Research article

Performance of Agricultural Sector in Bali

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Abstract.
Agriculture plays a multifunctional role in a district's development. Bali is an Indonesian province that uses rustic regions as a gateway to the agricultural sector, which supports the tourism industry. In 2020, this sector was responsible for 15% of Bali's gross domestic product, ranking second among 17 sectors (the sector of providing convenience, food and drink took the lead at 18%). The purpose of this review was to plan the development typology of the sector and assess the variables causing changes in the agricultural sector's impact in the Bali region. The investigation was focused on the Bali area, and it was completed with the intention of examining expansions in agrarian land in Bali. Klassen typology and ISM were used in the research. The farming, ranger service, and fisheries areas were placed in quadrant II as a result of this review. According to the ISM analysis, land conversion, reduced water discharge, and the decline in productivity of farmers affect the agricultural sector's performance in the short term; the budget for the agricultural sector, agricultural subsidies, and the synergy between agriculture and tourism affect the agricultural sector's performance in the medium term. Meanwhile, the application of new technology, the existence of subak, the marketing system's orientation, and the strengthening of the agricultural agroindustry are all important long-term factors. As a result, increasing the agricultural sector's growth can be accomplished by establishing an industry for processing raw materials, integrating regional regulations and awig-awig, and providing appropriate incentives for farmers.

Keywords: agricultural sector, the existence of subak, awig-awig

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1. Introduction

The rural area is the fundamental area for the economy in non-industrial nations. The rural area has a multifunctional job in the improvement of a locale. These multifunctional roles include roles in aspects of production, food security, improving farmers' welfare, and sustainability in development [1], [2], [3]. The development of the agricultural sector has given a trickle down effect for other sectors, such as the tourism sector or the service sector.

Bali's agricultural sector has always been a strong buffer for the the travel industry area. The commitment of the rural area is in second place after the tourism sector as the largest contributor to the economy of Bali Province. In addition, the agricultural

sector has always been one of the largest labor absorbing sectors in Bali by absorbing 18.7% of the total of almost 2.5 million workers in 2019. When the tourism sector fell, many workers were suspected of switching to other sectors (shifting), one of which is the agricultural sector. It is proven that in 2020, BPS recorded the number of workers absorbed by the agricultural sector reached 545.5 thousand people, an increase of 17.9% from the previous year [4]. In other words, in the context of efforts to maintain economic conditions, the agricultural sector is highly expected to be the backbone that Bali still has when the tourism sector slows down due to the shocks of the Covid-19 pandemic.

Bali actually has great potential to develop the agricultural sector. Apart from the geographical side, soil conditions and tropical climate, agribusiness in Bali is one of the world's vacation destinations which obviously likewise assumes a part in the accomplishment of the travel industry area in Bali so far. Agriculture is also very closely related to the beliefs and culture of the Balinese people. Unlike the tourism sector, which is very fragile due to economic, social and natural turmoil, the agricultural sector is a sector that is resilient in the face of turmoil. This was proven after the social crisis (Bali Bombings in 2003 and 2005) and the economic crisis in 2008, the agricultural sector in Bali continued to grow positively [5]. So it's no wonder when the tourism sector is shaken, the agricultural sector is still the hope of the Balinese people to rise and survive during the pandemic at least to meet their daily needs. The provincial government of Bali is also very focused on developing the agricultural sector. Attention to the importance of agriculture is contained in the Bali provincial government's mission to realize food self-sufficiency, increase added value and agricultural competitiveness and improve farmers' welfare. The performance of the agricultural sector was also quite good in 2010 to 2019, which on average was able to grow more than 3% per year. In addition, the Bali Province Farmer's Exchange Rate (NTP) from 2010 to 2019 was on average above 105, which indicates that farmers earn profits or show fairly good farmer welfare [6], [4], [7].

But unfortunately in 2020, in contrast to the state of agriculture nationally, the agricultural sector in Bali actually experienced a decrease in added value of 1.06% from 2019 (y-on-y). The welfare of farmers in Bali is also not as beautiful as expected. Bali Province's NTP in 2020 is on average below 100, which means farmers are losing money [8]. An NTP below 100 also indicates that at a certain level, the income earned by farmers has not been able to meet their household needs. This indicator shows that the agricultural sector is in fact not optimal to become the second backbone for the Balinese economy when the tourism sector weakens due to the pandemic. The delay in

the distribution chain of producers to consumers due to the pandemic is suspected to be one of the causes of the decline in the performance of the Balinese agricultural sector. As a tourism buffer sector, agricultural output, which in the pre-pandemic situation could be maximally absorbed, was automatically affected. Excess local production is not absorbed in the local market, resulting in farmers experiencing losses due to excess supply. The expansion of the market with a wider scope has not yet shown an impact due to the weakening economy which has pushed households to be less consumptive than before the pandemic.

The shock of the pandemic has indeed made the economy more difficult and complicated. Although weakened, Bali's agricultural potential is still there, at least to stem the purchasing power of households. However, the golden opportunity to optimize integrated Balinese agriculture seems to need to be studied. In this study, the factors causing changes in the performance of the agricultural sector in Bali Province will be studied.

2. Methodology

The factors that influence changes in the shift in the presentation of the rural area in Bali Territory used the analysis of Interpretative Structural Modeling (ISM). One of the demonstrating strategies created for key strategy arranging is the Interpretative Structural Modeling (ISM) method. ISM is a gathering learning measure in which underlying models are delivered to catch complex issue of a framework, through painstakingly planned examples utilizing designs and sentences.The ISM strategy is one of the frameworks displaying methods to manage the difficult to-change propensities for long haul organizers who regularly straightforwardly apply functional examination strategies or potentially elucidating factual applications [9], [10].

The steps taken in the ISM method are: (1) identifying and listing elements, (2) creating contextual relationships, (3) creating a single structured interaction matrix (Structural Self Interaction Matrix/SSIM), (4) creating a Reachability Matrix (RM). , (5) analyzing the level of participation to classify elements in different levels of the ISM structure, (6) creating a Canonical matrix, (7) compiling a graph, and (8) generating ISM [11], [12].

ISM is identified with the understanding of a total item or framework portrayal through the use of graphical hypothesis in an orderly and iterative way [10]. ISM is a PC based strategy that assists bunches with distinguishing connections among thoughts and fixed designs on complex issues. ISM can be utilized to foster a few kinds of designs, including impact structures (for example backing or relinquishment) need structures (e.g.: more

significant than“, or ought to be examined beforehand“) and thought classifications (e.g.: incorporates a similar class as) [13]. ISM is an intelligent technique and is executed in a gathering discussion. The strategy gives the ideal climate to advance and expand the view in genuinely complex developments.

ISM dissects framework components and settles them in graphical type of direct connections among components and progressive levels. Components can be strategy goals, hierarchical targets, appraisal variables and others. Direct connections can be in an assortment of settings (identified with logical connections).

ISM methodologies and techniques are separated into two sections, in particular progressive course of action and sub-component arrangement. The fundamental standard is the ID of designs inside a framework that offer high benefit for benefits to define the framework adequately and for better dynamic. For each element of the program under study, it is broken down into a number of sub elements. After that, the contextual relationship between the sub-elements is determined which contains a direction in the terminology of the subordinate that leads to pairwise comparisons, such as ”Is goal A more important than goal B?” Pairwise comparisons that describe the interrelationships between sub-elements or whether or not the contextual relationships are carried out by experts. If the number of experts is more than one, then smoothing is done. Assessment of contextual relationships in pairwise comparison matrices using symbols [11], [12]:

V if eij = 1 and eji = 0

A if eij = 0 and eji = 1

X if eij = 1 and eji = 1

O if eij = 0 and eji = 0

The significance of the worth of eij = 1 is that there is a logical connection between the I and j sub components, while the eji esteem = 0 is that there is no context oriented connection between the I and j sub components. The consequences of the evaluation are masterminded in Primary self Int. DP esteem $<$ 0.5 X and D worth $>$ 0.5 X, X is the quantity of sub-component raction lattice (SSIM). SSIM is made as a Reachability Lattice (RM) table by supplanting V, A, X and O into numbers 1 and 0. The matrix is further corrected until it becomes a closed matrix that meets the transitivity rules. The transitivity rule in question is the completeness of the causal-loop, for example A affects B and B affects C, then A must influence C. In this study, only the factors that cause shifts in the performance of the agricultural sector in Bali Province are discussed.

3. Result and Discussion

Government policies and political scenarios can also affect agricultural growth, so that the emphasis on agricultural development can spur the growth of other sectors such as the industrial sector [14], [15]. The same thing was shown by Suleiman and Aminu [16] that the agricultural sector is more important and has a higher contribution than other sectors in the economy. Zaheer [17] uses data on the growth of the agrarian area, the commitment of the horticultural area, the usefulness of farming work, and the TFP (All out Factor Efficiency) record to clarify the exhibition of the rural area in Pakistan. These conditions indicate that the agricultural sector has an important role in the economy.

Nationally, the agriculture, forestry and fisheries sectors grew 4.3 percent (YoY), higher than the same period the previous year (3.8 percent, YoY). Production of this sector in general

increased except for production of food crops and forestry which contracted by 1.0 and 0.2 percent (YoY), respectively. The decline in food crop production was caused by extreme weather, a longer dry season than the previous year. Meanwhile, production of plantation crops and livestock increased sharply to 5.2 and 7.9 percent, respectively. The growth of plantation crop production was driven by increased oil palm production. Livestock production has also increased to balance the demand for broilers, chicken eggs, and beef [8].

The agricultural sector grew quite stable with a contraction of -0.53 percent in the final quarter of 2020 compared to the performance of the hotel and restaurant sector which contracted very deeply to -31.8 percent. Meanwhile, the trade and industrial sectors contracted by -9.8 percent and -7.5 percent, respectively [7]. The agricultural sector has a significant contribution of 13.5 percent, or the second largest after the hotel and restaurant sector in the Balinese economy. In addition, the agricultural sector has a fairly strong resistance to pressures of demand and supply. The strength of this sector is because agriculture continues to grow during the crisis, although there is a contraction but it is very low compared to other sectors.

Agriculture has absorbed the highest workforce in Bali, reaching 19.6 percent. This condition is caused by the flexible nature of employment in the agricultural sector so that it can send workers to other sectors and can absorb workers from different fields of work when unemployment occurs. During the pandemic, the number of workers working in the hotel restaurant sector decreased from 13.3 percent in 2019 to 9.7 percent in 2020, so that part of it was absorbed in the agricultural sector which caused its share to increase from 18.7 percent to 22.5 percent [7].

Figure 1. Contribution of Bali and Indonesia's Agricultural Sector to GDP (Gross Domestic Product) in 2013-2020

The fluctuating exhibition of the agrarian area in Bali Territory is caused by several factors. Based on the results of the graph and structure of the ISM, it can be seen that the key factors to be resolved immediately in the short term are the problem of land conversion (E1), reduced water discharge (E2), and decreased human resources for productive farmers to be involved in the agricultural sector (E3). The three problems are located in quadrant I (independent quadrant) where elements in this quadrant have high driver power and low dependence. The problem of reducing the budget for the agricultural sector (E6), diversion of agricultural subsidies (E8), and the synergy between agriculture and tourism (E10) are problems that must be addressed in the medium term, while the application of new technology (E4), the weakening of the existence of subak (E5), orientation marketing system (E7), and weak strengthening of agricultural agro-industry (E9) are problems that must be addressed in the long term. If all these factors can be overcome, then the presentation of the rural area in Bali Region will increment.

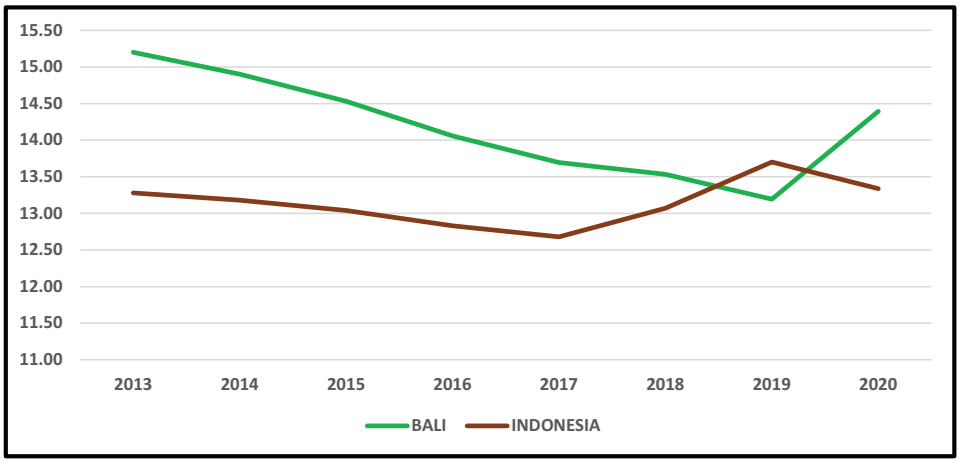

Figure 1: ISM graph.

These elements can be explained as follows.

3.1. Land conversion problem

The conversion of paddy fields or subak agricultural land in Bali is currently in an alarming stage. Land conversion in Bali in the last five years, from 2013 to 2017 an average of about 550 hectares per year. From these data, in 2017 alone there was a significant increase. The figure reaches 900 hectares of land that has changed functions, with a percentage of 1.13 percent of the total land area of 78,626 hectares. This number

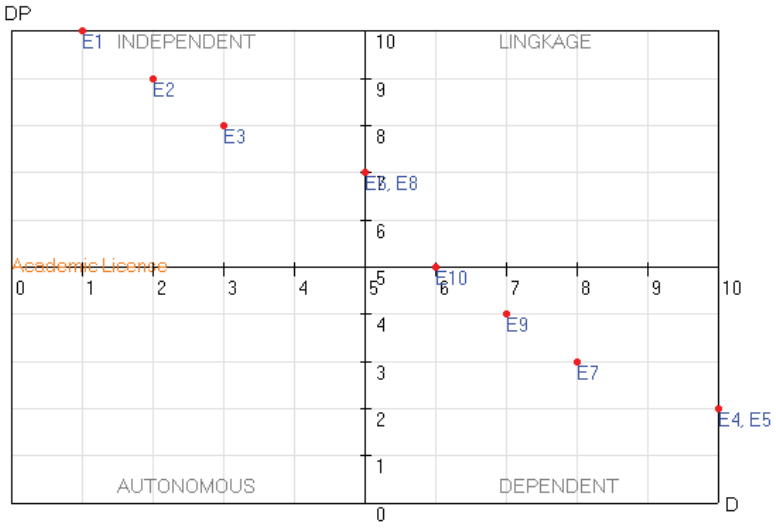

Figure 2: ISM Structure.

has increased compared to 2016 which reached 537 hectares out of a total land area of 79,562 hectares [6].

Three approaches in controlling the conversion of paddy fields. includes: (a) establishing a number of rules in the use of existing land; (b) acquisition and management (acquisition and management), perfecting systems and rules for buying and selling land as well as improving existing land tenure systems to support efforts to maintain the existence of agricultural land; and (c) incentives and charges, through the provision of subsidies to farmers who can improve the quality of the land they own, as well as the application of attractive taxes for those who maintain the existence of agricultural land [18], [19], [20], [21].

3.2. The decrease in water discharge

The status of the carrying capacity of water comes from the comparison between the amount of water availability and the level of water demand. From the status of the carrying capacity of water, information is obtained about the ability of the environment, especially the hydrospheric environment to maintain its condition due to the presence and activities of humans, which is described by the status of carrying capacity of water that is surplus or deficit. In general, the water carrying capacity status of the Province of Bali in 2013 and 2014 either from the BPS area data or from the RBI (Indonesian Digital Topography) data area is a deficit. Meanwhile, the addition of several assumptions about the availability of water from groundwater basins, changes in the amount of rain due

to the El Nino or La Nina phenomena also show that the availability of water in the Province of Bali remains in deficit although with different distribution patterns [6].

Increasing people's income and population as well as development in all fields, especially settlements and the tourism industry in Bali, demands the fulfillment of water needs that continue to increase both in terms of quantity and quality. This implies that water is becoming an increasingly scarce resource. Competition leading to conflicts of interest in its utilization between various sectors, especially the agricultural and non-agricultural sectors, is likely to increase in the future. Given that water is becoming increasingly scarce, subak farmers are required to be able to manage water more efficiently and so are other water users to be able to develop a water-saving culture.

3.3. Decreased interest in productive human resources in the agricultural sector

The condition of the main actors in agricultural development is mostly in the elderly position. There is a need for regeneration and fostering interest in the younger generation to work in the agricultural sector and at the same time preventing second lost generation.

Developing the interest of the more youthful age to work in the rural area can be done by developing and introducing technology that can provide convenience for farming communities, both men and women, especially young people in carrying out production at the on-farm and off-farm levels. Therefore, research and development institutions must be able to produce technologies that can attract the interest of young people, such as agricultural mechanization and agricultural product processing technology. Research institutions and extension institutions must always be able to coordinate in meeting the needs of the agricultural community considering that research institutions and extension institutions in Indonesia are not under one roof.

To attract more young people to be involved in agriculture, it is necessary to open greater access for youth, especially those who have completed high school and university level education to open agriculture-based businesses. Besides that, it is also developing various entrepreneurship training programs in the agricultural sector [22], [23], [24], [20].

3.4. Application of new technology

The application of new technologies in the agricultural sector has not been fully implemented by farmers in Bali. They consider the operational costs of using new technology to be high. Technology-based agricultural innovations such as start-up stimulus that can help the process of planting to harvesting more effectively and efficiently. Today's technology such as drones can be used to map land, so that in the future drones can replace the role of farmers and work according to maps that have been made.

3.5. Weakening of the existence of subak

Subak is confronted with different difficulties both now and later on. These difficulties include: (1) exchange advancement (counting agrarian items); (2) transformation of flooded land for non-rural purposes; (3) the undeniably restricted accessibility of water comparative with request; (4) natural harm, particularly contamination of water assets; (5) monetary requests to bear Operation costs because of IPAIR projects; and (6) decreased interest of youngsters to fill in as ranchers. Confronted with difficulties like that, it appears to be that Subak will actually want to keep up with its reality on the grounds that Subak has the potential as a "practical" association. Such possibilities are intended for instance: (1) the presence of an unmistakable authoritative design outfitted with rules and severe authorizations; (2) optimistic mood of common participation; (3) the presence of ceremonial exercises which are essentially a bringing together component of the individuals; (4) has a philosophical establishment of Tri Hita Karana; (5) the presence of a compromise system; and (6) the presence of a gathering pledges work to assist the association. Be that as it may, subak is additionally not liberated from shortcomings, for example, (1) a large portion of them are not yet lawful substances; (2) the region developed by ranchers is for the most part tight and has the situation with keen; (3) restricted capital of ranchers; (4) powerless negotiating posture of ranchers; (5) restricted authority of innovation, administrative and pioneering capacities just as market data; and (6) not all water system region has a between subak coordination gathering.

3.6. Relatively small agricultural budget policy

Regional development budgets sourced from regional expenditure budget for agricultural programs in Bali are still relatively small. The placement of the vision in agricultural

development does not have to be directly related to the size of the regional expenditure budget allocation for agriculture. However, often the small budget (regional expenditure budget for agriculture) is used as a “scapegoat” to cover the absence of a more promising vision in agricultural development programs. It should be understood that the vision of agricultural development is considered good if the vision is successfully disseminated and can be understood together, especially between agricultural officials and farming communities in rural areas. It would be even better if the farming community in rural areas understood what the vision of agricultural development was proclaimed by the elected officials or regional heads. The participatory regional development planning process is still limited to the ceremonial Musrenbang (formality) events.

3.7. Marketing system orientation

The progress of a business is generally characterized by the development of entrepreneurship and business organization. In the agricultural sector, it is almost entirely true that agricultural businesses in rural areas are farming businesses that produce raw material products with low added value, are managed traditionally, are not supported by skilled workers, are weak in financial capital, depend on nature, and are inherently subsistence. This situation is generally not conducive to forming agricultural enterprises to produce highly competitive agricultural products, which are characterized by high value added products, managed in a modern way, supported by a professional workforce, strong in financial capital support, not too dependent on nature, and inherent in commercial characteristics. -industrial. The progress of tourism can be seen as part of the trigger for agricultural-industrial modernization in rural Bali. Indications of the lack of development of agricultural entrepreneurship in Bali are shown that the agricultural product trade segment is generally not controlled by farmers, either individually or collectively. As an illustration, the domestic agricultural product market in Bali is relatively large. It is almost impossible to find business organizations in rural areas experiencing planned changes, almost related to the dynamics of market demand for domestic agricultural products in Bali. The Bali area, as a relatively developed tourism area and a transit point for human movement from eastern Indonesia and western Indonesia (and vice versa), should be viewed as one of the political forces of regional agriculture in the eastern region. The strength of this position and transit space should be seen as a strength for planners for the development of agricultural enterprises in Bali. Given that this has not been taken into account in a meaningful way, the dynamics

of the market for agricultural products in Bali do not provide significant feedback for improving the performance of traditional rural agriculture in Bali.

3.8. Misappropriation of agricultural subsidies

Misappropriation of subsidies is one of the causes of the decline in the performance of the agricultural sector. One of the programs to overcome this condition is the issuance of a card. This card will be integrated with the RDKK data (Definitive Design of Group Needs) which contains the identity of the farmer according to the family identification number, the area of land owned and the need for subsidized fertilizers needed. When a farmer wants to redeem this subsidized fertilizer to a line four or village level subsidized fertilizer retailer officially appointed by the distributor, it will be seen that the allocation of fertilizer that is their right will be seen.

3.9. Lack of strengthening of agricultural agro-industry

Agricultural development policies in Bali have not been specifically directed to rural industrialization. It is impressed that the vision of agricultural development in Bali emphasizes the romantic aspect (traditional rural agriculture) compared to the rational-technocratic vision, for example (to) carry out a transformation towards industrialization of agriculture in rural areas. Farmers or economic actors in rural areas do not make the regional development vision important. For them, especially among the elderly farmers, as long as the implementation of traditional agricultural development does not face obstacles, farming is considered adequate. In which direction is the development of traditional agriculture, it seems that it is not something that is important to the designers of regional development policies. Progress in dryland agriculture is starting to be felt, as a response to the demand for non-traditional agricultural products, especially horticultural agriculture. Young farmers, who are not too confined by the cultural imagination of traditional agriculture (paddy rice), have shown a significant response to market demand for local agricultural products. In areas with cool climates, such as around Baturiti and Kintamani sub-districts, the development of seasonal horticultural crop farming (and also smallholder plantations) provides a ”fresh air” future for agriculture in rural Bali. The demand for horticultural crop products, both from annual and annual crops, shows significant developments. The market price of horticultural crop products (vegetables and fruits) is relatively high and high, compared to lowland rice. This situation provides a stimulus for dry land farmers to organize seasonal horticultural crop farming.

3.10. Synergy between agriculture and tourism

Judging from the regional development vision, agricultural development planning has not placed the three forces as a synergistic unit; namely agriculture, tourism and industry. Agriculture can be seen as the socio-historical strength of (traditional) rural Balinese society; tourism is a result of the attraction to the uniqueness of Balinese Hindu religious culture to foreign tourists, and industry is a vision of the economic progress of the Balinese people in the future. Agricultural development policies in Bali need to be placed in the frame of the "three forces" driving the economic progress of the Balinese people. With this vision, tourism progress is no longer a "rivalry" for traditional agriculture in rural areas. With the perspective of industrial agriculture transformation; then the power of tourism can be placed as a lever of progress, while the industrialization of rural agriculture as a spread energy for the progress of the Balinese people in a sustainable manner.

4. Conclusion

Key factors that affect the performance of the agricultural sector in Bali Province are land conversion, reduced water discharge, and decreased human resources for productive farmers to be involved in the agricultural sector. These three factors must be resolved in the short term. The next factor is the reduced budget for the agricultural sector, abuse of agricultural subsidies, and the synergy between agriculture and tourism. Meanwhile, the application of new technology, the weakening of the existence of subak, the orientation of the marketing system, and the weak strengthening of the agricultural agro-industry can be addressed in the long term.

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