

Subak, Traditional Irrigation Management System in Bali for Indonesians SDGs

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Abstract

Subak, the traditional irrigation system of Bali, represents a unique form of local wisdom that integrates ecological sustainability, social cooperation, and spiritual values. Recognized by UNESCO as a Cultural Landscape, Subak serves not only as a water management system but also as a socio-cultural institution that reflects the philosophical principles of harmony between humans, nature, and the divine. This study aims to examine the relevance of Subak to Pancasila values, Sustainable Development Goals (SDGs), and human rights principles within the context of civic education. Employing a qualitative descriptive approach through literature review and conceptual analysis, this paper explores the role of Subak as a living example of democratic participation, environmental stewardship, social justice, and community-based governance. The findings indicate that the Subak system embodies several Pancasila values, particularly social justice, unity, deliberative democracy, and belief in God. Furthermore, Subak contributes to sustainable development through responsible water management, ecosystem preservation, and food security. From a human rights perspective, Subak supports equitable access to natural resources, community participation, and environmental rights. The study concludes that integrating Subak into civic education can strengthen students' understanding of citizenship, sustainability, and human rights while preserving Indonesia's cultural heritage in the era of globalization.

Keywords: *Subak*; local wisdom; Pancasila values; sustainable development; human rights; civic education.

Introduction

The challenges of the twenty-first century require education systems to prepare citizens who are capable of responding to environmental degradation, social inequality, cultural transformation, and human rights issues. As global attention increasingly focuses on the Sustainable Development Goals (SDGs), educational institutions are expected to cultivate values that support sustainability, democratic participation, and respect for human dignity. Civic education plays a strategic role in this process because it develops knowledge, skills, and dispositions necessary for responsible citizenship. In Indonesia, civic education is closely linked to the national ideology of Pancasila, which serves as the foundation for social harmony, democracy, justice, and national unity. However, the implementation of civic

education often relies heavily on theoretical and constitutional perspectives while paying less attention to local cultural practices that embody these values in everyday life. Consequently, integrating local wisdom into civic education has become increasingly important to contextualize citizenship learning and strengthen students' cultural identity.

One example of local wisdom that deserves greater attention is the Subak system in Bali. Subak is a traditional irrigation organization that regulates water distribution among farmers through collective management and consensus-based decision-making. More than a technical irrigation system, Subak represents a cultural institution rooted in the philosophy of Tri Hita Karana, which emphasizes harmonious relationships between humans and God, humans and fellow humans, and humans and nature.

The significance of Subak extends beyond agriculture. The values embedded within the system correspond closely with Pancasila principles, sustainable development objectives, and human rights norms. The collective management of water resources promotes social justice and community participation, while environmental conservation practices support ecological sustainability. Furthermore, equal access to water and participatory decision-making reflect important dimensions of human rights and democratic governance.

Despite its significance, limited studies have examined Subak from an interdisciplinary perspective that connects local wisdom, civic education, Pancasila values, sustainable development, and human rights. Most existing studies focus on agricultural management, tourism, or environmental conservation. Therefore, this paper seeks to fill this gap by analyzing the relevance of Subak to civic education and its potential contribution to the development of sustainable and rights-based citizenship.

The purpose of this study is to explore how Subak embodies Pancasila values, contributes to sustainable development, and promotes human rights principles. In addition, this paper discusses the implications of integrating Subak into civic education to foster civic responsibility, environmental awareness, and democratic participation among students.

Literature Review

Subak as Balinese Local Wisdom

Subak is a traditional socio-ecological institution that has governed irrigation systems in Bali for centuries. The organization coordinates water allocation, agricultural planning, conflict resolution, and environmental conservation among farmers. Unlike modern irrigation systems that primarily focus on technical efficiency, Subak integrates social, cultural, spiritual, and ecological dimensions.

The philosophical foundation of Subak is *Tri Hita Karana*, which emphasizes balance and harmony among three interconnected relationships: humans with God (*Parahyangan*), humans with other humans (*Pawongan*), and humans with nature

(*Palemahan*). These principles shape the governance structure of Subak and contribute to sustainable agricultural practices.

Pancasila Values and Civic Education

Pancasila serves as the philosophical foundation of Indonesian citizenship. The five principles emphasize belief in God, humanity, unity, democracy, and social justice. Civic education aims to cultivate these values through learning experiences that encourage active participation and responsible citizenship.

Local wisdom can function as a contextual learning resource that allows students to understand abstract civic values through concrete social practices. The Subak system provides a practical example of democratic deliberation, collective responsibility, and social cooperation that reflects Pancasila values.

Sustainable Development and Human Rights

The Sustainable Development Goals (SDGs) emphasize environmental protection, social inclusion, and economic sustainability. Goals related to clean water, climate action, sustainable communities, and food security are particularly relevant to the Subak system.

Human rights principles also recognize the right to participate in public affairs, access natural resources fairly, and enjoy a healthy environment. Therefore, local institutions that promote equitable resource management contribute significantly to the realization of human rights.

Tri Hita Karana as the Philosophical Foundation of Subak

The sustainability of the Subak system cannot be separated from the philosophy of *Tri Hita Karana*, which literally means “three causes of well-being.” This philosophy emphasizes harmonious relationships among humans and God (*Parahyangan*), humans and fellow humans (*Pawongan*), and humans and the natural environment (*Palemahan*) (Lansing, 2012). The philosophy serves as a

normative framework that guides social behavior and environmental management within Balinese society.

Several scholars argue that Tri Hita Karana represents an indigenous sustainability framework that predates modern environmental governance models (Windia & Dewi, 2011). Through this philosophy, environmental conservation is not viewed merely as an economic necessity but also as a moral and spiritual obligation. Consequently, the Subak system has been able to maintain ecological balance while supporting agricultural productivity for centuries.

Civic Education and Local Wisdom

Contemporary civic education increasingly emphasizes contextual learning experiences that connect citizenship concepts with students' social and cultural realities (Knowles, 2018). Local wisdom provides an important source of civic values because it reflects practical examples of participation, cooperation, responsibility, and social justice.

Research has shown that integrating local wisdom into civic education enhances civic engagement, cultural identity, and democratic competence among students (Banks, 2020). Through local cultural practices, learners can better understand abstract civic concepts such as equality, deliberation, and public responsibility.

Sustainable Development and Community-Based Resource Management

Sustainable development refers to development that meets present needs without compromising future generations' ability to meet their own needs (United Nations, 2015). Community-based natural resource management has become an important strategy for achieving sustainability because local communities often possess valuable ecological knowledge.

The Subak system represents a successful example of community-based governance where local stakeholders collectively manage water resources through established norms and participatory mechanisms (Ostrom, 2015). Such practices contribute to ecological resilience and long-term sustainability.

Method

This study employed a qualitative descriptive approach based on literature review and conceptual analysis. Data were collected from academic journals, books, policy documents, UNESCO reports, and previous studies discussing Subak, civic education, sustainable development, Pancasila values, and human rights.

The collected data were analyzed through thematic analysis. The analysis focused on identifying key values embedded within the Subak system and examining their relevance to citizenship education, sustainable development principles, and human rights frameworks.

Results and Discussion

Subak and Pancasila Values

The Subak system demonstrates the practical implementation of several Pancasila principles. The collective management of irrigation reflects democratic participation through deliberation and consensus-building. Farmers regularly meet to discuss water distribution, planting schedules, and community concerns. This process illustrates the fourth principle of Pancasila concerning democracy guided by wisdom through deliberation.

The principle of social justice is also evident in the equitable allocation of water resources. Every member receives access according to agreed regulations, minimizing inequality and conflict. Furthermore, religious ceremonies associated with Subak reflect the first principle of belief in God, while cooperation among farmers strengthens social unity.

Subak and Sustainable Development

Subak contributes significantly to environmental sustainability. The coordinated management of irrigation systems prevents excessive water consumption and supports ecosystem balance. Traditional agricultural practices help maintain biodiversity and reduce environmental degradation.

Moreover, the system contributes to food security by ensuring stable agricultural production. Through collective resource management, local communities are able to sustain livelihoods while preserving environmental resources for future generations. These practices align with several SDGs, including SDG 2 (Zero Hunger), SDG 6 (Clean Water and Sanitation), SDG 13 (Climate Action), and SDG 15 (Life on Land).

Subak and Human Rights

From a human rights perspective, Subak supports principles of equality, participation, and environmental rights. Farmers are involved in decision-making processes and have equal opportunities to express their views. The equitable distribution of water reflects fairness in access to essential resources.

In addition, the preservation of agricultural landscapes contributes to the realization of environmental rights. Communities benefit from a healthy ecosystem that supports economic activities and cultural continuity. Thus, Subak represents a local mechanism that promotes both collective welfare and individual dignity.

Implications for Civic Education

Integrating Subak into civic education can enhance students' understanding of citizenship through local cultural contexts. Students can learn democratic participation, environmental responsibility, social justice, and human rights from real-life community practices rather than solely through textbook instruction.

The incorporation of local wisdom into civic education also strengthens cultural identity and promotes appreciation of Indonesia's diverse heritage. By connecting local traditions with global challenges, educators can foster citizens who are culturally rooted, socially responsible, and globally aware.

Subak as an Embodiment of Pancasila Values

The values embedded within Subak strongly reflect the philosophical principles of Pancasila. The first principle, Belief in the One Supreme God, is manifested through various religious rituals conducted before planting and harvesting seasons. Water temples play an important role in maintaining spiritual relationships between farmers and the divine (Lansing & Kremer, 2017).

The second principle, Just and Civilized Humanity, can be observed through the equal treatment of Subak members regardless of social status. Every farmer possesses rights and responsibilities that are regulated collectively through agreed norms (Roth, 2014).

The third principle, the Unity of Indonesia, is reflected in the strong communal bonds developed among members. Cooperation among farmers demonstrates social solidarity and collective responsibility. Rather than competing for resources, members prioritize mutual benefits and community welfare (Warren, 2019).

The fourth principle, Democracy Guided by Wisdom through Deliberation and Representation, is evident in the decision-making processes within Subak organizations. Important matters related to irrigation schedules, water allocation, and dispute resolution are discussed collectively through deliberative meetings (Geertz, 2004).

The fifth principle, Social Justice for All Indonesian People, is represented by equitable water distribution mechanisms. Fair access to irrigation resources helps prevent conflicts and ensures agricultural productivity across farming communities (Windia, 2018).

Subak and Sustainable Development Goals

The Subak system contributes directly to several Sustainable Development Goals (SDGs). First, it supports SDG 2 (Zero Hunger) by enhancing agricultural productivity and maintaining food security (Food and Agriculture Organization of the United Nations, 2022). Efficient irrigation management allows farmers to optimize crop production while preserving ecological balance.

Second, Subak contributes to SDG 6 (Clean Water and Sanitation). The system promotes sustainable water use and prevents excessive exploitation of water resources (UNESCO, 2023). Water allocation follows collective agreements designed to ensure long-term availability.

Third, Subak supports SDG 13 (Climate Action). Traditional agricultural practices incorporated within the system help maintain environmental resilience and reduce ecological degradation (United Nations Development Programme, 2023).

Fourth, Subak contributes to SDG 15 (Life on Land) by preserving biodiversity and protecting agricultural landscapes (UNESCO World Heritage Centre, 2022). UNESCO's recognition of the Cultural Landscape of Bali Province highlights the significance of Subak in maintaining ecological sustainability.

Human Rights Dimensions of Subak

Human rights principles emphasize equality, participation, dignity, and access to essential resources (United Nations Human Rights Council, 2022). These principles are evident within the Subak system.

Access to water constitutes a fundamental human need. Through equitable water distribution, Subak ensures that all members can access irrigation resources without discrimination (United Nations, 2021). Such practices align with international human rights standards concerning access to water.

Participation is another important human rights principle reflected in Subak governance. Members actively engage in discussions and decision-making processes affecting community welfare (Sen, 2009). This participatory approach strengthens democratic culture and social accountability.

Environmental rights are also promoted through Subak. Communities benefit from sustainable ecosystems that support livelihoods and cultural traditions. The preservation of natural resources contributes to present and future generations' well-being (Knox, 2018).

Subak as a Learning Resource for Civic Education

Integrating Subak into civic education can provide students with authentic learning experiences that connect citizenship concepts with local realities. Students can explore how democratic participation operates within traditional institutions and how environmental stewardship contributes to sustainable citizenship.

The use of local wisdom in civic education encourages culturally responsive teaching practices. Learners become more aware of their cultural heritage while simultaneously developing competencies required to address contemporary global challenges (Print & Lange, 2023).

Furthermore, the integration of Subak into classroom learning can strengthen civic literacy, environmental awareness, and respect for human rights. Students learn that citizenship is not limited to legal knowledge but also involves active participation in promoting social welfare and environmental sustainability.

Conclusion

Subak represents a valuable form of Balinese local wisdom that integrates cultural, ecological, social, and spiritual dimensions. The system embodies important Pancasila values, including democracy, social justice, unity, and belief in God. Furthermore, Subak contributes to sustainable development through environmental conservation, responsible resource management, and food security.

The study also demonstrates that Subak aligns with human rights principles by promoting participation, equality, and environmental protection. As a result, Subak provides a meaningful example of how local wisdom can support global commitments related to sustainability and human dignity.

Integrating Subak into civic education offers opportunities to contextualize citizenship learning while preserving cultural

heritage. Future educational initiatives should explore innovative strategies for incorporating local wisdom into curricula to strengthen sustainable and rights-based citizenship in Indonesia.

Ultimately, the significance of *Subak* extends beyond its historical role as an indigenous irrigation system. It offers a transformative perspective on how local wisdom can address contemporary global challenges through values that have been practiced for generations. As countries strive to achieve sustainable development while protecting human rights and preserving cultural diversity, *Subak* demonstrates that traditional knowledge remains highly relevant in shaping resilient and inclusive societies. By positioning local wisdom at the center of civic education, Indonesia can strengthen a generation of citizens who are not only knowledgeable about democratic principles but also committed to environmental stewardship, social justice, and collective responsibility. Therefore, *Subak* should be recognized not merely as a cultural heritage of Bali, but as an educational and civic model capable of inspiring sustainable citizenship at both the national and global levels.

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