Betting Scenario for Sustainability of Farming Bussines in Urban Areas

Putu Riska Wulandari*, Ida Ayu Nyoman Saskara, I Gusti Wayan Murjana Yasa and Anak Agung Istri Ngurah Marhaeni

Faculty of Economics and Business, Udayana University, Indonesia.

Abstract: Bali has agricultural institutions that are not owned by other regions in Indonesia or even other countries, namely subak. The sustainability of farming through subak institutions provides benefits for urban communities. However, there are several challenges that must be faced to ensure the sustainability of farming in urban areas. This article aims to present scenarios for sustainable farming in urban areas. The research approach with case studies was carried out through participant observation and semi-structured interviews. Data collection was also carried out through Focus Group Discussion (FGD), which would later be analyzed through SMIC-Prob Expert prospective analysis. The results of the analysis show that the scenario that has the highest probability is the combination of scenario number 18 with a probability of 0.098, with the combination of scenario 01110, which means only plant diversification, agricultural intensification, and farmer cadre formation are implemented. The prime movers for sustainable farming businesses in urban areas are strengthening agricultural institutions and diversifying plant scenarios. The opportunity for diversification in plant scenarios has the greatest opportunity to be realized for the sustainability of farming businesses and achieving food security.

Keywords: Scenario, prospective, sustainability, farming, urban subak.
JEL Classification: M48, O13, O18.

INTRODUCTION

Issues pertaining to food conditions continue to be a significant global concern. Food insecurity is a prevalent issue that transcends national boundaries and affects not only underdeveloped and developing countries but also those that are currently experiencing rapid growth across various domains. The Agricultural Development Master Strategy for the years 2015 to 2045 has been formulated with the aim of achieving sustainable agriculture-bioindustry. This strategy is aligned with the development objectives that have been set, which include the attainment of national food self-sufficiency by 2020, national food sovereignty by 2025, and community food sovereignty by 2045. This information has been reported by Syahyuti et al. in 2015. The agricultural sector plays a crucial role in providing food and employment opportunities, as well as contributing to economic development on a national scale (Handayani, 2018).

The notion of sustainability in agriculture is predicated upon three dimensions of sustainability, namely: economic sustainability (profitability), social sustainability (human well-being), and ecological sustainability (planet health). These three dimensions are commonly referred to as the triangular pillars of sustainable agriculture, as posited by Lagiman (2020). Gibson et al. (2005) proposed a typology that comprises five pillars, namely economic, social, ecological, institutional, and cultural. This typology is distinct from another typology that is based on three pillars. Fauzi (2019) has discussed this typology in detail.

*Address correspondence to this author at the Faculty of Economics and Business, Udayana University, Indonesia;
E-mail: riskaawulandari2@gmail.com

Amidst the Covid-19 pandemic, the agricultural sector remains a viable option for individuals seeking employment opportunities, whether as their primary or supplementary means of livelihood. The present role of agriculture is to provide employment opportunities for individuals who have been impacted by layoffs (PHK) in other industries, as well as to supplement the influx of new labour into the agricultural sector. The primary hazards associated with rice farming are the heightened occurrence of floods, droughts, and pest infestations. These risks have become increasingly intricate in light of the unpredictable climate change scenario. The challenge lies in ensuring an adequate supply of agricultural produce to meet public demand.

The contemporary transformation of paddy fields has significant socio-economic implications, particularly with regard to income and employment opportunities. This phenomenon has resulted in a shift in livelihoods, commonly referred to as socio-economic transformation. According to Sugino (2003), the efficacy of farming is primarily contingent upon two crucial factors: optimal implementation of agricultural resource management practises by institutions, and government intervention. Subak is considered to be one of the governing institutions. The Subak system is a traditional irrigation organisation utilised in agriculture that serves various functions. One of its notable roles is its contribution to the distinctiveness of Balinese culture, which has gained global recognition (Windia et al, 2001).

The Subak system is known to operate on the principles of harmony and unity, as per the foundation of Tri Hita Karana (THK), while also ensuring ecological equilibrium (Pusposutardjo, 1997; Arif, 1999). According to PERDA No. 9 of 2012, subak is a socioagrarian, religious, and economic tradi-

tional organisation that has historically developed and expanded in Bali. It pertains to the management of water use and/or crop cultivation at the farming level of the indigenous population. The objective of sustainable agriculture is to enhance the financial and social well-being of the farming population by improving agricultural productivity in an equitable manner while considering the ecological carrying capacity. This approach ensures the long-term sustainability of production by minimising environmental degradation, as stated by Budiasa (2018). The Farmer Exchange Rate (NTP) serves as an indicator of the level of welfare among farmers. In December 2022, the Bali Province NTP registered a value of 97.05, indicating a relatively weaker performance compared to the national NTP index, which surpassed the threshold of 100.

The imperative need for the government to intervene in the plight of farmers cannot be overstated. Specifically, the formulation of policies that can enhance the welfare of farmers is crucial. This will not only attract the younger generation to the agricultural sector but also position it as a viable source of income for meeting their daily needs. The Smart City movement has facilitated the involvement of the relevant SKPD, thereby enabling future synergies in the development of Subak Lestari. This region comprises approximately 2,485 hectares of wet and dry agricultural land located in Denpasar City (BeritaBali.com, 2016).

The majority of cultivated agricultural land is owned by individuals other than the cultivators. The practise of sharing agricultural produce with landowners is a result of this phenomenon, whereby farmers allocate approximately 25% of their crop for the purpose of seed preservation in the subsequent planting season. The costs incurred in procuring production inputs, commonly referred to as inputs, may lead to a reduction in the income earned despite their potential to escalate.

In addition to land ownership, rice farming is often associated with high production costs, which can result in reduced profitability. Despite the fact that rice yields in Denpasar are acknowledged for their quality and ability to rival those of other districts, the local rice is sold at a higher price than imported products. The social dimension of sustainable farming is characterised by a focus on people, with an emphasis on promoting social welfare. This is manifested through the cultivation of a harmonious social environment, which involves measures to prevent social conflict, preserve cultural diversity, and safeguard socio-cultural capital. The implementation of development requires consideration of important indicators such as poverty alleviation, equal distribution of business opportunities and income, socio-political participation, and socio-cultural stability.

Sustainable agriculture presents a means of enhancing the agricultural sector by promoting labour absorption, social cohesion, and justice. According to Rukmana (2012), social sustainability encompasses the appropriate treatment of workers and the expansion of options for locally sourced products. The agricultural practise that is centred on the ecological dimensions of the natural environment is commonly referred to as ecology. This approach underscores the importance of maintaining the stability of natural ecosystems, which encompasses biological life systems and natural materials. The aforementioned encompasses the preservation of biodiversity and biological carrying capacity, soil, water, and agro-climate resources, alongside environmental health and comfort (Rivai & Anugrah, 2011).

Farming in urban areas has challenges and constraints to be able to remain sustainable in the future. However, there is no model or scenario that discusses the sustainability of farming in urban areas with narrow land in Indonesia, namely Bali. Much research on farming sustainability has been carried out in Bali, but there has been no research using a prospective approach with SMIC-Prob Expert to construct the transformation of farming sustainability in Bali. So that the aim of this article is to obtain a scenario that drives the sustainability of farming bussines in urban areas.

LITERATURE REVIEW

Sustainable agriculture has emerged as a potential solution to enhance human well-being while simultaneously safeguarding natural resources and the environment. The optimization of sustainable development can be achieved through the establishment of partnerships between agribusiness actors. The establishment of business partnerships can ensure sustainable development by promoting efficiency and growth, equity and justice, and environmental consciousness. Septana and Ashari (2007) argue that in order to facilitate this endeavour, it is imperative to establish robust institutional consolidation across various levels, including farmers, private sector, and government. The notion of sustainable agriculture is centred on three sustainability dimensions, namely: economic sustainability (profit), social sustainability (people), and ecological sustainability (planet) (Munasinghe, 1993). According to Sampleiling et al. (2012), the assessment of urban agricultural sustainability can be conducted through the examination of five dimensions, which include ecological, economic, social, institutional, and technological dimensions. Gibson et al. (2005) proposed an alternative typology consisting of five pillars, namely economic, social, ecological, institutional, and cultural. This is in contrast to the three-pillar typology that is commonly used. Fauzi (2019) notes the existence of this alternative typology. The viability of agriculture in Bali is intricately linked to the Tri Hita Karana principles and indigenous knowledge, which are deeply ingrained in the Balinese culture. According to Saskara and Marhaeni (2017), the Balinese population is intrinsically linked to the cultural framework of their community, which encompasses various aspects such as social governance, customary practises, regional cultural norms, and indigenous knowledge. The significance of agricultural sustainability lies in the existence of regulatory institutions such as Subak. The Subak system is a traditional irrigation organisation utilised in agriculture that serves various purposes. Among these is its contribution to the distinctiveness of Balinese culture, which has gained global recognition (Windia and Dewi, 2011).

A sustainable farming scenarios has been devised and implemented across multiple farms in Indonesia. Much research on farming sustainability has been carried out in Bali, but there has been no research using a prospective approach with SMIC-Prob Expert to construct the transformation of farming sustainability in Bali. Numerous scholars have conducted research on the sustainability of farming. However,

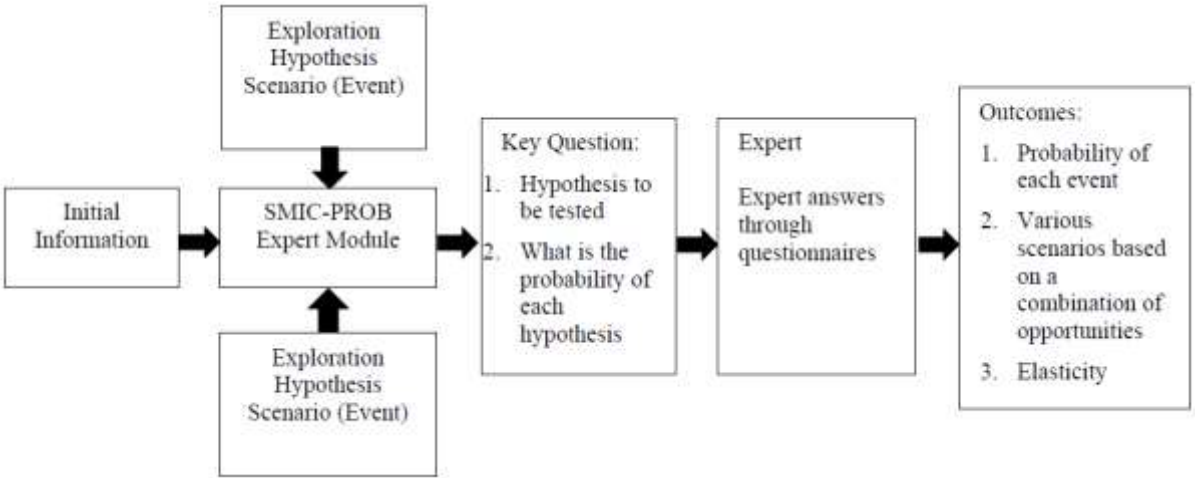

Fig. (1). The Analytical Framework SMIC-PROB Expert
Source: Fauzi (2019).

such studies have predominantly been conducted in rural areas where there exists a substantial amount of agricultural land. Anantanyu (2009) conducted a study on the involvement of farmers in enhancing the institutional capacity of farmer groups in the Central Java Province. Suharyon and Busyra (2016) conducted research on the performance of farmer groups in the sub-optimal land rice farming business system and its empowerment methods. The study focused on paddy field activities on sub-optimal land in Tanjung Jabung Regency, East Jambi. Similarly, Raditya (2021) conducted a study on the effectiveness role of Subak in mitigating land conversion in the Penatih sub-district of Denpasar city. Udayani (2021) conducted research on the implementation of the tri hita karana philosophy for the sustainability of the Anggabaya subak, a subak located in the city of Denpasar, with the aim of assessing its sustainability. Consequently, the outcomes of this investigation are anticipated to serve as a point of reference for a prospective sustainable farming framework in urban localities. The Denpasar City Area lacks research on Made Ayu Intan's Subak Lestari, which comprises five subaks that have been transformed into a sustainable subak programme. Specifically, there is a dearth of information on potential models and sensitivity of driving scenarios in farming sustainability. The present study fills this gap and provides a valuable reference for future researchers seeking to investigate this topic in the city of Denpasar.

METHODS

The study was carried out in Denpasar City due to the presence of Subak Lestari area called 'Subak Lestari Made Ayu Intan' comprising five subaks, namely Anggabaya, Umalayu, Umadesa, Intaran Barat, and Intaran Timur. The primary purpose of Subak Abadi is to prevent the conversion of agricultural land functions that have become increasingly challenging to sustain. The Subak Lestari pilot model was based on the five subaks, which served as the initial prototype. One of the key factors taken into account was the emergence of a sense of commitment among the subak members (krama) to preserve their subak area as agricultural land, with a particular emphasis on rice fields. The expectation is that the pilot model will gradually influence the establishment of sustainable agriculture in urban regions.

This case study research uses two approaches, namely a combination of quantitative and qualitative approaches (Mixed Methods) with a Sequential Exploratory design, namely this research model is carried out by collecting data and analyzing qualitative data in the first stage, then collecting data and analyzing quantitative data in the second stage. second (Creswell, 2010). Primary data collected by researchers through observation and semi-structured face-to-face interviews through open questions with smallholders as material for consideration and comparison of the results of Focus Group Discussions (FGD) with experts and stakeholders (Seal, Bogart, and Ehrhardt, 1998). As many as 12 stakeholders from academia, government, farming communities, and business in order to obtain comprehensive information about the scenarios driving the sustainability of farming in Denpasar City.

The analysis of sustainability involves the utilisation of the SMIC-PROB technique, also known as SMIC-PROB EXPERT, which incorporates an element of uncertainty. This technique employs scenario analysis, based on opportunity theory, to evaluate the probability of an activity taking place or not taking place (event), with the aim of assessing the sustainability of Tanu's business (Godet et al., 2004). The potential outcomes of these opportunities are utilised by SMIC-Prob to compute a score for various scenario combinations, which can then be either implemented or disregarded. According to Fausi (2019), The assessment of different scenarios relies on the expert opinions concerning the viability of agricultural practises conducted through Focus Group Discussions (FGDs) and questionnaire responses. The outcomes of the Focus Group Discussion (FGD) will be utilised to deduce basic probability, conditional probability, and sensitivity analysis. According to Kusdiantoro et al. (2020), the policy alternatives that exert the greatest influence are contingent upon the outcomes of the sensitivity analysis. The SMIC-Prob methodology employs two distinct methods for evaluating the likelihood of a given case being observed.

The first approach involves soliciting input from each expert involved in the analysis, who are asked to provide estimates of both simple and conditional probabilities for each scenario. This method results in a combination of outcomes that

reflects the individual analyses of each expert. The proposed approach is anticipated to be intricate and will require a considerable number of specialists.

The second methodology involves expert aggregation, wherein the average probability of the experts is computed to generate a singular, comprehensive outcome. The second approach is commonly employed in diverse scenarios, including regional planning, as demonstrated by Somodji et al (2011) and Medina et al (2015).

The SMIC-Prob methodology employs a questionnaire that utilises a Likert scale. The data obtained from the questionnaire is subsequently transformed into opportunities by means of standardisation techniques. Subsequent to the completion of the Likert scale, the responses are transformed into opportunities through the utilisation of established formulas.

$$P(F_i) = \frac{(V_i - min)}{(max - min)} \quad (1)$$

The variable V_i represents the score assigned by expert I, while max and min denote the maximum and minimum values of the Likert scale on the questionnaire.

FINDINGS AND DISCUSSION

During the initial stage of SMIC-Prob analysis, the identification of probability scenarios to be analysed was conducted. The scenario in this study pertains to the potential actions of farmer cultivators towards the sustainability of their agricultural enterprise. Based on the questionnaire results that were adjusted with the FGD outcomes, five scenarios (referred to as hypotheses in the SMIC-Prob data input) were identified for the sustainability of agricultural businesses. These scenarios include: (1) Strengthening agricultural institutions (lembg), (2) Crop diversification (diver), (3) Intensification of agricultural businesses (intens), (4) Farmer cadres (kader), and (5) Career transition (alihprof).

The determination of potential scenarios in sustainable agricultural business is obtained through the calibration of raw data into net data, which is the initial process of Smic-Prob Expert analysis, resulting in more accurate data. The results of the calibration process, which transformed raw data into net data on the probability of simple scenarios for the sustainability of agricultural businesses, are presented in Table **1**.

Table 1. Simple Probabilities of Farming Sustainability Scenario.

Hypothesis	Probabilities	
	Raw Data	Net Data
H1- Strengthening Agricultural Institutions(lnst)	0,350	0,462
H2- Plant Diversification (diver)	0,600	0,585
H3- Agricultural Intensification (intens)	0,600	0,507
H4- farmer cadre formation (cadre)	0,500	0,493
H5- switching professions (swit)	0,100	0,293

(Source: Researcher, 2023).

Table **1** displays a transformation of data from raw to net data. The probability of institutional strengthening, which was initially 0.350 (35%), has increased to 0.462 (46.2%), while the probability of professional conversion, which was originally 0.100 (10%), has risen to 0.293 (29.3%). In addition to an increase, a decrease in the likelihood of scenarios was observed following calibration. Specifically, the probabilities of plant diversification decreased from 0.600 (60%) to 0.585 (58.5%), plant intensification decreased from 0.600 (60%) to 0.507 (50.7%), and the cultivation of stink beans decreased from 0.500 (50%) to 0.493 (49.3%). The subsequent discussion employs an analysis based on net data, which reveals that the highest probability is associated with the scenario of crop diversification, while the lowest probability is associated with changing professions.

	inst	diver	intens	cadre	swit
1 : inst	0.462	0.415	0.448	0.335	0.316
2 : diver	0.526	0.585	0.726	0.638	0.391
3 : intens	0.492	0.629	0.507	0.674	0.444
4 : cadre	0.357	0.538	0.655	0.493	0.564
5 : swit	0.2	0.196	0.257	0.335	0.293

Fig. (2). Conditional Probabilities if realized.

(Source: Researcher, 2023).

If the strengthening of the agricultural institution of *Subak Lestari Made Ayu Intan*, as depicted in Fig. (2), is realised or implemented, the chances of strengthening agricultural institutions would be 46.2%, crop diversification would be 52.6%, agricultural intensification would be 49.2%, while cadre development would only be 35.7%, and the smallest chance would be the choice to switch professions, at 20%. The strengthening of agricultural institutions is categorised into three functions, namely guidance, services, and business, based on their respective roles. One type of institutional entity that serves as a developer is the agricultural extension agency. Two types of institutions that serve as providers are agricultural kiosks and credit institutions. According to Suardi (2016), the types of agricultural cooperatives include farmer cooperatives, farmer groups, and subak. The *subak* institution can serve as a means for productive economic development, thus emphasising the importance of strengthening *subak*-based economic and business units through the establishment of the *Lembaga Usaha Ekonomi Subak* (LUES) to ensure the sustainability of agricultural businesses (Lestari et al., 2023).

The consequences of not implementing the agricultural institutional strengthening scenario can be observed in Fig. (**3**), where the responses of experts indicate that the opportunities for crop diversification are 63.5%, opportunities for agricultural intensification are 52%, opportunities for farmer cadres are 60.9%, and opportunities for switching professions are 37.2%.

	inst	diver	intens	cadre	swit
1 : inst	0	0,527	0,476	0,585	0,522
2 : diver	0,635	0	0,44	0,533	0,665
3 : intens	0,52	0,335	0	0,344	0,533
4 : cadre	0,609	0,43	0,326	0	0,463
5 : swit	0,372	0,43	0,331	0,252	0

© LIPSOR-EPITA-PROB-EXPERT

Fig. (3). Conditional Probabilities if not realized.
(Source: Researcher, 2023).

The outcomes of the combination probability scenario are presented in Table **2**. Based on the SMIC-Prob analysis, a total of 2n combinations were obtained, where n represents the five possible scenarios investigated, resulting in 32 scenario combinations. The meaning of the value of zero is that the scenario is not realised, while the value of one signifies that the scenario is realised. The scenario with the highest probability is scenario number 18, with a probability of 0.098. This scenario involves the combination of diversification of crops, intensification of farming practises, and training of farmers, while institutional strengthening of agriculture and switching professions are not implemented.

The sequence of sustainable farming scenario combinations in *Subak Lestari Made Ayu Intan*, based on their likelihood, is illustrated in Fig. (**4**). The figure reveals that the highest probability is associated with the 18th scenario combination, which involves crop diversification, farming intensification,

Table 2. Combination of Various Scenarios.

No	Scenario Combination	Probability	No	Scenario Combination	Probability	No	Scenario Combination	Probability	No	Scenario Combination	Probability
1	11111	0,003	9	10111	0,001	17	01111	0,058	25	00111	0,035
2	11110	0,071	10	10110	0,031	18	01110	0,098	26	00110	0,026
3	11101	0,004	11	10101	0,009	19	01100	0,051	27	00101	0,000
4	11100	0,072	12	10100	0,027	20	01011	0,017	28	00100	0,000
5	11011	0,000	13	10011	0,009	21	01010	0,048	29	00011	0,033
6	11010	0,021	14	10010	0,020	22	01001	0,015	30	00010	0,013
7	11001	0,007	15	10001	0,051	23	01000	0,044	31	00001	0,003
8	11000	0,066	16	10000	0,061	24	00111	0,035	32	00000	0,058

(Source: Researcher, 2023).

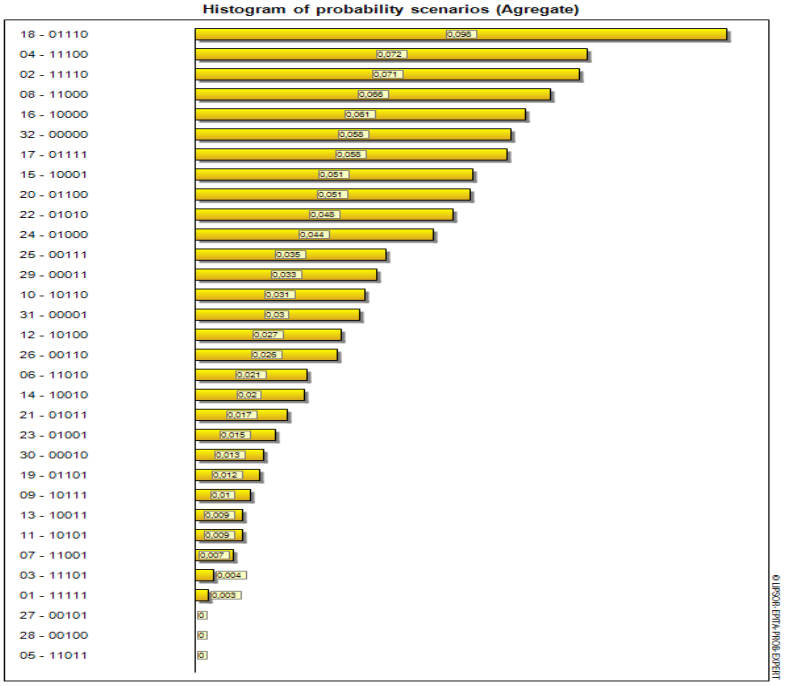

Fig. (4). Order of Hypothesis Combinations Based on the Probability Size.
(Source: Researcher, 2023).

and farmer empowerment, with a probability of 9.8%. Subsequently, the fourth scenario was implemented in conjunction with institutional strengthening, crop diversification, and agricultural intensification, among other measures. The smallest probability is obtained in the fifth combination, which relies on institutional strengthening, crop diversification, farmer cadres, and switching professions without intensifying agricultural efforts, with a probability of 0%. The total of the first 15 sequences in Figure 4 yields a cumulative probability of 70.4% for the sustainability of agricultural businesses under the main scenario of agricultural institutional strengthening.

The actions taken in sustainable agriculture practises, whether realised or not, will inevitably impact other scenarios. Fig. (**5**) illustrates the impact of the realisation on the hypothesis that the implementation of the scenario of strengthening agricultural institutional businesses would result in a decrease in opportunities for crop diversification, crop intensification, cadre development, and profession switching. The study reveals a decline of 4.6% in diversification, 1.4% in intensification, 12.7% in cadreship, and 14.6% in professional mobility.

	inst	diver	intens	cadre	swit
1 : inst	0	-0.046	-0.014	-0.127	-0.146
2 : diver	-0.059	0	0.141	0.053	-0.194
3 : intens	-0.015	0.122	0	0.167	-0.063
4 : cadre	-0.135	0.045	0.163	0	0.071
5 : swit	-0.093	-0.097	-0.036	0.042	0

© LIPSOR-EPITA-PROB-EXPERT

Fig. (5). The impact of the realized scenario on other scenario opportunities.
(Source: Researcher, 2023).

	inst	diver	intens	cadre	swit
1 : inst	-0.462	0.065	0.014	0.123	0.06
2 : diver	0.05	-0.585	-0.145	-0.052	0.08
3 : intens	0.013	-0.172	-0.507	-0.162	0.026
4 : cadre	0.116	-0.063	-0.167	-0.493	-0.029
5 : swit	0.079	0.137	0.037	-0.041	-0.293

© LIPSOR-EPITA-PROB-EXPERT

Fig. (6). Impact of unrealized scenario against other scenario opportunities.
(Source: Researcher, 2023).

Fig. (**6**) illustrates the probability if the scenario is not realised. Failure to strengthen farmer cadres will result in a decrease of 6.3% in the opportunity to diversify crops, a decrease of 16.7% in agricultural intensification efforts, and a decrease of 2.9% in the likelihood of changing professions. The decline in agricultural intensification can be attributed to the lack of cadreship, as agricultural intensification requires a productive and professional workforce or farmers. The need for farmer leadership training arises from the increasing age of farmers, which results in a decline in agricultural business performance (Pessotto et al., 2019). Therefore, the cultivation of farmer cadres is crucial for the sustainability of agricultural enterprises.

	inst	diver	intens	cadre	swit	Absolute value
1 : inst	1	-0.337	-0.303	-0.423	-0.468	1.531
2 : diver	-0.42	1	-0.114	-0.251	-0.611	1.395
3 : intens	-0.252	-0.113	1	-0.055	-0.281	0.701
4 : cadre	-0.385	-0.199	-0.068	1	-0.152	0.803
5 : swit	-0.23	-0.231	-0.193	-0.148	1	0.802
6 : Absolute value	1.87	0.879	0.678	0.876	1.512	

© LIPSOR-EPITA-PROB-EXPERT

Fig. (7). Scenario Elasticity.
(Source: Researcher, 2023).

Based on Fig. (**7**), institutional strengthening and crop diversification are identified as prime movers with respective elasticities of 1.531 and 1.395. This implies that the sustainability of agricultural enterprises will be greatly influenced by the implementation of these two scenarios. On the other hand, the scenario of switching professions is the most extractive scenario, as it is most heavily influenced by elasticity, which amounts to 1.512. This implies that the largest contributor is the profession switch, which amounts to -0.611. This indicates that every 100% increase in the likelihood of crop diversification scenarios will decrease the likelihood of a profession switch by 61.1%. The change of profession here is a change of profession where initially agriculture became the main job, turning agriculture into a side job. According to Megalhaes et al. (2021), appropriate decision-making has an impact on the success of food diversification scenarios, particularly in the chosen logistics process. Strengthening Agricultural Institutionsto strengthen the goals to be achieved (Marín-González, 2023).

The results of the sensitivity analysis related to the most probable scenario and how the magnitude of the opportunity between being implemented and not being implemented are presented in table **3** and **4**. Table **3** is the result of the recapitulation of each scenario which shows that the plant diversification scenario has the highest overall probability of 0.575 or 57.5%. Table **4** presents scenarios of plant diversification that are realized by code ('1" in the second order) and not realized by code ('0' in the second order). It can be seen that the probability of the plant diversification scenario being realized is 0.575, while if it is not realized it is 0.412. Analysis of farming sustainability with probability scenarios implies that the main issues triggering current changes are likely to be relevant in the policy context in the medium and long term so that it is necessary to identify how strategic decisions must be made to overcome the uncertainty of policy makers (Fauzi, 2019). Based on table **4**, it is found that the opportunity between realized and not realized shows that the opportunity for the diversification scenario to be realized is greater. This shows that it is very important to plant diversification for the sustainability of farming business and the welfare of farmers. Plant diversifications requires creativity and innovation. The creative process requires more than inspiration in generating new ideas. It also requires the ability to organize ideas into a unified whole that must have a "feel"

in the creative process (Einarsson 2016). Creativity includes new knowledge, whereas innovation may not be synonymous with creativity and is additional (Pratt and Jeffcutt 2009; Anderson, Potocnik, and Zhou 2014). Utilization of appropriate technology is part of process and product innovation in which capital stock and labor growth are generated by improving production process techniques (Pratt and Jeffcutt 2009; Kerr 2009).

Table 3. Recapitulation the Probability for Each Scenario.

No	Inst	Diver	Intens	Cadre	Swit	Probability
18	0	1	1	1	0	0.098
4	1	1	1	0	0	0.072
2	1	1	1	1	0	0.071
8	1	1	0	0	0	0.066
16	1	0	0	0	0	0.061
32	0	0	0	0	0	0.058
17	0	1	1	1	1	0.058
15	1	0	0	0	1	0.051
20	0	1	0	1	1	0.017
22	0	1	0	0	1	0.015
24	0	0	1	1	1	0.035
25	0	0	1	1	1	0.035
29	0	0	0	1	1	0.033
10	1	0	1	1	0	0.031
31	0	0	0	0	1	0.003
12	1	0	1	0	0	0.027
26	0	0	1	1	0	0.026
6	1	1	0	1	0	0.021
14	1	0	0	1	0	0.02
21	0	1	0	1	0	0.048
23	0	1	0	0	0	0.044
30	0	0	0	1	0	0.013
19	0	1	1	0	0	0.051
9	1	0	1	1	1	0.001
13	1	0	0	1	1	0.009
11	1	0	1	0	1	0.009
7	1	1	0	0	1	0.007
3	1	1	1	0	1	0.004
1	1	1	1	1	1	0.003
27	0	0	1	0	1	0.000
28	0	0	1	0	0	0.000
5	1	1	0	1	1	0.000
	0.450	0.575	0.521	0.519	0.280	1.000

(Source: Researcher, 2023).

Table 4. Comparison of Realization of Plant Diversification.

No	Scenario Combination	Probability of Diversification =1	No	Scenario Combination	Probability of Diversification =0
18	01101	0.098	16	10000	0.061
4	11100	0.072	32	00000	0.058
2	11110	0.071	15	10001	0.051
8	11000	0.066	24	00111	0.035
17	01111	0.058	25	00111	0.035
20	01011	0.017	29	00011	0.033
22	10001	0.015	10	10110	0.031
6	11010	0.021	31	00001	0.003
21	01010	0.048	12	10100	0.027
23	01000	0.044	26	00110	0.026
19	01100	0.051	14	10010	0.02
7	11001	0.007	30	00010	0.013
3	11101	0.004	9	10111	0.001
1	11111	0.003	13	10011	0.009
5	11011	0	11	10101	0.009
			27	00101	0
			28	00100	0
Amount		0.575	Amount		0.412

(Source: Researcher, 2023).

CONCUSION

The scenario that has the highest probability is the combination of scenario number 18 with a probability of 0.098, with the combination of scenario 01101, which means only crop diversification, agricultural intensification, and cadres training are implemented. The scenario of institutional strengthening and crop diversification is considered a prime mover, indicating that the sustainability of agricultural enterprises is highly dependent on institutional strengthening and crop diversification. Among the two determining scenarios for the sustainability of farming, is plant diversification and strengthening agricultural institutions, it was found that crop diversification most determines the sustainability of farming business in Denpasar City. The opportunity between realized and not realized shows that the opportunity for the diversification scenario to be realized is greater. To secure the sustainability of urban farming, the government must prioritize crop diversification programs to achieve community food security.

REFERENCES

Anantanyu, S. 2009. Partisipasi Petani dalam Meningkatkan Kapasitas Kelembagaan Kelompok Petani (Kasus di Provinsi Jawa Tengah). Disertasi pada Institut Pertanian Bogor

Anderson, Neil, Kristina Poto_cnik, and Jing Zhou. 2014. "Innovation and Creativity in Organizations: A State-ofthe- Science Review, Prospective Commentary, and Guiding Framework." Journal of Management 40 (5): 1297–1333. doi:10.1177/ 0149206314527128.

Arif, S.S. l999. Applying Philosophy of Trihita Karana in Design and Management of Subak Irrigation System, dalam A Study of Subak as Indigenous Cultural, Social, and Technological System to Establish a Culturally based Integrated Water Resources Management Vol.III. (ed: S.Susanto), Yogyakarta ; Fac.of Agric.Technology, Gadjah Mada University.

Berita Bali, 2016. Beritabali.com/news/read/lestari-subakku-lewat-subak-lestari,

Budiasa, I.W. (2018). Pertanian Berkelanjutan Teori dan Pemodelan. Udayana University Press. Denpasar. 310 h

Buitrago, Felipe, and Ivan Duque. 2013. The Orange Economy. InterAmerican Development Bank 1300 New York Avenue NW Washington, DC 20577

Einarsson, Agust. 2016. Cultural Economics. Bifrost University. Iceland: Bifrost University

Fauzi, Akhmad. 2019. Teknik Analisis Keberlanjutan. Jakarta: PT. Gramedia Pustaka Utama

Gibson, R B, S Hassan, S Holtz, J Tansey and G Whitelaw 2005. Sustainability Assessment: Criteria and Processes, London: Earthscan.

Godet, M., Monti, R., Meunier, F., & Roubelat, F. 2004. Scenarios and strategies: A toolbox for scenario planning. Lipsor Working Papers, 3th issue. Laboratory for investigation in prospective and strategy (LIPSOR).

Handayani, W., P. Nugroho, dan D. O. Hapsari. 2018. Kajian Potensi Pengembangan Pertanian Perkotaan di Kota Semarang. Riptek Vol. I2, No. 2: 55-68

Kerr, Barbara. 2009. "Creativity & the Economic System." Encyclopedia of Giftedness, Creativity, and Talent 2009: 1–6.

Kusdiantoro, Achmad Fahrudin, Sugeng Hari Wisudo, dan Bambang Juanda. 2020. The Policy Strategy For Sustainable Capture Fisheries

Development Strategi Kebijakan Pembangunan Perikanan Tangkap Berkelanjutan. Journal of Economic and Soscial of Fisheries and Manrine 07(02) : 131-141

Lagiman, 2020. Pertanian Berkelanjutan : Untuk Kedaulatan Pangan dan Kesejahteraan Petani. Seminar Nasional, Fakultas Pertanian UPN Veteran. Yogyakarta. http://eprints.upnyk.ac.id/24326/1/b4%20FULL%20PAPER_LAGIMAN.pdf

Lestari, N. P. N. E., SE, M., Made Kembar Sri Budhi, M. P., Suidarma, I. M., & SE, M. 2023. The Subak Economy: Masa Depan Ekonomi Agraria Bali lewat Penguatan Lembaga Usaha Ekonomi Subak. Nilacakra.

Marín-González, F., Pérez-González, J., Senior-Naveda, A., Narváez-Castro, M., Moganadas, S. R., & Garcés-Rosendo, E. (2023). Betting Scenario for the Management of University Professional Practices from the Conformation of Intersectoral Cooperation Networks. *Sustainability*, *15*(7), 6215.

Medina,E.,R.de Arce., R.Mahia.2015.Barriers To The Investment In The Concentrated Solar Power Sector In Morocco: A Foresight Approach Using The Crossimpact Analysis For A Large Number Of Events. Futures vol 71.35-56

Megalhaes, Renata Lucia; Santos, Igor Vieira; Graciano, Guilherme; Libano, Andr'e Augusto Cunha Libanio; Oliveira, Leise Kelli dan Bracarense, LDSFP. 2021. A Sustainable Approach For Urban Farming Based on City Logistics Concepts For Loacl Production and Consumption of Vegetables. Research in Transportation Economics 87(2021).

Munasinghe, M. 1993. Environmental Economic and Sustainable Development. The International Bank for Reconstruction and Development/THE WORLD BANK. Washington, D.C. 20433, U.S.A.

Peraturan Daerah Provinsi Bali Nomor 9 Tahun 2012 Tentang Subak (selanjutnya disebut Perda Subak).

Pessotto, A. P., Costa, C., Schwinghamer, T., Colle, G., & Dalla Corte, V. F. 2019. Factors influencing intergenerational succession in family farm businesses in Brazil. *Land Use Policy*, *87*, 104045.

Puposutardjo, S. 1997. Konsep konservasi tanah dan air untuk keberlanjutan irigasi, Pidato pengukuhan guru besar UGM, Yogyakarta; UGM.

Pratt, Andy C., and Paul Jeffcutt. 2009. "Creativity, Innovation and the Cultural Economy." Creativity, Innovation and the Cultural Economy, 2009, 12. doi:10.4324/ 9780203880012.

Rivai, R.S dan I.S. Anugrah. (2011). Konsep dan Implementasi Pembangunan Pertanian Berkelanjutan di Indonesia. Forum Penelitian Agro Ekonomi Vol 29 (1), 13 -25.

Rukmana, Didi. 2012. Pertanian Berkelanjutan: Mengapa, Apa, dan Pelajaran Penting dari Negara lain. *Fakultas Pertanian, Universitas Hasanuddin*.

Saptana dan Ashari. 2007. Pembangunan Pertanian Berkelanjutan Melalui Kemitraan Usaha. Litbang Pertanian 70: 123-130

Saskara, Ida Ayu Nyoman dan Marhaeni, AAIN. 2017. The Role of Social Capital and Business Strategies in Developing the Business of Banten to Increase Balinese Women's Employment. Journal Of Comparative Asian Development Vol. 16, No. 1, 68–86

Seal, David Wyatt, Laura M. Bogart, and Anke A. Ehrhardt. 1998. "Small Group Dynamics: The Utility of Focus Group Discussions as a Research Method." Group Dynamics 2 (4): 253–266. doi:10.1037/1089- 2699.2.4.253.

Somodji,S.N.Novkovic,B.Muntavdzic.2011.Potential Scenarios of Economic Deveopment of North Vojvodina and Forecast of Future Trends of Employment.UDK 330.342.22:338.432.571-579

Suardi, I Dewa Putu Oka. 2016. Penguatan Kelembagaan Pertanian untuk Menjaga Eksistensi Subak di Bali Sebuah Tantangan Bagi Penyuluh dan Komunikasi Pembangunan. Konferensi Nasional Penyuluh dan Komunikasi Pembangunan di Universitas Brawijaya Malang 30-31 Agustus 2016

Sugino, T., 2003. Identification of Pulling Factors for Enhancing the Sustainable Development of Diverse Agriculture in Selected Asian Countries. Palawija News The CGPRT Centre Newsletter. Bogor: CGPRT Centre Publication Section, 20 (3): 1-6.

Suharyon dan Busyra BS. 2016. Kinerja Kelompok Tani dalam Sistem Usaha Tani Padi Lahan Sub Optimal dan Metode Pemberdayaannya (Studi Kasus Pada Kegiatan Padi Sawah di Lahan Sub Optimal Kabupaten Tanjung Jabung Timur Jambi). Jurnal Penelitian Universitas Jambi Seri Humaniora Vol 18 No 1. Universitas Jambi.

Syahyuti, Sunarsih, Sri Wahyuni, Wahyuning K. Sejati, dan Miftahul Azis. 2015. Kedaulatan Pangan Sebagai Basis Untuk Mewujudkan Ketahanan Pangan Nasional (Food Sovereignty As The Basis To Realize National Food Security). Forum Penelitian Agro Ekonomi, Vol. 33 No. 2

Udayani wijayanti, 2021. Implementasi filsafat tri hita karana untuk keberlanjutan suba Anggabaya sebagai subak lestar di kota Denpasar. Jurnal ilmu sosial dan ilmu poliyik, wira bhakti, Denpasar issn 1411-8130, e-ISSN 2774-9630

Windia, W dan R.K.Dewi. 2011. Analisis Bisnis yang Berlandaskan Tri Hita Karana. Denpasar: Jurusan Sosial Ekonomi Pertanian, Fakultas Pertanian, Universitas Udayana.

Windia, W., N.G. Ustriyana, I W. Budiasa, I W. Ginarsa, dan I W. Sudarta. 2001. Keberlanjutan Nilai-nilai Tri Hita Karana untuk Pelestarian Sumberdaya Budaya di Kabupaten Gianyar. Kerjasama antara Bappeda Kab. Gianyar dan Jurusan Sosek Fakultas Pertanian Universitas Udayana, Denpasar

Received: Sep 15, 2023 Revised: Sept 25, 2023 Accepted: Mar 01, 2024