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## Application of Ecovillage for the Redevelopment Strategy of Rural Communities in Taiwan. A Case Study of Jianguo Military Dependents' Villages

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# Application of Ecovillage for the Redevelopment Strategy of Rural Communities in Taiwan. A Case Study of Jianguo Military Dependents' Villages

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**Abstract.** Agriculture in Taiwan is facing challenges of issues related to industrial pollution, ground subsidence, agricultural safety as well as rural regeneration. Yunlin County has among the highest output of agricultural products in Taiwan. To achieve “Taiwan agricultural technology corridor” policy, Yunlin County promoted sustainable development model for creative water and energy saving agriculture and low-carbon environment by hosted the 2013 “Agricultural Expo.” Jianguo military dependents’ village, located nearby the Agricultural Expo Ecological Park, is the representative agricultural military dependents’ village in Taiwan which is evaluated to be redeveloped. Previous studies approved sustainable development was benefited with residents. Relative literatures indicated that imported brought positive effects for local redevelopment. This study, therefore, reviews the relevant literature on eco-village, and proposes a redevelopment strategies framework for eco-village based on that review and a two-stage questionnaire administered to experts. The first stage utilized the Fuzzy Delphi Method, which focuses on impact factors, and the second, the Analytical Network Process Method, deals with performance factors. The results indicate that the key impacts on the ecovillage redevelopment strategies for Jianguo military dependents’ village were (2.1) water and energy efficiency, (2.2) community symbiosis, and (2.3) cultural preservation. Water recycle, energy saving, and agricultural technology are the most important criteria for eco-village redevelopment strategies of Jianguo military dependents’ village.

## 1. Introduction

Agriculture in Taiwan is facing challenges of issues related to industrial pollution, ground subsidence, agricultural safety as well as rural regeneration. Yunlin County has among the highest output of agricultural products in Taiwan. On the other hand, Yunlin County suffers from trend of youth population outflow and aging in rural area seriously.

The government in Taiwan announced to build a "golden agricultural corridor" in areas suffering from land subsidence in central Taiwan to solve the problem of land subsidence in the region. The policy aims to make farming in this area more water-conservative and energy-saving to deal with the over-pumping of underground water in the region. Yunlin County promoted sustainable development model for creative water and energy saving agriculture and low-carbon environment by hosted the 2013 “Agricultural Expo” which promoted the environmental quality and agricultural development in rural areas. The major goals of these actions are to satisfy residents’ living demand simultaneously on economic and environmental improvement. However, challenges remain, including the question of



how to promote systematic endeavours, both in policies or research on aging, and how to encourage greater involvement of nongovernment organizations in the rural revitalization issue [1].

According to relative researches, the concept of ecovillage provides rural community redevelopment strategies to integrate ecology, social, culture and economy aspects. In order to investigate success factors behind rural revitalization, this study explores a project in Jianguo military dependents' village [2]. located nearby the Agricultural Expo Ecological Park, is the representative agricultural military dependents' village in Taiwan which is evaluated to be redeveloped as a demonstration of ecovillage.

## **2. Literature Review**

Robert and Dianne Gilman (1991) defined ecovillage: an intentional community, which is human-scaled, full-featured, harmlessly integrated with nature, supports healthy human development and is sustainable [7]. Previous researches indicated the rural ecological environment protection, economic sustainable development and eco-village construction need to be explored. Top -down approaches of rural community redevelopment typically focus on government policy and legislation for public investments. Bottom-up approaches generally focus on social movements and civil society directing their actions toward sustainable development. Ecovillages are consciously designed through locally owned, participatory processes in ecologic, social, cultural, and economic dimensions of sustainability to regenerate their social and natural environments [3][4].

### *2.1. Ecology*

Ecovillages allow people to experience their spiritual connection to the living earth. They provide for their daily needs-food, shelter-while respecting the cycles of nature, which include water recycle, energy saving, and new agricultural technology.

### *2.2. Society*

Ecovillages are communities in which people feel supported by and responsible to those around them. Ecovillages provide a deep sense of belonging to a group which include participants' self-identity, social value, community participation, and local organization operations.

### *2.3. Culture*

Ecovillages have a particular significance for the prospect of cultural transformation on a larger scale offering concrete demonstrations of both a different way of life and the lived embodiment of a holistic worldview which include preservation of cultural heritage, cultural values, and promotion of cultural activities.

### *2.4. Economy*

Ecovillages demonstrate a unique economic dimension to generate income not only through products and services but also improvement of every participant in the communities which include local brand marketing, satisfaction of tourists' requirements, local industrial development, and environmental improvement.

## **3. Research Methods**

This study aims to contribute to local-redevelopment policies and strategies by arriving at a clearer picture of ecovillage redevelopment strategies, with particular reference to local government and non-governmental organizations in the Jianguo Military Dependents' Villages. Based on the foregoing review of the relevant literature on ecovillage and rural redevelopment strategies, its research approach was divided into two main phases. First, using the Fuzzy Delphi Method (FDM), experts were invited to answer questionnaires on ecovillage redevelopment strategies indicators; and second, having summarized the indicators arrived at in the first phase, it adopted the Analytical Network Process Method (ANPM) to base a local-redevelopment strategy around Jianguo Military Dependents' Villages [5]. The ANPM was created to provide interdependency and feedback in response to a broad range of

decision-making problems in the real world. In contrast to the analytic hierarchy process (AHP), it has a decentralized pattern similar to that of the Internet, and its goal is to foster optimal decisions via internal interdependence among all goals, criteria, and plans through the use of ratio scales.

This study, through a review of rural revitalization literature related to ecovillage development, explores the framework of the interview issues, which is mainly conducted via in-depth interview, in order to understand the current situation of the planning strategies. This study used in-depth interviews to collect data that cannot be obtained from secondary sources. While purposive qualitative research samples are not representative of a whole group, they are nevertheless the best source of abundant, in-depth, first-hand information about the real-world experiences of the members of a pluralistic society. Semi-structured interviews can also be applied to obtain detailed answers to similar questions. In this method, the interviewees respond using standardized words and in a standard order, facilitating rapid and straightforward organization, comparison, and analysis of all the respondents' answers. Based on a review of the relevant literature, a preliminary interview framework and context was developed, and interviews were conducted. Based on the results of our pilot interviews, the structure and content of the interview protocol were revised slightly.

#### **4. Research Object: From Abandoned Military Dependents' Village to Ecovillage Demonstration**

Military Dependents' Village is a unique cultural landscape in Taiwan. The original purpose of these buildings was to serve as provisional housing for soldiers and their dependents after the Government from Mainland China retreated to Taiwan in 1949. Some of the military buildings suitable for living in the Japanese troops' war readiness ruins in Taiwan were converted into military houses. These settlements were designed to integrate the family experience with the military experience for the soldiers. A unique subculture was created with the cultures from various Chinese homeland [6].

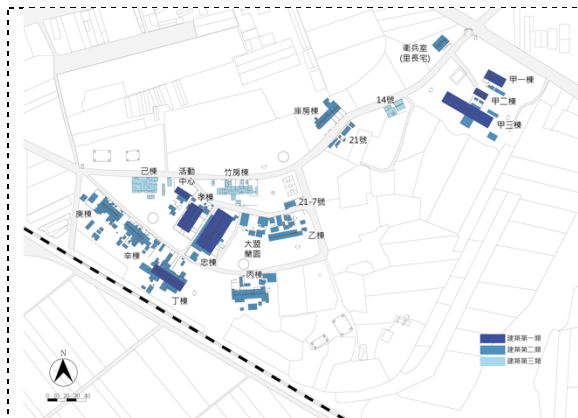
Jianguo Military Dependents' Villages in Huwei, Yunlin County were built in 1943 under Japanese colonization. After World War II, military family-built extensions into the original buildings and organically transformed to liveable space. Jianguo Military Dependents' Villages were related to the Japanese troops' war readiness relics in Taiwan were preserved in the name of "military housing community culture preservation". The Japanese colonial war-remnant facilities intended for residential use by the military housing communities had the dual identity of "relics" and "military housing community". Jianguo Military Dependents' Villages were scattered villages and village I and village II were preserved to be cultural heritages, since village III transformed as an elementary school and village IV are now a prison (see the figure 1.2.3.4.). The condition of unique culture and rural agricultural environment provide the opportunity for Jianguo Military Dependents' Villages to redevelopment as a ecovillage demonstration in Taiwan.



**Figure 1.** status of Jianguo Military Dependents' Villages I



**Figure 2.** status of Jianguo Military Dependents' Villages II



**Figure 3.** Configuration diagram of building level classification of Jianguo Military Dependents' Villages I



**Figure 4.** Configuration diagram of building level classification of Jianguo Military Dependents' Villages II

The research objective is to conduct a research on changes in the space and use pattern of “ruins of military housing villages” in order to explore the evolution of how residents in Taiwan used different types of Japanese colonial war-remained facilities and converted them into living spaces during the military housing community period. For redeveloping with ecovillage strategies, the research scope was extended to the correlation of the evolution of the space of the ruins of military housing communities, the 39 retained buildings, and agricultural environment [8].

## 5. Conclusion and Discussion

### 5.1. Analysis of the FDM Questionnaire Results

The FDM is a stepwise problem-solving procedure. This study constructed a hierarchical structure of 3 dimensions and 9 impact factors of ecovillage redevelopment. 12 questionnaires of experts were analysed to verify the impact factors of ecovillage redevelopment. All of this study's FDM items were scored from 0 to 10; the higher its score, the more important an influence factor is, according to the expert's individual professional experience. A threshold value of 6 was set as the pass score, and the remaining factors below the threshold of 6 were deleted. The results are shown in Table 1.

**Table 1.** The impact factors of ecovillage redevelopment

Objective	Dimension	Impact Factor	Expert Consensus Value (Gi)
Ecovillage Redevelopment	Water and Energy Efficiency	Water recycle	8.9167
		Energy saving	9.0833
		Agricultural technology	8.5000
	Community Symbiosis	Resident identification	8.1667
		Community participation	8.1667
		Local organization operations	7.3333
	Cultural Preservation	Preservation of cultural heritage	8.0833
		Presentation of cultural values	7.3333
		Promotion of cultural activities	7.0833

### 5.2. Analysis of the ANPM Questionnaire Results

This study proposes a taxonomy model that applies ANPM to a specially designed questionnaire. In this phase of the study, a total of 9 expert questionnaires were collected. After passing the consistency check, all were deemed valid. Finally, we present the weights for ecovillage redevelopment. The multi-criterion decision software. The geometric averaging method was used to arrive at the experts' relative importance of each indicator. The ranked weights of Water and Energy Efficiency, community symbiosis, cultural inheritance, and regional revitalization are shown in Table 2. Water and energy efficiency (weight 0.4107) was again found to be the most important, followed by community symbiosis (weight 0.3436), and cultural preservation (weight 0.2457).

**Table 2.** The dimensions ranked by weights

<b>Dimension</b>	<b>Weight</b>	<b>Ranking</b>
Water and Energy Efficiency	0.4107	1
Community Symbiosis	0.3436	2
Cultural Preservation	0.2457	3

### 5.3 Discussion

This study sought to provide insights of redevelopment of Jianguo military dependents' villages via the Fuzzy Delphi Method and indicated economy dimension are relatively unimportant in the planning stage since public investment fund provided reconstruction costs. Thus, the major issue is how to integrate ecology, community, and culture and establish a platform for the interactions between dimensions of ecovillage redevelopment for achieving sustainable community development of military dependents' villages in Taiwan.

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