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## INNOVATION AND DEVELOPMENT PRODUCT BASED ON THE SALT POTENTIAL OF MADURA: FORTIFIED MORINGA SALT

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### ABSTRACT:

*This study aims to identify the development process of fortified moringa salt based on Madura Island's potential. Analytical Hierarchy Process (AHP) methods used the commercialization strategy scenarios. SWOT analysis was used to select alternative strategies formulated. The results are moringa fortified salt product contains 87% NaCl, 11.88 µg/g vitamin C, 4.88 µg/g B-carotene, 3.6% water content, and 46.713 ppm antioxidant content so that it meets the requirements as health salt; the development of salt products is carried out by making a new product in moringa fortified salt for the upper-middle class and hypertension. The priority of the product commercialization strategy that is carried out is to open a new business, a joint system between farmers and business people or other related parties, and a drop selling system to increase salt farmers' revenue.*

**Keywords:** AHP, Commercialization Strategy, Development Product, Fortified Moringa Salt

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### 1. Introduction

Madura is the largest salt-producing region in Indonesia. Madura Island consists of four districts: Sampang, Bangkalan, Pamekasan, and Sumenep Regency. Productivity, land area, and total production of Indonesia's most extensive salt-producing regions (Table 1). The salt farmers were directly selling their salt intermediaries. Intermediaries calculate the prices of salt. Indonesia's salt prices are four times higher than those of salt imported. The local salt price dropped from IDR 600 to IDR 200 in 2016. The import policy makes the domestic salt price uncompetitive for farmers (Detik, 2017). The price of salt imported was IDR 475 per kg in 2017. In the meantime, salt prices were around IDR 2,000 per kilogram (Kemperindag, 2017). The price of salt hit IDR 2 500 per kg in early 2019, but the price was IDR in mid-2019. 250. For benefit, the price of salt is at least IDR 900 per kg for farmers (Kompas, 2019)

The high cause of the people's salt price is the production cost and labour used. The salt price is smaller than the expense of the farmers' products and the price of the government. The government is also not in a position to monitor the salt price at the farm level. The quality of salt farmers is lower, does not always follow market requirements, so the price of salt is more lacking in farmers than that of the market. This condition has stopped salt farmers from receiving decent income; indeed, the beneficiaries are intermediaries because of the glut of imported salt on the market (Sudaryana & Pramesti, 2018). Indonesian salt farmers can only produce salt for consumption. Salt consumption is 94.7% NaCl content based on dry weight with a maximum 2% impurity level Sulphate, Magnesium, and Calcium, the remainders are soil (mud, sand), with a limit of 7% water content.

Table 5. Productivity, Land Area, and Total Production of Indonesia's most Extensive Salt Producing Regions

No	Region	Number of Farmer	Production (Ton)	Land Area (Ha)	Productivity (Ton/ha/usim)
1	Cirebon	3.707	335.000,00	2.944,00	113,79
2	Sampang	2.021	346.666,00	2.814,00	123,19
3	Pati	6.781	116.273,00	2.838,11	40,97
4	Indramayu	3.986	361.105,00	2.714,00	133,05
5	Sumenep	3.222	236.887,00	1.460,00	162,25
6	Rembang	4.009	218.491,00	1.568,65	139,34
7	Pamekasan	1.461	40.613,00	929,00	43,72
8	Bima	1.192	80.470,65	1.743,02	46,17
9	Demak	1.354	40.304,00	1.271,00	31,71
10	Brebes	658	10.433,00	605,79	113,79

Sources: BPS, 2019; KKP, 2019

One attempt to increase added value can be made by commodity diversification. One form of diversification salt is fortified salt (Astutik, Maflahah, & Rakhmawati, 2019). Moringa fortification salt is a specific salt, which was applied as a fortification to moringa extract. The goal of fortified moringa salt overcome deficiencies in iron, anemia, and vitamin A weakness, which cannot be overcome by sodium salt. The moringa contents are A, B, and C vitamins, potassium, calcium, iron, and protein in substantial quantities (Krisnadi, 2010). In addition, Moringa also contains antioxidants that can inhibit free radicals

The purpose of salt diversification is to increase productivity to compete with other salt products. Salt is also an iodine source, but salt should also use as a source of vitamins and antioxidants. one of the efforts to make Moringa salt fortification products preferred by consumers is using packaging to draw people's purchase power (Astutik et al., 2019). Moringa fortified salt met the test parameters of iodine content, H<sub>2</sub>O content, NaCl content, and vitamins content compliance with SNI 01-3566-2000 requirements. Moringa fortified salt is added salt with Moringa leaves as a water-containing vitamin C source of 11.88 µg/g; B-carotene of 4.88 µg/g; NaCl of 87%; 3.6% moisture content, and 46.713 ppm antioxidant content.

The opportunity to develop salt products needs to be followed up. Efforts to develop new products require an effective strategy as a determining factor in the sustainability of product development. Products that can be developed are products that are needed by the community. People's need for healthy food can be used as an opportunity to develop moringa fortified salt. Developing a new product is not an easy job, as it requires effort, time, and the ability of the resources used. In addition, the risks and costs of failure are also borne by the company. The failure of a product is caused by several things: lack of new ideas in the market area, divided market for, social and government constraints, high cost of developing new products, lack of capital, very short development time, and shorter product life cycle. Based on this, it is necessary to ensure the success of new products based on the stages.

Product development and innovation are essential things that companies need. The companies must provide different goods from the other rival. The company-owned goods would have benefits over other businesses (Trott, 2008). Innovation involves changing current or fresh information into new goods or products, systems, and services intended to deliver new value for consumers and improve innovation makers financially (Magrab, Gupta, McCluskey, & Sandborn, 2010). Innovation makes an idea or something new, while imagination makes it smart and suitable (Wilemon & Millson, 2006). Creativity, which is the beginning of creation, is part of innovation. An organization's aspects are how a better and better concept can be created or generated. There are many models that businesses should use to incorporate product creation and innovation. Companies must also promote easy and efficient product design (Griffin & Ebert, 2007). There are three types of creativity: making amendments or making essential modifications to products (Gupta, 2007) without removing their original properties; (2) creating or modifying the designs for the comparative benefit of new products or current products; and (3) producing new products that are

distinct from the pre-product product (Wilemon & Millson, 2006).

The stages of product development are (1) Product idea: Product creation starts with a quest for innovative product concepts; (2) filtering: this process aimed at extracting ideas not linked to the company's objectives; (3) concept conducting: testing market analysis to gain buyers' insight into advantages and fair prices; (4). Economic analysis: When obtaining market/customer feedback, the cost of production and services is compared to determine whether the items produced achieve minimal profitability objectives; (5). Prototype production: The manufacturing or research and development group forms a prototype until the company has established the possible profitability of the project; (6). Checking and selling of products; (7). Commercialization. The organization will launch full-scale manufacturing and distribution if the marketing test results are favorable.

Differences in quantity cause market competition of salt, quality, and price of imported salt compared to local salt. The extreme rivalry on the market lets consumers consider how to profit from their goods and win in this fierce competition. The concept comes from this to create goods that can be superior, forcing people to invent and improve their products (Kotler, 2009). In recognition of the value of invention and product growth, salt farmers need to create and design products and trace how to develop and innovate products. This study aims to identify the development process of fortified moringa salt based on Madura Island's potential. This research starts with the search for ideas to the commercialization stage.

## 2. Research Method

The method of analysis used is qualitative research. This approach explains the central phenomenon and question; the researcher interviews the participants with extensive and general inquiries. The effects of the collected information have been analyzed in words or code. The analysis findings can be clarified, identified, or organized according to the subject (Creswell, 2008).

In this study, the researcher agrees on the source of information used for the snowball sampling and specifies how the researcher gathers the data on commodity growth – data on landlords, landowners, and farmers' associations.

The results of this study are qualitative data that are not statistical but evidence-based sentences. Qualitative figures are the status of the performance of the people observed and the world around them. These data can consist of sources of information, interviews, field reports, history, or observations (Sarwono, 2011).

Primary data are data gathered directly for the exploratory, informative study testing objectives. Preliminary evidence was gathered from analyses and direct interviews with farmers and landowners. Secondary data is complete like records, and this data uses to support primary data. Techniques for data collection in this study using observation analysis and interviews. Observation by explicitly considering the potential of salt quantity and efficiency, human resources capability, and the supply of owned capital. The informant carried out the interview processing by answering open questions. The data obtained from the findings and interviews were then analyzed using qualitative methods and compared with written data. In this technique, the information analyzes, classifying the data from the obtained data. This analysis seeks to provide a comprehensive and detailed description of moringa-enhanced salt products' production analysis.

The preparation of commercialization strategy scenarios uses the AHP (Analytical Hierarchy Process) method. The AHP method is used to simplify complex problems to become more structured and easy to solve (Marimin, 2008). The strategy is determined based on the priority scale (weight) resulting from the AHP analysis. Analytical Hierarchy Process (AHP) is a method of solving a complex situation that is not structured into several components in a hierarchical arrangement, by assigning subjective values about the relative importance of each variable, and determining which variables have the highest priority to influence the outcome of the situation. The decision-making process is essentially choosing the best alternative. However widespread the alternatives that can be established or the details of the exploration of possible values, the limitations that remain encompassing are the basis of benchmarking in the form of a single criterion. The main equipment of AHP is to have a functional hierarchy with its primary input of human perception. With hierarchy, a complex and unstructured problem is solved into its groups and organized into a form of hierarchy.

### 3. Results and Discussion

#### *Product Innovation Description*

Moringa fortified salt is a salt added to the extract of moringa as a fortification. The process of making the first moringa fortification salt is by collecting materials. The materials used in moringa fortification salt are salt, moringa powder, and distilled water. They have macerated Moringa powder to extract the extract using distilled water. The salt was carried out by evaporation until it obtained Moringa extract.

For salt, which is still in salt, first, dissolve it using distilled water until BE 25. Then the moringa extract and salt solution are mixed and heated until it becomes moringa fortification salt. The last process is to dry the fortified moringa salt into the dryer cabinet. Salt farmers in product innovation are carried out through farmer groups. The farmer groups carry out various stages: market survey, research, and experiment through preference consumers. It was distributing questionnaires distributed through health education facilities, food training conducted by the surrounding community. The data is carried out at the stage, and it begins to calculate costs and other things needed in production to consider whether the target price can be met, then finally, production begins. Farmer groups create fortified moringa salt products with a variety of different types of packaging. The salt content produced by farmers and the fortified salt content of Moringa (Table 2).

Table 6. Moringa fortified salt content

Parameter	Unit	Total
NaCl	%	87,41
Vitamin C	µg/g	11,88
B-carotene	µg/g	4,88
Water Content	%	3,60
IC <sub>50</sub>	ppm	46,713

Sources: Maflahah & Asfan, 2020

Moringa fortified salt products contain beneficial properties for human health. The nutritional content in fortified moringa salt (Table 2) indicates that they can use as a source of antioxidants (IC<sub>50</sub>). The IC<sub>50</sub> (46.713) is a powerful antioxidant intensity category with a value of less than 50 ppm. As soon as possible, moringa fortified they can use salt as a source of vitamin C. This fortified moringa salt is a healthy salt category, so it is safe for people with hypertension.

#### *Product Development Stages*

Farmers are encouraged to generate product ideas at this point. The farmers will get design suggestions from many references that promote the invention of new products. Product production is carried out through the diversification of salt, including moringa salt. The segmentation market of moringa fortified salt is upper-middle class.

#### *Introducing New Products*

Farmers' associations develop more creativity in the development of new goods. Not only is the salt manufactured sold at a low price. The latest commodity created by the farmer groups is safe salt for people with high blood pressure and the upper-middle-class who care about wellbeing. The measures to create a new product are as follows:

##### 1. The emergence of ideas

The stage where the idea is developed involves many parties in the creation of new goods. Farmers are introduced to Moringa fortified salt. The initial challenge was that farmers did not know how to make fortified salt. Farmers can only use salt to marinate fish with conventional technology so far. It takes one week at this level to provide comprehensive training to farmers.

##### 2. Screening Stage

Farmers, buyer, and PT. Garam (corporate state) participants performed the screening stage. It is intended to provide feedback on developed goods. This process takes two weeks to complete.

### 3. Concept Testing

In the third stage of testing this idea, farmers' organizations, professionals, and PT. Garam, the consumer. The principle of concepts evaluated by giving the customer the idea to know from this innovation's design point is appropriate for customers. It takes one week to do this exam. At this test stage, the hurdle or restriction is that the generated idea is not approved and would require added costs that the concept has developed. The funding aspect is exploring at the design testing stage. The findings of the study are decisive for the next move. It takes two weeks for this point. When the results of the study display promising results, the production process of the prototype is followed.

### Development Stage

At this point of production: an authentic product is raised. Fortified moringa salt produces to monitor for defects and deficiencies. This product is also a summary of this product for customers. The time is two weeks. The constraints at this point were very high costs when they required repairs of the product.

### Testing Phase

The step is to produce the products in small quantities at the testing process since they have not been sold. This product is tested for its success if this product satisfies the performance criteria. If the product is according to the specifications, the product is checked for the customer. The time needed for this test is one week. According to consumers, there is a shortage, improvements made to increase fortified salt's selling value.

### Commercialization Stage

The farmers' groups start manufacturing goods entirely during commercialization, and products are sold to individual customers. In the last point, it takes about a week. The business barrier is the production delay, triggered by the worker's slow speed and efficiency.

#### *Product Innovation Commercialization Strategy*

To analyze the commercialization strategy for innovation in moringa fortification salt products using the AHP approach. The AHP approach produces the following general categories and structures:

1. Identification of elements
2. Factor Level

Marketing	:	Market potential, product types, marketing strategies are considered in achieving an effective strategy.
Production	:	Development of production (technological, technical, location), the availability of commercial-scale local raw materials is considered to achieve an effective strategy.
Human Resources:	:	Leadership, networking, entrepreneurial spirit, ability to be considered to achieve an effective strategy.
Financial	:	Commercialization costs, sources of funding, profitability are considered to achieve an effective strategy.

### 3. Actor Level

Inventor	:	As an invention producer, an inventor develops a product by thinking about the right market, product development (innovation), developing networking capacity / becoming an entrepreneur.
College	:	As the manager and driver of the invention. Universities can find markets, develop inventor capacity through training, business meetings, or find scale-up incentives.
Businessman	:	Participates in finding markets and suppliers, developing old or new industries.
Government	:	As regulator and policymaker for inventions, participating in finding

markets, such as local souvenirs, providing incentives, developing new entrepreneurs.

## 5. Goal Level

- Increased revenue : Commercialization is expected to increase revenue for inventors, universities, business people and the government.
- Cost efficiency : Commercialization costs money, the right commercialization strategy can make costs efficient, production can be cheaper than existing ones. This is a consideration for the perpetrators.
- Long-term Impact : Product commercialization can enhance image, increase employment / entrepreneurship and provide added value.

## 6. Scenario Level

- This level is related to the goals of increasing revenue, cost efficiency, and long-term impact
- New businesses : new businesses can be carried out by farmer groups who are capable of starting new businesses
- Drop-selling : Products that are not patented but the inventor is familiar with the technology / process can develop a break-up scheme.
- Joint : Products that require development and require the inventor to take part can be developed jointly (financial, production, marketing or human resources).

## 7. Hierarchy Arrangement

The results of element identification are arranged in a hierarchy as follows Figure 1. Marketing, human capital, financial factors, and development factors affect the commercialization approach. The marketing factor is central as the guarantee of market share dictates the viability of the manufacturing process. Human capital would influence work availability and farmers' readiness to begin salt production. The human resources' willingness would assess the contribution to the production of salt goods. The financial side is the third priority because farmers' most significant barrier to growing value is insufficient resources, while farmers need cash quickly after harvest. The element of the production is the availability of raw materials in reinforced salt production. There are no issues with the supply of raw materials for the production of backed salt goods.

Three clusters favour developers, led by industry, colleges, and inventors, in terms of players who affect the marketing campaign. Business people are essential to the progress of the marketing process and should read the possibilities on the market. The inventors are the next priority. Inventors with common sense are more straightforward than those lacking a business spirit to follow a marketing campaign — building new entrepreneurs encouraged by the university (entrepreneurial model). The government plays an essential role in deciding policies, in particular those about business policy. Currently, the higher education part is small in the effectiveness of an effective marketing campaign.

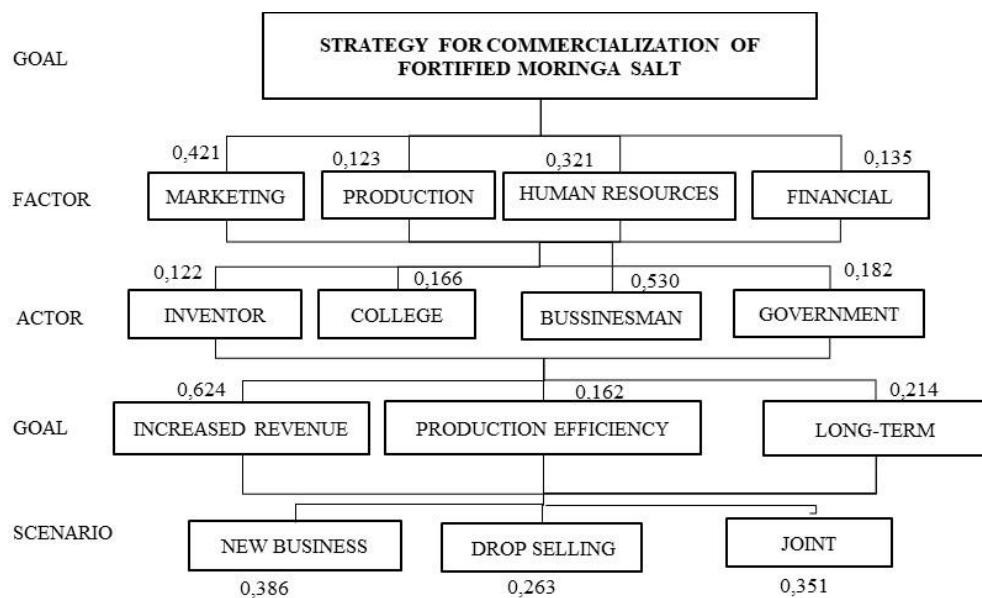


Figure 1. Structure of the Strategy for Commercialization of Moringa Fortified Salt Products  
(Sources: primary data)

The priority priorities for the marketing of moringa fortified salt products are improved income, long-term effects, and cost-effectiveness. Rising sales are the secret to selecting goods that can sell. The long-term impact will improve salt market prices and open new employment, particularly for the local region. The strategic priority of moringa fortified salt products is marketing to open a new sector, a shared structure between farmers, business people, other relevant parties, and citizens' network. The selling and braking mechanism links the selling and purchasing of products between the seller (provider of the goods) and the customer (recipient of the goods). The supplier sends the goods to the receiver of the goods on request. The purchaser of the goods would pay a nominal sum in full, in cash, or at the agreed time, as specified in the notice.

#### 4. Conclusion and Implications

The new product developed is Moringa fortified salt which contains 87% NaCl, 11.88 µg/g vitamin C, 4.88 µg/g B-carotene, 3.6% water content, and 46.713 ppm antioxidant content so that it meets the requirements as health salt and market segmentation for the upper-middle class and hypertension. The product development process takes nine weeks, starting with idea generation (2 weeks), idea screening (1 week), concept testing (1 week), business analysis (1 week), prototype development (1 week), market testing (1 week) and the commercialization stage (2 weeks). The priority of the product marketing strategy that is carried out is to open a new business, a joint system between farmers and business people or other related parties, and a drop selling system to increase salt farmers' revenue.

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