

Hydroponic Vegetable Production Planning at Plantation Parung Farm Bogor

Wiwi Iswardani

UIN Syarif Hidayatullah, Jakarta
wiwiswardani@yahoo.co.id

ABSTRACT

The objectives of this study are: (1) Knowing the hydroponic vegetable production operations carried out by Parung Farm, especially in terms of production costs and profits. obtained, as well as in the use of resources. Produce production planning that can optimally meet market demand for the future by taking into account the efficient use of production factors that result in optimal production costs and profits. The research was conducted at Parung Farm, Parung, Bogor. Data were collected from January 2011 to April 2011. The location selection was made deliberately with the consideration that the company is a company engaged in the production of hydroponic vegetables and is consistent with hydroponics. The data used in this study are primary and secondary data. To find out the sales data is done by looking at the document archives. Meanwhile, to find out business income is done by interviewing the production manager, the person in charge of the garden and the production department. In addition, conducting direct observations in the field to determine cropping patterns and production processes. Parung Farm unit Parung produces two types of lowland vegetable products, namely spinach and hydroponic kale. The vegetable production process at Parung Farm uses hydroponic technology. The planting and harvesting technique is carried out using asystem *rolling* where every day there is a process of planting and harvesting in the designated beds. In production operations

Keywords: Planning, Vegetables, Hydroponics.

INTRODUCTION

Access to markets that can provide attractive benefits is a very dominant problem faced by agribusiness entrepreneurs. Therefore, once an entrepreneur can find an attractive market because of good prices and a market position that puts him in a good bargaining position, that position must be maintained. It is only possible for agribusiness entrepreneurs to be able to maintain it if they are able to guarantee a continuous supply of products, which means that seasonal cropping patterns can no longer be maintained (Supari, 2001: 4).

Hydroponic development in Indonesia has bright prospects, both to fill domestic needs and seize export opportunities. Residents of big cities such as Jakarta, Surabaya, Bandung, Medan and other big cities have a tendency to improve their quality of life. The use of quality products makes users feel comfortable. Modern markets have

become a distinctive feature of the demand for quality products, no longer many products but origins, but clean products and high continuity.

The commercial application of hydroponics in Indonesia began in 1980 in Jakarta to produce vegetables and fruits with high economic value. Currently there are several companies in Indonesia that are engaged in hydroponics. Among others: PT Saung Mirwan, Parung Farm, PT.Joro, Putri Segar, Amazing Farm, PT. Bandung Farmer Internasional, and HMI Fruits & Vegetables. One of the largest companies in the production of vegetables using the hydroponic method is Parung Farm. Parung Farm is a brand that is carried by PT Kebun Sayur Segar, which since the beginning of its development until now, PT Kebun Sayur Segar can be said to be the pioneer of the best agricultural product producing companies in the country.

These requirements require entrepreneurs to change their attitude in managing their agribusiness, one of the ways is by implementing appropriate technology. Technological developments in agriculture are indispensable for agribusiness development. One of the developments in agricultural cultivation technology that can be applied in Indonesia is hydroponic technology. According to Sudarmodjo (2008: 2), hydroponics is an alternative technology in farming using planting media other than soil (*soilless culture*), where all the input of nutrients, water, oxygen, temperature, humidity, is measured and controlled. The principle is to provide what the plants need at the right time so that the plants can grow optimally.

Parung Farm is a brand carried by PT Kebun Sayur Segar which was founded in 2003. Its products are divided into three groups, namely lettuce, non-lettuce (*Caisim*, green and red spinach, green and white *Pak-choi*, Kangkung, *Petsay*, and *Kailan*.), and tomatoes. All products are marketed to supermarkets and *hypermarkets* such as *Carrefour*, *Giant*, *Hypermart*, *Makro*, and *Hero*. Hydroponics method makes Parung Farm products produce stable quantity, quality and continuity. This stability is one of the reasons the number of enthusiasts for Parung Farm products continues to increase, of course from the middle to upper economic segment. Moreover, awareness of eating healthy food is increasing in the community. With an increase in market demand, to fulfill it, Parung Farm has expanded its cultivation area which is divided into four places, namely Parung, South Tangerang, Puncak, and Cianjur. The gardens in the Puncak and Cianjur areas are for upland vegetable crops such as various types of lettuce

and tomatoes, while the gardens in Parung are for lowland vegetables such as spinach and kale.

An important aspect to consider in the vegetable production business is the production aspect, namely the process of management activities applied in the production process. Production management includes planning and controlling the production process in which there are decision making in the field of preparation and production processes for the short, medium, and long term.

THEORETIC

Hydroponic Vegetable Plants

The term hydroponics (*hydroponics*) is used to describe how to grow crops without soil as a planting medium, including farming in pots or other containers that use water or other porous materials, such as tile fragments, river sand, gravel, and white cork (Lingga, 2005: 1). According to Karsono, et al (2002: 1), hydroponics comes from the word hydro which means water and ponus which means power. Thus, hydroponics means empowering water.

Spinach

According to Sunarjono (2006: 16) spinach can grow throughout the year, both in the lowlands and the highlands. Spinach will grow well when planted in soil with a degree of acidity (soil pH) around 6-7. When the pH is less than 6, the plants will languish. While at a pH above 7, spinach plants will experience chlorosis, which is a yellowish white color, especially on young leaves.

Kale

Kale is a commercial vegetable crop that is creeping. Kale with small trunk, long round and holes in it (Sunarjono, 2006: 20). According to Sunarjono (2006: 23) water spinach can be easily planted in all types of soil, as long as the soil is fertile (sufficiently muddy) and water is sufficient. Land spinach is usually planted in places that are somewhat dry, while water spinach is on the edges of ponds and swamps. The good planting time for kale is in the rainy season for land kale and the dry season for water spinach.

Production Management

Buffa (2005: 8) explains that a production system is the conversion of resource inputs into goods and services that are more useful. These inputs are converted into goods / services by process technology, which is a particular method or method used for the transformation process. Changes in technology will change the way one input is used in relation to other inputs, and may also change the outputs produced.

Definition of Production Planning

Production planning is a planning of what and how many products will be produced by the company concerned in a period to come. Production planning is part of operational planning within the company. In preparing the production planning, the thing that needs to be considered is the optimization of production so that the lowest cost level can be achieved for the implementation of the production process.

METHOD

The data sources used in the study were primary and secondary data. Primary data were obtained from direct observations of spinach and kale production activities at Parung Farm and interviews with the production manager. Meanwhile, secondary data obtained from production and sales data for 3 years and supporting data obtained from literature - literature related to the research title. The data needed is an overview of the company, the production process, the time of production, production resources, and sales results.

Effective planning depends on forecasting the demand for the company's products. Forecasting will be used to predict the market demand for each hydroponic vegetable product. There are two general approaches used in forecasting, namely, quantitative forecasting and qualitative forecasting. While the approach used in this research is a quantitative approach using historical data in a (*time series*). Before determining the forecasting method, it is necessary to test the data pattern with the aim of knowing whether the historical data pattern is stationary data or not. Testing data patterns to make it easier to determine the appropriate method to use for forecasting.

RESULT

Hydroponic Vegetable Products / Commodities

Broadly speaking, vegetables produced by Parung Farm can be categorized into three groups, namely lettuce, non-lettuce, and tomatoes. Vegetables included in the lettuce category include curly lettuce, *Lollo Rossa*, *Romaine*, *Butterhead*, *Batavia*, *Red Oakleaf*, *Siomax*, and *Endivee*. Meanwhile, vegetables included in the non-lettuce category are *Caisim*, Green Spinach, *Kale*, *Petsay*, *Kailan*, Red Spinach, *Pak Choy Hijau*, and *Pak Choy Putih*. Meanwhile, those included in the tomato group include *Red Unique*, *Golden Unique*, *Clutser*, *Golden Shine*, *Fortune Unique*, *Cherry*, *Recento*, and *Oblong Beef*.

These vegetables are cultivated in four different gardens, namely Parung, South Tangerang, Puncak, and Cianjur. The gardens in the Puncak and Cianjur areas are for upland vegetable crops such as various types of lettuce and tomatoes, while the gardens in Parung are for lowland vegetables such as spinach and kale.

Hydroponic Vegetable Production

Process The Parung Farm vegetable production process at the Parung Garden unit uses hydroponic technology. The hydroponic method used for each vegetable is different. Seedlings of spinach are carried out using the substrate hydroponic method, namely the planting medium in the form of gravel. Then, after they are old enough to move plants, the spinach seedlings are raised using aeroponic methods. Whereas for kale plants, the cultivation method used is the substrate hydroponic method using gravel as the planting medium.

The nutrition system for each hydroponic method is different. In the aeroponic type, nutrients are atomized to the root area of the plant. Whereas in the gravel substrate type, nutrition was carried out by means of NFT (*Nutrient Film Technique*).

Stages of Production of Parung Farm Hydroponic Vegetables in Parung Gardens Unit

The planting land used for spinach is different from that used for kale plants. Spinach plants use land in a greenhouse, while kale plants use open land outside the greenhouse. This different treatment is because the kale plant is not difficult to grow in any condition, it is very different from spinach which requires extra care in its growth.

The land is cleared of weeds, moss, and plant debris, so as not to disturb the growth of the plants to be planted.

The nursery is carried out in the land with the planting medium in the form of gravel. Gravel is used because it is porous in large quantities, allowing oxygen to easily enter the roots of the plant. In addition, using gravel can make it easier to get seedlings without damaging the roots of the plant seeds.

Spinach seeds that have been wrapped in *rockwool* and have been placed in a *jelly cup*, are then put in the planting hole in *Styrofoam*. *Styrofoam* measuring 1 m² placed in a bed, one bed measuring 16 m² contains 16 sheets of *Styrofoam*. *Styrofoam* is perforated with a distance per planting hole of 10 cm and a diameter of ± 3 cm per planting hole, 1 sheet of *styrofoam* contains 81 planting holes.

If a plant dies, the action to take is to remove the dead plant. Meanwhile, plants that are still growing are collected at one age (*pengekepan*) so that they can grow uniformly. In Parung Farm there is no embroidery activity that replaces dead plants with new plants because the replacement plants are not the same age so it can result in uneven growth. During plant maintenance, to reduce pest and disease attacks on plants, it is done manually by removing caterpillars that are attached to leaves and removing unhealthy plants so that they are not infected to other plants. Parung Farm does not use pesticides to control pests and diseases.

After enough to be harvested (for spinach plants ± 15 -18 days after transplanting), the plants will be harvested. Harvested plants that meet the harvest criteria (in terms of appearance and stem height). The time and age of harvest depends on optimal appearance. Plants with old stems will be hard and have grown flowers, they are not suitable for sale because they reduce quality.

At the time in the packaging room, the plants are not processed immediately, but are allowed to stand for a while to dissipate the (*field heat* *field heat*). Then after that the selection process is carried out. Selection (sorting) is carried out to select plants to make them suitable for packaging and selling. Selection is done by removing old leaves, yellow leaves, hollow leaves, torn leaves, then weighing 250 grams per package.

The packaged products are then arranged in trays and flattened for transportation. The transportation of vegetables is carried out on the same day as the harvest and packaging process. Transportation is carried out by using a car box equipped with a

cooler with a temperature of about 15-20 °C. Vegetables are transported to the warehouse, where they are then distributed to consumers who order the vegetables (supermarkets).

CONCLUSION

Production planning is made using the optimum production combination where spinach product is recommended as much as 3,939 packs and 3,839 pack of kale products so as to produce a total profit of Rp. 40,994,499, - Planning uses lower production costs, namely Rp. 4,511, - per unit of spinach product and Rp. 2560, - per unit for kale products. The allocation of the use of seeds and nutrients is reduced without changing the effective requirements of the plant, this is because the use of production factors in the company's production operations shows excess capacity. The recommended use of seeds in spinach production is 750 grams and nutrients as much as 90,000 liters. Meanwhile, for kale production, the recommended use of seeds is 20,000 grams and the use of nutrients is 25,000 liters.

REFERENCES

- Adisaputro dan Anggarini. *Anggaran Bisnis Analisa, Perencanaan, dan Pengendalian Laba*. (Yogyakarta: UPP STIM YKPN, 2007)
- Aminuddin, S.Si. *Prinsip-Prinsip Riset Operasi*. (Jakarta: Erlangga, 2008)
- Assauri, S. *Manajemen Produksi dan Operasi*. (Jakarta: FE-UI, 2004)
- Buffa, F.S. dan R.K. Sarin. *Manajemen Produksi/Operasi Modern*. (Jakarta: Binarupa Aksara, 2005)
- Firdaus, M. *Analisis Deret Waktu Satu Ragam*. (Jakarta: IPB Press, 2006)
- Handoko, Drs. Tani, M.B.A., Ph.D. *Dasar-Dasar Manajemen Produksi dan Operasi*. (Jakarta: BPFE-Yogyakarta, 2000)
- Heizer dan Render. *Manajemen Operasi (Terjemahan, Jilid 1)*. (Jakarta: Karyasalemba Empat, 2005)
- Lingga, Pinus. *Hidroponik, Bercocok Tanam Tanpa Tanah*. (Jakarta: Penebar Swadaya, 2005)
- Mulyono. *Peramalan Bisnis dan Ekonometrika*. (Yogyakarta: BPFE, 2000)
- Rubatzky, Vincent E. dan Mas Yamaguchi. *Sayuran Dunia, Prinsip, Produksi, dan Gizi Jilid Ketiga*. (Bandung: ITB Bandung, 1999)
- Santoso, Singgih. *Business Forecasting Metode Peramalan Bisnis Masa Kini dengan Minitab dan SPSS*. (Jakarta: Elex Media Komputindo, 2009).
- Simbolon, Drs. Maringan Masry, MM. *Dasar-Dasar Administrasi dan Manajemen*. (Jakarta: Ghalia Indonesia, 2004)
- Siswanto. *Riset Operasi Jilid 1*. (Jakarta: Erlangga, 2007)
- Sudarmodjo. *Pengenalan Sistem Hidroponik [Paper untuk Kalangan Sendiri]*. (Bogor: Parung Farm, 2008)

- Sunarjono, Hendro. *Bertanam 30 Jenis Sayur*. (Jakarta: Penebar Swadaya, 2006)
- Sunyoto, Drs. Danang, SE, SH, MM. dan Drs. Danang Wahyudi, M.Si. *Manajemen Operasional (Teori, Soal-Jawab, dan Soal Mandiri)*. (Yogyakarta: CAPS, 2011)
- Supranto, Johanes. *Riset Operasi untuk Pengambilan Keputusan*. (Jakarta: UI-Press, 2006)
- Sutiyoso, Yos. *Hidroponik ala Yos*. (Jakarta: Penebar Swadaya, 2004)
- Tampubolon. *Manajemen Operasional*. (Jakarta: Ghalia Indonesia, 2004)
- Wahyudi, Sugeng. *PT Kebun Sayur Segar, Sediakan Sayur Terbaik*. 27 Juli 2011.