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Economic Calculation of Tea Plant Cultivation

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Introduction

Abstract

Tea is one of the most important economic industrial plants. From this plant is taken leaves are still young. Then processed and used for delicious beverage ingredients. Expenditure of cost in cultivation is relatively low cost. In addition, tea is also exported and generates foreign exchange for the country. The need for tea inside and outside the country continues to increase. Therefore, the cultivation of the climate plant is expanded and improved. Tea plant because it comes from sub tropical, hence suitable planted in mountainous area. An outline of growing conditions for tea plants is and soil compatibility.

Tea plants generally can start picking the leaves continuously after the age of 5 years. With good maintenance the tea plant can give enough tea leaves for 40 years. Tea gardens therefore need to always obtain fertilization regularly, free of pests of plant diseases, obtain good pruning, obtain sufficient rainfall.

be planted in Japan. Europeans know tea in the 16th century. Tea has 2 varieties, namely: varieties Sinensis and Assamica varieties. Teh assamica is the most widely grown in Indonesia.

Key words : cost, economic, european, industrial, picking,

A. Condition of Tea Cultivation

Subandi, Setiati, Mutmainah. (2017) said that biological pest control is important as in the research of Suitability of *Corcyra cephalonica* eggs parasitized with *Trichogramma japonicum*. And Subandi (2011) said plantation is contributed considerable amount of money (revenue) that Notes on Islamic Natural Based and Agricultural Economy.

And Climate for proper tea cultivation ie with rainfall not less than 2,000 mm / year. Plants require bright sun. Daily air temperature of tea plant is 13-25o C. Humidity less

Tea gardens need to be rejuvenated after the tea plant is 40 years old and above. After the 18th century, tea was known throughout the world. First only in mainland China and India. In the 9th century tea began to

than 70%. For planting media suitable soil for tea is Andisol, Regosol, and Latosol. But tea can also be cultivated in podsollic soil (Ultisol), Gley Humic, Litosol, and Aluvia.

Tea loves the soil with a thick layer of top, crumb structure, clay to dusty, and loose. The degree of land similarity (pH) ranges from 4.5 to

B. Objectives

1. To know the growing condition of tea
2. To know the morphology of tea
3. To know the taxonomy of tea
4. To know how plant propagation is vegetative and generative
5. To know the maintenance of tea
6. To know the control of pests and diseases of tea plants
7. To know how to harvest and post-harvest tea processing

6.0. Based on the height of the place, tea plantation in Indonesia is divided into three areas, namely lowland to 800 m asl, da-taran medium 800-1200 m asl, and plateau more than 1,200 m asl.

Differences in altitude lead to differences in growth and quality of tea. The height of the place depends on the clones, the tea can grow in the lowlands.

B. Tea Taxonomy

Division: : Spermatophyta
Sub division : Angiospermae
Class : Dicotyledoneae
Sub Class : Dialypetalae
Order : Clusiales
Familia : Theaceae
Genus : Camellia
Species : Camellia sinensi

C Morphology

Tea plant shaped trees. The height can reach a dozen meters. But the tea plantations in the plantations are

always pruned to facilitate picking, so the height is only 90- 120 cm. The crown of the cone-shaped tea plant. The leaves are jorong or slightly ovoid inverted / lanceolate. Leaf edge serrated.

surface of old leaves is smooth and not hairy anymore. Single flower and there are arranged in small series. Flowers emerge from leaf axillary. The color is pure white and smells of soft scent. However, there are pink colored flowers. The crown of flowers amounted to 5-6 strands. Pistil with long or short stems and on the head there are three fins. Number of stamens 100 - 200. quickly decline and easy tea seeds become rotten

Tea fruit in the form of green fruit will break by itself and the seeds come out. The seeds are round or flattened on one side, white when young and turn brown after age.

The roots of tea are taproots and have many branch roots. If the root of the rope breaks, the roots of the branch will replace its function with the original grown direction (horizontal) downward (vertical). The roots can grow big and deep enough. brown box fruit. In one fruit contains one to six seeds, an average of three seeds. The ripe and dried

D Generative Plant

Tea plants can be propagated generatively or vegetatively. In the multiplication generatively used planting material from seed, whereas vegetative propagation is used

seeds are black and shiny

b. Contains full, with white seed content.

c. It has a specific gravity greater than water, so when it is inserted into the water will drown.

d. Have a normal shape and size.

e. Not infected by disease, fungi or seedling. Seeds collected for seed are seeds that have fallen to the ground, collected regularly every day, the seeds used are good seeds. We recommend seeds soon sowing because the power of tea seed sprouts

E. Vegetative Plant

Vegetative propagation of tea using one leaf cuttings is recommended. In addition, such vegetative seeds have the same character with the parent so that the potential yield, quality, and resistance to pests and diseases are guaranteed. Plant growth is also uniform so easy to manage it. The seeds used must meet the following requirements:

Is a superior clone that has been released as seeds of development by the Minister of Agriculture.

material of plant origin of clone cuttings. Good seed is characterized by several characteristics, among others:

Seed taken from plants that have been managed specifically and trimmed 4 months before.

Seeds should be certified and labeled before they are ready to be transported and planted in the field. This is a guarantee of the quality of the seed. The tea seed comes from a propagation plant that has been kept until the age of 2 years. After done clean cut as high as 50-60 cm. The cutting cuttings begin to be taken 4 months after the pruning, with the feature of the primary branch at the base of the base already seen brown.

a. Cutting and cutting

The selected cuttings are in the middle of the shrub (2/3), cut as high as 15 cm from the crop field (brown and green border)

Selective cuttings are taken selectively, which grows healthy, erect upward and leafy smooth, dark green and shiny.

Twigs of cuttings taken immediately inserted into labeled plastic bags and given clone description.

Cutting of cuttings is done in the morning (07.00-10.00) and evening (hours 4:00 to 5:00 pm).

From 1 stick cuttings can be produced 4-6 cutting. Cutted seeds taken along 1 segment and has 1 leaf,

Derived from a propagation Garden that has been purified and designated as a garden Seed source.

The base and the end are not used.

Seed cutting is done with a sharp knife by cutting each segment with a single sheet of leaves along 0.5 cm above the leaf and 4-5 cm under the armpits leaves with a slope of 45° (the pointed portion towards the outside / top of the leaf).

The cut seeds are accommodated on a bucket of clean water and soaked maximum 30 minutes and can be planted in the seedbed

b. Seedlings

Before the seeds are ready to be planted, the seedbed and polybag should be prepared first.

Prepare two large buckets, one of which is filled with clean water and other bucket filled with a solution of the substance growth regulator (ZPT). Dip the tea seeds into the first bucket and then into the second bucket for 1 minute.

Setek planted by placing the stem into the ground in polybags with leaves facing towards the hand, the direction of the leaf should be upward and not cover each other to another.

After planting then sprinkled with clean water and kept so that the cuttings do not waver.

Beds immediately closed with plastic hoods for 3-4 months depending on growth, only opened if

comes from the center of the colored twig dark green.

\$ After the seeds are 6-7 months old, the selection of plants is done. Seeds with min height. 15 cm ready to be adapted to the sun by opening shade in a way gradually. Seed ready for planting after 8 months, minimum height 30 cm and 5 leaf, visually healthy, done stocky and jagur, and has a minimum of 2 pseudo-rooted roots and no swelling callus.

Cost Expenditure to Cultivate Tea in Indonesian Rupiah (IDR)

No	description	unit	Volume	Unit price (IDR)	Amount (IDR)	Description
1	2	3	4	5	6	7
1	Wages of labor					land area Hatcher y 1 ha for Planting cutting
	1 mapping survey	HOK	5	40,000	200,000	
	2. Land Opening	HOK	80	40,000	3,200,000	
	3. drainage making	HOK	25	40,000	1,000,000	
	4. Making naungan	HOK	265	40,000	10,600,000	
	5. Preparation	HOK	160	40,000	6,400,000	
	6. Soil media procesing	HOK	365	40,000	14.600,000	
	7. Charging Polybag	HOK	1000	40,000	40,000,000	
	8. Making beds	HOK	135	40,000	5,400,000	
	9. Preparation of Polybag	HOK	1200	40,000	48,000,000	
	10. Making Hoods	HOK	235	40,000	9,400,000	
	11. Witholding of	HOK	500	40,000	20,000,000	
	12. Planting	HOK	300	40,000	12,000,000	
	13. Maintenance of	HOK	1460	40,000	58,400,000	
	14. seed selection	HOK	320	40,000	12,800,000	
	15. Supervision of	HOK	1497	40,000	59,880,000	
	Total		7547		301,880,000	

No	description	unit	Volume	Unit price (RP)	Amount (Rp)	Description
1	2	3	4	5	6	7
II	Materials					
	1 cutting	Set	600,000	250	150,000,000	
	2. Polybag.	Kg	1,000	19,000	19,000,000	
	3. Land Topsoil.	M3	300	100,000	30,000,000	
	4. Sand	M3	300	135,000	40,500,000	
	5. Plastic Cover	Roll	20	400,000	8,000,000	
	6. Urea Fertilizer	Kg	340	1,600,	544,000	
	7. TSP Fertilizer	Kg	340	2,000	680,000	
	8. Fertilizer Kcl	Kg	340	5,500	1,870,000	
	9. Fertilizer ZA	Kg	150	1,400	210,000	
	10. Amopos	Kg	150	1,500	225,000	
	11. Zink Sulfate (zn)	Bottle	10	1,089,400	10,894,000	
	12. ZPT Atonik	Bottle	12	300,000	3,600,000	
	13. Insektisida	Liter	30	220,000	6,600,000	
	14. Basamid	Packaging	300	60,000	18,000,000	
	15. Vavam	Kg	340	220,000	74,800,000	
	16. Fungisida	Kg	270	220,000	59,400,000	
	17. Trimaton	Kg	170	220,000	37,400,000	
	18. Cast powder	Kg	700	3,850	2,695,000	
	19. Akarisdal 1	Kg	30	220,000	6,600,000	
	20. Bamboo big	Stem	400	45,900	18,360,000	
	21. Bamboo small	Stem	280	17,100	4,788,000	
	22. Paranet	Roll	111	375,000	41,625,000	
	23. tuk injuk	Roll	2400	10,000	24,000,000	
	24. Ter	Liter	114	12,000	1,368,000	
	25. Repotch of	Roll	30	15,834	475,020	
	26. Wire Rope i	Meter	750	2,000	1,500,000	
	27. Wire Sift 2	Meter	10	25,000	250,000	
	28. Nails of various sizes	Kg	50	25,000	1,250,000	
	Amount II				564,634,020	

III	Land					
IV	Tools					
	1.piau Setek	Fruit	15	250,000	3,750,000	
	2.Hand sprayer	Fruit	2	572,000	1,144,000	
	3.Hot of l	Fruit	4	71,500	286,000	
	4.Garpu	Fruit	4	107,250	429,000	
	5. Shovel	Fruit	2	55,100	110,200	
	6.Hawbill	Fruit	1	32,000	32,000	
	7.gelok.	Fruit	1	100,000	100,000	
	8.Ember	Fruit	8	17,000	136,000	
	9.Gembor	Fruit	6	30,000	180,000	
	10.Fine doses of	Fruit	1	3,000	3,000	
	11.Small Balance	Fruit	1	200,000	200,000	
	12. Sanding Angle	set	2	25,000	50,000	
	13.Drum	Fruit	8	90,000	720,000	
	Meter Roll	Fruit	1	99,000	99,000	
	15. Plastic hose	Meter	100	1,700	170,000	
	JUMLAH III		156		7,409,200	
	TOATAL JML I+II+III				873,923,220	
The cost of seeds			Rp.2.081			

Crops (Means of cultivation)

1. Fertilization

Subandi, Nella Purnama Salam, Budy Frasetya (2015) explained the availability of nutrients depend on liquid condition of soil as described in paper entitle Pengaruh Berbagai Nilai EC (Electronic Conductivity) terhadap Pertumbuhan.

To meet the needs of plants for nutrients, fertilization on the cultivation of organic tea using organic fertilizer can be:

Trash cuttings;

Remnants of plants and animals from the same or other land;

Compost or bokasi

organic waste of households, cities and markets; Organic waste plant waste; - waste farm waste; and

Special plant producing organic material (green manure, tree protector and others).

In addition, green manure is useful for maintaining and improving organic materials soils which further Green manure can be collected from leaves, branches, twigs and grass that are transported to field to be spread as mulch on the ground or immersed in the soil. Green manure can also be planted in the field and dipenam during fallow or before planting main crops.

Green fertilizers can be planted intercropping (intercrop) as a live mulch for the main plant.

- Green fertilizers can be grown as alley cropping, trees or shrubs grown green manures as a fence a few meters away and among them (alley) can be planted

2. The formation of the quotation field

3.

a. How to Behead (centering) This method is done on plant material / seedlings from cuttings planted in bekong. The implementation of centering is as follows:

After the seedlings are planted in the field and have shown growth, which is approximately 4-6 months old, the main stem in the centering as high as 15-20 cm by leaving at least 5 leaves. If at that altitude there is no leaf then centering done higher.

Then after the new branch grows as high as 50-60 cm, which is approximately 6-9 months after centering and there is a branch that grow strong upwards, it needs to be cut (decentering) at a height of 30 increase the nitrogen. Green manure is a special

\$ Three to six months later, if new branching has grown to a height of 60-70 cm, selective cut cross is left for 3-6 months, then tipped at a height of 60-65 cm or 15- 20 cm from the field of crop.

b. How to Submiss (bending)

Bending is a way of forming the field of quotation by bending the main stem and secondary branches without reducing the parts of the plant to stimulate the growth of shoots on the part. Implementation of bending is as follows: - \$ After the seeds are transferred to the field and show growth (4-6 months), the main stem is curved (bent) by forming an angle of 45° from the soil surface. To bend the rod or branch is used bamboo straps, wooden cagak and others.

\$ Approximately 6 months after bending I, the secondary shoots have reached 40-50 cm long and bending II is done in a direction spreading in all directions. In general, secondary shoots have different growth rates, so bending is done 2-3 times until the branch closes in all directions.

\$ Branch that grow strong upward after bending II cut as high as 30 cm.

\$ Buds that grow after bending II (except those growing strong up) are allowed to reach a height of 60-70 cm (6-9 months after bending II), then cut cross / trimmed as high as 45 cm to spur growth to the side / width.

attacks can be in the garden or nursery. The leaves are attacked toothed / perforated. Control: cleaning litter and weed, balanced fertilization and insecticide Lannate 35 WP, Lannate L.

4. Pruning

Pruning is done as follows \$ Pruning in medium plains (800-1200 dpl), 50-60 cm trimming height by clearing small branches and leaves and leaving 1-2 leafy branches (crushed trim). \$ Pruning on high altitude (> 1,200 dpl), 50-60 cm trimming height by clearing small branches and leaves (clean cutting), and allowing 1-2 leafy branches (clipping cuttings), especially in young plants less than 10 years. High cuts for productive gardens range from 40-70 cm. Higher cuts lower than 40 cm will cause the branching to become too low, making it difficult for pickers to carry out picking. Conversely, if higher than 70 cm will be difficult in the implementation. After pruning, it should be followed by abrasive moss treatment and soil treatment by means of a fork

G. Pest Management

Pest.

Subandi (2014) stated there are many organism causing pest and diseases but many as valuable for agriculture. This is explained in the book entitles Mikrobiologi, Kajian dalam Perspektif Islam.

1 Helopeltis antonii

Adult insects such as mosquitoes, attack the leaves of tea and young twigs. The part that was attacked was brownish brown and dried out. Attacks on twigs can cause branch cancer. Control: picking with 7-day

3. Cutlery (*Homona aoffearia*) A 1-2.5 cm caterpillar attacks young and old tea leaves. The leaves are rolled up and folded. Control: mechanical way, releasing biological enemies like *Macrocentrus homonae*, *Elasmus homonae*, *Ripcord 5 EC* insecticide.

4. Caterpillar grinder (*Cydia leucostoma*) A 2-3 cm caterpillar is inside a tea top. Control: mechanical, biological way by releasing natural enemies *Apanteles* and *Bayrusil 250 EC* insecticides, *Dicarbam 85 S*, *Sevin 85S*.

5. Fire caterpillars (*Setora nitens*, *Parasa lepida*, *Theya*) Wormy caterpillars attack young and old leaves, plants become hollow. Control: mechanical, biological way by removing parasites and insecticides *Ripcord 5 EC* and *Lannate L*.

6. Orange mites (*Brevipalpus phoenicis*)

Measuring 0.2 mm in color orange, attacking old tea leaves on the bottom surface. There are small patches on the base of the leaves, mites form colonies in the base of the leaves, Then the attack towards the tip of the leaf, the leaves dry and fall out. Control:

4. Red wine wine disease In the lowlands of 900 meters above sea level especially Latosol land. Transmission through root contact. Cause: *Ganoderma pseudoferreum* fungus. Symptoms: the plants turn yellow, wilt, die. Control: disassemble and burn sick tea, digging gutters 60-100 cm deep around healthy plants, fumigation methyl bromide or *Vapam*. 5. Red brick root disease Cause: *Proria hypolatertia* mushroom. In the

quotation, balanced fertilization, sanitation, mechanical, *Hierodula* and *Tenodera* predators, Insecticides *nthio 330 EC*, *Carbavin 85 WP*, *Mitac 200 EC*.

5. Caterpillar span (*Hyposidra talaca*, *Ectropis bhurmitra*, *Biston suppressaria*) Caterpillars black or brown with white stripes, attacking young leaves, shoots and old leaves,

(1) mechanical means, weed control, balanced fertilization, *Amblyseius* predator,

(2) *Dicofan 460 EC* insecticide, *Gusadrin 150 WSC*, *Kelthane 200 EC*, *Omite 570 EC*.

Disease

1 Chickenpox

Cause:

fungus *Exobasidium vexans*. Attacking young leaves and twigs. Symptoms: translucent small spots with a diameter of 0.25 mm, at an advanced stage the center of the spots to brown and released so that the leaves hollow. Control: reducing the protective tree, partial trimming of the soil surface, picking with short cycle (9 days), planting smallpox clone PS 1, RB 1, Gmb1, Gmb2, Gmb3, Gmb4, Gmb 5, fungicide.

2. Leaf rot Cause: *Cylindrocladum scoparium* fungus. Symptoms: brown brown parent leaves starting copper

from the tip / armpit of leaves, leaves fall, cuts will die. Control: dip the cuttings into the fungicide. If the seedbed is sprayed benomyl 0.2%.\

plateau of 1,000-1,500 meters above sea level. Transmitted by root contact, Symptoms: same as red wine disease. Control: same as red wine disease. 6. Black root disease Cause: Rosellinia arcuata mushroom in the area of 1,500 meters above sea level and R. bunodes in the area of 1,000 meters above sea level. Symptoms: wilted leaves, yellowing, falling and dead plants, there is a black thread on the root,

on the surface of the root wood there is a white thread (R. arcuata) or black (R.

H. Harvest and Post Harvest

How to Harvest There are three kinds of tea excerpts:

1. Draw a kick, the first one after the crop to form the plot area to be flat and flat.

2. Excerpts of .. Quote, done in the inserted into the milling machine. 1 machine load 350 kg tea leaves and time to grind is 50 minutes. Once ground, to the place to sift. The process for sieving occurs several times with calculated results based on sieving quantities: powder 1, powder 2, powder 3 7,

powder 4, and badag. Meanwhile, the last sieve of badag does not pass through the fermentation process. Badag and powders that have passed through the fermentation process are then taken to the next room to be dried. The duration of the drying process is 23 minutes with a temperature of 100o C. The fuel for this drying process is wood and coconut shell for a better taste. After drying, the leaves are brought to the room sortasi .. There are 3 types of work done in the room using a tool called Vibro. Second, separate the large size and small size. After all the process is done then the tea

3. Dead ends on quotes Cause: fungus Pestalotia tehae. Often attack TRI clone 2024. Symptoms: the former passage brown berbercak and extends down and dries, new buds are not formed. Control: timely fertilization, picking is not too heavy, fungicides contain garden to be pruned by picking all

shoots without looking at the formula quotation. Harvest Period The short length of the picking period is determined by the age and speed of shoot formation, altitude, climate and plant health. Tea tops are picked with periods between 6-12 days. Japanese green tea is harvested with a longer frequency of 55 days. Production Forecast Production is expected to reach 200 kg dry weight / ha / year.

Subandi (2013) picking tea sprout is harvesting in tea plantation as describe in his reasearch entitles Physiological Pattern of Leaf Growth at Various Plucking Cycles Applied to Newly Released Clones.

Post harvest

Processing of tea leaves is meant to change the chemical composition of fresh tea leaves in a controlled manner, thus becoming a processed product that gives rise to the desired properties in its steeping water, such as color, flavor, and a favorable and favorable aroma. The chemicals contained within the tea leaf consist of four groups: phenol substance (catechin and flavanol), non-phenol substitute (pectin, resin, vitamin, and mineral aromatic substances and enzymes. Tea leaves are picked, beginning through the process of pelayuan which takes 18 hours in a rectangular place called withered trough. Every 4 hours the leaves are

should be checked first (quality control). When the leaf meets the standard it will be packed in place of temporary storage (stored in a large plastic barrel). When ready to be marketed, for example in the export of tea leaves that are ready to be marketed will be packed into papersack (Setyamidjadja, 2000). maintenance the tea plant can give enough tea leaves for 40 years. Tea gardens need to always obtain fertilization regularly, free of pests of plant diseases, obtain good pruning get sufficient rainfall. Tea gardens need to be rejuvenated after the tea plant is 40 years old and above. After the 18th century, tea was known throughout the world. First only in mainland China and India. In the 9th century tea began to be planted in Japan. Europeans know tea in the 16th century. Tea has 2 varieties, namely: varieties Sinensis and Assamica varieties. Teh assamica is the most widely grown in Indonesia. B. ADVICE In the completion of this paper, the authors hope that the authors expect the kritik and suggestions from readers for improvement for the next time.

reversed manually. Each withered trough contains 1 to 1.5 tons of tea leaves. The function of this foraging process is to remove water content up to 48%. The wilted tea leaves are then inserted into the barrel and transported using the monorail to the next process site. From the monorail the leaves are

A. Conclusion

Tea is one of the most important industrial plants. From this plant is taken leaves are still young. Then processed and used for delicious beverage ingredients. In addition, the same is exported and generates foreign exchange for the country. The need for the inside and outside of the country continues to increase. Therefore, the cultivation of the plant is expanded and improved. Tea plant because it comes from sub tropical, hence suitable planted in mountainous area. An outline of growing conditions for tea plants is climate and soil compatibility. Tea plants generally can start picking the leaves continuously after the age of 5 years. With good

B. References

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