www.bircu-journal.com/index.php/birci
Budapest International Research and Critics Institute-Journal (BIRCI-Journal)
Humanities and Social Sciences
ISSN 2615-3076 Online)
ISSN 2615-1715 (Print)
Budapest Institute

Economic Valuation and Cultivation of Persimmons in Takengon City Central Aceh District

Ayu Erfiana Asmy[1], Rahmadhani Fitri[2]
[1]*Natural Resources and Environmental Management, University of Sumatera, Indonesia*
[2]*Universitas Pembangnan Panca Budi, Medan, Indonesia*
ayuerfiana@ymail.com, rahmadhanifitri@dosenpancabudi.ac.id

Abstract

The persimmon fruit (Diospyros kaki) or Oriental persimmon is a complex plant that lives in the wild for hundreds of years growing in Indonesia in the highlands of at least 1000 above sea level; this plant turns out to function to resist erosion, landslides, and floods because of its strong roots and form fibers inside. The soil so that can withstand soil shifts that are suppressed by water. Besides stems, seeds, fruit from persimmon is also beneficial for health. However, some of this persimmon ecosystem has been cut down because its economic value is too low for the community. The purpose of this study is to determine the monetary value of the remaining persimmon ecosystem, determine what impacts humans feel when cutting down persimmon trees and determine alternative policies with the management of persimmon cultivation in the city of Takengon. This study used a survey method; sampling was selected by purposive sampling. The analysis used is the formula for total economic value (total economic value/TEV), willingness to accept (WTA). The results of this study indicate that the total monetary value of the persimmon ecosystem area in Takengon City is Rp. 27,175,000,000/ha/yr. The estimated economic value of the persimmon area is Rp.254.316 million/year.

Keywords
economic valuation; persimmon cultivation; Takengon

I. Introduction

Other places in Indonesia that produce persimmons include Takengon Aceh, producing 100 tons per harvest period every year. North Sumatra produces 120 tons, West Java 750 tons, and Central Java amounts to 2500 tons. East Java excels as the largest producer of persimmons, up to 3000 tons. Suprayitno (2020) states that the economic factor in which the economy of the plantations rapidly developed so that it needed a wide area to do export and import activities. When a farm leader implements the effectiveness of organizational communication in the garden circle, the garden assistant is essentially instilling the organization's value in the plantation to the garden employee (Riadi, 2020). However, the number of persimmons produced does not raise the community's economy because persimmons are only sold for Rp. 1,500/kg; it is estimated that the overall economic value of persimmon resources throughout Indonesia is around Rp. 9,705,000,000/year.

The study was selected in the provinces of the smallest persimmon producers in Indonesia, namely Aceh Province, Takengon City, Central Aceh Regency, and Bener Meriah Regency, where the persimmon ecosystem that grows wild is recorded, it is estimated that it will grow to become a tree for eight years, with a harvest period of once a year, tree height of 5 to 7 meters, the age of the tree reaches hundreds of years.

Budapest International Research and Critics Institute-Journal (BIRCI-Journal)
Volume 4, No 3, August 2021, Page: 5245-5252
e-ISSN: 2615-3076(Online), p-ISSN: 2615-1715(Print)
www.bircu-journal.com/index.php/birci
email: birci.journal@gmail.com

Table 1. Five-Year Persimmon Harvest Data from 2016 - 2020

Districts Central Aceh	**Year**					**Information**
districts	**2016**	**2017**	**2018**	**2019**	**2020**	**Total**
atu Lintang	3 tons	3 tons	3 tons	3 tons	4 tons	
Bebesen	3 tons	2 tons	2 tons	2 tons	2 tons	
Bies	6 tons	4 tons	3 tons	4 tons	6 tons	
Star	3 tons	3 tons	3.5 tons	5 tons	6 tons	
woe	5 tons	4 tons	3.5 tons	4 tons	5 tons	
Jagong Jeget	5 tons	4 tons	3 tons	3 tons	5 tons	
Plumpness	2 tons	1 ton	2 tons	2 tons	2 tons	
Ketol	3 tons	3 tons	3 tons	4 tons	6 tons	
Panang Cake	5 tons	3 tons	4 tons	5 tons	6 tons	
Fresh Sea	2 tons	1 ton	1 ton	1 ton	2 tons	
Linge	4 tons	3 tons	3 tons	3 tons	4 tons	
springs	3 tons	3 tons	2 tons	2 tons	2 tons	
Rusip Between	5 tons	3 tons	3 tons	3 tons	5 tons	
Please Nara	6 tons	3 tons	4 tons	4 tons	5 tons	
amount	55 tons	40 tons	40 tons	45 tons	60 tons	**240 tons**

Table 2. Five-Year Persimmon Harvest Tekangon from 2016 - 2020

Districts Really Happy	**Year**					**Information**
districts	**2016**	**2017**	**2018**	**2019**	**2020**	**Total**
city	6 tons	4 Ton	4 tons	3 tons	4 tons	
Really Merry	5 tons	3.5 tons	3.5 tons	3 tons	3.5 tons	
Hill	4.5 tons	4.5 tons	4.5 tons	4 tons	4.5 tons	
White elephant	5.5 tons	5.5 tons	5.5 tons	5 tons	5.5 tons	
messiah	3 tons	2.5 tons	2.5 tons	4 tons	2.5 tons	
Gems	4.5 tons	4 tons	4 tons	3 tons	4 tons	
Gayo Rime Door	3.5 tons	2 tons	2 tons	2 tons	2 tons	
Main Shia	5 tons	4 tons	4 tons	4 tons	4 tons	
Elephant Timang	11 tons	6 tons	6 tons	8 tons	6 tons	
Wow Pesam	7 tons	4 tons	4 tons	4.5 tons	4 tons	
amount	55 tons	40 tons	40 tons	45 tons	40 tons	**220 tons**

The total fruit in Takengon City in five years is 460 tons. There are approximately 1500 trees and each tree produce 300 kg of persimmons. The persimmon fruit ecosystem is one of the resources that supports the economy of the people of Takengon City, in addition to coffee plantations. The persimmon tree also grows as a protective plant for the surrounding trees, including coffee plants. The felling of persimmon trees that grow in the mountains has a major impact on erosion that occurs, so that when it rains for a long time, landslides often occur on roads leading to rural areas. Persimmons are rarely found in the market, they only grow in wild forests and are no longer found in community gardens, or are deliberately cultivated.

The community's treatment of the persimmon ecosystem is a threat to its sustainability. Therefore, this study refers to the community and local government in collaboration with Perhutani and Forest Village Community Institutions (LMDH) to utilize unused state-owned land to cultivate persimmon plantations. There is also a count in 1 hectare of persimmon land can be planted with 500 trees with a spacing of 4x5 meters, one tree can produce up to 500 kg of persimmons, with the collaboration of the Institute and the Faculty of Agriculture representing the University to create superior seeds, so that persimmons can grow faster than

wild persimmons, which is 5 years apart from the first harvest. In 1 hectare it can cost around 250 million to harvest. So that it gives an overview of the economic value of the persimmon ecosystem area. Other than that, this study seeks to estimate the value of economic losses due to persimmon logging activities that have been carried out. Based on this description, this study aims to determine the economic value of the remaining persimmon ecosystem and estimate the economic value of persimmon ecosystem cultivation.

II. Research Methods

The method used is a survey method. To obtain existing facts and seek information both socially, economically, culturally of an area (local wisdom)

2.1 Total Economic Value Valuation (total economic value/tev)

The economic value in the total economic value (TEV) of the persimmon ecosystem refers to the use/use (Use Value/UV) and not the use (Non-Use Value/NUV). UV is obtained from the direct use of persimmons (Direct Use Value / DUV), the economic value of indirect use (Indirect Use Value / IUV), the value of choice (Option Value/OV). Then identified in the mathematical equation as follows:

a. Direct Benefit (direct use value/duv)

Direct benefits are benefits that are directly obtained from the use of persimmons, namely selling the harvested persimmons, utilizing the leaves from persimmons before they fall to be processed into tea drinks. Broken branches can be used as firewood. The formulation of each of these benefits is:

DUV = DUV1 + DUV2 + DUV3

Information:

DUV = Total direct benefit
DUV1 = Yield of persimmon fruit
DUV2 = Utilization of persimmon leaves into tea
DUV3 = Twigs become firewood

b. Indirect Benefits (indirect use value / iuv)

The calculation of indirect benefits of the persimmon ecosystem is obtained in the form of physical, biological and ecological benefits. The indirect benefit that is calculated on the persimmon ecosystem of the city of Takengon is the potential to withstand soil shifts that are pressured by water. Besides stems, roots, fruit from persimmons are also beneficial for health.

2.2 Potential to Resist Ground Shift

The value of the benefit of resisting ground displacement is formulated as follows:

IUV1 = TKT x VRA x PMP

Information:

IUV1 = Potential to withstand ground shift (discharge)
TKT = Level of soil fertility (minerals)
VRA = Volume of water infiltration (kg)
PMP = Acceleration of harvest time (time)
PTS = Determination of temperature level (ºC / F)

a. Health Benefits

The value of benefits for health is formulated as follows:

IUV2 = DTT + MPD + MKL + KLW

Information :

DTT = Endurance (Rp)

MPD = Avoid degenerative diseases (Rp)

MKL = Helping men's strength (Rp)

KLW = Women's skin beauty (Rp)

b. Option Benefits (Option value /ov)

The value of the optional benefits if the persimmons are sold to the health processing factory the persimmon fruit is received at the factory in per 1 kilo gram at a price of Rp. 5000, -

If 1 tree produces 500 kg multiplied by 500 trees in 1 hectare to produce 250 tons of persimmons. With the formulation approach as follows:

V500 = V500 (1 + t)

Information:

V = tree value

1 = price

T = ton

2.3 Total Economic Value (Total Economic Value/Tev)

The total economic value of the Takengon persimmon ecosystem is the sum of all the benefits of the economic value of the persimmon ecosystem. The formulation can be seen as follows:

TEV = DUV + IUV + OV

Information

TEV = Total economic value

DUV = Direct use value

IUV = Indirect use value

OV = Option value

2.4 Persimmon Cultivation Valuation with Contingent Valuation Method (CVM) Approach

Pearce et al. (2006) stated that in general CVM analysis involves three main stages, namely: 1) identification of goods and services to be evaluated, 2) construction of hypothetical scenarios, and 3) obtaining information on the readiness of farmers by asking about the readiness to cultivate persimmon ecosystems through a certain format. The stages of implementing CVM to determine the Willingness to Accept (WTA) value (Hanley and Spash 2003) are:

2.5 Creating a Hypothetical Market

A hypothetical market is created using the scenario that farmers are willing to cultivate persimmons in order to maintain forest conservation and increase the production of persimmons. The questions in the hypothetical market are: "Are you willing to participate in the cultivation of persimmons?

2.6 Get a Quote for the Amount of WTA Value

The method used to obtain the WTA value is using a dichotomous choice with a single bounded dichotomous choice technique. This method is used because it is relatively easy to answer by respondents. In dichotomous choice, respondents are only asked questions and only answer "yes" or "no". The value of the rupiah offered is called the bid value (Whitehead 2006). After receiving the WTA offer, 75 respondents were grouped, where the number of groups was adjusted to the number of bid classes offered.

2.7 Aggregate Data

Data summation is a process where the average value of the supply sample is converted to the total population in question, one way to convert is to multiply the sample mean by the total population. The equation used can be seen as follows:

TWTA = EWTA x N
Information:
TWTA = Total WTA (Rupiah/year)
EWTA = Average WTA value (Rp/year)
N = Total cultivated population (KK)

III. Discussion

Persimmon has many variants, even in various developed countries such as Japan, China and America this persimmon has been found in thousands of variants and even tends to shape, culture, and taste. But actually, with so many variants, scientists in the world have categorized persimmons into two parts, namely: Astringent Persimmon with astringent taste and Non-Astringent with astringent taste. As for this finding, it is a variant of sepat persimmon (astringent) because sepat persimmons are very common in Indonesia.

3.1 The Economic Value of the Persimmon Ecosystem

Based on the research that has been done, persimmon in Takengon City is one of the pillars of the community's economy. Directly persimmons become commodities of raw materials for health production.

3.2 Economic Valuation of the Persimmon Ecosystem

Economic valuation of a natural resource can help provide information on the potential economic value of a resource. In the basic concept of natural resource economic valuation, the value of the persimmon resource is determined by the function of the resource itself. The economic valuation of the persimmon ecosystem that is calculated consists of three typologies of value, namely direct use value, indirect use value, and option value.

3.3 Direct Benefit (Direct use value/duv)

The direct benefits of the persimmon ecosystem in Takengon City are the persimmon fruit harvest for health production raw materials, the persimmon fruit harvest is sold to the persimmon storage factory at a price of Rp. 5000/kg multiplied by the number of persimmons in the city of Takengon as much as 100 tons, then the amount generated from the sale of persimmons is Rp. 500,000,000,- Utilization of persimmon leaves into tea is sold at a price of Rp. 5000/kg x harvest period amounted to 10 tons the amount generated from the sale is Rp. 50,000,000,- Twigs become firewood Rp. 15.000/kg x harvest period amounted to 25 tons the amount generated from the sale is Rp. 375,000,000,- So the total amount of direct benefits is Rp. 925,000,000,-

3.4 Indirect Benefit (Indirect Use Value/Iuv)

The total economic value of persimmons as resisting soil shift

The persimmon tree provides many indirect benefits, so that in this use it cannot be measured in rupiah, only in other units in the fields of physics, chemistry, mathematics and biology.

Benefit Type	Volume Rate Infiltration (mineral)	Acceleration Fertility. Soil	Determination time Water (kg)	Level Harvest (time)	Temperature (ºC / F)

Total economic value of indirect benefits for Health

Persimmon fruit is processed into health supplement products that provide selling value Rp. 400,000 of each product, as follows:

Benefit Type	Power Resistant Male	Avoid Wealth Degenerative	Helping Disease Body	Beauty Skin	Total economy Health Woman
	Rp. 400,000 /lt	Rp. 400,000. /lt	Rp. 400,000 /Lt	Rp. 400,000 /lt	Rp. 1,600,000

From 1 ha of persimmon land it can produce 500 trees x 500kg/tree, 500kg can be 125Lt of persimmon products.

So 125Lt x 500 trees = 62,500Lt

62,500Lt x Rp.400,000 = Rp. 25,000,000,000

Option value (Option value /ov)

The economic value of cultivated persimmons is Rp. 5000/kg. From a land of 1 hectare pxl = L (length x width = area) while at the same time determining the distance between trees to trees = 4x5m then the land area of 10,000 meters is divided by 20 meters (10,000mx 20m) to get the number of 500 trees multiplied by 500kg of fruit produced 1 tree. Then the total value of the persimmon yields obtained from 1 hectare is Rp. 1.250,000,000,-

Table 3. The Total Economic Value of the Takengon City Persimmon Ecosystem

No	Economic Benefits of Persimmon	Value Rp	Time period
1	Direct benefits (Direct Use Value/DUV)	925,000,000	1 year
2	Indirect Use Value (IUV)	25,000,000,000	1 year
3	Option benefits (Option Value/OV)	1,250,000,000	1 year
	Total Economic Value (TEC)	**27,175,000,000**	

3.5 The Economic Value of Persimmon Cultivation

The first step to restore the sustainability of the persimmon ecosystem is by cultivating it and urging the community to cultivate on idle lands owned by the local government. And maintain the remaining persimmon ecosystem by not cutting down persimmon trees illegally, or logging in succession. considering the dangers of cutting down persimmon trees can cause erosion, flooding and landslides, if the disaster occurs it can certainly have a bad impact on the community with property losses. One way to estimate the value of cultivation is to estimate the provision of community welfare including: 1. Providing seeds for farming, 2. Fertilizing to speed up the harvest period. 3. The land for the community's residence is around the area to be planted. By using the willingness to accept (WTA) approach with the contingent valuation method (CVM) technique. Blomquist (2006) in Fauzi (2014) contingent

valuation method (CVM) is a method that can measure economic value for people who experience directly the changes that occur.

This study uses a dichotomous choice CVM (DC-CVM) model with a single-bounded technique. Fauzi (2014) reveals that this model uses a different bid value offered to each group. Each group of samples will be taken purposively. Respondents are the people of Takengon City who experience the impact of the cultivation system directly or indirectly. The single-bounded technique used requires the respondent to answer "Yes" or "No" to the bid value that has been offered.

The initial step in the single-bounded technique is to build a hypothetical market. This is done in order to lift the community's economy is carried out. The hypothetical market scenario uses the following questions “Are you willing to participate in the cultivation of persimmons?” Furthermore, the determination of the amount of the bid value offered to the respondent is determined. The bid value categorization is determined based on the area of land where all seeds and fertilizers will be cultivated for a value of

Rp. 250,000,000/1Ha/KK then the next two bids apply a multiple of the point bitd,

Rp. 500,000,000/2Ha/KK and so on in the period from planting to harvesting persimmons within 5 years, while waiting for the harvest period to cover the needs of farmers to plant samiloto plants on the sidelines or intercropping with persimmon trees, which are harvested every 3 once a month, then the samiloto is sold to a drug processing factory at a price of Rp 750,000/kg.

The determined bid categorization is asked to respondents based on what has been grouped before, there are 3 bid values offered to respondents, namely: Rp. 250,000,000, Rp. 500,000,000, Rp.750,000,000. Each of these bids had 25 respondents, so the total respondents in this study were 75 respondents. The percentage of respondents' answers to the bid value offered is as follows:

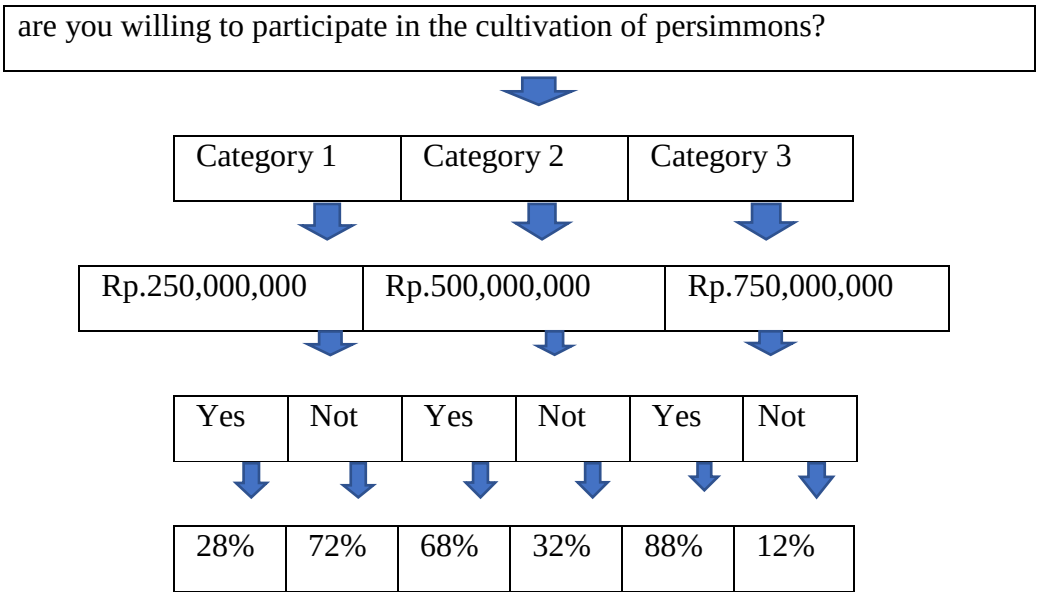

Figure 1. *Greater the Bid Value Offered, the Greater the Level of Respondent's Willingness*

The figure shows that the greater the bid value offered, the greater the level of respondent's willingness to manage, whereas if the bid value is smaller, the respondent's willingness to accept is smaller. The dependent variable in this study is the respondent's decision to answer "yes" or "no" to the bid value that has been offered and the independent variable is the bid value.

The total cost of cultivation work wages for the people of the city of Takengon

Description	Amount (Rp)
Total respondents (person)	75
Population (KK)	21.193
Average WTA of respondents (rupiah/KK/month)	1,000,000
Total WTA Community (rupiah/month)	21,193,000,000
Total WTA Community (rupiah/year)	254.316 million

IV. Conclusion

The total economy of persimmons is Rp. 27,175,000,000/year from vThe economic evaluation of the persimmon ecosystem that is calculated consists of three typologies of value, namely direct use value of 925,000,000/year, indirect use value of Rp. 25,000,000,000/year, the option value is Rp. 1,250,000,000. Totalestimated value of persimmon cultivation for the people of the city of Takengon Rp. 254.316 million/Year.

The ultimate goal of persimmon cultivation is to ensure the comfort and safety of the community so as to achieve prosperity, considering that so far the impact received by farmers is the uncertainty of where to sell their agricultural products at what price, and whether it is in accordance with the investment costs until harvest Because it is necessary to understand that farmers in Indonesia are capable potentialists, but at this time the peasants have become groping workers. With this cultivation, people who flock to urbanization are attracted to big cities, because with the creation of this cultivation, local wisdom will be realized so that unemployment will decrease.

References

M. Sudjana, Persimmon Researcher, Indonesia. 2013

Persimmon, M. Nazir, Research Methods. Ghalia Indonesia, 1988.

EB Barbier, The Value of Coastal Wetland Ecosystem Services. Elsevier BV, 2019.

EB Barbier, “Economics of the Regulating Services,” Encycl. Biodivers. Second Ed., vol. 3, pp. 45–54, 2013.

EB Barbier, “Valuing the storm protection service of estuarine and coastal ecosystems,” Ecosyst. Serv., vol. 11, pp. 32–38, 2015.

A. Fauzi, Economic Valuation and Assessment of Damage to Natural Resources and the Environment, 1st ed. Bogor: IPB Press, 2014.

N. Hanley and CL Spash, Cost-benefit analysis and the environment Author. Cheltenham: Elgar, 2003

Riadi, S., Kholil, S., and Yusnadi. (2020). The Communication Effectiveness of Garden Circle Organization in Improving the Performance of Nusantara Plantation Employees, PTPN II Bandar Kliffa Plantations and PTPN III Sei Putih Plantations in North Sumatra, (Islamic Perspective Study). Budapest International Research and Critics Institute-Journal (BIRCI-Journal) Vol 3 (2): 985-994.

Suprayitno, et.al. (2020). From Labuhan Deli to Belawan: The Removal of Harbor in Medan during the Dutch Colonial Period of 1863-1942. Budapest International Research and Critics Institute-Journal (BIRCI-Journal) Vol 3 (2): 1392-1402.