



Relationship between Farmer Knowledge and Porang Farming Income



Putu Udayani Wijayanti ^a, Ketut Budi Susrusa ^b, Ni Luh Prima Kemala Dewi ^c

Manuscript submitted: 09 January 2024, Manuscript revised: 18 February 2024, Accepted for publication: 27 March 2024

Corresponding Author ^a



Keywords

commodity;
farming;
income;
knowledge;
Porang;

Abstract

Recently, the area where Porang is planted has become more and more widespread in the Bali region because it is increasingly in demand among farmers. Based on 2021 data, the planting area of Porang plants in Bali has reached 974 hectares spread throughout Bali. The income promised from this farming business is certainly very profitable for farmers, but of course as a new commodity, Porang farmers face various risks in cultivating it. This research data analyzed quantitatively to find out the amount of income and how it relates to the knowledge of Porang farmers. The population is 200 farmers who are members of the Bali Porang Farmers Association (P3B), 15% of the sample was taken, namely 30 Porang farmers. Farmer's knowledge is everything that farmers know regarding activities regarding the Porang plant and also business opportunities or employment opportunities for farmers. Knowledge is an aspect of behavior that is mainly related to the ability to remember material that has been studied. Farming income is the difference between the farming income obtained and the total farming expenditure.

International Journal of Life Sciences © 2024.

This is an open access article under the CC BY-NC-ND license (<https://creativecommons.org/licenses/by-nc-nd/4.0/>).

Contents

Abstract	25
1 Introduction	26
2 Materials and Methods	26
3 Results and Discussions	29
4 Conclusion	30
Acknowledgments.....	31
References	32
Biography of Authors	34

^a Agribusiness Study Program, Faculty of Agriculture, Udayana University, Denpasar, Indonesia

^b Agribusiness Study Program, Faculty of Agriculture, Udayana University, Denpasar, Indonesia

^c Agribusiness Study Program, Faculty of Agriculture, Udayana University, Denpasar, Indonesia

1 Introduction

Indonesia is known as an agricultural country, which means a country that relies on the agricultural sector both for livelihoods and to support development. Agriculture is one of the sectors that is very dominant in people's income in Indonesia, because the majority of the Indonesian population works as farmers. Therefore, the agricultural sector is a sector that has an important role in the Indonesian economy. One of the agricultural sectors is plantations. Plantations are the most promising subsector for increasing foreign exchange and improving people's welfare (Haase et al., 2016; Figuerola-Ferretti & Gonzalo, 2010). The Central Statistics Agency (BPS) noted that the contribution of the plantation sector to the national economy in 2018 increased by 22.48% compared to the contribution in 2014. Porang is one of the plantation crop commodities that is exported to various countries such as Japan, Australia, Korea, Sri Lanka, Pakistan, Malaysia, New Zealand, Italy and England. Indonesian Porang exports reached 14.8 thousand tons in 2021. Based on data from the Agricultural Quarantine Agency (Barantan), this figure exceeds the number of exports in 2019 with a total of 5.7 thousand tons. This increase shows export demand of 160%.

Porang commodities are tubers that belong to the Areaceae family and generally grow in forests. Porang has recently become a plant that is being widely discussed since the Minister of Agriculture exported 60 tons of this plant commodity to China. Apart from that, this commodity is also exported to countries such as Japan, Vietnam, Thailand, Hong Kong, Malaysia, South Korea, Zealand, Italy and Pakistan. Porang is exported to these countries in the form of flour and other processed products which are expected to have higher added value. Bali plans to export 5,000 tons of Porang to China to support Porang tuber export activities. This commodity is one of the new export commodities that Bali Province wants to explore for international trade. However, the need for this commodity cannot be fulfilled optimally because the Porang plant has not been cultivated intensively by Porang farmers in Bali. This is because currently the plants being cultivated are still very dependent on natural conditions, land is still limited and good and correct cultivation guidelines are not yet available (Mertz et al., 2005; Soullier & Moustier, 2018). Apart from that, this is also because Porang farmers do not have sufficient knowledge to cultivate Porang plants. Based on 2021 data, the planting area of Porang plants in Bali has reached 974 hectares spread throughout Bali. So it is interesting to examine the relationship between farmer knowledge and Porang farming income in Bali Province.

Based on the background above, the research objectives can be formulated to analyze farmers' knowledge of Porang farming, to analyze Porang farming income, and to analyze the relationship between farmer knowledge and Porang farming income. Porang farmers, as material for consideration in making decisions to cultivate Porang and as Description regarding the net income received in Porang farming and Bali Provincial Government, as a consideration in determining policies related to the development of Porang farming.

2 Materials and Methods

The research was carried out in Tabanan and Buleleng Regencies in Bali Province. The research period is from March to October 2023. The types of data used in this research are quantitative data and qualitative data. Quantitative data is data in the form of numbers that can be calculated, namely the costs incurred during the production process from planting to harvest. Qualitative data is data in the form of words, sentences and figures.

In this study, the qualitative data used included farmer identities, descriptions of research locations, field observation notes, and obstacles to Porang farming. The data were collected came from two sources, namely primary data and secondary data. Primary data is data obtained directly from respondents or informants. Primary data in this research was obtained from direct observation and interviews with Porang farmers, for example the amount of costs incurred for Porang farming and activities or activities carried out when carrying out farming using a list of questions that have been prepared in accordance with the research objectives.

Meanwhile, secondary data is data obtained indirectly from the source. Secondary data was obtained from library sources and documents from the District Agricultural Extension Center, Central Statistics Agency (BPS) of Bali Province, field observation notes, supporting books and journals related to research on farming activities. This secondary data was obtained to determine time series data on the amount of Porang

production, the total area of Porang harvested land and Porang productivity in the region. The data collection method used in this research is as follows:

Population is a collection of individuals consisting of objects/subjects with certain qualities and characteristics that have been determined by the researcher. Meanwhile, the sample is part of the number and characteristics of the population (Sugiyono, 2013). The population in this study were 200 farmers who were members of P3B (Bali Porang Farmers Association) who planted Porang. The determination of the sample size used by the author in this research was by taking 15% of the population, namely 30 farmers.

The research variables used in this analysis are the knowledge variable with indicators of cultivation techniques, as well as farming income with the first indicator used being the total income from Porang farming which uses the parameters of the production amount and selling price of Porang on the market and the second indicator is the total farming costs. Overall the parameters above can be seen in the Table 1.

Table 1
Variables, indicators, parameters, and variable measurement

No	Variable	Indicator	Parameter	Analysis
1.	Knowledge	Cultivation Techniques	1. Land preparation	Qualitative
			2. Preparation of seeds	
			3. Planting System	
			4. Planting stages	
			5. Maintenance	
			6. Pests and Diseases	
2.	Income	Farming Revenue	1. Production quantity	Quantitative
			2. Selling price	
			1. Labor costs	
			2. Cost of seeds	
			3. Fertilizer costs	
			4. Cost of medicines	
	Total Farming Costs		5. Rent land	
			6. Equipment depreciation	

For this second objective analysis, the analysis used is qualitative analysis. The data obtained is then processed and tabulated in tabular form, then the percentages are calculated and the results are described to determine knowledge and attitudes. Farmers' knowledge is measured using a Likert scale, namely scores of 1, 2, 3, 4, and 5. Where score 1 or the minimum score indicates the value of the answer that is least expected and score 5, namely the maximum score, indicates the value of the answer that is most expected. Can be determined by the formula:

$$I = \frac{ST-SR}{Y} = \frac{5-1}{5} = 0,8$$

Description:

- I = Class interval
- Y = Number of classes
- ST = Highest score
- SR = Lowest score

Table 2
Category of farmers' knowledge in Porang cultivation

No	Score	Category
1.	1 - 1,8	Strongly Disagree (STS)
2.	≥ 1,8 - 2,6	Disagree (TS)
3.	≥ 2,6 - 3,4	Doubtful (RR)
4.	≥ 3,4 - 4,2	Agree (S)
5.	≥ 4,2 - 5	Strongly agree (SS)

Table 2 shows that the level of Farmers' Attitudes and Knowledge is divided into 5 class intervals, namely strongly disagree score 1 - 1.8, disagree score ≥ 1.8 - 2.6, doubtful score ≥ 2.6 - 3, 4, agree score ≥ 3.4 - 4.2 and strongly agree score ≥ 4.2. The revenue from Porang farming can be calculated by multiplying the production price of Porang by the amount of production obtained using the following formula:

$$TR = Pq \times Q$$

Description:

TR : Total Revenue (IDR/cultivated area/year)

P : Production Price (IDR /year)

Q : Production obtained Porang farming costs

Fixed costs consist of production costs and depreciation costs for agricultural equipment. Production costs are costs incurred in Porang farming activities and depreciation costs for agricultural tools such as hoes and sickles. The amount of depreciation costs for agricultural equipment used for Porang farming is calculated using the straight line method. The formula for the straight line method is as follows.

$$\text{Depreciation of Building Equipment} = \frac{N \quad P_i \quad -N \quad s}{U \quad E}$$

Variable costs are calculated from the costs of fertilizer, medicine and labor used in Porang farming. To find out the total production costs incurred, it is necessary to calculate the total costs. Production costs can be calculated using the following formula:

$$TC = TFC + TVC$$

Description :

TC : Total Cost (IDR /yr/cultivated area)

TFC : Total Fixed Costs (IDR /year/cultivated area)

TVC : Total Non-Fixed Costs (IDR /year/cultivated area)

To increase income, farmers must try to increase production yields in order to obtain increased income by maximizing inputs that influence Porang farming. Porang farming income can be calculated by subtracting the farmer's total income minus the total costs during farming using the following formula:

$$\Pi = TR - TC$$

Description:

Π : Income (IDR/yr)

TR : Total Revenue / Total Revenue (IDR/year)

TC : Total Cost (IDR/year)

To find out the relationship between farmer knowledge and Porang farming income, use the Spearman Rank formula.

$$r_s(\rho) = \frac{1 - 6 \sum d^2}{n(n-1)}$$

Description

$r_s(\rho)$ = Spearman rank correlation coefficient

d^2 = Difference between X and Y

Σ = Sigma or sum

n = Number of individuals in the sample

Numbers 1 and 6 = Constant numbers (Sugiyono, 2012)

3 Results and Discussions

Farmers' knowledge influences behavior change and enables them to participate in social life to improve society and their lives. This happens because knowledge is sufficient to motivate someone to do a lot to fulfill their own life. The level of knowledge in accepting a reform depends on how agricultural extension implements extension methods that are suitable for the conditions (Van den Berg et al., 2007; Miyata et al., 2009). Farmers stated that media to increase the knowledge of village communities, especially farmers, had been prepared by the government and facilities had been provided through agricultural extension programs. Whether it's about farming or the application of new technology (Syafiuddin, 2010 in Arbi et al., 2017). Farmer knowledge is everything that farmers know regarding activities regarding dragon fruit plants and also business opportunities or employment opportunities for farmers. Knowledge is an aspect of behavior that is mainly related to the ability to remember material that has been studied (Soekanto, 1999 in Arbi et al., 2017). In current development, it is realized that knowledge of something new is a quite vital tool, especially in realizing the shared hope of creating a just and prosperous society. As a result, it is absolutely necessary to think about and look for a concept that can bridge the gap between the reality of development and increasing knowledge (Zuckerman, 2002 in Arbi et al., 2017). Learning for farmers and their families is not only to develop their knowledge but also to increase their social participation. Learning outcomes will appear in changes in behavior, including increasing knowledge in both type and quantity (Syafiuddin, 2010 in Arbi et al., 2017).

Education Education is an effort to develop personality and abilities inside and outside school and lasts a lifetime. Education influences the learning process, the higher a person's education, the easier it is for that person to receive Description. With higher education, a person will tend to get Description, both from other people and from the mass media. The more Description you enter, the more knowledge you gain. Knowledge is closely related to education, where it is expected that someone with higher education will have more extensive knowledge. However, it needs to be emphasized that someone with low education does not mean absolutely low knowledge, increased knowledge is not absolutely obtained in formal education, but can also be obtained in non-formal education. A person's knowledge about an object also contains two aspects, namely positive and negative aspects. These two aspects will ultimately determine a person's attitude about a particular object. The more positive aspects of an object you know, the more positive your attitude will be towards that object (Khan et al., 2019).

Mass media info obtained from both formal and non-formal education can have a short-term influence, resulting in changes or increased knowledge. As technology advances, various types of mass media will be available that can influence people's knowledge about new innovations. As a means of communication, various forms of mass media such as television, radio, newspapers, magazines and others have a big influence on the formation of people's opinions and beliefs. In conveying Description as its main task, the mass media also carries messages containing suggestions that can direct a person's opinion. The existence of new Description about something provides a new cognitive basis for the formation of knowledge about that thing.

Socio-cultural and economic Habits and traditions that people carry out without reasoning whether what they do is good or bad. In this way, someone will increase their knowledge even if they don't do it. A person's economic status will also determine the availability of facilities needed for certain activities, so that this socio-economic status will influence a person's knowledge (Stoop et al., 2009; Wójcik et al., 2019).

Environment is everything that exists around an individual, whether physical, biological or social. The environment influences the process of knowledge entering into individuals who are in that environment. This occurs because of reciprocal interactions or not which will be responded to as knowledge by each individual.

Experience Experience as a source of knowledge is a way to obtain the truth of knowledge by repeating the knowledge gained in solving problems faced in the past. The learning experience at work that is developed provides professional knowledge and skills as well as the learning experience during work will be able to develop the ability to make decisions which is a manifestation of the integration of scientific and ethical reasoning based on real problems in the field of work (Orlando et al., 2020).

Age influences a person's understanding and thinking patterns. The older you get, the more your understanding and thinking patterns will develop, so that the knowledge you obtain will get better. In middle age, individuals will play a more active role in society and social life and make more preparations for the success of adapting themselves to old age, apart from that, middle age people will spend more time reading. Intellectual abilities, problem solving, and verbal abilities are reported to have almost no decline at this age. Two traditional attitudes regarding the course of development throughout life:

The older you get, the wiser you get, the more info you encounter and the more things you do to increase your knowledge.

Cannot teach new skills to people who are old because they experience setbacks both physically and mentally. It can be expected that IQ will decrease with age, especially in other abilities such as vocabulary and general knowledge. Some theories argue that a person's IQ will decrease quite quickly as they get older. Saefuddin in Arbi et al. (2017), states that knowledge is the initial stage of perception which then gives birth to attitudes and in turn gives birth to deeds or actions. Having good knowledge about something will encourage changes in behavior in individuals, where knowledge about the benefits of something will cause someone to have a positive attitude towards that thing, and vice versa. Having a genuine intention to carry out an activity can ultimately determine whether the activity is actually carried out. Knowledge has a role in generating a person's attitudes and perceptions towards a particular object which is influenced by factors of experience, learning processes and knowledge (Suarta et al., 2023).

According to Bloom Subiyanto in Arbi et al. (2017), states that knowledge is how the process of becoming know occurs. In measuring a person's level of ability to mastery of material, according to Bloom, it can be categorized into 6 levels, namely level of knowledge (Knowledge). If someone is only able to remember something in outline. Comparative commands (Comprehension), if someone can explain again fundamentally the knowledge being studied. Application, when someone is able to use something obtained in a new situation. Analysis, if someone is able to analyze the relationship between one another and a particular organization. Synthesis is a process of forming a new structure that was previously discovered.

Assessment (Evaluation), if someone is able to fully understand all the material being studied and is also able to assess it according to predetermined criteria. Results: lies in the criteria of less close relationship with a percentage of -31.64% (significant at 5% level). From a total of 30 farmers, it was found that there was a less close relationship between knowledge and the level of farmer income, it is not certain that the income of Porang farmers is influenced by knowledge. It is possible that the higher the farmer's knowledge of Porang cultivation will affect the farmer's income. The level of knowledge of farmers is very influential in increasing the effectiveness of farming implementation.

4 Conclusion

According to Kastijadi (2009), one of the causes of low productivity of a crop is that farmers have not fully implemented production technology. Meanwhile, the factors that influence the level of use of this technology

are the low level of farmers' ability to understand Description and obtain knowledge, low capital and land ownership status, as well as the price of production factors and production prices.

Suggestion

Knowledge is very important for the success of a business, some of this knowledge is entrepreneurial innovation, a positive attitude towards work, technical knowledge and training experience so that it will lead to positive advantages and even an increase in income, in this case Porang cultivation.

Acknowledgments




We are grateful to two anonymous reviewers for their valuable comments on the earlier version of this paper.

References

- Aini, H. N., Prasmatiwi, F. E., & Sayekti, W. D. (2015). Analisis pendapatan dan risiko usahatani kubis pada lahan kering dan lahan sawah tadah hujan di Kecamatan Gisting Kabupaten Tanggamus. *Jurnal Ilmu-Ilmu Agribisnis*, 3(1).
- Aprilliani, R. (2016). Analisis Pendapatan dan risiko usahatani padi organik dan anorganik di Kabupaten Pringsewu.
- Arbi, K. A., Kausar, A. R., & Salim, I. (2017). Minimizing asymmetric information in online markets through knowledge management. *International Journal of Management Excellence (ISSN: 2292-1648)*, 8(2), 924-931.
- Figuerola-Ferretti, I., & Gonzalo, J. (2010). Modelling and measuring price discovery in commodity markets. *Journal of Econometrics*, 158(1), 95-107. <https://doi.org/10.1016/j.jeconom.2010.03.013>
- Haase, M., Zimmermann, Y. S., & Zimmermann, H. (2016). The impact of speculation on commodity futures markets—A review of the findings of 100 empirical studies. *Journal of Commodity Markets*, 3(1), 1-15. <https://doi.org/10.1016/j.jcomm.2016.07.006>
- Hariadi, S. S. (2011). *Dinamika kelompok: teori dan aplikasinya untuk analisis keberhasilan kelompok tani sebagai unit belajar, kerjasama, produksi, dan bisnis*. Sekolah Pascasarjana, Universitas Gadjah Mada.
- Hernanto, F. (1989). Ilmu Usaha Tani, Penebar Swadaya Jakarta., 1991. *Ilmu Usaha Tani Cetakan Kedua, Penebar Swadaya Jakarta*.
- Khan, M. F., Nakano, Y., & Kurosaki, T. (2019). Impact of contract farming on land productivity and income of maize and potato growers in Pakistan. *Food Policy*, 85, 28-39. <https://doi.org/10.1016/j.foodpol.2019.04.004>
- Kurniati, D. (2012). Analisis risiko produksi dan faktor-faktor yang mempengaruhinya pada usahatani jagung (*Zea Mays L.*) di Kecamatan Mempawah Hulu Kabupaten Landak. *Jurnal Social Economic of Agriculture*, 1(3).
- Lubis, S. (2005). *Pengaruh budaya kerja dan sikap inovatif terhadap kinerja guru MAN di kota Medan* (Doctoral dissertation, UNIMED).
- Mertz, O., Wadley, R. L., & Christensen, A. E. (2005). Local land use strategies in a globalizing world: Subsistence farming, cash crops and income diversification. *Agricultural systems*, 85(3), 209-215. <https://doi.org/10.1016/j.agsy.2005.06.007>
- Miyata, S., Minot, N., & Hu, D. (2009). Impact of contract farming on income: linking small farmers, packers, and supermarkets in China. *World development*, 37(11), 1781-1790. <https://doi.org/10.1016/j.worlddev.2008.08.025>
- Moleong, L. J. (2011). *Metodologi Penelitian Kualitatif*. Bandung: PT. Remaja Rosdakarya.
- Orlando, F., Alali, S., Vaglia, V., Pagliarino, E., Bacenetti, J., & Bocchi, S. (2020). Participatory approach for developing knowledge on organic rice farming: Management strategies and productive performance. *Agricultural systems*, 178, 102739. <https://doi.org/10.1016/j.agsy.2019.102739>
- Soekanto, S. A. (1999). IL-1 & IL-6 in Bone: Local Translators in Cell-to-Cell Communications. *Journal of Dentistry Indonesia*.
- Soeparno, H., Pasandaran, E., Syarwani, M., Dariah, A., Pasaribu, S. M., & Saad, N. S. (2013). Politik Pembangunan Pertanian Menghadapi Perubahan Iklim.
- Soullier, G., & Moustier, P. (2018). Impacts of contract farming in domestic grain chains on farmer income and food insecurity. Contrasted evidence from Senegal. *Food Policy*, 79, 179-198. <https://doi.org/10.1016/j.foodpol.2018.07.004>
- Stoop, W. A., Adam, A., & Kassam, A. (2009). Comparing rice production systems: A challenge for agronomic research and for the dissemination of knowledge-intensive farming practices. *Agricultural Water Management*, 96(11), 1491-1501. <https://doi.org/10.1016/j.agwat.2009.06.022>
- Suarta, G., Suberata, I. W., & Dananjaya, I. G. A. N. (2023). Farmer motivation towards the development of honeybee farming in Bali Province. *International Journal of Life Sciences*, 7(3), 48-57. <https://doi.org/10.53730/ijls.v7n3.14557>
- Sugiyono, D. (2013). *Metode penelitian pendidikan pendekatan kuantitatif, kualitatif dan R&D*.
- Swastika, D. K. (2011). Penguatan kelompok tani: langkah awal peningkatan kesejahteraan petani. *Analisis Kebijakan Pertanian*, 9(4), 371-390.

- Syafruddin, S., Jahi, A., & Lumintang, R. W. (2006). Hubungan Sejumlah Karakteristik Petani Mete Dengan Pengetahuan Mereka Dalam Usahatani Mete Di Kabupaten Bombana, Sulawesi Tenggara. *Jurnal Penyuluhan*, 2(2).
- Syahyuti, S. (2007). Kebijakan Pengembangan Gabungan Kelompok Tani (GAPOKTAN) Sebagai Kelembagaan Ekonomi di Perdesaan. *Jurnal Analisis Kebijakan Pertanian*, 5 (1).
- Thurstone, L. L. (1928). Attitudes can be measured. *American journal of Sociology*, 33(4), 529-554.
- Van den Berg, M. M., Hengsdijk, H., Wolf, J., Van Ittersum, M. K., Guanghai, W., & Roetter, R. P. (2007). The impact of increasing farm size and mechanization on rural income and rice production in Zhejiang province, China. *Agricultural Systems*, 94(3), 841-850. <https://doi.org/10.1016/j.agsy.2006.11.010>
- Wawan, A., & Dewi, M. (2010). Teori dan pengukuran pengetahuan, sikap dan perilaku manusia. *Yogyakarta: Nuha Medika*, 12.
- Wójcik, M., Jeziorska-Biel, P., & Czapiewski, K. (2019). Between words: A generational discussion about farming knowledge sources. *Journal of Rural Studies*, 67, 130-141. <https://doi.org/10.1016/j.jrurstud.2019.02.024>
- Zuckerman, J. N. (Ed.). (2002). *Principles and practice of travel medicine*. John Wiley & Sons.

Biography of Authors

	<p>Dr. Putu Udayani Wijayanti, SP, M.Agb. She is a lecturer in the Agribusiness Study Program, Faculty of Agriculture, Udayana University, now she is the Coordinator of the Agribusiness Study Program, Faculty of Agriculture, Udayana University. Study interested in Subak Studies. <i>Email: putuudayani@unud.ac.id</i></p>
	<p>Prof. Dr. Ir. Ketut Budi Susrusa, MS. He is a lecturer in the Agribusiness Study Program, Faculty of Agriculture, Udayana University. He is Chair of the Senate of the Faculty of Agriculture and Secretary of the Senate of Udayana University. He is a Permanent Professor at the Faculty of Agriculture, Udayana University. <i>Email: kbsusrusa@unud.ac.id</i></p>
	<p>Dr. Ni Luh Prima Kemala Dewi, SP, M.Agb. She is a lecturer in the Agribusiness Study Program, Faculty of Agriculture, Udayana University, currently the Head of the Computing and Multimedia Laboratory in the Agribusiness Study Program. Study interested are in Agribusiness Studies and statistics. <i>Email: primakemaladewi@gmail.com</i></p>