DOMESTIC WATER AND LATRINE MARKET SYSTEMS IN THE CONTEXT OF FLOODING IN JAKARTA

Penjaringan and Kampung Melayu Village, Jakarta Province, Indonesia

Pre-Crisis Market Analysis (PCMA) 15th - 31st March 2016

December 2016

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Annexes

Front cover photo: Water cart seller being interviewed by a PCMA Taskforce Member as part of the PCMA process, Jakarta, April 2016

Acknowledgements

This report was made possible by the generous support of the American people through funding received from the United States Agency for International Development (USAID) under a grant from the Office of U.S. Foreign Disaster Assistance (OFDA). The activities documented in the report formed part of the global program entitled 'Promoting Market-based Responses to Emergencies through WASH Market Mapping and Analysis' (OFDA Grant AID-OFDA-A-15-00038) managed by Oxfam GB. The contents are the responsibility of Oxfam and do not necessarily reflect the views of USAID or the United States Government.

Kurniawan Muhammad, Meili Narti, Magda Sirait, Agustinus Aribowo Nugroho, Fidia Wati, Angga Winata in the Oxfam Indonesia office took the lead in the PCMA process and preparation of this report. We would like to thank the 'Rights in Crisis' team from Oxfam Indonesia for their great insights to structuring this process; and Ellen Dahat for her excellent translation support.

We are very grateful of the commitment and dedication of the 'WASH and Markets' working group and taskforce team members who conducted this study (see Annex 4 for full list of participants) and the extensive support from the Local Disaster Management Agency in Jakarta Province. We are also grateful to Katie Whitehouse from the Global WASH & Markets Team in Oxfam Global Humanitarian Team and Tom Wildman, Regional WASH Co-ordinator Oxfam GB for their technical support and contributions toward the preparation of this report.

Disclaimer

Market systems are complex and fluid and are continuously changing such that if market-based programming is used in future contingency planning in Jakarta a review mechanism should be integrated into the planning to ensure relevance of market-based programs within the current context of the market system.

The scenarios which informed the data collection and subsequent analysis for this report reflect a small sample set of the areas targeted. Similarities in collected data analysis suggest trends which have been reflected in the analysis and recommendations from this report. It should be noted that any recommendations taken forward may require subsequent analysis to validate their design and scalability. Indeed, future use of the recommendations from this report should also take into consideration the relevance of the data collected and any need for baseline updates.

List of Acronyms

BPBD	Local/Provincial Disaster Management Agency
CSR	Corporate Social Responsibility
ECHO	European Commission Humanitarian Office
EMMA	Emergency Market Mapping Analysis
EPR	Emergency Preparedness & Response
DRR	Disaster Risk Reduction
HEA	Household Economic Approach
IDP	Internally Displaced Person
INGO	International National Government Organization
IRC	International Rescue Committee
NGO	Non Government Organization
PDAM	Government owned water utility
PCMA	Pre Crisis Market Analysis
RAM	Rapid Assessment Market
RW	Community Group

EXECUTIVE SUMMARY

In the humanitarian context, market-based programs are a part of emergency preparedness, response or resilience building activities aimed to work with or strengthen local market systems to enable continuous accessibility to affordable and quality goods and services that are critical for the survival of vulnerable populations in order to mitigate the risk and impact of crisis.

Pre-crisis market analysis (PCMA) is a tool designed to assess market systems in order to identify vulnerabilities and opportunities within critical market systems in order to respond more effectively to crisis and importantly without further harming current market systems and livelihoods dependent on these systems by the introduction of external humanitarian response. The outputs of the work will be a set of market response recommendations that could complement current emergency preparedness and contingency planning based on scenario specific responses.

Jakarta is a city with a population of over 10 million people[i]. Built adjacent to the sea, over 40% of the city is built on land that predominantly lies below sea level. There are 13 rivers that flow across Jakarta which when combined with a long rainy season (Oct-May with a peak in January of 300mm monthly[iiiii]) and insufficient drainage of river channels (due to high rates of sedimentation and solid waste contamination clogging channels) make Jakarta highly prone to flooding. Unfortunately, Jakarta faces a more pressing flooding issue due to subsidence which is resulting in the city sinking at an alarming rate with estimates of about 5 to 10cm annually and even up to 20cm in the northern coastal areas[iv]. The consequent sea-level rises and infiltration are exacerbating the current flooding issues and exposing the city population to greater risk. Increasing rural to urban economic migration puts more pressure on the city authorities to address the flooding issues. However, in reality, subsistence is not an issue that will ever disappear and although flood defenses are being planned and constructed most will not completely alleviate the flooding issue nor be active for at least another decade due to their scale.

In Jakarta, flooding occurs seasonally, between October to March, when the increased water capacity due to the rainy season, combined with rising sea levels, overwhelms the city infrastructure. There are two types of flood. First is lower at 20-60cm flood occurring for up to one week on an annual basis and within areas close to sea or rivers. The second is a much higher 200cm flood lasting for at least one - two weeks that generally occurs every 5 years affecting but is increasingly affecting a larger proportion of the city.

The city of Jakarta is served by a well-established, government-controlled Local Disaster Management Agency (LDMA) which has contingency plans and budget to manage flooding. However, the LDMA has an ambition to improve its emergency response management in light of the increasing scale and scope of flooding. As such, market-based programming was seen as a potential opportunity in addressing some of these issues by potentially offering complementary market response activities for contingency planning that could be more effective locally and could spread the cost of the response within the market systems themselves.

The WASH infrastructure in Jakarta is mediocre but better established than other areas in Indonesia. There is no sewer network, although plans are in place for a city-wide rollout of a new sewer system by 2050[v]. Currently, wastewater is collected in drains direct to the sea or by exhauster trucks. There is a high incidence of illegal dumping of fecal sludge into drains that remains untreated. Water is distributed from water treatment plants managed by the government owned entity DPAM and also through private sector companies AETRA or PALYJA throughout the city via pipes or water trucking.

Major criticisms of the system is that it still fails to reach that majority of the population particularly the poorest communities who instead rely on more expensive water provided by local service providers and retailers.

To inform the PCMA, a decision-making Taskforce was created consisting of key stakeholders from government, utilities, INGOs, local NGOs, and disaster management agencies in order to define the scope of the research. The two WASH markets identified for assessment were water supply and latrine access. The target areas were Penjaringan and Kampung Melayu due to their increasing vulnerability to flood and concentration of relatively poorer communities.

Within these communities, a complex system of local formal and informal service providers and retailers has arisen to address the service gap accessibility, reliability and quality issues experienced from water supplies from the local utility. However, during floods, all communities find their water supply is cut off due to power failure with only those with stored water able to access it safely. In low floods, retailers remain open and water carts, bottled water and water trucking utilized. Costs for these goods and services are inflated by a minimum 25% cost increase and water quality, if not bottled, was significantly lower dependent on the source utilized by water cart sellers and trucking companies. In high floods, most businesses close as they accessed by customers or goods/services distributed to customers. There is a greater dependency on use of stockpiled goods within places of shelter and movement of people to IDP centers, many of which remain unregistered and unknown to disaster management agencies and therefore do not receive support by local disaster management services in a timely or sufficient manner during floods.

Latrines, whether domestic, non-domestic and public, in both high and low floods, are either flooded (as many are located on the ground floor) or remain unused as water supply is cut off. Critically, all latrines, due to local Islamic cultural practices, rely on water supply in order that the latrine is utilized appropriately for cleansing purposes. People are confined to the buildings in which they shelter to find alternative means of defecation. Even those people with access to latrine facilities in multi-storey building do not use the latrines for excretion (only urination) due to the lack of water. They would prefer to use 'flying' latrines or openly defecate out of windows during the night directly into the street. As such accessibility and use of latrines is dependent on the functionality of water supply market and the two markets for this study are intrinsically connected.

Interestingly, though this is not the case for all households, during annual low floods, affordability of WASH supplies is less of an issue than accessibility to them. Certain communities have created personal and community coping strategies to manage the impact of the reoccurring annual floods stockpiling survival goods and pooling resources amongst households to pay for services e.g. water trucking if required. A comparison of costs of WASH goods and services, even at inflated prices, relative to income shows an ability to be able to pay particularly if households are aware they need to save in advance. The vast majority of respondents expressed dissatisfaction at current in-kind distribution stating that accessibility to water, power and latrines were the main issues during flooding which were often the things not provided by disaster management agencies. As such provision of free goods may be, for some residents, an inefficient use of resources in these particular areas, except for those within IDP camps in high floods. Being aware of such community coping strategies is good practice in ensuring that flood crisis support is targeted at those that cannot help themselves.

There are many opportunities that could be capitalized upon in order to mitigate and address flood risks dependent on the flood type. These are summarized below:

Table 1: Response Recommendation Summary

IMMEDIATE RISK MITIGATION ACTIVITIES

	Response Name	Description	Critical Market		Scenario: Emergency		City Wide Scalability Potential
			Potable Water	Latrine Access	Type 1	Type 2	
4.2.1	Water storage tanks	Mandating minimum emergency water storage within critical points in the value chain	✓	✓	✓	✓	High
4.2.2	Identify and prepare IDP camps	Integrating unregistered IDP camps into EPR plans and readying them through training, stockpiling and infrastructure upgrades	✓	✓	✓		High

EMERGENCY PREPAREDNESS & TEMPORARY RESPONSE ACTIVITIES

	Response Name	Description	Critical Market		Scenario: Emergency		City Wide Scalability Potential
			Potable Water	Latrine Access	Type 1	Type 2	
4.3.1	Flood Protection Public Pay Toilets	Toilets operated by water and sanitation/ waste management companies to provide services to affected people during floods.		✓			Med
4.3.2	Flood protection for Water Service Providers	Building flood defences around critical WASH infrastructure to maintain WASH services	✓	✓		✓	Med
4.3.3	Stablising costs of potable water in emergencies	Improving WASH distribution and implementing financing mechanisms to reduce and/or subsidise cost to consumers	✓	✓	✓	✓	Med

4.3.4	Downstream Wastewater Overflow Management	Monitoring and maintaining drainage systems to mitigate risks of overflow due to blockages	✓	✓	✓	✓	High
4.3.5	Partnership between refill stations and cart sellers	Improving access and quality of water supply through partnerships between local informal & formal service providers	✓			✓	Med

RESILIENCE BUILDING ACTIVITIES

	Response Name	**Description**	**Critical Market**		**Scenario: Emergency**		**City Wide Scalability Potential**
			Potable Water	**Latrine Access**	**Type 1**	**Type 2**	
4.4.1	Distributed Management Model	Establishment of PPPs between DPAM and local service providers (e.g. water stations) to increase reach and quality of water services	✓			✓	High (if similar value chain exists)
4.4.2	Supporting local license to operate	Establishment of quality standards within regulatory frameworks of already utilised filtration systems to legitimise local service provider operations	✓		✓	✓	High (if similar value chain exists)
4.4.3	Urban Building Regulations for Sanitation	Revision of urban planning regulations to mandate improvements in water storage and sanitation provisions of all buildings	✓	✓		✓	High

Within Jakarta disaster management plans, response activities are carried out at the village level by LDMA and as such the contingency plans would have to reflect changes at this level particularly given certain market responses may be more appropriate in some villages as opposed to others based on the market capacity and vulnerability to flooding.

Indeed, as indicated earlier, the type of emergency will influence the type of response implemented and with this in mind the LDMA will need to develop scenario-specific contingency plans to ensure the right level of response is implemented at the right time. In addition, the Taskforce will need to agree on what tier of responses it would be interested in implementing whether that be immediate risk mitigation, emergency preparedness and temporary response, or resilience building activities, or a combination of all of them.

The final section of this paper provides details on how further data collection and analysis activities, contingency plan reviews, situation monitoring and sustainable financing can be employed to support decision-making with regards to market responses to be trialed in Jakarta should the LDMA be interested in using market-based programming to support its work further.

The PCMA conducted in Jakarta is part of a global programme funded by USAID/OFDA to understand how pre-crisis market analysis could be better applied to the WASH sector; to apply a PCMA in the urban context (as the vast majority to date have been conducted in rural areas where systems are often more simplistic); and how the results of such an analysis could be successfully operationalized. As such this PCMA report forms the basis of a wider ‘PCMA approach’ being tested and refined within Bangladesh, Indonesia and Zimbabwe. Process learnings taken from the delivery of this work in Indonesia have also been documented but will not be discussed in this report. Those learning will be delivered in a broader report collating learning from other PCMAs completed globally to discuss how to improve the effectiveness of the PCMA approach overall going forwards.

SECTION 1: CONTEXT AND METHODOLOGY

A key aspect of this work is to build awareness within the WASH and Humanitarian sector of the possibility of utilising complementary market based responses for emergency preparedness and response and resilience building throughout the PCMA process. In addition to articulating the strategic potential of market-based programming, the approach to the PCMA fieldwork also incorporates capacity building of decision-makers and field practitioners to enable others to utilise this approach in the future.

Within Indonesia, Jakarta was focused upon to meet OFDA objectives of targeting an urban area prone to crisis but where a well-established and financed governance structure exists within national and local government for disaster management. In addition, Jakarta has an interesting WASH system with a combination of public utilities and private sector and informal service providers and retailers providing access to WASH goods and services in different capacities across the city. Oxfam does not currently provide support to Jakarta during its annual floods due to some limitations, such as: as International organization, Oxfam cannot directly respond to emergency in Indonesia without the calling for international assistance by the national government. However, Oxfam saw an opportunity to provide support to the LDMA (and other associated emergency response and preparedness (EPR) organisations) by investigating the prospects of utilising market-based responses to support EPR and resilience building within the city to complement LDMA's disaster management approaches.

1.1 Why market analysis is important?

All humanitarian interventions have an impact on markets either before, during or after a crisis occurs. Analyzing markets is important at all stages of humanitarian responses in order to:

- Do no harm: mitigate risks of medium and long-term negative impacts on local markets and peoples livelihood created by humanitarian responses bypassing local economic dynamics;
- Increase efficiency and effectiveness: use existing market actors' capabilities and networks to provide for the needs of affected population, analyze how markets respond to a humanitarian response to allow for timely adjustments throughout implementation;
- Strengthen preparedness and emergency response;
- Support livelihoods and local economic cycles in all stages of preparedness and emergency response, to support resilience building and bridges the divide between humanitarian and development agendas.

Importantly, this approach also encourages a local sense of ownership and accountability to emergency preparedness and response and resilience-building which are critical in terms of reducing dependency on external support being the default response and brings more community-based inclusivity to contingency planning.

The Pre-Crisis Market Analysis (PCMA) is an approach to conducting market assessments prior to emergencies in order to anticipate how markets will respond after a shock occurs. It builds on earlier experiments with market baseline mapping and analysis conducted in pre-crisis settings.

PCMA is designed to help agencies to improve preparedness, feed into future planning efforts and contribute to the design of disaster risk reduction programs by identifying certain parts of market systems which are not functioning well or may be vulnerable to shocks. Increasing the speed of emergency responses or mitigating disaster risks by utilizing or strengthening market systems to support disaster management planning would potentially reduce the impact on lives and livelihoods and begin to address the longer term or chronic nature of poverty and vulnerabilities.

1.2 Methodology for OFDA Programme

The PCMA is an adapted version of the Emergency Market Mapping and Analysis (EMMA) methodology. EMMA is an iterative process of ten steps from preliminary analysis to communication of results, including key analytical steps: market mapping, gap analysis, market analysis and response analysis. The core feature of the approach is the production of market system maps, showing how the market actors interact and how the market chain is influenced, in its functioning, by environmental factors (institutions, rules, norms and trends) as well as by key infrastructures, inputs and market-support services.

In order to meet a number of learning objectives for this program, a new methodology for delivering the PCMA was developed in an attempt to address key challenges identified through a global review of PCMA's conducted to date. This has resulted in the following revised 'PCMA Approach' being developed, tested and iterated upon by the three countries involved in the OFDA Program:

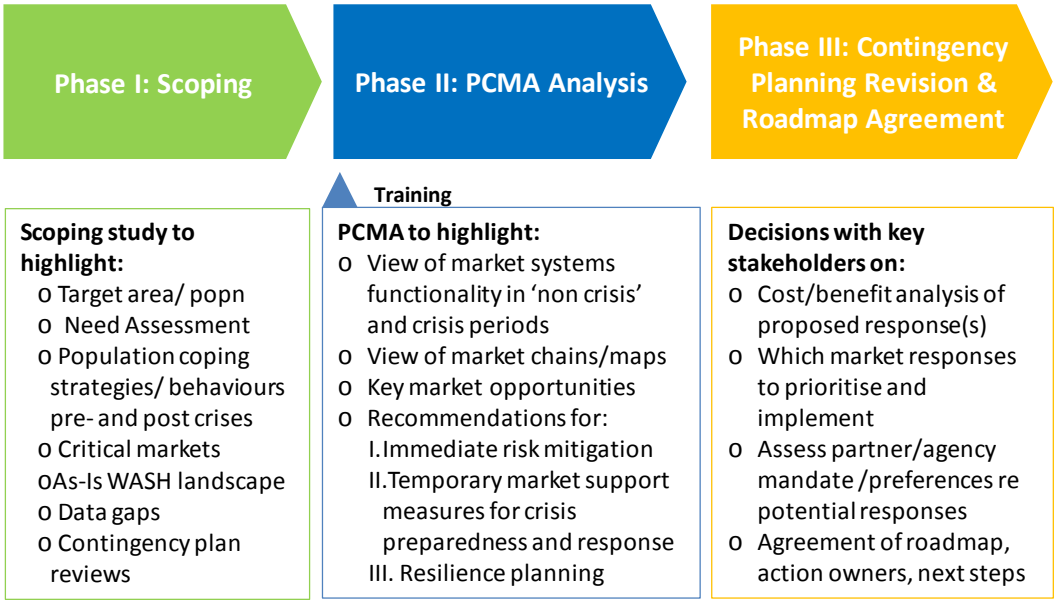


Figure 1: Revised PCMA Approach

Within Section 4 of this report, the results of the Phase I: Scoping will be presented. This provides an overview of the current situation in Jakarta and the context within which the PCMA is taking place. This phase also included a '**Reflection Workshop**' in which key stakeholders including emergency response agencies were invited to discuss current effectiveness of contingency plans and WASH challenges. Market-based programming was presented as a new tool that could potentially complement local contingency plans and a joint capacity building and delivery plan agreed for conducting field analysis to better understand the local WASH systems current existing within agreed vulnerable areas.

Within Section 5 of this report, the results of the Phase II: PCMA Delivery will be discussed and recommendations presented to take forward to Phase III: Contingency Planning. For each market system investigated, two maps have been produced, the first showing how the market systems function in the current situation, and the second capturing the most likely impacts of the shock scenario on the market system.

SECTION 2: SCOPING

2.1 Purpose and Approach

The purpose of this section of the report is to provide a high-level summary of the scoping activities undertaken. Previous learning feedback from other PCMAs have indicated that the 10 day delivery plan for PCMAs (often delivered with a mix of both experienced and inexperienced staff) creates an environment where there is inadequate time for secondary data analysis and informed preparation of localised data collection materials which can lead to more generic, high-level PCMA recommendations and a lack of confidence in the process (particularly if it does not capitalise on previous research done with households/markets in the local area). The Scoping Phase of the OFDA-funded PCMA work is intended to assess whether providing this additional time for scoping activities produces stronger PCMA recommendations and greater overall buy-in from local stakeholders in the approach.

Essentially the Scoping Phase looks to answer the following core question in order to refine our scope and questioning to a practical and in-depth level for the short project timeframe and differing levels of experience within PCMA delivery teams: ***What are the critical market needs currently underserved in a crisis within vulnerable populations?***

In order to answer this core question, a series of desk-research, key informant interviews and a Scoping Workshop incorporating key stakeholders involved in provision of WASH goods and services were undertaken.

2.2 Stakeholder Mapping & Engagement

At both the institutional and community level there are a wide range of stakeholders involved in the provision, monitoring and consumption of WASH goods and services in both normal and crisis periods. The following stakeholder map shows the key stakeholders who at minimum needed to be involved in this research to input upon, validate and provide acceptance to the data and recommendations resulting from this work (either in interviews or workshops):

Table 2: Key Stakeholder List

Stakeholder Group	Role in WASH in Jakarta	Stakeholders	Influence in Study
Policy & Regulation	Sets policy & regulation for WASH services, standards, businesses etc	Ministry of Health Ministry of Social Affairs	High
Emergency Services	Providing services and goods for the affected communities during disaster	Disaster Management Agencies (BPBD (LDMA), Social Agency, SAR)	High
Public Utility	Providing services (water and power) during normal situation as well as during the disaster emergency	PLN, PDAM, AETRA, PALYJA	High
Other Service Provider	Providing services, goods during the normal and emergency situation	Yamaha, Private Water Stations, Water Cart, Local Smaller Vendors, Water Stations, Private Latrine Providers, Water Truckers	Med - High

Manufacturer	Major wholesale manufacturers and distributors of goods and services	Unilever, Wings, Kao, Indomaret	Low - Med
INGO/NGO/CBO	Assisting the communities to understand the importance of WASH during emergency an normal situation	Oxfam, Save The Children, World Vision, Mercy Corps, Dompet Dhuafa, ACT (Aksi Cepat Tanggap), Religious based organisation, IUWASH	Med
Community (in addition to household beneficiaries)	Day to day life on accessing the WASH facilities and practice in the areas, both during normal and emergency situation	Community leaders, health centers, 'unregistered' IDP centers (e.g. schools), community health groups	High

A multi-stakeholder Taskforce was created amongst key stakeholders (see Appendix for Task Force list) attending the **Reflection Workshop** to support the PCMA delivery and follow-on contingency planning activities to ensure local capacity building and continuity of engagement with key influential engagement partners. During the Reflection Workshop, hazard and vulnerability mapping was undertaken and consensus built amongst key institutional stakeholders on the most relevant and impactful crisis scenario(s) where WASH issues are believed to predominantly adversely affect vulnerable populations and in which localities. In addition the workshop participants analyzed the current contingency plans for flooding in Jakarta that were developed by multiple stakeholders (Government units, INGO, NGO, DRR Forum and Private Companies).

Key outputs of this phase of work defined the scope of the PCMA study in terms of target areas, populations, reference crises, critical markets, key stakeholders, and the strengths and weaknesses of current contingency plans. A summary of these outputs is detailed below. For detailed workshop reports please contact the Oxfam Indonesia team.

2.3 Reference crisis

Reference Crisis Identification

Jakarta is at risk of a number of hazards with the main ones considered for this assessment detailed in Figure 2 below. In order to asses which would be used as a reference crisis for this market assessment the hazards were firstly ranked against impact and frequency within the city as well as population vulnerability to the hazard. Flooding was deemed as the most impactful crisis to focus the PCMA upon due to its increasing severity, frequency and impact on low-income communities living in high flood risk areas.

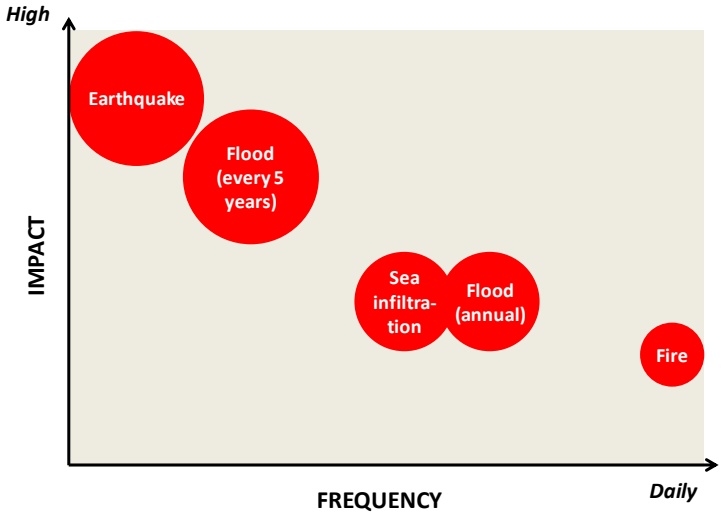


Figure 2: Hazard Analysis: Mapping crisis frequency vs impact

Jakarta is a city with a population of over 10 million people[vi]. Built adjacent to the sea, they city is built on land that predominantly lies below sea level. The city itself is sinking about 5 to 10cm annually and even up to 20 centimeters in the northern coastal areas[vii]**.** There are 13 rivers that flow across Jakarta which when combined with a long rainy season (Oct-May with a peak in January of 300mm monthly[viiiix]), rising sea levels and insufficient drainage of river channels (due to high rates of sedimentation and solid waste contamination clogging channels) make Jakarta highly prone to flooding. Floods in Jakarta are divided into two. Firstly, the flooding caused by overflowing rivers due to heavy rains causing surges downstream such as in Bogor; and secondly, from sea water infiltration that has affected several areas on the north coast of Jakarta including Kamal Muara, Pluit, Penjaringan, Kalibaru, Cilincing and Marunda.

Assessment of major and minor flooding

Typically, the reference crisis utilized for a PCMA is a high impact, life-threatening crisis. For this PCMA, we expanded our analysis to involve data on understanding the market system responses in both high impact and low impact floods because it became evident that different responses would be required for both and potentially addressing the low impact flood issues could have a positive mitigation and/or cost saving effect for high impact floods. Predictable reoccurring floods may be easier to design response programs for with local small-scale markets actors due to the reliability of the floods and the consequential ability to build more structured framework agreement and budgets to support such responses. For the purpose of this PCMA the two reference crises are:

Table 3: Reference Crisis Description

Type	Severity	Scale	Frequency	Duration	Summary of impact differences (from PCMA 2016)
1	High (200cm)	Citywide	Approx every 5 years	1-2 weeks	• Comparison to 2012/2013 flood • Complete shutdown of power and road infrastructure. Sewer overflows inundated • Inaccessibility of WASH and power services to those not flooded due to integrated nature of infrastructure • Internal displacement of people to formal and unregistered IDP sites. The wealthier stay in hotels. • Closure of all local, community-level WASH service providers and vendors • Closure of schools, public health centers • Limited ability to continue income-generating activities (both formal and informal) • BPBD operates to deliver aid through community centers and representatives
2	Low (20-60cm)	Localized	Annually in months of Oct - May	Up to 1 week	• Comparison to annual floods • Complete shutdown of power and partial disruption of road accessibility. Sewer overflows in use but not overflowing. • Inaccessibility of WASH and power services to those not flooded due to integrated nature of infrastructure • Limited displacement of persons. People have coping strategies in place due to regularity of flood to prepare financially for the floods and to stockpile accordingly • Most local WASH retailers remain open • Partial disruption of local WASH service providers • Complete shutdown of DPAM piped water supply • Closure of schools, public health centers • Limited ability to continue income-generating activities (both formal and informal) • BPBD operates to deliver aid through community centers and representatives

2.4 Geographic Focus & Profiles

As a result the Scoping Phase of work, two areas were agreed for focusing the PCMA. These two areas were also being supported by other INGOs (Save the Children, World Vision, and Mercy Corps) and it was decided that incorporating all agencies into this work would be more effective and inclusive in terms of collection of field level data, community insights and developing a coordinated response.

Area one is Kampung Melayu Village, East Jakarta (population 110,000) and area two is Penjaringan Village, North Jakarta (population 30,000)[x]. In Penjaringan Village, the team was only focusing on sub-village (RW) RW 01, 02, 03, 06, 13 and 17, while in Kampung Melayu the team was focusing in sub-village (RW) 04, 05, 06, 07, 08.

These areas were two of the most affected areas for major flooding in 2007, 2012 and 2013. In addition, on an annual basis these areas experience minor flooding in the months of November to March (see tables 4 and 5). Important to note is the correlation between the rainy season and dengue fever due to increasing pooling of stagnant water. In addition, North Jakarta experiences higher level of flooding than East Jakarta due to the combination of being downstream and competing with sea level rises and infiltration causing overflows of the systems within Penjaringan.

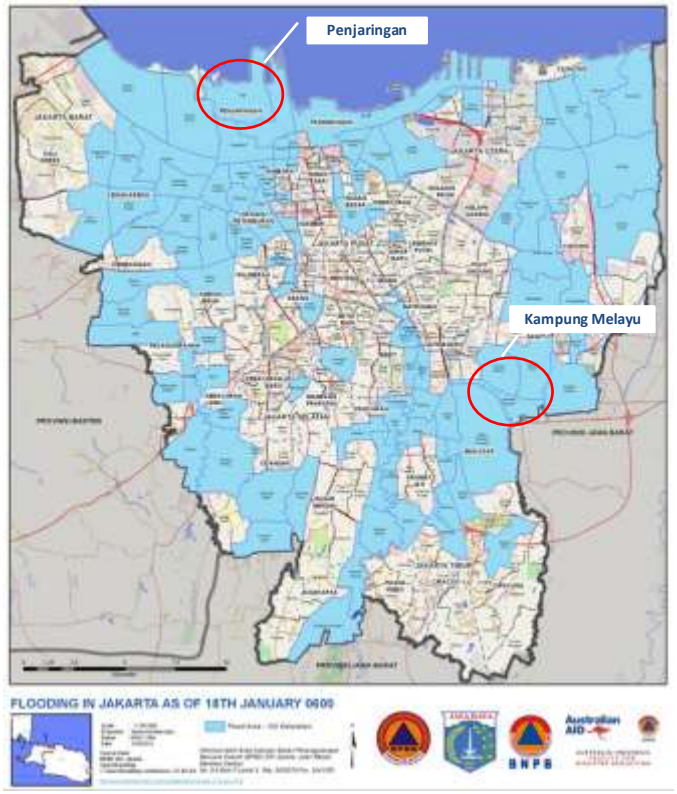


Figure 3: Jakarta Flood Map (Jan 2013) and Target Areas for PCMA[xi]

Table 3: Seasonal calendar North Jakarta

Activity/Month	3	4	5	6	7	8	9	10	11	12	1	2
1. Dry season												
2. Rainy season												
3. Dengue season												
4. Eid-Mubarak (urban to rural migration)												
5. Infiltration sea water												
6. Fire												

Table 4: Seasonal calendar East Jakarta

Activity/Month	3	4	5	6	7	8	9	10	11	12	1	2
1. Dry season												
2. Rainy season												
3. Dengue fever												
4. Eid-Mubarak (urban to rural migration)												

2.5 Location Profile Summary

	Penjaringan	Kampung Melayu
Area (ha) [xii]	395	48
Population Size [xiii]	108,163	30,416
Population Density [xiv]	28,071	63,973
Housing Type[xv]	Permanent, multi-storey building	
Avg Household Size	4	4
Geographic Features	Located next to the sea and confluence point for river tributaries and artificial sewer overflows	This area is in the flat area in urban Jakarta, located just next to Ciliwung river
Road Quality/Access	• Good quality paved roads • Many higher than ground floor level • Only partially flooded in Type 2 flood	
Power Quality[1]	Most household connected to mains power but outages occur weekly. During floods the power is usually off.	
Primary Water Source	Utility PDAM	
Primary Latrine Access	Pit latrine or communal pay for use facility	

2.6 Current Crisis Mitigation & Response Activities in Target Locations

Flood Mitigation Projects

Hard-infrastructure flood mitigation projects have been utilized by Jakarta Provincial Government to try and reduce the risk and impact of floods. This has included channel dredging, reservoir constructions and installation of water pumps.

In January 2014, Central Government agreed to build 2 dams in Ciawi, Bogor and a 1.2km tunnel from Ciliwung River to Cisadane River to ease downstream discharge levels into Jakarta. In addition, a 1.27km with capacity 60 cubic meters per second underground water tunnel between Ciliwung River and East Flood Canal is being worked to ease Ciliwung River overflows. Theoretically, if successful,

1 This is based on anecdotal evidence from the surveyed areas and requires further validation with the utility to confirm frequency of blackouts

this should mean that within 10 years decade Jakarta should start to see a reduction in flooding in high-risk areas.

Contingency Planning for Floods in Target Areas

The flood contingency plan is already very thorough in terms of mapping out the capacity of the stakeholders in Jakarta and how to mobilize their capacity during an emergency.

Currently, during crisis, stock is provided freely to residents exclusively by BNPB (National Disaster Management Agency) in terms of goods (domestic water for drinking and non-drinking purposes and NFIs) providing temporary relief funded by the government and/or individual philanthropists or other donors. This is distributed at local community and health centers that can be accessed in times of flood. Transportation plans also exist for mobilizing movement of treated water from the mountains and treatment centers to centralized distribution centers across the city[xvi] .

Area contingency plans have a lifecycle to be reviewed every time it was activated to measure how applicable the contingency plan is and how to make it more efficient, effective and sustainable. However, the contingency plan does not take into consideration the capacity of the local market systems into its planning.

2.7 Selection of critical market systems

The PCMA is intended to analyze WASH markets, which are critical for supporting the basic needs and livelihoods recovery locally vulnerable populations.

Criticisms of the PCMA approach to date have weighted upon the fact that the beneficiary (or consumer of the goods and services) are not involved enough in the PCMA data collection and thus critical markets are assumed based on secondary data, preferences of service providers and retailers and a few select community members. There is therefore a limited understanding of household preferences, habits, attitudes and practices to inform critical market selection and appropriate market based response design.

Attempting a different approach to this PCMA, rather than narrowing down to critical WASH-specific service providers or goods prior to starting the fieldwork, it was decided that broader market systems would be explored from a beneficiary perspective in the first instance. This would then allow us to narrow down on critical market goods and services from a beneficiary perspective to guide data collection.

As such, prior to the start of the study, consultations with members of the relevant clusters led to agreement on the following market systems being investigated:

- Domestic water
- Latrine access

Taking this into consideration, questionnaires were developed that integrated more human-centered, qualitative data collection tools (see Annex for sample questionnaires used). Feedback loops at the end of each day ensured that the questionnaires and survey targets were updated daily to allow for rapid iteration and refinement of questions to meet data collection objectives.

SECTION 3: FIELD DATA COLLECTION & ANALYSIS

3.1 Objective

For all each market, the key goals are to understand:

- Functionality of market system and its capacity to cover needs of the target groups
- Constraints in access and entry points for target groups; and
- In light of the analysis, recommending most appropriate interventions to ensure current and future target groups have access to the market system.

The key analytical questions forming the basis of questioning to understand both the domestic water and latrine market systems were as follows:

1. What are household knowledge, attitudes and practices within the target population with regards to water and sanitation in both crisis and non-crisis periods?
2. What are the constraints, if any, affecting the accessibility, affordability and/or quality of water and latrine services/goods in both crisis and non-crisis periods?
3. What are the possible indirect and direct market response opportunities to address identified household behaviors and/or market constraints inhibiting the provision of affordable, safe and accessible water and latrine services or goods to the target population, in both crisis and non-crisis periods?

At the time of mapping in March 2016, the market is considered not in crisis and no other social, economic or environmental influences on the market system are currently causing extreme stresses from the norm.

3.2 PCMA Training & Data Collection Approach

Current PCMA training is designed to provide on-the-job learning to participants in order that they learn about the PCMA approach and conduct field data collection activities and analysis in order to build in-country capacity with regards to market-based programming.

In December 2015, a preliminary PCMA training on the analytical concepts of market-based programming and pre-crisis market analysis was undertaken with the objective to include the participants in the field data collection in early 2016. A total of 36 participants from various backgrounds joined the training (see Annex for list).

In March 2016, a one-day PCMA refresher training was conducted followed by seven days of data collection across the target locations and two days of analysis to consolidate learnings and develop response recommendations. These activities were conducted between the 15 – 31st March 2016. The Global Urban WASH & Markets Advisor supported the PCMA delivery and collected learnings from the process also to support collaboration and knowledge sharing across OFDA program countries.

An experienced markets expert from Oxfam acted as the market focal point and conducted the refresher training. The participants were split into two teams with each team being led by an Oxfam Humanitarian or WASH advisor. The global advisor floated between both teams observing and providing input and advice.

Across the two target areas a total of 126 interviews were conducted. Focus groups consisted of representative samples of vulnerable groups living in the target locations or conducting emergency preparedness and response activities in the areas. Individual household interviews were conducted in addition to focus group discussions in an attempt to validate the key findings from the groups from an individual perspective, particularly with regards to sensitive data points (e.g. household incomes). Fewer interviews were conducted in Kampung Melayu due to lower availability of interviewers during the latter half of the field data collection activities in which teams visited Kampung Melayu. This was due to conflicting obligations of non-Oxfam participants and is detailed as a key learning for future data collection activities.

Table 5: Interview List

	Penjaringan	Kampung Melayu
Focus Group Discussions (representatives from households; community groups; IDP centers)	Total: 10 FGDs (5 male / 5 female) Total participants: 65 Female:35 Male:30	Total: 6 FGDs (3 male / 3 female) Total participants: 43 Female:25 Male:18
Individual Household Interviews	Total participants: 17 Female:10 Male: 7	Total participants: 3 Female:2 Male:1
WASH Service Provider & Retailers/Vendors Interviews	Total: 20	Total : 15
Sub total	Households: 82 (F 45 / M 37) Businesses: 20	Households: 46 (F 27 / M 19) Businesses: 15
Total	Households: 128 (F 72 / M 56) Businesses: 35	

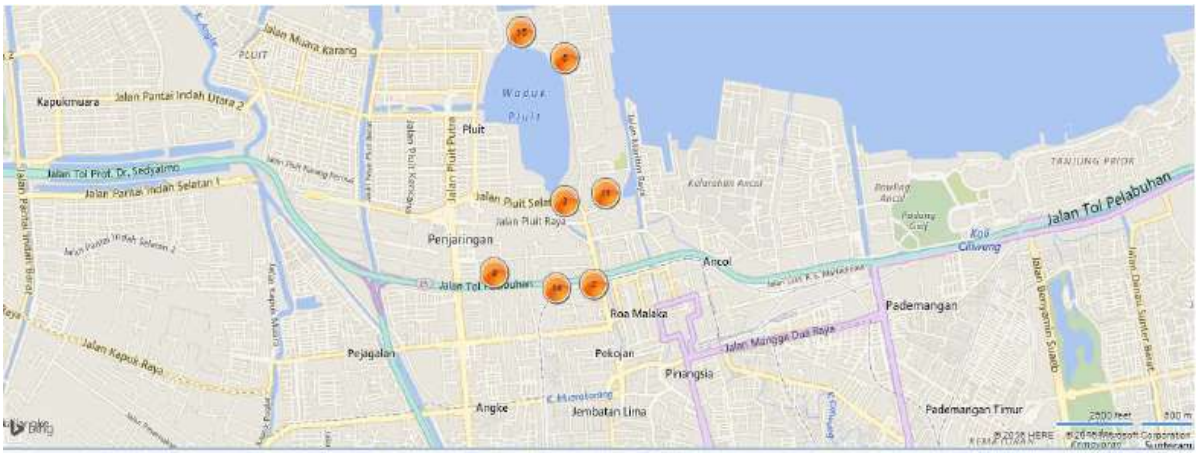


Figure 4: Map for Penjaringan with the locations of the data collection[2]

[2] *In certain locations, multiple focus group discussions were conducted with participants from the surrounding areas for ease of logistics. Due to difficulties in tracking GPS locations interview with individuals and businesses were not recorded. This data gap is looking to be rectified during the ICT mapping exercise referenced in Section 4.2*

Figure 5: Map for Kampung Melayu with the locations of the data collections[3]

3.3 Section Structure

The analysis of the two market systems is laid out in the rest of this section as detailed below. The findings are for both Penjaringan and Kampung Melayu as their reference crises, market systems, market actors and influences are very similar.

The presentation of analysis will first look at the WASH market environment affecting both the water supply (domestic water for drinking and non-drinking purposes) and latrine markets. The market environment is influenced by a combination of political, social, economic and environmental factors that need to be considered when understanding the conditions within the market system in both crisis and non-crisis periods. It will then present the WASH supporting infrastructure, which provides complementary support to enable WASH value chains from production to consumption (for water supply) or from excretion to disposal (for latrines).

The report will then focus on the water supply and latrine market system separately in periods of normality and crisis. A visual representation of the market will be followed by an explanation of the market value chain and market actors detailing how they perform in normality and react to crisis with regards to variations accessibility, affordability and quality of WASH goods and services to consumers[4].

Section 7 will then present potential responses to support markets during crisis.

It should be noted that although quantitative indicators with regards to price were accessible and easy to validate during the data collection exercise, it was harder to gain accurate estimates of capacity of WASH goods and services from market actors due to a wide range in capacities by actor. As such, this report details, at a high level supply and demand gaps and surpluses for opportunity identification and further investigation. This further investigation will be conducted during the cost-benefit analysis and ICT mapping to validate the feasibility of the responses proposed in section 7.

3 As above

4 The term 'consumers' is used in a general term to refer to all users that consume WASH goods or services. All or a subset of these consumers may be deemed as beneficiaries for the market response dependent on their vulnerability.

WASH Market Environment

Rural to urban migration – increasing migration has led to rapid urban development where demand is outstripping supply from formal services

A complex water market system has arisen within Jakarta, with the informal sector often supplying water to households where formal systems cannot provide a reliable, quality nor affordable service. The informal sector provides a vital link for access to perceived potable water however do not carry permits to sell water. Quality and source of water is questionable and control of prices by cartels difficult.

Policy & Regulation - A regulated water system exists but both formal and informal markets have arisen, particularly in low-income areas where access to formal service providers is limited

There is an uncertain and invisible environment for water supply in which the informal sector, a critical water service provider, feels unsecure to reveal itself to formal institutions for fear of closure inhibiting their inclusion in improvement programs and acknowledgement of their role in emergency response. The Ministry of Health carries out regular monitoring of PDAM services and formal, permitted water sellers but has limited visibility of the informal sector and its role in water supply and distribution.

Urban planning – attempts to regenerate low-lying low-income areas in Jakarta need to incorporate emergency preparedness and disaster risk reduction principles

The Governor of Jakarta has implemented a plan to rehabilitate low-income areas, particularly those affected by rising sea levels, to secure the city from flooding; resident's wellbeing; and overall aesthetics of the city. There are plans in place to rebuild certain areas of the city which may benefit from the outputs of this PCMA. As such, where plans exist now or in the future to regenerate certain areas, insight should be sought from this analysis to influence urban planning agendas to build resilience with the WASH systems to avoid the impacts of flooding in the future.

Subsistence & climate change – over 40% of Jakarta lies below sea-level sinking 3 inches a year[xvii]. Rising sea levels and increasing subsistence will continue to exacerbate flooding issues

Flooding is not going to disappear in Jakarta. It will become a more regular and severe occurrence and the city will need to defend itself with systems and infrastructure that can withstand inundations in the interim as hard-engineering solutions (predicted not to be ready for another decade) are built to mitigate the effects of subsistence and sea infiltration.

Muslim culture and WASH practices – cleanliness is key in local culture, particularly with respect to latrine practices, where flushing and anal washing are mandatory and as such wet latrines preferred

Cultural practices and behaviors lend rationale to individual's preferences and reactions to WASH provisions and designs. In this circumstance, accessibility to water is critical to both water use and latrine use.

Political discourse – new governor elections and recent political heat in Jakarta

It is important to be cognizant of the changing political environment when planning for market system changes as markets desire certainty for investment or commitment. When negotiating public-private partnerships or framework agreements with market actors these will be factors that need to be considered.

BPBD / LDMA emergency preparedness and responses (EPR) – **complementing not inhibiting local disaster management strategies with market responses is critical to their success**

The strong disaster management structures that already exist in Jakarta need to be improved upon and, likewise, traditional in-kind responses need to not inhibit market responses in the case of an emergency. Collaboration on contingency planning is therefore crucial to any market interventions.

3.4 WASH Supporting Infrastructure

Power reliability and road access - High dependency on road and power infrastructure across the water value chain results creates a high risk of immediate breakdown of WASH services if the supporting infrastructure fails

As many parts of Jakarta lie below sea level, pumping systems are required to move water from source to consumer. Decentralized service providers (e.g. refill stations and water tankers) and retailers of bottled water are dependent on roads for their water supply. Refill stations are dependent on both roads and power for access to water supply, treatment of water and distribution of treated water to households.

Sea defenses and sea-level rise – rapid subsistence and sea-level rise are countering flood defenses quicker than they can be modified

According to residents, flood walls and roads are heightened on an annual basis (approximately 10cm annually[xviii]) to cope with increases flood heights. However, some of these actually exacerbate local flooding issues. For examples, with ground floor flats now being below road level and the first to suffer flooding consequences.

Discharge overflow channels – designed to discharge surplus water from upstream channels, rain and surface run-off, these overflow channels provide some relief but are often compromised from sea infiltration

As downstream discharge routes to sea are blocked by increasing sea levels, overflow channels back-up and flood the areas they are trying to support. Flood water is then combined with sewerage causes a public health risk.

Water supply pipes –the pipes depend on electrical pumping due to level of the city and with water often contaminated due to pipe accidental and deliberate pipe breakages

PDAM supply water via underground pipes to customers and are costly to build and maintain particular in a dense urban environment of low-lying land where potential energy is not utilized to support the movement of water. Non-revenue water is of particular concern where PDAM water pipes may be tapped by other service providers, vendors, or households for sale or consumption without PDAMs consent. Aside from contamination and water loss issues associated with illegal tapping of water pipes, PDAM also has to substitute to cost of maintenance of these pipes and lost water without securing the revenue to cover operational costs. This is a wider, systemic issue to providing continuous and reliable piped water services to households across Jakarta.

Building height and storage – the majority of buildings in the surveyed areas are multi-storey providing shelter from floods

The height of buildings in the areas provides relief for residents in terms of shelter. Residents employ coping mechanisms during floods moving valuables and stockpiling survival goods on higher levels during floods. Larger public buildings are converted into IDP shelters.

3.5 Water Supply System Analysis

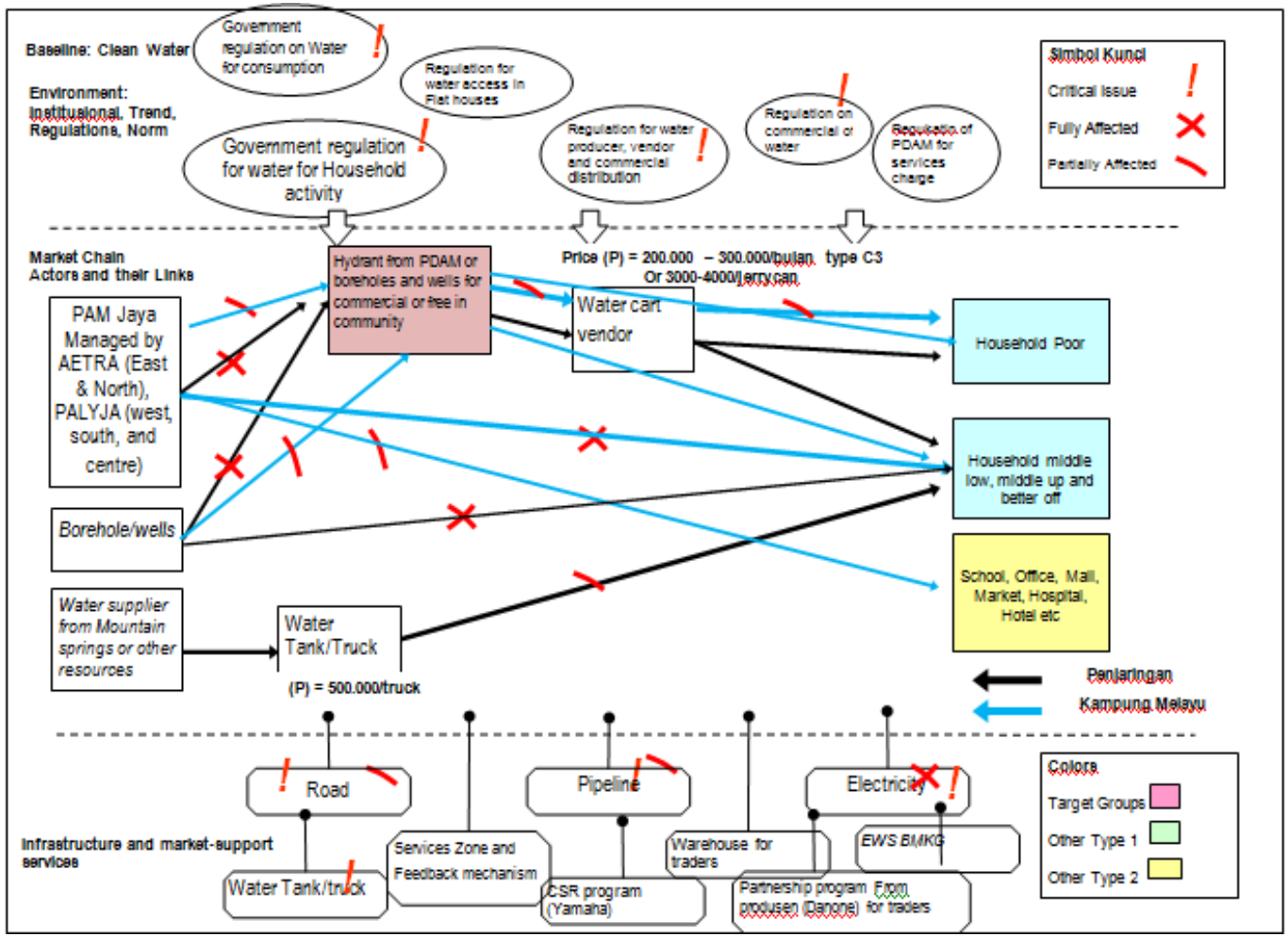


Figure 6: Market Map for Domestic Water (Non-Drinking)

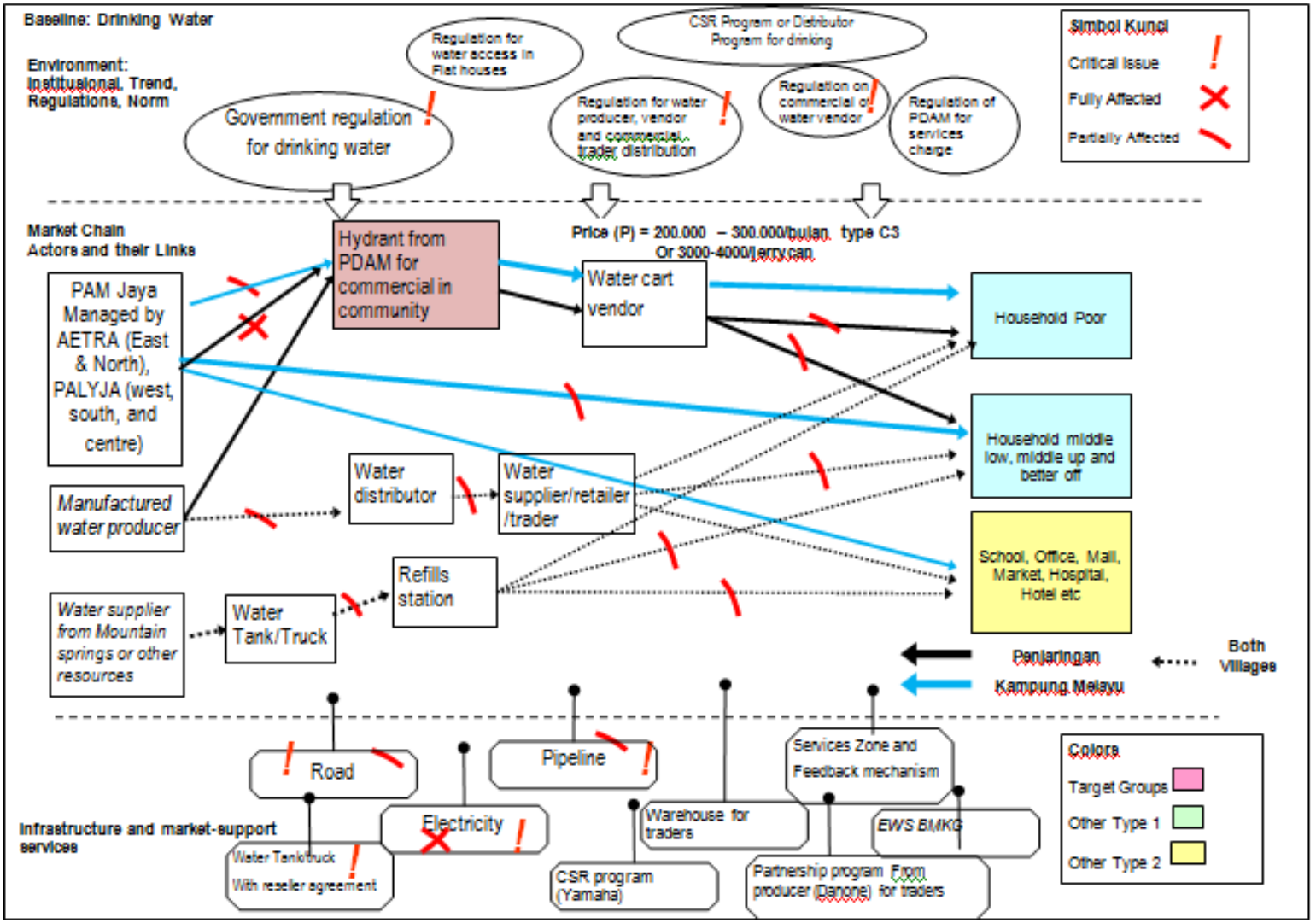


Figure 7: Market Map for Domestic Water (Drinking)

3.5.1 Value Chain Actors and Movement of Goods/Services

Within Jakarta, a complex system of local formal and informal service providers and retailers has arisen to address the service gap accessibility, reliability and quality issues experienced from water supplies from the local utility.

Domestic Water (non-drinking use)

1. **Kampung Melayu**
   - Water that is supplied by PDAM and distributed by AETRA is treated but the quantity of the water is low.
   - Water that is supplied by PDAM and distributed via public water hydrants (which are managed by individuals) is distributed to poorer families by water cart sellers. The water cart sellers are selling IDR 3000 – 4000 per 20 L jerry cans.
   - Each household has their own water storage mechanism based on their financial capacity. The lower up, middle up are mostly using plastic water storage, jerry can and/or buckets to contain their non drinking water.
   - Boreholes are also utilized but the groundwater quality is poor during rainy season with the water smelling or unclear. During the regular power cuts in the city, the water pumps used for the boreholes fail and as such households cannot access water.

2. **Penjaringan**
   - Water that is supplied by PDAM and distributed by PALYJA is treated but the quantity of the water is low.
   - Water that is supplied by PDAM and distributed via public water hydrants (which are managed by individuals) is distributed to poorer families by water cart sellers. The water cart sellers are selling IDR 3000 – 4000 per 20 L jerry cans.
   - Each household has their own water storage mechanism based on their financial capacity. The lower up, middle up are mostly using plastic water storage, jerry can and/or buckets to contain their non drinking water.
   - Boreholes are also utilized but the groundwater quality is poor during rainy season with the water smelling or unclear. During the regular power cuts in the city, the water pumps used for the boreholes fail and as such households cannot access water.
   - During flooding, communities access their water from the government as well as utilizing public pay toilet, and even water trucking from different areas.

Domestic Water (drinking use)

1. **Kampung Melayu**
   - Most families use PDAM water for cooking whilst using the refill water stations for drinking water. The stations are relatively affordable at around IDR 5000 per 19L gallon. Families preferred the refill water stations compared to the branded ones due to the price.
   - PDAM water still has chlorine smell therefore people rarely drink it. They only use it to wash their food before cooking.
   - Refill water stations mostly have permits from the owner of the machines, however water quality produced by these stations are not controlled regularly.
   - The refill stations are mostly getting their water source from water trucking to avoid the chlorine smells from the PDAM.
   - Most of the stations have power generator to support the electricity during the power cut.

2. Penjaringan

- Most families use PDAM water for cooking whilst using the refill water stations for drinking water. The stations are relatively affordable at around IDR 5000 per 19L gallon. Families preferred the refill water stations compared to the branded ones due to the price.
- PDAM water still has chlorine smell therefore people rarely drink it. They only use it to wash their food before cooking.
- Refill water stations mostly have permits from the owner of the machines, however water quality produced by these stations are not controlled regularly.
- The refill stations are mostly getting their water source from water trucking to avoid the chlorine smells from the PDAM.
- Most of the stations have power generator to support the electricity during the power cut.
- There is one vendor supported by CSR Yamaha, since his brother works for the CSR Yamaha. CSR Yamaha provides regular water quality checking. However, CSR Yamaha does not provide that support for new vendor anymore.
- The refill station provides delivery, with addition IDR 1000 – 3000 extras.
- During the flood, the government provides water trucking in some locations.
- Bottled water's price is increased during flood due to the limited accessible road available during the flood.

A summary of the different value chain actors is provided in Table 6 below.

Table 6: Summary of market actors

Actor	**Summary**	Accessibility	Affordability (IDR per liter)	Quality
DPAM (AETRA or PALYJA)	AETRA and PALYJA distribute water through pipes as well as water trucking. The cost is for piped water. Households only seem to utilize piped water for non-drinking purposes due to smell/cleanliness concerns.	Coverage does not extend to all homes	1-3 Monthly payment	Secondary contamination due to broken pipes
Water Trucking	Trucked water from private companies is perceived as safer than piped or carted water and people will pay more for it. People may have to travel to accessible point for truck to provide water due to narrow roads. Anecdotal evidence exists that some trucking companies illegally tap their water from DPAM pipes.	Urban density restricts movement to homes	30-40	Generally perceived as better quality though source quality needs to be determined by provider
Water Refill Stations	Mixture of permitted and non-permitted private service providers using trucked water and treating it at the station using filtration technologies (e.g. Yamaha) for immediate sale to customers at the station or distribution direct to household through cycle/tuk tuks. Stations use	Door to door service	1000	High

	trucked water over DPAM water as it is perceived as cleaner and is more attractive to customers despite it being treated at their stations. This increases operating costs which are passed to the consumer. Storage capacity exists at stations.			
Water Carts	Informal sector providers using trucked or piped water to supply water direct to households. Despite being a similar price to stations but with questionable water quality due to lack of treatment and source identification, people still purchase from these providers probably due to accessibility issues to (or knowledge of) other providers.		1000	
Bottled Water Retailers	Retailers sell bottled water (e.g. Danone and Nestle brands) direct to customers. Bulk supply is trucked from distributors direct to larger buildings. Households/individuals purchase direct at store/vendors. The price is substantially higher than all other services but quality guaranteed.		2000 -3000	
Rainwater Storage	Rainwater is not collected or stored for secondary use and is managed at a cost to the utility/local government through drainage and sewage overflow systems			

3.5.2 Users

Household characteristics between these two surveyed villages are very similar. The only differences are the types of livelihood where more of the communities are reliant on the fishing industry generating household income from labor, commodity sales and other indirect businesses (e.g. restaurants) which stop during floods.

Generally, all consumers use piped, trucked or carted water for non-consumption water uses and bottled, trucked or station water for drinking water. At the household level, water requirements are estimated as:

- Non-drinking: 100 – 125 l/p/d
- Drinking: 2 l/p/d

For other non-domestic facilities, the water requirements would need to be investigated on an individual basis with the assumption that during a flood, most public, commercial and industrial

facilities close and those requiring water will be critical services such as health centers, hospitals, public latrines (if accessible), and IDP shelters

3.5.3 System Reaction to Crisis

System Reaction to Crisis – WASH Goods & Service Providers

As supporting infrastructure fails due to the vulnerabilities discussed above, all water production and treatment stops. Piped water distribution fails and movement of water is limited to roads not inundated by water or from people wading through flooded streets .The reaction to this crisis situation is different according to the type of emergency being experienced (see Section 5 for description) and by each actor. This is summarized below:

Table 7: Market actor reaction to crisis

Actor	Reaction Summary	Accessibility		Affordability *(IDR per liter)*	Quality
		Type 1 Flood (High)	Type 2 Flood (Low)		
DPAM	Immediate treatment and distribution stops	○	○	No change but households have to purchase another source	Distribution pipes likely contaminated due to tapping and sewer overflows
Water Trucking	Limited access to local communities	○	◑	60-80 (+ 25%)	Mid dependent on illegal service supply
Water Refill Stations	Immediate treatment and distribution stops. Some stock may exist for collection if roads accessible.	○	◑	2000 – 3000 (+25%)	High
Water Carts	Immediate disruption to water source & distribution. Service continuation in hazardous conditions & less volumes increases prices.	◑	◑	2000 – 3000 (+25%)	Variable
Bottled Water Retailers	Immediate closure of shops during Type 1 flood. Type 2 flood shops remain mostly open but users have to wade through water to get to retailer.	○	◕	3000 - 4500 (+25%)	High

Harvey balls have been used to represent complete disruption (empty ball) to fully functional (full ball) market actors during crisis

Despite, the challenges faced by the system during floods, critically it was realized that the needs of households differed from assumptions of need and between different types of floods.

System Reaction to Crisis – Users

In Type 2 emergencies, middle income households have created personal and community coping strategies to manage the impact of the reoccurring annual floods. Affordability of WASH supplies is less of an issue than accessibility to them although poorer households may still have limited access

- The vast majority of respondents expressed dissatisfaction at current in-kind distribution stating that accessibility to water, power and latrines were the main issue during flooding which were often the things not provided during the floods. Some respondents saw the in-kind distribution as an income-generating activity as it provided extra goods for them, not survival goods.
- Floods occur at similar times each year and mid to better off households prepare for them financially. They stockpile basic necessities; move possessions to higher ground; and save money for low-income generating periods caused by floods in order to mitigate the impact. Households often 'pool' together to afford increased prices from high-quality water trucking services. Informal community structures exist to facilitate pooling of savings to facilitate this as a coping strategy, while the low income group of people only relying in the support coming from donations and government.

PDAM & non-PDAM customers utilize incumbent water service providers or retailers but risk ill-health to reach distributors and are impacted by inflated prices

- During type 2 floods, most decentralized service providers still supply water but often 1-2 meters of water exist between consumer and distributor creating a health risk for collection
- Households reliant on PDAM have to switch water providers without compensation from the utility for service failure compounding the effect of inflated prices
- In Type 1 emergencies, households are reliant on water cart sellers and LDMA for clean water (non drinking/domestic use) (non drinking water/ for domestic use) which results in highly variable supply, quality and affordability
- During both emergencies, the affordability of water decreases as limited supply takes advantage of growing demand and people find it difficult to engage in income-generating activities

In Type 1 floods, 'unregistered' IDP shelters emerge but do not have the facilities and support to cater for thousands of IDPs

- Certain communities live in ground level houses, which are inundated during Type 1 floods. During these floods respondents referenced the creation of 'unregistered' IDP shelters where the general public will converge due to it being a community centre (e.g. school, health centre, stadium etc) and/or a building with multiple levels which indicates 'safety' in a flood.
- The 'unregistered' centers, are potentially easier for communities to reach than official emergency IDP camps, but are not recognized by emergency service providers. An example being in 2013, a school in SDN 5 Penjaringan, was inundated with approximately 300 people, converging on the school for guidance and relief from the floodwaters given the school is 2 stories high. The school

staff was untrained for such a situation and the WASH facilities unable to cope under the stress. Piped water was cut-off and water trucks could not reach the school. Attempts to contact LDMA for assistance failed due to an inability to communicate with the right people coordinating the response. Resourceful staff leaders found a nearby supermarket which had not been flooded and moved water by hand from the supermarket to the school.

3.6 Latrine Market System Analysis

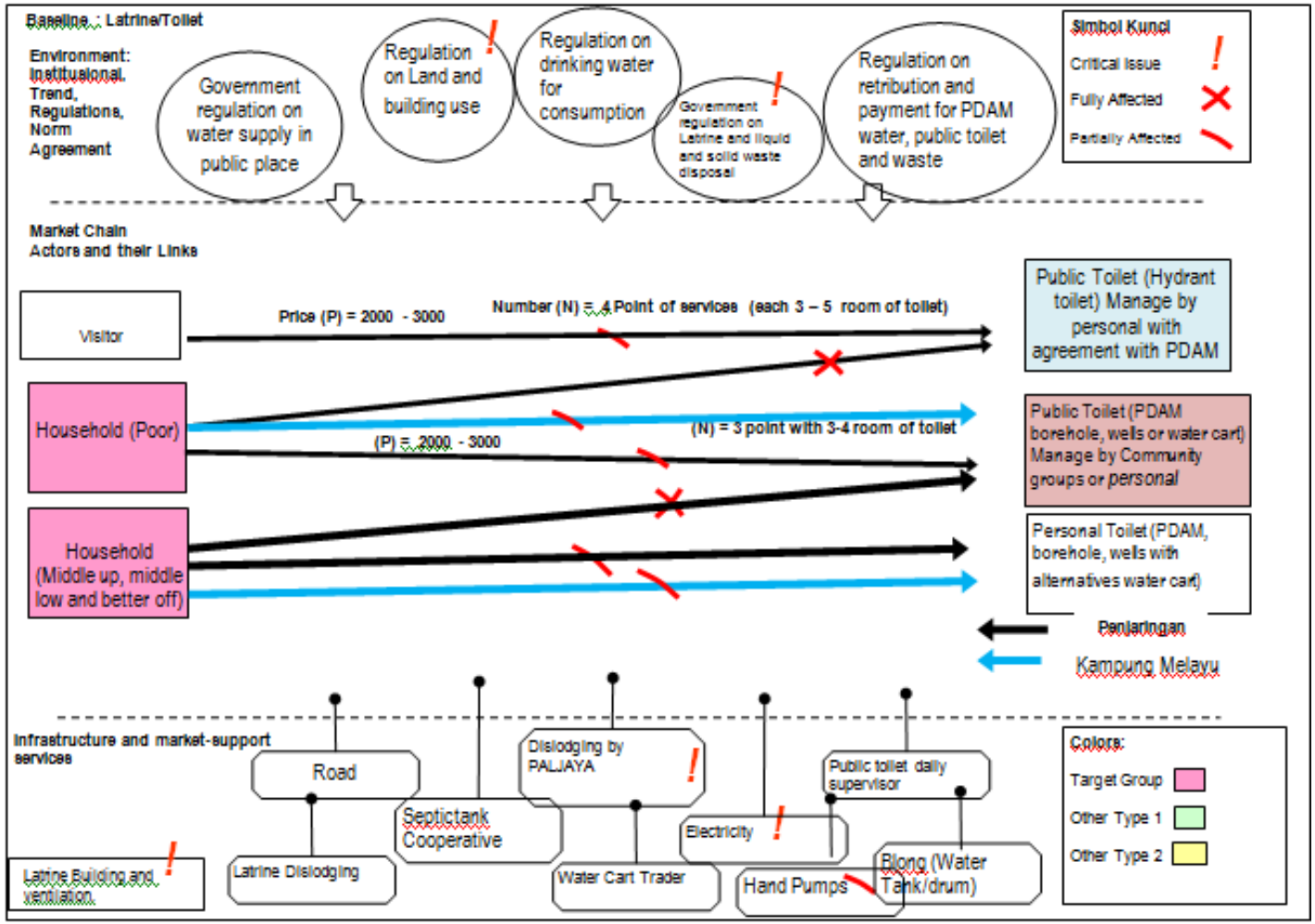


Figure 8: Market Map for Latrine Access

3.6.1 Value Chain Actors and Movement of Goods/Services

For the purpose of assessing latrine access, unlike water supply, key service provisions are often provided by users themselves. Critically, all latrines, due to local Islamic cultural practices, rely on water supply in order that the latrine is utilized appropriately. As such accessibility and use of latrines is dependent on the functionality of water supply market and the two markets for this study are intrinsically connected.

Within poorer areas of Jakarta, many households still utilize ground-level pit latrines or communal latrines as they cannot afford to rent building with sanitation provisions. As such landlords hold a level of accountability and set a precedent should they not provide sufficient facilities for tenants who cannot afford other facilities. Those paying higher rent generally have access to a standing or squatting flush latrine which connects to a septic tank. Many of pit latrines have no septic tank installation and it is common practice to dump waste manually directly into drainage channels or the sea without treatment. Those with septic tanks utilize exhauster services.

As latrine access is the main point of the value chain under assessment for this survey, the table below provides a summary of the accessibility options:

Table 8: Summary of market actors

Actor	Summary	Accessibility	Affordability (IDR)	Quality
Household (Pit)	Most of houses who has pit latrine set on the ground floor approximately 20cm above the ground and these latrines are submerged in Type 1 and 2 floods.		Cost included in rent and water use	
Household (Flush)	Some houses also have flush to septic sanitation systems.		Cost included in rent and water use	
Non-residential (Flush)	Larger building tend to have flush to septic sanitation systems		Cost included in rent and water use	
Communal facilities (Flush, laundry & showering)	These tend to have flush to septic sanitation systems. Public latrines are poorly constructed and maintained with poor light, air circulation, cleanliness and security. They are often found at ground level and closed during floods. People are using the public latrines because there is no latrine in the house they rent or they don't have clean water (non drinking/domestic use) in their houses. The cost of using public latrines is decided between the owner and local community leader.	Closure during evening and need to walk to facility	5000 (laundry) 2000 (bathing) 1000 (latrine)	

3.6.2 System Reaction to Crisis

As supporting infrastructure fails due to the vulnerabilities discussed above, fecal waste movements are mostly disrupted from the point of use (e.g. the latrine) due to a lack of water supply disruption to encourage use of wet latrines. Some movement of waste to septic tanks may still partially exist but pit latrines are inundated, and ground-level communal facilities, cannot be used. In short, people are confined to the buildings in which they shelter to find alternative means of defecation. Even those people with access to latrine facilities in multi-storey building do not use the latrines for excretion (only urination) due to the lack of water. They would prefer to use flying latrines or openly defecate out of windows during the night directly into the street.

In registered IDP camps the government provides portable, temporary latrines but in the last Type 1 flood there were not enough portable latrines supplied to meet demand and critically exhaustion needs were not monitored nor a sufficient system put in place to remove waste in order to maintain continuous use of the latrines with the increased demand. As such the latrines become un-usable quickly.

This is particularly frustrating if already established permanent facilities are not being utilized due to a lack of water provision. In Type 1 floods, unregistered IDP camps emerge but do not have the facilities and support to cater for thousands of IDPs. A school that acted as a shelter for IDPs in Penjaringan referenced the issues it had with latrines during the 2013 flood. Despite flush latrines existing on all floors of the building (which connected to a septic tank), the latrines remained unused for defecation. This was due to customary anal cleansing practices. Without access to water for cleaning people resorted to flying latrines and open defecation directly into the flood waters creating a huge and unnecessary public health risk despite everyone having access to a latrine.

The reaction to this crisis situation is different according to the type of emergency being experienced (see section 5 for description) and by each actor. This is summarized below:

Table 9: Market actor reaction to crisis

Actor	Reaction Summary	Accessibility		Affordability *(IDR per liter)*	Quality
		Type 1 Flood (High)	**Type 2 Flood (Low)**		
Household (Pit)	No access and overflows creating public health risk	○	○	N/A	N/A
Household (Flush)	Where no water is available latrines only used for urination. Open defecation through flying latrines or windows	○	◔	N/A	Partial functionality due to lack of water
Non-residential (Flush)	Where no water is available latrines only used for urination. Open defecation through flying latrines or windows. This is a major concern for IDP shelters.	○	◔	N/A	Partial functionality due to lack of water
Communal facilities (Flush, laundry & showering)	No access and closes for flood duration. For those above ground level people queue for hours in flood water to access the facility. Owners noted a drop of 50% customers using facilities during flooding.	○	○	15000 (laundry) 6000 (bathing) 3000 (latrine) (+300%)	N/A

Harvey balls have been used to represent complete disruption (empty ball) to fully functional (full ball) market actors during crisis

SECTION 4: RESPONSE RECOMMENDATIONS

A number of response opportunities were identified during this exercise. The responses address either one or both market system challenges and vary according to flood type and response scalability. They also have a time dimension where responses are divided:

I. ***Immediate Risk Reduction Activities (or quick wins)*** – these responses are relatively simplistic to implement and would realize immediate benefits to target populations

II. ***Emergency Preparedness and Temporary Response Activities*** – these responses are prepared in the eventuality that a flood occurs and activated to respond to the flood either as a mitigation response or to directly address the impact

III. ***Resilience Building Activities*** – *these are longer term, policy, regulatory or system changes that will require more time and resources to design and implement than the PCMA process can provide. However, the PCMA provides the 'stepping stone' to justifying exploration of these activities to address issues within WASH market systems in flood emergencies*

Critically, the response implemented should improve either or multiples of the main issues stemming from the reference crises analyzed. Those issues are accessibility, affordability and/or quality. The suggested responses below address at least one of these issues, if not multiples, and could all work parallel. In some cases, if one response is implemented it may negate the rationale for delivering another response. As such a feasibility analysis should be done in each area to understand which combination of responses may be most appropriate for the current infrastructure; willingness of market actors to participate; and cost effectiveness compared to other responses (including those already employed by current contingency plans).

Annex 2 provides a household socio-economic breakdown with indications of accessibility to WASH service and good provision at the different wealth levels according to location based on the PCMA analysis. This allows for prioritization and targeting of PCMA recommendations for the most vulnerable in the different types of crisis according the changes in the WASH system and estimation/scale of need and beneficiary numbers.

The following table provides a summary of the responses and the rest of the section 7 then explains each response suggestion in detail.

4.1 Summary of Response Recommendations Summary

IMMEDIATE RISK MITIGATION ACTIVITIES

	Response Name	Description	Critical Market		Scenario: Emergency		City Wide Scalability Potential
			Potable Water	Latrine Access	Type 1	Type 2	
4.2.1	Water storage tanks	Mandating minimum emergency water storage within critical points in the value chain	✓	✓	✓	✓	High
4.2.2	Identify and prepare IDP camps	Integrating unregistered IDP camps into EPR plans and readying them through training, stockpiling and infrastructure upgrades	✓	✓	✓		High

EMERGENCY PREPAREDNESS & TEMPORARY RESPONSE ACTIVITIES

	Response Name	Description	Critical Market		Scenario: Emergency		City Wide Scalability Potential
			Potable Water	Latrine Access	Type 1	Type 2	
4.3.1	Flood protection public pay toilets	Toilets operated by water and sanitation/ waste management companies to provide services to affected people during floods.		✓			Med
4.3.2	Flood protection for water service providers	Building flood defences around critical WASH infrastructure to maintain WASH services	✓	✓		✓	Med
4.3.3	Stablising costs of potable water in emergencies	Improving WASH distribution and implementing financing mechanisms to reduce and/or subsidise cost to consumers	✓	✓	✓	✓	Med

4.3.4	Downstream wastewater overflow Management	Monitoring and maintaining drainage systems to mitigate risks of overflow due to blockages	✓	✓	✓	✓	High
4.3.5	Partnership between refill stations and cart sellers	Improving access and quality of water supply through partnerships between local informal & formal service providers	✓			✓	Med

RESILIENCE BUILDING ACTIVITIES

	Response Name	**Description**	**Critical Market**		**Scenario: Emergency**		**City Wide Scalability Potential**
			Potable Water	**Latrine Access**	**Type 1**	**Type 2**	
4.4.1	Distributed managem ent model	Establishment of PPPs between DPAM and local service providers (e.g. water stations) to increase reach and quality of water services	✓			✓	High (if similar value chain exists)
4.4.2	Supportin g local license to operate	Establishment of quality standards within regulatory frameworks of already utilised filtration systems to legitimise local service provider operations	✓		✓	✓	High (if similar value chain exists)
4.4.3	Urban building regulation s for sanitation	Revision of urban planning regulations to mandate improvements in water storage and sanitation provisions of all buildings	✓	✓		✓	High

4.2 IMMEDIATE RISK MITIGATION ACTIVITIES

4.2.1 Water storage tanks (domestic & non-domestic buildings & critical service providers)

Recommendation	Value Add		Risks /Assumptions	Next Steps
	Households	Market		
Water storage should be installed on top of multi-storey buildings or in to capitalise on potential energy due to gravity for water movement during power failure. A minimum storage should be in the tank at all times or seasonally in case of emergency and regulations updated to ensure that this is followed by building owners. Installations should be mandatory for domestic buildings, non-domestic critical buildings (e.g. health centres), communal latrines, water stations (if they can remain functional during floods), water cart sellers.	• Ensures water contingency storage for water consumption; washing; flushing latrine to reduce open defecation • Storage also provides risk mitigation for FIRE also • Water can be moved from towers without the use of electricity powered pumps and when roads flooded	• Increases customer service quality to DPAM customers • Continues service even when critical infrastructure under stress	• Identifying space to build towers or store tanks • Financing payment of tanks and 'stored' water • Maintaining emergency load levels in the tanks • Water is treated appropriately prior to consumption	• Identifying other low-lying cities using water towers for systems in this manner • Identifying pilot area and # DPAM customers with intermittent & poor quality water service • Identifying volume required and spaces to build towers or store tanks based on pre-agreed criteria • Understanding financing mechanisms and regulatory requirements for tank installations

4.2.2 Identify and prepare registered and unregistered IDP camps

Recommendation	Value Add		Risks /Assumptions	Next Steps
	Households	Market		
Identify the all IDP centers used during severe floods (whether officially or unofficially) by the community and integrate them into contingency plans. Ensure local staff (e.g. teachers) in these centers trained on emergency and communications plans. Develop WASH provision plans for the centers based on surrounding local infrastructure and support systems. This is for provision of WASH goods, food and NFIs from market actors rather than BPBD stocks. Understanding the need for increased water and latrine capacity in Type 1 floods in order to plan for water storage tank requirements, septic tank emergency overflows, and need for emergency portable latrine provision.	• Default centers are supported immediately in crisis rather than having to struggle to find support • Staff are trained and local WASH support services already in place, reducing burden on BPBD • Open defecation does not occur in these areas	• In relevant areas, service providers and vendors can have service level agreements in place with BPBD to stock the IDP camps prior to or during emergencies benefitting market actors and reducing complexities for BPBD to reach IDP camps with supplies	• Financing the training and provision of support systems • Creating continuous service level agreements and financing for provision of WASH products in an emergency • Buy-in from 'default' centers to provide IDP services • Updating local policy and regulation to ensure default centers are managed as IDP centers in emergency	• Identifying all IDP centers (and surrounding WASH infrastructure) from last peak floods and assess need • Pilot IDP centers could be used in sub-village 1-3 in Penjaringan where schools are located next to a refill station with warehouse that could be used to provide stored water • Potentially collaborate with Save the Children and Mercy Corps on their safe school programmes for support

4.3 EMERGENCY PREPAREDNESS & TEMPORARY RESPONSE ACTIVITIES

4.3.1 Identify & prepare flood protection public pay toilets

Recommendation	Value Add		Risks / Assumptions	Next Steps
	Households	Market		
In the short-term, annually, when flood risk is high, these public pay toilets will provide the WASH facility services to the affected population. These public pay toilets will be supported by the water companies, sanitation and waste management company as well as the water trucking company to ensure they will keep operating during the flood and providing services to the affected population.	● Reduces health risk during flooding and increased inundation of roads in communities	● Increased inclusion of water trucks company, water provider company, sanitation and waste management company as well as the Public Pay Toilet Owner in emergency response. ● Indirectly supports continuation of service providers and retailers should fewer roads become flooded.	● Financing of these services during non flood period. ● Ensuring the village government understand about this agreement and monitor the situation during disaster and non disaster period.	● Identifying public pay toilets that are close to the IDP designated centers and not affected by flood. ● Initiating agreement between all the related stakeholders to support the public pay toilet, before and during the flood.

4.3.2 Flood protection for water service providers

Recommendation	Value Add		Risks /Assumptions	Next Steps
	Households	Market		
Improve planning regulations to ensure that water infrastructure is built at a height that is less affected by flood waters and factors in rising flood levels due to climate change	• Reduces impact of floods on WASH infrastructure	• Allows partial continuation of service	• Financing of modifications for current vs new builds • Integration of requirements into policy and regulation enforcement • Dependent on urban planning requirements for new builds vs modifications	• Identify cost-benefit of infrastructure modifications to justify any business case for doing this. It may be just as effective to implement recommendations A- D instead

4.3.3 Stabilizing costs of potable water in emergencies

Recommendation	Value Add		Risks /Assumptions	Next Steps
	Households	Market		
The government and/or DPAM regulates the price during emergencies by : 1) Supporting greater access to customers (recommendation D) to balance supply and demand 2) Subsidizing price of water in emergencies where OPEX costs increase 3) Provision of voucher systems to DPAM customers to cover water costs where DPAM pays supplier (e.g. recommendation K) 4) Warehousing and forward payment of emergency stock by BPBD to local service providers and vendors such that stock is stored for emergencies and distributed freely during emergencies 5) Provision of voucher systems to households pre-flood season for limited goods to be redeemed at agreed local providers and retailers in order to regulate price 6) Regulating and enforcing price controls during emergencies	• Provision of this treated water during emergency will be cheaper for government to distribute during emergency as it will already be located in the affected areas • Immediate distribution of water within affected areas	• Local service providers and vendors that would normally be out of business during flooding periods who can now make money by supplying stored water	• Financing 'stored' water provision for local water providers • Ensuring service level agreements maintained pre and during crisis • Ensuring that prices are kept at the right level and abuse of subsidy or voucher system does not occur • Testing first whether water towers address the water provision issue in Type 2 emergencies. If so warehousing only required in Type 1 emergencies. • Warehousing, price control and voucher systems all depend on distribution so much be done in-situ with distribution improvement	• Piloting effectiveness of water towers in Type 2 emergencies to assess need • Identifying refill stations where warehouse storage of treated water could be effective for emergency • Conducting rapid business case analysis of provision of stored treated water from local refill stations vs. donations/BPBD in emergencies

4.3.4 Downstream wastewater overflow management

Recommendation	Value Add		Risks / Assumptions	Next Steps
	Households	Market		
In the short-term, annually, when flood risk is high, these channels should be manually pumped to reduce the channel storage volumes and risk of overflow by exhauster trucks and rubbish removed. During floods, this will be difficult but prior to floods the wastewater levels will at least be low to reduce contaminants entering street level. Overflow tanks could be installed when trucks cannot reach areas.	• Reduces health risk during flooding and increased inundation of roads in communities	• Increased inclusion of exhauster trucks in emergency response • Indirectly supports continuation of service providers and retailers should less roads become flooded	• Financing of exhauster truck service and rubbish collectors during high risk periods • Ensuring exhausted waste is adequately treated rather than dumped to downstream channels which will just contribute to the flooding risk • If low-level flooding prevents truck access understanding alternative means of exhaustion of the channels	• Identifying open channels within vulnerable communities and frequency and likelihood of flooding and develop monitoring program to monitor levels • Conducting rapid business case analysis of provision of exhausting the channels during high flood risk periods

4.3.5 Partnership between refill stations and cart sellers

Recommendation	Value Add		Risks / Assumptions	Next Steps
	Households	Market		
During normal and emergency periods, informal cart sellers could be contracted to or employed by refill stations to provide water to households. This also means that the government shows its understanding of the value of the informal sector in water distribution and works to integrate them into a safer WASH system rather than penalize them which could create more shadow market systems in the future and negatively impact poorer households. This approach could be done at the same time or separate to recommendation J.	• Increases area served with potable water • Reduces illegal tapping of PAM water by informal sector reducing operational costs • Increases number of customers for refill stations/truckers • Regulates water price (if done in conjunction with recommendation K)	• The water supplied would be of a higher quality • Cart sellers would have a more regular wage • Refill stations and bottled water retailers would have access to a bigger market • DPAM could distribute to households if supplying contingency water through local refill stations or retailers when pipes fail	• Difficulty of ensuring guaranteed and livable wage for cart sellers who are giving their customer base to water provider • Ensuring customer service level quality • Regulation of water price required to ensure affordability not an issue to poorer customers	• Identifying # customers using informal cart sellers and price of water • Identifying water quality provided to these customers vs. piped water • Understanding appetite for continuous, salaried employment of informal cart sellers

4.4 RESILIENCE BUILDING ACTIVITIES

4.4.1 Distributed management model

Recommendation	Value Add		Risks / Assumptions	Next Steps
	Households	Market		
DPAM customers, during periods of crisis and non-crisis have to pay for drinking water in addition to piped water in periods of crisis and non-crisis due to accessibility and quality issues. No compensation is provided for periods of poor DPAM supply. DPAM could work with water refill stations to have regular water supply to stations for filtering using government-endorsed filtration system (e.g. Yamaha). This water can be used for drinking and cleaning water by DPAM customers experiencing supply/quality issues **direct** to their households. Should DPAM water supply to refill stations also cease there would be stored tanks to ensure continuation of service. Voucher systems could exist between DPAM customers and refill stations such that vouchers are redeemed for refill station water and refill stations paid by DPAM for vouchers received.	Lowers cost of water for poorer households by: • Increasing coverage for DPAM customers of both cleaning and drinking water at all times • for refill customers who spend more money for refill water than DPAM water because of higher cost of supplied water (from water tankers)	• Increases revenues to DPAM to support its overall business costs given it is currently missing out on refill stations as customers. Note that refill stations also provide home delivery service so the DPAM home service can still be upheld but through the refill station delivery • Increases customer service quality to DPAM customers • Increases customer base of local refill stations	• Policy requirements for licensing refill stations to supply DPAM customers • Service level quality & accountability risks to DPAM through local providers • Convincing refill stations to use DPAM water instead of trucked water given perception of water quality	• Verifying water quality of filtration systems of DPAM water against trucked water and cost difference • Investigating how to license refill stations (potentially through Yamaha) without putting stations out of business • Identifying pilot area and # DPAM customers with intermittent & poor quality water service • Identifying ability for refill stations to provide coverage to DPAM customers • Identifying opportunities for employment of informal vendors for distribution of refill water

4.4.2 Supporting local license to operate

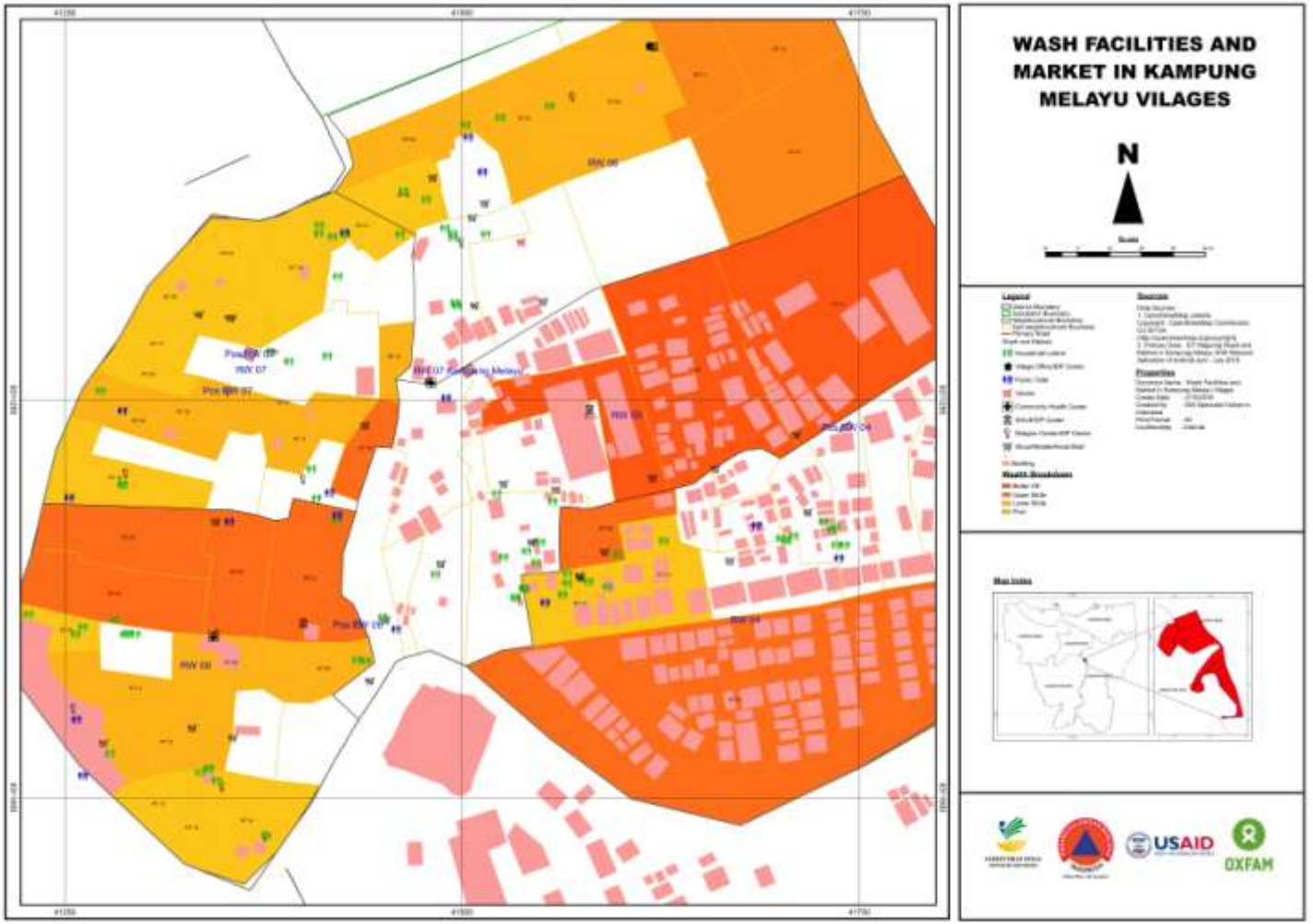
Recommendation	Value Add		Risks / Assumptions	Next Steps
	Households	Market		
Currently many local level water service providers do not have licenses from Ministry of Health (MoH) to provide water to customers but without these services people cannot afford or access water. Shutting them down would create more public health issues. It should be noted that some service providers e.g. refill stations provide high quality water but cannot afford permitting. Yamaha provide loans and service level agreements to refill stations to ensure that a) they sell their product b) that their product performs and is maintained to provide safe drinking water. Yamaha provides certificates to owners of filtration system as proof of filter quality. There is the potential to create service level agreements with Yamaha to provide proof to MoH of water service quality to avoid need of local businesses being priced out of doing business through requirement of government licenses. In addition, supplying water from DPAM to local refill stations and cart sellers will mean that approved water is being utilized.	• It is in MoH's best interest to a) ensure people who cannot access/afford DPAM water get access to safe water b) ensuring that local formal/informal water sellers are monitored at low cost • Local water businesses are not shut down as the MoH become aware of their activities • Customers retain access to water services where piped DPAM water is not available	• It is in Yamaha's interest for its business customers to keep in business to pay off filter loans and be the 'brand' that people trust to drink	• Can new licensing be created for informal service providers that is affordable and practical? • Would Yamaha (or similar filtration providers) be interested in providing this certification service? What legal accountability issues may there be? • What happens to services not using certified treated water? Can they be supported to convert to a system through MFIs?	• Verifying water quality of filtration systems • Investigating how to license refill stations (potentially through Yamaha) without putting stations out of business • Identifying how many refill stations exist without MoH licenses to justify cost of agreements to license them • Understanding if water cart sellers would purchase water from refill stations or be employed under refill stations to increase water quality and licenses sellers?

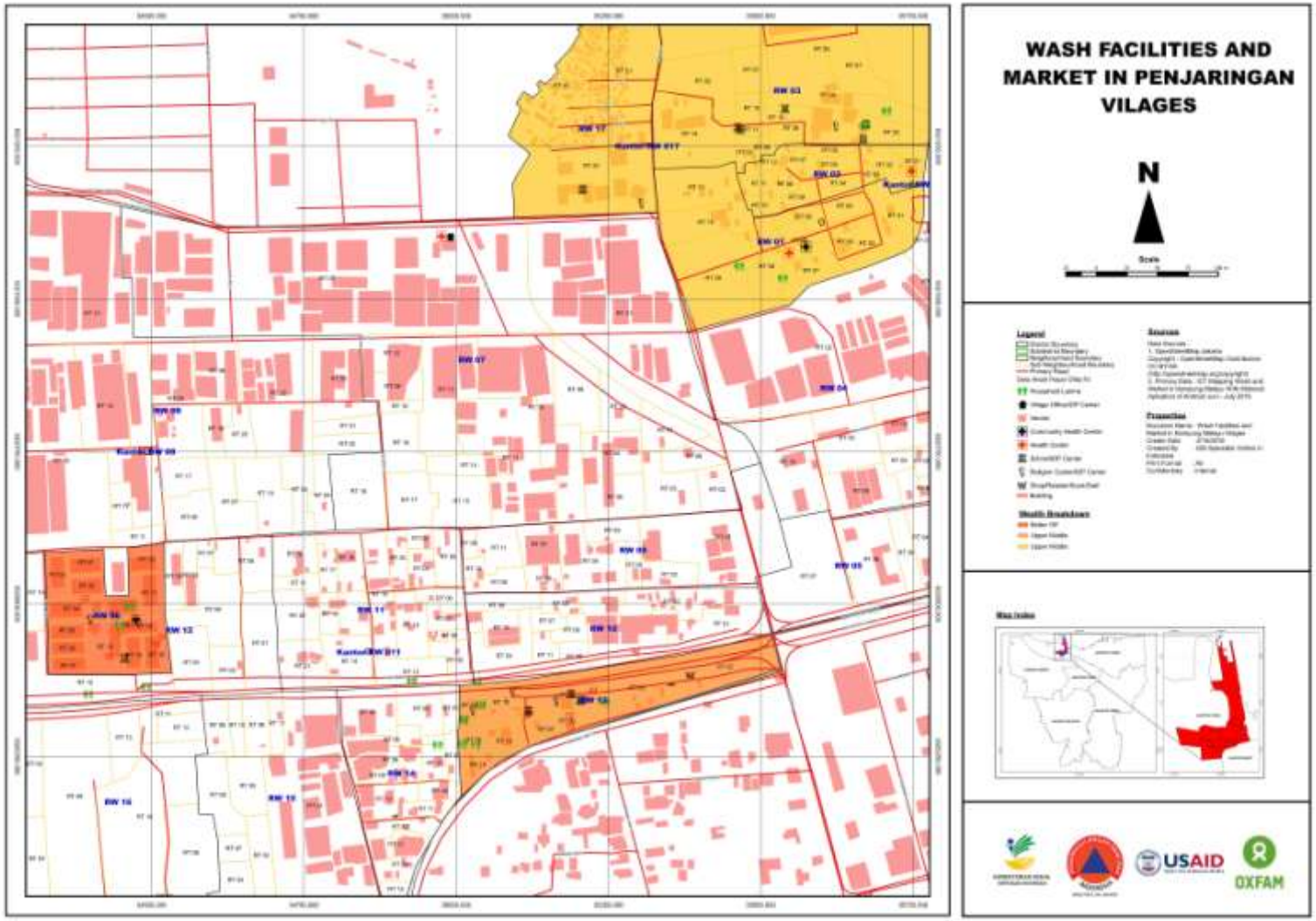
4.4.3 Urban building regulations for sanitation

Recommendation	Value Add		Risks / Assumptions	Next Steps
	Households	Market		
Improve planning regulations to ensure that latrine infrastructure is built at a height that is less affected by flood waters and factors in rising flood levels due to climate change. E.g. in some areas latrines are built 20cm above the floor but the average annual flood height is 50cm. Having more latrines on first level flooring or top of buildings is recommended.	• Reduces impact of floods on WASH infrastructure and need for open defecation	• Unsure. It is not yet clear whether private latrines would be able to move their services to higher ground due to cost and land availability issues	• This should be enforced in situ with water towers (A & B) to allow for anal washing and flush to facilitate continuation of use otherwise people still may not use them • Financing of modifications for current vs. new builds • Integration of requirements into policy and regulation enforcement • Dependent on urban planning requirements for new builds vs. modifications	• Identify cost-benefit of infrastructure modifications to justify any business case for doing this • Understand legal requirements to mandate changes at household and public/private communal latrines

ANNEX 1 : MAPS OF WASH FACILITIES AND MARKET IN MELAYU AND PENJARINGAM VILLAGES

Conducted as part of a GIS mapping of the WASH systems in the area (a separate report will be made available discussing the tools and techniques used in programme countries to trial this approach).




WASH FACILITIES AND MARKET IN PENJARINGAN VILAGES
N
Scale
Legend
Sources
Projection
Health Breakdown
USAID
OXFAM

ANNEX 2: WEALTH BREAKDOWN INDICATORS AND EXTENT OF COVERAGE IN MELAYU AND PENJARINGAM VILLAGES

Kampung Melayu

Table A2.1: Wealth Breakdown Indicators in Kampung Melayu

Indicator / Wealth Breakdown	Better Off	Upper Middle	Lower Middle	Poor
Housing Ownership	Own house	Own house	mixed –rent/own	mixed - rent/own
Type of Resident	± 20 Years, permanent	± 20 Years, permanent	Mixed permanent, temporary and commuter resident	Mixed temporary and commuter resident
Type of house construction	Big, Permanent	Medium, Permanent, owner rent house/room	mixed – Semi Permanent (SP) Permanent (P)	mixed – Semi Permanent (SP) Permanent (P)
Sharing room with other Household (HH)	No	No	Yes	Yes
Vehicle Ownership	Car-Motorcycle more than 1 unit	Car-motorcycle	Motorcycle	motorcycle
Income source	Formal Employee, Large scale businessman	Trader, Formal employee, private employee	Medium/small trader, Handyman, Construction Labour, Daily Labour, Shop Assistants	Micro or Small trader, Handyman, Construction Labour, Daily Labour, Shop Assistants
# of people earning Income in Household (HH)	More than 2 Persons	Mostly 1 person	More than 1 persons	more than 1 Persons
Children Education	Up to University	High School	High school	Medium High School or School Drop Out
Access to Latrine	Own Permanent Latrine inside house	Own Permanent latrine inside house -	Own permanent latrine –	Public Latrine
Type of Latrine	Flush or Squat	Squat	self made Squat Latrine	Squat
Type of Septic Tank	Permanent Septic tank	Permanent Septic Tank	No septic tank	No septic tank
Dislodging	Some are Regular By Dislodging Company, there are still some others that are not regular.	Not Regular Dislodging	Open Drainage flow to river	Open Drainage flow to river
Access to Clean water (non drinking/domestic use)	PDAM-AETRA and boreholes with electric pump	PDAM and Borehole with electric pump	PDAM and Cart Vendor	Cart Vendor or public Latrine (PDAM/Borehole with pump/hand pump
Type of water storages	Water Storage or Plastic Drum	Medium water tank or Plastic Drum	Small Plastic drum or Bucket or Jerry Can	Bucket or Jerry Can
Access to Drinking Water	PDAM-AETRA and or Manufactured or refill Station	PDAM-AETRA and or Manufactured or refill Station	PDAM-AETRA and or refill Station	Cart Vendor and or refill Station

Access to Health Care	Public health center - puskesmas, some private doctor, hospital	Public health center - puskesmas, some private doctor, hospital	Public health center – puskesmas, hospital	Public health center – puskesmas

Table A2.2: Wealth Breakdown Percentage and Coverage Area in Kampung Melayu

Wealth Breakdown	Better Off	Upper Middle	Lower Middle	Poor
Percentage based on Proportional Filling through FGD	7%	24 %	36%	33%
Coverage area	**RW 5:** RT 1,2,3	**RW 4**: RT 1,2, 6,14 **RW 6**: RT 1,11,12 **RW 7**: RT18 **RW 8**: RT 1,2,3,4	**RW 6**: RT 7,8,9, 10 **RW 7**: RT 6,7,9,10,11,12 **RW 8**: RT 1, 8, 9, 11, 12	**RW 4**: RT 13,12 **RW 5**: RT 6, 8, 10,11 **RW 6**: RT 5, 7 **RW 7**: RT 1,3,4,5,8,15,16,17 **RW 8**: RT 5,6, 10,13,14,15

Penjaringan

Table A2.3: Wealth Break down Indicators in Penjaringan

Indicator	**Wealth Breakdown**	**Better Off**	**Upper Middle**	**Lower Middle**	**Poor**
Housing Ownership		Own or subsidized by government flat	Own or subsidized by government flat	mixed – rent/own	mixed - rent/own
Type of Resident		± 20 Years, permanent	± 20 Years, permanent	Mixed permanent, temporary and commuter resident	Mixed temporary and commuter resident
Type of house construction		Big, Permanent, flat	Medium, Permanent, owner rent house/room, flat	mixed – Semi Permanent (SP) Permanent (P)	mixed – Semi Permanent (SP) Permanent (P)
Sharing room with other Household (HH)		No	No or Yes	Yes	Yes
Vehicle Ownership		Car-Motorcycle more than 1 unit, Medium Fishery Boat	Car-motorcycle, small fishery boat	Motorcycle	motorcycle
Income source		Formal Employee, Large scale businessman or trader, owner of fishery boat	Formal employee, private employee, Small Medium businessman or trader, monthly or Daily Labour	Medium/small trader, Handyman, Construction Labour, Daily Labour, Shop Assistants	Micro or Small trader, Handyman, Construction Labour, Daily Labour, Shop Assistants or unstable income or uncertain job
# of people earning Income in Household (HH)		More than 2 Persons	Mostly 1 person	More than 1 persons	more than 1 Persons
Children Education		Up to University	High School	Medium High School or School Drop Out	Medium High School or School Drop Out
Access to Latrine		Own Permanent Latrine inside house	Own Permanent latrine inside house – or public latrine	Own permanent latrine or public Latrine	Public Latrine
Type of Latrine		Flush or Squat	Squat	Squat	Squat
Type of Septic Tank		Permanent Septic tank	Permanent Septic Tank	With or without septic tank	With or without septic tank
Dislodging		Some are Regular By Dislodging Company or manage by flat management but still some that are not regular.	Not Regular Dislodging	Not Regular Dislodging or Open Drainage flow to river/ dam	Not Regular Dislodging or Open Drainage flow to river/ dam

Access to Clean water (non drinking/domestic use)	PDAM-Palyja and or wells with electric pump or pulley	PDAM-Palyja and or wells with electric pump or pulley	PDAM and Cart Vendor	PDAM and Cart Vendor
Type of water storages	Water Torrent or Plastic Drum	Medium water tank or Plastic Drum	Small Plastic drum or Bucket or Jerry Can	Bucket or Jerry Can
Access to Drinking Water	PDAM-Palyja and or Manufactured or refill Station	PDAM-Palyja and or Manufactured or refill Station	PDAM-Palyja and or refill Station	Cart Vendor and or refill Station
Access to Health Care	Public health center - puskesmas, some private doctor, hospital	Public health center - puskesmas, some private doctor, hospital	Public health center – puskesmas, hospital	Public health center – puskesmas, hospital

Table A2.4: Wealth breakdown percentage and their area coverage in Penjaringan

Wealth Breakdown	Better Off	Upper Middle	Lower Middle	Poor
Percentage based on Proportional Filling through FGD	8%	22 %	40%	30%
Coverage area	RW 1, 2, 3, 6, 13	RW 1, 2, 3, 6,13,17	RW 1, 2, 3, 13,17	RW 1, 2, 3, 13,17

ANNEX 3: PCMA QUESTIONNAIRES

SAMPLE DATA COLLECTION APPROACH

Key Considerations

It should be noted that the what data would be collected (qualitative and quantitative), how it would be collected and from whom would be defined from key known data points required to complete a PCMA but also the outputs of the scoping study/desk research. The types of questions being asked will also be influenced by who we are talking to and as such questionnaires may need to be modified for different stakeholders.

The following would need to be defined:

- Target areas & permissions
- Interviewee sample sizes and types
    - E.g. households (women, men, children, landlords, tenants, high-income, low-income, employed, unemployed, disabled, elderly)
    - E.g. market actors (service providers, vendors, formal, informal)
    - E.g. community health groups, elders, leaders
    - How many people need to be sampled?
- Data collection requirements
    - Objectives of questions
    - What questions
    - How questions are asked
        - To avoid bias and reduce risk of false information sharing a combination of interview techniques should be utilised for cross-verification:
            - Individual interviews
            - Focus Groups
            - Observations
            - Potential conducting of stored water sampling for verification of water treatment practices and identification of potential hotspots for outbreaks
            - Qualitative vs quantitative responses
    - Materials required (e.g. invitations, ICT tools, clipboards, pens, GIS tools, photo/video disclaimers, water sampling tools etc)
- Data collection tools
    - Manual vs ICT tools for data collection
    - Data quality checks
    - Data cleansing and storage

- Rapid data analysis techniques
-

A) Households in Individual Interviews & Focus Group Discussions*

**with adaptations for larger groups made in terms of questions asked*

Questions	**Answers**
Name	
Age	
Gender	
Marital status	
# of dependents	
Contact number	
GIS location	
What type of house?	*Permanent, semi-permanent, mud or metal sheeting?*
How many rooms in your house?	
What area is your house located?	
How many people live permanently in your home?	
Are you a homeowner, landlord or renter?	

Questions	**Answers**
<u>Knowing the area</u>	
Why did you choose to live in this area? Why?	
What do you dislike about living here? Why?	
How often do you move house? Why?	
*Remember to get people's **individual answers to questionnaires** and then we should ask more generic questions about household expenditure; employment etc*	
<u>Employment/Income</u>	
How many people earn an income in your house?	

How many of you are employed informally?			
On average, how many hours do you manage to find work per week?			
Does this change any times in the year? Why?			
What do you have to do to find work?			
When is it harder to find work? Why?			
Expenditure			
Rank the top 5 expenditures in your house in terms of cost			
Do you ever struggle to pay for these expenditures? If yes, why and when?			
Have you got any savings or loans?			
WASH			
If WASH does not feature in these expenditures, ask:	*Cost (weekly)*	*Volume/Amount*	*Supply source*
Water for cleaning			
Water for washing			
Water for drinking			
Access to a latrine			
Cleaning the latrine			
CLEAN WATER (NON DRINKING/DOMESTIC USE)			
Can you always get access to clean water (non drinking/domestic use) whenever you need it? If no, please explain a time you could not	*Make sure to write name who the vendors are and where they are (if they don't use piped water) so we can talk to them*		
Do you change your water provider? Why?			
Do you ever get sick from your water?			
(for renters) Do you have a choice over your water supply?			
LATRINE			
What type of latrine do you have access			

to?	
Is it shared (with how many people?) or separate?	*Make sure to write name who the latrine owners are (if they use them) so we can talk to them*
(for renters) Do you have a choice over your latrine?	
On a scale of 1-5 (5 excellent) how clean is your latrine? Provide examples for answer	
On a scale of 1-5 how safe do you feel using the latrine? Provide examples for answer	
How often is the latrine cleaned? Who cleans it?	
How often is the latrine emptied? By whom?	
What happens at night when you need the latrine?	
What happens when children need the latrine?	
(For women) Do you feel you can access and use sanitary products easily and with privacy?	
Ask people to pick their top 3 things they would do to improve their latrine	*Can provide examples on paper and ask them to pick* - *Flush* - *Cleanliness* - *Latrine Paper* - *Privacy* - *Security* - *Smell* - *Flies* - *Cost* - *Other*
ONLY FOR LANDLORDS	
How many people live on your plots?	
Do you provide water and sanitation for your renters?	
What are the challenges with providing these services?	
UNDERSTANDING CRISIS	

When was the last crisis in this area? What was it? How long did it last? What were the effects?	
Does this crisis occur frequently? When?	
Do you think this is the biggest risk to the community or are you worried about something else?	
During the last crisis, could you access **clean water (non drinking/domestic use)** from your normal source? If not, who?	
Was the quality of the water good enough to drink?	
Did the cost change?	
Are you back with your original water supplier now? If not, why not?	
During the last crisis, could you access to your **normal latrine**? If not, what did you do?	
What was the change, if any, in quality of the service?	
Did the cost change?	
Are you back with your original latrine now? If not, why not?	
During the crisis, did any of you receive any aid? If so, what? From whom? How long did it take to get to you after the crisis started? Was it the right aid? What did you need instead?	

B) Local market actors providing WASH goods or services

ALL INTERVIEWEES

QUESTION	***Why we asking it***
Name of seller/business	
Gender	
Contact Details	
Location (GPS coordinates or approximate)	
Business Type	*e.g. water cart seller; mini-mart; borehole provider*
How long have you worked here / done this job?	*To understand their historical experience in the area*
Can you tell me what you typical day is like?	*To understand their role in the job*
Which areas do you serve? **Or** **Where do you customers generally come from?**	*To understand what locations to they work in* *Establish different customer needs e.g. gender; disability; loyal vs. sporadic*
How many customers do you have weekly/monthly? **Does this amount change in the year? Why?**	*To understand who they serve and if any factors affect how many customers they have*

BOTTLED WATER & WATER SERVICE PROVIDERS – water tankers; boreholes; pumps; wells; refill stations; vendors

QUESTION	*Why we asking it*
Is your water for cleaning or drinking?	*People pay different prices for different water*
How many days a week do you provide services?	*To understand accessibility for customers*
How much do you sell daily/weekly/monthly? Does this change during the season?	*To understand volumes sold*
How much does it cost you to run your business? ***Does this cost ever change? Why?***	*To understand what factors affect the running costs of the business*
Do you need to treat your water?	*To understand water quality issues*
What is the price of your service **(make specific to what you are talking about – e.g. water; public latrine etc)?** ***Does this cost ever change? Why?***	*To understand the normal cost to the customer. Understand cost by volume* *To understand if there are price fluctuations in the market and why*
How long been doing this? Do you intend to stay open?	*To understand whether they are a viable actor to work with / understanding challenges for operation*
What are the main challenges of doing business?	*Do understand their general business issues*
Who are your main competitors?	*To understand what other market actors exist*
What impact do the annual floods have on the business? Can you still work?	*To understand whether they have challenges; whether demand changes; whether they still work*
Can your business function without utility water supply and/or power supply? ***Do you call water/power supplier when there is a supply issue?***	*To understand inter-linkages between different critical markets*
What impact does this have on your customers?	*To understand price changes; demand changes etc*

Do you know what your customers do when they cannot get to you during flood times?	*To identify coping mechanisms of customers or other actors we may not be aware of*
Do you receive any support during flooding periods?	*To understand if they are already collaborating with government or NGOs etc*
(If relevant) How important is the extra income you get from the flood period?	*To understand if crisis periods create a critical income for these service providers as this will explain cost increases and response requirements*
Do you need to get any permits/licenses to function? Is this easy to do?	*To understand whether there are any barriers to entry for market actors*
What would help you do you provide a better service / do business better?	*To understand priority of opportunities from the business owner perspective*

SANITATION SERVICE PROVIDERS – public or portable latrines; vacuum trucks

QUESTION	*Why we asking it*
How many days a week do you provide services? ***What do customers do at night?***	*To understand accessibility for customers*
How much does it cost you to run your business? ***Does this cost ever change? Why?***	*To understand what factors affect the running costs of the business*
What is the price of your service **(make specific to what you are talking about – e.g. water; public latrine etc)?** ***Does this cost ever change? Why?***	*To understand the normal cost to the customer. Understand cost by volume* *To understand if there are price fluctuations in the market and why*
How long been doing this? Do you intend to stay open?	*To understand whether they are a viable actor to work with / understanding challenges for operation*
What are the main challenges of doing business?	*Do understand their general business issues*
Does rubbish create a problem for your business?	*To understand if this causes problems for pipes and vacuuming still*
Who are your main competitors?	*To understand what other market actors exist*
What impact do the annual floods have on the business? Can you still work?	*To understand whether they have challenges; whether demand changes; whether they still work*
Can you still run your business when there is limited water available?	*To understand if sanitation facilities can still function when there is a crisis*
What impact does this have on your customers?	*To understand price changes; demand changes etc*
Do you know what your customers do when they cannot get to you during flood times? ***(If the business closes ask....where do people***	*To identify coping mechanisms of customers or other actors we may not be aware of*

go to the latrine when you are closed?)	
Do you receive any support during flooding periods?	*To understand if they are already collaborating with government or NGOs etc*
(If relevant) How important is the extra income you get from the flood period?	*To understand if crisis periods create a critical income for these service providers as this will explain cost increases and response requirements*
Where does your wastewater go?	*To understand impact of poor sanitation in the local community and risks of crisis*
Can the latrines/washrooms function without water supply? ***Power supply?*** ***Do you call water/power supplier when there is a supply issue?***	*To understand inter-linkages between different critical markets*
Do you need to get any permits/licenses to function? Is this easy to do?	*To understand whether there are any barriers to entry for market actors*
What would help you do you provide a better service / do business better?	*To understand priority of opportunities from the business owner perspective*

ANNEX 4 : PROGRAMME TASKFORCE

Name	M	F	Organization
Dewi Andaruni	0	1	MPBI
Marissa	0	1	DPAM
Christian	1	0	DPAM
Iwan Alex K	1	0	KPBK JB
Indrie Octa	0	1	PDPAL Jaya
Wahyudi	1	0	KPDK JP
Adri Akhyani	1	0	Health Agency DKI
Djoko Irianto	1	0	Health Agency DKI
Harry Sudrajat	1	0	KPBK Utara
Arif Mahmud	1	0	BPBD
Firman Anggoro	1	0	BPBD
Rachmat M	1	0	KPBK South Jakarta
Sisdwi Sulanti	0	1	Dinas Kom KMP
Ella I	0	1	Dinas Kom KMP
Budi S	1	0	PD Pasar Jaya
M. Yamin Pane	1	0	PD Pasar Jaya
Iwayan Budi Arta	1	0	Social Agency
Ronny Ichwan	1	0	Wahana Visi Indonesia
Sri Hidayanto	0	1	Water Management Agency
M. Yahya	1	0	Water Management Agency
Wardoyo	1	0	BPBD
Dedi Rohaedi	1	0	BPBD
Muhammad Ali	1	0	KPBK Thousand Islands
Mulyanto	1	0	Fire Dept
Edi Sucipto	1	0	Fire Dept
Reka Anjulika	1	0	PT. Aetra Air Jakarta
Arifin A	1	0	PD Pasar Jaya
Agus Laman	1	0	PD Pasar Jaya
M. Ojoe Rachman	1	0	PD Pasar Jaya

Nanang S	1	0	KPBK JT
Armyn Gita	1	0	Unilever Indonesia
Irma D	0	1	PALYJA
Mia	0	1	PALYJA
Sigit P	1	0	Cleaning Agency
Setie M	1	0	Cleaning Agency
Waryanto	1	0	Health Agency
Sukendar	1	0	BPBD
Amirudin	1	0	PALYJA

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