservation remains fragmented. While many environmentally friendly practices are in use, they are unevenly adopted and rely heavily on individual experience. Participants noted the lack of mechanisms to consolidate these practices into shared, replicable models, or to access technical support that aligns conservation goals with production realities.

External pressures added urgency. Dry-season water stress linked to climate change, increasing human-wildlife interactions (including leopard cat predation and roadkill risks), and demographic constraints related to labor availability all shape what is feasible on the ground.

Taken together, RAWs clarified that Fuxing-Nanhe's current resilience depends heavily on favorable environmental conditions and accumulated local knowledge. Strengthening coordination, innovation pathways, and cross-sector integration emerged as critical for sustaining resilience over the long term.

Community-based ecosystem restoration and butterfly monitoring at the Fuxing-Nanhe is a leisure agriculture area. Source: @ScapesLab.

4 RAWs-to-ACM: From Insight to Action

Following RAWs, Fuxing-Nanhe partners moved steadily from diagnosis to practice. Since 2023, biodiversity learning has expanded through hands-on courses focused on butterflies, frogs, turtles, and birds. These activities encouraged residents and operators to carry out their own monitoring, gradually making observation a shared practice rather than a specialist task.

As ecological knowledge deepened, it began to inform everyday management decisions. Participants noted growing confidence in engaging with wildlife, reduced fear and misunderstanding, and a stronger emphasis on coexistence rather than exclusion. Biodiversity came to be seen not only as something to protect, but as something to understand, interpret, and live alongside.

Livelihood strategies evolved in parallel with this learning. Building on earlier ecotourism efforts, the SEPL increasingly integrated forest therapy, permaculture-inspired design, and green living practices such as rainwater harvesting, soil cover, composting, and low-disturbance land management. Several farms and guesthouses now incorporate ecological interpretation, night walks, and seasonal experiences directly into their service models, making conservation an integral part of their economic activities rather than an add-on.

While challenges remain, the experience has reinforced a shared understanding that resilience grows through steady accumulation, practice, and learning. Participation continues to vary, and time and labor constraints shape what is feasible, but these realities have encouraged a pragmatic approach focused on continuity rather than rapid, project-driven expansion.

Throughout the process, FANCA-Hsinchu has played an important supporting role, working alongside academic institutions and facilitation teams to help connect local initiatives with broader policy frameworks. This sustained accompaniment has supported a gradual shift from isolated efforts toward more coordinated, confident, and community-centered governance.

A strong partnership between the Fuxing-Nanhe SEPL and FANCA-Hsinchu. Source: Fuxing-Nanhe Community Development Association.

5 *Looking Ahead*

Fuxing–Nanhe's shared vision is to become a "Satoyama Healing Village" —a living landscape where biodiversity, well-being, everyday life, and sustainable livelihoods reinforce one another. Rather than pursuing mass tourism, the community emphasizes long-term residency, intergenerational learning, and meaningful human–nature relationships. This vision also recognizes the role of relational populations: residents from outside Fuxing–Nanhe who support the landscape through responsible consumption, repeat visitation, volunteering, learning, and long-term engagement.

Taiwan Partnership for the Satoyama Initiative northern exchange base (TPSI-N) workshop in Fuxing–Nanhe SEPL, 2022. Source: Dharma Drum Institute of Liberal Arts.

Looking forward, priorities include deepening local ecological knowledge, maintaining consistent biodiversity monitoring, and translating ecological data into education, therapy, and livelihood content. There is also strong interest in developing more institutionalized stewardship mechanisms that lower participation barriers—both for local residents and for these wider relational populations—and expand collective action over time.

From a Taiwan Ecological Network perspective, Fuxing–Nanhe represents a valuable node within the Miaonan Hills Shallow-Mountain conservation corridor, with clear potential to connect community forestry, other effective area-based conservation measures (OECMs), and forest-based recreation into a coherent regional model grounded in long-term relationships rather than short-term visitation.

6 *Lessons Learned and Reflections*

The Fuxing-Nanhe experience highlights that resilience building requires more than recognizing strengths—it also requires naming constraints openly. RAWs created space to discuss climate variability, water stress, wildlife interactions, and internal coordination challenges in a structured, non-confrontational way. Participants consistently emphasized that the value of RAWs lay not in the scores themselves, but in the shared understanding that emerged. By collectively revisiting lived experience and everyday practices, previously scattered initiatives were repositioned within a more coherent Satoyama narrative. In this sense, RAWs functioned less as a one-time assessment and more as a catalyst for collective learning and long-term orientation—helping Fuxing-Nanhe move toward a biodiverse, resilient healing landscape grounded in everyday practice.

Chenglong SEPL

Yunlin County

Coexisting with a Coastal Wetland in a Satoumi Landscape

CASE SNAPSHOT

SEPL Type:

Coastal satoumi wetland–aquaculture landscape

Location:

Kouhu Township, Yunlin County, Taiwan

Location within the Taiwan Ecological Network:

Changhua–Yunlin Coastal Wetland Conservation Corridor (south–western Taiwan)

What Makes This SEPL Distinctive:

Community stewardship of a subsidence–formed coastal wetland

RAWs-to-ACM Timeline:

2022–2023 onward

RAWs Facilitation Team:

Taiwan Biodiversity Research Institute; Kwan–Tree Education Foundation

Supporting Agencies:

Forestry and Nature Conservation Agency, Nantou Branch

CASE SUMMARY

Chenglong is a coastal community in southwestern Taiwan (Yunlin County) that has learned—out of necessity—to live with permanent land subsidence and the emergence of an extensive wetland landscape. Through resilience assessment workshops (RAWs), residents reframed long-standing concerns about flooding, aquaculture, and habitat change as interconnected system-level challenges, rather than isolated problems. This shared understanding became a foundation for adaptive wetland management rooted in everyday practice. Situated within the Changhua-Yunlin Coastal Wetland Conservation Corridor of Taiwan Ecological Network (TEN), Chenglong SEPLS shows how satoumi landscapes can sustain livelihoods and biodiversity through iterative, community-centred co-management.

Meet the Chenglong SEPL 1

Chenglong Village lies along the Niutiaowan River on Taiwan's southwestern coast, in Kouhu Township, Yunlin County. Once a productive agricultural area, decades of groundwater extraction led to severe land subsidence, gradually exposing the landscape to tidal flooding. This vulnerability became irreversible after Typhoon Wayne (1986) and Typhoon Herb (1996), when seawater surged inland, breached riverbanks, and permanently inundated farmland. Salinized fields could no longer be cultivated. Over time, abandoned farmland transitioned into grass-dominated wetlands, transforming Chenglong into an important stopover and wintering site for migratory birds.This ecological shift

created new conservation value, but it came at a high social cost: the loss of farmland, agricultural identity, and long-established livelihoods. In response, the government introduced an ecological fallowing subsidy, leasing subsided farmland for wetland conservation while compensating farmers. Through sustained collaboration among government agencies, academic institutions, NGOs, and residents, the Chenglong Wetland has been maintained as a functioning ecosystem providing wildlife habitat, water purification, and disaster mitigation. Surveys have recorded over 120 bird species, including at least 14 protected species such as the black-faced spoonbill, alongside estuarine species like the Chinese rice fish.

Chenglong—formerly known as Niuniaogang, a historic river transport hub—remains culturally Hokkien. Today, population aging and out-migration have reduced resident numbers, while foreign spouses play an increasingly important role in local labor. Community life centers on Anlong Temple, founded in 1770, which remains a focal point for collective activities.

Livelihoods have adapted alongside the landscape. Many residents converted flooded fields into fishponds, using mixed seawater and freshwater to farm clams, often alongside white shrimp and milkfish. The wider Kouhu area is also known for mullet roe production. A small number of households continue rice or black soybean farming where conditions allow.

Since 2009, the Forestry and Nature Conservation Agency (FANCA) has leased subsided farmland under the ecological fallowing scheme. Long-term collaboration soon followed with the Kwan-

Chenglong SEPLS – once a fertile agricultural area, now a wetland of national importance. Source: @ScapesLab.

Tree Education Foundation through education, art, and community engagement. In 2015, the Chenglong Community Development Association formally joined conservation efforts. Together, partners developed the “Three-Generation Chenglong Wetland” approach and the guiding principle of “Learning from the Wetland,” emphasizing stewardship across age groups and lived experience.

Located within the Changhua-Yunlin Coastal Wetland Conservation Corridor, Chenglong plays a strategic role in maintaining coastal connectivity while demonstrating how communities can adapt livelihoods to irreversible landscape change.

Black-faced spoonbill (Platalea minor) using the Chenglong Wetland as wintering habitat. Source: FANCA-Nantou.

Clam, white shrimp, and milkfish farming as key livelihood activities in the Chenglong SEPLS today. Source: @ScapesLab.

2 *RAWs: The Process*

Between 2022 and 2023, Chenglong used RAWs as a structured space to reflect on how long-term environmental change and human activity have reshaped both the landscape and community life. The process was facilitated by the Taiwan Biodiversity Research Institute, with support from the Kwan-Tree Education Foundation and institutional backing from the Nantou Branch of FANCA (FANCA-Nantou). Rather than starting from abstract indicators, discussions focused on three closely linked concerns that residents were already living with: increasing wetland water depth, declining opportunities for biodiversity-related use, and the challenge of sustaining aquaculture livelihoods while conserving wetland ecosystems.

Participants often described RAWs as a “health check” rather than a problem-solving exercise. The framework helped surface issues that were familiar but rarely discussed together. For the first time, residents, government agencies, and technical experts shared a platform to acknowledge that Chenglong’s challenges stem from intertwined hydrological, ecological, productive, and governance dynamics.

Workshops were held in the evenings to accommodate working schedules. Seven sessions were conducted in total, including briefings, assessment discussions, and synthesis meetings. Assessments from eighteen participants were included, representing farmers, fishers, teachers, students, and community facilitators.

3 *RAWs: The Results*

RAWs clarified both vulnerabilities and strengths. Ecologically, Chenglong's satoumi landscape was seen as relatively uniform, lacking adjacent forests or foothills that could buffer change and enhance diversity. Infrastructure-driven interventions—such as fixed water control—were viewed as long-term risks that are difficult to reverse. Aquaculture depends heavily on externally sourced fry, limiting local breeding and conservation of native strains. Socially, residents noted limited influence over resource-use decisions and uneven recognition of how environmental health links to community well-being.

At the same time, strong adaptive capacity was evident. Flooding was no longer perceived as an existential threat, reflecting decades of lived experience and adjustment. Fishponds and coastal resources were seen as abundant if managed carefully. Traditional aquaculture knowledge remained robust, and social welfare systems contributed to overall resilience.

Priority issues included safeguarding wetland health and connectivity, restoring mudflat exposure through better water-level management, clarifying appropriate uses of wetland resources, revitalizing traditional knowledge through modern tools, strengthening community governance, and addressing livelihood and welfare concerns together.

Chenglong residents sharing reflections on RAWs results and future visions, 2025. Source: @ScapesLab.

4 RAWs-to-ACM: From Insight to Action

RAWs marked a turning point by transforming fragmented concerns into a shared diagnosis. One focal issue was the gradual deepening and stabilization of wetland water levels, which reduced mudflat habitat and weakened ecological functions as well as disaster mitigation capacity. These changes were understood not as isolated failures, but as cumulative outcomes of aquaculture practices, infrastructure operation, and broader coastal dynamics. In response, Chenglong SEPLS and its partners initiated small-scale, reversible hydrological trials, including water-gate adjustments and habitat diversification, accompanied by ecological monitoring. The emphasis was on learning-by-doing—testing, observing, and adjusting—rather than relying on one-time engineering solutions.

Adaptive co-management also extended to wildlife-friendly aquaculture and policy-linked programs such as payments for ecosystem services (PES). Community organizations played a key role in coordination and communication, lowering participation barriers for individual producers.

The FANCA-Nantou provided stable policy coordination, the Taiwan Biodiversity Research Institute contributed scientific analysis, and the Kwan-Tree Education Foundation maintained long-term accompaniment. Clear role-sharing among long-term partners enabled steady progress while preserving flexibility for learning and adaptation.

Wetland art and environmental education as integral parts of the Chenglong SEPLS story. Source: FANCA-Nantou.

5 *Looking Ahead*

Looking ahead, Chenglong SEPLS is concentrating on improving water and habitat management through gradual, adaptive adjustments: refining water levels, expanding friendly aquaculture practices, and deepening wetland understanding through education, interpretation, and art. Partners stress that Chenglong's experience provides lessons and approaches, not a fixed model for replication.

From a TEN perspective, Chenglong functions as a key coastal wetland node, combining ecological significance with mature community organization and cross-sector collaboration. Its experience illustrates how adaptive management can align national conservation objectives with local livelihoods.

Resilience in Chenglong as an ongoing practice shaped by water, livelihoods, and the wetland landscape. Source: @ScapesLab.

6 *Lessons Learned and Reflections*

Chenglong's experience shows that RAWs work best when discussions stay close to everyday realities. Early sessions felt unfamiliar to many participants, but returning repeatedly to concrete issues—such as water depth in ponds, mudflat exposure, and aquaculture practices—helped residents move from individual observations to shared understanding.

Long-term accompaniment was critical for turning reflection into action. Support from partners helped maintain continuity across workshops and follow-up activities, even as participation remained concentrated among a core group. This highlighted the importance of developing additional entry points for wider involvement, while also showing that a committed core can still move collective action forward.

As adaptive co-management continues, Chenglong's conditions keep changing with tides, seasons, and management decisions. The case demonstrates the value of periodically revisiting priorities, checking whether earlier assumptions still hold, and adjusting actions accordingly. In Chenglong, resilience has come to be understood not as a final state to be achieved, but as an ongoing practice shaped by how people work with water, livelihoods, and the evolving wetland landscape.

S q b a S E P L

Taichung City

Sustaining Farming Livelihoods in an Indigenous Mountain Satoyama Landscape

CASE SNAPSHOT

SEPL Type:

Mid-elevation mountain landscape (forest-farm mosaic)

Location:

Heping District, Taichung City, Taiwan

Location within the Taiwan Ecological Network:

Taichung Western Foothills Forest Conservation Corridor (central Taiwan)

What Makes This SEPL Distinctive:

Indigenous mountain farming and forest-orchard mosaic

RAWs-to-ACM Timeline:

first round – 2021; follow-up round 2024 and onward

RAWs Facilitation Team:

Mointain River Sea Co., Ltd.

Supporting Agencies:

Forestry and Nature Conservation Agency, Taichung Branch

CASE SUMMARY

Sqba is a small mountain community in central Taiwan (Taichung County), where farming livelihoods are closely interwoven with forest ecosystems and Atayal cultural practices. Through two rounds of resilience assessment workshops (RAWs) in 2021 and 2024, residents clarified how agricultural resilience, wildlife coexistence, and cultural continuity are inseparable, and translated these insights into adaptive co-management (ACM) actions in collaboration with long-term partners. Positioned within the Taichung Western Foothills Forest Conservation Corridor, Sqba SEPL illustrates how mountain satoyama landscapes can sustain local livelihoods while contributing to biodiversity stewardship.

Bird's-eye view of the Sqba SEPL, Taichung County. Source: FANCA-Taichung.

Sqba SEPL is a mountain community in Heping District, Taichung City. In Atayal, Sqba means "hand" —a name rooted in everyday life. Elders recall that when people in nearby Harungtai asked where neighbors had been working, the answer was often a simple gesture: a hand pointing toward the slopes where fields had been opened and tended. Over time, that gesture became a place name—

Sqba: “the place pointed out by hand,” and also “a place opened by human hands.” After World War II, lowland residents came to refer to the area as “Upper Guguan.”

Located between 900 and 1,100 meters above sea level and covering roughly 30 hectares, Sqba is a landscape where dense mid-elevation forest presses close to cultivated plots. Farms are embedded in woodland, and woodland edges shape daily farming decisions. This forest-farm mosaic supports high biodiversity. A 2022 survey recorded 8 mammal species, 54 bird species, 6 reptiles, 11 amphibians, and 285 insect species, with protected wildlife such as forest raptors and the Formosan black bear also documented. Farming here takes place alongside intact mountain ecosystems.

Community life mirrors the terrain. Sqba is organized across three terraces, with 28 registered households and around 150 registered residents. The population is mixed—Atayal, Hakka, Hoklo, and mainland Chinese descendants—though Atayal people comprise roughly one-third of registered residents. Only about two-thirds live in Sqba year-round. Han households are more concentrated on the lower terrace, while the second and third terraces include more Atayal households. Community affairs are supported by the Sqba Indigenous Culture and Leisure Agriculture Development Association, a simplified water supply committee, and Fruit Marketing Cooperative Group No. 51.

Livelihoods have shifted repeatedly in response to access constraints and disasters. Before the 1999 Chi-Chi (921) Earthquake and the 2004 floods, farming focused on short-cycle vegetables. Difficult road conditions and repeated hazards pushed farmers toward less labor-intensive crops. Citrus orchards became the first major transition, until citrus greening disease forced another shift. Sweet persimmon eventually emerged as a higher-value, more stable option and is now Sqba’s agricultural backbone. By 2023, livelihoods had diversified modestly to include small camping sites and ecological and cultural interpretation.

Sweet persimmon remains the primary crop, alongside peaches, citrus, wax apple, guava, and dragon fruit. Seasonal vegetables are grown for household use, and some families continue cultivating traditional Atayal crops—not for market expansion, but to keep seeds and knowledge alive.

Because farms sit close to forest habitat, wildlife damage is a constant concern. Earlier deterrents, including traditional electric fencing, posed safety risks and could harm non-target species. With guidance and subsidies from agricultural and forestry agencies, many farmers have adopted safer electric shepherd fencing systems, reducing risks while protecting crops.

Sqba's RAWs journey did not begin from scratch. Long-term collaboration with the Taichung Branch of the Forestry and Nature Conservation Agency (FANCA-Taichung) had already been built through community forestry initiatives and ecotourism capacity-building, including guide training and ecological and cultural inventories. Beginning in 2017, two phases of the Guguan Indigenous Community Satoyama Forest Conservation Promotion Project documented local biodiversity, farming systems, traditional culture, and Indigenous crops while supporting Satoyama-aligned livelihoods. Community members also actively contributed to public-sector conservation efforts, such as wildfire response and Formosan black bear rescue.

Situated within the Taichung Western Foothills Forest Conservation Corridor of the Taiwan Ecological Network (TEN)—between state-owned forests and foothill agricultural landscapes—Sqba had already developed strong relationships, shared experience, and conservation practice, making it a natural candidate for the first round of RAWs.

Sweet persimmon remains the primary crop, alongside peaches, citrus, wax apple, guava, and dragon fruit. Source: FANCA.

2 *RAWs: The Process*

Sqba carried out two rounds of RAWs, in 2021 and 2024. The full process was facilitated by Mountain River Sea Co., Ltd., with support from the Taichung Branch of the Forestry and Nature Conservation Agency (FANCA-Taichung).

RAWs were introduced with care, recognizing that the framework can feel abstract for first-time participants. To ground the process, the first workshop in August 2021 invited Dr. Paulina G. Karim (@ScapesLab, National Dong Hwa University) to guide residents through SEPLS resilience concepts and walk step by step through the assessment of Perspective A (SEPLS diversity and connectivity). This learning-by-doing approach helped participants see what RAWs look like in practice, while also building confidence among facilitators and community members alike.

The first RAWs cycle in 2021 consisted of four workshops, culminating in a results-sharing session that included relevant government agencies. Workshops were designed to fit community rhythms: sessions began with shared dinners and informal conversation, followed by approximately two hours of structured discussion. Time was intentionally left afterward for relationship-building and continued dialogue. Participation was handled flexibly. When residents were unable to attend a session, the accompaniment team followed up individually to share discussion points, gather perspectives, and guide scoring—ensuring that absence did not mean exclusion.

Dr. Paulina G. Karim (@ScapesLab, National Dong Hwa University) supporting the first RAWs session in the Sqba SEPL, August 2021. Source: FANCA-Taichung.

Following completion of the first RAWs cycle, Sqba moved into implementation. A second round of RAWs was held in 2024 to reflect on progress and reassess emerging challenges. This follow-up process was streamlined into three evening workshops held between August and September 2024. A final summary workshop on February 7, 2025, brought multiple agencies together to collectively review findings and discuss next steps.

Across both rounds of RAWs, one message remained clear: in Sqba, livelihoods, ecology, and culture cannot be separated. What happens in orchards shapes wildlife movement; forest conditions influence farming decisions; and the way knowledge is passed on determines how the landscape is cared for over time.

Agricultural resilience emerged as the community's central concern. Sweet persimmon farming underpins household incomes, yet farmers face mounting pressures from pests—including invasive ants—alongside climate extremes and changing pesticide regulations. Through RAWs, these challenges were discussed not as isolated technical problems, but as interconnected risks affecting market trust, land stewardship, and the long-term viability of remaining in the mountains.

Cultural continuity formed a second key theme. Participants openly acknowledged the decline of traditional crops and the difficulty of passing elders' knowledge to younger generations. RAWs helped reframe "revival" as more than commercial production: maintaining seeds, practices, and spaces for learning was recognized as a meaningful goal in itself, tied to identity and place.

Community-authored handbook on traditional livelihoods and ethnobotanical knowledge in the Guguan area. Source: FANCA-Taichung.

A third theme centered on external linkages. Many existing support programs are designed for lowland agriculture and do not readily fit mountain mosaic farming systems. RAWs provided a structured space for residents to articulate their needs more clearly, helping external institutions better understand where existing policies and tools fall short.

Between the first and second rounds, discussions became more focused. Early conversations were wide-ranging and exploratory, while later sessions concentrated on concrete constraints—such as pest diagnostics, climate adaptation strategies, and what "friendly farming" verification could realistically mean in a mountain context. This progression reflected growing confidence in using RAWs not just to reflect, but to plan.

4 RAWs-to-ACM: From Insight to Action

In Sqba, the transition from RAWs to adaptive co-management did not take the form of a single plan, but unfolded through practice. Insights from the RAWs gradually converged into three areas where action felt both necessary and feasible: cultural transmission, conservation of traditional crops, and day-to-day farm management under changing environmental conditions.

Agriculture became the most sustained entry point for action. Through partnerships with research and extension bodies, farmers worked on practical issues such as pest diagnostics, reduced-chemical strategies, grass-cover cultivation, and soil and microbial management. Simple screening tools were introduced to help farmers meet pesticide requirements and maintain market credibility, while several farms served as demonstration sites where practices could be tested, observed, and adjusted collectively.

Cultural actions moved forward at a different pace. Efforts focused on documenting and safeguarding everyday knowledge—recording practices, interviewing elders, and producing local publications that reflected how farming, forests, and culture intersect in daily life. Seed-saving was approached cautiously, with the emphasis placed on continuity and learning rather than rapid expansion or commercialization.

Local government and agricultural agencies participating in a Satoyama initiative platform to support community development through the RAWs-to-ACM process. Source: FANCA-Taichung.

Ecotourism was treated with restraint. Given limited labor availability and the seasonal demands of farming, residents chose not to aggressively pursue tourism. Instead, activities were offered selectively, when capacity allowed and when they complemented—rather than competed with—agricultural and cultural priorities.

Throughout this process, FANCA-Taichung played a steady convening and coordinating role, helping translate community priorities into coordinated action among different agencies. With facilitation and follow-up support from Mountain River Sea Co., Ltd., partners bridged policy, science, and local realities, while agricultural agencies gradually shifted from one-off training events toward longer-term engagement aligned with the community's rhythms.

5 *Looking Ahead*

Sqba's vision for the future is not about scaling up, but about staying grounded. Residents are clear about what fits their landscape, labor capacity, and cultural values. Agriculture remains the backbone of community life, supported by ecological health and cultural knowledge that make farming viable over time.

Leaving something meaningful for the next generation is a guiding concern. Ecology is seen not as a constraint on development, but as an asset to be cared for. Cultural knowledge is not treated as static heritage, but as a working resource for managing a complex mountain landscape.

From the perspective of the Taiwan Ecological Network (TEN), Sqba functions as a connective node within the Taichung Western Foothills Forest Conservation Corridor. The community exemplifies how wildlife-friendly farming, Indigenous knowledge, and everyday forest stewardship can sustain ecological connectivity through lived practice—rather than through formal protection measures alone.

Agriculture, supported by traditional ecological knowledge and new technologies, is the backbone of Sqba community life. Source: FANCA-Taichung.

6 *Lessons Learned and Reflections*

Sqba's experience shows that RAWs are not just a one-off assessment, but a process for building a shared language between communities and institutions over time. Having completed two rounds of RAWs (2021 and 2024), the community now uses the framework as a systematic, time-sensitive tool for reflection—helping to track change, revisit priorities, and adjust responses as conditions evolve. Through this process, RAWs also enabled agencies to better understand the realities of mountain livelihoods, where standardized agricultural solutions often fall short.

At the same time, RAWs created a rare platform for translating mountain-scale farming concerns into concrete, actionable requests. Rather than expressing abstract needs, residents articulated specific challenges related to pests, climate adaptation, labor constraints, and cultural continuity in ways that external partners could more readily engage with.

Challenges were also clearly visible. Participation remains difficult to stabilize amid farming seasons and daily responsibilities, and trust-building takes time and cannot be rushed. Looking ahead, future RAWs cycles will require more inclusive strategies, clearer and more accessible language, and continued accompaniment to sustain engagement. Strengthening local adaptive capacity—through observation skills, management confidence, and seed stewardship—forms a critical bridge between community resilience and wider ecological network goals.

Shanglin SEPL

Chiayi County

Living with the Farmland Tree Frog in a Bamboo Satoyama Landscape

CASE SUMMARY

Shanglin is a bamboo-based agricultural community in southern Taiwan (Chiayi County) where frog-friendly farming has become a cornerstone for conserving the nationally protected Farmland Tree Frog. Through resilience assessment workshops (RAWs), the community identified water governance, habitat management, and disaster preparedness as shared priorities, and translated these insights into ACM actions spanning community forestry, river governance, and cross-agency collaboration. Located within Northern Chiayi-Southern Tainan Agricultural Conservation Corridor, Shanglin demonstrates how nature-friendly bamboo farming practices can actively support SEPL-scale biodiversity conservation.

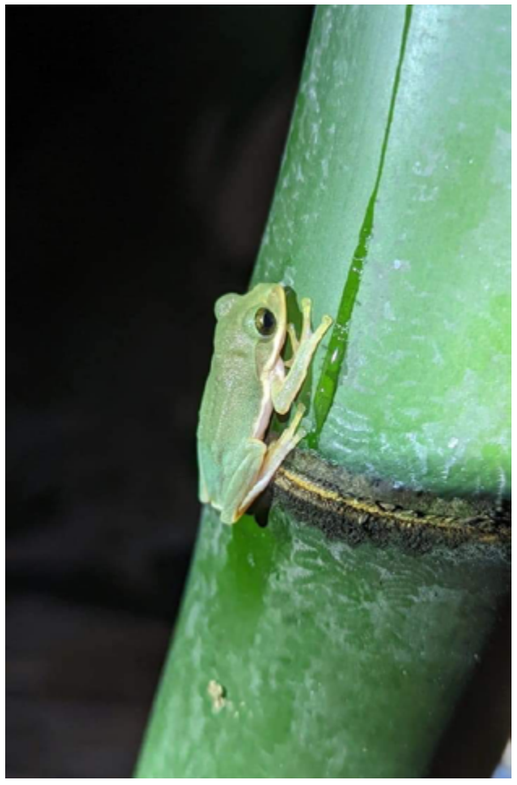
Shanglin is a rural community in Dalin Township, Chiayi County, located within a mosaic of farmlands and secondary forests that forms an important ecological transition zone between the plains and foothills of southern Taiwan. This mixed agricultural-forest landscape continues to provide habitat for a wide range of species, most notably the Farmland Tree Frog (Zhangixalus arvalis)—a Taiwan-endemic and nationally protected species. Shanglin SEPL represents one of the frog's most important remaining strongholds. Dependent on water-retaining bamboo groves and secondary forests, the species has experienced severe population declines due to habitat loss and fragmentation, with fewer than 8,000 individuals estimated to remain in Chiayi County.

Historically, extensive bamboo cultivation unintentionally created suitable breeding habitat for the Farmland Tree Frog. In recent years, however, the decline of the bamboo shoot industry and shifts in land use have reduced bamboo coverage, increasing habitat fragmentation and making habitat maintenance an urgent conservation priority. Beyond the tree frog, the area also supports other protected or endemic species—including the Greater Painted-snipe, Black-winged Kite, Formosan Stream Crab, and Formosan Rat Snake—highlighting Shanglin's ecological richness despite its productive agricultural setting.

Shanglin is a predominantly Han Chinese farming community of approximately 860 residents, with a noticeably aging population. Local culture is closely tied to agricultural cycles and the integrated use of "forest-river-village" resources. Traditional practices—such as bamboo shoot pickling, sugarcane-related customs from the Japanese colonial period, fishing and shellfish gathering, and children's games made from forest materials—reflect long-standing relationships between livelihoods and nature.

Since Dalin Township was designated an International Cittaslow in 2016, Shanglin has actively embraced “slow living” principles. These include promoting slow food, low-impact tourism, and food-and-agriculture education as ways to sustain local culture while easing development pressure. Most residents remain engaged in agriculture, with bamboo shoots as the primary crop, alongside rice, pineapple, and gardenia.

The Chiayi Branch began working with Shanglin in 2018 through the promotion of frog-friendly farming, recognizing both the area’s ecological importance and the strength of local leadership. With an active community development association, growing conservation awareness, and long-term collaboration on Farmland Tree Frog habitat management, Shanglin was selected as a pilot site for the first round of SEPLS resilience assessment.



Situated within the Northern Chiayi-Southern Tainan Agricultural Conservation Corridor of Taiwan’s Ecological Network, Shanglin plays a strategic role in linking farmland conservation, freshwater systems, and lowland biodiversity. From the Chiayi Branch’s perspective, Shanglin demonstrates how frog-friendly agriculture and participatory governance can function as practical connectors within TEN—turning everyday farming and water management decisions into contributions to landscape-scale ecological connectivity.

Eco-friendly bamboo production and habitat management in the Shanglin SEPL supporting conservation of the Taiwan-endemic, nationally protected Farmland Green Tree Frog. Source: FANCA-Chiayi.

2 *RAWs: The Process*

The RAWs process in Shanglin took place between August and September 2021 and involved twelve community members—primarily long-term residents engaged in agriculture and community service—who participated in four evening workshops. The process was facilitated by Watch Nature Ecological Consultant Co., Ltd., with support from the Chiayi Branch of the Forestry and Nature Conservation Agency (FANCA-Chiayi).

RAWs in Shanglin were convened with strong leadership from the community development association. Its chair had prior exposure to resilience assessment concepts and Satoyama-related initiatives, which helped anchor the process from the outset and build early confidence among participants.

As this was the community's first experience with resilience assessment, initial sessions focused on establishing a shared foundation. Facilitators introduced core concepts, clarified the relationship between RAWs and the Satoyama Initiative, and created space for participants to become comfortable with discussion and expression. Subsequent sessions worked through the five resilience dimensions and twenty indicators using facilitated dialogue, collective reflection, and shared scoring.

Rather than treating RAWs as a technical or data-driven exercise, the process emphasized collective sense-making. Participants discussed each indicator in relation to lived experience, gradually identifying priority issues and distinguishing between actions that could be addressed locally and those requiring external coordination. The final session brought these discussions together, consolidating them into a shared set of priorities and possible pathways forward.

Facilitation team explaining resilience indicators to RAWs participants, Shanglin, 2021. Source: FANCA-Chiayi.

3 *RAWs: The Results*

Through RAWs, Shanglin identified several pressing challenges. Environmentally, unclear governance responsibilities for local rivers, ponds, and irrigation systems complicated water management, while flood risk and disaster preparedness emerged as urgent concerns in this watershed-dominated landscape. Socio-economically, participants highlighted the rapid loss of traditional knowledge, difficulties in agricultural transformation and product marketing due to an aging workforce, and limited diversification of income sources beyond conventional farming.

At the same time, RAWs surfaced strong local assets. Community members expressed pride in their surrounding environment, high levels of social cohesion, and existing self-organized mechanisms such as water patrol teams, local ecological interpreters, and engagement in frog-friendly habitat management. Food self-sufficiency remained high, and the community had already begun expanding participation and benefit-sharing through partnerships with neighboring communities and institutions.

Among the most urgent priorities identified were improving water quality and quantity management, strengthening ecologically sensitive maintenance of rivers and ponds, enhancing environmental awareness and cleanliness, and improving disaster preparedness—particularly for older residents.

Participants of the Shanglin RAWs upon successful completion, 2021. Source: FANCA-Chiayi.

4 RAWs-to-ACM: From Insight to Action

Building on the RAWs outcomes, Shanglin translated assessment insights into concrete adaptive co-management (ACM) actions grounded in everyday land use. With guidance from the FANCA-Chiayi, the community advanced a community forestry program centered on the Farmland Green Tree Frog as an umbrella species within its bamboo Satoyama landscape.

At the core of this effort is a habitat-friendly production and certification scheme that links frog conservation with sustainable bamboo and rice farming. Participating farmers manage bamboo groves and surrounding farmland using pesticide-free practices, maintain breeding and shelter habitats, and enhance ecological connectivity through measures such as raptor perch installation and long-term bamboo forest stewardship. These practices are reinforced through eco-labeling and value-added products, including bamboo shoots and local cuisine, allowing conservation outcomes to be directly connected to market incentives and farmer livelihoods.

Shanglin also became an active participant in cross-sector river governance. Through green network platforms and river basin meetings, community members engaged directly with the Fifth River Management Office, contributing local ecological knowledge to river engineering discussions and habitat

Community-led night frog-watching tours for environmental education in Shanglin SEPL. Source: FANCA-Chiayi.

conservation planning. This engagement helped shift interactions from consultation to collaboration.

Local water stewardship emerged as another effective ACM pathway. Community members successfully reported illegal wastewater discharge from upstream poultry farms, leading to enforcement actions and remediation. In parallel, collaboration with the township office enabled the removal of invasive water hyacinth from local ponds, restoring irrigation functions and improving aquatic habitat quality—benefiting both farming and frog habitat.

These landscape-scale actions were complemented by initiatives focused on resident well-being and risk preparedness. Partnerships with nearby universities and student service programs supported ecological monitoring, education, and community activities, while shared refuge and support spaces were established to strengthen disaster preparedness.

Taken together, Shanglin's experience shows how RAWs can function as a practical entry point for sustained ACM—moving from issue identification to coordinated, multi-stakeholder responses that align biodiversity conservation, livelihood resilience, and community stewardship within a working Satoyama landscape.

5 *Looking Ahead*

Shanglin's focus moving forward is not rapid expansion, but consolidation—strengthening habitat management, stabilizing frog-friendly farming practices, broadening participation across generations, and maintaining regular dialogue with river, agriculture, and conservation authorities. With the Farmland Tree Frog as a focal species and RAWs as a guiding framework, Shanglin offers a replicable example of how agricultural communities can anchor biodiversity conservation within everyday livelihoods.

Taiwan Partnership for the Satoyama Initiative southern exchange base (TPSI-S) workshop in Shanglin SEPL, 2022. Source: FANCA-Chiayi.

6 *Lessons Learned and Reflections*

Community members viewed the RAWs process positively, noting that it helped clarify local priorities, identify available resources, and distinguish issues requiring external support. By providing a structured space for discussion, RAWs strengthened community cohesion and supported consensus-building around shared environmental and livelihood concerns—functioning as a practical resilience "health check" rather than a one-time assessment.

Several challenges emerged. Translating resilience concepts and Satoyama-related terminology into locally meaningful language required sustained facilitation effort, particularly when working with older participants and across linguistic contexts. Participation was also concentrated among long-standing, active community members, pointing to the need for future cycles to engage a broader range of ages and perspectives. Early discussions tended to remain narrow until facilitation helped participants connect lived experience with wider social-ecological dynamics.

Shanglin's experience also showed that understanding the transition from RAWs to ACM develops over time. Only after completing a full cycle did participants and facilitators gain a clearer picture of how assessment outcomes could inform policy alignment and cross-agency coordination—suggesting value in introducing the ACM pathway earlier in future RAWs processes.

Despite these challenges, Shanglin demonstrated strong initiative beyond the workshops, actively engaging authorities on pollution control, water management, and habitat conservation, and supporting neighboring communities in related efforts. Recognition through national community forestry awards reflects how RAWs, when combined with sustained accompaniment, can reinforce community-led action and align local priorities with the broader objectives of Taiwan's Ecological Network.

Jinshan SEPL

Kaohsiung City

Cultivating Guava Resilience in a Geobiodiverse Badlands Landscape

CASE SNAPSHOT

SEPL Type:

Agricultural–forest mosaic (mudstone badlands, orchards, and freshwater systems)

Location:

Yanchao District, Kaohsiung City, Taiwan

Location within the Taiwan Ecological Network:

Northern Kaohsiung Badlands Hills and Shallow-Mountain Forest Conservation Corridor (southern Taiwan)

What Makes This SEPL Distinctive:

Geobiodiverse mudstone landscape and signature guava production

RAWs-to-ACM Timeline:

2024 onward

RAWs Facilitation Team:

Watch Nature Ecological Consultant Co., Ltd.

Supporting Agencies:

Forestry and Nature Conservation Agency, Pingtung Branch

CASE SUMMARY

Jinshan is a guava-growing farming community set within a dramatic mudstone badlands landscape in southern Taiwan (Kaohsiung City), where geology, biodiversity, and livelihoods are tightly intertwined. Through resilience assessment workshops (RAWs), community groups clarified shared strengths—strong place identity and learning capacity—alongside challenges related to wildlife conflict, environmental management, and demographic change, and began translating these insights into adaptive co-management actions. Positioned within a Northern Kaohsiung Badlands Hills and Shallow-Mountain Forest conservation corridor, Jinshan SEPL highlights the opportunities and challenges of turning geobiodiversity into a living foundation for conservation, education, and resilient rural livelihoods.

Meet the Jinshan SEPL 1

Jinshan Community is located in Yanchao District, Kaohsiung City, covering approximately 4.3 km². A main access road links Jinshan efficiently to more densely populated parts of Yanchao, giving the community relatively good accessibility despite its rural setting.

What makes Jinshan distinctive is its mudstone badlands terrain—a striking "geobiodiverse" landscape shaped by geology, intense sunlight, and low-latitude warmth. Historical records already noted the area's dramatic landforms and foothill plains. These

Mudstone geobiodiverse landscape of the Jinshan SEPL. Source: @ScapesLab.

environmental conditions have strongly influenced local livelihoods: crops tolerant of sticky soils and strong sun—historically betel palm, and today guava and wax apple—became central to farming systems. Over time, guava has been refined into a signature local variety (often referred to as “pearl guava”), now emblematic of both Jinshan and the wider Yanchao area.

Water is both an asset and a constraint. Jinshan lies within the catchment of a tributary of the Agongdian River system, contributing to the Agongdian Reservoir downstream. While annual rainfall is relatively abundant, it is highly seasonal, concentrated in late spring and summer, with a pronounced dry season in winter. Combined with mudstone’s low permeability and limited groundwater storage, this seasonality creates recurring dry-season pressure affecting both farming and daily life.

Jinshan also carries deep historical layers, from early Indigenous presence and cultivation to later Han migration, settlement expansion, and cultural blending over time. Today, the community faces significant demographic change. As of October 2023, Jinshan had approximately 202 households and 486 residents, with ongoing population outflow and a shrinking farming population.

Two local organizations play particularly active roles. The Jinshan Community Development Association focuses on elder care and community-based activities, including local trails and visitor experiences, drawing mainly on rural regeneration and community forestry resources. The Yuanjiao Cultural Association emphasizes geo-environmental interpretation and cultural guiding, often working in the Wushan mud volcano landscape and around the reservoir area, with broader project linkages across cultural and environmental agencies. While relations between the two groups are positive, their project scopes and activity spaces differ, and collaboration is not yet routine.

Ecologically, Jinshan lies within the Northern Kaohsiung Badlands Hills and Shallow-Mountain Forest conservation corridor within Taiwan Ecological Network (TEN). This corridor prioritizes the conservation of mudstone badlands landscapes, shallow-mountain wildlife, and habitat connectivity, while reducing conflict and roadkill risks. Biodiversity knowledge in the area draws from both research and citizen observation, including records of protected

Cultivating guava and wax apple as signature fruits supporting local livelihoods in the Jinshan SEPL. Source: @ScapesLab.

species such as pangolins and raptors, as well as a rich assemblage of native plants documented through past studies. While the corridor identifies the Eastern Grass Owl as a focal species, it does not consistently appear in Jinshan's immediate records—highlighting a common TEN challenge: translating corridor-level priorities into locally visible species narratives and feasible community action.

2 *RAWs: The Process*

RAWs in Jinshan were facilitated by the Watch Nature Ecological Consultant Co., Ltd. team, with financial and institutional support from the Pingtung Branch of the Forestry and Nature Conservation Agency (FANCA-Pingtung). Beyond supporting the assessment itself, FANCA-Pingtung also played a central role in moving the process from RAWs toward adaptive co-management (ACM), providing continuity between assessment, coordination, and follow-up action.

The RAWs process began with consolidation of baseline information. The facilitation team compiled Jinshan's social, cultural, livelihood, and ecological context through interviews and review of existing studies and datasets, including TBN records. This synthesis was prepared as a community-facing reference, intended to remain with Jinshan as an internal resource for future planning and learning.

Stakeholder engagement then focused on mapping local issues through the SEPLS resilience lens, treating RAWs as a whole-community health check across five dimensions and twenty indicators. To ensure practical relevance, facilitators localized the indicators into accessible, place-based questions grounded in Jinshan's badlands context—for example, vegetation conditions in mudstone landscapes, interactions between fruit farming and biodiversity, and the community's capacity to respond to environmental hazards.

RAWs implemented in two phases with the Jinshan Community Development Association and the Yuanjiao Cultural Association, 2024. Source: @ScapesLab.

Reflecting Jinshan's dual-organization landscape, RAWs were implemented in two phases. Workshops with the Jinshan Community Development Association were held between May and June 2024, followed by sessions with the Yuanjiao Cultural Association between October and November 2024, concluding with a joint wrap-up workshop. This two-track approach increased facilitation effort but enabled broader representation and more open discussion, reducing the constraints that can arise when groups with different project histories and mandates are combined too early.

Across discussions, RAWs revealed a consistent pattern: strong place identity and landscape assets, alongside structural pressures related to demographics, wildlife conflict, and coordination capacity.

Participants repeatedly identified Jinshan's geological landscape—mud volcanoes, moon-world badlands, and prominent ridges—as a defining strength and a foundation for environmental education and community storytelling. Equally important was accumulated experience in community building, project implementation, and local learning activities. Facilitators described this as a distinct "local resilience character": the capacity to adapt and persist in a harsh badlands environment.

At the same time, challenges were discussed candidly. Monkey and bird damage to fruit orchards emerged as a high-impact issue with limited locally feasible solutions. Environmental management pressures—including legacies of illegal dumping and ongoing waste issues—were also highlighted as affecting both ecological conditions and community image. Underlying these issues is a deeper constraint: aging and outmigration have concentrated active participation among older residents, making forest and protective woodland management increasingly difficult. Recurrent fire risks further underscored the need for stronger public-sector support and cross-agency coordination.

Differences also emerged between the two organizations. The Community Development Association emphasized strengths related to everyday use of local natural resources, including biodiversity observation, grass cover management,

organic fertilizer use, and informal gathering of wild plants and fungi. Crop seed-saving was also perceived as relatively strong, though invasive species received limited attention. The Yuanjiao Cultural Association took a more conservative, regionally informed view, stressing that conservation should extend beyond economic crops to native and locally characteristic species, and noting that invasive species pressures may be underestimated because impacts are not yet fully visible.

Across both tracks, common gaps mirrored those seen in many SEPLs: limited mechanisms for translating research into usable community materials, insufficient access to context-appropriate technical support, and uneven foundations for long-term coordination across organizations and sectors.

4 RAWs-to-ACM: From Insight to Action

In the months following RAWs, Jinshan treated the assessment not as a completed report, but as a starting point for adaptive work. Priority themes included mitigating monkey and bird damage, managing slope and soil-water risks in mudstone terrain, strengthening native crop and plant conservation, documenting and transmitting traditional knowledge, enhancing marketing linked to geology and friendly farming, and creating pathways for youth engagement through internships, service learning, or longer-term collaboration.

Through discussion, a practical "three-in-one" coordination logic emerged—linking the Satoyama Initiative, Community Forestry program, and TEN strategic priorities through platform-based collaboration. The facilitation team played a bridging role by helping frame issues, suggesting technical options (such as infrared cameras), and translating information into community-usable formats.

Partnership and coordination in action: words of support from Professor Mei-Hui Chen, Head of the Southern Exchange Base of the Taiwan Partnership for the Satoyama Initiative (left), and Ms. Zhong-Yue Yang, Section Head of FANCA-Pingtung. Source: @ScapesLab.

FANCA-Pingtung supported this transition by aligning community priorities with corridor-level considerations, encouraging approaches that make biodiversity more visible through community-based monitoring and information systems (CBMIS) and farm-based learning.

In practice, the main constraints are less about ideas than about people. Efforts such as marketing, environmental interpretation, and eco-tourism design depend heavily on younger participation, yet pathways to sustain youth involvement beyond short-term projects remain limited. Community partners also recognize that challenges such as wildlife conflict, waste management, and youth retention extend beyond the reach of the community or FANCA-Pingtung alone, reinforcing the importance of ongoing cross-sector collaboration.

5 *Looking Ahead*

Looking forward, Jinshan's shared direction is to more systematically connect landscape, culture, biodiversity, and livelihoods into a pathway that people can understand, join, and benefit from. Community partners noted that Jinshan has no shortage of stories or assets; the challenge lies in moving beyond scenery to embed local knowledge and daily practices into coherent experience, learning, and livelihood models.

Seen from a wider landscape perspective, Jinshan has the potential to function as a demonstration node within TEN's conservation network—showing how geobiodiversity, friendly farming, environmental education, and community action can be integrated in a difficult but distinctive environment. Rather than acting alone, Jinshan's value lies in what it can share outward: lessons, models, and practices that are relevant to other mudstone and shallow-mountain SEPLs facing similar constraints.

Looking ahead: turning Jinshan's stories and assets into shared futures. Source: @ScapesLab.

6 *Lessons Learned and Reflections*

In Jinshan, RAWs proved most valuable not as a scoring exercise, but as a way to reorganize long-standing, loosely connected concerns into a shared and workable set of priorities. Viewing issues such as wildlife conflict, environmental management, demographic change, and coordination capacity side by side helped reveal how they reinforce one another rather than exist independently.

Conducting RAWs separately with two community associations was a deliberate process choice that surfaced complementary perspectives and reduced constraints on open discussion. While more demanding to facilitate, this approach helped make differences in assumptions—such as how biodiversity conservation is defined—visible and discussable, strengthening the overall assessment.

Crucially, the process also helped draw a clearer boundary between what the community can realistically sustain on its own and where outside expertise, institutional support, and coordination are essential. This clarity shifted expectations away from "doing everything locally" toward more strategic collaboration.

Finally, RAWs highlighted that Jinshan's geobiodiversity becomes an asset only when it is made legible and usable. Turning landscape features into learning tools, narratives, and participation mechanisms requires deliberate knowledge translation, but offers a promising foundation for resilient, guava-based livelihoods.

Luoshan SEPL

Hualien County

From Taiwan's First Organic Village to a Satoyama Platform for Collective Resilience

CASE SNAPSHOT

SEPL Type:

Riverine agricultural landscape (organic paddies, streams, forested hills, and bamboo groves)

Location:

Fuli Township, Hualien County, Taiwan

Location within the Taiwan Ecological Network:

Xiuguluan River Conservation Corridor (eastern Taiwan)

What Makes This SEPL Distinctive:

Taiwan's first organic agriculture village

RAWs-to-ACM Timeline:

March–September 2023 onward

RAWs Facilitation Team:

@ScapesLab, National Dong Hwa University

Supporting Agencies:

Forestry and Nature Conservation Agency, Hualien Branch

CASE SUMMARY

Luoshan is a long-established organic farming village in eastern Taiwan (Hualien County), where dense river networks, forested hills, and agricultural livelihoods are closely intertwined. Through RAWs, residents revisited long-standing challenges related to water, governance, culture, and land use, and used the results to establish a multi-stakeholder Luoshan Organic Village Satoyama Platform that translates assessment insights into adaptive co-management. Located within the Xiuguluan River Conservation Corridor, Luoshan illustrates how mature organic villages can evolve into coordination hubs linking local livelihoods with landscape-scale conservation.

Postcard-like panorama of the Luoshan SEPL. Source: @ScapesLab.

Luoshan Village is located in Fuli Township, Hualien County, bounded by the Coastal Mountain Range to the east, the Xiuguluan River to the west, Luozai Stream to the south, and Ji'an Stream to the north. Covering approximately 25 square kilometers, Luoshan is the second-largest village in Fuli Township. Its location—between major waterways and forested hills—has shaped both settlement patterns and livelihoods.

Luoshan's landscape is composed of low-lying plains in the northwest and hilly

terrain in the southeast. A dense river network underpins both ecology and agriculture. Ji'an Stream and Luozai Stream supply fertile soils and abundant water, supporting rice paddies and settlement areas concentrated near Provincial Highway No. 9. The surrounding hills—largely state-owned forest land—are less suitable for farming due to poor soils and geothermal activity, but host key natural assets such as bamboo forest trails, the Luoshan Big Fishpond, mud volcanoes, Moso bamboo groves, and rare fern species.

As of December 2024, Luoshan comprised 186 households and 473 residents, with a population structure dominated by working-age adults. Nearly 80 percent of residents are descendants of Hakka migrants who settled during the Japanese period, alongside Hokkien, Indigenous, and new immigrant populations. Long-term interaction among these groups has produced a distinctive local culture, expressed through bamboo hats, lei cha (ground tea), and Hakka floral textiles.

Livelihoods remain strongly agricultural. Nearly 90 percent of residents engage in farming, primarily rice cultivation, supplemented by green plums and poultry. Most products are marketed through contract farming with the Fuli Farmers' Association, while some households integrate agriculture with homestays and experiential tourism.

In 2003, Luoshan became Taiwan's first Organic Agriculture Demonstration Village, marking a major shift toward integrating production, livelihoods, and ecology. Over time, organic farming expanded into leisure agriculture and value-added processing, including bamboo vinegar, mud volcano tofu, and plum vinegar, forming a locally rooted six-sector value chain.

With time, several limitations also emerged: a strong emphasis on production left less space for cultural and ecological work, leadership and coordination depended on unpaid local effort, and Luoshan's distinctiveness diminished as organic villages became more common across Taiwan.

Seeking a renewed development framework, Luoshan residents turned to the Satoyama Initiative, joining the International Partnership for the Satoyama Initiative (IPSI) in 2018 through the Fuli Farmers' Association. This shift was followed by the establishment of the Luoshan Leisure Agriculture Area and its Development Association in 2021, alongside the long-standing Community Development Association, creating a more diversified organizational landscape. A pivotal moment came with the Luoshan Satoyama Vision Workshop in October 2022, which brought together local actors, Hualien Branch of the Forestry and Nature Conservation Agency (FANCA-Hualien), and National Dong Hwa University, and formally surfaced Luoshan SEPL's significance within the Xiuguluan River Conservation Corridor of the Taiwan Ecological Network (TEN).

Situated in the mid-reaches of the corridor, the workshop reframed Luoshan as a place where organic agriculture, river systems, forested hills, and community governance intersect. This recognition did not yet prescribe specific actions, but it clarified Luoshan's potential role within TEN and set the stage for using RAWs as a tool to translate corridor-level conservation values into locally grounded priorities and pathways.

Luoshan Big Fishpond and mud volcano. Source: @ScapesLab.

2 *RAWs: The Process*

Luoshan conducted its RAWs in 2023, with preparatory work carried out between March and September and the core assessment held in September. The process was facilitated by the @ScapesLab team from National Dong Hwa University, with financial and institutional support from FANCA-Hualien. Fourteen residents completed the full assessment cycle.

Participants were first introduced to the SEPLS framework and its five resilience dimensions. Each indicator was supported by visual explanations, guiding questions, and locally relevant issue lists, helping participants connect abstract concepts to lived experience. Scoring was conducted individually using a star-based system, followed by facilitated discussion in which participants explained their reasoning and reflected on differing perspectives.

Rather than pushing for immediate consensus, the process emphasized learning through dialogue. After completing all indicators, participants collectively reviewed and ranked key issues, identifying priority concerns to guide follow-up action. A synthesis workshop consolidated scores and priorities, providing a shared reference point for both the community and partner institutions.

Luoshan RAWs in progress, September 2023. Source: FANCA-Hualien.

3 *RAWs: The Results*

Looking across the full set of indicators, participants assessed Luoshan's resilience as broadly moderate, applying a deliberately conservative lens that nonetheless brought governance and coordination gaps into clear focus. Participants emphasized the importance of integrated forest–farmland–stream monitoring, while noting constraints in manpower and funding.

From production perspective, recurring concerns included dry-season water allocation, land conversion, disaster risks, wildlife crop damage, invasive species, and pollution linked to daily life and tourism. Residents highlighted local food consumption as an expression of land–people relationships, valued traditional ecological knowledge, and stressed the importance of seed conservation across fields, waterways, forests, and streams.

Ms. Su-Zhen Deng, Luoshan Village Head, and Ms. Mei-Zhu Wang, Head of the Luoshan Community Development Association (right image), discussing local water issues (left image). Source: FANCA-Hualien.

There was strong interest in friendly farming, permaculture, and institutional support for participatory guarantee systems (PGS) and payments for ecosystem services (PES) mechanisms.

From the perspective of local knowledge and modern technology, youth outmigration and weakening cultural transmission emerged as major challenges. Participants pointed to the need for systematic documentation, accessible archives, context-appropriate agricultural technologies, and careful integration of infrastructure to avoid unintended social and ecological impacts.

From a governance perspective, participants pointed to limited legal literacy, unclear rights over forest and stream management, fragmented organizational communication, and the absence of village-wide coordination mechanisms. Expanding participation—across generations, residents, migrants, and external stakeholders—was seen as essential.

Overall, RAWs revealed strong environmental and knowledge foundations, but underscored the need for coordination platforms and sustained cross-sector support.

4 RAWs-to-ACM: From Insight to Action

Luoshan Organic Village Satoyama Platform meeting, February 2024. Source: FANCA–Hualien.

On February 29, 2024, Luoshan formally established the Luoshan Organic Village Satoyama Platform, with support from FANCA–Hualien. Rather than a project-based response, the platform functions as a multi-stakeholder coordination mechanism to translate RAWs outcomes into adaptive co-management (ACM).

Priority issues addressed through the platform include habitat restoration for the gold-ringed pond frog, stream ecological surveys and restoration, dry-season water scarcity, irrigation rehabilitation for upland fields, waste management impacts, seed conservation for medicinal plants, and mechanisms to broaden resident participation through village agreements.

Internal coordination within the community has been critical. Residents now conduct pre-meetings, assign issue focal points, and engage agencies with clearer proposals. Much work remains, yet site visits and active agency responses—especially on water resources and irrigation—have begun to build confidence among Luoshan residents.

Community members emphasized that the platform's value lies in dialogue and shared responsibility, rather than one-way administrative briefings. Clear agency windows, timelines, and follow-through were seen as essential to sustaining momentum.

5 *Looking Ahead*

Walking toward a shared future for the Luoshan SEPL.
Source: FANCA-Hualien.

Looking ahead, Luoshan's direction is shaped by a long view of resilience—one that builds gradually through everyday decisions rather than quick fixes. Efforts are focused on strengthening water security, reducing disaster risks, and sustaining a workable balance between agriculture, ecology, and quality of life.

There is growing interest in engaging with the third phase of TEN (2026–2029) and new conservation approaches (other effective area-based conservation measures, OECM), particularly where these can be adapted into locally workable practices. From FANCA-Hualien's perspective, Luoshan's value lies not only in having completed RAWs, but in its ability to turn assessment insights into an operating platform—positioning the village as a connective node linking organic farming, Satoyama governance, and river-basin conservation.

6 *Lessons Learned and Reflections*

Luoshan's experience shows that RAWs is most valuable as a collective sense-making process. The workshops allowed long-standing but fragmented concerns—water, disasters, livelihoods, governance, and ecology—to be examined together, revealing how deeply interconnected they are.

The process also helped shift skepticism into cautious trust. While some residents initially questioned whether assessment results would lead to concrete responses, the subsequent establishment of the Satoyama Platform demonstrated that RAWs can provide a practical foundation for medium-term action and sustained dialogue with public agencies.

Ultimately, the Luoshan case highlights that resilience is not built through individual projects, but through durable platforms that enable communities to anticipate risks, coordinate responses, and gradually reduce vulnerability over time.

Torik SEPL

Taitung County

Indigenous Ridge-to-Reef Biocultural Stewardship in a Satoyama–Satoumi Landscape–Seascape

CASE SNAPSHOT

SEPL Type:

Indigenous satoyama–satoumi landscape–seascape

Location:

Chenggong Township, Taitung County, Taiwan

Location within the Taiwan Ecological Network:

Southern Section of the Coastal Mountain Range Conservation Corridor (eastern Taiwan)

What Makes This SEPL Distinctive:

Indigenous Amis ridge–to–reef biocultural stewardship

RAWs-to-ACM Timeline:

2021–2022 onward

RAWs Facilitation Team and Supporting Agency:

Forestry and Nature Conservation Agency, Taitung Branch

CASE SUMMARY

Torik is an Amis community on Taiwan's east coast in Taitung County, embedded within a forest–river–village–ocean landscape–seascape continuum. Through resilience assessment workshops (RAWs), local elders and youth came together to reflect on water governance, farming practices, coastal ecotourism, and community decision-making, turning long-standing challenges into shared priorities for action. As a strategic node in the southern section of the Coastal Mountain Range Conservation Corridor, the Torik SEPLS illustrates how Indigenous biocultural stewardship can sustain biodiversity while strengthening livelihoods across a ridge–to–reef system.

Meet the Torik SEPL 1

Torik is an Amis community on Taiwan's east coast, where the Coastal Mountain Range meets the Pacific Ocean. In Amis, Torik refers to fastening or weaving—an apt name for a place where mountains, streams, paddies, springs, wetlands, reefs, and bays are tightly interlinked in everyday life. Elders describe Torik as a "blessed land," where fertile soils, a natural bay, and abundant wild resources once supported farming, fishing, and foraging, guided by cultural norms emphasizing respect and restraint.

Torik's living landscape–seascape stretches from upland ridges to the sea. Inland, the satoyama zone

The ridge–to–reef panorama of the Torik SEPLS, Taitung County, Taiwan. Source: FANCA–Taitung.

centers on Tafa, the “River of Life,” which sustains rice paddies and carries stories of ancestry and care. The highest ridge, Masa’afala’ay—the “ridge that carries responsibility”—is understood as a provider, capturing rainfall that feeds streams and paddies before flowing to the coast. Other mountain places hold both practical lessons and memory, shaping how people move, farm, and gather.

Indigenous and Traditional Territory and Local Place Names in the Torik SEPLS. Source: “The Ocean Book of Torik”, FANCA-Taitung.

Along the coast, the satoumi seascape is equally storied. Beaches, reefs, and bays—such as Pacefongan, the traditional raft-launching shore, and Ngoso’, now used for intertidal and coral monitoring—reflect generations of seafaring knowledge. Fishing grounds and bays preserve histories of collective harvesting, sharing, and inter-village relationships, reinforcing the belief that life originates from the sea. Cultural life continues to be anchored in two major ceremonies. Kilumaan, the harvest festival, marks Torik’s New Year and renews age-grade responsibilities, while Pafafoy, the sea ritual, honors land and ocean deities and asks for safe fishing seasons. These ceremonies remain central to cultural transmission and governance.

Crab-eating mongoose (Urva urva) captured by an infrared camera in the Torik SEPLS. Source: FANCA-Taitung.

Livelihoods in Torik have evolved over time. Rice farming and fishing once anchored the local economy, but youth out-migration has increased the average age of the labor force and left portions of farmland uncultivated. Older residents remain most engaged in farming and fishing, while some younger community members are returning through ecotourism, cultural revitalization, and environmental work.

Torik SEPLS is located within the Southern Section of the Coastal Mountain Range Conservation Corridor of the Taiwan's Ecological Network (TEN), occupying a strategic position along the east coast mountain-river-sea continuum. Over the years, the community's participation in TEN-related activities has included restoring fallow paddies, rehabilitating paddy ecosystems, promoting biodiversity-friendly farming, conducting biodiversity monitoring, and developing forest-understory livelihoods. In parallel, the biocultural stewardship and long-term commitment of the Torik people positioned the community as a strong candidate for resilience assessment workshops initiated in 2021.

Resilience assessment workshops (RAWs) in the Torik SEPLS, 2021.
Source: FANCA-Taitung.

RAWs were carried out in the Torik SEPLS between September and November 2021, facilitated directly by the Taitung Branch of the Forestry and Nature Conservation Agency (FANCA-Taitung). This was a unique case in which the government agency itself took on the role of the facilitation team. Seven community members participated.

Rather than beginning with abstract concepts, discussions were anchored in everyday concerns such as water sharing, paddy restoration, reef disturbance, tourism pressures, and cultural continuity. Because many assessment terms were unfamiliar or difficult for elders and participants with limited exposure to these topics, facilitators grounded questions in local ecological and landscape examples—drawing on Torik's paddies, rivers, forests, and coastal environments—to build shared understanding. In practice, ground-level landscape photographs proved more effective than aerial images in supporting discussion and engagement.

A defining feature of the process was its strong intergenerational and context-specific focus. The 20 resilience indicators were carefully translated from Mandarin into the Amis language and explained iteratively by facilitators, with younger and middle-aged participants supporting communication with elders who do not speak Mandarin. During discussions, elders primarily expressed their views in Amis. To ensure accuracy, middle-generation participants used audio recordings to help confirm and refine translations of key concepts. While some facilitation bias was unavoidable, the first round of assessment emphasized helping participants understand the purpose and overall process of the

workshops.

RAWs created a rare space for elders, working-age residents, and youth to sit together and discuss community-wide issues in depth. Trusted local bridging leaders played a critical role in linking the workshops with ongoing initiatives, including cultural education programs, elder activities, and conservation associations developed through mentor-apprentice approaches.

The workshops were continuously adapted to local conditions. Sessions were kept short and scheduled in the mornings to accommodate elders' stamina. Across multiple rounds, participants worked through all five SEPLS resilience dimensions. The final session focused on sharing assessment results, discussing discrepancies, and collectively identifying feasible follow-up actions and future planning priorities.

3 *RAWs: The Results*

The RAWs highlighted a set of closely linked environmental, governance, and livelihood pressures. Environmentally, tourism has been increasing in the absence of clear management mechanisms, placing growing stress on beaches, intertidal zones, and coral reefs. At the same time, Torik's short and steep streams create highly variable water flows, leading to uneven irrigation for rice paddies and knock-on effects for downstream ecosystems. Participation in biodiversity-friendly farming remains limited, as an aging labor force often prioritizes efficiency and risk reduction over experimentation with new practices.

Governance challenges emerged as another critical area. Community members expressed a lack of shared consensus on how to exercise stewardship over traditional marine areas, particularly in the face of expanding external commercial activities. Infrastructure developments—such as poultry operations and proposed landfill sites—were seen as sources of uncertainty, raising concerns about environmental impacts, decision-making authority, and potential conflict.

Alongside these pressures, the RAWs also revealed significant

Traditional ecological knowledge, grounded in the wisdom of local elders, as a foundation for locally appropriate eco-agricultural practices and biodiversity conservation. Source: FANCA-Taitung.

strengths and opportunities. Torik's ridge-to-reef landscape-seascape supports high levels of biodiversity, with soil and water resources well suited to agriculture. The relative absence of hard infrastructure has helped retain flexibility and adaptive capacity in the face of disturbances such as typhoons and earthquakes. Socially, the community benefits from growing youth-led initiatives and strong cultural continuity, reinforced through festivals, education, and everyday practice—providing a solid foundation for collective action.

From these discussions, four priority issues were identified by participants: (1) restoring forest-river-village-ocean connectivity through more stable and coordinated water management; (2) strengthening locally appropriate eco-agricultural and conservation innovation; (3) addressing tourism-related impacts through clearer and more inclusive governance mechanisms; and (4) building internal social capital to support tribal self-governance and long-term stewardship.

4 RAWs-to-ACM: From Insight to Action

From insight to action: multi-stakeholder partnership in the Torik SEPLS, 2021 onwards. Source: FANCA-Taitung.

Guided by the priorities identified through the RAWs, Torik gradually translated assessment insights into adaptive actions linking water, food, culture, and governance. This transition from RAWs to an adaptive co-management cycle (ACM) was supported by FANCA-Taitung, a long-term and trusted partner accompanying the community throughout the process.

Water scarcity and landscape-seascape connectivity emerged as early focal points. With support from the Taitung District Agricultural Research and Extension Station, the Tainan District Agricultural Research and Extension Station, and the Department of Agronomy at National Chiayi University, the community tested water-saving rice varieties and eco-friendly, climate-smart farming practices. These trials enabled continued rice cultivation under reduced water availability while maintaining ecological flows to downstream coastal systems. As confidence grew, Torik's eco-friendly rice successfully entered formal markets through agricultural cooperatives and national retailers, including the MUJI chain, demonstrating how ecological adaptation can also strengthen economic viability.

Cultural knowledge advanced in parallel with technical innovation. In collaboration with elders, FANCA-Taitung, the Torik Environmental Protection Association, and the Torik Culture and Health Station, the community conducted field surveys and documented Indigenous place names and land-sea knowledge. These efforts resulted in the publication of The Ocean Book of Torik and The Mountain Book of Torik, which focus on the restoration and preservation of local historical names and their cultural meanings. These efforts helped re-embed cultural memory into contemporary stewardship

and governance practices.

At the same time, Torik's younger generation took steps toward more formalized, multi-stakeholder governance. The establishment of a Tribal Council created a regular platform for dialogue with the Taitung County government and the National East Coast Scenic Area Administration, particularly on the management of traditional marine areas. While still evolving, this mechanism represents an important shift toward structured, community-led decision-making and local empowerment.

The Ocean Book of Torik, telling the story of Torik's biocultural seascape. Source: FANCA-Taitung.

When Torik residents speak about the future, they often return to a simple idea: caring for life. This means keeping streams flowing, sustaining rice farming under increasing water stress, creating pathways for youth to stay or return, and ensuring that adaptation strengthens—rather than weakens—cultural identity.

From the perspective of FANCA-Taitung, Torik is a strategically important node for advancing TEN in its third phase (2026-2029), offering a living example of how conservation areas and other effective area-based conservation measures (OECMs) can coexist with Indigenous livelihoods. Building on this foundation of biocultural stewardship, the Torik SEPLS applied for OECM certification in August 2025. Its strength lies not only in biodiversity values, but in Torik's practice of biocultural stewardship.

6 *Lessons Learned and Reflections*

Torik's experience shows that RAWs are most useful when they are shaped around how people actually live and speak. In Torik, this meant working through Amis–Mandarin translation, slowing the pace of discussions, using familiar landscape examples, and creating space for elders, working-age residents, and youth to speak together. Trust was built not through the tool itself, but through respectful facilitation and the involvement of people already trusted in the community.

Participants repeatedly noted that the value of RAWs did not lie in numerical scores, but in the process of sitting together to talk through shared concerns—water use, farming, tourism, and cultural continuity—and to clarify where views aligned or differed. The workshops provided a common reference point for dialogue within the tribe and with external partners, while also making clear that decisions about priorities and stewardship must remain rooted in internal community agreement.

CONCLUSION

From Resilience Assessment to Adaptive Practice: Practitioner Takeaways

Across Taiwan's diverse socio-ecological production landscapes and seascapes (SEPLS) — from forested mountains and shallow-mountain rice paddies to bamboo mosaics and coastal wetlands — a common lesson has emerged: resilience assessment is powerful both because of the framework itself and because of how people work with it. The tool provides a shared structure for reflection and dialogue, while its real impact depends on how practitioners, communities, and institutions adapt and apply it in context.

When guided by clear principles, resilience assessment becomes more than an issue-identification exercise. It creates space for learning, shared reflection, and coordinated action. Farmers, fishers, elders, youth, community groups, researchers, and government agencies come together to reinterpret their SEPLS and gradually translate assessment into adaptive practice — from RAWs to ACM. Over time, dialogue leads to experimentation, and experimentation strengthens stewardship.

These experiences also show that local action does not stand alone. Each SEPLS is part of a wider ecological system, connected through the Taiwan Ecological Network. Viewing landscapes and seascapes as interconnected corridor nodes helped practitioners link local priorities — such as water management, wildlife coexistence, and livelihood transitions — to broader biodiversity goals. This connection strengthened policy relevance, opened space for cross-agency collaboration, and allowed local stewardship practices to contribute directly to landscape-scale ecological connectivity. In many cases, resilience assessment acted as a bridge between community knowledge and biodiversity-focused spatial planning.

Resilience assessment also plays an emerging role in supporting other effective area-based conservation measures (OECMs).

In several cases, the assessment process helped generate a structured understanding of how local governance, biodiversity values, and livelihood practices interact — providing useful insights for evaluating a SEPLS's suitability as a potential OECM. Over time, repeated assessments can also support long-term adaptive management, helping communities and institutions reflect on whether conservation outcomes, governance arrangements, and socio-ecological functions remain effective. In this sense, resilience assessment can serve both as an entry point for identifying potential OECMs and as a practical tool for strengthening their ongoing management effectiveness.

Drawing on RAWs-to-ACM experiences across eight SEPLS cases, we offer seven principles that may serve as practical takeaways for practitioners, communities, and institutions designing, facilitating, or accompanying resilience assessment processes.

1. See assessment as a learning journey

Resilience grows through iteration, not one-time assessment.

Resilience assessment works best as an ongoing learning process rather than a single event. Early stages build shared understanding and confidence; later rounds help refine priorities and translate insights into action. Designing for reflection and follow-up allows learning — and resilience itself — to accumulate over time.

2. Build trust through long-term relationships and accompaniment

Trust creates the conditions for meaningful participation.

Meaningful assessment depends on relationships developed over time. Consistent presence, respectful facilitation, and long-term accompaniment help create safe spaces for dialogue and shared decision-making. Without trust, even strong frameworks

struggle to generate collective ownership or sustained action.

3. Ground concepts in local realities

Local language and lived experience make resilience meaningful.
Concepts such as resilience, connectivity, or adaptation become useful only when connected to familiar places, practices, and stories. Effective facilitation translates frameworks into locally understandable terms so communities can interpret assessment through their own experience.

4. Focus on interconnectedness, not isolated issues

Local challenges are often expressions of wider system dynamics.
Resilience assessment helps reveal how ecological, social, economic, and governance dimensions interact. Water shortages, wildlife conflict, or livelihood pressures rarely exist in isolation; understanding their interconnections supports more integrated and strategic responses.

5. Begin with practical concerns that matter to SEPLS communities

Everyday priorities are the entry point to engagement.
Communities engage most deeply when discussions begin with tangible concerns — such as farming, water issues, disaster risk reduction, or local incomes. Starting from real-life priorities builds motivation and creates pathways toward broader resilience and biodiversity goals.

6. Build durable partnerships with facilitation and institutional support

Facilitation and institutional backing sustain collaboration

beyond projects.

Long-term resilience depends on partnerships that connect communities, facilitators, researchers, and public institutions. Skilled facilitators help bridge perspectives and maintain dialogue, while institutional support provides continuity, legitimacy, and coordination across scales. Together, these structures help sustain collaboration beyond short project cycles.

7. Turn learning into adaptive practice

Experimentation and reflection translate assessment into action.

Adaptive co-management develops through small experiments, monitoring, and ongoing adjustment. When learning is embedded in implementation, communities and partners can respond to uncertainty and strengthen resilience step by step.

Resilience in action: traditions adapted and renewed through everyday practices that connect people, culture, and landscape. Source: Indigenous Amis Dipit Tribe.