
Economic Prospects for Integrating Superior Cocoa Clones into People's Coconut Plantation Systems: Evidence from North Sulawesi, Indonesia

ABSTRACT

Some research shows that the economic value of coconut should be able to produce more than 10 processed products, but the current condition of the value of farmers' income is very low, the economic value is limited to the primary product in the form of copra or coconut granules. The low income of farmers has occurred about 4-5 decades ago and there is no right solution to increase the income of farmers per unit of coconut farming unit. Cocoa commodity is one of the effective options to increase revenue per unit of coconut farming unit significantly. The purpose of writing is to propose the potential of available resources to increase the income of coconut farmers with cocoa interstitial plant business in coconut plantation areas. The approach of writing in the form of reviews, sources of information quoted from several articles and the results of previous studies in the development of cocoa farming in coconut areas. The implementation of superior clone cocoa farming in coconut areas intensively in just a short time (2-3 years) cocoa began to produce optimally in the 4th year. Cocoa cultivation in intensive coconut areas will be sustainable input allocation efficiency with revenue 5-6 times from only monoculture coconut farming.

Keywords: Economic prospects, coconut, cocoa, integration business

1. INTRODUCTION

Coconut commodity is still the leading commodity in North Sulawesi, involving farming communities around 40-50% which is still one source of income. More and more processed coconut products of economic value are marketed at home

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and abroad so that the coconut commodity contributes dominantly to regional economic growth [1,2,3].

The potential area of coconut in North Sulawesi is approximately 260,000 hectares, more than 96% of the area is managed by independent farmers, most of which are managed in monoculture. Generally, farmers only focus on maintenance activities in the form of potluck cleaning on coconut plant areas [4]. Harvesting activities are all carried out conventionally to produce granular coconut or copra, generally using labor outside the family [5]. Coconut farmers only receive income from coconut primary products in the form of granules, copra, and a small part of coconut shell products and coconut shell charcoal [6].

The main challenge in the organization of coconut farming is that the economic value of this business is only from the primary product, because of which the income of farmers is low, the income will increase when diversifying various coconut processed products [7]. The economic value of coconut is only from the primary product and the inefficient marketing system is the main cause of the low income of farmers. Coconut agribusiness system in this area is still dispersal [8] the sub-sub systems in the order of agribusiness system is not related to each other.

Industrial development in the village of coconut centers is still slow, the indication is only 1-2 primary products produced causing the economic value received by farmers is very low [9,10]. A minimum value chain approach of about 6-10 derivative products from shell, coir, water, meat and coconut stalks are processed. The economic value of this processed product has the potential to increase farmers' income by about 5-6 times.

[11] reported the results of research in the provinces of North Sulawesi and Riau showed the socio-economic level of coconut farmers below the poverty line, which is less than US \$ 200/capita/year. The living conditions of coconut farmers like this will continue to limit the progress of coconut development in the region and nationally. Comparative advantage of cultivating coconut crops, among coconut crops can be cultivated other crops or livestock simultaneously [12,13]. Business management like this could achieve revenue value of about 3-5 times.

Currently, many farmers have used coconut areas with other crops and livestock, but the management system is still extensive and conventional. Generally, coconut farmers are still difficult to get out of such conditions which has an impact on more and more farmers becoming poor [14]. Suitable commodities are cultivated in coconut areas depending on the distance and coconut plant system, soil type, climate, topography and age of coconuts. The economic value of coconut in the era 5-6 decades ago the price of 1 kg of copra was equivalent to 1-2 kg of rice price, now the price of 1 kg of copra is equivalent to 0.4-0.6 kg of rice price. The exchange rate of coconut prices (grains/copra) with other food commodities is also decreasing.

The development of coconut farming needs to be revitalized in an integrated and commercial management system, starting with changing the mindset. [15] stated that changing the mindset of the farming community from the comfort zone must be willing to learn and be more creative in managing farming more productively. Coconut farming still gives hope for higher economic value if this farming becomes a sustainable farmer business action.

The potential economic value of coconut commodities to contribute to regional economy is still quite high if there is an increase in productive activities. Cocoa plant business in coconut plant area plus coconut processing business can increase added value 2-3 times. [14] stated that cocoa is one of the potential reliable commodities for foreign exchange. The development of cocoa in North Sulawesi is no longer in doubt, by [16] stated that the history of cocoa development in Indonesia was initially under the Spanish in 1540 in Minahasa Regency, North Sulawesi with growth considered appropriate and very appropriate in this area.

Cocoa plants (*Theobroma cacao* L.) are one of the important plantation commodities for foreign exchange, intensive cocoa farming will provide significant added value. Indonesia's cocoa is needed in the chocolate processing industry, cosmetics and pharmaceutical industry [17]. The design of cocoa development not only increases productivity, but also increases efficiency, added value of products, competitiveness, and industrial business independence in line with the national cocoa development program [18,19,20]. This paper aims to discuss the concept of approach and design for the development of integrated coconut plantation areas with cocoa plants that can increase the income of farmers in the union of farming units. There is a new economic hope for farmers that through the development of superior coconuts in an intensive, integrated and sustainable manner will contribute to regional economic growth.

2. METHOD

The data sources used are primary and secondary data with data collection methods through literature review by exploring and reviewing data and information obtained from various sources of research results published in various publications, such as journals, books and proceedings, including others including print and electronic media. The data were analyzed in a qualitative descriptive manner to discuss aspects with the concept, approach and design of the development of integrated coconut plantation areas with cocoa plants that sustainable.

3. RESULTS AND DISCUSSION

3.1. Arrangement of Superior Clone Cocoa Farming System in Coconut Area

The use of superior cocoa clones is the main requirement for achieving high cocoa productivity [21]. The use of superior cloned cocoa seeds is increasingly widespread by buying ready-to-use or self-help seeds. The application of cocoa farming in coconut areas is quite easy, cocoa is planted between coconuts and coconuts are the shade of cocoa plants. There are 2 ways to plant cocoa in coconut areas, namely: (1) cocoa is planted on existing coconuts, conventional coconut planting distance is 8x8 m and 9x9 m, cocoa 2 rows between coconuts and 2 cocoa plants in coconut rows, the number of cocoa is about 900–1000 trees, (2) cocoa and cocoa are planted at the same time, arranging the coconut and cocoa population more flexibly. The coconut population is less, the cocoa is more. The coconut planting distance is 9x12 m away, 3 rows of cocoa can be planted and in a row of 9 m 2 cocoa plants, the number of cocoa reaches >900 trees.

Farmers who have good knowledge in cocoa cultivation have a great influence on cocoa production [22,23]. Nowadays, there are many cocoa farms that are not / have not been managed intensively, among other things because farmers do not have adequate knowledge and skills to manage cocoa farming intensively. The optimal production of cocoa plants if a series of cultivation activities is carried out intensively, especially starting from the selection of superior seeds [24]. Optimal cocoa bean production is highly dependent on farmers allocating labor in a series of cocoa farming systems. The working series of the intensive cocoa farming system is weed cleaning, pruning, fertilization and pest and disease control. It needs to be added is plant embroidery, the dry season needs watering, as well as the rehabilitation of plants that do not grow optimally.

Cocoa maintenance is an activity to maintain the growth of cocoa plants in a sustainable manner. In coconut-cocoa farming, the treatment of cocoa plants has been compensated for caring for coconut plants, the integration of these two plants has maintenance cost efficiency. Intensive care ensures that the plant remains productive, guaranteeing the quantity and quality of production. Plant pruning activities aim to focus the photosynthesis process of cocoa plants allocated to the fruit part and significantly increase cocoa production.

To achieve optimal cocoa production, coconut farmers must understand how to organize farming so that adding cocoa plants will earn higher income. To achieve maximum production from the cocoa plant business, the cocoa maintenance system must be intensive unlike the previous application of the coconut farming system.

3.2. Conception of Optimal Outcomes for Sustainable CoconutCocoa Integration

Developing a cocoa plant business in coconut areas is a solution to overcome the low income of farmers per farming unit, also contributes greatly to regional economic growth and foreign exchange. [25] stated that the development of a business like this has increased national cocoa production. The results of research by [26] show that the potential for the development of cocoa cultivation in Indonesia, especially on the Island of Sulawesi, is one of the mainstay commodities that can generate foreign exchange, increase farmers' income and welfare as well as regional economic growth.

Monoculture coconut farming only relies on the economic value of primary products will not guarantee the needs of families throughout the year. Cultivating coconut plants could obtain maximum added value because the land between coconuts is classified as suitable for cultivating other crops or livestock. The coconut-cocoa integration effort has resulted in farming efficiency, namely (1) cleaning cocoa areas that have entered the coconut area, (2) the application of cocoa plant fertilizer has a positive effect on coconut production, and (3) coconut plants become the patron of cocoa plants.

The implementation of integrated and commercial coconut-cocoa farming still has economic opportunities to be achieved, in coconuts can process products from coir, shells, meat and coconut water. The income of coconut farmers who only rely on primary products of coconut, granules and copra must be abandoned because the price is relatively low. The economic value of coconut products should be obtained at least around 5-8 processed products, the economic value could be 3-4 times the value of primary production.

The proportion of several types of plants in the coconut plantation area, it is estimated that there are 40% 1 type of plant, 24% 2 types of plants, 8% 3 types of plants and 5% 4 types of plants, generally still managed conventionally. The net income of farmers in general is still less than IDR 6,000,000/ha/year, indicating that the income of each household from coconut farming is very low. Farmers' perception of whether coconut farming still provides benefits to the economy of farming households is only around 17%-26% is still classified as profitable [27].

Indikasinya bahwa nilai produk kelapa hanya mengandalkan produk primer. It should immediately switch to other products that are more profitable through the processing of several coconut products of economic value. Increasing the income of coconut farming, processing coconut products is a relevant option in the short term. Several locations in this area have begun to have businesses processing coconut products in the form of shell charcoal, Virgin Coconut Oil (VCO), coconut water and coir. Businesses of other types of crops or livestock in coconut areas are also an option to obtain higher farming income.

Generally, coconut farmers sell coconut products directly to collectors at relatively low prices, marketing collectively directly to wholesalers or manufacturers is still limited. The price difference between village collectors and wholesalers or

manufacturers has a price difference of around IDR 300 – IDR 400/kg and granular products with a price difference of around IDR 100 – IDR 150/kg. If farmers have copra as much as 4,000 kg of copra/year, through collective marketing there is an additional opportunity of around IDR 1.2-IDR 1.6 million/year for copra and IDR 1.6-IDR 2.4 million/year for granules. If one village has a production of 800 tons/year of copra, then sales like this will have an increase in income of IDR 240-IDR 320 million/village/year for copra IDR 320-IDR 480 million/village/year for coconut.

Until now, the shape and color of copra products sold by farmers are the same as they were about 30-40 years ago. Several forms of products that can provide added value include being processed into white copra, Virgin Coconut Oil (VCO), and various other food ingredients. If each farmer has a coconut with an average product of 4 tons/year equivalent to copra, then the processing of white copra has a price difference with copra of IDR 700 – IDR 1,000/kg, each farmer has an additional income opportunity of around IDR 2.4 – IDR 4 million/kk/year. If one village produces coconut copra products of 800 tons/year, through the application of white copra processing, additional income of around IDR 560 million – IDR 800 million/village/year is obtained. If coconut products are processed into VCO products, even greater income will be obtained. If about 25% of coconut products are processed into VCO, the production of coconut equivalent to 200 tons/village/year is obtained from 80,000 liters of VCO products worth IDR 3.2 billion/village/year (VCO price of IDR 40,000/liter). The added value of processed VCO products is around IDR 1.5-IDR 1.7 billion/village/year.

The potential added value of coconut products above should be in each central village there should be a farmer economic institution in the form of Village-Owned Enterprises or cooperatives that accelerate commercial farming. Developed and independent economic institutions make it easier for farmers to try to be more productive and commercial. The development of agribusiness businesses in the future needs to immediately carry out collective actions in the form of selling results, purchasing production facilities, obtaining investment funds, and accessing information technology. Increasingly advanced farmer economic institutions motivate farmers to manage their farming systems into sustainable farmer family businesses.

3.3. Economic Prospects for Coconut-Cocoa Farming System Management

The management system of coconut and cocoa farming in North Sulawesi is generally still conventional, the economic value is only from primary products. If these two commodities are managed intensively, there is an opportunity for added value of around 4-5 times. Coconut commodities with a production capacity of around 200-1500 tons equivalent to copra/village/year are suitable for building an integrated coconut industry, can produce at least 4-5 processed products enjoyed by farmers.

Intensive improvement of coconut-cocoa farming only from primary products there is hope for a new economy of about 3-4 times the value of monoculture coconut products. The management of coconut-cocoa farming can still be improved by integrating with other crops and intensive livestock business and processing some products with additional income of about 5-7 times from monoculture coconuts. The differences in the economic value of monocultural and intensive cocoa farming development and the income value of coconut cocoa farming on an economic and industrial scale are as follows:

- a. The economic value of the development of cocoa farming in intensive monoculture and industry

The development of monoculture and intensive cocoa farming is classified as a profitable business and can guarantee farmers' income throughout the year. The economic value of the intensive coconut-cocoa integration business can be presented in Table 1.

Table 1. Intensive integrated coconut-cocoa farming income ¹⁾

No	Description	Coconut	Cocoa	Information
1	Production (kg)	2.000	3.000	Intensive effort
2	Price (IDR) ²⁾	7.500	50.000	Prices in 2023
3	Production value (Rp)	15.000.000	150.000.000	
4	Labor costs	7.500.000	20.000.000	IDR 125,000/day
5	Cost of production facilities	1.000.000	10.000.000	
6	Other fees	250.000	1.000.000	
7	Total cost	8.250.000	31.000.000	
8	Net income	6.750.000	129.000.000	

Description: ¹⁾ Based on several research results, the researcher's experience in handling the development of cocoa farming is approximately 5 years and finally the researcher's experience in handling/directly assisting farmers in cultivating cocoa from planting until the cocoa begins to bear fruit (last 2 years)

²⁾ The price of cocoa in 2023 is listed, the price of cocoa in June 2024 in North Sulawesi reaches >IDR 100,000/kg of dry beans.

In Table 1, coconut farming only from primary products has a very low net income value, not reaching IDR 600,000/month while in intensive cocoa farming there is an opportunity for a net income of at least IDR 10 million/ha per month. This very striking difference in income gives an indication that the development of conventional coconut farming is not feasible to meet the needs of farming families.

1. Economic value of coconut and cocoa on an industrial scale
The development of coconut-cocoa farming on an economic and industrial scale is to empower every existing resource in the form of processing

several products, utilizing coconut areas, and integrating with other commodity businesses in an integrated manner. The implementation of this kind of business will give us the hope of greater and sustainable profits.

Table 2. Income from integrated coconut-cocoa farming at economic scale and industry ¹⁾

No	Product Type	Production	Price (IDR)	Production value (IDR)	Production cost (IDR)	Net income (IDR)
1	Industrial Coconut	2000 kg	7.500	15.000.000	7.500.000	7.500.000
	1. Copra	400 kg	4.000	1.600.000	500.000	1.000.000
	1. Shell	8000 btr	60	480.000	-	480.000
	a. Coir					
	b. Coconut water/nata de coco	2.000 kg 750 l	4.000 35.000	8.000.000 26.250.000	3.500.000 10.000.000	4.500.000 16.250.000
	c. VCO					
2	Fermented Cocoa Dried seeds	2.500	50.000	125.000.000	30.000.00	95.000.000

Source: ¹⁾ The results of the estimated primary production of coconut and its derivative products as well as prices and costs in 2023, cocoa products are still dry bean primary products.

In Table 2, it can be seen that the implementation of coconut farming with 4-5 products produced, intensive coconut-cocoa integration net income reaches Rp 8.5 million/month plus coconut industry business there is an additional income of farmers<IDR 1 million Added value there are still opportunities through the development of various kinds of processed cocoa products such as chocolate bars, chocolate powder, chocolate candy and various other processed products [28].

1. Development of rural scale industrial businesses.

The coconut-cocoa industry on a rural scale is generally not growing/has not yet grown, so the value of farmers' income is only from primary products. In coconut center villages, raw materials are available and feasible to build a rural-scale coconut industry. The development of this industry is managed collectively under the auspices of village economic institutions. Other crop businesses or livestock can be managed individually, but the provision of production facilities, capital procurement, and marketing of products are managed under the auspices of village economic institutions.

The demand for coconut products as a food ingredient, especially coconut oil, will continue to increase because coconut oil is classified as the healthiest food [29]. *The Food and Drug Association* in the United States mentions coconut oil as the healthiest and safest oil in the world [30]. Now that the Virgin Coconut Oil (VCO)

processing industry has developed, market demand at home and abroad continues to increase. Especially for cocoa commodities at the upstream level, it is necessary to disseminate product processing technology so that farmers can develop their cocoa processing industry [31].

Technically, the older the coconut plant, the more light reaches the land, the more suitable it is for other plant businesses. At a planting distance of 9x9 meters, the land used by coconut plants is only about 20% [3]. This means that there is still around 80% of the land among the potential coconuts for other crop businesses. [33] stated that the objectives of horizontal diversification of business activities are (1) to increase land productivity and farmers' income, (2) to reduce the risk of price fluctuations, (3) to maintain soil fertility, (4) to ensure the continuity of farmers' income, and (5) to ensure labor productivity.

3.4. Impact of Expansion of Coconut-Cocoa Plantation Areas

Taking advantage of opportunities while answering the challenges of sustainable coconut-cocoa farming development, innovation must be carried out from upstream to downstream. Innovation here is not only in the form of technology, but something that can lead to improvement or make it better, simpler, cheaper, and easier. Innovation is the innovation of methods/techniques/methods [32,33,34,35] With the development of coconut farming, there are many economic opportunities that can be achieved if the existing resources, especially the land between coconuts, are cultivated by other crops, especially cocoa. The main goal of agricultural development in rural areas is to improve people's welfare measured based on the level of real income or per capita consumption expenditure of the community [36].

The development of the cocoa-cocoa area begins with the selection of areas to be developed, including high potential for the regional economy, location-specific, can be replicated, complementary to other regions, has broad market potential, is competitive and has the potential for response and support from relevant actors and stakeholders [37]. The development of such an area needs to conduct land suitability analysis, scalogram and determination of industrial locations. Each location (village) is directed with its functions and roles in the existing structure, where the role reflects the characteristics, potentials and resources possessed [38].

Taking advantage of opportunities and answering these challenges, there must be improvements from upstream to downstream. The impact of the expansion of the people's cocoa-cocoa plantation area in the long term is as follows:

1. Farmers' incomes increase

The management of agricultural businesses, especially smallholder coconut plantations, is generally still traditional, because of which productivity and income per farming unit are relatively low. The implementation of monoculture and polyculture cocoa farming is very feasible for farmers. [39] stated that the higher

the income of farming, the higher the number of cocoa plants, the higher the contribution to the income of farmer households.

Intensive cocoa development in people's coconut areas will provide added value about 3-5 times more than monoculture coconut farming. The added value will be maximized if there are productive actions to improve technology, available production facilities, available capital and place to market results. Accelerating the development of intensive coconut-cocoa farming must be a priority program in every village.[40] stated nationally that our country is the third largest cocoa producer in the world, but the quality of cocoa is ranked fifth after Ivory Coast, Gana, Nigeria, and Cameroon. The main problems in the development of farming are the low productivity of only 850 kg/ha/year, the potential of >2 tons/ha and the low quality of dry seeds, mainly because they are without fermentation. The economic value of cocoa still could be increased through mass increases in productivity and quality of cocoa products. [41]stated that Indonesia must be able to improve the quality of cocoa beans to compete with other cocoa-producing countries.

2. Farmer Group Business.

In general, existing farmer groups have not/have not experienced development from conventional farming to commercial farming. Cocoa farming, both with monoculture and intercropping patterns, is feasible to pursue where intercropping cocoa farming is more feasible than monoculture cocoa farming. The increase in production costs in cocoa farming by 7.26%, the decrease in cocoa selling price by 22%, and the decrease in cocoa production by 12%, monoculture and intercropping cocoa farming remain more feasible [42].

Farmer groups and farmer group association are actors who detail what are the needs of farmers in the coconut-cocoa planting area development system through the provision of harvest and storage infrastructure, transportation facilities, capital and intensive improvement of cocoa cultivation skills and knowledge [43]. To strengthen the position of farmers, the approach and actions must be integrated and directed towards the establishment of advanced and independent farmer economic institutions.

3. Research and assessment results

Most of the information technology from research and assessment is not / has not been useful or has not/have not been implemented into a farmer family business. Many research and innovation results have not been a solution to the low income of farmers and their contribution to regional economic growth. [44], an expert in the field of management, innovation is a big change that not only creates new products but also develops better systems and new business concepts. Policies to support the acceleration of agricultural technology innovation already exist but the implementation is not optimal because the realization is still partial. The implementation of technological innovations has generally not been integrated into sustainable business activities.

The approach to developing a coconut-cocoa integration area that is based on innovation and competitiveness, comparative and competitive advantages will be optimally developed. This approach places: (1) synergy of related resources in the region; (2) acceleration of the operating system starting from the procurement of facilities and infrastructure, production of raw materials, processing of results, distribution to the market; (3) increasing research and development capacity, as well as technology transfer; (4) expansion of domestic and international markets; and (5) increasing access to markets, technology, capital and information [45,46]. The development of the people's coconut-cocoa plantation area, it is hoped that the innovation of research results will be a solution to the problem and there are policies to support the development of coconut-cocoa farming.

4. Implementation of Counseling

The extension service system at the farmer level is generally inadequate, among other things, because the forum for farmer groups in each region/village has not focused on productive activities. [47] stated the concept of modern agricultural development, especially the development of cocoa farming with various patterns, including that farmers as a group are obliged to respond to every new technological innovation to spur the development of cocoa farming into sustainable business activities. [48] stated that modern agricultural development is closely related to the role of farmers and technology, related to institutions that regulate farmers' behavior individually and collectively and are open to information and technology from outside. The development of the people's coconut-cocoa plantation area further encourages the growth of farmer group activities as the main basis for the development of economic institutions to support the acceleration of technology absorption.

5. Human Resource Performance

The service system to the farming community, ranging from the provincial to the village level is very diverse and the available facilities and infrastructure are limited. It is still rare to find researchers and extension workers to be professionals in serving farmers, if in the field of human health, a doctor or nurse is quite professional in serving patients. The development of the coconut-cocoa plantation area is expected to increase the interest of the farming community and take action to utilize existing facilities and infrastructure. [49] that increasing the competence of farmers influences improving cocoa production. Efforts made to increase production cannot be separated from the competence of farmers in managing their farming [50]. The success of farming depends on the skills and intentions of farmers to manage farming to be more advanced and independent.

6. The position of farmers in the order of the agribusiness system

The agribusiness system is considered the weakest is the production/farming subsystem whose actors are peasant communities. The development of agricultural areas, sub-sub-systems in the agribusiness system is no longer dispersal but becomes an interrelated action. The empowerment of farmer groups/farmer group association should be under the auspices of farmer economic institutions, becoming the main program of each village. In such an atmosphere, farmers are increasingly motivated to organize and develop farming businesses. [51]that strong farmer institutions are the basis for realizing welfare. The reference for its development is based on the economy and social of the agricultural sector as follows:

a. Orientation for Economic and Social Village Development in the Agricultural Sector

Every village development program, including agricultural development that is designed, pays attention to the potential condition of all existing resources. [14] stated that the development of coconut farming in coconut center villages needs to be designed to be a more profitable business through a value chain approach where there is a gradual addition of productive activities.

The indicator of the success of the coconut-cocoa farming development program is that it can reduce poor households, and every farmer manages this farming system into a household business in a sustainable manner. Indicators of the success of agricultural development should focus more on increasing farmers' household income every year, farmer economic institutions will help realize an increase in farmers' income. Efforts that must be made in the next 4-5 years are designed to have a minimum farmer income of IDR 40 – IDR 50 million/family/year. Furthermore, in the next 10 years, it is designed to reach IDR 100 million/household/year, and then it is designed to achieve maximum revenue.

b. Efficiency and Effectiveness of Resource Use

The development of coconut plantation areas has resulted in efficiency and effectiveness in resource allocation, in turn there has been an increase in productivity and added value. [52] Endaryono stated that businesses and companies need good performance functions for business people. In running a business or business, the Pareto Principle is very useful for increasing profits. [53] mentioned this principle as an 80/20 regulator which means that around 80 percent of the results occur due to 20 percent of the causes. In venture or business, this principle helps with the focus that 20% of efforts are directly related to the results that drive sales, revenue, and growth [54].The implementation of the development of people's cocoa can be described through the Pareto principle above as follows:

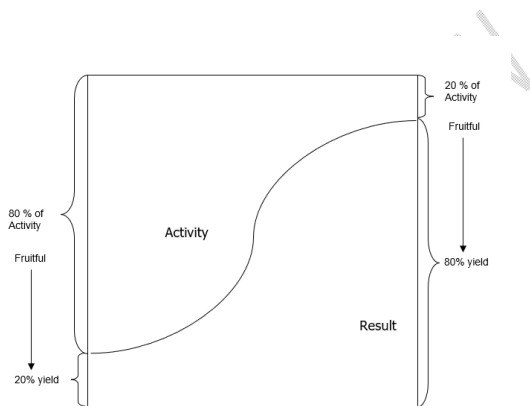


Figure 1. Pareto Principle

Figure 1 can be seen on the left side of 80% of the activities yielding 20% results. On the left side, it shows that with 20% activity it produces 80% results. [55] stated that the principle of pareto is 80 percent of events, due to a cause of 20%. Around 80% of success is achieved because of 20% of efforts, meaning that 20 percent of actions and thoughts are maximally achieved 80 percent of success. Various commodities that farmers cultivate, productivity and income per unit of farming unit are low because there is an imbalance in inputs. The allocation of labor is adequate, but the allocation of input to production facilities is unbalanced, resulting in low productivity and income. The establishment of economic institutions has accelerated the development of cocoa cocoa because there is access to new technological information, affordable production facilities, market guarantees, and availability of capital, forms and types of products according to market demand, as well as the management of farming shifted to commercial enterprises.

The approach as above indicates that the cultivation of cocoa plants in coconut areas intensively (activity + input) is 20%, the result is 80%. In conventional coconut farming, farmers who own coconuts without working earn a net income of less than Rp 1 million/ha/month. Intensive cocoa farming management in coconut areas, cocoa yields are approximately 3-tons of dry beans/ha/year with a cocoa price of IDR 50,000/kg with a production value of IDR 150 million/ha/year. [43] analyzed that intercropping cocoa farming is more feasible than monoculture cocoa farming. The above approach to cocoa plantation business in coconut areas is allocated a total cost of approximately IDR 30 million/ha/year (20%) with a net income of approximately IDR 120 million/ha/year (80%).

4. CONCLUSION

The development of cocoan-cocoa farming individually and intensively ensures that farmers get more adequate profits. The development of this farming should be a reference for the development of smallholder coconut plantation areas that guarantee sustainable farmers' income. The intensive application of coconut-cocoa farming only in the short term (3-4 years) has a guarantee of higher farming income. The implementation of business collectively has been launched for a long time through farmer groups farmer group association, the fact in the field is that this institution is not at all a sustainable business institution. The critical point that needs to be fixed is the activity of selling produce, purchasing production facilities, and obtaining business capital. So far almost all of them have only been carried out by individual farmers.

A strategic step in realizing the success of the development of coconut-cocoa growing areas is to consolidate coconut areas in one area starting from villages, sub-districts, districts, and provinces. Revitalizing the performance of farmer groups/farmer group association oriented to the formation of economic institutions in each village in the 4th and 5th years has become an independent and commercial village economic institution.

The development of peasant community economic institutions in villages is highly dependent on the performance and dynamics of farmer farmer group association. The role of the local government, more specifically the village head, is very decisive in mobilizing the village community through farmer group/farmer group association

for the development of coconut plantation areas to be more productive.

References

- [1] Khaw KT, Stephen, J, Sharp, Leila, Finikarides, I Afzal, MAH, Lentjes, Robert, Luben, Nita, G, Forouhi. Randomised trial of coconut oil, olive oil or butter on blood lipids and other cardiovascular risk factors in healthy

Comment [AJ2]: It will be useful to mention the exact impact of 80-20 principle using an example or like a strategy to adopt. It is also recommended to mention the same in the final conclusion as a standard model to adopt. In an 80-20 principle, contrary to what is suggested, out of all efforts generated only the most feasible ones provide great benefits which is likely the 20 percent. So, I would recommend that perspective to be clear. Please differentiate the potentially beneficial efforts and the least beneficial ones. Also include them in the conclusion.

- men and women. *BMJ Open*, (2018)8(3) doi: 10.1136/BMJOPEN-2017-020167
- [2] Ching, I, Lin, Chu, Fu, Shen, Tsui, Han, Hsu, Shyh, Hsiang, Lin. A High-Fructose-High-Coconut Oil Diet Induces Dysregulating Expressions of Hippocampal Leptin and Stearoyl-CoA Desaturase, and Spatial Memory Deficits in Rats. *Nutrients*, (2017)9(6):619-. Doi: 10.3390/NU9060619
 - [3] Emily, Gibson, Natasha, Stacey, Terry, Sunderland, Dedi, S, Adhuri. Coping or adapting? Experiences of food and nutrition insecurity in specialised fishing households in Komodo District, eastern Indonesia. *BMC Public Health*, (2021) 21(1):1-17. doi: 10.1186/S12889-021-10248-3
 - [4] Miharza T, Nurheni, Wijayanto, James M, Roshetko, Iskandar, Z Siregar. Carbon stocks and footprints of smallholder cacao systems in Polewali Mandar, West Sulawesi. *Frontiers in Environmental Science*, (2023) 11 doi: 10.3389/fenvs.2023.680984
 - [5] Heinrich P, DCP Hendrawan, T Bähr, O Musshoff, M Wollni, R Asnawi, H Faust.. Replanting challenges among Indonesian oil palm smallholders: a narrative review. *Environment, Development and Sustainability*, (2023)doi: 10.1007/s10668-023-03527-z
 - [6] Ariesca R, AA, WT Sau, WC Adinugroho, AAR Setiawan, T Ahamed, R Noguchi. Land Swap Option for Sustainable Production of Oil Palm Plantations in Kalimantan, Indonesia. *Sustainability*, (2023)15(3):2394-2394. doi: 10.3390/su15032394
 - [7] Hanggrasari H, AK Sari. Indonesian Coconut Oil Export Opportunities with Main Trade Partner Countries in the International Market. *Agricultural Socio-Economic Research Bulletin - Faculty of Agriculture, University of Haluoleo*, (2023)25(1):44-55. doi: 10.37149/bpsosek. v25i1.44
 - [8] Simatupang P. Agribusiness development strategy towards sustainable farming. *Proceedings of the National Seminar on the Application of Appropriate Technology in Supporting Agribusiness*. Yogyakarta, September 24, 2003. Cooperation between the Center for Agricultural Socio-Economic Research and Development, BPTP Yogyakarta and the Agricultural Institution "STIPEK" Yogyakarta.
 - [9] Kairupan AN, et al. Value Chain Implementation in Rural-Scale Integrated Coconut Farming System in North Sulawesi Province, Indonesia. (2023)doi: 10.5772/intechopen.110190
 - [10] Tooy D, David P, Rumambi, Nurdy, Fritsgerald, Lucky, Waney, Maya H, Montolalu., Elsje, Pauline, Manginsela. A Study of Economic Technos in the Development of the Coconut Coir Industry System for Small and Medium Enterprises in North Sulawesi. *Agri-Socioeconomics (Manado)*, (2023)19(1) doi: 10.35791/agrsosek. v19i1.45674.
 - [11] Allorerung D, HT Luntungan, DS, Effendi IN, Maya, Syukur H, Supriadi and Yuliusman. Sustainable Coconut Development Based on Income-Generating Technologies as a Strategy for Poverty Reduction in Poor Rural Communities and Conservation of Genetic Resources on Farmer Land in Indonesia. *Executive Summary of Research Results in Collaboration with Higher Education, Private/Regional Government/Other Institutions and International Institutions*. (2003) Agency for Agricultural Research and Development.

- [12] Asnawi S. People's coconut plants on the island of Java. (1985) Manado Coconut Research Institute.
- [13] Mahmud Z. Intercrops under Coconut. XVIII Journal of Agricultural Research and Development (2). (1988) Agency for Agricultural Research and Development.
- [14] Kindangen JG. People's Coconut Plantation Area with Food Crop Business in North Sulawesi. Regional Agriculture Builder Based on Workshop and Partnership Wisdom. Agricultural Research and Development Agency. (2017) p. 132-164, AARD Press.
- [14] Melania M Hd, E Yanita. Export Potential of Cocoa Processed Indonesia in 53 International Markets Through Supporting Aspects, Export Potential Of Cocoa Indonesia In International Market Through Supporting Aspects, Marketing Aspects And Policy Aspects. 1–9.
- [15] Suryana NK, SI Mulyani and H Hendris. Local Resources-Based Community Empowerment Model to Achieve Food Security at the Indonesian Border Community of North Sebatik. (2023) Jurnal Kawistara, 13(1):56-56. doi: 10.22146/kawistara.8433510.20473/DC. V1.I2.2019.45-49
- [16] Karmawati E, Z Mahmud, M Syakir, J Munarso, K Ardana and Rubiyo. Cocoa Cultivation and Post-Harvest, Plantation Research and Development Center. (2010) Bogor: Center for Plantation Research and Development
- [17] Ministry of Agriculture. Boosting Indonesia's Cocoa Exports in the European Union. Jakarta: (2020) Ministry of Agriculture of the Republic of Indonesia.
- [18] Andrianyta, H and H Hermawan. 2012. Government policy support in increasing the added value of horticultural products. National Seminar on Food Independence 2012 "Increasing Competitiveness and Added Value of Local Resources-Based Agricultural Products". Jatinangor, July 11-12, 2012. ISBN: 978-979-16972-4-8. Padjajaran University Bandung
- [19] Sudjarmoko, B. State of The Art Cocoa Industrialization in Indonesia. Circular Innovation of Industrial and Refreshing Crops, (2013b) 1(1): 31-42.
- [20] Leksono, A.S., Mustafa, I., and Gama, Z.P. 2021. Organic Cocoa Farming in Indonesia: Constrains and Development Strategies. Organic Agriculture, 11: 445-455. <http://doi.org/10.1007/s13165-021-00351-5>
- [21] Junaedi S, Thamrin, B Darwisah, RNYana. 2016. Identification of superior cocoa clones in Tarengge village, Wotu District, East Luwu Regency. (2016) Agrocomplex, Volume 16 No. 1 January 2016
- [22] Panna MR, MN Mustari, and T Supatminingsih. Analysis of Factors Affecting Cocoa Production in Tapango District, Polewali Mandar Regency. SOCIETIES: Journal of Social Sciences and Humanities, (2021)1(2), 1–11.
- [23] Alkamalia I & Budi S. Analysis of the Influence of Land Area and Labor on Smallholder Plantation Cocoa Production in Aceh Province. Agrifo: Journal of Agribusiness, Malikussaleh University, (2017) 2(2), 56. <https://doi.org/10.29103/ag.v2i2.369>

- [24] Manullang W, & Silalahi FR. Effect of Planting Media Composition on Stem Cuttings Growth. *Journal of Agrica Ektensia*, (2019) 13(2), 29.
- [25] Bulkis S, Fahmid, IM, Hidayah H, Arsyad M, Amiruddin, A, Khaerati, R, Situmorang, FC, & Amrullah A. Competitiveness analys of cocoa commodities in South Sulawesi. (2019) IOP Conference Series: Earth and Environmental Science, 343(1). <https://doi.org/10.1088/1755-1315/343/1/012106>
- [26] Depparaba F, & Karim HA. (2019). National Cocoa Prospects in Policy Perspective. *AGROVITAL: Journal of Agricultural Sciences*, (2019) 3(1), 14. <https://doi.org/10.35329/agrovital.v3i1.215>
- [27] Kindangen JG. Business Feasibility Analysis of Rural Scale Integrated Coconut Industry Development in North Sulawesi. *Journal of Agricultural Technology Assessment and Development*, (2007) Vol. 10 No.3 November 2007. Bogor Agricultural Technology Assessment and Development Center. Agricultural Research and Development Agency.
- [28] Fakhruzzazi, T Bantacut, and S, Raharja. Institutional Model of Agrotourism Development Based on Cocoa Agroindustry in Pidie Jaya Regency, Aceh Province. *Journal of Technology Management*, 1(2018) 7(3): 244-260
- [29] Fife B. Go back to Coconut Oil. (2005) Trubus Edition 428, July 2005/XXXV. Jakarta
- [30] Rubiyu and Siswanto. Increasing the production and development of cocoa (*Theobroma cacao* L.) in Indonesia. *RISTRI Bulletin* (2012) Vol. 3(1): 33-48
- [31] Darwis SN. Intercropping among Coconut. Development Series No. 2. 1988. Bogor Research and Development Center. (1988) Agricultural Research and Development.
- [32] Soebiaprada R. Policies and roles of the government and coconut development in Indonesia. (1991) Director General of Plantations.
- [33] Kolleck N. 2013. Social Network Analysis in Innovation Research: Using a Mixed Methods Approach to Analyze Social Innovations. *Eur J Futur. Res.* 1(25): 1-9
- [34] Indraningsih KS. Agricultural Innovation Dissemination Strategy in Supporting Agricultural Development. *Agro Economics Research Forum*, (2017) 35(2): 107-123.
- [35] Karaveg C, Thawesaengskulthai N, & Chandrachai A. Evaluation model for research and development commercialization capability. *Production & Manufacturing Research: An Open Access Journal*, (2014) 2(1), 586–602. <https://doi.org/10.1080/21693277.2014.886086>
- [36] Wahyudi T, TR Pangabea and Pujiyanto. Cacao. *Agribusiness Management from Upstream to Downstream. Full Guide*. (2002) Independent Spreaders. 363p
- [37] Kindangen JG. Agricultural Technology Clinic: Institutional agribusiness and rural economy drivers. Agricultural Research and Development Agency, Ministry of Agriculture. (2014) IAARD PRESS, Jakarta.
- [38] Setyanto A. Approach and Implementation of Agricultural Superior Commodity Areas. *Agro-Economic Research Forum*. (2013) Vol 31 No 2, December 2013. 171- 195

- [39] Surur F. Optimization of land use for the development of cocoa commodities (*Theobroma cacao* L.) in Tompobulu District, Bantaeng Regency. *Journal of Technoscience*, (2017) 11 (1): 89 – 102.
- [40] Siwi P and VR. Ingesti. Contribution of Cocoa Farming (*Theobroma Cacao*) to Household Income of Cocoa Farmers Di Kabupaten Kulon Progo Contribution of Cocoa (*Theobroma Cacao*) Farming Business to Farmers' Household Income in Kulon Progo Regency. *Jurnal Pertanian Agros*. (2021) Vol. 23 No.2, Juli 2021: 271 -281 e-ISSN 2528-1488, p-ISSN 1411-0172 Politeknik LPP Yogyakarta, Program Studi Budidaya Tanaman Perkebunan D-III
- [41] Nurhadi E, Hidayat S.I, Indah P.N, dan Widayanti S. 2019. Keberlanjutan Komoditas Kakao sebagai Produk Unggulan Agroindustri dalam Meningkatkan Kesejahteraan Petani. *Agriekonomika*, 8(1): 51-61.
- [42] Valentin R D, Diwangkara B, & Riskiono SD. Moisture content test equipment on dried cocoa pods based on Arduino microcontroller. (2020) 1(1), 28–33.
- [44] Pasariibu MC, FE Prasmatiwati K, Muriati. Analysis of the Financial Feasibility of Cocoa Farming in Bulok District, Tanggamus Regency. Faculty of Agriculture Lampung. *Journal of Agribusiness Sciences (JIIA)*, (2016) Vol.4 No.4. Bandar Lampung.
- [44] Herman H, R Purnamajani, H Adrianyta. 2012. Approach And Design to Develop A Cocoa Area Based On Innovation And Competitiveness. (2012) MAHATANI Vol. 5, No 1, June 2022 Large Assessment and Development of Agricultural Technology, Bogor.
- [45] Raras ATS. Become a successful manager, through four aspects of the company. (2019) Alfabeta, Bandung.
- [46] Herdhiansyah D, and Asriani D. Kako Commodity Agroindustry Development Strategy in Kolaka-Southeast Sulawesi Regency. *Journal of Agroind*, (2018) 4: 30-41.
- [47] Arfah SYC. Strategy for Cocoa Agribusiness Development in Central Sulawesi. *Jurnal Agroland*, (2019) 26: 179-188
- [48] Kindangen JG, RTP Hutapea, S Liwu. Allocation of Female Labor in the Development of Cocoa Farming Business. The Existence of Women in Agricultural Business. (2023) IPB Press. p. 81-108.
- [49] Mardiharini M, and E Jamal. Menuju Pembangunan Pertanian Modern. Menuju Pertanian Modern Berkelanjutan. (2017) IAARD Press. p. 15-33. Badan Litbang Pertanian. Jakarta
- [50] Managanta AA. Improving Cocoa Production and Quality Through Improving Farmer Competence in Sepe Village, Lage District, Poso Regency. *PRIMA: Journal of Community Empowering and Services*, (2020) 4(2), 70–77. <https://doi.org/10.20961/prima.v4i2.41442>.
- [51] Aziz S, Nuraini C, & Saepudin A. The Relationship between Farmers' Competence and Motivation with Paddy Rice Productivity (Case on Paddy Rice Farming in Sukahurip Village, Pamarican District, Ciamis Regency). (2020) *Agribusiness System Scientific Journal* ISSN:XXXXXXX, 1(1).
- [52] Endaryono BT, Paramansyah A, & Djuhartono T. The Role of Performance can Increase Income for Family Economic Improvement

- According to Islamic Perspective. *Sosio E-Kons*, (2018). 10(1), 11.
<https://doi.org/10.30998/sosioekons.v10i1.2347>
- [53] Pope L. How to Waste Less Time at Work with the Pareto Principle.(2021)
<https://www.g2.com/articles/pareto-principi>
- [54] Cahyani, S., & Sukanta, S. (2022). Product Quality Analysis of Filter Water using Basic Seven Tools di PT. Batarasura Mulia. *Jurnal Ilmiah Wahanann Pendidikan*.
<http://jurnal.peneliti.net/index.php/JIWP/article/view/2088>.
- [55] Sunarto, & WN, H. S. (2020). Buku Saku Analisis Pareto (Suparji (Ed.); Pertama). Prodi Kebidanan Magetan Poltekkes Kemenkes Surabaya.
<https://sunartoyahya.files.wordpress.com/2020/06/buku-saku-analisis-pareto.pdf>