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Environmental Externality Cost of Tofu Agroindustry Center in Gadingrejo Village, Pringsewu Regency

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ABSTRACT

This research analyze environmental externality costs by estimate the value of Willingness to Pay (WTP), Willingness to Accept (WTA), and the effect of environmental costs on the profits of the Tofu Agroindustry in Gadingrejo Village Pringsewu Regency. This research method is a case study. Respondents were determined purposively with a total of 12 agro-industries and 48 communities. Research data were collected from October to November 2023. The analytical method used was Contingent Valuation Method (CVM) to estimate WTP and WTA values and profit analysis to see the difference in profits before and after internalizing environmental costs. The results showed that the average WTP value was Rp94,791 per month per agro-industry. The average WTA value was obtained at Rp26,875 per month per community. There was a decrease in the average profit of agro-industry by 1.12% per month or Rp94,791.67 after internalizing environmental costs.

Keywords: tofu agro-industry, environmental cost, WTA, WTP, and profit.

INTRODUCTION

Agroindustry is an important activity that is one of the alternatives to increase the added value of a product (raw material) into semi-finished or finished products. This subsector has a role as a link between the agricultural and industrial sectors that cannot be separated from the support of science and technology in its development, especially the emergence of new product innovations that have added value and a fairly wide marketing range in the current era of competition and globalization (Meganingsih, et al. 2015). Agroindustry is expected to play a major role in regional development, both in economic growth, equitable development, and economic stability. The existence of agro-industry in the region is expected to increase the selling value of agricultural commodities.

Pringsewu Regency is one of the regions supported by the processing industry sector, one of which is agro-industry, which is quite large in the Gross Regional Domestic Product (GRDP). The processing industry in Pringsewu Regency has a large contribution which is in second place, which is an average of 15.16% in 2018-2022. This shows that there is considerable potential for the development of the processing industry sector which can contribute to increasing GRDP.

Tofu is a soy-based processed food that is very popular among Indonesians, both in urban and rural areas. Tofu is a processed product resulting from the activities of the processing industry (agro-industry). One type of industry that contributes is the

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tofu agroindustry. Tofu agro- industry is one of the industries that is growing rapidly because the production process does not use complicated technology. One of the areas with a high number of tofu agro-industries in Pringsewu Regency is Gadingrejo Village. Gadingrejo Village is one of the tofu industry centers in Pringsewu Regency which is assisted by the Pringsewu Regency Cooperative, Industry and Trade Office with the main products produced are white tofu and yellow tofu.

The process of tofu production at the agro-industry level begins with the procurement of raw materials, namely soybeans as the main raw material. In addition, there are supporting inputs used consisting of water, fuel, oil, and firewood. The tofu production stage starts with sorting, washing and soaking, grinding, cooking, filtering, clumping, molding, and cutting tofu. Tofu and tofu pulp are outputs that are generally utilized because of their economic value. Meanwhile, wastewater and combustion gases will be discharged into the environment without further treatment. The limited ability of the environment to absorb these wastes will cause damage to the surrounding environment.

Waste generated from tofu production activities in Gadingrejo Village has not been managed properly by agro-industry owners where all of it is disposed of into the environment, causing negative impacts felt by the community. Many communities around the industrial site feel the environmental damage. (Tijani, et al, 2015). However, the impact of these activities is often ignored and not taken into account in the cost component of an activity (Prasetia, et al. 2016) resulting in the existence of environmental externalization costs. The cost of environmental externalization are costs incurred to improve the quality of the damaged environment or costs used to prevent future damage (Biçer, et al. 2019). Therefore, this study aims at 1) analyzing the environmental costs incurred by calculating the willingness of agroindustry owners to pay the costs of environmental damage due to their agroindustry activities and the willingness to accept of surrounding communities affected by environmental externalities from agroindustry activities and 2) analyzing different in profit after environmental costs are internalized.

METHODS

The research methods are case study. This research was conducted at the Tofu Agroindustry Center located in Gadingrejo Village, Gadingrejo District, Pringsewu Regency. Sample determination was carried out using the purposive sampling. Purposive sampling is a technique for determining samples with certain considerations (Sugiyono, 2018). The sample size of community respondents is determined using Isaac and Michael (1981) as stated in the following:

$$n = \frac{\mathrm{NZ^2S^2}}{\mathrm{Nd^2 + Z^2S^2}}$$

The total population in this study was 362 people, the confidence level was 90%. The total sample of community was 48 respondents to estimare WTA value. There were 12 agro-industry respondents who constituted the entire agro-industry in Gadingrejo Village to estimate WTP value. The data used in this study consisted of primary and secondary data. Primary data were obtained through interviews using the help of questionnaires, observations, and direct recording of the state of the tofu agro-industry. Meanwhile, secondary data was obtained from literature studies, scientific publications, reports, and other literature relevant to the research.

The analytical methods used in this research are Contingent Valuation Method (CVM) and profit analysis. CVM

is used to determine the value of Willingness to Pay (WTP) and Willingness to Accept (WTA) (Astri, et al. 2018) which is a component of environmental cost (Hidayat et al., 2023). Environmental costs are felt by others and should be the responsibility of the producer (World Health Organization, 2017), (Winda et al. 2022). Willingness to Pay is shown to producers orparties who cause environmental damage from their activities (Saptutyningsih, 2017). WTP is used to determine the environmental costs that the owner of the tofu agro-industry is willing to pay. Meanwhile, WTA is used to calculate the environmental costs that are readily accepted by the people who feel the impact of the existence of the tofu agro-industry (Pratiwi, 2023), (Idris, 2013). The use of CVM to measure consumers' WTP for non-market environmental goods or services has been widely employed (Choi, et al. 2017), (Loomis, et al. 2015). According to (Hanley, 1993) the use of the CVM method is divided into the following stages:

a. Creating a Hypothetical Market
   The creation of a hypothetical market aims to establish a rationale for why producers should pay for an environmental good or service (Qowi et al, 2020). The Hypothetical market will provide an overview of the state of the agro-industrial environment as well as the population potentially affected by effluent pollution that accountability in the form of compensation is required.
b. Determine the supply of WTP and WTA values
   The method used uses open ended or open questions. This method will ask respondents to determine the highest amount of money they are willing to pay or accept (Shuaibu, et al. 2023) (Priambodo, et al, 2016). At this stage, to determine the Willingness to Accept value, respondents are asked questions about what form of loss is felt and the amount of compensation they are willing to accept (Linyu, et al. 2015). Furthermore, to determine the value of Willingness to Pay, respondents will be asked questions regarding the form of willingness to pay to overcome environmental damage.
c. Calculating the Average
   This stage will calculate the average value of the bid (auction) value against the Willingness to Pay and Willingness to Accept obtained from the previous stage.
d. Estimating WTA and WTP Curves
   The WTA and WTP curves show the relationship between the amount respondents are willing to pay and the cumulative frequency of respondents. The WTP/WTA curve is formed by using the cumulative sum of of individuals who chose a certain value (Lestari, 2019). For this reason, a table was created to rank all WTA values from the largest to the smallest respondent, followed by the number of respondents who paid at that WTA and WTP level.

The profit analysis method is used by calculating the total revenue earned in a certain period and deducting the total costs incurred. Systematically, agroindustry profits before cost internalization in this study were calculated using the following formula (Kartadinata, 2000):

Profit = Total revenue - total cost
Π = (Y. pY) - (X. pX)

Description:
Π =Profit
Y = Number of Products
pY = Product price
X = Factor of production
pX = Price of factor production

After obtaining the profit before, the profit after cost internalization is calculated by adding the Willingness to Pay (WTP) value obtained from the

environmental cost analysis to the production cost. Agustini (2015) states that environmental cost internalization is done by incorporating negative externalities or external costs into actual production costs.

RESULTS AND DISCUSSION

Environmental Cost Analysis

Environmental cost analysis was conducted by calculating the Willingness to Pay (WTP) aimed at agro-industry owners and Willingness to Accept (WTA) aimed at the affected communities using the open-ended question method, so that respondents were given the freedom to determine the value of environmental costs. However, to get the highest value, the question was repeated by asking for an increase in environmental costs if willing.

a. Willingness to Pay

The environmental impacts arising from tofu agro-industry activities in Gadingrejo require owners to take action to minimize the impacts that occur. Several actions have been taken by agro-industry owners to prevent and compensate those affected by the environment. The environmental costs that have been incurred by the agro-industry are presented in Table 1.

Table 1
Environmental costs that have been incurred by the agro-industry

Activities	Average cost (Rp/month)	Total cost (Rp/month)	Min (Rp/month)	Max (Rp/month)
Chimney construction	6,944	83,333	0	83,333
Sewerage construction	13,194	158,333	0	66,667
Compensation to the community	38,194	458,333	0	166,666
Total	58,332	672,222	-	-

Based on Table 1, it is known that three activities have been carried out by the agro-industry. Compensation to the community is the highest cost. The cost is given to people who live not far from the factory location because they feel more environmental impact. Another cost is the construction of wastewater generation channels. It is intended that the tofu water waste produced is not splashed into the surrounding environment, but is directed to the river (Hutami, 2019). The construction of the chimney is because there are complaints from the community about the smoke from burning that disturbs the community. By making a chimney, the smoke will come out higher so that it does not disturb the surrounding community (Rissa Damaya et al. 2019).

Then, to determine the Willingness to Pay value, the willingness of agro-industry owners to pay for three aspects, namely the construction of wastewater treatment plants (WTP), the construction of chimneys (for those who have not made them), and compensation costs to the community. In detail, the WTP values are presented in Table 2.

Based on Table 2, it is known that the largest willingness costs are incurred by agro-industries for the manufacture of wastewater treatment plants (WWTP). In line with the research of Qatrunada, et al. (2023), the cost of making WWTP is the highest cost in the cost component of the tofu agroindustry. The manufacture of WWTP serves to manage the tofu wastewater produced so that it does not have an impact on the environment, especially the impact on the river.

Another willingness cost is the manufacture of chimneys which aims to make the pollution generated from burning firewood be wasted higher into the air so as not to disturb the surrounding community. Research by (Muharrahmi, et al. 2023), stated that the tofu industry causes air pollution and smoke which has an impact on public health risks. Another willingness to pay is the provision of compensation to the community. The cost of this willingness is generally in the form of providing necessities to people who live close to the agro-industry location.

Table 2
Willingness to Pay Value

Activities	Average WTP (RP/month)	Total WTP (RP/month)	WTP Min (Rp/month)	WTP Max (Rp/month)
Construction of WWTP	65,972	791,666	25,000	250,000
Chimney Construction	15,972	191,666	0	50,000
Compensation to the Community	12,847	154,166	0	41,666
Total	94,791	1,137,498	-	-

After obtaining the WTP value, the next step is to create a WTP curve. The curve is obtained by summing up the number of individuals who choose a certain range (Saputri, 2018). The curve will illustrate the level of WTP value that respondents are willing to pay with the number of respondents who are willing to pay compensation at that level of value. The following WTP curve is presented in Figure 1.

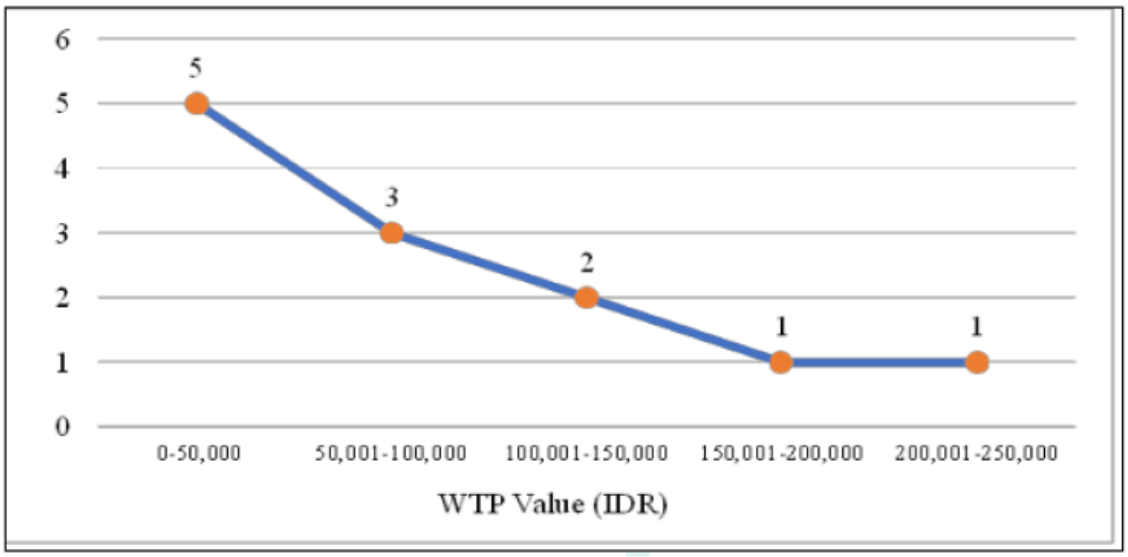


Figure 1
Willingness to Pay Curve

Based on Figure 1, it is known that the highest number of respondents is at the WTP value between Rp0-Rp50,000 per month with a total of 5 people.

Meanwhile, the lowest number is in the WTP value between Rp150,000-Rp200,000 and Rp200,001-Rp250,000 per month. Thus, it is known that the higher the WTP value, the fewer the respondents. This is in line with the research of (Nihaya, et al. 2019) that the higher the WTP value, the fewer respondents are willing to pay.

b. Willingness to Accept

The environmental impacts caused by the existence of agro-industry encourage the community to take several actions to minimize these impacts. The following costs that have been incurred by the community are presented in Table 3.

Table 3
Environmental costs that have been incurred by the community

Activities	Average cost (RP/month)	Total cost (Rp/month)	Min (Rp/month)	Max (Rp/month)
Health aspect	1,354	65,000	0	35,000
Air pollution	2,395	115,000	0	20,000
Total	3,750	180,000	-	-

Based on Table 3, it is known that two costs have been incurred by the community, namely in the aspects of health and air pollution. The highest cost was incurred in the aspect of air pollution, which amounted to Rp115,000 per month. The cost is used as an effort to minimize the odor caused by tofu water waste that is not managed properly. The cost is allocated for the purchase of on air freshener so that it can eliminate the odor of tofu wastewater. This is in line with the research of Hanifiyah, et al. (2020) that people incur costs for purchasing air fresheners due to the presence of industry in the community environment. Meanwhile, in the health aspect, the total cost that has been incurred is RP 65,000 per month. This cost is used as the cost of medical treatment due to smoke pollution from agro-industrial production activities. Then, to determine the total value of Willingness to Accept (WTA), the community's willingness to accept compensation costs in three aspects, namely health aspects (Muharrahmi, et al. 2023), river pollution (Deffy, et al. 2020), and air pollution (Kesuma, et al, 2013) presented in Table 4.

Table 4
Willingness to Accept Value

Activities	Average WTP (RP/month)	Total WTP (RP/month)	WTP Min (Rp/month)	WTP Max (Rp/month)
Health Aspects	7,188	345,000	0	35,000
River Pollution	9,583	460,000	0	30,000
Air Pollution	10,104	485,000	0	20,000
Total	26,875	1,290,000	-	-

Based on Table 4, it is known that the highest WTA value is in the aspect of air pollution. In line with the research of Arifa, et al. (2023), unpleasant odors are the biggest impact felt by people living around the tofu agroindustry. The fee is received as compensation for the onset of bad odor as a result of poorly managed tofu wastewater. WTA on river pollution is received as compensation for

the damage to the river ecosystem due to the disposal of tofu wastewater so that it cannot utilize the presence of the river. Halder (2015) stated that one of the direct and indirect impacts of wastewater polluting river water can result in the disruption of the activities of the surrounding community. Meanwhile, the WTA in the health aspect is the lowest compared to others because only people close to large-scale agro-industry feel the environmental impact. Meanwhile, communities around medium and small agro-industries do not feel any losses in health aspects.

Furthermore, a WTA curve was created that illustrates the level of WTA value that respondents are willing to accept with the number of respondents who are willing to accept compensation at the WTA level presented in Figure 2.

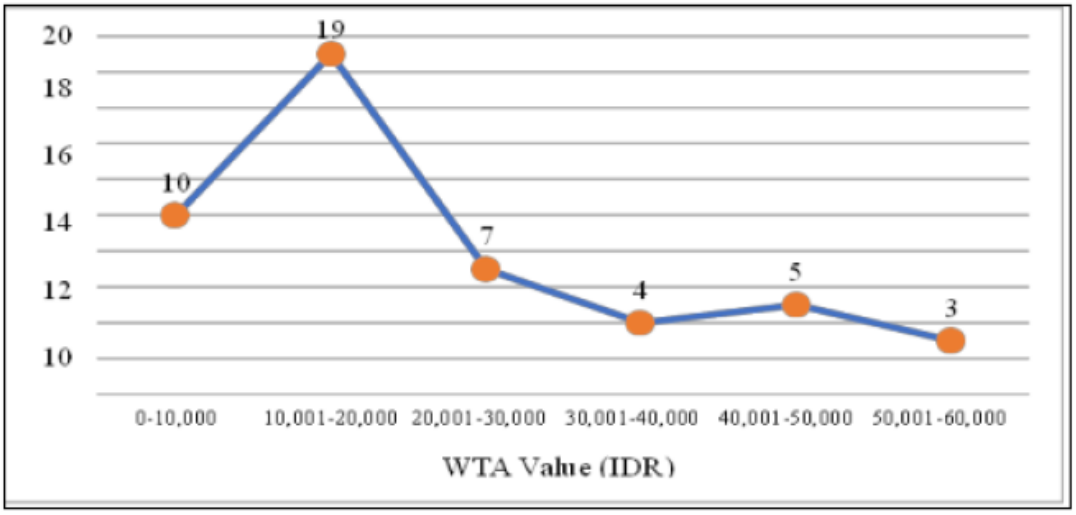


Figure 2.
Willingness to Accept Curve

Based on Figure 2, it is known that the highest number of respondents is in the WTA value between Rp10,001-Rp20,000 per month with a total of 19 people. Meanwhile, the lowest number is at the value between Rp50,001-Rp60,000. Thus, it is known that the higher the WTA value that is available, the fewer the respondents. This is in line with the research of Cao (2012), that the greater the bid value offered, the lower the number of respondents.

Profit Analysis

Profit analysis is carried out by calculating the total revenue earned in a certain period and deducting the total costs incurred. In this analysis, calculations are carried out by looking at the differences before and after the internalization of environmental costs by including the willingness to pay agro-industry (willingness to pay) in the cost component. This refers to the research of Rahmawati, et al (2017) where the willingness to pay value is used in the internalization of liquid waste of small and medium industries (SMI). The profit before internalizing environmental costs is done by not including the environmental cost component in total cost. The profit after internalization of environmental costs is done by including the environmental cost component in total cost. Agustini (2015) states that the internalization of environmental costs is done by incorporating negative externalities or external costs into actual

production costs. In detail, agro-industry profits before and after internalizing costs are presented in Table 5.

Table 5.
Agro-industry profits before and after internalization of environmental costs

Name	Environmental Cost (Rp/Month)	Total Cost (Rp/Month)	Income (Rp/Month)	Profit before internalization (Rp/Month)	Profit after internalization (Rp/Month)	% decrease in profit
Prio Sunar	250,000	120,805,613	144,000,000	23,194,386	22,944,386	1.08
Mrs. Lis	175,000	54,223,607	63,500,000	9,276,392	9,101,392	1.89
Tono	116,666	52,908,743	62,400,000	9,491,256	9,374,590	1.23
Hariyadi	66,666	34,433,638	42,000,000	7,566,361	7,499,694	0.88
Juanan	108,333	34,855,000	42,750,000	7,895,000	7,786,666	1.37
Sisdi Yanto	33,333	34,518,023	42,750,000	8,231,976	8,198,643	0.40
Rusdi	116,666	34,825,694	43,550,000	8,724,305	8,607,638	1.34
Yuli	41,666	35,230,138	43,500,000	8,269,861	8,228,194	0.50
Nuriyanto	66,666	32,452,342	39,000,000	6,547,657	6,480,990	1.02
Mahmud	54,166	23,771,805	28,000,000	4,228,194	4,174,027	1.28
Dewi	58,333	24,120,608	28,500,000	4,379,391	4,321,057	1.33
Suwarno	50,000	21,905,064	26,400,000	4,494,935	4,444,935	1.11
Min	33,333	21,905,064	26,400,000	4,228,194	4,174,027	0.40
Max	250,000	120,805,613	144,000,000	23,194,386	22,944,386	1.89
Average	94,791	42,004,190	50,529,166	8,524,976	8,430,184	1.12

Based on Table 5, it is known that there is a decrease in agro-industry profits after the internalization of environmental costs. The average profit before internalizing environmental costs is Rp8,591,365 per month. The highest profit at Prio Agro-industry was Rp23,393,047.47 per month and the lowest at Mahmud Agro-industry was Rp3,744,277.78 per month. This indicates that the higher the soybean production capacity used, the higher the profit obtained. In line with Duffy, (2019) research, the higher the production capacity, the higher the profit obtained. After internalizing environmental costs, the highest profit decline occurred in Mrs. Lis's Agroindustry, which was 1.89%. Meanwhile, the lowest decrease occurred in Yuli Agroindustry, which amounted to 0.40%. The average decrease in profits was 1.12% or Rp

94,791.67 per month. This value is the same when compared to Shaffitri (2011) that the average decrease in profits after the internalization of environmental costs is 1.01%. The decrease is due to environmental costs such as the willingness to make wastewater management installations, make chimneys, and compensation to the community charged to each agroindustry, it will increase total costs and reduce profits.

CONCLUSIONS

Environmental costs incurred are in the form of WTA and WTP. The total WTA value from the community is Rp1,290,000 per month with an average of Rp26,875 per month per community. The total value of WTP from agro-industry owners is Rp1,137,498 with an average of Rp94,791 per month per agroindustry. The profit before cost internalization is an average of Rp8,591,365 per month. There is a difference of Rp. 152,502, which is greater than the WTA value, resulting in a producer surplus. After cost internalization, the average profit was Rp8,496,573 so there was a decrease in average profit of 1.12% per month or Rp94,791.67 because environmental costs were charged to production costs.

REFERENCES

Agustini. (2015). Internalisasi Eksternalitas PLTU Batubara. *Jurnal M&E*, *13*(2), 61–75.

Arifa, A.N & Ratnawati, D. (2023). Analisis Dampak Sosial Industri Tahu Terhadap Kualitas Air di Desa Sidomulyo Kecamatan Punggur. *Journal of Social Science Education*, *4*(2), 117–130.

Astri Hasbian, Anni Rochaeni, A. F. S. (2018). Analisis Kesediaan Membayar (Willingness To Pay) Dan Kesediaan Untuk Menerima Kompensasi (Willingness To Accept) Dari Keberadaan Tempat Penampungan Sementara Ciwastra Dengan Contingent Valuation Method. *Jurnal Infomatek*, *20*(2), 107–116.

Biçer, Ali, & E. (2019). Environmental costs and its role in improving the quality of financial reporting. *Environmental Costs and Its Role in Improving the Quality of Financial Reporting*, *8*(5), 194–211.

Cao, J.J., Holden, N.M., Qin, Y.Y., & Song, X. Y. (2012). Potential Use of Willingness to Accept (WTA) to Compensate Herders in Maqu County, China, for Reduced Stocking. *Journal of Rangeland Ecology & Management*, *65*(5), 533–537.

Choi, I.C., Kim, H.N., Shin, H.J., Tenhunen, J., N., & T.T. (2017). Economic Valuation of the Aquatic Biodiversity Conservation in South Korea: Correcting for the Endogeneity Bias in Contingent Valuation. *Journal of Sustainability*, *9*(930), 1–20.

Deffy, T., Nilandita, W., & Munfarida, I. (2020). Bioremediasi limbah cair industri tahu menggunakan larutan EM4 secara Anaerob-Aerob. *Jurnal Presipitasi Media Komunikasi Dan Pengembangan Teknik Lingkungan*, *17*(3), 233–241.

Duffy, M. (2019). Economies of Size in Production Agriculture. *Journal of Hunger & Environmental Nutrition*, *4*(4), 375–392.

Halder, J. N. & M. N. I. (2015). Water Pollution and its Impact on the Human Health. *Journal of Environment and Human*, *2*(1), 36–46.

Hanifiyah, M., & Subari, S. (2020). Eksternalitas Pabrik Gula PT Kebun Tebu Mas Desa Lamongrejo Kecamatan Ngimbang Kabupaten Lamongan. *Jurnal Agriscience*, *1*(1), 324–338.

Hanley, N. dan C. L. S. (1993). *Cost-Benefit Apringnalysis and Environmental.* Edward Elgar Publishing.

Hidayat, I., Ismail, T., Taqi, M., & Yulianto, A. S. (2023). The Effects of Environmental Cost, Environmental Disclosure and Environmental Performance on Company Value with an Independent Board of Commissioners as Moderation. *International Journal of Energy Economics and Policy*, *13*(3), 367–373. https://doi.org/10.32479/ijeep.14159

Hutami, R. A. (2019). *Kajian Minimisasi Limbah Cair Pada Industri Tahu X dan Y, Bantul, D.I Yogyakarta*. Universitas Islam Indonesia.

Idris, T. B. (2013). *Analisis Willingness to Accept Masyarakat Akibat Eksternalitas Negatif Kegiatan Penambangan Batu Gamping (Studi Kasus Desa Lulut, Kecamatan Klapanunggal, Kabupaten Bogor)*. Institut Pertanian Bogor.

Kartadinata, A. (2000). *Akuntansi dan Analisis Biaya: Suatu Pendekatan terhadap Tingkah Laku Biaya*. PT Rineka Cipta.

Kesuma, D. D., & Widyastuti, M. (2013). Pengaruh limbah industri tahu terhadap kualitas air sungai di kabupaten Klaten. *Jurnal Bumi Indonesia, 2*(1), 115–124.

Lestari, A. (2019). Analisis willingness to pay (WTP) masyarakat terhadap upaya pelestarian lingkungan Situ Ciledug Kota Tangerang Selatan. *Skripsi*. https://repository.uinjkt.ac.id/dspace/handle/123456789/46702

Loomis, J., Smith, A., Huszar, P. (2015). Estimating the economic benefits of maintaining residential lakelevels at an irrigation reservoir: A contingent valuation study. *Journal of Water Resources Research*, *41*, 1–15.

Meganingsih, N., Maharani, E., & Khaswarina, S. (2015). nalysis of Agroindustry Chips Tempe Bu Siti in Buluh Rampai Village Seberida District Indragiri Hulu Regency. *Jurnal Jom Faperta*, *2*(2), 1–11.

Muharrahmi, F., Aldani, M., Indriani, N., & Hasibuan, A. (2023). Analisis Dampak Limbah Cair pada Pabrik Tahu terhadap Pencemaran Lingkungan di Kecamatan Tanjung Morawa Kab. Deli Serdang. *Journal of Health and Medical Research*, *3*(3), 385–390.

Nihaya, D.M., Pujiati, A.M., & Prastiwi, F. . (2019). Willingness to Pay for Improving the Quality of Public Transportation. *Journal of Economic and Policy*, *12*(2), 365–381.

Prasetia, H., N. Annisa., A. (2016). Nilai Ekonomi, Lingkungan, dan Sosial dari Perkebunan Sawit Swadaya di Kabupaten Seruya, Kalimantan Tengah. *Jurnal Teknik Lingkungan.*, *2*(1), 71–77.

Pratiwi, A. (2023). Pengaruh Penerapan Green Accounting Terhadap Tingkat Profitabilitas Pada Perusahaan Farmasi Yang Terdaftar Di Bursa Efek Indonesia. *Jurnal Satyagraha*, *6*(1), 164–181.

Priambodo, L. H., Najib, M. (2016). Analisis Kesediaan Membayar (Willingness to Pay) Sayuran Organik dan Faktor-Faktor yang Mempengaruhinya. *Jurnal Manajemen Dan Organisasi*, *5*(1), 2–14.

Qatrunada, S. S., Kusnadi, N., & Putri, T. A. (2023). Kelayakan Finansial Pabrik Tahu dengan Instalasi Pengolahan Air Limbah (IPAL). *Jurnal Agribisnis Indonesia (Journal of Indonesian Agribusiness)*, *11*(1), 159–173.

Qowi, A., & Arianti, F. (2020). Analisis Willingness To Pay Pengunjung Dan Peningkatan Sarana

Prasarana Objek Wisata Grand Maerokoco Di Kota Semarang. *Diponegoro Journal Of Economics*, *9*(3), 155–166.

Rahmawati, R., Putri, E.I.K., & Ekayani, M. (2017). Internalisasi Limbah Cair Industri Kecil Menengah (IKM) Tapioka melalui IPAL Biogas untuk Pembangkit Listrik. *Jurnal Risalah Kebijakan Pertanian Dan Lingkungan*, *4*(1).

Rissa Damayanti, Puji Santoso, H. S. (2019). Analisis Perhitungan Ketinggian Cerobong Pada Aeet 10 Mev Dengan Kondisi Tanpa Sistem Ventilasi. *Jurnal Prima*, *16*(1), 11–16.

Saptutyningsih, E. (2017). Faktor-Faktor Yang Berpengaruh Terhadap Willingness To Pay Untuk Perbaikan Kualitas Air Sungai Code Di Kota Yogyakarta. *Jurnal Ekonomi Dan Studi Pembangunan*, *8*(2), 171–182.

Saputri, L. D. S. (2018). *Willingness To Pay Mahasiswa Fakultas Ekonomi Universitas Negeri Yogyakarta Tahun Angkatan 2014-2017 Terhadap Mie Samyang Berlabel Halal LPPOM MUI*. Universitas Negeri Yogyakarta.

Shaffitri, L. R. (2011). *Internalisasi Biaya Eksternal Pengolahan Limbah Tahu (Studi kasus: Desa Kalisari, Kecamatan Cilongok, Purwokerto)*. Institut Pertanian Bogor.

Shuaibu, M., Maji, I.K., Saari, M.Y., Salusi, L.N., & Dahiru, I. . (2023). Analysis of Willingness to Pay for Carbon Emission Reduction by Road Users in Northeastern Nigeria. *Journal of Social Science and Humanities*, *8*(1), 1–8.

Sugiyono. (2018). *Metode Penelitian Kuantitatif, Kualitatif, dan R&D*. Alfabeta.

Tijani, Akeem Abiade, A. A. (2015). “Cement Production Externalities and Profitability of rop Enterprises in Local Government Area of Ogus State. *Journal Of Social Science*, *11*(1), 43–48.

WB, I. S. dan M. (1981). *Handbook in Research and evaluation.* Edits Publishers.

Winda Widanengsih, E., & Maria Lusiana Yulianti. (2022). The Effect of Implementing Green Accounting and Environmental Perfomance on Return on Assets (ROA) in the Non-Cyclical Consumer Sector Listed on the Indonesian Stock Exchange. *Journal of Accounting and Finance Management*, *3*(3), 135–144. https://doi.org/10.38035/jafm.v3i3.120

World Health Organization. (2017). Tobacco and its environmental impact: an overview. In *International Review of Psychiatry* (Vol. 34, Issue 1). http://dx.doi.org/10.1016/j.ccm.2013.09.011

Xu, Linyu, Bing, & Y. (2015). Ecological compensation based on willingness to accept for conservation of drinking water sources. *Frontiers of Environmental Science & Engineering*, *9*(1), 58–65.