



# 15 Tahun Sanitasi di Kiaracondong, Bandung

*15 Years of Sanitation in Kiaracondong, Bandung*

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*15 Years of Sanitation in Kiaracondong, Bandung*



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# Kata Penganta Prakata Daftar Isi Pendahuluan

Foreword

Preface

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Short Introduction

# Kata Pengantar



Saat itu tahun 2003, proyek pertama kami diluncurkan di Indonesia. Hingga saat ini, kerja lapangan kami di Kiaracdong telah berlangsung hampir 18 tahun.

Kolaborasi penelitian yang panjang dan berkelanjutan terwujud berkat kerja sama erat antara tim Indonesia, dipimpin oleh Dr. Neni Sintawardani, dan tim Jepang, yang dulu dipimpin oleh saya, dan kemudian sekarang dipimpin oleh Prof. Taro Yamauchi. Selain itu, hubungan erat antara peneliti dan masyarakat di Kiaracdong juga dibangun oleh sikap tulus dari masing-masing pekerja lapangan, seperti Prof. Mayu Ikemi dan Dr. Ken Ushijima.

Selama bertahun-tahun, kami, termasuk warga di Kiaracdong, telah membangun tim antar disiplin dan sekarang mencoba untuk bersama-sama menciptakan sistem sanitasi berkelanjutan.

Anda dapat mengikuti secara visual sejarah proyek kami dalam buku ini. Saya berharap buku ini dapat dibaca secara luas oleh masyarakat di Kiaracdong, masyarakat Indonesia, dan masyarakat dunia.

**Naoyuki Funamizu**

Direktur Eksekutif/Wakil Presiden Institut Teknologi Muroran  
Hokkaido, Jepang

# Foreword

*It was 2003 when our first project in Indonesia was launched. Our fieldwork in Kiaracdong has therefore continued for almost 18 years up to the present day.*

*Our long research collaboration has been sustained by the sense of reliance between an Indonesian team, headed by Dr. Neni Sintawardani, and a Japanese team, headed firstly by me, and now headed by Prof. Taro Yamauchi. Furthermore, the sense of reliance between the researchers and the people in Kiaracdong also has been developed through the sincere attitude of each of the field workers, such as Prof. Mayu Ikemi and Dr. Ken Ushijima.*

*Through the years, we, including the people in Kiaracdong, have built a transdisciplinary team and are now attempting to co-create a next-generation sanitation system.*

*You can follow our project's history visually by reading this book. I hope the book will be widely read by people in Kiaracdong, people in Indonesia, and people around the world.*

**Naoyuki Funamizu**

*Executive Director/Vice President of Muroran Institute of Technology*  
*Hokkaido, Japan*

# Prakata



Buku bergambar ini disampaikan kepada Anda dalam rangka merayakan hubungan kerjasama antara tim peneliti Jepang dan Indonesia yang telah meneliti masalah air, sanitasi, kebersihan (WASH) di Kiaracondong, Jawa Barat, Indonesia selama 18 tahun terakhir, yang dijelaskan dalam berbagai gambar yang mudah diingat dan diagram sederhana.

Secara pribadi, saya telah terlibat dalam beberapa penelitian di Kiaracondong dengan mahasiswa pascasarjana saya sejak tahun 2015 sebagai salah satu lokasi studi Proyek Rantai Nilai Sanitasi di Research Institute for Humanity and Nature (RIHN).

Buku ini terdiri dari 7 bab yang menyampaikan gambaran singkat tentang Kiaracondong, sejarahnya dan kehidupan sehari-hari masyarakatnya, serta isu-isu WASH yang menyasar pekerja kebersihan, anak-anak dan perempuan. Pada bagian akhir, menggambarkan sanitasi yang berorientasi pada sumber daya, konsepnya dan ko-kreasi yang melibatkan para pelaku lokal.

Saya harap Anda dapat menikmati perjalanan panjang kolaborasi kami.

**Taro Yamauchi**

Pemimpin Proyek Rantai Nilai Sanitasi, RIHN

Kyoto, Jepang

# Preface

*This picture book is delivered to you in celebration of the cooperative relationship between Japanese and Indonesian research teams working on water, sanitation, hygiene (WASH) issues in Kiaracondong, West Java, Indonesia over the past 18 years, which is described in a variety of memorable pictures and simple diagrams.*

*Personally, I have been involved with some research in Kiaracondong with my graduate students since 2015 as one of the study sites of the Sanitation Value Chain Project at Research Institute for Humanity and Nature (RIHN).*

*This book consists of 7 chapters conveying a brief overview of Kiaracondong, its history and people's daily life, and WASH issues targeting sanitation workers, children and women. At the end, it describes resource oriented sanitation in terms of its concept and co-creation alongside various local actors.*

*I hope you will enjoy the journey of our collaborations over the years.*

**Taro Yamauchi**

*Leader of the Sanitation Value Chain Project, RIHN*

*Kyoto, Japan*

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# Pendahuluan

## Short Introduction

Proyek kerja sama penelitian antara LIPI Indonesia (dilebur menjadi BRIN pada September 2021) dan tim Jepang untuk masalah sanitasi di Kiaracondong telah dimulai sejak tahun 2003, dan masih terus berjalan dan berkembang. Namun waktu berjalan begitu cepat. Anak-anak yang bermain di jalanan telah beranjak dewasa. Gadis responden telah menjadi ibu. Mahasiswa telah menjadi peneliti profesional. Beberapa orang sudah meninggal, dan putra atau putri mereka sekarang mengambil peran mereka. Selama 18 tahun, Kiaracondong telah berubah di beberapa bagian, dan tidak berubah di bagian lain. Buku ini menghimpun foto-foto dan gambar yang tidak hanya berkaitan dengan air dan sanitasi, tetapi juga kehidupan masyarakat di Kiaracondong. Melalui pengalaman kami selama 18 tahun, kami menemukan bahwa masalah air dan sanitasi tidak dapat diselesaikan tanpa pemahaman yang mendalam dan luas tentang kehidupan sehari-hari masyarakat dan komunitas.

*Our international joint research project between LIPI Indonesia (amalgamated into BRIN Indonesia in September 2021) and a Japanese sanitation team in Kiaracondong which had started on 2003, and which still continues to be active and evolve. But time flies so fast. Children playing in the streets have become adults. A respondent girl has become a mother. Students have become professional researchers. Some have passed away, and their sons or daughters are now taking their roles. During these 18 years, Kiaracondong has changed in some ways, and not changed in others. This book collects many photos and graphics relating not only to water and sanitation, but also to people's lives in Kiaracondong. Through our 18 years of experience, we found that the water and sanitation issue cannot be solved without a deep and wide understanding of people's daily lives and of their community.*

Ikhtisar kolaborasi panjang dan pendanaan (grafik oleh Ken Ushijima).  
Overview of long collaboration and the funding (graphic by Ken Ushijima).



- Current status of sanitation
- In terms of water pollution
- Feasibility of Bio-Toilet (BT)

JSPS (type S)  
2009-2014.3

MEXT  
(prototyping)  
2013.11-2014.3

- Understanding value chain
- Analysis on demand and supply
- Decision making model
- Productdesign approach for BT
- Prototyping of BT
- Field interview to assumed BT users

Deposit Toilet (2014.3-)

JSPS (Asia-Africa)  
2014.4-2017.3

- JST : Japan Science and Technology Agency
- CREST : Core Research for Evolutional Science and Technology
- JSPS : Japan Society for the Promotion of Science
- MEXT : Ministry of Education, Culture, Sports, Science and Technology

TOYOTA Faundation  
2015.5-2017.4

- Networking (JP-ID-ZM)
- Workshop
- Apply research budget

RIHN  
(Research Institute for Humanity and Nature)

IS (Incubation Studies)  
2015.4-9  
FS (Feasibility Studies)  
2015.9-2016.8

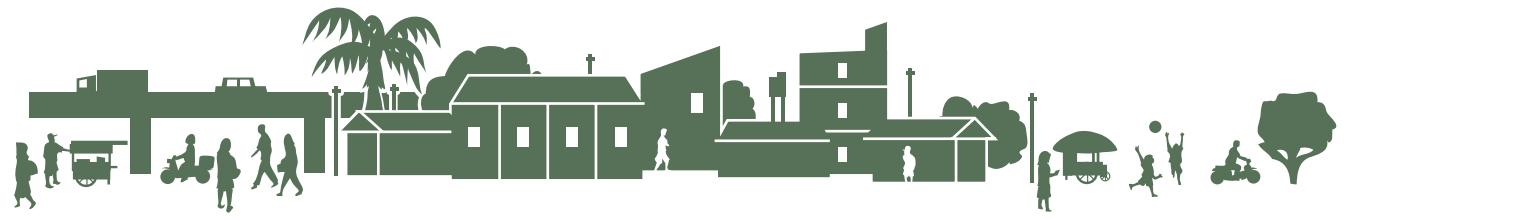
- Comprehensive idea of sanitation value chain
- Creating new discipline

RIHN PR (Pre-Research), FR(Full-Research)  
2016.8-2022.3

Co-creation of value chain

Sanitation & Health

**Ikhtisar kolaborasi panjang dan pendanaan (grafik oleh Ken Ushijima).  
Overview of long collaboration and the funding (graphic by Ken Ushijima).**



1.

# Sekilas tentang Kiaracondong

*Overview of Kiaracondong*

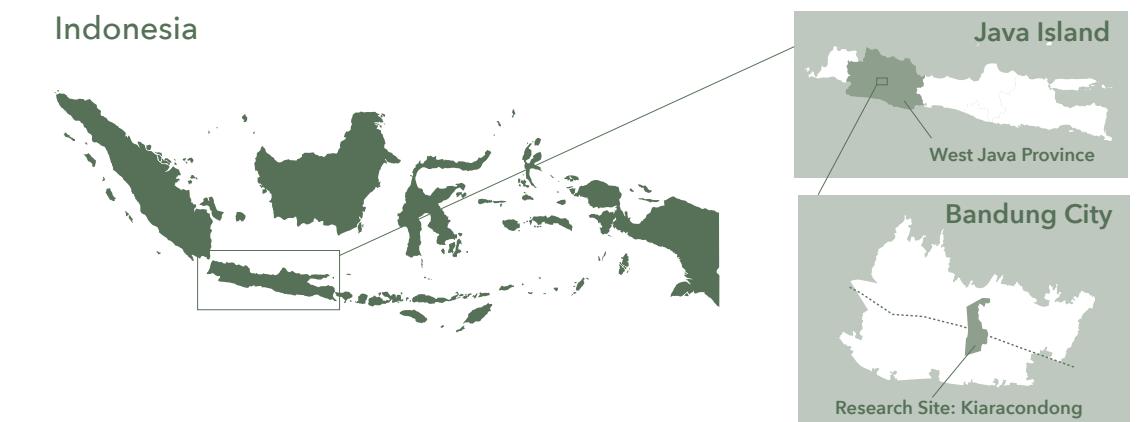
# Dimana dan Bagaimana Kiaracondong

## *Location and Characteristics of Kiaracondong*



Kiaracondong adalah daerah yang sangat kecil tetapi sangat ramai, yang dikenal sebagai daerah padat penduduk di pusat Kota Bandung.

*Kiaracondong is a very small but extremely crowded area known as a big urban-slum area in the center of Bandung City.*



Populasi: 130.080 (2019)  
dengan 6 Kelurahan, 85 RW, 593 RT  
Luas: 6,12 km<sup>2</sup>  
Ketinggian: 760 m

Population: 130,080 (2019)  
with 6 Kelurahan, 85 RW, 593 RT  
Area: 6.12 km<sup>2</sup>  
Altitude: 760 m

# Air dan Sanitasi di Kiaracondong

## *Water and Sanitation in Kiaracondong*



Toilet yang ada kebanyakan adalah toilet siram (water flush) tapi buangannya langsung dialirkan ke saluran atau parit. Kualitas air saluran sangat buruk, dan sering berubah warna karena buangan industri pencelupan tekstil. Air ledeng (PAM) tersedia tetapi banyak rumah tangga masih belum memiliki sambungan air ledeng, sehingga mereka mengambil air bersih dari penampungan air ledeng umum (corsen PAM) atau membeli air dalam jeriken.

Many toilets are water flush type, but are directly discharged to canals or ditches. Canal water quality is very poor, and the color changes often due to textile or dye industries. Municipal water (PAM: Drinking Water Company) is available, but many still do not have taps in their houses and therefore have little option but to use a community tap or a plastic tank.



# Masyarakat di Kiaracondong

## People in Kiaracondong



Penduduknya memiliki berbagai macam pekerjaan. Meskipun Kiaracondong dianggap sebagai daerah padat perkotaan, beberapa kalangan PNS, TNI, Polri juga tinggal di sini. Dari sejarahnya, perkembangan Kiaracondong dimulai sejak berdirinya pabrik senjata di awal abad ke-19, sehingga sampai saat ini masih banyak ditemukan industri logam rumahan di daerah tersebut dengan pekerja/buruh berasal dari daerah tersebut.

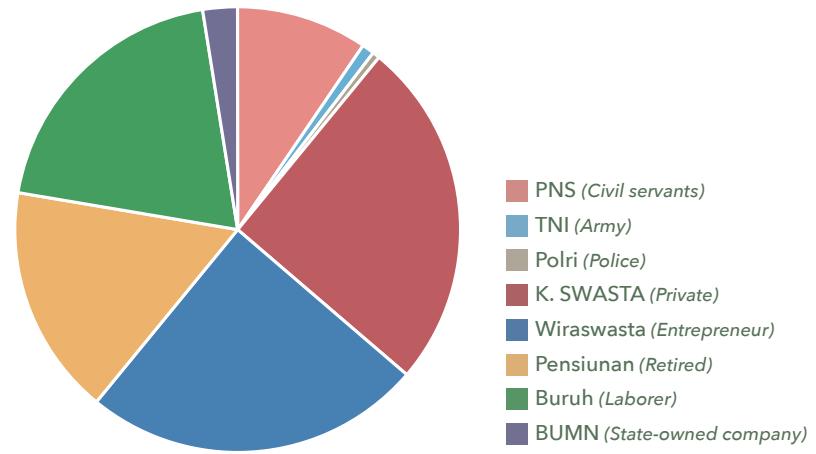
People here hold a wide variety of jobs. Although Kiaracondong is regarded as a slum area, civil servants, as well as army and police personnel are also living here. Historically, Kiaracondong's development began from the establishment of the weapons industry in the early 19th century, and therefore many home metal industries exist in the area, the workers/laborers also coming from the area.

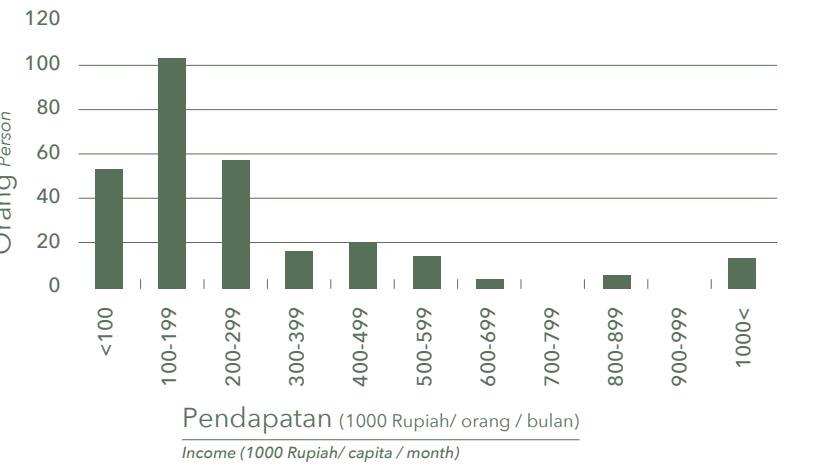


### Kasus di satu RW di Kiaracondong

Case of one of RW in Kiaracondong

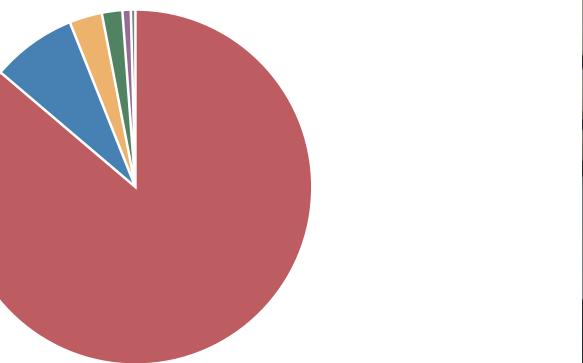
| Pekerjaan Job              |    |
|----------------------------|----|
| PNS (Civil servants)       | 34 |
| TNI (Army)                 | 3  |
| Polri (Police)             | 2  |
| K. SWASTA (Private)        | 91 |
| Wiraswasta (Entrepreneur)  | 89 |
| Pensiunan (Retired)        | 60 |
| Buruh (Laborer)            | 71 |
| BUMN (State-owned company) | 9  |





Mayoritas penduduknya berpenghasilan rendah (< 300.000 rupiah / bulan), namun ditemukan distribusi yang luas. Kisaran distribusi pendapatan di wilayah studi (N=62). (Ushijima et al. 2008)

*The majority have low incomes (< 300,000 rupiah / month), but a wide distribution is found. The income range distribution of the study area (N=62). (Ushijima et al. 2008)*



- Islam (Islam)
- Protestan & Kristen lainnya (Protestantism & Other Christians)
- Katolik (Catholicism)
- Hindu (Hinduism)
- Budha (Buddhism)
- Konghucu (Confucianism)
- Lainnya (Other)

Seperti diketahui umum, hampir 90% penduduk Indonesia beragama Islam. Situasi yang sama juga terjadi di Kiaracondong.

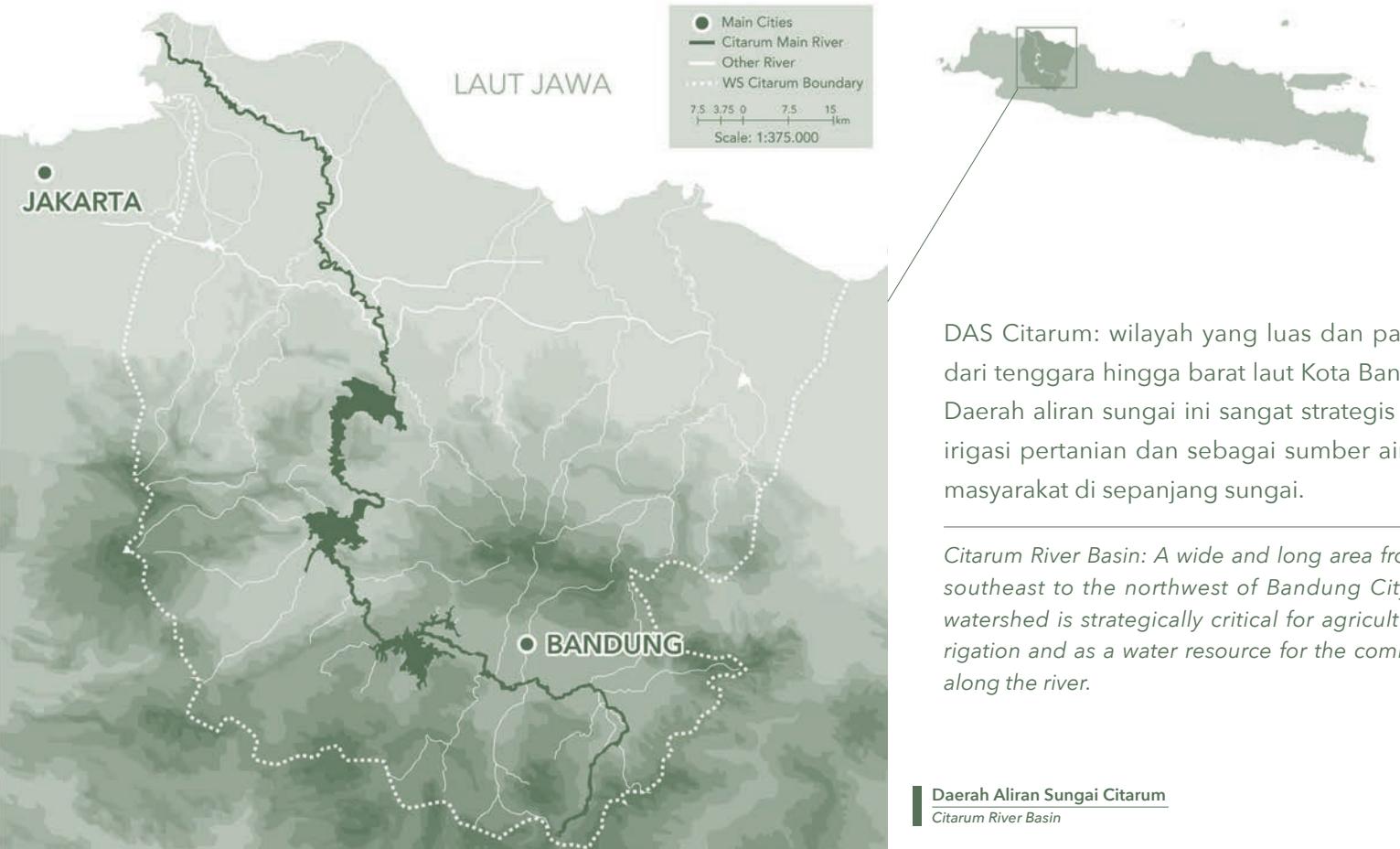
*As is widely known, more than 90% of the Indonesian population are Muslim. The situation is the same in Kiaracondong.*



Masjid di RW 02: Masjid Babul Ijabah (RT 03) dan Masjid Nurul Hidayah (RT 08) (LIPIS 2021)  
Mosque in RW 02: Masjid Babul Ijabah (RT 03) and Masjid Nurul Hidayah (RT 08) (LIPIS 2021)

# Tautan ke Sungai Citarum: Isu Nasional, Hulu dan Hilir, dan lain-lain

*Link to Citarum River: National Issue, Upstream and Downstream, etc.*



Hulu Sungai Jondol di Kiaracondong (Ushijima 2014)  
Upstream Jondol River in Kiaracondong (Ushijima 2014)



For decades the Citarum River has suffered from severe water quality and environmental degradation, even though the river plays a very vital role in the province of West Java and Jakarta, as the capital city of Indonesia, as a drinking water source and for irrigation. President Joko Widodo has launched a state program to accelerate and overcome the incoherency among stakeholders to control and reduce pollution or damage in the Citarum Watershed in only seven years. This is known as the 'Citarum Harum Program' (Presidential Regulation No. 15/2018) of 14 March 2018.

The Kiaracondong area is crossed by several tributaries that run downstream to the Citarum River, one of which, the Jondol River and its surroundings, have been the subject of our research over the years.



Hilir Sungai Jondol di Kiaracondong (LIPI 2004)  
Downstream Jondol River in Kiaracondong (LIPI 2004)

Selama beberapa dekade Sungai Citarum mengalami penurunan kualitas air dan lingkungan yang parah. Padahal sungai ini memiliki peran yang sangat vital untuk sumber air minum dan irigasi di Provinsi Jawa Barat dan Jakarta sebagai ibu kota Indonesia. Pada 14 Maret 2018 Presiden Joko Widodo telah mencanangkan program pemerintah untuk mempercepat upaya dan mengatasi kurang terpadunya koordinasi antar pemangku kepentingan untuk mengendalikan dan mengurangi pencemaran atau kerusakan di DAS Citarum hanya dalam waktu 7 tahun. Program ini dikenal dengan 'Program Citarum Harum' (Perpres No. 15/2018).

Kawasan Kiaracondong dilintasi oleh beberapa anak sungai yang menyalir masuk ke Sungai Citarum, salah satunya adalah Sungai Jondol/Cidurian. Sungai Jondol dan kawasan sekitarnya menjadi bahan penelitian kami selama ini.

# Bandung dan Sekitarnya: Kawasan Kumuh, Perkotaan, Pinggiran Kota, Lahan Pertanian, dan lain-lain

*Bandung and Surroundings: Slums, Urban Areas, Suburbs, Agricultural Areas, etc.*



Perumahan yang padat  
(Ushijima 2012) / Pasar pagi  
(Ushijima 2011) / Area mewah  
di Kota Bandung (Ushijima  
2016)

Crowded housing (Ushijima 2012)  
/ Morning market (Ushijima 2011)  
/ Luxus area in Bandung City (Ushijima  
2016)



Kantor Kepala Daerah  
Propinsi Jawa Barat (Ushijima  
2011) / Tempat bersejarah  
Gedung konferensi Asia-Afrika  
(Ushijima 2015)  
Rovincial office (Ushijima 2011)  
Historical site (Ushijima 2015)

Kebun sayur (Ushijima 2004)  
/ Sawah di kawasan kumuh  
Kiaracondong (LIPPI 2001)  
Vegetable garden (Ushijima 2004)  
/ Rice field in Kiaracondong slum area  
(LIPPI 2001)



Kota Bandung memiliki wajah yang beragam. Terdapat daerah hunian mewah, villa, dan lahan pertanian di daerah dataran tinggi sebelah utara, daerah perumahan dan perkantoran di bagian tengah, beberapa daerah padat dan kumuh perkotaan di bagian timur dan selatan kota, dan pertanian sayuran dan sawah sebagian besar di daerah dataran rendah bagian selatan.

Sebagai ibu kota Provinsi Jawa Barat, Bandung memiliki cerita dan bangunan bersejarah. Museum Asia-Afrika adalah salah satu bangunan yang paling dikenal sebagai tempat Konferensi Asia-Afrika pertama berlangsung.

Kota Bandung juga dikenal sebagai kota pendidikan tinggi tempat beradanya berbagai universitas dan lembaga penelitian.

*Bandung City has various faces. There is a luxurious living area in the north, villas and farmland in the northern highland area, a residential and office area in the center, some high density and urban-slum areas in the eastern and southern part of the city, and vegetable farms and rice fields mostly in the southern lowland area.*

*As the capital city of West Java Province, Bandung is the home of many historical events and buildings. The Asia-Africa Museum is one of the iconic buildings where the first Asia-Africa Conference took place.*

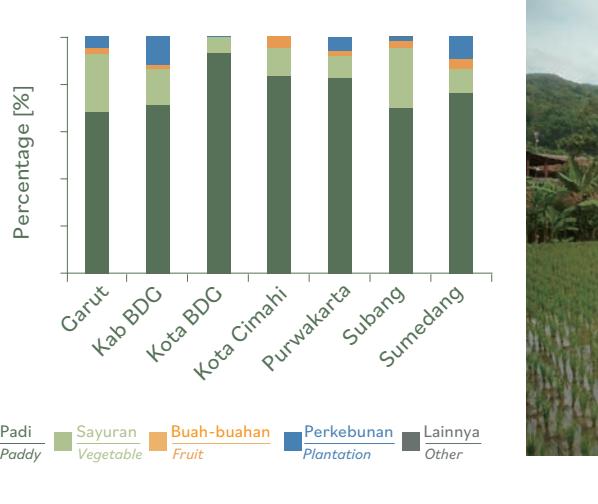
*The city of Bandung is also known as a university city, where various universities and research institutions are located.*

# Kegiatan Pertanian dan Hortikultura di Dalam dan Sekitar Bandung

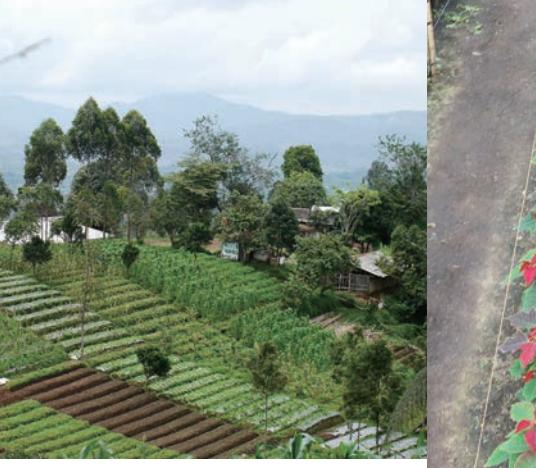
## *Agri- and Horti-Cultural Activities in and around Bandung*

Area persawahan sebagian besar berada di dataran rendah di bagian selatan Bandung. Ladang sayuran, perkebunan teh dan rumah kaca untuk berbagai tanaman hias berada di dataran tinggi di bagian utara dan selatan Bandung.

*The area surrounding Bandung is mostly rice fields in the southern lowlands. Vegetable fields, tea plantations and greenhouses for various ornamental plants are seen in the highlands to the north and in the southern part of Bandung.*



**Sawah (Ushijima 2010)**  
Rice field (Ushijima 2010)



**Ladang sayuran (Ushijima 2010)**  
Vegetable fields (Ushijima 2010)



**Rumah plastik (Ushijima 2010)**  
Plastic greenhouse (Ushijima 2010)



**Budidaya tanaman hias (Ushijima 2018)**  
Ornamental plant cultivation (Ushijima 2018)



**1. Sekilas tentang Kiaracondong**



2.

## Air dan Sanitasi

*Water and Sanitation*

# Ketersediaan dan Kualitas Air Bersih

## Clean Water Availability and Quality



Sumur terbuka (Ushijima 2004)  
Open well (Ushijima 2004)



Sumur terbuka (LIPI 2006)  
Open well (LIPI 2006)



Tempat penyimpanan air (Ushijima 2018)  
Water storage (Ushijima 2018)



Hand pump (closed well) (Irie & Ushijima 2003)  
Sumur pompa tangan (sumur tertutup) (Irie & Ushijima 2003)



Penyaringan sederhana untuk air minum (LIPI 2004)  
Simple filtration for drinking water (LIPI 2004)



Masyarakat di Kiaracondong menggunakan air dari sumur dangkal, sumur dalam, dan air ledeng. Tampaknya air tanah mengandung zat besi dan kadang-kadang patogen, sehingga saat ini banyak orang menggunakan air ledeng untuk minum dan memasak, sementara itu menggunakan air tanah untuk mandi, toilet, dan cuci. Pada awalnya, sebagian besar penduduk menggunakan air sumur terbuka atau sumur tertutup dengan kedalaman yang relatif dangkal. Untuk mendapatkan air sumur yang bersih dilakukan penyaringan menggunakan bahan yang sesuai atau cukup disaring dengan kain berlapis-lapis. Sisanya harus membeli air dalam jeriken. Saat ini, pasokan air menjadi lebih baik dengan adanya sumur dalam komunal. Konsumsi air minum kemasan juga meningkat karena mudah ketersedianya dan murah harganya.

*People in Kiaracondong use water from shallow and deep wells, and tap water. The ground water may contain iron and sometimes pathogens, and therefore many people nowadays use tap water for drinking and cooking, while using groundwater for bathing, toilets, and laundry. In the past, most of the residents used open well water or closed wells with a relatively shallow depth. If the water was turbid, it was filtered using a suitable material or simply filtered with a multi-layered cloth. Other people had to buy water in a canister. At present, the water supply has improved through the use of communal deep wells. The ease of availability of bottled water at a relatively low price has also brought about an increase in its consumption.*

## 2.1



Air eceran dalam jerigen (LIPI 2005)  
Retail water in jerry cans (LIPI 2005)

Akses terhadap air bersih didapatkan dengan berbagai cara, sesuai dengan perubahan lingkungan dan ketersediaan teknologi. Pompa air tanah menjadi alat penting untuk mendapatkan air bersih pada tahun 2002. Selain itu, karena air bersih semakin sulit, beberapa orang menjual air bersih dalam jeriken (2005). Saat ini telah dibangun sumber air sumur dalam terpusat untuk 60 rumah tangga (2021).



Pompa air tanah (LIPI 2002)  
Ground water pump (LIPI 2002)



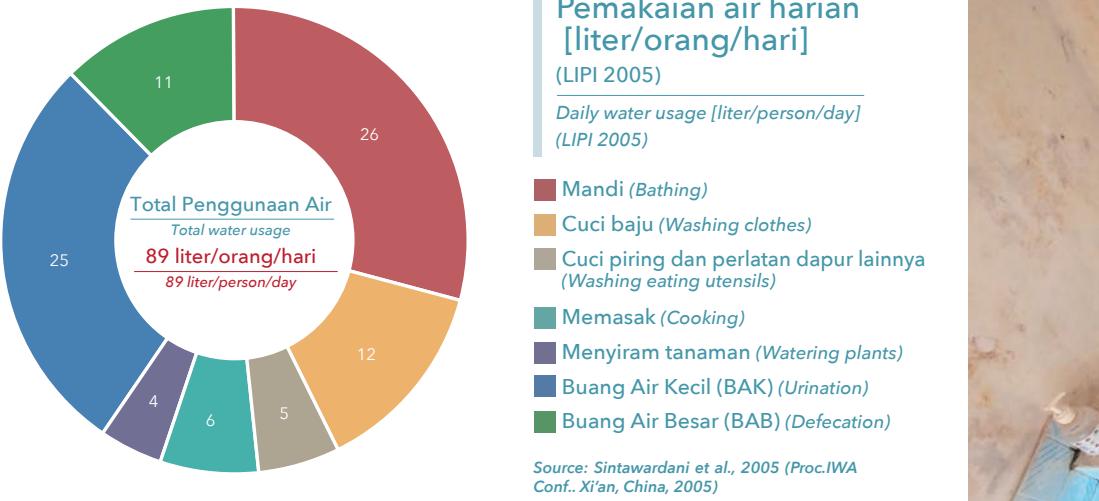
Sumur dalam terpusat dengan pompa submersibel (LIPI 2021)  
Centralized deep water well with submersible pump (LIPI 2021)



Tempat pengisian air minum isi ulang (Ushijima 2014)  
Bottled water refill station (Ushijima 2014)

# Kita Membuang Air yang Dapat Diminum untuk Toilet

*We Are Disposing of Water for Toilets*



Porsi terbesar penggunaan air adalah untuk toilet. Hampir setiap kali ke toilet, orang menggunakan air untuk menyiram, membasuh tubuh, dan membersihkan ruang toilet. Porsi kedua terbesar kedua adalah untuk mandi. Beberapa warga memiliki kamar mandi terpisah, tetapi banyak dari mereka tidak memiliki dan harus mandi di ruang toilet.



Orang membutuhkan banyak air untuk toilet (Ushijima 2013)  
People require much water for toilets (Ushijima 2013)



Kamar mandi terpisah (Ushijima 2013)  
Separate shower room (Ushijima 2013)

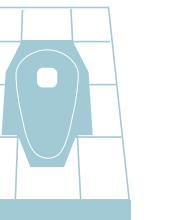
The largest portion of water usage is for toilets. People use water for flushing, washing themselves, and cleaning up the toilet room, almost every time they use the toilet. The second largest use of water is for bathing (taking showers). Some residents have a separate shower room, but many of them do not and are taking showers in the toilet room.



Area cuci (Ushijima 2014)  
Clothes washing area (Ushijima 2014)

# Toilet Umum vs Toilet Pribadi

## Public Toilets vs Private Toilets

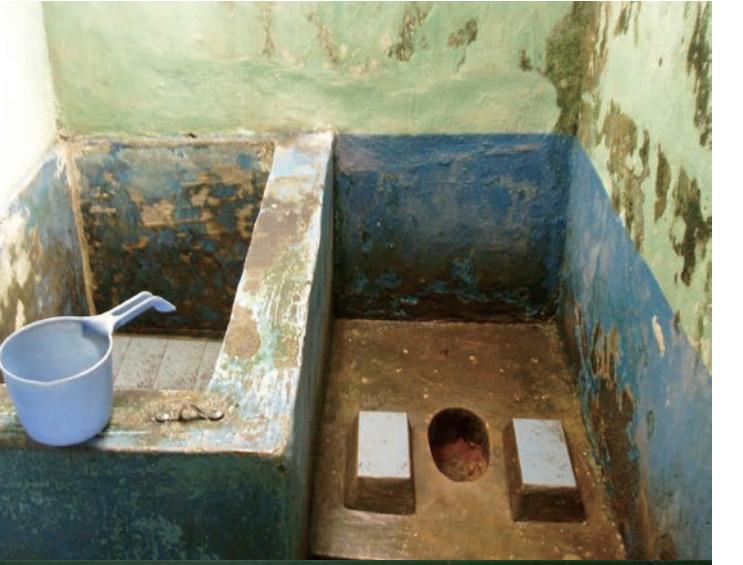


Data PKK untuk ketersediaan air dan fasilitas MCK di rumah tangga tahun 2004 (LIPI 2004)

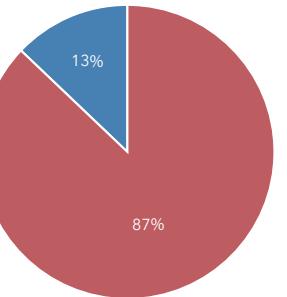
\*PKK (Pembinaan Kesejahteraan Keluarga) adalah Gerakan Keluarga Sejahtera.

PKK's data for water availability and toilet facilities in households in 2004 (LIPI 2004)

\*PKK (Pembinaan Kesejahteraan Keluarga) is the Family Welfare Movement.



| NO | NOMOR<br>R<br>T | CATATAN DATA DAN KEGIATAN WARGA<br>DALAM KELOMPOK PKK RW |  |                              |                                 |                                 |                       |                       |                       |                           |                         | JUMLAH<br>KELUARAHAN<br>TAHUN | JUMLAH<br>WARGA | TYPE RUMAH SEHAT<br>YANG DIDIAMAI | JUMLAH KELUARGA DGN<br>SUMBER AIR YANG DI<br>GUNAKAN | JUMLAH<br>KEL<br>ME |    |   |   |   |
|----|-----------------|--|--|------------------------------|---------------------------------|---------------------------------|-----------------------|-----------------------|-----------------------|---------------------------|-------------------------|-------------------------------|-----------------|-----------------------------------|--|---------------------|----|---|---|---|
|    |                 | JUMLAH<br>D<br>K<br>TP<br>PKK                            | JUMLAH<br>U<br>M<br>K<br>H<br>S<br>SUS | JUMLAH<br>R<br>U<br>H<br>NYA | JUMLAH<br>B<br>A<br>L<br>T<br>A | JUMLAH<br>P<br>U<br>S<br>T<br>A | JML<br>3<br>TYPE<br>A | JML<br>J<br>TYPE<br>B | JML<br>J<br>TYPE<br>C | JML<br>J<br>TYPE<br>SUMUR | JML<br>J<br>TYPE<br>PAM |                               |                 |                                   |  |                     |    |   |   |   |
| 1  | 2               | 3  | 4                                      | 5                            | 6                               | 7                               | 8                     | 9                     | 10                    | 11                        | 12                      | 13                            | 14              | 15                                | 16   | 17                  |    |   |   |   |
| 1  | 01              | 4  | 67                                     | 1                            | 4                               | 2                               | 187                   | 18                    | 54                    | -                         | 19                      | 14                            | 2               | 8                                 | 16   | 6                   | 35 | - | 1 | - |
| 2  | 02              | 3  | 53                                     | -                            | 3                               | 1                               | 215                   | 12                    | 34                    | -                         | 20                      | 10                            | -               | 3                                 | 9  | 19                  | 25 | 5 | - | - |
| 3  | 03              | 3  | 54                                     | -                            | 3                               | 2                               | 210                   | 21                    | 7                     | -                         | 12                      | 8                             | -               | 1                                 | 9  | 2                   | 18 | 2 | - | - |
| 4  | 04              | 3  | 40                                     | -                            | 3                               | -                               | 160                   | 11                    | 25                    | -                         | 20                      | 1                             | 1               | 3                                 | 10   | -                   | 27 | 1 | - | - |
| 5  | 05              | 3  | 52                                     | -                            | 3                               | 1                               | 185                   | 14                    | 31                    | -                         | 16                      | 4                             | 1               | 5                                 | 15   | -                   | 18 | 2 | - | - |
| 6  | 06              | 3  | 63                                     | -                            | 3                               | 2                               | 280                   | 15                    | 30                    | -                         | 20                      | 1                             | 2               | 2                                 | 9  | -                   | 21 | 2 | 1 | - |
| 7  | 07              | 1  | 37                                     | -                            | 1                               | -                               | 139                   | 11                    | 27                    | -                         | 18                      | 11                            | 1               | 1                                 | 7  | 5                   | 14 | 6 | - | - |
| 8  | 08              | 2  | 56                                     | -                            | 2                               | 1                               | 183                   | 16                    | 49                    | 13                        | 9                       | -                             | 8               | 11                                | 3  | 10                  | 8  | - | - | - |



Tempat BAB  
Place of Defecation

Di rumah  
At Home

WC umum  
Public Toilet

Hasil wawancara tentang tempat BAB  
(Ushijima 2006)  
Result of interviews about the place of defecation  
(Ushijima 2006)



# Kebersihan Toilet dan Sungai yang Kotor

## *Toilet Cleanliness and Dirty River*



Bagian dalam toilet (Ushijima 2006) / (Ushijima 2014) / (Ushijima 2013)  
Inside of toilet room (Ushijima 2006) / (Ushijima 2014) / (Ushijima 2013)

Bagian dalam toilet (Ushijima 2014) / (Ushijima 2014)  
Inside of toilet room (Ushijima 2014) / (Ushijima 2014)



Di luar toilet (Ushijima 2018) / (Ushijima 2004)  
Outside the toilet (Ushijima 2018) / (Ushijima 2004)



Kotoran mengambang di saluran/parit  
(Ushijima 2004)  
Feces floating in the channel (Ushijima 2004)



Tanki septik yang tidak terawat (Ushijima 2006)  
Poorly maintained septic tank (Ushijima 2006)

Pada umumnya, kamar mandi di rumah-rumah di Kiaracondong cukup bersih.

Namun, di luar toilet kita dapat dengan mudah menemukan kotoran segar di saluran. Di wilayah RW yang diteliti di Kiaracondong, 53% rumah tangga membuang kotoran WC langsung ke saluran dan 47% rumah tangga menggunakan tangki septik. Namun dalam pengamatan kami selama wawancara, sebagian besar tangki septik tidak terawat dengan baik.

*In most cases, the toilet rooms in houses in Kiaracondong were clean.*

*However, outside the toilet we can easily see fresh feces in the channel. Among the RW studied in Kiaracondong, 53% of household toilets discharged toilet waste directly into the channel and 47% of households used a septic tank. However, from the interviews, most of the septic tanks are not well-maintained.*

# Air Mengalir dari Hulu ke Hilir

## Water Flows from Upstream to Downstream



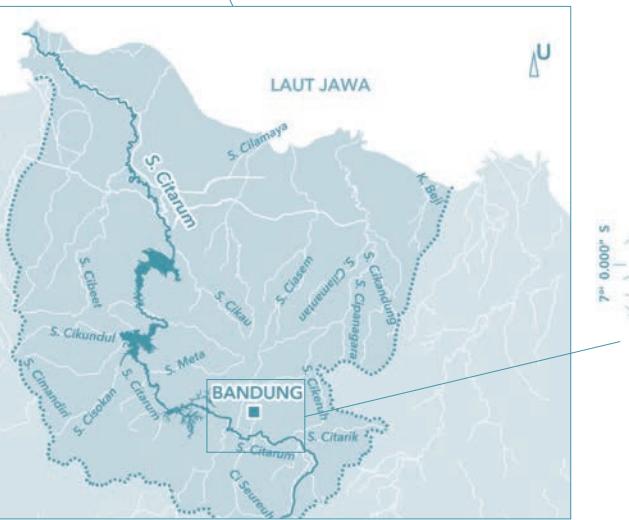
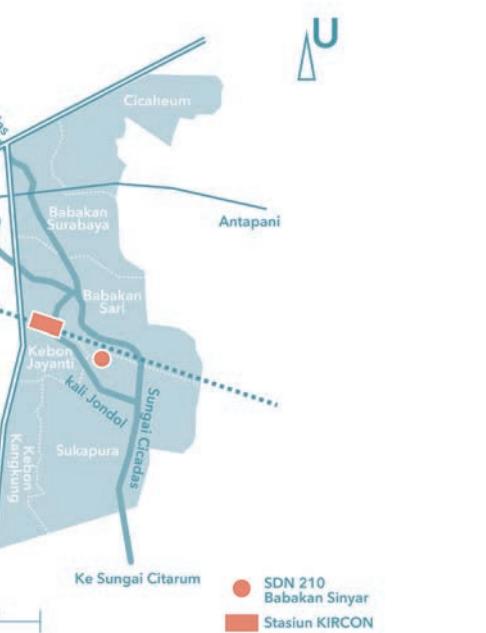
Kawasan Kiaracondong banyak dilintasi kali atau saluran yang bermuara ke Sungai Cicadas atau Cidurian. Salah satu saluran kali adalah Sungai Jondol atau Sungai Sekewaluh, tempat penelitian dilakukan. Sungai Cicadas kemudian bersama anak-anak sungai lainnya menghilir ke Sungai Citarum.

Kiaracondong area is crossed many small rivers or channels that flow downstream to the Cicadas River. One of the small rivers is known as Jondol, or the Sekewaluh River, where the study has been conducted. The Cicadas River then, together with other tributaries, flows downstream into the Citarum River.

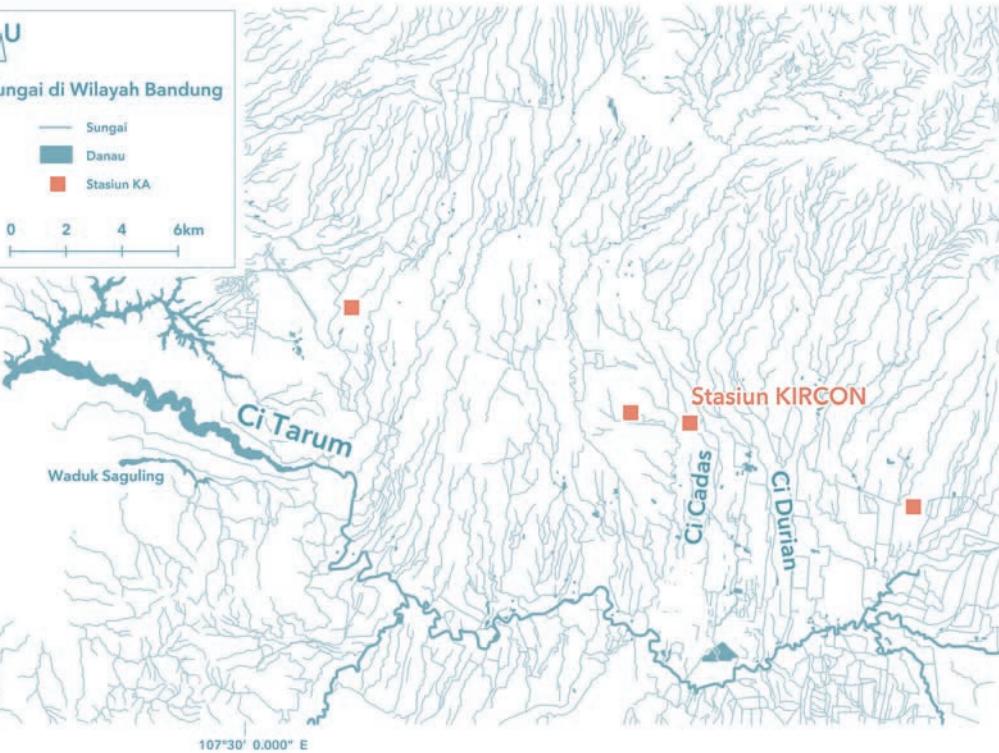
Anak-anak sungai tersebut mengalir di atas kawasan Kiaracondong dan melanjutkan alirannya ke selatan Bandung. Pertemuannya dengan Sungai Citarum ("Area Kiaracondong". LIPI, 2021)

The tributaries flow through the Kiaracondong area and continue to flow to the southern part of Bandung. They meet at the confluence of the Citarum River ("Kiaracondong Area". LIPI, 2021)

Wilayah Studi di Kiaracondong (LIPI 2020)  
Study area in Kiaracondong (LIPI 2020)



Sungai Citarum mengalir dari tenggara Bandung ke utara dan bermuara ke Laut Java  
The Citarum River flows from the south-east of Bandung to the north and discharges into the Java Sea



Hulu Sungai Citarum merupakan sungai utama yang menampung banyak sungai dari wilayah Bandung ("Sungai-sungai di sekitar Wilayah Bandung". LIPI, 2021)

Upstream from the Citarum River is the main river into which many rivers from the Bandung area flow ("Rivers around the Bandung Area". LIPI, 2021)

# Kondisi Sungai

## River Condition

Dari tahun ke tahun kondisi sungai di Kiaracondong tidak menunjukkan perbaikan yang berarti, sampah masih tampak berserakan di sungai. Meski saat ini Tim **GOBER (Gorong-Gorong Bersih)** sudah ada, kondisi sungai masih memprihatinkan. Cuaca sangat mempengaruhi keadaan sungai.



■ LIPI 2004



■ Irie &amp; Ushijima 2004



Hilir saluran Jondol (LIPI 2005)  
Downstream Jondol River (LIPI 2005)



■ Irie &amp; Ushijima 2004



■ Irie &amp; Ushijima 2004



■ Irie &amp; Ushijima 2004

Hulu saluran Jondol (LIPI 2005)  
Upstream Jondol River (LIPI 2005)



■ IPI 2005



Hilir saluran Jondol (LIPI 2005)  
Downstream Jondol River (LIPI 2005)

# 3.

## Sejarah dan Kehidupan Sehari-hari di Kiaracondong

*History and Daily Life in Kiaracondong*



# Sejarah Kiaracondong

## *History of Kiaracondong*



Kawasan Kiaracondong mulai berkembang ketika penjajah Belanda memindahkan pabrik senjata/serbuk mesiu dari Ngawi dan Surabaya (Provinsi Jawa Timur) ke Bandung pada tahun 1898. Para pekerja di pabrik tersebut didatangkan langsung dari Surabaya. Oleh karena itu, di wilayah Kiaracondong terdapat kawasan Babakan Surabaya (Babakan = kampung). Nama Kiaracondong konon berasal dari keberadaan pohon Kiara (*Ficus roxburghii*) yang sangat besar tetapi posisinya miring (condong). "Miring" disebut juga "condong" dalam bahasa Sundan atau bahasa Indonesia saat ini. Bengkel logam mendominasi industri kecil di Kiaracondong, yang mencerminkan sejarahnya.

Sumber: Perpustakaan Digital Budaya Indonesia

*The Kiaracondong area begin to develop when the Dutch colonialists moved their weapons and gunpowder factories from Ngawi and Surabaya (East Java Province) to Bandung in 1898. The workers in the factory were brought directly from Surabaya. Therefore, in the Kiaracondong area there is a sub-area named Babakan Surabaya (Babakan = village). The name Kiaracondong is said to have originated from the existence of a very large and inclined "Kiara" tree (*Ficus roxburghii*). "Inclined" is "condong" in Sundanese or the Indonesian language. Metal workshops dominate the small industries in Kiaracondong, reflecting its history.*

*Source: Perpustakaan Digital Budaya Indonesia*

# Stasiun Kereta Kiaracondong

*Kiaracondong Train Station*



*History and Daily Life in Kiaracondong*

Stasiun Kiaracondong merupakan stasiun kereta api terbesar kedua di Bandung. Terletak di dekat Jalan Kiaracondong (juga dikenal sebagai Jalan Ibrahim Adjie), di sisi timur Bandung. Stasiun terletak di dekat pasar tradisional Kiaracondong dan jalan layang Kiaracondong. Transportasi logistik dan manusia ke dan dari Kiaracondong sangat mengandalkan stasiun ini.

*Kiaracondong Station is the second largest railway station in Bandung. It is located near Kiaracondong Street (also known as Ibrahim Adjie Street) on the eastern side of Bandung. The station is located near the Kiaracondong traditional market and Kiaracondong flyover road.*

# Situasi Lalu Lintas di Kiaracondong: Jalan Utama, Jalan Layang, dan di Bawah Jalan Layang (2021)



Traffic Situation in Kiaracondong:  
Main Road, Flyover & under the Flyover (2021)

# Area Perumahan yang Masih Terus Berkembang...

*The Housing Area Is Still Growing...*



■ Ushijima 2004



Kita dapat dengan mudah menemukan pembangunan rumah di Kiaracondong pada tahun 2015 (Ushijima 2016)

We can easily find houses constructed in or after 2015 in Kiaracondong (Ushijima 2016)



■ Ushijima 2018



■ Ushijima 2018



■ Ushijima 2014



Rumah bagus dan jalan sempit (LIPI 2017)  
Good houses along a narrow path (LIPI 2017)



■ LIPI 2021



■ Ushijima 2005



■ Ushijima 2011



■ Ushijima 2014



■ Ushijima 2018

Kawasan Kiaracondong sudah padat pada tahun 2004, namun Kawasan perumahan masih terus bertumbuh. Orang membangun atau memperluas rumah mereka di ruang yang sangat sempit dan terbatas. Meski padat, lokasi kawasan tersebut sangat strategis di tengah kota (Bandung), sehingga harga tanah cukup tinggi.

Kiaracondong was already a crowded area at the time of 2004, but the housing area is still growing. People build or extend their houses in very small and limited spaces. The area is very strategically located in the middle of the city (Bandung), even though it is dense and the land price is quite high.

# Perkembangan Kecil Pemandangan di Pinggiran Anak Sungai:

Aman, Awet, Indah

*Small Channel-Side Development: Safe, Durable, then Beautiful*

\*Semua foto di tempat yang sama oleh Ushijima

\*All photos are of the same place, taken by Ushijima

2004 Tanpa pagar

2004: No fence



2005 Pagar kayu

2005: Wooden fence



2011 Pagar besi & beton

2011: Iron and concrete fence



2018 "dinding hijau" rangkaian pot tanaman

2018: Green wall



Semua foto fokus di tempat yang sama di Kiaracondong. Pada tahun 2004, tidak ada pagar di sepanjang jalan di atas saluran. Pada tahun 2005, pagar kayu dipasang. Setelah itu diganti dengan pagar besi & beton permanen. Saat ini telah ditambahkan "dinding hijau" dengan tanaman dalam pot. Tak bisa dipungkiri, kawasan ini semakin bersih.

*All photos are of the same place in Kiaracondong. In 2004, there were no fences along the street beside the canal. In 2005, a wooden fence was erected. After that, a permanent iron and concrete fence was built, and now a "Green wall" with plant pods has been added. It is undeniable that this area is making an effort to be cleaner.*



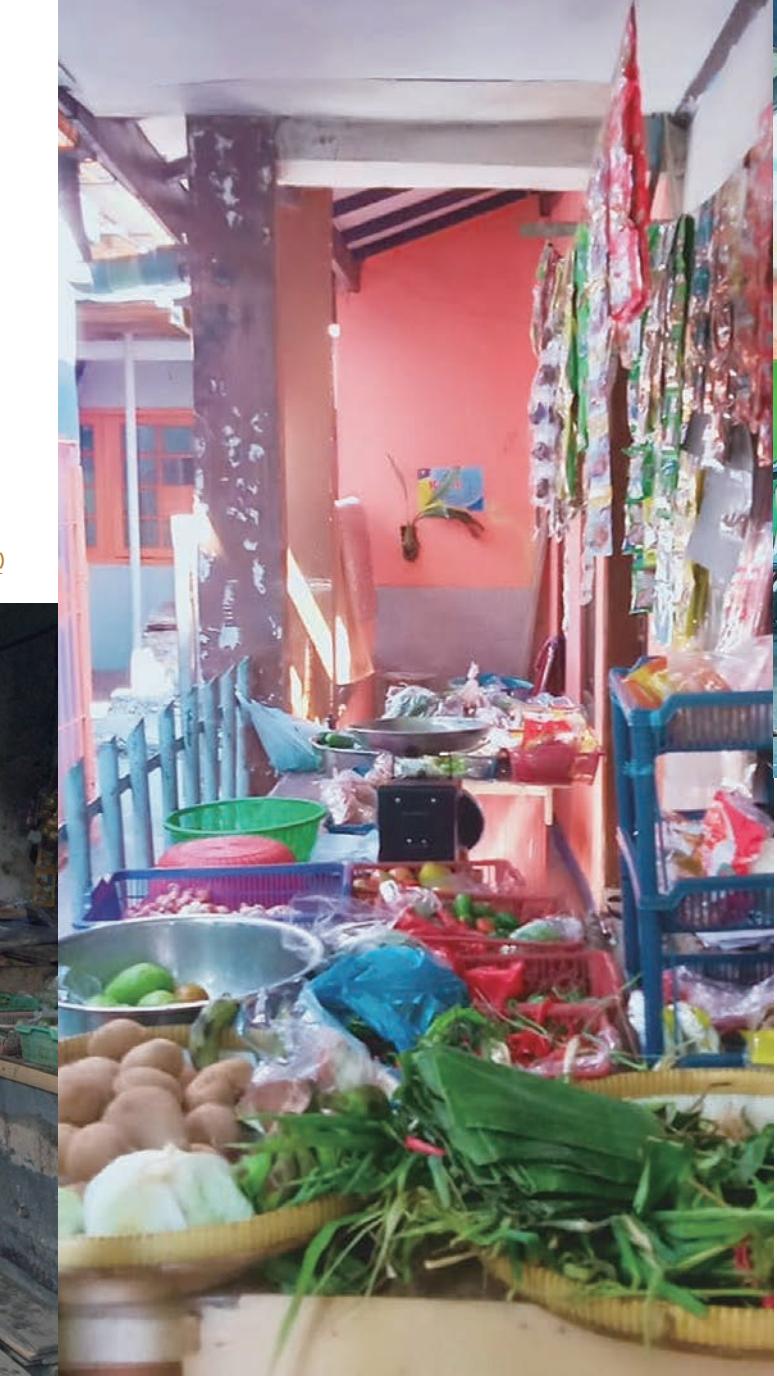
Pagar beton hijau (LIP 2017)  
Green wall (LIP 2017)

## 3.6

# Kehidupan Sehari-hari di Kiaracondong

## *Daily Life in Kiaracondong*





History and Daily Life in Kiaracondong

Rumah dengan warung kecil di dalamnya mudah ditemukan sejak dulu hingga sekarang. Warga dapat membeli kebutuhan sehari-hari, sayur mayur, makanan dan jajanan di warung tersebut.

Houses with small stores or stalls have been easy to find from the past up to the present day. Residents can buy daily necessities, vegetables, food and snacks at the stalls.

### 3.6



Warga bersosialisasi di banyak kesempatan, misalnya berkumpul untuk acara syukuran atau pesta pernikahan. Tradisi syukuran biasanya merupakan acara yang bertujuan untuk mengungkapkan rasa terima kasih kepada Sang Pencipta. Tidak harus bermewah-mewah, dalam kesederhanaan warga tetap terlihat menikmati kebersamaan.

*People like to get together at any time; for example, getting together for a thanksgiving event or a wedding party. The thanksgiving tradition is usually a ceremony that aims to express gratitude to the Creator. It doesn't have to be luxurious; people still seem to enjoy being together in simplicity.*



Acara Syukuran peresmian toilet pengompos baru (LIPI 2004)

*Thanksgiving for a new composting toilet installment (LIPI 2004)*

Acara Syukuran peresmian toilet pengompos baru (LIPI 2004)

*Thanksgiving for a new composting toilet installment (LIPI 2004)*



Pesta pernikahan di jalanan rumah warga (Ushijima 2011)

*Wedding party on the street (Ushijima 2011)*



4.

# Permasalahan Sampah di Kiaracondong

*Garbage Issues in Kiaracondong*

# Kegiatan Sehari-hari di TPS:

## Setelah Anda Membuang Sampah...

*Daily Duties at TPS: After Your Disposal...*



**1. Mengumpulkan sampah**  
1. Heading out for collecting



**2. Mengangkut sampah yang terkumpul**  
2. Bringing back collected garbage



**3. Membongkar sampah**  
3. Unloading the garbage



Membongkar sampah: di dalamnya ada  
aneka jenis sampah... semua "bercampur"  
*There are a variety of things inside... all unsorted*

Contributions from each household are the driving force for garbage collectors (workers who are paid by the community to pick up garbage from households) to bring a mixture of waste from each household periodically to the TPS (Tempat Pengolahan Sampah: Waste Management Site) where sorting is carried out to separate valuable materials for sale.



**TPS tidak resmi dan tumpukan kompos dari sampah (LIP 2014)**  
Unofficial TPS and composting pile from garbage (LIP 2014)

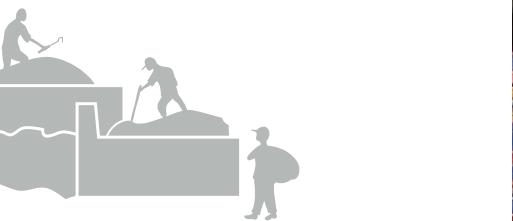
Tahapan pemilahan sampah... Butuh ketangguhan fisik dan mental karena semua jenis sampah bercampur; semua kegiatan dilakukan secara manual.

*Garbage sorting has several steps... It requires physical and mental toughness to sort every day because all the waste comes unsorted and all the work is done manually.*



# Aktivitas Rutin: Adegan Pembongkaran Sampah

## *Daily Duties: A Scene from Garbage Unloading*



Kami telah mengenal dan bekerja dengan para 'tukang sampah' selama hampir 15 tahun menelaah lingkungan kerja mereka.

Meskipun ada beberapa perubahan di lingkungan kerja mereka, kita mungkin harus menerima kenyataan bahwa banyak limbah berbahaya yang tidak terpisah dan tidak terolah harus ditangani secara manual oleh para 'tukang sampah.'

*We have known and have been working with the garbage workers for almost 15 years in terms of their work environment.*

*Although there have been some changes in their working environment, we have to face the unchanged fact that unsorted and untreated hazardous waste has been handled manually by workers.*



# Penelitian Lapangan:

## Partisipasi dalam Pemilahan Sampah

*Field Research: Participation in Garbage Sorting*

Kami benar-benar berpartisipasi dalam pemilahan sampah bersama para tukang sampah.

Menangani sampah secara langsung memang sulit secara fisik, tetapi kita harus ingat akan dedikasi beberapa orang dalam proses ini, yang penting demi kebersihan masyarakat.

*We actually participated in garbage sorting with the workers in TPS.*

*Direct handling of waste is physically tough, but we have to remember that there are certain people who engage in this process, which is necessary for clean societies.*



Apa kriteria untuk material yang "bernilai"?

*What's the criteria for "valuable" items?*

"Yang ini (botol plastik) oke?"

"Ya."

*"This one (plastic bottle) OK?"*

*"Yes."*

Saya pikir saya memahaminya sedikit demi sedikit...

*I think I got this brick by brick...*

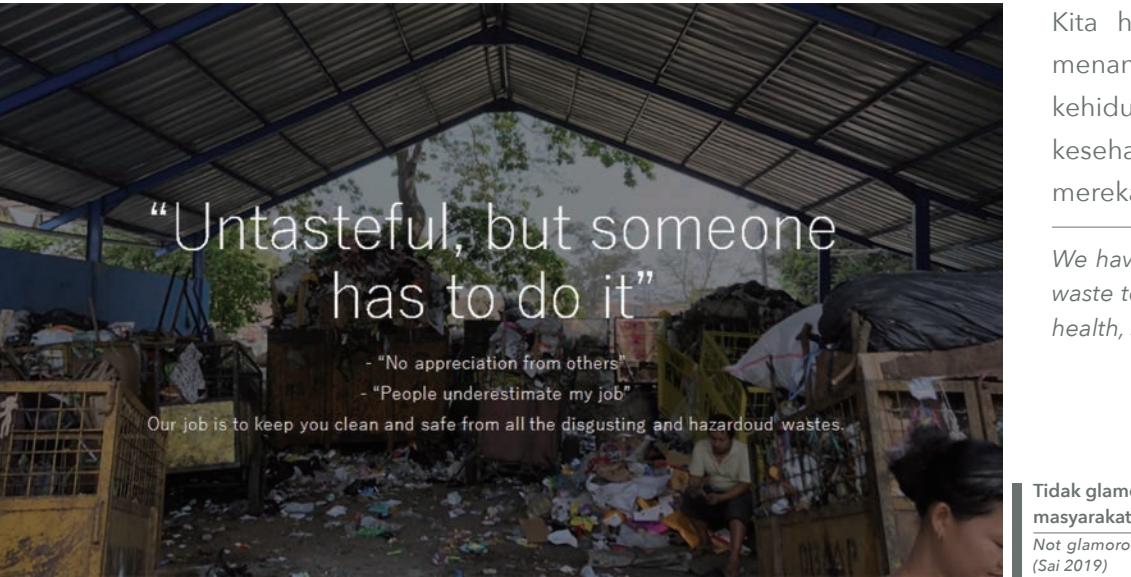
Ternyata memang sangat sulit...!!

*It was really tough...!!*

# “Harus ada Seseorang yang Melakukannya”

## – Realitas Tukang Sampah

*“Someone Has to Do It” – the Reality of Garbage Work*



Kita harus ingat bahwa para pekerja menangani sampah untuk memudahkan kehidupan kita dengan mengorbankan kesehatan, keselamatan, dan martabat mereka.

*We have to bear in mind that workers handle waste to improve our lives at the cost of their health, safety and dignity.*

Tidak glamor tetapi **sangat diperlukan** bagi masyarakat (Sai 2019)  
*Not glamorous, but INDISPENSABLE for our society (Sai 2019)*



# Daur Ulang Berbasis Dorongan Pasar

*Market-Driven Recycling*



Berkelanjutan??

*Sustainable??*



G a r b a g e / i s s u e s i n K i a r a c o n d o n g

Daur ulang sampah di Kiaracondong adalah bisnis untuk pekerja dan pelapak yang terkait, bukan sekedar "kampanye kerja sukarela yang indah." Ada pasar bahan daur ulang untuk setiap jenis bahan, dan bisnis mereka adalah memisahkan sampah dengan aturan yang ketat agar dapat menembus pasar tersebut dan menghasilkan uang.

*Recycling in Kiaracondong is a business for related workers and junkshops, not a "beautiful voluntary campaign." There is a recycle material market for each material, and their business is to segregate garbage under strict rules in order to connect with the market and make money.*

# Tekad: “Kami Melayani Komunitas Kami”

*Determination: “We Serve Our Community”*

Beberapa mungkin merendahkan pekerjaan kami, tetapi kami berkomitmen pada komunitas dan kehidupan masyarakat.

*Some people may undervalue our job, but we commit to our community and people's lives.*



Irie & Ushijima 2006



Sai 2019



Sai 2019

# Perubahan Perlahan di TPS

*Secular Change at TPS*



2004 — 2010

TPA Leuwigajah (Irie & Ushijima 2006)

Pengelolaan limbah/sampah di Kiaracondong menganut prinsip sederhana yaitu **Pilah-Daur Ulang** dan **buang**. Tim TPS bekerja dan mendapat penghasilan dari alur kegiatan tersebut. Tukang angkut sampah adalah pihak yang terkait dengan rumah tangga dalam mengumpulkan sampah untuk dibawa ke TPS. Sisa sampah di TPS yang tidak bisa dijual akan berakhir di TPA yang berlokasi di luar kota Bandung.

Waste/garbage management in Kiaracondong adopts the simple principle of Sorting-Recycling and disposal. A TPS team works and earns income from the flow. Garbage collectors are parties related to households in collecting their waste to bring to TPS. The remaining waste in the TPS that cannot be sold will end up in a TPA landfill outside the city of Bandung.





**Mesin penghancur sampah plastik di TPS (LPI 2005)**  
Plastic waste shredder in TPS (LPI 2005)



Gerobak pengangkut sampah kini secara bertahap telah dilengkapi mesin bermotor.

Atap TPS mengalami kerusakan pada 2018, dan telah diperbaiki pada 2019. Lingkungan TPS menjadi jauh berbeda setelah memiliki atap, terutama pada musim hujan.

*Garbage collection carts are now becoming gradually motorized.*

*TPS roof had been damaged and removed in 2018, but was repaired by 2019. The working environment greatly differs with or without a roof, especially in the rainy season.*

Pada awal penelitian, dapat diamati bahwa sekelompok orang mengelola lokasi TPS dengan memilah sampah dan menjual barang-barang bernilai yang dipisahkan (plastik, kaleng, kertas). Ruang publik digunakan untuk menumpuk barang bernilai yang telah disortir.

Saat ini, alokasi ruang untuk pemilahan sampah hanya pada bangunan yang telah ditentukan, sehingga ruang publik dapat digunakan untuk area parkir publik.

Pelaku pemilahan sampah tidak berubah selama 2 dekade terakhir.

Sisa sampah yang tidak dipilah akan diangkut ke tempat pembuangan akhir (TPA).

*At the beginning of the study, it was observed that there was a group of people managing a temporary waste management site by sorting waste and selling separated valuables (plastics, cans, and paper). A public space is used to stack products that have been sorted.*

*Currently, the allocation of space for garbage sorting is only in designated buildings, so the public space can be used as a public parking area.*

*The sorting management actors have not changed over the last two decades. The remaining unsorted garbage will be transported to the final landfill.*

**GOBER mulai hadir (Ushijima 2018)**  
"GOBER" appeared (Ushijima 2018)



# Tragedi Longsor Sampah di Leuwigajah

## Garbage Landslide Tragedy in Leuwigajah



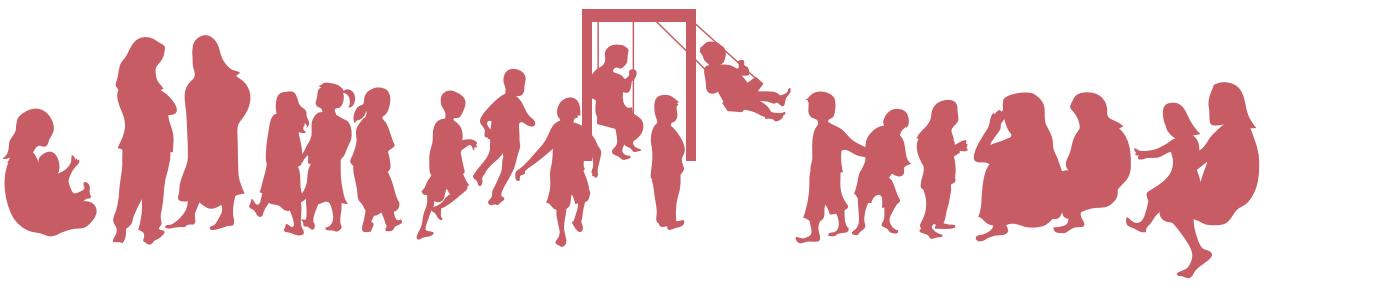
Tumpukan sampah yang runtuh menelan sebuah desa dan menyebabkan banyak kematian (Ushijima 2006)  
*The collapsed pile of garbage swallowed up a whole village and caused many deaths (Ushijima 2006)*



Tumpukan sampah masih menghasilkan asap (Ushijima 2006)  
*The garbage pile still generates smoke (Ushijima 2006)*



Beberapa pemulung tampak masih bekerja setelah kejadian longsor (Ushijima 2006)  
*A few waste pickers were still working there (Ushijima 2006)*



5.

## Sanitasi untuk Perempuan dan Anak- anak di Kiaracondong

*Sanitation for Women and Children in Kiaracondong*

# Pendidikan Prasekolah Berbasis Masyarakat di Kiaracondong

*Community-Based Preschool in Kiaracondong*



PAUD/Kelompok Bermain (LIP 2005)  
PAUD/Playgroup (LIP 2005)



Kelas di PAUD (LIP 2017)  
A class in PAUD (LIP 2017)



PAUD di masa pandemi, tanpa suara anak-anak (LIP 2021)  
PAUD without children's voices during the pandemic, (LIP 2021)

# Sekolah Dasar di Kiaracondong

Elementary School in Kiaracondong



■ Ushijima 2015



■ Ushijima 2017



■ LIPI 2017



■ Ushijima 2015



■ Kataoka 2017



■ Kataoka 2017



■ Kataoka 2017

# Kebiasaan Cuci Tangan & Prevalensi Diare pada Anak

## Child Handwashing & Diarrhea Prevalence



Kami telah melakukan pengamatan kebiasaan cuci tangan pada anak di PAUD dan sekolah dasar setempat, dan menemukan:

1. Prevalensi diare anak balita hampir sama dengan data resmi di Jawa Barat: Kebersihan di daerah padat penduduk perkotaan tidak seburuk yang kita kira.
2. Hampir semua anak mencuci tangan dengan sabun, dan sebagian kecil anak menggunakan handuk setelah mencuci tangan.

We conducted observations of child handwashing at a local primary school (PAUD and SD/Sekolah Dasar) and found:

1. The diarrhea prevalence in the under-fives was almost the same as the official data in West Java: Hygiene in the urban slum was not as bad as we thought.
2. While almost all children washed their hands with soap, fewer children used a towel after handwashing.

|   | Kategori<br>Category              | n (jumlah sampel)<br>n (sample number) | %    |
|---|-----------------------------------|--|------|
| Jenis kelamin<br>Sex                                | Anak laki-laki<br>Boy             | 117                                    | 51.3 |
|   | Anak perempuan<br>Girl            | 111                                    | 48.7 |
| Sekolah<br>School                                   | PAUD                              | 59                                     | 25.9 |
|   | SD                                | 169                                    | 74.1 |
| Prevalensi/frekuensi penyakit<br>Disease prevalence | Diare<br>Diarrhea                 | 32                                     | 14.0 |
| Pengamatan cuci tangan<br>Handwashing observation   | Menggunakan sabun<br>With soap    | 210                                    | 95.0 |
|   | Menggunakan handuk<br>Using towel | 158                                    | 71.5 |

Diare / 3 kali buang air besar lembek atau cair / hari

\*Diarrhea:  $\geq 3$  loose or liquid stools / day

Prevalensi diare di bawah lima tahun  
Studi saat ini (2017) : 11.4%  $\doteq$  Jawa barat: 11.9%

Diarrhea prevalence under five:  
Currents study (2017) : 11.4%  $\doteq$  West Java: 11.9%

# Status Gizi di Kalangan Anak-anak

## *Nutritional Status among Children*



Berdasarkan pengukuran tinggi dan berat badan anak-anak untuk status gizinya, kami menemukan bahwa:

Secara umum status gizi mereka dalam kondisi baik.

*Based on the measurement of children's height and weight for nutritional status,*

*we found that nutritional status was generally good in the urban slum.*



|  | Anak laki-laki<br>Boy<br>(n=117) | Anak perempuan<br>Girl<br>(n=111) |
|--|----------------------------------|-----------------------------------|
| HAZ (Tinggi-untuk-Ustia Z-skor) (rata-rata)<br>HAZ (Height-for-Age Z-score) (mean)                           | -1.27                            | -1.04                             |
| BMIAZ (Indeks Massa Tubuh-untuk-nilai Z Usia) (rata-rata)<br>BMIAZ (Body Mass Index-for-Age Z scores) (mean) | <b>-0.66</b>                     | <b>-0.49</b>                      |
| Stunting/kerdil<br>Stunting  | <b>0</b>                         | <b>0</b>                          |
| Kekurusan<br>Thinness  | 11.1                             | 5.4                               |
| Kegemukan<br>Obesity   | 3.4                              | 2.7                               |
| <b>BMIAZ &gt; -1</b><br>Tidak ada anak kerdil<br>No stunted children   |                                  | <b>Bagus</b><br><i>Good</i>       |



# Prevalensi Diare pada Anak

## Child Diarrhea Prevalence



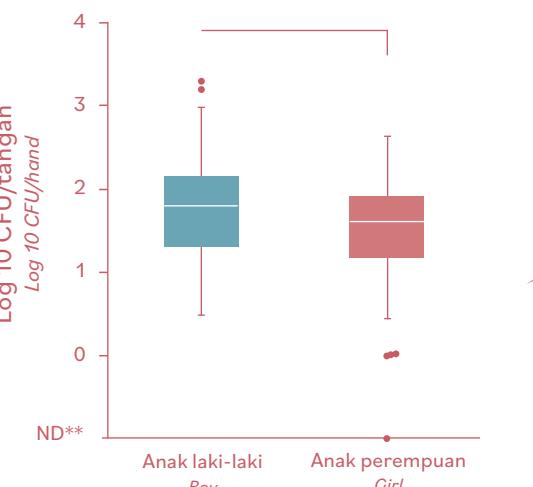
Untuk mengetahui penyebab prevalensi diare pada anak, kami mengambil sampel swab (sapuan) telapak tangan dari masing-masing anak:

- *E. coli* terdeteksi di hampir semua tangan anak-anak: tangan anak laki-laki lebih terkontaminasi dibandingkan anak perempuan.
- Anak perempuan memiliki kebiasaan cuci tangan, pengetahuan dan kesadaran WASH yang lebih baik daripada anak laki-laki: Anak perempuan lebih baik dari pada anak laki-laki dalam hal pengetahuan dan praktik kebersihan.



To examine the cause of child diarrhea prevalence, we took a palm swab sample from each child:

- *E.coli* was detected on almost all children's hands: More contamination among boys than girls.
- Girls had better handwashing behaviors and knowledge and awareness of WASH: Girls are better than boys in hygiene knowledge and practice.



*E. coli* (+)  
99% (148/150)

Anak laki-laki > Anak perempuan  
Boy > Girl

Top of the box: 75th (Q<sup>3</sup>) percentiles  
Bottom of the box: 25th (Q<sup>1</sup>) percentiles  
Top of the whisker: Q<sup>3</sup>+1.5xIQR  
Bottom of the whisker: Q<sup>1</sup>-1.5xIQR

\*Wilcoxon-rank-sum test,  $p < 0.05$ .  
\*\*Not detected

### Faktor-faktor terkait Correlated factors

#### 1. Keterampilan mencuci tangan Handwashing skills

#### 2. Indeks WASH

(instrumen yang dikembangkan untuk pengetahuan dan kesadaran mencuci tangan dan WASH)

WASH index (instrument developed for handwashing and WASH knowledge and awareness)

#### 3. Cuci tangan pakai sabun: Handwashing with soap:

**Anak perempuan lebih baik dari anak laki-laki**  
**Girls are better than boys**

# Pendidikan Menstruasi/Haid pada Anak Perempuan dan Pelajar Putri

## *Menstrual Education for Daughters and Female Students*



Wawancara Ibu (LIPI 2020)  
Interview with a mother (LIPI 2020)



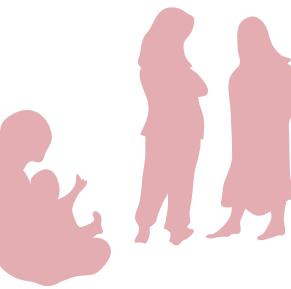
Wawancara Ibu (LIPI 2020)  
Interview with a mother (LIPI 2020)

Kami juga bertanya kepada para ibu, anak perempuannya, dan guru sekolah tentang pendidikan menstruasi:

- Takhayul masih ada.
- Penanganan pembalut kewanitaan yang tepat merupakan hal penting.
- Sebagian besar pengetahuan dan informasi tentang menstruasi dan MKM (manajemen kebersihan menstruasi) diajarkan oleh ibu.
- Nilai-nilai agama tentang menstruasi dan darah menstruasi memengaruhi MKM perempuan dan anak perempuan setempat.

We also asked mothers and girls, as well as schoolteachers, about menstrual education:

- Superstitions exist.
- Proper handling of sanitary products is important.
- Most of the knowledge and information about menstruation and MHM (Menstrual Hygiene Management) are from mothers.
- Religious values on menstruation and menstrual blood influence local women's and girls' MHM.



# Manajemen Kebersihan Menstruasi (MKM)

## Menstrual Hygiene Management (MHM)

Kami mewawancara remaja putri dan ibu mereka tentang bagaimana mereka mengelola kebersihan menstruasi:

- Para remaja putri umumnya mengganti produk menstruasi mereka di rumah.
- Kondisi toilet dan air yang kotor menghalangi MKM.
- Peningkatan fasilitas sanitasi sangat penting untuk MKM yang lebih baik.

**Wawancara Ibu (LIPI 2020)**  
Interview with a mother (LIPI 2020)



We interviewed schoolgirls and their mothers about how they manage menstrual hygiene:

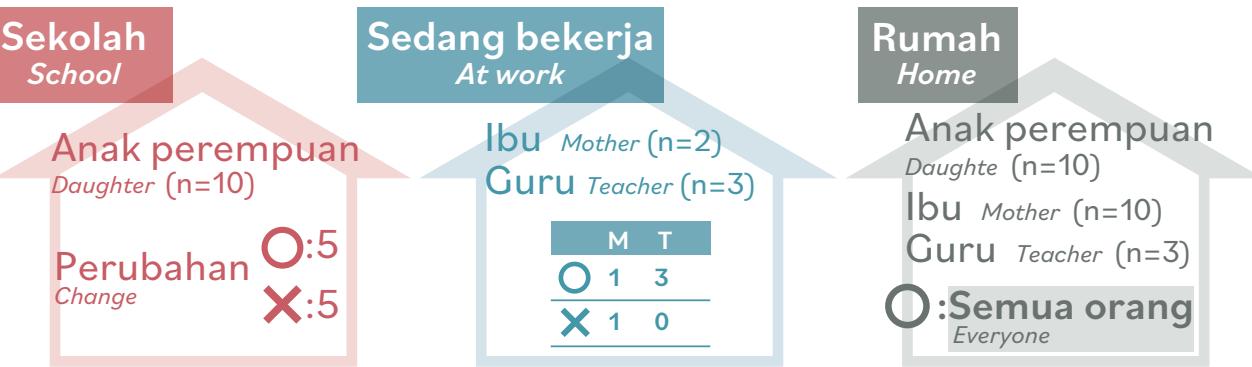
- Girls generally change their menstrual products at home.
- Dirty toilets and water hinder MHM.
- Improvement of sanitation facilities is crucial for better MHM.

**Wawancara remaja putri (LIPI 2020)**  
Interview with schoolgirls (LIPI 2020)



## Perubahan produk terkait menstruasi dan isu MKM

*Change of menstrual products and MHM issues*



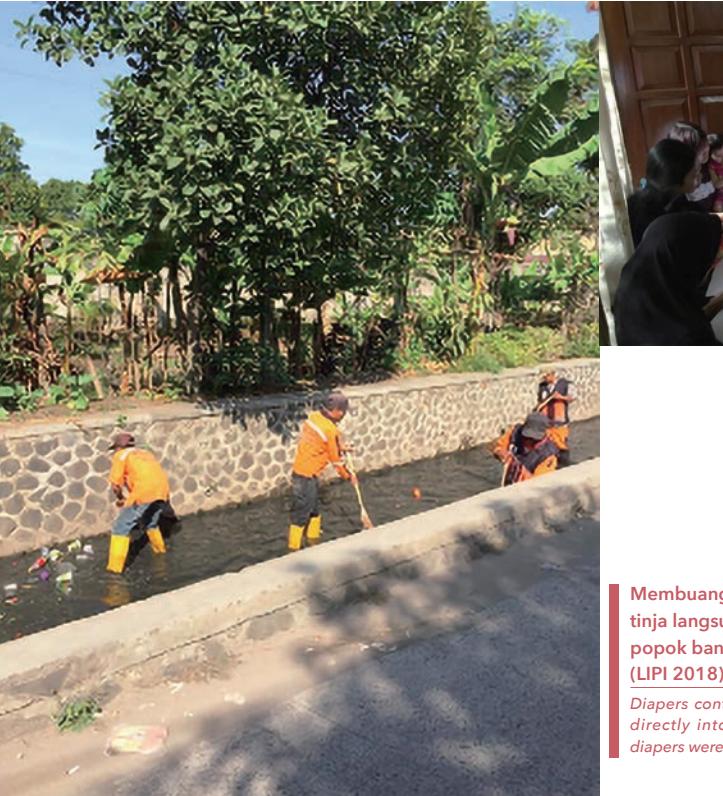
| Masalah-masalah<br>Issues               | Di sekolah / kerja At school / work |                         |                       |                       | Rumah Home                      |                         |
|---|-------------------------------------|-------------------------|-----------------------|-----------------------|---------------------------------|-------------------------|
|   | D1<br>(SMP Junior high)             | D2<br>(SMP Junior high) | D3<br>(Tinggi High)   | D4<br>(Tinggi High)   | Guru 1 Teach. 1<br>(SD Primary) | D2<br>(SMP Junior high) |
| Kekurangan air Lack of water            |                                     |                         |                       |                       | <input type="radio"/>           |                         |
| Tidak ada sabun No soap                 | <input type="radio"/>               | <input type="radio"/>   | <input type="radio"/> | <input type="radio"/> |                                 |                         |
| Tidak ada kertas toilet No toilet paper | <input type="radio"/>               |                         | <input type="radio"/> | <input type="radio"/> |                                 |                         |
| Toilet kotor Dirty toilet               |                                     |                         | <input type="radio"/> |                       |                                 | <input type="radio"/>   |
| Tidak ada tempat sampah No rubbish bin  |                                     |                         |                       |                       | <input type="radio"/>           |                         |
| Air kotor Dirty water                   |                                     |                         |                       |                       |                                 | <input type="radio"/>   |
| Malu Shame                              | <input type="radio"/>               | <input type="radio"/>   |                       | <input type="radio"/> |                                 |                         |

## Masalah-masalah WASH

*Issues of WASH*

# Manajemen Penanganan Tinja dan Praktik Pemberian Makan pada Anak-anak

## *Children's Feces Management and Feeding Practices*



Wawancara mendalam tentang pengelolaan tinja dan praktik pemberian makan pada anak (LIPIS 2018)

In-depth interview about child feces management and feeding practices (LIPIS 2018)

Membuang popok yang mengandung tinja langsung ke saluran air terbuka; popok banyak ditemukan di badan air (LIPIS 2018)

Diapers containing child feces are disposed directly into open bodies of water; many diapers were often found (LIPIS 2018)

Pengelolaan tinja anak-anak juga menjadi masalah serius di Kiaracondong. Misalnya, penggunaan popok sekali pakai kini semakin meningkat, dan biasanya dibuang ke saluran air terbuka.

*Children feces management is also a serious problem in Kiaracondong. For example, the use of disposable diapers is now increasing, and they are usually disposed of in open channels.*



Praktik menyusui dan pemberian makan pada balita di Kiaracondong (LIPIS 2018)  
Breastfeeding and feeding practices among children under five in Kiaracondong (LIPIS 2018)

# Pembuangan Popok

## Diaper Disposal



Membuang kotoran anak di dalam popok sekali pakai di tempat sampah rumah tangga atau di dalam kantong plastik terbuka  
Disposing of child feces inside a disposable diaper in a household trash bin or inside open-access plastic bags

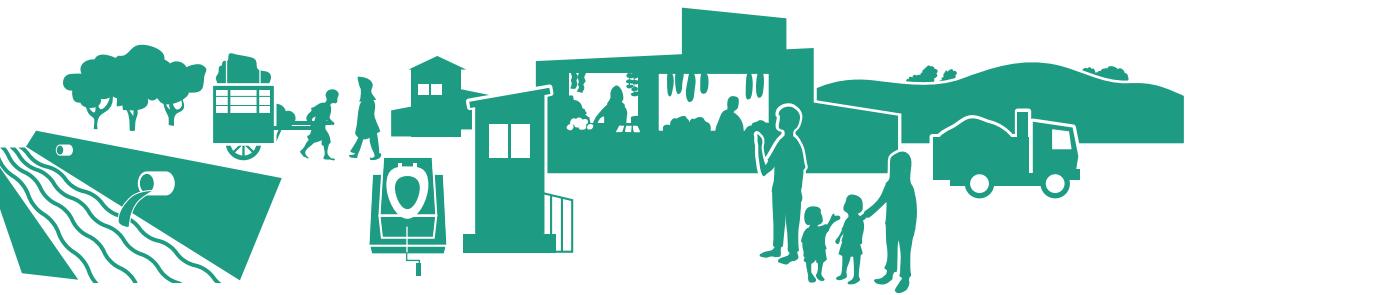
Ibu-ibu di wilayah penelitian membuang popok ke tempat sampah dengan 2 cara: 1) membungkusnya dalam kantong plastik agar terpisah dari sampah lain; 2) bercampur dengan sampah lain.

*Mothers in the study area can be observed throwing diapers into the trash in two ways: 1). Wrap it in a plastic bag to keep it separate from other trash; 2). Mix it with other trash.*

# 6.

## Konsep Sanitasi Berorientasi Sumber Daya

*The Concept of Resource-Oriented Sanitation*



# Bisakah Kita Menciptakan Nilai dari Sanitasi? Jika Ya, Bagaimana Caranya?

*Can We Create Value from Sanitation? If Yes, How Can We Do This?*



Sanitasi berorientasi sumber daya, melalui daur ulang urin dan tinja manusia, merupakan salah satu solusi yang menjanjikan untuk masalah air dan sanitasi di Kiaracondong (Gambar). Untuk mewujudkan sistem sanitasi yang berorientasi sumber daya, diperlukan kerjasama antara masyarakat di Kiaracondong dan para pakar, termasuk para peneliti.

Resource-oriented sanitation, which recycles human urine and feces, is one of the promising solutions for the water and sanitation issue in Kiaracondong (Figure). In order to realize the system for resource-oriented sanitation system, co-creation among the people in Kiaracondong and many specialists, including researchers, would be necessary.

# Percobaan Pertama Kami untuk Penerapan Toilet Pengompos: 2006-2007

## *Our First Trial of a Composting Toilet Application: 2006-2007*



Fasilitas kamar mandi dan WC yang sangat sederhana (LIPI 2010)  
Existing bath and very simple toilet facility (LIPI 2010)



Sumur terbuka dilengkapi kamar mandi-toilet sebelum toilet pengompos dipasang 2005  
(LIPI 2005)  
Existing open well and bath-toilet room before composting toilet installation in 2005 (LIPI 2005)



Bangunan Toilet pengompos di latar belakang (LIPI 2007)  
Composting toilet in the background (LIPI 2007)



Area bekas penempatan toilet pengompos (LIPI 2017)  
Former area of composting toilet (LIPI 2017)

Percobaan menggunakan toilet pengompos dilakukan di satu area dengan 10 rumah tangga sebagai pengguna. Sebelumnya mereka menggunakan secara bersama satu fasilitas mandi-cuci-kakus (1 sumur). Pada tahun 2006-2007, 1 unit toilet pengompos berkapasitas 50 pengguna/hari dipasang di dekat lokasi sumur. Pengguna merasakan manfaat toilet pengompos, tetapi mereka belum siap mengelolanya sendiri, sehingga kami harus mengambil kembali toilet yang sudah terpasang. Cepatnya pergantian penghuni rumah kontrakan di lokasi tersebut menjadi salah satu faktornya. Saat ini, warga kembali menggunakan toilet biasa yang telah diperbaiki dinding dan atapnya.

*An experiment using composting toilets was carried out in one area with 10 households as the users. The households formerly used the one shared common bath-toilet-laundry room (one well). In 2006-2007, one composting toilet unit with a capacity for 50 users per day was installed near the well site. The users felt the benefits of the new toilet, but were not ready to manage it by themselves, so we had to remove the toilet. The rapid change of house occupants in the location was one of the factors. Currently, the residents are returning to the use of the old toilet, for which the walls and roof have been repaired.*

# Belajar dari Kegagalan: Mengapa Toilet Pengompos Tidak Digunakan

*Learning from Failure: Why the Toilet Was Left Unused*



Proses konstruksi (LIPI 2005)  
Construction process (LIPI 2005)

Percobaan pertama penerapan toilet pengompos di lapangan tidak berhasil. Pengguna memakainya hanya sebentar (6 bulan) kemudian berhenti menggunakan toilet itu. Kami belajar dari kegagalan ini.

Penyebab kegagalan:

- Mereka setuju untuk menggunakan dan memang menggunakan, akan tetapi mereka tidak siap untuk mengelola sendiri
  - Kami belum memikirkan penerapan rantai nilai sanitasi
- Memperkenalkan dan menciptakan rantai nilai sanitasi adalah penting.



*Our first compost toilet application trial failed. People used it for a while (six months) and then stopped using it. We learned from this failure.*

*Reasons for failure:*

- They agreed to use it and they did in fact use it, but they were not prepared to manage it by themselves

- We hadn't thought about the sanitation value chain

→ Co-creating the sanitation value chain is important

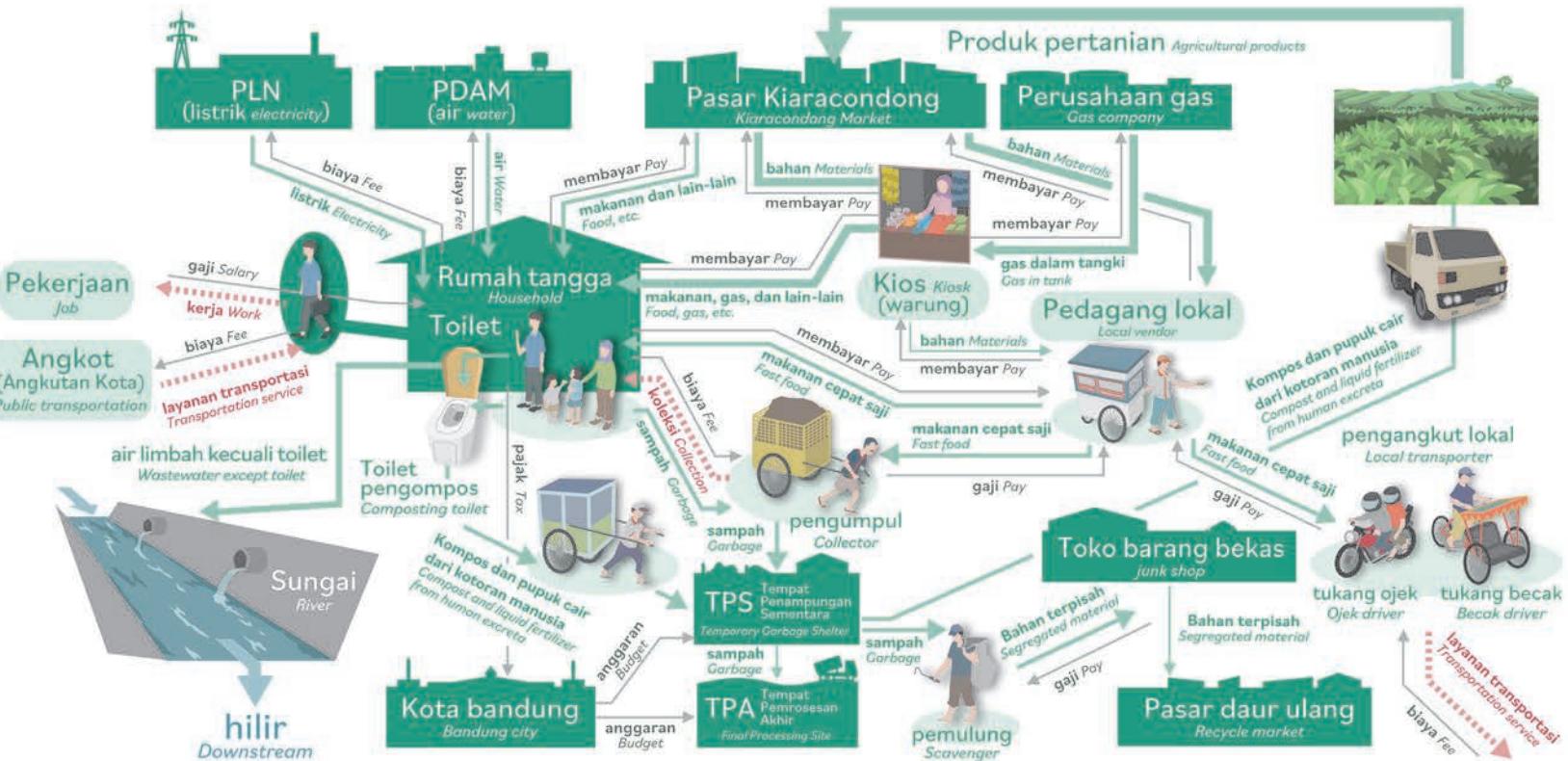
Peresmian toilet pengompos yang terpasang untuk  
10 rumah tangga (LIPI 2006)  
The opening of the installed composting toilet for 10  
households (LIPI 2006)



# Faktor dan Pelaku yang Diperlukan Sanitasi yang Sukses di

## *Essential Factors and Actors for Creating a Successful*

Peta Konsep Rantai Nilai Sanitasi (Ushijima 2021) Concept map of the Sanitation Value Chain (Ushijima 2021)



untuk Terwujudnya Rantai Nilai Kiaracondong, Bandung

*Sanitation Value Chain in Kiaracondong, Bandung*

Kami mempelajari bahwa memasang toilet pengompos saja tidak akan menjadi solusi nyata. Diperlukan sistem sanitasi yang menarik orang untuk ikut terlibat. Salah satu konsep kuncinya adalah penerapan rantai nilai sanitasi. Peta konsep menggambarkan rantai nilai sanitasi saat menggunakan toilet pengompos di Kiaracondong, Bandung.

Untuk mewujudkan rantai nilai sanitasi yang berkelanjutan dan berhasil dari penggunaan toilet pengompos, sesuai target dari tim peneliti, diperlukan dukungan sejumlah faktor dan aktor penting. Tujuan tersebut tidak dapat dicapai tanpa upaya bersama antara para aktor, peneliti, dan masyarakat lokal.

We learned that just installing a toilet would not be a real solution. A sanitation system which attracts people to join is necessary, and one of the key concepts might be the sanitation value chain. The concept map describes the sanitation value chain when using composting toilets in Kiaracondong, Bandung.

In order to realize a sustainable and successful sanitation value chain with composting toilet use, which the research team has been aiming for, a number of essential factors and actors are required. More importantly, the goal cannot be achieved without co-creation efforts among the actors, researchers, and local communities.

# Peresmian Proyek Kerja Sama tentang Rantai

## *Kickoff Meeting of Japan-Indonesia Joint*



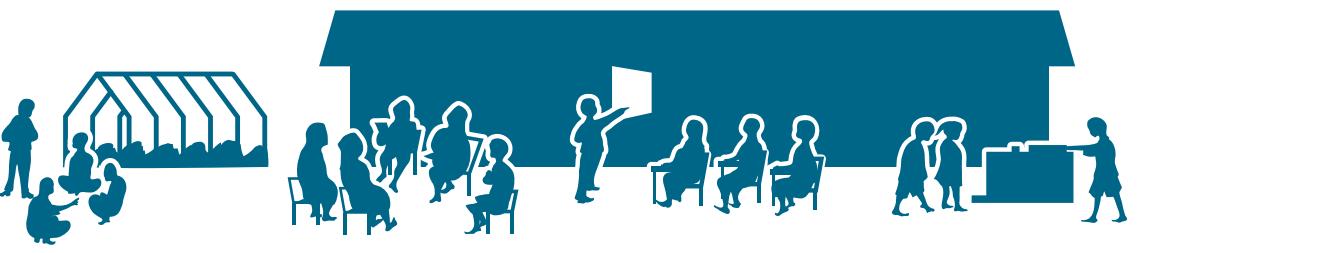
# Penelitian Jepang-Indonesia Nilai Sanitasi

## *Research Project on the Sanitation Value Chain*

Peresmian proyek kerja sama penelitian Jepang-Indonesia tentang rantai nilai sanitasi diselenggarakan pada 22 Oktober 2017 di Jakarta dengan LIPI sebagai tuan rumah. Proyek ini dipimpin oleh RIHN (Kyoto, Jepang) bekerja sama dengan LIPI, dengan lokasi kegiatan di Kota Bandung dan sekitarnya. Kegiatan dilakukan berdasarkan kesepakatan pelaksanaan antara RIHN dan LIPI dengan judul penelitian "Rantai Nilai Sanitasi: Desain Sistem Sanitasi sebagai Sistem Nilai Eko-Komunitas." Konsep rantai nilai sanitasi yang diadvokasi oleh tim proyek Sanitasi RIHN telah berhasil dibagikan dengan LIPI dan pemahaman yang lebih baik telah diperoleh melalui kolaborasi.

The kickoff meeting of the Japan-Indonesia joint research project on the sanitation value chain, hosted by LIPI, took place in Jakarta on 22nd October 2017. The project led by RIHN has been conducted in collaboration with LIPI in the city of Bandung and its suburbs, based on the implementation agreement between RIHN and LIPI under the research title of "Sanitation Value Chains: Design of Sanitation System as an Eco-community's Value System." The concept of sanitation value chain advocated by the RIHN Sanitation project team has been successfully shared with LIPI and a better understanding has been obtained through the collaboration.





7.

# Ko-Kreasi Sanitasi Berorientasi Sumber Daya

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*Co-Creation of Resource-Oriented Sanitation*

# Potensi Penggunaan Pupuk Kompos untuk Pertanian

## *Potential Use of Compost Fertilizer for Farming*



Kunjungan ke kebun bunga di Lembang dan diskusi dengan pemiliknya (Ushijima 2018)  
Visiting a flower farm in Lembang and talking with the owner (Ushijima 2018)



Wawancara dengan beberapa petani di Lembang (Ikemi 2018)  
Interview with several farmers in Lembang (Ikemi 2018)



Mengunjungi kebun poinsettia di Lembang (Ushijima 2018)  
Visiting a poinsettia farm in Lembang (Ushijima 2018)



Mengunjungi kebun mawar di Lembang (Ikemi 2018)  
Visiting a rose farm in Lembang (Ikemi 2018)

Kami memperkenalkan konsep rantai nilai sanitasi kepada pemilik kebun bunga, petani tanaman poinsettia, dan petani bunga mawar di Lembang yang berada pinggiran Kota Bandung.

Meskipun berdasarkan pengetahuan mereka ada kekhawatiran tentang penggunaan kotoran manusia sebagai pupuk kompos akan tetapi mereka masih menunjukkan minat yang kuat untuk berpartisipasi dalam demonstrasi penggunaan pupuk.

Saling pengertian antara peneliti dan petani (pengguna kompos) terbangun.

*We introduced the concept of the sanitation value chain to a flower farm owner, a poinsettia farmer, and a rose farmer in Lembang, a suburb of Bandung City.*

*Although they expressed concerns, based on their knowledge, about the use of human excreta as a compost fertilizer, they still showed strong interest in participating in the demonstration using the fertilizer.*

*Mutual understanding was developed between researchers and farmers (compost users).*

# Kerjasama dengan SMP Negeri 1

## *Collaboration with SMP Negeri 1 Junior High School*



**Lokakarya rantai nilai sanitasi di SMP Negeri 1 Lembang (Ikemi 2018)**  
A workshop on the sanitation value chain at the SMP Negeri 1 Junior High School in Lembang (Ikemi 2018)



**Memperkenalkan konsep rantai nilai sanitasi kepada staf pengajar sekolah menggunakan tisu gulung yang dicetak menggambarkan proses rantai nilai sanitasi (Ikemi 2018)**  
Introducing the concept of the sanitation value chain to the school teaching staff using the toilet roll printed with the sanitation value chain process (Ikemi 2018)

Kami mengadakan lokakarya tentang rantai nilai sanitasi di SMP Negeri 1 Lembang, dan berdiskusi dengan siswa sekolah dan staf pengajar tentang rencana kegiatan kerja sama masa depan untuk pendidikan lingkungan.

Kami menjelaskan konsep rantai nilai sanitasi menggunakan tisu gulung. Gulungan tisu toilet dicetak dengan ilustrasi yang menggambarkan proses rantai nilai sanitasi.

Kami juga mengusulkan proyek bersama "Sani Camp" antara sekolah SMP Negeri 1 dan sekolah Jepang. Proyek ini akan menjadi contoh yang baik untuk menunjukkan kemungkinan kontribusi pendidikan terhadap Air, Sanitasi dan Kebersihan (WASH) yang dapat dicapai melalui kolaborasi antara pelajar Indonesia dan pelajar Jepang.

*We held a workshop on the sanitation value chain at the SMP Negeri 1 Junior High School in Lembang, and discussed collaboration on a future activity plan for environmental education with the school students and teaching staff.*

*We explained the concept of the sanitation value chain using a toilet roll. The toilet roll is printed with illustrations describing the process of the sanitation value chain.*

*We also proposed a joint project called "Sani Camp" between the SMP Negeri 1 school and a Japanese school. The project will be a good example to show the possibilities for educational contributions toward Water, Sanitation and Hygiene (WASH) that can be achieved by collaboration between Indonesian and Japanese students.*

# Penelitian Partisipatif Berbasis Masyarakat di Kiaracondong

## *Community-Based Participatory Research in Kiaracondong*

Survei kuesioner dengan penduduk lokal di Kiaracondong (tentang sanitasi, norma atau nilai tentang kompos, tingkat pendapatan, latar belakang pendidikan, pekerjaan dan kegiatan ekonomi, dan lain-lain) dilakukan oleh anggota organisasi berbasis masyarakat (PKK/Pemberdayaan Kesejahteraan Keluarga, Karang Taruna).

Kolaborasi aktif dengan organisasi berbasis masyarakat di Kiaracondong meningkatkan kesadaran warga setempat akan sanitasi dan memperdalam minat mereka terhadap kebersihan.

*Questionnaire surveys with local residents in Kiaracondong (on sanitation, norm or values about compost, income level, educational background, occupation and economic activity, etc.) were conducted by community-based organization members (PKK, Karang Taruna).*

*The active collaboration with community-based organizations in Kiaracondong raised the local residents' awareness of sanitation and deepened their interest in hygiene.*



Sertifikat yang diberikan kepada kolaborator penelitian di Kiaracondong (Ikemi 2018)  
Certificate given to the research collaborators in Kiaracondong (Ikemi 2018)



Melakukan survei kuesioner di Kiaracondong (LPI 2018)  
Conducting a questionnaire survey in Kiaracondong (LPI 2018)



Survei kuesioner kunjungan rumah anggota Karang Taruna di Kiaracondong (Ushijima 2016)  
Home-visit questionnaire survey by Karang Taruna members in Kiaracondong (Ushijima 2016)



Survei lapangan dengan focus group discussion dengan anggota PKK (perempuan) di Kiaracondong (Ikemi 2016)  
Field survey by focus group discussion with PKK members (women) in Kiaracondong (Ikemi 2016)

# Kerjasama dengan Sekolah Dasar (SD) Negeri Babakan Sinyar di Kiaracondong

## *Cooperation with Negeri Babakan Sinyar Elementary School (SD) in Kiaracondong*

Lokakarya bertajuk "Soft Launching Penerapan Teknologi Toilet Pengompos dan Sosialisasi Potensi Pemanfaatannya: SDN 210 Babakan Sinyar- Kiaracondong"

A workshop titled "Soft Launching Penerapan Teknologi Toilet Pengompos dan Sosialisasi Potensi Pemanfaatannya: SDN 210 Babakan Sinyar- Kiaracondong"



**Lokakarya di SD Negeri Babakan Sinyar Kiaracondong (Ikemi 2019)**  
A workshop at the Negeri Babakan Sinyar Elementary School in Kiaracondong (Ikemi 2019)

Kami mengadakan lokakarya dalam uji pra-lapangan rantai nilai sanitasi di SD Negeri Babakan Sinyar di Kiaracondong. Judul kegiatan tersebut adalah "Soft Launching Penerapan Teknologi Toilet Pengompos Dan Sosialisasi Potensi Pemanfaatannya: SDN 210 Babakan SinyarKiaracondong yang memperkenalkan teknologi toilet pengompos dan potensi manfaat sosialnya. Selain guru dan staf sekolah, ada beberapa petani, pemulung dan tokoh masyarakat setempat yang ikut serta dalam lokakarya tersebut. Banyak informasi berharga, ide dan pendapat saling dipertukarkan dalam pertemuan tersebut, sehingga terjalin hubungan kerja sama dan rasa saling percaya antara peneliti dan mitra lokal.

We held a workshop for a pre-field test of the sanitation value chain at the Negeri Babakan Sinyar Elementary School in Kiaracondong. The title in Indonesian was "Soft Launching Penerapan Teknologi Toilet Pengompos Dan Sosialisasi Potensi Pemanfaatannya: SDN 210 Babakan Sinyar Kiaracondong," which promotes the soft launch of composting toilet technology and its potential social uses.

In addition to the schoolteachers and staff, farmers, garbage collectors and local community group leaders participated in the workshop. A lot of valuable information was shared and ample ideas and opinions were exchanged.

Through the workshop, a cooperative relationship and mutual trust were built up between the researchers and local partners.



**Liputan media lokal tentang lokakarya di SD Negeri Babakan Sinyar di Kiaracondong (Ikemi 2019)**  
Local media coverage of the workshop at the Negeri Babakan Sinyar Elementary School in Kiaracondong (Ikemi 2019)

# Peragaan Penggunaan Toilet Pengompos di SD di Kiaracondong

*Demonstration of Using Composting Toilets at the Elementary School in Kiaracondong*



Bagian dalam toilet pengompos  
(Ikemi 2019)

*Inside the composting toilet (Ikemi 2019)*

Dua toilet pengompos (satu merah muda untuk perempuan dan satu biru untuk laki-laki) yang dibuat oleh tim peneliti untuk siswa sekolah dasar (Ikemi 2019)

*Two composting toilets (a pink one for girls and a blue one for boys) produced by the research team for the elementary school students (Ikemi 2019)*

Dua toilet kompos dengan warna berbeda (merah muda untuk perempuan dan biru untuk laki-laki) dibuat oleh tim peneliti untuk siswa SD Negeri Babakan Sinyar.

Sebelum toilet dipasang, kami memberikan peragaan dan penjelasan tentang cara kerja dan penggunaan toilet pengompos kepada para siswa dalam lokakarya.

Kami juga mencoba mengajarkan pentingnya pemanfaatan kompos dari toilet secara efektif menggunakan teknologi baru untuk meningkatkan sanitasi di lingkungan tersebut. Siswa sekolah menunjukkan minat yang besar terhadap penggunaan toilet pengompos.

*Two different colored composting toilets (a pink one for girls and a blue one for boys) were produced by the research team for the Negeri Babakan Sinyar Elementary School students.*

*Before installing the composting toilets, we demonstrated and explained to the schoolchildren how they work and how to use them through the workshop.*

*We also tried to teach the importance of effective use of human compost by using a new technology to improve sanitation. The schoolchildren showed great interest in the use of composting toilets.*



Peragaan penggunaan dan cara kerja toilet pengompos kepada siswa sekolah dasar (LIPI 2019)

*Demonstrating how to use a composting toilet and how it works to the elementary schoolchildren (LIPI 2019)*

# Penggunaan Toilet Biasa di Sekolah Dasar

## *Students' Use of Regular Toilets in the Elementary School*

SD Babakan Sinyar yang berada di lokasi penelitian memiliki siswa yang berasal dari penduduk sekitar. Keterbatasan ruang sekolah dan jumlah siswa yang banyak membuat pihak sekolah membagi waktu sekolah menjadi 2 pergiliran, yaitu pagi dan sore.

Siswa di sekolah dasar tersebut berpotensi untuk mengambil peran sebagai agen perubahan bagi masyarakat atau keluarganya. Kami memilih mereka untuk pengenalan dan penggunaan toilet pengompos, serta cara mengelola buangannya.

*Babakan Sinyar Elementary School, located in the research area, has pupils coming from the surrounding population. School time is organized into two shifts, a morning shift and an afternoon shift, due to space limitations and the high number of pupils attending the school.*

*The pupils in the school could potentially play the role of agent of change to their community or families. We chose them for the introduction of composting toilets and how to manage the waste.*



Toilet yang biasa digunakan di SD Negeri Babakan Sinyar (Ikemi 2019)  
The regular toilets are still being used in the Negeri Babakan Sinyar Elementary School (Ikemi 2019)

**Frekuensi penggunaan toilet sekolah oleh siswa di SD Negeri Babakan Sinyar (LIPI 2019)**  
*The frequency of student use of school toilets in the Negeri Babakan Sinyar Elementary School (LIPI 2019)*



Petugas sekolah memperlihatkan toilet yang biasa digunakan di SD Negeri Babakan Sinyar. Ada lampu di toilet, tetapi posisi tombol lampu terlalu tinggi untuk dijangkau oleh sebagian siswa.

Berdasarkan hasil survei wawancara pada siswa sekolah dasar, toilet sekolah digunakan sekitar 41 kali per hari oleh mereka (sekitar 20 kali penggunaan per hari oleh anak laki-laki dan sekitar 21 kali penggunaan per hari oleh anak perempuan).

*The school staff showed us the regular toilets that have been used in the Negeri Babakan Sinyar Elementary School. There is a light in the toilet, but the position of the light switch is too high for some of the children to reach.*

*According to an interview survey with the elementary school students, the school toilets were used by them approximately 41 times per day (about 20 times by boys and 21 times by girls).*

# Pemasangan Toilet Pengompos di Sekolah Dasar

## *Installation of the Composting Toilets in the Elementary School*



Dua toilet pengomposan (warna pink untuk putri dan biru untuk putra) dan semprotan air yang dipasang di samping toilet di SD Negeri Babakan Sinyar (Ikemi 2019)  
Two composting toilets (a pink one for girls and a blue one for boys) and a shower installed next to the girls' toilet in the Negeri Babakan Sinyar Elementary School (Ikemi 2019)



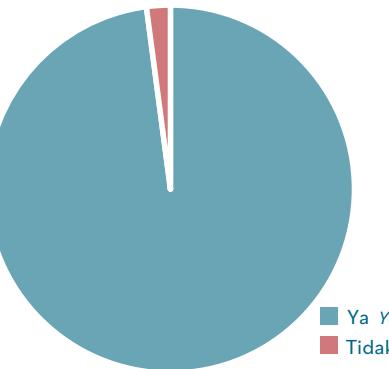
Kami memasang dua toilet kompos (satu untuk perempuan dan satu untuk laki-laki) di SD Negeri Babakan Sinyar. Ketika kami memasang toilet kompos, terutama untuk anak perempuan, kami juga memasang semprotan air tepat di sebelah toilet, yang dapat membantu mereka merasa lebih nyaman menggunakan toilet.

Reaksi awal siswa terhadap toilet kompos sangat positif.

We installed two composting toilets (one for girls and one for boys) in the Negeri Babakan Sinyar Elementary School. When we installed the composting toilets, we also installed a shower right next to the toilet, which may help the children feel more comfortable when using the toilet.

The students' initial reaction to the composting toilets was very positive.

Reaksi awal siswa terhadap toilet kompos yang terpasang di sekolah (LIPI 2019)  
Initial student reaction to the composting toilets installed in the school (LIPI 2019)



# Realisasi Penggunaan Toilet Pengompos yang Dipasang di Sekolah Dasar

## *Actual Use of Composting Toilets Installed in the Elementary School*



Sosialisasi terakhir bersama siswa SD Negeri Babakan Sinyar setelah toilet pengompos dipasang (LIPI 2020)

The latest socialization workshop with the Negeri Babakan Sinyar Elementary School students after the composting toilets were installed (LIPI 2020)

Realisasi penggunaan toilet pengompos yang terpasang di sekolah dasar (LIPI 2020)

Actual use of the composting toilets installed in the elementary school (LIPI 2020)



Kotak tombol hitung yang dipasang di dalam ruang toilet pengomposan untuk mencatat frekuensi dan keperluannya (BAK, BAB, atau keduanya) dari penggunaan toilet (LIPI 2020)

Counting button box installed inside the composting toilet room to record the frequency and purpose (pee, poop, or both) of toilet use (LIPI 2020)

### Frekuensi penggunaan toilet kompos siswa di Sekolah Dasar Negeri Babakan Sinyar (LIPI 2019)

Frequency of student use of composting toilets in the Negeri Babakan Sinyar Elementary School (LIPI 2019)



Pada lokakarya terakhir dengan siswa SD Negeri Babakan Sinyar setelah toilet pengompos dipasang di sekolah, kami menjelaskan konsep rantai nilai sanitasi secara sederhana dan menerangkan kembali cara kerja toilet tersebut.

Sebagian besar siswa yang mengikuti workshop ingin mencoba toilet kompos, dan pada kenyataannya banyak yang melakukannya. Untuk mengumpulkan data yang lebih akurat tentang frekuensi penggunaan toilet dan keperluannya (BAK, BAB, atau keduanya), sebuah kotak tombol hitung dipasang di dalam ruang toilet. Seorang staf LIPI menginstruksikan cara menggunakan kotak tombol hitung dan meminta siswa untuk tidak lupa menekan tombol sesuai keperluan sebelum meninggalkan toilet.

*At the latest workshop with the Negeri Babakan Sinyar Elementary School students after the composting toilets were installed inside the school, we re-demonstrated the concept of the sanitation value chain and explained again how the composting toilets work.*

*Most of the students who participated in the workshop wanted to try the composting toilets, and in fact, many of them did. To gather more accurate data on students' frequency and purpose (pee, poop, or both) of toilet use, a counting button box was installed inside the toilet room. One of the LIPI staff instructed students on how to use the counting buttons box and asked them to leave a record of composting toilet use by pressing a button on the box.*

# Ko-Kreasi Rantai Nilai Sanitasi di Kiaracondong

## *Co-Creating the Sanitation Value Chain in Kiaracondong*

Lokakarya lokal bertajuk "Sanitasi dan Rantai Nilai" diadakan pada tanggal 26 Oktober 2017 di Kelurahan Sukapura, Kiaracondong. Pejabat pemerintah setempat, tokoh masyarakat dan anggota inti organisasi berbasis masyarakat juga menghadiri lokakarya dan berdiskusi bersama. Mereka memahami konsep rantai nilai sanitasi dan peran pentingnya. Mereka bahkan meminta lebih banyak informasi kepada LIPI dan RIHN tentang model rantai nilai sanitasi di Kiaracondong. Upaya ko-kreasi bersama dan membangun hubungan saling percaya antara peneliti dan masyarakat lokal terus dilakukan.



Diskusi dengan tokoh masyarakat  
(Ushijima 2017)  
Discussion with community leaders  
(Ushijima 2017)

Presentasi menerjemahkan Bahasa Inggris ke Bahasa Indonesia (Kataoka 2017)  
Presentation interpreting English into Bahasa Indonesia (Kataoka 2017)

Sambutan dari Camat (Ikemi 2017)  
Speech by the head of Kecamatan (Ikemi 2017)

Suasana lokakarya di tempat pertemuan Kelurahan Sukapura (Ikemi 2016)  
A scene of the workshop at Kelurahan Sukapura meeting place (Ikemi 2016)

Peserta aktif mengajukan pertanyaan (Kataoka 2017)  
Audience actively asking questions (Kataoka 2017)

# Kata Penutup



Apakah Anda menyukai isi buku ini? Ya, itulah pertanyaan yang memenuhi benak kami saat menyusun buku ini. Selama hampir dua dekade penelitian di daerah Kiaracondong, kami semakin merasa bahwa kami masih jauh dalam penerapan penelitian kami: Sejauh mana itu akan berhasil dan diterima, apa tantangan selanjutnya yang harus diselesaikan?

Menulis buku di masa pandemi Covid-19 juga cukup menantang. Diskusi intensif melalui media virtual dilakukan untuk mengatasi perbedaan bahasa dan pendapat.

Kami berharap Anda dapat menikmati buku bergambar ini dan memahami pengalaman mendalam kami di Kiaracondong. Semoga beberapa hasil yang diuraikan dapat memberikan kontribusi solusi yang lebih baik bagi masyarakat di Kiaracondong, yang selalu penuh optimisme dalam hidup mereka dan mendukung kami dalam berbagi informasi kepada masyarakat dunia.

**Neni Sintawardani**

Peneliti Utama, Koordinator Indonesia untuk proyek RIHN-LIPI  
Loka Penelitian Teknologi Bersih, Badan Riset dan Inovasi Nasional

# Afterword

*Did you like the contents of this book? Yes, that is the question that has kept us quite busy while compiling this book. During nearly two decades of research in the Kiaracondong area, we increasingly feel that we are still a long way from implementing our research: To what extent will it be successful and accepted, what are the next challenges to be solved?*

*Writing a book during the Covid-19 pandemic is also challenging. Intensive discussions through virtual media were conducted to overcome differences in language and opinions.*

*We hope you enjoy this picture book and understand our immersive experience at Kiaracondong. Hopefully, some of the results described can contribute to a better solution for the people of Kiaracondong, who are always full of optimism in their lives and support us in sharing information with the world community.*

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