

Evaluation Indicators and Development Strategies of Agricultural Revitalization for Rural Rejuvenation

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Abstract: The goal of rural rejuvenation is to establish newly regenerated rural villages via economic development and beautification. However, it is necessary to engage agriculture in rural areas as a basis to reach the goal. In order to effectively promote agricultural development, the objective of this study is to develop the related indicators as evaluation criteria. A modified Delphi method is applied to develop the questionnaire. The indicators are divided into two categories: requirement and implementation evaluation indicators. This implies indicators in both sides should be considered simultaneously for effectively promoting agricultural development. There are four dimensions, consisting of twelve items, which are included in requirement indicators. The four dimensions are to (1) activate agricultural production (2) to promote agricultural marketing (3) to construct the distinguishing features of rural life and culture, and (4) to develop leisure agriculture and rural village experiences. The implementation indicators are comprised of five dimensions including 21 items. The five dimensions are (1) community factors (2) human resource factors (3) local resource surveys (4) environmental and facilities planning, and (5) government subsidies and guidance. To determine the relative importance sequence of the target evaluation indicators, the fuzzy analytic hierarchy process (FAHP) is applied to calculate the weight for each item. Then, the quality function development method (QFD) is adopted to explore the relative importance sequence of implementing indicators. Based upon the important items of evaluation indicators, this study proposes the development strategies recommended for the agricultural authority.

Keywords: Rural rejuvenation, agricultural revitalization, evaluation indicators, fuzzy analytic hierarchy process, quality function development method.

1. INTRODUCTION

Rural villages in Taiwan are gradually showing signs of economic decline such as aging population, depopulation, and sluggish industry performance. In order to revitalize rural villages, the government authority promulgated The Rural Rejuvenation Act in August, 2010. According to the first article, the goal of the act is to improve the fundamental infrastructure for agricultural production, to preserve rural ecology and culture, to upgrade the quality of life, and to create a newly regenerated rural village with affluence and beauty. In order to enhancing revitalization of villages, residents of rural communities are encouraged to propose a bottom-up regeneration plan. Moreover, a fund of 150 NT billion for rural revitalization is dedicated to assist the village in reaching the goal of constructing of new rural villages, (Rural Rejuvenation Act, 2010).

This fund from government is able to create a rural village's beautiful facade in a short period of time without much of a problem. However, to maintain the appearance of a rural village depends on sustainable economic prosperity. Surface beauty¹ is not able to be

continued without sustainable economic prosperity. Therefore, it is imperative to revitalize rural villages and improve their economic outlooks, by defining how best to increase the well-being of local residents. According to article 14 of The Rural Rejuvenation Act, the governmental authority is allowed to subsidize industrial revitalization. However, the subsidy is restricted to agriculture related industries. In other words, with agriculture as the main focus, the three dimensions of rural revitalization are production, quality of life, and ecology; relating to outputs of primary, secondary, and tertiary industrial sectors, such as agricultural products, processed agricultural products, rural life and ecology, and experiencing rural culture for example. All products are related to the agricultural industry; therefore, in order to revitalize rural villages, we have to take care of all three dimensions to integrate all related fields of rural revitalization. For example, those might include such as rural migration and manpower training (Stockdale, 2006), rural building renovations (Zavadskas and Antuceviciene, 2007), rural landscape and ecological structures (Meurk and Simon, 2000; Bonaiuto, *et al.*, 2003), and related corporations (Zografos, 2007). Thus, to propagate rural revitalization, a bottom-up community input approach to rural rejuvenation is used to plan the future of revitalized agriculture in order to achieve the goals (Rodela, 2010). Regarding rural revitalization, we learn that agricultural revitalization in rural villages is linked to many disciplines and subjects per the literature.

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¹Surface beauty refers to facilities such as buildings without a proper management.

Therefore, without a related evaluation index as a base, plans to revitalize rural villages may not be effective or are conducted inefficiently. This index has to be built in the early stage of rural vitalization. According to our best knowledge, few literatures are regarding with the creation of such an index. Therefore, this study is of significance.

The strategy for the revitalization of rural villages is a bottom-up approach, meaning, community has a stake and input to the process, facilitated by qualified leadership and proper planning. To achieve the implementation of rural rejuvenation, residents in rural villages have to attend training. The program is a progressive curriculum designed to train villagers that includes four progressive stages within 92 hours. Generally, the implementation of a rural rejuvenation plan is focused on the training of residents. The main purpose is to achieve a consensus in order to provide environmental improvement. Further additional goals include improving infrastructure such as soil and water conservation, drainage facilities, and landscaped public areas.

Based on the above discussions, the implementation of rural rejuvenation has to consider two dimensions: the needs from the requirement side and the provisions from the implementation side. Therefore, the evaluation indicators of rural revitalization have to reflect the needs from the agricultural sector with provisions for appropriate implementation. The implementation indicators of agricultural renewal include different dimensions such as community factors and local resources. The requirement indicators mainly consider items that citizen's needs. How to converting the resident's requirements and needs to the appropriate strategies (policies) to implement agricultural revitalization is the most important issues in the planning process. The purpose of this research is to identify the related indicators as evaluation criteria for rural rejuvenation. Therefore, this research uses a modified Delphi method to discuss the items among the indicators and employs the fuzzy analytic hierarchy process (FAHP) to derive the related weights of all items required in agricultural revitalization. Then, the application of quality function development (QFD) is used to explore the relationship between required and implementation items in agriculture revitalization to identify the priority of implementation items. The results of this research can be useful for governments in the process of implementing the rural rejuvenation plans.

2. DESIGN OF RESEARCH

2.1. Analytic Hierarchy Process and Quality Function Deployment

2.1.1. Fuzzy Analytic Hierarchy Process

Analytic hierarchy process (AHP) is a multi-principle decision method developed by Saaty (1980). This method transfers subjective perception to objective decisions, by quantifying pair-wise comparison. This method has been gradually applied to different fields of social science due to its objectivity. However, the pair-wise comparison in AHP causes problems of semantic fuzziness. Therefore, Laarhoven and Pedrycz (1983) developed an adjusted method called fuzzy analytic hierarchy process that uses an interval scale rather than a point scale. Then, they use a questionnaire for professionals to conduct empirical analysis regarding subjective issues such as the order of proceedings, distribution of resources, and the levels of importance. This method is stricter in measuring professionals' semantics; hence it has been used in many research works (Cheng *et al.*, 2011; Vanegas and Labib, 2001; Fung *et al.*, 2006; Wang, 1999; Kim *et al.*, 2000; Shen *et al.*, 2001). In addition, the major problem of the Analytic Hierarchy Process is that it is hard to keep consistency if there are involved many evaluation indicators in one hierarchy level. FAHP solves this problem of AHP. There are many evaluation indicators in this research. Therefore, Fuzzy Analytic Hierarchy Process is used.

This research uses a 9 interval fuzzy linguistic scale collected from questionnaires. Conducting a fuzzy transformation by triangular fuzzy numbers, we then employ defuzzication with $\alpha = 0.5$ and normalize the fuzzy weights to achieve the weights of the indicators. Finally, series of hierarchical is used to obtain fuzzy weight values of indicators.

2.1.2. Quality Function Deployment

QFD was initially proposed in the 1960s by Japanese companies in order to understand customer needs and demands as they relate to manufacturing toward the improvement of production technology. Because this method both considers demand and supply side technologies, it is quite practical then to be gradually applied toward research within various fields such as assessing service quality improvement plans or product quality attributes (Ansari and Modarress, 1994; Graessel and Zeidler, 1993; Murgatroyd, 1993). Some researches combined QFD with AHP in various fields (Weng *et al.*, 2009).

Regarding public administration, Ocampo Jimenez and Baeza Serrato, (2016) used quality function deployment method in the planning process of a municipal administration in rural development directorate of the Moroleón City, Mexico. In their research, QFD method was used to improve the service according to farmers' latent needs and expectation.

Schillo, and Shakiba, (2017) used Quality Function Deployment method to develop biofuels policies based on stakeholders interests. In this research, the stakeholders include NGO, government, end user, and biofuel producers. The interests are different for different stakeholders. Therefore, each state holder's interest is assigned a weight. After the link between stakeholders' interests and policies are assigned, the relative importance of policy is determined. Although much of the existing research literature is related to both methods, there is currently no application in the field of agriculture revitalization. This study intends to use FAHP and QFD to develop indicators in order to assess technology in the implementation of agricultural revitalization. This QFD framework encompasses targeting the demand side, the technique of implementation, the relationship matrix, and priority of technical improvements.

In this research, the targeted objectives are set to be requirement index of agricultural revitalization. The weights of items in indices are estimated by the FAHP method. Then, these weights are applied to a QFD table. The technique of implementation regarding the indexing of items is needed to achieve the goal of agricultural revitalization.

2.2. Proposal of Requirement Indicators of Agricultural Revitalization

The revitalization of rural villages has raised public concern. However, the related discussions are wide spread in different literature, where the content, in general, regards agricultural production, rural living, and ecological issues. Research regarding rural planning (Chou, 2010; Chen, 2011) are also concerned with the indicators of agriculture revitalization. However, those literatures do not develop an indicator that is able to cover the whole picture of agricultural revitalization. Thus, before conducting FAHP, by considering relevant literatures such as Chou, (2010) and Chen, (2011), interviewing 18 experts and conducting field exploration, this research suggests that the evaluation of agriculture revitalization should

consider four dimensions including: revitalization of agricultural production (A1), enhancing agricultural marketing (A2), enhancing rural living and cultural features (A3), and developing leisure agriculture and rural village experiences (A4). These items are related to the well-being of residents.

In order to revitalize agricultural production, a healthy environment inclusive of agricultural roadways, waterways, and appropriately sized farmlands are needed initially. Then, the improvement and extension of production technology would be helpful to increase production quality and reduce costs. Furthermore, local agricultural production characteristics are used to develop unique and valued agricultural products in order to capitalize on market segmentation toward competitively positioning goods. Moreover, developing related products or souvenirs to create value added revenues are in the best interests of the producers and industries within the rural village.

Without a well-designed agricultural marketing system, even a perfect production system is not able to help producers to improve their profits. An effective marketing system has to develop long-term marketing channels and consumer loyalty in order to bring stable benefits to farmers, in addition to efficient logistical chains. Due to the scale of production being small in rural areas, it is necessary to pool farmers and residents toward establishing agricultural marketing organizations. Because of the advances in information technology, an internet sales platform can be built to sell the agricultural products, for improving marketing effectiveness; the development of regional brands for local signature agricultural products is another means to differentiate within the marketplace. Nevertheless, appropriate packaging and promotion are used to improve brand value. Further, we note that the marketing processes of products from industries in rural villages have to be appropriately integrated in order to obtain a positive net effect. An over flooding of brands will confuse consumers while the effects of branding will become unobservable. In order to enhance local food marketing, channels for local agricultural production such as farmer's markets and sales centers have to be developed in order to attract visitors to improve the sale of local products.

When the life and culture characteristics of rural areas can be engendered, the visibility and stories of local specialty agricultural products will be enriched. Furthermore, marketing develops deep rural tourism and activities that encourage the local sales of

specialty agricultural products. Therefore, a proper maintenance of the rural landscape should be kept in order to highlight the quality of the environment and the unique characteristics of rural life. This will not only attract tourists, but also help to attract young people back to an active rural economy. With the development of urbanization, the rural culture and unique festivals often served as an important feature to attract tourists from metropolitan areas or abroad. Most rural culture and festivals are closely associated with agricultural activities. Therefore, when rural villages could be developed with cultural and creative aesthetics, it will be helpful to increase the attractiveness of local produce and thus bring business opportunities. The unique culture and rural festivals do help to increase the number of tourists. In addition, many rural food or handicrafts often have their own unique qualities. They often fit into a niche market with a high profit margin. So if local rural cuisines are best promoted, higher added values are generated.

Local agricultural production, tied to rural life and culture as a foundation, combined with a natural landscape and ecology increases desirable tourism services and activates, such as with leisure agriculture and rural experiences. With the rapid development of rural tourism, opportunities for one day family and group trips increase, for example fruit picking or cultural tours. In addition, B&B² are also available for development to experience the rural landscape and local life. Leisure agriculture and the promotion of rural experience activities will help to increase spending by tourists and create jobs. Furthermore, to enhance the value of leisure agriculture and rural experiences, we need appropriate tour guides to highlight the uniqueness of rural tourism associated with agricultural production, living and ecological, and to promote a feeling of satisfaction or value for tourists. In order to facilitate tourist travel, an interactive information network platform for online searching and planning related tourist itinerary should be built.

Summarized above, regarding indicators of activating agricultural production, this study proposes three facets including: improvement in the environment of agricultural production (A₁₁), extension and improvement of production technology (A₁₂), and the development of local value added agricultural products, processed products, and souvenirs (A₁₃).

Regarding indicators of promoting agricultural marketing, this study proposes three facets including: the construction of a network marketing organization and marketing platform (A₂₁), the development of local brands and industry-integrated marketing (A₂₂), and the development of channels for local agricultural products (A₂₃).

Regarding indicators of creating rural life and culture, this study proposes three facets including: improving the quality of life in rural areas (A₃₁), developing characteristics of rural culture and festivals (A₃₂), and developing unique local food and souvenirs (A₃₃).

Regarding indicators of development of leisure agriculture and rural experiences, this study proposes three facets including: the promotion of B & Bs (A₄₁) and memorable experiences (A₄₂), the development of leisure agriculture and rural tourism, and the hiring/training of rural tour guides as well as the development of interactive information networks (A₄₃).

2.4. Proposal of Implementation Indicators of Agricultural Revitalization

To reach the goal of agriculture revitalization in rural rejuvenation, the supports from implementation side are needed. In other words, without appropriate rural rejuvenation-related practices, the plan of agricultural revitalization is only a dream. In order to effectively execute the plan of rejuvenation of rural agriculture to achieve the goal of revitalization, it is needed to explore the relevant implementation of indicators. These indicators are reflected in the rural rejuvenation implementation manual published by water conservation bureau, council of agriculture and its website for rural rejuvenation implementation instructions and examples, (Soil and Water Conservation Bureau). Together with surveying professionals of actual implementation (including agricultural officer), these items can be categorized onto five dimensions including: community factors (B₁), human factors (B₂), local resources surveys (B₃), environmental and facilities planning (B₄), government subsidies and guidance (B₅). This means that the implementers of agricultural revitalization for rural rejuvenation need to consider the three basic dimensions of community, labor, and local resources, coupled with all appropriate planning assistance from government to be fully actuated. Plainly, in order to reach the goal of rural regeneration, rural communities have to be integrated and equipped with enthusiastic

²bed and breakfast.

labor, abundant and diverse local resources, together with an appropriated planning of environment and facilities. Moreover, government has to provide guidance and fund needed.

Regarding community, residents have to be able to recognize and participate in community activities. Residents having the collective consciousness and a sense of belonging are willing to make greater efforts for the community and be involved in the implementation of positive changes. Residents may have different opinions and ideas regarding how to promote rural agricultural revitalization and therefore need to collaborate with facilitation in order to reach a consensus. If community residents have the same goals, related improvement programs are able to be successfully implemented. In order to efficiently promote the related improvement programs, community-based organizations should be engaged or established to face the problem or benefit as a starting point. The organization should be organized into a large scale collection of cultures to remove obstacles, develop community potential, and create the overall interests of the community. In other words, the programs of environmental or industrial development to promote community engagement, lacking due process and facilitation, are difficult to be managed and implemented. Based on this, indicators of the community factor can be divided into community-consciousness (B₁₁), recognition and participation of residents (B₁₂), community integration (B₁₃), community organizations (B₁₄), and community meetings (B₁₅).

Regarding the labor/volunteer factor, within environmental or community programs to promote agricultural revitalization or community organization, appropriate leadership is in critical. Leadership characteristics are important not only for being able to earn and maintain the trust of community residents, but also capable of creating idea, bringing image, and with firm perseverance and endurance to contribute to the implementation of the relevant revitalization programs. Additionally, in recent years, the aging of rural communities is becoming a serious problem; recruiting and/or maintaining the youth population within or to rural villages is needed. This requires fostering within the youth, a sense of belonging to rural communities, developing positive hopes and expectations for the future, and participation in relevant industrial and agricultural activities to enhance the vitality of rural areas. It is inevitable that there will be a number of things that are in determinative for regeneration program. Therefore, relevant consultants who provide

professional services are needed to help solve related problems. Furthermore, rural residents, leaders, and young workers understandably often lack vital experience, agriculture-related knowledge, and/or skills to implement rural rejuvenation. Consequently, the associated labor/volunteer training activities also are needed to improve agricultural productivity. Based on the above analysis, the facets of labor/volunteerism can be divided into characteristics of leadership (B₂₁), youth involvement (B₂₂), consultants (B₂₃), and training (B₂₄).

Pertaining to local resources surveys, to develop and promote agriculture revitalization programs for rural rejuvenation, at the start, we have to become aware of the relevant local resources, which cover agriculture and related industries, culture and environment. An agricultural resource survey is conducted in order to understand local land use and agricultural production profiles, especially the community's feature agricultural products. In addition to agriculture in rural areas, there are other related industries often associated with agricultural production, such as processing, leisure agriculture, food and beverage, manufacturing, etc. Greater abundance in related industries promotes greater diversification of agricultural development. Agricultural production activities, in rural areas, are often accompanied by related developments, such as building facilities and non-physical historical and cultural entities, etc., among which, unique cultural and creative industries, such as arts promotion and public facilities are integrated to help revitalize agriculture. In addition, rural areas also hold a variety of natural resources such as plants, animals, mountains, rivers and so on, which are inextricably linked with agricultural activities, these natural assets are an important foundation for the sustainable development of agricultural revitalization. Based on above, the local resource survey indicators can be divided into the agricultural resource survey (B₃₁), related industries survey (B₃₂), cultural resources survey (B₃₃), and natural resource survey (B₃₄).

Addressing environmental and facilities planning, according to the characteristics of rural communities and local resources, land use planning will help for a better allocation and utilization of rural land and agricultural land. Furthermore, land use planning can contribute to a more comprehensive rural village and can enhance the efficiency of agricultural production. Conducting rural planning will inevitably need some public facilities, which often involves public or private land. If public land for facilities cannot be successfully

attained, then the integrity of rural planning and its outputs are more difficult to maintain. Furthermore, at the time of rural planning, landscape design-related facilities required to consider the practicality and aesthetics, to be associated with local cultural and natural resources to create unique rural landscape to improve the quality of life of residents and even initiate rural tourism. Good land use planning and landscape design, without sound environment and facilities maintenance, will not be able to continue in perpetuity to accomplish the intended functions. Poor planning, design, and maintenance of agricultural revitalization are factors of failure. Based on above, the indicators of environment and facilities planning can be divided into: land use planning (B_{41}), public facilities land use (B_{42}), facilities and landscape design (B_{43}), environmental and facilities maintenance (B_{44}).

Regarding government guidance and subsidies, agricultural renewal for rural rejuvenation are the joint efforts of community residents. In addition, the governments are still needed to provide guidance and subsidies. Due to manpower and funding often being more inadequate in rural communities, it's important explore the actual needs and capacity for local agricultural revitalization, while developing innovative proposal concepts to apply for program facilitation and implementation grants. Development of rural villages and agriculture requires adequate infrastructure, such as farm roads, drainage facilities, information networks, and so on. These still rely on government funding in order to be built. Furthermore, in order to attract young people, shaping the quality of the rural tourism environment and improving the quality of life of local residents have to be improved. This is especially so in the education, culture, health care, sanitation, supermarkets, and security sectors and are advised to be strengthened. To revitalize rural industrial activity, government has increased rural-related public investment, such as a set of garages, holiday markets, and so on, in order to stimulate the development of related industries and create more jobs. Based on this, indicators for effective government subsidy allocations can be divided into plan proposal (B_{51}), infrastructure (B_{52}), living function improvements (B_{53}), and public investment (B_{54}).

3. EMPIRICAL ANALYSIS

3.1. Analysis of the Requirement Indicators of Agricultural Revitalization

According to the proposed agricultural revitalization objective indicators, an expert questionnaire is

designed, after a pilot survey with related experts. Questionnaires are sent to the experts such as academics, agricultural officers, rural rejuvenation specialists, and rural cadres. Then, applying the FAHP method, we find that the calculated level of consistency ratio (CR) is less than 0.1 and that the overall hierarchy of consistency ratio (CRH) is also less than 0.1. This indicates that the judgments of questionnaire respondents are consistent. Therefore, the calculated weights of the dimensions and their items are reliable.

As the results show in Table 1, among the weights of the four dimensions for agricultural revitalization, revitalization of agricultural production is the highest (0.318), followed by promoting agricultural marketing (0.308), then creating a rural life and culture (0.205), and finally, developing leisure agriculture and rural experience. (0.169). Based on this, it indicates that experts still believe that agriculture should be reactivated as a priority in production simply because agricultural production is the base of all agricultural activities. Furthermore, promoting agricultural marketing is also significantly important, which implies that the production and marketing should be coordinated. Developing of leisure agriculture and rural experience is relatively low in importance; this implies that each rural area may not be suitable for leisure agriculture and that agricultural revitalization requires careful consideration of this dimension. It is better to review local leisure conditions and characteristics in order to phase it in successfully, wishing to develop leisure agriculture in rural areas.

Among the requirement indicators of agricultural revitalization, the first six important items are development of local brand and industry-integrated marketing, improvement of agricultural production environment, development of local agricultural products, processed products, and souvenirs, construction of a network marketing organization and marketing platform, extension and improvement of production technology, and improving rural living conditions and creating specialties. This supports that marketing integration of rural industries and the establishments of local brands are the primary goals in agricultural revitalization. The next improvement of the production environment should cover proper hardware and software implementation. Furthermore, the distinctive strategy for products should be explored. Moreover, improving the quality of life in rural areas and creating specialties for rural life also need much attention. Based on those indicators there are two important implications here. Firstly, that good

Table 1: FAHP Analysis of the Requirement Indicators of Agricultural Revitalization

Dimensions	Weight	Priority	requirement indicators	Weights within group	Priority within group	Overall weights	Overall priority	Consistency
Revitalization of agricultural production(A ₁)	0.318	1	Improvement of agricultural production environment (A ₁₁)	0.361	1	0.115	2	0.014
			Extension and improvement of production technology environment (A ₁₂)	0.311	3	0.099	4	
Promoting agricultural marketing(A ₂)	0.308	2	Development of local agricultural products, processed agricultural products, and souvenirs (A ₁₃)	0.328	2	0.105	3	0.011
			Construction of a network marketing organization and marketing platform (A ₂₁)	0.338	2	0.105	3	
Creating a rural life and culture(A ₃)	0.205	3	Development of local brands and industry-integrated marketing industry (A ₂₂)	0.465	1	0.144	1	0.003
			Development of channels for local agricultural products (A ₂₃)	0.197	3	0.060	7	
			Improving rural living conditions and creating specialties (A ₃₁)	0.477	1	0.098	5	
			Developing characteristics of rural culture and festivals (A ₃₂)	0.367	2	0.075	6	
Developing leisure agriculture and rural experience(A ₄)	0.169	4	Developing local food and souvenirs(A ₃₃)	0.156	3	0.032	10	0.002
			Promotion of B & Bs and life experiences (overnight) (A ₄₁)	0.295	3	0.049	9	
			Development of leisure agriculture and rural tourism (one day trip) (A ₄₂)	0.360	1	0.060	7	
			training of rural tour guide and development in interactive information network, etc. (A ₄₃)	0.345	2	0.058	8	

Table 2: QFD Analysis of Objective and Executive Indicators of Agricultural Revitalization

Items	objective indicators																						
	B ₁				B ₂				B ₃				B ₄				B ₅						
subjective indicators	B ₁₁	B ₁₂	B ₁₃	B ₁₄	B ₁₅	B ₂₁	B ₂₂	B ₂₃	B ₂₄	B ₃₁	B ₃₂	B ₃₃	B ₃₄	B ₄₁	B ₄₂	B ₄₃	B ₄₄	B ₅₁	B ₅₂	B ₅₃	B ₅₄		
A ₁₁	4	4	4	4	4	5	4	4	4	5	4	4	5	5	4	4	4	5	5	4	4	4	
A ₁₂	4	4	4	4	2	4	5	5	5	5	4	3	4	5	3	2	3	5	5	3	2	2	2
A ₁₃	4	5	5	5	1.5	5	5	3	4	5	4	4	4	3	1.5	2	1	4	4	1	2	3	3
A ₂₁	4	4	4	4	3	5	5	3	5	4	3	3	3	2	0.5	1.5	0.5	5	5	0.5	0.5	5	5
A ₂₂	5	5	5	5	4	5	5	5	5	4	4	5	4	3	0.5	2.5	1.5	5	4	4	3	5	5
A ₂₃	5	5	5	5	5	5	5	5	4	4	4	4	4	4	4	5	4	5	4	4	4	5	5
A ₃₁	5	5	5	5	5	5	4	4	4	4	5	5	5	5	5	5	5	5	5	5	5	5	5
A ₃₂	5	5	5	5	5	5	4	4	4	4	4	5	4	4	4	5	5	5	5	5	5	5	5
A ₃₃	4	4	4	4	4	5	5	3	4	5	4	4	4	3	3	4	3	4	4	4	4	5	5
A ₄₁	4	5	5	5	4	5	4	4	4	3	4	5	5	4	4	5	4	4	4	5	5	4	4
A ₄₂	4	4	4	4	4	5	4	4	4	4	5	5	5	4	4	5	5	4	4	4	5	4	4
A ₄₃	3	4	4	4	3	5	5	5	5	4	5	5	5	3	1	5	4	5	3	4	4	5	5
Weight of importance	4.319	4.53	4.53	4.53	3.549	4.901	4.603	4.111	4.406	4.302	4.119	4.280	4.275	3.763	2.659	3.514	3.06	4.754	3.498	3.363	4.269		
priority	6	4	4	4	14	1	3	12	5	7	11	8	9	13	19	15	18	2	16	17	10		

environmental quality of rural life and revitalization of agricultural production and marketing are able to retain or attract young people to rural employment. Secondly, if agricultural marketing were to be based on rural characteristics, the story of agricultural products could be told to increase sales.

3.2. QFD Analysis of the Implementation Indicators of Agricultural Revitalization

The QFD analysis of implementation indicators investigates the correlation between requirement indicators and implementation indicators of agricultural revitalization. By this analysis, the relative importance of indicators or their priority can be recognized to grasp more important indicators to help achieve the agricultural revitalization goals. The correlations of these two indicators are involved with the implementation, and are concerned with professionals in practice. Thus, this study sent the questionnaires to agricultural officers and consultants responsible for the implementation of agricultural revitalization. Implementation indicators and requirement indicators of agricultural revitalization are listed as mentioned. The correlation between the two indicators for each item, if no correlation, it is set to 0; in the case of low correlation, it is set to 1; for moderate correlation, it is set to 3; in the case of indicators being highly correlated, then it is set to 5. Three completed questionnaires were received and used to develop the relationship matrix between implementation indicators and requirement indicators. Then, we use the weighted average of the coefficients of correlation between each item in implementation side and items in requirement side to determine its prioritization by using the overall weights from Table 1. Based on this, the prioritization of indicators is determined. The results are listed in Table 2. For example, in Table 2, weight of B11 can be calculated by the following:

$$0.115*4+0.099*4+0.105*4+0.105*4+0.144*5+0.060*5+0.098*5+0.075*5+0.032*4+0.049*4+0.060*4+0.058*4=4.319$$

The first priority in executive indicators is characteristics of leadership. Different characteristics of leaders will create different organizational cultures. Leadership characteristics are very important in all types of organization. It also plays an important role in the promotion of agricultural revitalization. The next indicator is plan proposal. The promotion of agricultural revitalization requires a good plan. Based on an effective plan, agricultural revitalization is able to

progressively reach the goal. The third important indicator is youth involvement. This means that youth have a very important role in the implementation of agricultural revitalization. The rural society has more vitality with an engaged youth population and there is no future to self-sustain without them. The fourth important indicator has three items: reorganization and participation of residents, community integration, and community organization. Without considering the integration of community, even the best plans cannot be easily implemented, as leaders or youth will find it more difficult to reach the goal of agricultural revitalization.

4. POLICY SUGGESTION: STRATEGIES FOR AGRICULTURAL REVITALIZATION

Based on the aforementioned empirical results, the more important items of requirement and implementation indicators were shown. Development strategies of agricultural revitalization will be proposed and discussed in this section.

4.1. Promote Integrated Marketing Coupled with Agricultural Production and Rural Life

The importance of an agricultural product's connotation lies in a strategic rural life with a story to tell. Strategic agricultural products are exquisite renderings of agricultural production, which receive the trust of consumers, especially pertaining to their safety, health, quality, and so on. A rural life with a story can enhance agricultural marketing themes to increase the attractiveness of agricultural products and strengthen consumers' willingness to buy.

4.2. Deepen Rural Labor Training

To develop an agricultural revitalization plan, government guidance is needed. However, the key lies in rural labor. Although now some Non-Governmental organizations are available to assist developing related projects, if the plan is not fully render the main idea of the local agricultural revitalization, the results of implementation plan are afraid of the one that are don't expect. Furthermore, government should provide training courses or guidance for rural leaders (including cadres) and young farmers in writing the proposal.

4.3. Strengthen Community Participation, Integration, and Organization

Regarding implementation of agricultural revitalization, how to strengthen community

participation, integration and organization is also quite important. In other words, if the residents of the rural community cannot recognize and participate in the relevant revitalization plans, or if the views of community residents are not integrated into the process, then community is not likely to be organized. Community and organizations have interdependent relationships. If the community views can be integrated and residents are willing to participate, then it is easier to construct a sound community-based organization with which to promote the agricultural revitalization plan. Furthermore, the agricultural authorities may also provide incentive (including related counseling and evaluation) for promoting community participation and organization. This will increase contributions to promote the implementation of agricultural revitalization such as including pre-planning, planning, and continued maintenance by internal and external pressures from rural communities to enhance their vitality.

4.4. Integrate Plan Proposals of Agricultural Revitalization and Government Resources

To help rural revitalization, several different government ministries actively propose related projects. Because rural communities push for supporting from different government ministries, they often need to furnish extensive and numerous proposals. This raises two questions: (1) plans from different department of government, though each has its focus, are inevitably to have some similarities, so are in danger of duplication. Furthermore, owing to the lack of integration between different government ministries, a comprehensive community development planning is also lacking. Although government ministries tend to invest considerable resources, rural developments are in danger of becoming scattered. (2) In response to the requirements from government ministries, rural communities often slightly refurbish the same plan to fight for support from the different parts of government. Furthermore, the time limits for government ministries is short, this reflects the lack of an overall rural development plans across government agencies, especially in agricultural revitalization. It can be said that bottom-up or top-down programs need a further adjustment, especially in cross-community regional agricultural revitalization. Thus, proposals for rural rejuvenation plans and government resources should be combined with each other so that they become a whole. For example, rural villages have its communities and agricultural revitalization plan, including sources of funding to maintain their projects

after implementation of project. Government can set up an efficient single designation to receive applications. Then by the joint meetings of ministries to review proposed rural plans and grant projects, rural communities will be guided to develop approved appropriate projects. Therefore, government resources can expect to be used more effectively.

5. CONCLUSIONS

The rural rejuvenation plan stimulates a new hope for gradually degrading rural areas. The purpose of rural rejuvenation is to achieve a splendid countryside. To achieve this goal, it is necessary to revitalize agriculture in rural areas. Agriculture revitalization should include implementation indicators and requirement indicators to evaluate its achievements.

In this study, requirement indicators are developed, which encompass the four dimensions such as revitalization of agricultural production, promoting agricultural marketing, creating rural life and culture, and developing leisure agriculture and rural experiences. Twelve indicator items are created from these four dimensions. Through the use of expert questionnaires and the FAHP method, empirical results showed that the first six priority items in order of significance are: (1) development of local brands and industry-integrated marketing (2) improvement of the agricultural production environment (3) development of local agricultural products, proceeded products, and souvenirs (4) construction of a network marketing organization and marketing platform (5) extension and improvement of the production technology (6) improving rural living conditions and creating specialty products. Based on these, it indicates that the core of the agricultural revitalization is agricultural production and marketing, followed by the further development of agricultural activities associated with rural life and cultural characteristics. However, the development of leisure agriculture and rural experience are needed to promote the characteristics of the local environment.

Regarding implementation indicators of agricultural revitalization, this study develops five dimensions including community factors, human factors, local resources surveys, environmental and facilities planning, government subsidies and guidance. A total of 21 indicator items were developed from the five dimensions. Through interviews with experts and the use of QFD method, six priority items are obtained, which in order of significance are: characteristics of leadership, proposal plan, youth involvement,

recognition and participation of residents, community integration, and community organizations. According to these results, in order to enhance the implementation of agricultural revitalization, the key indicators are community leaders and youth involvement as the human factors. The community factors are proposal plans for government guidance and subsidy resources, reorganization, participation, integration, and organization. In other words, to reach the goal of agricultural revitalization, we should master these six key community indicators of project implementation.

According to the key requirement and implementation indicators of agricultural revitalization, this study presents 4 rural rejuvenation strategies: (1) to promote the integrated marketing coupled with agricultural production and rural life, (2) to deepen rural labor training, (3) to strengthen community participation, integration, and organization, (4) to integrate proposals of agricultural revitalization and government resources. By combining the requirement and implementation sides of agriculture revitalization, we can grasp the key items and be expected to effectively revitalize agriculture.

Based on the results of this study, agricultural authorities in Taiwan are suggested to deliberate on these indicators and strategies to grasp the key factors that contribute to the effectiveness of policies to promote rural rejuvenation in the future. Furthermore, short, medium, and long-term detailed indicators could be constructed to assess the performance of rural rejuvenation revitalization and examine the related issues of implementation.

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