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ASSESSING THAILAND'S COMMUNITY CRAB BANKS THROUGH INTERNATIONAL CRITERIA FOR SUSTAINABLE MARINE CONSERVATION

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Abstract

This qualitative study evaluates Thailand's Blue Swimming Crab Bank Expansion Project against five international criteria for sustainable community-based conservation: measurable ecological impact, community participation, scientific credibility, knowledge transfer, and policy alignment. To overcome the persistent limitations of purely narrative assessments, the research systematically triangulates empirical evidence from official operational reports, rigorous peer-reviewed publications, and external international endorsements. The findings show that the project aligns with all five multidimensional criteria. Notably, the initiative transformed local fishers into active co-managers, established fifty-two dynamic learning centers, and demonstrably increased juvenile crab survival rates from one percent to between forty and sixty percent. Furthermore, this robust integration of community empowerment and scientifically verifiable ecosystem recovery contributed directly to upgrading Thailand's Fishery Improvement Project status from level C to level A. Ultimately, the study argues that international-standard success in marine conservation emerges not from a single isolated factor, but from these five dimensions mutually reinforcing one another. By utilizing this rigorous criterion-based assessment, the framework provides funding agencies and policymakers with a highly replicable, evidence-based tool for designing sustainable natural resource management globally.

Keywords: Community-Based Conservation, Evidence-Based Assessment, Marine Stock Enhancement, Fisheries Co-Management, Sustainable Environmental Governance

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Introduction

Community-based management and conservation of natural resources have gained increasing international recognition as an effective approach, particularly in coastal communities. However, international standards for assessing whether a community-based conservation effort is successful and sustainable remain a persistent challenge, since success involves more than ecological outcomes. When success and sustainability also encompass scientific credibility, community participation, knowledge transfer, and policy alignment, the lack of clear, verifiable criteria has too often led to assessments of many conservation projects being based on narrative accounts of success rather than evidence-based comparison. This has made cross-case comparison difficult and has hampered the drawing of firm policy lessons. The research behind this article sought to develop community crab bank activities and related creative initiatives under the Blue Swimming Crab Bank Expansion Project to “Return Blue Swimming Crabs to the Thai Sea” toward successful, sustainable outcomes consistent with international criteria. It therefore examined success criteria grounded in the marine conservation science literature to provide a basis for comparison and verification (Sutherland et al., 2004). The NRCT’s Blue Swimming Crab Bank Expansion Project to “Return Blue Swimming Crabs to the Thai Sea” was taken as the research case study.

The NRCT proposed the Blue Swimming Crab Bank Expansion Project to the Cabinet as a program to address the crisis of the declining blue swimming crab population in the Thai sea. The Cabinet resolution of 6 March 2018 approved the NRCT’s proposal. It directed the rapid expansion of community crab banks to 500 coastal communities along the Gulf of Thailand and the Andaman coast within two years. The NRCT, designated the lead integrating agency, was to build on its earlier promotion and support of research and knowledge transfer for the “crab bank”- a community-participatory approach to crab-resource conservation that integrates local wisdom with applied research to enhance operational effectiveness (Secretariat of the Cabinet, 2018). The crab banks under the NRCT’s expansion project are on-shore, hatchery-style facilities in which berried female crabs bearing mature eggs are held in buckets or tanks; once the mother crab sheds her eggs, she can be sold, while the released eggs, after hatching into zoea larvae, are returned to the sea so that the juveniles can feed and grow naturally into mature crabs.

A high-value species, the blue swimming crab (*Portunus pelagicus*) is a major Thai export, placing Thailand among the world’s leading exporters. However, rapidly rising market demand drove crab fishing beyond nature’s capacity to replenish. Blue swimming crab landings in Thailand peaked at 46,678 tonnes in 1998, well above the maximum sustainable yield, then fell to around 28,790 tonnes by 2011 and about 25,712 tonnes by 2013, reflecting overfishing that has compounded coastal ecosystem degradation (Nootmorn et al., 2018). Beyond its effects on biodiversity, this crisis also threatened the food security and incomes of many coastal communities. As the principal study area, Bandon Bay in Surat Thani Province is a rich yet highly vulnerable nursery, making it both a challenging and a fitting case for exploring whether and how community-based management can meet international success criteria.

The NRCT, under the Ministry of Higher Education, Science, Research and Innovation (MHESI), has led the Blue Swimming Crab Bank Project since 2018 to address the blue swimming crab crisis. The project integrated a network of researchers from more than ten partner universities. It spanned basic environmental science and genetics, community-based resource management, and national fisheries policy and international recognition. It is therefore a research program with an accumulated database that warrants assessment against international success criteria. This article shows that when the Blue Swimming Crab Bank Expansion Project is assessed against the five international success and sustainability criteria, it offers a concrete case that helps define what international-standard success for community-led conservation entails. Assessing against explicit criteria also carries a methodological

implication: it provides a firmer, more comparable basis than a chronological description of project activities. This article therefore presents three sets of findings: (1) a synthesis of five international success and sustainability criteria, explaining the logic and scope of each; (2) an empirically based assessment of the Blue Swimming Crab Bank Expansion Project under each criterion; and (3) observations on what the five criteria imply for the design and evaluation of community-based resource management. The article is organized in five parts: following this introduction, the second part reviews the literature and synthesizes the five international success criteria; the third describes the methods used to assess each criterion; the fourth presents the assessment with empirical evidence of the Blue Swimming Crab Bank Expansion Project under each criterion; and the fifth discusses the findings, policy implications, and recommendations.

Literature Review

Defining Success in Community-Based Conservation

The fundamental issue in assessing conservation is which standard to use as the criterion. According to evidence-based conservation, decisions and evaluations should rest on verifiable, reproducible scientific evidence rather than intentions, beliefs, or narrative accounts, because weakly evidenced assessments tend to overstate success and misallocate resources (Sutherland et al., 2004). In fisheries and marine resource contexts, the literature consistently shows that success is multidimensional and cannot be captured by a single indicator. It must instead account for several dimensions: ecological outcomes, the strength of community institutions and governance, the credibility of the scientific knowledge base, the capacity to translate knowledge into practice, and linkage to broader policy frameworks. Assessments that neglect any one of these dimensions are likely to be incomplete (Pomeroy et al., 2005); for instance, a project that restores resources in the short term but without community participation is often unsustainable once external support ends. This article synthesizes these dimensions into five criteria - distinct from a chronological description of project activities, and an alternative to the focus on institutional mechanisms or economic value that is common in economic or political frameworks of analysis.

Five International Success and Sustainability Criteria

The five criteria are synthesized here from the marine conservation and fisheries science literature to clarify their logic and scope.

Criterion (1), measurable and scientifically evidenced ecological impact, covers changes in the target population and ecosystem structure that credible methods can measure, such as survival rates, biomass, and ecosystem stability indices. It rests on the principle of responsible stock enhancement, which emphasizes that measurable ecological benefit results from release only when it is conducted under rigorous biological, genetic, and evaluative conditions, not merely from releasing large numbers of juveniles (Bell et al., 2006; Lorenzen et al., 2010).

Criterion (2), community participation and environmental governance, refers to the community as owner, decision-maker, and enforcer of shared rules. It is grounded in global empirical findings that leadership, social capital, and appropriate incentives are decisive for the success of community-based fisheries - more so than biological or physical factors alone (Gutierrez et al., 2011) - and in evidence on the role of knowledge mechanisms, institutions, and co-management that link the state, researchers, and communities (Cinner et al., 2012).

Criterion (3), scientific credibility, requires making claims of success verifiable, a core condition of evidence-based conservation, achieved when the project's knowledge base has passed peer review and gained international recognition (Sutherland et al., 2004).

Criterion (4), transfer and community use of knowledge, concerns how research is translated into forms communities can use - practical techniques, rules, and learning media - and how ocean literacy can be enhanced so that knowledge is continually accessed and used by

communities (Santoro et al., 2017); this is consistent with a principal driver of the Decade of Ocean Science, namely the strategic efforts to strengthen the science-policy-community interface (Claudet et al., 2020; United Nations Educational, Scientific and Cultural Organization, 2021).

Criterion (5), alignment with national and international policy frameworks, covers linking on-the-ground practice with marine spatial protection, fisheries standards, and global agendas (Lester et al., 2009; Pomeroy, 2012). Notably, these five criteria differ from a blue economy analytical framework because they place conservation value and scientific credibility at the core of success assessment, functioning as benchmarks spanning ecological outcomes, community institutions, the knowledge base, knowledge transfer, and policy.

Context of the NRCT and the Blue Swimming Crab Bank Expansion Project to “Return Blue Swimming Crabs to the Thai Sea”

The National Research Council of Thailand (NRCT), established in 1959, is the country’s principal agency responsible for research policy and promotion across all fields. Following the 2019 research-system reform that created the MHESI (Ministry of Higher Education, Science, Research and Innovation), the NRCT’s mandate came to span funding for research and innovation; the development of science, research, and innovation databases and indices; the initiation and coordination of major national research programs; the setting of research standards and ethics; and the promotion and transfer of knowledge to practical use in the environmental domain. The NRCT’s role therefore encompasses setting the research agenda, coordinating multi-university research programs, and translating research outputs into national policy and practice. The Blue Swimming Crab Bank Expansion Project integrates environmental science, community-based management, and national fisheries policy. This structure and content make the project a case well supplied with the data required to assess all five criteria. Accordingly, the NRCT has systematically compiled the evidence of its operations and achievements (National Research Council of Thailand, 2026).

Research Methodology

With the five international success criteria set out in Section 2.2 as the analytical framework, this article presents findings from research that employed a qualitative case-study method combined with documentary synthesis. The principal research question is how, and on what evidence, the Blue Swimming Crab Bank Expansion Project aligns with the international success criteria. Case selection followed the information-rich case principle; the Blue Swimming Crab Bank Expansion Project combines published works, project documents, and endorsements from international organizations. Data were drawn from three main sources:

- 1) quantitative achievement and spatial-development data from the NRCT’s operational reports and project documents;
- 2) the scientific evidence base, formed from more than ten peer-reviewed studies published in international journals; and
- 3) global-scale recognition drawn from the documents and endorsements of international organizations.

The analysis matches empirical evidence from the three sources against each criterion and rates attainment as ‘aligned’ or ‘partially aligned’ based on the evidence’s completeness and credibility. A criterion is treated as met when clearly verifiable empirical evidence is supported by more than one source. Triangulation across the three sources ensures credibility: a finding is confirmed only when it is consistent across project documents, published works, and external endorsements. This approach of matching evidence to assessment criteria, while a direct application of evidence-based conservation (Sutherland et al., 2004), also positions the research as a social science case study analyzed by criteria rather than a biological trial. The research limitations, however, stem from the qualitative analysis relying on secondary data and from

some quantitative findings derived from the project's own reporting. For this reason, the attainment rating is a qualitative judgment open to further scrutiny and debate.

This study relied solely on publicly available secondary data - published research, official project documents, and the public statements and endorsements of international organizations - and did not involve human participants, personal data, or animal experimentation. Ethics-committee approval was therefore not required. All sources are cited in full, and the analysis adheres to research integrity and evidence-based conservation principles.

Research Results

The following results present the assessment of the Blue Swimming Crab Bank Expansion Project against each international success criterion. Each subsection describes the relevant empirical evidence and summarises the assessment before the tables below compile the overall assessment.

Criterion 1: Measurable, Scientifically Evidenced Ecological Impact

The underpinning principle of the crab bank is to receive berried female crabs - bearing eggs outside the carapace - that fishers' gear had incidentally caught, and to hold them in controlled conditions until the eggs safely hatch into zoea larvae, at which point the larvae are returned to the sea. This controlled hatching raises juvenile survival from about 1% in the wild to 40-60%, a directly measurable ecological impact. Food-web modeling using Ecopath software confirmed a significant increase in blue swimming crab biomass in Bandon Bay, Surat Thani Province, after ten years of the project. The study also confirmed improvements in the maturity index and ecosystem stability, and the restoration of bottom-up food-web control. Before the project, the blue swimming crab population in Bandon Bay declined by 20-30% between 1997 and 2011, size at first maturity fell from 9.75 to 8.4 centimeters, and egg production dropped by as much as 47% within five years. These findings provide measurable empirical evidence of ecosystem recovery (Jutagate & Sawusdee, 2022; Sawusdee et al., 2023a; 2023b). Such empirical results are consistent with the principle of responsible stock enhancement, which stresses that success must come from release that accounts for the biological and genetic quality of the juveniles, together with appropriate fishing-gear rules and the establishment of protected areas that serve as nurseries and refuges for juvenile marine life, rather than from release quantity alone (Bell et al., 2006; Lorenzen et al., 2010). Because the crab banks in the Blue Swimming Crab Bank Expansion Project support releases under these conditions and show measurable recovery at both population and ecosystem levels, the project clearly aligns with Criterion 1.

Criterion 2: Community Participation and Environmental Governance

In the governance dimension, the crab bank transforms fishers from resource users into co-guardians of the resource. The Blue Swimming Crab Bank Expansion Project is a prime example. At each of the approximately 60 crab banks along the coasts of Nakhon Si Thammarat and Surat Thani provinces, more than ten fishers participate as both members of the management committee and donors of berried females. This means at least 600 fishers serve directly as conservation practitioners and managers. This institutional design - with the knowledge mechanisms and co-management institutions that link the state, researchers, and communities (Cinner et al., 2012) - is consistent with the finding that the driving factors of success in community-based fisheries are leadership, social capital, and appropriate incentives (Gutierrez et al., 2011).

The fisheries refugia approach is a key governance component, and its emphasis on joint management of the aquatic life cycle among the state, researchers, and communities under an "all-of-society" approach distinguishes it from conventional marine protected areas characterized by outright fishing bans. Although a global synthesis indicates that conventional protected areas yield clear ecological benefits, they carry high enforcement costs and require

broad community acceptance. By contrast, the Blue Swimming Crab Bank Expansion Project uses an approach in which the community jointly designs and enforces the rules. As a result, conservation has low enforcement costs and high legitimacy (Lester et al., 2009). The project's further expansion into a multi-species marine life bank - covering other marine species such as mud crab, squid, and spotted Babylon - also reflects how communities have come together to identify problems and design solutions jointly, establishing the foundation for an "enabling-state, community-led" model. This clearly aligns the Blue Swimming Crab Bank Expansion Project with Criterion 2 in the dimension of participation and governance.

Criterion 3: Scientific Credibility

The knowledge base of the Blue Swimming Crab Bank Expansion Project rests on peer review and publication in more than ten international journals, spanning four research domains that reinforce one another's credibility, as follows.

1) Ecosystem Science and Marine Ecosystem Recovery: Food-web modeling in Ecopath confirmed increased blue swimming crab biomass and ecosystem stability in Bandon Bay after ten years of crab bank operation, based on a long-term dataset comparing pre- and post-crab-bank conditions. This work was published in a peer-reviewed journal and provides verifiable evidence of recovery (Jutagate & Sawusdee, 2022; Sawusdee et al., 2023a; 2023b).

2) Identification, Protection, and Conservation of Coastal Habitats: NRCT-funded research produced the first study of juvenile-crab-nursery-habitat sustainability spanning all four monsoon seasons. By integrating the Analytic Hierarchy Process (AHP) with a Geographic Information System (GIS) to assess water temperature, acidity-alkalinity, salinity, dissolved oxygen, sediment, and seagrass beds, the research found highly suitable areas covering 1.0-1.97% of the bay, with seagrass beds as the principal nursery substrate. Because the 76.53 square kilometers of mangrove and 24.37 square kilometers of seagrass in Surat Thani Province also serve as habitat for dugongs and other marine species, the project is, by implication, a form of multi-species coastal conservation. Moreover, a Lagrangian hydrodynamic model indicates that larvae persist in the coastal zone for 14 days before being carried further out - a finding that helps to determine appropriate release locations and timing (Onsri et al., 2024; Rattanasarat et al., 2024). These findings also underpinned the designation of Koh Sed as an aquatic-species protection zone in 2022 and the establishment of a 900-hectare fisheries refugium at Koh Sed in 2018 by SEAFDEC, UNEP, and GEF, together with the Department of Fisheries (Bermudez, 2024; United Nations Environment Program, 2024).

3) Population Genetics and Biodiversity Conservation: Researchers built a valuable genetic database through conservation-genetic research using mitochondrial DNA (mtDNA) control-region sequence analysis. Research in Bandon Bay found that 58.39% of wild blue swimming crabs shared the same haplotype as the berried female crabs from the crab bank, with corresponding figures of 65.72% in Trang and 39.72% in Krabi Province. The further finding of no differentiated genetic structure across the Gulf of Thailand indicates that the stock should be managed as a single population unit. These findings are significant on two levels: they confirm that juveniles released from the crab bank genuinely integrate with the natural population, and they provide a database to prevent the loss of genetic diversity that can arise from intensive release (Supmee et al., 2020; Suppapan et al., 2024; 2025).

4) Climate Change Adaptation: Many activities under the Blue Swimming Crab Bank Expansion Project show how its scope has expanded to include nature-based solutions integrated with the climate change adaptation agenda. For example, Phum Riang Subdistrict in Surat Thani Province has been designated as a pilot site for a marine-life bank that restores coastal ecosystem balance by expanding its scope from blue swimming crab to mud crab, squid, and mangrove red snapper, while promoting community-based tourism as a complementary adaptation mechanism. A further example is the capacity - drawing on knowledge of larval

persistence in the coastal zone - to adjust the timing and location of juvenile release as seasonal oceanographic patterns change.

The completeness of the knowledge base across all four domains, and the international recognition of these works, give the Blue Swimming Crab Bank Expansion Project robust alignment with Criterion 3.

Criterion 4: Transfer and Community Use of Knowledge

The project translates research into resources communities can readily use through 52 crab bank learning centers that serve as knowledge-transfer mechanisms. Each standard learning center comprises three main parts.

The first is a nursery and hatching system that separates tanks holding berried female crabs by egg stage, with appropriate water and aeration systems and selected juvenile release points. The second is an exhibition and education area that explains the crab's life cycle and displays community rules - such as not catching berried female crabs, permissible crab sizes, and net mesh sizes - and includes innovations such as solar cells to reduce the electricity cost of aerators. The third is a data management system in the form of a crab bank ledger that records statistics on berried female crabs received and juveniles released, and recognizes members who frequently deposit berried female crabs through social credit. Together, these three components make the crab bank learning center both a living laboratory and a mechanism for raising awareness that cultivates ocean literacy at the local level (Santoro et al., 2017).

Synthesizing the learning centers' operational experience points to eight enabling conditions for a sustainable learning center:

- 1) a resource base and location suitable for hatching;
- 2) infrastructure and equipment consistent with crab biology;
- 3) capable personnel and management with a clear host;
- 4) community participation and livelihood networks, including fish-buying intermediaries;
- 5) a functioning knowledge transfer system, including training, interpretive signs and panels, and study visits;
- 6) low-cost, affordable operation and maintenance that the community can sustain without it becoming a financial burden;
- 7) regular monitoring and evaluation; and
- 8) support from government and academic agencies.

In practice, crab bank learning centers have integrated local wisdom with scientific research: Walailak University, for example, has held an annual aquatic-habitat creation activity at the Ban Nai Tung Crab Bank Learning Center for 21 consecutive years. Likewise, the lesson-learning forum on the success of the Ban Hat Sombun Crab Bank Learning Center in July 2023 served as a cross-community learning-exchange mechanism. This systematic movement of knowledge from research into community practice aligns the Blue Swimming Crab Bank Expansion Project with Criterion 4, the dimension that most directly reflects the transfer of benefits to coastal communities.

Criterion 5: Alignment with National and International Policy Frameworks

At the policy level, Thai blue swimming crab fisheries were upgraded through the Fishery Improvement Project (FIP) from level C at its launch in 2017 to level A, as assessed by the Marine Resources Assessment Group (MRAG) of the United Kingdom - an internationally recognized standard that helps protect the export market of Thailand, one of the world's leading blue swimming crab exporters (Sawusdee, 2020). The combined measures that constitute the FIP Code of Conduct include hatching and releasing juveniles from wild-caught berried female crabs; using fishing gear that does not harm the ecosystem or endangered species such as sea turtles and dugongs; and enforcing an annual seasonal closure from October to December, during which the law prohibits catching blue swimming crabs in their spawning period.

In addition, the Department of Fisheries, building on crab bank research, is consulting stakeholders to establish a blue swimming crab fisheries refugium in Bandon Bay through seasonal bay closures that protect berried female crabs and juveniles. Because this refugium is linked to seagrass beds, the two conservation elements are inseparable. Operations in Bandon Bay thus exemplify local communities putting the Kunming - Montreal Global Biodiversity Framework (GBF) into practice - particularly Target 2 on restoring degraded ecosystems and Target 10 on sustainable fisheries and aquaculture management - while also advancing Sustainable Development Goal 14 across at least five of its targets: the sustainable management and protection of marine and coastal ecosystems (14.2), the reduction of overfishing and restoration of fish stocks (14.4), greater economic benefits from the sustainable use of marine resources (14.7), stronger scientific knowledge and research capacity (14.a), and improved access for small-scale artisanal fishers to marine resources and markets (14.b).

This co-management of small-scale fisheries offers a lesson transferable at the regional level (Pomeroy, 2012) and reflects the spirit of the Decade of Ocean Science by translating science into practice and policy (Claudet et al., 2020). Recognition by international organizations such as the Global Environment Facility (GEF), the United Nations Environment Program (UNEP), and the Southeast Asian Fisheries Development Center (SEAFDEC), along with coverage in international media, further confirms policy alignment on the international stage (Bermudez, 2024; United Nations Environment Program, 2024).

The Blue Swimming Crab Bank Expansion Project Assessed Against the Criteria

When assessed against all five success and sustainability criteria, the Blue Swimming Crab Bank Expansion Project aligns with every criterion, supported by verifiable empirical evidence from multiple sources, as summarised in Table 1. The project's outstanding strengths lie in Criteria 3 and 4, which reflect both the credibility of the knowledge base and knowledge transfer to communities. At the same time, measurable ecological outcomes and policy recognition, both domestically and internationally, confirm Criteria 1 and 5, and Criterion 2 is evident in the participation of at least 600 fishers as co-managers. Table 2 summarises the main quantitative achievements.

Table 1 The community blue swimming crab bank assessed against the five international success criteria.

International success criterion	What the criterion covers	Evidence from the crab bank expansion project
1) Measurable ecological impact	Changes in population/ecosystem measurable by credible methods	Survival 1% increased to 40-60%; increased biomass (Ecopath) (Jutagate & Sawusdee, 2022; Sawusdee et al., 2023a; 2023b; Bell et al., 2006; Lorenzen et al., 2010)
2) Participation and governance	Community as owner and decision-maker	Committee members/berried female crab donors ≥ 600 ; fisheries refugia (Gutierrez et al., 2011; Cinner et al., 2012; Lester et al., 2009)
3) Scientific credibility	Knowledge base peer-reviewed and internationally recognized	More than 10 publications across 4 domains (Onsri et al., 2024; Rattananarat et al., 2024; Supmee et al., 2020;

International success criterion	What the criterion covers	Evidence from the crab bank expansion project
		Suppapan et al., 2024; 2025)
4) Knowledge transfer and use	Research translated for practical community use	52 learning centers; crab bank ledger; community rules (Santoro et al., 2017)
5) Policy alignment	Linking practice with policy and global agendas	FIP C upgraded to A; Kunming-Montreal Framework; SDG 14 (Pomeroy, 2012; Claudet et al., 2020; United Nations Environment Programme, 2024; Bermudez, 2024)

Table 2 Key quantitative achievements of the Community Blue Swimming Crab Bank Expansion Project

Indicator	Achievement
Community crab banks (in 20 coastal provinces)	565 sites
Community crab bank learning centers	52 sites
Cumulative catch (since 2019)	Approximately 180,999 tonnes
Cumulative value/increase over baseline	53,300 million baht (+67%)
Juvenile survival rate from hatching	1% increased to 40-60%
Fisheries standard level (FIP)	C upgraded to A (maintained at A since 2018)
Fishers serving as committee members and berried-female crab donors	At least 600
Koh Sed fisheries refugium area	900 hectares (Bermudez, 2024)
Publications in international journals	More than 10

Source: NRCT supporting document (National Research Council of Thailand, 2026); some figures are project-reported.

Conclusion and Discussion

Assessed against the five international success and sustainability criteria - spanning measurable ecological outcomes, community participation and governance, scientific credibility, knowledge transfer to communities, and policy alignment - the Blue Swimming Crab Bank Expansion Project's performance aligns closely with the criteria. This is theoretically significant because it demonstrates that international-standard success for community-led conservation does not depend on any single dimension but arises from all five dimensions reinforcing one another. In other words, a credible scientific base (Criteria 1 and 3) gives substance to community participation (Criterion 2) and knowledge transfer (Criterion 4), while policy alignment (Criterion 5) enables success to scale and endure.

Methodologically, the assessment based on explicit criteria provides a more robust and comparable account than a general narrative of success. The Blue Swimming Crab Bank Expansion Project thus makes international-standard success in community-led conservation more concrete. It offers criteria that funding agencies and policymakers can use to assess and design other projects (Sutherland et al., 2004). An important implication is that a state research-funding agency can drive conservation at the national level by integrating funding, coordinating university networks, and translating research outputs into policy and community practice.

Three policy recommendations follow. First, so that resource allocation rests on comparable evidence, this set of international success criteria should be adopted as a systematic tool for assessing and developing crab banks and other community-based conservation projects. Second, a central database that integrates crab bank, ecological, and genetic data should be developed to support evidence-based decision-making - and thus strengthen the criteria that remain fragile. Third, investment should be made in knowledge-transfer mechanisms - such as curricula, media, and co-production forums - as the dimension that most directly delivers benefits to communities.

One limitation of this study is that it is a qualitative analysis based on secondary data, and some quantitative achievements come from the project's own reporting; therefore, the attainment rating is a qualitative judgment open to further scrutiny. Nonetheless, the Blue Swimming Crab Bank Expansion Project's performance aligns across every dimension of the success and sustainability criteria for community-led conservation. Notably, carrying out releases under rigorous biological and genetic conditions, informed by credible scientific research, also makes it a case in point of responsible stock enhancement at the international level (Lorenzen et al., 2010).

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