



## ORIGINAL RESEARCH ARTICLE

## Farmers' motivation and obstacles in the smallest available agricultural region

D.P. Darmawan<sup>1</sup>, G.M.K. Arisena<sup>1,\*</sup>, A.A.A.W.S. Djelantik<sup>1</sup>, A.A.K. Krisnandika<sup>1</sup>, N.L.M.I.M. Dewi<sup>1</sup>, N.T.L. Korri<sup>1,2</sup>, N.M.C. Sukendar<sup>1</sup><sup>1</sup>Faculty of Agriculture, Udayana University, Jl. P.B. Sudirman, Dangin Puri Klod, Kecamatan Denpasar Barat, Kota Denpasar, Bali, Indonesia<sup>2</sup>Program Development and Evaluation Division at the Investment and One-Stop Integrated Service Office, Bali Province, Indonesia

## ARTICLE INFO

## ABSTRACT

## Article History:

Received 10 December 2022

Revised 12 February 2023

Accepted 12 April 2023

## Keywords:

Agricultural

Farmers

Motivations

Obstacles

Urban areas

**BACKGROUND AND OBJECTIVES:** The high need for tourism-supporting infrastructure has impacted the increasing conversion of land functions in Denpasar City, Indonesia. The lack of agricultural areas in Denpasar City has motivated farmers to continue farming. Farmer motivation to do farming will collide with obstacles in carrying out agricultural activities in Denpasar City. The purpose of this study was to examine the motivations and obstacles faced by farmers in carrying out agricultural activities. This research is relevant to the journal scope of Sustainable Agriculture Management, Urban, and Built Environmental Management.

**METHODS:** This study was carried out in Denpasar City in Indonesia, where each sub-district in Denpasar City will be selected by one Subak. The selection of Subak was based on the Subak with the most farmers in each sub-district in Denpasar City. The selected subak were Pakel 1 Subak, Kerdung Subak, Temaga Subak, and Margaya Subak. The population in this study was 672 people. The respondents in this study were 87 people. The data collection method was carried out using structured and in-depth interviews using questions and points while face-to-face between the interviewer and the respondent, via a prepared questionnaire. This study uses two variables with 41 indicators. The analytical methods used to point to objectives one, two, and three are descriptive quantitative and descriptive qualitative methods. Goal four is "Build a model for dealing with obstacles to farming in urban areas." The fourth objective was analyzed descriptive qualitative based on the results of the analysis of objectives one, two, and three.

**FINDINGS:** The study results show that the motivation to continue farming is caused by demands to work, not having another job to get help from other parties, a healthy work environment, the ability to take lessons from previous farming experience affect product quality, and work in nature. The obstacles for farmers to continue farming are the bargaining position of farmers in selling products, market information obtained by farmers is still minimal, and market absorption of the products produced is not maximized.

**CONCLUSION:** Based on the results of the research, several things deserve to be concluded. The number of dependents of a farming family is more than six because there are still children of farmers already working but still being supported by their parents for their primary needs, and most of the farmers do farming in an area of 0.21 – 0.60 hectares. The motivation to keep farming is caused by the demands to work, not having another job to get help from other parties, a healthy work environment, and the ability to take lessons from the previous farming experience affecting product quality and work in nature. The obstacles for farmers to continue farming are the bargaining position of farmers in selling products, market information obtained by farmers is still minimal, and market absorption of the products produced is not maximized.

DOI: [10.22035/gjesm.2023.04.20](https://doi.org/10.22035/gjesm.2023.04.20)This is an open access article under the CC BY license (<http://creativecommons.org/licenses/by/4.0/>).

NUMBER OF REFERENCES

46



NUMBER OF FIGURES

1



NUMBER OF TABLES

9

\*Corresponding Author:

Email: [korriarisena@unud.ac.id](mailto:korriarisena@unud.ac.id)

Phone: +62819 4486 4138

ORCID: [0000-0001-8162-4947](https://orcid.org/0000-0001-8162-4947)

Note: Discussion period for this manuscript open until January 1, 2024 on GJESM website at the "Show Article".

## INTRODUCTION

Denpasar City has an area of 12.778 hectares (ha), divided into four districts: Denpasar Utara, Denpasar Timur, Denpasar Selatan, and Denpasar Barat (Rahayu, et al., 2018). Denpasar City is located at 8.67 South Latitude and 115.21 Eastern Longitude (Narottama, et al., 2017). The climate of Denpasar City can be seen from the average rainfall rate of 244 millimeter (mm) per month, with relatively high rainfall occurring in December, while the average air temperature is around 29.8 Degrees Celcius (°C) with the lowest average around 24.3 °C. Denpasar City has total agricultural land of 3,232 ha. The establishment of Denpasar City as the capital of Bali Province and the national tourism barometer has been triggering higher needs for infrastructure development, leading to the increasing rate of land conversion. Most agricultural land in Denpasar City areas is protected beneath the traditional *subak* organizational system. A study by Zullo et al. (2021), said that in European Countries, in terms of both economic and food needs, analyses have demonstrated the potential agricultural productivity lost as a result of urban land conversion. The abandonment of rural communities, particularly in hilly and mountainous regions, fueled by the economic hardships that have long plagued agriculture, is another factor in the loss of productive agricultural land. Darmawan et al. (2023) mentioned that Bali's farming community owns Subak, an organization that has strict rules for managing the traditional rice fields there. The Pekaseh (Kelihan Subak), Petajuh (Vice Kelihan Subak), Kesinoman (Instructor), and Subak's farmer members made up the traditional organization of Subak (Suamba et al., 2023). They were held to an agreement (awig-awig) that all Subak members had to follow. The Balinese agricultural tradition known as Subak local wisdom has been recognized by United Nations Educational, Science and Cultural Organization (UNESCO) as a world cultural treasure (Sriartha and Kertih, 2019). To keep Subak in good working order, Subak as a customary institution plays a significant role in social, cultural, and economic spheres (Prastyadewi, et al., 2020). Darmawan, et al. (2021), then urges farmers to adapt sufficiently to the face-paced changing world, retaining the agricultural land conversion activities. Jambor and Szerletics (2022) conducted an agricultural study in Europe, discovering that "land grabbing" or land conversion is a global phenomenon

that takes place in many regions of the world, mostly driven by several market factors. The study results of Khoshnava et al. (2020) state that infrastructure as the backbone of economic growth must be awakened through green competencies to rethink infrastructure strategies and economic prosperity in dealing with local and global issues. Oddly, the reduced availability of farmland in Denpasar City has not disheartened farmers from continuing to farm. Despite their faithful commitment and undying motivation, farmers would unescapably confront numerous obstacles in conducting their agricultural activities. Ranjan et al. (2019) said there are four themes of motivations: economic factors, social norms, perceptions of government programs, and farm characteristics. Further, In Romania, farming activities, such as selling agricultural products, can increase agricultural productivity factors, as well as increase farmers' income (Maican et al., 2021). In Ghana, Bedi et al. (2020), said that motivational factors significantly influence farmer adoption decisions. A study by Jambor and Szerletics (2022) in Europe further reported that the farmer's motivation to innovate and work more efficiently decreased when they became increasingly dependent on subsidies as a source of income. Findings from a study in the Czech Republic by Pechrová et al. (2018) revealed that the typical motive of farming among 510 young farmers was the desire to sustain the legacy of farming business from their parents or other relatives and also to work in nature with animals. Young farmers and women farmers see opportunities and challenges when starting and maintaining their farms by focusing on optimizing land to achieve high economic value through the cultivation of food crops, horticulture, and ornamental plants concerning technological innovation. Environmentally friendly production processes that increase oxygen levels and reduce air pollution are needed to produce fresh and healthy food, as well as motivation to continue farming in the form of support for farmer regeneration from parents so that their children farm and meet the demand for labor in agriculture. The limited area that farmers work on is not a barrier because the results can meet the primary needs of the household. The motivators in this study are economic motivation, sociological motivation, cultivation technical motivation, and urban farming development motivation. The results of Agyei et al.

(2021) research state that the key factors motivating smallholder decisions to implement climate-smart agricultural practices are product harvesting and timely storage, emergency seed storage, crop rotation, weed control, appropriate pest control, and on time. Farmers in urban areas can adapt to climate change and extreme weather by implementing the planting calendar from the Ministry of Agriculture, planting new adaptive superior varieties, and applying technology in land resource management and agricultural insurance. Furthermore, the results of [Jambo et al. \(2019\)](#) research stated that motivating small farmers is needed to stimulate economic viability, improve nutrition, reduce poverty, and maintain the natural resource base of the rural economy. Intrinsic and extrinsic motivation is equally important in smallholder implementation decisions. Urban farmers have been struggling with complicated issues in running their agricultural businesses. The cultivating, processing, marketing, and product promotion activities have been greeted by obstacles. The obstacles faced by farmers should ideally be supported by “pro-farmer” policies. Policies are needed to support redesigned agricultural systems without reducing productivity ([Gava et al., 2020](#)). In Namibia, [Kiesel et al. \(2022\)](#) recommend a more knowledge and place-based policy, including a multidimensional perspective adapted to agricultural management and open decentralized governance structures that engage region-specific agricultural, economic, political, and environmental knowledge. In Turkey, regional variances should be considered when formulating agricultural assistance policies to make up for income losses brought on by physical limitations ([Unuvar and Dellal, 2022](#)). [Pechrová et al. \(2018\)](#) also discovered several obstacles to agricultural business in the Czech Republic, including the capital assets to get land, administrative burden, and financing development strategy for start-ups. Despite several challenging issues served during the process of urban farming, farmers seemed to be stubbornly sustaining their agricultural business amidst the overwhelming situation. This phenomenon is pretty intriguing. Even though urban areas present miscellaneous work opportunities, farmers prefer to run their agricultural activities to do other professions. The study objectives were to describe the characteristics of farmers, analyze the motivation in sustaining agricultural activity, analyze the obstacles, and construct a model

for managing the obstacles to farming in urban areas. The Subak region, which encompasses all of Denpasar City, was the site of the study. This study was carried out in Denpasar City in Indonesia in 2022.

## MATERIALS AND METHODS

The study was conducted in the *Subak* area that spread over Denpasar City. Most of the available agricultural areas in Denpasar City are still under the Subak organizational system. The area of *Subak* with the highest number of farmers in each district was then picked as the study location. Several *Subak* involved in this study were Subak Pakel 1 in North Denpasar District, *Subak Kerdung* in South Denpasar District, *Subak Temaga* in East Denpasar District, and *Subak Margaya* in West Denpasar District. The study population was all members of Subak Pakel 1, Kerdung, Temaya, and Margaya, with a total of 672 farmers. Eighty-seven participants were then eventually enrolled in this study. Proportional sampling was applied to select eligible farmers in each Subak area. Data were gathered by conducting structured interview sessions directed by a questionnaire. In-depth interview sessions were also performed with the participants to complement the study data. Previous study files and documents were included to acquire information about the profile of the study location. Finally, two variables with 41 indicators were involved in this study. The quantitative and qualitative descriptive methods were enrolled to point out the first, second, and third objectives. This analysis method provides the perspectives and thoughts from the subject’s viewpoint (farmers in Denpasar City) and observes them most intimately. Quantitative data were also collected to support the qualitative findings. Before being analyzed, all data obtained was carefully studied to minimize the chance of errors by following these steps: editing (the process of potential error detection), coding (creating and assigning participant’s responses into certain codes), and tabulation (compiling and representing the data in rows and columns). Based on the category scale values in [Tables 1](#) and [2](#), five categories were selected to determine the level of motivation and constraints of farmers in the Denpasar City area starting from 1.00-1.79 up to a value of 4.20-5.00. Values for determining categories in each indicator are obtained from tabulation results based on interviews with farmers.

Table 1: Scale value of farmers' motivation category to keep trying farming

No.	Farmer motivation	Scale value
1	Very motivating	4.20-5.00
2	Motivating	3.40-4.19
3	Simply motivating	2.60-3.39
4	Less motivating	1.80-2.59
5	Very unmotivating	1.00-1.79

Table 2: Scale value of farmer's obstacles category to keep trying farming

No.	Farmer obstacles	Scale value
1	Very inhibiting	4.20-5.00
2	Inhibiting	3.40-4.19
3	Simply inhibiting	2.60-3.39
4	Not inhibiting	1.80-2.59
5	Very uninhibited	1.00-1.79

The final objective was to construct a model for addressing obstacles to farming activities in urban areas. This objective was analyzed thoroughly using the descriptive-qualitative method based on the findings in the first, second, and third objectives. A proper model dealing with obstacles in urban area farming is expected to be created, promising better welfare for urban farmers.

## RESULT AND DISCUSSION

### *Participant's characteristics*

The typical commodity identified was the rice paddy. But in a certain period, participants also grew several crops, such as *palawija*, water spinach, spinach, rose balsam, lotus, and mungbean. Table 3 shows the cultivated land area, land ownership status, and cultivated commodity. The majority of participants, (55.17 %), cultivated in 0.21 to the 0.60-ha-land area as tenant farmers or owners. Findings showed that ten farmers were working on <0.2 ha - land area (11.49%). This situation likely happened due to their status as novice farmers. Most had just retired from their previous work due to the massive layoffs during the pandemic. Only 8.05% of participants were cultivated on more than 1 ha of land area. According to [Sitinjak \(2018\)](#), the family head's educational attainment, control over the land's basis, and environmental factors (agricultural land) have all impacted rural poverty. This means rice paddy

farmers with small land areas could not afford their daily expenses properly. On the other hand, based on [Makate et al. \(2019\)](#) research located in Zimbabwe, richer farmers have higher odds of planting on larger land compared to their less affluent counterparts. This finding aligns with [Ren et al. \(2019\)](#). They discovered a positive correlation between the size of cultivated land with the total income among farmers in China.

[Darmawan et al. \(2021\)](#) mentioned several challenging issues in agricultural activities in Subak Sembung, Denpasar, that contribute to the total income gained by the farmers. Significant decline in farmer population, urbanization, limited land, poverty, environmental changes, uncertainty in agricultural production, and constrained resource access was recognized as complex issues encountered in conducting agricultural activities. Another study by [Veveeris et al. \(2019\)](#) in Latvia and Lituania portrayed that bigger-scale agribusiness had a better financial state, and multiple streams of funds of investment produce faster agricultural production through a proper modernization process. Additionally, [Nhan and Yutaka \(2019\)](#) also mentioned that the greater size of rice paddy fields in Delta Mekong Vietnam had increased the product's output selling price. The higher price may parallel the higher agricultural output volume. The majority of participants (39.8%) were tenant farmers who farmed land leased from the landowners. The revenues from the land were

Table 3: Cultivated land area, land ownership status, and cultivated commodity

No.	Type of data	Number of persons (n)
1	Cultivated land area	
	≤ 0.2 ha	10
	0.21 – 0.60 ha	48
	0.61 - 1 ha	22
	≥ 1 ha	7
	Total	87
2	Land ownership status	
	Privately owned land	32
	Land leasing (Tenant Farmer)	34
	Contract	5
	Others (privately owned + leased land)	16
Total	87	
3	Cultivated commodity	
	Paddy/rice	58
	Vegetable	3
	Flower	0
	<i>Palawija</i> (annual commodities, cultivated particularly in the dry season)	0
	Others (intercropping commodities, paddy, vegetables)	26
Total	87	

Table 4: Age, educational background, number of dependents, experience in agribusiness, and occupation

No	Type of data	Number of persons (n)
1	Age	
	≤ 14 years old	0
	15 - 65 years old	66
	≥ 66 years old	21
	Total	87
2	Educational background	
	Never went to school/Did not complete Elementary School	13
	Elementary School	30
	Junior High School	12
	Senior High School	27
	Vocational School/University	5
Total	87	
3	Number of dependent	
	≤ 2 persons	21
	3 -5 persons	59
	6 persons ≥	7
Total	87	
4	Experience in agribusiness	
	≤ 10 years	15
	11 - 30 years	28
	31 years ≥	44
Total	87	
5	Occupation	
	Farmer as the primary occupation (had the second occupation)	12
	Farmer is the second occupation	18
	Farmer is the only occupation	57
Total	87	

split between the tenant farmer and the landowner on the basis proportion of 2:1. The tenant farmer who resided and cultivated on the land obtained the share of 2, and the landowner earned the share of 1. Tenant farmers commonly paid the cost required for agricultural production. It was discovered farmers with contract land systems. The average payment given to the landlord in this system was \$US 65/0,1 ha, annually. This finding was parallel to a study conducted by (Musdalifah et al., 2021) that found an equal and reasonable distribution of crop profit between tenant farmers and landowners. For instance, in the agreement, tenant farmers would get a share of 2 if they consented to pay for the farming expenditures, while the landlord would get a share of 1 because they only supplied the land. In line with this finding, Dimitri et al. (2016) also found that urban farmers rarely cultivated their land, signifying that most of them were tenant farmers. Table 4 shows the age, educational background, number of dependents, experience in agribusiness, and occupation.

Around 24% of the participants were elderly (above 66 years of age). They were actively engaged in the land tillage process, including processes that involved physical strength. They confirmed that land tillage activities had kept them active after their retirement. Most of them previously worked in private and government-based institutions. They voluntarily worked as farmers to kill their leisure time. Agricultural activities that mostly demanded physical strength were perceived as sufficient to maintain their health and slow down their aging process. They also believed that being less active and sleeping all day would gradually weaken them. The majority of participants graduated from Elementary School (34.8%). In the past, it was a common situation that the participants were asked to follow their parents' occupation as farmers. Only five participants (5.75%) graduated from vocational school/university. Further, most of them were placed in managerial positions in the business (did not engage in agricultural physical activities). The farmer was not the primary occupation but only a side gig. Participants with more than six dependents were discovered. The high number of dependants were clarified as working children who still received support from their parent for their primary needs. The results found that the majority of participants had been working as farmers for more than 31 years. They had been introduced

to farming work since graduating from elementary school. Participants were very devoted to their occupation as a farmer because it was perceived to be more uncomplicated. No certification was required as a farmer, and it was seen to be relatively undemanding compared to other occupations. Findings also reported that 65.52% of the participants were full-time farmers with no second occupation. Eighteen participants (20.69%) put farming as their second occupation. They claimed that farming was a flexible business that could be done anytime in more flexible hours (morning and afternoon). They also stressed the uncertain income gained from the farming business. Participants who placed farming as a non-primary occupation were working as a bank employee, construction worker, an employee in Village Credit Institutions, a field officer in Denpasar City, a security guard, an employee in the Department of Environment and Sanitation Service, a cleaning service, gardener, *kalian adat* (local community leader), electric meter recorders, and pemangku (local spiritual teacher/leader). Parallel with this finding, Diaz et al. (2022) mentioned educational background, income from the agricultural sector, and farmer-based cooperation unit in Northern Columbia as vital factors for agribusiness sustainability.

#### *Farmer motives to constantly engaged in agricultural business in Denpasar city*

Table 5 showcases several indicators that poorly motivated the farmers: desire for luxurious goods and income from the agricultural business covered the secondary household expenses. Farmers may want to purchase luxury goods; however, their financial situation may not support their desire. The majority of crop production was initially intended to be traded by the farmers. Only a few of them personally consumed and carried the crop to their residence because of limited space to preserve the crops. Farmers also stated that the revenue from crop production was saved for their future needs, especially for traditional ceremonies, such as *manusa yadnya* or *dewa yadnya* (Hinduism). *Dewa yadnya* refers to traditional ceremonies to express assurance and gratitude to the Almighty God, *Sang Hyang Widhi Wasa*, as one path for magnificent protection and forgiveness for all wrongs (Trisanti, 2021). Suardi et al. (2023) further mentioned that the cultural submission of Balinese farmers in preserving their tradition was one factor

that contributed to the sustainability of agricultural land.

A relatively comfortable market access for the farmers was observed. The wholesalers were spotted easily on agricultural land during the harvesting seasons. They would propose certain prices to purchase crop production during those times. The indicator of farming as a second job to supplement the primary source of income moderately motivated the farmers in sustaining their agricultural business. Further, the demand to work and no side occupation were discovered to be a great drive to engage constantly in farming activities. This finding was confirmed by the high number of participants who worked as a farmer (more than 50%). Farmers could

eat crops grown on their land for food, simultaneously covering their primary needs, such as staple food (rice, side dishes, vegetables), personal hygiene essentials, water, and also electricity bills. Table 6 shows that agricultural activities constructed positive relations among the farmers.

The wholesalers who potentially purchased their crop production were also counted as their business relations. Farmers could also establish a reciprocal connection with students or academicians that frequently targeted farmers as the subject of agricultural study. Establishing mutual partnerships, creating more harmonies, and allowing the process of exchanging thoughts and feelings were also confessed as motives to be immersed constantly in

Table 5: Economic motivation

No.	Question	Score	Category (Level of motivation)
1	Yearning for a more prosperous living state	2.79	Moderately motivated
2	Desire to own, invest and increase savings	2.74	Moderately motivated
3	The desire for luxurious goods	2.37	Poorly motivated
4	Longing for higher income	2.84	Moderately motivated
5	Desire to adequately fulfilling daily needs	3.58	Highly motivated
6	Yearning for a better life	2.95	Moderately motivated
7	The demand to work	3.89	Highly motivated
8	Personal need fulfillment	3.68	Highly motivated
9	Convenient market access	3.16	Moderately motivated
10	Income from the agricultural business covered the primary household expenses	3.58	Highly motivated
11	Income from the agricultural business covered the secondary household expenses	2.47	Poorly motivated
12	Had no side occupations, the absence of an additional stream of income	3.89	Highly motivated
13	As the second occupation, supplementing the income from the primary occupation	3.16	Moderately motivated
14	Desire to meet the daily family needs	3.74	Highly motivated
15	Crop production (agricultural products) for own personal and family use	2.47	Poorly motivated

Table 6: Social motivation

No.	Question	Score	Category
1	Building positive relationships or making friends	3.42	Highly motivated
2	Establishing mutual partnerships	3.68	Highly motivated
3	Creating more harmonies	4.00	Highly motivated
4	Establishing understanding communication, allowing the process of exchanging thoughts and feelings	4.00	Highly motivated
5	Get help from other parties	4.89	Extremely motivated
6	Healthy workplace environment	4.26	Extremely motivated



*Farmer's motivation and obstacles*

the agricultural business. The process of exchanging thoughts and ideas was typical sessions in subak, directed as a regular agenda under the *subak* organization. Farmers were asked to gather in specific sessions to communicate their thoughts with the *prajuru* (*subak's* organizational committee) and other members of the *subak*. A study by Milone and Ventura (2019) demonstrated the role of collaboration skills in the success stories of farmers in Italy. Sriartha and Kertih (2020) said that the social activities in *subak* are regulated through *awig-awig* and the principle of *paras paros sarpanaya sagilik saguluk selunglung sebayantaka*. In addition, Utari (2017) mentioned the interaction and intense communication during the *subak's* regular meeting sessions, which occurred between the organizational leader board of the *subak* with the members, primarily discussing agricultural issues and alternative strategies to manage those issues. Important collaborations are carried out between farmers and other stakeholders, such as industrialists, research institutions, consumers, and

the government, to provide added value, procure seeds, post-harvest assistance, increase income, and public-private partnerships on food system issues. A collaboration platform needs to be created to share knowledge in food systems and involve banking and ventures. Farmers stated their enthusiasm for aid from officials or universities to support their agricultural work and crop production. Government policies in supporting urban farmers are in the form of subsidies and input-output price incentives, as well as legal certainty in the agricultural sector. Additional support needed includes utilizing local resources, applying appropriate technology that is easy for farmers to implement, reusing urban organic waste as a source of plant nutrition, and urban farming practices characterized by sustainable and environmentally sound concepts. National and local government institutions distributed several agricultural aids: subsidized diesel fuel, subsidized fertilizers, subsidized seeds, and subsidized tractors. Subsidized diesel fuel and subsidized fertilizers could

Table 7: Cultural motivation

No.	Question	Score	Category
1	The quality of crop production is nearly equal to the expected quality	3.05	Moderately motivated
2	The satisfaction with the previous crop production as a motive to engage persistently in agribusiness activities	3.21	Moderately motivated
3	The capacity to learn from the previous season affects the crop production quality	3.16	Moderately motivated

Table 8: Motives of urban farming development

No.	Question	Score	Category
1	Developing urban farming	3.37	Moderately motivated
2	Maintaining the existence of urban productive green spaces	3.63	Highly motivated
3	Gaining more experience in agricultural practices	3.63	Highly motivated
4	Conserving <i>Subak</i> Irrigation System	3.74	Highly motivated
5	Mandated to manage the inherited agricultural land	3.37	Moderately motivated
6	Sustaining the legacy of the farming business from parents or other relatives	3.26	Moderately motivated
7	Establishing an independent agricultural-based business	3.42	Highly motivated
8	Working in the nature	4.05	Highly motivated



be requested annually by *kelian subak* (*subak's* leader). However, the availability of these agricultural aids was very restricted. This situation was parallel with findings in a study by [Varshney et al. \(2021\)](#). In India, the government gives an assistance package (known as Pradhan Mantri Garib Kalyan Yojana (PM-GKY) to procure agricultural inputs. Farmers who benefited from the PM-GKY scheme incurred much greater costs for the purchase of seeds, fertilizer, and insecticides. The nature of the dependence of farmers on input subsidies by the government also changes their business and production patterns and, in turn, influences changes in market price balances. Therefore, it is deemed necessary to regulate the balance of sustainable inputs for farmers that guarantee business efficiency and farmers' income. [Šumrada et al. \(2020\)](#) research in Slovenia shows that there is an agricultural policy from the government in Slovenia that some countries in the EU have promoted result-based schemes (RBS) that remunerate farmers for ecological results. [Asai et al. \(2018\)](#) conducted a large-scale study in Asia, Europe, and the United States of America and reported financial and technical support as primary external factors that influence integration at the farmer level. A healthy workplace environment was also discovered to be the major motive in sustaining agribusiness activity in urban areas. Farmers felt quite qualified to manifest a healthy work environment. They had been actively clearing land that was heavily polluted by household waste carried by water. Agricultural activities were also broadly perceived as physical exercises, simple ways

to balance the mind, body, and soul. The awareness of environmental sustainability, especially the irrigation system, was contrary to a study by [Peltonen-Sainio, et al. \(2020\)](#). This study was conducted in Finland and reported the farmer's ignorance of the irrigation system. Additionally, [Was et al. \(2021\)](#) found that the farmer's awareness in Poland is associated with their economic interests. [Patel et al. \(2015\)](#) underline that in India, the food sovereignty approach recognizes the importance of the economic stability of small-scale farms, local autonomy for decision-making, ecological sustainability, and the preservation of nutritional culture through the diversity of cultivated food crops. [Table 7](#) shows the cultural motivation. The quality of crop production that closely matched the expected quality was identified as an indicator that moderately motivated the farmer.

Based on the traditional beliefs of farmers in Bali, there are two major seasons in farming, namely the Kerta and Massa seasons. Kerta occurs around the harvesting seasons from September to October (Sasih Kapat; Balinese Calendar System). During this season, it is believed that crops would be sold at the highest price. In contrast, during the Massa, from March to April (Sasih Kadasa), the crop is forecasted to be traded at the cheapest price. This situation was unique. Despite the identical quality and cultivation process, the price proposed in both seasons was somewhat different. While according to [Grujic et al. \(2021\)](#), the source of agricultural water in Central Serbia comes from various sources that can be used for irrigation. Further, [Ati et al. \(2022\)](#)

Table 9: Obstacles to maintaining urban agricultural practices

No.	Question	Score	Category
1	Strategic planning (what to produce, for whom)	1.95	Did not hinder
2	Obtaining capital at the beginning of the growing season	1.84	Did not hinder
3	Capital assets for agribusiness development	1.89	Did not hinder
4	Farmer's bargaining position	3.95	Hindered
5	Market information	2.74	Enough to hinder
6	Crop production absorption rate	2.74	Enough to hinder
7	Water resources availability	1.74	Very uninhibited
8	The profit-sharing system	2.47	Did not hinder
9	Physical strength for farming	1.47	Very uninhibited

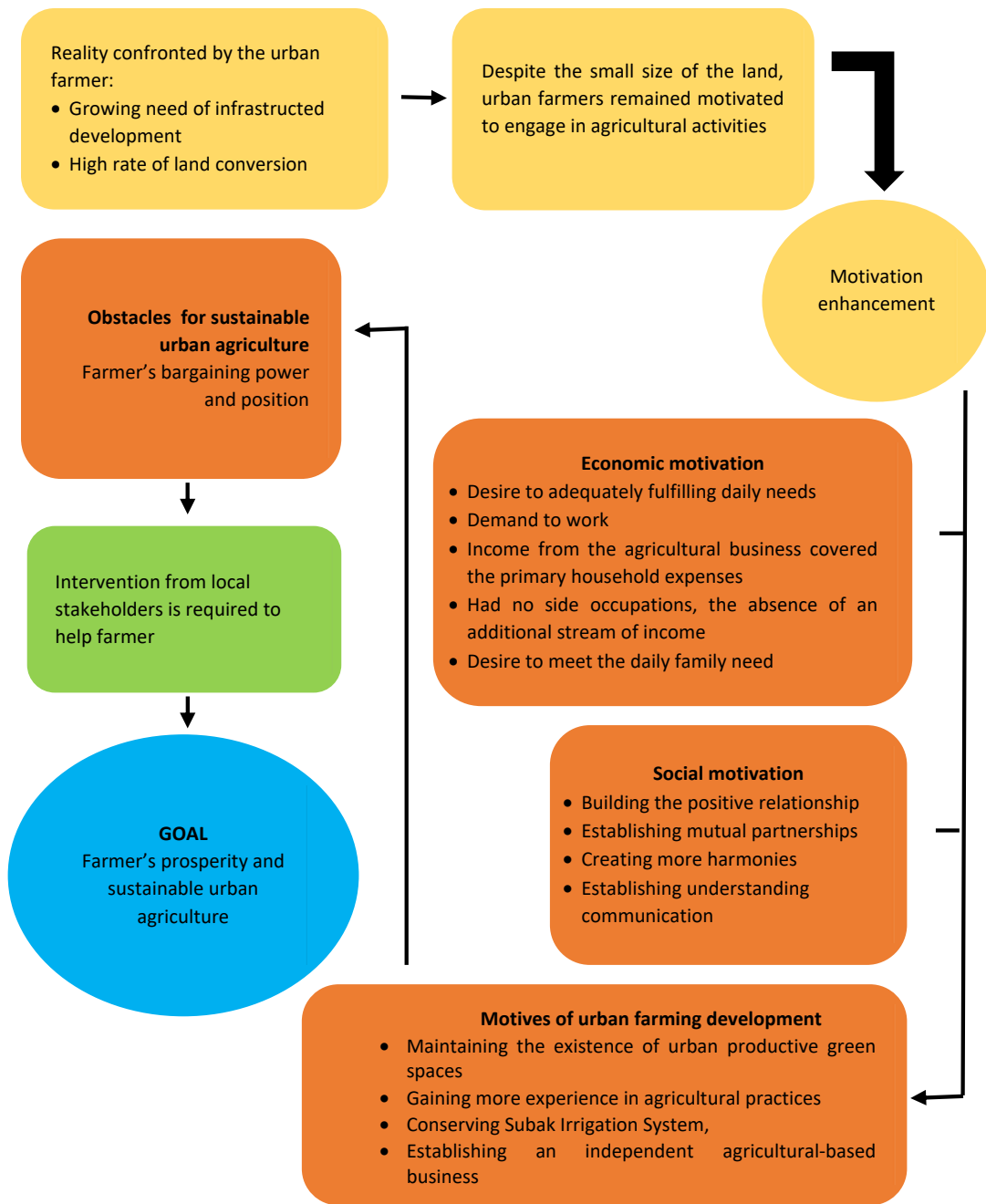


Fig. 1: Model to overcome obstacles to sustainable urban agriculture

mentioned the cultivating period was very important in rain-fed rice fields or irrigated rice fields, where the water availability was not secure. In these fields, the volume of water available for crops depended very

much on the beginning, length, and end of the rainy season. Table 8 shows the motives of urban farming development.

Farmers expressed their desire for urban farming

development. This motive kept them persistently maintaining their agricultural practices in Denpasar City. The inherited land from their parents and relatives also pushed them to remain engaged in agribusiness. Constant agricultural activities in the urban area, concurrently, maintain urban green spaces in the city area. The presence of a water irrigation system was expressed as one element that affected the existence of urban farming. Farmers stated their willingness to endure and sustain their farms amidst the infrastructure and residential development around their land, as long as the water source availability could be guaranteed. The establishment of independent agricultural-based businesses was parallel with their desire to produce and distribute their crop production in multiple streams of market lines. Some wholesalers distributed the local grain commodity cultivated by the urban farmers to many areas, including those located outside of Bali.

#### *Obstacles to maintaining urban agricultural practices in Denpasar City*

Table 9 shows the obstacles to maintaining urban agricultural practices. It is revealed that the rice cultivation plan has been established during the subak regular meeting. This situation made the production planning less likely to encounter obstacles because it has been well organized by Pekaseh (Subak's Leader). According to Artha (2016), the primary function of Pekaseh is to lead every Subak regular meeting, both related to the internal matters of the Subak and external issues related to institutions outside the Subak.

Slightly different from rice cultivation, the vegetable commodity was cultivated for daily food needs, especially if the land and water sources availability could be guaranteed. In West Denpasar, the majority of farmers grow vegetables, such as water spinach, spinach, and green vegetables, to earn daily income. At the beginning of the growing season, farmers obtained capital to start the season from the previous harvesting period. However, if this profit is insufficient, farmers would try to acquire funds from their relatives, friends, or Local Credit Institutions. Especially for the case of Pakistan, Ullah et al. (2020) said that the source of funding for farmers in Pakistan comes from banks. This institution mainly served as financial assistance official body to support the development of each

traditional village or *Pekraman* village in Bali. At the same time, it was also a force to maintain Balinese customs and culture, a novel strategy to expand funding sources for the community members. Farmers lacked bargaining power and position in the market. All crops were sold to the *penebas* (wholesalers), and the prices were then subsequently set by the wholesaler. Harvested rice paddy was distributed to the market as *tebasan* (was traded while still planted in cultivation land). The vegetable commodity was distributed to small-scaled merchants, traditional markets, and cafés situated in Kedonganan. Participants were using the profit-sharing system with a proportion of 2:1. The tenant farmer who resided and cultivated on the land obtained the share of 2, and the landowner earned the share of 1. A land contract system was also identified in this study. It was perceived as a more convenient system compared to the profit-sharing system. Farmers who cultivated vegetable commodities commonly preferred land contracts to the profit-sharing system. Further, physical strength was not recognized as a prominent barrier to agricultural activities. The majority of participants declared that the physical strength required for farming activities was adjustable. The level of farming work was modified according to their physical strength and capability. Farming works were then perceived as physical exercise, allowing them to be constantly active and maintain their health status.

#### *Model to overcome obstacles to sustainable urban agriculture*

The model to overcome obstacles to sustainable urban agriculture is shown in Fig. 1. Urban farmers have been confronted with the bitter reality that the growing need for infrastructure unavoidably impacts the agricultural land conversion rate, ending with the smaller size of cultivation land.

Surprisingly, a certain number of farmers remained enthused to cultivate their crops in these congested areas. They were particularly driven by several motives: the desire to adequately fulfill daily needs, demand to work, income from the agricultural business covered the primary household expenses, had no side occupations, the absence of an additional stream of income, desire to meet the daily family need, building a positive

relationship or make friends, establishing mutual partnerships, creating more harmonies, establish understanding communication, allowing the process of exchanging thoughts and feelings, maintaining the existence of urban productive green spaces, gaining more experience in agricultural practices, conserving the *Subak* Irrigation System, establishing an independent agricultural-based business, and working in nature. Farmers had been struggling with their bargaining power in the market. Intervention from local stakeholders is required to help farmers strengthen their power, pushing them to a sufficient position in the market and reap the profit from potential market lines. Obstacles in the market were in the form of access to the products produced, information, and the bargaining position of farmers. The way to overcome this is as follows: understanding the unique value proposition of the product, specific market segments, distribution channels that expand the market, good relations with consumers, marketing management with 4P (product, price, place, promotion), and optimal use of digital marketing. Local stakeholders have an influential position in providing funds/investment and granting access to credit programs for urban agribusiness development. A study conducted in Spanish by [Veronica et al. \(2021\)](#) reported motivation and competency level to construct a sustainable system became the determinants in overcoming obstacles in urban agriculture practices among farmers. Farmers make an important contribution to local food security and sustainable agriculture. In the view of farmers, local food security is increasingly fulfilled if the younger generation is involved in farming and, in turn, achieves sustainable agriculture in urban areas. Green Information Technology (GIT) is one model that can be adopted to overcome obstacles to urban agriculture to remain sustainable. Malaysia is one country that adopted GIT, which helps decision-makers and policymakers develop policies and programs for effective work and enhance green information technology ([Asadi et al., 2021](#)). Research conducted by [Khoshnava et al. \(2020\)](#) also added that Green Infrastructure (GI) and Green Economy (GE) have a major influence on environmental, social, and economic Sustainable Development (SD). Research conducted by [Kamyab et al. \(2020\)](#) also stated that Malaysia implements a sustainable energy system

for smart cities and industries involving smart energy systems, low carbon dioxide (CO<sub>2</sub>) emission technologies, reduction of biomass and pollution, and renewable energy. In addition, there are also several innovative products developed to support a sustainable environment. The first product is phytoremediation, a cost-effective remediation technology capable of treating sites polluted by heavy metals. According to [Rezania et al. \(2016\)](#), this environmentally friendly method has been successfully applied to artificial wetlands, which can restore natural aquatic biosystems. Research by [Soni et al. \(2022\)](#) also stated that the use of urban solid waste could be used as an alternative product of building materials for sustainable development purposes.

## CONCLUSIONS

Even though farmers are faced with many obstacles encountered in the process of farming, this does not dampen the motivation of farmers to continue farming in Denpasar City. This phenomenon is interesting to study because even though there are many choices of employment opportunities, farmers prefer to continue farming. The novelty of this research is to examine the motivation of farmers from various sides. In this study, motivation is seen from the economic, sociological, and technical aspects of cultivating and developing urban agriculture. From the results of the study, it can be concluded that the number of dependents of a farming family is more than six people. This is because farmers have children who are already working but are still being supported by their parents for their primary needs, and most of the farmers do farming on an area of 0.21 – 0.60 ha. There are still farmers classified as elderly (over 66 years old) who think they can make themselves more youthful/healthy by doing farming activities. They think that when you are old, you just stay still (sleep), and your body gets tired easily. The average experience of farmers in farming is more than 31 years. Farmers think that working as a farmer does not require special requirements, and agricultural work is easier to do than other jobs. The motivation to continue farming is caused by the demand to work and not have another job. Working as a farmer can meet personal needs and primary needs, including the need for staple foods (rice, side dishes, side dishes, vegetables), the need

for toiletries, the need for electricity, and water costs. The sociological motivation of farmers to continue farming is due to assistance from other parties and a healthy work environment. Farmers are very motivated when they get help from other parties, such as the government or higher education institutions, to support farming activities. A healthy work environment means farming, and farming creates a work environment close to nature and maintains environmental sustainability. Farmers consider farming activities as sports activities that make the body and soul healthy. Farmers are also motivated to develop urban agriculture. The desire of farmers to develop agriculture in urban areas so that it is more advanced causes farmers to remain enthusiastic about farming. Inheritance and mandates obtained from parents or other relatives to manage agricultural land also motivate farmers to continue farming. Continuing their farming activities in paddy fields can motivate farmers to maintain green land in urban areas. Farmers are determined, as long as there is water available for farming, even though a house might have been built on the land next to them, farmers will continue to farm their rice fields. Farmers found obstacles to king farming, namely the bargaining position of farmers in selling products, market information obtained by farmers is still minimal, and market absorption of the products produced is not maximized. Based on the research results, several things can be suggested as implications for decision-making. The local government should ideally find an alternative solution because based on field observations, farmers do not have a bargaining position in selling their crops; all crops are sold to the slashers at a price determined by the slashers. Most of the rice produced by farmers is usually sold in the form of slashes (buy directly from the land). Lembaga Perkreditan Desa (in English calls Village Credit Institutions) facilitates or creates innovative programs for farmers so that farmers can obtain sources of funds to carry out farming activities.

#### **AUTHOR CONTRIBUTIONS**

D.P. Darmawan coordinated all stages and work steps starting from the preparation of data collection, data analysis, and data interpretation to the preparation of published texts. G.M.K. Arisena conducted a literature review, analyzed, interpreted

the data, funded, and wrote the first draft of the publication. A.A.A.W.S. Djelantik accompanied and carried out all stages of the work starting from the preparation of the manuscript to the preparation of the published manuscript. A.A.K. Krisnandika conducted a literature review and reviewed the first draft of the published manuscript. N.L.M.I.M. Dewi assisted the implementation of activities in the field, compiling reports, and data tabulation. N.T.L. Korri helped with the implementation of activities in the field and data tabulation. N.M.C. Sukendar compiled appropriate references, edited the manuscript according to the template, and rewrote the manuscript in English.

#### **ACKNOWLEDGMENT**

The author would like to thank Udayana University through DIPA PNBP for the 2022 Academic Year, which has supported funds to carry out this study by the Research Assignment Agreement Letter Number: [B/78.129/UN14.4.A/PT .01.03/2022] dated 26 April 2022. The author also thanks the respondents and Kelian Subak Pakel, Subak Kerdung, Subak Temaga, and Subak Margaya who have participated in the implementation of this research.

#### **CONFLICT OF INTEREST**

The author declares that there is no conflict of interest regarding the publication of this manuscript. In addition, the ethical issues, including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, and redundancy have been completely observed by the authors.

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#### PUBLISHER'S NOTE

GJESM Publisher remains neutral about jurisdictional claims in published maps and institutional affiliations.

#### ABBREVIATIONS

%	Percent
\$US	United State dollars
°C	Degree Celcius
CO <sub>2</sub>	Carbon Dioxide
EU	European Union
<i>et al.</i>	And others
<i>Fig.</i>	Figure
<i>GI</i>	Green Infrastructure
<i>GE</i>	Green Economy
<i>GIT</i>	Green Information Technology
<i>ha</i>	Hectare (100 m <sup>2</sup> )
<i>n</i>	Number of persons
<i>No</i>	Number
<i>PM-GKY</i>	Pradhan Mantri Garib Kalyan Yojana
<i>RBS</i>	Result-based schemes
<i>SD</i>	Sustainable Development
<i>UNESCO</i>	United Nations Educational, Science and Cultural Organization

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#### AUTHOR (S) BIOSKETCHES

**Darmawan, D.P.**, Ph.D., Professor, Coordinator of the Doctoral Program in Agricultural Sciences, Faculty of Agriculture, Udayana University, Jl. P.B. Sudirman, Dangin Puri Klod, Kecamatan Denpasar Barat, Kota Denpasar, Bali, Indonesia.

- Email: [putradarmawan@unud.ac.id](mailto:putradarmawan@unud.ac.id)
- ORCID: 0000-0002-0410-9367
- Web of Science ResearcherID: NA
- Scopus Author ID: 57211079741
- Homepage: <https://sinta.kemdikbud.go.id/authors/profile/6184883>

**Arisena, G.M.K.**, Ph.D., Assistant Professor, Faculty of Agriculture, Udayana University, Jl. P.B. Sudirman, Dangin Puri Klod, Kecamatan Denpasar Barat, Kota Denpasar, Bali, Indonesia.

- Email: [korriarisena@unud.ac.id](mailto:korriarisena@unud.ac.id)
- ORCID: 0000-0001-8162-4947
- Web of Science ResearcherID: HOA-6751-2023
- Scopus Author ID: 57225193544
- Homepage: <https://sinta.kemdikbud.go.id/authors/profile/6188678>

**Djelantik, A.A.A.W.S.**, M.A., Assistant Professor, Faculty of Agriculture, Udayana University, Jl. P.B. Sudirman, Dangin Puri Klod, Kecamatan Denpasar Barat, Kota Denpasar, Bali, Indonesia.

- Email: [wulandiradj@unud.ac.id](mailto:wulandiradj@unud.ac.id)
- ORCID: 0000-0003-3102-6732
- Web of Science ResearcherID: NA
- Scopus Author ID: 58044500200
- Homepage: <https://sinta.kemdikbud.go.id/authors/profile/6188306>

**Krisnandika, A.A.K.**, M.Sc., Assistant Professor, Faculty of Agriculture, Udayana University, Jl. P.B. Sudirman, Dangin Puri Klod, Kecamatan Denpasar Barat, Kota Denpasar, Bali, Indonesia.

- Email: [agung\\_keswari@unud.ac.id](mailto:agung_keswari@unud.ac.id)
- ORCID: 0000-0003-3708-7544
- Web of Science ResearcherID: NA
- Scopus Author ID: 5721335226
- Homepage: <https://sinta.kemdikbud.go.id/authors/profile/5982459>

**Dewi, N.L.M.I.M.**, M.A., Lecturer, Faculty of Agriculture, Udayana University, Jl. P.B. Sudirman, Dangin Puri Klod, Kecamatan Denpasar Barat, Kota Denpasar, Bali, Indonesia.

- Email: [murdyani.dewi@unud.ac.id](mailto:murdyani.dewi@unud.ac.id)
- ORCID: 0009-0004-2069-0587
- Web of Science ResearcherID: NA
- Scopus Author ID: NA
- Homepage: <https://sinta.kemdikbud.go.id/authors/profile/6795486>

**Korri, N.T.L.**, M.A., Alumnee of the Master of Agribusiness, Faculty of Agriculture, Udayana University, currently working as staff in the Program Development And Evaluation Division at the Investment and One-Stop Integrated Service Office, Bali Province

- Email: [lupitakorri22@gmail.com](mailto:lupitakorri22@gmail.com)
- ORCID: 0000-0002-4014-1743
- Web of Science ResearcherID: NA
- Scopus Author ID: 58044240500
- Homepage: [https://pddikti.kemdikbud.go.id/data\\_mahasiswa/NTkzMzdFRjUtRDVfQy00QzIzLUFENUEtNEVGRkQ4QjEwOUU2](https://pddikti.kemdikbud.go.id/data_mahasiswa/NTkzMzdFRjUtRDVfQy00QzIzLUFENUEtNEVGRkQ4QjEwOUU2)

**Sukendar, N.M.C.**, M.A., Lecturer, Faculty of Agriculture, Udayana University, Jl. P.B. Sudirman, Dangin Puri Klod, Kecamatan Denpasar Barat, Kota Denpasar, Bali, Indonesia.

- Email: [classia.sukendar@unud.ac.id](mailto:classia.sukendar@unud.ac.id)
- ORCID: 0000-0001-8176-7833
- Web of Science ResearcherID: NA
- Scopus Author ID: NA
- Homepage: <https://sinta.kemdikbud.go.id/authors/profile/6793071>

#### HOW TO CITE THIS ARTICLE

Darmawan, D.P.; Arisena, G.M.K.; Djelantik, A.A.A.W.S.; Krisnandika, A.A.K.; Dewi, N.L.M.I.M.; Korri, N.T.L.; Sukendar, N.M.C., (2023). Farmers' motivation and obstacles in the smallest available agricultural region. *Global J. Environ. Sci. Manage.*, 9(4): 967-982.

DOI: 10.22035/gjesm.2023.04.20

URL: [https://www.gjesm.net/article\\_704241.html](https://www.gjesm.net/article_704241.html)

