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Management Policies Implication for the Agricultural Land Conversion Sustainable Control Strategy in Bali Province

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Abstract:

The conversion of agricultural land to non-agricultural-purposes land had occurred in almost all areas in the Bali Province. This study aimed to explore sustainable food agricultural land control strategies in the Bali Province, by involving stakeholders: farmers, subak institutions, local agricultural board, agricultural business actors, agricultural financial institutions, NGOs, universities, and agricultural research and development bodies as study participants.

SWOT analysis and Interpretive Structural Modeling (ISM) are used to analyze study data. The findings showed that the short, medium, and long-term strategies have great potential and are in line with some management policies to control the agricultural land sustainable conversion in the Bali Province. This strategy may bring essential changes for several areas: stimulating agricultural development policy formulation that align with Balinese local wisdom values, leading to a more selective agricultural land investment choice, procurement of special fund for legal protection of staple food agricultural land, and strengthening local to national-scale agricultural institutions.

Keywords: Bali Island; control strategy; conversion land used; subak.

JEL Classification: Q15; Q18; Q24; Q28; R11.

Introduction

Bali is a province in Indonesia, with the majority of the population adhering to Hinduism practices. Utama (2016) declared Bali as a prominent tourist destination with its natural beauty, arts, and cultural exclusivity. The data from the Central Bureau of Statistics of Bali Province (Badan Pusat Statistik Provinsi Bali, 2020) revealed that the number of foreign tourists who visited Bali in 2019 was 6,275,210, consisting of tourists from Australia (19.78%), China

(18.90%), India (5.96%), United Kingdom (4.58%), United States (4.41%), Japan (4.11%), South Korea (3.40%), France 206,941 (3.30%), Germany (3.1%), Malaysia (2.95%) and others (29.48%). Further, a study conducted by (Suradnya 2006) had identified eight factors that contributed to foreign tourists' visitation in Bali: affordable product prices, a myriad manifestation of culture, beaches, travel coziness, broad opportunities for relaxation, the persona of Bali, the beauty of nature, and the locals' hospitality.

The rapid tourism expansion has not only been passing positive effects (Ohlan 2017, Lama, Mandal, and Kandel 2019), but also destructive impacts (Boori, Voženílek, and Choudhary 2015, Schirpke, Altzinger, Leitinger, and Tasser 2019, Mikulić *et al.* 2021). The significance of this study was the investigation of the agricultural land depreciation threat of total farmland that provides direct impacts on food security, leading to declining rice production and disrupting economic stability, social, political, and population development in general. A study aimed to organize a sustainable agricultural land strategy in Bali Province is necessary to maintain the sustainability of the land and its role to secure staple food production.

Farmland conversion to non-agricultural uses recognize as a complex issue, it may deliver significant impact to other related fields. Hence, stakeholder parties with roles, functions, and policies that closely associated to the land management is required for a more comprehensive exploration of the issue

1. Literature Review

Agricultural land conversion has developed as a typical phenomenon in regencies/cities in the Bali province, especially in Tabanan Regency. Tabanan is recognized for its remarkable view of natural terraced rice fields as the key attraction worldwide. Nevertheless, due to the growth of the tourism sector, their farmland was being sacrificed. Land conversion has occurred in several agricultural sites, such as Pandak Gede Village (Sidiq, Armeli, and Siwalatri 2020) and Bongan Village (Williyanto and Sudharsana 2020). Nusa Penida, Klungkung Regency, also had experienced a massive land conversion that reached 164.84 ha in the range of 2003-2019 (Sudipa, Mahendra, Adnyana, and Pujaastawa 2020). The agricultural land conversion also had occurred in subak area situated in Gianyar Regency (Ediastini, Setiyawan and Gai 2018, Martha, Diarta, and Putra 2020, Denpasar City (Trigunasih 2015), Badung Regency (Krisnandika *et al.* 2019 and Wati, Sudarma, and Widhianthini 2020), and many areas in Bali.

The occurrence of land conversion was mainly caused by a higher chance of employment, especially in the tourism industry sector, resulting in urbanization or population migration to Bali Communication and Information Department of Bali Province, (Diskominfos Provinsi Bali 2021). The population in Bali Province from 2010 to 2020 was increased by 426,650 persons or equal to 42,660 every year. Furthermore, Krisnandika, Yusiana, Dharmadiatmika, and U'Zal (2020), Ediastini *et al.* (2018), Pratama and Rosyidie (2017) discovered that the rapid increase of the population would promote the land function conversion for infrastructure investment and development that supported human needs such as settlements, roads, and the development of tourism supporting infrastructures such as hotels, villas, and restaurants.

The next factor that indirectly affects the sustainability of agricultural activity in Bali is the poor interest of the younger generation. It seems that they put more interest in the tourism sector due to its higher income. Inadequate farmer support and protections had been well-demonstrated in various works of literature as factors that contributed to low interest to participate in farming activities. Ruiz Salvago, Phiboon, Faysse, and Nguyen, (2019) also had confirmed that the majority of farmers considered as a part of the elderly population. This situation signified the high possibility of the absence of younger generation participation in agricultural activities, resulting in abandoned land. High population cramped agricultural planting area, and the poor participation of the younger generation had threatened food security. A study by Żmija *et al.* (2020) emphasized that the combination of the younger generation's inclusion and adequate technology/tools employment in agricultural sectors deliver effective means in meeting national food demands amid limited land.

Seven major factors recognized as the cause of the agricultural land conversion in Bali Province: 1) increasing population which resulted in land fragmentation, 2) decline rice production and farmer exchange rates, 3) land demand for tourism infrastructure expansion, 4) reduced economic value of the agricultural sector, 5) the stagnant regeneration of farmers, 6) infrastructure development (physical infrastructure) that undeniably required land, and 7) weak regulations and law enforcement.

Prasada and Masyhuri (2019) in their study had discovered that the establishment of fixed price of the agricultural commodities may decrease the agricultural land conversion activities in urban area. It possibly perceived as the incentive among the farmers in maintaining the sustainability of their farmland. Further, Nasrullah and Ovitasari (2022) mentioned that agricultural development strategy had been conducted by Ministry of

Agriculture by agricultural revitalization that comprised of revitalization of agricultural land, seeding process, human resources, agricultural means and infrastructures, agribusiness financing, and agricultural institutions.

2. Research Methodology

This study was conducted from January to August 2019 in the Bali Province. The purposive method applied to select the study location. Bali picked as a study location according to the need for scientific information as the policies basis for sustainable food agricultural land protection. Stakeholders involved in the agricultural land management: farmers, subak institutions, local agricultural board, agricultural business actors, agricultural financial institutions, Non-Governmental Organizations, universities, and agricultural research and development bodies were included as the study population. Study participants then purposively selected with the consideration that they could provide valid information/data for the study. The number of respondents determined by the representative principle.

Primary data were obtained from the interview techniques, in-depth interviews, and FGD (Focus Group on Discussion). Structured questionnaires and interview guides employed to gather the study data. Secondary data were collected from the statistical boards, local/national agriculture boards, local land agencies, and other relevant agencies. Data included in the analysis were: the total area and distribution of rice fields conversion, allotment of rice field conversion, rice fields that planned to remain as rice fields in agricultural areas, rice fields converted to other uses, area, and other types of allotment from rice fields conversion, rice fields that have been granted a permit for other uses.

Strength Weakness Opportunity Threat (SWOT) employed as the analysis method in this study. The basis of the internal and external environment in this analysis lingered on the agricultural food land and the farmer, factors beyond it then included as external environment. To define factors in each category (SWOT), a review of several related references was conducted. Priority strategy of a sustainable food agricultural land security set by applying Interpretative Structural Modelling (ISM) analysis.

3. Sustainable Agricultural Land Conversion Control Strategy

Agricultural land conversion control strategies were organized by performing SWOT Analysis to obtain the alternative control strategies and ISM analysis to set the priority that elaborated as follows in below paragraphs.

3.1. SWOT Analysis

As previously mentioned in the methodology section, the basis of the internal and external environment in the SWOT analysis lingered on the agricultural food land and the farmer, factors beyond it then included as external factors.

3.1.1. Strength Factor Identification

The strength factors identified were: 1) geographical position and natural resources availability, 2) priority of agricultural sector development, 3) high motivation among the farmers' community involvement and resiliency, 4) the existence of subak institutions, 5) agricultural sector as tourist attraction sites/objects, 6) philosophy of Tri Hita Karana, and 7) Bali Province's mission and vision (Nangun Sad Kerthi Loka Bali).

The presence of the subak institution recognized as an essential strength factor. Subak is a customary law community with religious-socio-agrarian traits that organized the rice field irrigation system. A study of Lestari, Windia, and Astiti (2015) highlighted subak as a traditional institution that played a vital role in environmental conservation through the internalization of Tri Hita Karana and the local wisdom values. Farmers in a subak institution conserve their land through physical and spiritual maintenance. In line with this statement, Korri and Kemala 2017) in their study discovered that as an ecotourism area, Subak Sembung had elevated its value based-selling as a tourism attraction site. An ecotourism area establishment was advantageous in increasing the economic value for parties involved in the management. It also added environmental value to conserve the area.

The philosophy of Tri Hita Karana was also identified as a strength factor. This philosophy is heavily adopted in the Balinese community. It implied that humans should have always balanced themselves with God (parhyangan), fellow humans (pawongan), and their surrounding environment (palemahan). This cultural uniqueness also contributed to the authentic concept of subak in Bali (Windia, Sumiyati, Sedana 2015). A study conducted by Darmawan, Arisena, Utami, and Krisnandika (2021), Arisena, Krisnandika, and Darmawan (2020) also Arisena *et al.* (2020) described that subak conveyed effective irrigation management and positive impacts on farmers in Denpasar City. They even declared its potency as exclusive ecotourism sites.

3.1.2. Weakness Factor Identification

The weakness factors identified were: 1) land price that relatively increased, 2) limited fund of Regional Revenues and Expenditures II for agricultural sectors, 3) improper rice distribution data, 4) inadequate infrastructure and agriculture production tools, 5) unavailability of institutions that managed sustainable food farming land incentives, 6) inheritance status of the agricultural land, 7) detailed spatial plans hasn't been issued by all cities/regencies in Bali, 8) rice cultivation land depreciation, 9) limited ownership of agricultural land, and 10) non-agricultural sector development/expansion.

The weakness factor of inheritance land was quite intriguing. The status of inheritance land perceived as a chance to use the land more carelessly. The younger generation tended to lease or sell the land without evaluating the further impacts. In line with this statement, a study by (Semara and Saputra, 2015) discovered that high tourist visitation in Kuta, Badung, had triggered agricultural land rent and sale for tourism facilities and infrastructures. The low income produced by agricultural activities had supported their decision to sacrifice their land for the tourism sector. They perceived prices offered by the investor had more advantageous impacts on their life. A study by (Manalu, Lanya, and Adi 2020) on rice land tenure in Denpasar had confirmed that the percentage of farmers who worked on their privately owned land was lower than farmers who worked on land that belonged to other farmers. This finding may signify that farmer who owned their land tended to sell their land then worked in other lands.

The next weakness factor was the absence of institutions regulating the sustainable food farming land incentives. Bali Province has not prepared an institution concentrating on agricultural-related incentives and disincentives management. This institution plays a crucial role in agricultural land use supervision. Findings from Takim (2018), Ansari, Bachri, and Lahae (2020) discovered that sustainable food farming land incentives are protected by Regulation no. 41/2009, where local governments require establishing policies that prevent agricultural land conversion. Similarly, Satria, Falatehan and Beik (2018) proposed a collaboration between the government, private sector, academics, and NGOs/foundations in implementing sustainable food farming land incentives. A proper partnership would create a safer environment for the farmer, provide adequate access, initiate technology and innovation in production, stimulate excellent agricultural products, and present decent selling prices.

3.1.3 Opportunity Factor Identification

The opportunity factors recognized were: 1) rice commodity distribution to other areas, 2) high demand for local rice from Bali and outside Bali area, 3) food farm incentives financed by business enterprises, 4) food farm incentives financed by National and Regional Revenues and Expenditures, 5) support from government policies or regulations, 6) agropolitan policies, 7) the food agricultural land and its potential substitution land inventory process, 8) agricultural sector's contribution on Bali gross regional domestic product, and 9)agricultural sector output absorption for non-agricultural sectors.

The agropolitan policies considered as an opportunity factor because the agropolitan concept had arisen from the inequality issue of regional development between urban and rural areas. Urban areas tended to be developed as economic centers and growth; rural areas as centers of underdeveloped agricultural activities. (Friedmann 1979) initially introduced the concept of agropolitan for the Asia Region in 1975. Studies of Ahmad, Saad, Afgani, and Yusof (2014), Rosdiana, Inayati, and Murwendah (2014), Fatkhiati, Tjiptoherijanto, Rustiadi and Thayib 2015) then appointed the need for modification of this model.

Rudita, Sitorus, and Hadi (2012) had explored the tourism sector development in the Payangan Agropolitan Area, Gianyar Regency. They stated that it was well-managed, but no synchronization between the agricultural and the tourism sector identified in the sites. Further, they acknowledged a lack of community involvement. The local community, nature, and local culture were only objects of the development process. (Basuki 2012) described agropolitan (food production central development program) as an agriculture-based economic development program utilizing the existing potentials in an area as a whole and comprehensive unit. It characterizes by a competitive, community-based, sustainable, decentralized, and community-driven nature. Local and national stakeholders are responsible for guiding and supervising the programs. Rural areas should have developed as an integrated regional development area based on economic linkages between rural-urban and comprehensive connections.

3.1.4 Threat Factor Identification

The threat factors identified were: 1) investment in the non-agricultural sector, 2) increase in farmers' living needs, 3) increase in agriculture production tool input price, 4) spatial planning consistency, 5) the proportion of agricultural labor < non-agricultural labor, 6) weak spatial violation control and management, and 7) no control policies and act on the land price.

Recent study recognized non-agricultural sector investment as a prominent threat. Tourism sector expansion has stimulated high non-agricultural sector investment and delivered a threat to the existence of agricultural land in Bali. Ediastini *et al.* (2018) identified 12 factors that influenced changes in subak land usage in Ubud Village, Gianyar Regency, Bali: dry land, production costs, squeezed agricultural land, uncertainties, road construction, housing needs, living demands standard evolution, employment opportunities in other sectors, land income, land selling value, land location, and population growth.

3.1.5 Internal Factor Evaluation and External Factor Evaluation Matrix

The Internal Factor Evaluation (IFE) Matrix (Table 1) and External Factor Evaluation (EFE) Matrix (Table 2) were analyzed in this step. The strategic factors in the matrix were strengths, weaknesses, opportunities, and threats identified in the previous section. We assessed each factor by giving a weight and rating score to evaluate the factors' influence on agricultural land protection in Bali.

Table 1. IFE Matrix of sustainable food farming land protection in Bali Province

No	Internal Strategy Factor	Weight	Rating	Score
Strength				
1	Geographical Position and Natural Resources Availability	0.15	2.92	0.45
2	Priority of Agricultural Sector Development	0.23	3.00	0.69
3	High Motivation among the Farmers	0.08	2.31	0.18
4	Community Involvement and Resiliency	0.08	2.38	0.18
5	The Existence of *Subak* Institutions	0.15	2.92	0.45
6	Agricultural Sector as Tourist Attraction Sites/Objects	0.08	2.92	0.22
7	Philosophy of *Tri Hita Karana*	0.15	2.85	0.44
8	Bali Province's Mission and Vision (*Nangun Sad Kerthi Loka Bali*)	0.15	2.69	0.41
Total			1.00	3.03
Weakness				
1	Land Price that Relatively Increased	0.28	1.62	0.45
2	Limited Fund of Regional Revenues and Expenditure II for Agricultural Sectors	0.06	1.77	0.10
3	Improper Rice Distribution Data	0.03	2.00	0.06
4	Inadequate Infrastructure and Agriculture Production Tools	0.10	2.38	0.24
5	Unavailability of Institutions that Managed Food Sustainable Farming Land Incentives	0.03	1.46	0.04
6	Inheritance Status of the Agricultural Land	0.10	2.31	0.23
7	Detailed Spatial Plans Hasn't Been Issued by All Cities/Regencies in Bali	0.03	1.92	0.05
8	Rice Cultivation Land Depreciation	0.28	2.08	0.58
9	Limited Ownership of Agricultural Land	0.11	1.62	0.18
10	Non-Agricultural Sector Development/Expansion	0.14	1.85	0.26
Total			1.00	2.18

Source: Processed primary data

The internal and external factors were the basis for the integration process to identify strengths, weaknesses, opportunities, and threats in the SWOT matrix (Table 3). The SWOT matrix then organized it into four strategies: 1) Strength-Opportunities (S-O), 2) Weakness-Opportunities (W-O), 3) Strength-Threats (S-T), 4) and Weakness-Threats (W-T). These strategies were elaborated as follow:

1.Utilizing the potency of the geographical position and natural resources availability and prioritizing the agricultural sector development, especially the food crop cultivation area, to obtain financing from the National and Regional Revenues and Expenditures I (S1, S2, W2).

2.Pulling the potency of the geographical position and natural resources availability (organic fertilizer utilization, local seeds, irrigation management) due to limited fund provided by the Regional and National Revenues and Expenditures to prevent the impact of the higher price of agriculture production input (S1, W2, O4).

3.Improving the development of the sustainable agricultural sector in the rural and urban areas (agropolitan policies) as internalized from the philosophy of Tri Hita Karana and Nangun Sad Kerthi Loka Bali that also endorsed by the government policy. Spatial plans need immediate revision and regional regulation related to incentives and disincentives for sustainable food farming land protection are necessary to be issued to maintain agricultural sector existence in contributing to Bali Gross Regional Domestic Product (S2, S7, S8, O5, O6, O8). (Dewi 2020) had stated that Nangun Sad Kerthi Loka Bali represented the acts of maintaining the sanctity and harmony of Bali's nature and every single thing within it to learn a prosperous and content-mannered life, the seen and unseen world

towards a balanced life of the community. This vision is highly influenced by Bung Karno's Trisakti principles, such as political sovereignty, economic independence, and personality in culture (S2, S7, S8, O5, O6, O8, T5, T7).

Table 2. EFE Matrix of sustainable food farming land protection in Bali Province

No	External Strategy Factor	Weight	Rating	Score
Opportunities				
1	Rice Commodity Distribution to Other Areas	0.1	2.77	0.28
2	High Demand for Local Rice from Bali and Outside Bali Area	0.1	2.64	0.26
3	Food Farm Incentives Financed by Business Enterprises	0.1	1.54	0.15
4	Food Farm Incentives Financed by National and Regional Revenues and Expenditures	0.1	1.92	0.19
5	Support from Government Policies or Regulations	0.2	2.46	0.49
6	Agropolitan Policies	0.05	2.08	0.10
7	The Food Agricultural Land and Its Potential Substitution Land Inventory Process	0.1	2.46	0.25
8	Agricultural Sector's Contribution on Bali Gross Regional Domestic Product	0.15	2.23	0.33
9	Agricultural Sector Output Absorption for Non-Agricultural Sectors	0.1	2.54	0.25
Total			1.00	2.32
Threats				
1	Investment in Non-Agricultural Sector	0.24	2.92	0.69
2	Increase in Farmers' Living Need	0.12	2.38	0.28
3	Increase in Agriculture Production Tool Price	0.12	2.31	0.27
4	Spatial Planning Consistency	0.12	2.54	0.30
5	The Proportion of Agricultural Labor < Non-Agricultural Labor	0.12	2.15	0.25
6	Weak Spatial Violation Control and Management	0.12	2.15	0.25
7	No Control Policies and Act on the Land Price	0.18	1.77	0.31
Total			1.00	2.35

Source: Processed primary data

4.Constricting non-agricultural sector investment with high potential of agriculture land function transformation to prevent the high price of the agriculture land (T1, T8, W1, W8).

5.Improving the inventory process of the agricultural land and its potential substitution land. The rice distribution data in Bali Province and from Bali Province also requires to be fixed to present accurate data of areas that need rice supply. Hence, reciprocal funding can be obtained from those areas/regional or national governments (W2, W3, O7).

6.Employing the funding from National and Regional Revenues and Expenditures I for the infrastructures and agricultural production tools improvement (W4, O3).

7.Establishing an institution that manages food sustainable farming land incentives. This institution would provide adequate incentive management, also optimize Regional Revenues and Expenditures Budget II, National Revenues and Expenditures Budget, Regional Revenues and Expenditures Budget I, and Business Entities as the financial protection cost (W5, O3, O4).

Table 3. Strategies identified in the SWOT matrix

	Strength (S)	Weakness (W)
	1.Geographical Position and Natural Resources Availability; 2.Priority of Agricultural Sector Development; 3.High Motivation among the Farmers 4.Community Involvement and Resiliency; 5.The Existence of *Subak* Institutions; 6.Agricultural Sector as Tourist Attraction Sites/Objects; 7.Philosophy of *Tri Hita Karana;* 8.Bali Province's Mission and Vision (*Nangun Sad Kerthi Loka Bali*).	1. Land Price that Relatively Increased; 2. Limited Fund of Regional Revenues and Expenditure II for Agricultural Sectors; 3. Improper Rice Distribution Data; 4. Inadequate Infrastructure and Agriculture Production Tools; 5. Unavailability of Institutions that Managed Food Sustainable Farming Land Incentives; 6. Inheritance Status of the Agricultural Land; 7. Detailed Spatial Plans Hasn't Been Issued by All Cities/Regencies in Bali; 8. Rice Cultivation Land Depreciation; 9. Limited Ownership of Agricultural Land; 10. Non-Agricultural Sector Development/ Expansion.

	Strength (S)	Weakness (W)
Opportunities (O)	S-O Strategy	W-O Strategy
1. Rice Commodity Distribution to Other Areas; 2. High Demand for Local Rice from Bali and Outside Bali Area; 3. Food Farm Incentives Financed by Business Enterprises; 4. Food Farm Incentives Financed by National and Regional Revenues and Expenditures; 5. Support from Government Policies or Regulations; 6. Agropolitan Policies; 7. The Food Agricultural Land and Its Potential Substitution Land Inventory Process; 8. Agricultural Sector's Contribution on Bali Gross Regional Domestic Product; 9. Agricultural Sector Output Absorption for Non-Agricultural Sectors.	1. Pulling the potency of the geographical position and natural resources availability (organic fertilizer utilization, local seeds, irrigation management) through the support of government policies (S1, O4); 2. Improving the development of the sustainable agricultural sector in the rural and urban areas (agropolitan policies) as internalized from the philosophy of *Tri Hita Karana* and *Nangun Sad Kerthi Loka Bali* that also endorsed by the government policy. Spatial plans need immediate revision and regional regulation related to incentives and disincentives for sustainable food farming land protection are necessary to be issued to maintain agricultural sector existence in contributing to Bali Gross Regional Domestic Product (S2, S7, S8, O5, O6, O8).	1. Maximizing the utilization of National and Regional Revenues and Expenditures to prevent the impact of the higher price of agriculture production input (W2, O4); 2. Improving the inventory process of the agricultural land and its potential substitution land. The rice distribution data in Bali Province and from Bali Province also requires to be fixed to present accurate data of areas that need rice supply. Hence, reciprocal funding can be obtained from those areas/regional or national governments (W2, W3, O7); 3. Establishing an institution that manages food sustainable farming land incentives. This institution would provide adequate incentive management, also optimize Regional Revenues and Expenditures Budget II, National Revenues and Expenditures Budget, Regional Revenues and Expenditures Budget I, and Business Entities as the financial protection cost; 4. Establishing an institution that manages food sustainable farming land incentives. This institution would provide adequate incentive management, also optimize Regional Revenues and Expenditures Budget II, National Revenues and Expenditures Budget, Regional Revenues and Expenditures Budget I, and Business Entities as the financial protection cost.
Threats (T)	S-T Strategy	W-T Strategy
1. Investment in Non-Agricultural Sector; 2. Increase in Farmers' Living Need; 3. Increase in Agriculture Production Tool Price; 4. Spatial Planning Consistency 5. The Proportion of Agricultural Labor < Non-Agricultural Labor; 6. Weak Spatial Violation Control and Management; 7. No Control Policies and Act on the Land Price;	1. Improving the development of the sustainable agricultural sector in the rural and urban areas (agropolitan policies) as internalized from the philosophy of *Tri Hita Karana* and *Nangun Sad Kerthi Loka Bali* that also endorsed by the government policy. Spatial plans need immediate revision and regional regulation of detailed spatial plans are necessary to be issued, especially related to land price control. Millennial farmer programs required to be executed to attract the younger generation interest to participate in the agriculture sector. (S2, S7, S8, T5, T6, T7). 2. Putting more focus on the agricultural sector development and restricting the investment that converted agricultural land function (S2, T1).	1. Constricting non-agricultural sector investment with high potential of agriculture land function transformation to prevent the high price of the agriculture land (T1, T8, W1, W8).

Source: Processed Primary Data

3.2. Interpretative Structural Modeling Analysis

This ISM analysis (Figure 1 and Figure 2) performed to prioritize the strategies obtained from the SWOT analysis. Seven strategies were situated in the linkage quadrant with a high level of driving power and dependence. This finding signified that these strategies had a strong correlation and should have been completed at a certain level.

Strategy 3 and 4, strategy 1, 2, 5 and 7, and strategy 6 could be conducted in the third (short term), second (medium-term), and first (long-term), respectively.

Figure 1. Diagram structure of sustainable food farming land protection in Bali, Province

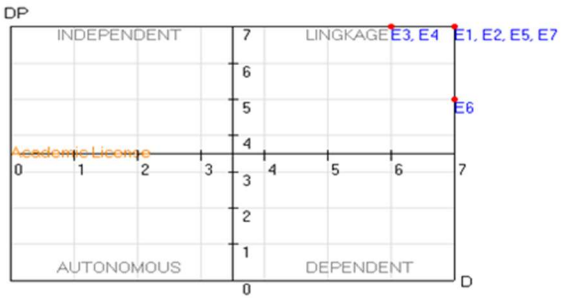
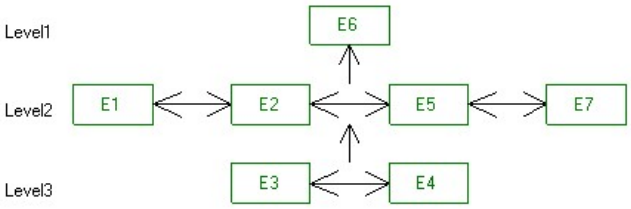


Figure 2. Driving Power-Dependent graph



Note: E1: strategy 1; E2: strategy 2; E3: strategy 3; E4: strategy 4; E5: strategy 5; E6: strategy 6; E7: strategy 7.

4. Implication of Agricultural Land Conversion Control Strategy

The strategy execution probably would delay land conversion pace and deliver several impacts on these aspects:

- Agricultural Development Policy. Agricultural development activities in rural and urban area should have established according to Balinese local wisdom values: Tri Hita Karana, an ancient Balinese philosophy that worship three dimensions of life harmony: (1) harmony of life between human and God as the divine creator, (2) harmony between humans and their social and cultural system, and (3) harmony between human and the nature.
- Investment Policy. Performing selective and strict criteria for non-agricultural land-use investment to prevent massive land conversion activities.
- Development Fund. Setting aside a certain amount of budget from the Regional and National Revenues and Expenditures for legal protection of staple food agricultural land, including the subsidies for agricultural production means and agricultural infrastructure development.
- Agricultural Institution. The formulation of these strategies strengthens the agricultural institution that accommodate the requirement of obligation and entitlement, administration, incentive, and sanction due to violation.

Conclusion

The strategies formulated for the short, medium, and long-term term are advised to be used for the control of agricultural land sustainable conversion in Bali Province, in order to ensure the application of some management policies.

The short-term strategies convey that these maximize the sustainable agricultural sector development in rural and urban areas (agropolitan policies) according to the philosophy of Tri Hita Karana (traditional Balinese philosophy of life, its literal translation is three reasons of prosperity) and Nangun Sad Kerthi Loka Bali (a vision for the Bali development plan) are welcomed. Also, it could be conducted strategies with management implications by organizing stricter policies for non-agricultural sector investment that performed agricultural land conversion to prevent the high price of agricultural land and ensures sustainable perspectives.

The medium-term strategies can be implemented by establishing an institution that should develop management policies for sustain sustainable food farming land incentives. This institution would provide adequate incentive management policies, also optimize Regional Revenues and Expenditures Budget II, National Revenues and Expenditures Budget, Regional Revenues and Expenditures Budget I, and the business entities as financial protection cost.

The long-term strategy delivers by maximizing the Revenues and Expenditures Budget and National Revenues and Expenditures Budget for infrastructure and agricultural production tools improvement needs. Agricultural development strategy, investment policy, development fund, and agricultural institution had identified as the aspects affected by the implementation of land conversion control strategy.

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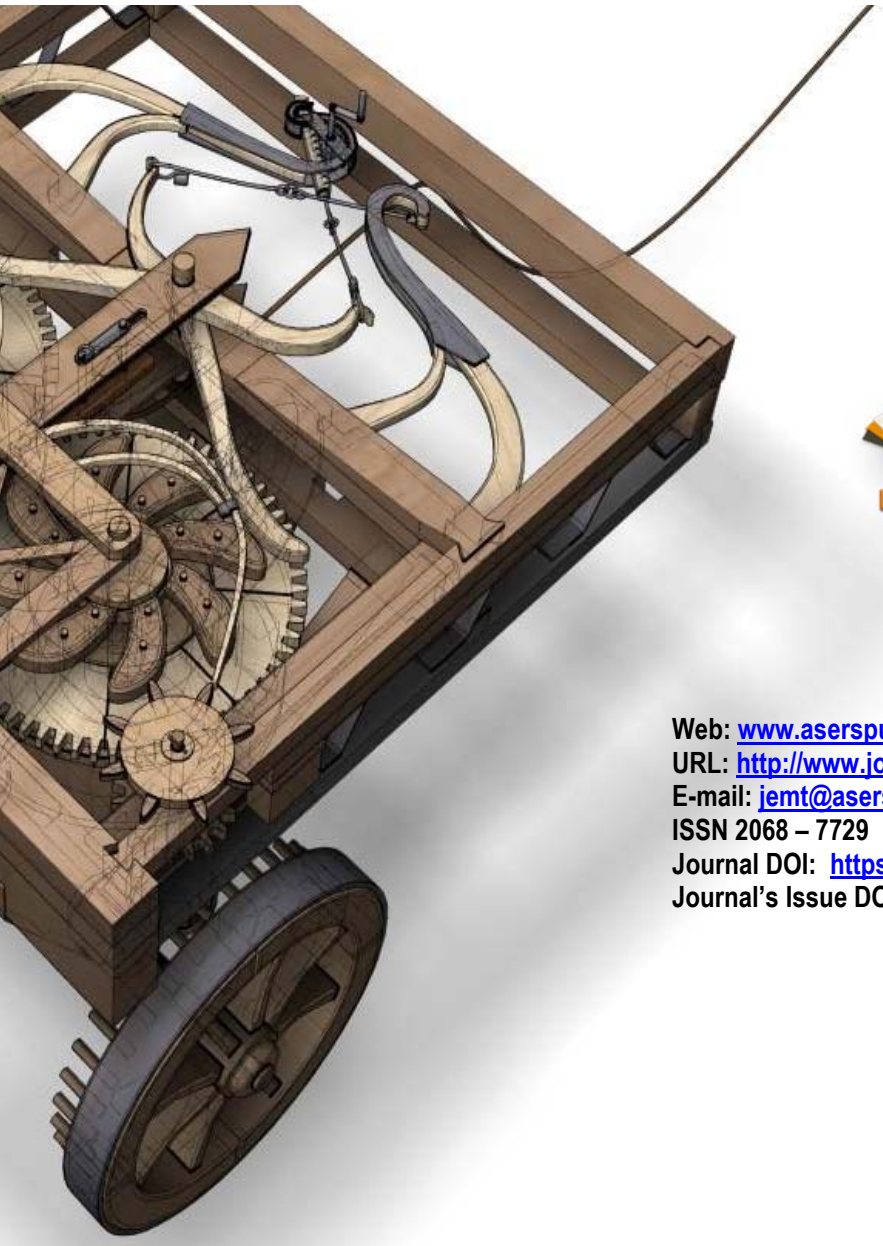

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