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*Article*

# Public Service Provisions for Land Resource Planning in Khao Phanom, Krabi Province in Thailand

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**Abstract:** This study explored the intricate nexus between public service provision and land use planning, with a specific focus on the conservation of local plant species in Tambon Khao Phanom, Amphoe Khao Phanom, Krabi Province. Rooted in commitment. The research framework encompasses three fundamental activities: resource survey and collection, resource conservation and utilization, and resource development planning for public services, emphasizing land use planning for local plant species conservation. This multidisciplinary approach integrates the one-map method and draws data from the Department of Land Development to formulate a comprehensive land utilization plan that optimizes land use for biodiversity conservation. This study underscores the critical synergy between public service delivery and land use planning, highlighting their collective potential to advance community well-being and sustainable development.

**Keywords:** land resource planning; plant genetic resources; policy implementation; public service; Thailand 4.0

## 1. Introduction

The Royal Initiative's Project for Conserving Plant Genetic Resources, spearheaded by Princess Maha Chakri Sirindhorn, focuses on human resource development and safeguarding beneficial plant genetic resources [1]. One of the leading universities collaborates on this project, emphasizing personnel training and plant genetic resource conservation in Southern Thailand.

Sub-district Administrative Organizations (SAOs) are crucial local government units providing public services and environmental conservation [2]. They contribute to Thailand's "Thailand 4.0" vision by adopting new roles under the New Public Service (NPS) paradigm, which stresses community-driven development and societal connections [1].

Khao Phanom SAO faces challenges in public service provision and environmental preservation due to land use and demarcation disputes. This study aims to address these issues by investigating the unification of land boundary demarcation (One Map) and land use philosophies to enhance public service planning and optimize land resource utilization in line with the Royal Initiative's Project [1].

The study contributes by developing strategies for integrating land use planning with biodiversity conservation, implementing the one-map approach for conflict resolution, analyzing Khao Phanom SAO's public service provision under NPS, and providing insights into sustainable land resource utilization for conserving indigenous plant species and Thailand's biodiversity heritage.

### 1.1. Research Objectives

This study investigated public service planning and land resource utilization for the conservation of plant genetic diversity in the local land resources of the Khao Phanom Sub-district Administrative Organization, Khao Phanom District, Krabi Province, in alignment with the Royal Initiative Project for Conservation of Plant Genetic Diversity (H.R.H. O.P. Sirindhorn) of the 7th Five-Year Plan (October 1, 2564 – September 30, 2569).

The specific objectives of this study were twofold: first, the execution of the H. R. H. O.P. Sirindhorn plant genetic diversity conservation project, aimed at harnessing local plant resources within the scope of 10 villages located in Khao Phanom Sub-district, Khao Phanom District, Krabi Province; and second, to conduct an analysis of the public service provision by the Khao Phanom Sub-district Administrative Organization (SAO) pertaining to land resources, with the aim of facilitating the preservation of indigenous plant species.

### 1.2. Literature Review

#### 1.2.1. Land Use Planning

Land use planning is a complex process that significantly impacts regions and communities. It involves managing land resources, considering urban development, environmental conservation, infrastructure design, and socio-economic growth [3]. GIS and RS technologies have been instrumental in analyzing land use changes, monitoring cities, and simulating urban expansion [4,5]. Effective planning integrates empirical data from surveys and interviews to gain insights into urban expansion and conservation programs [3,6]. Tenure-responsive land use planning recognizes the influence of planning and tenure security on spatial transformation and development [7].

Ecological support and conservation prioritization are crucial in land-use management decisions to prevent natural capital degradation [8,9]. Addressing land use classification inconsistencies and considering the implications of plans on urban growth and sustainability are essential [10,11]. Public participation is vital for identifying regional meetings, resources, and strategies [12]. Conserving environmentally critical areas through urban planning ensures healthy urban living [13]. Ecosystem-based and traditional land use planning preserve biodiversity and functional ecosystems.

#### 1.2.2. The Significance of Land Use Planning

Land-use planning is crucial for sustainable development by creating a balanced allocation of land resources. It harmonizes various land uses while prioritizing environmental preservation and community well-being [14]. Effective planning mitigates urban sprawl, reduces resource consumption, and encourages compact, resource-efficient urban patterns [15]. It preserves critical natural resources, safeguards ecologically sensitive areas, and conserves essential water bodies, contributing to biodiversity preservation [16]. Planning determines infrastructure placement to meet future requirements, foster economic growth, and enhance economic resilience. Well-conceived communities promote walkability, green spaces, and reduce traffic congestion, enhancing residents' quality of life. Land use planning is influenced by social, environmental, and economic factors and cannot solely control soil erosion [17]. It is essential for evaluating environmental carrying capacity and aligning spatial and regional planning with environmental considerations [18]. Planning addresses land degradation, soil erosion, and natural resource conservation, leveraging technologies for sustainable land management.

#### 1.2.3. Principles of Land Use Planning

Land use planning is guided by several fundamental principles. Public participation emphasizes the involvement of all stakeholders. Flexibility suggests that plans should be adaptable to changing situations and challenges. Sustainability emphasizes environmental conservation, resource efficiency, and climate change resilience. Efficiency ensures optimal resource utilization and infrastructure development. Equity aims to distribute development benefits fairly across

demographic segments. These principles guide the development and implementation of responsive, adaptable, and sustainable plans.

The planning process involves defining goals, data collection and analysis, plan formulation, negotiation, implementation, and monitoring. Time-limited property rights are a critical aspect of land-use planning, as evidenced in Switzerland [19]. Overall, these principles and processes promote sustainable, equitable, and efficient land management practices.

**Key Components of a Land Use Plan** Land use planning encompasses various key components. Land Use Zones allocate land for specific purposes, managing urban growth and balancing objectives. Infrastructure Planning strategically positions transportation systems, utilities, and public facilities to support urban development [20]. Environmental Conservation safeguards natural assets and mitigates environmental impacts through regulations and conservation measures [11]. Housing and Population forecasting influences housing development and density decisions to cater to future population requirements. Economic Development focuses on strategies to boost business growth, tourism, and economic diversity. A comprehensive Regulatory Framework ensures adherence to the land-use plan and promotes orderly urban development [21].

#### 1.2.4. Public Service (PS)

Public services provide essential services through government programs and policies guided by professionalism, ethics, accountability, transparency, and responsibility. They include government agencies, not-for-profit organizations, and charities with broad social and cultural objectives [22,23]. Ethical leadership promotes public service motivation and normative commitment among employees [24]. It instills moral values, influences ethical behavior, and impacts job performance [25]. Public service ethics are tied to accountability, accommodating societal needs and adhering to community norms and values [26]. The effectiveness of the public service code of ethics in controlling corrupt behavior underscores the importance of ethical conduct [27]. Public service motivation research highlights the ethical orientation associated with willingness for self-sacrifice and the intrinsic drive to serve the public good (Perry, 2011). Digitalization, accounting, and accountability have garnered attention in public services research [28,29]. Conversations between society and government foster closer ties and ensure effective public service delivery through citizen participation in ICT-enabled governance. Administrative reforms and ICT play a critical role in citizen empowerment, managerial innovation, and enhancing public service delivery.

#### 1.2.5. Plant Genetic Conservation Project under the Royal Initiatives Her Royal Highness Princess Maha Chakri Sirindhorn

Launched in 1993, the Royal Initiative-inspired Conservation of Plant Genetic Resources project aims to promote understanding and appreciation of Thailand's diverse resources. It has formulated a resource-information system for widespread dissemination [1]. The project, rooted in Queen Sirikit's commitment to conserving rubber trees and other species since 1960, identifies and safeguards resources vulnerable to extinction, fosters them in secure environments, evaluates their attributes and utility, and develops long-term resource management strategies. It also educates the public about the value of conservation and Thailand's plant genetic heritage. Many plant species, historically woven into Thai culture, may face marginalization or extinction due to environmental dynamics, societal needs, and consumer preferences. This project, an extension of Queen Sirikit's efforts, adopts contemporary scientific methodologies to enlighten the Thai community about the legacy and potential of numerous plant species [1].

#### 1.2.6. The "One Map" Initiative for State Land Boundary Management in Thailand

The "One Map" initiative, a state land boundary adjustment plan at a 1:4000 scale, is supervised by the National Land Policy Committee under the National Land Policy Committee Act B.E. 2561. Approved by the Cabinet in 2018 and 2019, it aims to be a cornerstone for sustainable land and soil resource management, addressing land tenure, housing, and enhancing land-related services.



Guided by the "One Land One Law" doctrine, it promotes a structured state land management system, clear agency roles, efficient law enforcement, and public awareness of state land demarcations [1].

The initiative ensures precise state land boundary representations, optimizes resource allocation, and fortifies state land protection. It facilitates information access for officials, expedites services for citizens, and allows the public to ascertain land use and rights [1]. The project mitigates land boundary disputes between the government and the public, following legal procedures. It safeguards the public's legal land rights, as reaffirmed by the Cabinet in 2022. The National Land Policy Committee is committed to public outreach, knowledge dissemination, and addressing the implications of the "One Map" initiative on impacted individuals and communities.

## 2. Materials and Methods

This study employed a multi-method research approach to gather an exhaustive set of data and insights. In this research study, the researcher collected data from documentation research and secondary data sources. The data sources included laws, regulations, orders, official documents from the Land Development Department and Tambon Administrative Organizations (TAOs), and relevant research studies. The research methodology involved qualitative research, specifically documentary research using public documents published by both public and private sector organizations. These documents presented data, policies, and guidelines in the form of laws, royal decrees, ministerial regulations, annual reports, and analyzed statistical data. The researcher also analyzed theories and the use of the one-map system, utilizing data from the Department of Lands to create a land-use map for the Khao Phanom Tambon Administrative Organization in Khao Phanom District, Krabi Province.

**Documentation Research:** A thorough collection of data was achieved through an array of documents, including legal papers, regulations, official correspondence, and reports. These documents were primarily sourced from recognized institutions such as the Department of Land Development and the Tambon Administration Organization (TAO). This documentation provides a foundation for in-depth policy analysis and the extraction of vital statistical data.

**Secondary Data Analysis:** This approach involved a detailed review of publicly available documents from both the government and private sectors. Materials such as Royal Decrees, ministerial regulations, annual reports, and previously analyzed statistical documents were invaluable for insights into relevant policies and statistical facets.

**Qualitative Research:** This methodology delved deeper into the narrative content within public documents, uncovering implicit policy goals and tangible outcomes of these policies. This helped shed light on public service delivery and land resource management, specifically in Tambon Khao Phanom, Amphoe Khao Phanom, and Krabi Province.

This research, centered on Tambon Khao Phanom, presents an integrated approach to the intersection of public service and land-use planning, emphasizing local plant species conservation. This study was framed by a conceptual foundation that defines its methods and aims. This research aligns with His Majesty's project, which focused on preserving plant genetic resources, reflecting Thailand's dedication to biodiversity conservation, and sustainable resource management. Spanning seven years, from October 1, 2021, to September 30, 2026, the research comprises three key activities:

**Activity (Resource Survey and Collection):** This phase entails a thorough survey of the local plant genetic resources. It captures data on native plant species, their distribution, abundance, and ecological relevance, serving as the groundwork for future conservation and planning endeavors.

**Activity (Resource Conservation and Utilization):** Building on Activity 2, this stage emphasizes biodiversity conservation and the potential utilization of these resources for community benefits.

**Activity (Resource Development Planning for Public Services):** This culminating activity integrates resource conservation with public-service planning. It evaluates how local land resources can be effectively allocated for plant species conservation while meeting broader community needs.

Central to this research methodology is the one-map approach, which incorporates data from the Department of Land Development. It offers a comprehensive spatial perspective on Tambon Khao

Phanom's land-use. By combining ecological data with land-use details, this study aims to develop a land-use strategy that prioritizes the conservation of native plant species. This interconnected and data-centric method ensures that land use planning aligns seamlessly with the study's conservation goals.

- Step 1: Understanding Challenges in Plant Genetic Resource Conservation: An Initiative under His Majesty's Royal Guidance;

This study aims to discern the hurdles and prospects in conserving local plant genetic resources, inspired by His Majesty's Royal Initiatives. It seeks to optimize these resources to uplift local communities while preserving plant genetic diversity. The study dissects potential impediments, including technical intricacies, logistical complexities, and the need for community engagement. It also considers ecological, economic, and societal dimensions, aiming to create an enlightened strategy aligned with His Majesty's conservation ideals.

- Step 2: Theoretical Framework and Pertinent Documentation;

The research is underpinned by concepts of public service, land use planning, and the "One Map State Land" notion. Public services involve preserving resources and leveraging them to improve local communities [30]. Land use planning involves strategic land demarcation for sustainable development ("Plant genetic resources and food security: stakeholder perspectives on the International Treaty on Plant Genetic Resources for Food and Agriculture," 2012). The "One Map State Land" notion emphasizes uniform mapping protocols for fair and prompt public service [31]. The study also considers legislative and regulatory landscapes, aiming to discern their interplay and influence on the conservation project's rollout and its ripple effects on local communities.

- Step 3: Execution of Dual Core Project Activities;

The project focuses on conserving and sustainably utilizing native plant species and establishing a comprehensive database for informed decision-making [32]. It promotes sustainable harvest and cultivation methods for economic benefits while ensuring species sustainability [33,34]. The database facilitates collaborative efforts between researchers, policymakers, and local communities [35], aiming to achieve a balance between conservation and utilization.

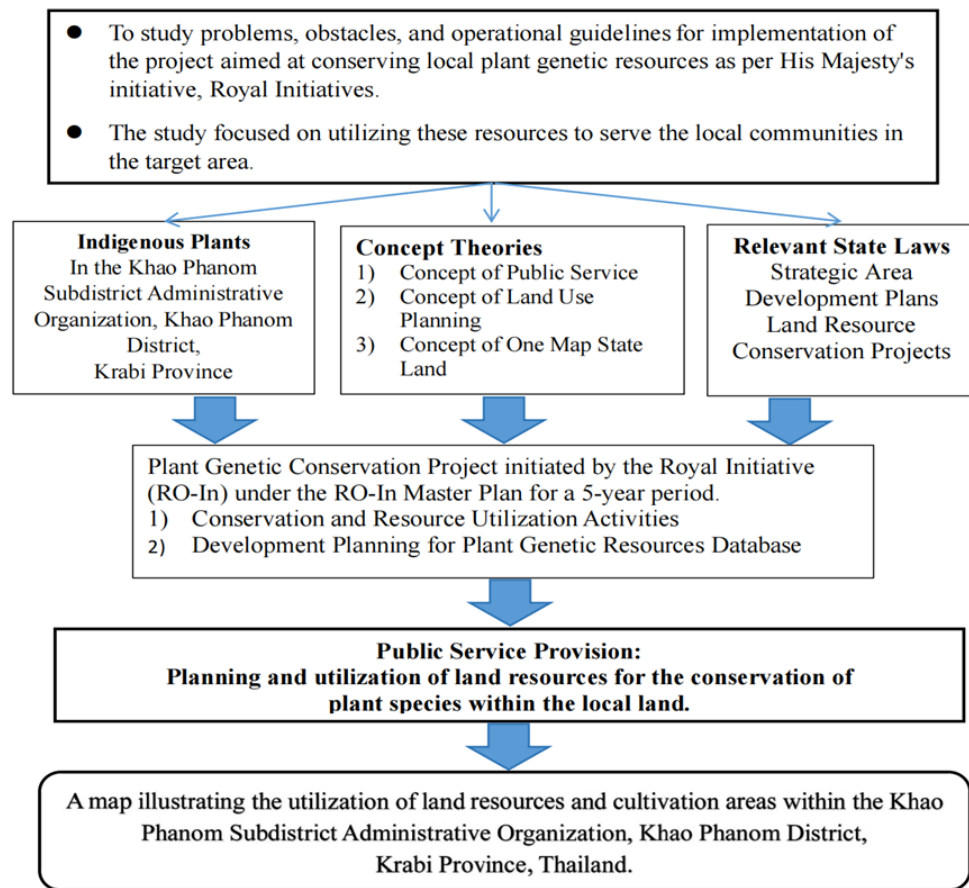
- Step 4: Public Service Facilitation - Strategizing and Harnessing Land Resources for Local Plant Species Conservation;

Effective conservation requires a comprehensive approach integrating local knowledge, sustainable land stewardship, and broader conservation goals. It involves participatory land-use strategies, ecologically mindful resource stewardship, communal collaboration, oversight, and synchronized policy frameworks [36,37]. Public service facilitation emphasizes integrating local knowledge, promoting sustainable stewardship, and harmonizing initiatives with broader policy frameworks [38,39].

- Step 5: A Map Illustrating Land Resource Utilization and Cultivation Areas (The Concept of One Map) within Khao Phanom Subdistrict Administrative Organization, Khao Phanom District, Krabi Province, Thailand;

Developing a comprehensive map reflecting land resource utilization and cultivation zones is crucial for land use planning, aligning with the "One Map" methodology. It involves integrating multifaceted data, ensuring transparency and accessibility, and periodic updates [40–42]. Recent research has focused on spatial zoning, optimizing cultivated land use, and evaluating land suitability [43–45]. The study of spatial allocation, community-engaged planning, and the application of GIS in agriculture is also highlighted [46,47].

The researchers designed Figure 1. to be the Conceptual Framework for this study.



**Figure 1.** Conceptual Framework for this study.

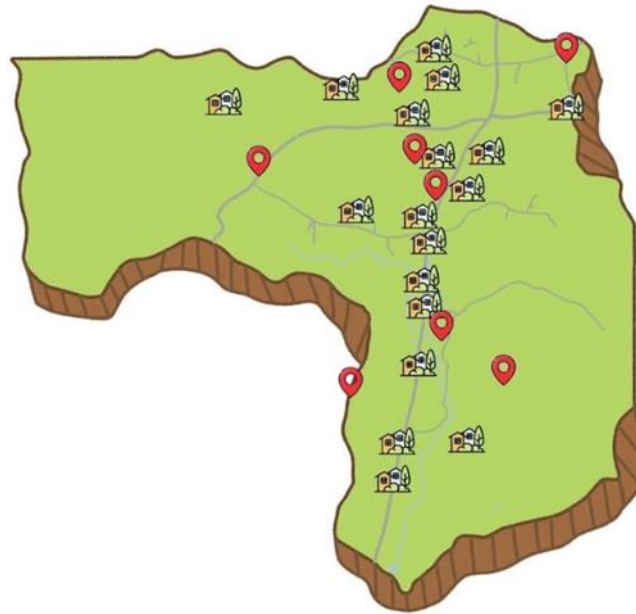
The study primarily concentrates on two fundamental research areas:

- Research Implementation in Alignment with His Majesty's Conservation Project;  
This facet delves into the execution of research activities aimed at fulfilling the objectives set forth by His Majesty's project for the preservation of plant genetic resources. These activities encompass resource surveys, collection, conservation, utilization, and development planning for public services.
- Provision of Public Services, Land Use Planning, and Resource Conservation for Indigenous Plant Species;  
This research stream focuses on the delivery of public services, land utilization planning, and resource conservation initiatives concerning native plant species within Tambon Khao Phanom, Amphoe Khao Phanom, Krabi Province. The emphasis was on promoting sustainable land management practices and formulating effective strategies to achieve these goals.

Through these research pursuits, this study seeks to contribute significantly to the realization of His Majesty's vision to conserve plant genetic resources and ensure the sustainable utilization of local land resources in Tambon Khao Phanom, Amphoe Khao Phanom, Krabi Province

**3. Results**

This study presents an overview of the outcomes obtained from the implementation of the project aimed at conserving local plant genetic resources, as per His Majesty's Royal Initiative. This study focused on utilizing these resources to serve local communities in the target area, which comprises ten villages within Tambon Khao Phanom, Amphoe Khao Phanom, Krabi Province. Researchers have designed land utilization plans for the Tambon Khao Phanom, Amphoe Khao Phanom, and Krabi Province, as shown in Figure 2.



**Figure 2.** Land Utilization Planning for Tambon Khao Phanom, Amphoe Khao Phanom, Krabi Province.

A comprehensive analysis of public service provision by the Tambon Administration Organization (TAO) within the context of land resources for the conservation of local plant species in Tambon Khao Phanom offers a compelling illustration of the intricate relationship between public services and land use planning. This analysis underscores the critical importance of aligning public service objectives with land use strategies to maximize the benefits accruing to communities, while also adhering to established guidelines and principles for responsible governance and equitable resource allocation.

One key aspect of this analysis revolves around the strategic alignment of public services with land resources, as is evident in TAO's adherence to its strategic objectives. Notably, the focus on "development-level maintenance of public benefits" reflects a conscientious effort to leverage land resources to improve local communities. This synergy between public service goals and strategic planning exemplifies a forward-thinking approach to community development in which the utilization of land resources extends beyond economic considerations to encompass broader societal well-being.

The study's reference to the Ministry of the Interior's publications, particularly reference numbers 0309/W794 and 0309/134, underscores the importance of adhering to established guidelines and legal frameworks in land-use planning and public service provision. These publications provide valuable insights into how public lands can be optimally utilized to bolster the local economy, support agriculture, create recreational spaces, and meet other community needs. Moreover, the requirement for seeking approval from relevant authorities for developmental modifications underscores the significance of transparency and accountability in the decision-making process, ensuring that land use planning aligns with broader public interests.

A crucial dimension of this analysis pertains to the concept of public land as a communal resource for the public's mutual benefit, as introduced in the citizen-centric approach of 2000. This concept embodies the principles of equity, inclusivity, and shared responsibility for land-resource management. This highlights the need for land use planning to consider the diverse needs and aspirations of the community, ensuring that the benefits derived from public land are accessible and equitable for all residents.

In conclusion, the analysis of public service provision in tandem with land use planning in the Tambon Khao Phanom offers valuable insights into the collaborative and integrated approaches required for sustainable community development. The alignment of strategic objectives, adherence to established guidelines, and recognition of public lands as communal resources underscores the



importance of responsible governance in shaping the future of communities. This case study serves as a compelling example of how effective public service provision can be intricately linked with prudent land use planning to foster the well-being and prosperity of local populations. This highlights the significance of holistic and equitable resource management in benefiting all members of society. Therefore, the researcher designed a one-map plan for land use in the Tambon Khao Phanom, Amphoe Khao Phanom, and Krabi Province (Figure 3).



**Figure 3.** One-Map Plan for Land Use in Tambon Khao Phanom, Amphoe Khao Phanom, Krabi Province.

This study revealed a symbiotic relationship between public services and land-use planning in Tambon Khao Phanom, Krabi Province. The alignment of public service delivery with strategic local administrative plans, as exemplified by Strategy 4's multifaceted approach, signals a proactive and holistic approach to community development. The "Conservation of Plant Genetic Resources as per Royal Initiatives" project mirrors this approach, emphasizing biodiversity conservation and sustainable resource management. Land use planning is an integral facet of public service provision, highlighting the intricate relationship between land resources and community development. The TAO's adherence to Ministry of Interior guidelines ensures that public land is harnessed to its full potential, serving as a communal resource for local economic growth, agriculture, recreation, and various community needs. This approach is grounded in equity and inclusivity principles, aligning with the citizen-centric approach introduced in 2000. In summary, public services and land-use planning work together harmoniously to promote well-being and sustainable development in local communities.

**4. Discussion**

The analysis of public service provision in Tambon Khao Phanom offers insights into the application of essential governance principles, as outlined by the United Nations (2015). Equity is exemplified by the "One Map" concept, ensuring equal access to accurate geographical information. Timeliness enhances the overall service experience through prompt and efficient delivery. Ample service aligns with delivering the right services to the right geographical area, as demonstrated by Tambon Khao Phanom's approach to natural resource conservation and plant genetic resource care. Continuous service emphasizes consistency and prioritization of the public's welfare, ensured by

assigning specific tasks to the village headman and designated personnel. Progressive service embodies continuous improvement in service quality and performance, as reflected in Tambon Khao Phanom's dedication to conserving plant genetic resources as per the Royal Initiatives and the 60% conservation rate target. The alignment of public service provision with Strategy 4 showcases a comprehensive approach to community development, emphasizing local religious and cultural activities and preserving cultural and environmental heritage. This analysis underscores the effective application of governance principles to enhance public service provision and community development in Tambon Khao Phanom.

- **Implementation Framework;**

The integration of land-use planning and biodiversity conservation in Tambon Khao Phanom is a pivotal step towards sustainable development, balancing ecological requirements with socioeconomic needs. Effective land use planning contributes to biodiversity preservation, maintaining ecosystem services and environmental health. A holistic and inclusive approach, as advocated in the literature, aims to develop a replicable model that emphasizes the interconnectivity between land uses and considers ecological impacts in planning decisions. The One-Map approach is a strategic tool for integrating data layers to provide a comprehensive overview of land use and biodiversity. It facilitates better decision making by consolidating data on topography, land cover, species distribution, and human activity. Implementing the One-Map approach in Tambon Khao Phanom involves collecting accurate data, integrating it into a dynamic mapping platform, identifying areas of ecological significance, assessing proposed land use impacts, and aligning development plans with conservation goals.

## **5. Conclusions**

In conclusion, the implementation of this comprehensive plan for integrating land use planning with biodiversity conservation in the Tambon Khao Phanom represents a forward-thinking approach to sustainable development. The key steps in the implementation process, from stakeholder engagement to monitoring and policy integration, highlight the multifaceted nature of this endeavor. It is crucial to recognize the dynamic nature of this process, where ongoing adaptation and learning are integral to its success.

The significance of this plan lies not only in its immediate impact on land use and biodiversity but also in its potential as a model for other regions facing similar challenges. The collaborative and inclusive approach adopted in Tambon Khao Phanom can serve as a blueprint for integrating ecological considerations into land use planning, thereby contributing to the broader goals of environmental sustainability and conservation.

- **Policy and Operational Recommendations**

To promote holistic and sustainable development, it is essential to encourage integrated planning at the Tambon Administration Organization (TAO) level. This can be achieved by aligning all aspects of the TAO's work, projects, and budgets with policy-based integrated planning. By adopting this approach, TAOs can effectively incorporate initiatives from the Royal Initiatives of Her Royal Highness Princess Maha Chakri Sirindhorn into their local development plans. For instance, initiatives related to education, culture, and local heritage conservation can be integrated into TAO's development plans to contribute significantly to sustainable community growth. Such integration will ensure that development efforts are comprehensive and focus on improving the quality of life of all the members of the community.

Community engagement encourages active participation of local communities in the planning and execution of policies and projects related to education, culture, and heritage conservation. Community involvement fosters a sense of ownership and increases the likelihood of a project's success. Community engagement is a vital aspect of any policy or project related to education, culture, or heritage conservation. Encouraging active participation from local communities is essential to the success of such initiatives. Members can foster a sense of ownership by engaging in community planning and implementing policies and projects. This not only increases their investment in the project but also enhances their understanding and appreciation of its value. The

benefits of community engagement are numerous and include increased transparency, improved communication, and greater accountability. When local communities are involved in decision-making processes regarding education, culture, and heritage conservation, they are likely to support these initiatives fully. Consequently, the chances of project success have significantly increased significantly. Therefore, it is crucial to prioritize community engagement in all policies and projects related to education, culture, and heritage conservation to ensure that they are successful and sustainable over time.

Sustainability ensures that policies and projects related to education, culture and heritage conservation have long-term implications. These should include strategies for maintaining and continuing these initiatives beyond the initial implementation. It is imperative to establish a sustainable plan for policies and initiatives pertaining to education, culture, and preservation of local heritage sites. This must encompass comprehensive strategies that ensure the perpetuation and longevity of these endeavors beyond their initial implementation phase. These policy and operational recommendations aim to enhance the effectiveness of Tambon Administration Organization (TAO) efforts in the areas of education, culture, and local heritage conservation. By implementing these suggestions, TAO can contribute significantly to the sustainable development and well-being of its communities, aligned with the principles of integrated planning and policy-based governance.

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