SWOT analysis and strategic planning for cocoa industry development in West Sulawesi Province

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Abstract. This study provides input on strategies and policies that need to be taken to develop the cocoa industry in West Sulawesi Province. SWOT, IFE and EFE analysis have been used to determine the best strategy for developing cocoa industry in West Sulawesi. The results found 5 strength, 6 weakness, 4 opportunity and 4 threat factors. The IFE and EFE analysis show that strategy that needs to be taken is the development (SO) strategy. Policies that need to be followed are (1) Provision of superior seed sources through the establishment of cocoa seed garden, (2) Conducting cocoa rejuvenation programs along with spacing programs, (3) Increasing extension activities to disseminate GAP cocoa innovations, (4) Increasing role of Farmers Group in Fulfilling farm financing of its members through the establishment of savings and loan units supported by BumDes, (5) Increasing role of Farmers Group to ferment cocoa using GMP innovation through the establishment of processing units and profit sharing system with cocoa owners, (6) Increasing role of Farmers Group in cocoa market by establishing a marketing unit. Members of Farmers Group can sell cocoa to wholesalers through Farmers Group to increase their bargaining position.

1. Introduction
The first, Indonesia is one of the world's largest producers of cocoa. Indonesia's cocoa production in 2018 reached 577.04 thousand tons. However, this value has not met the needs of the domestic industry. The Ministry of Industry noted that there are 20 cocoa processors with a production capacity of up to 800,000 tons cocoa per year in Indonesia. The processed cocoa products include cocoa cake, cocoa butter, cocoa liquor, and cocoa powder. Apart from being consumed domestically, this product is also exported. The export value of cocoa cake products reached US $155.2 million, cocoa butter US $697.9 million, cocoa liquor US $89.6 million, and cocoa powder US $163.9 million. The opportunity to improve the cocoa processing industry is still high, especially if domestic cocoa bean production can meet industrial needs.

The area of Indonesia's cocoa plants has fluctuated, in 2014 around 1.73 million ha, in 2017 it decreased to 1.65 million ha and in 2018 it increased slightly to 1.66 million ha. Cocoa bean production has also fluctuated, in 2014 around 728.4 thousand tons, in 2017 it fell to 585.24 thousand tons and in 2018 it fell again to 577.04 thousand tons [1]. Factors that hinder the development of the cocoa industry are the large number of old plants, inadequate facilities and infrastructure and poorly maintained plantations, coupled with conditions where 90% of cocoa in Indonesia is produced by small farmers who have financial constraints.
One of the centres of Indonesian cocoa production is West Sulawesi Province with an area of 146,730 ha of cocoa planted in 2018, spread over 6 regencies with the largest area in Polewali Mandar Regency (32%) and Mamuju Regency (29%), the rest is spread over 4 other regencies. namely Mamasa, Majene, Central Mamuju and North Mamuju Regency. This study seeks to provide input on strategies and policies that need to be taken to develop the cocoa industry in West Sulawesi Province.

2. Methods
The research was carried out in West Sulawesi from January to May 2020. Data and information were obtained by means of in-depth interviews based on questionnaires with farmers to obtain descriptions of the conditions of cocoa and through the implementation of focus group discussions (FGD) to obtain internal factors (strengths and weaknesses) and external factors (opportunities and threats) that exist in the cocoa industry in West Sulawesi and the strategies that must be taken for its development using SWOT analyse and Internal Factor Evaluation (IFE) and External Factor Evaluation (EFE) analyse.

The FGD was attended by 9 cocoa farmers from 7 farmer groups, 3 cocoa processors and exporters, 2 NGOs and 3 government officials. SWOT analysis method has been widely used as a tool for planning and analysing strategic actions [2]. SWOT analysis is a strategic planning tools which that takes the information from an environmental and separates it into internal (strengths and weaknesses) and external issues (opportunities and threats) [3]. The SWOT model can be explained as a complete analysis of any problems that an entrepreneur may have to face while starting a new business [4]. SWOT can also be defined as a system or process of considering the internal and external factors affecting the performance of an organization in relation to competitors or market situation [5]. While [6], states that strengths and weaknesses are internal to the entity under evaluation, whereas opportunities and threats refer to the broad context or environment in which the entity operates.

The SWOT analysis is carried out in several stages, starting with determining internal factors in the form of strengths and weaknesses of the cocoa industry, as well as external factors in the form of opportunities and threats in the cocoa industry. Each factor in the internal factor is weighted with a weight value from 0.0 (very insignificant) to 1.0 (very important). The total weight of all factors under internal factors must be 1. Every factor in external factors is weighted in the same way.

Each factor of strength, weakness, opportunity and threat is rated with a score of 1 to 4. For the strengths and opportunities factors are scored 1 if the influence of the factor is very weak, 2 if the influence is weak, 3 if the influence is strong and 4 if the influence is very strong. Meanwhile, the factors of weakness and threat are scored 1 if the influence of the factor is very strong, 2 if the influence is strong, 3 if the influence is weak and 4 if the influence is very weak. The multiplication result between the weight value and the rating value becomes the score for each factor. The total score of the strengths and weaknesses factors becomes the IFE value and the total score of the opportunity and threat factors becomes the EFE value. The placement of IFE and EFE values in the Strategic Position and Action Evaluation (SPACE) Matrix shows the types of strategies that need to be taken in developing the cocoa industry in West Sulawesi.

3. Results and discussion

3.1. Performance of cocoa industry in West Sulawesi
The area of cocoa in West Sulawesi Province ranks fourth after Central Sulawesi, South Sulawesi and Southeast Sulawesi, and contributes 10.01% of the national cocoa planted area (Figure 1 (a)). Cocoa productivity in West Sulawesi was 847 kg / ha, higher than the national productivity (779 kg / ha). West Sulawesi province's cocoa production is 72,667 tons / year, contributing 11.14% to the national cocoa production (Figure 1 (b)).
In West Sulawesi Province, the cocoa area spreads over 6 regencies with the largest area in Polewali Mandar Regency (32%) and Mamuju Regency (29%), the rest is spread over 4 other regencies, namely Mamasa, Majene, Central Mamuju and North Mamuju Regency. However, cocoa productivity varies between districts. The highest cocoa productivity is in Majene Regency, reaching 906 kg / ha / year (Table 1). The variety of cocoa productivity in each district is closely related to the application of cultivation technology and plant maintenance.

Table 1. Areal and production of cocoa in West Sulawesi Province, 2017

| Regency       | Areal (ha) | Production (ton) | Productivity (kg/ha) | Number of Household |
|---------------|------------|------------------|----------------------|---------------------|
| Polewali Mandar | 48,929     | 27,371           | 892                  | 46,553              |
| Mamasa        | 15,499     | 6,968            | 703                  | 15,450              |
| Majene        | 13,169     | 6,499            | 906                  | 11,634              |
| Mamuju        | 43,099     | 19,610           | 758                  | 33,190              |
| Mamuju Tengah | 15,232     | 6,539            | 708                  | 17,475              |
| Mamuju Utara  | 12,802     | 5,690            | 801                  | 12,151              |
| Total         | 148,730    | 72,667           | 847                  | 136,453             |

Source: [7]

3.2. The essential key factors analysis in SWOT

The results of the SWOT analysis show that there are five strengths, six weaknesses, four opportunities and four threats in the cocoa industry in West Sulawesi. Table 2 shows that the first strength is the farmers have a long experience in cocoa cultivation (S1). The second strength is cocoa land ownership per farmer is quite extensive, 1 – 2 ha (S2). The third strength is cocoa farming is the main income for the farmers (S3). This condition makes farmers' income very dependent on their cocoa plants so that they continue to care for their plants. The fourth strength is the Farmers have experience in processing Cocoa beans and sell them in the form of dried beans (S4). The fifth strength is Cocoa beans marketing chain has formed (Farmers - Middlemen - Wholesalers) (S5).
Table 2. Internal Factor Evaluation (IFE) matrix

| Internal Factors                                                                 | Weight | Rating (1-4) | Score  |
|----------------------------------------------------------------------------------|--------|--------------|--------|
| **Strengths**                                                                    |        |              |        |
| 1. The Farmers have a long experience in cocoa cultivation (S1)                  | 0.086  | 3            | 0.258  |
| 2. Cocoa land ownership per farmer is quite extensive (1-2 ha) (S2)             | 0.095  | 2            | 0.190  |
| 3. Cocoa farming is the main income for the farmers (S3)                         | 0.093  | 3            | 0.279  |
| 4. The Farmers have experience in processing Cocoa beans and sell them in the form of dried beans (S4) | 0.115  | 4            | 0.460  |
| 5. Cocoa beans marketing chain has formed (Farmers – Middlemen – Wholesalers) (S5) | 0.117  | 4            | 0.468  |
| **Weaknesses**                                                                   |        |              |        |
| 1. Cocoa trees are planted mix with others crops, close spacing and high shade (W1) | 0.103  | 2            | 0.206  |
| 2. The farmers have not mastered GAP for Cocoa (W2)                              | 0.074  | 3            | 0.222  |
| 3. The majority of Cocoa plants are old (W3)                                     | 0.067  | 2            | 0.134  |
| 4. Majority farmers process their cocoa without fermentation. (W4)               | 0.066  | 2            | 0.132  |
| 5. Bargaining position of farmers in cocoa marketing is low. (W5)                | 0.103  | 2            | 0.206  |
| 6. Farmers access to Financial institution is low (W6)                           | 0.081  | 3            | 0.243  |
| **TOTAL**                                                                        | 1.0    |              | 2.798  |

Apart from the strengths, there are also 6 weaknesses obtained, first, cocoa trees are planted mix with others crops, in close spacing and with high shade (W1). Cocoa is intercropped with other crops such as coconut, banana and pepper, so that the spacing of cocoa applied is 4 x 4 meters with a population of 625 trees per hectare, much lower than monocultures using a spacing of 3 x 3 m or 4 x 2 m with a plant population of 1.110 – 1.250 trees per ha. The second weakness is the farmers have not mastered good agricultural practise (GAP) technology for Cocoa (W2). Pruning of the cocoa plants is only done 2 times a year, in the beginning of the rainy season (November) and after harvest (April), as well as fertilizing which is only done 2 times a year with a total fertilizer dosage of 600 kg NPK and 600 kg Urea. The third weakness is the majority of cocoa plants are unproductive old plants (W3). The majority was planted in 1980, even though some of the existing cocoa plants are the result of replanting which was carried out in 2014 and 2015 using the shoot grafting method of clones Sulawesi 1, Sulawesi 2, MCC 01, MCC 02 and local clones of Mamuju Padantana. The fourth weakness is the majority farmers process their cocoa without fermentation. (W4), this has resulted in a low price received by farmers of around IDR. 31,000/kg. Farmers are not interested to ferment their cocoa beans because the price difference between fermented and unfermented beans is only around IDR. 1,000 - 2,000 per kg, possibly due to poor fermentation by the farmers. The fifth weakness is the bargaining position of farmers in cocoa marketing is low (W5), farmers become a price taker rather than price maker. The sixth weakness is farmers’ access to financial institution is low (W6).

The opportunities from external environment in cocoa Industry in West Sulawesi Province that can be used to support the development of cocoa Industry are innovation of cocoa GAP is available (O1), cocoa extension agents are available (O2), increasing of good quality fermented cocoa demand with high price (O3) and farmers group role can be expanded to financial service (savings and loan service) (O4) (Table 3). But, the industry has also to address threats from external environment, those are pest and disease attack on cocoa plants is high (T1), Cocoa middlemen buyers prefer to buy wet cocoa beans (T2), The price difference between fermented cocoa by farmers and cocoa without fermentation is very small (T3) and The farmers’ inability to pay for replanting their cocoa trees has led to the conversion of cocoa land (T4).
Table 3. External Factor Evaluation (EFE) matrix

| Opportunities                                                      | Weight | Rating (1-4) | Score |
|--------------------------------------------------------------------|--------|--------------|-------|
| 1. Innovation of cocoa GAP is available (O1)                      | 0.102  | 2            | 0.204 |
| 2. Cocoa extension agents are available (O2)                      | 0.139  | 3            | 0.417 |
| 3. Increasing of good quality fermented cocoa demand with high price (O3) | 0.112  | 2            | 0.224 |
| 4. Farmers Group role can be expanded to financial service (savings and loan service) (O4) | 0.157  | 4            | 0.628 |
| Threats                                                           |        |              |       |
| 1. Pest and disease attack on cocoa plants is high (T1)           | 0.129  | 3            | 0.387 |
| 2. Cocoa middlemen buyers prefer to buy wet cocoa beans (T2)      | 0.115  | 2            | 0.230 |
| 3. The price difference between fermented cocoa by farmers and cocoa without fermentation is very small (T3) | 0.137  | 2            | 0.274 |
| 4. The farmers’ inability to pay for replanting their cocoa trees has led to the conversion of cocoa land (T4) | 0.109  | 3            | 0.327 |
| TOTAL                                                             | 1.0    |              | 2.691 |

3.3. Strategy of cocoa industry development in West Sulawesi

Based on Internal Factors Evaluation (IFE) – External Factor Evaluation (EFE) analysis, IFE score (2.798) is greater than EFE (2.691), the means that the industry prioritize internal factors than external factors (Figure 2). To determine what strategy the Industry should undertake, the IFE – EFE scores are put in the Strategic Position and Action Evaluation (SPACE) matrix. The result shows that the strategy should take is Development (SO) Strategy, meaning that the industry optimizes the strengths to make the most of opportunities as optimally as possible

![Figure 2. Strategic Position and Action Evaluation (SPACE) Matrix](image)

Taking into account the development (SO) strategy, several policies that need to be taken to develop the cocoa industry in West Sulawesi and improve the welfare of cocoa farmers are:

3.3.1. Provision of superior variety sources through the establishment of cocoa seed garden. Efforts to increase cocoa production, in the long term, require improvement of cocoa plants by using superior
seeds [8]. Provision of superior cocoa seeds, then, is important. Provision of superior seeds can be done by developing seed gardens in cocoa production centres. In West Sulawesi Province, cocoa seed gardens can be developed in 6 districts cocoa production centres so that they can meet the need for superior seeds. Implemented strategy for assessing varieties, hybrid seeds and superior varieties of cocoa which is broad adaptable as well as the appropriate strategy for propagating cocoa seeds, supported by the existence of certified cocoa seed farms and certified cocoa seed breeders to ensure that superior cocoa seeds are able to meet the needs of seeds in West Sulawesi Province, accelerating efforts to increase cocoa production. All these efforts must also be supported by efforts to unify understanding and perceptions of the need to utilize new superior varieties of cocoa to all stakeholders.

3.3.2. Conducting cocoa rejuvenation programs along with spacing programs. Currently, around 36% of the cocoa plants in West Sulawesi are unproductive either because they are old or because of poor plant care. In this condition, efforts to replant the cocoa plants need to be done so that they can produce well. It is important for cocoa rejuvenation to be done on plants that are too old, plants with low production capacity and plants that are affected by disease. Rejuvenation of cocoa can be done by using side grafting, shoot grafting, insertion or replanting techniques accompanied by the provision of input material at the appropriate dose.

Side grafting is a grafting technique that uses budwood from superior variety which are cut and attached to mature plants. Rejuvenation of cocoa through side grafting technique has a high percentage of success, fast results and low cost. Through this side-grafting technique, the average productivity of the cocoa plant can be increased to 1.5 tons / ha. Shoot grafting is a method of rejuvenation of cocoa which has a different technique but the treatment is almost the same as the side grafting method. The difference is that shoot grafting is done on chupons or water shoots while side grafting is done on mature trees or old trees that are less productive.

Rejuvenation of cocoa plants can also be done by replanting cacao plants with new plants which can be done through (1) Insertion, where dead, infertile or diseased trees need to be replaced. The insertion needs to be done immediately in order to obtain uniformity of plant growth in the garden, (2) Replant, if it is not possible in one garden to do side grafting or shoot grafting, so to rejuvenate the plants it is necessary to replant. Rejuvenation of cacao plants using the replanting technique needs to be accompanied by spacing which must be adjusted to the cocoa cultivation technology.

3.3.3. Increasing extension activities to disseminate GAP cocoa innovations. Efforts to increase cocoa productivity in West Sulawesi need to be supported by accelerating the adoption of cocoa cultivation technology. The skills of extension agents must be upgraded in the field of cocoa cultivation technology and in the field of effective technology information distribution techniques to farmers. In order for the flow of information on cocoa cultivation technology to be accepted by farmers effectively, technology information is disseminated, especially to pioneer farmers, who can then forward it to other farmers through existing social network ties in the community [9]. Dissemination of information technology through social networks must be packaged in various media, information channels and communication techniques.

3.3.4. Increasing the role of Farmers Group in fulfilling the farm financing of its members through the establishment / strengthening of savings and loan units supported by Badan Usaha Milik Desa (BUMDes). Cocoa farmers in West Sulawesi generally only have 1-2 ha of cocoa plants, with a productivity of only 847 kg / ha and a price of IDR. 30,000 per kg of cocoa, the income they earn is minimal for further farming capital and to meet household needs. Especially if there are events such as pests or unexpected household needs, farmers usually rely on loans from the middlemen to meet household needs or further cocoa farming capital by means of bonded cocoa production, this will certainly put the farmers in a weak bargaining position. In this condition, the Farmer Group is expected to be able to play a role in helping farmers through the establishment / strengthening of savings and loan units supported by BUMDes. BUMDes is a village business institution managed by the community and
village government in an effort to strengthen the village economy and is formed based on the needs and potential of the village.

3.3.5. Increasing the role of Farmers Group to ferment cocoa belonging to its members using GMP innovation through the establishment of processing units and establishing a profit sharing system with cocoa owners. The fermentation process is one of the steps that farmers need to take to produce high quality cocoa beans. Fermentation is one of the post-harvest step that most affect the quality of the products obtained from cocoa [10]. Some farmers have tried to carry out fermentation, but the quality of the cocoa beans produced is not good, this may be due to the incomplete fermentation process and not according to the GMP of cocoa bean fermentation. [11] Found that problem for cocoa trading is the low quality of the beans produced due to the poor control of fermentation and drying, obtaining a significant amount of beans with undesirable characteristics, that will not develop the characteristic flavour for high quality chocolate production.

In order to produce high quality fermented cocoa beans, the fermentation process can be carried out in groups, through the establishment of a processing unit at Farmers Group. With this processing unit, the fermentation process can be controlled and according to GMP so that the fermented cocoa beans produced have high quality [12].

3.3.6. Increasing the role of Farmers Group in cocoa market by establishing a marketing unit. Members of Farmers Group can sell their cocoa to wholesalers through Farmers Group to increase their bargaining position. Currently, the farmers sell their cocoa products individually to middlemen. The weakness of this method is that the price is more determined by the buyer. This situation can be coped by establishing a marketing unit in the Farmers Group. The farmers then, can sell their cocoa products together through the marketing unit to the wholesaler. By using marketing unit, the bargaining position of the farmers increased and the farmers get better price for their cocoa [13].

4. Conclusions

Based on the SWOT, IFE, EFE and SPACE matrix analysis, the strategy for developing the cocoa industry in West Sulawesi is the Development (SO) Strategy. Policies that need to be followed are (1) Provision of superior seed sources through the establishment of cocoa seed garden, (2) Conducting cocoa rejuvenation programs along with spacing programs, (3) Increasing extension activities to disseminate GAP cocoa innovations, (4) Increasing the role of Farmers Group in Fulfilling the farm financing of its members through the establishment / strengthening of savings and loan units supported by Village-Owned Enterprises (BumDes), (5) Increasing the role of Farmers Group to ferment cocoa belonging to its members using GMP innovation through the establishment of processing units and establishing a profit sharing system with cocoa owners, (6) Increasing the role of Farmers Group in cocoa market by establishing a marketing unit. Members of Farmers Group can sell their cocoa to wholesalers through Farmers Group to increase their bargaining position. Through the implementation of this policy, the productivity of the cocoa plant is expected to increase to 1.5 tonnes / ha with high quality fermented cocoa beans so as to obtain a higher price.

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