

## Development Prospect of Aloe Vera Plant in Peatlands of West Kalimantan

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### ABSTRACT

Peat soil is one of the decent growing medium for aloe vera plant. Seeing the potential of peat land in West Kalimantan is quite extensive, this plant is cultivated commercially and becomes one of the leading commodity in peatlands in West Kalimantan, especially in Pontianak City with an area of more than 25,000 ha. This research aims inventoried obstacles and development prospects of the *aloe vera* in West Kalimantan performed with data collection method secondary and primary and supported by the literature study. This research was done during 2014-2015. With complete and varied nutrient content, this plant progress opportunities, especially for diversification is enormous ranging from food products and beverages such as juices, cocktails, aloe vera gel in syrup, jams, jellies, tarts, sweets, tea, chips and as well as agro-tourism in West Kalimantan. Existing obstacles now are market share and unstable price, trouble controlling plant diseases and peat area is flooded during the rainy season. Prospects for the future development of these plants can be carried out through the cooperation of government and relevant stakeholders, stable markets and prices, the acceleration of product promotion through fairs and business gathering activities, as well as the dissemination and application of cultivation technology and post-harvest of *aloe vera*.

**Keyword:** Peatland, *aloe vera*, prospect

### INTRODUCTION

Environmentally friendly peatland management really needs to put into practice given peatland is one of the potential lands for the future when managed properly. Perception of farmers on peat land is so limited in that the conservation efforts to maintain the productivity of peatlands is also inadequate. Various problems faced by many farmers around peatland. Problems in improvement of socio-economic conditions and the use of economic resources. Peat soil as a growing medium for aloe vera plant is restricted nature of peat sour, low base saturation, low levels of P, K and Ca, so effort to make the peat ready to be used for the cultivation of aloe vera is imperative. Another problem in the cultivation of aloe vera in the peat soil is organic matter that has not decomposed

completely and have not advanced mineralization.

Peatland area in West Kalimantan Province is an area of 1.73 million ha (BPS Kalbar, 2010). Aloe vera plant development is still great potential, it is evident from the availability of peatlands in Pontianak reach 1,100 ha (10.20 % of the area). In addition the Government of Pontianak City also provides support through cooperation with the Agency for the Assessment and Application of Technology (BPPT) and the Research and Development (Research and Development) of West Kalimantan Province in setting up the Center for the National Study and Development, Aloe vera Center (AVC) in Pontianak (Wahjono and Koesnandar, 2002).

In West Kalimantan, aloe vera is one of the leading commodity with its comparative value to grow well on peatland (Widiastuti dan Hatta, 2002). With its agroecosystem peatland, high rainfall, the good intensity of light, many farmers develop specific crops in this region as a center for commodities namely aloe vera). Aloe vera is a plant that has long been known for its efficacy and

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usefulness as a medicinal plant and industrial raw materials. Utilization of Aloe vera includes aloe powder, finished materials such as soaps (aloe soap) and other products, such as juice and aloe veragel. In developed countries like America, Australia, and Europe aloe vera has been used as raw material for the food industry and health drinks (Furnawanthi, 2002).

Aloe vera cultivation on peat soils is very productive in growth, but it should be accompanied by a good and proper processing. Peat soil that will be used as a medium to grow aloe vera plant should be fertile and friable, so that the aloe vera plant growth is not hampered. Low levels of seed quality of aloe vera making its development hampered and impact on quality. Incultivation of aloe vera plant, nutrients can be obtained through the growing media and fertilizer. Symptoms of lack nutrients in the aloe vera plant in the field resulted in the slow growth since the environment is less supporting. Availability of nutrients affect plant growth, nutrient deficiencies due to the soil is too acidic and can cause an aloe plant poisoned by heavy metal, so that the leaves turn yellow, burned like color, stunted growth and reduced number of tillers.

Peatlands around the city of Pontianak and its regency is very suitable for growing aloe vera (Institute for Biotechnology BPPT and Government of Pontianak City, 2001), resulting in excellent quality aloe vera, stem which is longer (60-70cm), weighing up to 1.5 kg and more gel content (DipertaKalbar, 2001; Aisha, 2005; Anonymous, 2008). Development of aloe vera in peatlands are faced with obstacles to aquaculture related to the characteristics of less fertile and soft rot disease caused by bacteria (Rianto&Sarbin, 2004; Suswati et al., 2005; Aminardi et al., 2006 ). The loss due to soft rot disease can reach up to 25%. Various efforts have been done by farmers yet the results are not satisfactory. Given the peat is an accumulation of organic materials at a slow rate overhaul as a result of the low number and activity of microorganisms in it (Noor, 2001; Barchia, 2006), then the addition of

microorganisms, especially fungi and bacteria that are beneficial to plants needs to be done (Worosuryani et al., 2006).

Aloevera is efficacious as an anti-inflammatory, anti -fungal, anti -bacterial and helps in cell regeneration. According to Wahyono and Kusnandar (2002), aloe vera is also beneficial for controlling blood pressure, stimulates the immune system to attack cancer, and can be used as nutritional support of cancer and HIV / AIDS.

Aloe vera in Latin known as *Aloe vera.L.Webb*, it is a sekulen plant that comes from the Canary Islands in West Africa. These plants then spread to various countries such as Saudi,India,Europe, East Asia, and Southeast Asia, to Indonesia in the seventeenth century (Fadhilah , 2008) . More than 17 species of aloe vera have been cultivated in the tropics, but this time there are three types of commercially cultivated, namely *Aloe barbandensis* of America, *Aloe ferox* from Africa, and *Aloe sinensis* from Asia ( Yogi et al., 2001).

The aloe vera plant has been widely used as a medicine and cosmetics since centuries ago. It is recorded in the Book of Egyptian Remedies, in the book it is said that at the time of Cleopatra, aloe vera raw materials was used for cosmetic and skin moisturizer or as a nurse beauty (Furnawanthi, 2002) .

Aloe vera is a low plant and almost all located in the trunk near the soil surface. The flowers are dark red, while the thin roots, leaves thick and contains a lot of water with a length of 40-50 cm and a width of 7-10 cm. Leaf blade has soft spikes and spotted surface. The leaves as if emerging from the ground, because the stem is short, soft , thick , soft , Sekulen and contains a lot of mucus ( Wahid, 2000).

Aloe vera plant can be grown at high altitude between 0-1500 meters above sea level, with a temperature range 16° C - 33° C and annual rainfall of 1000-3000 mm / year. Suitable land for aloe vera plant is loose structured soils, sandy or well drained peatlands (Directorate General of Horticulture, 2002). Aloe vera (*Aloe vera* L) is included in *Liliacae* family which has about

200 species. In Indonesia, there are no commercial varieties or recommended varieties for cultivation in particular. Generally only three species of cultivated aloe vera, namely *Aloesorcotin* of Zanzibar, *Aloe barbadensis miller* and *Aloe vulgaris*. *Barbadensis Aloe* and *Aloe vera Linn* are generally cultivated in Indonesia (Directorate General of Horticulture, 2002). The harvest of aloe vera is considered somewhat long, the first harvest is done when the plant aged 10-12 months marked by flowering plants. The leaves harvested are grown leaves which grows on the bottom and a maximum growth, with the oldest leaf weight in the trunk can reach 0.8 to 1.0 kg. After reaching a productive period of harvesting can be done every two weeks. If the maintenance is done intensively, every harvest can be obtained 8-10 tons aloe midrib leaf per hectare, with a period of over six years of productive age (Directorate General of Horticulture, 2002).

Aloe vera plant began to be cultivated commercially in Pontianak in West Kalimantan, especially in 1996 with a plant area of 14.80 ha with a population of plants was 109.520 trees, and the average production of 140.18 tons / year (Bank Indonesia, 2008). These conditions continue to increase until 2004, with plant area of 161 ha, and the production of 26.304 tones, with the number of farmers aloe 105 people. Then starting in 2005 this condition continues to decline, until 2009, with plant area of 38.1 ha and production 1,512 tons with a number of farmers still active as many as 43 people (UPTD Agribusiness Terminal Pontianak, 2010).

In West Kalimantan Aloe vera plants cultivated exclusively on the area of Peat land (organosol). As we know that peat is a type of soil that is problematic in the supply of nutrients for the plants, because the nature of extremely sour to sour, then the utilization of agricultural land, first peatlands should be conditioned so that it complies with the tenure. Aloe vera does not grow well on wet land or long puddle of water, while peat lands in the water generally contains relatively bulky because of its ability to bind water.

Mechanical cultivation of aloe vera on peatland in West Kalimantan can be explained as follows:

#### 1. Making circumferential Trenches

Ditches / drains are created around the land and in the direction of cutting out the middle area of land the size of the trench: Upper Width 50 cm, bottom width 35 cm and depth about 50-60 cm (depending on thickness of peat layer and soil conditions of puddles).

#### 2. Land Clearing

Land Clearing is to clear the land of all the existing vegetation by means of cutting trees, cut off all shrubs until all vegetation / plant, then the result is let to dry until it is ready to be cultivated.

#### 3. Making beds / ridges

Making bed / ridge as well as a land management activities. Ditches or mounds are made with size adjusted to a spacing that will be used, among other things:

a) Planting Space: 1.25 m x 1.00 m  
(population approximately 7400 trees / ha).

b) Planting space: 1.25 m x 1.25 m  
(population approximately 6000 trees / ha)

Size of ridge is 75 cm wide and for the distance from point (a) to point (b), the ridge is made with height of 20-30 cm, and the length adapted to land conditions or need.

#### 4. Preparation of Production Facility

Things to be prepared are Aloe vera seeds, fertilizers (organic and inorganic), shrimp skin or rotten fish (if available) and fungicides. Aloe vera plant seeds directly derived from tillers that have reached the size of thumb with a height of 10-15 cm, then planted in nurseries (nursery plant spacing 15x20 cm or 15x15 cm), during nursery fertilization is given (manure, ash and urea).

#### 5. Planting Preparation

Land that has been made with ridge then given markers as signs for plant spacing and planting, at least one week ( 7 days ) before planting . At stake / planting marker, the planting holes are made with the size of 20x20x20 cm. After the prepared planting holes, then place the mixture of urea, TSP, KCl, ash, and manure into the planting hole and cover again with soil and place the

markers right in the hole as a sign to sow the seeds of aloe vera.

#### 6. Seeds of Aloe Vera

Seedlings which will be planted have to be selected at the time of revocation seedling at nursery center. Seed of Aloe vera generally measuring 20-30 cm high with a minimum of six aloe leaves. Nursery usually takes for 1 (one) month

#### 7. Planting

Selected seeds should be totally healthy, there are no wounds on the leaves midrib. Seed revocation should be done in the same day of planting (notto be prolonged or get exposure to direct sunlight). After 3-4 days of giving basal fertilizer, seeds removed and transferred to cultivate crops in the field to the provided holes and have been given basic fertilizer mix. Planting seeds by way of embedded 4-6 cm deep and compacted soil around the seedlings so that the seedlings are not easily uprooted in that planting should be done in the morning. After 10-14 days after transplanting (DAT), if there are died seedlings then do stitching. The number of needed seeds depends on spacing used and generally amounts to 6000-7400 plants / ha.

#### 8. Control of Plant Diseases

For Aloe vera plant which is intensively cared (balanced fertilizer) symptoms of disease are rarely seen. However, the aloe plant that has imbalance nutrients provision especially when there is excess of Nitrogen (N) will be visible on the leaf midrib. They are vulnerable to diseases caused by fungi, because the fibers contained in aloe vera leaf midrib are not strong. If there are wounds to the leaf midrib, it will likely be rot disease caused by fungi. Aloe vera lacks of Potassium is very susceptible to leaf spot disease (the edge of midrib becomes dry or black spots) caused by Soloni Fusarium or Alternariaalternata.

#### 9. Plant Fertilization

##### a) Basic Fertilizer

Given 3-4 days before planting, consisting of: Manure = 200 g / tree, Urea = 10-20 g / tree, Fertilizers TSP = 10 grams / tree, Fertilizer KCL = 10-40 g / tree, Ash Planting = 25 gram / tree. In case of the shrimp shells

are difficult to obtain or too expensive, use ash with a higher of 250 grams / tree.

##### b) Supplementary fertilizers Year I:

This fertilizer plant began to be given at the age of 1.5 - 2 months after planting, consisting of: Urea = 15-20 g / plant, fertilizer TSP = 10 grams / plant, fertilizer KCL = 20-40 g /plant (then given every 2 months). As for the manure and ashes given every 24 weeks (6 months) with doses: Manure = 250-300 g / plant, ash plants = 30-50 g / plant

##### c) . Supplementary fertilizer Year II and beyond:

In the second year supplementary fertilizer, inorganic fertilizer dose is increased, so will in the third and fourth and so on, for ash and manure extra doses for each time giving fertilization by 5-10 grams / tree.

#### 10. Weeding (Weed Control)

Weeding is done at the time before fertilization, however, weeding can be completed as soon as possible when there are enough weeds around the plant aloe vera already.

#### 11. Harvest and Post-Harvest

Harvest of Aloe vera leaves usually only after entering the plant age of 10-12 months. Thriving Aloe vera, the first stem at the bottom has a length of about 40-70 cm, midrib width between 2-3 cm and weighing up 0.60 to 1.40 kg. On the same overlays harvest can be done once a month as much as 1-2 midrib leaves. However, farmers usually don't harvest at the same overlay once due to different growth rate, so that harvesting can be done several times in the same overlay but different plants.

Harvesting is for the first midrib leaves (bottom) by means of tearing the underside of leaves attached to the stem of the plant stem and slitting can be done using a sharp knife and do not hurt the meat and stems of plants. After that midrib leaves harvested subsequently they are cleaned or washed in a bath of water to remove any dirt or soil attached. Midrib leaves are already clean then arranged neatly on a shelf leaving no residual or any water freckles. When dried, aloe vera is ready for packing and delivered to meet market demand.

Aloe vera farm in West Kalimantan originally started in jars on house yard and plant to meet household need. Interest of farmers to develop the aloe vera plant has increased along with

the increasing demand to gradually shift from subsistence farming to commercial farming and become a principal source of income for farmers.

Table 1. Crop area development and production of aloe vera in Pontianak year 2004-2009

Year	Areal Size (Ha)	Harvest Size (Ha)	Production	
			(ton/month)	(ton/year)
2004	161	137	2.192	26.304
2005	121	121	1.888	22.651
2006	100	65	845	10.140
2007	60	43	559	6.708
2008	60	55	869	10.428
2009	38.1	35	126	1.512
<b>Total</b>	<b>540.1</b>	<b>556</b>	<b>6.479</b>	<b>77.743</b>

Source : UPTD Terminal Agribisnis, 2010.

A wide variety of nutrient content in the stem of aloe includes:

- Vitamin A, B1, B2, B3, B12, C, E, Choline, Inositol, Folic Acid
- Mineral, namely Calcium, Magnesium, Potassium, Sodium, Iron, Zinc, Chromium
- Enzymes, namely Amylase, Catalase, Cellulose, Carboxypeptidase, Carboxyhelulose, Bradykinesia
- Amino acids , namely arginine , Asparagine , Aspartic Acid , analine , Serine , Glutamate , Threonine , Glycine , Phenyl alanine , histidine , Isoleucine

Aloe vera has benefits on human health, such as: As an anti-microbial against pathogenic bacteria, body cleanser, blood cholesterol level stabilizer, body armor because it contains antibiotic, as a material that slows aging and as an anti-burns. The results of the content analysis of aloe vera gel ( 100 g ) are as follows : Water : 99.5 % , fat : 0.067 % , carbohydrates : 0.043 % , vitamin A , vitamin C and total dissolved solids : 0.49%

## METHODOLOGY

This research was conducted in the area of aloe vera in West Kalimantan during 2014-2015. The methods used data in the form of primary and secondary supported the

literature study. The primary data is by means discussion and direct interview with farmers and businessman. While data collection secondary done through evaluation internal and external and desk study based on regional development assistance program horticulture in West Kalimantan.

## RESULTS AND DISCUSSION

### Some aspects of aloe vera feasibility of (technical, marketing and finance aspects)

According to Kadariah, et al. (1999), generally aspects that were examined in the feasibility study are production technics, finance and marketing.

#### a. Technical Aspects

Including an overview of the commodity, the technical requirements of production, processing and packaging

##### 1) Production Facilities and Equipment

It is intended to determine the various equipment used to support the production activities such as tool for stripping Aloe vera, crusher equipment (blender), engine heater that can be set, rough filtering machine, fine filtering machine, bottling machine, pasteurizer and appliance packaging.

## 2) Procurement and Quality Ingredients

To check the availability of raw and supporting materials required, fresh aloe leaves whether it comes from the garden owned by factory or on smallholdings (farmers' garden) or from suppliers. This is important considering the philosophical basis of the selection of materials for making the food product is *Garbage in Garbage out*(GIGO), if the raw material is bad then result is also bad. Standards quality of midrib Aloe vera determined by four (4) elements, namely: (a) leaves a disability and rotten should be 0%, (b) the fresh leaf weight (0.7-1) kg per leaf, (c) the color of dark green leaves in a fresh state, and (d) leaf length > 50 cm (Yohanes, 2005).

## 3) Processing

It provides an overview of the processing of each product to packaging for shipment.

## 4) Sanitation, production capacity and product quality.

To find out sanitation, production capacity and product quality, it is needed to observe cleanliness and hygienic, whether it suits standard guidelines for *good manufacturing practice*(GMP) in Aloe vera processing business, as well as the extent of production capacity has been able to meet the demand of the market and how to determine the quality production criteria.

## 5) Labor

This is to determine the number and type of labor required, the level of education required and how to meet the needs of intended labor.

## **b. Aspects of Marketing**

It covers conditions of demand, supply, price, competition and market opportunities, as well as projection of market demand as follows:

### 1) Request

This gives an idea of the demand for Aloe vera liquid products to meet the needs of domestic and overseas.

### 2) Offer.

This gives an idea of competitors of Aloe vera and balance factor between demand and supply

## 3) Price.

It provides an overview of the mechanism for setting the selling price of Aloe vera drinks, the relationship between the selling price and supply and demand by the buyer, as well as factors that affect the price of Aloe vera drinks.

## 4) Competition and Market Opportunities

It gives an overview of the beverage producer and distributor of Aloe vera.

## 5) Product Development

To find the target market, mainly distributors and MLM network.

## **c. Financial Aspects to determine the feasibility of financial prospective.**

Cost components include the provision of facilities and infrastructure, operating costs and other costs. Infrastructure procurement cost is covering the cost of investment, namely licensing fees, building and purchase of equipment for the production process.

1) The operating costs include the cost of purchasing fresh aloe vera leaves, additional materials costs, packaging costs, wages, cost of equipment / vehicles and overhead costs.

2) Income is the total earnings of Aloe vera drinks to customers, which is based on five year projection.

3) Capital and Credit Requirements. In supporting the development of the company working and investment capital are needed.

### 4) Analysis of Cash Flow

Based on analysis of projected cash flow over five years, it will be known when obtaining credit, whether the company can meet the obligation to pay interest or installments to the bank well. (Surplus / deficit).

### 5) Profitability Analysis.

Profitability analysis is required to determine business feasibility as commonly used to evaluate a project.

## **Constraints and Prospects for Development of Aloe Vera**

Aloe vera plant in West Kalimantan has been cultivated commercially since 1995, including in Pontianak (Siantan) and Pontianak regency (Rasau Jaya). Initially, the plant is only cultured on a small scale.

However, as the demand for harvest is getting higher, and production and market prospect were quite good, so it encouraged for bigger scale of Aloe Vera farm and it continued until 2004.

In a further development, the cultivation of aloe vera since 2005 - up to now on the decline. This occurs due to:

1). Resource constraints due to a lack of capital in the financing of farming.

Peatland agricultural problems is drainage, high- acidity peat and low fertility rates. Peat high acidity and nutrient availability as well as a low base saturation caused agricultural peatland production is very low. Exploitation of peat certainly need a fairly high input farming, such as organic fertilizers, inorganic fertilizers and pesticides. The availability of organic fertilizers include *sawmill* ash and manure. The availability of manure is very dependent on the livestock population. Decreasing the number of sawmill because of the scarcity of raw material causes ash scarcity.

This situation led to the availability of organic matter tends to decrease and if needed in immediate time and in large quantities, it would be difficult to fulfill. When organic fertilizer is hard to find, inorganic fertilizer and pesticide are relatively more secure to use, only that the farmers have to pay more thus leading to higher capital to run aloe vera farm.

2). Market assurance risks and poor prices.

Aloe vera farm development over the years led to the abundance of aloe vera harvest, but it is not followed by an increase in demand and market guarantee on production. Lack of market information and knowledge of farmers and the lack of ability of capital make farmers unable to expand the marketing network both nationally and internationally so that farmers are dependent on local market, selling crops at local retailers and aloe vera crops Processing Company. Dependence of farmers on local marketing in recent years led to some farmers are forced to sell with lower prices or delay the harvest, so it will affect their income.

Farmers' income from aloe vera farming at production center in Pontianak since 2005

fluctuated and tended to decrease. Some of the suspected causes are reduced area of aloe vera land farming, inefficient and ineffectiveness of farmers in allocating the means of production (input) in aloe vera farming, lack of demand for aloe vera leaves and the influence of fluctuated prices of basic necessities means of farm production and the price leaves fresh aloe vera.

Aloe vera is a species of medicinal plants that has great benefits for health. The aloe vera plant provides as anti-inflammatory, antifungal, antibacterial, and cell regeneration, lower blood sugar levels for diabetics (Sumarno, 2003). Aloe vera plant species including 10 top-selling drugs in the world. Demand from Japan on fresh aloe reaches 300 tons per month, and those needs supplied by Brazil and Thailand (Rahardjo, 2002). While the need for *nata de aloe* beverage industry domestically such as INACO and PT NiramasUtama, each requiring fresh Aloe vera raw materials by 100 tons per month (BPPT, 2003). Indonesia as a tropical country has great potential in the development of Aloe vera. With more and more people are starting to realize the benefits of the plant, making the Aloe vera market opportunities in agribusiness is very vast, then again the availability of fresh aloe vera products in Indonesia is still very limited due to the decrease in number of harvested area.

In addition to farming, Aloe vera agribusiness development in West Kalimantan is also done through the processing of fresh products (agro-industry). Agro industrial activity of aloe vera in West Kalimantan produces many kinds of processed aloe vera in the form of food, drinks, and various other forms such as drugs and cosmetics. The existence of a variety of processed products that provide added value and benefits vary so that the required analysis relating to the added value provided by a variety of processed aloe products for raw materials such as fresh aloe vera meat midrib. Various patterns of development is done by aloe vera businesses people both diversified and non-diversified business. Diversification efforts include farming activities and agro-

industry (processing of fresh produce aloe vera), while non-diversified agribusiness aloe vera is an activity carried by entrepreneurs only be farming activities or business processing of fresh aloe vera (agro-industry). Farm diversification and agro-industry aims to increase production efficiency and reduce distribution costs incurred procurement of raw materials in the manufacture of processed products so that these products generate higher added value and can increase revenue for their business people.

Agribusiness development of aloe vera has very good prospects in terms of community involvement and benefits it brings such as : (1) the way to grow aloe vera is relatively easy; (2) encourage the growth of rural industries both upstream and downstream sectors, so as to increase employment in rural areas; (3) diversification of the product is numerous ranging from food and beverages, cosmetics raw materials, and medicine; (4) the value-added of downstream products is quite enormous; and (5) demand for dairy products have a good market. Under the development plan of Aloe vera plant in Kalimantan, covering an area of 17,400 hectares, nationally this commodity is one of main commodity in West Kalimantan and it is expected that this province to be the largest manufacturer of Aloe vera either fresh midrib leaves or other products .

Farmers' income from aloe vera farming at production center in Pontianak since 2005 fluctuated and tended to decrease. Some of the suspected causes are reduced area of aloe vera land farming, inefficient and ineffectiveness of farmers in allocating the means of production (input) in aloe vera farming, lack of demand for aloe vera leaves and the influence of fluctuated prices of basic necessities means of farm production and the price leaves fresh aloe vera.

Soekartawi (1994) stated that, in doing farming, a farmer or entrepreneur farmer will always work on how to allocate the means of production (input ) owned as efficiently as possible in order to obtain the maximum profit in economics this way of thinking is often called the profit maximization approach.

The absence of standard quality and the price of the local industry has also led to less motivated farmers to increase acreage. The selling price of fresh aloe vera leaves are marketed either directly to the final consumer or through the collecting agency does not vary much with the purchase price set by the industry. This price was determined by the agent, so farmers are at price takers position. Marketing outside the region both domestic and overseas, if carried out by farmers today still impossible due to lack of special equipment associated with the production. Marketing problems today is an important issue in efforts to develop Aloe vera farming. Aloe vera thrives mainly on soil rich in organic matter. Aloe vera cultivation in peatlands Pontianak City West Kalimantan is capable of producing 8000kg / ha / month, with the harvested midrib on average 1.5 kg per frond and its length reaches 70 cm (Department of Food Affairs - , Pontianak 2004). Development of aloe vera in peatlands face many obstacles, especially with peat low fertility rates.

According to Henry (1979), the main element of the liquid aloe vera is aloin, emodin, resin, gum and other elements such as essential oils. In terms of nutrient content, or mucus gel aloe leaf contains some minerals such as Zn, K, Fe, and vitamins such as vitamin A, B1, B2, B12, C, E, inositol, folic acid, and kholin. Djubaedah (2003) mentions that aloe gel contains 17 kinds of essential amino acids. Such nutritionally complete and varied, the diversification Aloe products is vast. Aloe vera drinks have very low calories (4 cal / 100 g gel), making it suitable for a diet program (Hartanto and Lopez 2002). In West Kalimantan, aloe vera is processed in various forms of food and beverages such as juices, cocktails, aloe vera gel in syrup, jams, jellies, dodol, and sweets. To prolong the preserved life, it has also conducted research on aloe powder making (Sumarsi et al. 1998).

Natural products are increasingly appreciated by the public and has become a lifestyle today. Similarly, Aloe vera plant is only known as a shampoo for hair care and ornamental plants in front yard. Public

awareness of health and a tendency to revert to using natural materials (back to nature), making Aloe vera become one of the plants that demand by the public. In terms of nutrient content, Aloe vera gel contains some minerals such as Zn, K, Fe and vitamins such as Vitamin A, B1, B2, B12, C and E, Inositol, folic acid, and kholin. Fumakanthi (2003), mentions that Aloe vera gel contains 17 kinds of essential amino acids. Aloe vera products in the form of fresh gel quickly lapsed because the liquid gel is easily oxidized (Sudarto, 2007). Hence the need for the processing of Aloe vera gel into food products that are not easily damaged. Such nutritionally complete and varied that Aloe vera has a great opportunity processed into snack foods rich in vitamins

Based on food diversification program of Aloe Vera Center (AVC) in West Kalimantan, product development of Aloe vera gel is needed due to increasingly broad market segment. One is to make a dried Aloe vera jelly with the addition of chocolate layers as a snack food rich in vitamins. As it is known that chocolate is a popular food and in demand by all ages, from small children to the elderly.

Aloe vera gel product development as local potential of West Kalimantan in this research is focused on developing dried Aloevera jelly with chocolate layer with the main raw material *Aloe vera gel Chinensis*. Aloe veragelatin dried with chocolate layer has been created by researchers in a preliminary study, but still need to be developed further. To find out how the actual product characteristics desired by consumers that have a high value, the selected research methods oriented product functionality that is Value Engineering (Miles, 1989) and Quality Function Deployment (Cohen, 1995).

Profit gained from by aloe vera farmers is allegedly influenced by the distribution system of marketing and coverage of aloe leave sale to the consumer. Constraints faced by farmers as producers in terms of marketing is limited ability of producers to market directly to the region between islands and exports. Producers depends solely on traders

or wholesalers to be able to market aloe leaves or export to other regions. This led to limited aloe vera coverage, consequently the absorption of products produced by farmers is not balanced with the ability or the purchasing power of traders, wholesalers or exporters. Even based on research Muinet.al. (2010) R/C ratio of the results of the study in 2010 was lower than the results Burhansyah (2002) , ie, of was 2,11 to 1.19 .

Aloe Vera Center (AVC) Pontianak is the development center of Aloevera plant complex located in the center of the Technical Implementation Unit (UPTD) Agribusiness Pontianak. At first, the establishment of Aloe Vera Center functions as center of assessment and development of aloe vera to facilitate the activities in the agricultural sector. Along with the development of the cultivation of aloe plant in Pontianak makes Aloe Vera Center as a tourist destination farm. On March 5, 2013 Agribusiness UPTD region was inaugurated as the Agro Park area. Development of Aloe Vera Center under UPTD Agribusiness from agriculture to tourism infrastructure but it was not supported by proper facilities. Aloe vera Center is located at the main entrance of the park area can be potential to be developed as a major attraction and the icon of Pontianak. Development UPTD Agribusiness into the park area is one of the policies that can increase the tourism potential in Pontianak.

Agribusiness functions include cultivation facilities, production facilities, processing facilities, research and development (Research and Development) while the function Agrotourism include educational facilities, tour facility, workshop facilities, trade facilities and recreational facilities.

## CONCLUSION

Prospects for Aloe vera plant development in West Kalimantan is influenced by several factors: a) physical factors include topography, temperature, rainfall and soil pH to suit the requirements to grow aloe vera plant, b) a non-physical factor linked to the farming of Aloe vera include capital, labor,

transportation, and marketing of products of farming, c) the farm management includes: land preparation, seedlings, planting, fertilizing, watering, eradication of pests and diseases, harvest and post-harvest treatment, d) difficulty of marketing the crop, no change in the price of aloe vera from year to year in production costs continue to rise and the procedures for marketing the area is complicated. Efforts to do in the future is to have partnership with government and relevant stakeholders to have clarity of markets and prices, product promotion through fairs and business meeting activities, as well as the dissemination and application of cultivation technology and post-harvest of Aloe vera.

## REFERENCES

- Adesuyi AO, Awosanya OA, Adaramola FB and Omeonu AI. 2012. Nutritional and Phytochemical Screening of *Aloe barbadensis*. *Current Research of Journal Biological Science* 4(1): 4-9
- Badan Pusat Statistik Propinsi Kalimantan Barat. 2010. *West Kalimantan in numbers 2010*. Pontianak. 15 h.
- Bappeda dan BPM Pontianak. 2003. *Preparation of Medium Term Development Program Agribusiness Center Region Pontianak*.
- Burhansyah, R. 2002. Economic Analysis of Aloe Vera Farming in Pontianak. Postgraduate IPB. Bogor.
- Brundrett, M., L. Melville, L. Peterson. 1994. Practical Methods in Mycorrhiza Research. Mycol. Publ. Ontario, Canada. 161p.
- Cohen L. 1995. Quality Function Deployment: *Lingking a company with is customers*, ASQS Press.
- Dinas Urusan Pangan Kota Pontianak. 2004. Agribusiness Profile for Aloe vera in Pontianak, West Kalimantan Province. Pontianak. Food Affairs Agency. 54 hal.
- Ditjen Bina Produksi Hortikultura, 2002. Efficacy and Benefits of Medicinal Plants. Directorate of Vegetables, Ornamental and Miscellaneous Plants. Dirjen Bina Produksi Hortikultura. Jakarta.
- Ellyta, 2006. Analysis for Farmer Marketing Communications Network, Aloe ( A case in Agribusiness Center Pontianak Kalimantan Barat ). Thesis for Graduate School - Bogor Agricultural Institute.
- Endang SS dan Prasetyastuti. 2010. Effect of Aloe Vera Juice (Aloe Vera L.) on Lipid peroxide levels (MDA) to Male Rats Male - Hyperlipidemia. *Jurnal Farmasi Kedokteran* 3(1):353-362.
- Foth. H. D. 199. *Fundamentals of Soil Science*. VI.ed. Erlangga. Jakarta: 347 h.
- Furnawanthi, I. 2002. Efficacy and Benefits of Aloe Vera , The Wonder Plant. PT. Agro Media Pustaka. Jakarta.
- Governor of West Kalimantan Province. 2002. Decree No. 505 of 2002, Concerning Determination of West Kalimantan Regional Commodity. Pontianak 2002.
- Hatta, M, dan D, Sahari, 2001. Farming Aloe Vera ( Aloe vera ) . BPTP West Kalimantan .
- Hamman JH. 2008. Compositon and Application of Aloe vera Leaf Gel. *Molecules* 13:1599-1616.
- Hardjadi, S. S. 1996. *Introduction to Agronomy*. Gramedia. Jakarta. 197 h.
- Latifah dan Apriawan A. 2009. Flour manufacture from Aloe Vera With Various Drying Method. *Rekapangan: Jurnal Teknologi Pangan* : 70-80
- Misawaa E, Tanakaa M, Nomaguchia K, Yamadaa M, Toidaa T, Takaseb M, Iwatsukia K and Kawadac T. 2008. Administration of phytosterols isolated from *Aloe vera* gel reduce visceral fat mass and improve hyperglycemia in Zucker diabetic fatty (ZDF) rats. *Obesity Research & Clinical Practice* 2: 239—245
- Miles L. 1989. *Techniques of Value Analysis and Engineering 3rd edition*. Eleanor Miles Walker. USA
- Notohadiprawiro, 1998. Challenge the use of peatland. In Proceedings of the National Peatland Seminar III. HGI-Univ. Tanjung Pura (Pontianak)-Pemda Tingkat I Kalimantan Barat- BPP Teknologi Jakarta. Hlm. 282-285
- Padmadisastra Y, Sidik dan Ajizah S. 2003. Liquid dosage formulations gel aloe (Aloe

- vera Linn) as a health drink. National Symposium on Natural Product of Chemistry III
- Rahardjo, A. 1999. Aloe Vera from West Kalimantan Planted in Bogor. *Trubus*, 30 (360).
- Radjaguguk, B. 2001. Problem Perspective and conception of tropical peatland management for sustainable agriculture. Papers for Inauguration Speech. Universitas Gadjah mada. Yogyakarta.
- Rianto, F., Sarbino, 2003 Control of soft rot disease on aloe ( Aloe vera ) as non-chemical using antagonist microorganisms [Research Report]. Pontianak. Faculty of Agriculture Universitas Tanjungpura
- Setiadi.B. 1996. Technology using peatlands for agriculture. Seminar on development of environmentally friendly technologies for agriculture on peatlands . The 33th Inauguration of IPB, Bogor, 26 Sept. 1996.
- Subagyo, H., DS. Marsoedi, dan A.S. Karama.1996. Prospects for the development of peatlands for agriculture ; Seminar on Development of environmentally friendly technologies For Agriculture on Peatland. The 33th Inauguration of IPB, Bogor, 26 Sept. 1996.
- Soekartawi,1986.Farm Science and Research for Development of Small Farmers. UI-Press. Jakarta.
- Sudarto Y. 2007. *Aloe Vera*. Kanisius. Yogyakarta
- Suratiah, K. 2008.Farming Sciences. Cetakan ke 2. Penebar Swadaya. Jakarta.
- Taryono dan A, Ruhnayat. 2002. *Cultivation of Aloe Vera*. Circular No. I. Crops Research Institute for Spices and Medicine -Bogor. Journal of Technology Development. TRO Vol. XIV. No. 1. 2002.
- Taryono dan R, Rosman. 2003.Cultivation Technology and Product Diversification forAloe Vera. Research Institute for Spices and Medicinal Plants. Journal of Technology Development TRO Vol. XV. No. 1. 2003.
- UPTD AgribusinessTerminal, Food Security Office and Guidance of Pontianak , 2010. Data Development and Production Area Plant Aloe Vera Year 2004-2009 and Development of Export and Sales Inter Island of Aloe Vera Products of 2000 - 2007. Food security and Guidance Department- Pontianak.
- Wahid, P. 2000.Development Opportunities for Aloe Vera. Research and Development Agency of Forestry and Plantation Crops Research Center. Bulletin of Research and development Industrial Plants. Bogor.
- Wahjono, Edi dan Koesnandar. 2002. Creating Aloe Vera Garden. Jakarta : Agromedia Pustaka.
- Widarjono, Agus. 2005. *Ekonometrika :Theory and Applications to Economics and Business*. Yogyakarta : Ekonisia Fakultas Ekonomi UII.
- Widiastuti, D. dan M. Hatta. 2002.Exploiting Peatland for Agriculture in West Kalimantan. Pontianak : BPTP Kalimantan Barat.
- Widiyanto, A. 2002.Risk Analysis of Option Planting Pattern. Agricultural Economics for Graduate School Thesis- Universitas Gadjah Mada. Yogyakarta
- Yogi, A, K. Makino, I Nishioka and Y. Kuchino. 1977. *Aloe mannan, polysacharida, from Aloe arborescens*. Var. Nataleusis. *Planta Medica* 31 (I) : 17 – 20.