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Innovative climate resilient indigenous food system combining "Water Taro, Shrimp, Eel and Water Cress in Vanuatu – Scaling Up"

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KEYWORDS

Indigenous food system
Climate resilience
Vanuatu
Scaling up
Innovation
GIHAS

INTRODUCTION

Vanuatu, a Pacific island nation highly vulnerable to climate change impacts like sea-level rise, intensified cyclones, and saltwater intrusion, faces critical food security challenges. The FAO-GEF project "Integrated Sustainable Land and Coastal Management" (2018-2024) aims to bolster community resilience. This study (2021-2023), supporting a GIAHS (Globally Important Agricultural Heritage System) nomination, focuses on a traditional, climate-resilient food system integrating water taro, shrimp, eels, and watercress cultivation. This integrated system creates a synergistic relationship: water taro, a staple crop, thrives in flooded conditions, providing habitat for shrimp and eels. These, in turn, act as natural pest control and fertilizer. Watercress, a highly nutritious vegetable, further diversifies production and income streams.

Context and background

The integrated taro irrigation system in Vanuatu stands as a testament to the ingenuity and resilience of indigenous agricultural practices. This system, deeply rooted in the cultural fabric of Vanuatuan society, is a sophisticated interplay between ecology and sustenance, harnessing the natural landscape to cultivate Colocasia esculenta, commonly known as water taro. Passed down through generations, this traditional method has not only provided a stable food source but also embodies the adaptive strategies of a community living in harmony with its environment.

In the face of modern challenges, particularly those posed by climate change and environmental degradation, the significance of such systems has become increasingly pronounced. The forests of Vanuatu, integral to maintaining the water levels necessary for taro cultivation, have suffered from deforestation and unsustainable land use practices. Recognizing this, there has been a national shift towards environmental protection and climate-resilient agriculture, with the integrated taro irrigation system at the heart of this movement.

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The international community, through instruments such as the World Risk Index Report, has acknowledged Vanuatu's vulnerability to natural disasters and climate-related risks. It is in this context that the GIAHS (Globally Important Agricultural Heritage Systems) designation becomes crucial. Such recognition would serve not only to preserve the unique agricultural practices but also to ensure the conservation of forest lands which are vital for water management and biodiversity.

METHODOLOGY

Key problem(s) addressed

The innovative water taro gardens in Vanuatu, supported by the FAO-GEF project Integrated Sustainable Land and Coastal Management in Vanuatu, address several key problems that affect the productivity and sustainability of traditional agricultural practices. This project aims to promote sustainable land and coastal management practices, including the development of climate-resilient agricultural systems.

Key challenges and solutions

Implementing this integrated system presented challenges: limited access to improved farming techniques and resources, the need for robust community engagement and capacity building, and vulnerability to natural disasters. The project addressed these through:

- **Training and technical support:** Farmers received hands-on training in improved water management, pest control, and harvesting techniques. Specific examples of training modules (e.g., gabion dam construction workshops, aquaponics system maintenance) would strengthen this section.
- **Community organization:** The formation of farmer cooperatives facilitated knowledge sharing, resource pooling, and collective bargaining power for market access. Mentioning the number of cooperatives formed or the size of the communities involved would add impact.
- **Disaster risk management:** Development of community-based disaster preparedness plans, including early warning systems and post-disaster recovery strategies, enhanced resilience. Specific examples of these plans (e.g., cyclone preparedness protocols, saltwater intrusion mitigation strategies) would be beneficial.
- **Technological and innovative solutions**
- The project incorporated several technological innovations to enhance water taro cultivation.
- **Improved dike construction (Gabion Dams):** These dams, made of wire cages filled with rocks, improved water retention and reduced water loss, increasing yields. Quantifiable data on water retention improvement or yield increase would be valuable.
- **Improved ditch management:** Regular ditch cleaning removed debris and facilitated the introduction of pest-repelling plants, minimizing pesticide use. Specific examples of pest-repelling plants used would be helpful.
- **Drip irrigation:** This efficient irrigation method reduced water waste and improved water taro growth. Data comparing water usage before and after implementing drip irrigation would strengthen the point.
- **Aquaponics:** Integrating aquaculture (shrimp and eel farming) with hydroponics (watercress cultivation) created a closed-loop system, minimizing waste and maximizing resource utilization. Details on the design and success of the aquaponics systems would be valuable.
- **Solar-Powered pumps:** Sustainable energy sources for irrigation reduced reliance on fossil fuels and ensured consistent water supply. Mentioning the number of pumps installed or the area covered would add context.

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RESULTS

Key Outcomes:

The project yielded significant positive impacts:

- **Increased food production and income:** Quantifiable data on increased yields of water taro, shrimp, eels, and watercress, and corresponding income increases for farmers, is crucial for demonstrating impact.
- **Improved water management:** Specific data on water conservation achieved through improved irrigation and dam construction would be impactful.
- **Resilience to cyclones:** Concrete examples of how the improved water taro gardens withstood cyclones compared to traditional methods would strengthen this point.
- **Strengthened social bonds:** Describing specific examples of improved community cohesion and cooperation would enhance understanding.
- **Preservation of traditional knowledge:** Highlighting specific traditional practices preserved or revived through the project would be beneficial.
- **Key actors and stakeholders:**
- The project's success stemmed from a collaborative effort involving.
- **Government of Vanuatu:** Providing policy support, funding, and regulatory frameworks.
- **Farmers and local communities:** Providing labor, traditional knowledge, and active participation.
- **NGOs and international development agencies:** Offering technical expertise and financial resources. Mentioning specific organizations would add credibility.
- **Researchers and academics:** Conducting research, monitoring, and evaluation.
- **Private sector:** Providing technology, investment, and market linkages. Mentioning specific private sector involvement would be beneficial.
- **Cultural institutions:** Protecting and promoting the cultural heritage associated with water taro cultivation.
- **International bodies (FAO, GEF):** Providing funding, technical assistance, and advocacy.
- **Lessons learned:**
  - **Positive:**
    The critical role of community participation and integration of traditional knowledge.
    The necessity of a holistic approach addressing climate change impacts.
    The value of collaborative research and adaptive management.
  - **Negative:**
    Challenges in accessing markets and establishing efficient value chains. Specific examples of market access barriers would be helpful.
    Limited capacity within local institutions to provide sustained technical support. Suggestions for improving institutional capacity would strengthen this point.

DISCUSSION AND IMPORTANCE

This Vanuatu model demonstrates the potential of indigenous food systems to address crucial challenges:

- **Climate action:** Carbon sequestration through improved water management and biodiversity enhancement. Quantifiable data on carbon sequestration would be impactful.
- **Water resource management:** Efficient water use and protection of water resources. Data on water usage reduction would strengthen this point.

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- **Agrifood systems:** Providing nutritious, culturally appropriate food, supporting livelihoods, and building community resilience.
- **Equity and social impact:** Empowering small-scale farmers, women, and youth.

CONCLUSION

The innovative integration of water taro gardens within the FAO-GEF project in Vanuatu showcases a sustainable model for climate-resilient agriculture. By leveraging traditional knowledge and sustainable practices, this system enhances food security, biodiversity, and community resilience. The project's success highlights the potential for scaling and replication, offering valuable insights for global efforts in sustainable agriculture and climate adaptation.

The FAO-GEF project Integrated Sustainable Land and Coastal Management in Vanuatu (2019-2024) has been instrumental in promoting and supporting the innovative and climate-resilient indigenous food system that combines water taro, shrimp, eel, and watercress. This unique system has emerged as a promising model for sustainable agriculture, particularly in the context of small island developing states like Vanuatu, which face significant challenges due to climate change, limited land resources, and the need for food security.

The success of this indigenous food system can be attributed to several key factors. First, it leverages the traditional knowledge and practices of the local communities, who have developed and refined this system over generations. By combining multiple species in a symbiotic relationship, the system maximizes the use of available resources and enhances the overall productivity and resilience of the agricultural ecosystem. The integration of water taro, shrimp, eel, and watercress creates a diverse and balanced system that is less vulnerable to the impacts of climate change, such as droughts, floods, and pests.

Moreover, the system employs innovative solutions to address the specific challenges faced by small island developing states. For example, the use of raised beds and irrigation systems helps to optimize water management and prevent soil erosion, while the incorporation of organic matter and mulching techniques improves soil fertility and moisture retention. These practices not only enhance the productivity of the system but also contribute to its long-term sustainability by conserving natural resources and reducing the reliance on external inputs.

The FAO-GEF project has played a crucial role in supporting the development and scaling up of this indigenous food system. Through capacity building, technical assistance, and the provision of necessary resources, the project has empowered local communities to adopt and adapt this system to their specific contexts. The project has also facilitated the sharing of knowledge and experiences among different communities, enabling the dissemination of best practices and fostering a sense of ownership and pride in this unique agricultural heritage.

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