

**IMPLEMENTATION OF ORGANIC VEGETABLE PRODUCTION SYSTEM USING GOOD AGRICULTURE PRACTICES (GAP) AT PT. TANIKOTA****Anita Arga Putri Sitio\* and Early Rochdiani**

Faculty of Agriculture, Padjajaran University, Indonesia

\*Correspondence Email: [anita18001@mail.unpad.ac.id](mailto:anita18001@mail.unpad.ac.id)

Submitted 10 January 2022; Approved 21 March 2022

**ABSTRACT**

Good Agricultural Practice (GAP) has its own importance when applied in agribusiness with vegetable commodities because it is included in the requirements for supply to modern markets and maintains competition with global markets. The implementation of this GAP comprehensively certainly has its own difficulties in the implementation process in an agricultural area or area. The approach of the GAP is implemented intensively, although not entirely from each agricultural area. The implementation of this study is intended to further enhance the principles of agriculture and gain understanding related to the extent to which workers or business actors in the agricultural sector gain an understanding of the implementation of GAP and the extent to which business entities implement GAP implementation, the reference of which is included in the regulation of the ministry of agriculture number 48/Permentan. /OT.140/4/2009 and the obstacles experienced by business entities in implementing GAP. The research method used in this research is a case study with descriptive analysis. The results of the research show that there are things that are not in harmony and problems in the process of implementing this GAP, where the average percentage that has been able to be done is only 81.84%. The constraints experienced by business entities include: 1) Lack of understanding related to the concept of GAP 2) Logo Prima as a guarantee of food quality does not yet exist, 3) Product results are oriented to domestic needs. The implementation of organic vegetable production using GAP at PT Tanikota still has to be maximized, especially in seeding, planting.

**Keywords:** *GAP, implementation, obstacles, sustainable*

**BACKGROUND**

Many vegetables are cultivated with organic vegetables considering that the results show an increase in public awareness related to health. Sales of organic vegetables in Indonesia show results that have increased by up to 50%. Below is data on the development of the amount of vegetable consumption in the country from 2017 – 2019 which can be seen from Table 1.

**Table 1.** Development of Vegetable Consumption in Indonesia 2017-2019

<b>Food Group</b>	<b>2017</b> (gram/day)	<b>2018</b> (gram/day)	<b>2019</b> (grams/day)
Vegetables	142.3	148.9	150.4

Source: Central Bureau of Statistics (2020)

The things mentioned above make Indonesia have high opportunities and prospects, in terms of continuing to improve and develop vegetable cultivation.

Table 2 provides data on the development of the amount of vegetable production in Indonesia's 5 highest provinces in 2016 – 2020.

**Table 2.** Total Vegetable Production in Indonesia's 5 Highest Provinces in 2016-2020

Province	2018 (tons)	2019 (tons)	2020 (tons)
North Sumatra	1,009,531	1,167,582	1,253,042
West Sumatra	904,151	1,115,709	1,081,898
West Java	19,729,077	20,052,015	4,372,104
Central Java	6,761,529	7,115,576	2,948,930
East Java	10,205,580	10,972,034	3,408,196

Source: Central Bureau of Statistics of West Java Province (2020)

The potential for horticultural types of vegetables in West Java certainly provides many opportunities for agribusiness entities that can process and market. Agribusiness enterprises have a role which is very important in the development of vegetable agribusiness. Currently, many business entities develop organic vegetables. Various agribusiness companies selling organic vegetable agricultural products in West Java can be seen from Table 3.

**Table 3.** Organic Vegetable Agribusiness Companies in West Java

No	Company name	Address
1	PT Bimandiri Agro Sedaya	Jl. Panorama No. 54, Kayuambon, Lembang, West Bandung Regency, West Java
2	Healthy Shop 1000 Gardens	Jl. Bowling No. 26 Arcamanik, Bandung City, West Java
3	PT Tanikota	Jl. Cisitu Indah VI, Dago, Coblong, Bandung City, West Java
4	FAM Organic Home	Jl. Setra Murni Atas No.8, Sarijadi, Kec, Sukasari, Bandung City, West Java
5	Istana Agro (Vegetables Supplier Bandung)	Jl. Notagara I No. 97, Lembang, West Bandung Regency, West Java

Source: <https://www.alamatelpon.com/2020/03/register-peasok-sayuran-segar-bandung>

Based on Table 3, PT Tanikota is included in an Agribusiness business entity that sells various vegetable products with an organic farming system. The application of fully organic vegetable cultivation must follow optimal quality standards in line with existing standards in the application of Good Agricultural Practices (GAP). The application of GAP will produce vegetables that are more durable and profitable for business entities, because having healthy and sustainable plants will become a long-term investment and will increase production capacity. Further agriculture (Sustainable Agriculture) includes efforts to manage natural resources as well as technological and institutional changes in such a way as to provide guarantees for efforts to meet and satisfy further individual needs for present and future generations.

The application of GAP to organic vegetable commodities is an obligation for PT Tanikota, because it has been stipulated in Law no. 13 of 2010 relating to Horticulture, in article 65 it is explained that "The application of horticultural cultivation emphasizes and through efforts to implement cultivation carried out optimally in addition to paying attention to market demand,

efficiency and competitive ability, environmental functions and local wisdom". Permentan 48/2009 stipulates that fruit orchards or vegetable business land that is assessed and continues to comply with the GAP requirements is given a GAP Registration Number by the provincial agency in charge of horticultural crops. The problem that occurs at PT Tanikota at this time is that the implementation of GAP tends to be not optimal, such as the lack of understanding of the concept and meaning of GAP, the absence of a prime logo that guarantees the quality of agricultural products or products, and the various agricultural products produced by farmers are still oriented towards fulfilling domestic needs and the local market and have not been oriented for export. After being aligned with the basics, namely from the problems previously mentioned, until now PT Tanikota has not received GAP certification. If PT Tanikota, which operates organic vegetables, wants to be competitive in the market and be able to compete with other similar business entities and be able to supply retail outlets that sell good quality organic vegetables, then PT Tanikota must try to apply the GAP correctly. The implementation of Good Agricultural Practices (GAP) at PT Tanikota can also increase organic vegetable production and business entity income. The purpose of this study was to determine the implementation of organic vegetable production systems using Good Agriculture Practices (GAP) at PT. Tanikota and knowing the constraints faced by companies in implementing GAP

## RESEARCH METHODS

### Objects and Places of Research

The object of this research is the Implementation of the Organic Vegetable GAP System at PT Tanikota which is located at Jalan Cisitu Indah VI number IA, Dago, Coblong District, Bandung City, West Java.

### Research Design and Methods

The design used in this study is included in the qualitative design. Based on the explanation from Creswell, (2016), qualitative research is included in the type of research that explores and understands the meaning of a number of individuals or groups of people whose origins are from social problems. The research method used in this study is included in the case study. Based on the explanation from Creswell (2016), case studies are included in the research method by carrying out in-depth investigations related to an event, activity, or group of individuals. The cases previously mentioned were limited by activities and time, in the end the researcher had to collect complete information using various procedures and a predetermined time.

### Data Source and Data Collection Method

The data used in this study comes from primary data and secondary data. The primary data source in this study were informants taken from the business entity PT Tanikota. The determination of informants was carried out purposively. Based on the explanation from Setiawan (2005), *purposive* means that the previously mentioned informants were selected on the basis of considerations to achieve the objectives to be achieved by the researcher. Secondary data includes data that is not directly obtained by researchers, namely through literature studies in the form of books, research journals, related agencies, namely the Ministry of Agriculture, BPS, and PT Tanikota or other sources relevant to research. Data collection technique used observation, interview, documentation, and study of literature.

**Data Analysis**

The analysis used to provide an overview of the implementation of vegetable production systems uses Good Agriculture Practices (GAP) and the constraints use descriptive analysis. The purpose of this analysis is to gain an understanding related to the implementation of an organic vegetable production system at PT Tanikota which uses Good Agricultural Practices (GAP) after being harmonized with the basis, namely from Regulation of the Minister of Agriculture No. 48/2009 regarding the scope of guidelines for optimal and correct fruit and vegetable cultivation.

**RESULT AND DISCUSSION**

**Implementation of Good Agriculture Practices (GAP) Organic Vegetable Production Systems**

**Land Alignment**

The main factor in carrying out organic vegetable cultivation is land alignment. Errors in land can cause economic loss, damage to the environment, and can affect the quality and quality of the product. Alignment of organic vegetable land in Permentan no. 48 of 2009 has various important aspects, namely, harmony with climatic conditions, land slope, and soil physics. Observations show that the land compatibility component at PT Tanikota 100% carries out GAP compliance can be seen from Table 4.

**Table 4.** Land Alignment

No	GAP components	GAP compatibility	
		In accordance	Not in accordance
1	Climate	✓	-
2	Land Slope	✓	-
3	Soil Physics	✓	-
Percentage (%)		100	0

Bandung city climate data for 2017-2020 can be seen from Table 5. After syncing denBasically, from Table 5, the cultivation climate of PT Tanikota is included in the administrative area of the city of Bandung, which has a rainfall of 200-1000 mm/month. Rainfall above 200 mm/month can fulfill the needs of water for agriculture. High rain intensity can increase agricultural productivity because optimal irrigation will stabilize the nutrients in the soil (Faradiba, 2021).

**Table 5.** Bandung City Climate Data 2017-2020

Month	2019 year		2020 year	
	Temperature (°C)	Rainfall (mm)	Temperature (°C)	Rainfall (mm)
January	23.7	231.6	25.60	207.6
February	23.8	269.1	25.22	336.6
March	23.6	222.7	25.80	290.8
April	23.9	298.9	25.91	271.4
May	23.9	245.7	25.94	292.3
June	23.3	26.5	25.95	30.3
July	22.7	13,4	25.42	63.7
August	24.0	0.2	26.22	41.6
September	23.8	55.0	26.86	87.7
October	24.9	84.2	25.77	327.3

Month	2019 year		2020 year	
	Temperature (°C)	Rainfall (mm)	Temperature (°C)	Rainfall (mm)
January	23.7	231.6	25.60	207.6
November	24.2	270.7	26.15	207.3
December	23.7	313.5	25.39	261.8

Source: Central Bureau of Statistics (2021)

The best temperature to carry out for organic vegetable cultivation falls within the range of 25-30°C. After being aligned with the basics, namely from observations in the garden that were carried out, the temperature in the morning between 08.00-10.00 WIB ranged from 18 - 24 °C, and related to during the day between 11.00 WIB - 13.00 WIB 21-31°C. The observation results show that the temperature range of the garden at PT Tanikota is included in the optimum temperature for organic vegetable crops. The climate at PT Tanikota helps in carrying out improvements to planting in organic vegetable cultivation which is ultimately in line with the Good Agriculture Practice (GAP) component enacted by the Decree of the Minister of Agriculture no. 48/2009.

PT Tanikota has a land slope of 0-8% on vegetable cultivation land. After being aligned with the basics, namely from Permentan no. 48 (2009), optimal organic vegetable cultivation is carried out on land with a slope of less than 30%. The things that have been mentioned before are intended to simplify the mechanism and prevent erosion which in the end the slope of PT Tanikota's land is aligned with the Good Agriculture Practice component which is called for by the Minister of Agriculture. After being aligned with the base, namely the slope class of the land in the Decree of the Minister of Agriculture (1980), PT Tanikota is included in an area with a class I slope (flat). The slope class of the land can be seen from Table 6.

**Table 6.** Land Slope Class

No.	Class	Tilt	Information
1	I	0-8	Flat
2	II	8-15	Sloping
3	III	15-25	A bit gloomy
4	IV	25-45	Steep
5	V	<45	Very steep

Source: Decree of the Minister of Agriculture no. 837/Kpts/Um/11/1980 (1980)

The erosion rate at PT Tanikota is included in the low category. Based on the explanation from Damayanti, (2005), the level of erosion can be affected by the slope of the slope and the type of soil. The more sloping a place, the lower the erosion rate and vice versa. Various soil conservation guidelines were found after being aligned with the basics, namely from the slope of the slope and the level of erosion as can be seen from Table 7.

**Table 7.** Land characteristics and land conservation after being aligned with the basics

Land Characteristics		Conservation Directive
Slope (%)	Erosion Rate	
0-3	Very light	Fertilization / liming, use of plants, as well as manure and crop rotation
3-8	Light	Management based on explanation of contour lines, crop rotation, terraces after

Land Characteristics		Conservation Directive
Slope (%)	Erosion Rate	
8-15	Currently	being aligned with the basics, namely width, use of mulch, and fertilization
15-30	A bit heavy	Utilization of mulch, crop rotation, terraces after being aligned with the base, namely from the width
30-45	Heavy	Crop rotation, bench terraces with grass reinforcement, grass cover crops, use of mulch, application of organic/inorganic fertilizers.
45-65	So heavy	Bench terraces, cultivation with human power.
>65	X	Permanent ground cover plant. Left in natural conditions.

Source: Putra et al. (2018)

After being aligned with the basics, namely from the characteristics and conservation directives, PT Tanikota was directed to carry out crop rotation as one of the erosion prevention measures. There are two types of crop rotation systems (A and B rotations) so that a wider variety of vegetables can be harvested. Crop rotations A and B are carried out at the same time. Planting was carried out every day for 11 consecutive days using twelve beds planted with different types of vegetables in each plot. Currently PT Tanikota has 132 beds that are ready to be used if they plant every day. It is hoped that PT Tanikota can harvest vegetables almost every week when it enters the harvest season.

PT Tanikota has an andosol soil type. Based on the explanation from Sukarman & Dariah (2014) The origin of andosol soil is volcanic ash with black or dark brown characteristics, light, loose, slippery, and in volcanic areas. Types of plants that can be planted on andosol soil include vegetables, secondary crops, and horticulture. PT Tanikota has various types of vegetable plants (kale, spinach, lettuce, mustard greens, and pakcoy), which in turn are in harmony with the existing soil types and carry out compliance with the components of Good Agriculture Practice (GAP).

GAP components in land preparation in Permentan no. 48 of 2009 includes clear land status, land mapping, land preparation free from waste, land preparation to improve the aeration structure of the soil, and land preparation that does not cause erosion. Land preparation takes place before production activities begin to determine compatible commodity and product systems. Land preparation at PT Tanikota is 100% aligned with the GAP components and can be seen in Table 8.

**Table 8.** Land preparation at PT Tanikota

No	GAP components	GAP compatibility	
		In accordance	Not in accordance
1	Clear land status/HGU	✓	-
2	Land Mapping	✓	-
3	Preparation of land free from waste pollution	✓	-
4	Land preparation to improve soil aeration structure	✓	-

5	Land preparation does not cause erosion	✓	-
Percentage (%)		100	0

The main land preparation component that must be fulfilled in starting a farming business includes clarity on land status. PT Tanikota's plantation land is included in the land owned by a business entity owned by the owner of PT Tanikota, namely Mr. Callum Lukita and has obtained an HGU (Hak Guna Usaha) which is ultimately aligned with the GAP component.

### ***Land Mapping***

Before starting land cultivation, it would be better to first make a sketch/land map with the aim of planning the layout of the garden which includes the boundaries and area of the garden, the location and direction of the terrace layout and the area of the beds, as well as for selecting plant types, calculating seeds, organic fertilizers, vegetable pesticides, cost and number of workers, and so on. The placement of water tanks, the location of nurseries and nurseries must be carefully considered so that plant management is optimal and continues to fulfill garden needs throughout the production period. Land mapping at PT Tanikota was carried out before the start of the farming business and was included in a book and kept in business entity documents which were ultimately aligned with the GAP components. The existence of land mapping can minimize the emergence of problems with land alignment.

Land preparation free from waste pollution. Based on the explanation from Widowati et al. (2018), land that can be used to carry out organic vegetable cultivation includes land that has optimum environmental conditions, both temperature, humidity, radiation, not polluted by chemicals, easy to process and sufficient irrigation. The organic vegetable cultivation system also requires that all farming activities are environmentally friendly and are managed naturally, i.e. without the use of synthetic chemical inputs and genetic engineering. Land preparation at PT Tanikota never uses synthetic chemicals at all and minimizes the amount of waste scattered around the business entity which in turn is in line with the Good Agriculture Practice component.

Land preparation for making improvements to soil aeration structures. Land preparation at PT Tanikota to make improvements to the soil structure is in line with the GAP Components issued by Permentan no. 48 of 2009, namely PT Tanikota carried it out by carrying out land processing. Optimal tillage techniques pay attention to the continuity of production and maintain optimal soil conditions and avoid the loss of essential elements in the soil. Land processing at PT Tanikota includes:

1. The soil was first loosened using hoes and tractors.
2. The loosened soil is then tidied up to make beds ready for planting.
3. The soil is given compost at the top which is then covered tightly using plastic mulch.
4. After about 2 weeks, the mulch is perforated and ready to be planted.

The tillage that is carried out is expected to be able to make improvements to the soil structure to make it more friable and to make improvements to soil aeration. The soft soil structure will make the soil have better porosity which in turn can increase the oxygen content in the soil to help root in vegetables. Land preparation does not cause erosion. Soil tillage that is carried out continuously results in compaction of the soil layer at the bottom of the tilled layer which results in inhibition of root growth and results in erosion and surface water runoff will erode the top soil which results in the soil getting thinner over time, because its nutrients are carried away by water.

There are various types of conservation tillage techniques including zero tillage, strip tillage, mulch tillage, ridge tillage and minimum tillage. However, in the long run, continuous tillage results in compaction of the soil layer below the tilled layer which results in inhibition of root growth. PT Tanikota uses minimum tillage technique. Based on the explanation from Wahyuningtyas (2010), Minimum tillage or minimum tillage is included in tillage only on land used for cultivation or not on all land areas or land management techniques where the mechanism disturbance is kept to a minimum. Minimum tillage tillage can minimize soil damage, maintain soil productivity in order to achieve high production in a limited time, reduce surface runoff and erosion, provide an increase in agricultural land production, and minimize the costs of land preparation, labor, and time.

Land processing carried out by PT Tanikota is in accordance with the components GAP where tillage does not cause erosion because it is carried out in a Minimum Tillage and as efficiently as possible using hoes and tractors in accordance with soil conservation principles, with the principle of increasing the infiltration of water into the soil and reducing runoff due to PT Tanikota makes raised beds for garden plots that help retain water-borne nutrients.

**Nursery**

The nursery at PT Tanikota is 90% aligned with the GAP components and can be seen in Table 9.

**Table 9.** Nurseries at PT Tanikota

No	GAP components	GAP compatibility	
		In accordance	Not in accordance
1	Purity Level	✓	
2	Germination Power		✓
3	High vigor	✓	
4	Seed Selection	✓	
5	Seed Source	✓	-
6	The location is easy to control, well drained,	✓	-
7	Near nurseries, planting areas and flat areas	✓	-
8	Well Drained	✓	-
9	Near a water source	✓	-
10	Soil free of parasitic nematodes.	✓	-
Percentage (%)		90	10

**Seed Preparation**

Based on the explanation of DariSitumeang & Udayana (2015), there are various seed criteria that must be fulfilled in carrying out Good Agriculture Practice. Seed criteria can be seen from Table 10.

**Table 10.** Seed Criteria

No	Seed Criteria	Seeds at PT Tanikota
1	Seed Quality	
	a. Purity level (95%)	98%
	b. Germination Rate (>90%)	80%



No	Seed Criteria	Seeds at PT Tanikota
	c. Vigority	Tall (free from weed seeds, not defective, as well as healthy seeds)
2	Seed Selection	PT Tanikota uses seeds that are certified and free from OPT
3	Seed source	The seeds used are originally from organic cultivation,

The seeds and varieties used by PT Tanikota are seeds that have been certified and have trademarks to guarantee the quality of the seeds, but various types of vegetables that have expensive seed prices, PT Tanikota breeds themselves. After being aligned with the basics, namely from Table 9 above, the seed components that are aligned with GAP are included in 4 components or as much as 80%. Criteria that are not aligned with GAP are included in the germination section, where the seeds at PT Tanikota have germination value of 80% or less than 90%.

### *Seeding*

Seeding procedures based on the explanation from *GAP* those issued by the Indonesian ministry of agriculture include easy-to-supervise locations, near nurseries and planting areas, flat, well-drained places, near water sources, and land free of parasitic nematodes. If viewed from *GAP*, the seeding process at PT Tanikota has carried out 100% compliance with the GAP standard. The hatchery stages that take place at PT Tanikota are included in the following:

1. Seed nursery activities take place in the vicinity of PT Tanikota's garden area, a flat place, and easily supervised by workers using purchased seeds and seeds from PT Tanikota's seed vegetables which have dried up.
2. The purchased seeds are then divided into two places for planting, namely through the tray and directly on the ground that has been provided as a nursery. Nursery activities that take place in trays begin with preparing trays, then mixing compost with manure, as well as preparing what seeds will be planted.
3. After preparing the materials, the first activity carried out was by putting a mixture of compost and manure into the tray and then leveling it to avoid parasitic nematodes.
4. The second activity made holes in each box on the tray, then put 2 seeds in each hole and then closed it again.
5. Finally, flush the tray that already contains the seeds to keep it moist. The difference between nursery activities carried out on trays and seeds directly on the ground is only the part of the planting on the tray that is converted to planting through the sowing process on the ground.

The activity of planting seeds that originate from seed vegetables that have dried up begins with separating the seeds from the original plant which is then carried out through a nursery through trays and directly on the ground. The materials used are the same as the seeds purchased from outside.

### *Planting*

Deep planting components *GAP* based on the explanation from the Minister of Agriculture no. 48 of 2009 covers cultivation techniques that conform to recommendations, proper planting season, anticipation of environmental stress, pre-planting treatment and recording of planting. After being aligned with the basics, namely from observations of the five GAP components above that have been

implemented at PT Tanikota, it is included in 60%, because the cultivation techniques and recording section are still not aligned with the GAP components and can be seen in Table 11.

**Table 11.** Planting at PT Tanikota

No	GAP components	GAP compatibility	
		In accordance	Not in accordance
1	Cultivation Technique as recommended	-	✓
2	The growing season is right	✓	-
3	Anticipate stress from drought, flooding, flooding or stress from abiotic factors	✓	-
4	Treatment before planting avoid opt	✓	-
5	Planting Records	-	✓
Percentage (%)		60	40

Planting at PT Tanikota was carried out through the following process:

1. Beds are perforated as deep as 2 cm. Beds are included in the place where plants grow.
2. The distance between plants is included in 50 x 50 cm.
3. The next activity is to move the seeds that have been sown before, usually two plant seeds are given in each hole as an anticipation if one of the seeds in the hole dies.
4. After carrying out the transfer then the holes in each bed are closed again and maintenance is carried out until harvest.

Based on the explanation of DariSitumeang & Udayana (2015), the procedure for planting organic vegetables is to have plant holes 2-3 cm deep with a distance between plants of 70 x 60 cm. The planting carried out at PT Tanikota has followed the recommended cultivation techniques in terms of the required seeds for each plant, but the distance between plants has not been in accordance with the recommendations given.

**Right Planting Season**

Based on the explanation from Gratitude and Jasmine (2016) Organic vegetable planting patterns include monoculture and intercropping. The monoculture pattern includes one type of vegetable commodity in one plot, and is related to the intercropping pattern consisting of various types of vegetable commodities in a predetermined plot. The intercropping cropping pattern is intended to optimize the utilization of each bed, to break pest cycles and to prevent nutrient competency. The intercropping cropping pattern is recommended to comply with various requirements, namely the type of fruit vegetables is intercropped with leafy vegetables, root vegetables are intercropped with leafy vegetables, root vegetable plants namely fiber are intercropped with single root vegetable plants, Vegetable plants with a long lifespan (one season/three months) are intercropped with short-lived vegetable plants (three weeks), and shade-tolerant plants are intercropped with taller plants. PT Tanikota also carried out a monoculture and intercropping cropping pattern in line with the recommended organic vegetable cropping pattern which in turn was in line with the GAP component.

*Anticipate stress from drought, flood, flooding or stress from biotic factors.* PT Tanikota in its cultivation process uses raised beds to anticipate stress from drought, flooding, flooding or stress from biotic factors. Based on the explanation from Widowati et al. (2018), beds function to prevent erosion and prevent the flow of water to the surface which in turn can prevent flooding. Which in the end PT Tanikota aligned with the GAP component.

*Treatment before planting to avoid OPT.* PT Tanikota, before planting, first makes a mixture of compost and manure in the seeding process to avoid parasitic nematodes or carry out pre-planting treatment to avoid OPT when the plants have started to grow which in the end is in harmony with the component sGAP.

**Planting Records**

Cultivation techniques that are in line with recommendations must be equipped with optimal recording. All planting activities must be recorded which includes the time and date of planting, the location of planting, even the name of the operator in charge of carrying out the planting. Recording activities are carried out to provide convenience in maintenance schedules, consideration for replanting, determining harvest times and other agronomic activities. Previously, PT Tanikota had not recorded planting activities, but starting in July 2021, PT Tanikota had recorded all activities in Microsoft Excel, however, it had not been carried out in a complete and consistent manner, which in the end was not aligned with the GAP component.

**Fertilization**

Deep fertilization componentsGAPbased on the explanation from the Minister of Agriculture no. 48 of 2009 covers the use of organic fertilizers, fertilization according to recommendations, fertilizers stored separately from agricultural products, found directions for the use of fertilizers, and fertilization records. the GAP components above that have been implemented at PT Tanikota are included in the 40%, because the fertilization section is according to recommendations, fertilization directions, and fertilization records are not aligned with the GAP components and can be seen in Table 12.

**Table 12.** Fertilization at PT Tanikota

No	GAP components	GAP compatibility	
		In accordance	not in accordance
1	Using organic fertilizers	✓	-
2	Fertilize as recommended	-	✓
3	Fertilizers are stored separately from agricultural products	✓	-
4	There are instructions for the use of fertilizers	-	✓
5	Fertilization record	-	✓
Percentage (%)		40	60

*Organic fertilizer.* Fertilization is useful for carrying out the fulfillment of the nutrients needed by plants so that they are sufficient for their development and growth. PT Tanikota in the fertilization process uses organic-based fertilizers as a whole which in the end is in harmony with the GAP components. The organic fertilizers mentioned earlier are made and processed by PT Tanikota themselves.

*Fertilize as recommended.* Fertilization at PT Tanikota does not yet have any recommendations or provisions regarding fertilization. The workers fertilize when they feel the plants need to be fertilized. The fertilization component is in accordance with PT Tanikota's recommendations, but it is still not in line with GAP's recommendations.

*Products are stored separately from agricultural products.* The fertilization site at PT Tanikota has a different location from the planting and storage of vegetable products, which in turn is aligned with the GAP component. In the composting section, PT Tanikota has been able to independently prepare almost all materials except manure. The activity of making compost starts with preparing wild plants, straw, and banana leaves which are then cut into small pieces before being put into the composting pit. In addition to these ingredients, PT Tanikota mixes manure consisting of chicken, sheep or goat manure, and cows to add nutrients to the organic fertilizer. The composting site is divided into 4 sections. The first part is a place for compost that has just been made until it is 1 week old. The second part is for compost which is 1 – 2 weeks old. The third part is for compost which is 2-3 weeks old and the fourth part is for compost which is 3-4 weeks old. Composting activities are carried out once a week.

*Fertilizer utilization direction found.* PT Tanikota does not have directions in using it but still uses the feeling, the things that were mentioned earlier were said by Jajang as one of the Field Workers at PT Tanikota. *"We don't have a dose for fertilization, so it's just in line with the feeling"*. Fertilization directives that do not yet exist make this component not aligned with the GAP component.

*Fertilization Recording.* PT Tanikota does not yet have records for fertilization that has been carried out and will be carried out which in the end is not yet aligned with the GAP component.

**Water Management**

Procedures for water management based on the explanation from the GAP issued by the Minister of Agriculture no. 48 of 2009 includes the availability of water in accordance with the needs of plants, irrigation water does not contain hazardous waste, the use of irrigation water is not related to interests. The GAP component, water management at PT Tanikota has complied with the GAP standard as a whole or 100% complied with the GAP and can be seen in Table 13, namely that the water in the plants is well-sufficient, the water has optimal quality, and the use of water is unrelated with the local community.

**Table 13.** Water Management at PT Tanikota

No	GAP components	GAP compatibility	
		In accordance	Not in accordance
1	Availability of water in accordance with the needs of plants	✓	-
2	Irrigation water does not contain hazardous waste materials	✓	-
3	The use of water for irrigation is not contrary to the public interest	✓	-
Percentage (%)		100	0

*Availability of Water in Accordance with Plant Needs.* The availability of sufficient water for plants at PT Tanikota is in line with the GAP component. The source of water used by PT Tanikota is originally from the Cikapundung river, which in the end the need for water during the cultivation process can be fulfilled, besides that the minimum rainfall in a PT Tanikota cultivation is included in the administrative area of the city of Bandung which has a rainfall of 200-1000 mm/ month. Rainfall above 200 mm/month can fulfill the needs of water for agriculture. High rain intensity can increase

agricultural productivity because optimal irrigation will stabilize the nutrients in the soil (Faradiba, 2020).

*Irrigation Water Does not contain Hazardous Waste.* Based on an explanation from BPS (2020), the Cikapundung River has slightly polluted water quality. Cikapundung river water is starting to get polluted due to waste from the community's household waste, but because it is still lightly polluted which in the end the waste is not dangerous for plants and causes this component to be in harmony with the GAP component. The results of water quality tests in 5 major rivers in West Java can be seen from Table 14.

**Table 14.** Water Quality Test Results in 5 Big Rivers in West Java Region

No	River Name	Water quality status
1	Cikapundung River	Light Black
2	Cicadas River	Light Black
3	Cinnambo River	Light Black
4	Civastra River	Medium Black
5	Cipedes River	Light Black

Source: BPS (2020)

*Utilization of Non-compliant Water is related to Public Interest.* So far, the use of water at PT Tanikota has not received any complaints from the community for irrigating plants that originate from sources of drinking water or household needs of the surrounding community, which in the end are in harmony with the componentsGAP.

**Plant Protection**

Alignment of Plant Protection components withGAPissued by the Minister of Agriculture no. 48 of 2009 includes that the use of pesticides is kept to a minimum or not used at all, OPT control measures are carried out according to recommendations, do not cause disruption to human health, and do not cause environmental damage. The GAP components related to OPT at PT Tanikota have complied with the GAP standard as a whole or 100% have complied with the GAP, it can be seen from Table 15.

**Table 15.** Plant Protection at PT Tanikota

No	GAP components	GAP compatibility	
		In accordance	Not in accordance
1	The use of pesticides is kept to a minimum or not at all	✓	-
2	OPT control measures are implemented as recommended	✓	-
3	Does not interfere with human health	✓	-
4	Does not cause disturbance and damage to the environment.	✓	-
Percentage (%)		100	0

*The use of pesticides is carried out as minimally as possible or not at all.* PT Tanikota is a business entity that focuses on selling organic vegetables. All activities related to plants are carried

out organically or without using pesticides at all, to minimize pests that can damage plants PT Tanikota uses Liquid Organic Fertilizer (POC). The use of pesticides that are not implemented at all is in line with the expected GAP components.

*OPT control measures are carried out in accordance with the recommendations* The pest control process is carried out with assistancesprayin order to speed up the process of administering drugs to the plants mentioned earlier. Utilization is adjusted based on the description of the type of plant, generally held once a week.

In making Liquid Organic Fertilizer (POC), you need leftover vegetables that can no longer be sold, protein obtained from snails, brown sugar, and water. First the leftover vegetables are put into the container. Second, put the brown sugar on top of the leftover vegetables. Third, put water and snail protein into a container with a ratio of 1: 3 water, 1: 3 leftover vegetables, and 1: 3 brown sugar. Finally, close the container and let stand for 2 weeks.

*Does not cause disruption to human health.* The use of POC in controlling pests will not leave residues on crop yields which are ultimately safe for human health. The liquid organic fertilizer used by PT Tanikota is in line with the GAP component, where the control is free from harmful chemicals which are ultimately safe for human health when spraying.

*Not Resulting in Disturbances and Damage to the Environment.* Organic fertilizers are included in fertilizers with basic ingredients taken from nature with the amount and types of nutrients contained naturally which in turn are included as one of the most important ingredients in efforts to improve soil fertility. Organic fertilizers that help improve soil fertility mean that they do not cause damage to the environment and are in harmony with the GAP components.

**Harvest**

Deep harvest componentsGAPbased on the explanation from the Minister of Agriculture no. 48 of 2009 covers harvesting methods to avoid contamination of the product, harvesting while maintaining product quality, and harvesting containers in good and clean condition. After being aligned with the basics, namely from observations of the three components of the harvest GAP that has been implemented at PT Tanikota, it is included in 66.6%, because the harvesting section through the process of being able to defend product quality is not aligned with the GAP components, it can be seen in Table 16.

**Table 16.** Harvest at PT Tanikota

No	GAP components	GAP compatibility	
		In accordance	Not accordance with
1	How to harvest avoid contamination of the product	✓	-
2	Harvesting in a way that can maintain product quality.	-	✓
3	The harvest container is in good condition and clean	✓	-
Percentage (%)		66.6	33.3

Harvesting is done when the vegetables are of the right age to get optimal quality. Determination of harvest time can be done through the process of observing the physical appearance of vegetables and the age of the plant. The harvesting techniques carried out at PT Tanikota are included in the manual method carried out by the workforce, starting from sorting, cleaning, and

grouping. Manual harvesting methods help reduce damage to products that will be given to consumers, which in turn is in line with the GAP components. Harvesting organic vegetables at PT Tanikota goes through various stages before being given

#### 1. Sorting

The sorting activity is carried out by selecting which vegetables have good quality and which have poor quality. In the sorting activity, 3 types are divided, namely:

- a. Vegetables in good condition
- b. Vegetables with unfavorable conditions
- c. Rotten vegetables.

Vegetables in optimal conditions later will be packaged and then sent directly to consumers, vegetables in poor condition and not selling well will be sent to the market for resale, and vegetables in rotten conditions will be used as organic compost. This sorting is carried out by looking at the physical condition of the vegetables previously mentioned, whether the products are clean or not, defects or slight rot are found, the sizes of the products mentioned earlier are in line with consumer demand or not, and the products are found to have pests or not.

#### 2. Cleaning

After going through the sorting stage, the next activity is cleaning the harvested vegetables so that they are free from the dirt that sticks to the vegetable products mentioned earlier such as soil or other dirt and removing small pests that stick to the vegetable products mentioned previously. Cleaning is carried out through a process of rinsing with water on the dirty parts, for various plants whose fruit grows below the surface of the soil, washing must be carried out extra and many times until it is clean from adhering soil, besides that cutting or cutting is also carried out on the long creeping roots.

#### 3. Grouping

Furthermore, after going through the sorting and cleaning stages, the products are grouped again according to the demands of each consumer. This grouping is carried out in accordance with consumer requests in terms of size, weight and other physical conditions.

*Harvesting through the process of doing defense against product quality.* Vegetables that are harvested are included in vegetables that have been ordered by consumers in advance. As a result, many vegetables that should be fit for harvest are delayed and result in rotten and unused vegetables. Rotten and unused vegetables, of course, reduce the quality of the vegetables previously mentioned which in the end are not in line with the expected GAP component, namely to protect product quality.

*Harvest Containers are in Good and Clean Condition.* At PT Tanikota the harvest containers are cleaned first to take the vegetable products will be harvested which in the end the container is clean and in accordance with the GAP components.

#### ***Post-harvest***

The post-harvest component in the GAP is based on an explanation from the Minister of Agriculture no. 48 of 2009 covers packaging that is consistent and can protect the product from damage and contaminants, the packaging is labeled that explains the identity of the product, the packaging area is clean, the packaging area is separate from the fertilizer storage area, and the storage area is able to protect the product from damage and contaminants. After being aligned with the basics, namely from observations of the five post-harvest GAP components that have been implemented at

PT Tanikota, it is included in 80%, because the product labeling section is not aligned with the GAP components, it can be seen from Table 17.

**Table 17.** Post Harvest at PT Tanikota

No	GAP components	GAP compatibility	
		In accordance	Not in accordance
1	Proper packaging can protect the product from damage and contaminants	✓	-
2	The packaging is labeled that explains the identity of the product	-	✓
3	The packaging area is clean, free of contamination and protected from pests	✓	-
4	The packaging area is separate from the fertilizer storage area	✓	-
5	Storage space is able to protect products from damage and contaminants.	✓	-
Percentage (%)		80	20

*Packaging protects the product from damage and contaminants.* Packaging at PT Tanikota is carried out on products that have been washed clean for the packaging process. Packaging at PT Tanikota uses plastic of various sizes ranging from small to large, with many sizes of plastic at the time of packaging will help product packaging to be protected from damage and contaminants which in turn harmonizes with GAP components.

*The packaging is labeled that explains product identity.* Optimal packaging is included by including a label as product identity. PT Tanikota does not yet have plastic packaging that uses a business entity identity label, which in the end the post-harvest process of this component is not aligned with the other components. *GAP.*

*Clean packaging, free from contamination, and protected from pests.* The packaging of organic vegetables at PT Tanikota uses clean plastic, and is free from contamination by fertilizers and pesticides, which in turn are in line with GAP components.

*Packaging Place is separate from Fertilizer Storage.* The packaging at PT Tanikota is located far from the place where fertilizer is made and stored. Fertilizer manufacture and storage of fertilizers have a place far from the packaging site and land which is ultimately aligned with the GAP component.

*Storage space able to protect sari products damage.* PT Tanikota stores its products before consumers want to pick them up. PT Tanikota uses a coolbox to store organic vegetable products so that the vegetables are still fresh, which in turn is in harmony with the GAP components because the storage space protects the products from damage.

**Constraints of Good Agriculture Practices (GAP) within the Company**

***Understanding related to the concept of GAP***

*Good Agriculture Practices* still sound common to the workforce at PT Tanikota. The following is one of the opinions based on the explanation from the informant Jajang who is included in the workforce at PT Tanikota.



*“GI know that I am GAP or what are the optimal farming methods, what do I do, I don't know”*.<sup>1</sup>

The opinion previously mentioned explains that PT Tanikota's plantation workers do not really understand what the intent and purpose of Good Agriculture Practice is. The understanding of PT Tanikota's workforce is still lacking for the GAP implementation of organic vegetable production starting from the selection of production areas, land preparation, nurseries, planting, fertilizing, water management, plant protection, to harvest and post-harvest. Which in the end there is a decrease in the quality of organic vegetable production and crop yields which results in less than optimal labor income.

### ***Prima Logo as Food Quality Assurance***

Food safety is included in the main matters in the provision of trade in food products. As a business entity providing food, the results of agricultural food business must obtain quality assurance of agricultural food products. Business entities that have food quality assurance are marked by the presence of a prime logo on the products of the aforementioned business entities. The objectives of implementing the prime certification mentioned earlier include providing quality assurance and food safety, providing guarantees and protection for the public/consumers, facilitating the tracing back of possible product quality and safety deviations, and carrying out improvements to added value and product competitiveness. Based on explanations from observations and interviews that have been conducted with Christoper informants as Director of Operations, PT Tanikota does not yet have a prime logo to guarantee the quality of food quality for business entities.

*"Not yet, PT Tanikota does not yet have a prime logo"*<sup>2</sup>

The stages to get the Prime Certification that must be passed by the farming business actors are that the farming business actors have implemented the GAP, SOP and garden registration, the farming business actors submit applications for certification, prepare for assessments, carry out assessments, report assessments, certify decisions, and submit certificates. Prima certificates are obtained by business entities by following the set standard guidelines. There are three defined activity groups, namely recommended (A), highly recommended (SA), and mandatory. The Prima One certificate found 12 mandatory activities, 103 highly recommended activities, and 64 recommended activities. The Prima Dua certificate found 12 mandatory activities, 63 highly recommended activities, and 39 recommended activities. The Prima Tiga certificate found 12 mandatory activities, 29 highly recommended activities, and 15 recommended activities.

### ***The Agricultural Products Produced are Oriented towards Fulfilling Domestic Needs and the Local Market are not yet Export Oriented***

At PT Tanikota, product sales are still limited to the Bandung Regency area. The sales process is through distributors, retail, and through social media (whatsapp, Instagram, and Facebook). Based on the explanation from (Director General of Horticulture, 2009), one of the objectives of having Good Agriculture Practice is included to increase competitiveness and opportunities for acceptance by international and domestic markets. The application of Good Agriculture Practice will assist PT Tanikota in expanding its marketing orientation, the things that have been mentioned previously are in line with the vision of the business entity, namely "To become a leading provider of self-sufficient

---

<sup>1</sup>Jajang: Field Worker at PT Tanikota

<sup>2</sup>Christoper : Director of Operations, PT Tanikota

community-based Ecological Agrotourism education services throughout Indonesia and Southeast Asia."

## CONCLUSION AND SUGGESTION

From this research, the conclusion are:

1. The organic vegetable production implementation system at PT Tanikota is 81.84% or has not implemented the GAP properly, because at the production stage there are still components that are not in accordance with the GAP assessment. Factors that become constraints are on the part of the seed, planting, fertilizing, harvest and postharvest.
2. Constraints at various stages of production resulted in production results obtained not in accordance with company targets. Constraints at the production stage are caused by several things, namely, the lack of understanding of the workforce regarding organic vegetable cultivation and the application of GAP, the absence of a prime logo which is a guarantee for product quality from the company because PT Tanikota does not yet have a GAP certificate, as well as the production results of PT. Tanikota is still only marketed to the city of Bandung.

From this research, the suggestion are:

1. The implementation of organic vegetable production using GAP at PT Tanikota still needs to be maximized, especially in:
  - a. Seeding, namely by selecting vegetable seeds with higher germination quality, for example the Daily Farm brand because the germination power of these brands is at 85-90%.
  - b. Planting, namely by improving vegetable cultivation techniques, especially in terms of plant spacing, changed to a size of 70 x 60 cm, as well as carrying out consistent recording of all organic vegetable cultivation activities starting from land management to post-harvest.
  - c. Fertilization, namely by carrying out the recommendations for the correct dosage of fertilizer for vegetable plants, including: fertilizing approximately 10 days after being transplanted, preferably with a high nitrogen content. Fertilizers that have high nitrogen, namely chicken manure at a dose of 200 g/plant or fermented organic compost, and make fertilization records every time the plants are given fertilizer.
  - d. Harvest and postharvest, namely the harvest component by providing records to evaluate and find out the advantages and disadvantages of the time of harvesting. Evaluation results can later be compared so that it can be known when to harvest and how to harvest the most economically profitable. In post-harvest, it is necessary to provide packaging labels to provide identity to the product.
2. Obstacles that hinder PT Tanikota in implementing GAP can be overcome by providing and introducing the importance of implementing GAP in an agricultural cultivation business, providing socialization to workers regarding GAP, carrying out certification to get a prime logo so that product quality is guaranteed, and expanding the target marketing.

## REFERENCES

- Central Bureau of Statistics of West Java Province. 2020. West Java in Figures, BPS West Java Province. BPS West Java Province.
- Creswell, J. W. 2016. *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches* (4th ed.). United States of America: SAGE Publications Inc.

- Damayanti, L. S. 2005. Study of Andosol, Latosol and Grumosol Soil Erosion Rates for Various Degrees of Slope and Rain Intensity in Semarang Regency. Doctoral Dissertation, Postgraduate Diponegoro University.
- Faradiba. 2021. Analysis of Rainfall Patterns on the Productivity of Paddy Fields in West Java Province. Proceedings of the 2nd Annual Conference on Blended Learning, Educational Technology and Innovation, 4(2), 234-238.
- Horticulture, D. J. 2009. Directorate General. Horticulture Directorate of vegetables.
- Ministry of Agriculture. 2009. Regulation of the Minister of Agriculture of the Republic of Indonesia Number 48 of 2009 relating to Guidelines for optimal cultivation of Fruits and Vegetables
- Putra, A., T. Triyatno, A. Syarief, & D. Hermon. 2018. The Erosion Assessment has been aligned with the basics, namely the USLE Method and Conservation Guidelines for the Upstream Cold Water Basin of Padang City, West Sumatra. *Journal of Geography*, 1–13.
- Setiawan, N. 2005. Sampling Technique. Inspectorate General of the Ministry of National Education.
- Situmeang, Y. P., & I. G. B. Udayana. 2015. Organic vegetable production technology. 3(1), 1–9.
- Sukarman & A. Dariah. 2014. Andisol Soils in Indonesia (Issue October 2014).
- Syukur, M., & M. M. Putri. 2016. Development of Organic Vegetables. Bogor: IPB Press Publisher.
- Wahyuningtyas, R. S. 2010. Preserving Land with Conservation. *Land Cultivation*, IV, 81–96.
- Widowati, L. R., D. Setyorini, W. Hartatik, J. Purnomo, U. H. Wiratno, & Samsudin. 2018. Organic Vegetable Cultivation System. AARD Press.