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# Paddy rice farming diversification with *Trigona sp.* in Pandeglang regency, Banten province (case study: diversification income analysis of paddy rice business with bee cultivation)

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**Abstract.** The study is aimed to determine the total income and contribution income of *Trigona sp.* cultivation by paddy rice farmers in Pandeglang District, Banten Province. The study location was purposively selected sub-districts at Pandeglang, Majasari, and Menes. Seven farmers who had at least 30 units of honeycomb colony and managed maximum 0,3 hectare (ha) of paddy field was used as a respondent. Data were collected using questionnaire to obtain the information and analyzed using Microsoft Excel for data analysis. The results showed that bee cultivation diversification with paddy rice business has potentially make a good income. The contribution income of bee cultivation and paddy rice business in 1 year have a rate 59.46% or Rp. 13,291,857,00 and 40.54% or Rp. 8,872,257.00, respectively with rate total income Rp. 22,164,114.00. The highest paddy rice and bee cultivation income were 10,296,000.00 and 18,568,000.00, respectively obtained by same farmer.

Keywords: contribution income, *Trigona sp.* cultivation, diversification, paddy rice business, total income.

## 1. Introduction

Pandeglang is a regency of Banten province located on the west and south coasts of the island of Java. It has 54.739 ha land of paddies including flooded and dry field with total paddy production. Most famer lived in Pandeglang are small farmer. Therefore, most of them have a low income and very depend to paddy farming, resulted their prosperity are much lower than labor worker. It resulted to decline of farmer household as it seen in table 1 [1]. The diversification with other work, such as labor, fish farming, animal livestock, as alternate to increase their income and prosperity [2].

**Table 1.** Agriculture population census of small farmer in Banten 2003 and 2013

City/Regency	Census		Growth (%)
	2003	2013	
Pandeglang	111,833	86,000	-23,10
Lebak	104,810	115,758	10,45
Tangerang	199,467	61,928	-68,95
Serang	141,606	85,045	-39,94



City/Regency	Census		Growth (%)
	2003	2013	
Tangerang City	19,006	7,561	-60,22
CilegonCity	14,005	6,072	-56,64
Serang City	22,526	12,841	-42,99
Tangerang Selatan City	21,162	4,683	-77,87
Total	634,415	379,888	-40,12

One of potency to increase their income is diversification through Trigona cultivation. *T. laeviceps* and *T. itama* can be found easily in Banten. These bees have a same type which is can also be found in Sumatra, Bali, and Borneo [3][4][5]. The only difference is their size much smaller and can be found anywhere, even in the house [6].

*Trigona* sp. products have economic potency due much more profit than other product from other honey bee especially propolis [7][8]. Therefore, it is considered a good candidate to be applied as diversification, especially in Pandeglang because they have much small farmer and also to increase their income as a part to integrate between paddy farming and Trigona cultivation [9].

It is important to study diversification in Pandeglang Regency to improve prosperity of small farmer. This study is aimed to learn about total income and contribution income from diversification of Trigona cultivation with paddy farming.

## 2. Method

The research was conducted in at selected districts in Pandeglang Regency, Banten: (1) Pandeglang, (2) Majasari, and (3) Menes from September to December 2018. These location was purposely selected as a sample location because they have biggest beekeeper as a data sources. Research conducted in the form of case study to learn about the diversification by small farmers which cultivated Trigona Sp as another sources of income. This study aimed to know the total income and contribution income cultivation by paddy rice farmers. Data was collected by exploration to obtain an information by questionnaire from respondent and analyzed using Microsoft Excel for data analysis. Data taken from respondent including: (1) time cultivation from start; (2) types of bee product that have been sold in one month; (3) amount of product that have been sold in one month; (4) price of each product (5) percentage of contribution income compared to main income from paddy farming; and (6) tools and utility for bee cultivation.

## 3. Result and Discussion

Seven farmers who had at least 30 units of honeycomb colony and managed maximum 0,3 hectare (ha) of paddy field was used as a respondent. The diverse of respondent can be seen below (table 2).

**Table 2.** Farmer respondent

No.	District	Total	Respondent	
			Name	Symbol
1	Menes	3	I.K	Farmer A
			A.S	Farmer B
			S	Farmer C
2	Pandeglang	2	G	Farmer D
			S	Farmer E
3	Majasari	2	M	Farmer F
			S	Farmer G

The data result can be seen at table 3.

**Table 3.** Contribution income of paddy rice farming diversification with Trigona cultivation in 1 year

No.	Farmer	Paddy income (IDR)	%	Trigona cultivation income (IDR)	%	Total income
1	A	9,282,800	38.40	14,885,000	61.59	24,167,800
2	B	7,374,000	39.77	11,164,000	60.22	18,538,000
3	C	7,098,000	35.79	12,733,000	64.21	19,831,000
4	D	9,094,000	39.87	13,716,000	60.13	22,810,000
5	E	10,296,000	35.67	18,568,000	64.33	28,864,000
6	F	9,828,000	41.74	13,716,000	58.26	23,544,000
7	G	9,133,000	52.51	8,261,000	47.49	17,394,000
	Rate	8,872,257	40.54	13,291,857	59.46	22,164,114

The table result showed that income contribution of diversification Trigona cultivating rice farmer varied each farmer. The average of total income was IDR 22,164,111 with 59.46% come from Trigona cultivation and the rest come from paddy farming. The highest paddy rice and bee cultivation income were IDR 10,296,000 and IDR 18,568,000, respectively, both obtained by farmer E. Farmer C from Menes also obtained high income from Trigona cultivation (64.21%) second only with farmer E, but lose to farmer A, D, and F in term of amount income. The only had contribution income below from 50% is farmer G, as the other farmer have contribution is above 55%.

The Income from Trigona cultivation above 50% is a good contribution. It means farmer has expectancy to increase their income through diversification. Cheap investment and operation affected their income, which resulted high income compared to rice farming. It could be due paddy farming has a high operational cost and can only harvested two times in one year, resulted paddy income much lower than Trigona income, which it can harvested 12 times or more in one year.

As the study result showed that Trigona income much higher than paddy come, diversification can be a good chance to be new alternate to increase their income and prosperity. It was showed that Trigona income reach 59.46% from total income. Another factor that affecting high income is price of honey and propolis. Both can be sold to higher price, about IDR 450,000/liter and IDR 50,000/kg, respectively.

As a comparison, research from Muyana and Hamzah [10] at Musi Rawas, Riau about contribution income from conversion of paddy farming to fish pond for pisciculture. The contribution income showed IDR 22,733,333,33/0.47 ha in 8 months compared to paddy income 9,441,366,67/0.47 ha for 8 months. Filly [11] studied about the income from bee cultivation (*apis cerana*) at Batanghari, Lampung showed contribution income of the beekeeper 27.71%. It much lower than other contribution income. It may due the honey price is much cheaper.

#### 4. Conclusion

The contribution income of bee cultivation and paddy rice business in 1 year have a rate 59.46% or IDR 13,291,857,00 and 40.54% or IDR 8,872,257.00, respectively with rate total income IDR 22,164,114.00. The highest paddy rice and bee cultivation income were IDR 10,296,000.00 and IDR 18,568,000.00, respectively obtained by same farmer.

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