



Opportunities for the development of Yam as an alternative of additional income (case study in District Wringin Anom, Gresik)

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Abstract

The purpose of this study was to determine the strategy of developing sweet potato plants as an additional alternative to family income. This type of research is a case study. While the analysis in this study is: 1) EFAS analysis to determine and analyze external environmental factors are opportunities and threats. 2) IFA analysis to identify and analyze environmental factors, namely internal strengths and weaknesses. 3) SWOT analysis to determine the strength and use of opportunities that can minimize weaknesses and threats. From the results of the SWOT analysis. Opportunities for The Development of Yam, As an Alternative of Additional Income, processed products include several: product promotion for export; development of derivative products; marketing strategy. As an Alternative of Additional Income " whose findings are alternative products that are based on the SWOT analysis, namely yam flour, with attention to some of the following: Product for export promotion (Kenyon and Fowler, 2000), Development of derivative products, Lipton (2005), Wiggins, S. (2006), Marketing strategy Fred. R. David. (2004), Hunger, J. David, and Wheelen, Thomas L. (2003).

Keywords: opportunities, development strategy, utilization of yam, diversification, the family income

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INTRODUCTION

Yam plants native to Mexico and Central America, these plants grow wild (Vaughan and Geissler 2009) observed since the period before the arrival of Columbus and later widely cultivated in Mexico and other countries in Central America, but not intensively (Peter, 2008). In Asia, sweet potato tubers were first planted in the Philippines which were then brought to the eastern part of Indonesia to be planted. Now sweet potatoes grow on several islands in Indonesia as vegetables. The benefits of sweet potatoes, tuber efficacious in smoothing the skin, while tubers have medicinal properties and indirectly fever can reduce pain due to hypertension (Adi 2008, Kheiry et al. 2013).

Yam is a very important plant for at least 60 million rural poor producers, processors and consumers in West Africa who provide many opportunities to reduce poverty and feed the poor in regions (Aidoo et al. 2011, IITA and EIARD 2013). This is no different from Ghana where the crop is the most important food crop in terms of the output value. It accounts for about 17 percent of the agricultural gross domestic product and also plays a

key role in ensuring household food security (Kenyon and Fowler 2000). Ghana is currently the main exporter of sweet potatoes (36 percent of world exports) and ranks second only to pineapples among non-traditional exports of Ghana (Asante et al. 2008). Of the total agricultural land cultivated (7,846,551 hectare), cassava cultivation reached 387,000 ha which is 4.9 percent, A total of 5.96 million tons of sweet potato produced in 2010 which ranks second from cassava 13,504,000 million tons. The importance lies in the fact that these foods serve as food security and crops. Fertilization across forests, coastal savannas, forest transitions and eco-paste ecological zone in Ghana.

Although Nigeria is the world's largest sweet potato producer with an annual production of 27 million tons, which is about 65 percent of the world's annual production potential in the production of sweet potatoes cannot yet be optimized. In fact, it has been observed

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that Yam production in Nigeria declined substantially due to many factors, especially the cost of planting materials and labor, each of which accounted for about 50 percent and 40 percent of the cost of production (Nweke et al quoted in Okoro 2008).

Guinea yams (*D. cayenensis* - *D. rotundata* complex species) are the main staple food in sub-Saharan Africa primarily in the West African seat belt where food security is a critical issue (Demuyakor et al. 2013, Fu et al. 2011). West Africa is the most prominent region in the world for sweet potato production and produces more than 95 percent of its production worldwide (Demuyakor et al. 2013). Plants produce underground tubers which are a good source of carbohydrates, vitamins, and minerals (Olajumoke et al. 2012). The tubers are eaten boiled, crushed, baked or fried and can also be peeled, dried and produced into wheat flour (Ayodeji et al. 2012, Oluwole et al. 2013). In Benin, the fourth producing country behind Nigeria, Ivory Coast and Ghana, total annual sweet potato production are 2,366,000 tons and egg consumption per capita per day is highest compared to other countries (FAO 2011). Different species are cultivated but *D. cayenensis* - *D. rotundata* complex is the most important and represents more than 95 percent of total output (Ersoy et al. 2017, Loko et al. 2013). Despite the proven economic resilience, nutrition, food, and crop culture, very little attention to pests and diseases, its impact on production and control strategies (Asante et al. 2008, Dansi et al. 2013, Korada et al. 2010). As a result, and as reported by producers, pests and diseases in paddy fields and storage are still spreading, tuber and tuber losses are high, many cultivars are lost and new phenomena even emerge and spread widely and uncontrollably (Loko et al. 2013). To overcome biotic factors in crop production systems, the development of Integrated Pest Management and Disease Pest Management strategies is a necessity (Pandey and Satpathy 2009, Tanzubil and Yakubu 1997, Waterfield and Zilberman 2012). For this, the documentation of farmers' knowledge and perceptions of sweet potato pests and diseases and their traditional management is a prerequisite (Midega et al. 2012). In traditional farming, farmers have a lot of knowledge in handling pests and diseases that are generally adapted to their socioeconomic and environmental conditions (Chanu et al. 2010, Sesay et al. 2013, Seses et al. 2012)

A study by Kibwage et al. (2009) on livelihood diversification strategies among small farmers in Kenya's southern Nyanza region shows that sweet potatoes are one of the most important crops that help food security in the area. However, soils under sweet potatoes and other food crops have declined over time as most farmers switched to tobacco growth which is considered to have a ready market and a clear market price set by tobacco companies compared to other agricultural products whose market structure is not under that stand by the peasants.

Lipton (2005) argues that agricultural growth should reduce poverty through agriculture; agricultural growth resulted in an increase in demand for unskilled labor, creating employment and tending to raise rural wages; produce back to the ground, the assets that some poor people have when they have few other assets than their labor; and tend to suppress the price of the product, including food, for the great benefit of the majority of the poor who must buy staple food. Wiggins (2006) argues that historical records have shown that no country (a city-state like Hong Kong and Singapore are liberated) has seen rapid economic growth without substantial agricultural growth. In many cases, increased agricultural output has preceded major manufacturing expansions. This will be the case for England in the 17th and 18th centuries, as well as many recent East Asian growth stars, such as China, South Korea, Indonesia, and Taiwan. The evidence suggests that agricultural growth has benefited millions of people through higher incomes and cheaper food, and by generating intensive development patterns of development and benefiting rural and urban areas. An increase in agricultural output due to land increases and labor productivity makes food cheaper in favor of the rural and urban poor who spend most of their income on food.

Strategy concept has been developing for the last 30 years. David (2004), strategic management is an art and science decision on cross-functional "implementation and evaluation", which is used as an action guide for Human Research functions, financial marketing, production, etc. so that the organization can achieve it while (Hunger and Wheelen 2003), Strategic Management is: "A series of managerial decisions and actions that determine the performance of companies over the long term".

Strategic Options

Strategy management experts generally agree that this type of approach as an instrument for assessing the various factors that must be taken into account by the organization in conducting strategic analysis is generally conducted a SWOT analysis. (Kotler and Armstrong 2012: 28) Explains that the projects should be conducted after the specified objectives and strategic goals. A strategy is a plan that is engineered to accomplish a mission. That mission must be planned within the parameters of *strength* (*S*, strength) and *weakness* (*W*, weakness) of the organization, *opportunities* (*O*, opportunities) and *threats* (*T*, threats) in the environment (Kotler and Armstrong 2012: 28).

SWOT / TOWS matrix is a *machine tool* that helps managers develop four types of strategies, the matrix is considered able to clearly describe how external opportunities and threats faced by the organization must be adapted to its strengths and weaknesses. This matrix can produce four possible strategic alternatives, as in the diagram swot (see Fig. 1).

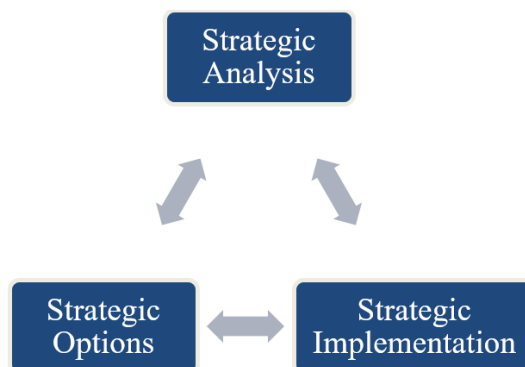


Fig. 1. Basic Model of Strategic Management Process

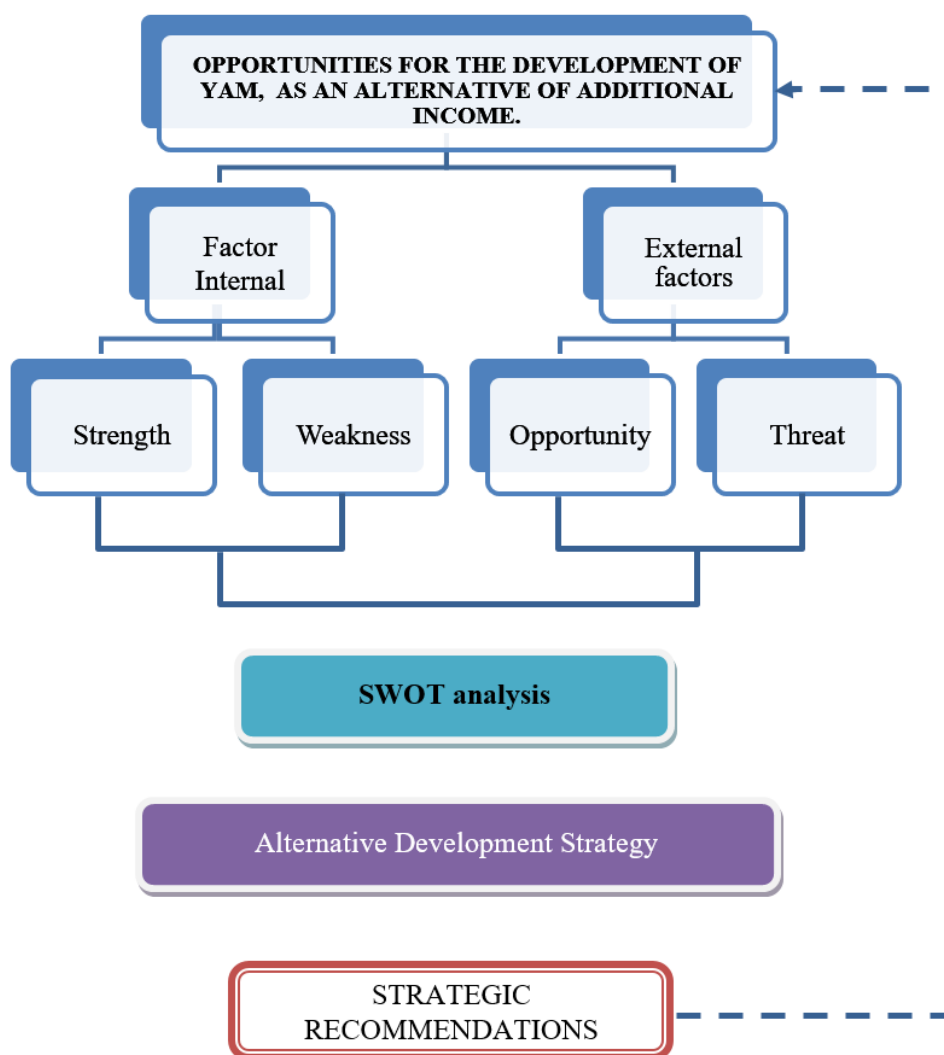


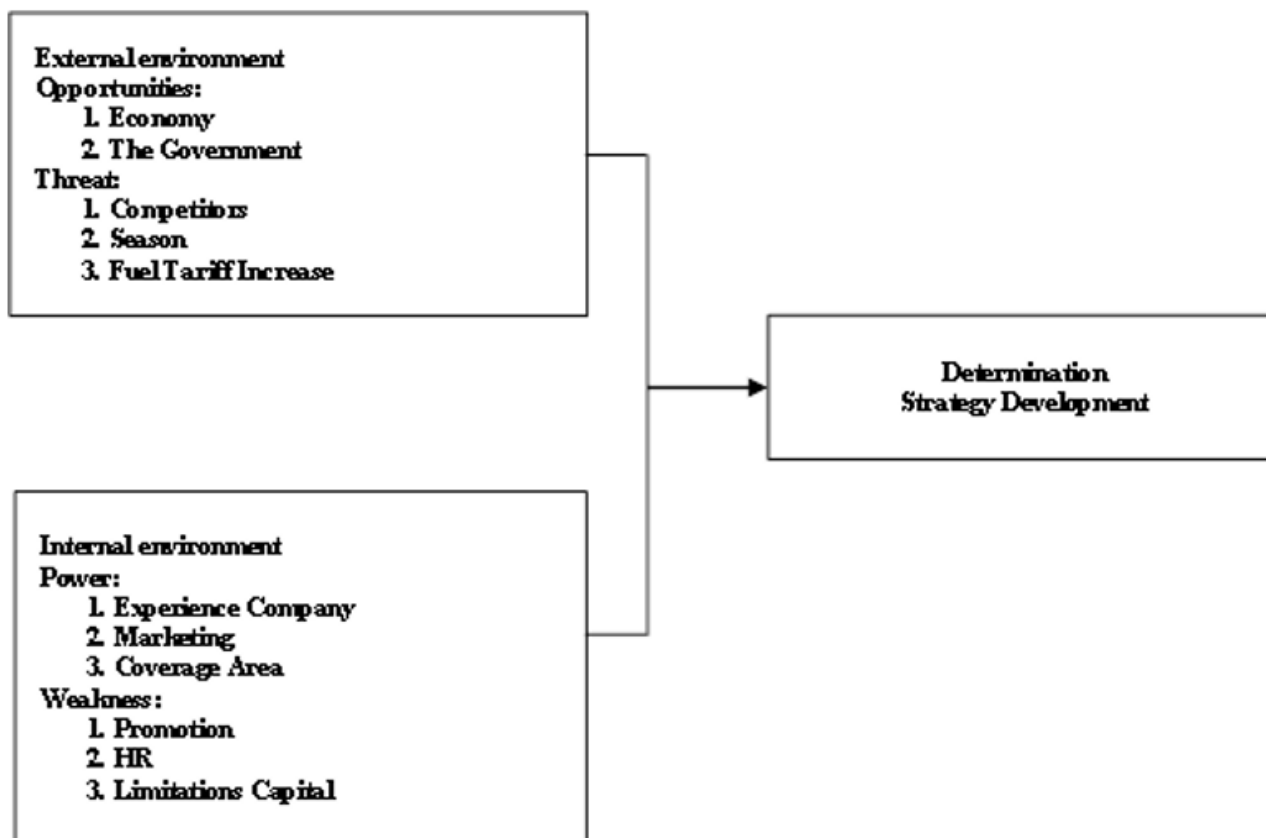
Fig. 2. Conceptual Framework

Conceptual Framework

Referring to the study of strategic management theory, the internal environment consists of strengths and weaknesses and the external environment consists of opportunities and threats. Internal and external factors have been obtained during the last calculation of weights, ratings, and scores. Calculations are specified

in IFAS and EFAS analysis. Preparation of IFAS and EFAS in a matrix called SWOT analysis. The SWOT analysis was used to obtain alternative use strategies for the development of yams as an additional alternative income family in Wringinanom Gresik.

By systematic research framework model concept is presented in Fig. 2.



Source: Kusnadi (1999)

Fig. 3. Study Design

MATERIALS AND METHODS

Research Design

Kotler and Armstrong (2012: 28) say that marketing is the process by which the company creates value for customers and builds strong relationships with customers to get value from customers in return. (Kalakota and Robinson 2001) state that Customer Relationship Management is an integration of coordinated sales, marketing and service strategies. Kotler and Keller (2009: 342) explain that brand equity is a set of brand assets and liabilities associated with the marks, names, and symbols that add or subtract the value provided by the goods or services to the company or customer.

Advantages include a case study approach to research may better answer why the situation occurred and researchers expected to find relationships that were not expected.

Research Approaches

This study used a qualitative approach that is more focused on efforts to decomposition and the inference is holistic with a series of data/facts and generalizations on the ground in accordance with the focus of the research problem, using a monolithic approach to research. In reality, the stages of this study consisted of two major

phases, namely: (1) the exploration phase, and (2) the development stage. In detail, these stages can be described as follows.

Exploration phase

This exploration phase is the stage in order to find the products processed yam which has a characteristic that has the potential to be developed into additional alternative products Wringinanom family income in the district of Gresik. In this exploratory study conducted: (1) determine the type of products processed yam; (2) analyze the need for products processed yam; (3) develop a draft model of development. In this exploratory study will produce a processed yam product that will be developed as an additional alternative product family income.

Stage development

At this stage of the model development will be carried out the validation and testing of processed yam product development model as an additional alternative product family income with the steps: 1) improvement of the draft model of development; 2) test the expert with the involvement of expert strategic management; 3) improved models based on expert input; 4) validation and field testing with farmers and sellers yam through *focus group discussion (FGD)*; and 5) the finalization of the development model. The end product of this research is in the form of processed yam product



Sources: Researchers are given the data on seed yam
Fig. 4. Interview



Sources: Investigators were interviewing with yam farmers
Fig. 5. Investigation

development model as an alternative product family income supplements.

Population and Sample

The population in the study were yam farmers in Wringinanom district, while the samples in this study were yam farmers in the weak Pasinan village and yam farmers in Tanjung Wates village. The reason the researchers took samples to the two villages was that

Table 1. SWOT matrix

IFAS	Strength (S)	Weakness (W)
EFAS	Factors Internal Strength	Factors Internal Weaknesses
Opportunities(O)	Strategy SO	Strategy WO
External factors Opportunities	Create a strategy to use its strength to take advantage of opportunities	Create strategies that minimize weaknesses to exploit opportunities
Threats	Strategy ST	Strategy WT
Factors External Threats	Create a strategy use its strength to overcome the threat	Create strategies that minimize the weaknesses to avoid threats

Source: Rangkuti (2006)

the two villages were the biggest sweet potato producers in Wringinanom district.

Type of Data

This study uses two types of data, Primary data is data obtained directly from the farmers or the seller yam. And Secondary Data, the data obtained through documentation study by studying the writings through books, the Internet, and research results related to this research.

Method of Collecting Data

Interviews, which do question and answer directly to the parties concerned, namely yam farmers and sellers as well as the surrounding community, as in **Figs. 4** and **5**.

Methods and Techniques of Data Analysis

Analysis of the data in this study conducted by SWOT analysis. This analysis aims to determine the potential strengths, weaknesses that are owned by farmers and sellers of yam in Sub Wringinanom Gresik, and the opportunities and threats by external factors that can not be controlled by the farmer and seller of yam in Wringinanom Gresik. From the combination of strengths and weaknesses with opportunities and threats obtained a SWOT matrix diagram (see **Table 1**).

RESULTS AND DISCUSSION

Potential District of Wringinanom

Wringinanom layout positioned for access to a close after passing Driyorejo Surabaya. Directly adjacent to the Sidoarjo district on the south side and Mojokerto on the west side, making Wringinanom could not escape from industrialization. The indication of acres of farmland, stand factories large industrial representation. From year to year, there are more and narrow the agricultural land. Want to ask any industrial commodities, in Wringinanom available. Start the steel plant, ceramics factories, paper mills following a power plan, everything is magnificent stand. Throughout the industry could go hand in hand with the local community dynamics and agrarian culture exists, so far so good. Even if there is a small ripple dispute would have to be communicated wisely so that residents remain to protect industrialization and agriculture can remain in production.

Alternative Products Processed Jicama (Yam Chips)

Yam has a distinctive flavor with high water content. In addition to the sweet taste, Yam also able to provide a fresh taste when eaten. Yam harvest is currently only consumed as fresh fruit, salad, and pickles. Utilization of this kind has several drawbacks including the durability of fresh yam is not long (± 5 days), marketing cannot spread widely, and the sale value so low that profits too low. To increase the selling fruit yam can be done with fruit processing yam into chips. The chips are sliced fruits or tubers are fried until dry and crisp. The chips have a low water content so it can be stored longer.

Therefore a smart idea is needed that yams can be processed into more varied products that have a higher economic selling value, and sweet potatoes are expected to meet market demand. In addition to being processed into chips, there are several advantages, including 1. yam chips; 2. The nutritional content is not lost (still healthy); 3. Taste and aroma according to the original ingredients; 4. Crisp; 5. There are no preservatives or chemicals; 6. No need for artificial flavor enhancers; 7. Foods that have high nutritional and fiber values.

When viewed from the side of an economic advantage by reference to the efforts of other fruit chips, such as chips pondoh, then this business will be a quick return on investment (± 6 months). Pondoh that costs only 3,000 IDR per kilogram, when it has been processed into chips price could increase to 80,000 IDR per kilogram. Likewise, the same thing happened to several other types of fruit such as fresh jackfruit that cost 1,500 IDR per kilogram, when it has become chips could reach 50,000 IDR per kilogram. Expected yam chips are also increasing the high value of fresh fruit price of 3,500 IDR per kilogram it becomes 90.000 IDR per kilogram of chips.

Wheat Yam

Utilization of yam is still limited to foodstuffs and less for the food industry. Yam limited shelf life is also an obstacle in its processing. Storage of yam tubers is too long causes fibrous, therefore it is necessary to preserve yam in the form of flour has the advantage can be kept longer, practical and smaller volume.

In the process of making flour browning process often occur either enzymatically or non-enzymatic during cutting and drying the tubers. One effort to prevent browning that is, done by soaking the tuber pieces in a certain time in a solution of sodium metabisulfite.

Yam processing into flour requires only simple technology. The trick then washed yam peeled then cut into thin or with a knife or other cutting tools. Chips then dried in the sun or using a dryer with a maximum temperature of 60 0 C for ± 5 hours and then milled. Flour can put plastic bags or cans tightly closed jar 7 which can be retained within six months. In cutting the

tubers, tissue destruction occurs material, resulting in oxidation and may result in browning. To produce good quality flour, shredded or sliced bulbs before drying or dried soaked in a solution of sodium metabisulfite to prevent browning on the materials. Best results obtained from yam flour is by adding sodium metabisulfite concentration of 3000 ppm with 15 minutes soaking time..

Sodium metabisulphite is an additional ingredient that is often used in food processing which serves as bleach foodstuffs used to prevent damage due to the enzymatic browning reaction and work as antioxidants. Its use in food processing to prevent the browning process and to maintain the color of the material to keep it interesting. Maximum use is 2000-3000 ppm.

Utilization Development Strategy Yam as an Alternative Family Income Supplement in District Wringinanom Gresik

SWOT Analysis formulate an alternative strategy that aims to establish the relative attractiveness of the of varying strategies that have been and to determine which strategy is considered the best to be implemented. SWOT matrix will be obtained from four different strategies as shown in Table matrix, it is useful to describe clearly the strengths and weaknesses of the adapted to the opportunities and threats faced in developing alternative products processed yam in Wringinanom Gresik (see **Table 2**).

As for alternative strategies yam flour through a SWOT analysis is as shown in **Table 3**.

SWOT analysis of both alternatives manufacture of processed yam, then that becomes an alternative strategy is yam flour processed product. It is based on a strategy SO and WO better strategy and more likely and certainly in terms of economic (profit) is more profitable.

Discussion Alternative Products Processed

In this section, we will discuss alternatives been refined products, namely yam flour. In the SWOT analysis, there are some things that need to be underlined, namely: promotion of products for export; The development of derivative products; Marketing strategy. For the above-mentioned items are the subject of which will be discussed in more depth with studies based theory-relevant theory.

Promotional Products For Export

Promotion is a means of communication and delivery of messages is done either by companies or intermediaries with the purpose of providing information about the product, price, and place. That information informs, persuade, remind consumers, intermediaries or a combination of both. In the promotion, there are some elements that support the operations of a campaign which is called the promotion mix.

Yam flour export success will be even greater if the product had been tested in the local market for many years. Consumers who use the product are satisfied with

Table 2. Alternative strategies chips Jicama Through SWOT Analysis

Internal factors	Strength (S) 1. Do not burn; 2. The content of nutrients are not lost (still healthy); 3. Flavor, and aroma corresponding original material; 4. Crisp ; 5. No need preservatives or chemicals; 6. No need artificial flavor enhancer; 7. Foods that have no nutritional value and high in fiber.	Weaknesses (W) 1. Vacuum tool is still expensive 2. Reduced the number of producers of local products 3. The flavors were inconsistent 4. Hygiene and Sanitation
External factors		
Opportunities (O) 1. A high economic value 2. The government's call to introduce local products to tourists 3. The development of special interest tourism (culinary) 4. The use of modern technology for product development	SO strategy 1. Increase promotion of local products 2. Maintain and improve the quality of local products	WO strategy 1. Raise awareness of local products 2. Implement quality control of local products
Threats (T) 1. Number of Competitors 2. Food products from other regions	ST strategy 1. Developing / cooperating with local produce outlets 2. Enhance and maintain the image, product quality	WT strategy 1. Improve and Maintain consistency taste local products 2. Increase the supply of local products

Source: Data processed

Table 3. Alternative strategies Jicama Flour Through SWOT Analysis

Internal factors	Strength (S) 1. Is the raw material of various food products, beauty and health; 2. Durable;	Weaknesses (W) 1. Still to be processed
External factors		
Opportunities (O) 1. Export opportunities 2. The use of modern technology for product development 3. Providing a high economic value	SO strategy 1. Increase promotion of products for export 2. Developing products	WO strategy 1. Developing poduk derivatives
Threats (T) 1. Number of Competitors	ST strategy 1. Developing / cooperating with local produce outlets 2. Enhance and maintain the image, product quality	WT strategy 1. Improve product offerings

the products and services provided. The key is to understand the true employer has knowledge and 'skill product'. Product knowledge is very important in exports. If we do not really understand the product, and then offers the trader / prospective buyers abroad certainly made a bad reputation yam flour businessman in front of them.

The second thing that is very important is the issue of product quality. Before offering a product, the entrepreneur must be confident about the quality of the products produced. Businessman yam flour must also know, the estimated world market prices for similar products. And entrepreneurs to know why the price of its products cheaper or more expensive. Furthermore, also prepare carefully on how to send our products to the export market. Do a little research by contacting the cargo, forwarder, to discuss how the delivery and of course the cost of delivery. Availability and production capacity would be of particular note. If indeed the product volumes are still limited, explain what they are. Of course, later can open up new opportunities if consumers really believe in the product.

Employers yam flour can do simple research using the internet. Go to [google trends](#) for example, then enter a name for yam flour products. There we can see some important data such as how big the market and the state estimates which many are looking for such products.

Derivative Product Development

Production can be interpreted as an attempt to create or increase economic fed an object with the aim to meet human needs. While the person, entity, or organization that produces goods and services are called producers. A simple example of the production activity is the production of salted fish. In which the salted fish production activities starts from fishing, fish drying, salting fish, up to the transport and trade of fish. Another example of production activities such as an accountant's job, the job of teachers, doctors, lawyers. The purpose of production is to meet human needs in order to achieve prosperity. Prosperity will be achieved if the consumer purchasing power is high enough and the goods/services needed enough to meet demand. In the production process, there are things that must be considered, including how the composition of the input should be used? how the production process to allow for maximum production rate? and how the composition of the input should be used? how the production process implemented for production costs as low as possible? Input from the production process includes the factors of production, where the division of factors of production can be shown the following :

- The original production factor is the factor of production that can not be updated and readily available.



Fig. 6. Example of Yam Flour

- Derivative production factors is the incorporation of the original factors of production which is the development of human culture and knowledge.

In this case as has been mentioned earlier that products derived from yam flour can be beauty products, health products, and food products (see **Fig. 6**).

Marketing Strategies

As an entrepreneur, it is important to introduce the brand/product to the crowd. The more people you reach, the more the sales figures that can be achieved. Therefore, marketing is something that must be properly addressed to one marketing. Even so, the most essential thing that should entrepreneurs consider in marketing entrepreneur in the first place is a good marketing strategy. Do not waste the entire capital/funds only for one path, but look at all opportunities that could be exploited to achieve sales wider and farther.

CONCLUSION

Based on the results of the discussion a number of conclusions as follows:

1. Wringinanom has appeal as well as industry and agriculture. Wringinanom has one tourist spot known as "Kedamean village". Kedamean Village is one of the tourism projects that the Gresik government built as a center for selling various flowers without having to go outside the city. Kedamean Village is divided into three regions, namely in Kedamean, Wringinanom Districts, and in the Suko district. In this area not only has selenium but also lots of flowers and other plants such as Sansiviera, Purring, and Anthurium. Kedamean Village has become the mascot of the two communities in Wringinanom after Yam, which is a fruit souvenir from the Wringinanom sub-district. Yam Wringinanom was planted in

rice fields in the villages of Sumengko, Pasinan, and Lebanisuko. Besides the large yam fruit, it tastes sweet. Not surprisingly, every type of fruit tuber harvest is always abundant and easily found along the Legundi-Wringinanom highway. the SWOT analysis of both alternatives manufacture of processed yam, then that becomes an alternative strategy is a product processed yam flour. It is based on a strategy SO and WO better strategy and more likely and certainly in terms of economic (profit) is more profitable.

2. Alternative development strategy there are some refined products, namely:
 1. Promotional products for export;
 2. The development of derivative products;
 3. The marketing strategy.

SUGGESTION

On the variety of the above description, it can be suggested the following:

1. Yam flour for product development in the District Wringinanom Gresik regency is suggested that businesses are always confident and optimistic that local products have very bright prospects for development.
2. Development of yam flour products Wringinanom can be done by using some alternative strategies.
3. By taking advantage of opportunities so vast, the local government as well Wringinanom District of Gresik regency are expected to participate more intensively to support the development of local products Wringinanom District of Gresik.

HIGHLIGHT

Findings

The alternative to processed sweet potato flour products is based on better and more likely SO and WO strategies, but from the SWOT analysis there are several things that need to be underlined, namely:

1. Promotional products for exports (Kenyon and Fowler 2000)
2. Development of derivative products, Lipton (2005), Wiggins, S. (2006)
3. Marketing strategy, Fred. R. David. (2004), Hunger, J. David, and Wheelen, Thomas L. (2003)

Implications

From previous research and theory, after conducting research with a SWOT analysis, cassava flour products can enter the global market through exports with good planning, so that this activity truly provides additional results for the family.

Practical Implications

After conducting research in Wringin Anom village, and the white one, it was known that the alternative product chosen was processed cassava flour. To pay attention to several things that need to be underlined that:

1. Promotional products for export
2. Development of derivative products.
3. Marketing strategy.

Social Implications

By noting the results of research in Wringin Anom village and weak white villages that the alternative product is chosen was processed cassava flour, the results of this study are expected to be applied in other villages in Wringin Anom district, especially and in other villages outside Gresik in generally.

Originality/Value

Based on the conceptual framework and results of research Originality/value of this research is "Opportunities For The Development Of Yam, As An Alternative Of Additional Income" whose findings are alternative products based on SWOT analysis, namely sweet potato flour, taking into account the following:

1. Products for export promotion (Kenyon and Fowler 2000).
2. Development of derivative products, Lipton (2005), Wiggins, S. (2006).
3. Fred's marketing strategy. R. David. (2004), Hunger, J. David, and Wheelen, Thomas L. (2003)

REFERENCES

- Adi LT (2008) Medicinal Plants & Juice To Overcome Heart Disease, Hypertension, Cholesterol. Jakarta: PT Agro Media Library.
- Aidoo R, Nimoh F, Andivi Bakang J-E, Ohene-Yankyera K, Fialor SC, Abaidoo RC (2011). Economics of Small-Scale Seed Yam Production in Ghana: Implications for Commercialization. *Journal of Sustainable Development in Africa*, 13(7). https://www.academia.edu/4195151/ECONOMICS_OF_SMALLSCALE_SEED_YM_PRODUCTION_IN_GHANA_IMPLICATIONS_FOR_COMMERCIALIZATION
- Asante SK, Mensah GWK, Wahaga E (2008) Farmers' knowledge and perceptions of insect pests of yam (*Dioscorea* spp.) and their indigenous control practices in northern Ghana. *Ghana Journal Of Agricultural Science*, 40(2): 185-92. <https://doi.org/10.4314/gjas.v40i2.2169>
- D'adamo PJ (2008) Diabetes Diet accordance Blood. Yogyakarta: Delapratasa Retrieved from <https://perpustakaan31setdaprov.wordpress.com/2014/03/04/diet-sehat-diabetes-sesuai-golongan-darah/>
- Dansi A, Dantsey-Barry H, Agré AP, Dossou-Aminon I, Assogba P, Loko YL, N'Kpenu EK, Kombaté K, Dansi M, Vodouhè R (2013a) Production constraints and farmers' cultivar preference criteria of cultivated yams (*Dioscorea cayenensis* - *D. rotundata* complex) in Togo. *International Journal of Applied Biology and Pharmaceutical Technology*, 4(2): 191-9. Retrieved from <http://ijabpt.com/pdf/63029-Dansi%20A.pdf>
- David FR (2004) Strategic Management: Concepts. Interpreting by Kresno Saroso. New Jersey: Prentice Hall.
- Demuyakor B, Dukrog TM, Chikpah SK (2013) Yam Germplasm in Ghana – A Survey on Varietal Identification and Characterisation of *Dioscorea Rotundata* – *Alata* in Northern Region of Ghana. *International Journal of Agronomy and Plant Production*, 4(4): 719-26. Retrieved from <https://www.cabdirect.org/cabdirect/abstract/20133138183>
- Ersay AÖ, Öztaş E, Özler S, Ersoy E, Topçu HO, Fındık RB, et al. (2017) The evaluation of the low risk pregnant women who gave birth to macrosomic infants. *J Clin Exp Invest.*, 8(4): 114-9. <https://doi.org/10.5799/jcei.382414>
- FAO (2011) FAOSTAT Database. Food and Agriculture Organization, Roma, Italy. *American Journal of Molecular Biology*, 6(2). Retrieved from <http://www.scirp.org/reference/ReferencesPapers.aspx?ReferenceID=1725129>
- Fu YRH, Kikuno H, Maruyama M (2011) Research on yam production, marketing and consumption of Nupe farmers of Niger State, central Nigeria. *African J. Agricul. Res.*, 6(23): 5301-13. Retrieved from <http://www.academicjournals.org/journal/AJAR/article-full-text-pdf/24CB05637868>
- Hunger JD, Wheelen TL (2003) Strategic Management, Yogyakarta: Andi. Retrieved from <http://library.um.ac.id/free-contents/index.php/buku/detail/strategic-management-and-business-policy-thomas-l-wheelen-j-david-hunger-15603.html>
- International Institute of Tropical Agriculture (IITA) and EIARD (2013) Healthy yam seed production. Retrieved from http://oldrinternet.iita.org/c/document_library/get_file?uuid=31aa5a45-5e48-472f-b249-026e5fafb1f1&groupId=25357
- Kalakota R, Robinson M (2001) E-Business 2.0 Roadmap For Success. Addison - Wesley, USA. Retrieved from http://dinus.ac.id/repository/docs/ajar/e-business_roadmap_for_success_full.pdf

- Kenyon L, Fowler M (2000) Factors affecting the uptake and adoption of output of crop protection research on yams in Ghana. Unpublished Paper, Natural Resource International Limited, UK. Retrieved from <https://www.cabdirect.org/cabdirect/abstract/20003032501>
- Kheiry MV, Hafezi AM, Hesarakı S (2013) Bone Regeneration Using Nanotechnology–Calcium Silicate Nano-Composites. *UCT Journal of Research in Science, Engineering and Technology*, 1(4).
- Kibwage JK, Odondo AJ, Momanyi GM (2009) Assessment of Livelihood Assets and Strategies among Tobacco and Non-tobacco Farmers in South Nyanza region, Kenya. Retrieved from <https://www.cabdirect.org/cabdirect/abstract/20093132727>
- Korada RR, Naskar SK, Edison S (2010) Insect pests and their management in yam production and storage: a world review. *International Journal of Pest Management*, 56(4): 337-49. <https://doi.org/10.1080/09670874.2010.500406>
- Kotler P, Armstrong G (2009) *Marketing Management* (13th ed.). Erland. Jakarta.
- Kotler P, Armstrong G (2012) *Principles of Marketing* (9th ed.). Prentice Hall, Inc., USA.
- Lipton M (2006) Can Small Farms Survive, and taken to be the key channel to cut mass poverty? *The Electronic Journal of Agricultural and Development Economics*, 3(1): 58-85. Retrieved from https://econpapers.repec.org/article/faotejade/v_3a3_3ay_3a2006_3ai_3a1_3ap_3a58-85.htm
- Loko YL, Dansi A, Linsoussi C, Tamo M, Vodouhè R, Akoegninou A, Sanni A (2013) Current status and spatial analysis of Guinea yam (*Dioscorea cayenensis* Lam. -*D. rotundata* Poir. complex) diversity in Benin. *International Research Journal of Agricultural Science and Soil Science*, 3(7): 219-38. Retrieved from <http://www.interestjournals.org/irjas/july-2013-vol.3-issue-7/current-status-and-spatial-analysis-of-guinea-yam-dioscorea-cayenensis-lamd-rotundata-poir-complex-diversity-in-benin>
- Midega CAO, Nyang'au IM, Pittchar J, Birkett MA, Pickett JA, Borges M, Khan ZR (2012) Farmers' perceptions of cotton pests and their management in western Kenya. *Crop Protection*, 42: 193-201. <https://doi.org/10.1016/j.cropro.2012.07.010>
- Nweke, et al. cited in Okoro JK (2008) Awareness and Use of the Rapid Seed Yam Multiplication Technology by Farmers In Nigeria's Yam Belt. Retrieved from www.patnsukjournal.net/currentissue
- Olajumoke OL, Agiang MA, Mbeh E (2012). Proximate and anti-nutrient composition of white Guinea yam (*Dioscorea rotundata*) diets consumed in Ibarapa, South West region of Nigeria. *J. Nat. Prod. Plant Resour.*, 2 (2): 256-60. Retrieved from <http://www.scholarsresearchlibrary.com/abstract/proximate-and-antinutrient-composition-of-white-guinea-yam-dioscorearotundata-diets-consumed-in-ibarapa-south-west-reg-5210.html>
- Oluwole OB, Awonorin SO, Henshaw F, Elemo GN, Ebuehi OAT (2013) Assessment of Microbial Changes and Nutritional Qualities of Extruded White Yam (*Dioscorea rotundata*) and Bambara Groundnut (*Vigna subterranean*) Blends. *Food and Nutrition Sciences*, 4: 100-7. <https://doi.org/10.4236/fns.2013.41014>
- Pandey KK, Satpathy S (2009) Development of integrated pest management in chilli against major diseases and insect pests. *Indian Journal of Plant Protection*, 37(1/2): 104-10. Retrieved from <https://www.cabdirect.org/cabdirect/abstract/20103199770>
- Sesay L, Norman PE, Massaquoi A, Kobba F, Allieu AP, Gboku ML, Fomba SN (2013) Assessment of farmers' indigenous knowledge and selection criteria of yam in Sierra Leone. *Sky J of Agri. Res.*, 2(1): 1-6. Retrieved from <http://www.skyjournals.org/sjar/pdf/2013pdf/Jan/Sesay%20et%20al%20%20pdf.pdf>
- Tanzubil PB, Yakubu EA (1997) Insect pests of millet in northern Ghana. 1. Farmers' perceptions and damage potential. *International Journal of Pest Management*, 43(2): 133–6. <https://doi.org/10.1080/096708797228825>
- Vaughan JG, Geissler CA (2009) *The New Oxford Book of Food Plants*. New York: Oxford University Press Inc. Retrieved from [http://edu-net.nl/flora%20en%20fauna/Boeken/The%20new%20Oxford%20book%20of%20food%20plants,%202nd%20edition%20J.G.%20Vaughan%20\(Oxford%20university%20press\).pdf](http://edu-net.nl/flora%20en%20fauna/Boeken/The%20new%20Oxford%20book%20of%20food%20plants,%202nd%20edition%20J.G.%20Vaughan%20(Oxford%20university%20press).pdf)
- Waterfield G, Zilberman D (2012) Pest Management in Food Systems: An Economic Perspective. *Annual Review of Environment and Resources*, 37: 223-45. <https://doi.org/10.1146/annurev-environ-040911-105628>
- Wiggins S (2006) *Agricultural Growth and Poverty Reduction: A scoping study*. IDRC, Ottawa Canada, working papers on globalizations, growth and poverty, No. 2, March. Retrieved from <http://citeseerx.ist.psu.edu/viewdoc/summary?doi=10.1.1.620.3009>