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on August 2nd-3rd, 2023.

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THE SUSTAINABLE CONCEPT DESIGN CONCERNING THE IMPLEMENTATION OF LOW IMPACT DEVELOPMENT IN URBAN AREA

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ABSTRACT

The relationship between water quantity and water quality status in the framework of water resources management was complex and likely to be site-specific, thus the cause-effect relationships between pollutant sources (affluents) and water quality condition remain unclear. The primary principle of Low Impact Development (LID) concept design is to detain and/or hold stormwater for as long as possible and to limit stormwater pollution before it enters major waterbodies. LID methods aim to preserve as much water on-site as feasible while also protecting water quality through the use of natural landscape elements. We also highlighted the results of preliminary data to design for the implementation of LID. The water quantity and water quality status relationship in the framework of water resources management was complex and likely to be site-specific, therefore the cause-effect relationships between pollutant sources (affluents) and water quality condition still need to be clearly quantified. The core concept of Low Impact Development (LID) is to detain and/or retain stormwater as long as possible and to reduce the stormwater runoff pollutions before flowing into main waterbodies. LID components seek to keep water onsite as much as possible and protect water quality using landscape natural features. Therefore, the main objective of this paper was to offer the opportunities of applying LID components in urban area. We also summarized the performances of LID components including the improvement of water quality from previous studies.

KEYWORDS: Sustainable Design; LID components; Sustainable water resources management

1 INTRODUCTION

Nowadays, the paradigm of sustainable development is a significant topic that has gained global attention (Deakin and Reid 2014, Puig, Wooldridge and Darbra, Foo 2013, Xing, Liang and Xu 2013). The primary purpose of this paradigm is to develop better ways of doing things in the future and in the present, particularly in relation to environmental challenges. It can be interpreted in many different ways and implemented in many sectors of civil engineering products (Oyedepo 2014, Deakin and Reid 2014, Suduc, Bîzoi and Gorghiu 2014). Nowadays, this paradigm has derived to similar terms such as green design, ecological sustainability or others (Diwekar and Shastri 2010). The general focus of this concept is to improve the quality of environment through several appropriate technologies (Sianipar et al. 2013, Lee and Shih 2011).

In the context of sustainable water resource management, there is also a need to implement sustainable components to increase the ecological aptitude in specific waterbodies and to resolve water problems that are becoming increasingly interconnected with other development-related issues such as social, economic, environmental, legal, and political factors at local and regional levels, and sometimes

even at national and international levels. The unsustainability and degradation of water quality condition are an issue of growing concern around the world (Oney et al., 2011; Bezlepkina et al. 2014; Davies and Wright 2014). Rapid economic growth and the forces of urbanization and industrialization are considered as the main causes of increased water pollution (Sim and Balamurugan, 1991; Tsuzuki, 2006; Keenleyside et al., 2009; Wu and Tan, 2012; Abdel-Dayem, 2011; Nursey-Bray et al., 2014). Thus, the water quantity and water quality status relationship was complex and likely to be site-specific, therefore the cause-effect relationships between pollutant sources (affluents) and water quality condition still need to be clearly quantified.

The concept of Low Impact Development (LID) was offered by several studies recently (Dietz and Clausen 2008; Bowman et al. 2012; Gilroy and McCuen 2009; Ahiablame et al. 2012). The core concept of Low Impact Development (LID) is to detain and/or retain stormwater as long as possible and to reduce the stormwater runoff pollutions before flowing into main waterbodies. The investigation of effectiveness of LID components and their implementation in many areas also have been disseminated by previous papers (Qin et al. 2013; Ahiablame et al. 2013; Sin et al. 2014). However, few studies have been conducted the implementations of LID in urban area of Indonesia. Therefore, the main objective of this paper was to offer the opportunities of implementing LID components in urban area of Indonesia. We also summarized the performances of LID components including the improvement of water quality from previous studies.

2 THE CONCEPT OF LID

LID was initially established in 1999 by the Department of Environmental Resources in Prince George's County, Maryland, USA. LID provided an alternative method to conventional stormwater management by improving surface and ground water quality, preserving the integrity of aquatic life resources and ecosystems, and preserving the physical integrity of receiving streams. It is a land development (or redevelopment) method that works with nature to manage stormwater as close to its source as possible. It aims to keep as much water on-site as feasible while also protecting water quality through the use of natural landscape elements. LID incorporates five concepts or key aspects, as seen in Figure 1. This method encompasses all components (conservation, small-scale controls, specialized site design, channeling runoff to natural areas and maintenance, pollution, prevention, and education). The development in a specific area or watershed should be held accountable for the effluents and/or runoff from the incoming rainfall. By emulating natural hydrologic processes, the installation of LID components can reduce or eliminate the quantity of wastewater created from a site in the first place (Figure 2).

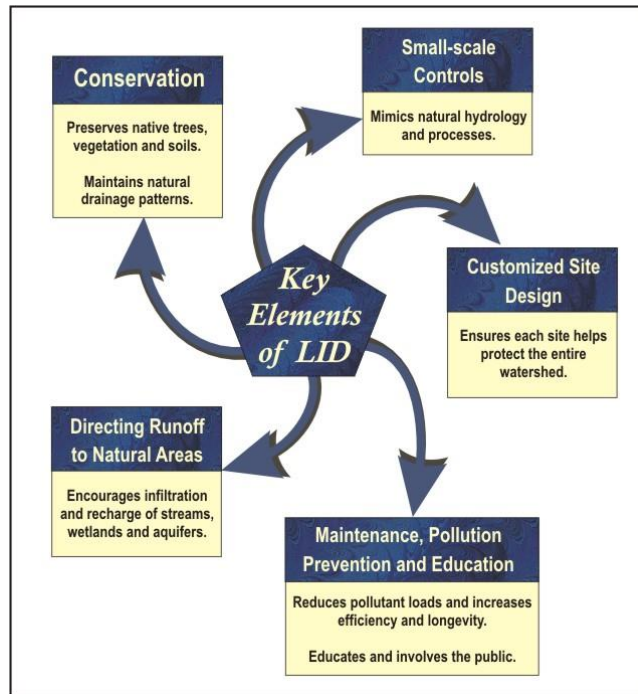


Figure 1: Key elements of LID
 (Source: <http://www.lowimpactdevelopment.org>)

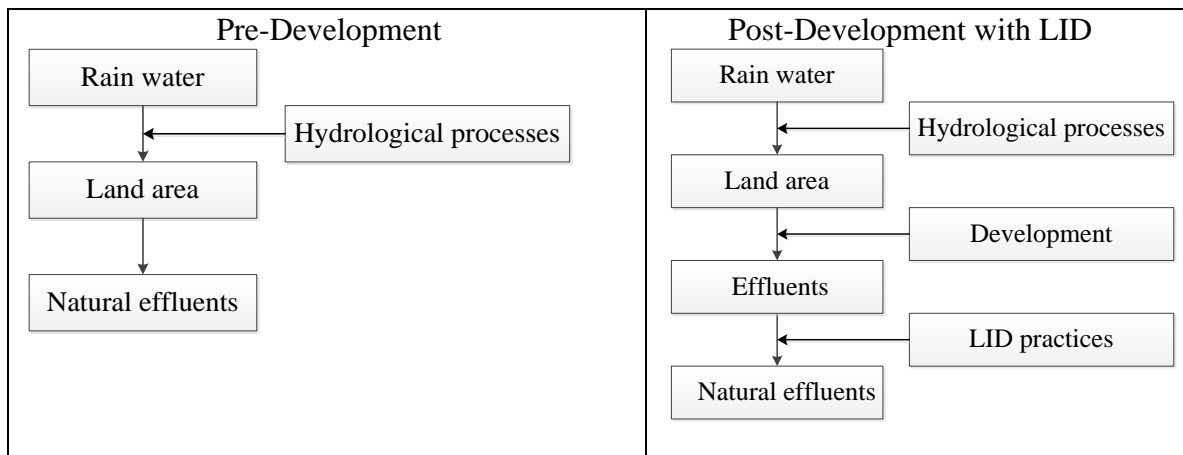


Figure 2: Basic concept of LID

2.1 LID components

The examples of LID components are bioretention or rain garden, green roof, rain barrels or cisterns, infiltration wells and permeable pavement. Bioretention, or variations such as bioinfiltration and rain gardens, has become one of the most frequently used stormwater management tools in urbanized watersheds (Davies et al., 2009). Bioretention is a plant and soil-based component that removes pollutants and debris from stormwater runoff. Stormwater is collected and sent to a treatment area that includes a grass buffer strip, sand bed, ponding area, organic layer or mulch layer, planting soil, and plants.

Meanwhile, green roof is a planted roof top that provides advantages of water harvesting, stormwater management, pollutions control and aesthetic value. It varies in depth of growing media, types of plants, infrastructures and intended use. It is generally categorized into two types: extensive and intensive. Both bioretention and green roof are considered aesthetic value into its system as one of the advantages.

Rain barrels or cisterns, infiltration wells and permeable pavement are the most common and simple LID components to minimizing stormwater impacts and providing runoff storage measures in the watershed. Rain barrels are low-cost, effective, and easily maintainable retention devices applicable to target area. Infiltration wells are shallow wells which put water into a natural aquifer. They can be used to either drain a catchment area or recharge groundwater. Meanwhile, permeable pavement, also known as porous pavement, is a range of sustainable materials with a base and sub-base that allow the movement of stormwater through the surface.

2.2 LID components in Indonesia

In Indonesia, some of LID components are already implement with slight different terms but similar functions such as biopore, rain barrels or cisterns, infiltration wells and permeable pavement. Biopore is a derivative component of bioretention. Some studies also classified this component into rainwater harvesting technology. It is simpler in design compare than bioretention (Figure 3). It is a hole contained with organic waste such as dead-leaves that serves to trap the flowing water as a groundwater recharge. This component is simple and relatively cheap.

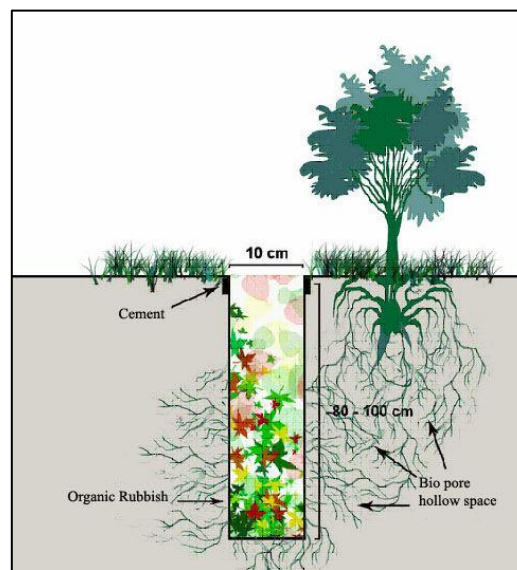


Figure 3: Typical design of biopore
(Source: <http://wctngcmfng.canalblog.com>)

Infiltration wells also the most common LID component in Indonesia. It is an excavated well that has been back-filled with stone to form a subsurface basin. Stormwater runoff is diverted into the well and is stored until it can be infiltrated into the soil, usually over a period of several days. Infiltration wells are very adaptable in Indonesia, and the availability of many practical configurations. The typical design of infiltration wells can be seen on Figure 4. Meanwhile, the typical design of permeable pavement can be seen on Figure 5.

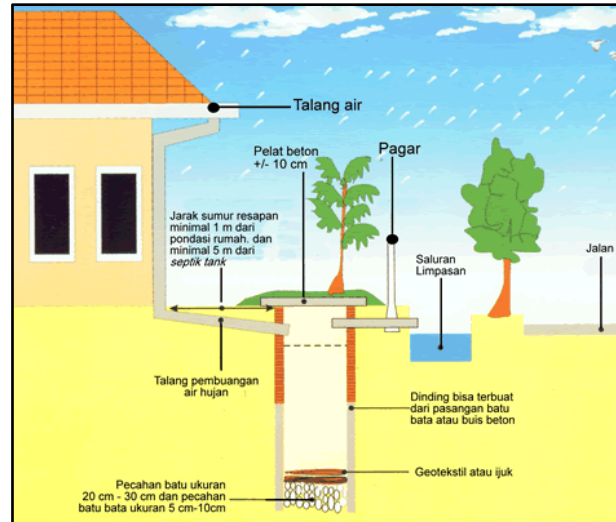


Figure 4: Typical design of biopore
 (Source: Indonesia Ministry of Environment)

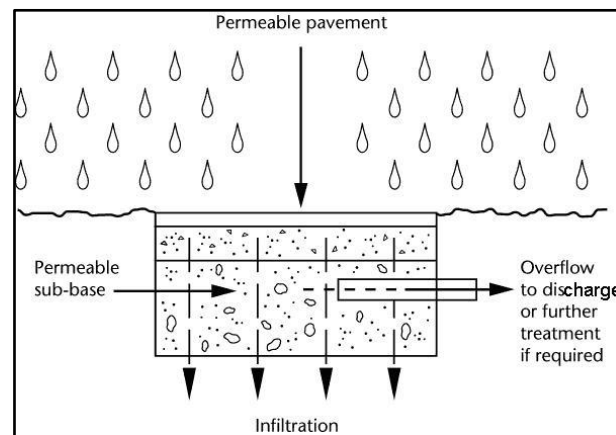


Figure 5: Typical design of permeable pavement
 (Source: <http://www.millermicro.com/porpave.html>)

3 THE EXAMPLE OF CASE STUDY

Indonesia has a long history of water pollution in many waterbodies. In this study, we selected Depok Area, Indonesia as the example of case study. The location of study area can be seen on Figure 6. As a hinterland and buffer area of Jakarta City, Depok Area has designed by the central government to retain and/or detain the water flowing through Jakarta City.

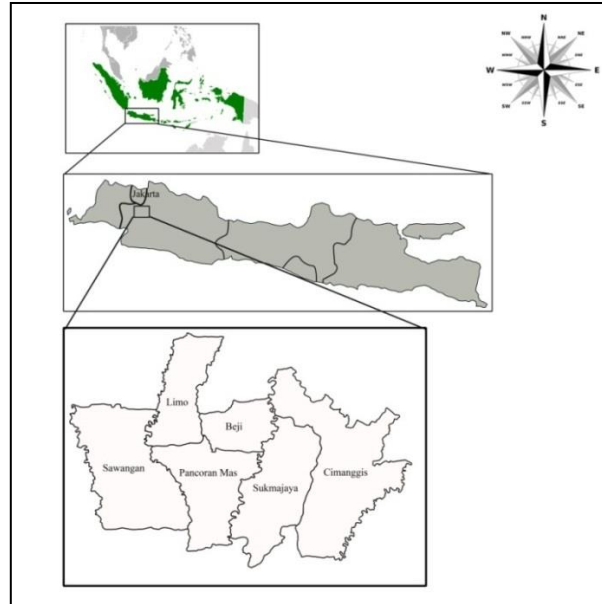


Figure 6: Location of study area

3.1 The review of water quality status

Status of waterbody especially rivers in study area are categorized as moderate to high polluted. There are some efforts from the central and local government through environmental agency in order to restore the water quality in several waterbodies.

3.2 The integrated adaptive LID components

Indonesia is facing the inundation problems due to increased direct runoff combined with water quality degradation. These facts were stirring up the efforts to implement the adaptive design of Low Impact Development (LID) components in the context of initiating the sustainable water resources. As described earlier, some of Low Impact Development (LID) components are already implement with slight different terms but similar functions such as biopore, rain barrels or cisterns, infiltration wells and permeable pavement. The existing Low Impact Development (LID) components need to be combined each other to get maximize results. We offered the integrated adaptive design Low Impact Development (LID) components in types of areas, including in modest residential area (Figure 7). The other alternatives of adaptive design Low Impact Development (LID) components can be modified depend on their purposes.

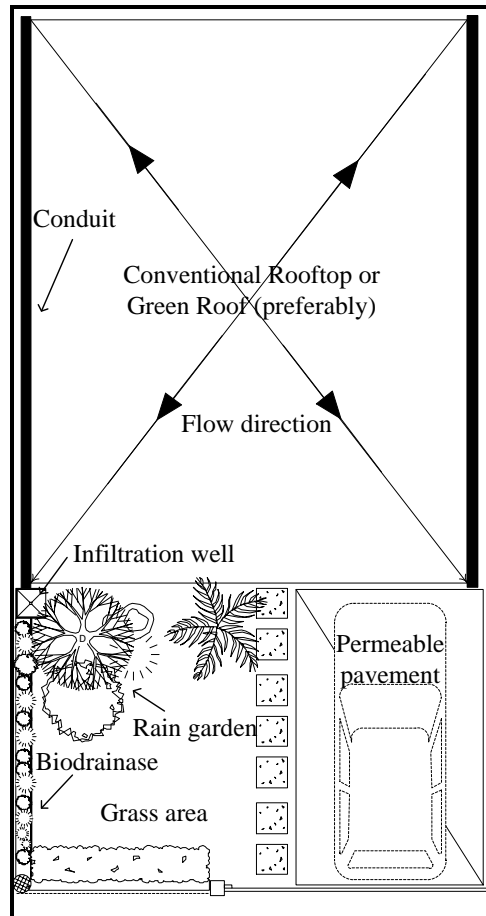


Figure 7: The typical design of sustainable design LID components for modest residential area (not in scale)

The fundamental hydrologic processes are considered throughout the site planning process in Low Impact Development (LID) concept design. By comparing pre- and post-development conditions, the preservation of the pre-development hydrology is assessed. The comparison is aided by taking four key measures into account: runoff volume, peak runoff rate, flow frequency/duration, and water quality. The runoff volume for a given storm grows as the impermeable area of the site increases. The runoff coefficient is the ratio of the associated runoff volume to the overall rainfall event. The runoff curve number (CN) will also be determined in order to complete a hydrologic study for a Low Impact Development (LID) site. Previous literature evaluations can provide more explanation.

4 DISCUSSION

Some catchment areas are categorized as areas with highly polluted status in waterbody. Understanding this fact, SWOT analysis was performed to provide some useful insights for further research (Table 1).

Table 1: The summary of SWOT analysis

SWOT components	Descriptions
Strengths	<ul style="list-style-type: none">• There are some indexes to measure water status of waterbodies.• The public awareness about degradation of water status is increased recently.
Weaknesses	<ul style="list-style-type: none">• A lack of detailed data on the quality and quantity of waterbodies in the Depok Area, including daily or monthly recorded data on water quality.• Due to an undefined water function in Depok Area waterbodies, the water purposes were mixed together.• Most bodies of water lacked precise blue print design planning, and rivers and lakes should have different and particular laws.
Opportunities	<ul style="list-style-type: none">• Some of the water purposes of waterbodies in Depok Area were categorized into moderate level pollution.• Several parameters can affected the water quality index.
Threats	<ul style="list-style-type: none">• Some parameters in Depok Area waterbodies, such as fecal coliform and total coliform, exceed prescribed limits. • Effluents from anthropogenic activities increase.• Monitoring and management programs are dependent on local government decisions and are inextricably linked to budget arrangements at all times.• A few waterbodies in the Depok Area have multiple local government agents with no defined authority (management issue).

According to the SWOT analysis, water consumption is intricately related to land use. This suggests that, more often than not, in order to handle water resource management issues correctly, land management issues must also be addressed. Changes in land use also affect watershed features, which have a significant impact on surface runoff, infiltration, and subsurface flows, and hence access and sustainability. Existing water resource management policies are deemed insufficient for conserving and improving the status of waterbodies in the research area. Land and water conservation regulations must be translated into local policies based on their own local characteristics. In other cases, more stringent criteria and policies are required to achieve long-term watershed and water resource management.

5 CONCLUSION

Water-related issues, particularly in metropolitan settings, have raised awareness of the significance of managing water resources holistically. Despite significant investment in the LID concept design, implementation appears to have been elusive and difficult because managing water resources crosses so many boundaries, such as the theory-component boundary, the ecological-societal boundary, and the administrative-hydrological boundary. This study provided the adaptive design of LID components for Indonesia.

LID is an ecological and sustainable technique that reduces or eliminates the amount of effluents/runoff produced by a site in the first place. Certain adaptive LID components have been investigated and the ecological water-purpose within has been underlined. By improving water

quality of the waterbodies, it will certainly protect the aquatic life from undesirable contaminants. The supported policies are needed to guard the implementation of LID components.

6 ACKNOWLEDGEMENTS

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INTERNATIONAL CONFERENCE ON ECONOMY, EDUCATION, TECHNOLOGY, AND ENVIRONMENT (ICEETE)

IN COLLABORATION WITH

**SULTAN IDRIS SHAH POLYTECHNIC (MALAYSIA), DON MARIANO MARCOS MEMORIAL STATE UNIVERSITY
(THE PHILIPPINES), & NAKHON RATCHASIMA RAJABHAT UNIVERSITY (THAILAND)**

Time	Name	Title	Institution	Room/Link
DAY 1				Time: Aug 2, 2023 08:00 AM Bangkok// Jakarta
08.00 – 08.40	Committee	Online Registration (Zoom Opens)		
08.40– 08.45	Moderator	Opening		Join Zoom Meeting https://us06web.zoom.us/j/4850933858?pwd=V1RjOU1UWE9wRE1rZ1oyVFhvR2pGU09
08.45 – 09.10	IT Team	Indonesia National Anthem ASEAN as One UTP's Video Profile		
09.10 – 09.30	Prof. Dr. Dra. Winarti, M.Si.	Opening Remarks	UTP Surakarta	
		Keynote Speaker		
09.30 – 10.15	Ms Duriya Amatavivat	Education in Society 5.0	Centre Director of the SEAMEO Regional Centre for Sufficiency Economy Philosophy for	Meeting ID: 485 093 3858 Passcode: utpjuara

			Sustainability (SEAMEO SEPS)	
10.15 – 10.45		Question and Answer		
		Plenary Speaker		
10.45 – 11.15	Prof. Victoria Malaya		DMMMSU, Philippines	
11.15 – 11.45	Mohd. Zamri bin Jamaluddin	Blueprint Smartgreen: Efforts In The Application Sustainable Development Goals Agenda In Malaysian Polytechnic And Community College System	PSIS Malaysia	
11.45 – 12.00		Question and Answer		
12.00 – 12.30		BREAK		
Parallel Session 1				
12.30 – 14.00	Wiwiek Nurkomala Dewi	E-Book Design Of Cirebon Royal Batik Motifs Pop-Art Style, Katura Studio At Trusmi Cirebon	Catur Insan Cendekia University	Break Out Room 1
	Alamsyah Agit	Creative Economy Contribution Toward The Development Of Sustainable Economy	Institut Agama Islam DDI Sidenreng Rappang	
	Aprilianto Krisnadi	Regional Inspectorate Characteristics And Government Accrual-Based Accounting Standards Adoption In Java	Universitas Sebelas Maret	
	Sukron Romadhona	Interaction Between The Addition Of Organic Material And Phosphate Rock Against Phosphate Availability In Oxisol And Andisol	UNDIP	
	Yuliana	The Possible Innovation In Teaching And Learning Anatomy	Universitas Udayana	
	Adi Hartono	Analysis Of Various Use of ICT Media In Biology Learning	Universitas Islam Negeri Sumatera Utara	
12.30 – 14.00	Suwandi	Implementation of Supply Chain Management Blockchain Technology Applications in Manufacturing Companies	Catur Insan Cendekia University	Break Out Room 2
	Taufik Hidayat	All About Gen Z: Entrepreneurship Myths And Edupreneurship Facts	UIN Sunan Kalijaga Yogyakarta	
	Avina Fitriani Yandys Putri	Analysis Of Determinants Of Labor Absorption In East Java Province 2017-2020	Universitas Muhammadiyah Surakarta	
	Stefanus, Robby Yussac Tallar	The Sustainable Concept Design Concerning The Implementation Of Low Impact Development In Urban Area	Universitas Kristen Maranatha	
	Halimah	Study of Entrepreneurial Literacy and Digital Literacy on Business Sustainability Mushroom Cultivation in Beruk Village, Jatiyoso District, Karanganyar Regency Regency	UTP Surakarta	

Anjar Safitri	Educational Evaluation Management with Technology-Based Descriptive Feedback as an Effort to Improve Achievement and Learning Motivation	Universitas Nahdlatul Ulama Purwokerto	
Moh. Khanif Muzaki	Analysis of Factors Influencing Business Success with KUR Credit as A Moderation Variable	Universitas Gajayana Malang	
Ikhwan Baidlowi Sumafta	Combination Of Caesar Cipher And Transposition Algorithm For Securing Text	State Polytechnic of Madiun	Break Out Room 3
Ferawati Setyo Retnoningsih	Empowerment of Used Imported Clothes Traders (Thriftling) Through Micro Entrepreneurship Collaboration System Activities	UTP Surakarta	
Durratun Nashihah	Optimization Of Strategic Areas In Regional Economic Recovery: Tourism Perspectives	University of Merdeka Malang	
Mohamad Azwan Ikhwat	Assessing Groundwater Quality For Agricultural Applications In Bemban, Melaka: Implications For Sustainable Farming Practices	Politeknik Melaka, Malaysia	
Rahmattullah	Validity Analysis Of Spatial-Cultural-Based PJBL-Based Entrepreneurship	Universitas Bina Bangsa Getsempena	
Muhammad Miftahurridlo	Economic Valuation Of Food Crop Agricultural Activities In Bleberan Village, Playen Sub-District, Gunungkidul District In 2022	Gadjah Mada University	
Ega Afrida Fathur Rochmah	Determinants Of Employment Opportunity Levels In Sukoharjo Regency	Universitas Muhammadiyah Surakarta	
Ainun Hasanah	Climate Change Adaptation In Coastal Cities	Wuhan University	
Wirda Ningsih	Empowering Students As Agents Of Change In Sustainable Society 5.0 In Higher Education	STAI AL-Kifayah Riau, UIN sultan Sayrif Kasim Riau	
Roy Bintang Pamungkas	The Influence of Parent Parenting Patterns on Mathematics Learning Outcomes in Class V SDN Anggramanis	Universitas Tunas Pembangunan Surakarta	
Mikyal Hardiyati	The Concept of Leadership and Quality Development of SD/MI Human Resources	UNU Purwokerto	
Nino (Ghian Maria) B. Sangalang	Development of Technology Adoption Framework on The Use of Smart Classrooms	University of the Philippines Diliman	
Fina Nailufaz	The Effect Of Financial Ratios, Operational Complexity And Free Cash Flow On Financial Distress (Case Study On Registered Transportation Companies On The Indonesia Stock Exchange)	Muhammadiyah Surakarta University	Break Out Room 5
Maria Augustine Graciafernandy	Value-Based Selling As An Intervening Variable: Impacts On Salesperson Innovativeness And Performance	Universitas Semarang	

	Febrianti Nurvida	Development of Booklet Through Ethnobotany Studies on Cok Bakal (Offerings) of Tarokan Community	Universitas Islam Negeri Sayyid Ali Rahmatullah Tulungagung	
	Chia Soi Lee	Study of Crumb Rubber as Binder Material in Asphalt	Politeknik Sultan Idris Shah	
	Aswan	Field Trip Method Based on Virtual Reality in Learning to Write Poetry: A Digital Learning Design in the Era of the Independent Curriculum	Universitas Negeri Malang	
	Hanifa Shulha	The Role of Entrepreneurial Literacy, Digital Literacy, and Family Environment in Supporting Entrepreneurial Interest among Students (Case Study of FEB UTP Surakarta Students)	UTP Surakarta	
	Fx. Risang Baskara	AI Transformation in Society 5.0: Envisioning A Sustainable Education Landscape	Universitas Sanata Dharma	
DAY 2				
08.00 – 08.45	Moderator	Online Registration (Zoom Opens)		Time: Aug 2, 2023 08:00 AM Bangkok// Jakarta
08.45 – 09.00	Moderator	Opening		
09.00 – 09.30	RIKOLTO	Soil Biodiversity as an Indicator Healthy Product	RIKOLTO	Join Zoom Meeting https://us06web.zoom.us/j/4850933858?pwd=V1RjOU1UWE9wRE1rZ1oyVFhvR2pGUT09
09.30 – 09.45		Question and Answer		
		Plenary Speakers		
09.45 – 10.15	Dr. Susilaningtyas Budiana Kurniawati	CSR Practical Orientation in Small Medium Enterprises (SMES): A Case Study in Solo City Indonesia	UTP Surakarta	Meeting ID: 485 093 3858 Passcode: utpjuara
10.15 – 10.30	Waewalee Waewchimplee		NRRU, Thailand	
10.30 – 11.30		Question and Answer		
Parallel Session 2				
11.30 – 13.00	Cahyoko Edi Tando	Increasing Human Resources For Inmates In Economic Development: A Literature Review	Politeknik Ilmu Pemasarakatan	Break Out Room 1
	Ni Kadek Sinarwati	Rural Inclusive Entrepreneur To Accelerate The Achievment Of Village Sustainable Development Goals	Universitas Pendidikan Ganesha	
	Eric Yeo Cheng Aun	Green Concrete Mixture Using Sawdust	POLITEKNIK MELAKA	
	Elwas Berdha Krismona	Development Of Mindfulness Training Program To Improve Psychological Wellbeing Of Guidance And Counseling Teachers	Universitas Pendidikan Indonesia	

Eva Dwi Kurniawan	Community Efforts in Implementing Inclusive Education: Analysis Of A Child's Short Story By Gatot Susilo Sumowijoyo	Unniversity of Technology Yogyakarta	
Prihatnolo Gandhi Amidjaya	Financial Accountability For Islamic Boarding School In Indonesia: A Systematic Literature Review	Universiti Malaysia Sarawak	
Naeli Rosyidah	English For Political Sciences: The Need Analysis Based Course Design	Nahdlatul Ulama University	
Edenia Aisha Pramesti	Poverty Phenomenon In Lampung Province	Universitas Muhammadiyah Surakarta	Break Out Room 2
Anteng Priyatin, Agung Prasetyo	Investigating The Voluntary Participation Of Students Phenomenon: A Case Study Of The Ippnu-Ippnu In Banyumas Regency	Universitas Nahdlatul Ulama Purwokerto	
Joko Tandiono	Utilization Of Soil Ameliorant To Control Emission From Oil Palm Plantation On Tropical Peat Soil	Universitas Riau	
Silvia Umrotun Nafiah	Investigating The Utilization Of Automated Writing Evaluation (Awe) In English Language Education	Yogyakarta State University	
Ade Herdian Putra	Mental Health Disorders In Students University As A Challenge In Higher Education Era Society 5.0	Universitas Negeri Padang	
Putry Apriyani	The Effectiveness of Computer Laboratory Utilization on the Interest in Learning Programming Algorithms of Mathematics Tadris Students of UINFAS of Bengkulu	UINFAS Bengkulu	
Novria Grahmayanuri	An Analysis Study Of Causes For The Sustainability Of The Lecture Method In Islamic Religious Education Subjects At Smp/Mts Level In Medan City	STAI AL-HIKMAH MEDAN	
Riztina Dwi Setyasih	The Role Of Ownership And Productive Zakat In Increasing The Economic Empowerment Of People	Universitas Nahdlatul Ulama Purwokerto	Break Out Room 3
Zazurah binti Mat Zuini	Effectiveness Mini Biogas Production from Kitchen Waste (KW) and Cow Manure (CM)	Politeknik Sultan Idris Shah	
Tia Seksiati Rahayu	The Existence of the "Gaduh Sapi" Profit Sharing System as An Implication of Strengthening Rural Communities Economy (Phenomenological Study of Cattle Breeder in Minggirsari Village, Kanigoro District, Blitar Regency)	Universitas Negeri Malang	
Mohammad Nurwahid	Implementation Of The Independent Curriculum In Learning Mathematics: An Innovative Approach	Institut Alif Muhammad Imam Syafi'i	

Sri Rahma Nuraini	The Role Of Students' Learning Style In Developing Civic Competence: Case Study In Learning Civilization Education At Mts. Al-Rohmah Karangpawitan Garut	Universitas Pendidikan Indonesia	
Yundri Akhyar	The Islamic Education Management Transformation To Support Sustainable Education In Society 5.0 Era	STAI AL-Kifayah Riau, UIN sultan Sayrif Kasim Riau	
M. Askari Zakariah	Organic Carbon Material Sources in Cow Dung Compost Fertilizing Process: A Meta-Analysis	Universitas Sains Islam Al Mawaddah Warrahmah Kolaka	
Ahmad Suryadi	Implementation of Education in Realizing Sustainable Development	UIN Alauddin Makassar	Breakout Room 4
Yenda Puspita	The Role of The Teacher in Building Character Education in 5.0 Era	Sekolah tinggi agama islam Al Kifayah	
Muallifah	Puan's Writing: Actions of Literacy Women in Voicing Opinions and Expressing Through Digital Space	Pascasarjana Universitas Gadjah Mada Yogyakarta	
Sovia Mas Ayu	Religious Humanism Values In Islamic Religious Education Learning	Universitas Islam Negeri Raden Intan Lampung	
Marudut Bernadtua Simanjuntak	Teaching Reading Literacy In English Storybooks For Vocational Students Of Maritime (Study Of Critical Literacy In One Piece Comic Books)	STIP	
Ernie binti Zulkifli	Advanced Membrane PolyCera® Titan : A Multifaceted Approach for COD, TSS, TDS, AN and color reduction for POME and semiconductor wastewater	Politeknik Sultan Idris Shah	
Heinrich Rakuasa	Spatial Analysis of Landslide Prone Areas in Tidore Island	Universitas Indonesia	
Uswatun Hasanah	Teacher's Creativity In Overcoming Students' Learning Difficulties	UIN Sayyid Ali Rahmatullah Tulungagung	Break Out Room 5
Satrio Dwi Haryono	The Challenges Of Gender Responsive Education In The Age Of Society 5.0	UIN Raden Mas Said, Surakarta	
Rahman Wahid	The Urgency Of Implementing Multicultural Education In Schools For Developing Children's Characters In The Era Of Society 5.0	Universitas Pendidikan Indonesia	
Robiatun Kurnia Sholihat	Transition Plan From Kindergarten To Primary School For Students With Autism Spectrum In Indonesia	Universitas Pendidikan Indonesia	
Umar Nur Addin Akbar	Analysis Of Barriers To Consumer Usage Intention Of E-Learning Platforms In Indonesia	Institut Teknologi Bandung	
Linda Sariasih	Feasibility and Environmental Carrying Capacity to Realize Sustainable Tourism in Sitalang Agrotourism, Salatiga City	Universitas Diponegoro	

	Ni Luh Kadek Dwi Kartika Shanti	Business Model Canvas And Swot Analysis On The Purchases Feasibility Electric Vehicles In Denpasar City	Universitas Mahendradatta	
13.00 – 13.10	CLOSING			

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The Sustainable Concept Design Concerning The Implementation of Low Impact Development in Urban Area

Stefanus⁽¹⁾ and Robby Yussac Talla⁽²⁾
¹ Universitas MercuBuana, Dept. of Civil Engineering, Indonesia
² Universitas Kristen Maranatha, Dept. of Civil Engineering, Indonesia

Slide 1 / 11

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Gibran Rakabuming Raka
Mayor of Solo City

Keynote Speaker (under confirmation)
Datuk Dr. Habibah Abdul Rahim
Director, IKAHEO Secretariat,
Thailand

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Prof. Dr. Drs. Winarti, M.Si
Rector UTP Surakarta (Indonesia)

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Dr. Saefudiningsya Budiana K., S.E., M.Si
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Plenary Speaker
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Plenary Speaker
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Plenary Speaker
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