



Revitalizing Abandoned Coastal Ponds in Indonesia: A Waqf-Based Permaculture Solution for Sustainable Aquaculture

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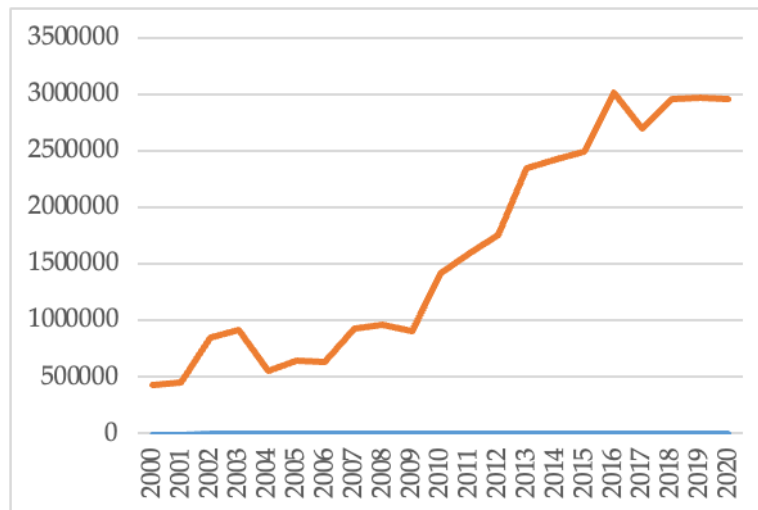


Abstract. This research proposes a sustainable model for revitalizing abandoned coastal ponds in Indonesia by integrating waqf and permaculture water design. Conventional industrial practices in coastal pond management, characterized by using artificial chemicals, have led to significant environmental degradation, contradicting Islamic principles. The study suggests utilizing cash waqf to fund permaculture pond — a method that collaborates with nature, avoiding artificial inputs and promoting ecological balance. By aligning with Islamic teachings on environmental stewardship, this model aims to restore land quality and productivity while benefiting coastal communities. Employing a qualitative methodology, the research utilizes secondary data from a range of sources to analyze the potential of this approach. The findings advocate for a waqf-based management system that ensures environmental sustainability and adheres to Islamic values, offering a viable alternative to harmful conventional practices.

Abstrak. Penelitian ini mengusulkan sebuah model berkelanjutan untuk merevitalisasi tambak pesisir yang terbengkalai di Indonesia melalui integrasi wakaf dan desain air permakultur. Praktik industri konvensional dalam pengelolaan tambak pesisir, yang dicirikan oleh penggunaan bahan kimia artifisial, telah mengakibatkan degradasi lingkungan yang signifikan, sebuah kondisi yang bertentangan dengan prinsip-prinsip Islam. Studi ini menyarankan pemanfaatan wakaf tunai sebagai mekanisme pendanaan untuk implementasi sistem tambak permakultur—sebuah metodologi yang berkolaborasi dengan proses alamiah, menghindari input buatan, dan mendorong keseimbangan ekologis. Dengan menyelaraskan praktik ini dengan ajaran Islam mengenai pengelolaan lingkungan, model yang diusulkan ini bertujuan untuk memulihkan kualitas dan produktivitas lahan sekaligus memberikan manfaat sosial-ekonomi bagi komunitas pesisir. Menggunakan metodologi kualitatif, penelitian ini menganalisis potensi pendekatan tersebut dengan memanfaatkan data sekunder dari beragam sumber. Temuan penelitian mendukung sistem pengelolaan berbasis wakaf yang menjamin keberlanjutan lingkungan dan berpegang teguh pada nilai-nilai Islam, sehingga menawarkan alternatif yang layak terhadap praktik konvensional yang merusak.

INTRODUCTION

Coastal aquaculture, particularly shrimp (*caridea*) culture, contributes significantly to rural and national economies, serving as a significant source of export earnings and employment in coastal areas (Alam & Phillips, 2004). Shrimp exports from developing countries – including Indonesia – are an essential source of foreign income for each country. In addition, this export activity also provides excellent benefits for entrepreneurs. The Ministry of Maritime Affairs and Fisheries (KKP) of Indonesia aim to double the value of cultivated shrimp exports to US\$4 billion in 2024 from last year's achievement of US\$2.23 billion (Lestari, 2022).



Source: Ministry of Maritime Affairs and Fisheries, 2022.

Figure 1 Total volume of pond production in Indonesia year 2000-2020

The Figure 1 shows that the total production from ponds has also increased significantly. Between 2000 and 2020, total production increased from 430,017 tonnes to 2,959,400. In percentage terms, production yields have increased by 688% over the last ten years.

Coastal communities often bear the negative consequences of benefits generated by aquaculture, as their natural resources are frequently appropriated by pond operators and commercial shrimp trawl companies (Down to Earth Indonesia, 2003). The adverse impacts of shrimp farming on Indonesia's coastal marine environment have been well documented, particularly since the shrimp aquaculture boom in Asia during the 1980s, which also contributed to extensive mangrove deforestation along coastal areas (Down to Earth Indonesia, 2003). By 2007, Indonesia had lost approximately 40% of its mangrove forests, primarily due to conversion for ponds, settlements, industrial activities, and plantations (Hakim, 2016).

The most significant contributor is the massive construction of shrimp ponds (Maharani, 2018; Witomo, 2018). When mangrove trees are cut down, the soil quickly decomposes and is no longer fertile when planted with these plants (Maharani, 2018). In addition, the externalities cost of mangrove conversion to the coastal pond is not comparable with the damage to mangrove forests (Setiawan et al., 2015).

Furthermore, the management of coastal ponds is often environmentally unsustainable. The extensive expansion of aquaculture ponds increases the release of effluents containing various chemical compounds, which can have detrimental effects on surrounding ecosystems (Nagaraju, Kumar et al., 2022). The reliance on monoculture practices and intensive cultivation compels farmers to apply chemicals to protect shrimp or fish from diseases and pests until harvest (Pangkey, 2010b). These chemical inputs ultimately

accumulate as harmful residues, negatively impacting both the pond ecosystem and the broader environment (Ichdayati et al., 2013).

According to Hidayatillah (2017), conventional coastal pond practices not only damage the environment but also reduce production quality and quantity. As a result, many aquaculture farmers abandon shrimp ponds once the land degrades, as such conditions can no longer support the cultivation of high-quality, disease-resistant shrimp (Isdarmawan, 2005).

Indonesia's coastal pond area totals 562,000 ha, of which 522,600 ha are traditional shrimp ponds, while the remaining 52,698 ha (approximately 7%) are semi-intensive and intensive ponds (KKP, 2021). Alarmingly, 56% of traditional ponds are currently idle or have been repurposed, leaving only 247,803 ha actively cultivated, with an average productivity of 0.6 tons/hectare/year. This significant proportion of underutilized ponds highlights a critical opportunity for sustainable rehabilitation initiatives.

In this context, instruments of Islamic social finance, such as cash waqf, present a viable solution for revitalizing idle and abandoned ponds. Cash waqf can finance not only religious activities but also diverse goods and services globally (Mohsin, 2013). Empirical evidence suggests that a self-managed cash-waqf model is the most effective in enhancing socio-economic outcomes, well-being, and moral-ethical development within the framework of *tawhid*, the unity of knowledge, followed by cash-waqf models partnered with external stakeholders (Ascarya et al., 2022). By leveraging such models, idle coastal ponds could be transformed into productive, socially and environmentally sustainable assets.

The application of cash waqf in marine resource management has been explored as a means to support fishing enterprises. Mutmainah et al. (2022) proposed integrating cash waqf with blue sukuk to enhance fishermen's access to capital, thereby facilitating business growth. Similarly, Citaningati and Kamaluddin (2022) emphasized that the utilization of cash waqf can increase fishermen's productivity, providing tangible socio-economic benefits to coastal communities.

Therefore, this study provides an overview model of cash waqf for policymakers and stakeholders in coastal ponds, which have a huge potential in Indonesia. This model is expected to serve as an alternative financing and management framework for revitalizing idle coastal ponds in an environmentally and socially sustainable manner.

Previous studies on waqf have primarily focused on the development of productive waqf and cash waqf models as alternative instruments for social welfare financing, poverty alleviation, and sustainable development (Mohsin, 2013; Ascarya et al., 2022; Citaningati & Kamaluddin, 2022). In parallel, a separate body of literature has examined permaculture and sustainable aquaculture as ecological solutions to environmental degradation caused by conventional agricultural and aquaculture practices (Holmgren, 2011; Troell et al., 2017; Luik, Reintam & Edesi, 2021). However, these two streams of research remain largely disconnected, as existing studies tend to address either financial-institutional aspects of waqf or ecological-technical aspects of sustainable aquaculture in isolation. To the best of the authors' knowledge, no prior study has explicitly integrated waqf—particularly cash waqf—with permaculture principles as a unified framework for revitalizing abandoned coastal ponds. This study seeks to fill this gap by proposing a conceptual waqf-based permaculture model aimed at achieving both environmental sustainability and socio-economic benefits in Indonesia's coastal regions.

This study offers a novel contribution by integrating Islamic social finance, specifically cash waqf, with permaculture principles to address the problem of abandoned coastal ponds. Unlike previous studies that examine waqf or sustainable aquaculture separately, this study proposes a unified conceptual framework that combines financial, institutional and ecological dimensions. The proposed model not only revitalizes

idle coastal ponds through environmentally friendly perma-aquaculture practices but also strengthens the social function of waqf by ensuring long-term sustainability, community empowerment, and economic resilience. From a policy perspective, this study provides an alternative model for policymakers and stakeholders to synergize waqf institutions and coastal resource management in Indonesia.

LITERATURE REVIEW

Waqf and Pond

The discussion of waqf has developed in line with the changing demands of the times. Starting from classic waqf studies to the latest innovations regarding waqf development. In the last centuries, the instinct of waqf studies has led to more prosperous waqf. This means that apart from the positive value of the form of the waqf object itself, it is also required that other products can be felt and positively correlated with the mission of *da'wah* for the welfare of the people from an economic standpoint. More concretely, waqf leads to more productive money because it can be an effective investment instrument.

In Arabic, there are three words that have the same meaning, namely, الوقف, التحبيس and التسبيل which has the same meaning to hold back (al-Khattib, n.d.). The messenger of Allah, Muhammad SAW used the words التحبيس and التسبيل in his hadith about waqf. The majority of fiqh experts (supporters of the Hanafi, Syafii and Hanbali schools) formulate their meaning according to syara' as follows (Azzam, 1998): *"Withholding (preventing) assets that may be used, without losing the objects, by not taking action on the objects, is distributed to those who are permissible (not prohibited) and exist."*

According to *Departemen Agama Republik Indonesia* or Ministry of Religious Affairs, Republic of Indonesia (2006), there are two types of waqf, namely *waqf ahli* (special) and *waqf khairi* (general). *Waqf ahli*, also known as family waqf, is intended for specific individuals, families, or designated parties, and is sometimes referred to as *alal awlad waqf*, which aims to provide social protection and welfare within the family. In contrast, *waqf khairi* is explicitly established for religious or public purposes, such as the construction of mosques, hospitals, orphanages, and other public facilities.

Waqf has evolved significantly in terms of form and application in Islam. In terms of waqf and water, Ahmad et al. (2020) mentioned that in early Islam, waqf and ponds were formed to preserve the water and to innovate hydro technology. For instance, a pond of Aqiq in Saudi Arabia for harvesting rainwater in the time of Harun al-Rashid. Aljibes in Granada (built-in 1494) also have the same function to harvest and store the water for the use of *ummah*.

In the context of fisheries and coastal livelihoods, several studies have explored the use of cash waqf to improve access to capital for fishermen and marine-based enterprises (Mutmainah et al., 2022; Citaningati & Kamaluddin, 2022). These studies highlight the role of waqf as a financial instrument that enhances productivity and income generation in coastal communities. However, sustainability considerations in these models are largely treated as supplementary objectives rather than being embedded within the ecological design of production systems.

Currently, some waqf-based pond initiatives have begun to develop in Indonesia, reflecting a practical application of waqf in the aquaculture sector. The waqf pond program initiated by the Indonesian Council of Ulama (*Majelis Ulama Indonesia* or abbreviated as MUI) in collaboration with Mitra Mikro Social Investment (MMSI) in 2022 aims to support community-based aquaculture through waqf financing (MUI, 2022; Bangsa Wakaf, 2022). Similarly, Al Furqon Islami Boarding School in Gresik has established a waqf-based pond to generate sustainable income for financing its educational activities (Al Furqon Gresik, 2021).

Despite these positive developments, such initiatives continue to rely on conventional aquaculture practices, including monoculture systems, standard pond designs, and the use of chemical inputs. These methods mirror traditional pond management approaches that have been widely criticized for their adverse environmental impacts, such as water pollution and ecosystem degradation. Consequently, although waqf has been operationalized as a financing mechanism in coastal pond development, existing models have yet to systematically integrate ecological principles into pond design and management. This gap underscores the need for an alternative framework that combines waqf financing with permaculture-based aquaculture to ensure both environmental sustainability and long-term socio-economic benefits.

Islam and Environment

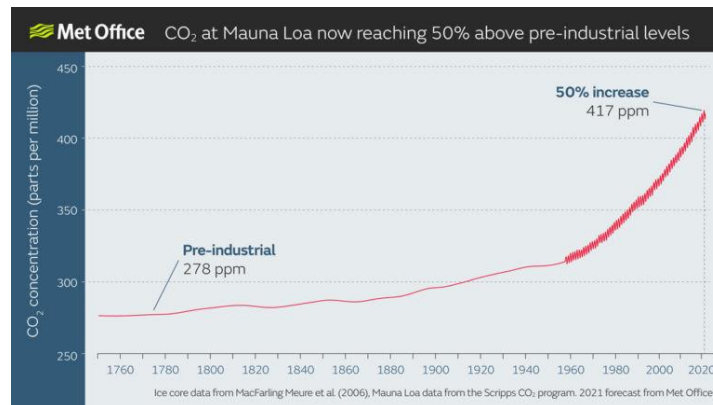
Islam has prohibited all forms of destruction to the natural surroundings, both direct and indirect descent. Muslims must be at the forefront of protecting and preserving the natural environment. Therefore, every Muslim should understand the foundations of environmental preservation because ecological preservation is the responsibility of all human beings as bearers of the mandate to inhabit this earth of Allah.

Islamic law is concerned about preserving nature, even in *jihad fi sabilillah*. It is reported in hadith Sahih Muslim No. 1763 that Muslims are not allowed to burn and cut down trees without a clear reason and necessity. The damage to nature and the environment we are witnessing results today from human actions. Allah mentions in Quran surah ar-Rum verse 41: “*Corruption has appeared throughout the land and sea by [reason of] what the hands of people have earned so He [i.e., Allāh] may let them taste part of [the consequence of] what they have done that perhaps they will return [to righteousness].*” Sayyid Quthb stated that the damage referred to in verse above did not occur without a cause and suddenly. However, the damage resulted from human actions (Quthb, 2004).

Al-Qaradhawi (2001) explained that fiqh is very concerned about environmental issues. This can be proven by discussions contained in classical fiqh literature, such as discussion of *thaharah* (cleanliness), *ihya al-mawat* (opening up idle land), *al-musaqat* and *al-muzara'ah* (utilization of land belonging to other people), laws related to the sale and purchase and ownership of water, fire and salt, pet rights and other discussions related to the environment that surrounds humans.

Al-Qaradhawi (2001) also emphasized that maintaining the environment is an effort to create benefits and prevent harm. This is in line with *maqāsid al-syarī'ah* (objectives of religious law) formulated in *kulliyāt al-khams*, namely: *hifzu al-nafs* (protecting the soul), *hifzual-aql* (protecting the mind), *hifzu al-māl* (protecting property), *hifzu al-nasb* (protecting offspring), *hifzu al-dīn* (protecting religion). According to him, preserving the environment is a requirement to protect the five objectives of the shari'ah. Thus, all behaviour that destroys the environment means actions that threaten life, mind, property, lineage, and religion.

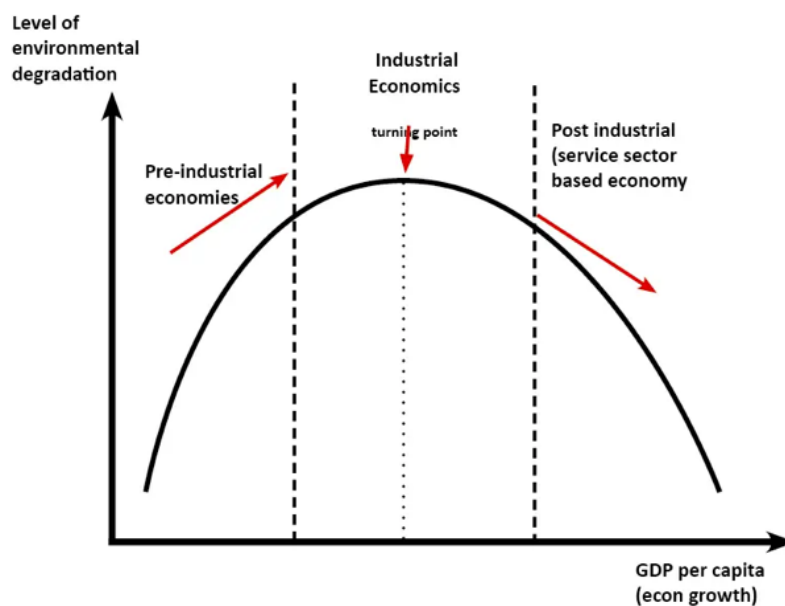
Since the 17th century, marked by the Industrial Revolution, many human activities, including the manufacturing industry and business processes, began to change. It is driven by capitalism; the industry will try to increase its profit by surpassing its cost. For instance, the Figure 2 shows that gas emission has grown yearly since industrialisation, meaning that all industrial processes are not environmentally friendly.



Source: World Economic Forum, 2020.

Figure 2 Global atmospheric CO₂ concentrations from 1700 to 2021

To be more specific, the Kuznets graph below demonstrates that common industrial activities tend to generate high environmental costs despite producing substantial economic benefits in terms of economic growth (Acemoglu & Robinson, 2002). Therefore, in the context of pond management, a solution is required that simultaneously promotes environmental sustainability and economic viability.



Source: Economics Help, 2025.

Figure 3 Kuznet curve

Musallamat (2011) explains that four major factors cause environmental destruction: anthropocentrism, consumerism, lack of ethics toward the environment, and exploitation of natural resources. This is certainly contrary to what Allah has mentioned in the Quran. Humans are only accustomed to taking advantage of nature but forget the concept of making the best use of nature without destroying it. Allah said in surah Hūd verse 61: "He has produced you from the earth and settled you in it."

According to Ibn 'Āsyūr, the word *al-isti'mār* in verse above means *i'mār*, namely "to make man his prosperity" (*ja'ala an-nās āmirihā*). The interpretation agreed upon by all interpreters is that the heavens and the earth and everything they contain were created in conditions ready to be explored, managed and prospered through development, irrigation, agriculture and other productive charities. Allah chose

humans to carry out the task of the earth's prosperity (Musallamat, 2011). Surah Hūd verse 61 is also related to surah Al-Baqarah verse 30, which states that humans are caliphs on earth.

While Islamic environmental ethics provide a comprehensive normative framework for environmental preservation, much of the existing literature remains conceptual and jurisprudential in nature. These studies offer limited operational guidance on how Islamic principles can be implemented through concrete economic instruments or technical environmental management systems, particularly in the context of coastal aquaculture and pond rehabilitation.

Taken together, the existing literature reveals three parallel but weakly connected streams of research. Studies on waqf and cash waqf focus primarily on financial mechanisms and institutional governance, with limited integration of environmental system design. Islamic environmental studies provide strong ethical and jurisprudential foundations for sustainability but remain largely normative and underutilized in applied resource management. Meanwhile, permaculture and sustainable aquaculture literature offer practical ecological solutions for restoring degraded ecosystems, yet they rarely incorporate Islamic social finance instruments or waqf-based ownership structures. The absence of an integrative framework that combines waqf, Islamic environmental ethics, and permaculture principles indicates a critical gap in the literature. This study addresses this gap by synthesizing these three domains into a unified conceptual model for revitalizing abandoned coastal ponds in Indonesia.

METHOD

This study employs a qualitative conceptual research approach to develop an integrated waqf-based permaculture model for revitalizing abandoned coastal ponds in Indonesia. A conceptual approach is suitable for synthesising existing knowledge and constructing new frameworks in interdisciplinary research areas (Jabareen, 2009; Gilson & Goldberg, 2015).

A targeted literature review was conducted by selecting peer-reviewed journal articles, academic books, and institutional reports related to cash waqf, Islamic social finance, coastal aquaculture, environmental sustainability, and permaculture. The selection focused on relevance, credibility, and contextual alignment with Indonesia's coastal conditions, following established guidelines for integrative reviews (Webster & Watson, 2002).

The conceptual model was developed through thematic synthesis, integrating cash waqf as a sustainable financing mechanism (Mohsin, 2013; Ascarya et al., 2022) with permaculture principles as an ecological design framework for sustainable pond management (Holmgren, 2011). Existing waqf-based pond initiatives in Indonesia were also examined to ensure contextual relevance and to identify current limitations in environmental sustainability (MUI, 2022; Al Furqon Gresik, 2021).

An integrative analytical framework combining Islamic social finance and environmental sustainability perspectives was applied to assess the proposed model's potential contributions to ecological restoration, community empowerment, and long-term socio-economic resilience (Troell et al., 2017; Luik, Fatoni & Ahmad 2021).

RESULTS AND DISCUSSION

Permaculture

Permaculture combines permanent agriculture and permanent culture. Permanent agriculture encompasses practices such as family gardens, agroforestry, animal management, and aquaculture to

increase land fertility, income, and production sustainably for both present and future needs. On the other hand, permanent culture strives to empower nature and humans to establish a robust, stable, and sustainable culture. The concept of permaculture was first introduced by David Holmgren and Bill Mollison in the 1970s in Tasmania, Australia. It was developed in response to unsustainable food production methods, particularly industrialized agriculture, energy production, forestry practices, urban planning, and lifestyles (Holmgren, 2011).

Holmgren (2011) stated that permaculture integrates diverse agricultural strategies and techniques to create a synergistic system that can be self-maintained as much as possible. This holistic approach addresses both agricultural and social, cultural, and economic aspects. Permaculture involves three core ethics and 12 principles that are the foundation for achieving permanent agriculture and culture.

The ethics of Earth Care, People Care, and Fair Share are central to permaculture practices. Earth Care highlights the importance of preserving the earth and its ecosystems, prohibiting activities that harm the environment. People Care ensures equality, respect, and opportunities for all individuals engaged in permaculture activities, emphasizing that everyone should have access to land, water, food, and health. Fair Share encourages a shift from focusing on monetary wealth to improving the quality of life. Quality of life encompasses food security, shelter, education, human rights, and more, requiring a healthy balance in the economy, environment, culture, and society (Holmgren, 2011). The 12 principles of permaculture serve as guidelines for designing and implementing sustainable permaculture projects, as follows:

Table 1 The principles of permaculture

| No | Principles | Details |
|----|---|--|
| 1 | Observe and interact | Aims to design farms, houses and gardens to be in harmony with nature. |
| 2 | Catch and store energy | Good design will reduce or even eliminate the need for non-renewable or unsustainable energy, because natural energy can be caught and stored. |
| 3 | Obtain a yield | Aims to manage short and long-term production results to remain useful both for oneself, the community and the interests of economic transactions. |
| 4 | Apply self-regulation and accept feedback | Ways to improve the quality of oneself, land, ecosystem, and community to obtain a more efficient and effective production system from time to time. |
| 5 | Use and value of renewable energy and resources | How renewable energy and resources can be available not only now but also in the future so as to create an independent and strong community. |
| 6 | Produce no waste | It does not produce waste that ends up as pollution but instead optimizes the utilization of existing waste as a creative medium with a reuse and recycle approach. |
| 7 | Design from pattern to details | How to design projects in harmony with nature to produce effective and efficient projects. |
| 8 | Integrate rather than segregate | An integrated system combines various different elements to work together in one unified system for more optimal. |
| 9 | Use small and slow solutions | Small systems are easier to maintain at first. This means it is easier to maximize product yields. |
| 10 | Use and value diversity | The existence of biodiversity and animals in an ecosystem will make it more healthy and balanced. |
| 11 | Use edges and value the marginal | Process utilizing every inch of land to make it productive. |
| 12 | Creatively use and respond to change | Change is something that will continue to be present in life. Succession and evolution is a natural change process that can be utilized by humans to improve the quality of the permaculture system from time to time. |

Source: Holmgren, 2011.

While previous studies have highlighted permaculture as a sustainable agricultural approach (Holmgren, 2011; Troell et al., 2017), most applications remain limited to small-scale food systems and terrestrial agriculture. Its potential as a governance and production framework for coastal aquaculture has received limited scholarly attention. This study extends the application of permaculture beyond technical land-use design by positioning it as an ecological foundation for managing waqf-based coastal assets. By embedding permaculture ethics into institutional and financial arrangements, this approach addresses not only environmental sustainability but also long-term social and economic resilience.

Pond in Permaculture

An ecosystem is a dynamic complex of plant, animal, and microorganism communities interacting as functional units. Remember that organisms in an ecosystem are classified into three types: producers, consumers, and decomposers (Hudson, n.d.). Therefore, in establishing the pond, we should not focus on the fish or shrimp we will raise, but the design architecture must also follow nature, including the ecosystem.

A pond in permaculture means that the pond will permanently stay as a pond (Luik, Reintam & Edesi, 2021). The design follows nature, but it can also have a harvest period to gain profit. Meanwhile, aquaculture means farming aquatic organisms such as fish, mollusks, crustaceans, and aquatic plants. Farming implies some intervention in the rearing process to increase output, such as regular stocking, feeding, or predator protection. Farming also means that the cultivated stock is owned by an individual or a corporation (Troell et al., 2017). Thus, the pond system as aquaculture in permaculture means farming the aquatic organism while maintaining the ecosystem to sustain farming.

According to McKenzie and Lemos (2008), some elements must be considered before building a pond in a permaculture. Namely, location, sun, size, depth, shape, and construction. The site should have a continuous water supply near the water irrigation. The pond should not be exposed to the sun, but 25% of its area must be covered with natural plants or shaded by trees. The pond's size, depth and shape must be considered to fit the environment by following the nature design, and construction with clay is more suitable than cement

The huge difference between conventional and pond in permaculture is that ponds will not use any artificial chemicals in their pond management. The food for omnivores and herbivores should be provided naturally by the habitat and extra feeding with manures and leaves. The potential disease can be solved with salt, while all the pests should remain to maintain the environment around the pond. Lastly, to keep the oxygen in the water sufficient for the pond, keep the water in and out flow by using the nature design or water pump (McKenzie & Lemos, 2008; Mollison, 1981; Troell et al., 2017).

In permaculture, a pond embodies the ethical principles that underpin the practice, namely Earth Care, People Care, and Fair Share. Earth Care emphasizes the protection of the planet and all living organisms, prohibiting actions that cause environmental degradation (Permatil Global, 2018). People Care ensures equality, respect, and equitable access for all individuals engaged in permaculture activities. This principle asserts that everyone has the right to land, water, food, and health, positioning human well-being at the center of permaculture design (Permatil Global, 2018). The principle of Fair Share encourages a shift from prioritizing financial gain to enhancing overall quality of life. It encompasses essential aspects such as food security, water, shelter, energy, transportation, education, opportunity, and human rights, all of which are achievable only through the harmonious interplay of a healthy economy, sustainable natural environment, and resilient social and cultural systems (Permatil Global, 2018).

Conventional aquaculture systems prioritize short-term productivity, often at the expense of ecological balance, resulting in disease outbreaks and land degradation (Pangkey, 2010a; Nagaraju, Malegole et al., 2022). In contrast, the permaculture-based pond system emphasizes ecosystem integrity by integrating producers, consumers, and decomposers within a closed-loop design. This study argues that such an approach is particularly relevant for abandoned coastal ponds, where restoring ecological functions is a prerequisite for economic revitalization. Unlike intensive aquaculture, perma-aquaculture reduces dependency on chemical inputs, thereby lowering production risks and enhancing long-term viability.

Cash Waqf Model for Abandoned Pond

Based on what has been discussed in previous sections, the authors propose perma-aquaculture as the base of the waqf for the abandoned coastal ponds by combining the waqf and cash waqf, idle/abandoned ponds as an asset for waqf while the cash waqf as the fund to start the project. The stakeholders in this model include *waqif*, waqf institutions (*nazhir*), the Indonesian Waqf Board (BWI), and the Ministry of Maritime Affairs and Fisheries (KKP).

Waqifs who are involved are individual *waqifs* and institutional *waqifs*. *Waqif* for the pond owner may participate in the contract as waqf *ahli* or waqf *khairi*. In addition, the role of BWI is to control the *nazhir* to manage waqf assets based on Waqf Core Principles and to give cash waqf management reports, while the KKP may share the idle or abandoned coastal pond to supervise the *nazhir*. BWI and KKP initiate the program along with supervision control of the model. Figure 4 is the modus operandi of perma-aquaculture coastal ponds with the explanation as follows:

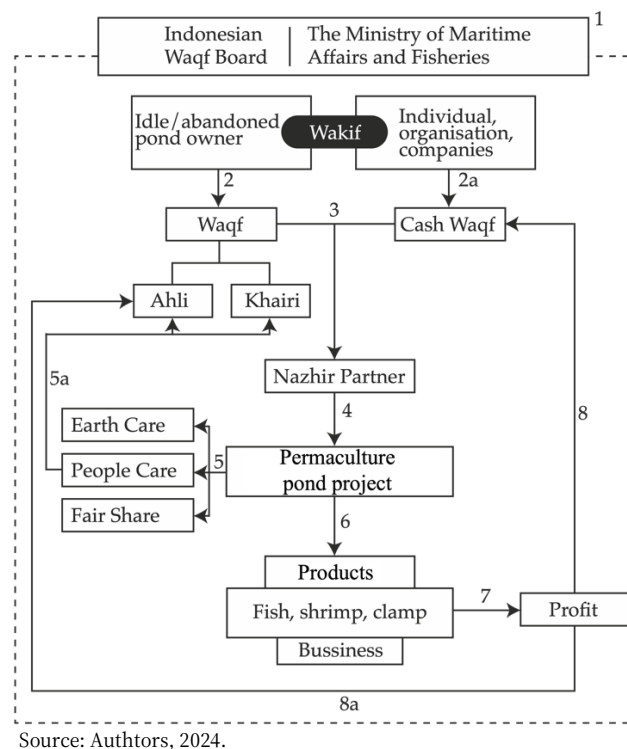


Figure 4 Waqf on coastal ponds model

1. The collaboration between the Indonesian Waqf Board and The Ministry of Maritime Affairs and Fisheries will kickstart the project by sharing data about idle or abandoned coastal ponds. The Indonesian Waqf Board will then take charge of the contractual aspects and issue the necessary waqf certificate to formalize the initiative.

2. There are two types of *waqif* individuals involved in the project: the primary landowner who decides whether to allocate the land for waqf *ahli* or waqf *khairi* purposes. Additionally, parties other than the landowners (2a) can contribute cash waqf to fund the project, offering a financial backing mechanism.
3. The utilization and management of both waqf assets and cash waqf contributions will fall under the responsibility of the *nazhir*, who acts as the trustee overseeing the project's overall implementation.
4. The *nazhir* collaborates as a project manager for the perma-aquaculture project, coordinating and executing various project activities. The appointment of the *nazhir* should take place in the initial stages, with regular reporting duties to the Indonesian Waqf Board.
5. The project's output can be categorized into two distinct areas: one aligns with permaculture ethics, emphasizing giving back to society. At the same time, the other focuses on generating revenue through supplementary business ventures. Under the ethos of people care, beneficiaries designated by waqf *ahli* or *khairi* principles can receive a share of the project's yield.
6. In case there are surplus yields post-distribution as per steps 5 and 5a, the *nazhir* has the option to sell them in the market to generate additional income for the project's sustainability and growth.
7. Selling the harvested products ultimately results in profits for the project, showcasing its viability and potential for financial success.
8. The generated profits are then channeled back into the cash waqf fund to fuel the project's continuity and development. Furthermore, these profits can also be shared with beneficiaries in line with the established criteria of waqf *ahli*, ensuring a fair and equitable distribution system.

Existing waqf-based fisheries initiatives in Indonesia, including those initiated by MUI, MMSI, and Al Furqon Gresik, demonstrate the feasibility of utilizing waqf for productive pond activities. However, these initiatives largely replicate conventional aquaculture practices and thus remain vulnerable to the same environmental and operational challenges. This study differs by integrating cash waqf with permaculture principles, transforming waqf from a financing instrument into a comprehensive ecological–institutional framework. The proposed model enhances the role of *nazhir* from passive asset managers to active ecosystem stewards, thereby strengthening both environmental outcomes and waqf sustainability.

CONCLUSION

The rapid expansion of conventional coastal aquaculture in Indonesia has generated significant economic benefits but has also resulted in severe environmental degradation, particularly through mangrove deforestation, chemical-intensive pond management, and the widespread abandonment of degraded ponds. This study addresses this challenge by proposing a conceptual model that integrates cash waqf with permaculture-based aquaculture as a sustainable pathway for revitalizing abandoned coastal ponds.

By combining Islamic social finance with ecological design principles, this study demonstrates that waqf can function not only as a financing mechanism but also as an institutional framework for long-term environmental stewardship. The proposed waqf-based perma-aquaculture model shifts the role of *nazhir* from passive asset managers to active ecosystem custodians, aligning financial sustainability with environmental restoration and social welfare objectives. This integration responds to the limitations of existing waqf initiatives in the fisheries sector, which often adopt conventional aquaculture practices without embedding ecological considerations into their operational design.

From a policy perspective, this study offers an alternative governance and management model for policymakers and stakeholders in coastal resource management. The collaboration between waqf institutions and government agencies—such as the Indonesian Waqf Board and the Ministry of Maritime Affairs and Fisheries—can enhance the utilization of idle coastal assets while supporting national sustainability and blue economy agendas. The model also contributes to broader discussions on sustainable

development by demonstrating how faith-based financial instruments can be mobilized to address environmental challenges in coastal ecosystems.

Nevertheless, this study is limited to a conceptual analysis based on secondary data and literature review. Future research should empirically examine the feasibility and effectiveness of the proposed model through case studies, stakeholder interviews, and pilot projects in selected coastal regions. Quantitative assessments of environmental recovery, economic performance, and social impacts would further strengthen the evidence base for adopting waqf-based permaculture approaches in coastal aquaculture. Despite these limitations, this study provides a foundational framework for integrating waqf, environmental sustainability, and permaculture in revitalizing abandoned coastal ponds in Indonesia and similar coastal contexts.

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