Science Development Alternatives (Labtek Apung)
Environmental Concern in Ciliwung

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ABSTRACT Waste management and domestic liquid waste residual household activities such as bathing, washing, and defecation were not done well along the Ciliwung river, causing water quality to decline. Residents of Kampung Tanah Rendah, Kampung Melayu, East Jakarta, is still free-throw garbage and domestic household waste into the Ciliwung River. Waste management is not unified and usually carried by an individual or group by using the tool carrier in the form of a cart. Waste transportation costs are paid by the voluntary contributions of citizens. Most residents do not have bathroom facilities at home are reluctant to use latrines and still perform a routine to defecate on a bamboo raft floating raft river or familiarly called. Inspired by the citizens raft (getek) used for bathing, washing and activity, defecation, trash, and interact in Ciliwung, people consisting of adults and children are invited to get to know various kinds of water pollution. Adopting an idea of things that a citizen of the existence of the Ciliwung River on the raft, then made a scientific introduction of alternative methods such as "Labtek Apung" that implementation can be done independently or together and anywhere. Tests conducted is a test that is based on visual and organoleptic sensory processes. Parts of organs that play a role in sensing are the eyes as senses of sight, nose, and tongue as the sense of smell as a sensory taster. The scope of experiments on various kinds of water in the village is a test of physics, chemistry, and biological simple to use tools and materials that are easily found in the home. Simple physics test to see the physical shape, smell, color, and taste of the water. Simple chemical testing to see on the water hardness using the tea and simple biological test is performed to determine the existence of microorganisms that live in the water. The introduction of scientific alternatives to the residents, especially the children through these activities, would make scientific terms such as levels of turbidity, acidity, disorders of harmful microorganisms that normally can only be understood by most people with a specific background in the laboratory, to be made easier to understand. It is expected that after this event took place, residents are targeted to raise awareness of environmental problems that occur.

Keywords: Science Alternative, Labtek Apung, Environment, Sustainability, Ciliwung,
1 Introduction
Garbage is all kinds of waste or solid waste originating among others from residence, office, lodging houses, hotels, restaurants, restaurants, markets, public buildings, factories, including debris, building materials and scrap metal, motor vehicles and others like it (letter of the Minister of Environment dated June 11, 1993 8.137N1993). According to Jakarta Governor Decree No. 15 In 2002, garbage is a type of effluent, and domestic solid waste results are derived from natural processes, human activities, and other living creatures.

Flood and garbage problems always arise in the midst of the community [1], NGOs, Foundations, as well as the policymakers related to the governance of the Ciliwung. The paradigm change in land-oriented development has caused changes in the society's perspective on water resources, which was originally oriented landscape water level or 'waterfront landscape' switch to landscape view behind water or 'water back landscape' [2] [3].

Fig 1. Residents match colors on universal pH paper after testing various types of water provided at the workshop material exposure.

Ciliwung River flood tides result from shows that environmental quality declines due to several domestic liquid waste and waste from daily household activity removed intentionally by residents along the Watershed (DAS). Ciliwung conditions that became a landfill and domestic waste, including human feces, are undoubtedly the more worrisome in the capacity and the carrying capacity of the environment. Ciliwung River, which flows from upstream to downstream, brings a lot of garbage and hazardous waste for the life of interrelated ecosystems.

The houses are located in Ciliwung riverbank tend to channel their waste directly into the flow of time because it has no waste disposal system in the form of fecal droppings septic tank standards that increase the intensity of contamination of microorganisms that bad for health. Ciliwung river banks which tend with the back of the house to create a function of the river turned into bins and wasted containers installation of pipes houses. As a result, the value of fecal bacteria, Escherichia Coli (E.Coli). Most residents do not use the toilets for washing and bathing activities defecate because having a bathroom in their homes. There are several toilets awakened provided by the government, and it is to facilitate the citizens for their lack of access to sanitation in their homes. In practice, users are required to pay dues to the MCK specific amount to reimburse the costs of electricity and water. However, a small portion of residents in Kampung Tanah Rendah still has to use a raft or raft to perform activities of bathing, washing, and defecating. It is considered effective because people do not need to provide a special space to make the bathroom in their home that has been very limited availability of land.

As for solid waste, it is disposing of tending more directly to the river compared to well manage. The average value of community waste volume Ciliwung riverbank in Kampung Melayu is two bags per day. This value is in the range between 1-2 bags per day is with a little volume of waste categories.
Waste generated by society Ciliwung riverbank in Kampung Melayu varies greatly from waste that can be parsed (organic) up to the garbage that can not be described (non-organic) [4].

Location Kampung Tanah Rendah selected as most citizens still do not trust the groundwater had been polluted due to garbage and domestic waste. According to the perception of suitable groundwater is colored translucent, and the contaminated water is yellow and smelly. Most citizens believe that the result of polluted groundwater clean-up lazy habits is not due where septic tanks are not standardized. Residents believe if they diligently clean the house so water will not be polluted, their land and water quality will be maintained properly.

2 Method
Method is done by holding workshops. The workshop was held in the hall, community center, or an ample space near the public housing residents by inviting and suggested they bring water for bathing, washing, and drinking consumption of each home using a container or packaging. In addition to the water brought by citizens, also supplied water Ciliwung River, water from toilets, the water mosque / mosque which is used for purification, and domestic sewage discharged into the river, and some of the test sample with a particular treatment such as a mixture of tea water or biological test [8] samples that need to be allowed to stand for a few days before observation. Residents in attendance were divided into groups, and each group was accompanied by a facilitator.

Residents visually observe the physical characteristics of the water, such as odor, color, and temperature. In addition to wastewater and water from the Ciliwung River, water is taken and provided taste. After conducting a visual test, the people who are divided into several groups to write the interpretation outlined in the Fig, a symbol, an image, or scale the guide sheet that has been provided.

a. Material: The water from homes, river water, water from toilets, water from Mushala / Mosque, wastewaster.
b. Tool: Beakers, test tubes, tube rack, glass funnel, winkler bottle, pipette, stir bar, thermometer, worksheets for observation.

When people compare a wide range of water visually, it will get a wide range of possibilities, such as the smell of citizens parameter identifies whether the water has a strong smell or no smell at all. For color parameters, residents will see the colors appear as a result of organic materials or chemicals that go into it. While the water temperature [9], it can be seen whether the water has a temperature less than or higher than the standard limit of 25°C.

In addition, residents do a simple chemical test to measure the pH of the water using the universal pH paper and water hardness test by steeping the tea that had been prepared the day before. Colors that arise at universal pH paper determines the degree of acidity in the water by nature acidic, basic, or neutral (standard). Acidic water will have a pH below 7, when its bases have a pH above 7, and neutral if the water showed pH on a scale of 7. While using a chemical test to determine the tea steeping water hardness level of alkaline earth metals group IIA such as Calcium (Ca) and Magnesium (Mg). The use of water brewed tea on a simple chemical test is to look at the ability of water to extract components of caffeine in tea, especially tea. The ability to extract water will be reduced when the content of the solute is very high. If the water used to brew tea in hardness temporary nature, the compounds Ca (HCO₃)₂ and Mg (HCO₃)₂ will react with acids and form salts with Ca and Mg release the CO₂ so that the color becomes dark brew [4].

3 Result and Discussion
After watching and observing the issues involved, it is necessary to create a discourse in order to intervene in citizens with new knowledge about the virtues of waste and waste management. Through a floating raft, familiarly called getek by residents in the village, children, and adults who live not far from the banks of the Ciliwung River leave traces of everyday habits. Ciliwung River keeps the
history and also witness changes in the landscape, which used to be the primary source of water is bright and clean, now muddy and not very good. Getek in the village into a critique of limited access to city residents will be water and sanitation infrastructure. The peeled physical spatial concept of the relationship between changes in time with changes in the home and in the village. How sanitation activities moving from house to potentially contaminate times higher health. It is seen from the existence of latrines, and septic tanks are still channeling the dirt to time. With the condition of the village is very dense, the location of the septic tank of the bathroom in the house, which is close to the point of groundwater wells will have an impact on health.

Departing from the above experience, people consisting of parents and children are invited to a separate workshop to find out the possibility of contamination of water and soil, take samples, and to introduce a simple test method through the development of alternative science. Simple test results obtained incarnated in the form of sheet consisting of tables to be filled in the numbers, narration, or picture; then, residents are asked to recount in the environmental conditions in the village to ensure the understanding gained through the workshop. For example, if the public feel defecate in the toilet cubicle at the end getek is one of the bad behavior. View the location of Kampung Tanah Rendah are only ± 4 Km from the University of Indonesia, the presence of friends can encourage cooperation between citizens to pay more attention to the environment when coupled with support from the government and social policy of the corporation. By following the workshop, participants are expected to experience the fun in learning to know the home environment and the village where they lived though with different interpretations. It is like a response to urban communities in general in the face of environmental problems that occur. Alternative science development activities with the residents aim to foster a sense of care and respect for the environment through a series of workshops conducted jointly. The water around the residents of Kampung Tanah Rendah contaminated physical, chemical, and biology due to the problem of waste and litter introduced through a simple test such as water chemistry testing using a teabag. Tests conducted is a test that is based on visual and organoleptic sensory processes. Parts of organs that play a role in sensing are the eyes as senses of sight, nose, and tongue as the sense of smell as a sensory taster [5]. Visual and organoleptic testing [6] is an objective of the measured object so that it can give rise to different interpretations of each participating in workshops Labtek Apung in Ciliwung riverbank settlements, as in the specific laboratory [7].

4 Conclusion
The term laboratory that gives the impression of being far and distance is applied in different spaces, such as the introduction of alternative science Labtek Apung to residents, which looks like a floating technical laboratory on the Ciliwung River. Simple test results during the workshop are narrated verbally or in writing as during water physics and biology testing. After being invited to recount the condition of the residential environment to ensure understanding gained through the workshop activities that were held, the participants present arose their curiosity. Raising new questions about environmental problems in their villages so that sensitivity on urban environmental issues can grow and the process of synergy of ideas and creativity with various parties in the future will become easier.

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References

[1] Ruliana V, Soemantojo R W, Asteria D. Assessing a community-based waste separation program through examination of correlations between participation, information exposure, environmental knowledge, and environmental attitude. *ASEAN Journal of Community Engagement*, 3, 1, 2019

[2] Arifin HS. Revitalisasi Ruang Terbuka Biru Sebagai Upaya Manajemen Lanskap Pada Skala Bio-Regional. *Jurnal Risalah Kebijakan Pertanian dan Lingkungan*. 1, 3, 172-180, 2014

[3] Muhsin, Muhammad and Soeryantono, Herr. A Quantitative Dynamic Model For Managing Litter Abundance In The Trash Trap Of An Urban Lake In Indonesia," *Journal of Environmental Science and Sustainable Development*: 2, 1, 2019

[4] Priambodo A, Fatchiya A, Yulianto G. Analisis Perilaku Perilaku Masyarakat Bantaran Sungai Ciliwung Terhadap Aktivitas Pembuangan Sampah Rumah Tangga di Kelurahan Kampung Melayu Jakarta Timur. *Buletin Ekonomi Perikanan*. 6. 2, 2006

[5] Idrus SWA. Analisis Pencemaran Air Menggunakan Metode Sederhana Pada Sungai Jangkuk, Kekalik dan Sekarbela Kota Mataram. *Jurnal Pijar MIPA*. 5, 2, 2015

[6] UoD 2017 Taste In: The Senses retrieved from 23rd Feb, 2019, http://udel.edu/slate/project3_2/taste.html.

[7] Apriyantono A, C H Wijaya 2006 Metode Pengujian Organoleptik III: Deskriptif Test. Modul Pelatihan Pengujian Organoleptik Bahan dan Produk Pangan. Bogor: IPB University

[8] Oxford English Dictionary ed 2nd. Oxford: Oxford University Press. 1989

[9] Moore F J. *Handbook on the History of Chemistry*. New York: McGraw-Hill Book Company Inc. 1939

[10] Moore F J 1. *Handbook on the Physical Chemistry*. Englewood Cliffs, NJ: Prentice Hall. 1979