Australian Government
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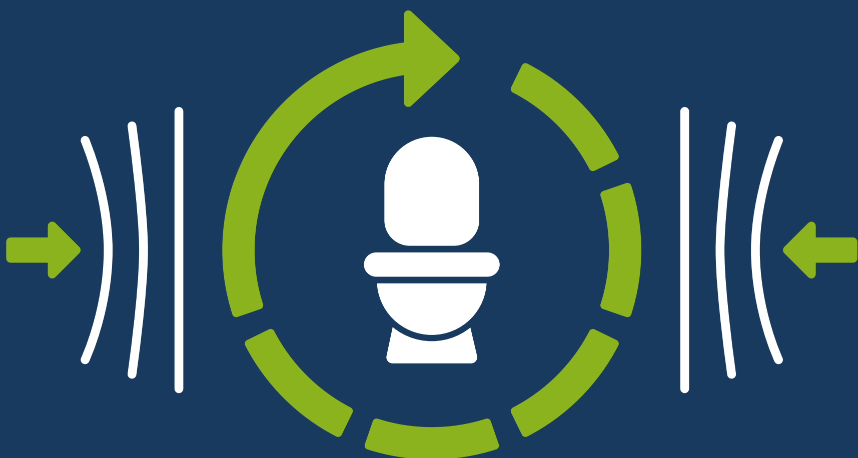
LESSONS FROM COVID-19

The Resilience of Innovative Sanitation and Hygiene Ventures

April 2021

A journey of resilience:
A brief review of how a group of innovative sanitation and hygiene ventures experienced the impacts of the COVID-19 global pandemic.



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It was authored by Georges Mikhael, Bill Twyman, reviewed by Syeda Zaki, Julie McDowell and Harold Lockwood, and copy edited by Heather Crawford. The authors would like to thank the ventures who took the time to participate in the study during a challenging period.

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Grand Challenges Canada is dedicated to supporting Bold Ideas with Big Impact®. Funded by the Government of Canada and other partners, GCC funds innovators in low- and middle-income countries and Canada. GCC's Transition To Scale program supports innovators who are positioned to take their bold ideas to big impact in the area of global health. Through this program, GCC brokers smart partnerships that mobilize private capital and domestic public resources to generate scalable and sustainable solutions that deliver measurable social impact.

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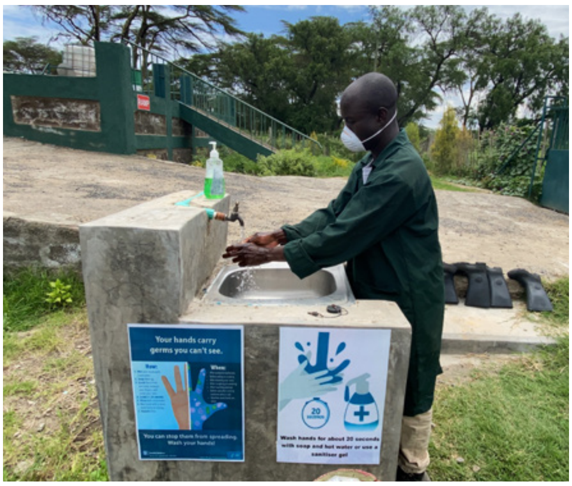
01.
Introduction

One year after being declared a global pandemic, COVID-19 has infected over 100 million people and lead to nearly three million deaths.[1] It triggered and intensified a range of shocks and stresses, including lockdowns, job losses, increased pressure on overstretched healthcare systems, urban to rural migration, resource competition and civil unrest.[2] These have been acutely felt in low- and middle-income countries (LMICs), especially in vulnerable communities in urban areas.[3]

As with other businesses, ventures providing innovative sanitation and hygiene products and services were significantly impacted by the pandemic. This paper explores that impact on 11 such ventures supported by Grand Challenges Canada (GCC) and operating across Africa, Asia and Latin America. It outlines their responses to the outbreak and potential lessons for a changing global climate.



Handwashing station and signage at Sanivation's waste-to-resource facility in Naivasha, Kenya

PRE-COVID-19 SHOCKS AND STRESSES

Before COVID-19, all 11 ventures were – to varying degrees –directly and indirectly exposed to challenging conditions, including:

1. **Limited Access to Capital:** Challenging access to grants and other forms of commercial finance to support investment and growth of the ventures.
2. **Poor Governance:** Ongoing stresses of the irregular turnover of political figures and technocrats within city authorities (e.g., Peru) impacts ventures' ability to establish strong partnerships.
3. **Socio-political:** The sudden imposition of sanctions or political unrest (e.g., Haiti) delivers shocks, which restrict supplies and disrupt service delivery.
4. **Economic:** Sudden or gradual currency devaluation and inflation impact costs and revenues of a venture (e.g., Ghana), especially when serving the poor in countries with high income inequality.
5. **Natural Disasters:** Earthquakes, hurricanes, cyclones, droughts and intense rainfall periods damage assets, disrupt service delivery and reduce demand for services.

1. Johns Hopkins University. (2021). COVID-19 Dashboard by the Center for Systems Science and Engineering (CSSE) at Johns Hopkins University (JHU). Retrieved February 23, 2021, from Johns Hopkins University: read here.

2. IEP. (2020). COVID-19 and Peace: Briefing Series. Sydney: The Institute for Economics & Peace.

3. UNDP. (2020, December 03). COVID-19 Could Push the Number of People Living in Extreme Poverty to Over 1 Billion by 2030, says UNDP Study. Retrieved from United Nations Development Program: read here.

The ventures and a brief history of resilience

The focus ventures[4] can be categorized into three main groups:

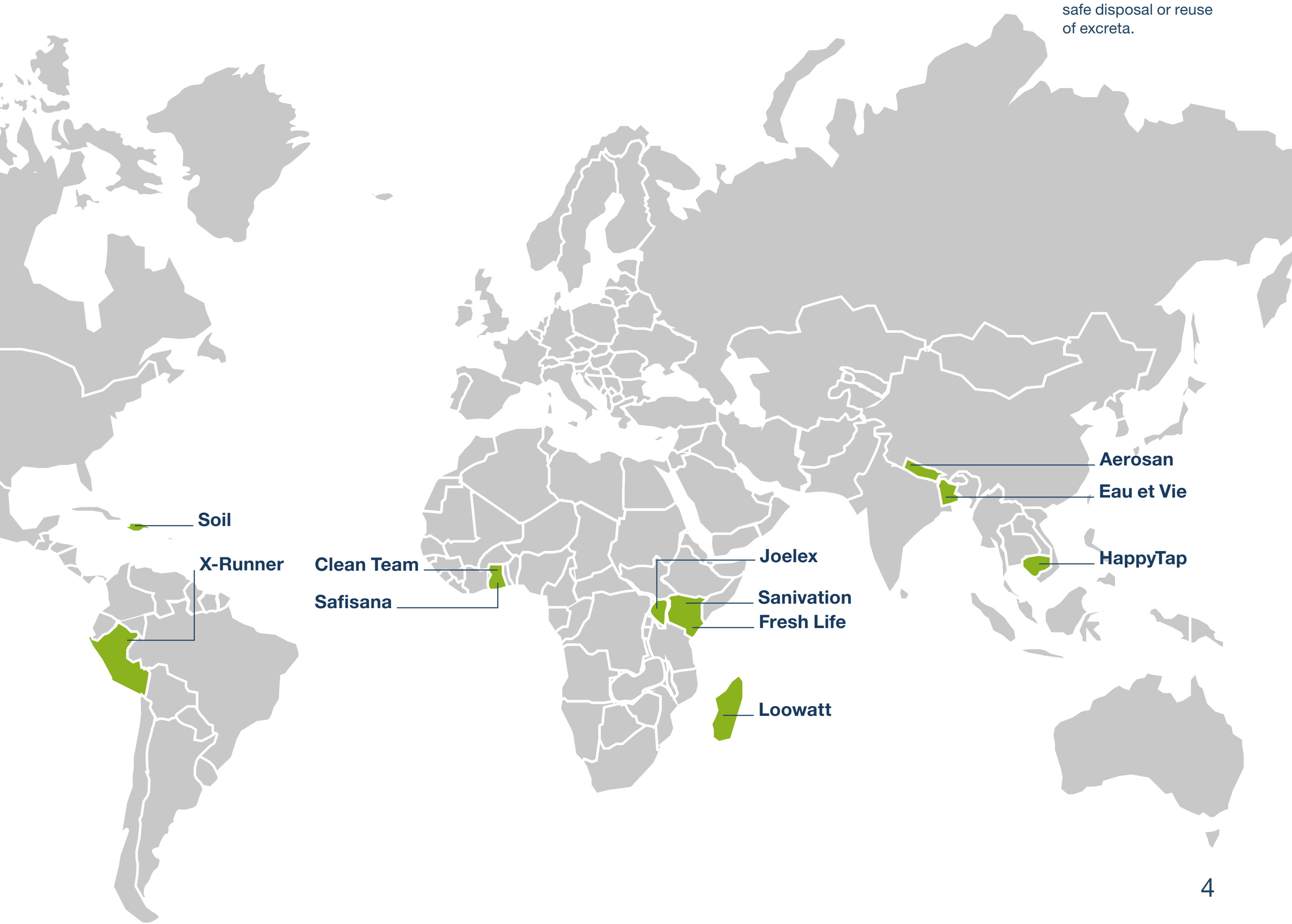
1. **Business-to-consumer (B2C) sanitation service providers –**
   a. Container-based sanitation (CBS[5]) services for single households (Clean Team, LooWatt, SOIL and X-Runner) or multiple households (Fresh Life)
   b. Communal toilet facilities bundled with water and solid waste management services (Eau et Vie)
   c. Public toilet facilities bundled with other services (Aerosan and Joelex)
2. **Waste-to-resource (W2R) services for cities** – treatment and conversion of human waste to by-products, including biogas-to-energy (Safisana), compost (SOIL and Safisana) or solid biofuel (Sanivation).
3. **Hygiene products** – portable and child-friendly handwashing station (HappyTap).

The sanitation ventures vary in size, from serving a few hundred people a day to serving thousands a day. The only hygiene venture, HappyTap, sells its product in multiple markets.

Common across all ventures, however, is their exposure to a multitude of shocks and stresses, which has strengthened their resilience. Collectively, they have often experienced limited access to capital, public procurement and skilled professionals, as well as political unrest, economic shocks, social inequality, and climatic and other natural disasters. All have had to adapt to their environment, with those experiencing the most pressure (such as SOIL in Haiti) developing a high level of resilience.

4. SOIL, X-Runner, Fresh Life, Aerosan, Joelex, Safisana and HappyTap are supported by GCC with the financial support of the Government of Canada. Eau et Vie and Loowatt are supported by the Australian Government through GCC. Clean Team and Sanivation are supported by the Australian Government and the Government of Canada through GCC.

5. According to the Container Based Sanitation Alliance, CBS is a sanitation service that provides toilets to collect human excreta in sealable, removable containers that are collected on a regular basis, and enables safe disposal or reuse of excreta.



02.
Impact of the pandemic and the response of ventures

The COVID-19 pandemic profoundly impacted ventures. The first three months after it was declared a global pandemic (March 2020), an acute shock was experienced by all ventures. There was a period of confusion, heightened uncertainty, and restrictive measures causing substantive impacts. This was followed by a generally less severe but sustained stress over a significant period, which has continued into the first quarter of 2021. The severity and duration of impacts varied according to several internal and external interlinked factors, including:

1. The types of services provided
2. The customer-base
3. The prevalence of the disease in the area or country
4. Government restrictions
5. The ventures' baseline level of resilience.

SUPPLY CHAIN DISRUPTIONS

Local and international travel restrictions disrupted supply chains for consumables (i.e., sawdust and plastic bags for CBS toilets) and equipment (i.e., prefabricated CBS toilets and portable handwashing stations). Aerosan (Nepal) below delayed opening a new community sanitation facility in Kathmandu by two months because of delays in sourcing Indian and Chinese components, while LooWatt and HappyTap incurred substantial additional costs across their international supply chains.

Aerosan's public toilet in Kathmandu, Nepal

The pandemic substantially impacted operations and growth

Restrictions on movement significantly impacted on-demand services, such as public toilets, and the collection and transport of faecal waste to waste-to-resource facilities. Joelex (Uganda) had to shut community sanitation facilities in Kampala for two months, while Safisana (Ghana) could not collect the faecal sludge and organic waste needed for its digester for six weeks. Most CBS providers were deemed 'essential services' and permitted to continue collecting waste; however, they were restricted from conducting sales. Due to travel restrictions, national and international supply chain disruptions became a challenge.

However, ventures quickly adapted; for some COVID-19 became a catalyst for positive change

All ventures had at least a foundational level of preparedness, with important aspects in place (such as health and safety plans and protocols) that were quickly modified to reflect pandemic realities. Operations were altered to reduce the risk of COVID-19 transmission among workers by expanding workforces, shifting to remote working, separating shift patterns, implementing staff 'bubbles', and enforcing social distancing and handwashing.

For a couple of ventures, the pandemic acted as a catalyst for increased automation and integration of systems for key functions. SOIL accelerated the rollout of a GPS mobile routing app to optimize waste collectors' routes and reduce dependencies on collectors' individual knowledge and memory. Fresh Life (Kenya) accelerated the deployment of a cloud-based system for contracts, financing and reporting, to increase efficiency and enable remote working.

HappyTap delivered a boom in sales of handwashing stations. By diversifying its supply chains and customer base, HappyTap was able to capture a rise in demand and increase its revenue by 3,000% in 2020. Pre-pandemic, its customer base was split 20:80 between institutions and consumer retail. Post-pandemic, this was drastically changed to 90:10 between government procurement for education (75%) and health centres (15%), and consumer retail sales.

The financial impact of the pandemic has been most significant and is slowly starting to recover one year on

All sanitation ventures experienced a significant drop in revenue. At the beginning of the pandemic, restrictions on movement directly reduced revenues by forcing the closure of community sanitation facilities and severely limiting CBS and W2R ventures' ability to conduct sales. However, the pandemic's greatest financial impacts were due to the loss of income experienced by venture customers and urban-rural migration. These were felt especially acutely by CBS ventures. In January 2021, Clean Team (Ghana) had 75% of its customers in arrears. In 2020, Fresh Life had to temporary close 900 facilities (27%) due to unforeseen challenges such as customer payments, and X-Runner (Peru) lost 12% of its customers for reasons attributed to COVID-19 (i.e., migration, economic challenges). To different extents, all three ventures are now recovering and gradually working towards achieving pre-pandemic levels of revenue from customers.

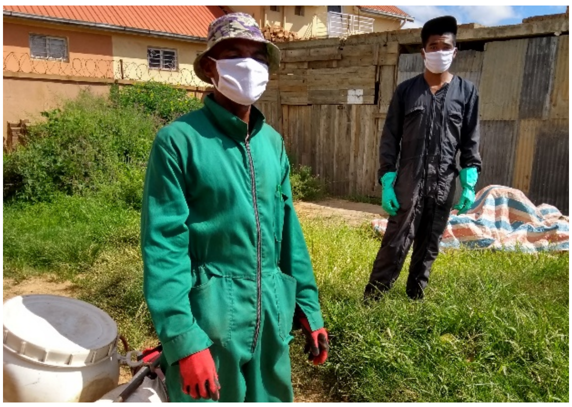
Many B2C ventures introduced across-the-board discounts to limit customer churn. Eau et Vie (Bangladesh) applied a 100% discount for the first four months of the pandemic, which it credits as having been critical to maintaining 99% of their customers, even after ending the discount in August 2020. Clean Team and Fresh Life did not provide discounts; instead, payment plans were offered that allowed customers to pay off their debt over an extended period. Some ventures invested in staff and systems to mitigate revenue losses, including employing additional financial staff, further incentivizing revenue collectors and adopting financial tracking software. The medium- and long-term effectiveness of such adaptation measures remains unclear.

Expenditures increased to cover additional personal protective equipment, hazard pay or expanded employee benefits, and insurance and medical costs. Disruptions to global supply chains and changing demand patterns also increased the cost of prefabricated equipment (such as CBS toilets and handwashing stations) and their shipping costs.

To plug the financial gap, ventures primarily leaned on existing investors

By highlighting the need to avoid disruption to services, ventures in critical financial positions actively sought additional grant funding from existing investors and extensions to their existing agreements. Quick decision-making by investors was critical to a venture's ability to make operational-level adaptations.

HappyTap, which was keen to capitalize on significant increases in demand, found it challenging to engage with new grant investors, experiencing a convergence around existing investments. They also found that the cost of borrowing had increased. Others (such as LooWatt) also found the cost of fundraising to have increased, but were open to and successful at raising equity from both existing and new investors.



LooWatt waste collectors transporting filled drums to the treatment site in Antananarivo, Madagascar

03.
What makes ventures and their services resilient?

Defining Resilience: Resilience is the ability 'to anticipate, absorb, accommodate, or recover from the effects of a hazardous event in a timely and efficient manner, including through ensuring the preservation, restoration, or improvement of essential basic structures of functions'.[6]

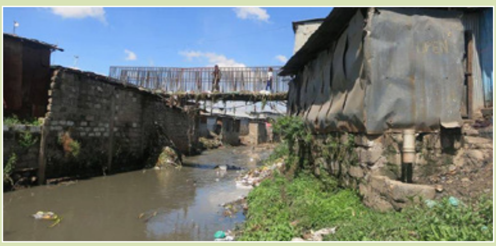
6. RCN. (2020). What is urban resilience? Retrieved from Resilient Cities Network (RCN): read here.

The severity and duration of COVID-19's impacts on ventures varied based on several interlinked factors, including their level of resilience. The elements that best defined the resilience of the considered ventures are outlined hereafter.

GOVERNMENT AS PARTNERS FOR SCALE

HappyTap's experience of growing their sales of handwashing stations to government by 130 times from pre-pandemic levels highlights the critical role of government in addressing issues of public health; in this case, COVID-19.

Local governments, regulators, national governments, and development finance institutions have a similar role to play in addressing sanitation-related public health challenges at scale. While some progress is being made, until now, innovative sanitation ventures and public authorities have not been able to foster partnerships strong enough to significantly scale sanitation at the city level.



High levels of pollution in some areas of Nairobi due to poor sanitation (Source: Fresh Life)

Designing, constructing, and managing resilient assets and services

Sanitation and hygiene ventures providing modular products and decentralized services demonstrated their resilience to disruption, whereby the failure of individual products (e.g., a CBS toilet) or the disruption of a single service (e.g., collection from an individual household) did not affect the overall service provided.

By comparison, some W2R ventures with more centralized infrastructure and services were less resilient to the impacts of the pandemic. Safisana, for instance, could not run its operations at full capacity for 10 months because travel restrictions prevented a critical maintenance visit from being performed by an international expert.

Building a financial 'last line of defence'

Before the pandemic, Fresh Life and SOIL managed to build reserve funds, which provided an important but ultimately not used financial safety net for the ventures. Other similarly sized ventures did not have this key 'weapon' in their arsenal, leaving them vulnerable to perilously short runways and a challenging funding environment.

It is unlikely that smaller ventures would be able to build such a fund; however, maintaining reserve funds for critical events is a key element of resilience.

Maintaining an effective risk management strategy

With the exception of SOIL and Fresh Life, many of the ventures (including large ones) did not develop and maintain sufficiently detailed risk management strategies for plausible risks. For SOIL, having a detailed risk management strategy in place was a result of their historic experience of overcoming and adapting to long-standing social, political, economic and climatic shocks and stresses in Haiti. Their strategy details protocols for operating under emergency conditions, providing a strong basis for their operational and financial adaptations to the COVID-19 pandemic.

Developing strong local and international partnerships

The upheaval caused by COVID-19 brought into focus the importance of strong relationships with local government. All CBS ventures were able to attain special designation as essential services, enabling them to continue providing their critical services uninterrupted, despite travel restrictions. By comparison, while not directly assessed, operators of vacuum tankers (used for emptying septic tanks) faced restrictions on their ability to operate in places such as Ghana, Kenya and Uganda.

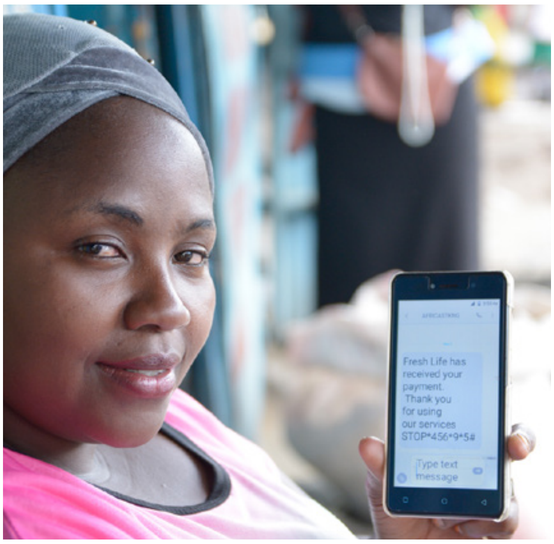
At an international level, partnerships with investors were a critical element of buffering the financial shocks and stresses of the pandemic. Existing investors, especially family foundations where decision-making is streamlined, were instrumental in providing access to additional grant funding to mitigate the financial impacts of the pandemic. Cross-venture partnerships (e.g., the Container-based Sanitation Alliance) appeared to play a less critical role, with an apparent gap in collective sharing and learning.

Integrating processes, procedures, and practices

Ventures increased their resilience through the integration of their systems and practices. Pre-pandemic, many ventures were over-reliant on manual systems, creating vulnerabilities through dependencies on specific individuals to perform key functions. The pandemic triggered several ventures to shift to more automated and integrated systems for key functions, including for operations (SOIL) and finance (Fresh Life). Integration was achieved by working towards a common and sustained outcome, and through the efficient exchange of information.

Incorporating flexibility and diversification

HappyTap credits its flexible management structure, as well as its diverse supply chain and distribution channels, for enabling its exponential growth in 2020. While demand did surge (due to increased awareness of the importance of handwashing in preventing the spread of COVID-19), HappyTap would not have been able to respond to that surge without these critical factors. Conversely, W2R ventures were severely impacted by their dependency on a small number of suppliers and customers.



Fresh Life customer in Nairobi, Kenya using mobile technology to pay for services

04.
Where do we go from here?

The potential risk of a slow COVID-19 recovery

The global economic outlook projects lower growth rates over the next five years, due to the COVID-19 pandemic[7]. A severe setback to living standards is expected, further increasing inequalities and driving more people into poverty. Lower-income customers of innovative sanitation and hygiene ventures are likely to continue to struggle to pay the full cost of products and services, even more so than before the pandemic. Without adapting and building resilience, ventures risk facing challenging financial prospects during what could be a prolonged and unhurried recovery.

The current and looming impacts of climate change

Micro, small and medium-sized enterprises operating in LMICs will be severely impacted by the direct and indirect effects of climate change[6]. The operational contexts of the ventures considered are forecast to experience various, unequal, and adverse climatic changes, many of which are already materializing. These include:

- Increased frequency and intensity of **extreme weather events**, such as hurricanes and cyclones.
- Increased proportion of rainfall during heavy rainfall events, leading to **rapid onset and recurrent flooding**.
- Reduction and/or changes in rainfall patterns, resulting in increased **water scarcity and droughts**.
- Increased occurrence, length and severity of **heat-related events**, especially in cities.

'Resilience is a journey, not a destination'

Most ventures see climate change as an opportunity to scale what they perceive to be their intrinsically resilient products or services[8]. At the same time, most express that they do not have the capacity, time or resources to build a venture that is resilient to climate change. The pandemic has made evident that ventures that invested in resilience prior to the pandemic were able to more rapidly adapt and, in one case, recover stronger. It is not necessary or possible to plan for all potential risks; however, building a resilient venture ensures there are systems in place to allow for rapid adaption and recovery.

There is no one-size-fits-all approach for building resilience. Each venture will have to do so based on its current size, capacity and context. However, the elements that contributed to the resilience of these ventures can be applied across ventures and across their journey to scale.

Aerosan enhanced the personal protective equipment of their public toilets operators

7. IMF. (2020). World Economic Outlook: A Long and Difficult Ascent. Washington, DC: International Monetary Fund. Retrieved from International Monetary Fund.

8. For instance, CBS services are reported to be resilient to droughts (as they do not require water to flush) and resilient to flooding (as containers can be sealed to prevent outbreaks of diseases).

05.
Recommendations to investors

To support venture resilience to current and future shocks and stresses, whether related to climate change or other factors, investors should consider the following.

1: Incentivize priority ventures to invest in building their own resilience

Ventures that are most severely impacted by climate change and that have limited capacity and resources should be incentivized to build their resilience. This could include added flexibility on how investments can be spent (e.g., building reserve funds), consideration of resilience-focused milestones, provision of 'resilience top-ups', supporting learning and capacity-building on resilience, and providing venture advisory support on resilience. The development of a framework may be required to assess and support the resilience of ventures.

Enhanced safety of Fresh Life's waste collectors to protect the team and customers

2: Coordinate with investors to mitigate shocks or stresses

Some investors will be best-positioned to address immediate and acute shocks, while others are better-positioned to mitigate the impacts of chronic stresses. Effective coordination between investors would support ventures in addressing their immediate and short-term needs, while ensuring sufficient support is available to mitigate evolving and longer-term stresses (e.g., continued local travel restrictions in Peru preventing sales and thus loss of income).

3: Invest in creating a better understanding of resilient services

Significant gaps in knowledge exist in understanding the resilience of sanitation and hygiene ventures, which require investments in cross-venture action research. Consideration should be given to exploring the following: (i) comparing the resilience of innovative sanitation services compared to conventional ones; (ii) the effectiveness of different adaptation tactics to financial shocks and stresses experienced by a customer base.[9]

4: Seek partnerships for resilience

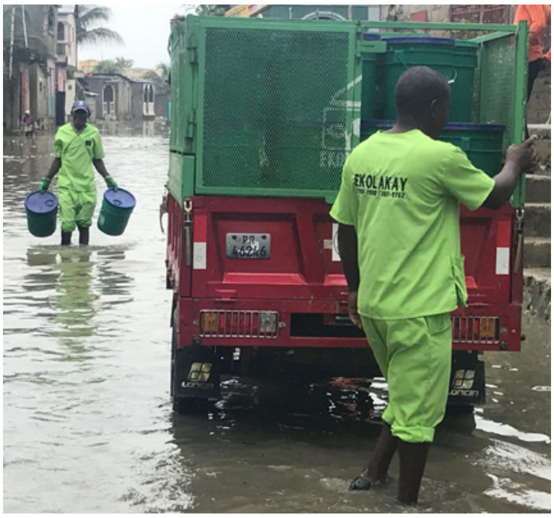
Explore opportunities to partner with organizations (e.g., Resilience First), other investors (e.g., Nordic Development Fund) and cities focused on building resilient communities and services. The objectives of the partnerships would be to allow for continuous learning and development on resilience, and to leverage additional funding from other like-minded investors.

9. The pandemic offered an opportunity for B2C sanitation ventures to test different adaptation approaches to the financial shocks experienced by their customers, including discounts, payment plans and diversification. The effectiveness of the different approaches to the short- and medium-term financial resilience of the ventures is not yet understood, nor the drivers that impact them.

Key takeaways

The COVID-19 pandemic has had a significant impact on global health; so far, over 100 million people have been infected and nearly 3 million have died. Innovative sanitation and hygiene ventures considered as part of this study showed strong resilience to the impacts of the pandemic.

Operations and growth of sanitation ventures were negatively impacted across the board; however, ventures were quick to adapt. For some, the pandemic became a catalyst for positive change, with a hand hygiene venture capably capitalizing on a surge in demand. The financial impact on the sanitation ventures was significantly negative but is slowly recovering one year on. To address the gap between the increase in costs and reduction in revenues, ventures primarily leaned on existing grant investors.



SOIL staff collecting waste after heavy rainfall in Cap-Haitien, Haiti

Based on the study, the critical elements that made these ventures resilient are the:

1. **Design, construction and management of resilient assets and services**
2. **Building of a financial 'last line of defence'**
3. **Maintenance of an effective risk management strategy**
4. **Development of strong local and international partnerships**
5. **Integration of processes, procedures and practices**
6. **Incorporation of flexibility and diversification.**

To address future risks such as climate change, investors should continuously incentivize ventures – especially those at risk – to invest in building their own resilience. The COVID-19 pandemic has reinforced the importance of investors coordinating resources when the ventures they support are faced with shocks and stresses. It has also highlighted the importance of investing in research into resilient sanitation and hygiene services, and the need to seek partnerships with other investors who prioritize resilience.

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