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"Technology and Research as Pillars of Sustainable Development"

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Profile

The Story of Titiek, the doctor that Evolved Acupuncture Therapy into Cure for Insomnia

The Garbage Chaplain that Transformed Brajan into a Blessed Oasis

Mosaic

Erika and Her Invention, The Lactation Vest

End of the Road of the Used Cooking Oil

Revealing Shocking Innovations in the Infrastructure of Train Tracks

Increasing Edamame Production with Rhizobium sp Bacteria

Cooking with Residues of Human Metabolism and Digestive System

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Contribution from UMY for the Victims of the Cianjur Earthquake

UMY Provides A Solution for Garbage Sorting and Processing

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EDITORIAL GREETINGS

Assalamu'alaikum wr wb

Alhamdulillah, we would like to praise our thanks to Allah SWT who has given us the blessing of knowledge and time to publish the fourth edition of UMY Magz. We would also like to give our Shalawat and greetings to Prophet Muhammad SAW whose intercession we look forward to in the last day.

At the end of the 2023 endemic period, the UMY Magz team reviews several interesting innovations and research, with the theme "Strengthening Research and Service to Advance the Nation", where the progress and achievements of various members of the Universitas Muhammadiyah Yogyakarta academic community in terms of research and innovation can be presented. We would like to invite our readers to continue exploring one's potential and develop important innovation to contribute to the field of research and community service. Hopefully, we can all be inspired by the success that these extraordinary people have achieved, and develop hopes of realizing our dreams and optimizing our role in the development of our beloved country, Indonesia. We humbly look forward to suggestions and input for the good and progress of UMY Magz in the future.

We hope you enjoy reading this edition of UMY Magz. Stay healthy, and keep innovating.

Wassalamu'alaikum wr wb

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The Story of Titiek, the doctor that Evolved Acupuncture Therapy into Cure for Insomnia

By: M. Ihsan Darmawan

"As an inventor, I strive to create innovation that benefits the public directly to improve their economic situation.



dr. Titiek Hidayati, M.Kes., Ph.D. Medical Doctor and Renowned Scholar at Universitas Muhammadiyah Yogyakarta ontinuous development of community welfare is an indicator of the successful realization of Sustainable Development Goals (SDGs). This is what Dr. Titiek Hidayati, M.Kes., Ph.D., a medical doctor and renowned scholar at Universitas Muhammadiyah Yogyakarta (UMY), believes. Titiek, who considers herself an inventor, believes that creating economic prosperity for the people will directly impact the quality of the environment and stir inclusive development which in turn is expected to support the sustainability of social life in society. When contacted by the UMY Public Relations team, Titiek talked about social phenomena in the field of public health, from her perspective as a health practitioner.

"One of the -related problems that I believe is still common in society is insomnia. Even though currently there is a lot of technology that can help cope with insomnia in the form of assistive devices, I do not think they are an effective solution. Worse still, if you take medication for your insomnia, there are still unfavorable side effects from long-term use, such as addiction, which makes insomniacs avoid using drugs for therapy," added Titiek.



Insomnia is a symptom of sleep deprivation where a person has trouble initiating and maintaining sleep, which results in poor sleep quality. Despite having adequate nutritional and physical health needs, a person can still suffer from insomnia, which can interfere with daily activities. Titiek believes that insomnia can be triggered by poor sleeping habits, having a history of depression and anxiety, lack of exercise, or having a chronic illness.

"There are many health reports stating that insomnia can lead to more complicated health conditions, such as hypertension and obesity. In addition, symptoms of acute insomnia can potentially increase the risk of mental disorders. Insomnia can even result in depression, anxiety, confusion, and even frustration if not treated immediately," she claims.

Based on this phenomenon, Titiek was motivated to create a device that can effectively treat insomnia symptoms the device must be practical and has minimum side effects. "As the front guard of primary health services, general practitioners are required to master ways to treat insomnia properly. This includes finding alternative solutions that are practical, easy to use, and affordable," explained Titiek. Armed with her knowledge and skills as an acupuncturist she created a device called "Medical Equipment to Overcome Insomnia" which uses acupuncture points to induce drowsiness from the top of the head.

Some Info Regarding Medical Equipment to Overcome Insomnia

As the name suggests, Medical Equipment to Overcome Insomnia is shaped like a bandana that covers the head. It consists of four components, namely a headgear, an electric stimulator, a power source, and a duration measuring device. Bapia Insomnia does not only stimulate acupuncture points, but also provides electrical stimulation. Titiek explained that all components are interconnected and the device itself is guite simple to use. "The electrical stimulator component attached to the headgear will stimulate at least one acupuncture point using a small amount of electrical power connected to the stimulation device. The timer, which functions as a duration measuring tool, is also used to limit how long Medical Equipment to Overcome Insomnia can be used," she said.

Titiek enthusiastically told the Public Relations team about the process of creating the Medical Equipment to Overcome Insomnia. In summary, the creation of this tool took several stages, starting from literature review to prototype testing. "I still remember when I studied the literature on the pathophysiology of insomnia, and techniques and methods of acupuncture and acupressure. This method consists of a main point called Baihui and four additional points called Shi Shen Chong. I also studied frequencies and vibrations that are safe to use so as not to harm the user," she said. This study was Titiek's first step in the process of creating Medical Equipment to Overcome Insomnia. The next process was designing the tool itself, where she created a prototype design and a prototype assembly design.

"This design was a reference for determining the materials to make the prototype. After that, we were able to collect the materials and assemble them into a voltage regulator, timer, and vibrator circuit. Everything was then assembled into one Medical Equipment to Overcome Insomnia prototype," added Titiek.

The final stage was prototype testing, where she tested the tool as well as its effectiveness. During the testing process, Titiek involved respondents who were reviewed using a questionnaire using the Pittsburg Sleep Quality Index method. The results of the test, which was divided into pre-test and post-test, were used to see the effectiveness of the prototype.



"In the first experiment, we used vibrations of 20 percent for 15 minutes. The device also functioned well, and it was silent enough that it would not disturb you while sleeping. Users reported a sensation like being massaged in certain parts of the head. The device can also make the mind calmer and more comfortable, making it easier for users to sleep," explained Titiek.

It was not easy for Titiek to create this innovative tool. Titiek faced many difficulties, starting from the difficulty of designing a prototype to assembling all the existing components into a Medical Equipment to Overcome Insomnia. "Back then, I also had difficulty finding partners to collaborate with, because I planned to duplicate this prototype," she recalled. Now, the Medical Equipment to Overcome Insomnia prototype has been perfected and has officially received an intellectual property patent which is registered in the Intellectual Property Database of the Ministry of Law and Human Rights.

Titiek had successfully invented a tool to overcome insomnia according to her specifications: effective, practical, and directly impact onto the society. A user can easily use Medical Equipment to Overcome Insomnia, which presses five points on the top of the head and draws a medial line from two sides of the ear to also stimulate the highest point on the head. "With only 15 minutes of use, this tool will stimulate acupressure points which can lead to optimal sleep," explained Titiek.

Tri Dharma as a Vessel for Titiek's Community Service

Even though she is very productive in the field of research and innovation, Titiek does not forget her commitment to the world of education as a lecturer. As a teacher, Titiek always tries to carry out the SDG agenda through teaching, research, and community service activities in accordance with the tri dharma of higher education. Titiek and her team developed a complementary medicine module to support student learning. "Because I have an academic background in acupuncture and hypnotherapy methods, I incorporated herbal and complementary medicine material into my teaching modules. This is part of UMY's plan of implementing SDGs, starting from a small-scale test, namely in the campus environment by involving the entire academic community, including students," she said.

Efforts to implement the SDGs are aimed at achieving sustainable improvement in the economic welfare of the community, maintaining the sustainability of the social life of the community, as well as maintaining the quality of the environment and inclusive development. Titiek feels that UMY has all the facilities needed to develop innovation and to realize SDGs in a wider scope. When implementing the tri dharma of higher education, especially through research activities, UMY has always focused on supporting ways to always think creatively and productively.

"I feel that UMY's implementation of the SDGs has been excellent, especially for conducting research and innovation. This is intended so that members of the UMY academic community, especially lecturers, can produce alternative science and technology products that meet the demands of the times. "I hope that what we do can improve the quality of life for the next generation, and be sustainable," added Titiek.

According to Titiek, a world that has entered a destructive era like today can be overcome with innovation and creativity, including realizing SDGs. One of the keys to achieving success in realizing the SDGs is to survive and compete to grow human resources which full of new innovative ideas to overcome existing problems and improve shared prosperity for the world community.





The Garbage Chaplain that Transformed Brajan into a Blessed Oasis

By: M. Ihsan Darmawan

n Monday mornings, it is tradition for the people of Brajan village to socialize around the Al-Muharram Mosque. For ten years, they have been gathering on the first and third Sunday of every month

However, this is more than just a regular meetup. The villagers of Brajan would work together to gather and sort through garbage. Around ten to fifteen people, children and adults, work together to sort the trash that they have piled up and saved for two weeks. Although fatigue can be seen on their faces, they push through enthusiastically and with great dexterity. However, anyone who sees this village's unique routine might be wondering: why are they using a Mosque, a holy place, as a place to gather and sort garbage?

A mosque is a holy place used for worship activities such as the five daily prayers, Qur'an recitation, or for the villagers to gather and perform other religious activities. However, this is not the case in the Al-Muharram Mosque of Brajan Hamlet, Tamantirto, Kasihan, Bantul, Yogyakarta Special Region. In addition to being the location for religious activities, Qur'an recitation, and religious gatherings, this mosque is also used by its people to pile and sort their trash, a very rare sight that cannot be seen in most other mosques.

After enjoying the very rare view of the Mosque, the Takmir (manager) of the Al-Muharram Mosque, Ananto Isworo, arrived on his motorcycle after attending two different recitations in different locations. Without further ado, he began to supervise the waste sorting process. This activity is known as the Shadaqah Sampah Movement. As he supervises the waste sorting process, Ananto, the founder and manager of the Shadaqah Sampah Movement, told us how the program started. He also told us how the program has greatly benefited the lives of the people of Brajan Village.

"It all started from a personal concern of mine when I moved to this village in 2005. I noticed that the social structure of this village still has problems, such as health, education, and even groceries. This is because the prosperity level of this village is still very low," Ananto reminisced.

Ananto, who was still a temp worker at that point, was not able to help the village much. He began to think, what can he do to contribute to the life of the Brajan village and its people?

"It turns out the people of this village had a lot of different personalities. I would even go as far as to say that they were not very religious. My background as an alumnus of Universitas Muhammadiyah Yogyakarta's Islamic Broadcast and Communication (KPI UMY) program and my previous experience as a preacher during my time in university moved me to start an effort to help the people of Brajan," said Ananto.

From Rejections to Threats

Ananto recalls the early days when he moved and started preaching in Brajan village which is located in Kasihan sub-district, Bantul regency. It was not easy for him to blend in with the intention of changing the behavior of the people there. For the first four days, he and his family were threatened to stay away and not disturb the locals' habits. "We've only lived in Brajan for about two weeks, and we already felt we must move. We couldn't stand the inappropriate behavior of the locals, as some people would drink alcohol at the front terrace of our house," he recalled. He considered the threats natural, considering his status as a migrant who is proactive in Brajan village. People who tend to maintain the status quo will be very difficult to change as they perceive change as a threat.

However, Ananto and his wife soldiered on and saw their struggle as a new opportunity to preach. "My wife and I made a commitment. If we want to change an environment, we must first change the way we view that environment. We cannot immediately judge this environment as good or bad without knowing the background first," he added.

Ananto began to change his method of approach. He took the initiative to approach the village youth, who would be willing to discuss things so that they would be more open. "From them, I learned that the youth of Brajan village lack self-confidence due to their environmental background. So, I invited them to take part in outbound activities and training to train their soft skills and hard skills," he said.

Ananto's efforts to preach did not stop there. In 2010, he and the Leader of the 'Aisyiyah Tamantirto Branch founded an Islamic Kindergarten (PAUD) so that the children of Brajan village could understand basic religious knowledge. "Because the people here have very strong cultural roots, I also try to bring people closer to religion through wayang performances, with a more Islamic nuance and substance. Thank God, people are starting to open up to what I do," he said.



Ananto Isworo, S.Ag. Alumni of Islamic Broadcasting and Communication 2001

Creating a Source of Goodness through Waste

After he was accepted by the people of Brajan village, Ananto began to enjoy a greater freedom to preach and help the community. Because the village had a lot of underprivileged families, many children had to drop out of school as they didn't have the money to continue their education. Ananto sees this phenomenon as a problem that must be solved immediately.

In the holy month of Ramadan in 2013, he took the initiative to ask residents to collect food packages left over from the communal breaking of the fast that was tradition in Al-Muharram Mosque. He then sold this collection of leftover food packaging waste to collectors, and set aside what money he earned for the needs of the residents of Brajan village.

"I started the program unwarily. I said to the residents, "the waste they donate will become sadaqah (blessings)". At first the residents were confused, how could waste be used as charity?" said Ananto. During that month of Ramadan, after performing his dawn prayers, Ananto would sort the rubbish he has collected. He did everything himself, and after two weeks, people started coming to help him. "At that time my wife cried, why did I have to want to help people so much. I said to her because if people haven't seen the evidence, they won't believe it," he said. He believes that if someone has proposed something then they must be responsible and dedicate themselves to their proposal. As the Javanese proverb goes; Wani Sul, Wani Mikul, Wani Ucul (Dare to suggest, dare to carry, dare to release).

However, Ananto received more opposition from several elements of the community for the actions he took. Some residents, including the head of the neighborhood, think that what Ananto did did not involve prior discussion or earn the residents' full approval. The sacks of Ananto's garbage collecting efforts began to fill the front yard of the mosque. Ananto argued that if he had to wait for a decision from the residents, this program would not work, because there would definitely be people who object and oppose it. He chose to immediately take action and accept the consequences for what he believed was right.

Others think what Ananto did was wrong because he used the mosque's vard as a place for his waste collection and sorting activities. "I accept all the input given. However, I still explained that the reason I chose the mosque yard as a waste collection site is because I believe that the mosque is a place that can purify and consecrate dirty things. A person who is not a good person can become one after going to the mosque and praying. If trash is considered dirty, it is converted in the mosque into a blessing in the form of alms. Thank God, the residents were able to understand my logic and even contribute to this program," said Ananto. Ananto also stated that proceeds from his first rubbish sale amounted to five hundred thousand rupiah. "However, I did get cheated by the garbage collectors. Because this was the first time I had done a transaction like this, I didn't understand the value of the waste I was selling. We could have earned two million rupiah from that first sale," said Ananto while laughing.

However, that five hundred thousand rupiah managed to save the education of a child in Brajan village. The child almost dropped out of school because he could not pay tuition fees. The residents of Brajan village did not seem to believe that the rubbish they provided could actually be useful for them. At that time, Ananto said that the people's mindset still thought that the waste they donated had no value, so they were surprised when they learned that their waste could make money. "And so we know that waste is an item that still has value that can be traded in for money. From there, the residents in this village became more enthusiastic to donate the rubbish in their homes, and this program continued to prosper for ten years," he added.

According to Ananto, the Sadaqah Sampah Movement is just one of the approaches that he uses to achieve his main goal of improving the conditions of the people of Brajan village. "My mission remains unchanged; I want to change the face of Brajan village. At first, there were not a lot of villagers who behaved here compared to those who misbehaved, until they slowly saw the light. I think that darkness is the absolute lack of light, not even a single speck. ..

.. What I do is preach to people so they do good things, without the need to be pious first. With one good person, that small speck of light will appear. I will continue until Brajan village becomes blindingly bright, while making people who are used to bad behavior feel ashamed of their bad habits," explained Ananto.



Saving the Environment while Conserving Energy

Ananto's success in carrying out the Sadaqah Sampah Movement cannot only be measured by how big and far-reaching the impact can be. He also succeeded in the most fundamental aspect of change: changing people's mindset towards waste. Ananto always preached that used goods, from food wrappers to unused household furniture, are not unusable waste, but something that is still full of potential. He considers waste as a combination of organic and inorganic waste as well as residue. "This is because plastic and unused household furniture can still be used as new items, if processed properly. One day, we can even make a waste-powered electric plant," he explained.

However, instead of aiming to process waste and build a power plant, Ananto wants to fix the waste problem starting from the upstream, so that he can shorten the long journey of waste processing. "Conventional waste processing can take a long time. Currently, garbage processing starts from households, where the waste is picked up by the sanitation worker, transported to the waste depot, then moved by truck to the Waste Processing Site (TPST) in Piyungan, where it still has to be dredged again using a tractor. You can imagine how much fuel energy is used in one trip," explained Ananto. He thinks that our waste problems are not limited to efforts to sort and process waste. Furthermore, Ananto wants the amount of energy used in the form of wasted fuel to be taken into account. The movement he made ultimately became an attempt to reinvent the chain of this journey.

The waste that has been collected in each household through the Sadagah Sampah Movement will stop at the mosque, where collectors will purchase it, then sold to recycling factories. With this scheme, less fuel energy will be wasted. "The workmanship is also effective. In addition to shortening the journey which saves energy, the garbage we sell to the collectors have also been pre-sorted. The sales proceeds can also be used to help many people. The impact will be much more positive, and if all mosques in Indonesia carried out this movement, it might help the government save up to several million barrels of fuel," said Ananto. His vision to see how far opportunities can be used to answer problems is very effective, systematic, and comprehensive. The waste that has been sorted form residual energy that can be reused, proceeds from waste sales can help the community's economy, and fuel can be conserved through simplifying waste disposal routes.

Religion and Environment is Unlike Water and Oil

Through the Sadagah Sampah Movement, Ananto and Braian village received attention from the rest of the world. In 2018, Ananto was invited by the Ministry of Environment and Forestry (KLHK) to explain the concept of the Waste Shadaqah Movement program. The Director of Waste Management from the Ministry of Environment and Forestry at that time was interested in the concept he was promoting. In the same year, he and other waste activists in Brajan village received a visit from representatives of a Malaysian Mosque Council who wanted to learn about mosque-based waste management. "What we are doing is an anomaly for most mosques in Malaysia, where managing the economy through mosque programs is not allowed, while we manage waste in ours," said Ananto. Ananto's direct concern for the residents of Brajan village has evolved into an effort to save the environment, not only with the Shadagah Sampah Movement, but also the Eco-Mosque program which he initiated.

The Eco-Mosque Program is another energy conservation effort by Ananto and the residents of Brajan village. The Al-Muharram Mosque was rebuilt with a building design that can maximize natural energy from lighting to air circulation, which significantly reduces the use of electrical energy. Alternative energy is also a resource for this new design as it uses solar panels and water throughs to absorb rainwater as a form of water conservation and a method to prevent flooding. "One of the environmental ambassadors from Norway came to our place just to see the Eco-Mosque concept we were promoting. The Al-Muharram Mosque is the first Eco-Mosque in Indonesia which has been running effectively since 2013. In fact, the MUI (Indonesian Ulama Association) and the Indonesian Mosque Council haven't launched the Eco-Mosque concept until 2017," he said.

Ananto felt that his journey had reached a checkpoint. When he first moved to Brajan ten years ago, his dream of becoming a preacher in Brajan to change the image of this village and its residents has now been fulfilled. Ananto, who promised Brajan's young people to raise their self-confidence, is now famous around the world. "I tell the children that the eyes of the world are now on you. I have fulfilled my promise to this village; now it's your job to continue it. That's my message to the youth of Brajan village," said Ananto. There are around seven hundred verses in the Koran that talk about the environment. The Prophet has also set many examples of a sustainable lifestyle. I want other religious leaders in Indonesia to do what I have done. I want more garbage ustadz, garbage pastors, garbage priests, or even garbage monks,"

Ananto's efforts show that religion cannot be separated from contemporary issues, such as the environment, poverty, and energy conservation. Everything Ananto did were based on Islamic teachings. "This is like what I said when I was threatened for managing waste in a mosque, which was considered like water and oil. There are around seven hundred verses in the Koran that talk about the environment. The Prophet has also set many examples of a sustainable lifestyle. I want other religious leaders in Indonesia to do what I have done. I want more garbage ustadz, garbage pastors, garbage priests, or even garbage monks," he said. He believes that all religious leaders are responsible for their congregation, not only in matters of worship, but also in social matters, including managing the environment. (ID)

SDGS, UMY'S VOW TO CREATE A PROSPEROUS WORLD

By: M. Ihsan Darmawan



s an educational institution, Universitas Muhammadiyah Yogyakarta (UMY) is committed to focusing on more than providing excellent educational services for the community. UMY has an obligation to improve people's lives and have a good impact in the future.

To this end, UMY has committed many efforts through its various schemes to fulfill this role. UMY has provided scholarships to students and dedicated its students and lecturers to community service programs. As if this were not enough, UMY continues to implement various new schemes, one of which is adopting Sustainable Development Goals (SDGs), which are expected to support the empowerment carried out by UMY in a more measurable manner.

SUSTAINABLE DEVELOPMENT G ALS

SDGs is a program initiated by the United Nations (UN), which is projected as a follow-up program to the Millennium Development Goals (MDGs), which they accomplished in 2015. SDGs are expected to improve the welfare of global society in a sustainable manner. SDGs also actively aim to continue its development in order to maintain the quality of a liveable environment to ensure social wellness in society. In order to implement these values, the SDGs have a broader scope of goals compared to the MDGs by implementing 17 points, as well as being a rallying call for all countries to collaborate globally.

Through UMY's Department of Planning and Development (BPP), UMY helps supervise and oversee the implementation of the SDGs, especially in the campus environment. UMY has carried out many agendas which are in line with the implementation of the SDGs at several points. This was stated by the Head of the BPP UMY Strategic Data and Information Center, Ir. Tony K. Hariadi, M.T., IPM. When interviewed at his office, he stated that UMY had been running programs related to and supporting the SDGs' achievement for a long time. "For example, we provided scholarships for students, which is a form of support for two SDGs, namely Quality Education and No Poverty," he said when met at the BPP office at UMY some time ago.

Tony stated that UMY really wants to be actively involved in realizing the SDGs that have been formulated by the UN. Currently, UMY has effectively implemented 7 out of a total of 17 SDGs points. These 7 points consist of No Poverty, Zero Hunger, Good Health and Well-Being, Quality Education, Clean Water and Sanitation, Decent Work and Economic Growth, and Partnership for the Goals. According to Tony, currently, the SDGs have become a global agreement, and UMY have been willing and would continue to show its commitment to implementing the SDGs values within the Young and Global campus environment. "One reason why we decided to focus on implementing the SDGs is because we want all the efforts that have been made by UMY, which are intended to increase societal welfare, to be measurable. If we can measure what we have done, we can see and assess the extent of the impact we have made," added Tony. He also mentioned that one way for UMY to measure the SDGs achievements that have been made is by participating in international rankings.

To prove this, UMY has once again received a global ranking from the Times Higher Education Impact Rankings (THE IR), an institution that reviews university performance in implementing SDGs. UMY has consistently succeeded in achieving significant improvements and was ranked 601-800 out of a total of 1,591 institutions throughout the world, according to THE IR. According to Tony, UMY wants to use the results of this ranking as a benchmark for how far UMY is committed to making SDGs align with the values taught in UMY.

"One of the aims of this ranking is so that the efforts that we have made to achieve the SDGs can be measured properly. However, UMY has also made some internal efforts that are indirectly related to the SDGs, such as through the UMY Mengabdi and KKN programs which also support the No Poverty, Zero Hunger and Good Health and Well-Being indicators," explained Tony.

Of the 17 points contained in the SDGs, UMY succeeded in getting rankings in 7 points, with Zero Hunger, Decent Work, and Economic Growth being the points with the highest ranking achieved by UMY, namely in position 101-200 worldwide. Tony also added that so far, efforts to increase economic growth for employee welfare have been carried out at UMY. "This includes the wage scale, where UMY does not differentiate between women and men in wages. Apart from that, UMY also classifies wages based on the length of time employees work, give out extra allowances, and so on," he said.

SDGs Center: The Center of SDG Research in UMY

One proof of UMY's efforts in supporting the SDGs program is the launch of the SDGs Study Center, the UMY SDG Center. This study center was established to strengthen the integration of the implementation and development of UMY programs that are in line with the 17 SDGs. With the SDGs Center as a headquarters, UMY and many other universities in Indonesia can play an active role in realizing the achievement of SDGs through the education sector.

The head of the UMY SDG Center, Dr. Ane Permatasari, S.IP., M.A said that their target to fulfill the SDGs is getting closer, as they aim to finish by 2030. However, there are still many problems related to the SDGs that have not been resolved in Indonesia. "With around seven years remaining, Indonesia still needs to improve several sectors, such as poverty, social inequality, and renewable energy. The UMY SDG Center is intended to help the government accelerate the fulfillment of SDGs in Indonesia in general," she said.

When interviewed in her office, the UMY Government Sciences Lecturer revealed that UMY implemented the SDGs Center concept slightly differently than other universities. She thinks that UMY has adeptly used human resources by involving almost all of its existing faculties. With diverse educational backgrounds, Ane is optimistic that an increasingly rich academic atmosphere will be created and will optimize research and community service activities, which are also part of the SDGs goals.

The UMY SDG Center focuses primarily on research related to fulfilling SDGs goals. However, research is only the first step, and it begins with identifying problems in society, analyzing them, and offering solutions. Ane also hopes that the UMY SDG Center can become a data bank where a large amount of research can be carried out. "The results of this research will become solutions to different problems, which we can use to implement effective community service and develop innovation. We also collaborate with related institutions at UMY in developing innovation," she said.

Perfecting Research Through Innovation

As the institution responsible for developing innovation at UMY, the Research and Innovation Center (LRI) develops innovation based on research results, including research related to SDGs. LRI, through research conducted independently and in collaboration with the SDG Center, focuses on raising issues related to the SDGs and developing innovations that can be implemented in society.

The head of LRI UMY, Prof. Dr. Dyah Mutiarin, S.I.P., M.Sc., who is usually called Arin, revealed the innovation development scheme that is used to implement SDGs. According to her, applied research and development will produce innovation in the form of ready-to-use products that can answer problems in society. "For example, we have innovations related to sustainable water-based housing, which can overcome problems in the sanitation and water sector. Apart from these products, the innovations produced can also be in the form of systems such as agricultural systems to support sustainable agriculture," added Arin.

In order to achieve the SDGs goals, Arin admitted that LRI has a special strategy. "Every research we carry out must have a positive impact, which means that the results of the research in the form of applied innovation must be beneficial to society. We will then review how the innovation was applied to see what the benefits it has produced," she explained.

The UMY Government Science lecturer also revealed that implementing SDGs within UMY through research and innovation has become one of the main focuses of LRI, in addition to fulfilling UMY's vision as a research excellent university. "So far, we have been focusing on collaborating with partners both from inside and outside the country in conducting research. Secondly, we also have ensured that every research must have results, whether in the form of publications or intellectual property rights and patents such as innovative products. As of today, UMY already has 186 patents from various product inventions that have been produced," Arin concluded.



"Every research we carry out must have a positive impact, which means that the results of the research in the form of applied innovation must be beneficial to society. .."



Erika And Her Invention, The Lactation Vest



By: Mutiah Parawangsah

Breast Milk is the best source of sustenance for babies aged 0-6 months. This elixir contains all the nutritional elements that a growing baby needs for growth and development. However, breast milk is more than just food; it also contains immune boosters that protect babies from various infectious diseases, bacteria, viruses, parasites, and fungi.

In the Holy Qur'an, Allah SWT mandated mothers to nurse their children, and not without reason. Various studies by nutrition experts have proven that breast milk is the best source of sustenance for babies. In addition to providing all the necessary nutritional elements, breast milk contains specific components to meet the needs and development of the baby. "Mothers should breastfeed their children for two full years, for those who want to perfect their children. And it is the duty of fathers to feed and clothe mothers in a ma'ruf (honest) way. A person is not burdened except according to the level of his ability" (Q.S. Al-Bagarah: 233)

Breast milk contains the natural protections that newborn babies need, including antibodies that can protect them from the threat of disease. So, when the mother is fighting an illness, she can still nurse her child because breast milk provides invaluable protection. Studies conducted in Europe have revealed an interesting fact: children who were exclusively breastfed in the first 0-6 months since birth will have a much higher level of intelligence (around 12.9 points) when they reach 9.5 years of age compared to their peers who did not exclusively breastfeed.

Exclusive breastfeeding plays an important role in children's development, especially in terms of intelligence, which in turn significantly impacts their ability to socialize. The intimacy between mother and child during breastfeeding creates feelings of security and deep affection, which in turn will positively influence the child's emotional development.

The Miraculous Lactation Vest

On May 2, 2010, Erika Loniza S.T., M.Eng., a Lecturer in Electromedical Engineering at Universitas Muhammadiyah Yogyakarta (UMY), had just given birth to her first daughter, whom she named Afiqah Khairunnisa Sembodo. However, that moment of happiness suddenly turned into sadness. The new mother, who is familiarly called Erika, experienced a trial that almost made her give up. Her breast milk, which is the best source of nutrition for babies, could not flow as expected. The unstoppable stress that resulted drove her into a period of baby blues. However, this bitter experience provided a strong impetus to find a solution.

"I'm sure many breastfeeding mothers experienced the same thing as I did," said the 40-year-old woman when met at the Electromedical Laboratory. She was fully aware that these experiences were not limited to herself. On that basis, a revolutionary idea emerged. Erika created a lactation vest. She believes that through this innovation, she will create the positive change that mothers worldwide will need.

The opportunity to realize this idea came to a breakthrough when her students showed enthusiasm to participate in the 2019 Student Creativity Week (PKM). Without hesitation, she took her idea of a lactation-inducing vest to the next stage. As a result, the idea passed the PKM. In the following year, the PKM team she supervised succeeded in getting their funds back, which she used to develop her innovation further.

Helped by her personal experience, Erika researched to achieve a goal through various methods several times until she finally found the most suitable way. When an error or mistake occurs, it is recorded to be evaluated as learning material. She also read a lot of journals, which she included in a PKM event, and the result is a lactation-inducing vest that many mothers really need. This vest has a noble purpose: to help working mothers provide breast milk for their children. "This vest is a necessity for mothers because I have experienced it myself. When a working mother cannot provide her breast milk for her child, she must resort to giving their child formula milk. **That said, breast milk is the best milk in the world for children**. With breast milk, a bond between children and mothers can develop," said the female engineer confidently.

Erika strongly believes in the importance of breast milk as the best food in the world for babies. By providing breast milk, you can magically embrace the closeness between mother and child. Breastfeeding will make the baby feel attached and safe. The sense of security that a baby has in the first and second years of life will influence the development of the next stages, including the child's emotional and mental development.

However, these achievements don't just stop there. Erika, who is currently pursuing a doctoral degree, plans to make this research the topic of her dissertation. Erika admitted that she was very grateful to be mentored by a leading lactation expert professor at Universiti Sains Malaysia. She is confident that she will be able to take this research to a global level.

Since its invention in 2019, this lactation vest has received support through PKM. It has been covered on several television stations and even attracted the attention of PT Sari Garmen, a company that is one of the holders of well-known brands such as Uniqlo. This success proves that a brilliant idea derived from personal experience and driven by strong determination can change the world, even in something as intimate as breastfeeding.

This vest has also received a copyright for its product, registered in the Director General of Intellectual Property's "Creation Registration Letter" number 000226533.

Providing Oxytocin Massage and Breast Care

This vest is not just an ordinary vest; it is a tool with two important functions. First, this yest combines oxytocin therapy massage technology for postpartum mothers. Oxytocin massage is a massage performed on the back, specifically the spine, to increase breast milk production in breastfeeding mothers. Using this vest, postpartum mothers can experience a significant increase in relaxation, and they can provide massage as recommended by WHO (World Health Organization). The second benefit of this vest is Breast Care.

This state-of-the-art technology has gone through several stages of production. However, it is still undergoing developments in terms of appearance. Erika admitted that she was happy to be able to continue this research in her dissertation, which allows her to receive input from professors who are competent in the field of lactation.

In addition to providing massage and breast care, this vest is also equipped with a hot compress to provide an extra feeling of relaxation. The results were extraordinary when it was first tested at a local clinic. Mothers who use the vest testified that the volume of their lactation has increased significantly. PT Sarigarmen even assessed that this vest can increase breast milk production and provide a relaxing effect.

"When a mother relaxes, she produces more endorphins, and her breast milk will flow smoothly," explained the woman from Palembang.

It is important to note that postpartum mothers often experience tiring and challenging times. Turbulent hormones, fatigue, difficulty sleeping, and a crying baby can be a heavy burden that can test a mother's physical and mental health.

The woman, who was born on August 25, 1983, told another story about when she was undergoing the process of developing the lactation vest in PKM. Erika and the PKM Team experienced several challenges, from the initial design phase to realizing the product. Initially, she and her team did not know how to create a tool to provide effective oxytocin massage. One crucial consideration is whether the team should focus on the breast care feature or the oxytocin massage first, considering that WHO recommends both should not be done simultaneously. Therefore, the team decided to present them alternately. First, this vest provides an oxytocin massage, followed by a warm-up, and then a massage. After about 20 minutes, the focus shifts to the breast care section. The breast care part also involves warming up the breast before the massage. Even though this vest also has additional features in the form of pumping,

Erika and the team focused more on perfecting the massage and breast care features.

"The vest provides massage function for the mother's back and breast care in the front. When breast milk comes out, mothers usually experience swelling and pain. The issue we faced was designing a way to provide a massage function on the breasts, which was not easy. We know that the breast sizes of women or breastfeeding mothers vary. In the end, we tackled it medically," she said.

Another challenge that she faced was the design step. Erika admits she is not a design expert, so creating an effective electronic tool for breastfeeding mothers is not easy. One other obstacle is the Ethical Clearance process. Ethical Clearance (EC) or ethical feasibility is a written statement provided by the Research Ethics Commission for research involving living creatures, which states that a research proposal is worthy of implementation after meeting certain requirements. To test this tool on patients, Erika and the team had to find volunteers who were willing to participate.

In addition, she had to pay more serious attention to medical aspects. "We communicated with obstetricians and gynecologists to ensure that the massage approach we proposed was appropriate to the needs of postpartum mothers with special conditions," she said. The results were extraordinary when it was first tested at a local clinic. Mothers who use the vest testified that the volume of their lactation has increased significantly. PT Sarigarmen even assessed that this vest can increase breast milk production and provide a relaxing effect.



A Vest that is Safe, Comfortable, and Effective for Nursing Mothers

The next task for Erika is to ensure that the lactation vest is safe and comfortable and can effectively help breastfeeding mothers. Erika explained that she had ensured that Ethical Clearance measures or a written statement from the Research Ethics

Commission had been obtained, confirming that this research proposal met all the ethical requirements necessary to involve living creatures in experiments. This is an important step to ensure that product research and testing are conducted with high integrity.

The next step in developing this vest was carrying out various measurements and tests. The team measured and adjusted the vest according to applicable health standards. For example, the frequency of product use is evaluated to ensure that regular use remains safe. The suggested temperature for the device use was also calculated carefully, with references from reliable medical journals. The approach used in measuring and testing this product was based on scientific evidence available in the medical literature. Additionally, active collaboration with various medical professionals, such as obstetricians, pediatricians, and even a lactation expert who served as Erika's dissertation supervisor, provided valuable insight to ensure this product meets stringent health standards.

The entire design and creation process was a careful and meticulous step to ensure that this product is a safe, comfortable, and effective solution to help mothers who experience difficulties in producing breast milk. By adhering to high scientific and ethical principles, Erika has created a tool that can potentially change the lives of many mothers who long for a smoother and more comfortable breastfeeding experience.



Economic and Eco-friendly

According to Erika, the main difference between this product and similar products currently on the market is that other products do not offer automatic oxytocin massage. An oxytocin massage service is generally available, performed manually by individuals. However, in practice, not all mothers have access or the ability to do this oxytocin massage themselves. They may need help from other people, who, of course, may have their limitations and weaknesses.

This oxytocin massage vest responds to mothers' needs by providing an automated solution. This product has been intelligently designed to provide an effective oxytocin massage without requiring the help of another person. This makes it more practical and accessible for mothers who want to experience the benefits of oxytocin massage.

The material for this vest is a fabric commonly used to create t-shirts, which is then sewn carefully by a tailor. This vest is also equipped with a bra form, making it easier to wear. Each vest is currently sold for 5 million rupiahs. The high price is because this vest is still in the initial production stage. Erika hopes that as production increases, the cost of this product will become more affordable for many mothers.

However, in the long term, this vest will be a more economical option to constantly use formula milk because many people can use it repeatedly. It also supports the concept of sustainability, leading to more environmentally friendly and economical choices in the long term. Thus, this product is not only innovative in its technological development but also in providing a more cost-effective and sustainable alternative for mothers who experience difficulties in producing breast milk.

A Plan to Develop a Tool for Oxytocin Massage for Mothers in the Foot Area

In the future, Erika plans to develop another innovation while still focusing on the health of mothers and babies. Erika suggested continuing development by considering oxytocin massage in the foot area. Although there are many massage devices already on the market, special attention to pregnant women has not been given yet.

Pregnant women have different needs and sensitivities, so developing a personalized massager would be an invaluable step. In some cases, not all types of massage are safe or appropriate for pregnant women, so developing products that specifically accommodate their needs would be beneficial.

Furthermore, Erika also emphasized that therapy using tools like this might reduce the need to take drugs that are potentially dangerous for the mother and unborn baby. With this therapeutic approach, pregnant women can experience the benefits of oxytocin massage without having to take unnecessary risks.

By continuing to focus on maternal and infant health, the development of this innovation has the potential to have a greater positive impact on maternal and perinatal care. A meaningful contribution to maintaining the well-being of pregnant and postpartum mothers and providing safer and natural solutions is a very important step in the world of health care.

"Breast milk is God's creation and something we cannot mathematically define," said Erika with a twinkle in her eyes.

Erika's goal is very clear: for mothers, especially those who work while struggling to provide breast milk to their children, to remain aware that breast milk is a sacred gift from God that is priceless, which cannot be calculated and mathematized. Breast milk is a gift that cannot be measured in numbers.

"Do not be tempted by advertisements for Formula milk, which will eventually be costly to our wallets," she added.

Erika understands very well that the cost of formula milk will increase if mothers give it to their babies at a younger age. Therefore, breast milk is a wise economical choice, providing great benefits in the form of closeness between mother and baby. These beautiful moments will be priceless. However, it cannot be denied that some mothers must return to work, so maintaining the commitment to provide breast milk becomes a bigger challenge. This is where the lactation vest comes to save the day. With various sophisticated features, this vest is not just a tool, but a loyal friend that supports caring for babies with breast milk.

With this vest, mothers no longer need to wait for their husbands or other people to give them a gentle oxytocin massage. This vest is a friend here to embrace mothers in the warmth of love. In busy work situations, this vest is a companion that helps maintain the commitment to provide exclusive breastfeeding to your little one. With this vest, Erika invites us to see a brighter future. She reminds us that breast milk is a gift that cannot be calculated in numbers. With every gentle massage of this vest, every mother can feel a touch of love, an encouragement to support mothers in their beautiful journey of providing breast milk to the babies they love. We are invited to never forget this natural wonder and always maintain our commitment to provide the best to future generations.

The lactation vest is not just a product but a symbol of love and dedication in maintaining the happiness of mother and child.

.. for mothers, especially those who work while struggling to provide breast milk to their children, to remain aware that breast milk is a sacred gift from God that is priceless, which cannot be calculated and mathematized. Breast milk is a gift that cannot be measured in numbers.



End of the Road of the Used Cooking Oil

By: M. Ittaqullah RMM

"Waste management and processing must start from its source. Waste management must be integrated from upstream to downstream. We need to do this to provide economic benefits, be healthy, save the environment, and change people's behavior. This is very important to minimize the waste problem that eternally plague us."



he sentence was highlighted by the Dean of the Faculty of Agriculture, Universitas Muhammadiyah Yogyakarta (FP UMY), Ir. Indira Prabasari, M.P., Ph.D. Maintaining the environmental ecosystem is the responsibility of every human being on earth to support the continuity of healthy living and a sustainable environment. One of the things that supports this movement is waste processing, including processing household waste and food waste.

Based on data from The Economics Intelligence Unit, Indonesia is the second largest producer of food waste (food loss and waste/FLW) in the world. Meanwhile, according to data collected by The International Council on Clean Transportation, Indonesia collects 715 kilotons of used cooking oil every year. This is certainly hard evidence that the processing of food waste and household waste in Indonesia is suboptimal.

Indira Prabasari, who is familiarly called Mrs. Sari, has concerns about the suboptimal processing of used cooking oil waste. This is especially true regarding the processing of used cooking oil in her neighborhood. With a frown in her face, Sari expressed her concerns regarding the processing of used cooking oil waste. "Cooking oil waste is not good for your health. However, every household produces cooking waste. Every liter of cooking oil used by households produces around 0.4 liters of cooking oil waste, and Yogyakarta can churn out 2,985.84 kiloliters of used cooking oil per year," said Sari.

Her concerns about cooking oil waste drove Sari to act and contribute to providing a solution to the problem of used cooking oil waste. In February 2022, the Agrotechnology lecturer began carrying out her research. Sari firmly stated that if used cooking oil is not managed and processed properly, it will only pollute the environment and disrupt the continuity of a healthy lifestyle and environment. She also emphasized that this research was carried out not only to find solutions to waste that threatens the environment but also to process and recycle used cooking waste into oil-based products that have economic value.

Sari said that she had been working with used cooking oil for 2 months, researching the infamous household waste. Through her digital device, she explained the method she used to process used cooking oil.





"I had a thought. What if this waste was processed into laundry soap, as long as something is dirty, everyone will need soap. So, I started processing the used cooking oil. The processing began with sorting and cleaning used cooking oil, then continues with refining the used cooking oil, followed by saponification and soap formulation because this waste will be processed into soap," Sari emphasized.

The process of turning used cooking oil into soap takes more than 24 hours. This is because the cleaning and purification process of used cooking takes approximately 12 hours, the saponification and resting phase takes 12 hours, and the formulation takes 2 hours.

Sari herself has carried out formulation trials more than 5 times, all of which gave different results. On the first try, the resulting soap was coarse but too runny. In the second experiment, the soap was coarse, and the viscosity was appropriate, but the foam was still not suitable. In the third experiment, the fragrance of the soap did not last long depending on the quality of the essential oil. Sari also said that water quality is also a problem because the water used to dissolve the soap formulation must be non-mineral so that the composition of the water does not damage the soap formula.

She also mentions that processing household waste should really minimize the waste problem with proper waste management and processing. Waste management must be integrated everywhere so that it can provide economic benefits, is healthy, safe for the environment, and can motivate change in people's behavior.

Sari thinks that household waste is still not managed well on a massive scale, even though it should be. Waste must be resolved from the source, so household waste must be resolved from the household. Households must start cleaning up and sorting their waste. There are many household waste processing technologies, as long as each household is willing to start sorting their waste. Organic waste can be processed into compost/eco enzyme/organic pellets, while inorganic waste that has been sorted can be sold. Inorganic and organic waste that is not managed properly can contribute to agricultural land pollution.

At the end of the interview. Sari added a piece of hope that the research on used cooking oil that she carried out would be able to have a positive impact on the wider public. "There is great hope that this research can make a real contribution to the problem of used cooking waste as household waste. And through community service activity the results of this research can be conveyed to the public and this technology can be adopted by the community so that people can process their cooking waste into products that are economically valuable and safe for the environment," she stressed. (RM)

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There is great hope that this research can make a real contribution to the problem of used cooking waste as household waste. And through community service activity the results of this research can be conveyed to the public and this technology can be adopted by the community so that people can process their cooking waste into products that are economically valuable and safe for the environment,"



From Garbage to Greatness:

REVEALING SHOCKING INNOVATIONS IN THE INFRASTRUCTURE OF TRAIN TRACKS

By: Mutiah Parawangsah

Every year, humanity continues to innovate. This revelation is not limited to innovations in the digital sector; as even in the transportation sector there are always unique and new innovations. Transportation is becoming more and more advanced as it develops rapidly every year, making travel from one place to another even easier and more efficient. Railway infrastructure is no exception, as it makes it easier for people to reach certain areas that are far from where they live.

This development must also be accompanied by high-quality and reliable infrastructure facilities. Good, safe, and reliable railway lines play a very important role in maintaining the efficiency of the railway transportation system. One of them is the railway balustrade structure, which is an important support structure in the railway transportation system. If the railway balustrade structure suffers from a decrease in strength due to prolonged usage or complex environmental factors, then it can hinder the operation of the railway system.

Photo by Ryzhkov Oleksandr on Freepik



Of course, this is something that should never happen. More innovation is needed from academics or scientists to overcome the problem concerning railroad ballast structures. This problem was solved by two lecturers of Universitas Muhammadiyah Yogyakarta (UMY). Both lecturers are experienced academics who hail from the UMY Faculty of Engineering, and one of them is well-known and acknowledged for his expertise in the field of railways. These two academics are Prof. Ir. Sri Atmaja Putra Jatining Nugraha Nasir Rosyidi, S.T., M.Sc.Eng., PG-Certf., Ph.D., P.Eng., IPU., ASEAN.Eng and Ir. Dian Setiawan. M., S.T., M.Sc., A.M. ASCE.

Prof. Ir. Sri Atmaja P. Rosyidi, S.T., M.Sc.Eng., PG-Certf., Ph.D., P.Eng., IPU., ASEAN.Eng. is an expert consultant in the railway sector. He has even produced a book about railway safety which is often used as a reference by the government in building safe and reliable railways. This time, Prof. Sri Atmaja and Ir. Dian Setiawan collaborated to create extraordinary innovations in the railway sector.

Their revolutionary idea was a railroad balustrade structure that uses rubber and asphalt. This innovation has proven to be a massive breakthrough aimed at improving the quality, durability, and resilience of railway infrastructure. By combining two strong and elastic materials, namely rubber and asphalt, they succeeded in creating a road ballast system that is more durable and better-equipped to face environmental challenges.

"Over time, road ballast structures can experience degradation caused by geographical conditions and complex environmental factors. This phenomenon can negatively impact the strength of the rocks that are part of the road ballast layer, and if not handled appropriately, can cause various negative effects such as the appearance of ballast pockets and puddles of water in the ballast which can disrupt train operations as a whole," said the Professor, who is familiarly called Prof. Sri, regarding the background of this innovation to UMY Public Relations Team in his office at the UMY Postgraduate Building.

THE POTENTIAL TO SOLVE RAILWAY PROBLEMS

The innovation that was initiated by Prof. Sri and Ir. Dian Setiawan. M., S.T., M.Sc., A.M. ASCE. presents a truly unique solution and has the potential to overcome a series of problems that plague railway lines. This innovative development process involves selecting rubber and asphalt as the two main components in the road ballast structure. According to Prof. Sri, this is what makes his project extraordinary, because these two materials have extraordinary elasticity and suppleness properties.

Prof. Sri explained that rubber is the main material that plays a very important role because it has excellent elastic properties and can absorb and dampen vibrations that are caused by train movements. "It cannot be denied that this elasticity contributes significantly to minimizing the damage to the road ballast layer due to repeated pressure from passing trains," he added. This also confirms that road ballast structures that rely on rubber as the main component can offer a better level of endurance in facing operational loads.

He did not stop there, as Prof. Sri also explained that the next stage in this innovation was to glue the rubber material using asphalt as an adhesive. This forms a very effective combination and creates a stronger and more durable road ballast structure. Using asphalt as a binder makes the bond between rubber and asphalt tighter, thereby providing additional stability and durability to the road ballast structure.

A POSITIVE IMPACT ON THE ENVIRONMENT

The innovation initiated by Prof. Sri and Ir. Dian Setiawan not only represents an impressive technological breakthrough. It also offers a positive contribution to environmental sustainability. In addition to the various technical and performance advantages this innovation presented, environmental aspects are the focus point in this innovative development process.

One of the main advantages of using rubber and asphalt as the main components is the significant reduction in dependence on natural stone aggregates, which are generally used as the main materials in conventional railway line construction. Using used rubber as an alternative to natural stone is the correct and strategic choice because apart from reducing the use of limited natural resources, it also provides extraordinary benefits in managing spare tire waste, which is often difficult to recycle.

Prof. Sri enthusiastically explained how the use of used rubber is an important step in supporting environmental sustainability, "We believe that by using used rubber as an integral part of this innovation, we can make a concrete contribution in efforts to maintain ecosystem balance. By combining the elasticity and suppleness of rubber, we can reduce the negative impact of vibrations produced by train movements, and in turn, minimize damage to the road ballast layer," he explained. This invention has another positive impact on the environment. The principle of recycling and reusing resources is a strong foundation for this innovation. Used rubber, which if left to its own has the potential to be a source of environmental pollution, is now being used to provide real benefits in the construction of environmentally friendly railway lines. In addition to providing a smart solution for reducing waste, this innovation is proof of concern for the environment, and at the same time brings awareness to the importance of viewing waste as a valuable resource.



A DIFFICULT DEVELOPMENT PROCESS

The journey to develop this extraordinary innovation was not easy as it required intensive collaborative efforts from various parties involved. "We carried out a series of research and tests in a very strict laboratory environment to test the exact composition of rubber and asphalt materials, with the aim of achieving optimal strength and performance," Prof. Sri said.

This initial stage of development was not without obstacles, because they struggled to find the right chemical composition to avoid potential weaknesses that might arise in the new road ballast structure. Tirelessly, the development team faced every challenge to find the best solution. Creativity and perseverance are steadfast friends when dealing with various problems that arise. This process requires the patience and will to continue trying and making improvements to ensure that this innovation is on the right track. Every test and analysis result becomes valuable evaluation material, and from there, they continue to carry out literature reviews to develop better and more efficient solutions.

This development is more than just a step to face technical challenges, it also highlights the importance of teamwork between engineering experts, scientists, and railway practitioners. Together, these experts worked together to reach an agreement on the best concepts and technical details. Discussions and insights from multiple perspectives inject fresh and inspiring ideas, forming a solid foundation for the success of this innovative project. In addition to tackling the technical aspects of the project, the development team also pays attention to the social and environmental impact that their innovation will have. The use of used rubber as part of this solution reflects their concern for waste management and renewable resources. Therefore, the development phase also involves in-depth studies of waste management and overall environmental impact.

During the development process, the field trial stage was an important part of proving the innovation's performance in real situations. Teams can observe and evaluate directly how these innovations perform and identify areas that require further improvement. The results of field trials become a critical assessment to measure the success of the innovation and record any valuable learning experiences that can be learned and applied for the future.



Prof. Ir. Sri Atmaja Putra Jatining Nugraha Nasir Rosyidi, S.T., M.Sc.Eng., PG-Certf., Ph.D., P.Eng., IPU., ASEAN.Eng

APPLICATION OF RUBBER AND ASPHALT IN THE FUTURE

Prof. Sri and Ir. Dian Setiawan are determined to make an extraordinary contribution to the sustainability and efficiency of the rail transportation system in the future. They believe that this innovation has great potential to bring positive transformation to the world of railways. They revealed that they have drawn up an ambitious plan involving various stakeholders, including industry and related agencies, to realize their vision.

"What we need is a collaborative process with various parties involved in the railway industry. This collaboration is an important basis for creating the implementation of innovation on a wider scale," said Prof. Sri with burning confidence.

This innovative development team realizes that the success of this innovation will greatly depend on the support and involvement of various parties. Therefore, they have committed to continuing to strengthen cooperation and build strong strategic partnerships, in order to achieve success in implementing this innovation in the field.

This innovative implementation process involves very careful strategic steps. After they succeed in the development and testing stages in the laboratory, the team hopes that this innovation can be implemented on a larger scale on real railway lines. This requires the team to face various technical and logistical challenges. They must ensure that these innovations can be implemented effectively and efficiently in different train operational environments. In this case, the team must consider various aspects, ranging from geographical conditions, and climate, to the intensity of train traffic.

Collaboration between industry players, related agencies, and researchers is the key to successfully implementing this innovation in the future

In addition, regulations and safety standards need to be adhered to in the process of implementing this innovation. The development team must not only ensure that these innovations provide high quality and reliability but also comply with various requirements and regulations set by authorities in the railway industry.

However, their ambitions do stop there. As a visionary railway expert, Prof. Sri looks far to the future. In addition to studying further development by modifying the use of used rubber and concrete plates for the construction of railway crossing doors, he also proposed that this innovation could be applied in the development of high-speed train lines in the future.

If this innovation is successfully implemented on a wide scale, not only will the sustainability and efficiency of the rail transportation system improve, but it will also have a positive impact on the environment and society. The operational efficiency of trains will reduce greenhouse gas emissions and negative impacts on the environment while supporting global efforts to achieve sustainable development targets. With unwavering determination and burning enthusiasm, Prof. Sri and Ir. Dian Setiawan have proven that big dreams for the future of railways can be turned into a real reality. The success of this innovation will pave the way for the realization of a transportation system that is more efficient. environmentally friendly, and provides positive benefits for the wider community. We hope that the collaborative efforts and dedication they have shown will be an inspiration for many parties to contribute to creating a brighter, more sustainable, and innovative future for railways.

Collaboration between industry players, related agencies, and researchers is the key to successfully implementing this innovation in the future. To achieve these goals, the participation and support from various parties is very important. The development team hopes that through strong collaboration and synergy between various stakeholders, this innovation can be implemented on a wider scale.

It is hoped that this innovative railway ballast structure using rubber and asphalt can be an effective and efficient solution for building long-lasting and sustainable railway lines. The increasingly improved quality and reliability of railway infrastructure will contribute to a railway transport-ation system that is more reliable and responsive to society's needs in the future. Through dedication and high enthusiasm, Prof. Sri and Ir. Dian Setiawan has proven that a big vision for the future of railways can be realized. and this innovation is clear proof of the potential of technology to bring positive changes to the progress of the world of transportation and saving the environment.



Increasing Edamame Production with Rhizobium sp Bacteria

By: M. Ittaqullah RMM

Photo by creative lab design on Freepik

Indonesia is blessed with vast open lands and a beautiful and varied biome in its seas and land. One of those richness God bestowed upon Indonesia is the Edamame bean. Indonesia is one of the world's largest producers of Edamame.

Meanwhile, Indonesia's soybean production in the 2022/2023 season is estimated to reach 400 thousand MT, ranking it at 17th place in the world. Indonesia's soybean production is only 0.1% of total global production, while the province of East Java (Jatim), which is the largest soybean reservoir in Indonesia, is only able to contribute around 42% of national soybean production.

However, even though it is on the list of the 20 largest Edamame bean producers in the world, Indonesia imports a lot of soybeans yearly because production has been unable to keep up with the large domestic demand. Edamame soybeans are an introduced variety from Japan and are only starting to be produced in Indonesia. Despite this, Edamame farmers in Indonesia still cultivate the beans using fertilizers that are not friendly to the environment.

UMY Agrotechnology Lecturer, Ir. Agung Astuti, M.Si, stated that in Indonesian Edamame, farmers generally need four times as much synthetic fertilizer to cultivate Edamame. This will cause excessive chemicals that will damage the environment in the long term, especially soil conditions.



"It is very unfortunate that in Edamame cultivation, many farmers still use four times the amount of synthetic fertilizer they use for local soybeans. Soybeans have a symbiotic mutualism with the Rhizobium sp. bacteria which can increase the efficiency of N fertilizer by up to 30%," she said. Effectiveness of Nano Formula Rhizobium Inoculation on Edamame Soybean Seeds







Edamame Soybean Seeds Non Rhizobium Inoculation

Rhizobium Inoculation Non-nano Formula

Rhizobium Inoculation Nano Formula

The lecturer, who is familiarly called Mrs. Agung, has been researching the use of Rhizobium sp bacteria for fertilizer development since 2018. In 2018, her research showed that none of the Rhizobium sp. inoculum commonly found in commercial products in Indonesia are compatible with Edamame sovbeans. This spurred Agung Astuti's instincts to isolate a variant of Rhizobium sp. which is compatible with Edamame soybeans. Her research eventually paid off, as the isolation she carried out on Rhizobium sp was proven to be able to increase the efficiency of N fertilizer to up to 50%. She didn't stop there, however, as Agung was immediately ready to carry out the development phase. She began to mass produce the Rhizobium sp that had been isolated and developed it into a special inoculum for cultivating Edamame soybeans.

Agung Astuti explained how she processed fertilizer. She would need 1-2 weeks to process one quintal of fertilizer on an industrial scale. In addition to the indigenous Rhizobium sp. isolate, several carrier materials are mixed in the fertilizer, such as nano peat, charcoal, and lime. She also claims that her indigenous Rhizobium sp. bio-fertilizer is effective for cultivating Edamame soybeans. In addition to increasing Edamame production, it can reduce urea fertilizer use by 50%. This fertilizer is environmentally friendly, unlike synthetic fertilizers. This is because synthetic fertilizers produce chemical residues in the soil, which will affect the quality of water and the soil itself.

Agung Astuti also said that our ancestors passed down fascinating agricultural technology that could be studied by many people. However, even though we inherited many agricultural techniques from our ancestors and also had many technological advances, we are still unable to advance agriculture in Indonesia to achieve food independence, which can be seen from our dependence on exports.

The Public Relations team can hear a glimpse of hope in Mrs. Agung's voice. As this research progresses, she emphasizes that she hopes society will be aware of food independence and the importance of environmentallyfriendly agriculture practices. She also hopes that the community, especially farmers, will be able to make maximum use of the natural resources and biodiversity that Allah SWT has given to Indonesia. (RM)

Photo: UMY Document

This indigenous Rhizobium sp. bio-fertilizer is effective for cultivating Edamame soybeans. In addition to increasing Edamame production, it can reduce urea fertilizer use by 50%. This fertilizer is environmentally friendly, unlike synthetic fertilizers.



Photo by nuraghies on Freepik

COOKING WITH RESIDUES OF HUMAN METABOLISM AND DIGESTIVE SYSTEM

By : Annisa Zachra Humaira

S anitation is often related to a healthy lifestyle that attempts to control the environment to avoid disease. This includes water sanitation, food sanitation, sewage disposal, waste water and garbage, air sanitation, and pest control in order to improve the hygiene in our day-to-day environment.

In 2022, the United Nations Children's Fund (UNICEF) presented data based on their latest study which shows that almost 70 percent of 20,000 household drinking water sources in Indonesia were contaminated with fecal waste. This staggering fact has been the case for many years. The culprit behind groundwater pollution in Indonesia is seepage from the septic tanks of most Indonesian household. The lack of public awareness of proper septic tanks management is a major contributing factor to the seepage of fecal waste from septic tanks.

Conventional septic tanks, which are often produced haphazardly, also contribute to the high rate of groundwater pollution in Indonesia. A properly made septic tank should be able to store and process waste effectively. Dr. Muhammad Heri Zulfiar, S.T., M.T., a lecturer at the Civil Engineering Study Program at Universitas Muhammadiyah Yogyakarta (UMY) and an expert in the field of construction management, created an innovative pipe-based waste processing system that is capable of producing renewable fuel in the form of biogas. In addition, the process of his invention is environmentally friendly.

When interviewed by the UMY Public Relations Team in his room, Dr. Heri explained the inspiration to create this innovation in fecal waste processing. "When I was in college, I had a lecturer who I really looked up to. He was both knowledgeable and innovative. His name is Prof. Ir. Hardjoso Prodjopangarso. His innovation in processing feces, which was named Tripikon-S, became a source of inspiration for my innovation," Heri explained proudly.

Tripikon-S is an abbreviation for Three (tri) Pipe (pi) Concentric (kon) Septic (S). Tripikon-S can be used for household latrine/septic tanks in areas with shallow groundwater, tidal areas, swamp areas, or in areas with limited land. Prof. Hardjoso's innovation inspired Heri to create something similar. "Even though my innovation is similar to Prof. Hardjoso's Tripikon-S, it is not the same. There is a major difference, as Tripikon-S has an overall vertical shape, while the majority of my PVC pipe-based biogas producing stool processing equipment is arranged with horizontal pipes," explained Heri.

The development of this innovation also considers the dense settlement conditions along the rivers in Yogyakarta, especially the Code river. The density of residences around river banks results in the river water being polluted by household waste and feces. To overcome this problem, Heri focused on optimizing the safe processing of feces before it is transferred through drainage pipes into filtration areas or designated rivers which function as waste decomposition sites. It is hoped that this innovation can reduce the level of river water pollution and create septic tanks that do not require a lot of space and is more affordable.



Systematics of the PVC Pipe-Based Biogas Production and Fecal Processing System

Heri invented a construction that consists of 3 separate rooms using PVC pipes, Fiber Glass, or similar materials, which were adapted to each decomposition stage. This invention produces methane gas through an anaerobic process in a tight, leak-proof room to ensure that the resulting gas does not leak out. In addition to the anaerobic process, aerobic processes are also applied in fecal waste processing.

In fecal waste processing, the anaerobic process occurs in a hermetic room, and is carried out by anaerobic microorganisms which will decompose and eliminate the contamination that results from fecal waste processing. Meanwhile, the aerobic process is the same as the anaerobic process, but is carried out in conditions that require oxygen. The oxygen is used as energy for the metabolism of aerobic bacteria which will carry out the processing of fecal waste. Apart from these two processes, there is also a deposition process that also occurs in the systematic processing step of the invention.

The device processes feces using water as an auxiliary processing medium. The feces that float into the surface of the water will be decomposed with the help of the bacteria or microbes that live on dirt and oxygen. These microbes are known as aerobic bacteria, which live on surfaces that contain a lot of oxygen and certain humidity.

The man who was once the Dean of the UMY Faculty of Engineering for the 2013-2017 period also explained that a settling process would occur, which would result in a change in the density level of the feces after it had been decomposed by aerobic bacteria. The resulting dirt will be smaller and have different weights. The refuse that settles in the liquid after the aerobic process will be decomposed by anaerobic bacteria that live at the bottom of the sediment. which live and develop in the oxygen-deprived environment. These anaerobic bacteria also decompose the sediment that has occurred by producing various gases, with the largest composition being methane gas. In addition to methane gas, the decomposition process caused by anaerobic bacteria produces sludge with a lighter density level which will flow towards the surface of the liquid.

An Added Value of T_Pikon-H

According to Heri, this stool processing innovation has many advantages. First, it is suitable for narrow and densely populated land. This innovation does not require a large area of land like a conventional septic tank would. The system only requires around 0.50m x 0.50m to install, while the diameter of the feces processing system itself measures 3m x 1.5m.

In addition, this innovative product is also easily produced. A conventional septic tank requires work time that requires personnel to be on site and install it in a designated area. Meanwhile, T_pikon-H can be assembled in the factory and installed anywhere. T_Pikon-H has a piping system made from Fiberglass Reinforced Plastic (FRP) and Polyvinyl Chloride (PVC) pipes, which are resistant against corrosion and are long-lasting. This fecal processing system will have a relatively long service life. Because T-Pikon-H is made to be as simple as possible, this processing system requires very little material to produce and implement.

Henri claims that this waste management system can produce methane gas, which in turn can be used for household purposes, such as to power stoves or water heaters. In addition, the environmentally-friendly sludge that is the byproduct of this innovation can also be used.



Dr. Muhammad Heri Zulfiar, S.T., M.T.



Implementation of T_pikon-H in Yogyakarta

Heri is determined to implement his innovation in the city where he teaches. "I want to help reduce the level of river water pollution in Kali Code, Yogyakarta. There are still many residents around Code River who don't have septic tanks," said Heri.

From the 2021 Water Quality Report issued by the Yogyakarta City Environmental Service (DLH), it is stated that the quality of river water in Yogyakarta City is very bad. The city has four rivers, namely the Winongo, Code, Manunggal, and Gajahwong. The quality of a river can be known from the quality of its water.

Nevertheless, the T_pikon-H system had been installed in RT 18 RW 04, Kotabaru, Yogyakarta. In addition to installing the waste processing system, Heri and his team created a work plan detailing the activities that would be carried out, developed the organizational structure of the work team, socialized it to the community, surveyed the location, and designed, created and disseminated the waste processing implementation program. Heri explained that he had installed his innovation in his home village. He has been using this feces processing system since 2006 at his personal home. The benefits he gets are the same as the advantages mentioned above. He can use the methane gas produced by the system for his daily household needs.

"My family and I use the methane gas this system produces for daily needs such as cooking. I have been using this waste treatment system for several years, and there have been no complaints such as full septic tanks or blockages," added Heri. The first application of his invention was carried out in the riverbanks of the Code river.

With the T_pikon-H, the people of Code can not only have access to a proper septic tank, but also help reduce the contamination level in the river that is caused by household waste and feces. The methane gas produced also has many functions, regardless of where it is obtained. The gas, which is produced by processing feces using T_pikon-H, allows people to cook with the byproduct of the human body's metabolism. What is left behind and considered waste has a function that cannot be underestimated if it is processed properly and correctly.

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My family and I use the methane gas this system produces for daily needs such as cooking. I have been using this waste treatment system for several years, and there have been no complaints such as full septic tanks or blockages,"



CONTRIBUTION FROM UMY FOR THE VICTIMS OF THE CIANJUR EARTHQUAKE

By: Annisa Zachra Humaira

hat one Monday afternoon (21/11/2022) will forever horrify the people of Cianjur Regency. On that day, an earthquake of 5.6 magnitude shook the area for 10-15 seconds according to records from the National Agency for Disaster Countermeasure (BNPB). This disaster took the lives of at least 602 people.

We may never know what the locals felt during those tense few seconds. One thing is certain, that disastrous day left physical and mental trauma on the people of Cianjur. Seeing their brothers and sisters in pain drove many Indonesians to help. Such empathy is the spirit of temulung (assistance) that all Indonesians possess. This feeling is also the reason behind the Muhammadiyah and Aisyiyah Colleges (PTMA)'s decision to deploy its students as volunteers in the post-earthquake disaster area of Cianjur Regency. Among all the institutions, Universitas Muhammadiyah Yogyakarta (UMY) also took part in sending its students to Cianjur Regency.



Through its Community Service Institute (LPM), UMY deployed 99 students who were divided into several groups which consisted of 20 people each. When met some time ago, Dr. Aris Slamet Widodo, S.P., M.Sc, the Head of the LPM UMY Student Service Division, conveyed the reason why UMY decided to deploy its students to post-disaster areas.

"Every student stands ready to answer a humanitarian call to serve as a disaster volunteer. Our concern for one another and spirit to help each other are something all of us feel. However, there is no special reason why UMY plays an active role in sending its students to carry out post-disaster management. Every student who volunteered felt as if it was a call on humanity," said Aris firmly.

Acting as agents of disaster relieves, UMY students need more than just the spirit to serve. They must also understand disaster management information. Aris said that UMY also collaborates with the Muhammadiyah Disaster Management Center (MDMC), a Non-Governmental Organization (NGO) under the Muhammadiyah Association which handles disaster relief and mitigation.

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UMY often holds collaborations with MDMC. If MDMC carries out humanitarian activities in disaster locations, they will contact PTMA and ask whether anyone wants to become volunteers," he said.

Any UMY students that participate in field humanitarian activities such as disaster management can receive extra credit for the Student Study Service (KKN) grades. However, many UMY students become disaster volunteers without waiting for the KKN schemes.

"Even without emphasizing that students deployed to post-disaster areas under the Disaster KKN scheme will get extra credit, many UMY students volunteered when a natural disaster occurred. This was the case in the earthquake disaster followed by a large tsunami in Palu in 2018; many UMY students participated as volunteers. Their participation can be converted into grades for KKN activities. In essence, KKN is a public service program," added Aris.

UMY fully supports all humanitarian activities that betters society. The best people are those who benefit others. As the hadith explains, "And the best people are those who are most beneficial to other people." (HR. Al-Qadlaa'iy in Musnad Asy-Syihaab no. 129, Ath-Thabaraaniy in Al-Ausath no. 5787).



Devastated buildings, miserable houses, and those hopeless stares looking at the debris are the first thing I saw right on our arrival at Ciheurang Village", said Fawaz

STORY OF UMY STUDENT SERVICE IN CIANJUR

Fawaz Muhammad Ihsan is a student at the UMY Law Science Program who took part in the Cianjur Disaster Recovery KKN scheme. In an interview conducted by the Human Relations team, Fawaz shared his unforgettable experiences.

Fawaz was stationed at the Ciherang Service Post (Posyan) under a program to carry out psychosocial activities for the community, especially children affected by the earthquake. The "Cheerful Week" program was an activity carried out to restore children's sense of joy.

"We tried to provide support through psychosocial activities to children. This is expected to reduce the feeling of trauma due to the events they experienced during the earthquake disaster. Even though the earthquake itself is over, the trauma may remain until after they have grown up," he said. In addition to psychosocial activities, they also provided sanitation and clean water. "Even though we focused more on the psychosocial elements of the program, we also carried out other community service activities, such as drilling wells. The locals suffered from a shortage of clean water," said Aul, another student. Aul, whose full name is Aulia Sabila Syarifa Qalbie, is a student at the UMY International Relations Study Program. She was stationed differently from Fawaz, namely at Posyan Ciendeur.

Programs such as Tenda Ceria, an emergency schools and Al-Quran Reading and Writing (BTA) sessions were help children who have been struck by disaster. However, not all good plans and intentions was able to be implemented according to expectations. According to Fawaz and Aul, they also encountered problems while serving in Cianjur Regency. "The volunteers took turns to devote themselves to the earthquake-affected communities in Cianjur Regency. However, whenever the volunteers would finish this shift, it would leave new trauma for the children. The bond between volunteers and children existed in a sincere and pure way," explained Aul again.

"After we learned about this problem, we tried to carry out every program or activity with certain limitations. This is with the aim that after we leave to return to our classes, the children will not miss us too much," added Fawaz.

The volunteers also encouraged **Clean and Healthy Living Behavior** (PHBS) in every community affected by the earthquake in Cianjur Regency. "Judging from the situation and conditions in the field, the resident's awareness regarding environmental cleanliness was quite lacking. Therefore, we presented PHBS outreach activities. Even after the earthquake, they still have to implement behavior that applies aspects of cleanliness to prevent problems such as diseases that are caused by unhealthy living conditions," explained Aul.

The UMY students who chose to dedicate themselves as volunteers in Cianjur Regency were there for approximately 1 month, from early January to February 2023. "As volunteers, everyone had be alert and ready to be ordered to carry out disaster management. Even though volunteers come with the intention of helping people affected by natural disasters, the safety and security of volunteers are still important," concluded Fawaz firmly.

LOGISTIC ASSISTANCE FROM UMY

The mobilization of Human Resources (HR) is not the only thing UMY has provided to dedicate itself to the communities affected by the earthquake. Aids in the form of logistics was also collected to support the services that are carried out by the UMY academician in Cianjur. The distribution of this aid was carried out with the help of the UMY Amil Zakat Infaq and Shadaqah (LazisMu) Institute.

"We prepared logistical assistance in the form of basic food items, toiletries, and clothing," said Rozikan, M.S.I., Chair of the UMY LazisMu Management. A team of volunteers and logistical assistance were deployed a week after the earthquake in Cianjur Regency occurred. On that cloudy afternoon, the UMY LazisMu team and the volunteer team worked together to help their brothers and sisters in Cianjur.

This distribution was carried out in a structured manner through the Muhammadiyah institution which was present beforehand to help the people affected by the earthquake in Cianjur. "The hope is that with a distribution scheme like this, the aid distributed will not only be distributed evenly, but also right on target. I knew that the assistance we provided will not be sufficient, so there needs to be a priority scale," concluded Rozikan.





An appropriate and targeted assistance is the most beneficial aid for communities affected by disasters. The UMY LazisMu team also coordinated with the logistics team at the disaster location at that time, so that the aid distributed really meets the needs of the earthquake victims, such as toiletries and hygiene.

Any human's heart will be touched when they hear about a group of people affected by natural disasters. This rapid response to deliver logistical aid is a real manifestation of UMY's concern for its brothers and sisters throughout the country. When we provide assistance, we should not discriminate, because all humans deserve rights as long as they don't impact the rights of others.

The Faculty of Medicine and Health Sciences (FKIK) UMY provided assistance by sending a Medical Assistance Team (TBM Alert). The TBM Alert team worked for seven days in the post-disaster location. However, these challenges were answered capably by TBM Alert, because they set foot in the post-disaster area with the intention and determination to help the community. TBM Alert is a Student Activity Unit under the auspices of FKIK UMY which sent humanitarian volunteers to disaster areas.

University leaders, represented by Faris Al-Fadhat, M.A., Ph.D., as Vice-Rector for Student, Alumni and AIK UMY Affairs also fully support all humanitarian activities, especially humanitarian service to postdisaster areas. Countermeasures will be carried out by UMY to support and contribute to communities affected by natural disasters.

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we see that every time a disaster occurs, a lot of things will need to be done. Thank God, UMY has always sent aid in the form of goods, financial aid, and volunteer teams to every disaster in Indonesia. This is a form of commitment from UMY to contribute to human values," concluded Faris.







UMY PROVIDES A SOLUTION FOR GARBAGE Sorting and processing

By: Annisa Zachra Humaira

The waste problem that plagues Indonesia is a vicious circle that appears to persist. As high-lighted in the Ministry of Environment and Forestry's (KLHK) National Waste Management Information System (SIPSN) 2022 data, which includes data from 293 districts and cities across Indonesia, 35.1 million tons of national waste remains in the decomposition and processing stage. Of this total landfilled waste, 66.71% (13.9 million tons) can be managed, whereas the remaining 33.29% (7.2 million tons) has not been managed adequately.

Most of that large waste pile comes from food waste. This means that while we no longer suffer from food shortage, there are still children who experience stunting out there. In addition, the number of people who are classified as poor are still clearly visible in our social life.

The awareness to limit ourselves in purchasing and/ or managing food must be ingrained as a value. Moreover, data shows that the majority of food waste originates from households. Unfortunately, as a society, we are easily distracted. Apart from dissatisfaction caused by the abundance of food, the practice of not breaking down and managing waste from the household level is also a significant factor in the formation of mountains of waste in Indonesia.

WASTE MANAGEMENT IN THE PIYUNGAN LANDFILL

"I can no longer accommodate your rubbish," is perhaps what the Piyungan Final Waste Disposal Site (TPST) would say if it could speak. The landfill that has been operating since 1996 is most commonly associated with the words "dirty, smelly, and messy".

In truth, the city of Yogyakarta has intensified the socialization of the zero inorganic waste movement since January of 2023. This is based on the Circular Letter (SE) of the Mayor of Yogyakarta Number 660/6123/SE/2022 concerning the Zero Inorganic Waste Movement. This movement was made to reduce the volume of waste thrown into final disposal sites (TPA) since they are almost full of capacity.

However, like looking for an umbrella as heavy rain hits your body, the Piyungan TPST which stores waste from the Bantul Regency, Sleman Regency, and Yogyakarta City has finally reached the point where the management had to close it to reduce the waste pile discharge. As such, the Yogyakarta City Government issued an appeal to close access to the Piyungan TPST from July 22 to September 5 2023.

The Piyungan TPST was built in 1995 and began operations in 1996. This TPST was initially managed by the Yogyakarta Public Works Department, Cipta Karya, from 1996 to 1999. However, with the issuance of Law no. 22 of 1999 concerning Regional Government, the Piyungan TPST was jointly managed by Sleman Regency, Yogvakarta Citv and Bantul Regency in cooperation with the Kartamantu Joint Secretariat from 2000 to 2018. Finally, in 2019, the management of the Piyungan TPST was transferred to the DIY **Environment and Forestry Service** Waste Management Center. This takeover resulted in a program to expand the capacity of the Piyungan TPST to around 10,121 square meters with a depth of 5.5 meters in the south and 7 meters in the north with a total capacity of 171.000 cubic meters.

In 2022, the average amount of rubbish that entered the Piyungan TPST reached 742 tons each day. Meanwhile, in January to June 2023, the average amount of waste that entered the Piyungan landfill reached 707 tons per day. Based on data from the Joint Secretariat for Cooperation in the Management of **Urban Infrastructure and Facilities** between Yogyakarta City, Sleman **Regency and Bantul Regency** (Sekber Kartamantul) 2022, the volume of waste that enter the Pivungan TPA is around 700 tons per day.

TPST Piyungan has several programs to process waste. This includes recording incoming trucks, weighing waste, sorting waste, lowering waste, stockpiling waste, flattening waste, compacting waste, burying waste, compacting landfill, operating gas pipes, processing leachate, bulldozer operations, and excavator operations.



UMY'S ROLE IN WASTE MANAGEMENT IN YOGYAKARTA

Waste management is a shared problem. It is not only government agencies that have the responsibility to solve this waste problem. Educational institutions also have an important role to play in helping overcome this neverending waste problem.

Universitas Muhammadiyah Yogyakarta (UMY) absolutely supports the waste processing and selection movement. It operates its own waste management in collaboration with communities and villages that are active in the Waste Shadaqah Movement. Its latest program provides garbage and recycle bins for Kapanewon Kasihan. This program distributes garbage bins which have been adapted to the Organic and Inorganic waste categories to four villages in Kapanewon Kasihan.

UMY's decision to provide assistance in the form of garbage bin is not without aim and purpose. UMY wants the community, especially in Kapanewon Kasihan, to be able to sort their own waste from the household level before taking it to the TPST. Waste sorting should begin from the smallest level, namely households, which have a very important role in further waste processing.

The recycle bin distribution program that was carried out by UMY aims to support and make the Zero Inorganic Waste Movement a success. This movement is being promoted with the ultimate aim of teaching the community to sort waste based on its type before throwing it into final disposal sites.

Rudy Suryanto, S.E., M.Acc., Ph.D., Ak., CA as the UMY Vice-Rector for Finance and Assets recently said that UMY has contributed solutions to waste processing and sorting problems.



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UMY is motivated to contribute solutions to garbage problem, one of which is by providing recycle bins to villages around UMY. There are 4 villages in Kepanewon Kasihan that will receive the rubbish bin assistance, with a total of 100 rubbish bins. Efforts to sort waste from its source are expected to be effective in reducing the burden on final disposal sites," said Rudy. The Secretary General of the Indonesian Bumdes Forum also explained that the provision of recycle bins is in line with UMY's commitment to actualizing the Healthy Campus and Green Campus programs. In these programs, waste is not thrown away, but is sorted and processed first. Not only that, waste processing and sorting is an embodiment of Sustainable Development Goals (SDGs) point in waste processing. This is also related to UMY's ranking achievement in THE Impact Rankings which occupies position 601-800 worldwide, and its position in the top 5 national positions with four other universities.

The handover of the trash bins was welcomed by the Regent of Bantul, who in this case was represented by Yus Warseno, S.Pi., M.Sc., the Regent's Expert Staff for Economics, Finance and Development. Yus said in his speech that the trash bins given to Kapanewon Kasihan was support for Kapanewon Kasihan's innovation in the Eling Tahan Banting Class program.

"We would like to thank UMY for providing the trash bins to Kapanewon Kasihan. The bins will contribute to the success of the Eling Tahan Banting Class program, which is Kapanewon Kasihan's flagship program in overcoming waste processing problems. The Eling Tahan Banting Program is also a program that supports reducing and preventing stunting rates among toddlers in Kapanewon Kasihan," said Yus.

Meanwhile, The Rector of UMY, Prof. Dr. Ir. Gunawan Budiyanto, M.P., IPM., ASEAN.Eng, during his session at the UI GreenMetric (UIGM), Islamic Universities throughout Indonesia, pointed out that UMY has its own waste processing site. "We have a waste management unit and a 3-step program. First, we sort our waste. Teaching people to sort waste on a household level is a challenge we must overcome. Second, we recycle our waste by processing them so that it becomes reusable material. Third, we reuse our waste to create products," explained Gunawan.

Gunawan also admitted that having a waste management system at UMY has resulted in a drastic change in the way the UMY academic community thinks. "We also realized that waste can be divided into organic waste which is waste that is easy to process and non-organic waste, one of which is glass waste. In the past, there were many glass waste scavengers, and they played a role in managing glass waste in Yogyakarta," added Gunawan.

Tackling the waste problem in Yogyakarta City has become the responsibility of its community and government. This is not the time to point fingers at each other, to selfishly declare who is wrong and right in this matter. There will be no end to mutual accusations. Being self-aware is important for every element of Yogyakarta society, both immigrants and local residents.







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