



# ASEAN Countries







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The News Minute

<https://www.thenewsminute.com> › Delve

## No income, food or ration: Life of slum residents brought to ...

1 Apr 2020 — In many areas, residents in slums have not been able to get food or ration for two to three days since the nation-wide lockdown began. No ...



health



## Slum Health: Arresting COVID-19 and Improving Well ...

by J Corburn · 2020 · Cited by 587 — **Lack of water, sanitation, and clean energy compromise all efforts** for hygiene. Community-based slum mapping exercises have regularl...



BBC

<https://www.bbc.com> › future › article › 2018

## The slum residents trying to prevent a water crisis

12 Oct 2018 — Delhi is set to become the world's biggest city within the next decade, but it already faces crippling water shortages. How



Al Jazeera

<https://www.aljazeera.com> › news › bangkok-slum-re...

## Bangkok slum residents prepare for worst as virus grips ...

22 Mar 2020 — The 44-year old is one of 100,000 people living in Bangkok's largest slum community, Khlong Toey, a sprawling settlement in the centre of the ...



The Jakarta Post

<http://www.thejakartapost.com> › news › 2019

## Slums remain a fact of life in Ja

28 May 2019 — **Roughly half of Jakarta comprises slums**, according to a statement from the government. "This is the fact of slums in Jakarta.







ASEAN  
DATA SCIENCE  
EXPLORERS



**NUS**  
National University  
of Singapore

# Enhancing Slum Liveability through Robust Monitoring and Volunteering

**6** CLEAN WATER  
AND SANITATION



**8** DECENT WORK AND  
ECONOMIC GROWTH



**11** SUSTAINABLE CITIES  
AND COMMUNITIES



Investigating the key issues behind the lower quality of life among slum dwellers and recommending key strategies to enhance slum liveability

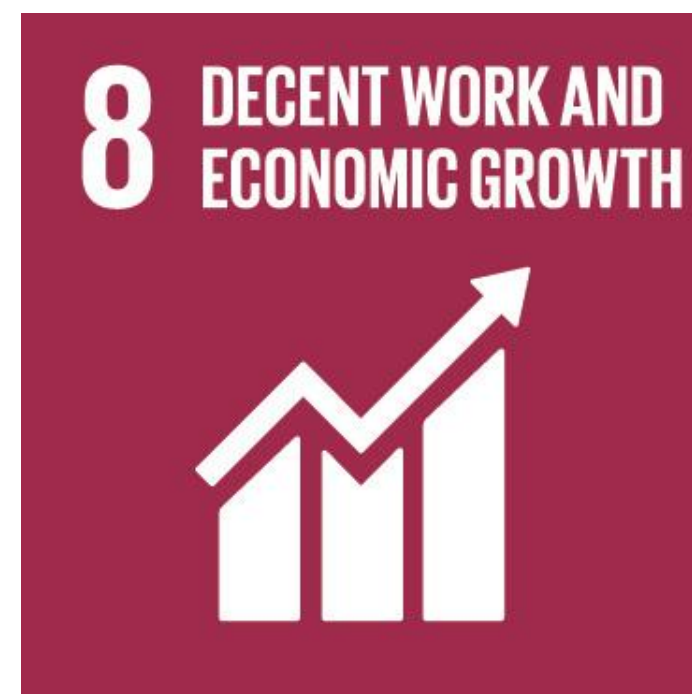


**Team JKaLgOLithm**  
Kay Eugenia Purnama  
Jessen Wiryawan  
National University of Singapore



# Objectives

To implement holistic and sustainable solutions aimed at alleviating slum challenges and building inclusive community

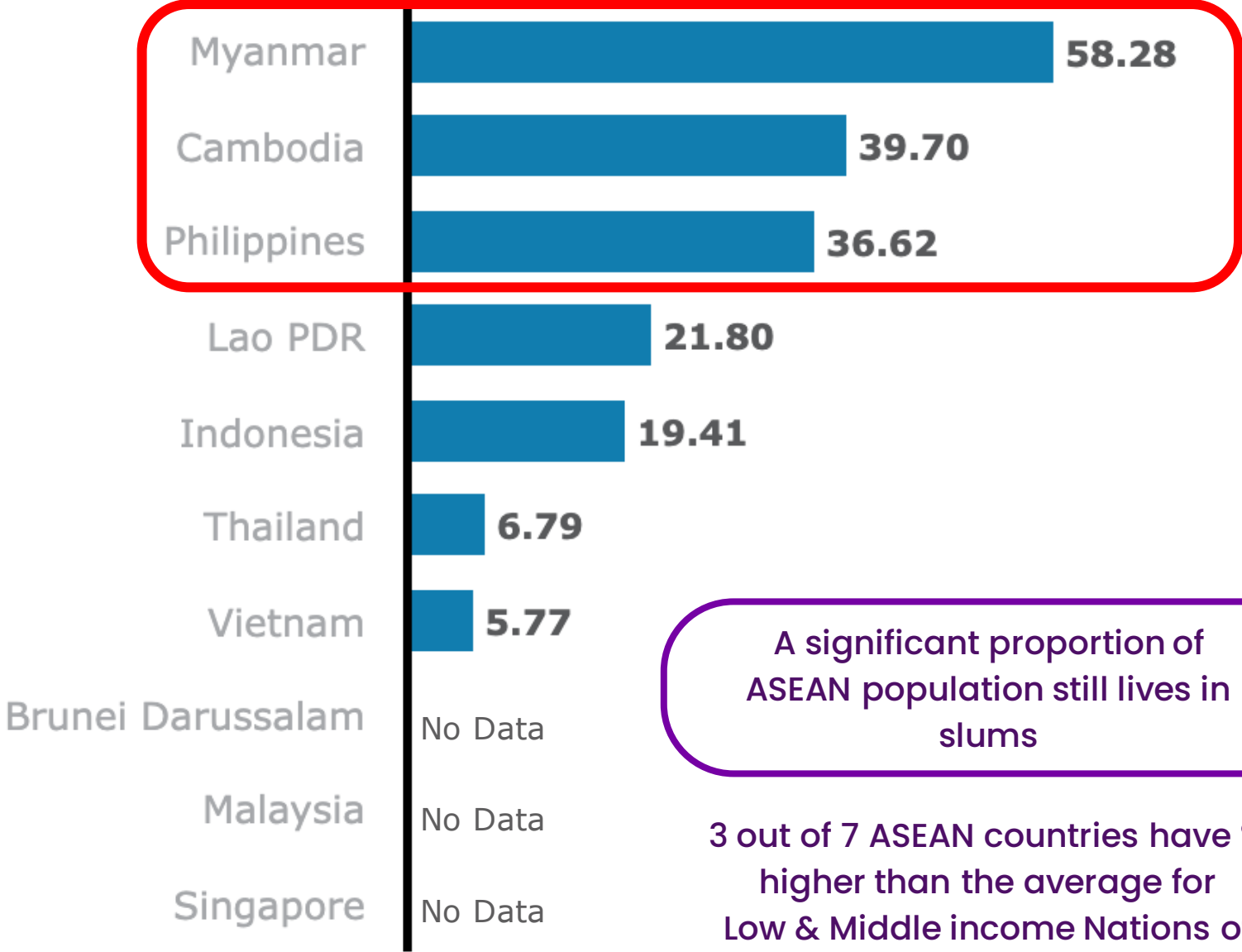




# Insight 1: A large segment of ASEAN population resides in slums

Latest Recorded Value of the % of Population Living in Slums in ASEAN Region

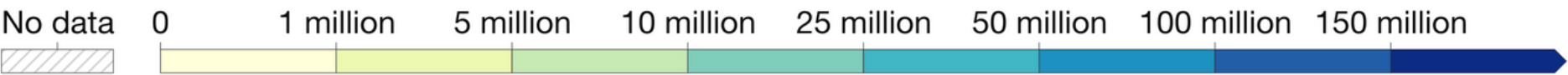
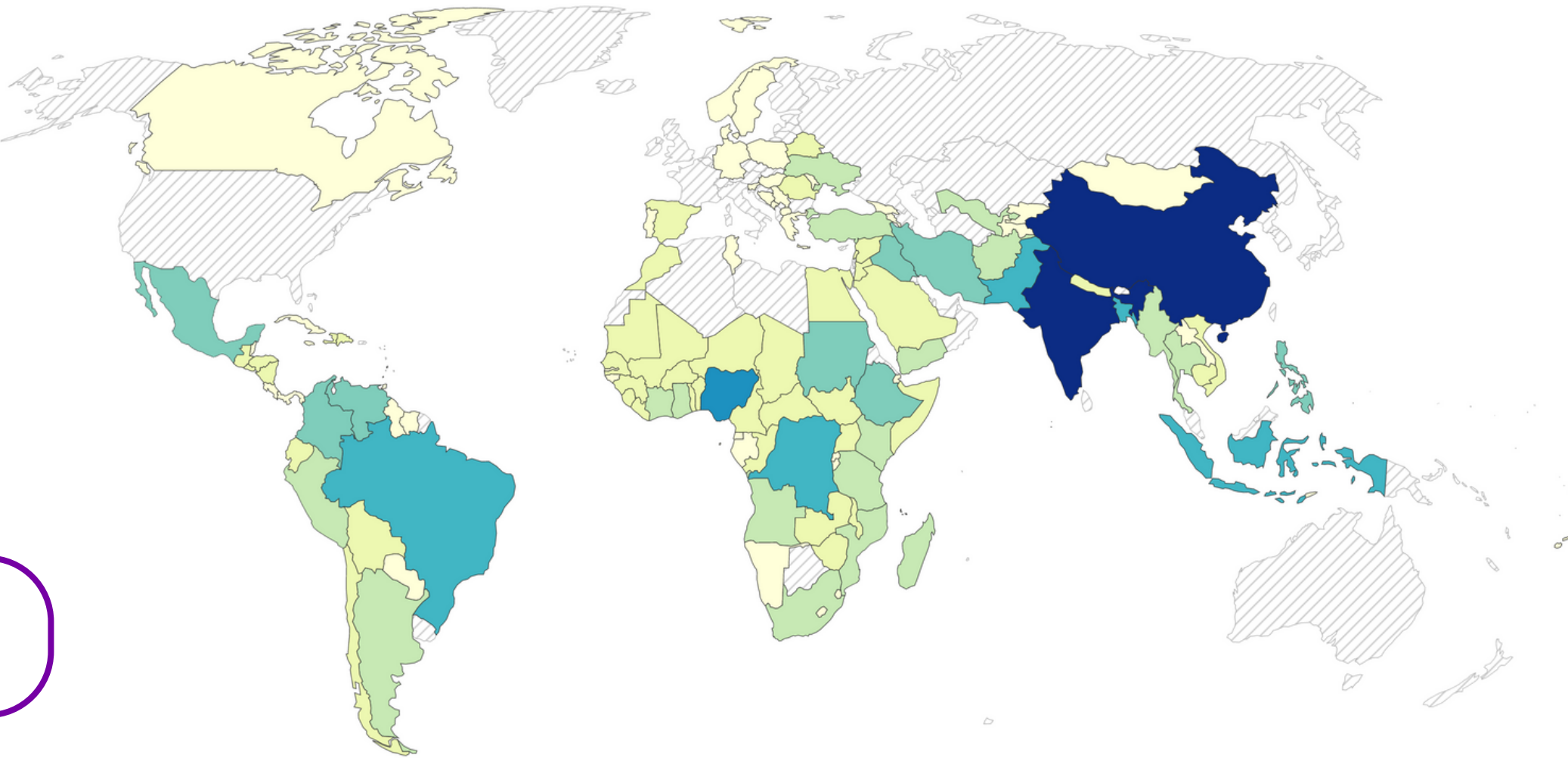
1 Filter



A significant proportion of ASEAN population still lives in slums

3 out of 7 ASEAN countries have % higher than the average for Low & Middle income Nations of

**36%**



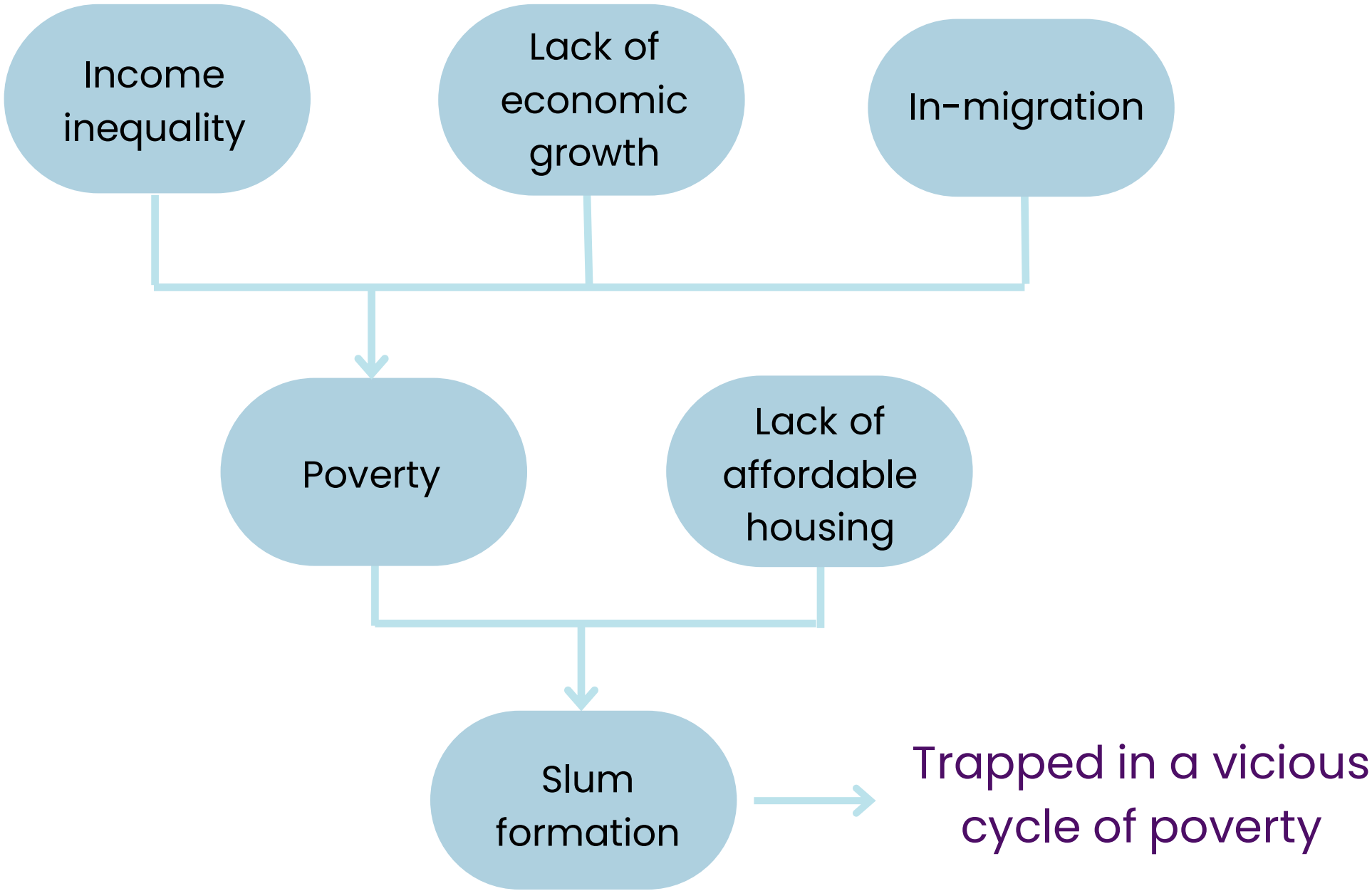
Source: Our World in Data (2018)

Source: WorldBank (2000, 2013-2020)

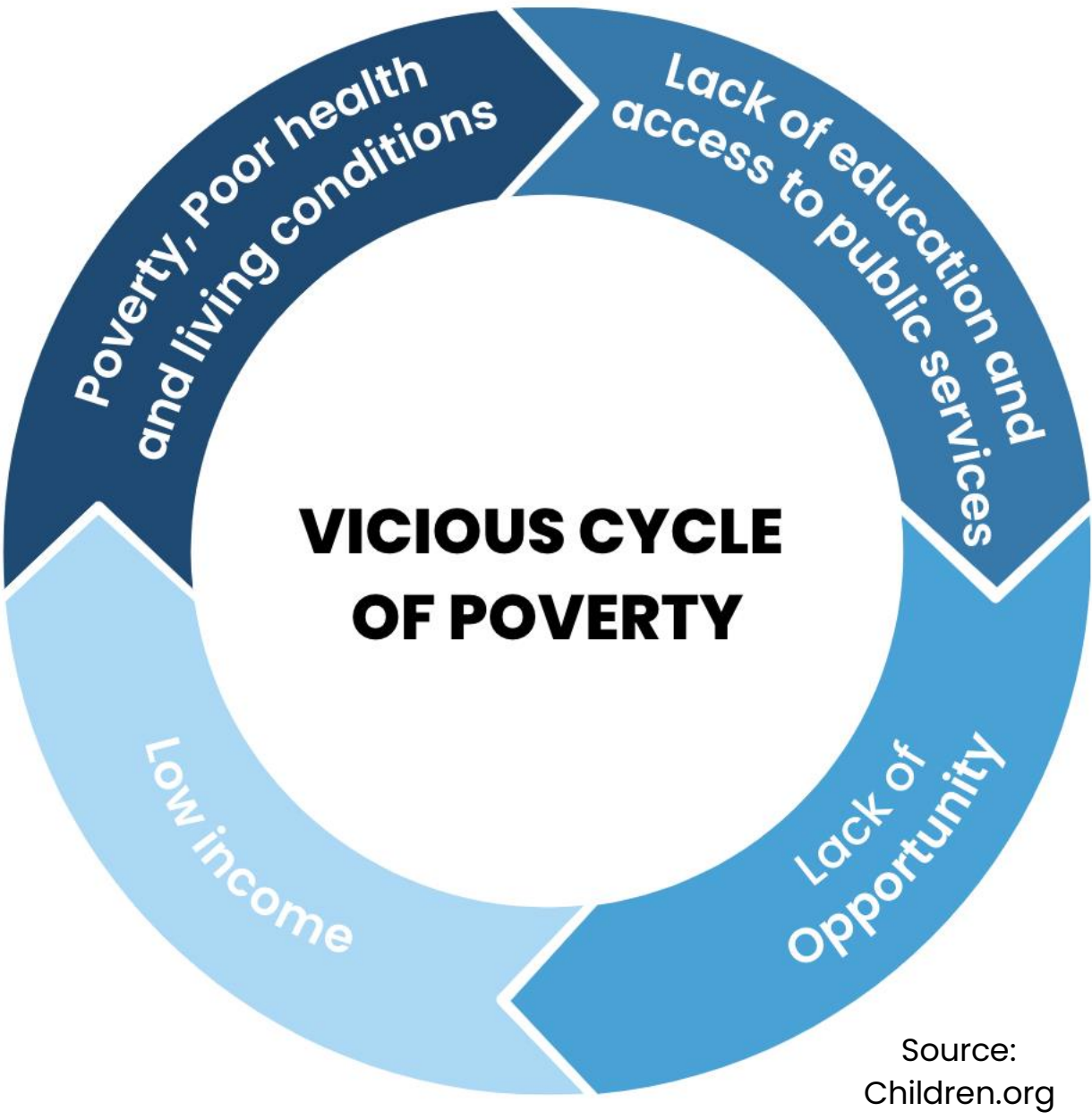


# How are slums formed?

## Reasons for slum formation



Source: UN-Habitat (2003)





# Why are slums still prevalent?

Current efforts are limited in effectiveness



## CASE STUDY: Indonesia National Slum Upgrading Project

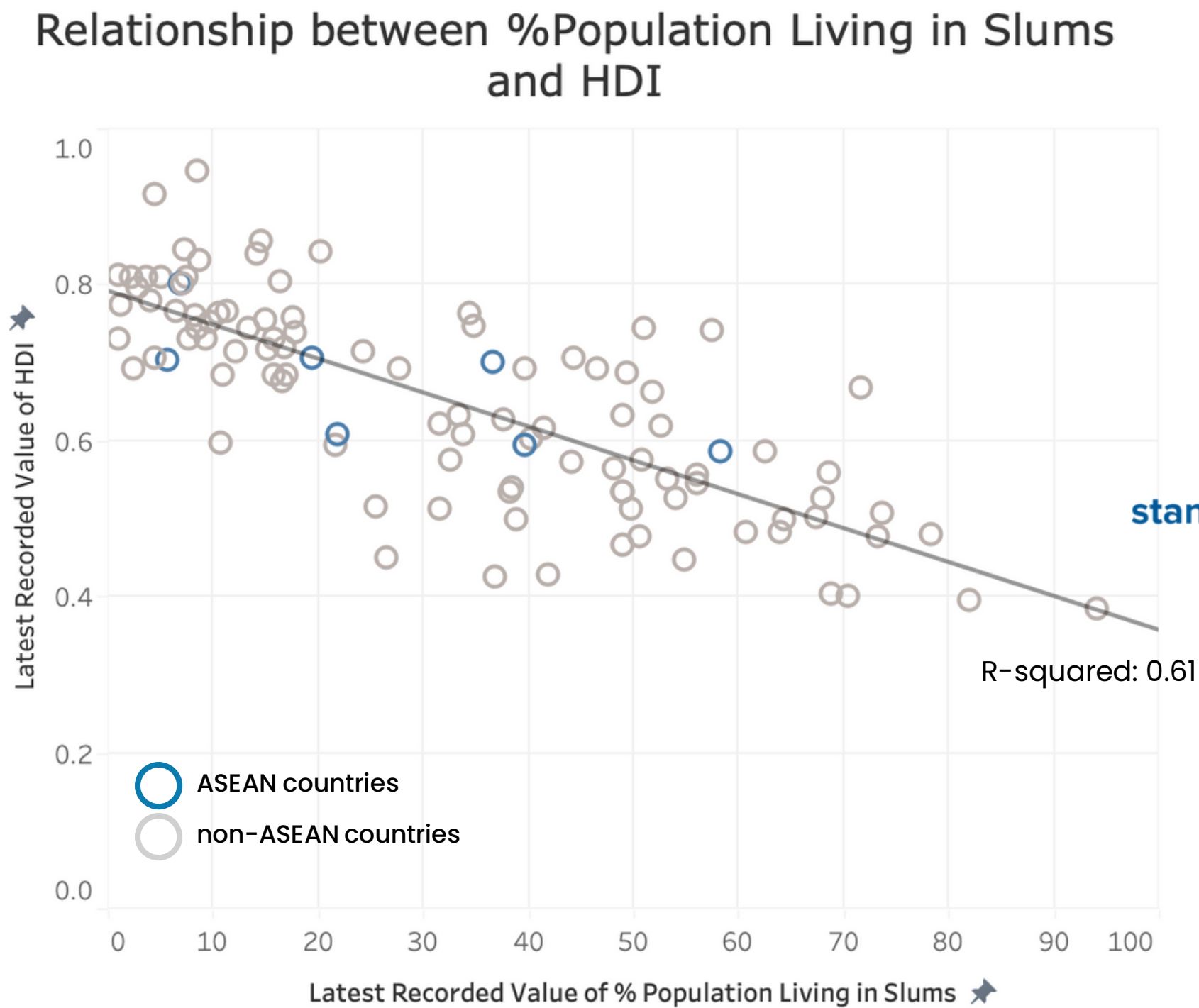
Source: WorldBank (2016)

Components	Weaknesses Identified
Institutional and Policy Development	Slow implementation and resistance to policy changes
Integrated Planning Support and Capacity Building for Local Governments and Community	Limited resources and expertise and resistance to change by local governments and residents
Urban Infrastructure and services in selected cities	Inadequate funding for infrastructure improvements and long-term maintenance requires support and resources
Implementation Support and Technical Assistance	Weak governance and corruption can undermine the implementation of these activities
Contingency for Disaster Response	Limited funding and logistical challenges that hinder effective disaster relief efforts

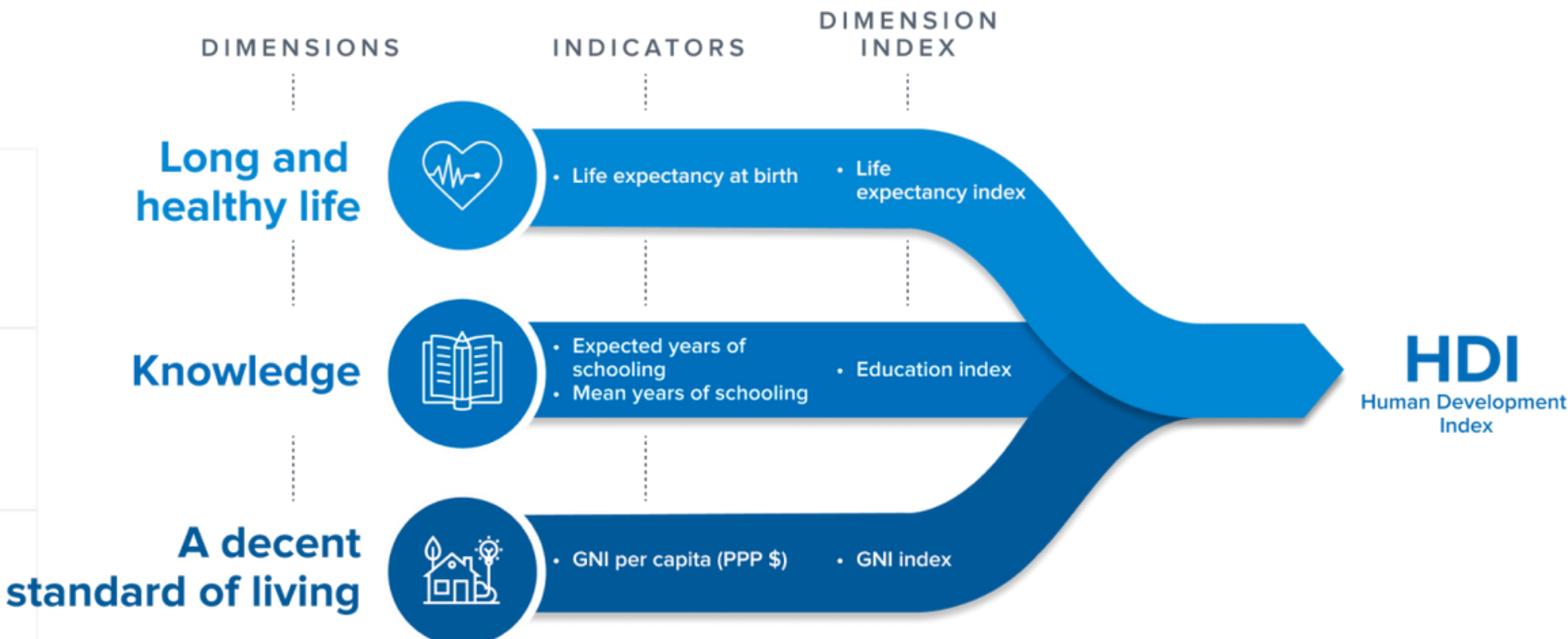


# Challenges faced by Slum Dwellers

Insight 2: There is a moderate negative correlation between the percentage of population living in slums and Human Development Index (HDI) value



Source: United Nations Development Programme (2021), WorldBank (2000, 2013–2020)



- Living in slums is moderately correlated with negative economic, social, environmental living conditions of the poor
- Addressing the issue of slum → Improving country's HDI performance



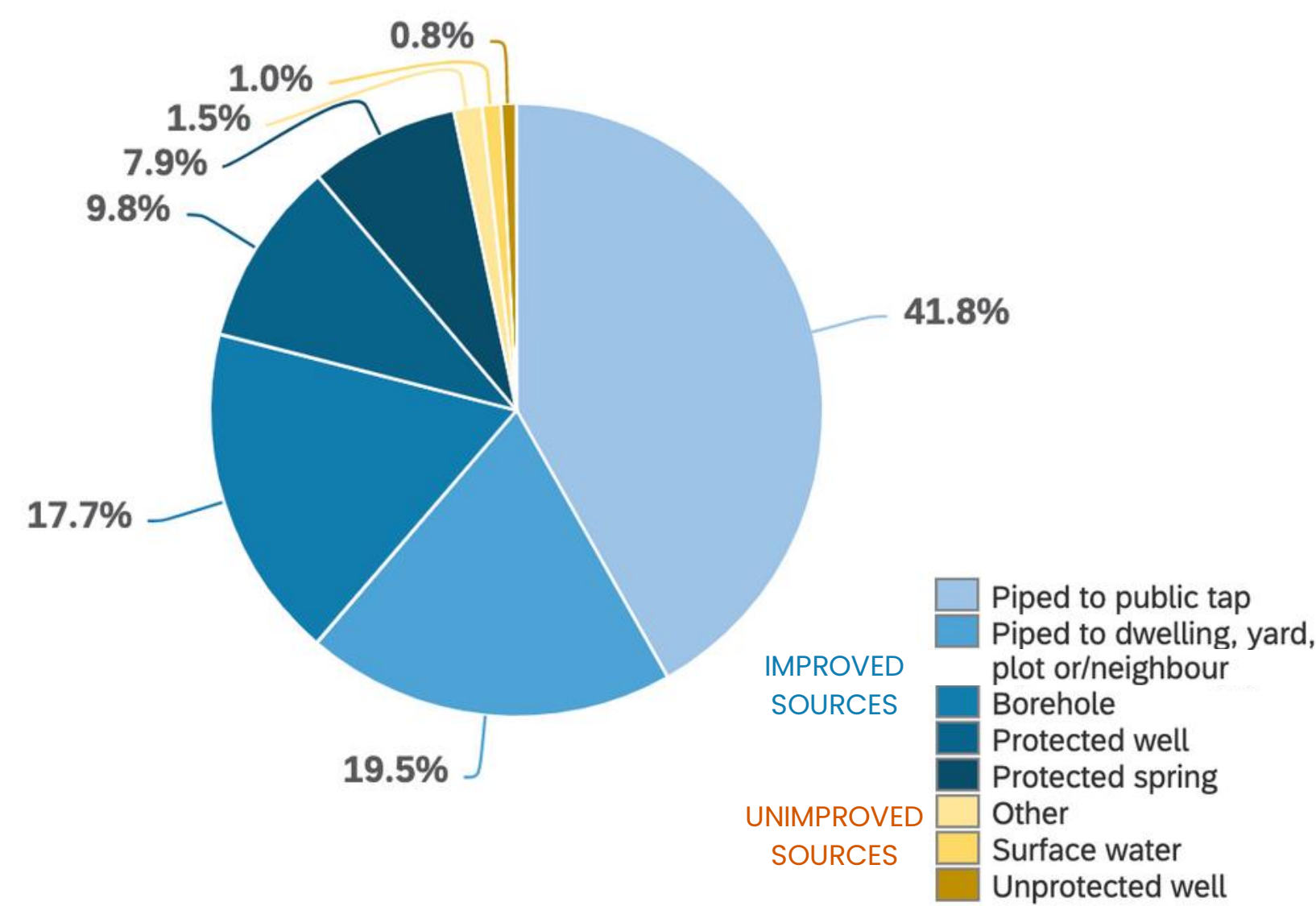
# Challenges faced by Slum Dwellers: SDG 6



Insight 3: The majority of water sources used by slum dwellers pose safety limitations

## CASE STUDY: Bangwe, Malawi

Percentage of Water Source Utilised by Urban Dwellers in Bangwe (n = 481)



Source: International Journal of Hygiene and Environmental Health (2021)



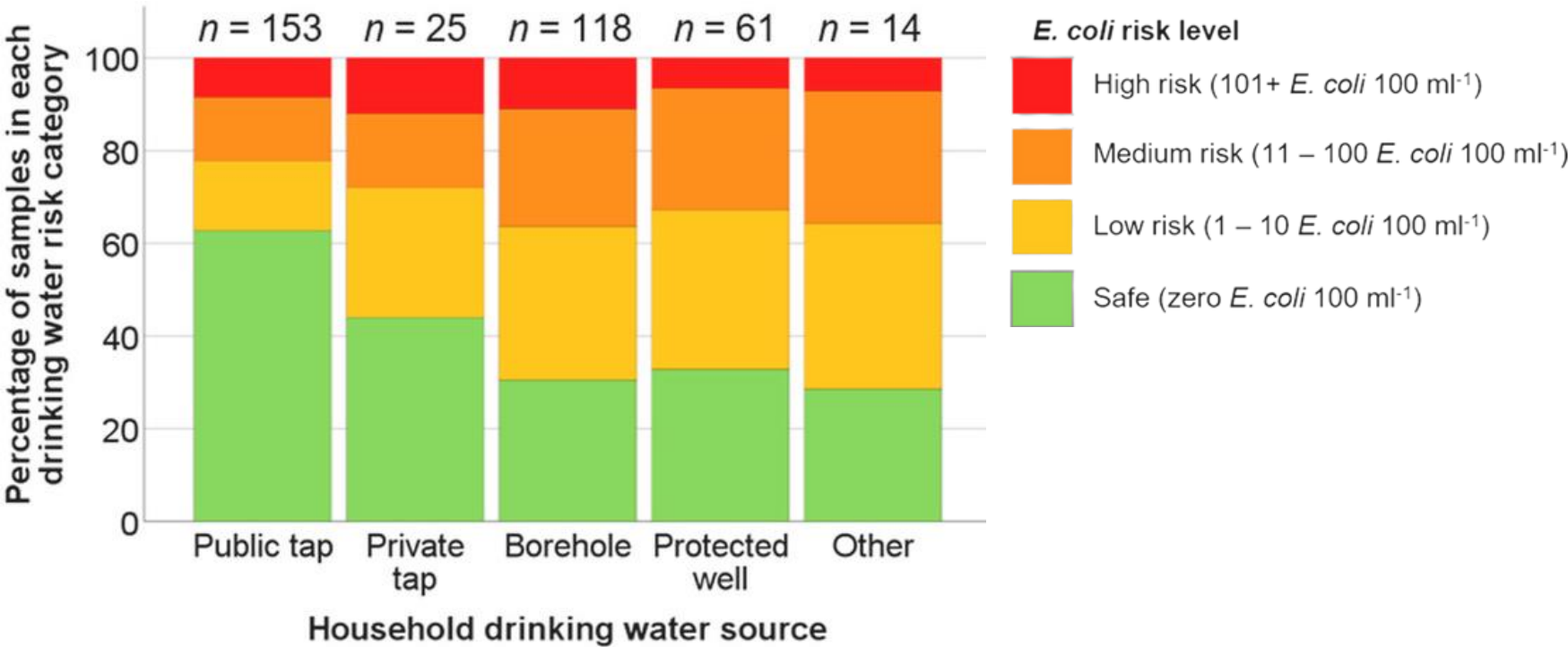
# Challenges faced by Slum Dwellers: SDG 6



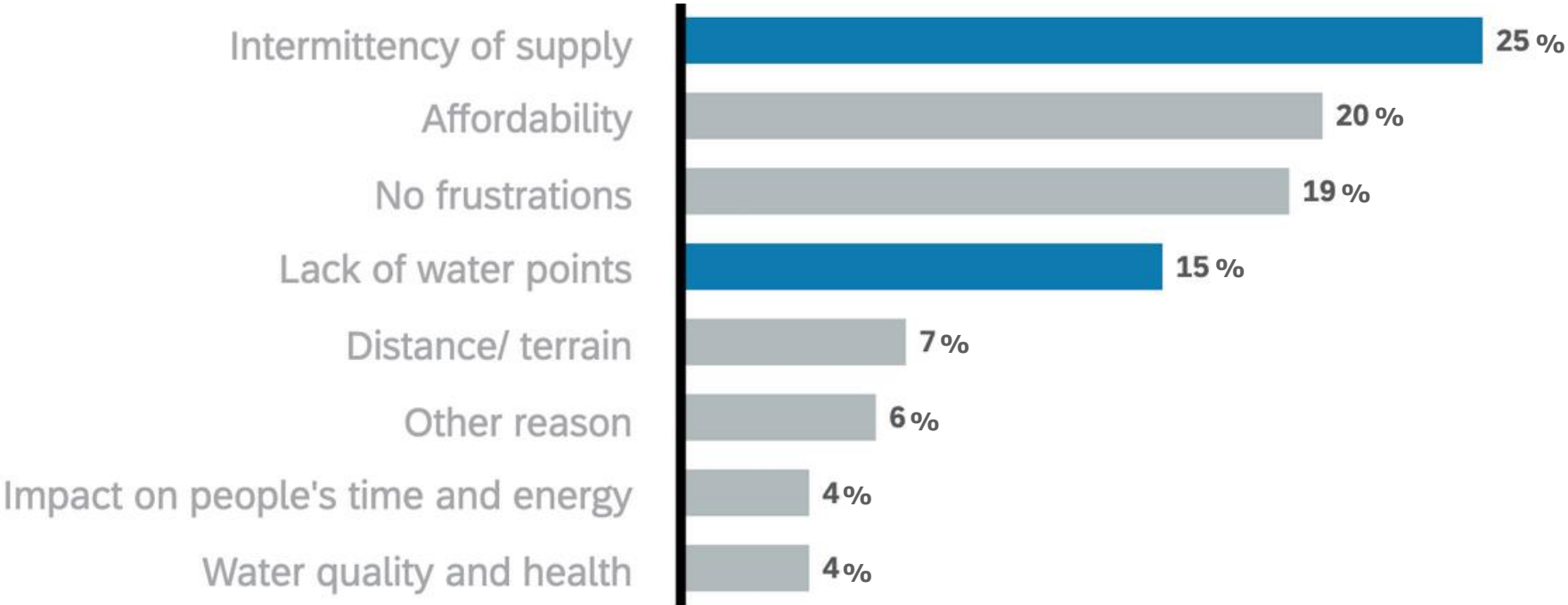
Insight 3: The majority of water sources used by slum dwellers pose safety limitations

## CASE STUDY: Bangwe, Malawi

Levels of *E. coli* contamination from various water sources



Factors contributing to frustration with drinking water



Less than 50% of most water sources (i.e. private tap, borehole, protected well, and other) are safe to be consumed

Other\*: protected or unprotected springs, unprotected wells, and surface water.

Intermittency of supply and lack of water points contribute significantly to the frustrations with drinking water



# Challenges faced by Slum Dwellers: SDG 8

Insight 4: A large proportion of slum dwellers is involved in informal employment or is unemployed

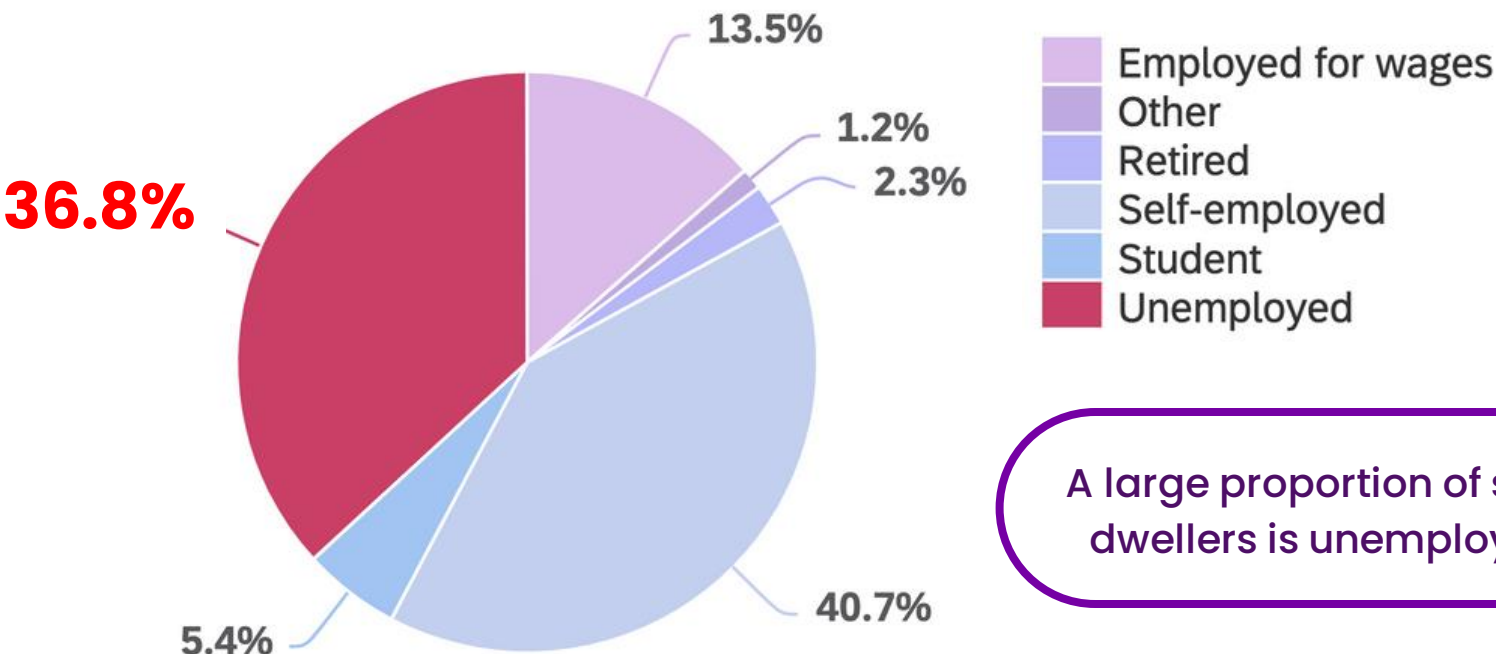
Slum economies support the day-to-day needs of **830 million** slum dwellers



Nearly all of this employment is informal

Source: Rockefeller Foundation (2013)

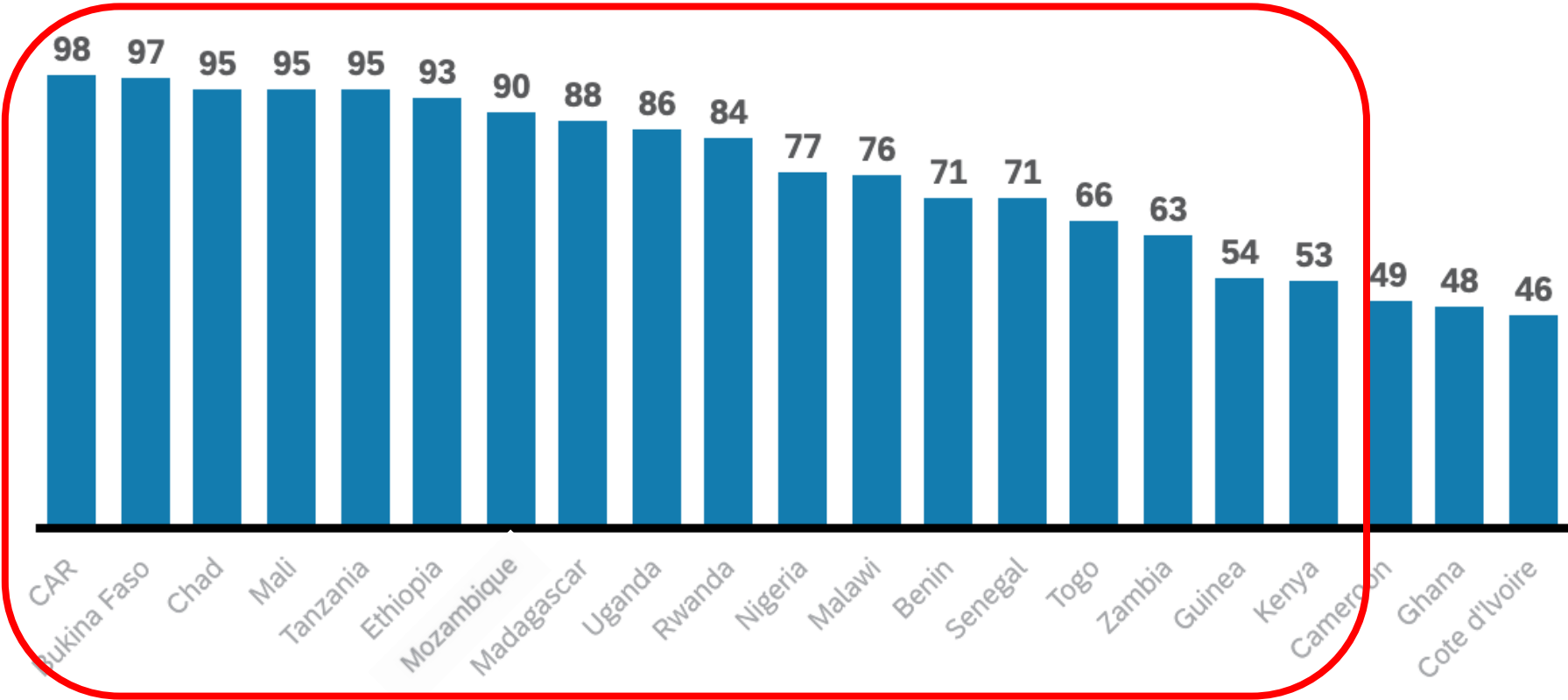
## CASE STUDY: Bangwe, Malawi



A large proportion of slum dwellers is unemployed

Source: International Journal of Hygiene and Environmental Health (2021)

Percentage of Youth Working in Informal Sector Living in Slums



Source: UN-Habitat (2013)

In 18 out of 21 countries, more than 50% of youth working in informal sector live in slums



***Elevating Lives, Transforming Communities***

***MONITOR***

***CONNECT***

***Training & Workshops***  
***Development***  
***Donate***

Introduction

Problem

Recommendations

Implementation

Conclusion





***MONITOR***

***CONNECT***

***Training & Workshops***  
***Development***  
***Donate***

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# Website Development – Elevating Lives, Transforming Communities



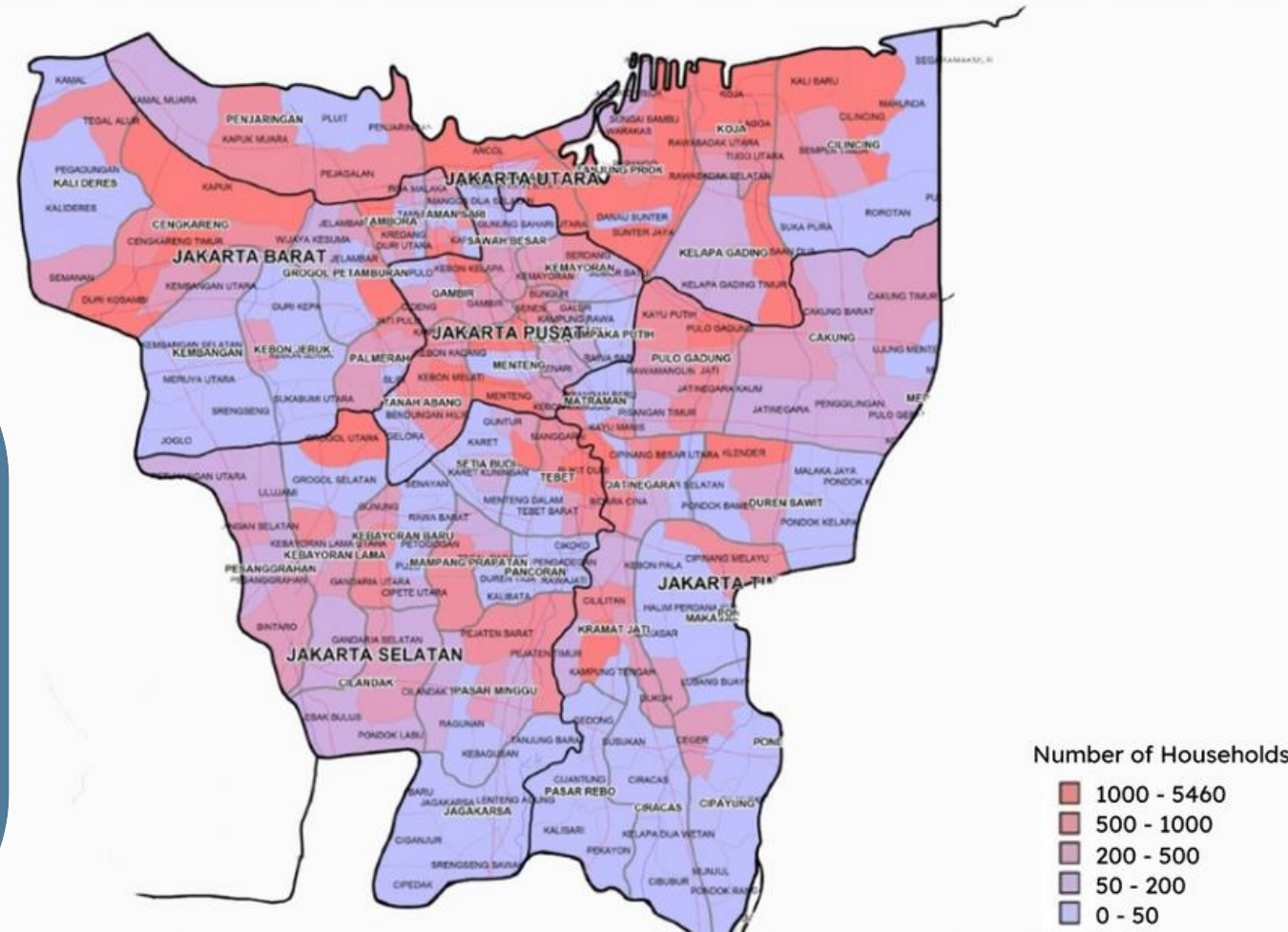
## STAKEHOLDERS



## Satellite Imaging

A remote sensing and image classification technique that captures high-resolution images of the planet's surface.

- Locating slums based on visual characteristics for mapping and monitoring
- Enabling policymakers to better understand the spatial distribution of slum areas for targeted interventions and urban planning.



## SUCCESS EXAMPLE

The implementation of Very High-resolution (VHR) satellite images, coupled with machine learning algorithms and roads network for **slum detection** in Cairo, Egypt has a high accuracy of **93%**

Source: Salem, M., et. al (2020)



# Website Development – *Elevating Lives, Transforming Communities*

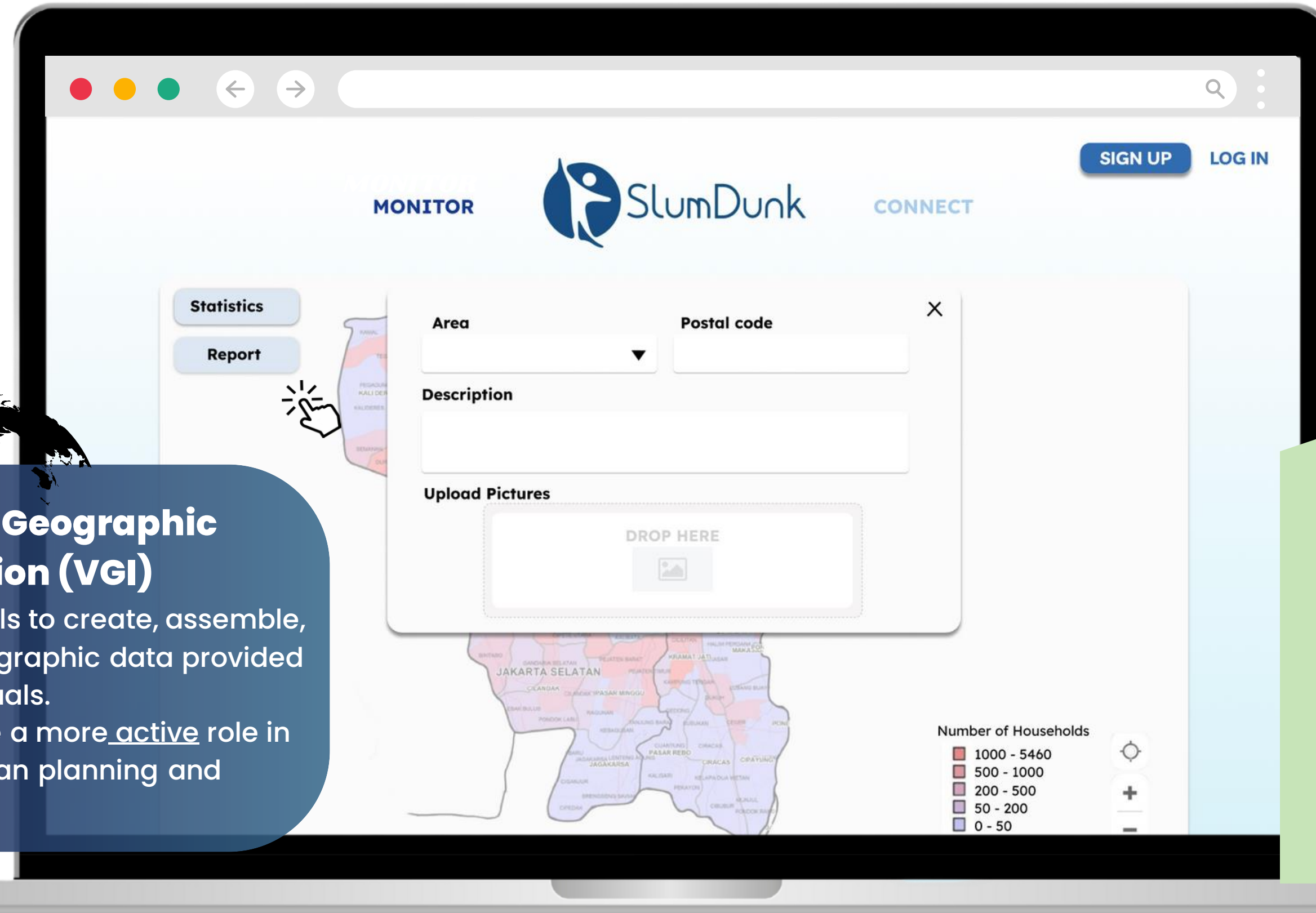


## STAKEHOLDERS



## Volunteered Geographic Information (VGI)

- The harnessing of tools to create, assemble, and disseminate geographic data provided voluntarily by individuals.
- allows people to have a more active role in activities such as urban planning and mapping



## SUCCESS EXAMPLE

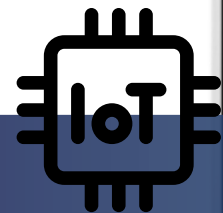
Quality evaluation of VGI using authoritative data shows that the outcome has a high percentage of completeness and correctness. Especially, the urban correctness percentage is as high as **90%**

Source: Dorn, H. (2015)

# Website Development – Elevating Lives, Transforming Communities



## STAKEHOLDERS



## Internet of Things

- Deploying IoT sensors and devices in slum areas to collect and analyse real-time data
- Providing a comprehensive understanding of slum areas, aiding in accurate identification and monitoring, and enabling targeted interventions to address the specific needs of these communities.



## WHY TARGETED INTERVENTIONS?



Limited resources and financial capacity

Prioritise and concentrate efforts on slum areas that are in dire need of assistance





***MONITOR***

***CONNECT***

***Training & Workshops***  
***Development***  
***Donate***

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# Website Development – Elevating Lives, Transforming Communities



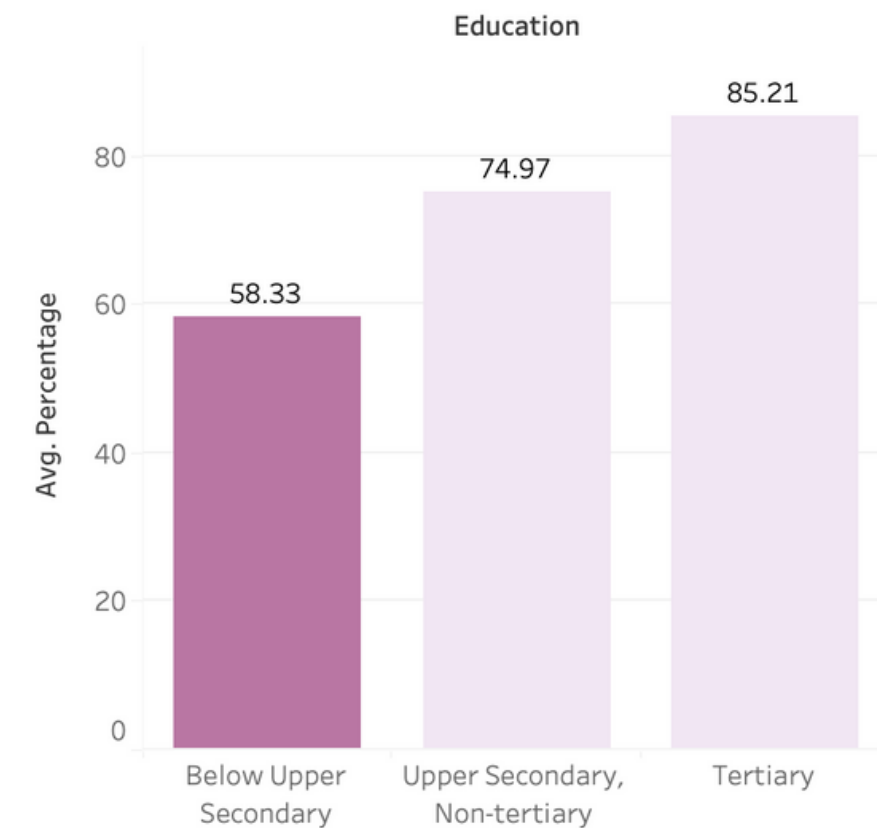
**CONNECT**

**Training & Workshops**

## AIM

Gather a vibrant community of volunteers and provide them with opportunities to uplift the lives of slum dwellers by conducting a diverse range of workshops and trainings

## Employment Rate against Level of Education



Source: The Organization for Economic Cooperation and Development (2021)

There is a strong correlation between one's education level and their employment prospects, indicating the significance of workshops and skills enhancement programmes in the lives of slum dwellers

## SUCCESS EXAMPLE

Individuals who underwent Workforce Skills Qualification (WSQ) training were more employable and enjoyed a real wage premium of

**5.8%**

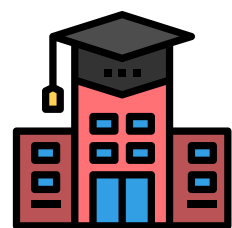
in the year after training.

Singapore Ministry of Education (2020)

## STAKEHOLDERS



Public



University/Colleges



NGOs

## POSSIBLE PARTNERSHIP



SlumAid



Voice of Slum

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# Website Development – *Elevating Lives, Transforming Communities*

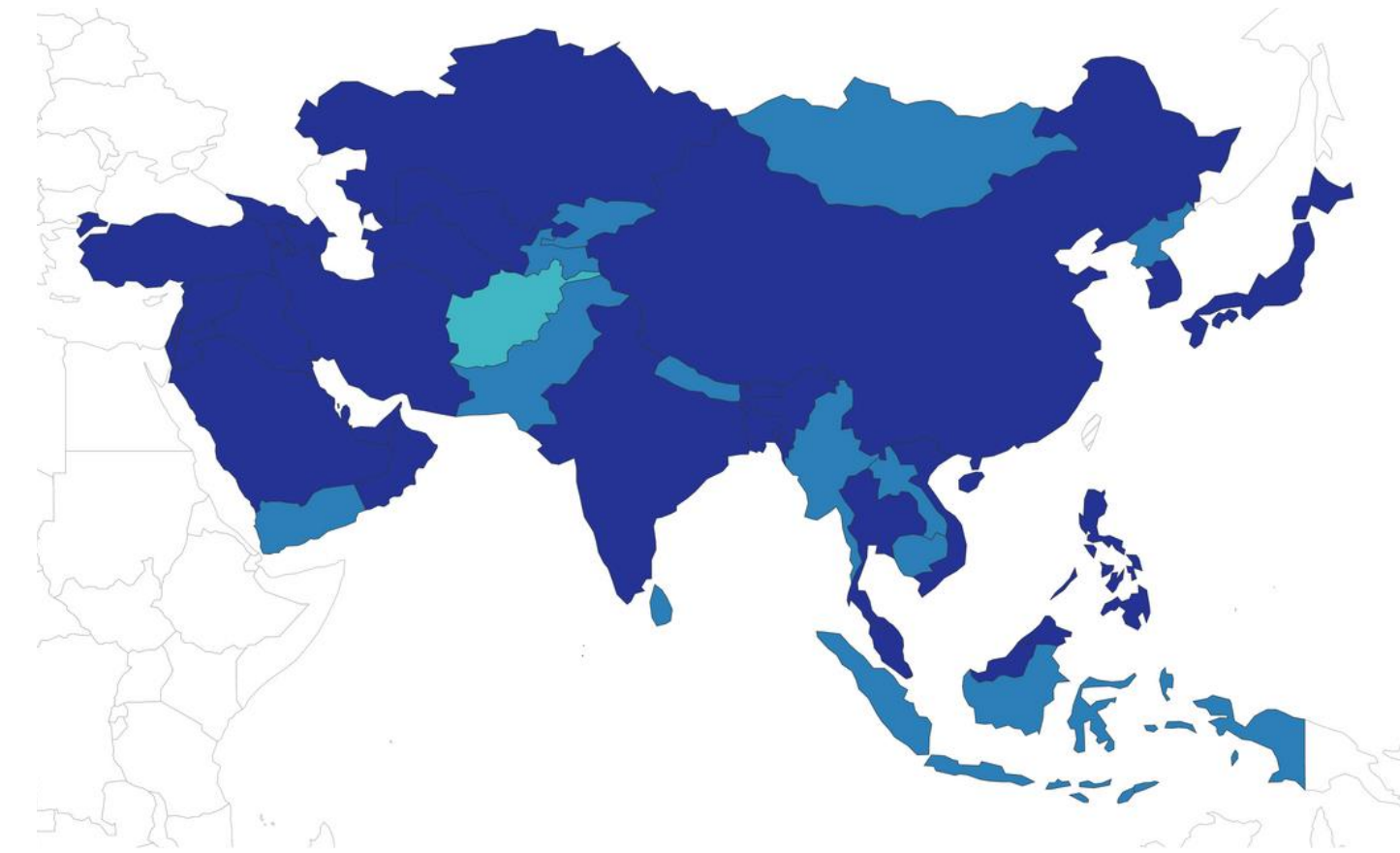
6 CLEAN WATER AND SANITATION



**5.62%** of ASEAN countries do not have access to an improved water source.

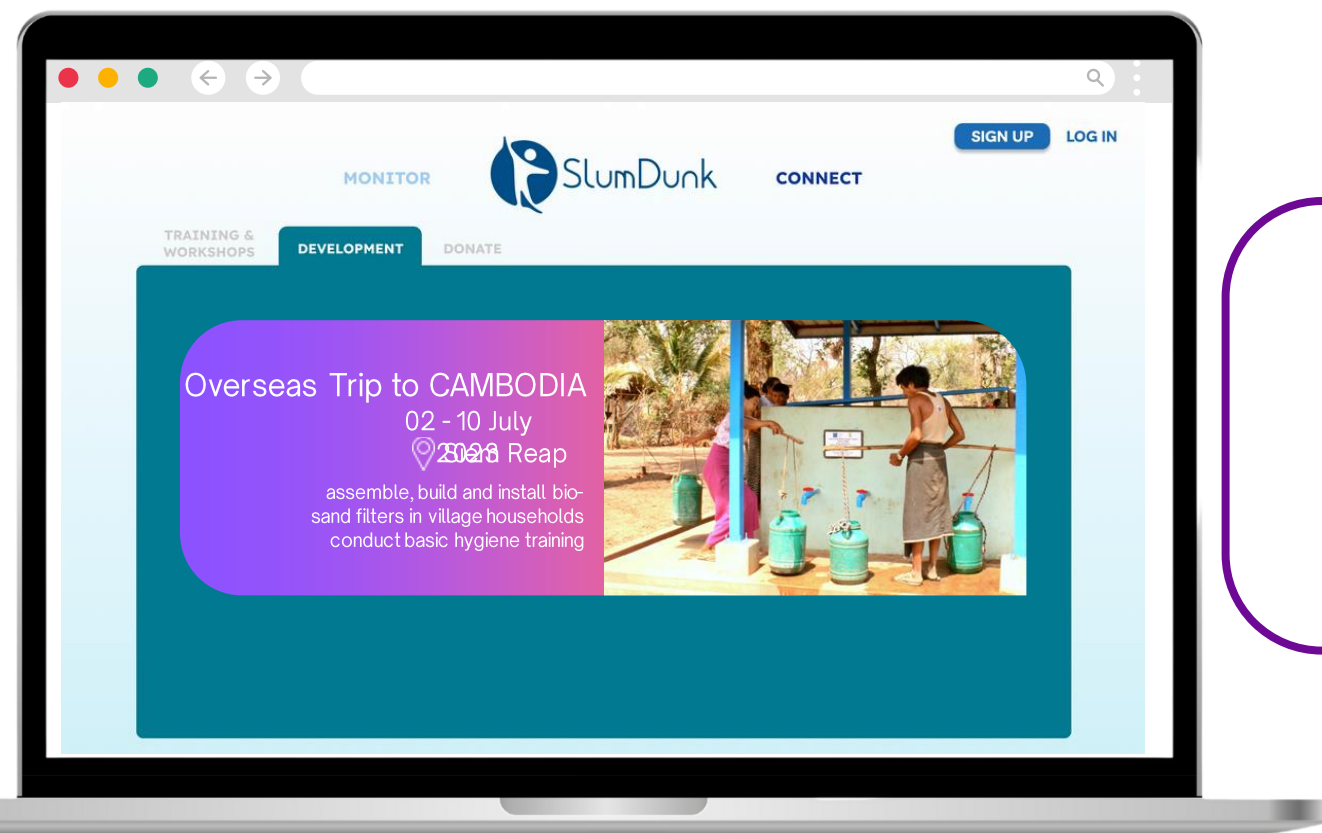
## AIM

Raising awareness and mobilising individuals to support the **construction of water points** and **waste disposal facilities** or improving the durability of housing



No data 0% 5% 20% 40% 60% 80%

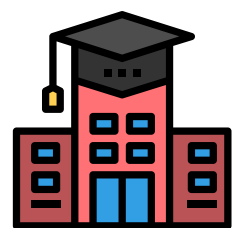
Source: Our World in Data (2020)



## STAKEHOLDERS



Public



University  
/ Colleges



NGOs

## POSSIBLE PARTNERSHIP



United Nation  
Development  
Programme



Singapore  
International  
Foundation  
for a better world

Water for Life  
Programme



Student Club/  
Interest Groups at  
various universities

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# Website Development – Elevating Lives, Transforming Communities



**CONNECT**

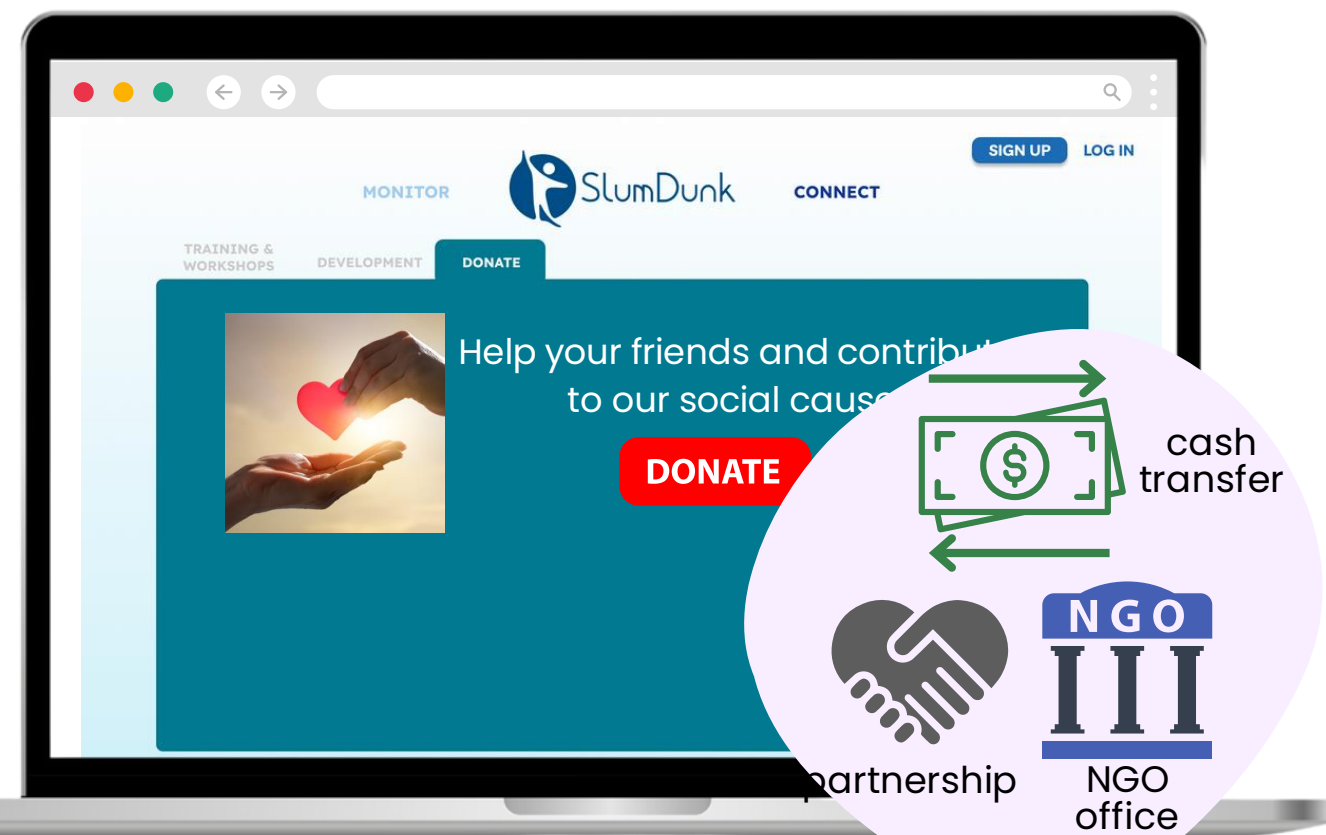
**Donate**

## AIM

Facilitating monetary and non-monetary donations for any project that aims to improve the quality of life of slum dwellers

**EFFECTIVENESS**  
**80%** of general public respondents and  
**82%** of corporate funders agree/strongly agree that  
Social Service Agencies meet the needs of  
individuals and families in need  
Source: : National Council of Social Service (2021)

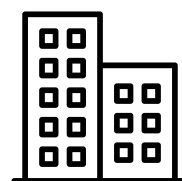
## DONATION CHAIN – IMPLEMENTATION PLAN



## STAKEHOLDERS



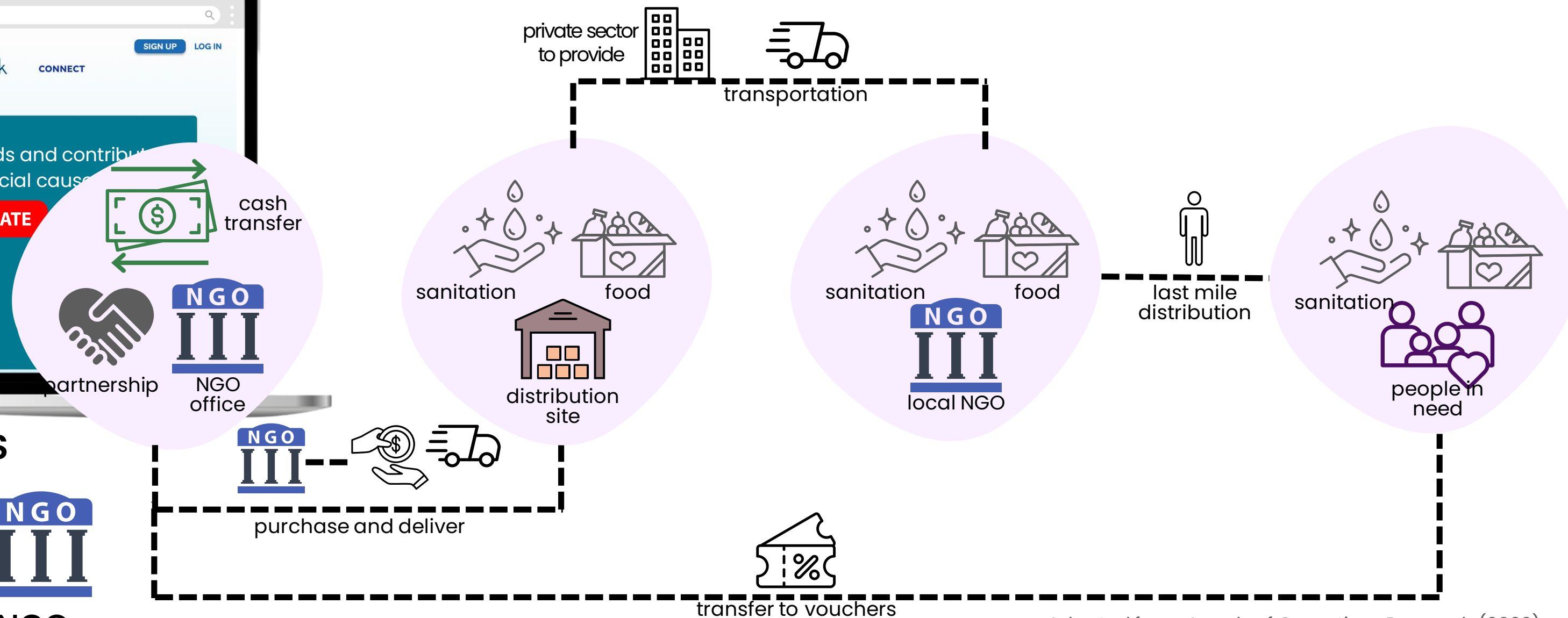
Public



Private sector



NGOs



Adapted from: Annals of Operations Research (2022)

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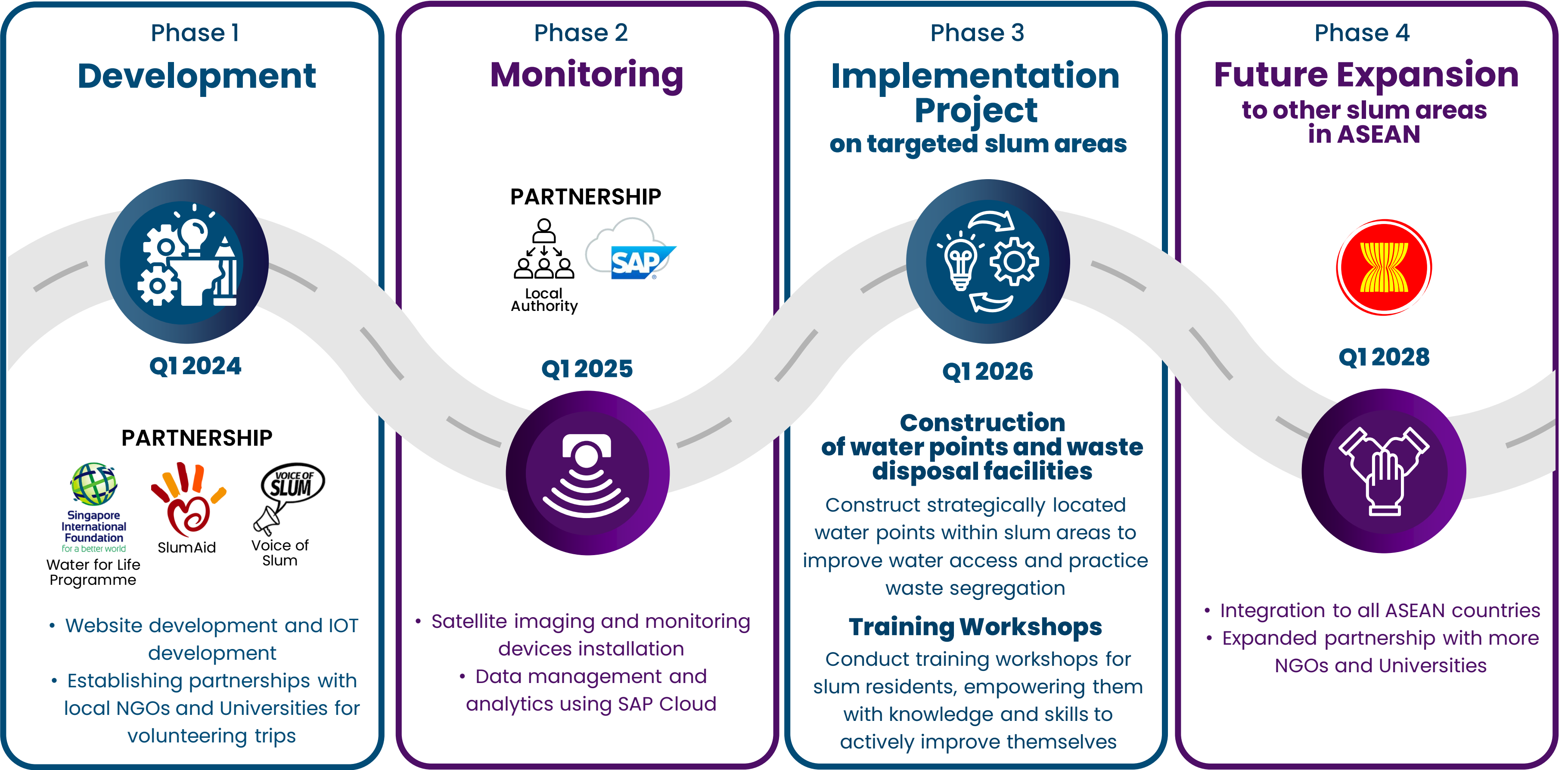
Recommendations

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# Implementation Roadmap

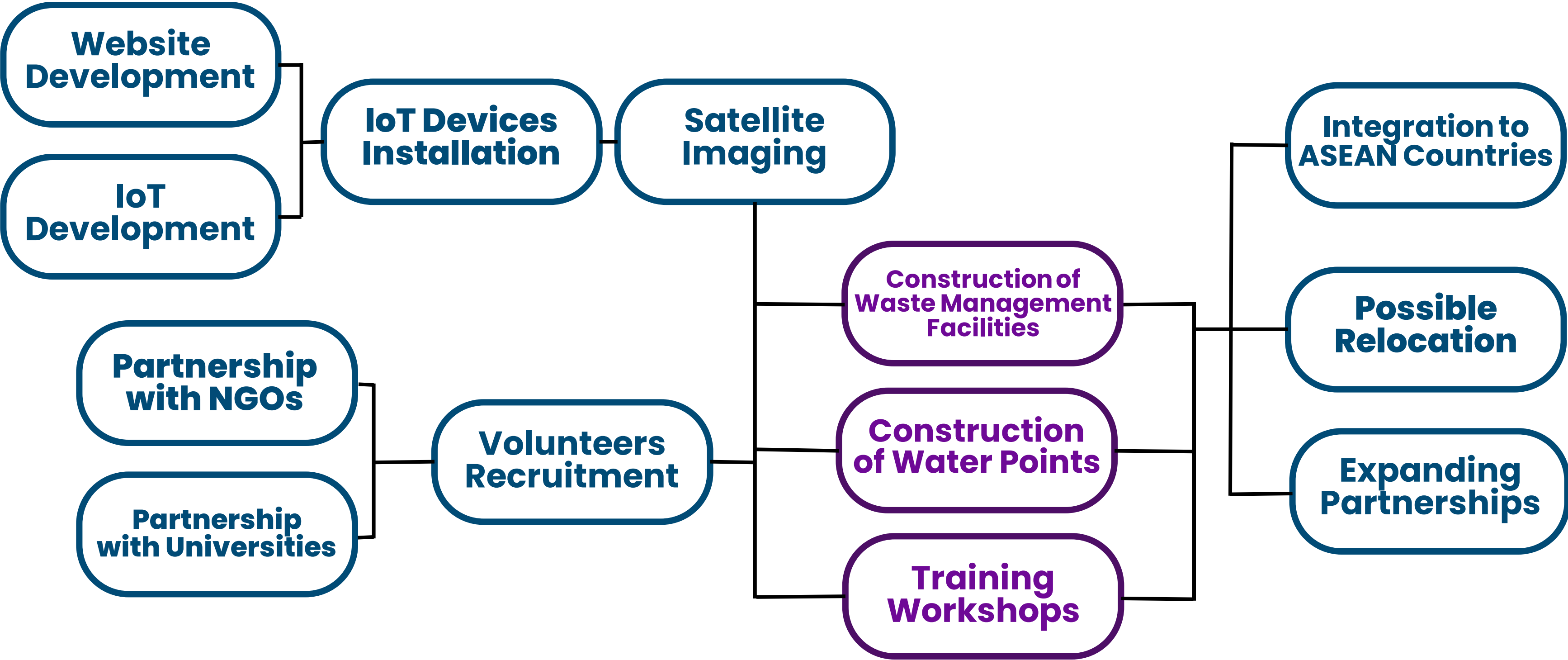


# Implementation Roadmap

Pre-Upgrading

During Upgrading

Post-Upgrading



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# KPIs to measure performance success and sustainability



## Slum Detection Accuracy Rate

**> 90%**

Accuracy of the satellite imaging and IoT integration in identifying slums



## Intervention Metrics

**4**

Volunteering trips per year for each slum area

**3**

Water points built in each slum area minimally

**\$50,000**

Raised for each slum area

**< 30**

Minutes for water collection time for roundtrip including queueing



## Increase in Employment Rate

**0.4**

Increase in the probability of being active

**0.2**

Decrease in probability of being unemployed

Source: Salem, M., et. al (2020)

Adapted From: The Organization for Economic Cooperation and Development (2004)

Introduction

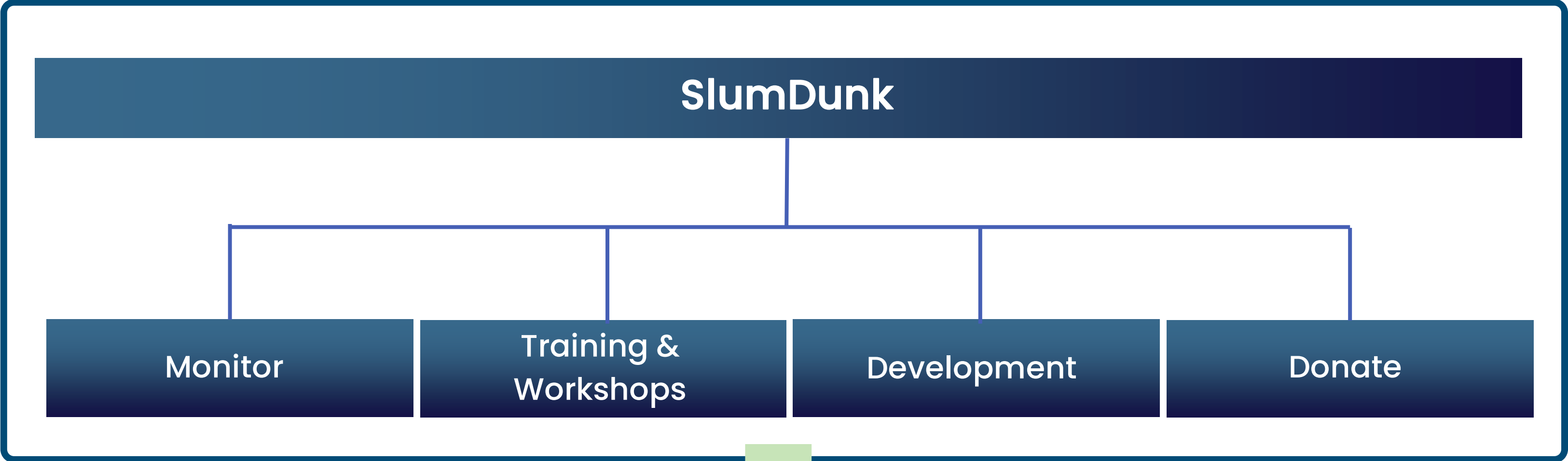
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**Key  
Strategy**



**Key  
Issues**



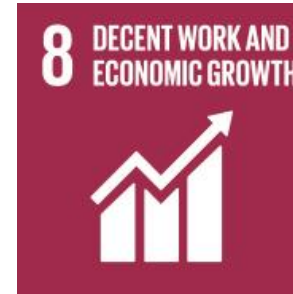


# Key Impacts

## TARGETED INTERVENTIONS



Improving slum dwellers' access to safe water and sanitation



Increasing employment opportunities and reducing unemployment rate



Building a more inclusive community and improving the quality of life of slum dwellers

## BENEFITS



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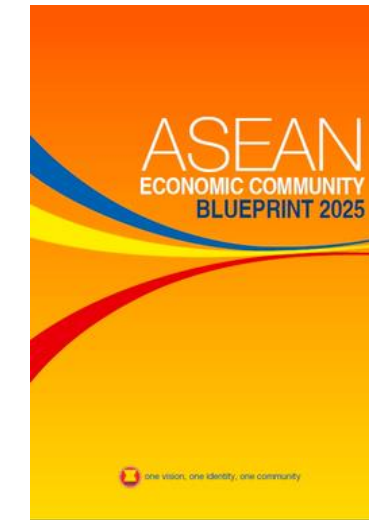
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# Key Impacts

## ASEAN Socio-Cultural Blueprint 2025 and ASEAN Economic Blueprint 2025



### MEASURES

#### A.2. Empowered People and Strengthened Institutions

- iii. Promote participation of local governments/ authorities, ... in the development of ASEAN capacity building programmes that benefit their respective communities;
- vi. Promote ASEAN awareness among government officials, students, children, youths and all stakeholders as part of building ASEAN identity

#### B.2. Equitable Access for All

- vi. Promote human capital development, economic self-reliance and sustainable livelihood, especially among the poor, through access to education, employment opportunities, entrepreneurship and microfinance;

#### B.3. Promotion and Protection of Human Rights

- v. Enhance the effective implementation of relevant ASEAN declarations and instruments related to human rights

#### D.1. Strengthening the Role of Micro, Small, and Medium Enterprises

- v. Promote entrepreneurship and human capital development by creating a more conducive environment for entrepreneurship

#### D.3. Public-Private Partnership

- ii. Identify partners to provide technical assistance to ASEAN Member States to support an enabling environment conducive to PPP

#### D.4. Narrowing the Development Gap

- iv. Building business opportunities for growth and employment, and increasing access to financial services;

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**Thank You!**



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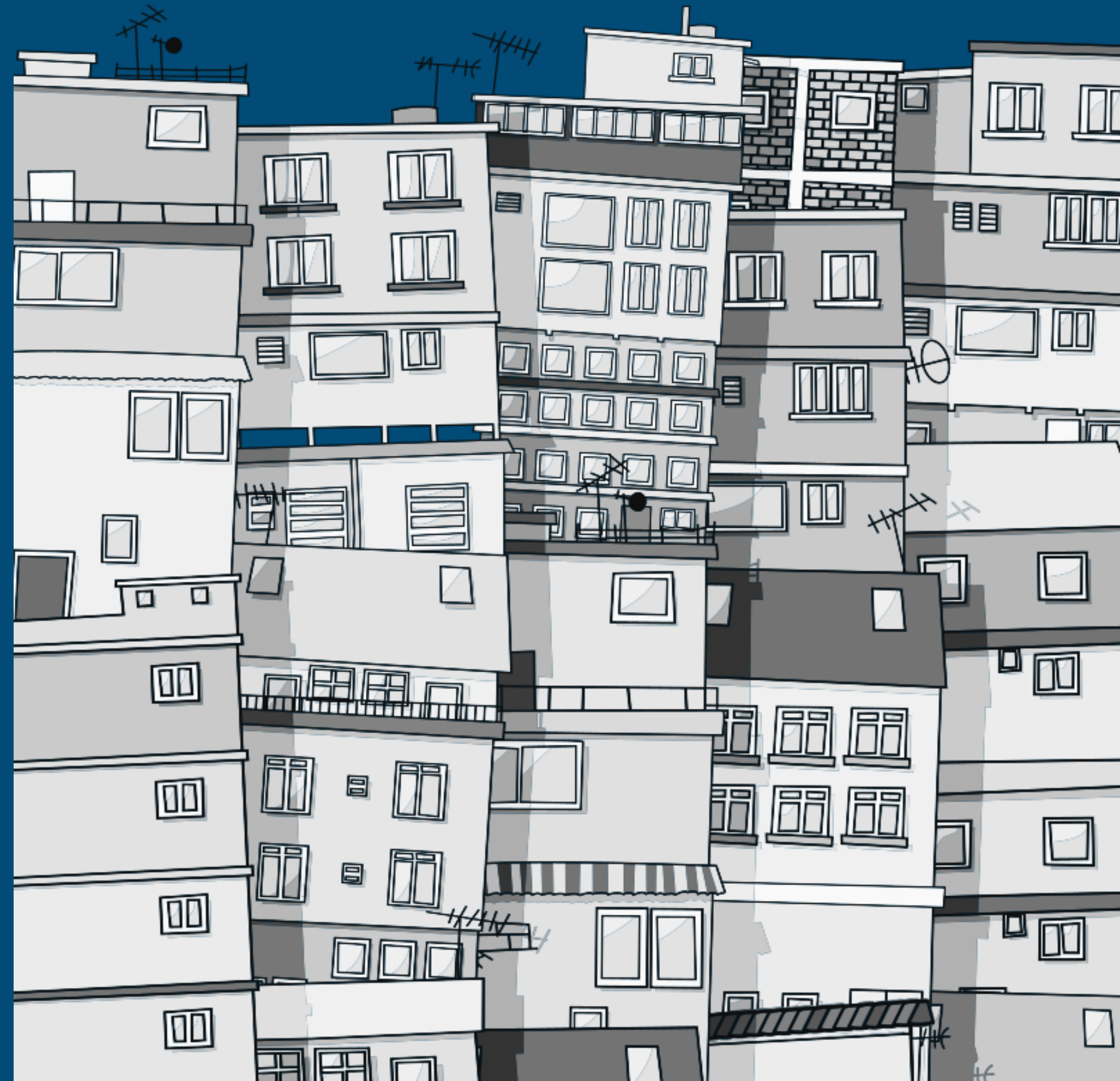
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# Appendix



## Appendix 1a: Current Efforts in redeveloping slums in ASEAN

### CASE STUDY: Indonesia National Slum Upgrading Project

Source: WorldBank (2016)

Components	Strengths	Weaknesses
<b>Institutional and Policy Development</b>	Supports the development of policies for sustainable slum upgrading and prevention	Sustainability of policy development efforts is heavily dependent on political commitment of the government
<b>Integrated Planning Support and Capacity Building for Local Governments and Community</b>	Support capacity building (including training, workshops, and knowledge exchange events between cities) Design and implement slum improvements in 154 cities	Requires sufficient resources and expertise to conduct training and workshops and educate the slum dwellers Incomplete coverage of slums due to limited knowledge of all existing slums
<b>Urban Infrastructure and Services Investment Support</b>	Address the improvement of primary, secondary, and tertiary infrastructure in slum areas	Execution of infrastructure projects may face logistical and implementation challenges Long-term maintenance requires support and resources
<b>Implementation Support and Technical Assistance</b>	Enhances project monitoring and coordination Provide technical support, advisory services, and training to project management and implementation	The effectiveness of technical assistance depends on the availability and expertise of the support teams
<b>Contingency for Disaster Response</b>	Allocates funds for disaster preparedness measures for quick response to emergencies	Heavily dependent on the availability of funds



## Appendix 1b: Current Efforts in redeveloping slums in ASEAN

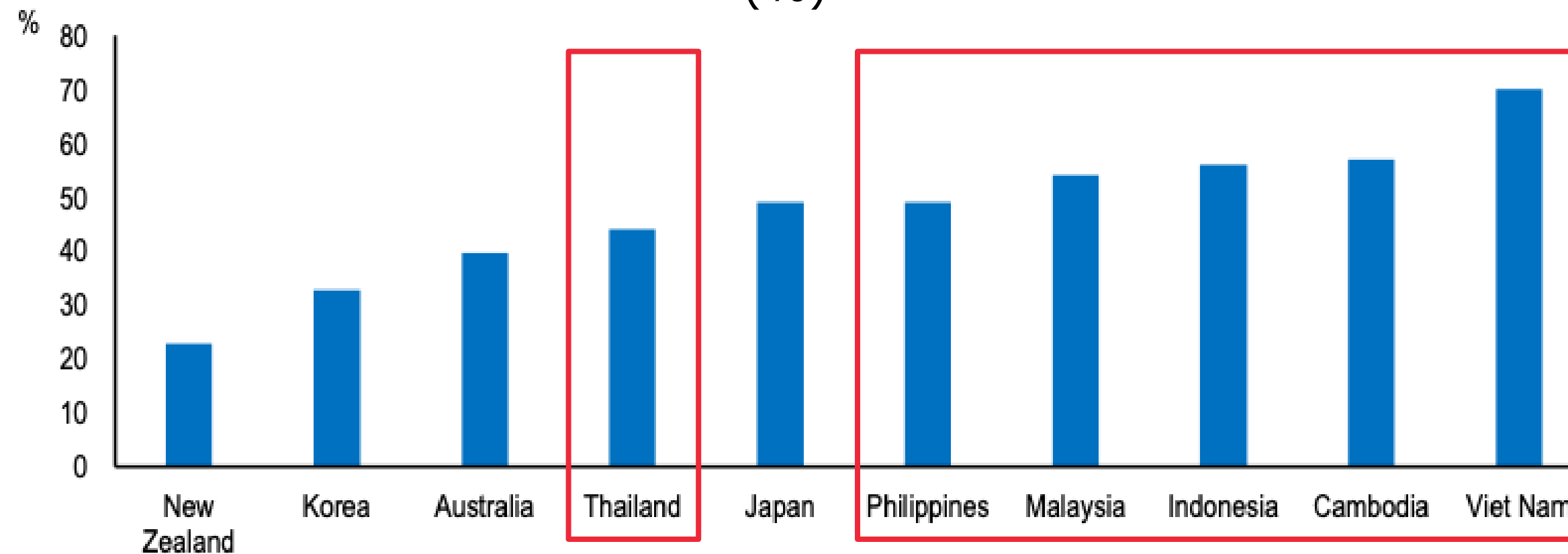
### **CASE STUDY:** Philippines National Slum Upgrading Strategy

Components	Strengths	Weaknesses
<b>Socialized Housing Programs</b>	Provide affordable housing options for low-income families	The supply of socialized housing units may not always match the high demand, resulting in a significant gap between the number of families in need and the available units
<b>Community Mortgage Program (CMP)</b>	Focus on empowering informal settlers by providing them with a pathway to secure land tenure	Limited coverage and scale in addressing the overall demand for land tenure security and housing among informal settlers in the Philippines
<b>Informal Settler Families (ISF) Housing Program</b>	Address the housing needs of vulnerable and marginalized communities by constructing medium-rise buildings and vertical housing projects	Relocating informal settlers from their original settlements to new housing projects can be a complex process
<b>Slum Upgrading and Rehabilitation</b>	Involve upgrading and enhancing the physical infrastructure of slums, including access to clean water, sanitation facilities, electricity, and paved roads.	The long-term maintenance and sustainability of the infrastructure and facilities can be a complex task

## Appendix 2: Changing Job Landscape and Its Consequences on Jobs

Pressing need for Upskilling which shows great significance of trainings & workshops

Share of jobs at risk of automation or a probability of significant change  
(%)



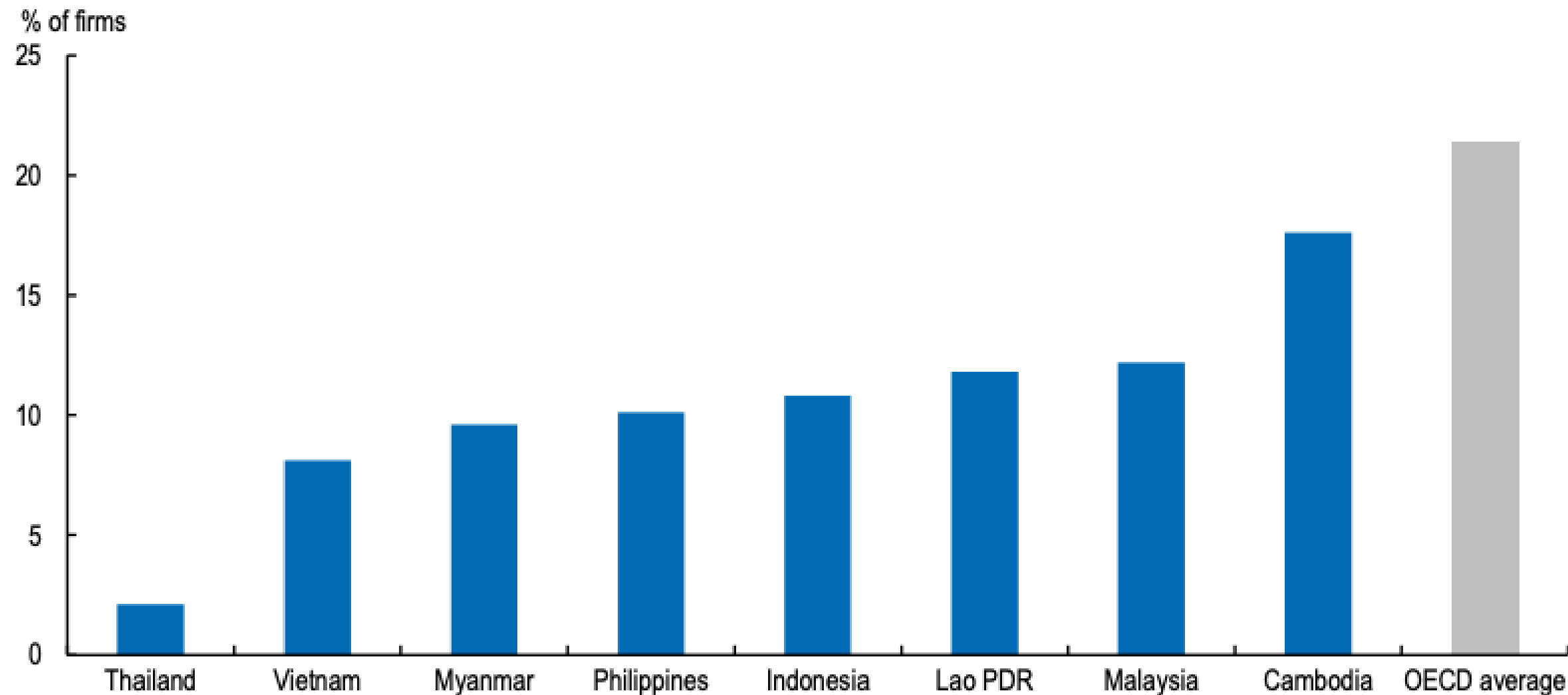
Note: The bars represent occupation-based estimates for the risk of automation, based on Frey and Osborne (2017)

Source: OECD (2020<sup>[9]</sup>), OECD Economic Surveys: Thailand, OECD Publishing, Paris, <https://doi.org/10.1787/ad2e50fa-en>.

## Appendix 3: Low Level of Education in ASEAN

Most ASEAN countries have inadequately educated workforce which affect employability.  
This shows a significant need for training & workshops to educate the people  
(including slum dwellers)

Percent of firms identifying an inadequately educated workforce as a major constraint



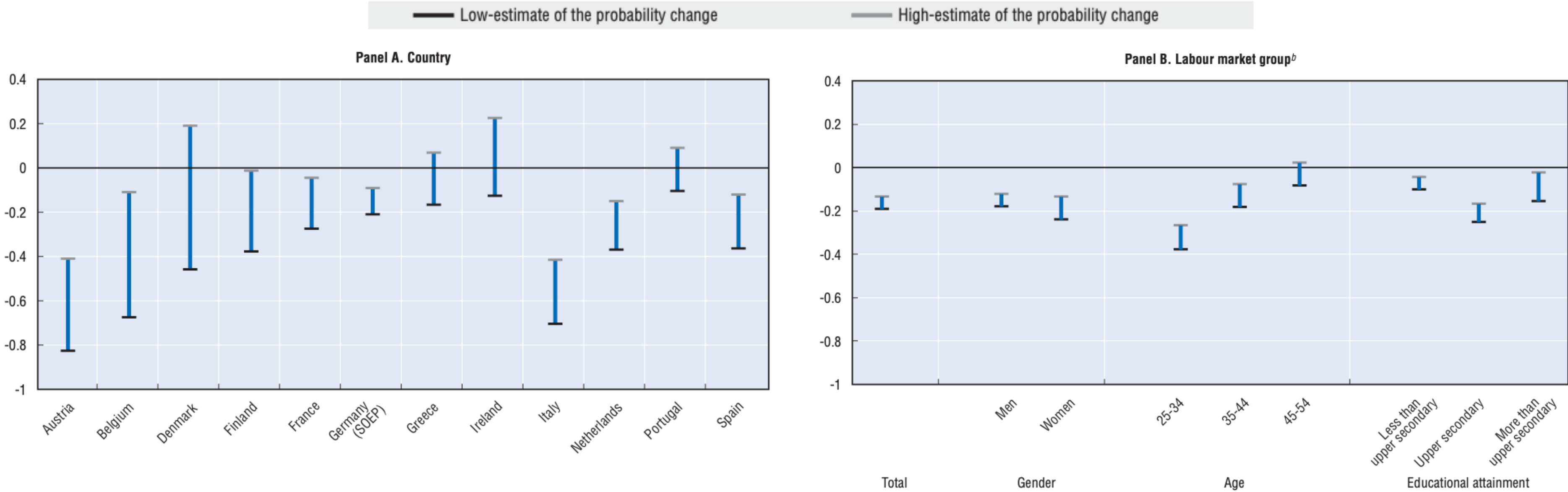
Note: Refers to 2015 for Indonesia, Malaysia, Philippines and Vietnam; 2016 for Cambodia, Myanmar and Thailand; 2018 for LAO PDR. OECD average includes Chile (2010), Czech Republic (2013), Estonia (2013), Greece (2018), Hungary (2013), Israel (2013), Italy (2019), Latvia (2013), Lithuania (2013), Mexico (2010), Poland (2013), Slovak Republic (2013), Slovenia (2013), Sweden (2014) and Turkey (2019).

Source: World Bank (2020), "Enterprise Surveys", <https://www.enterprisesurveys.org/>.



# Appendix 4: Training Reduces the Risk of Unemployment

Estimated change in the probability of being unemployed as a result of training, percentage points <sup>a</sup>

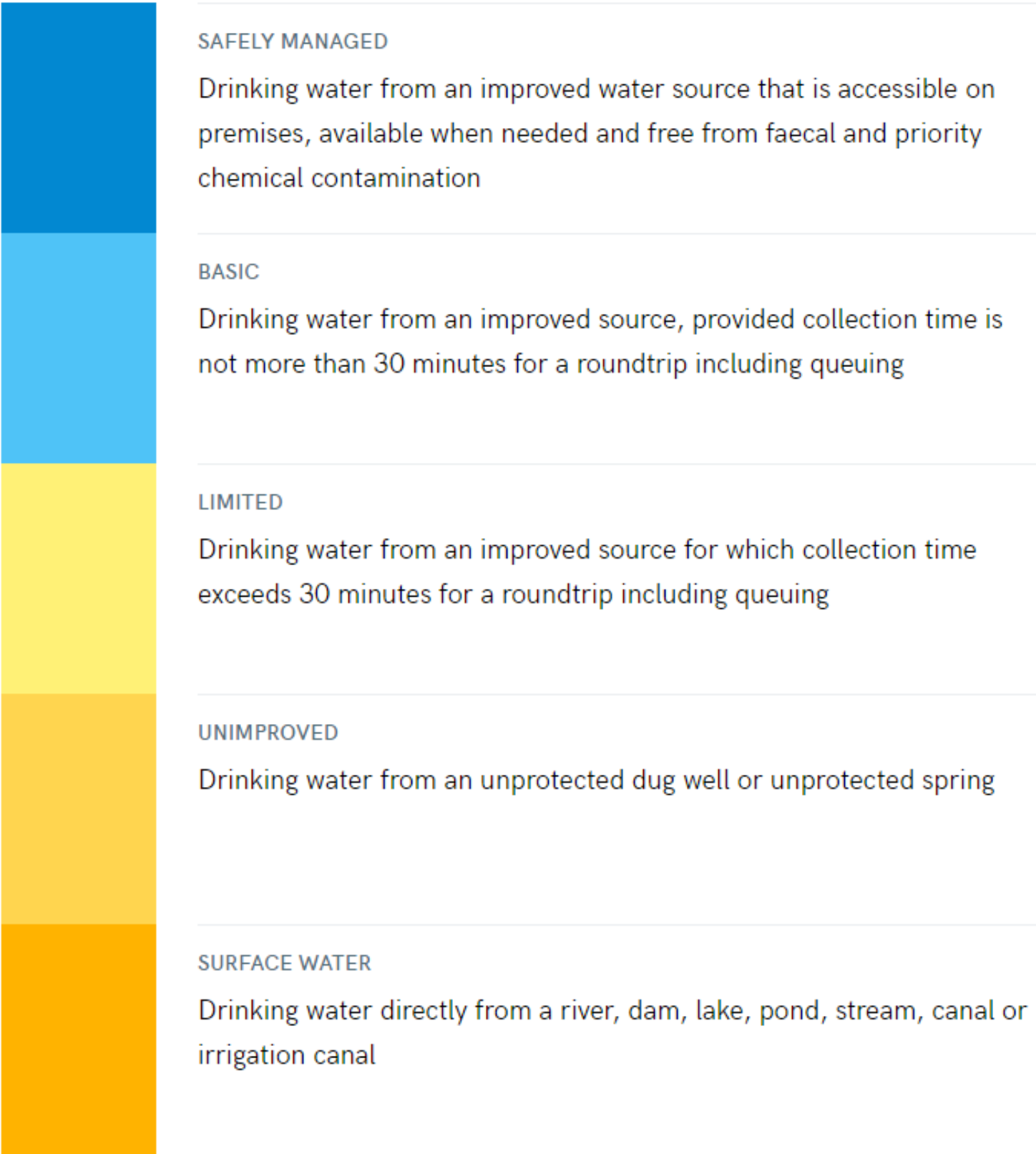


a) Ten per cent confidence interval of the impact of a 10% increase in the number of years in which an average individual receives some education or training. The estimates are obtained by maximising the conditional likelihood of a fixed-effect logit model. Beyond individual fixed effects, the specification includes country-year dummies, age and age squared, health status, family type, marital status, consensual union and presence of children. Family-related variables are interacted with gender. Data refer to individuals aged 25-54 years.

b) The sample includes the countries shown in Panel A.

# Appendix 5: Drinking Water Ladder

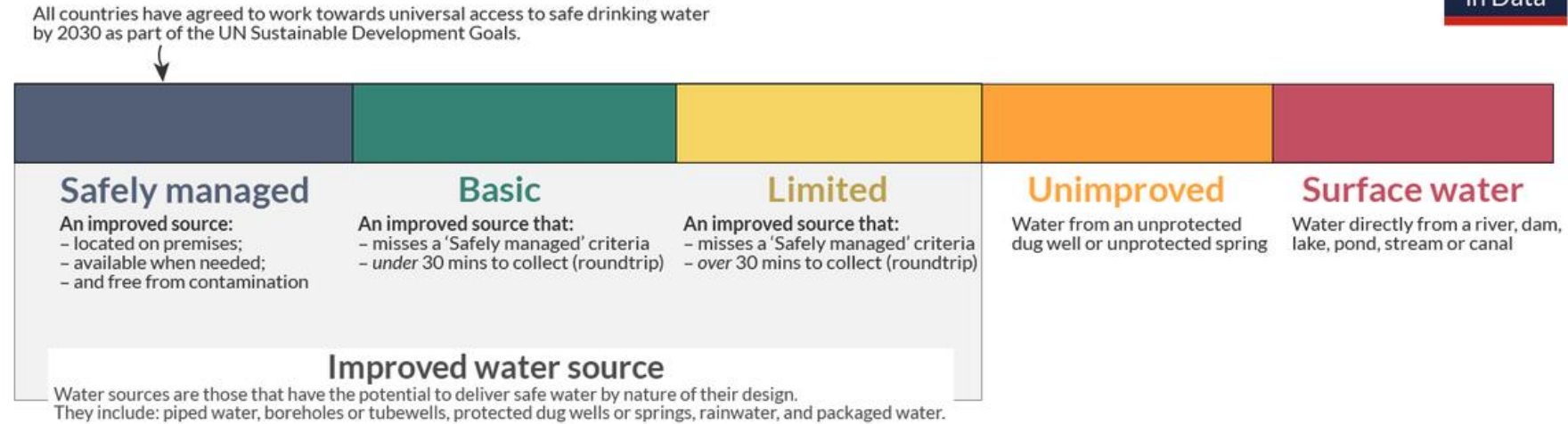
## Drinking water ladder



Source: UNICEF Joint Monitoring Programme



## Definitions across the drinking water ladder

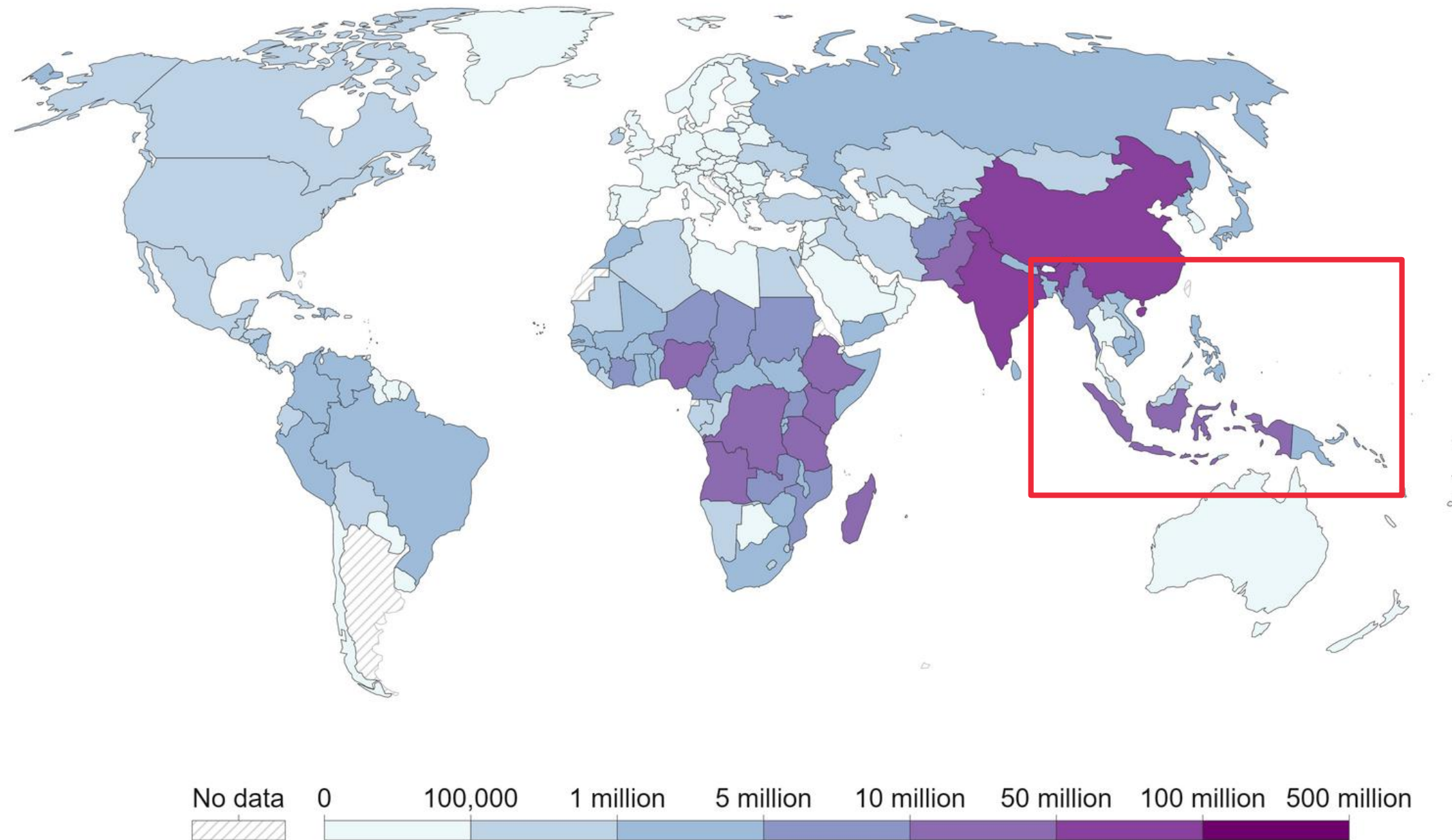


Source: WHO/UNICEF Joint Monitoring Programme (JMP) for Water Supply and Sanitation.

## Appendix 6: Number of people without access to an improved water source

Number of people without access to an improved water source, 2020

Our World  
in Data

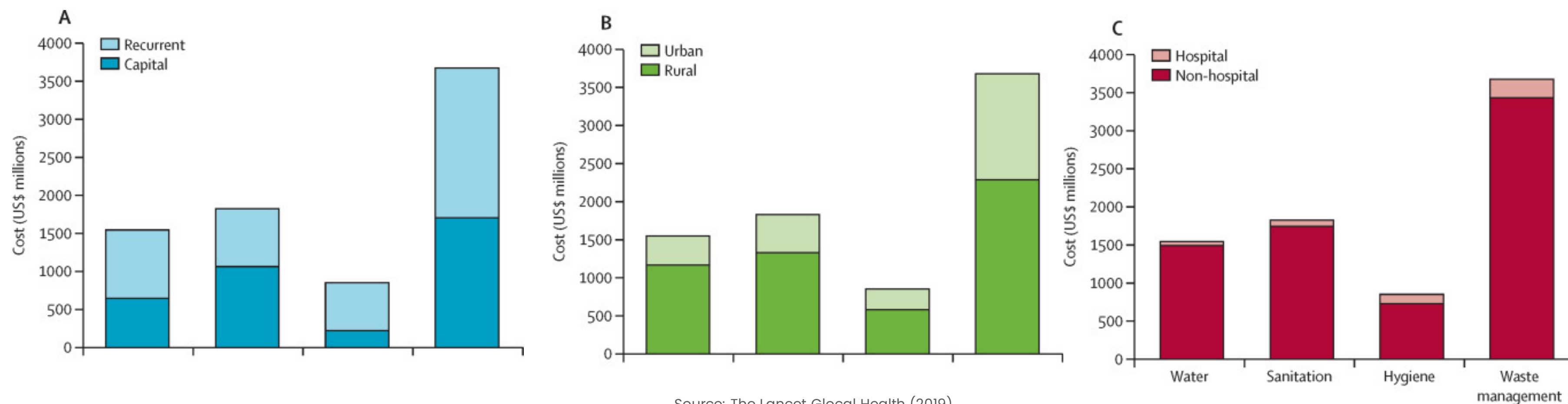


Source: WHO/UNICEF Joint Monitoring Programme (JMP) for Water Supply and Sanitation

OurWorldInData.org/water-access • CC BY



## Appendix 7: Total costs of meeting basic water, sanitation, hygiene, and waste service levels in the least-developed countries' public health facilities



Sanitation is the most capital-intensive service and the only one for which the majority of costs is for capital investment (figure 1A). For all four services costs are concentrated in rural facilities (figure 1B) and non-hospital facilities (figure 1C). Hence, providing donations would greatly contribute to improving access to a safe and clean environment.

## Appendix 8: Volunteering program effectiveness

Volunteering trips have a meaningful impact on the residents of slum areas as they can benefit from education initiatives and the construction of water points facilitated by volunteers.

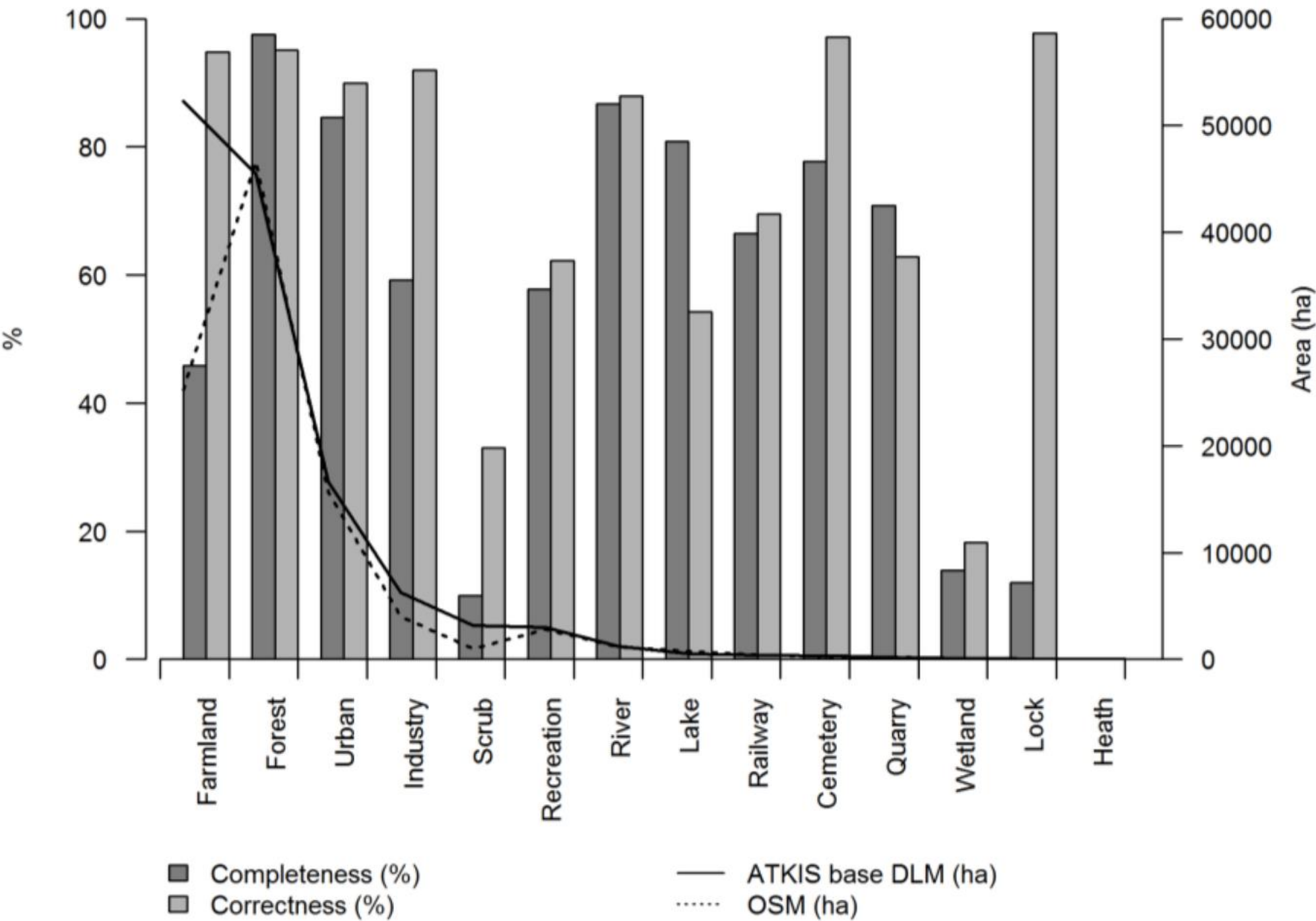
### Corporates' opinion on whether SSAs provide important services to meet the needs of individuals and families in need:

#### Findings

**80% of general public respondents** (n = 2,000),  
and **82% of corporate funders** (n = 182), agree/strongly agree that SSAs provide important services.



# Appendix 9: Quality Evaluation of VGI Using Authoritative Data—A Comparison with Land Use Data in Southern Germany



Source : Dorn, H. (2015)

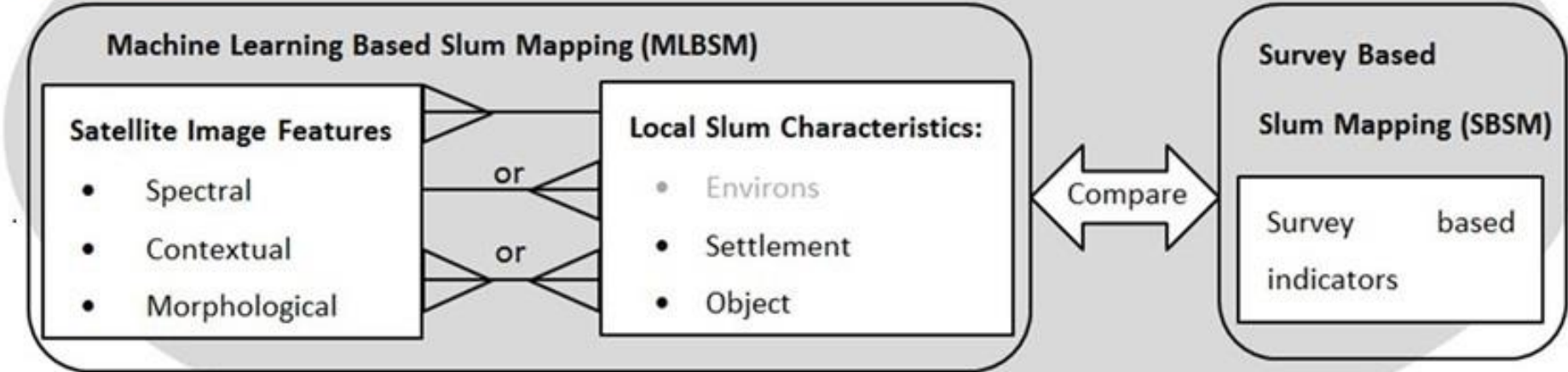


# Appendix 10: Slum Upgrading Programs in Bandung, Indonesia



## SLUM UPGRADING PROGRAMS

- Consistent, quick, detailed, and accurate slum maps
- Planning documents (as a guidance)

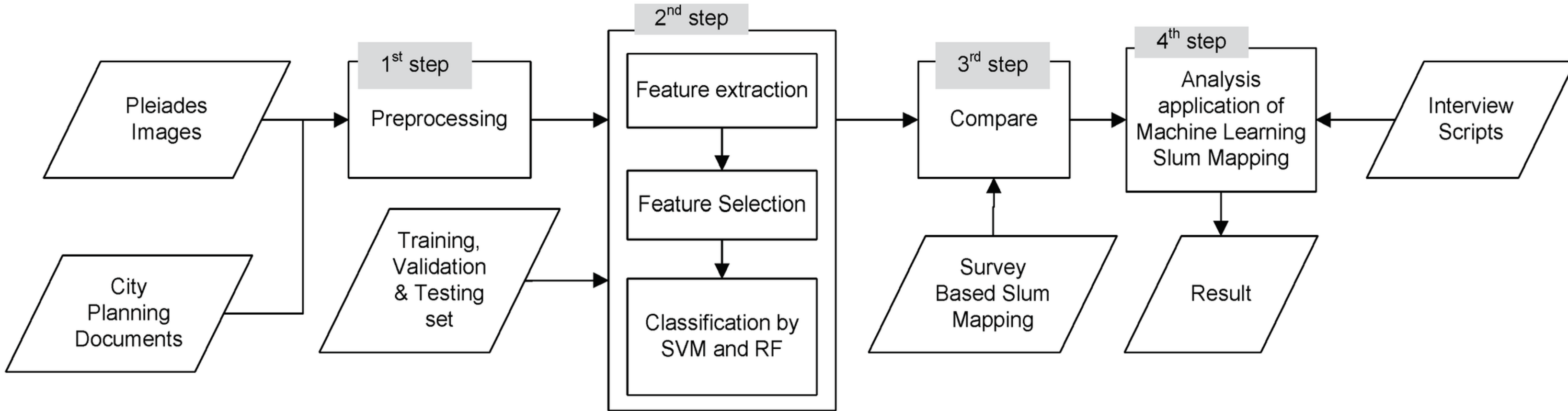


Tile	Raw Image	Ground Truth	SVM Classification	RF Classification
1. Antapani (TS1)				
2. Babakan (TS2)				



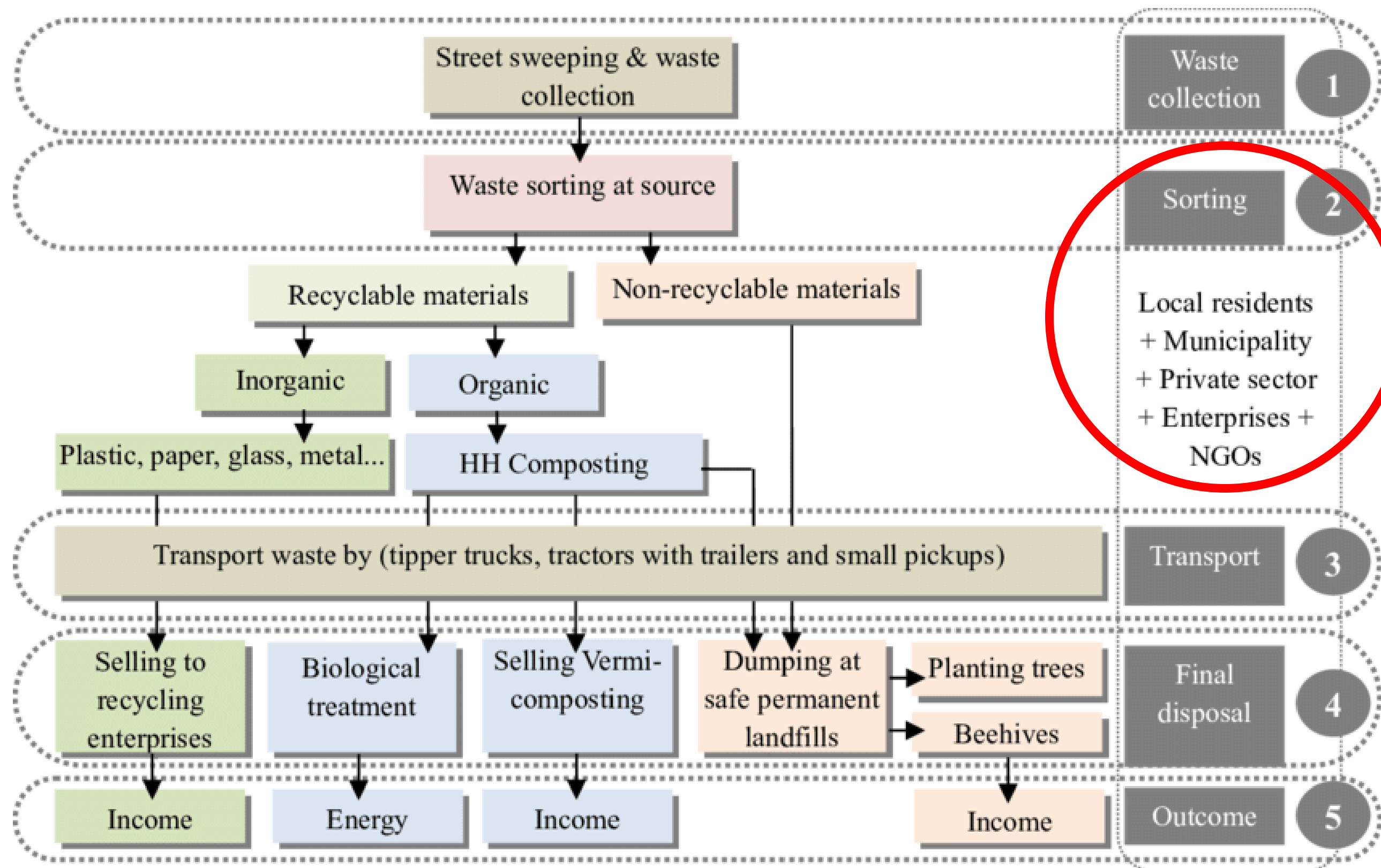
Source: Leonita et al. (2018)

## Appendix 11: Satellite Imaging Implementation



Source: Leonita et al. (2018)

## Appendix 12: Waste Management Implementation



Source: : Elrayies, G.M. (2016)