Asian Journal of Advanced Research and Reports

12(2): 1-9, 2020; Article no.AJARR.58595
ISSN: 2582-3248

Plastic Consumption in Group of Teens and Young Adults from Pangandaran District, Indonesia: A Glimpse of Environmental Awareness among the Locals outside Big Cities

Rega Permana[1*], Achmad Rizal[1] and Zahidah Hasan[1]

[1]Fisheries Department, Faculty of Fisheries and Marine Science, Padjadjaran University, Indonesia.

Authors' contributions

This work was carried out in collaboration among all authors. Authors RP and ZH designed the study and wrote the manuscript. Authors RP and AR managed the data analysis and discussion. Authors RP, AR and ZH read and approved the final manuscript.

Article Information

DOI: 10.9734/AJARR/2020/v12i230282
Editor(s):
(1) Dr. Neslihan Karavin, Amasya University, Turkey.
Reviewers:
(1) Hammed Adeniyi Salami, University of Ibadan, Nigeria.
(2) Merdaci Slimane, University Djillali Liabès of Sidi Bel Abbés, Algeria.
Complete Peer review History: http://www.sdiarticle4.com/review-history/58595

Original Research Article

Received 20 April 2020
Accepted 26 June 2020
Published 09 July 2020

ABSTRACT

In this research we tried to get an understanding of plastic consumption behavior in a relatively remote area, Pangandaran district Indonesia, especially on teens and young adults to evaluate their environmental awareness. Volunteers were asked to note down their plastic consumption for over 31 days and differentiate it in three different types of plastic waste that are plastic bottles, plastic bags, and plastic packaging. Results showed that plastic consumption in teens and young adults of the Pangandaran District is still inevitable although they are already exposed to the knowledge of plastic waste impacts. The usage accounted for up to 5 plastics per day. A fluctuating pattern of plastic used was found predominantly for three types of plastic waste with the plastic packaging topping the consumption, followed by the plastic bottle and plastic bag. We hypothesized that the idea of plastic detrimental effects is already known in the group, however the plastic consumption still an unavoidable option since there is no choice and straight law enforcement in the district. This putting the teens and young adults of Pangandaran District at the conscious incompetence category, according to the psychological theory of competence.

**Corresponding author: Email: rega.permana@unpad.ac.id;*

Keywords: Environmental awareness; Pangandaran; plastic consumption; theory of competence.

1. INTRODUCTION

Plastic pollution has been a major environmental issue in the past few years, attracting the initiation of the multi-sectoral act on its controls and treatments. This concerns not only scientists and engineers but together with government, politicians as well as entertainers and social influencers [1-3]. In 2015 the total quantity of plastic waste production accounted for 60-99 million metric tons globally with developing countries as the top contributors to the number, including Indonesia [4,5]. Efforts to reduce this have been applied by reinforcing the policy through presidential regulation number 83 in 2018 [6], recycling facility establishment [7], research on environmentally friendly bioplastic materials [8], and social campaign on its detrimental impact to earth, targeting local people [9].

A major adverse concern of plastic is when they reach the ocean thus potentially threaten the life of marine organisms. Endangered species such as sea turtle, whale, dolphins, sea bird, and shark have been reported to be critically affected by plastic pollution [10-14]. Furthermore, the possibilities of degradation occur in the ocean creating a tiny particle called microplastic, which endangered the seeds of much crucial marine life in the food webs, like planktonic organisms and juvenile fish [15,16]. Bioaccumulation and biomagnification are also most likely to occur and eventually affecting human health from seafood consumption [17].

On the other hand, plastic is manmade inventions that primarily design to ease human daily life, especially on packaging problems. It has been there for decades and productions were millions of tons annually [18]. We most probably cannot separate plastic from our daily life, since it is incorporated in almost our daily products like bottled water, food packaging, bags, cosmetical packaging, and many more [19-21]. The campaign of using tumbler and stainless steel straws is one of many examples approach to reduce plastic consumption [22]. It was also enhanced by food and beverage participation to strengthen the campaign [23]. Supermarket store starts to charge the plastic bag and universities ban the use of plastic bottle water [24]. However, there are particularly no or less significant attitudinal shift in the rural environment in using plastic products [25]. This could be the result of a lack of consciousness towards the fact of its environmental impact or simply because of weak law enforcement due to unreachable remote location.

Pangandaran district is a newly developed district in the southern coast of West Java Province, Indonesia. It is well known as one of the hotspots of tourism in West Java providing beautiful beaches, waterfall, and caves [26]. It remotely located far from a big city and people still live in a pearl of local wisdom together with nature. As the district grows, tourism development and international exposure might have an impact on plastic consumption among local people in the district. Here we try to see how well the people of Pangandaran District digest the current state of plastic and environmental implications in terms of their real daily consumption of plastics. Attention was taken to teenagers and young adults whose chance of exposure to wider media, including social media where most educational campaign on plastic consumption occurred, is relatively higher.

2. METHODOLOGY

The research was conducted quantitatively by observing the plastic consumption behavior in teens and young adults residing in Pangandaran District. The volunteers were mainly the student of the Padjadjaran University Fisheries Department originated or live in the district for more than 2 years. Particularly the volunteers were asked to note every plastic consumption they had for approximately 31 days. We also asked them to differentiate the type of plastic they used to be a plastic bottle, plastic bag, and plastic packaging. A simple questionnaire delivered through a targeted focus group discussion was also performed to see more knowledge regarding their perception of plastic and environmental impacts. The data obtained then analyzed descriptively to gain more understanding of how locals people reacted towards plastic consumption. The overall research schematic diagram can be seen in Fig. 1.

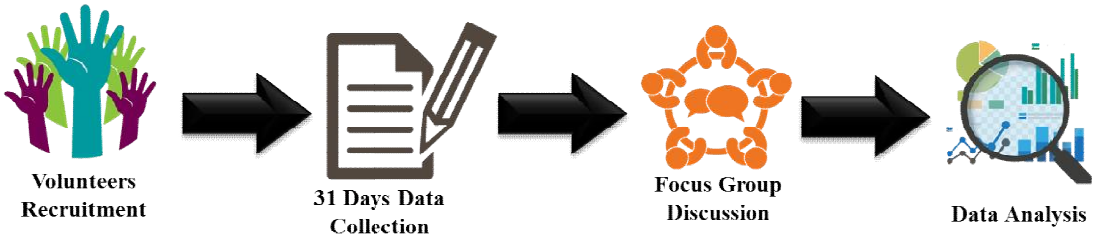

Fig. 1. Schematic of research

3. RESULTS AND DISCUSSION

3.1 Daily Consumption of Plastic

The volunteers recruited were mainly the students of PSDKU Padjadjaran University Pangandaran, a newly established branched program of its mother campus in Sumedang West Java. We selected those who currently in sophomore or final year study who have been resided in Pangandaran District for more than 2 years. Of all the recruited volunteers, 75% were girls and 25% were boys with range ages from 19-21. The overall daily plastic consumption from all volunteers by three different types of plastic is represented in Fig. 2.

From the graph below, we can see that there was a strong fluctuating pattern in the plastic consumption amongst teens and young adults in Pangandaran District. In the first few days, the consumption was relatively higher than the rest of the days, especially for plastic packaging. The use of a plastic bottle, although still found to be fluctuating, is somewhat stable through the 31 days observed. This was also true for the plastic bag but with a little bit shift in the number. These results conversely came with Babu and James [27] where the top consumption was found to be a plastic bottle followed by packaging. In these results, plastic packaging outcompetes plastic bottles in terms of daily consumption numbers. This can be suggested as one of the indicators of the awareness raised among the volunteers as they comfortably preferred to bring a reusable tumbler.

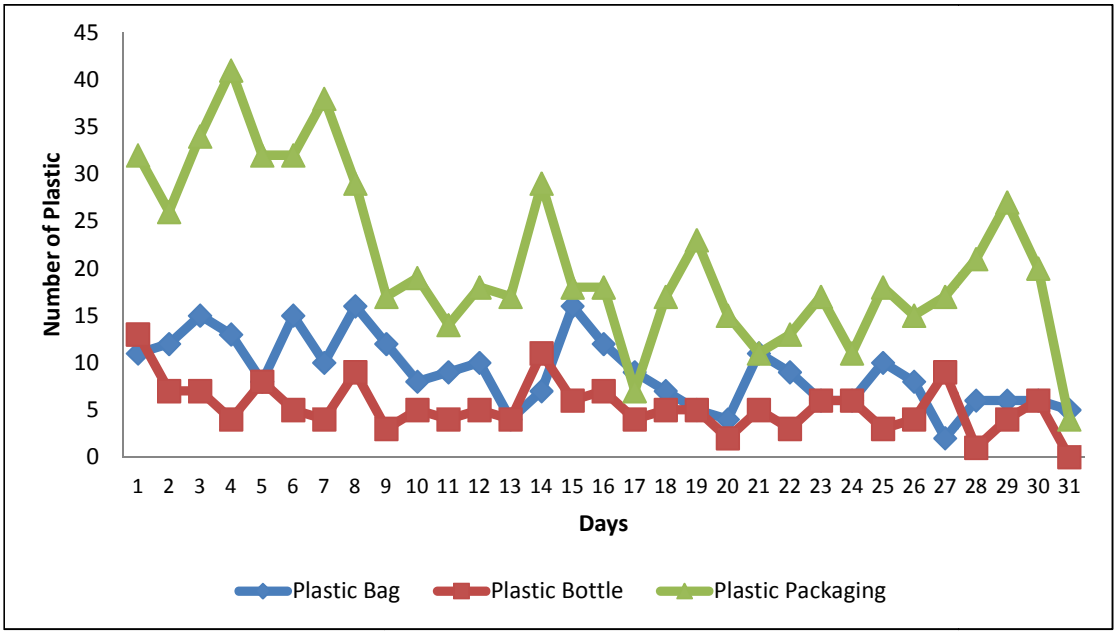

Fig. 2. Daily plastic consumption by three different types of plastic

The data collection of all volunteers was recorded in March 2020. This is when the pandemic Corona Virus Diseases-19 (Covid-19) starts to occur in Indonesia. This explained the relatively low number of overall plastic consumption for all three types of plastic since the majority of activities were frozen due to the lockdown policy including in Pangandaran. This has a huge effect on plastic consumption, during the lockdown framework teens and young adults had no obligation to go out doing their activities, subsequently, the needs of plastic consumption also decreased. The corresponded plunge of the pollutant was also recorded during the COVID-19 pandemic, mostly on atmospheric hazardous pollutant as the travel and some local industrial manufacturing activities decreased quiet drastically [28,29]. However, some noticeable decreases also found in the number of domestic waste produced, for example in Jakarta the daily trash output had fallen by 40% [30].

The average number of plastic usage daily can be seen in Fig. 3. Around 56,25% of volunteers used less than 2 plastics a day, followed by 25% who used 2 to 3 daily, and 12,5% for those who used 4 to 5 plastics daily. The least was around 3 to 4 plastics a day which only occurred at 6,25% of our volunteers. This number was typically low compare to other previous studies with the same subjects teenagers [27]. A high awareness could level up among teens and young adults from social media exposure and several students or local government activities in raising environmental awareness. Furthermore, the incorporation of environmental importance and plastic waste danger aspect in schools or universities could be playing a significant role in this.

3.2 Plastic Consumption Preference

Through a simple and casual focus group discussion, we concluded that all of our volunteers were aware of the plastic impact on the environment whether from social media or the local movement by government and environmental activists. As one of the most famous tourist spots in West Java Province, especially for beaches and sea activities, Pangandaran District has a relatively higher risk of plastic pollution. Several activities regarding plastic use awareness had been conducted in the past few years. However, not every citizen is adopting the issues pretty well, because of the lack of other alternatives as well as weak law enforcement.

We envisioned the preference of plastic-type usage among teens and young adults in the Pangandaran District by grouping three major types of plastic used, which were a plastic bottle, plastic bag, and plastic packaging. These three types of plastic dominated the plastic waste in the District followed by other types such as plastic cups and straw. From the data recorded over 31 days, as shown in Fig. 4, clearly the plastic packaging outcompete the two other types. Almost 57% total number of plastic consumption in the spent of 31 days belongs to plastic packaging. While for a plastic bag and plastic bottles, the total number in 31 days accounted to be 26% and 17% respectively. It was following the daily number consumption presented before and the reason behind this was clearly because of limited options on the daily consumer goods which were mostly packaged in plastic.

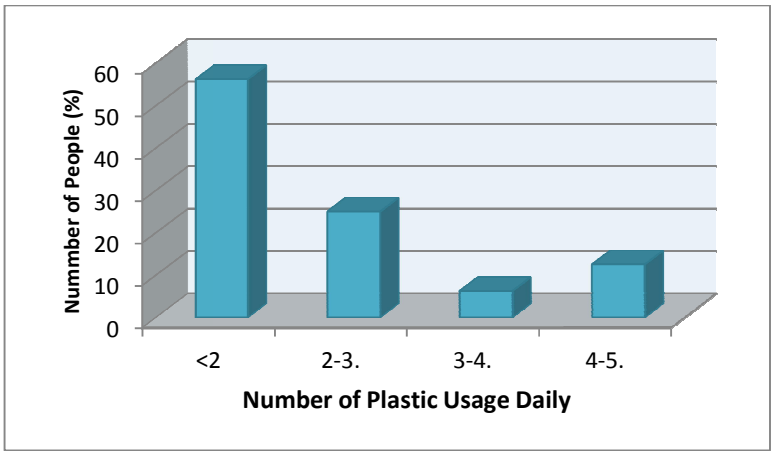

Fig. 3. Daily average of plastic consumption

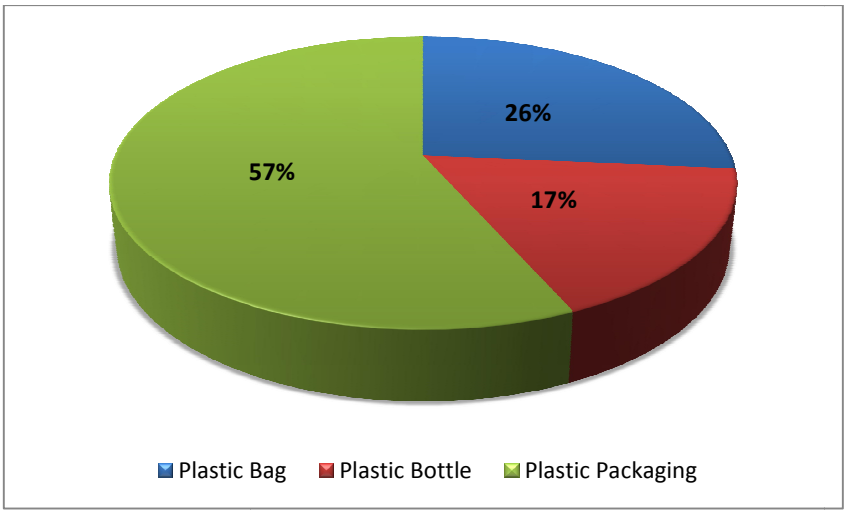

Fig. 4. Total plastic used categorized in three different types

The plastic consumption in our volunteers consisted of teens and young adults of the Pangandaran District are relatively low compare to other studies [27]. Perhaps the main driving factors are first the COVID-19 pandemic and second the exposure of plastic waste awareness to the volunteers. As the majority of the volunteers are university students at PSDKU Padjadjaran University Pangandaran, campaign and social movement regarding plastic waste pollution are quite often presented by the student bodies. Furthermore, the existence of the fisheries department in the campus which study the marine ecosystem as well as other fisheries-related science, gave a significant impact on their attitude. The campus is also known to be supporting the plastic waste reduction campaign by providing free mineral water so those who bring tumblers can freely refill their drinking water. This is perhaps one of the reasons why plastic bottles consumption resided as the lowest type of plastic used by our volunteers.

3.3 Focus Group Discussion

Our focus group discussion session revealed the reasons behind our volunteer's plastic consumptions, the understanding of each volunteer regarding plastic waste issues, and actual thoughts about plastic waste issues management. All were completely aware of the plastic problems faced by our global community and the majority already knew that Indonesia is one of the top countries in its production. They got the information from social media through a social campaign either from an influencer, government, or environmentalist. However, consumption, especially for packaging plastic, is hard to avoid. Almost every daily consumer goods were packaged in plastic thus its consumption is inevitable. Mainly they got it from a mini-market or a traditional local market. Products like snacks, instant noodles, soft drinks, cosmetics, and health products were the major products they consume daily.

Part of them was concerned about plastic consumption and think that social movement to educate local people is necessary to conduct for reducing its consumption. However, some were realistically thoughts about the feasibility of totally banning consumption since an alternative is currently not sufficient enough and relatively pricey compared to conventional plastic bags. This is also true in a study conducted by Poortinga et al. [31] in Wales where the willingness of citizens to convert their choices from single-use plastic bags to recyclable bags is quite low. Giving a sufficient price for single-used plastic bag usage is one of an appealing option although not 100% showing a good response to the citizen [32]. In big cities, this might be a good approach since it's economically ready and people are more aware of its importance. However, in a small city and remote area, this option might give a little bit pressure and if not accompanied by a good knowledge transfer, they probably will refuse the idea.

Nevertheless, from our simple and short focus group discussion, we can map our volunteer's understanding of the issues. According to competence theory stated primarily by Noel Burch in 1970 [33], there are 4 stages of

competences. First is unconscious incompetence, second conscious incompetence, third conscious competence, and lastly unconscious competence. The categorizing stages were based on how one person analysis particular issues and how do they react according to their natural intuition. The top of its stages is unconscious competence, where a person unconsciously doing the right thing as it already equipped with good competence. While the bottom stages or beginner stage is unconscious incompetence, meaning they don't have the right competence because they are also didn't realize the importance of the issue. A schematic Pyramide expressing stages can be seen in Fig. 5 below.

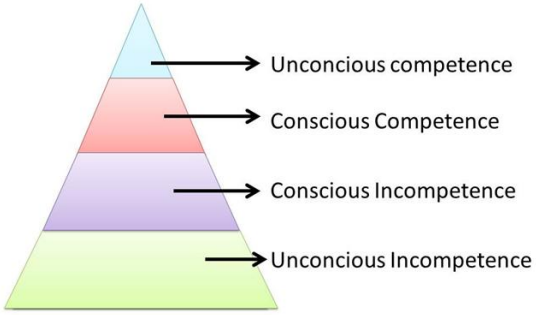

Fig. 5. Stages of competences

In linking this theory of competence to the issues of plastic waste pollution particularly in teens and young adults of Pangandaran district, we analyzed their intuition regarding their plastic use behavior. Overall, all our volunteers were aware of the issue pretty well and feel the necessity to reduce its consumption. However, the lack of option restrains their efforts to withheld their desire to use plastic. Insufficient capacity to make the right analysis was also predominantly found in our volunteers. This fact put the teens and young adults of Pangandaran District based on our volunteers to be currently at stages conscious incompetence, the second bottom stage.

This stage indicated that the group already know the importance of competence (plastic waste reduction) but have limited skill to perform it due to the wrong analysis. With an intensive accompaniment, the skill or competence might be acquired and leveling up their stage to the conscious competence stage. The conscious competence stage characterized by the well-known importance of the issues and accompanied by a good skill or competence to perform it. To move from one stage to another, several approaches needs to be done like well educational practice, intensive accompaniment as well as law enforcement (Fig. 6).

In the case of plastic pollution, especially to gain awareness to the locals in a remote location, changes in competences stages can be conducted via a good knowledge transfer through both educational or social campaign programs, followed by an intensive accompaniment to monitor its actual practice. Finally, by strict law enforcement, the changes in attitude and competence might be achieved in a permanent manner although more aspects need to be incorporated since it will be a very complex system [34-36].

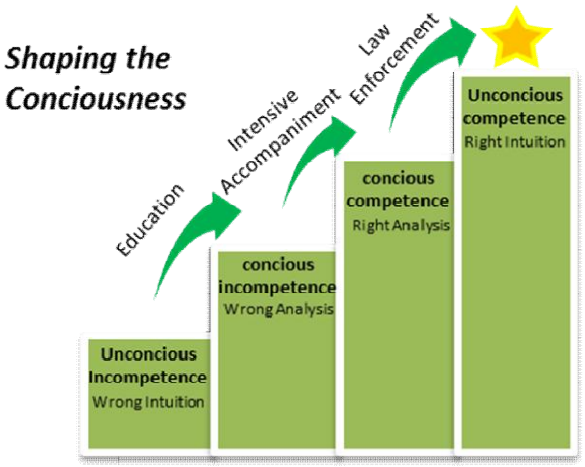

Fig. 6. Approaches to level up the competence ladder

4. CONCLUSION

In conclusion, the consumption of plastic in teens and young adults in Pangandaran District based on our recruited volunteers has a fluctuating pattern with consumption up to 5 plastics per day. The highest proportion goes to plastic packaging 57%, plastic bags 27%, and plastic bottle 16%. From the analysis, the group was attributed at stage conscious incompetence based on theory competency and an intensive accompaniment is needed to level up the competence level. More research needs to be addressed to get a full understanding of how people behaving towards plastic pollution.

CONSENT

As per international standard or university standard, respondents' written consent has been collected and preserved by the author(s).

ACKNOWLEDGEMENTS

We express our gratitude to the volunteers which mainly students of fisheries PSDKU Padjadjaran University class of 2017.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Chaerul M, Fahruroji AR, Fujiwara T. Recycling of plastic packaging waste in Bandung City, Indonesia. J. Mater. Cycles Waste Manag. 2014;16(3):509-518.
2. Letcher TM, Vallero DA. (Eds.). Waste: A handbook for management. Academic Press; 2019.
3. Xu L, Ling M, Wu Y. Economic incentive and social influence to overcome household waste separation dilemma: A field intervention study. Waste Manag. 2018;77:522-531.
4. Lebreton L, Andrady A. Future scenarios of global plastic waste generation and disposal. Palgrave Commun. 2019;5(1): 1-11.
5. Geyer R, Jambeck JR, Law KL. Production, use and fate of all plastics ever made. Sci. Adv. 2017;3(7):e1700782.
6. Purwendah EK, Periani A. Implementation of presidential regulation number 83 of 2018 concerning handling of sea was in order to provide protection and preservation of the sea environment for Indonesia. Ganesha Law Review. 2019; 1(2):18-37.
7. Milios L, Christensen LH, McKinnon D, Christensen C, Rasch MK, Eriksen MH. Plastic recycling in the Nordics: A value chain market analysis. Waste Manag. 2018;76:180-189.
8. Tsang YF, Kumar V, Samadar P, Yang Y, Lee J, Ok YS, et al. Production of bioplastic through food waste valorization. Environ. Int. 2019;127:625-644.
9. Eagle L, Hamann M, Low DR. The role of social marketing, marine turtles and sustainable tourism in reducing plastic pollution. Mar. Pollut. Bull. 2016;107(1): 324-332.
10. Fossi MC, Baini M, Panti C, Galli M, Jiménez B, Muñoz-Arnanz J, et al. Are whale sharks exposed to persistent organic pollutants and plastic pollution in the Gulf of California (Mexico)? First ecotoxicological investigation using skin biopsies. Comp. Biochem. Phys. C. 2017; 199:48-58.
11. Permana R, Pringgo KDNYP. Quantitative evaluation of shark fisheries from cantrang fishing gear in Mayangan Coastal Fishery Port, Probolinggo, Indonesia. World News of Natural Sciences. 2020;31:70-78.
12. Ebere EC, Wirnkor VA, Ngozi VE. Uptake of microplastics by plant: A reason to worry or to be happy? World Scientific News. 2019;131:256-267.
13. Domènech F, Aznar FJ, Raga JA, Tomás J, Two decades of monitoring in marine debris ingestion in loggerhead sea turtle, Caretta caretta, from the western Mediterranean. Environ. Pollut. 2019;244: 367-378.
14. Avery-Gomm S, Provencher JF, Liboiron M, Poon FE, Smith, PA, Plastic pollution in the Labrador Sea: An assessment using the seabird northern fulmar *Fulmarus glacialis* as a biological monitoring species. Mar. Pollut. Bull. 2018;127:817-822.

15. Lin VS. Research highlights: Impacts of microplastics on plankton. Environ. Sci. Process Impacts. 2016;18(2):160-163.
16. Ory NC, Gallardo C, Lenz M, Thiel M, Capture, swallowing, and egestion of microplastics by a planktivorous juvenile fish. Environ. Pollut. 2018;240: 566-573.
17. Akhbarizadeh R, Moore F, Keshavarzi B, Investigating microplastics bioaccumulation and biomagnification in seafood from the Persian Gulf: A threat to human health? Food Addit. Contam. Part A. 2019;36(11):1696-1708.
18. Karlsson TM, Arneborg L, Broström G, Almroth BC, Gipperth L, Hassellöv M. The unaccountability case of plastic pellet pollution. Mar. Pollut. Bull. 2018;129(1): 52-60.
19. Truelove HB, Yeung KL, Carrico AR, Gillis AJ, Raimi KT. From plastic bottle recycling to policy support: An experimental test of pro-environmental spillover. J. Environ. Psychol. 2016;46:55-66.
20. Groh KJ, Backhaus T, Carney-Almroth B, Geueke B, Inostroza PA, Lennquist A, et al. Overview of known plastic packaging-associated chemicals and their hazards. Sci. Total Environ. 2019;651: 3253-3268.
21. Wagner TP. Reducing single-use plastic shopping bags in the USA. Waste Manag. 2017;70:3-12.
22. Mamahit MV, Kalangi JB, Pandowo MH. Analyzing the purchase intention of tumbler by millennial generation in manado. Journal of Economic Research, Management, Business and Accounting. 2019;7(3). Bahasa.
23. Maxime D, Marcotte M, Arcand Y. Development of eco-efficiency indicators for the Canadian food and beverage industry. J. Clean. Prod. 2006;14(6-7):636-648.
24. Romer JR. The evolution of San Francisco's plastic-bag ban. Golden Gate U. Envtl. LJ. 2007;1:439.
25. Kreiger MGMA, Anzalone GC, Mulder ML, Glover A, Pearce JM. Distributed recycling of post-consumer plastic waste in rural areas. MRS Online Proceedings Library Archive. 2013;1492:91-96.
26. Rahmafitria F, Wirakusuma RM, Riswandi A. Development of tourism potential in watersports recreation, Santirah River, Pangandaran Regency, Indonesia. Int. J. Soc. 2017;3(1).
27. Babu D, James R. Survey on Plastic Usage among the Teenagers of Alappuzha Town, Kerala. Sch. Acad. J. Biosci. 2016; 4(6):488-497.
28. Nakada LYK, Urban RC. COVID-19 pandemic: Impacts on the air quality during the partial lockdown in São Paulo State, Brazil. Sci. Total Environ. 2020; 139087.
29. Liu Z, Deng Z, Ciais P, Lei R, Feng S, Davis SJ, et al. Decreases in global CO $ _2 $ emissions due to COVID-19 pandemic. arXiv preprint arXiv. 2020;2004: 13614.
30. Aqil AMI. Jakarta's trash output down during COVID-19 but environmentalists warn of possible increase. The Jakarta Post.
Available:https://www.thejakartapost.com/news/2020/05/01/jakartas-trash-output-down-during-covid-19-but-environmentalists-warn-of-possible-increase.html
31. Poortinga W, Whitmarsh L, Suffolk C. The introduction of a single-use carrier bag charge in Wales: Attitude change and behavioural spillover effects. J. Environ. Psychol. 2013;36:240-247.
32. Jakovcevic A, Steg L, Mazzeo N, Caballero R, Franco P, Putrino N, Favara J. Charges for plastic bags: Motivational and behavioral effects. J. Environ. Psychol. 2014;40:372-380.
33. Burch N. Conscious Competence Learning Model: Four stages of learning theory-unconscious incompetence to unconscious competence matrix-and other theories and models for learning and change. 1970;8.
(Accessed 25 May 2020)
Availabe:http://www.citehr.com/23983-conscious-competence-learning-model.html
34. Rizal A, Andriani Y, Kusumartono FX. A Strategic Environmental Assessment for Southern Coastal of West Java Province, Indonesia. World Scientific News. 2019; 137:188-209.

35. Rizal A, Anna Z. Climate change and its possible food security implications toward Indonesian marine and fisheries. World News of Natural Sciences. 2019;22: 119-128.

36. Rizal A. Science and policy in the coastal zone management. World News of Natural Sciences. 2018;21:1-8.

Peer-review history:
The peer review history for this paper can be accessed here:
http://www.sdiarticle4.com/review-history/58595