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## Performance financial analysis of rubber cooperatives in Trat province, Thailand

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**Abstract** The financial performance of rubber cooperatives in Trat Province, Thailand was studied. The results revealed that characteristics of rubber cooperatives were divided into primary and secondary businesses. Four rubber cooperatives obtained the highest revenue from gathering rubber products as primary business, accounting for 50 percent of all rubber cooperatives, covering 22.53 million (THB.) per year. Regarding secondary business, two rubber cooperatives generated the highest revenue by supplying and selling fertilizer and agricultural chemicals, and processing rubber products accounting for 4 million (THB) per year. Seven cooperatives (87.5%) had acceptable financial performance ratios. This finding implied that these cooperatives were successful in terms of operation. The ability of rubber cooperatives to meet current obligations and the use of resources were effective. In contrast, only one cooperative investing in rubber processing gained an unacceptable financial performance ratio which was below than 2. The Acid-test (-0.17) demonstrated rubber cooperative dependency upon inventory. Additionally, the inventory turnover ratio was excessively high. There was much invested in rubber processing, machinery, and equipment. Cooperative management should consider financial ratios as an important tool to investigate the performance of rubber cooperatives.

**Keywords:** rubber cooperative, cooperative performance, cooperative financial ratio, agricultural cooperative, financial performance

### Introduction

Agricultural cooperatives play an important role in helping small-scale farmers in many aspects and enhancing the development (Ortmann and King, 2007), accessing to specific assets needed for production, achieving economies of scale or scope, and gain bargaining power to negotiate with buyers (Bijman and Hu, 2011; Holloway *et al.*, 2000), accessing to credit (Badiru, 2010), as well as accessing to agricultural inputs (Uchenna and Olabisi, 2012). Agricultural cooperatives are considered suitable institutional structures for addressing market failure problems experienced by small-scale farmers (Lwanda, 2013). Agricultural cooperatives, with the concept of self-reliance and cooperation, have played an important role in raising the socioeconomic status of their farmer

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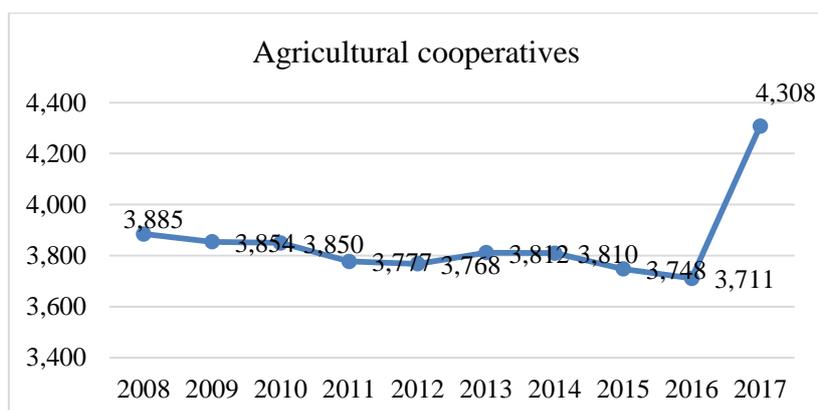
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members (Thuvachote, 2011). However, cooperatives around the world are in a state of instability, success stories of some or few cooperatives. There were also critical challenges in cooperatives sectors (Mohammed and Lee, 2015). Even, cooperatives are regarded as key vehicles, but little is known about their effectiveness to achieve these goals. There is a renewed interest from the governments to improve smallholder agricultural performance (Verhofstadt and Maertens, 2014). Under the economic, social, and environmental criteria, the performance of the cooperatives should be assessed (Ramanauskas and Stašys, 2011). Currently, the agricultural cooperatives were challenging by changes in various external and internal environments (Mukhjang, 2015). Increasing support of the agricultural cooperative, the government organizations should consider past performance.

In Thailand, agricultural sector plays a crucial role in economy contribution. The cooperative movement in the country is regarded as an important factor for economic and social development, especially in a rural sector (Thuvachote, 2011). Currently, regarding 12<sup>th</sup> National Economic and Social Development Plan (2017-2021), agricultural cooperatives have been supported in many regions in order to achieve economies of scale, and reinforce farmers and farmer institutes to be self-sufficient (Office of the National Economic and Social Development Board, 2017). Cooperatives in Thailand are composed of seven types: Agricultural Cooperative, Land Settlement Cooperative, Fisheries Cooperative, Thrift and Credit Cooperatives, Consumer Cooperative, Service Cooperative, and Credit Union Cooperative (Thuvachote, 2011). Amongst all cooperatives, agricultural cooperative is the biggest cooperative in terms of members which have been increasing each year. This is because of the increase of farmer's difficulty in low agricultural product prices every years (Cooperative Promotion Department, 2016; Pongpanich and Peng, 2016). At the country level, a statistic in the last 10 years reported that the number of agricultural cooperatives had increased from 3,885 cooperatives in 2008 to 4,308 cooperative in 2017 (as shown in Figure 1.).

Rubber Agricultural Cooperative in Thailand increases attention to resolve the natural rubber price issue. In agricultural policy for Natural Rubber Farmers in Thailand (Master Plan (2016-20), developing rubber cooperative is a mechanism to improve rubber farmers. Meanwhile, Rubber Authority of Thailand was established by the Rubber Act of Thailand B.E. 2558 (2018) to be a rubber farmers' association by means of that the cooperative association or the rubber farmers' group registered as legal entities. It does not include a limited company. Partnerships and partnerships with rubber farmers are a shareholders or partners that registered with the Rubber Authority of Thailand in accordance with the rules, procedures, and conditions prescribed by the board. By the year 2017, the Rubber Farmers' Association had become a rubber cooperative

registered as a rubber cooperative with the Rubber Authority of Thailand consisting of 670 cooperatives (Rubber Authority of Thailand, 2017) covering 15 percent of agricultural cooperatives. Rubber cooperatives was gathering rubber farmers who would like to create marketing by increasing their bargaining power.



**Figure 1.** The number of agricultural cooperatives in Thailand since 2008-2017 (Source: Cooperative Promotion Department (2017))

A first rubber cooperative in Trat province was established in 1994. In 2016, eight rubber cooperatives are still working (Trat Provincial Cooperative Office, 2016) aiming to encouraging members to do business together. At the beginning, the cooperative worked by gathering products from members in order to gaining the bargaining power with middlemen and improve product quality because most rubber farmers sell their products independently. Every government has attempted to solve the problem by issuing a number of measurements including supporting the establishment of an organization or a farmer group. It is believed that the development in the form of a group or an organization can solve such predicaments by giving farmers an opportunity to discuss and help each other or participate in group activities (Ritthirong and Singsuwan, 2008). At present, the rubber cooperative businesses are to gather rubber products, to supply and sell fertilizer and agricultural chemicals, together with to grant loan and deposit money. Each rubber cooperative has different business operation depending on the area and environment such as the ability of executive, staff, working systems. An idea to maximize the performance of the cooperative by using financial ratio has been employed in evaluating the performance and financial condition.

Many studies of cooperative business performance use financial ratio analyses. Financial ratios have been used to analyze the economic efficiency of cooperatives (Parliament and Taitt, 1989; Schrader *et al.*, 1985). Financial ratio analysis examines cooperative performance when making a decision to merge (Henehan, 2002). Financial ratios offer the

indication of the firm's position in the dimensions of profitability, liquidity, solvency, and efficiency (Shamsuddin *et al.*, 2017). Whilst, this is the most obvious indicator that cooperatives have a good performance each year. Trat province is one of ten provinces in Thailand that was selected as a province in the Special Economic Zone (SEZ) where located in eastern Thailand. It has a border area adjacent to Cambodia. Trat province is also the third largest rubber plantation covering 346,634 rai (55,461.44 hectares) (1 hectares = 6.25 rai) (Department of Agricultural Extension, 2017). Rubber cooperatives in Trat province received the best rubber cooperative award from the Rubber Authority of Thailand in 2016. From the abovementioned information, this study was conducted to investigate the efficiency of the rubber cooperatives in Trat province. Furthermore, the study investigated the financial efficiency of the rubber cooperatives in Trat province. The findings of this study can be used as a guideline for other farmers' institutions development which will be part of strengthening the community of rubber farmers. However, rubber production of the rural area is contributed mainly by smallholders. Therefore, this study aimed to investigate the financial performance of the rubber cooperatives in Trat Province, Thailand.

## **Materials and methods**

### ***Study area***

Trat Province, Thailand was selected as the study area (Figure 2). Rubber cooperatives in Trat Province were registered with Rubber Authority of Thailand, and supervision were handled by Cooperative Promotion Department.

### ***Data collection***

Data were collected from Annual Reports in 2016 of eight rubber cooperatives provided by the Department of Cooperative Promotion, Trat Province. In this study, each cooperative was represented by the code "Coop." running from Coop.1 to Coop.8 for the first to the eighth rubber cooperative. The information of each representing were presented as follow:

**Coop.1** represented Nerndindang Trat Rubber Tree Co-operative Ltd.

**Coop.2** represented Ta Kum Cooperative rubber planters.

**Coop.3** represented Trat Cooperative rubber.

**Coop.4** represented Lame Makam Samuckee Rubber Fund Cooperative Co., ltd

**Coop.5** represented Bang Ped Ruamjai Rubber Fund Cooperative.

**Coop.6** represented Huai Rang District Development of rubber quality Cooperative.

**Coop.7** represented Ban Sangam Rubber Fund Cooperative Co., ltd

**Coop.8** represented Ban Salak Rubber Fund Cooperative Co., ltd



**Figure 2.** Map of Trat Province, Thailand

### *Data analysis*

Descriptive statistics and financial ratios were employed to analyze the data. This financial performance of rubber cooperatives was measured based on the followings financial ratios (Rabirou *et al.*, 2013):

$$1. \text{Current ratio} = \frac{\text{Current Assets}}{\text{Current Debt}}$$

The current ratio is used to measure short-term r, and it also indicates that a company can readily cover its liabilities adequately through cash generated with its current assets. A current ratio of 2 or greater is preferable.

$$2. \text{Acid - test} = \frac{\text{Current assets} - \text{Inventory}}{\text{Current Debt}}$$

The quick ratio or acid test ratio is a specific test of liquidity. It examines whether a business is expecting to realize enough cash from its current assets in the near future to pay off all its current liabilities. A quick ratio of 1 or greater is preferable.

$$3. \text{Equity to assets} = \frac{\text{Equity}}{\text{Assets}}$$

Equity to assets ratio indicates the proportion of the shareholders' stake in the assets of the business that is the ratio of the business' assets financed by the shareholders. This ratio represents a rubber cooperative with

high ratios indicating less investment assets and more equity than cooperative.

$$4. \text{ Owners' equity to assets} = \frac{\text{Owner's Equity}}{\text{Assets}}$$

Owner's equity to assets ratio can be used in two different angles. For the first angle, investors can look at whether it can recover much of their wealth. However, if you look in the corner of the creditors, this ratio would imply a risk because if the loan is very risky.

$$5. \text{ Debt to assets} = \frac{\text{Total Debt}}{\text{Total Assets}}$$

Debt to Assets is used to compare the total liabilities to cooperative's total assets, and used to indicate the level of financial risk. The lower of this ratio is represent the lower is a good better.

$$6. \text{ Debt to equity} = \frac{\text{Total Debt}}{\text{Equity}}$$

This ratio is important in knowing if a company or a cooperative society has over borrowed or not. A maximum "safe" debt per equity ratio is 50%, which means that one-half of the total assets of a business are being externally financed. The lower of this ratio is better.

$$7. \text{ Current debt to equity} = \frac{\text{Current Debt}}{\text{Equity}}$$

The current debt to equity indicates that investment in a company is risky or not. If the result is greater than 1, the company has a debt more than shareholders representing a higher risk. Alternatively, this ration also indicates the higher ability of the company's loan.

## **Results**

### ***Businesses of rubber Cooperative***

The years of establishment of rubber cooperatives were 1994 to 2015. The highest number of members of the cooperative was 215 and the lowest number was 35 people. There were located around Trat province (Table 1).

The businesses of eight rubber cooperatives in Trat Province. The businesses of rubber cooperatives in Trat Province consisted of four major businesses as gathering rubber products was discovered in four rubber cooperatives accounting for 50% of the total cooperative businesses, supplying and selling fertilizer was found in two cooperative accounting for 25%. Only one cooperative managed for supplying and selling rubber pillows and rubber gloves, and the last cooperative granted loan and money deposit covering for 12.5% each. In Trat Province, only two rubber

cooperatives ran secondary business, namely gathering rubber dry sheet; and supplying, and selling fertilizer, agricultural chemicals, and processing rubber products.

**Table 1.** Rubber cooperative characteristics in year 2016

Title	Year of establishment	Location	Number of members
<b>COOP.1</b>	30 October 2015	8/1 Moo.11 Huai Rang sub-district Mueang Trat	34
<b>COOP.2</b>	23 November 2015	7 Moo. 1 Ta Kum sub-district Mueang Trat	37
<b>COOP.3</b>	10 September 2012	47 Moo.7 Sentung sub-district Khao Saming district	67
<b>COOP.4</b>	23 May 1995	26/1 Moo.4 Laem Ngop sub-district Laem Ngop district	37
<b>COOP.5</b>	24 March 1994	22 Moo.3 Bang Ped sub-district Laem Ngop district	60
<b>COOP.6</b>	29 April 2015	145 Moo.9 Huai Rang sub-district Mueang Trat	98
<b>COOP.7</b>	25 September 1996	124 Moo.4 Wang kraja sub-district Mueang Trat	215
<b>COOP.8</b>	21 March 1994	107 Moo.3 Tasom sub-district Khao Saming district	93

Source: The author computed based on the data from Cooperative Promotion Department (2016).

**Table 2.** Business of rubber cooperative characteristics in year 2016

Title	Primary business	Secondary business
<b>COOP.1</b>	Supply and sale rubber pillows and rubber gloves	Gather rubber dry sheet
<b>COOP.2</b>	Gather latex	-
<b>COOP.3</b>	Gather rubber products	Supply and sale fertilizer, agricultural chemical, process rubber productions
<b>COOP.4</b>	Supply and sale fertilizer	-
<b>COOP.5</b>	Supply and sale fertilizer, agricultural chemicals	-
<b>COOP.6</b>	Gather latex and process rubber sheet	-
<b>COOP.7</b>	Gather latex	-
<b>COOP.8</b>	Grant loan and deposit money	-

Source: The author computed based on the data from Cooperative Promotion Department (2016).

The volumes of primary business of rubber cooperative in Trat Province are demonstrated in Table 3. Four rubber cooperatives obtained the highest revenue from gathering rubber products as the primary business, accounting for 50 percent of all rubber cooperatives, covering 22.53 million THB. per year. Regarding secondary business, two rubber cooperatives generated the highest revenue by supplying and selling fertilizer and agricultural chemicals and processing rubber products accounting for 4

million THB per year. All rubber cooperatives have been saving and deposit for the next year.

**Table 3.** Volumes of Business of eight rubber cooperatives in Trat Province

Title	Primary business	Secondary business	Saving and deposits
COOP.1	232,630.00	4,317.40	358,930.70
COOP.2	-	-	87,702.64
COOP.3	20,635,232.70	4,999,382.60	13,327,831.25
COOP.4	75,850.00	-	120,275.85
COOP.5	436,725.00	-	308,657.94
COOP.6	18,171,462.00	-	2,605,947.15
COOP.7	22,538,253.12	-	4,103,572.93
COOP.8	123,590.21	-	18,097.78

Source: The author computed based on the data from Cooperative Promotion Department (2016).

### *The Financial Characteristics of Rubber Cooperatives*

The net sale and net profit in eight rubber cooperatives was compared. The highest net sale was approximately 22.53 million THB. Meanwhile, the business of COOP.2 did not operate during the accounting period. Two rubber cooperatives had the equity value over million THB. The highest value was 6 million THB. Two rubber cooperatives had the value of owner's equity over million THB. Only one cooperative had negative value. Only one cooperative had the value of assets over million THB (Table 4).

**Table 4.** Cooperative financial characteristics in year 2016 of eight rubber cooperatives in Trat Province.

Title	Financial characteristics (unit: THB)				
	Net sale	Net profit	Equity	Owner's equity	Assets
COOP.1	231,310.00	(14,976.07)	49,523.93	702,263.66	30,914.57
COOP.2	-	-	82,900.00	91,602.64	1,360.00
COOP.3	25,634,615.30	1,609,574.86	2,562,390.00	(450,794.21)	1,457,892.36
COOP.4	75,850.00	4,633.45	253,576.43	254,003.33	9.00
COOP.5	436,725.00	9,204.79	607,014.94	607,014.94	6,474.00
COOP.6	18,171,462.00	278,225.93	299,060.73	2,751,282.73	120,735.58
COOP.7	22,538,253.12	1,778,011.62	6,031,536.62	6,031,536.62	28,571.19
COOP.8	123,590.21	127,311.14	687,140.44	719,658.09	5,076.31

Source: The author computed based on the data from Cooperative Promotion Department (2016).

The assets and debts of eight rubber cooperatives was compared and only two rubber cooperatives had current asset value over million THB. Two rubber cooperatives had current debt approximately 15.55 million THB. Three rubber cooperatives had total asset value over million THB. The apex of total asset value was 19.72 million THB. Finally, total debt was

three rubber cooperatives had total debt value around 15.74 million THB (Table 5).

**Table 5.** Cooperative financial characteristics in year 2016 of eight rubber cooperatives in Trat Province.

Title	Financial characteristics (THB)			
	Current assets	Current debt	Total assets	Total debt
COOP.1	671,349.09	52,739.73	702,263.66	252,739.73
COOP.2	90,242.64	5,000.00	91,602.64	8,702.64
COOP.3	316,397.90	15,552,895.00	19,729,636.35	15,740,395.00
COOP.4	253,994.33	426.90	254,003.33	426.90
COOP.5	600,540.94	282,262.50	607,014.94	282,262.50
COOP.6	2,630,547.15	352,222.00	2,751,282.73	2,452,222.00
COOP.7	6,002,965.43	1,000,000.00	6,031,536.62	1,000,000.00
COOP.8	714,581.78	32,517.65	719,658.09	32,517.65

Source: The author computed based on the data from Cooperative Promotion Department (2016).

**Table 6.** Rubber Cooperative financial ratio analysis of eight rubber cooperatives in Trat Province

Title	Financial Ratio						
	Current ratio	Acid-test	Equity to assets	Owners' equity to assets	Debt to assets	Debt to equity	Current debt to equity
COOP.1	12.73	12.65	1.60	22.72	0.36	5.10	1.06
COOP.2	18.05	18.05	60.96	67.35	0.10	0.10	0.06
COOP.3	0.02	(0.17)	1.76	(0.31)	0.80	6.14	6.07
COOP.4	594.97	298.73	28,175.16	28,222.59	0.00	0.00	0.00
COOP.5	2.13	2.13	93.76	93.76	0.47	0.47	0.47
COOP.6	7.47	7.47	2.48	22.79	0.89	8.20	1.18
COOP.7	6.00	6.00	211.11	211.11	0.71	0.17	0.17
COOP.8	21.98	21.98	135.36	141.77	0.05	0.05	0.05

Source: Trat Provincial Cooperative Office (2016)

### *Cooperatives financial performance*

The financial ratios of the eight rubber cooperatives showed that the current ratio was more than 2 in seven rubber cooperatives (87.5%) indicating acceptable financial performance ratio. Seven cooperatives (87.5%) had a quick ratio or acid test ratio greater than 1 (Table 6). The rubber cooperatives had the ability to repay short-term debt. The ratio during 2 to 1 indicated endangers of the cooperative's ability to meet current obligation. The equity pointed out that rubber cooperatives equity could have a good finance proportion of cooperatives' assets, because the owner's equity to assets ratio was compared to the rubber cooperative financial stability. Only one rubber cooperative did not have financial stability because it invested in rubber processing. Debt to total asset ratio was presented in a normal range of rubber cooperative's total assets compared to

liabilities which could be interpreted that no risk in the rubber cooperatives. In addition, the debt to equity ratio presented rubber cooperatives' debt versus equity in the normal business risk, but three rubber cooperatives had the higher ratios. Three rubber cooperatives gained current liabilities to equity ratio greater than 1 indicating a risk. However, only one cooperative gained the current liabilities to equity ratio to 6 representing a higher risk. This ratio revealed that the rubber cooperatives remained in normal business risk.

## **Discussion**

This study focused on the case study of rubber cooperatives in Trat Province in order to measure the rubber cooperative performance. The results revealed that these cooperatives were successful in terms of operation. The ability of rubber cooperatives to meet current obligations and the use of resources were effective. In contrast, only one cooperative Coop.3, Trat Cooperative rubber, investing in rubber processing, gained an unacceptable financial performance ratio which was below than 2. The Acid-test (-0.17) was less than 1 demonstrated rubber cooperatives' dependency upon inventory. These cooperatives needed to generate cash from its current assets in the near future to pay off all its current liabilities. Liquidity is essential for cooperatives to provide quality service to their member-patrons (Jessup *et al.*, 2011). These cooperatives have to enhance a strong liquidity position, by reducing their current dept. To help the cooperative survived, financial support from the government should assist the cooperatives to clear off their remaining debts. This suggestion is similar to the lessons from the Bugisu Cooperative Union survival, which the BCU received financial support from the government to clear off its remaining debts and revive the union. The union traded some of its land assets with the government in exchange for this financial assistance (Kwapong *et al.*, 2013). This result provided information to support policy by promoting the integration of rubber farmer as rubber cooperation in Trat Province. In addition, this result may help rubber cooperatives to improve their financial performance and take the next steps to improve their management and productivity by controlling investment and operating profit to ensure sustainable growth in the future.

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## References

- Badiru, I. O. (2010). Review of small farmer access to agricultural credit in Nigeria. Policy Note 25.
- Bijman, J., and Hu, D. (2011). The rise of new farmer cooperatives in China; Evidence from Hubei Province. *Journal of rural cooperation*. 39: 99-113.
- Cooperative Promotion Department (2016). The annual report year 2012 of Cooperative Promotion Department. Retrieved 23 August 2018. from <http://www.cpd.go.th/>.
- Department of Agricultural Extension (2017). Information technology and communication center: Department of Agricultural Extension. Retrieved 22 September 2018. from <http://www.agriinfo.doe.go.th/year60/plant/rortor/perennial/rubber.pdf>.
- Henehan, B. M. (2002). The Decision to Merge: A Case Study of US Dairy Cooperatives: Department of Applied Economics and Management, Cornell University.
- Holloway, G., Nicholson, C., Delgado, C., Staal, S. and Ehui, S. (2000). Agroindustrialization through institutional innovation Transaction costs, cooperatives and milk market development in the east African highlands. *Agricultural economics*. 23:279-288.
- Jessup, E., Casavant, K., Monson, J. and Duft, K. (2011). Business Decisions In A Cooperative Environment. *Journal of Business & Economics Research*. 2:71-76.
- Kwapong, N., Lubega, P. and Ilukor, J. (2013). Why a few agricultural cooperatives survived the crises in the cooperative movement in Uganda while many others collapsed? *International Journal of Arts and Commerce*. 2:53-64.
- Lwanda, M. (2013). Analysis of business performance of agricultural cooperatives: a case study of ngolowindo, msangu and chitsanzo cooperatives in the central region of Malawi. the Third RUFORUM Biennial Meeting, Entebbe, Uganda.
- Mohammed, N. and Lee, B. W. (2015). Role of cooperatives in rural development, the case of south nations nationalities and people region, Ethiopia. *Science Journal of Business and Management*. 3:102-108.
- Mukhjang, R. (2015). A Comparison of Agricultural Cooperatives in Thailand and China. Paper presented at the Proceedings of International Academic Conferences. No. 2805353.
- Office of the National Economic and Social Development Board (2017). Cooperative annual report 2016. Retrieved 27 August 2018. from [http://www.nesdb.go.th/nesdb\\_en/main.php?filename=index](http://www.nesdb.go.th/nesdb_en/main.php?filename=index).
- Ortmann, G. F. and King, R. P. (2007). Agricultural cooperatives I: History, theory and problems. *Agrekon*. 46:18-46.
- Parliament, C. and Taitt, J. (1989). Mergers, consolidations, acquisitions: effect on performance of agricultural cooperatives: University of Minnesota, Department of Applied Economics.
- Pongpanich, R. and Peng, K. C. (2016). Assessing the Operational Efficiency of Agricultural Cooperative in Thailand by Using Super-SBM DEA Approach. *International Journal of Scientific and Research Publications*. 6:247-253.
- Rabirou, K., Olusayo, A. A. and Okparaocha, C. (2013). Analysis of Cooperative Financial Performance in Ibadan Metropolis, Oyo State, Nigeria. *International Journal of Cooperative Studies*. 2:10-15.
- Ramanauskas, J. and Stašys, R. (2011). Cooperative performance assessment based on the sustainable development aspect. *Proceedings: Rural Development*. 4:190-194.
- Ritthirong, S., and Singsowan, K. (2008). Factors affecting the performance of rubber plantation farmers in Nakhon Si Thammarat, Province. *Khon Kean University Research Journal*. 1:27-35.
- Rubber Authority of Thailand. (2017). Number of cooperatives in Thailand. Retrieved 1 September 2018. from <http://office.cpd.go.th/itc/index.php/79-2017-04-11-04-36-20/534-number-of-cooperatives>. pp.31-60.

- Schrader, L. F., Babb, E. M., Boynton, R. D., and Lang, M. G. (1985). Cooperative and proprietary agribusinesses: comparison of performance. Purdue Agricultural Experiment Station, Purdue University, West Lafayette. pp. 33.
- Shamsuddin, Z., Ismail, A. G., Mahmood, S., and Abdullah, M. F. (2017). Determinants of agricultural cooperative performance using financial ratio. *International Journal of Business and Technopreneurship*. 7:358-396.
- Thuvachote, S. (2011). Cooperatives and Poverty reduction in Thailand. the 2011 2nd International Conference on Economics, Business and Management. pp.1-6
- Trat Provincial Cooperative Office (2016). Cooperative annual report 2016. Retrieved 22 August 2018 from <http://web.cpd.go.th/trat/>.
- Uchenna, O. C. and Olabisi, A. T. (2012). The performance of agricultural cooperative societies under the National Programme on Food Security in Enugu State, Nigeria. *Review of Public Administration and Management*. 1:61-88.
- Verhofstadt, E., and Maertens, M. (2014). Smallholder cooperatives and agricultural performance in Rwanda: do organizational differences matter? *Agricultural economics*. 45:39-52.
- Williamson, L. (1987). *The Farmers' Cooperative Yardstick: Cooperative Mergers, Acquisitions and Other Forms of Restructuring*: University of Kentucky, College of Agriculture, Cooperative Extension Service.

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