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Development strategy of Virgin Coconut Oil (VCO) Agroindustry to Increase economic value of coconut commodity

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One of coconut processed products worth high selling is pure coconut oil or better known as virgin coconut oil, VCO. The advantage gained when the coconut is processed into virgin coconut oil (VCO), is the value-added obtained by farmers reaching 584% of the price of copra. The purpose of this research is to determine the best alternative of VCO agroindustry development strategy to increase the economic value of coconut commodity in Bombana Regency, Southeast Sulawesi, Indonesia. The method used in this research is a combination of SWOT-AHP where the hierarchical structure for the strategic planning process is based on SWOT study. The results showed that the efficiency of strategy to maintain the strength to optimize the assets of cultivation as well as improving the quality of human resources. The efficiency of strategy to overcome the weakness by increasing farmer business capital, and strengthening institutions and improving the quality of human resources. The efficiency of strategies to make use of the opportunities by expanding the market network with partnership patterns, institutional strengthening, and capital enhancement. The efficiency of strategy to minimize the threats is by institutional strengthening. The basis on AHP (Analysis Hierarchy Process) assessment, the main strategies for the development of VCO agroindustry in Bombana Regency with the highest weight respectively 23.3 % and 23.1 %. Main strategies to development of VCO agroindustry in Bombana Regency are to strengthen the institutions and increase the capital for executant of the industry.

Keywords: Agroindustry, coconut commodity, development strategies, virgin coconut oil

INTRODUCTION

Coconut is one of the agricultural commodities that have high potential to be developed in Indonesia now a day. Statistics data 2017 showed that the first largest of coconut production in Indonesia is Sumatera, and followed by Java and Sulawesi respectively 920.093 ton, 628.738 ton and 616.981 ton on smallholders (Directorat General of Estate Crops, 2017). Bombana is one of regency in Southeast Sulawesi, with a population of 170.020 people, consisting of 85.781 male and 84.239 female. The highest production of agriculture products in Bombana Regency is dominated bt rice and coconut (PBS-Statistics of Bombana Regency, 2017). The abundance of raw materials and the opportunity to

expand domestic and export markets are important factors in supporting the development of coconut agroindustry. Generally, farmers process coconuts into copra. However, the low price of copra and erratic price fluctuations has caused the income of farmers is very low. In terms of farm income, it has not been able to support the family life of farmers properly. The results of studies carried out at coconut production centers in Indonesia showed that the lives of families of coconut farmers, in general, are still below the poverty line (Tarigans, 2005). This has an impact on the low interest of farmers to use coconut plantations as their livelihood. As in Bombana Regency, Southeast Sulawesi, with mature coconut capacity ready for harvest reaches 12.500 ha and coconut land which is immature reaches 1.400 ha only attracted interest for the workforce of 5.316 families (Directorate General of Estate Crops, 2016). Copra prices continued to decline which at the beginning of 2018 was in the range of Rp. 10.000,-/kg, but in May dropped dramatically to Rp. 5.200/kg is an obstacle for farmers to develop the farming (Interview Results). In addition, coconut processing activities at the farm level in Bombana District is considered inefficient (Hastian, 2010). This has an impact on copra productivity to be very low (less than 1 ton/ha/year) compared to superior coconut products which reach 4 tons/ha/year and cause swelling in production costs so that farmers' income is low farmers' income, the economic role of coconut commodities is not optimal.

In order to increase the income of coconut farmers, one of the efforts that can be done is to diversify coconut products so that farmers not only focus on processing coconuts into copra, but also become other products with high economic value (Elfianus, 2008). Increasing farmers' income will be more real if the product diversification is carried out by farmers themselves. One of the high-value coconut products is pure coconut oil, better known as virgin coconut oil (VCO) (Annas, 2015). VCO is oil obtained from coconut kernels that are fresh and cooked in a mechanical or natural way, with or without the use of heat, without undergoing chemical distillation, bleaching or deodorizing and which does not lose any of its natural properties (Satheesh, 2015). According to Annas, the advantage is that if the fruit is processed into VCO, the added value what is obtained by farmers reaches 584% of the price of copra. Even VCO products are still superior compared to coconuts which are processed into ordinary cooking oil with added value which only ranges from 190% of the price of copra (Annas, 2015).

Based on the description above, the formulation of the problem in this study focused on how the best strategy in development of VCO agroindustry is to increase the economic value of coconut commodities in the Bombana Regency, Southeast Sulawesi.

MATERIALS AND METHODS

This research was conducted from January 2018 to May 2018 in Bombana Regency, Southeast Sulawesi. The material used in this study is in the form of AHP (Analysis Hierarchy Process) questionnaire supported by computer equipment and Expert Choice 11 software to analyze data.

Identification of Important Issues in SWOT (Strong, Weakness, Opportinity, and Threats) Factors (Internal and External Evaluation)

The ability of a business to grow and develop is different from one business to another. This is influenced by external conditions and internal capabilities. External factors such as climate policy, a market structure that works, access to information and services, and types of commodities provided will determine how much potential a business has to grow and develop. Internal factors such as marketing strategies, production patterns, labor management, and entrepreneurship have more influence on the ability of the business itself (Hanyfa, 2016). Therefore, the development strategy of VCO agroindustry is aimed to increasing the economic value of coconut commodities in the Bombana Regency can be done by auditing important issues based on the main factors both internal and external. To support the determination of important issues related to external and internal factors in the development of VCO agroindustry, an analysis can be carried out based on literature studies and the conditions of the research location. Based on the classification of the main factors can be grouped in more detailed components that contain Strengths and Weaknesses, Opportunities and Threats of VCO agroindustry development. Thus, the established hierarchy can be built into a framework of analysis of the hierarchy of processes to determine the VCO agroindustry development strategy to increase value economy of coconut commodities in Bombana Regency.

Compilation of Sustainable Strategies

Preparation of sustainabe strategies is based on literature studies and the conditions of the research location. The output of this analysis is in the form of strategic alternatives that can be used as input in the analysis of the development strategy of Agroindustry VCO in the Bombana Regency, Southeast Sulawesi.

Application of Combination of SWOT-AHP to Determine Agroindustry Development Strategy of VCO

The combination of SWOT-AHP factors is the use of a hierarchical structure for strategic planning processes based on SWOT studies, as well as the use of quantitative techniques to estimate the efficiency value of the ideal strategy for each proposed strategy by rationally capturing the opinions of the respondents then converting the factors not measurable into measurable factors, so that they can be compared (Kaya et al., 2013). The results of the identification of SWOT factors (internal and external evaluations) and sustainable strategies, were integrated into the SWOT-AHP hierarchy structure then analyze of development strategies based on the AHP approach. In solving problems with AHP, there are several stages namely:

1-Determining the aims, criteria, and alternative decisions
2-Criteria and alternative assessment.
3-Make normalized decision ratings
4-Logical consistency by following the steps as follows:
a-Determine the weighted number vector
b[Calculates vector consistency
c-Calculates the value of vector consistency
d-Calculates consistency index
e-Calculate the consistency ratio

Whereas to combine the opinions of respondents, was done with the geometric average equation:

$$G = \sqrt[n]{X_1 \, x \, X_2 \, x \, X_3 \, x \, \dots \, x \, X_n} \quad \dots\dots(1)$$

or

$$\text{Log } G = \frac{\log x_1 + \log x_2 + \log x_3 + \cdots + log x_n}{n} \quad \dots\dots(2)$$

Where : G = antilog (log G)
G = geometric average
x_n= data to-n
n = amount of data (Setiyadi, 2011)

RESULTS

The results of the evaluation and identification of SWOT factors and the study of strategies that can be implemented in the development of VCO agroindustry can be summarized in the AHP hierarchy structure. Figure 1.showed a hierarchical representation of the SWOT-AHP combination.

Design of Development Strategy of VCO Agroindustry in Bombana Regency

Analysis Hierarchy Process based on SWOT factors showed that in developing VCO agroindustry in Bombana Regency the most important thing to do is to maintain the strength possessed. Based on the weighting that has been done (Figure 2) shows that the effort to maintain strength has the highest weight of 35.6% compared to taking advantage of opportunities (weight = 27.4%), overcoming weaknesses (weight = 20.2%), and minimizing threats (weight = 16.8%).

The efficiency of strategies in every SWOT factors

The efficiency of strategies in maintaining strength in supporting the development of VCO agroindustry in Bombana Regency is the availability of raw materials and the availability of cultivated land. Based on Figure 3, the availability of raw materials and cultivation land has a fairly high weight compared to other factors, namely 35.7%.

In an effort to maintain strength in the development of VCO agroindustry, there are several alternatives that can be carried out, especially by optimizing cultivation assets so that the availability of raw materials is sustainable and cultivation lands can be used productively. Another alternative that can be done is by improving the quality of human resources, increasing the capital of industry players efficiently and by strengthening institutions. Based on Table 1, we can show the weight of each alternative, namely optimizing cultivation assets by 22.5%, increasing the quality of human resources by 20.7%, and strengthening institutions by 19.6%. Because the weighing range of each factor is not too large, all these alternatives can be done in maintaining the strength of VCO development in District of Bombana.

The most influential weakness in the development of agro industries VCO in Bombana Regency is capital and weak institutions. This is shown in Figure 4, where the two subfactors have the highest weight, namely 26.8% and 22.7%.

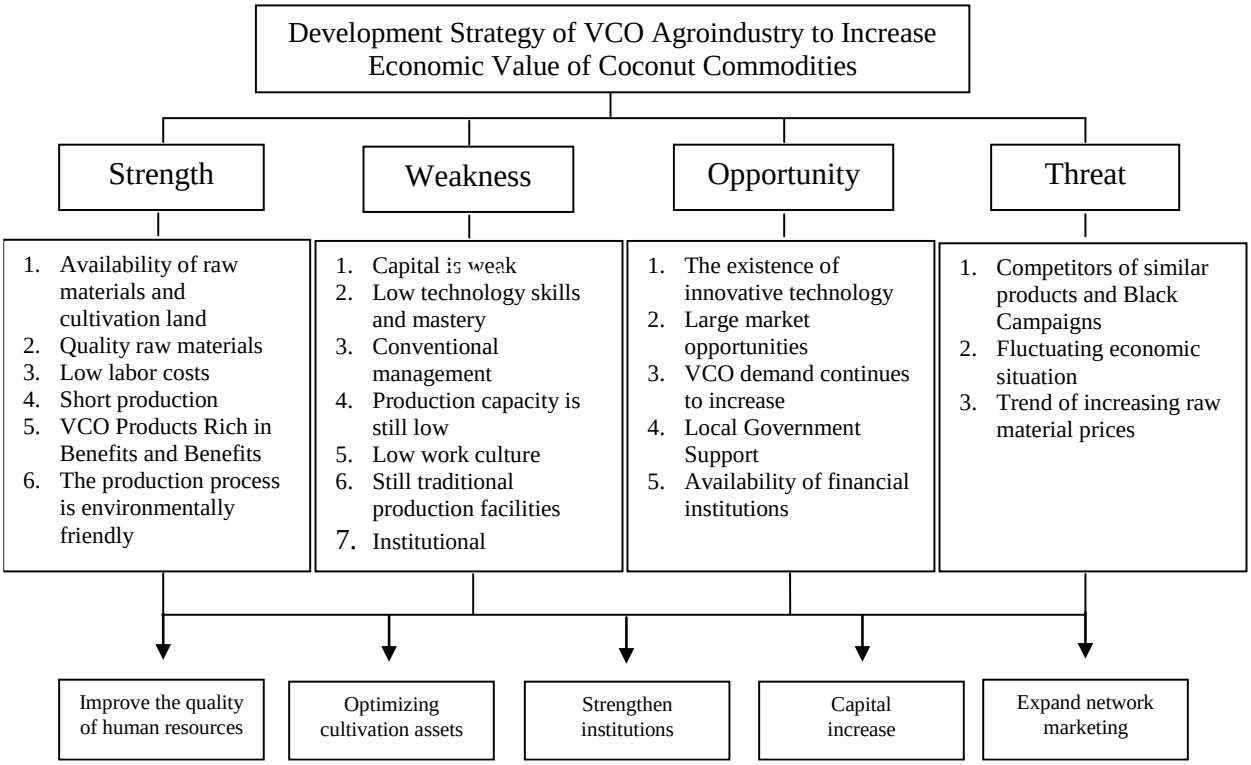

Figure 1; Hierarchy representation of the SWOT-AHP combination (Osuna modification, 2007).

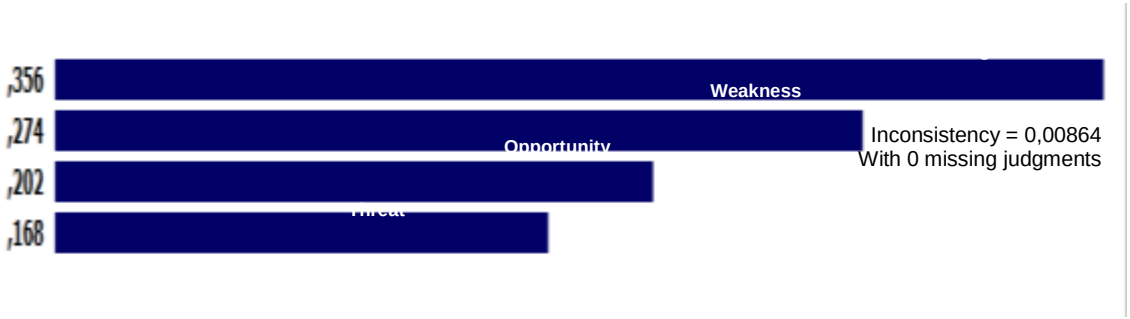

Figure 2; The weight of the Main Factors of Development Strategies VCO Agroindustry

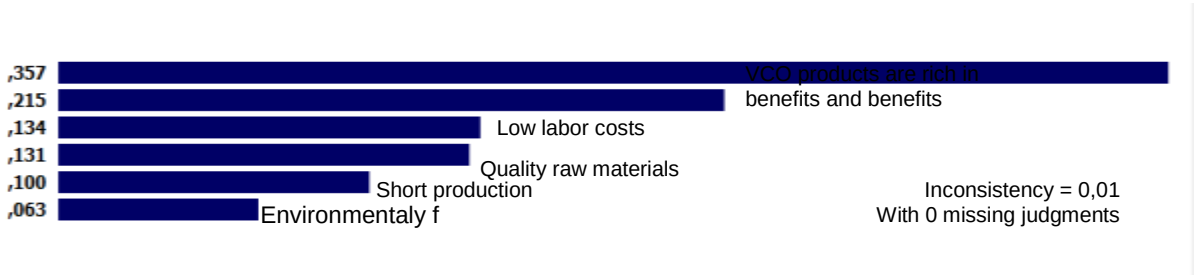

Figure 3; Sub Factor Weights Maintaining Agroindustry Development Strength of VCO

Table 1; Alternative strategies in maintaining the strength of agro-industry development VCO in Bombana Regency.

No.	Alternative Strategies	Weight (%)
1	Optimizing cultivation assets	22.5
2	Improve the quality of human resources	20.7
3	Capital increase	20.6
4	Strengthening Institutions	19.6
5	Expand Network Marketing	16.6

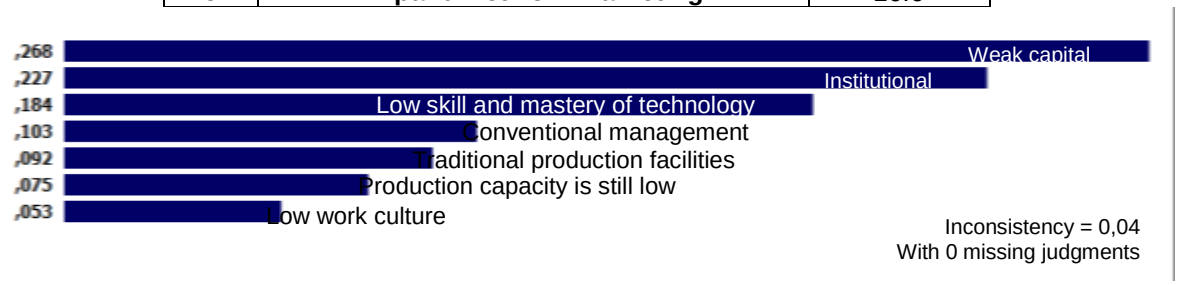

Figure 4; Subfactor Weight Overcoming the Weakness of Development of VCO Agroindustry

Figure 5; Subfactor Weight Utilizing Agroindustry Development Opportunities for VCO

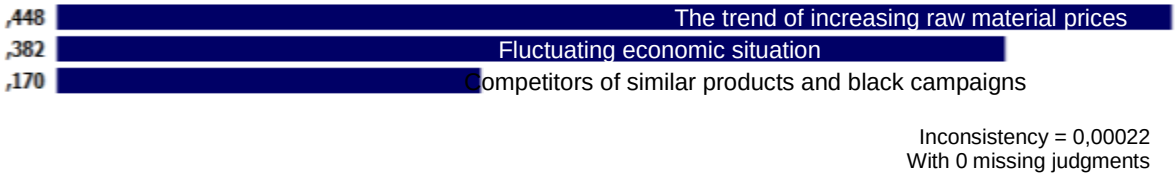

Figure 6; Weight of Subfactors Minimizing the Threat of Agro-Industry Development VCO

Table 2; Alternative strategies in overcoming the weaknesses of agro-industry development VCO in Bombana Regency.

No.	Alternative Strategies	Weight (%)
1	**Capital increase**	**29.2**
2	**Strengthening intitutions**	**27.2**
3	**Improve the quality of human resources**	**25.4**
4	**Expand Network Marketing**	**10.6**
5	**Optimizing cultivation assets**	**7.6**

Table 3; Alternative strategies in utilizing agro-industry development opportunities VCO in Bombana Regency.

No.	Alternative Strategies	Weight (%)
1	**Expand Network Marketing**	27.7
2	**Capital increase**	25.5
3	**Strengthening Institutions**	21.8
4	**Optimizing cultivation assets**	13.6
5	**Improve the quality of human resources**	11.4

Efforts that can be done in order to overcome the weaknesses in VCO agroindustry development in Bombana Regency are by increasing capital for industry players through ease of access to capital provider facilities so that they can help grow and independent industries. In addition to access to capital, another important alternative to overcome is to strengthen institutions and improve the quality of human resources. Based on the AHP analysis shown in Table 2, the weight of the three alternatives is not much different, namely to increase business capital by 29.2%, in strengthening institutions by 27.2%, and increasing the quality of human resources by 25.4%.

The most important factor as VCO agroindustry development opportunities in Bombana Regency is the existence of a large market opportunity and the increasing demand for VCO both from domestic needs and from overseas. This can be shown in Figure 5, where the two sub-factors have a higher weight than the others, which are 27.9% and 26.3%.

The best alternative that can be done in utilizing the opportunities that are owned for VCO agroindustry development in Bombana Regency is by expanding the market network. Partnership patterns with various components can be done to expand market networks, especially in the promotion of VCO products so that they can penetrate potential consumers. In addition to these efforts, increasing capital and strengthening institutions is an alternative support in utilizing the opportunities they have. The value of the alternative strategy weights in utilizing opportunities based on Table 3. Shows that efforts to increase the network amounted to 27.7%, while for capital increase and institutional strengthening respectively 25.5% and 21.8%.

The trend of increasing raw material prices is a significant threat in VCO agroindustry development in Bombana Regency. This threat is considered to occur as a result of the struggle for raw materials with other commodities and the high demand for raw materials by industry players to meet the production needs of VCO. This is shown in Figure 6 where the weight of the trend of increasing raw material prices is 44.8%. The potential for this threat should be watched out by industry players in order to maintain the stability of VCO market prices.

Figure 6. Weight of Sub-factors Minimizing the Threat of Agro-Industry Development VCO

Efforts that can be made in minimizing threats as shown in Table 4 are by strengthening institutions. Institutions that can be important in maintaining stability both in relation to raw material prices and VCO production prices.

Table 4; Alternative strategies to minimize the threat of VCO agroindustry development in Bombana Regency.

No.	Alternative Strategies	Weight (%)
1	**Strengthening Institutions**	29.5
2	**Expand Network Marketing**	21.7
3	**Capital increase**	19.3
4	**Optimizing cultivation assets**	17.4
5	**Improve the quality of human resources**	12.2

Main Strategy of VCO agroindustry development

The main strategy of VCO agroindustry development in Kabupaten Bombana is by strengthening institutions and increasing capital for industry players. This strategy can guarantee the sustainability of VCO agroindustry in Bombana Regency. Based on AHP assessment

(Table 5), each of the alternative strategies weighs 23.2% and 23.1%.

Table 5; Alternative strategies in overcoming the weaknesses of VCO agroindustry development in Bombana Regency.

No.	Alternative Strategies	Weight (%)
1	**Strengthening Institutions**	23.2
2	**Capital increase**	23.1
3	**Expand Network Marketing**	19.6
4	**Improve the quality of human resources**	17.3
5	**Optimizing cultivation assets**	16.8

DISCUSSION

Virgin coconut oil (VCO) made from milk extracted from raw kernel without any chemical processes, purest form of coconut oil and have water white color. VCO also known as mother of all oils because of contains a lot of vitamins, minerals, anti-oxidants, and free from trans fatty acid. VCO has many benefit for skin as skincare, hair protection, protect skin from infection by virus, fungi and bacteria, anti-aging and helps the absorbtion of fat soluble vitamin A, D, E and K (Swamy, 2015). Many of Fiji mowen groups has through switching from copra production to making virgin coconut oil for local use and external use (PARDI, 2011). VCO is very potential to be developed and to increase the income of coconut farmers in Bombana Regency. Some aspects that need to be consider in the development of agro-industry of VCO VCO are the availability of raw materials, quality, and continuity of raw materials (Lantarsih, 2011).

Evaluation and identification of SWOT development of VCO agroindustry internal and external factors of VCO can be described as follows iinternal factors and external factors. Internal factors consists of availability of raw materials and cultivated land, quality raw materials, low labor costs, short production and VCO production are rich in benefits and benefits. Weaknesses that can hinder the development of VCO agroindustry consist of weak capital, low technology skills and mastery, conventional management, production capacity is still low, low work culture, still traditional production facilities; institutionalization is almost nonexistent. External factors consist of the existence of innovative technology, large market opportunities, VCO demand continues to increase, local government support; and availability of financial institutions. The threats faced and must be minimized in the development of VCO agroindustry consists of competitors of similar products and black campaigns, fluctuating economic situation, and the tendency to increase raw material prices.

Compilation of sustainable strategies for Growth and Development of VCO Agroindustry can be implemented in the development of VCO agroindustry are grouped into 5 alternatives, namely:

Strategies to optimize cultivation assets

In optimizing cultivation assets, it is expected that efficient spatial planning for coconut cultivation, unproductive plant regeneration and the provision of superior seeds and restoration of empty land into productive lands.

Strategy to expand of network marketing

The expansion of network marketing is carried out with government support and partnership patterns related to the promotion of VCO products so that they can penetrate potential consumers. Given the high demand for VCO, the business opportunities are increasingly open to increase the income of VCO agroindustry executans.

Strategies to improve the quality of human resources

Increasing the quality of human resources is more focused on periodic extension programs for VCO agroindustries and mentoring and monitoring of VCO agroindustry activities.

Strategy for increasing capital

Increased capital in VCO agro-industry development can be done through cooperatives, financial institutions and government support in providing rolling capital assistance in order to increase motivation in doing business.

Strategies to strengthen institutions

Institutional strengthening in agroindustry activities is carried out through the formation of groups of industrial executants with a directed management system starting from an organizational system consisting of group leaders, secretaries and members divided into their respective duties. In addition to forming groups, mentoring institutions are formed as well as collaboration with other parties.

Opportunities in research for development the

VCO agroindustry can be categorized into some majors areas such as marjet focus, value adding product opportunities and processes, smallholder engagement and medicinal uses of coconut oil and the effect of lauric acid (PARDI, 2011).

CONCLUSION

The efficiency of strategy to overcome the weakness by increasing farmer business capital, and strengthening institutions and improving the quality of human resources. The efficiency of strategies to make use of the opportunities by expanding the market network with partnership patterns, institutional strengthening, and capital enhancement. The efficiency of strategy to minimize the threats is by institutional strengthening. The basis on AHP (Analysis Hierarchy Process) assessment, the main strategies for the development of VCO agro industry in Bombana Regency with the highest weight respectively 23.3 % and 23.1 %. Main strategies to development of VCO agroindustry in Bombana Regency are to strengthen the institutions and increase the capital for executant of the industry

CONFLICT OF INTEREST

The authors declared that present study was performed in absence of any conflict of interest.

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AUTHOR CONTRIBUTIONS

LOG designed and performleed the experiments and also wrote the manuscript. LOA, BA and MTH ferformed data analysis. NPP reviewed the manuscript. All authors read and approved the final version.

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