



**Learning note
on Sanitation
in Challenging
Environments in
Cambodia**
June 2023



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Executive Summary

3.6 billion people lack safely managed sanitation services worldwide, including 1.9 billion people with basic services, 580 million with limited services, 616 million using unimproved facilities, and **494 million practicing open defecation**. Two-thirds of people who lack basic services live in rural areas (JMP, 2021).

Cambodia has made significant progress on sanitation, with access to improved sanitation facilities increasing from 24.7% in 2004 to 83% in 2019 (CSES, 2019-2020). However, **a large urban-rural divide** persists, with development heavily concentrated in urban areas: 97.8% have access to improved toilets in the capital Phnom Penh compared to 74.2% in rural areas (CSES, 2019-2020).

The Royal Government of Cambodia has set an ambitious target to achieve **100% access to clean water and sanitation by 2025**, 5 years earlier than the 2030 Sustainable Development Goal targets. Specific urgent actions are needed to achieve this goal and fill the remaining gaps in accessing sanitation. **Challenging environments** have been identified as the most complex contexts to work in, and a tailored approach to deal with these is required to ensure no one is left behind.

To contribute to this, the Ministry of Rural Development (MRD) has developed the *National Guiding Principles on Sanitation in Challenging Environment for Rural Households* (MRD, 2019), which defines the challenging environments (CE) in Cambodia as tough physical environments, specifically: (i) Floating communities; (ii) Flood affected areas; (iii) High groundwater levels; (iv) Hard ground areas; (v) Water scarce areas. According to MRD estimates, **27% of the Cambodian population** lives in these challenging environments.

In this context, the Sanitation Learning Hub (SLH) and WaterAid Cambodia organised a **2-day workshop on Sanitation in Challenging Environments (SCE)**, held in October 2022 in Phnom Penh to bring together all relevant stakeholders (e.g., Ministries, Development partners, NGOs, associations) for the first time. The 2-day workshop enabled stakeholders share their approaches, experiences, successes, challenges, gaps, and to input suggestions to accelerate sanitation coverage in CE in Cambodia.

This summary provides an overview of the key findings of the Workshop, including an analysis of current approaches and challenges faced by stakeholders, the status of SCE in Cambodia, case studies discussed during the workshop, and recommendations for moving forward and accelerating sanitation coverage in CE in Cambodia. The accompanying **learning note** provides in-depth detail on these areas.

Mapping the work of NGOs/associations present at the workshop showed that most initiatives are located around **Tonle Sap Lake** and along the **Mekong River**, mainly in Kampong Chhnang and Kandal provinces. No initiatives were reported in the **mountainous areas** of northeast Cambodia, while only a few were reported in the **coastal areas**. The approaches used in these initiatives are shown in Figure 1.

Appropriate adaptation to CEs was only found in the technological approaches, with sanitation technologies designed and tested to be more suitable for physical CEs (Figure 2). In contrast, no adjustments were noted for the other approaches to make them more suitable for the people living in CEs. This remains a **major gap**. The lack of clear mapping of challenging environments in Cambodia and the populations living in these hinders the development of strategies and projects.



Figure 1: Sanitation approaches used in challenging environments in Cambodia, as presented during the workshop.



Figure 2: Sanitation technologies used in rural challenging environments.

Following the workshop, **four case studies** were developed to provide a more detailed description of the CE implementation approaches and technologies which garnered most interest from workshop participants. These are summarised in **Table 1**.

Case studies and locations	Key features
<p>HandyPod technology</p> <p>Wetlands Work!</p> <p>Phat Sanday Commune, Kampong Svay district, Kampong Thom Province</p>	<ul style="list-style-type: none"> • Technical solution suitable for many CEs, that includes on-site faecal sludge treatment. • Innovative marketing approach involving communities and targeting schools to help enlarge the beneficiaries • Support provided to local latrine business owners (LBOs) • Concern about cost • Need to promote sanitation through behaviour change communication (BCC) and to get additional funds

<p>Latrine Business Owner's (LBO) experience in Prey Veng</p> <p>Kamchay Mear, Kanchriech, and Svay Antor districts, Prey Veng Province</p>	<ul style="list-style-type: none"> • Construction of the twin pit pour latrine in hard ground areas • Training on operation and maintenance (O&M) and door-to-door education on sanitation
<p>Hard Ground Twin Pit Latrine</p> <p>EWB</p> <p>Rolear B'ier District, Kampong Chhnang Province</p>	<ul style="list-style-type: none"> • Pilot project promoting the twin pit latrine, designed for hard ground areas: reduced excavation depth, onsite faecal sludge treatment, and uninterrupted use of the latrine system year-round. • Testing phase: 15 latrines built reaching 71 people • Concerns about local community initially acceptance, cost, time needed to realize the system, space needed to build a toilet. • Need for subsidies and support.
<p>Behaviour change approach</p> <p>Thpong District Administration</p> <p>Thpong district, Kampong Speu Province</p>	<ul style="list-style-type: none"> • The district administration made behaviour change central to its strategy to improve sanitation, through door-to-door visits, mapping of sanitation coverage, involvement in WASH Working Group • It worked thanks to clear share of priorities, roles and responsibilities • Still need additional support and budget, and boost cooperation

Table 1: Presentation of the 4 case studies

Based on analysis of the workshop discussions and case studies and comparison to SLH, WaterAid and UNICEF's work identifying challenging contexts globally, **gaps and recommendations to boost SCE in Cambodia** were identified (summarised in Figure 3). This is divided into:

- (1) **Regulations and definitions**, recommending an update of the existing National Guiding Principles to expand the definition of CEs
- (2) Development of **studies and data**, to fill the knowledge gap through mapping and data collection,
- (3) **Technical Working Groups**, recommended to boost the development of more tailored specific approaches for CEs and reinforce concrete collaboration among key actors,
- (4) **Priorities and implementation**, to clarify the urgency of working on CEs and define a clear strategy and definition of roles, and
- (5) **Communication**, among key stakeholders and among national and sub-national level.

Overall, the workshop was a valuable opportunity to gather key actors and generate momentum around SCE as a priority topic to achieve the 100% sanitation. The process highlighted the **importance of developing specific studies and tools** to move forward, including defining a clear road map involving all key Ministries and actors to agree on and coordinate the future actions.

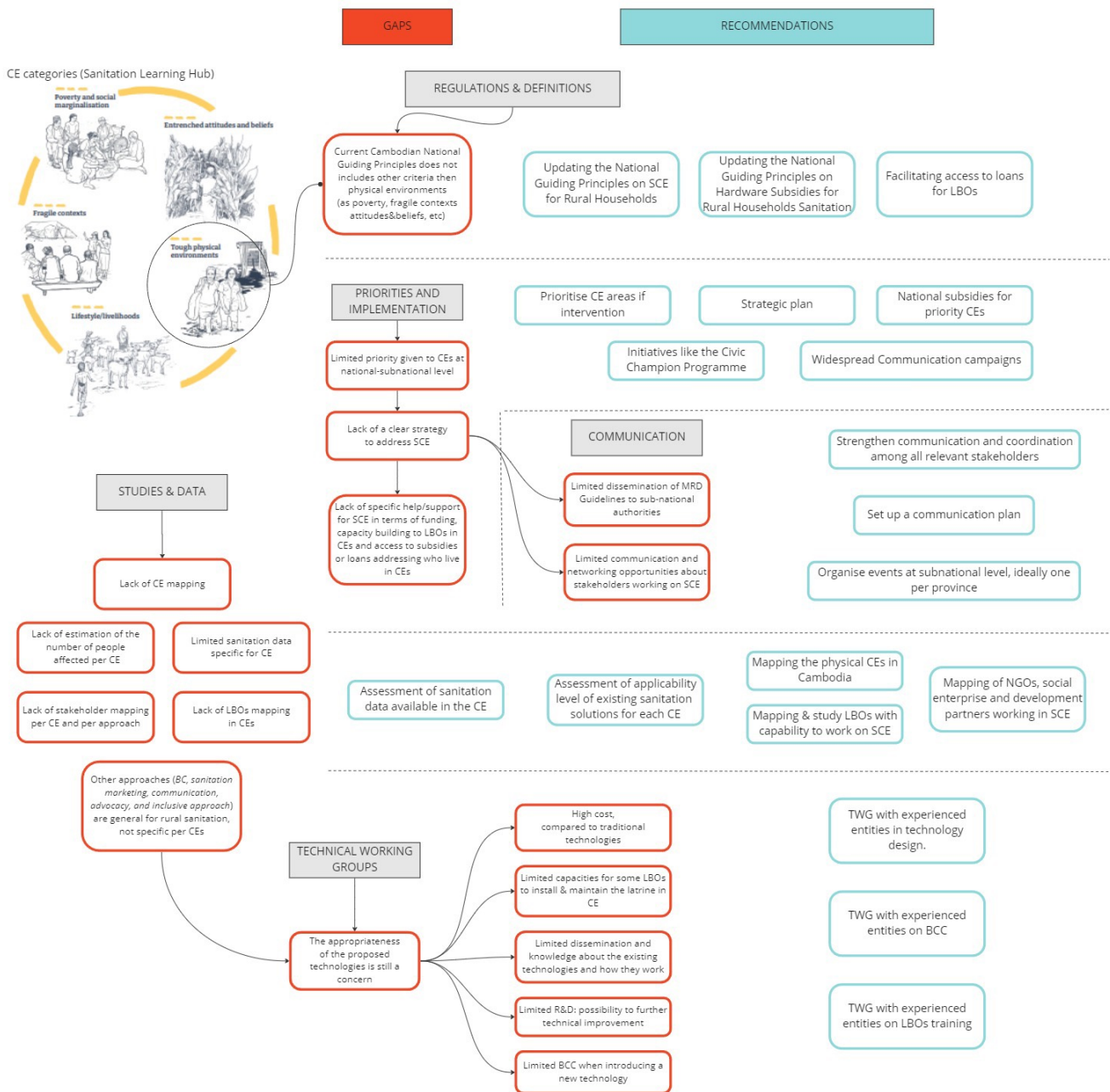


Figure 3: Gaps identified and recommendations.

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Table of Acronyms

ASU	All-Season Upgrade
BCC	Behaviour Change Communication
BOD	Biological Oxygen Demand
CDPO	Cambodia Disabled People's Organisation
CE	Challenging Environment
CLTS	Community-Led Total Sanitation
COCD	Cambodian Organisation for Children and Development
CSES	Cambodia Socio-Economic Survey
DWG	District Working Group
E4C	Engineers for Change
EWB	Engineers Without Borders
HH	Household
HP	HandyPod
iDE	International Development Enterprises
ID-Poor	Identification of Poor Households Programme
JMP	Joint Monitoring Program
KII	Key Informant Interview
LBO	Latrine Business Owner
MRD	Ministry of Rural Development
MISTI	Ministry of Industry, Science, Technology, and Innovation
NAP RWSSH	National Action Plan for Rural Water Supply, Sanitation and Hygiene
NGO	Non-Governmental Organisation
NIS	National Institute of Statistics
ODF	Open defecation-free
O&M	Operation and Manual
OPD	Organisation of Persons with Disabilities
PDRD	Provincial Department of Rural Development
PWG	Provincial Working Group
PWOs	Private Water Operators
R&D	Research & Development
RGC	Royal Government of Cambodia
SBCD	Social and Behavioural Change Communication
SCE	Sanitation in Challenging Environments
SDGs	Sustainable Development Goals
STI	Science, Technology, and Innovation
SLH	Sanitation Learning Hub
WASH	Water, Sanitation and Hygiene
WHO	World Health Organisation
WW	Wetlands Work!

A. Introduction

According to the Joint Monitoring Program report (JMP, 2021), 92% of the world population practising open defecation live in rural areas. Progress has been made on sanitation, with the population practising open defecation decreasing by a third from 2015 to 2020. 85% of this drop occurred in rural areas. However, challenges faced by the rural population are highly diverse and can be persistent, particularly in challenging environments.

In this context, the Royal Government of Cambodia (RGC) has set an ambitious target to achieve **100% access to clean water and sanitation by 2025**, five years earlier than the proposed Sustainable Development Goals (SDGs) target in 2030. This ambitious target calls for 100% rural sanitation coverage by 2025. To achieve this goal, align with SDG 6.2¹⁰ and fill the remaining gaps in terms of access to sanitation, specific actions are urgently needed. Challenging environments (CE) have been identified as the most complex contexts where to work, and a tailored approach to deal with these is required to fulfil the principle of leaving no-one behind.

To this aim, the Sanitation Learning Hub (SLH) and WaterAid Cambodia worked closely to organise a **2-day workshop about Sanitation in Challenging Environment (SCE)**, held in October 2022 in Phnom Penh, with the support of the Ministry of Rural Development (MRD), Sevea Consulting, Australian Aid, Engineers Without Borders (EWB), iDE and Wetlands Work! (WW). The main objective was to bring all relevant stakeholders to meet and share approaches, solutions and lessons learnt from their programs and projects on this matter.

The National Workshop facilitated discussion between a total of 51 representatives of Ministries, development partners, NGOs, and associations. Through a series of group discussions, dividing the attendees in smaller groups, the following topics were addressed:

- Mapping stakeholder analysis: (i) understand where the organisations are working, in which CE and what are the type of intervention; (ii) potential overlaps between CE in the same area; (iii) opportunities to collaborate and network;
- To share knowledge and experiences: (i) share case studies and lessons learned, (ii) discuss challenges, gaps, suggestions and ideas for improvement;
- To move forward: (i) what could be done differently to accelerate better sanitation in CE by 2025? (ii) How to increase collaboration and collective action?

This **Learning Note** reports the key findings of the Workshop and further analysis on the current approaches and challenges faced by the stakeholders, by describing the current status of SCE in Cambodia, and by presenting some of the case studies discussed during the workshop. To conclude, the report provides recommendations to move forward and accelerate the sanitation coverage in challenging environments in Cambodia. The logical structure of the Learning Note, with an indication of the relative chapter, is shown in Figure 4.

¹⁰ Sustainable Development Goal 6.2: “achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations by 2030”.

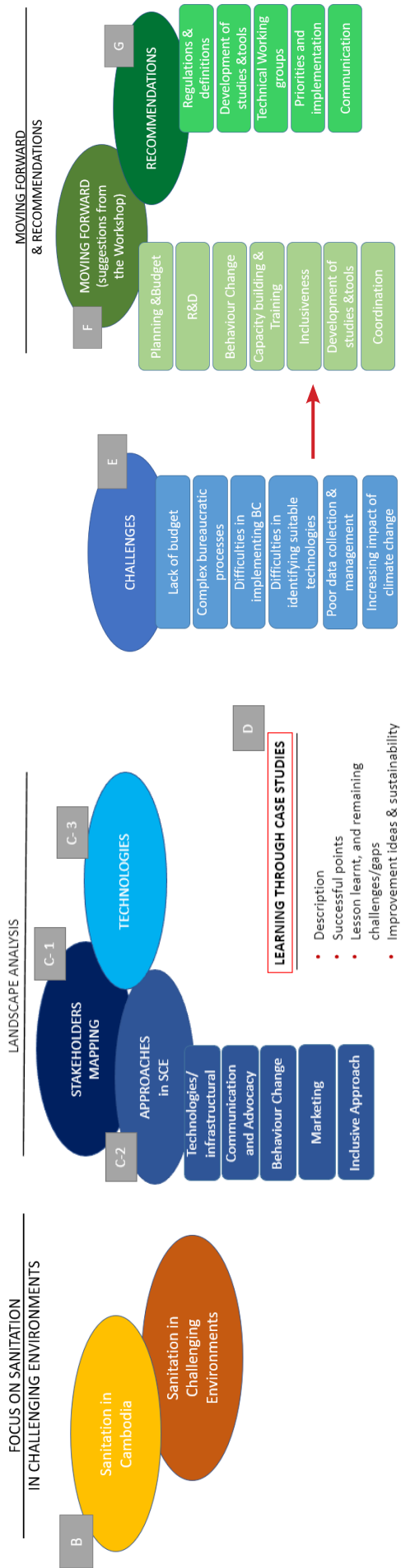


Figure 4: Logical structure of the Learning Note, in the grey box the Section – Chapter.

B. Focus on sanitation in challenging environments

1. Sanitation in Cambodia

Cambodia has made **significant progress in sanitation**, with access to improved sanitation facilities increasing to 83% in 2019, from 24.7% in 2004 (CSES, 2019-2020). Nevertheless, a significant urban-rural divide persists, with development heavily concentrated in urban areas. For example, on average, nationwide access to improved toilets is 80.4%, 97.8% in the capital Phnom Penh, and 74.2% in rural areas (CSES, 2019-2020).

The **National Institute of Statistics** (NIS) categorises sanitation into improved and unimproved toilets. The definition of “improved sanitation facility” includes three types of toilets namely “pour flush/flush connected to sewerage”, “pour flush/flush connected to septic tank/pit”, and “pit latrine with slab”. In addition, MRD also classifies sanitation as “basic”, “safely managed”, and “limited” sanitation services, which is aligned with JMP definitions. The different types of improved and unimproved toilets as well as percentage of access in different regions is summarised in Table 2.

Type of facilities	Cambodia	Phnom Penh	Other urban	Rural
Improved toilets	80.4	97.8	86.1	74.2
Unimproved toilets	19.6	2.3	13.9	25.8
Total	100	100	100	100

Table 2: Access to toilet facilities by geographical domain in percentage (CSES 2019-2020)

The Royal Government of Cambodia is committed to achieving **100% rural sanitation coverage by 2025**. To coordinate actions, the Ministry of Rural Development (MRD) in collaboration with development partners has developed two national action plans: (i) **National Action Plan for Rural Water Supply, Sanitation and Hygiene (NAP RWSSH)** 2014-2018 (NAP I) and (ii) the NAP II¹⁰ for the period 2019-2023 (MRD, 2019). NAP I recognizes, from experiences in Cambodia and globally, that building infrastructure promotes behaviour change, and that additional effort should include:

- 1. Hygiene behaviour change**, promoted mainly through Community Led Total Sanitation. The first stage is to get people to consider their behaviour and create a demand for better sanitation; the second stage is to motivate people to build and use a basic level of latrines; finally, the third stage is to motivate people to buy and use improved latrines.
- 2. Marketing**: promote latrines that are affordable and appropriate.
- 3. Building capacity of the private sector**: develop financing mechanisms to help poorer households buy latrines and support small entrepreneurs to provide services in rural areas.

¹⁰ The NAP II RWSSH aims to improve rural Cambodians' access to and usage of facilities for drinking water, sanitation, and hygiene. The emphasis on equality will be increased, through targeted initiatives for low-income households and people living in challenging environments. Therefore, NAP II aims to move the sector closer to the goal of universal access by providing equitable, safe, and affordable drinking water, sanitation, and hygiene services to 90% of the rural population, contributing to the Cambodia Sustainable Development Goals, particularly SDG6: “Ensure availability and sustainable management of water and sanitation for all”.

Despite advancements in sanitation practices overall, a significant prevalence of **open defecation** remains in the country, since part of the rural population still defecate in the open fields, open bodies of water, or other open spaces (E4C and EWB, 2020). In 2019, open defecation had been reduced by 31.5%, and a total of 1,789 villages, 67 communes and 2 districts attained open defecation-free (ODF) status (MRD, 2019). As of October 2022, there are only two provinces which have been declared ODF thus far, which are Svay Rieng and Prey Veng provinces. Meanwhile, at least three other provinces, Kandal, Kampong Chhnang, and Kampong Speu, have set a target to be declared ODF by 2023 (Kimmarita, 2022).

2. Sanitation in Challenging Environments

Even if progress has been made on increasing rural sanitation and access levels are rising, both worldwide and in Cambodia, challenges remain in reaching the ‘last mile’. The factors affecting the ability of households to construct and use toilets, as well as the challenges sanitation programs face in reaching specific groups, are highly diverse. Applying one-size fits all approaches has been proven not to work; therefore, **more adapted, and targeted approaches are needed** to capture the universality element of the Sustainable Development Goals and ensure that no one is left behind (Sanitation Learning Hub, 2021b).

According to the global desk review (Sanitation Learning Hub, 2021a) recently conducted by the SLH, UNICEF, and WaterAid, **five broad ‘categories’ of challenges** have been identified (i) poverty and social marginalisation, (ii) entrenched social norms and beliefs, (iii) tough physical environments, (iv) lifestyles and livelihoods and (v) fragile contexts. The document provides interesting insights about efforts and experiences in addressing those challenges, common barriers, systems, and strategies proposed, together with a series of recommendations.

In **Cambodia**, considering the national objective of achieving 100% access to clean water and sanitation by 2025, specific guidelines and targets have been developed to address the so-called challenging environments. MRD defined two output targets in the NAP II, to be reached by 2023, as follows:

- 70% of households (HHs) in challenging environments with access to basic sanitation services;
- 36 districts with entrepreneurs providing sanitation products and services for sanitation in challenging environments.

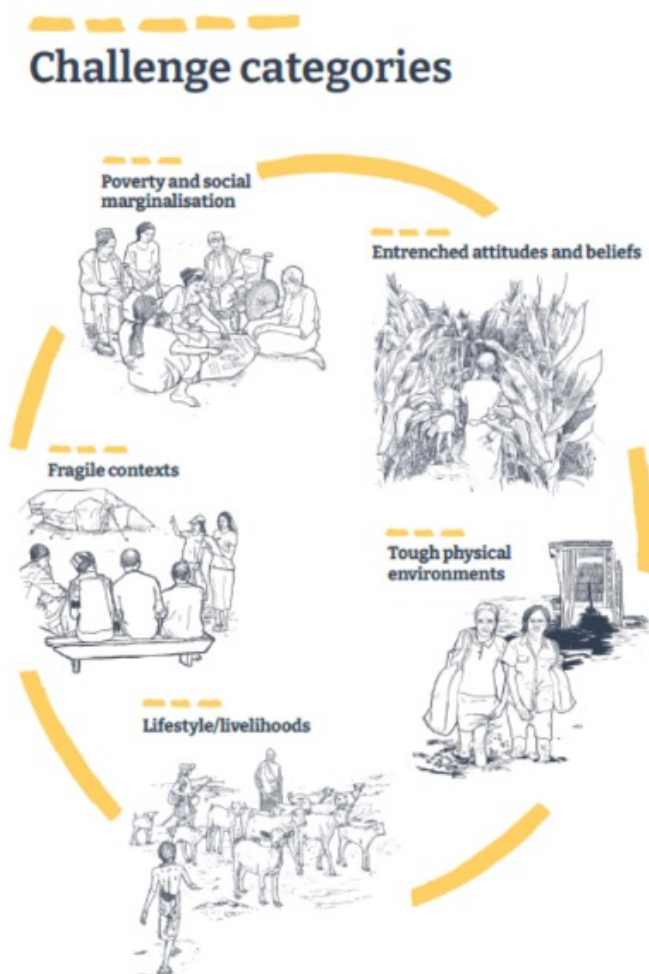


Figure 5: Challenge categories (SLH, 2021a)

To support work towards these, in July 2019, the Ministry of Rural Development published the **National Guiding Principles on Sanitation in Challenging Environments (SCE) for Rural Households**, (MRD, 2019). It represents a key document to coordinate action around the improvement of rural sanitation coverage in CE. This is much needed given that approximately **27% of the population live in a challenging environment** (World Bank - WSP, 2011) in Cambodia, representing over a quarter of the population.

MRD defines sanitation in a challenging environment as *“where it is either difficult to construct conventional latrines or where the use of conventional latrines is likely to contaminate the surrounding environment, particularly groundwater and surface-water resources.”*

The National Guiding Principles defines the following challenging environments, focusing only on **tough physical environments**:

- floating communities, where houses are floating for at least part of each year;
- flood affected areas;
- high groundwater levels, where conventional latrines are not possible;
- hard rock areas, where latrines cannot be dug by hand;
- water scarce areas, where conventional pour flush is not possible.

In the following paragraphs, the Challenging Environments as defined in the National Guiding Principles are described. However, it is important to note that there is currently a **lack of clear mapping of challenging environments** in Cambodia. One of the priorities for future research mentioned in the National Guiding Principle on Sanitation in Challenging Environments in Cambodia is the need for a much-improved mapping to identify floating, flood-prone, and water-scarce locations, in order to clearly identify and prioritise these areas. Additionally, mapping of population densities would also help estimate the number of persons affected by a challenging environment.

2.1. Floating Communities

Floating communities refer to communities that live mainly on boats, on precarious floating houses built on floating structures or on precarious stilt houses close to water bodies for a relevant period of the year. There are few sanitation options for the population in these communities, who usually urinate and defecate directly into their environment, contaminating the water source for drinking, washing, bathing, swimming and fishing. Residents of floating communities are exposed to levels of E. coli in their environment significantly above recommended WHO levels.

The floating communities in Cambodia are predominantly located within the Tonle Sap Lake area which includes Battambang, Siem Reap, Pursat, Kampong Chhnang, and Kampong Thom provinces. Around up to 100,000 people, with 1.1 million people living on the floodplain, spread out over 170 floating villages (Asiasentinel, 2019).

2.2. Flood-Affected Areas

Flood-affected areas are categorised in the National Guiding Principles based on the extent to which they are affected, such as:

1. Severely affected: people dealing with challenging area problems every day or for months at a time;
2. Medium affected: people dealing with the problems for weeks at a time every year, or once every 2-3 years plus annual flooding;

- Moderately affected: people dealing with challenging area problems for short time periods of a week or less annually, or affected once every 5-10 years by large flood or rainfall events.

One of the key sanitation challenges in flood prone areas is that, during floods, waste from rivers and improper septic tanks may be carried through neighbourhoods and into water sources, resulting in contaminating water resources and in possible human contact. Pit latrines in flood-prone areas need to be well sealed to prevent faeces from contaminating floodwater, to reduce the exposure of the communities to water-borne diseases. Furthermore, latrines not suitable for these conditions may become unusable during the rainy season, forcing the communities to go back to open defecation practices.

Flooding in Cambodia often occurs along the Mekong and around the Tonle Sap Lake, which expands more than five times over its normal size during the rainy season. Depending on the records, between 2 to 6 million people live within an area exposed to flooding, of which between 15,000 up to 450,000 households are affected each year by floods, depending on the intensity of the flood season.

Provinces along the Mekong which are susceptible to floods include: Stung Treng, Kratie, Kampong Cham, Kandal, Phnom Penh, Prey Veng, Svay Rieng, and Takeo. Other flood affected areas include Siem Reap, Banteay Meanchey, Kampong Thom, Kampong Chhnang, Pursat, and Battambang provinces around the Tonle Sap Lake.



Figure 6: Flood extent in Cambodia (Cambodia Humanitarian Response Forum, 2020)

2.3. High Groundwater

Within the MRD framework there is not yet a clear definition as to what constitutes high groundwater. Generally, high groundwater is defined where groundwater lies within 1 to 1.5 meters from the surface, either seasonally or permanently (Djonoputr, Blackett, Rosenboom, & Weitz, 2010).

In areas with high groundwater table, conventional methods for excreta or wastewater disposal may be impractical. It is recommended that there should be a space of at least 1.5 meters vertical separation between the bottom of a latrine pit and maximum groundwater level.

In the National Guiding Principles of MRD (MRD, 2019), the official estimate is that there are about 300,000 HHs located in high groundwater areas in Cambodia. However, this estimate can be debated if the total number of people living in the Tonle Sap floodplain (about 1.1 million people) is considered located in a high groundwater area.

2.4. Hard Ground/Hard Rock

Hard ground or hard rock areas are territories where the ground is dry and hard, making it difficult to dig or penetrate. In such areas, digging conventional latrines is difficult.

The areas in which hard ground may occur in Cambodia have to be clearly mapped. In general, hard rock has metalliferous mineral deposits composition (these potential areas are shown in

Figure 7). **Hard rock** has been described by experts as a less commonly encountered issue when implementing improved sanitation in Cambodia, compared to other challenging environments (E4C and EWB, 2020). However, **hard or clay soils** present a similar challenging environment to hard rock, as constructing latrines prove difficult. Research in Cambodia describes how seasonal changes in Cambodia impact soil hardness (E4C and EWB, 2020).

Deep soil profiles move from hard to soft in the dry season and rainy season, respectively. The variations in soil hardness seasonally potentially creates additional challenges in construction and contamination risks through fluctuating groundwater levels. The soil properties in hard rock environments generally exhibit low percolation rates making it difficult for water to infiltrate the ground surface during flood events.

Pit latrines in hard rock environments present two primary challenges. Firstly, where hard rock is encountered, it can be **difficult and costly to dig** a latrine where hard rock is close to the surface. Digging pit latrines in such areas may require the use of a drilling rig as manual digging can be insufficient, with some locations inaccessible to drilling rigs.

The second challenge is the **risk of fractures in the rock**, which can lead to rapid contamination of groundwater. Contamination takes place if there is a pathway between a source (leaching from on-site sanitation) and a receptor (groundwater). Water in an aquifer flows through pores and fractures in hard rock. These fractures can present high flow and high risk to groundwater contamination, and therefore pose a risk to water supply wells.

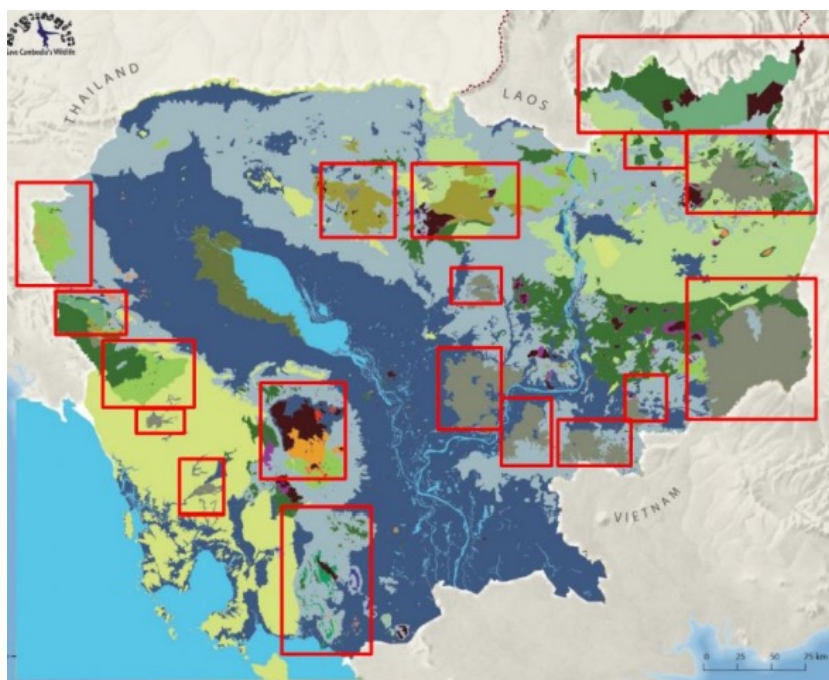


Figure 7: Potential hard rock areas in Cambodia (Open Development Cambodia, 2006)

2.5. Water Scarce

In communities where water is scarce, it is not possible to build conventional pour-flush latrines. Indeed, water scarcity hinders access to water for basic sanitation, either at homes, schools or healthcare facilities. In 2020, nearly 3.4 million people in Cambodia (LifeWater, 2020) predominantly in the rural communities, lack access to safe water, limiting the access to sanitation. In coastal communities, freshwater scarcity and seawater intrusion are also major obstacles to providing access to water. Although sea water can be used for sanitary purposes, the community will not invest in building a well if fresh water is not available, as this means that it cannot be used for drinking or hygiene.

C. Landscape analysis

The following Sections of the Learning Note (sections C, D, E and F) reflect the main findings of the 2022 2-day Workshop on Sanitation in a Challenging Environment (SCE).

This first section “Landscape analysis” focuses on the outcomes of the workshop session named “Mapping Stakeholders analysis”, which aimed to collect information from the participants about the main Province/area of work, the specific challenging environments faced, and the type of intervention implemented in their work on SCE. Each participant was asked to present themselves and the organisation they represented, describing their experience on sanitation and recent initiatives realized in challenging environments in Cambodia. The group discussion was facilitated using the following guiding questions: (i) Identify overlaps among challenges, e.g., if there are multiples challenges in the same region; (ii) describe any possible coordination among stakeholders.

To facilitate the understanding of the information gathered during the workshop, the key findings are presented grouped in the following main categories:

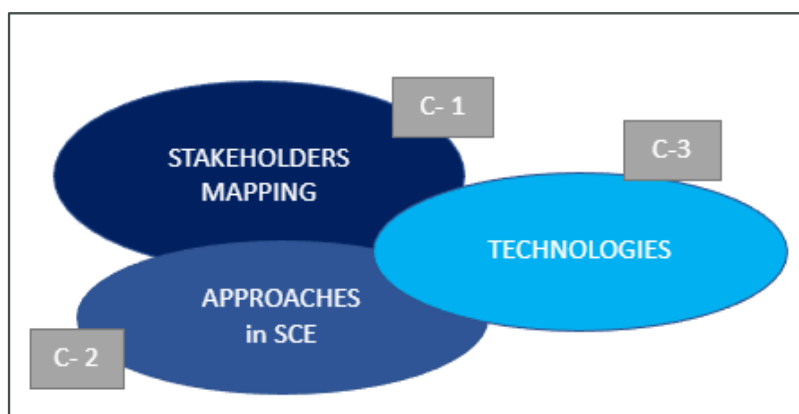


Figure 8: structure of the Section C, with in the grey boxes the reference to the single chapter

1. Stakeholders mapping

The list of stakeholders who participated in the Workshop on SCE is presented in **Appendix 1 - Stakeholder Mapping**, with a brief presentation of their role and main competences, based on their presentation at the workshop and some additional research.

From the information shared at the Workshop, it has been possible to get a deeper understanding about the **provinces of interventions**, identifying in which province the main stakeholders are currently working on SCE. A map elaborated in QGIS is presented in Figure 9, representing the number on NGO/associations that attended the workshop and are running a sanitation initiative/project/program per Province.

Provincial Departments and organizations working specifically only in one site (Province or District) are not included in this elaboration.

The majority of the initiatives are located around the Tonle Sap Lake and along the Mekong river, mainly in the Provinces of Kampong Chhnang and Kandal. None of the participants reported initiatives in the mountainous area in the North-East of the country, while only a few were reported in the coastal areas.

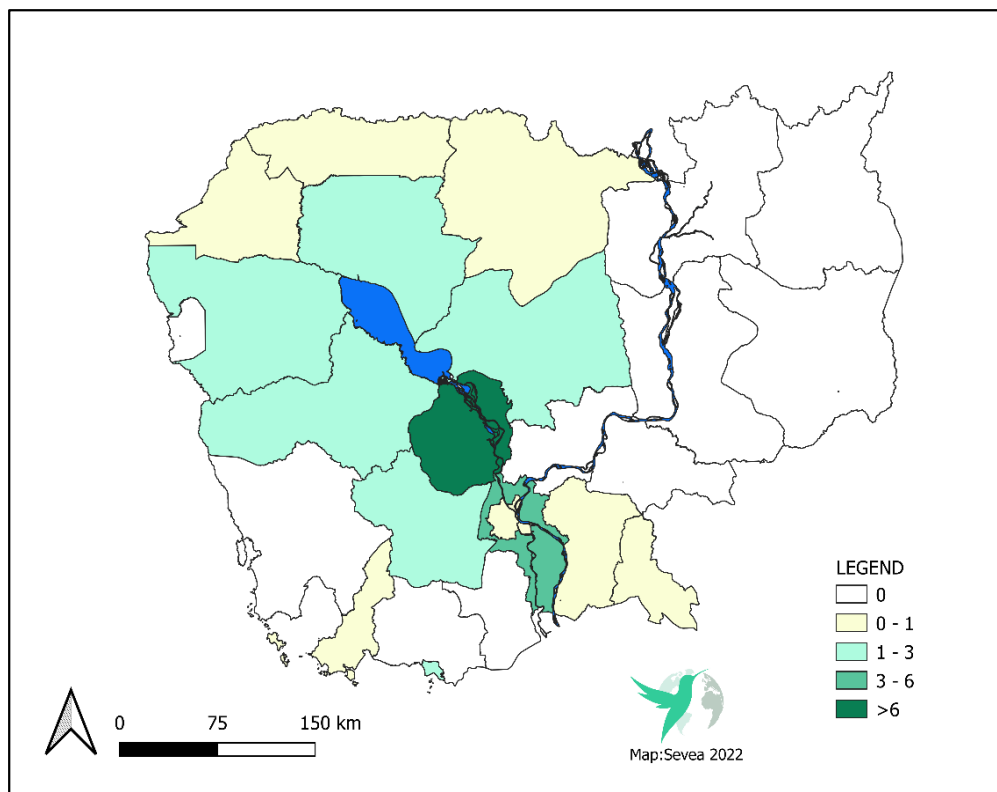


Figure 9 : number on NGO/associations present to the workshop and that run initiatives on SCE per Province:

In **Figure 10** represents the main CE encountered by stakeholders at the workshop, based on the group discussions. The most common CE is floating communities, followed by areas with seasonal scarcity of water, and seasonal flood prone areas. Slightly less common, high groundwater and hard ground.

The only **additional CE mentioned by the stakeholders is sandy soils.**

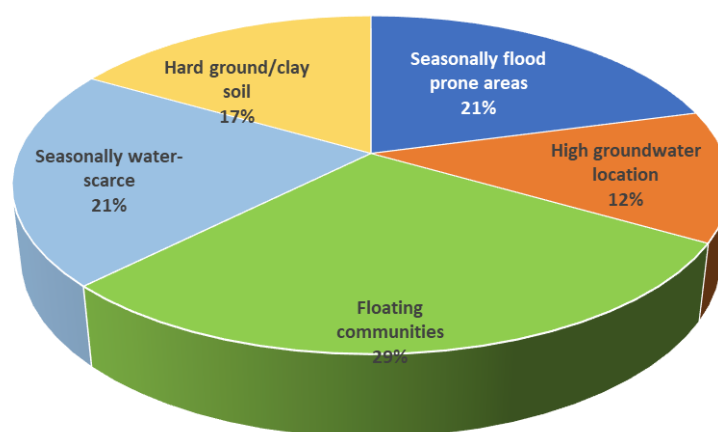


Figure 10: CE faced by all the stakeholders joining the workshop

Table 3 presents the **most common CEs faced per geographical zone**, based on the inputs of the stakeholders that joined the workshop and considering the main CEs reported by them in their work on sanitation. Even if this analysis cannot be considered exhaustive, because a proper CE mapping requires more complex and technical studies, it can give a first rough idea of the geographical distribution of CEs in the geographical zones of Cambodia.

	Zone 1 Plain ¹⁰	Zone 2 Tonle Sap ¹¹	Zone 3 Coastal ¹²	Zone 4 High land Mountain ¹³
Seasonally flood prone areas				
High groundwater location				
Floating communities				
Seasonally water-scarce				
Hard ground/clay soil				

Table 3: estimated distribution of CE per geographical zone

Legend

	Higher frequency
	Lower frequency
	No frequency

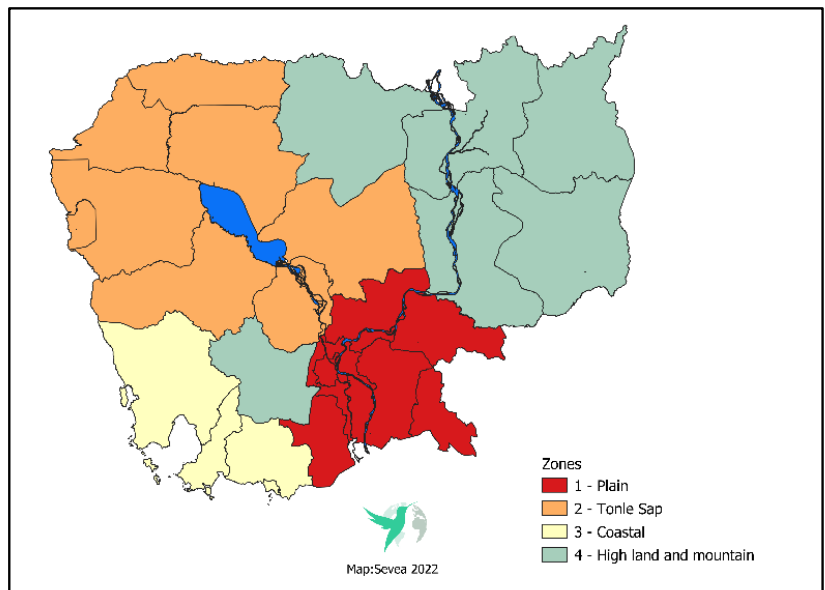


Figure 11: Cambodian geographical zones

¹⁰ Phnom Penh, Kandal, Kampong Cham, Tboung Khmum, Prey Veng, Svay Rieng, and Takeo.

¹¹ Kampong Thom, Siem Reap, Battambang, Bantheay Meanchey, Pursat, Kampong Chhnang, Oddor Meanchey, and Pailin.

¹² Sihanoukville, Kampot, Kep, and Koh Rong.

¹³ Kampong Speu, Preah Vihear, Rattanakiri, Steug Treng, Kratie, and Mondulkiri.

2. Approaches implemented in SCE

The stakeholders that attended the Workshop were asked to describe the main approaches and types of intervention they implement in their daily sanitation work in CE communities. The key findings are grouped into five categories, as follows:

1. Technologies/infrastructural:

- Design of appropriate latrines for SCE and R&D
- Support on latrine material supply and installation

2. Communication and advocacy:

- WASH Communication
- Prioritising sanitation in the local authorities' Agendas
- WASH focal point

3. Behaviour change:

- Community-Led Total Sanitation (CLTS)
- Wedding event approval

4. Marketing:

- Sanitation Marketing Approach

5. Inclusive Approach

- Addressing vulnerable groups
- Hardware Subsidies Approach



Each approach is described more in detail in **Appendix 2**. Where the level of details presented at the workshop was not sufficient, some additional information was included, based on additional literature review.

It should be noted that **appropriate adaptation to CEs was only acknowledged in the technological approach**: sanitation technologies have been designed and tested to be more suitable for physical CEs. In contrast, the adaptation of other approaches (communication, advocacy, marketing, or inclusiveness) to make them more appropriate for people living in CEs is still limited¹⁰. This remains a **major gap**.

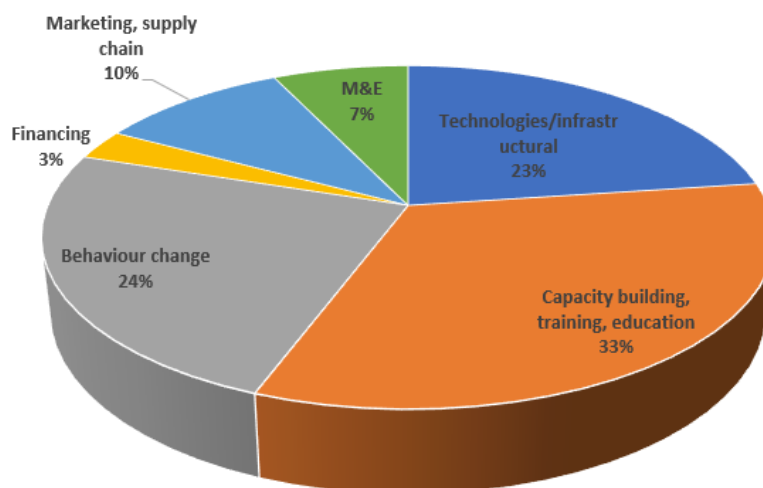


Figure 12: Types of interventions by stakeholders present at the Workshop.

¹⁰ As an example, WW has developed a sanitation marketing approach specifically designed for communication and marketing to remote floating communities.

As presented in **Figure 12**, capacity building, training and education represent the most common approach implemented by the stakeholders that joined the workshop, followed by behaviour change and infrastructural projects.

In general, it should be noted that the involvement of NGOs, and associations is evenly divided between technologies/infrastructures, capacity building & training, and Behaviour Change. Provincial Departments, in line with their official role and competences, focus more on infrastructure and Capacity Building & Training.

3. Technologies

This chapter presents an overview of the main sanitation technologies used in Cambodia, generally in rural areas and then specifically in CEs. A chapter is dedicated to this topic because the level of development of each technology and its relevance in CEs was discussed extensively during the national workshop. It is therefore considered important to give a general understanding of the most common sanitation technologies used in the country.

Improved sanitation in rural Cambodia primarily includes some form of pit latrine use, including simple pit latrines with a slab, Ventilated Improved Pit (VIP) latrines and pour flush latrine. A **simple pit latrine** is the cheapest, most basic form of improved sanitation available in rural Cambodia. A **VIP latrine** is essentially a pit latrine with a ventilation pipe to reduce odour and flies, improving acceptability. The **pour flush latrine** goes a step further: water is poured automatic into the bowl to flush excreta into the pit latrine. This reduces the presence of flies and allows for a general clean and comfortable use, making this type of latrine generally well-accepted by users. The primary concern in Cambodia with pour flush latrines, similar to pit latrines, is the liquids permeating into the soil that could contaminate the groundwater, therefore additional effort is required to manage the fecal sludge, providing a proper wastewater management.

Apart from these basic technologies, more advanced sanitation solutions that are present in the Cambodian rural areas and/or have been developed and tested by some NGOs and associations, include:

- **Easy latrine;**
- **Two Pit Pour Latrine;**
- **Twin Pit Pour Latrine;**
- **Sato latrine pan;**
- **Ecological Sanitation;**
- **ATEC biodigester;**

A description of each technology is presented in **Appendix 3**, clarifying to what extent it can be consider appropriated also in CE.

Additionally, in **Appendix 3**, a focus is dedicated to the systems presented at the **Gallery Walk** organized during the 2-day National Workshop: four organisations showed the technologies developed or co-developed to be appropriated in CE, showing prototypes, materials, and being available to discuss in person and share their own experiences:

- **Sky latrine and ASU** (All Seasonal Upgrade) system, presented by iDE;
- **Twin Pit Latrine and Septic tank for hard ground soils**, presented by Engineers Without Borders;
- **Handy-Pod** technology, presented by Wetlands Work!;
- **Wastewater treatment technology** based on **coconut fibres**, presented by SUDrain.

D. Case studies

During the Workshop, the group discussion “To share knowledge and experiences” aimed to discuss successful cases, common challenges, and lessons learnt of the ongoing SCE programs and projects.

In this section, the four case studies that raised the most interest during the workshop are presented. They have been selected also to allow an overview of different types of intervention (technological, marketing, behaviour change), of activities conducted by different actors (NGO, social enterprise, local authority, and LBOs), and finally to explore the situation of different Provinces.

The following 4 case studies are described in the following tables:

- (1) HandyPod technology, Wetlands Work!, Kampong Thom;
- Hard ground case studies: (2) LBO's experience in Prey Veng and (3) Engineers Without Borders' design, Kampong Chhnang;
- (4) Behaviour change approach, Thpong District, Kampong Speu.

Each case study is presented through a **description** of the initiatives, the main **successful points**, the main **challenges**, **lessons learnt** reported by the stakeholder and finally some **suggestions** on how to **improve** the impact and the contribution to the sanitation targets.

A more comprehensive description of each case study is presented in **Appendix 4**.

1. Wetlands Work's HandyPod solution in Kampong Thom	
Description	Successful points
<p>Wetlands Work! is a social enterprise that has been developing nature-based solutions to sanitation in CEs, including floating, flood-prone, high groundwater table, beach sand and impermeable soil (clay) environments.</p> <p>WW's signature accomplishment is the HandyPod (HP), initiated in 2009 and product-ready in 2016.</p> <p>WW selects and trains independent LBOs on how to make and market their products and become a sustainable business.</p> <p>This case study refers to the implementation of HP in 5 floating villages located in Phat Sanday, in the Province of Kampong Thom, in 2016-17.</p>	<ul style="list-style-type: none"> • Suitability of HP for many CEs: meets Cambodian water quality standards and has efficient on-site faecal sludge treatment • Sustainability: Some of those installed in Phat Sanday HHs in 2016-2017, still functioning today. New successful scale-up effort in 2023 on-going in 20 floating villages • Elaboration of simple Faecal Sludge Management protocol demonstrates the efficiency of shallow sludge/soil curing, tested in both dry and rainy season (WW, Final Report SCE Research, CRSHIP 2, Plan International, 2019) • Innovative marketing approach to involve the communities, using gamification and rewards to increase the engagement and demand for sanitation solutions. • Targeting schools to increase the number of beneficiaries and promote community sanitation awareness. • Provide sustainable support to LBOs by providing quality control oversight and mentoring for at least 2 years.

Lessons learnt, challenges or gaps remaining	Improvement & Sustainability
<p>Challenges</p> <ul style="list-style-type: none"> • Requires awareness and behavior change programming on importance of safe sanitation practices. • High demand for HP yet cost is a challenge for lowest-income households that cannot purchase a HP without subsidies. 	<ul style="list-style-type: none"> • Importance of behaviour change campaigns, especially towards low-income households • Two-year mentorship with LBOs to ensure a good understanding of the sanitation challenges and safe practices. • Availability of subsidies needs to be further discussed to enlarge the accessibility of tailored sanitation solutions to CE, as HP. • Additional funding is required to scale-up WW-trained HP LBO teams throughout Cambodia's SCE areas.

This section presents two case studies which are both located in hard ground areas in Cambodia, one related to a LBO operating in Prey Veng and the second one to the experience of Engineers Without Borders (EWB) in Kampong Chhnang.

2. LBO's experience in hard ground areas – Prey Veng	
Description	Successful points
<p>The LBO, established in 2011, that operates in 3 districts in the Province of Prey Veng (Kamchay Mear, Kanchriech, and Svay Antor districts). They are mainly characterized by hard ground areas, and the main sanitation solution proposed is the twin pit pour flush latrine.</p> <p>To ensure the system remains operational and sustainable in the long term, the LBO provides training on basic O&M to the households that purchase their technology.</p>	<ul style="list-style-type: none"> • LBO has provided more than 6,000 families with sanitation facilities; • It educates households door-to-door about the importance of sanitation, promoting best practices and the benefits of using sanitation solutions; • Positive customer satisfaction since the system is quite easy and simple for consumers to operate; • The Province of Prey Veng is the 2nd Cambodian province declared ODF (October 2022).
Lessons learnt, challenges or gaps remaining	Improvement & Sustainability
<p>Challenges:</p> <ul style="list-style-type: none"> • having the communities trust the importance of sanitation, and the benefits of avoiding open defecation; • having the families paying for the latrines; • difficulties in HH that lack access to water to use a pour flush latrine, or when transporting water from the source is complicated or costly. 	<ul style="list-style-type: none"> • LBO receives very small profit for its work, although has high level of commitment and willingness to support rural households. To be able to extend its marketing activity, the LBO may need additional support from the local authority in promoting sanitation among households; • Keep implementing these types of solutions and testing any possible improvements to make them even more effective in HG areas; • Keep providing training to end users.

<p>Lessons learnt:</p> <ul style="list-style-type: none"> • relevance of having the support from the local authorities, especially village chief and commune councillors; • the price of this sanitation technology is generally considerate acceptable; • LBO has been improving its ability to promote itself and its products. 	
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3. EWB's hard ground solution - Kampong Chhnang	
Description	Successful points
<p>EWB piloted the sanitation systema twin pit latrine, designed for hard ground areas, in the 2 villages in the District of Rolear B'ier, Province of Kampong Chhnang.</p> <p>15 latrines have been installed, and 71 people benefit.</p> <p>This solution allows reduced excavation depth (0.7m), provides onsite faecal sludge treatment, and ensures an uninterrupted use of the latrine system year-round.</p>	<p>The solution raised a general good level of satisfaction among the community.</p> <p>It has been proven to be suitable both for hard ground and high groundwater areas.</p> <p>It is an effective solution to guarantee:</p> <ul style="list-style-type: none"> • uninterrupted use of the latrine system for an entire year; • on-site faecal sludge management without contaminating the surrounding environment; • use of locally sourced and cost-effective materials such as concrete; • small excavation depth (0.7m) in comparison to conventional latrine designs (1.5m). <p>EWB provided:</p> <ul style="list-style-type: none"> • M&E plan and constant monitoring of the pilot systems, through monthly tracking and site visits. • training to the beneficiaries, LBOs active in the area and PDRD.
Lessons learnt, challenges or gaps remaining	Improvement & Sustainability
<p>Challenges</p> <ul style="list-style-type: none"> • local community initially reluctant to get on board; • concerns about the cost of the system; • concerns about the time needed to realize the system, longer than conventional systems; • lack of enough space available to build a toilet. 	<ul style="list-style-type: none"> • importance of keep promoting behaviour change campaigns; • reduce the cost through collaboration with NGOs and partners willing to provide subsidies; • cooperate with MRD to work on subsidies for SCE; • keep providing support and training on operation and manual (O&M) to local business, beneficiaries and PDRD.

The final case study focuses on the behaviour change approach adopted by the Thpong District in Kampong Speu Province.

4. Behaviour Change - district of Thpong – Province of Kampong Speu	
Description	Successful points
<p>Thpong District's administration has made behaviour change a central part of its strategy to improve sanitation, through:</p> <ul style="list-style-type: none"> • door-to-door visits to households without latrines to promote sanitation; • fundraising to build latrines, in coordination with the PDRD; • map of the sanitation coverage for each village to increase awareness and identify the priorities; • active involvement in the technical WASH Provincial and District Working Groups; • giving approval to organize a wedding event in a household only if a sanitation system already exists; • positive experience with the Civic Champions Program initiative. 	<p>Remarkable results: sanitation coverage from 81% in 2019 to 98.5% in October 2022, mainly achieved through:</p> <ul style="list-style-type: none"> • clear share of priorities, roles and responsibilities at the district and commune level; • strategic plan towards achieving ODF, thanks to the efficient meetings of the monthly District Working Group (DWG); • capability of allocating budget on sanitation for each commune (about US\$1,500 per year), redistributing some remaining budget from Social Development budget; • high level of commitment of the leaders, at district and commune level; • innovative initiatives, like the Civic Champion program and the sanitation coverage mapping in each village.
Lessons learnt, challenges or gaps remaining	Improvement & Sustainability
<ul style="list-style-type: none"> • Limited budget specifically allocated on WASH; • Request for budget allocation requires a complex administrative process; • Strong efforts required to raise awareness among people on the importance of sanitation and hygiene best practices; • Difficulties in dealing with the poorer households that do not own enough land to build latrines. 	<ul style="list-style-type: none"> • Encourage greater cooperation with the local population, authorities, and other stakeholders; • Keep working on behaviour change communication; • Cooperate with external partners could support to conduct digital mapping; • Follow-up, replicate and scale up the training to the commune councillors provided with the Civic Champions Program; • Design and provide climate resilient latrines.

E. Challenges

While presenting their individual experiences with SCE and case studies, during the Workshop stakeholders also shared the main difficulties they face. They identified **many challenges**, demonstrating the urgency of finding solutions to these.

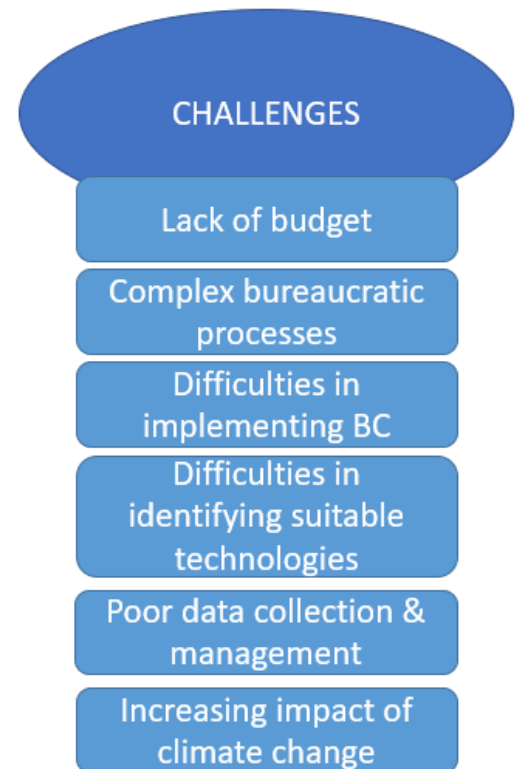
Most of the challenges were identified **as common in all the geographical areas of Cambodia**.

The following analysis identifies the situation and **to what extent a specific challenge refers to CEs**, all CEs, or a specific CE.

The challenges are grouped in the following categories:

1. Lack of household and government's budget to build latrines
2. Complex bureaucratic processes to access funds and subsidies
3. Difficulties in implementing Behaviour Change (BC)
4. Difficulties in identifying the technology suitable to CE and people's usage
5. Poor data collection & management
6. Increasing impact of climate change

The specific CE-related challenges are highlighted in boxes within each category.



Lack of budget to build latrines

The lack of economic resources refers both to citizens and to the government.

Regarding citizens, many rural households lack economic resources to purchase and build their own latrine. This is particularly critical for ID poor people, that do not have a sufficient income or economic stability to afford such investment. In Cambodia (WB, 2022), 22.8% of the population in rural areas live under the national poverty line, recently redefined as USD 2.7 per day. The poverty rate in rural areas is higher than the average national data (18%), and much higher than in the capital Phnom Penh (4.2%) and in other urban areas (12.6%).

Moreover, the people living in floating communities are considered to be among the poorest and most vulnerable, which presents an additional challenge to the challenging environment in which they live.

Additional constraints frequently encountered by people in rural areas that further reduce the possibility of purchasing latrines, are:

- migration of the workforce, both men and women, looking for better job opportunities outside the rural areas. This may cause budget constraints to the rest of the family staying in the rural

areas, mainly composed by the elder components of the family, and inability to make decision and plan the construction of toilets;

- unavailability of enough land to build latrines. This often affects vulnerable groups, like disabled or poor people, people who live in slum areas and/or in floating households. Slums are often illegal settlements, populated by people that cannot buy their own land, or have a stable house. This affects their willingness to invest in a proper latrine. It has been described the situation of some floating communities facing similar situations, with houses close to each other, making the construction of individual latrines difficult.

On the government's side, there is lack of budget allocation at provincial, district and commune level.

The total national budget transferred from the national to sub-national level has been enormously cut in the last two years to response to the Covid-19 emergency, therefore sub-national governors are struggling to allocate enough resources to sanitation. Some budget is still available on sanitation for the provinces that have been identified as a target to the ODF national strategy.

The issue is more complex in CE, **where appropriate technologies are more expensive than the conventional latrines**. Latrines which are considered appropriate for use in Cambodian CE have a higher cost compared to the conventional ones. This is considered one of the main challenges in reaching all households located in CE with a proper sanitation solution, that is useful throughout all seasons, not just during dry season.

Complex bureaucratic process to access funds and subsidies

At the commune level, the process of claiming money from the Ministry of Economics and Finance is quite complicated. For example, it has been mentioned that the commune needs to collect three quotations from companies or suppliers registered within the Ministry of Commerce, and this process may be complex in some contexts.

Furthermore, in case of subsidies, ID poor families need to take many steps to apply for subsidies. Commonly, the process involves village chief, up to the commune, district, and provincial level, requiring skills and time to get a response and approval.

Additionally, the access to subsidy is even more challenging for some communities, for example households with limited livelihood but not certified with the poverty card, as well as the communities that struggle to have documentation.

Difficulties in implementing behaviour change

Behaviour change is among the main approaches used by the stakeholders that work on SCE, but its long-lasting impact is a big concern.

From the experiences shared during the workshop, the following are still common:

- lack of knowledge about the importance of using latrines and how to practice WASH in daily life (e.g., hand washing after defecation);

- the practice of open defecation, both when a family refuses to purchase a latrine and when a latrine is available;
- improper use and management of latrines, especially when they have been received for free.

These situations are likely to happen in both non-challenging environments and in challenging environments, clearly showing the difficulties in making people understand the importance of using proper sanitation solution, avoid open defecation, and manage their latrine properly, if they have one.

All the stakeholders agree on the urgency of spending more effort and resources to support people living in CE, **implementing more behaviour change practices**. For instance, the discharge of wastewater into water resources needs to be addressed, mostly for households living in floating communities and flood prone areas.

Difficulties in identifying appropriate technologies for CE contexts and populations

The main problem highlighted by stakeholders is the **limited investment in the development of appropriate technologies for CE** as well as the deployment of sanitation solutions in CE, as it may be difficult for people to access them (awareness, cost, skills, etc.).

Some **specific technical gaps** have been identified in CE. In seasonally flooded areas, the floods cause frequent latrine clogging, making the latrine, when existing, impossible to use without being technically repaired (for example, Kampong Chhnang). Therefore, for periods up to 6 months, people are forced to defecate directly into the water, that is then used for domestic purposes. A similar situation is faced in floating communities without sanitation, where the risk of contaminating drinking water is very high.

Difficulties in digging toilet pits are mentioned in the hard ground, clay, and sandy soils, while some stakeholders added the issue of the coastal areas, where digging latrines is difficult due to saltwater intrusion and the consequent higher groundwater level.

The main issues related to the current existing technologies are:

- price, that is higher than the conventional ones;
- lack of knowledge about their existence and their characteristics (including their added value in some specific CE, sustainability, and benefits);
- few technicians or LBOs know how to realize and maintain them.

In general, there is a **lack of technical support** (e.g., NGOs, social enterprises, national authorities) addressing those who live in CE. It has been mentioned that the **Coastal zone receives less support compared to other CEs**.

These issues need to be taken into consideration while designing and testing the most appropriate technology that better fits specific challenging environments and people's usage.

Poor data collection and management

Some stakeholders mentioned difficulties regarding sanitation data collection and management. For instance, unclear definitions of the sanitation systems and service levels, poor data accuracy or limited availability budget for data collection were highlighted as challenges. It should be noted that this is a nationwide issue in Cambodia, where the establishment of an effective data collection structure remains difficult.

The National Institute of Cambodia is working hard on this, to better understand the limitations of the current system and to improve the SDGs reporting capacity (Sevea, 2022).

Finally, most stakeholders who participated in the workshop stressed the **need for SCE mapping** to identify the location of these challenging environments as well as the location of the remaining households without latrines.

Increasing impact of climate change

The impact of climate change negatively affects many areas of Cambodia, with a continuously increasing of extreme events like floods, including riverine and flash flooding, storms, and drought. The Tonle Sap area is one of the most affected areas by climate change in Cambodia.

It is important to note that the Tonle Sap Lake is surrounded by flood plains and freshwater marshes, with rice paddies and grasslands flooding seasonally. One of its natural features is that during rainy periods, the Mekong overflows, increasing the size of the lake by at least 5 times. The water levels of many other rivers around the lake also rise, creating a complex delta system, with some areas affected by floods for up to six months per year. In addition, the effect of climate change in the region exacerbates flooding. This has negative environmental and health impacts, in cases of improper latrine management, that can contaminate drinking water sources, and when people without proper sanitation are forced to return to open defecation.

F. Suggestions from the Workshop for moving forward

This chapter aims to reorganize the most pertinent **inputs gathered from the key stakeholders during the Workshop** about their ideas on how to move forward and accelerate the sanitation coverage of CE in Cambodia.

The inputs gathered are grouped in the 7 following topics:

- Planning & Budget
- Research & Development (R&D)
- Behaviour Change
- Capacity building & Training
- Inclusiveness
- Development of studies & tools
- Coordination



1. Planning & Budget

The lack of budget available, both for individual households and in terms of budget allocation at the sub-national level, has been identified as one of the main challenges, especially considering that the sanitation solutions more adapted for the CE are generally more expensive than conventional systems.

To cope with it, the main proposals regard:

- **Increase budget allocation**
 - Increasing budget allocation and development plans to address SCE from both government and key stakeholders, aiming to set clear objectives and put more support both technical and financial on SCE area. Budget allocation should prioritise SCE at national level through MRD and subnational level, including the PDRD.
 - Establishing a development plan and budget for disaster response for the CE where climate change is an aggravating factor.
 - Ensuring that development plans at district, commune and village levels have a specific focus and budget on WASH, setting SCE as a priority.
- **Facilitate access to loans & process to work on sanitation**
 - Facilitate access to loans to build latrines which are appropriate for CE, especially considering their high investment cost and the proportion of low-income households living in CE. Indeed, the very poor households in CE, not certified with the poverty card, should have access to subsidies to enable them to purchase latrines.
 - Provide small grants to LBOs to have more suppliers in CE which will increase the competition and thus reduce the price.
 - Facilitate the process for organisations wishing to work on sanitation to be able to launch their activities in a certain area, as it was mentioned that complicated documents are currently requested.

- MRD should provide specific trainings to subnational level on how to allocate and claim money back for sanitation activities, prioritizing CE
- **Support incentives initiatives**
 - Building on successful initiatives such as the Civic Champions programme, designed to promote access to water and promoted by MOI (Ministry of Interior) and MRD in 8 provinces with the active participation of WaterAid Cambodia, a similar initiative focusing specifically on SCE could be designed and implemented.

2. R&D and raising awareness of CE-appropriate solutions

The limited number of sanitation solutions appropriate for CE available, their costs, and the poor knowledge about them among government officers, communities and technical entities, are among the key gaps to reach 100% sanitation in CE.

To concretely move forward, the discussion identifies the following key points:

- Need for **more investment and R&D** to develop affordable and appropriate sanitation solutions for the CE;
- Need for **more knowledge** about the appropriate solutions to adopt for a specific challenging environment as well as their benefit.

While this Learning Note aims to give a contribution to consolidate the current knowledge on this matter, other ideas were discussed such as:

- increasing the **technical coordination** between development partners and promote product/technology development;
- supporting **more studies** to achieve affordable material/designs for the flooding regions.

Furthermore, as a basis for the required technical innovation, a **better understanding of the characteristics of CE** is also needed. Therefore, it was proposed to initiate an in-depth CE analysis, including a **mapping of CE throughout Cambodia**, taking into account areas highly vulnerable to climate change, poverty rate and population density. As suggested by key stakeholders, maps for CE should be developed (during the rainy season to ensure that no flood zones are missed). The poverty rate and population density will help to estimate the number of people affected by the lack of sanitation in CE, as solutions adapted to CE are often more expensive and, at the same time, the inhabitants of CE are usually the poorest.

Additional issues mentioned that require specific study and design were:

- **Monitoring the quality of wastewater discharge** to avoid/reduce the pollution;
- Design of **toilets accessible for people with disabilities**, adapted to rural areas.

3. Behaviour Change

The key point is the importance of **strengthening and expanding the promotion of WASH practices** to all the CEs in Cambodia, increasing specific communication on Behaviour Change (BC). Also, regular awareness raising on safe sanitation practices targeting CE population, including

women, was identified as necessary to accelerate SCE. As an example, households living in floating communities and flood-prone areas should be addressed by specific BC campaigns about the risk of discharging wastewater into water resources.

Specific targets have been mentioned:

- **People practising open defecation**, especially the ones that discharge directly into water resources later used for drinking or personal purposes;
- **People using shared latrines**, working with them to support them to build their own latrine.

Specific **Behaviour Change Campaigns** would also help reinforce sanitation marketing. To achieve this, specific campaigns have to be designed with more explicit content on sanitation, for example using pictures to facilitate understanding.

4. Capacity building & training

The following table summarizes the main ideas shared by stakeholders, in terms of the most urgent targets and the topics that should be addressed.

Targets	Topics
National leaders	Behaviour Change Communication (BCC) Awareness raising about the current situation of SCE in Cambodia
Sub-national authorities	Sanitation & BCC Training on sanitation, CE, and BCC for all new village and commune employees should be introduced to ensure their ability to raise community awareness. Presentation of the SCE guidelines to local authorities to ensure a good understanding of the objectives, definition, and priorities.
Commune councillor and village chief	BCC Data collection and management
Focal point in the communities	WASH, SCE, BCC, to allow him/her being able to spread this knowledge within the community.
Communities living in remote areas	Promote and educate widely on the importance of WASH, encouraging the promotion of safe sanitation practices, ensuring that women are included. Training and awareness programs should also be organised in schools and pagodas.
LBOs and technicians	Training on sanitation promotion, SCE and latrine construction, especially those suitable for CE. Regularly meetings among LBOs, especially the ones located in CE, should be organised to update on their work and to share knowledge and experiences.

Table 4: Main targets and topics to be addressed related to improving capacity building and training.

5. Inclusiveness

The participants attending the Workshop shared that to ensure the inclusion of vulnerable people (for example, pregnant women, children, older people, ethnic minority communities, people with disabilities), it is important to engage them in the **discussion** and **decision-making process**, for example, when drawing up development plans.

Although it was not mentioned during the Workshop, it should be noted that MRD developed the *National Guidelines on WASH for Persons with Disabilities and Older people* (MRD, 2017) which aims to ensure that the entire community, including people with a disability, older people, pregnant women, children, ethnic minorities and other marginalised groups benefit and participate equally from WASH programmes and processes.

Three key actions have been identified for ensuring an inclusive WASH approach:

- Action 1 - Ensuring participation of persons with disabilities and older people, for example by working with organisations such as CDPO (Cambodia Disabled People’s Organisation);
- Action 2 - Identifying persons with disabilities and older people at the outset of the WASH program cycle, (for example, by using Key Informant Interview (KIIs));
- Action 3 - Assessing barriers to promote inclusion of persons disabilities and older people in WASH, including:
 - Attitudes barriers;
 - Physical environment;
 - Communication and information;
 - Institutional processes, legislation, and policies.

6. Development of studies and tools

The development of studies and tools, and in some cases the further development of the already existing ones, have been proposed, as follows:

Studies & Tools	Description
Map SCE areas	Develop a map to identify clearly where the CEs occurs in Cambodia.
NGO mapping	Map the current activities of NGO, development partners and association on SCE to identify what kind of intervention are the most needed.
LBOs mapping	Develop a map of existing LBOs to determine how many there are and their location to identify any gaps in specific areas where there may be less supply in order to strengthen their support and set priorities.
Policies/regulations	<p>Improve the current regulation to support more the population living in challenging environments, including vulnerable communities and people with disabilities.</p> <p>For instance, the National Guiding Principles on SCE should be updated, adding new technologies and identifying which ones are most appropriate for each CE.</p>

Table 5: List of tools to be developed to facilitate sanitation in challenging environments.

7. Coordination

The need to enhance the existing networks in Cambodia to further discuss and coordinate actions about WASH topics was clearly mentioned, specifically:

- Strengthening role of Provincial Working Group (PWG) and District Working Group (DWG);
- Increasing the meeting opportunities among Technical Working Groups, (for example, PWG&DWG), enhancing the cooperation among communities, provincial, district and commune level, ministries, NGOs & private sector;
- Improving the cooperation between local authorities and the private sector to gather more key suppliers, increase competition, and reduce price;
- Increasing the key development stakeholders involved to gather more suppliers to SCE regions;
- Enhancing the role of LBOs by involving them in PWG meeting. For example, better cooperation between local authorities and LBOs should lead to better communication, such as informing LBOs when there is a new HH in the community without latrines.

As already described in the R&D section, better coordination could lead to increased innovation, through better technical coordination between development partners. Promotion of technology development, and joint design studies would lead to affordable materials and designs for CE. This could also help to improve the inclusiveness of the product and the approaches currently in place.

Finally, an on-boarding meeting could be organised before each SCE project implementation with representatives of the relevant Ministries, development partners/NGOs as well as local authorities and representatives of vulnerable people to discuss the project objectives and align with government priorities.

G. Recommendations

The key findings from the workshop and the studies conducted afterwards have allowed a deeper understanding of the current status of sanitation in Cambodia, the targets set up by the government, the definitions of CE currently in use, and the strategies, approaches and pilot projects already put in place by a wide range of stakeholders committed to filling the remaining gaps to achieve 100% sanitation coverage in Cambodia.

The following figure summarizes the major **gaps** identified and links them to the **recommendations** presented in this chapter.

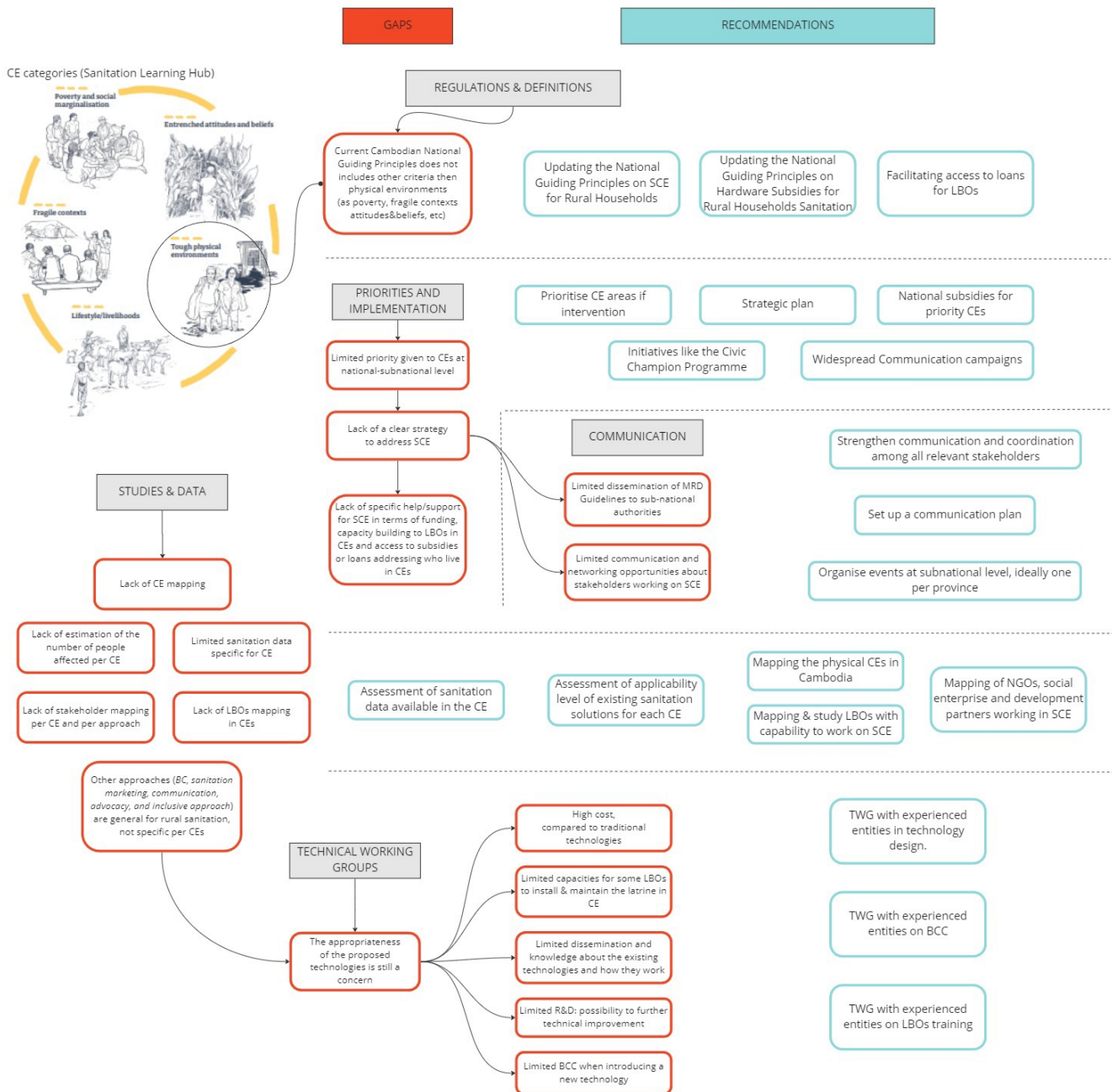


Figure 13: Gaps identified and linked to the recommendations.

The stakeholders agreed that **more effort is needed** to achieve this ambitious objective by 2025, and the Workshop discussions about improvements, future strategies, and ideas on how to move forward provided many inputs, as described in the Section E.

This chapter aims at reorganizing the most relevant inputs gathered from the key stakeholders, and at presenting consolidated **recommendations** on how to move forward and accelerate the sanitation coverage in CE in Cambodia.

The **pillars** of the proposed recommendations are the recognition of (i) the **urgency of prioritizing SCE as key step to achieve the 100% sanitation**, and (ii) **the importance of developing some specific studies and tools**, as a necessary knowledge starting point to move forward.

Furthermore, it should be noted that the workshop was a first successful, and much appreciated, opportunity to gather all the key actors. It was itself an outcome, bringing **together for the first time all the stakeholders already involved in SCE** and underlining the urgency of the topic. It is important to keep this momentum and follow up and to define a clear road map involving all the key Ministries and actors, to agree on and coordinate the future actions.

1. Regulations & definitions

- **Updating the National Guiding Principles on SCE for Rural Households**

In the current National Guiding Principles, MRD defines the CE only according to the physical environment. However, it has been shown that there are also other factors that affect the capability of rural population to access to sanitation, such as poverty rate, social marginalisation (for example, communities that struggle to have documentation and therefore to access to subsidies), vulnerable groups (for example, people with disabilities), fragile contexts (for example, people living in precarious livelihoods and settlements, not certified as ID-poor but still living in harsh conditions).

While the lack of economic resources is seen as one of the main obstacles to decide to purchase a latrine, other common concerns are related to personal uncertainty about the future and precarious livelihoods and settlement conditions, that make the investment decision difficult. For example, people who do not own the land where their house is built, people forced to migrate to find better job opportunities or to vacate a certain area because it is required for public use, communities without official papers and documents, thus without the possibility to buy land or access national grants. There are likely to be other examples too.

There may be correlation, even if not yet quantified or deeply studied so far, between extreme situations of uncertainty and poverty and some specific physical CEs, like floating communities and CE that are badly affected by the impact of climate change, where people do not have resources and skills to cope with these adverse situations.

Furthermore, in a potential future revision of the National Guidelines, additional physical challenging environments should be considered among the definition of CEs. **Sandy soils** and **remote areas** have been identified as critical contexts to be further studied and considered.

It is recommended that these additional criteria are considered while updating the National Guiding Principles and designing the national strategy to reach 100% sanitation coverage. This, together with the output of the recommendation #2, would help the government to prioritise the areas of intervention.

- **Updating the National Guiding Principles on Hardware Subsidies for Rural Household Sanitation**

Achieving the national target required to provide further support to some specific communities to increase the access and usage of improved sanitation in CE. In the current National Guiding Principles, sanitation subsidies only target ID-poor 1 and ID-poor 2 households without an improved latrine. As mentioned before, other type of households located in CE (non-certified but very poor households as well as households without ownership of the land) should be included in these guidelines to accelerate sanitation, especially in CE.

Therefore, additional eligibility criteria might be integrated into these principles to have a more inclusive approach and support towards the households living in challenging environments with precarious livelihoods and settlements conditions.

- **Facilitating access to loans for LBOs**

The introduction of more LBOs in CE has been identified as a possible solution to increase competition and reduce the price of technology. However, LBOs face some technical problems in registering with the Ministry of Commerce, which is a necessary step for financial institutions to grant loans. Therefore, it is recommended that LBO training be introduced at the national level to facilitate the process for LBOs and increase their access to loans, which will lead to an increase in the total number of LBOs in the CE.

2. Development of studies and tools

To establish a solid background of data, knowledge, and tools to support and drive the national strategy and policies on SCE, it is recommended to develop the following studies and tools:

- **Mapping of the physical CEs in Cambodia, according to the definition currently in the National Guiding Principles.**

This has been required by many stakeholders and it is recognized as a priority. It is recommended to guarantee a certain level of detail in the mapping analysis, at least at the District level, if not even at the Commune level.

Nevertheless, it is important to keep in mind that in Cambodia some technical background information, data or monitoring tools are not very well or fully developed. This may slow down the SCE mapping analysis itself. For example, it still does not exist a national groundwater level monitoring network, therefore mapping the high groundwater areas may require additional studies, time, and resources.

- **Assessment of sanitation data currently available in the CE, improving and using the current data collection (Commune DataBase, Cambodia Socio-Economic Survey, General Population Census of Cambodia).**

NIS, in collaboration with relevant Line Ministries and stakeholders, has put in place a data collection system to collect quarterly and annual WASH data. Some weaknesses in the ongoing process have been identified in recent studies (Sevea, 2022), among them some unclear definitions on the WASH systems, overlaps in the data collection tools, limited effectiveness of the training addressing who directly in charge of the data collection and data analysis.

It is recommended to review the current system, with a special focus on the sanitation data collection and SCE. This may identify some additional data collection that may be needed to improve the background knowledge, or to develop some specific modules (for example, definition of sanitation systems, of CE) that could be proposed in the current training sessions and capacity building done from the National level to the subnational authorities.

- **Mapping of NGOs, organisations, social enterprises, and development partners currently working in SCE.**

This mapping could be done with an intensive consultation phase, through surveys and Key Informant Interviews (KIIs).

- **Assessment of the level of applicability of the current sanitation solutions for each CE.**

This assessment will require a desk review about different technologies in use, the outcomes of the pilot studies recently or currently developed in Cambodia. The expected result of this study is a comparison among the technologies to evaluate their level of applicability for each CE. As a reference, the work done by Engineering for Change for the hard rock environment (E4C and EWB, 2020) could be used.

The research should also address key technical issues such as clogged toilets in flood-prone areas and explore technical solutions about wastewater discharge and treatment. Indeed, fecal sludge management represents one of the main issues encountered in both floating communities and seasonal flooded areas.

- **Mapping and study on the LBOs with capability to work on SCE.**

The mapping of the existing LBOs should determine how many are currently active, the level of coverage, to identify any gaps in specific areas. This assessment is useful in designing any additional support needed to strengthen the role of LBOs, in terms of recruitment, capacity building and training, both on technical, business and communication aspects. It aims to provide the basis for developing a strategy to enlarge the number of local businesses able to provide sanitation solution in CEs.

3. Technical Working groups

The workshop itself has been recognized as a success, gathering for the first time all the actors which play a key role on SCE and providing them the opportunity to meet and to share knowledge and experiences. However, to increase the efficacy of this type of meeting, it is proposed to schedule a series of **smaller events**, in the form of workshops or technical sessions with each one focusing on a specific topic, rather than a single event.

The following Technical Working Groups, topics, and expected outputs are proposed:

- **Technical Working Group with entities with experience on technology designs.**

Objective: starting from the results of the study proposed in Recommendation #2, draft a strategy to scale up the most applicable technologies to the national level.

- **Technical Working Group with entities with experience on BCC.**

Objective: starting from experiences and lesson learnt, define a draft strategy to expand the most promising approaches in the most need areas to achieve a bigger impact in engaging the local communities, taken into special consideration the need of the vulnerable groups.

- **Technical Working Group with entities with experience on training to LBOs.**

Objective: starting from the results of the assessment and mapping of the LBOs, draft a road map to enlarge the number of local businesses able to provide sanitation solution in CEs.

It is suggested that representatives of MRD are included in all these Working Groups, together with representatives of vulnerable groups (people with disabilities, ethnic minority communities, etc.).

4. Priorities and implementation

The previous studies and output from the Technical Working Groups, should provide MRD a more comprehensive understanding of the phenomena, enabling it to define and agree on:

- **Priority areas/CE of intervention;**
- **Strategic plan.**

The strategy to address the priority areas, consistent with the principle of “leaving no one behind”, could include solutions such as:

- **National subsidies, addressing only the priority CE** (taking into consideration the additional criteria described in recommendation #1);
- **Initiatives like the Civic Champion Programme**, tailored to be implemented in CE. In the planning phase of such initiatives, it is important to involve the most appropriate actors (for example, in the case of the Civic Champion Program, Ministry of Interior and MRD should be included as well as NGOs with previous experience);
- **Widespread Communication campaigns** on the most appropriate solutions, with the support of NGOs and development partners. Furthermore, strengthening the BCC approach should be conducted by promoting a door-to-door campaign by the most consistent and competent community leaders to accelerate the end of open defecation practices in CE.

5. Communication

It is considered crucial to ensure **stronger coordination and frequent communication** at national level, among all relevant Line Ministers, and at sub-national level, between stakeholders involved in promoting SCE.

It is recommended to set up a **communication plan** that allows MRD, supported by key stakeholders, to (i) inform the decisions taken on SCE, (ii) disseminate the main results (for example, studies and tools developed), (iii) support the entities working on this difficult subject in order to ensure that the topic remains a priority and that regular monitoring is carried out.

It might be useful to organise **events at subnational level**, ideally one per province, to present the more promising technologies as well as the pilot results to the communities. As the gallery visit was very popular during the National Workshop, events organised at the provincial level could raise awareness and understanding of the different technologies to encourage households to purchase the most appropriate one.

H. Conclusions

The Royal Government of Cambodia has set an ambitious target to achieve 100% access to clean water and sanitation by 2025, five years earlier than the proposed Sustainable Development Goals target in 2030. This ambitious target calls for 100% rural sanitation coverage by 2025. To fill the remaining gaps in terms of access to sanitation, specific urgent actions are needed. Challenging environments have been identified as the most complex contexts where to work, and a tailored approach to deal with them is required to fulfil the principle of leaving no-one behind.

This Learning Note reports the key findings of the 2-day Workshop about Sanitation in Challenging Environment (SCE), held in October 2022 in Phnom Penh, with the support of the Ministry of Rural Development (MRD), Sevea Consulting, Australian Aid, Engineers Without Borders (EWB), iDE and Wetlands Work! (WW). In addition, further desk research including a literature review, and interviews with key stakeholders were conducted to present a comprehensive report of SCE in Cambodia, that explores the following topics:

- Current regulation and guidelines about SCE, mainly referring to the National Guiding Principle (MRD, 2019);
- Stakeholder mapping, referring to the Workshop attendees;
- Approaches currently put in place;
- Main sanitation technologies used in Cambodian rural areas;
- Case studies: successes and lessons learnt;
- Challenges;
- Suggestions from the stakeholders to move forward.

This in-depth analysis enabled the development of a list of recommendations, illustrated in **Figure 14**, based on the following pillars:

- the **urgency of prioritizing SCE as key step to achieve the 100% sanitation;**
- **the importance of developing some specific studies and tools**, as a necessary knowledge starting point to move forward.

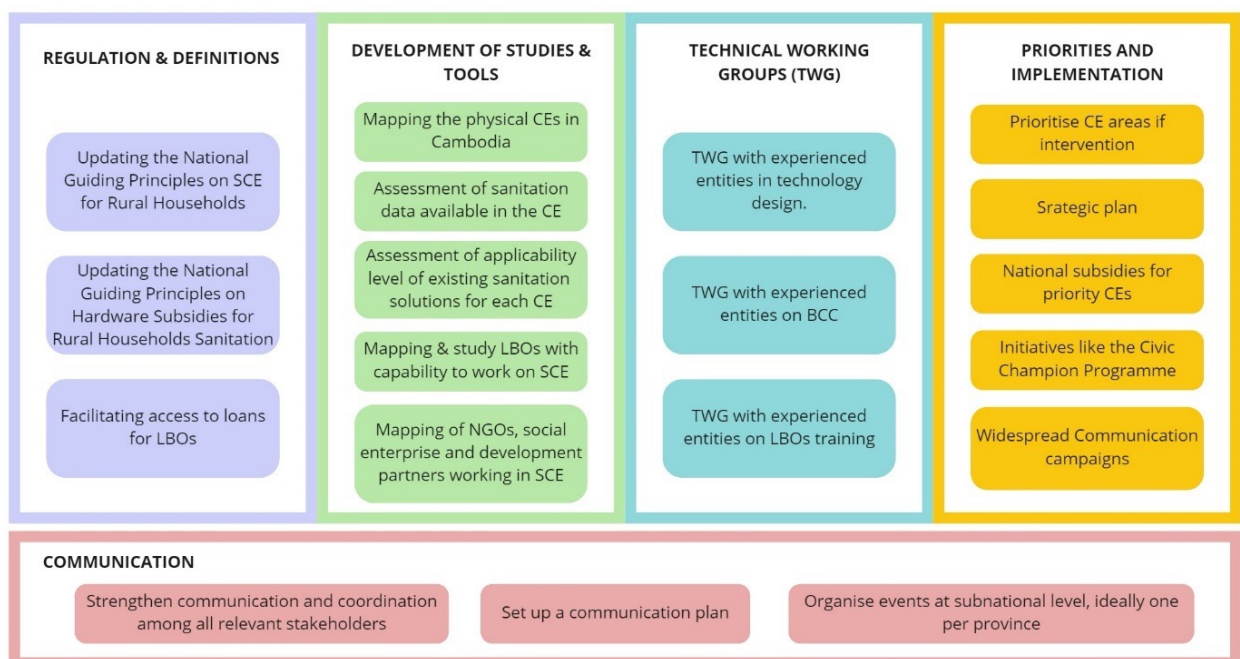


Figure 14: List of recommendations

To conclude, it should be noted that the workshop has been a first successful, and much appreciated, opportunity to gather all the key actors. It has itself been an outcome, bringing **together for the first time all the stakeholders already involved in SCE** and underlining the urgency of the topic. Moving forward, it is important to follow up and to define a clear road map involving all the key Ministries and actors, to agree on and coordinate the future actions.

Appendix 1 - Stakeholder mapping

The list of stakeholders who participated in the Workshop on SCE is presented in the following table, with a brief presentation of their role and main competences, based on their presentation at the workshop and some additional research.

Stakeholders	Role
Ministry of Rural Development (MRD)	<p>MRD is entrusted by the Royal Government of Cambodia to lead and manage the rural development sector with the following functions and duties:</p> <ul style="list-style-type: none"> • define the rural development policy and strategy in accordance with the government's political agenda; • target short-, medium- and long-term rural development plans to improve the socio-economic and social status of rural people, gradually reducing poverty and rural/urban disparities; • participate in nation building and country development in the field of rural development. <p>In this regard, MRD is a key responsible body for developing an investment strategy for improving sanitation in difficult environments for rural households.</p>
Ministry of Industry, Science, Technology, and Innovation (MISTI)	<p>MISTI has the mandate to oversee the Science, Technology, and Innovation (STI) sector with the aim of stimulating the development of industry, small and medium enterprises, including the private water operators (PWOs). MISTI has to ensure that all PWOs supply drinking water to urban areas according to Cambodian standards and demand.</p> <p>In 2021, MISTI has developed the Cambodia's STI Roadmap 2030, (MISTI, 2021) with the advisory support from United Nations Economic and Social Commission for Asia and the Pacific (ESCAP), which is the vital and strategic policy document in realizing the government's vision to transform Cambodia to an upper-middle income country by 2030 and to a high-income country by 2050.</p>
Ministry of Women's Affairs (MoWA)	<p>MoWA acts as a catalyst and advocate to encourage public institutions, civil society, and the private sector to integrate gender equality into their policies and programs, and as a coordinator and facilitator for gender mainstreaming across government agencies. It is responsible for monitoring and evaluating policies and programs to assess their contribution to achieving the Government's goals in promoting gender equality and the empowerment of women.</p>
Provincial Department of Rural Development (PDRD)	<p>The PDRD is a body responsible for implementing the Ministry of Rural Development's strategy at provincial level by coordinating projects and programs with NGOs, development partners, the private sector, and sub-national institutions (district, commune, and village levels).</p>
Provincial Department of Women's Affairs (PDWA)	<p>The Provincial Department of Women's Affairs plays an important role in supporting and empowering women across Cambodia, including in challenging environments. In addition, the PDWA works closely with women to promote their leadership role in WASH sector.</p>

District government bodies	The district are the government bodies at the sub-national level. Its role is to promote sanitation at the district level by managing and following up with the commune councillors to engage rural people to build latrines. To achieve the district sanitation targets, all districts have to lead a district working group to plan, implement, monitor and evaluate the progress of the district action plan.
Latrine Business Owners (LBOs)	LBO is a local business who market and sell latrines, or other sanitation technologies, to the rural communities, on behalf of the organisations or companies that developed those technologies.
WaterAid Cambodia	<p>WaterAid’s mission is to transform lives by improving access to safe WASH for the world’s poorest communities.</p> <p>WaterAid Cambodia works by supporting local organisations and government authorities to design appropriate and sustainable WASH programs. It also seeks to influence policy change through government and other key sector actors to protect the rights of the vulnerable households to safe and affordable water and sanitation services. Indeed, it is working closely with local NGOs and government agencies to achieve the national goal of 100% access to water, sanitation, and hygiene by 2025.</p>
International Development Enterprises (iDE)	iDE is an international NGO that works to deliver effective solutions to WASH issues, as well as sanitation marketing to build LBOs’ capacity. It has been operating in Cambodia since 1994. In addition, iDE has developed technologies, in both challenging and non-challenging environments in Cambodia, including the Alternating Dual Pit (ADP) upgrade, Sky Latrine, Easy Latrine, and All-Seasons Upgrade (ASU) Latrine.
Wetlands Work! (WW)	WW is a social enterprise that works in Cambodia and Myanmar. Its signature technology is the HandyPod, which can be applied in flooding, flood prone as well as high groundwater areas.
Engineers Without Borders (EWB)	EWB is an NGO operating in Cambodia since 2014. Its role is to focus on providing sanitation to vulnerable and disadvantaged communities in challenging environments. In addition to technical work (technology design, pro-typing, installation), they also work on capacity building, support to local mentors and implementation of sanitation guidelines and policies.
UNICEF	<p>As a development partner, UNICEF is supporting the Royal Government of Cambodia to identify areas at increasing risk of flooding or drought and to design and then roll out sustainable climate-resilient water, sanitation, and hygiene solutions.</p> <p>In 2017-2018, UNICEF tested selected Sato latrine bins in close collaboration with MRD.</p>

SUDrain	It is a start-up social enterprise working on wastewater treatment and management. Its main product is an environmentally friendly wastewater treatment solution, which uses recycled or natural materials such as coconut fibre and waste as a filtration medium for wastewater treatment.
World Vision International (WVI)	WVI is an international NGO that promotes sanitation in challenging environments in Cambodia by working closely with PDRD as well as district and commune authorities. WVI uses both Behaviour Change Communication (BCC) and Community Led Total Sanitation (CLTS) approaches in its projects.
Center for Sustainable Water (CSW)	CSW is a local organisation that provides training and capacity building in water, sanitation, and hygiene, mainly targeting the youth generation.
Cambodian Disabled People's Organisation (CDPO)	<p>Cambodian Disabled People's Organisation (CDPO) was established in 1994 as a movement of Cambodian persons with diverse disabilities, including women, children and persons of ethnic minorities with disabilities. CDPO is a membership-based, non-governmental organisation that advocates for the rights and interests of these people and helps to build their rights awareness and capacity towards their empowerment to participate equally in the society.</p> <p>CDPO is promoting access to water and sanitation for people with disabilities, using Behaviour Change Communication approach and stimulating the construction of inclusive sanitation systems.</p>
Cambodian Organisation for Children and Development (COCD)	CODC is a local NGO that works to improve the lives of vulnerable children by addressing several issues, including education, family income, migration and human trafficking, access to safe water and sanitation, and participation in decision-making at the family, school and community levels. CODC uses the BCC approach to promote sanitation by coordinating with local authorities, district governors, NGOs, and the private sector.
WASH Journalist network	It is a network of journalists who voluntarily publish and share information on water, sanitation, and hygiene, thereby contributing to raise public awareness.

Appendix 2 - Description of the approaches

The main approaches, and types of intervention, that the stakeholders that attended the National workshop implement in their daily work in the communities, dealing with sanitation in CE, are described.

1. Technologies/infrastructural

Design of appropriate latrines for SCE and R&D

Many NGOs, development partners, and a few private companies, have worked in the past or are still working on Research and Development (R&D) for sanitation technologies suitable in challenging environments. Among them, it is worth mentioning iDE, Engineers Without Borders (EWB), Wetlands Work! (WW), and SUDrain.

Many collaborations among these stakeholders have been experienced in the recent years. For instance, EWB partnered with iDE in 2017-2018 to test a the 3-Chamber Pit solution and Sky Latrine, as combined SCE technology for flood-prone areas, and to design and test the All-Seasonal Upgrade (ASU) product.

Similarly, Wetlands Work! partnered with WaterAid in 2015-2017 to pilot sanitation marketing of HandyPods in 10 floating villages. WaterAid and EWB have supported WW's awareness programming of the HandyPod to treat floating school and floating household wastewater. Presently, WW is partnered with Oxfam and iDE to scale-up floating sanitation on Tonle Sap Lake and seasonal floodplain in 20 villages.

Support for latrine material supply and installation

This approach is mainly used by the PDRDs of each province: PDRDs are responsible for requesting budget from the Line Ministry MRD, and for seeking funds, usually from NGOs and development partners willing to provide assistance.

In parallel, PDRDs provide technical support in building latrines to the LBOs, which are financially supported by NGOs or Line Ministries. A quality control is conducted at the household location once the latrine is built, provided by the PDRDs.

2. Communication and advocacy

WASH Communications

Several organisations provide **training** on WASH topics to young people, including Center for Sustainable Water (CSW), WASH Journalists Network and WaterAid Cambodia. Through the Young Professional Program in WASH, CSW trains young people as well as focal persons in their communities on key topics related to water and sanitation. The program is important to spread awareness and promote the importance of the WASH topic among students to become future professionals in this field.

WaterAid Cambodia regularly hosts **events and workshops** on WASH-related topics. It cooperates closely with local leaders to communicate key WASH topics, which includes sanitation in challenging contexts as well.

Prioritising sanitation in the local authorities' Agendas

To accelerate sanitation, national and sub-national governors have committed to **including sanitation on the agenda** of their monthly, quarterly, or annual meetings at provincial, district, and commune levels. This allows to dedicate time to remind everyone to consider sanitation as a priority.

This approach was mentioned during the Workshop by the PDRD representatives and the Thpong District, located in Kampong Speu Province, one of the five provinces prioritised by the government to achieve Open Defecation (ODF) status by 2023 ¹⁰.

The effort to **prioritise sanitation** in discussions at sub-national level is seen as very relevant and promising, especially as some stakeholders complained that other rural infrastructure projects, such as roads and bridges, are often prioritised by ministries, compared to WASH interventions.

WASH Focal Point

A **WASH Focal Point exists in every Cambodian village and commune**: his/her role is addressing WASH topic, working closely with communities, households, local organisations and NGOs.

For any type of WASH project, this focal point helps **coordinate the WASH activities, including sanitation promotion**, door-to-door, sales, meetings, CLTS, BCC, etc. The WASH Focal Point is the most relevant person within the village or commune as she/he has an overview of the current WASH situation in their area.

In addition, households need to contact the WASH Focal Point to order a latrine, so that she/he is informed of the sanitation coverage in their region. The Focal Point is then responsible for contacting the LBO to deliver the latrine to the household.

3. Behaviour change

Among the most implemented approaches, **Social and Behavioural Change Communication** (SBCC) is considered the key approach to achieving sanitation in CE. All stakeholders agreed on its relevance in raising awareness of the importance of sanitation and hygiene, and in reducing open defecation in rural areas.

Behaviour change plays a key role in accelerating sanitation as it is considered well known among stakeholders that having a latrine does not necessarily mean that it is used.

Two approaches are commonly used by the Provincial Departments of Rural Development (PDRD) to implement SBCC:

- **door-to-door approach**: this allows to identify clearly which households do not have latrines, and to have the opportunity to raise awareness, discuss about the importance of sanitation, and promote latrines and sanitation practices face to face;
- organisation of **sale events/workshop**, inviting all the households of a village, both the ones that already have latrine and the ones that do not. The purpose of these types of events is

¹⁰ The 5 targeted provinces are: Kampong Speu, Kep, Kampong Chhnang, Svay Rieng and Prey Veng. The provinces of Svay Rieng and Prey Veng were declared ODF by the end of 2022.

sharing experiences and benefits of having a latrine, giving the opportunity to hear directly from those who have already experienced using a private toilet. These events are also useful for informing the community and reaching people interested in purchasing a latrine.

MRD closely cooperates with the PDRDs, supporting them to share knowledge and experiences to rural communities.

NGOs, like EWB, have also advocated for change in behaviour. They have adopted a **human-centred approach** to sanitation: it empowers people to become the change they want to see in their own communities, especially by encouraging them to build latrines and help their neighbours build theirs as well.

Community-Led Total Sanitation (CLTS)

Community-led total sanitation (CLTS) is an approach that focuses on changing sanitation behaviour through community engagement and participation rather than through the construction of latrines. This approach encourages community participation to eliminate open defecation practices. CLTS recognises that the provision of latrines alone does not necessarily lead to improved sanitation and hygiene practices and does not guarantee their use. By focusing on behaviour change and awareness raising, it instils in the community the collective desire for change, which leads to greater accountability and sustainability.

The implementation of CLTS is led by the Department Rural Health Care (DRHC) of the Ministry of Rural Development. At the sub-national level, it is implemented by the Provincial Department of Rural Development (PDRD) with the help of the commune focal points and village focal points. In general, the criteria for selecting villages for CLTS implementation include areas where more than 50% of households do not have latrines and where sanitation awareness remains relatively low.

The USAID Water, Sanitation and Hygiene Partnerships and Learning for Sustainability (WASHPaLS, (USAID, 2021)) project examined CLTS datasets in four countries, including Cambodia, to quantify the extent to which factors affect ODF achievement.

In Cambodia, CLTS performance based on whether a village had achieved ODF status (e.g. had at least 85% basic sanitation coverage) was reviewed from the Rural Sanitation and Hygiene Improvement Program (CRSHIP) coordinated by Plan International, for the period 2012-2018, including 2,204 villages from 275 communes. Three statistically significant contextual determinants of CLTS performance in Cambodia has been identified: (1) villages were more likely to achieve ODF status if they had fewer households, (2) had a higher latrine coverage at baseline or (3) were located in communes with higher literacy among men and among women.

Wedding event approval

At the commune level, one particular approach was mentioned: having a latrine or sanitation facility is a mandatory prerequisite for obtaining permission to hold a wedding. One of the districts in which this approach is implemented is Thpong District, Kampong Speu Province, but it is recognised as a very common practice in rural Cambodia, even without formal national regulations. For example, if a household does not have a latrine, the commune chief does not give permission to hold the

wedding event, which in Cambodia is normally held on the premises of the house, and can easily involve 400 people, up to 600. This is seen as a strong incentive to build a latrine, for those who do not have one, and avoids the practice of open defecation at such an important event.

4. Marketing

Sanitation Marketing Approach

Sanitation Marketing is a market-based approach that aims to increase both the capacity to supply and the demand for sanitation by making owning a toilet more appealing and desirable for households.

Stakeholders discussed that to implement a proper sanitation marketing approach two main steps are essential to take action, promote sanitation in CE and support local business suppliers:

1. make people aware of the importance of sanitation and the benefit of having a latrine;
2. guarantee and efficient supply chain and support the suppliers.

While the first step consists of the Behaviour Change approach, the second step may indeed be tricky in some contexts, where specific capacity building and training are needed to support the suppliers, making them aware of the importance of working in CE, providing technical training about the specific products and technologies appropriated in CE.

Several entities have adopted this approach by marketing their sanitation products. On top of this, they offer training and mentoring as well to Latrine Business Owners (LBOs) to ensure that businesses remain competitive and sustainable in the long term. iDE's sanitation marketing efforts began in 2009 across seven provinces and have resulted in over 409,000 sales of improved pour-flush latrines (iDE). iDE facilitates the sale of their latrines through a network of LBOs and other sales agents. In iDE program areas, sanitation coverage has increased from 30% in 2012 to 88% in 2022. In addition to their marketing strategy, LBOs also received training on how to produce quality and hygienic latrines.

To ensure there are sufficient LBOs in the rural area, the PDRD of each province works closely with NGOs to recruit and provide trainings (e.g., construction of latrines). However, there is no database on LBOs, except those working with iDE.

5. Inclusive approach

Addressing vulnerable groups

To ensure an inclusive approach and the implementation of the principle of leaving no-one behind, the needs of marginalised and vulnerable groups should be considered while planning the construction of latrines. It is relevant ensuring that everyone is included since the decision-making process.

Among the vulnerable groups, during the National workshop have been mentioned mainly people with disabilities, and ethnic minorities, who mainly reside in the mountainous region.

According to reports by Ratanakiri and Mondulakiri Provincial Departments, some minority ethnic communities live 6 months at their houses and spend the other 6 months in the forest. This situation presents a unique challenge to those provinces in terms of sanitation.

Additionally, people with disabilities face difficulties in terms of using latrines, that are commonly not designed to be accessible. The Cambodia Disabled People's Organisation (CDPO) advocates on the behalf people with disabilities to ensure that they also benefit from sanitation solutions. CDPO has cooperated with other organisations, such as WaterAid and East Meets West.

Hardware subsidies approach

The hardware subsidies approach aims to increase access and usage of improved sanitation among the poorest households. This approach (MRD, 2016) applies to national and local government bodies, non-government organisations, and private sector organisations that currently, or are planning to, include hardware subsidies for rural sanitation in their programs.

The National Guiding Principles on Hardware Subsidies for Rural Household Sanitation has been developed by the Department of Rural Health Care in the Ministry of Rural Development to promote a more coordinated and consistent approach. Its objective is to **motivate ID-Poor households to contribute financially to the construction of their own latrines**. The sanitation subsidies target ID-Poor 1 and ID-Poor 2 households without improved latrines. The exception is for ID-Poor households with a disabled person, as the subsidy and contribution can be revised and reduced to enable the family to afford an appropriate sanitation system.

An effective hardware subsidy is defined as one which (1) is based on a good understanding of the local context and consumer preferences, (2) targets the poorest householders, (3) has clearly defined eligibility criteria, (4) is transparent, (5) is easy to administer, (6) is monitored and (7) is not a standalone intervention. It aims to avoid the risks of distorting the existing and potential market, lack of financial reliability, stifling innovation, creating dependency, and providing latrines in areas where there is insufficient demand (MRD, 2016).

Sanitation subsidies are applied only to the costs of the sub-structure of the latrine, that means the latrine slab and the main components required to separate human excreta (f.i. toilet pan, pipes, pit).

The subsidies are applied only in communes where at least 60% of the HHs are using an improved latrine which means that social norms and behaviours have already changed, and that supply chain mechanisms are established. Each subsidy must not exceed US\$50 per latrine sub-structure, and each ID-Poor household's monetary contribution should not be below US\$30. For instance, for a latrine sub-structure priced at US\$50, the minimum contribution by an ID-Poor household would be \$30, while the maximum subsidy provided would be \$20 (MRD, 2019).

Total cost of sub-structure (US\$)	Minimum ID-Poor household contribution (US\$)	Maximum subsidy (US\$)
\$50	\$30	\$20
\$60	\$30	\$30
\$70	\$30	\$40
\$80	\$30	\$50
\$90	\$40	\$50

Table 6: Minimum ID-Poor HH contribution and maximum subsidy according to the total cost of sub-structure

iDE has successfully deployed targeted subsidies at scale with the goal of equitable access to sanitation and leaving no one behind. Between 2019 and 2021, iDE provided targeted subsidies exclusively to IDPoor households to reduce the price of latrines and temporary latrine shelters. In total, iDE has facilitated the purchase of 38,941 partially-subsidized latrines and 7,387 temporary “Soft Shelter” products by IDPoor families.

In 2022, iDE conducted research on climate targeted subsidies. The novel eligibility assessment developed through this research incorporated the Poverty Probability Index (PPI) assessment for assessing the vulnerability of households who had not qualified through the IDPoor system and added additional dimensions of household and community-level climate vulnerability. In a randomized controlled trial, offering targeted sanitation subsidies increased the likelihood of successful sales conversions for climate-resilient latrine products among vulnerable households by 32%, indicating that subsidies are effective at increasing market-based sanitation uptake. This translated to higher sales closing rates at the village level. Communities with subsidies achieved higher rates of safe sanitation coverage than those without. iDE intends to apply learnings from this research into an at-scale climate-targeted subsidy mechanism in future interventions.

Appendix 3 - Description of the technologies

1. Easy Latrine

The Easy Latrine was designed in 2009 as the first hygienic latrine product in Cambodia. It is a pour flush toilet built with concrete rings and it is the most prevalent sanitation solution in the country, serving mainly low-income households in rural communities. This system is primarily provided by local businesses. (E4C, 2022), ((E4C), 2020)

The household's owner can choose to purchase an easy latrine with two rings or three rings, based on number of people, and the available depth. With more than four family members, it is suggested to purchase a 3 rings latrine.

Its installation can be difficult in hard ground areas, especially for the 3-ring solution that normally require to dig up to 1.5-2m of depth.



Figure 15: Easy Latrine

2. Two pit pour latrine

The two pit pour latrine is basically an Easy Latrine connected to two pits, connected one to each other in series. It is chosen to have more storage space to stock the human waste, doubling it compared to the Easy latrine and doubling the lifetime of the sanitation system.

It shows the same limitations of the Easy latrine in terms of suitability in CE.

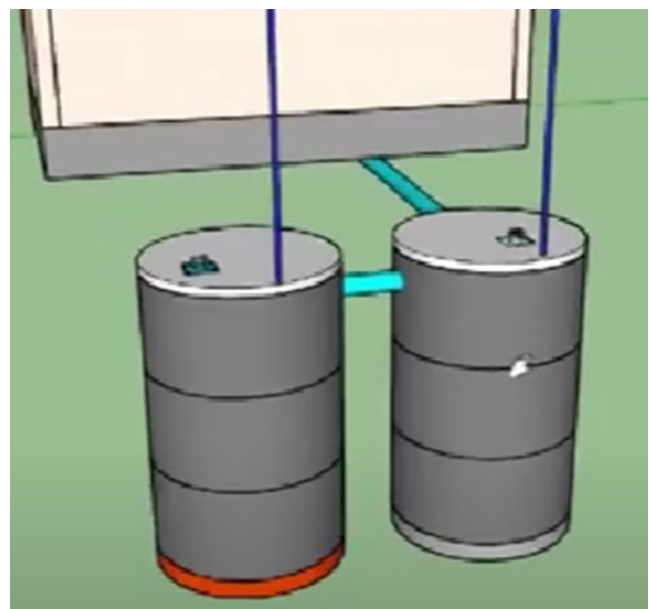


Figure 16: Two pit pour latrine

3. Twin Pit pour latrine

This technology consists of two alternating pits connected to a pour flush toilet. The pits are used alternatively, one at a time. The main advantage is that, once one pit is full, the faecal sludge decompose, and after a period of 1-2 year the material can be used to improve soil fertility and fertilize crops. (USAID S. t., 2018)

When the first pit is fully filled, the user changes the direction of flow inside the control box so that the water and human excreta flow to the second pit.

This design requires to dig less to build the pits, therefore, it is considered more suitable for hard ground areas and for high groundwater areas, in this case only when the maximum water table is lower than the bottom of the pits.

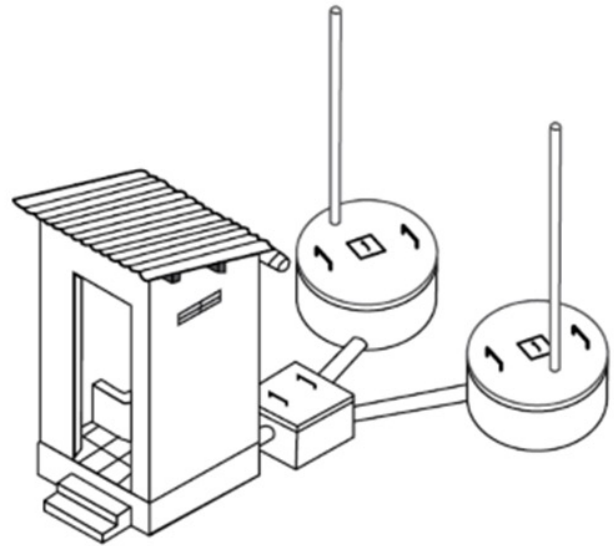


Figure 17: twin pit pour latrine

4. SATO Latrine Pan

This system consists of a toilet pan that uses a mechanical and water seals to close off pit latrines from open air. This reduces disease transmission from flying insects that come into contact with human waste, odors from open pit latrines and reduces the volume of water needed to flush.



Figure 18: Sato Latrine pat

It is an affordable type of latrine pan which requires minimal water use, making it suitable for water-scarce communities. (E4C, 2022)

5. Ecological Sanitation (EcoSan)

The EcoSan system is a urine diverting dry toilet. It is designed to be a permanent twin chamber installation for household use and onsite treatment.

Separating urine from the main sanitation containment, the process allows excreta to be treated on site for reuse for agricultural purposes or disposed of safely.

Existing pit latrines can be converted into EcoSan by constructing a second latrine nearby and alternating uses. ((E4C), 2020)

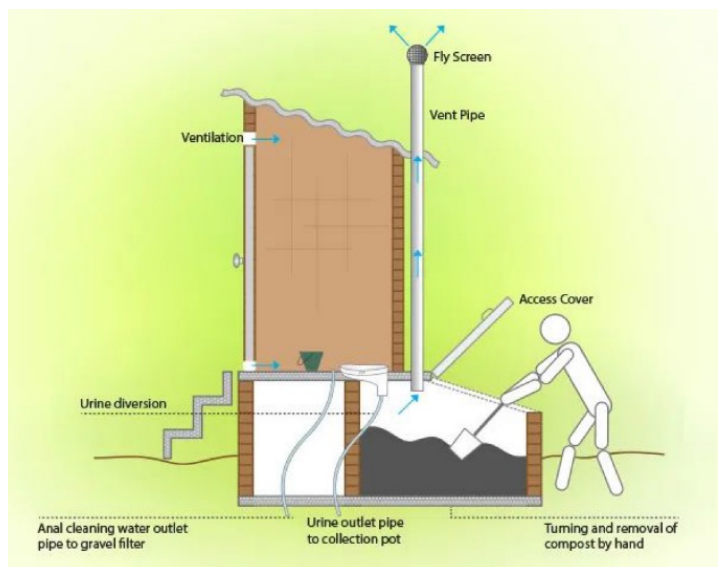


Figure 19: EcoSan

The system has been introduced in Cambodia in the past years, but it is still not so commonly implemented because it's considered complex to operate and maintain.

6. ATEC Biodigester

The ATEC Biodigester is a sanitation solution that converts human and animal waste into biogas for cooking, and organic fertilizer for crops and soil. The watertight, flood resistant and above ground setting of the ATEC Biodigester makes this product very suitable for hard rock environments, as well as in high ground water. (Atec Biodigester, 2022)



Figure 20: ATEC biodigester

7. Sky Latrine

The Sky Latrine differs from a typical Cambodian latrine as it is elevated from the ground, and it's commonly built inside a stilted traditional rural house, rather than in a shelter outside the house. From the ceramic pan, a PVC pipe connects it to the ground. IDE designed the Sky latrine to ensure access to safe sanitation for households that live in flood prone areas, allowing them to have a system that works for the whole year. The rings and the bottom of the pit are cemented to avoid leakages.

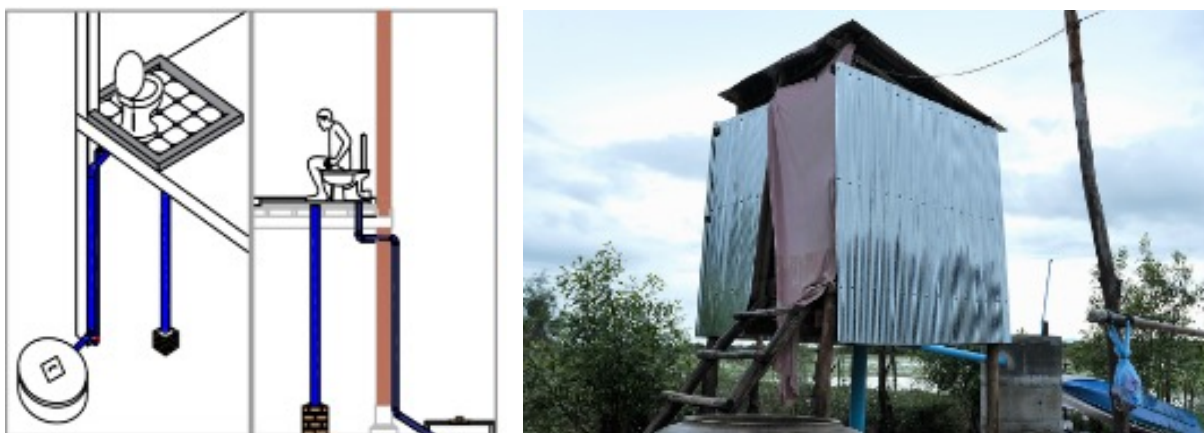


Figure 21. Sky Latrine in a floating house

8. All Seasonal Upgrade (ASU)

Between 2017 and 2018, iDE and EWB partnered to develop and test a technology called All Seasonal Upgrade (ASU). This system combines the concept of the 3-Chamber Pit (3C Pit) and Sky Latrine for flood-prone environments. (iDE&EWB, 2020)

The 3-Chamber Pit is based on the principle of a septic tank, and it is designed to provide primary settling, followed by primary treatment through gravel filter media, and finally discharge of the treated wastewater into the soil. The prototyping and field-testing phase showed that it was difficult and costly to construct to guarantee appropriate standards of quality, requiring four unique concrete molds and significant training for local masons.

In early 2019, iDE and EWB used the lessons learned from the 3C Pit to design the All-Season Upgrade (ASU) product, that aims to provide year-round pit functionality in high groundwater and low infiltration soils.

This product can be connected to an existing pit, so it has been considered more marketable than a new alternative design to the standard pit.

As shown in **Figure 22**, ASU is a latrine upgrade product that attaches a gravel filter pit and leach field to an existing latrine pit, providing year-round latrine pit functionality and preliminary treatment of wastewater before discharging into the environment.

The filter pit is filled with gravel and offers an additional treatment reactor for reducing BOD, turbidity, and pathogens, and prevents the leach field from clogging.

The leach field is designed to increase the surface area for infiltration at a depth above the groundwater table.

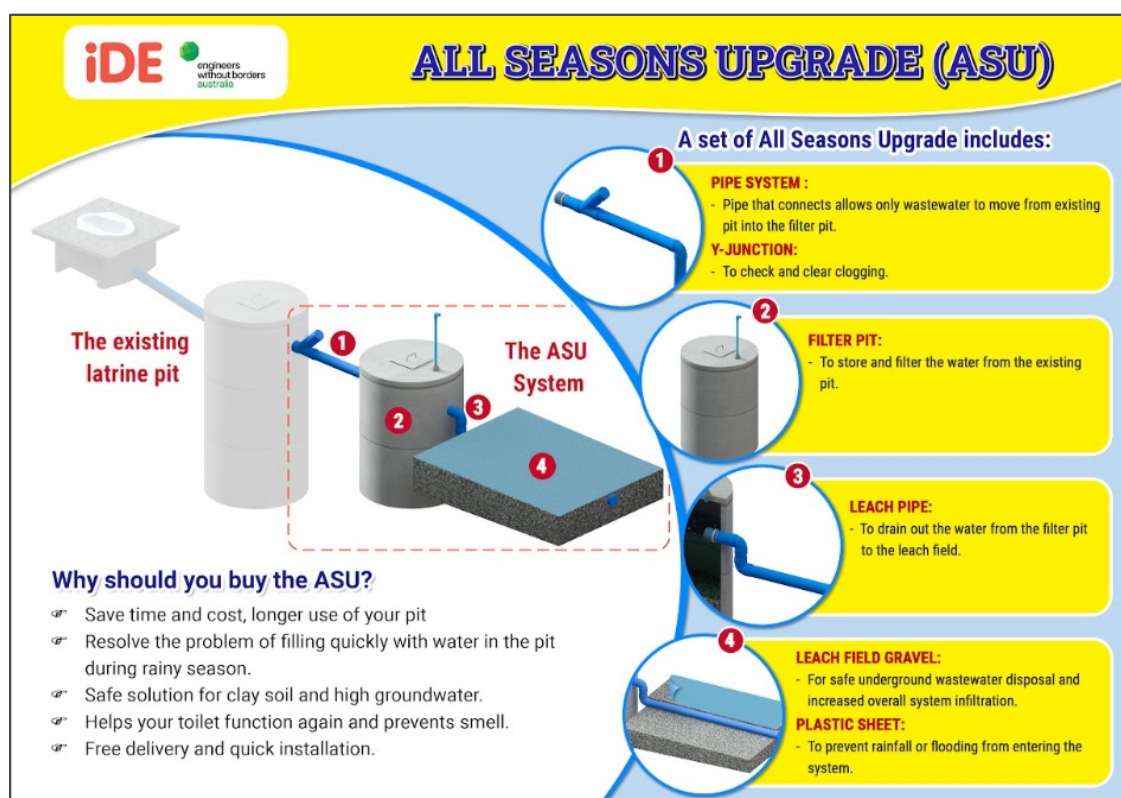


Figure 22: ASU model

9. Twin Pit Latrine hard ground sanitation solution

This product has been recently piloted by EWB in hard ground areas in the Province of Kampong Chhnang, reaching 15 households and 71 community members (Chapter 10 “Case study 3: EWB’s hard ground solution - Kampong Chhnang”).

It uses the same principle of the Twin Pit Pour Latrine, using alternatively the two pits, but adding a third pit used as soak pit and a leach field. The pits are built using 2 concrete rings, not 3, reducing the depth to excavate too deep. (E4C and EWB, 2020)

Wastewater is separated by density: solid fecal waste will flow into one pit of the twin pit system, the solid part is deposited, while liquid waste flows into the soak pit. The soak pit contains a construction aggregate that serves as a secondary chamber to treat wastewater prior to flowing into the leach field. The leach field, containing aggregate, charcoal, and sand, removes pathogens before gradually filtering out the wastewater into the surrounding environment.

This solution is suitable for hard ground environments, because using only two concrete rings, instead of three, it is possible to excavate less depth. Furthermore, it reduces the risk of hitting the groundwater table and contaminating local groundwater.

The twin pit latrines system design concept also considering withstanding flooding, as the latrine slab is installed 20 to 30 cm above the localized flood level.

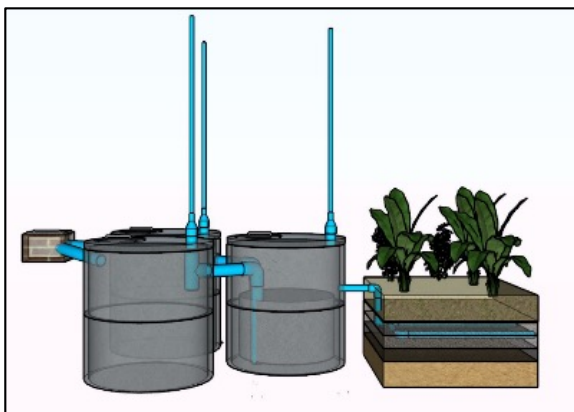


Figure 23. EWB's Twin Pit for hard ground areas

To ensure the latrine system can withstand the challenges brought on by Cambodia’s wet and dry seasons, a control valve is installed to control the flow of water between the soak pit and the leach field. During the wet season, the control valve must be closed to prevent runoff water entering the pit system through the pipe. During the dry season, the control valve stays open to allow the liquid waste to flow from the soak pit into the leach field.

10. Septic tank for hard ground areas

The design concept developed by EWB works well in hard ground areas when limited space is available, as the toilet pan is built very close to the septic tank.

EWB design it to solve the solution for household in Trapeang Anchanh village, Kampong Chhnang province as many households had limited available space to construct the twin pit hardground.

This system requires only 1m (width) x 2m (length) x 1m (height). Similar to the twin pit latrine system, the septic tank requires an excavation depth of 0.7m.



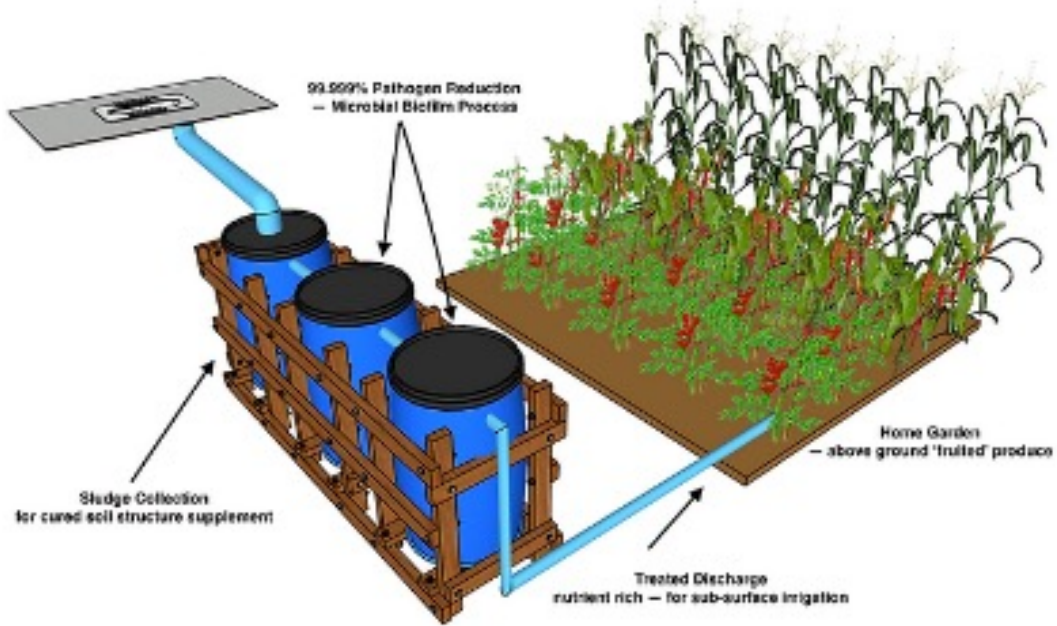
Figure 24. EWB's Septic tank hard ground Sanitation solution

The septic tank consists of two chambers; the upper chamber functions as a scum barrier that prevents scum from clogging the outlet pipe, whilst the lower chamber functions as a sludge barrier. The two-chamber system ensures only liquid waste can flow into the leach field through the outlet pipe. The leach field contains gravel, charcoal, and sand. Wastewater passes through the leach field, which removes the majority of pathogens and reduces the risk of environmental contamination on local groundwater.

A two-meter vent pipe located on top of the septic tank ventilates the air inside the two chambers, releasing odours above. The vent pipe can be removed if the outlet pipe becomes clogged and needs to be investigated.

Once the septic tank is ready to be emptied, fecal sludge is accessed via the cover on top of the tank. Beneficiaries were guided through the process to operate and maintain the septic tank following the construction of the latrine system.

11. HandyPod



HandyPod (HP) is a sanitation solution developed by Wetlands Works! for floating communities, flood-prone areas, and high groundwater areas.

It consists of 3 connected containers, that treats wastewater step by step. The first container collects the human waste, that settles and decomposes thanks to anaerobic processes over a 3-day period.

Then, by gravity, the nutrient-rich waste moves to the second container and then the third, and gradually gets treated at each stage.



Figure 25. HandyPod

The 3-stages of treatment allow a very efficient treatment: microbial biofilms develop and absorb organic chemicals and particles, reducing the load of pathogens. Helped by the warm tropical climate, enormous microbial activity occurs at all stages of treatment. Through this treatment system, the effluent meets the standards set by the Ministry of Environment.

Moreover, HandyPod's treatment system can float with the house or operate on land, allowing it to cope with dry and wet conditions. Therefore, it treats wastewater in all environments, both aquatic and upland, including clay soils and hard rock areas.

The treatment stages can be sized according to the number of people using the latrine, be it a school or a household. Adding more than 3 tanks is possible, which further improves the quality of effluent.

12. Coconut fibers wastewater system

This system has been designed by SUDrain, a Cambodian social enterprise, and it consists of an eco-friendly sanitation technology for wastewater treatment by using coconut fiber as a biofilter product.

The coconut filter system uses gravity flow, and it is considered capable of removing most of the chemical pollutants, and almost 100% of physical and biological pollutants, guaranteeing high treatment efficiency and meeting the discharge standard.

The coconut filter uses all-natural material and is a recycled product that can be found locally.

It can be implemented in small spaces, is affordable and easy to maintain. The wastewater treated from this system can be used for gardening and plantation. The coconut filter should be replaced after 3-5 years of use, and it can be reused as compost.

SUDrain has been collaborated with WaterAid Australia and Provincial Department of Rural Development. This system has been implemented in floating community in S'ang District of Kandal Province.



Figure 26. SUDrain's sanitation system for floating house using coconut fibre as filter media

Appendix 4 - Case studies

1. Case study 1: Wetlands Work's HandyPod solution - Kampong Thom

12.1. Description

Wetlands Work! (WW, Wetlands Work! Website, 2022) is a social enterprise (soon to become NGO in 2023) based in Cambodia, that has been developing nature-based solutions to sanitation in challenging environments, since 2008, including in floating, flood-prone, high groundwater table, beach sand and impermeable soil (clay/rock) environments. Additionally, WW selects and trains independent LBOs on how to market their products and become independent sustainable businesses.

WW's signature technology is the HandyPod (HP), first launched in 2009 and product-ready in 2016. The solution consists of 3 connected containers, that treats wastewater step by step, described in more detail in Appendix 3 - Description of the technologies, paragraph 11. The discharge effluent meets the Cambodian standard.

The HP is attached to the house, either floating with it or attached to a stilted house on land, allowing it to perform in dry and wet conditions. Furthermore, the treatment stages can be sized according to the number of people using the latrine, be it a school or a household.

This case study refers to the implementation of HP in the floating village of Phat Sanday, in the Province of Kampong Thom. The project was run in 2016-17, thanks to Canadian funding and a collaboration with WaterAid. Through this project, WW developed their 'LBO-schools-awareness-raffle lucky draw marketing approach' in 5 villages in the Phat Sanday region, and 5 villages in the Prek Toal region.

The **price** for the HP is from US\$150 up to \$250; the price varies according to the structural condition of the house and the area in which it is installed (floating or stilted on floodplain). The price of HP is a feature of the high-quality materials used. To secure together the three containers and allow attachment to a floating house, currently high-quality, yet expensive, wood is used. WW is working to replace it with recycled plastic 'wood', to reduce cost and expand the 6-year lifetime of the wood in water.

Additional to the innovation provided by the technology itself, the approach used by WW to engage the communities and to promote sanitation marketing is quite interesting.

First, to raise awareness and introduce the use of the HandyPod the WW team started by involving the floating **schools** located in a village and engaging directly both teachers and students. This is a key way to get known within the communities, and the schools are the first to receive the HP system. In parallel, to increase the knowledge and the awareness, WW organizes **hygiene training for teachers and students**.

After that, the program continues with awareness initiatives addressing the whole community. A fun and participative strategy is used: a "sanitation raffle". The WW team, supported by the local WW-trained LBO, sells 2000 Riel tickets door to door to allow the villagers to compete in the lottery,

that provides a very interesting reward: a HandyPod system. Commonly, between 3 and 5% of households win the lottery, and winners are entitled to receive a HandyPod installed by LBO. Second prize winning households receive a bucket of sanitation products. This approach helps to raise community awareness and create demand for sanitation, and enables LBOs, trained by WW, to start up their business.

12.2. Successful points

Among the successful points, it's worth mentioning:

- The **suitability** of HP for many challenging environments, and the possibility to have an efficient **on-site faecal sludge treatment** that meets the Cambodian quality standards;
- The **sustainability** of the HP, as several of those implemented in households in 2016-2017 are still functioning today.
- Description of a **FSM protocol** demonstrating the efficiency of the treatment, tested in both dry and rainy season, and developed in collaboration with the Cambodia Royal University of Agriculture with CRSHIP II funding (WW, Final Report SCE Research, CRSHIP 2, Plan International, 2019);
- The innovative strategy put in place by the WW Team to involve the communities, using **gamification and rewards** to engage the people and create a higher demand for sanitation;
- Targeting the **schools** to help enlarge awareness and the number of people that benefit from the HP system. Additionally, the direct involvement of the youth generation may support the spreading of best practices and the importance of sanitation towards the families living in an aquatic or flood prone area.



Figure 27: HandyPod at a floating school - Teachers, students and LBO members working together. Wetlands Work!

In addition to providing sanitation solutions, WW's emphasis is to **select and train local LBOs** to promote the HandyPod system. These teams work with WW to create sanitation awareness and demand, provide supply and maintenance, and to become sustainable professional businesses. Indeed, WW is committed to provide **quality control and mentoring** to the LBOs for at least 2 years, after its establishment.

So far, 5 LBO teams trained and mentored by WW are currently located in the Tonle Sap region (2023), including 2 LBO teams in Kampong Thom and 3 teams in Battambang, for a total of 17 trained people. WW started training and working with one LBO team in Phat Sanday in 2015, which has been useful for design improvements, cost reductions and basic research on treatment efficiency. This remains a successful relationship.

It is worth noting that **women** have been showing a significant interest in becoming LBOs members and leaders. This approach has been reinforced in the recent years: for instance, in 2022 in Siem Reap and Battambang, WW trained 3 LBO teams, each with 5 people and including 3 women. WW! feels strongly that women can play a **key role in promoting sanitation**: they know better, and they are closer to the needs of their own family's health, especially their children ones. They are often more concerned about health and well-being, personal dignity, safety, and sometimes also on "looking good" compared to other members of the communities. Commonly, women are also the ones in charge of family expenses, including for medicines and doctors.



Figure 28: HandyPod installation, Wetlands Work!

12.3. Lessons learnt and any challenges or gaps remaining

WW recognizes the importance, while promoting a new technology like HP, of the need to boost the adoption of new **behavioural practices**.

More effort is generally required while interacting with economically disadvantaged households, which often have lower knowledge and awareness on safe sanitation practices. Since open defecation, mainly directly into open water bodies, remains prevalent in floating communities, working to strengthen the behaviour change communication is a key factor to accelerate sanitation in these challenging environments. This is the reason why WW's sanitation marketing approach is so comprehensive and intense as compared to Sanmark practiced in the upland communities.

In addition, while the demand is high, the **cost** of a HandyPod remains an issue for many very low-income households that cannot purchase a HP without subsidies.

12.4. Improvement ideas & sustainability

A key point to ensure sustainability is the **support** provided by Wetlands Work **to LBOs**, including training and mentoring over two years. It allows them to build sufficient capacity to become professionals, understand the sanitation challenges and the characteristics of the HP system, the necessity of safe sanitation practices as well as how best to work directly with PDRDs, communes, communities and households.

Since the financial resources to purchase the system is still the main gap, further **discussion about availability of subsidies** is needed. **Additional funding** may also be required from development partners, whether from the public, private sector or from NGOs **to continue the scale up of the HP in Cambodia**. In 2016-2017, WW managed all the HP's installation with local help but the help was not yet formalized as a LBO. Only the raffle-winning schools and few homes received HPs as there was no follow-up funding despite demand for more HP. Thus, WW was unable to scale-up with trained LBOs.

Nevertheless, WW is currently working to ensure the sustainability of HP provision and the scale-up of the HandyPod on Tonle Sap Lake and floodplain. From 2022 to 2024, WW is working on two EU funded CAPFISH projects, (i) Tonle Sap Lot I program in 13 villages in Siem Reap and Battambang and (ii) Tonle Sap Lot II in 18 villages in Pursat and Kampong Thom with additional sites in Kampong Chhnang.

For the "Tonle Sap Lot I" program, WW is implementing their own "schools-awareness-raffle lucky draw marketing approach" in partnership with Oxfam.

In "the Lot II" program (known as GREEN), WW is partnering with iDE and Save the Children. WW and iDE are currently collaborating on increasing sanitation coverage in the floating villages of Kampong Thom's Phat Sanday Commune. iDE is implementing their own marketing/sales approach while WW's trained LBOs do the installation and maintenance, including WW's Faecal Sludge Management protocol. Sales initiatives have only recently started (June 2023), but if successful the team plans to expand sales to floating villages in nearby Pursat Province.

13. Hard ground areas: Case study 2 & 3

This section presents two case studies which are both located in **hard ground areas** in Cambodia, one related to a LBO operating in Prey Veng and the second one to the experience of Engineers Without Borders (EWB) in Kampong Chhnang.

13.1. Case study 2: LBO's experience in Prey Veng

13.1.1. Description

The LBO has been working in 3 districts in the Province of Prey Veng (Kamchay Mear, Kanchriech, and Svay Antor districts) supporting the LBO established in 2011. These districts are mainly characterized by **hard ground** areas, and the more popular sanitation solution installed by the LBO is the **twin pit pour latrine**. This technology, that is commonly used also in non-CEs, it's considered suitable also in hard ground areas because it requires less deep excavation than conventional latrines.

The price for the substructure of a twin pit latrine (toilet pan, pipes, switching box, pits) is approximately 344,000 riels (US\$86), which does not include labour.

13.1.2. Successful points

The LBO in Prey Veng has been working for more than a decade on sanitation in hard ground areas, and within this period more than 6,000 households have been supplied with sanitation facilities. Even though construction of the twin pit pour flush may take longer than conventional latrines, it brings a lot of benefits once it is completed.

The technology proposed and sold has shown a **positive customer satisfaction** since it is quite easy and simple for consumers to operate, requiring only a simple pour flush. Since 2011, around 70% of the latrines installed have remained fully operational.

The **price** of this sanitation technology is generally considerate **acceptable** by most of the households, especially when compared to other more expensive technologies implemented in challenging environments.

Over the past 11 years, the local LBO has contributed to a significant reduction of open defecation practices, which culminated in **Prey Veng province** becoming the second province to be declared **ODF**, Open Defecation Free, in October 2022.

13.1.3. Lessons learnt, challenges and gaps remaining

Within the first years of implementation, the main challenge has been having the communities trust the importance of sanitation, of safe sanitation practices and the benefits of avoiding open defecation. Most families were also **reluctant to pay for the latrines**.

Over the years, the LBO has been improving its ability to promote itself and its products. In the past, the LBO of Prey Veng cooperated with the PDRD, iDE and the Cambodian Red Cross. Currently, the LBO is not having any further formal cooperations with other public and private operators.

The **support from the local authorities** is really important for every LBO, especially the support from village chief and commune councillors. To promote sanitation in the rural areas, both village

chief and commune councillors play a key role to educate and encourage households to change their behaviour, and to build latrines. Therefore, if a LBO presents itself without any representatives from the local authority, the household may hesitate to purchase the latrine from that LBO.

Additionally, the commune may support with door-to-door initiatives and co-organizing sale events to promote the products.

Although the system itself is quite simple to operate, there are sometimes difficulties in households that **lack access to water to use a pour flush latrine**, or when transporting water from the source to the toilet is complicated or costly.

Additionally, to reduce the initial investment required to purchase the latrine, some families decide to build only some parts of the system, commonly the slab, the switching box and one single pit. When the pit gets full, and it should be time to switch to the second one, not every family has the **resources to pay for the second pit and to complete the system**.

This is one of the most common reasons of failure according to the LBO's experience, which estimated that, since 2011, about 30% of the systems are not utilized anymore because the single pit got full, and the families could not afford to purchase a second one.

13.1.4. Improvement ideas & sustainability

In the Prey Veng case, the LBO receives very **small profit** for its work, although it shows a high level of commitment and willingness to continue their work in supporting rural households to access sanitation.

Additionally, to be able to extend its marketing activity, the LBO may need additional support from the local authority in promoting sanitation among households. This may include awareness raising through door-to-door initiatives or public events.

To ensure the system remaining operational and sustainable in the long term, the LBO provides the necessary **training on basic O&M to the households** that purchase their technology. In addition, the LBO offers to **repair the system for free within a 6-month period** after the installation. This is important to ensure people do not feel left on their own after receiving the latrine.

As possible further areas of improvement, some technological adjustments could be made to design a system more adapted to the hard ground areas. In that respect, the LBO is open for and **welcomes collaboration** with the authorities or any partners to accelerate the sanitation in challenging contexts.

13.2. Case study 3: EWB's hard ground solution - Kampong Chhnang

13.2.1. Description

EWB have been designing, pro-typing, and testing various sanitation technologies in challenging environments in Cambodia, often in partnership with other NGOs and social enterprises, such as iDE and Wetlands Work! (E4C and EWB, 2020).

EWB piloted a sanitation system designed for **hard ground areas** in the Province of Kampong Chhnang, located in the Tonle Sap Lake region. The pilot area is the District of Rolear B'ier, and the

following villages have been selected, upon the recommendation of the local PDRD (EWB, 2022):

- village of Trapang Anchanh, Commune of Kraing Dey Meas: 1,065 people, 331 families and 310 households. 45 households classified as “very poor” (ID-Poor2) and 71 households as “poor” (ID-Poor1);
- village of Ou Totueng, commune of Svay Chrum: 376 people, 94 families and 85 households; 4 households classified as “very poor” and 20 households as “poor”.

The baseline study conducted by EWB at the beginning of the program showed that in the village of Trapang Anchanh some toilets were being shared by up to 7 households (or more than 30 people), because not all households could afford their own toilet. This resulted in issues such as clogging, overflow, and unpleasant odour. In the village of Ou Totueng, only 65% of the households had access to a private sanitation system. Baseline data found that some existing toilets were malfunctioning: impermeability of hard clay soil, run-off water penetrating into the pit and age of the toilets are reported to have likely caused these malfunctions. Moreover, baseline data revealed that unsafe faecal sludge management was also being practised to manage the issue of latrine pits becoming full quickly, increasing the risk to community health and environmental pollution.

EWB piloted the sanitation solution of a **twin pit latrine** consisting of a toilet pan, switching box, twin pit made by 2 concrete rings, soak pit, and a leach field. As described in **Appendix 3**, this solution allows to reduce the excavation depth (0,7m) and to provide an onsite faecal sludge treatment. It is estimated that each pit takes, on average, two years to become full. The system is designed to ensure an uninterrupted use of the latrine system year-round.

13.2.2. Successful points

During the prototyping phase, 15 latrines have been installed in the two villages, and 71 people could benefit from it. (EWB, 2022)

The systems showed to provide effective solution to guarantee:

- **uninterrupted use of the latrine system for an entire year;**
- **on-site faecal sludge management** without contaminating the surrounding environment;
- use of **locally sourced and cost-effective** materials such as concrete;
- **small excavation depth** (0.7m) in comparison to conventional latrine designs (1.5m).

The technology has been proven to be suitable both for hard ground and high groundwater areas, because it requires a smaller excavation depth than the conventional latrine designs. It therefore reduces the risk of hitting the groundwater table and contaminating the groundwater.

Additionally, the design foreseen to install the slab at 20-30 cm above the local flood level, and this allows the system to be suitable also in flood prone areas.

EWB has put in place a **M&E** plan and its staff has been constantly monitoring the pilot systems, since their installation, through **monthly tracking** and occasional **site visits**.

Moreover, EWB provided **training to the beneficiaries, to the LBOs active in the area and to the PDRD**.

It is possible to say that the solution provided has raised a general good level of satisfaction among the community.

13.2.3. Lessons learnt, challenges and gaps remaining

At the early stages of the implementation, the local community was reluctant to get on board, especially due to **concerns related to the cost of the system**¹⁰, which is \$275 including labour cost. Some people were also worried about the time needed to realize the system, generally longer than conventional systems.

Additional to the cost of the technology, logistic and transport costs played a role in increasing the total expense to be sustained by the households, when the villages are located in remote areas. If this is certain, it applies also to non-challenging environments.

In terms of reliability of the system, only in one case, that happened in the village of Trapang Anchanh, the pit become unusable prematurely, because it was filled with water. A possible reason is likely to be a mistake done during the construction and installation.

Another challenge raised by some households is the lack enough **space available** to build a toilet. To address this, EWB designed and tested a septic tank system that requires much less surface to be put in place in the section 13.2.1.

13.2.4. Improvement ideas and sustainability

To move forward, EWB pointed out the importance of keep promoting **behaviour change campaigns**, of working to gain a real cooperation from the households, and of having the full support and contribution from the ministries and provincial departments level.

To deal with the concerns related to the cost of the technology, EWB hopes that the **cost**, both to realize and install the technology, will be lowered in the future, through the collaboration with other NGOs and partners willing to provide subsidies. In particular, EWB is willing to **cooperate with MRD to work on subsidies for sanitation in challenging environments**.

As EWB already does, but also as an idea to further improve and work for a long-term sustainability, ongoing **support and training on operation and manual (O&M) to local contractors and local business** is relevant. This ensures that the systems are properly build and maintained.

Moreover, it is important to guarantee **O&M training to the beneficiaries and to the PDRD**, particularly relating to **faecal sludge management**, a topic that is still poor addressed.

¹⁰ The unit cost of the device is around \$175.

14. Case study 4: Behaviour Change in the district of Thpong (Province of Kampong Speu)

14.1. Description

The District of Thpong is located in the Province of Kampong Speu, in central Cambodia, approximately 80 km from Phnom Penh. It is divided into 7 communes and 88 villages, with a total population of 63,328, and 14,298 households (NIS, 2019). The province is part of the high land and mountain geographical zone, and hard ground areas are quite widespread.

The District works closely with communes and villages to deal with sanitation and hygiene issues, it contributes to set up the sanitation strategic plans, and it's involved in the WASH data collection. In 2015, MRD piloted the **Function Transfer**¹¹ on WASH topics in 5 districts in the Province of Kampong Speu, and among them there is also the district of Thpong.

Thpong District's administration has made **behaviour change** a central part of its strategy to improve sanitation. Commune or village chiefs go door-to-door to individual households to **promote sanitation**, targeting the households that still do not own latrines.

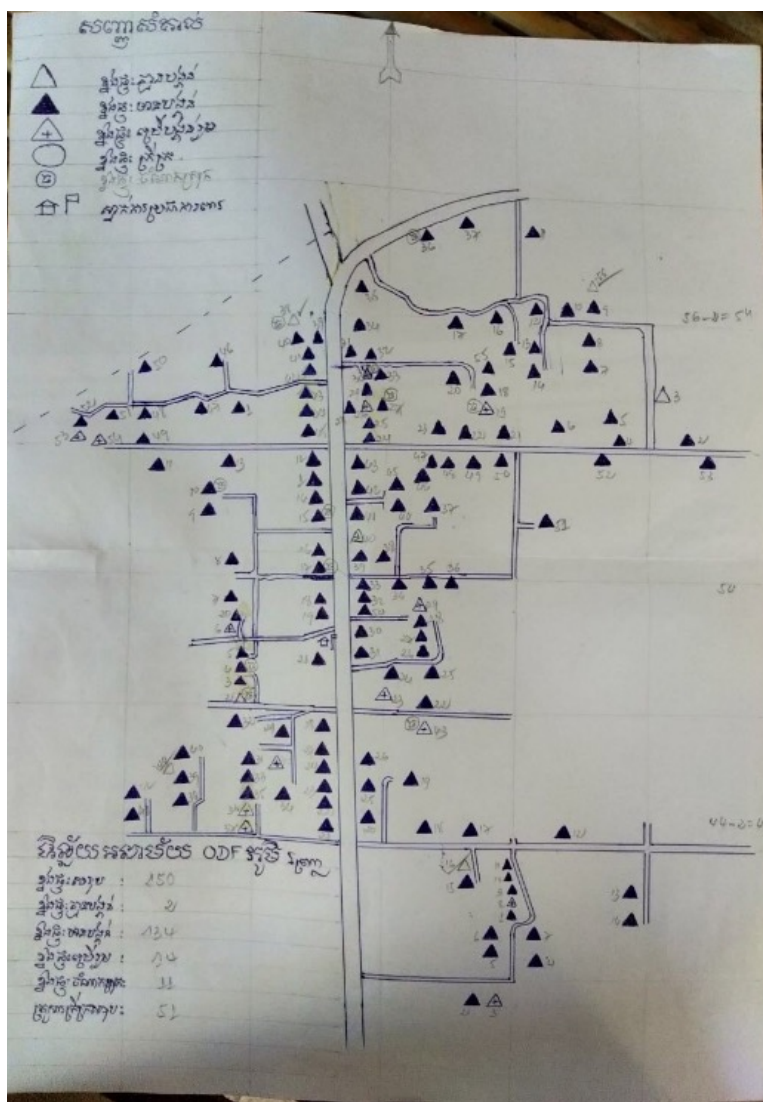


Figure 29. Latrine mapping

During the personal discussions with the family members, commune or village chiefs explain the benefits of having a latrine, compared to the disadvantages of practising open defecation. The main topics raised are the reduced exposure to water-borne diseases and

¹¹ *Function Transfer refers to the decision made by MRD to delegate some functions to the districts. When the Function Transfer targets WASH topics, this means that the district will become responsible for managing and maintaining the WASH systems in the rural areas of their competence. This includes repair and maintenance of the water supply systems (f.i. wells, ponds, and communities' pipe systems), water quality tests, strengthening of the WASH working group responsible for the water supply systems, etc. Before 2015, all these tasks were managed and implemented by MRD.*

the possibility of living in more dignified and healthy conditions. Sometimes they present some figures of the sanitation coverage in Cambodia, compared to other more developed South-East Asian countries. When it is still difficult to get a family understanding the importance of sanitation, neighbours are involved, having them setting a good example and showing concrete benefits on having a personal latrine.

There has been a significant change in sanitation coverage in Thpong District, from 81% in 2019 to 98.5% in October 2022. Between 2021 and 2022, 2,275 households built a private latrine.

In addition to the efforts done with the behaviour change campaigns, the district, in close coordination with the PDRD, has been working to **raise funds** to build latrines. If in 2019, the large majority of the commune chiefs was concerned about not having enough budget for addressing the sanitation needs, it has been finally possible to redistribute some budget and to cover the planned sanitation expenses.

The district administration has also promoted and conducted a **map of the sanitation coverage for each village**, identifying household per household the current status, and mapping it on paper. This helped the authorities becoming more aware on the sanitation coverage in the villages, and where it's worth working harder.

Furthermore, the quarterly, and annual meetings of the **technical WASH Working Groups** (Provincial Working Groups – PWG and District Working Groups - DWG) are conducted regularly and they always include sanitation and ODF objectives in the debate, having them among the key topics while discussing the local action plan.

Another strategy adopted by the district administration is to issue the **approval to organize a wedding event** in a household only if a sanitation system already exists. Thus, to hold such an event, building sanitation facilities is a mandatory precondition.

It is worth mentioning another successful initiative called **Civic Champions Program**, run in the district from 2015 to 2022. More than 1,000 elected commune councillors applied to participate and conducted the process themselves. As a result of this programme, more than 62,000 latrines have been built in eight target provinces. The objective of Civic Champions was not to expand an NGO-led capacity development programme, but rather to institutionalise leadership development at multiple levels of government. Through iterative cycles of discovery, development and implementation, participants learned to create their vision for community development based on their current situation, to develop a plan and to implement it. This programme provided an opportunity for participants to share their successes, challenges, solutions and to learn from each other. This programme also secured the commitment of the LBOs to work with the local councillor.

It is a proof-of-concept project designed to transform the leadership of elected local government officials in rural Cambodia, developed and implemented by WaterSHED ¹². It worked as an incentive initiative, setting up a competition between different villages and communes with rewards (prizes, medals, certificate etc.), and it helped increasing awareness raising and capacity building.

14.2. Successful points

As already mentioned, the District has achieved remarkable results implementing behaviour change campaigns and additional initiatives, increasing the sanitation coverage from 81% in 2019 to 98.5% in October 2022.

¹² <https://watershedasia.org/civic-champions/>

The most relevant successful points are:

- A **clear share of priorities, roles and responsibilities** at the district and commune level;
- A clear strategic plan towards achieving ODF, thanks to the efficient meetings of the **District Working Group (DWG)**, where sanitation is a key topic during every monthly meeting;
- Capability of allocating budget on sanitation for each commune, redistributing some remaining budget from Social Development budget. The amount of the budget has been about US\$1,500 per year;
- High level of **commitment** of the leaders, at district and commune level;
- Innovative initiatives, like the Civic Champion program and the sanitation coverage mapping in each village.

14.3. Lessons learnt, challenges and gaps remaining

The main challenge faced by the district is the **lack of budget** specifically allocated on WASH. Nevertheless, the district managed to reallocate some budget from the general administration resources to cover transportation and per diem costs, and to use some budget availability from the Social Development budget.

For the districts involved in the Rural Sanitation Function Transfer from MRD, asking for **budget allocation requires a complex process**. Each district needs to plan ahead their targets to increase sanitation coverage, setting priority actions, an action plan, and a budget plan. These procedures are quite complex, and in not every district there are enough skills and competences to properly address it.

In the district, for who can afford it, the so called “villa latrines” are getting popular: they consist of more modern and bigger structures, about 1.5x4m, and with a cost up to 500-1000\$. Some villagers wish to purchase similar toilets, as a matter of reputation, even if they don't have any means to afford them. **Since they do not accept to purchase a basic one, much cheaper even if still appropriated, they would rather practice open defecation.**

Similarly to other districts, despite the considerable success achieved, remaining challenges refer to the efforts still required to **raise awareness among people** on the importance of sanitation and hygiene best practices, and to the difficulties in dealing with the poorer households that **do not own enough land to build latrines**.

14.4. Improvement ideas and sustainability

On top of everything, the district believes that an even **greater cooperation with the local population, authorities, and other stakeholders** should be encouraged.

There is the need to keep working on **behaviour change communication**, and an increase cooperation with external partners could support in conducting some **digital mapping**, considered useful improvement since the current mapping is done on paper.

Furthermore, follow-up, replicate and scale up the **training to the commune councillors** provided with the Civic Champions Program could be useful to further accelerate sanitation.

Last but not least, it is worth mentioning that the impact of climate change in terms of increased flooding and droughts is quite strong in these areas, and, therefore, it's strong the need for designing and providing **climate resilient latrines**.

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