

# Opportunities for Private Sector Engagement in Urban Climate Change Resilience Building



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# Introduction



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## Objectives of the Study

Global rise in temperature has been steep in the last 50 years, leading to increased climatic variability. This variability manifests itself in various ways including through unpredictable rainfall patterns, increased flooding, depleting agricultural output and rising sea-levels. Although efforts are in place to reduce greenhouse gas emissions and mitigate future rise in temperature, responding to the inevitable impacts of climate change that we are already witnessing has received relatively less attention.

The poor are typically the most vulnerable in the face of climate change, as they are highly exposed to the environment through their living conditions and livelihoods. Those in Asian cities are especially susceptible to unpredictable environmental changes, as these cities are expected to account for more than 60% of global population growth in the next 30 years. Tier two cities in particular lack the resources and infrastructure of larger, more developed cities to be able to address the compounding challenges of urbanisation, poverty and environmental degradation, leading to an escalation in the vulnerabilities of the urban poor.

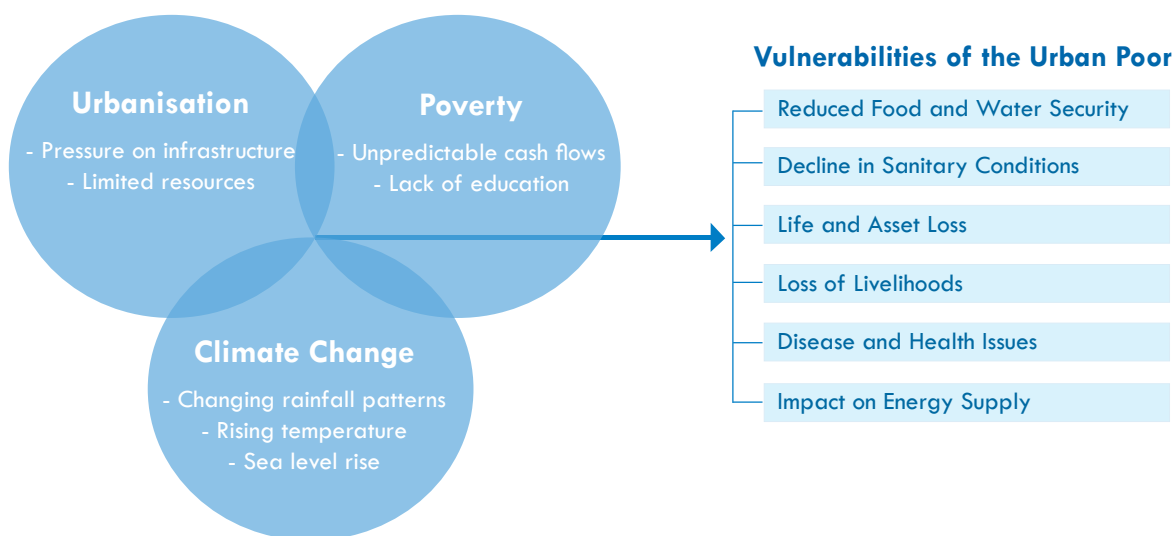


Figure 1: Vulnerabilities of the Urban Poor

Thus, measures that help the urban poor in Asian cities adapt to the changing climate and build their resilience and capacity to respond dynamically to its adverse impacts, are essential, and call for attention, funding and action from civil society, the public and private sectors. Private sector engagement in Urban Climate Change Resilience Building (UCCRB) is particularly important, as the need is vast, and grant funding from governments and donors is limited.

To the extent that there are unmet market needs, opportunities for private enterprises exist. Yet, while businesses are actively engaging in climate-proofing their supply chains and operations, and in responding to infrastructure building opportunities initiated by the public sector or civil society, very few investments in businesses that build resilience have been made. Private sector interest in ensuring business continuity, by protecting owned infrastructure and preparing for market disruptions, and in capitalising on revenue generating opportunities presented by other actors is clear. However, understanding of and thus interest in market-based solutions to build resilience is under-developed. The Rockefeller Foundation and Intelicap thus set out to identify business opportunities in UCCRB, and to understand the drivers and inhibitors to private sector participation.

In an effort to put boundaries around the scope of this study, we defined business opportunity as potential for private sector engagement in UCCRB with the intent to respond to a market need for products or services. To this end, partnership with civil society organisations and public-private partnerships (PPPs) were considered only if initiated by the private sector. Business response to public tenders, technical assistance contracts or other requests initiated and funded by public or donor funding are not considered to be opportunities, as in these cases businesses act as secondary stakeholders, do not contribute additional funds to the field and rarely develop a financially sustainable resilience building intervention.

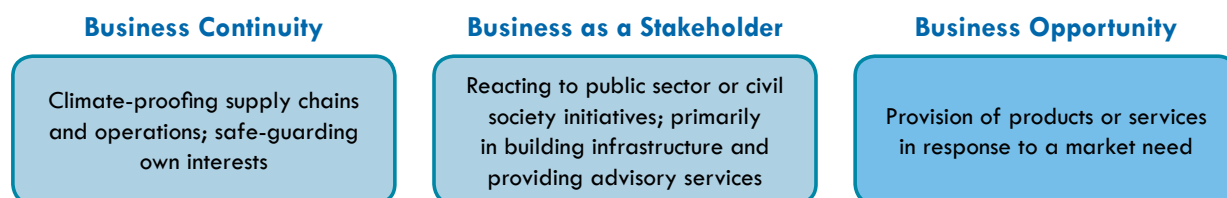


Figure 2: Modes of Private Sector Engagement in UCCRB

The approach taken has been to explore the current state of private sector engagement in resilience building and future opportunities through primary and secondary research, to showcase potentially viable business models and to understand challenges to private sector engagement in this space. As case studies, we focused on the vulnerabilities of and opportunities in four of the ten cities participating in the Asian Cities Climate Change Resilience Network (ACCCRN) program<sup>1</sup> – Gorakhpur and Surat in India, Semarang in Indonesia and Chiang Rai in Thailand.

We hope the findings of the study will inform key stakeholders on business opportunities and challenges in the urban resilience building field. Private sector actors, from large corporations to social enterprises (SEs) to community owned companies, seeking to better understand business opportunities in resilience building could find value in the results, as could investors looking to channel capital to the space, and local or national government agencies seeking to develop facilitative policy to engage the private sector.

## Contours of UCCRB

Vulnerabilities of the urban poor can be a direct result of climate change, such as flooding or drought, or an indirect result, such as higher incidence of disease or an increase in food prices. The impact of climate change on the urban poor is thus often disguised and entangled with other socio-economic and urban issues. Precarious cash flows, limited access to finance, poor public infrastructure and substandard living and working conditions, aggravate the impacts of unpredictable environmental changes and increase the overall risk profile of the urban poor.

UCCRB therefore includes measures that improve the capacity of individuals and communities to cope with unpredictable climate events. These are interventions that address climate-linked vulnerabilities by improving infrastructure, access to scarce resources and basic services, building the disaster preparedness of the urban poor, and promoting livelihoods to enhance income or improve cash flow predictability. Examples of measures that build community resilience include early warning infrastructure, improved waste management and access to quality, affordable healthcare while examples of those that build individual resilience include asset micro-insurance, access to savings and vocational training. No one of these solutions alone can holistically address the vulnerabilities of the urban poor, and thus a myriad of interventions are needed to build urban resilience.

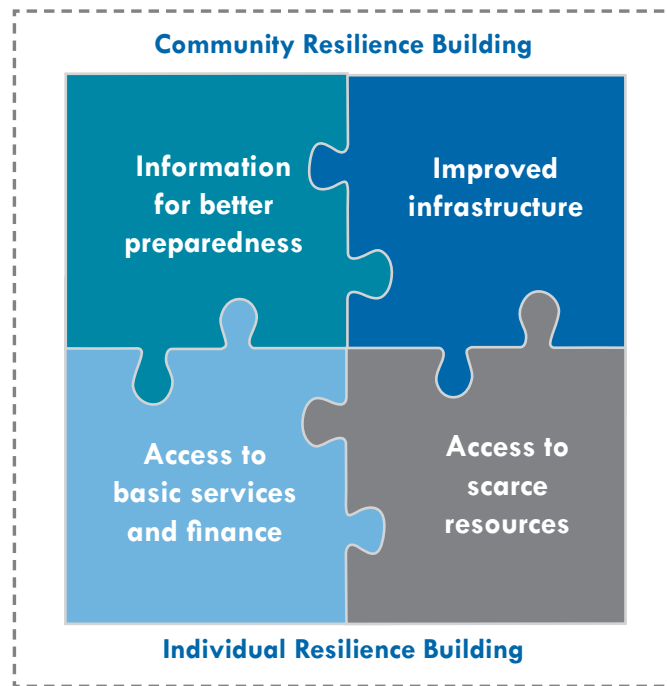


Figure 3: Components of UCCRB

## Role of the Private Sector in UCCRB

Given the paucity of funds to tackle the impacts of climate change, the private sector has a critical role to play in bringing in its understanding of the market, operating efficiencies and quality products and services that can sustain, given the business model attached. Enterprises are incentivised by market forces to produce and deliver the best product or service for their target customers at the best rate in the most efficient way. Businesses are also typically at the cutting edge of innovation and technology in the fields in which they operate, and are sometimes more flexible and able to respond to the needs of those at the base of the pyramid (BOP) than government bodies and other not for profit organisations.

However, private sector activity in resilience building has been limited, largely because the needs of the urban poor resulting from changes in the climate are unclear. Through a detailed study of the vulnerabilities in four Asian cities we found that opportunities for the private sector do exist; some are clear models in mature markets, while others are in under-developed markets and require market making support. These resilience building opportunities are in businesses that provide products and services that improve infrastructure, access to scarce resources and basic services, provide information to better prepare for disasters, and promote livelihoods.

Vulnerabilities and thus opportunities in this field are extremely context specific, and thus are often best confronted by local enterprises, skewing the concentration of opportunities in UCCRB in favour of small and medium enterprises (SMEs), community owned companies (COCs) and SEs rather than large corporations. In cases where scale is not a constraint, such as with health micro-insurance or water purification systems, large companies often enter this segment in order to expand their existing market.

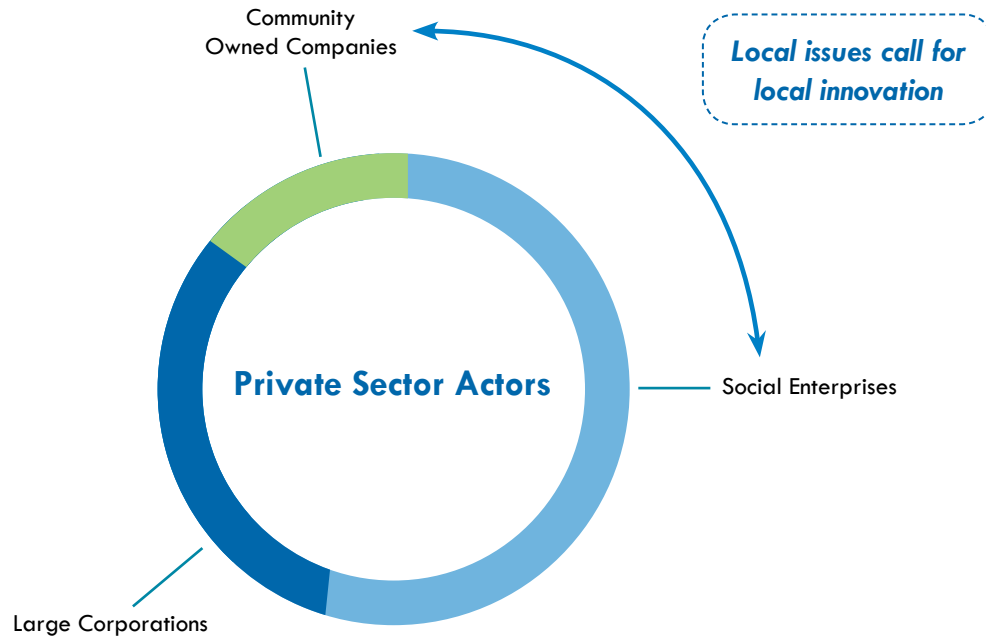


Figure 4: Private Sector Actors

Opportunities for the private sector in UCCRB were identified based on both their business and resilience building potential. Business potential was evaluated based on ease of implementation, financial sustainability and scalability, while resilience building potential was measured by ability to improve infrastructure, access to basic services or scarce resources, enhance income or build awareness and disaster preparedness of the urban poor. High potential opportunities to build resilience were thus found across sectors, the key ones being micro-insurance, healthcare, waste management and sanitation, water management, affordable housing, off-grid energy, microfinance, information and communication technology (ICT) and livelihood promotion. The relevance of each of these sectors varies depending on the context of each city.

**Multiple solutions, no magic bullets:** while a myriad of business opportunities in UCCRB across key sectors exist, each addresses some aspects of the vulnerabilities of the urban poor, rather than a holistic solution.



## Key Sectors for Private Sector Engagement in UCCRB

**Micro-insurance:** the exposure of the urban poor to natural hazards is high, and the effects can be debilitating for families. Micro-insurance products that cover life, health, assets and crops are a feasible way for the urban poor to limit the risks associated with cyclones, floods, crop failures and other climate related uncertainties.

**Healthcare:** rising temperatures cause an increase in exposure-related and vector-borne diseases, and as a result of increasing precipitation, water-borne diseases and others resulting from a decline in sanitary conditions. Affordable preventive care, treatment facilities and drugs can go a long way in building the resilience of the urban poor.

**Waste and Sanitation:** waste is increasingly clogging urban drainage systems and reducing the capacity of cities to deal with increased precipitation, leading to a decline in sanitary conditions. Robust waste management systems can enhance the capacity of cities to cope with the changing climate, and reduce potential health hazards.

**Water Management:** precipitation levels and other climate induced issues such as salinity intrusion and sewage seepage owing to water logging are important determinants of a city's water supply, and affordable purification and conservation solutions are important for the urban poor.

**Affordable Housing:** in coastal cities the urban poor live in badly constructed homes that are in cyclone, flood, landslide or land subsidence prone areas. Access to secure, sanitary, low cost rentals or affordable homes for purchase and the ability to make home improvements are essential resilience building measures.

**Off-grid Energy:** flooding and natural catastrophes can lead to unpredictable failures in grid power supply, and changes in rainfall could impact power generation in cities highly dependent on hydro-power. These issues further reduce the inadequate access to power for the urban poor. Affordable off-grid backup solutions to ensure basic lighting and the ability to charge cell phones could hugely improve urban poor family's ability to cope in adverse times.

**Microfinance:** in the face of climate change, credit and other financial services such as savings, investments and remittances help to overcome income shocks and health issues, support building or acquiring assets, improve livelihoods and thus build resilience.

**Information and Communication Technology:** information can inform the actions of the government, media, private sector, consumers and producers, spurring them on to develop appropriate early warning systems and insurance products or select the right crops. In addition, market and job information too greatly enhance the resilience of the urban poor.

**Livelihood Promotion:** in Asian cities the most vulnerable population tend to be those whose livelihoods are highly dependent on the weather, such as fishermen and agri-linked workers, and those in the informal sector. Skill building and support in moving up the value chain can enhance incomes, improve employability and build predictability of cash flows.

# Key Sectors for Private Sector Engagement in UCCRB



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## Micro-insurance

The urban poor have limited or no access to insurance or other risk management tools and in the face of climate change, are exposed to unpredictable events including disease, loss of assets, livelihoods and lives. These events coupled with inadequate infrastructure often perpetuate the vicious cycle of poverty.

Insurance products designed specifically for the poor can cushion the impact of unplanned events by providing significant economic and psychological security and reducing exposure to multiple risks. Such micro-insurance products are tailored to those un-served by mainstream insurance, and are characterised by low premiums and low coverage limits.

In the context of building urban resilience, micro-insurance products that cover life, health and assets are highly relevant, and in cities well integrated with the surrounding rural areas, those that cover crops are important too. Depending on the kind of exposure given a specific geography or type of livelihood, products can be structured in several ways and bundled to provide multiple coverage and also to include features such as a saving component.

**Life micro-insurance** products compensate families through a fixed pay out in the event that the insured passes away. These are the most common micro-insurance products as they are the easiest to explain and administer, can be **credit-linked**, and thus have seen significant scale. Several Microfinance Institutions (MFIs) have introduced such products to cover the loss they could incur upon the death of a borrower and relieve the family of the burden of loan repayment. Premiums are generally low as high volumes have enabled large insurance providers to design affordable products. However insurance providers have become highly dependent on MFIs for distribution and few other channels such as Non-Government Organisations (NGOs) or Community Based Organisations (CBOs) are as developed. Further, credit-linked products have limited utility as coverage ceases once the loan is repaid and voluntary renewal rates are low.

Life micro-insurance can also be **savings-linked**, offering greater incentive for voluntary uptake as policyholders no longer perceive the premium payment as a write-off. The pay-out upon maturity is typically a multiple of the savings balance at the time, and premiums are deducted either from the interest on a deposit account or, as a percentage of the savings balance. A guaranteed minimum return if no claim is made also increases the willingness amongst the urban poor to pay for such products. However, the reach of savings-linked products is dependent on the distribution partners' ability to accept savings and thus retain a long term relationship with the client.

**Health micro-insurance** can be a significant resilience building product, as the poor spend an inordinate proportion of their income on healthcare. It improves access to preventive and curative healthcare via empanelled<sup>2</sup> hospitals, pharmacies and doctors, thus reducing out of pocket expenses. Products can cover individuals or be community-based. Although a few products have been developed to tackle specific vulnerabilities, such as Dengue insurance by ACA Insurance in Indonesia, most products provide wider coverage to improve uptake and viability.

Health insurance products can also be credit-linked, making them easier to scale. As voluntary renewal rates have been low, product innovation and education to generate demand are required to increase uptake. The provision of out-patient benefits such as vaccines and strong preventive coverage, for example, could encourage non-claimants to renew their policies.

Viability of micro-health insurance is often determined by the state of the public health system as complementary government schemes could encourage private sector participation. In addition, design elements such as a strong monitoring component to ensure adherence to prescriptions and doctors' instructions and the right

2. Facilities – hospital, clinics, pharmacies, etc. – which are authorised to provide services to policy holders against their insurance schemes

delivery channel could help to maintain profitability. These products necessitate administration of numerous low-value transactions, and thus controlling fraud by patients and hospitals are an added challenge. Cashless transactions can reduce risk and enable access to healthcare despite precarious cash flows. However, cashless transactions often require third-party administration (TPA) to identify clients and pre-authorise hospital treatments and a risk carrier to administer claims and fraud.

**Community-based health insurance (CBHI)** however can reduce adverse selection by clubbing people with varying levels of risk together and insuring them as a group, resulting in lower transaction costs. CBH organisations are also better placed to monitor members more effectively. However, their small size, limited technical and managerial skills make them less scalable.

**Crop micro-insurance** products cover farmers' losses from crops owing to falling yields, reduction in quality, pest epidemics and other causes for revenue loss. However these products face a number of challenges including risk of fraud, moral hazard, adverse selection and a high degree of covariant risk as natural hazards often affect many farmers at the same time. These factors make crop insurance a costly business; few programmes to date have been able to break-even.

**Asset micro-insurance** products for the urban poor are very limited, and primarily cover livestock and housing. Credit-linked asset insurance, especially for income generating assets such as dairy cows, rickshaws, handcarts or boats have shown some viability.

For crop and asset insurance, **index or trigger based products** are being tested. These are products linked to specific trigger events such as thresholds in wind speed, flood level, precipitation levels and claims towards the policy are disbursed only if the policy triggers. Such products are easy to administer, leading to higher efficiencies and lower transaction costs. However, one of their disadvantages is that premiums are relatively high and there could be a mismatch between the fixed pay-out and the amount actually lost by the client.<sup>3</sup> Further, the low density of weather stations in many areas necessitates the setup of several smaller ones, as these are essential to the accuracy of the index adding to the initial setup costs.

**Service providers** will find opportunities in offering third-party administration and other last mile services to help insurance companies reduce their costs as a percentage of revenues. High costs stem from sourcing under-writing data, client acquisition, claims assessment and back office processing. Given their knowledge of consumers and the last-mile distribution channel, these enterprises can also play a vital role in product design. With scale, they will also become demand aggregators and could support insurers in sourcing clients.

### Case Study – Design Challenges Limit the Scale of Weather Insurance



In 2009, Munich Re in association with GTZ and Asuransi Wahana Tata introduced a weather insurance product in Jakarta, Indonesia, the trigger being based on flood levels. The response to the product has been low on account of various design-related factors and as of March 2010, only 60 policies have been sold, while 500 have been donated. The major challenge is in selecting a trigger and pay-out amount that appropriately insures the customer while diversifying the risk faced by the insurer. Jakarta has a natural flood cycle of 5 years hence people have planned to buy the policy only in anticipation of the flood. In addition, willingness to pay for the product is low amongst many, as some expect government assistance after flooding or natural catastrophes, while others believe such events to be God's will.

Product or Service	Current Activity	Challenges
Life Micro-Insurance	<p><b>SEs and NGOs</b> act as agents for last mile delivery of life insurance products</p> <p><i>Various MFIs, cooperatives and self-help groups across countries</i></p>	<ul style="list-style-type: none"> <li>▪ Credit life products have been piggy-backing on MFIs' services – there will be a greater need to develop stand-alone as well as integrated products</li> <li>▪ <i>Low voluntary uptake</i> – going beyond credit life insurance is key to develop a culture of insurance among the low income people</li> <li>▪ <i>Low renewal rates</i> – incentives along the loan period could equal growth</li> </ul>
	<p><b>Large insurance corporations</b> have achieved some scale by partnering with MFIs in linking micro-insurance to loan products</p> <p><i>Birla Sun Life, Bajaj Allianz, Tata-AIG, Allianz Indonesia, LIC, Muang Thai Life</i></p>	
	<p><b>Government agencies</b> are very active in the life micro-insurance sector</p> <p><i>Life Insurance Corporation of India</i></p>	
Crop Micro-Insurance	<p><b>SEs and NGOs</b> have designed successful products however they remain small scale</p> <p><i>Micro Ensure, GlobalAgRisk, NASFAM</i></p>	<ul style="list-style-type: none"> <li>▪ <i>Moral hazard</i> arises from difficulty in verifying whether the insured are diligently taking care of their crops or assets. (offset for index based insurance)</li> <li>▪ <i>Assessing agricultural and asset loss</i> can be very difficult and costly</li> <li>▪ <i>Adverse selection</i> as those at risk are more likely to buy the insurance; high risk and low returns makes insuring the poor against natural catastrophes unviable</li> </ul>
	<p><b>Large insurance corporations</b> collaborate with NGOs in piloting products</p> <p><i>Swiss Re, Sampo Japan Insurance Inc., Kilimo Salama, Munich RE, ICICI Lombard</i></p>	
	<p><b>Government</b> is a key stakeholder and indemnity payments and administrative costs are often covered by schemes and subsidies</p> <p><i>Horn of Africa Risk Transfer for Adaptation Programme in Ethiopia, weather stations in Malawi</i></p>	
Asset Micro-Insurance	<p><b>SEs and NGOs</b> have launched a number of credit-linked products that provide coverage for property, livestock or business interruption</p> <p><i>MicroEnsure, VimoSEWA</i></p>	<ul style="list-style-type: none"> <li>▪ <i>Low willingness to pay</i> as often the government and donor agencies provide relief in times of disaster</li> <li>▪ <i>Covariant risk</i>, as droughts, pests and animal or crop epidemics and natural disasters are likely to affect many policy holders together leading to loss accumulation</li> </ul>
	<p><b>Large insurance corporations</b> offer credit linked products bundled with life insurance</p> <p><i>Allianz Indonesia, C.I.C. Insurance</i></p>	
	<p><b>Governments and donor agencies</b> have limited participation though often provide assistance in times of disaster</p> <p><i>Caribbean Catastrophe Risk Insurance Facility</i></p>	

Product or Service	Current Activity	Challenges
Health Micro-Insurance	<p><b>SEs and NGOs</b> support product delivery and are often responsible for marketing and servicing; often administer CBHI products</p> <p><i>VimoSEWA, BRAC, Grameen Kalyan, SKY Cambodia, AssEF, ServiPeru</i></p>	<ul style="list-style-type: none"> <li>▪ <i>Moral hazard</i> resulting from people using more services than they would if they were not covered</li> <li>▪ <i>Fraud</i> is a main concern as health service providers often submit false claims or inflate genuine ones</li> <li>▪ <i>Adverse selection</i> when the risk profile of the group insured is worse than it would be in the general population</li> </ul>
	<p><b>Large insurance corporations</b> partner with healthcare providers to develop products for the poor, wherein they carry the risk and reinsure them, while partners aggregate demand and implement products</p> <p><i>Uplift India, Asuransi Central Asia, Karuna Trust, Yeshasvini Trust, UMSGF, UTM, Micro Care, AllLife</i></p>	
	<p><b>Government agencies</b> create health insurance schemes to encourage private insurers to serve the poor by funding premiums or subsidising benefits</p> <p><i>Rashtriya Swasthya Bhima Yojana, Jamkesmas, Thai Universal Healthcare (UHC)</i></p>	
Last Mile Service Providers	<p><b>SEs</b> provide services across Asia and Africa</p> <p><i>MicroEnsure</i></p>	<ul style="list-style-type: none"> <li>▪ Scale is vital to make services cost-effective for insurance providers</li> <li>▪ Ability to provide multiple services and get buy-in of multiple partners</li> </ul>
	<p>No <b>large corporations or government</b> actors operate in this space</p>	

### Case Study – Last Mile Service Providers Reduce Transaction Costs



One of the major challenges faced by large insurance companies in providing micro-insurance policies to the poor is the high cost of distribution, outreach and servicing. Enterprises such as MicroEnsure seek to lower this cost by providing data to underwrite policies, conducting client outreach, processing and servicing claims and undertaking back-office operations for large insurance providers. It has also designed a dedicated cell captive that can underwrite the health risk through a fronting insurer, and provides insurers claims assessment and processing services for a fee.

In addition, MicroEnsure designs and pilots innovative products that can then be adopted by large scale insurers. For example, with an insurer and TSKI, an MFI in the Philippines, it offered a housing loan and index-based typhoon insurance product. The insurance was initially linked to credit, but is now also offered stand alone. The coverage is determined based on an assessment of the building material and risk area. MicroEnsure is also working on adapting HospiCash, a product for the urban poor which pays out a fixed daily income to the policy holder’s family in the event of his/her hospitalisation.

## Outlook – High Potential in Well Developed Microfinance Markets

The micro-insurance market is extremely nascent and it will be a while before the sector can see scale across products. Demand for micro-insurance in developing markets is estimated at over 1.5 billion policies and current market penetration is less than 5% of estimated demand.<sup>4</sup> The sector's growth has been limited to areas with high microfinance coverage, as demand aggregation is otherwise a challenge. Given this, the market in India is more likely to see growth in the near term than Indonesia or Thailand.

- Innovation in product design will be driven by large insurance companies, SEs and grant funded NGOs
- Credit-linked products will continue to dominate over products that require voluntary uptake
- Products with a savings component could catalyse the uptake of voluntary insurance
- Client education and demand generation through CBOs and NGOs will increase voluntary uptake
- Coverage of natural catastrophes is less likely to scale in the near term
- Developing non-MFI distribution channels and last-mile service providers will be important for growth
- Grant funding will remain key as cross-subsidisation is not feasible in a world of pilot projects

Country	Potential	Outlook for Private Sector Engagement
India	High	<ul style="list-style-type: none"> <li>■ The credit-life micro-insurance market is the most developed in the world</li> <li>■ Policy necessitates that insurers serve the rural market, forcing innovation in product design for the sector</li> <li>■ At least 24% of the population falls below the poverty line on account of hospitalisation, high potential for well-designed health micro-insurance</li> </ul>
Indonesia	High	<ul style="list-style-type: none"> <li>■ 173 insurers operate, only few have entered the low-income market signifying scope for expansion<sup>5</sup></li> <li>■ Strong network of community-based informal financial groups (<i>Arisans</i>), <i>Pasar Konsortium</i> and commercial microfinance banks</li> <li>■ High growth market; 12 million policy holders estimated by 2015</li> <li>■ Policy constrains growth of non-life products, as they cannot be credit linked</li> <li>■ High potential for products that can be credit-linked – life and other products bundled with life coverage</li> </ul>
Thailand	Medium	<ul style="list-style-type: none"> <li>■ Insurance products are distributed through Government cooperatives and banks</li> <li>■ As agriculture is a major contributor to the economy, crop insurance is likely to grow</li> <li>■ Growth of micro-insurance products will likely be through collaborating with Government programs as public credit schemes dominate the microfinance market</li> </ul>

4. Lloyds 360 Risk Insight. Insurance in developing countries: Exploring opportunities in Microinsurance. Microinsurance Center.

5. Allianz AG, GTZ and UNDP – Micro-insurance Indonesia Report

## Healthcare

Climate change, when combined with lack of awareness, poor infrastructure and inadequate medical facilities, has direct and indirect effects on the health of the most vulnerable population in urban areas. While specific health impacts vary from city to city, rising temperatures, increased rainfall, water logging and flooding have led to an increase in vector and water-borne diseases across the board.

Amongst the urban poor, the willingness to pay for immediate relief or cure is often high, despite low incomes. However, as awareness of climate-linked vulnerabilities is limited, the willingness to pay for preventive measures is lower. Yet, opportunities exist across preventive care including micro-insurance, vaccines and vitamins, curative care including pharmaceuticals and affordable medical equipment, and in emergency care.

**Preventive care** is the most cost efficient way to deal with increasing health issues. However, low willingness to pay amongst the urban poor challenges the scale of business opportunities, and government and donor initiatives such as vaccination drives further dilute consumer interest. However, there are clear opportunities in both the provision of preventive treatment and in consumer products such as bed nets, mosquito repellents, vitamins and dietary supplements.

Some have created business models through innovative demand generation, tailoring products to this segment and developing a network of micro-entrepreneurs. Others sell products tailored for prevention in times of disaster however these are often only viable if purchased in bulk by donors. For example, Vestergaard Frandsen sells emergency response products including bed nets, curtains made of insecticide-incorporated plastic sheeting for malaria and dengue prevention and water purifiers to disaster relief implementation agencies.

### Case Study – Demand Generation through Awareness Building



SC Johnson's "Iwas Dengue" campaign was started in 1999 in the Philippines as a public service initiative. The company formed brigades of trained and equipped groups called "Men in Baygon" that were deployed nationwide to conduct free spraying operations and distribute "Off!" mosquito repellents in cities. They also distributed educational materials and established lecture caravans to educate people on effective preventive measures. The campaign's success was later coined with the sale of one of the company's products "Off Insect Repellent Lotion" demonstrating the vital role of the media and private sector in creating public awareness and demand.

**Affordable health treatment facilities:** While the know-how required to treat climate-linked diseases exists, affordability and accessibility for the urban poor remains a challenge. The relevance of each model to building urban resilience would depend on the specific climate-linked health vulnerabilities and the state of healthcare in a given city. The following are business models that address the issue of last mile delivery by lowering the cost of production or distribution, creating novel ways to access the market.

- **Hub and Spoke Model:** a primary hospital located in a dense area and secondary hospitals serving smaller cities, allows for the wider provision of affordable healthcare by leveraging markets with the capacity to bear the cost of specialty equipment and facilities. The urban poor are able to receive quality basic treatment at secondary hospitals and can be referred for further treatment to the primary one. This model could also be further extended to tertiary micro-clinics



- **Speciality Care:** Specialisation is typically associated with higher sophistication and thus costs. However models in eye care, prosthetics and maternity care have shown that these services can be delivered in a viable manner to the poor. Aravind Eye care is an exemplary model that disaggregates tasks and maximises throughput to optimise efficiency of personnel and resources. Maintaining the highest standards attracts wealthy clientele, allowing for cross-subsidisation. Specialty water and/or vector borne disease hospitals could have applicability in some cities
- **Mobile Clinics:** in underserved areas well-equipped mobile vans staffed by medical staff are a low cost option. Although these have primarily been donor-driven initiatives, there is scope for operators to run viable mobile clinics as a standalone enterprise as demonstrated by Siemens mobile clinics, or as feeder clinics to channel rural patients to associated treatment facilities in urban areas
- **Tele Medicine:** telecommunications as a media to share medical information such as test results and symptoms has high potential to reduce the cost of expert consultations in underserved areas. Low cost health officers could gain access to trained doctors for diagnosis and treatment, such as in the Piramal eSwasthya model
- **Affordable Medical Equipment:** companies are increasingly innovating to serve BOP markets. GE Healthcare, for instance, has committed to investing USD 6 billion by 2015 as part of a strategy to deliver low-cost medical equipment by capitalising on their wealth of experience in medical equipment and research and development centres in China and India
- **Emergency Care:** the urban poor most often lack access to efficient and low cost medical transportation. While some government schemes offer ambulatory services on a subsidised basis, existing models often lack efficiency. In contrast, social enterprises such as Dial 1298 have been able to achieve scale in ambulatory services through a cross-subsidised model

**Improved access to drugs:** There is immense opportunity for drug makers to extend the reach of their generic drugs and monetise this vast untapped BOP market. Pharmaceutical companies can make these medicines available to the poor at affordable rates by collaborating with government-led schemes, other SEs, NGOs and CBOs with last mile reach, or by offering drugs in conjunction with other affordable treatment facilities.

### Case Study – Unlimited Primary Health Care



Primedica provides access to unlimited primary health care at affordable rates for low income families in Mexico. The company offers a healthcare medical membership for primary care consultations costing 1,200 pesos (USD 92) a year and guaranteeing direct, unlimited and free of charge primary care consultations. In addition, members can access discounts on medicines, tests, and consultations with specialists. By encouraging preventive care, Primedica lowers the overall costs incurred by the company and its patients by reducing claims for expensive treatments.

Product or Service	Current Activity	Challenges
<b>Preventive Healthcare</b>	Efforts have traditionally been <b>NGO</b> driven, however some <b>SEs</b> have found clear business opportunities  <i>A to Z Textile Mills, Vestergaard Frandsen, Primedic</i>	<ul style="list-style-type: none"> <li>▪ <i>Willingness to pay is limited</i> as the level of education and awareness on the benefits of preventive care is low amongst the urban poor</li> <li>▪ <i>Intangible benefits</i> of preventive products and services such as disease prevention to the poor</li> <li>▪ <i>Access to finance</i> is key to create willingness and capacity of the urban poor to pay</li> </ul>
	<b>Large companies</b> have entered the market, providing products such as bed nets, vitamins and mosquito repellents  <i>Dannone, SC Johnson, BASF, Dupont Solae</i>	
	<b>Governments</b> have invested in public health campaigns such as vaccination drives, spraying public areas and building awareness	
<b>Affordable Treatment Facilities</b>	<b>SEs</b> have shown proof of concept in providing affordable healthcare; some have collaborated with government schemes and micro-insurance providers  <i>GV Meditech, Aravind Eye Care, Narayana Hrudayalaya, Vaatsalya, LifeSpring, Dial 1298, Voxiva, Smile Foundation, Health Management and Research Institute, Vision Spring</i>	<ul style="list-style-type: none"> <li>▪ <i>Levying a fee during a natural disaster is unviable</i> and business models need to have a longer-term value proposition that can subsidise services offered during disasters</li> <li>▪ <i>Access to finance</i> is key as the ability to pay for healthcare is low amongst the poor; collaborations with MFIs and insurance providers could address the issue</li> </ul>
	<b>Large corporations</b> are increasingly involved in research and innovation of low cost medical equipment  <i>GE Healthcare, Philips</i>	
	<b>Governments</b> provide subsidised or free healthcare facilities, fund insurance premiums	
<b>Curative – Improved Access to Drugs</b>	Some <b>SEs</b> manufacture generic drugs while donor agencies fund research and development  <i>Living Goods, Gates Foundation, Health Store Foundation, Locost</i>	<ul style="list-style-type: none"> <li>▪ <i>Unclear business model</i>; although drug manufacturers have the technology to produce low cost medicines, poor last mile reach constrains volumes, making it unattractive for companies to sell them at low prices</li> </ul>
	High activity amongst <b>large pharmaceutical corporations</b> in the generic drugs markets  <i>Novartis, Pfizer, Glaxo, Piramal, Cipla</i>	
	<b>Government</b> Health Care ministries have successfully subsidised low cost drugs and partnered with drug manufacturers  <i>Jan Aushadhi</i>	

## Outlook – Business Model Innovations Could Catalyse Growth

Healthcare is one of the “formed” social enterprise markets; the size of the low cost health care market globally is estimated at \$158 billion.<sup>6</sup> However, enterprises have been unable to capitalise on this market as providing last mile access to products and services while retaining affordability remains a challenge. Opportunities in developing process innovations and novel delivery mechanisms are however immense.

- Products such as vaccines for dengue and financial products for healthcare could be game changing in the realm of resilience building, and can be expected to see innovation in the next few years
- Large corporations and academia will continue to drive research and development efforts
- More viable specialty care models serving the poor will emerge as they are more conducive to process and cost efficiencies
- Cross-subsidisation is likely to remain key to provide affordable healthcare services
- MFIs and CBOs will remain key in enrolling the urban poor in insurance schemes

Country	Potential	Outlook for Private Sector Engagement
India	High	<ul style="list-style-type: none"> <li>■ Total value of the healthcare market is approximately \$36 billion; private sector accounts for more than 80% of total healthcare spending<sup>7</sup></li> <li>■ Infrastructure is woefully inadequate to meet current demand; ~860 beds per million people as compared to the world average of 3,960<sup>8</sup></li> <li>■ Only 11% of the population has any form of health insurance coverage; Rashtriya Swasthya Bima Yojana (RSBY)<sup>9</sup> creates scope for private participation</li> </ul>
Indonesia	Medium	<ul style="list-style-type: none"> <li>■ While primary health care facilities are adequate, there is a shortage of hospital beds with just 625 beds for every 100,000 people<sup>10</sup></li> <li>■ Scope for expansion of low cost pharmacies and affordable health care treatment facilities that can be empanelled with <i>Jamkesmas</i><sup>11</sup></li> <li>■ Potential to provide affordable, accessible treatment as willingness to pay and awareness levels are relatively high</li> </ul>
Thailand	Medium	<ul style="list-style-type: none"> <li>■ High health insurance coverage shared between the Universal Health Care (UHC) system and schemes for Government employees; half of those covered by the UHC are in the lowest two income quintiles<sup>12</sup></li> <li>■ Sector has attracted large investments, but focus on the top of the pyramid</li> <li>■ Scope for expansion of low cost pharmacies and affordable, accessible health care treatment facilities that can be empanelled with the UHC</li> <li>■ Potential to provide preventive healthcare products targeted at the BOP</li> </ul>

6. Ashoka Foundation

7. PWC, Healthcare in India, Emerging Market Report, 2007

8. Ibid.

9. RSBY was launched by the Government of India to provide health insurance coverage for families living below the poverty line. Beneficiaries under RSBY are entitled to hospitalisation of up to INR 30,000 (USD 660). Coverage extends to five members of the family which includes the head of the household, spouse and up to three dependents.

10. WHO Indonesia Report

11. Jaminan Kesehatan Masyarakat or Jamkesmas was introduced by the Government of Indonesia in 2008 to increase access to healthcare and financial protection and now covers over 76.4 million poor people. The scheme funds premiums for coverage of inpatient, outpatient, maternal and preventive care and contracts with over 900 hospitals.

12. UNDP – Thailand Human Development Report 2009

## Waste and Sanitation

Increased migration and natural population growth will result in higher waste generation, putting immense pressure on the current urban waste management infrastructure. Inefficient waste management leads to the choking of drains that in many cities have inadequate carrying capacities. Thus, in times of intense rainfall, cyclones, or tidal floods, the state of sanitation declines rapidly, further exacerbating the vulnerabilities of the urban poor. Sound waste management and sanitation systems are vital. Thus private sector engagement in the hygienic provision of toilets and in waste collection, segregation, transport and processing is therefore essential to the scale and sustainability of urban sanitation.

**Toilet facilities** that are hygienic and affordable are limited in congested Asian cities, especially so in slums. Open defecation is widespread, particularly in countries such as India, arising from the combination of bad habits and infrastructural lacunae. Opportunities exist for enterprises to provide household and community toilets, both fixed and mobile to the urban poor.

While fixed toilets offer a more permanent solution, access to land, power, water, and to drainage and sewage facilities in crowded areas is often hard. Portable toilets offer a potential solution as these units can be set up at a low cost and delivered to any location. They can be operated at large scale gatherings and construction sites where no sanitation facilities are otherwise available, and can be operated on a pay per use basis or be leased out for a fixed term.

**Integrated waste management** by private enterprises or models that include all activities in the waste value chain - collection, segregation, transport and disposal or processing - are limited. Enterprises have largely been involved in waste processing and treatment. Private participation in other activities along the value chain is primarily on contract for city municipalities. However, there are significant opportunities to integrate enterprise activities from waste collection to processing. Taking such a holistic approach can improve the quality and volume of waste collected through a central channel, thus improving overall operating efficiency, increasing the returns from processing.

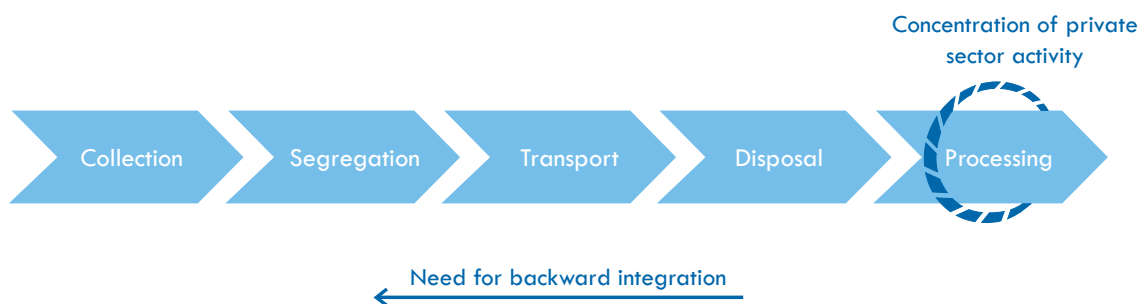


Figure 5: Private Sector Participation in the Waste Value Chain

Waste collection, segregation, transport and disposal are typically disaggregated activities undertaken by a number of actors, most notably by city municipalities, waste and rag pickers, NGOs and CBOs. Integration of efforts would benefit informal sector actors too affording them assured wages, while enhancing waste management in an inclusive manner. Further, Clean Development Mechanism (CDM) funding for landfill gas recovery, bio-methanisation, incineration and composting could be leveraged by early stage models.

Product or Service	Current Activity	Challenges
Provision of Affordable Toilet Facilities	<p><b>NGOs</b> are setting up 'pay per use' facilities and <b>SEs</b> are finding viable opportunities in the provision of sanitation facilities, launching portable toilet businesses</p> <p><i>Sulabh International, Scope, Ecosan International, Shramik Sanitation Systems</i></p>	<ul style="list-style-type: none"> <li>▪ <i>Government support</i> is essential to access land and utilities at strategic locations</li> <li>▪ <i>Demand generation</i> is often required to overcome prevalent behavioural habits, and create awareness on the need for toilet facilities</li> </ul>
	<p><b>Large corporations</b> have focused largely on sanitary ware for middle and high income consumers; none have entered the business of toilet provision for the urban poor</p>	
	<p><b>Governments</b> have often taken the lead in providing sanitation facilities in public places or contracting out the task to NGOs</p>	
Integrated Waste Management	<p>Numerous <b>NGOs</b> and <b>CBOs</b> operate small scale waste collection and processing initiatives, many build the capacities of rag pickers</p>	<ul style="list-style-type: none"> <li>▪ <i>Government support</i> in licensing, integrating private sector models with municipal operations and in allowing an entity to operate across city zones is essential to enterprises in this space</li> <li>▪ <i>Awareness generation</i> on waste segregation needs to be created in order to ensure cooperation during doorstep collection and to ensure willingness to pay for services</li> </ul>
	<p><b>SEs</b> have developed innovative business models in municipal waste management, including integrating rag pickers into collection and processing activities</p> <p><i>Chintan, Nidan, Waste Wise, Kanak Waste Management, LPKP, Waste Ventures, Wongpanit, BEST (Indonesia), Bali FOKUS</i></p>	
	<p><b>Large corporation</b> involvement has been limited to industrial waste treatment, municipal waste processing and to CSR initiatives</p> <p><i>ITC, Tetrapak</i></p>	
	<p><b>City Municipalities</b> initiate waste management activities and engage the private sector through PPPs</p>	

### Case Study – Waste Management by Formalising Rag Pickers is Viable



Nidan Swacchdhara Private Ltd. (NSPL), an urban waste management company, employs over 1,600 waste workers and incorporates them into the company as shareholders. Through collection of household waste, sale of recycled products and vermi-composted organic waste, the company was able to achieve a profit of INR 4 million (USD 80,000) in 2008. The company also provides access to financial services, protection against harassment, legal aid, insurance and education for children. NSPL has reduced the vulnerability of waste workers significantly, increased their average monthly income by 85%, and provided an effective solution for municipal waste disposal.

## Outlook – Collaboration Across Public, Private and Informal Sectors

Sanitation and waste management will continue to be an essential component of urban planning, and local governments' interests will always be vested. Thus, although immense opportunities exist for the private sector, models will have to be tailored to the local context. The scale of waste management enterprises across cities could therefore be constrained, though early movers have proven that processing and integrated waste management are viable opportunities. Portable community toilets, however, could be replicable across geographies and see rapid scale.

- Waste and rag pickers will continue to grow and organise themselves; models that integrate them into the formal waste management system will thus have increasing relevance in the future
- Waste management will receive greater attention from green funds being at the cusp of climate change adaptation and mitigation
- Private sector participation in integrated waste management and sanitation are both likely to be driven by SEs until proof of concept at scale is clear

Country	Potential	Outlook for Private Sector Engagement
India	High	<ul style="list-style-type: none"> <li>▪ 0.1 million tons of waste is generated every day<sup>13</sup>, and urban local bodies spend between INR 500-1,500 (US \$10-30) per ton: 60-70% on collection, 20-30% on transportation and less than 5% on disposal<sup>14</sup></li> <li>▪ Almost 90% of organic waste is disposed off in landfills</li> <li>▪ Opportunity to professionalise, integrate and monetise waste collection</li> <li>▪ 17% of the urban population lack access to sanitation facilities; strong potential for fixed and portable toilets to meet high unmet demand</li> </ul>
Indonesia	High	<ul style="list-style-type: none"> <li>▪ Sanitation amenities in urban areas are widespread, with small enterprises offering pay-per-use facilities</li> <li>▪ Urban areas generate about 55,000 tons of solid waste every day of which only 50-60% is collected; organised by local communities</li> <li>▪ Landfill sites are mostly open dumps, as funding for proper management of final disposal sites is a major constraint for municipalities</li> <li>▪ Potential for integrating collection with processing including the <i>pemalung</i><sup>15</sup></li> </ul>
Thailand	Medium	<ul style="list-style-type: none"> <li>▪ Privatisation of urban waste processing and trading of recyclables has been successfully achieved in Phitsanulok province by Wongpanich; potential for replication across Thai cities</li> <li>▪ Scope to improve waste management as Government services collect 30-50% of solid waste, while 20-30% is collected by the informal sector<sup>16</sup></li> <li>▪ Sanitation amenities are sufficient, provided by both public and private enterprises in urban areas</li> </ul>

## Water Management

The climate is a key factor in water supply planning as precipitation levels are an important determinant of water availability. The impact of climate on water management ranges from flooding, soil erosion, ground water levels, coastal erosion, salinity intrusion and drought, leading ultimately to challenges such as water logging, water scarcity, degradation in water quality and a shortage of potable water for cities.

Urban water management systems increasingly need to focus on water conservation, purification and prevention of contamination in order to adapt to changing conditions. Water recycling, rain-water harvesting and reducing water consumption through measures such as drip irrigation are sustainable adaptive approaches. Extending the reach of water treatment plants and household units are also important measures to increase the availability of and access to drinking water for the urban poor.

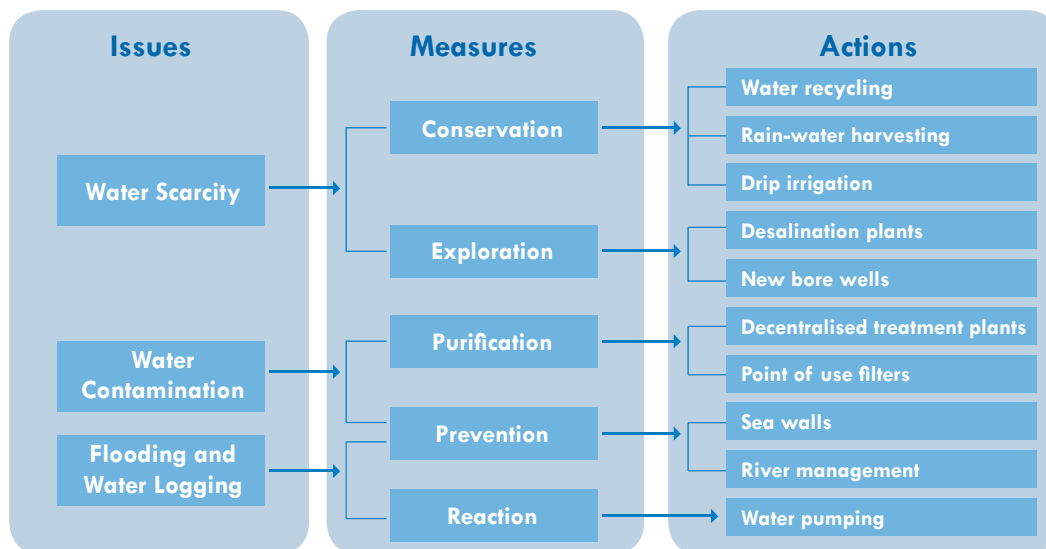


Figure 5: Water Management – Issues, Measures and Actions

However, not all resilience building measures within water management are clear business opportunities, especially those that prevent contamination. Community infrastructure such as sea walls and river management for example, are not viable stand-alone opportunities for the private sector, and will require Government initiative. In other cases, such as in recycling, bore well drilling and desalination plants, while the private sector has the technology to provide these services, these models have limited applicability to the urban poor, as they are cost and energy intensive and are usually linked to large industrial, commercial or residential establishments.

In the context of water management for the urban poor, the most promising business opportunities for the private sector are in drip irrigation and water purification.

**Drip irrigation** is a highly effective means of conserving water used in irrigation enabling slow and regular application of water directly to the roots of the plants through a network of economically designed plastic pipes and low discharge emitters. Private companies have developed affordable solutions for rural farmers, supporting adaptation to changing rainfall patterns and longer dry seasons. Companies such as International Development Enterprises have demonstrated that the model is viable and applicable to the urban poor in *Desakota*<sup>17</sup> cities.

17. Desakota means “village town” in Bahasa Indonesian, and refers to closely interlinked rural-urban livelihoods, communication, transport and economic systems.

**Water purification** and creating access to potable water address not only climate-linked vulnerabilities, such as salinity intrusion and sewage seepage, but also build resilience indirectly by improving general health and immunity to diseases. **Point of use (POU) water filters** are household filtration units that typically also have a chlorine drip and can be quite effective in combating water-borne diseases. These are sold through retail outlets as well as through MFIs to ensure reach and capacity to pay amongst the urban poor. **Decentralised water treatment plants** on the other hand are community water purification systems using primarily reverse osmosis to provide clean drinking water to households on a per-litre basis. Given land availability constraints in urban areas, the reach of community treatment plants is limited.

Product or Service	Current Activity	Challenges
Drip Irrigation	<b>NGOs and SEs</b> provide affordable ready-to-use drip-irrigation kits for farmers <i>Jain Irrigation, Netafim, IDE</i>	<ul style="list-style-type: none"> <li>▪ <i>Power shortages</i> in rural and peri-urban areas could constrain demand when energy is required to pump water through the irrigation system</li> <li>▪ <i>Unreliable water connectivity</i> is a constraint for farmers in peri-urban areas</li> <li>▪ <i>Capacity to pay</i> is often limited, <i>access to finance</i> can enable uptake</li> </ul>
	<b>Large corporations</b> provide various irrigation products and complete irrigation solutions. However, very few are customised for the BOP markets	
	<b>Government</b> activity limited to conservation campaigns, rarely target the urban poor	
<b>Water Purification:</b> Point of Use and Decentralised Water Purification Systems	<b>SEs</b> have launched decentralised water treatment plants that work on a franchisee, community and enterprise-owned basis. They have also launched POU products across Asia, that have seen less scale <i>Waterlife, Sarvajal, Byrraju and Naandi Foundations</i>	<ul style="list-style-type: none"> <li>• <i>Water source connectivity</i> is essential at both a household and neighbourhood-level; dependence on municipal water provision is high</li> <li>• <i>Cost of delivery</i> is often high for decentralised water treatments plants, as land for treatment facilities could be far away from residential areas</li> <li>• <i>Choice of technology</i> limits scalability of products, as each technology is most suited for certain kind of water impurities</li> <li>• <i>Cost of technology</i> could be a limiting factor as not all technologies are cost effective for the urban poor</li> </ul>
	Numerous <b>large corporations</b> manufacture POU filters and many have developed products for the low-income market. Innovations in product design and delivery models are on the rise <i>HUL-Pureit, Tata Swatch, Eureka Forbes, Kent, Life Goods-Life Straw, Tulip, Ion Exchange</i>	

### Case Study – Micro-entrepreneurs Increase Access to Potable Water



Sarvajal develops decentralised reverse osmosis water treatment plants. It engages local entrepreneurs as franchisees to manage treatment plants and produce ultra-affordable drinking water. The enterprise identifies and trains franchisees who each make an initial token contribution towards the investment in equipment, and then share 40% of monthly revenues after the first two months. Over 115 franchises have been set up serving more than 60,000 people in a sustainable manner. Such a model not only safeguards the poor against widely prevalent water-borne diseases, but also provides livelihood opportunities through supporting micro-entrepreneurship.



## Outlook – Innovations in Water Conservation and Recycling for the BOP

Water scarcity and contamination of drinking water will continue to plague the urban poor across countries. Innovation in affordable methods of contamination prevention, water conservation and in harnessing water from alternate sources will be crucial. While the market is responding to the need for affordable purification solutions in Thailand and Indonesia, in India the sector is still nascent. Given that water is a universal need.

- In the near term, private sector participation will continue to be focused on water purification through POU solutions and decentralised treatment plants and on agriculture-linked conservation
- SEs in partnership with CBOs, NGOs and MFIs will continue to drive the growth of decentralised water treatment plants
- Local municipality support is essential to provide household access to water, especially in urban slum areas where land use and utility connections are not authorised
- Adapting products that recycle or conserve water for the urban poor will require investment from academia, public and private sectors

Country	Potential	Outlook for Private Sector Engagement
India	High	<ul style="list-style-type: none"> <li>▪ Estimated market size of USD 4 billion, growing at over 15% annually</li> <li>▪ Ranked 120<sup>th</sup> out of 123 nations on access to safe water – need and demand for access to pure water is very high, especially in cities where rapid urbanisation is widening the water demand-supply gap</li> <li>▪ More SEs and large corporations are likely to enter the water purification market as the POU and decentralised treatment plant markets show viability and scale</li> </ul>
Indonesia	Low	<ul style="list-style-type: none"> <li>▪ In coastal cities such as Semarang, the ground water level is very shallow and salinity content is high; shortage in potable water is likely to emerge as a major issues in such cities</li> <li>▪ The market for low cost bottled water is well developed, numerous SMEs meet demand in urban areas</li> <li>▪ Scope for the development of appropriate POU systems, as salinity intrusion and seepage continue to contaminate water sources</li> </ul>
Thailand	Low	<ul style="list-style-type: none"> <li>▪ Over 97% of all households have access to water as rain and the Mekong River meet demand; only the North-East faces intermittent shortages</li> <li>▪ The market for low cost bottled water is well developed with 29% of all households, primarily in urban areas, using bottled water<sup>18</sup></li> <li>▪ Potential for POU systems targeted at those using tap water for drinking and cooking</li> <li>▪ With water contamination owing to seepage of industrial and agricultural pollutants on the rise, large scale pollution prevention and treatment plants are likely to increase in relevance</li> </ul>

## Affordable Housing

Climate change has severe effects on human settlements; it impacts both individual homes and community infrastructure. Coastal regions and flood-prone areas are most vulnerable to the impacts of climate change, including sea-level rise resulting in land subsidence, coastal erosion, tidal flooding and tropical cyclones and typhoons leading to unpredictable flash floods and landslides.

The urban poor in coastal cities, who live in poorly constructed homes, typically in slums, and those who are homeless are thus highly vulnerable in the face of climate change. Access to secure, sanitary, affordable homes for rent or purchase and the ability to make home improvements, including slum up-gradation in authorised slums, are important measures to build resilience. Providing the means to afford well designed, robust housing facilities, secures a basic standard of life for the urban poor, free of climate-linked worries, and allows for the un-encumbered pursuit of livelihoods, thus building resilience.

**Micro-housing finance** is essential to create the capacity to pay amongst the urban poor for the purchase of housing units at affordable rates or for home improvements that shield them against the changing climate. There is a role for an enterprise to provide both wholesale finance to the sector and retail finance to these consumers. There is potential to create innovative financial products tailored to the cash flows of the urban poor.

**Slum up-gradation** is an opportunity to support slum home owners better their living conditions. The opportunity for private sector engagement in ad-hoc home improvement is limited, as local masons build doorstep dykes or households choose to build these on their own piecemeal, as and when funds permit. In flood-prone areas and those with land subsidence, people eventually abandon the first floor and construct an additional story.

However, in the case that community buy-in exists for planned slum up-gradation, and improvements include common infrastructure such as drainage and pavements, the provision of design and building services by an enterprise greatly enhances the value for money for the home owner. Such enterprises can be viable as community buy-in ensures critical mass in terms of demand. Technical assistance could range from land purchase or procuring fair long-term lease terms to architectural inputs, material procurement and implementation. A suite of pre-designed options to match different budgets and partnerships with micro-housing loan providers can enhance the model's viability.

**Construction of affordable housing** has potential, as demand is extremely high amongst long-term urban slum dwellers, especially in the case that the land they live on is prone to subsidence or flooding and relocation is a necessity to building resilience. Pre-fabricated building materials can bring down the per-unit cost of construction, as can building at scale. Large apartment complexes are being developed in the suburbs of many urban centres, as the business case for serving this market is increasingly clear. All private sector actors in the construction value chain stand to benefit from opportunities in this growing market.

**Low cost rentals** could help the most vulnerable urban dwellers for whom home ownership is not feasible or a priority, such as recent migrants to the city. Daily wage earners often lack the financial backing required for loan approvals. Others are temporary workers who do not intend to live in the city permanently. For this group, rentals are most appropriate and options are typically limited to unsanitary rentals in slums. There is an opportunity for enterprises to provide affordable dormitories and small rented apartments for short-term stays ranging from a night to a few months.

Private participation in this market has been limited as the perception is that the urban poor are unwilling to pay. In fact, in many cities, those that sleep by the road pay land lords or security guards for their spots, and are very willing to pay for a more secure, clean option that is close to their place of work. Some innovative

ways to lower an enterprise's cost of land or construction include refurbishing abandoned buildings to provide affordable rentals and running government shelters on contract.

Product or Service	Current Activity	Challenges
<b>Micro-housing Finance</b>	<p><b>SEs and CBOs</b> meet the need for retail housing finance, while commercial banks offer wholesale lending. Some MFIs have designed special home improvement loans. Enterprises in this space have already generated high investor interest</p> <p><i>Financiera Independencia, SEWA Bank, Micro Housing Finance Corporation, Janalakshmi, India Shelter Housing Finance, Shalom Finance</i></p>	<ul style="list-style-type: none"> <li>▪ <i>MFIs are unwilling to carry the higher risk as these loans are non-income generating and have longer tenures than typical micro loans</i></li> </ul>
<b>Strengthening / Slum Up-gradation</b>	<p>A number of initiatives by <b>CBOs, SEs</b> and <b>governments</b> have demonstrated success</p> <p><i>CODI (Thailand), Mahila Housing Trust (MHT)</i></p>	<ul style="list-style-type: none"> <li>▪ <i>Garnering community buy-in especially in the case of non-homogeneous communities, is hard, hampers enterprise viability</i></li> <li>▪ <i>Procuring land rights or leases in the case of un-authorized slums can be politically charged; government support is essential</i></li> </ul>
	<p><b>Large corporations</b> are often engaged in designing and constructing low cost housing for government slum relocation schemes</p>	
<b>Relocation:</b> Construction of Affordable Housing	<p>Few <b>SEs</b> have developed affordable homes for purchase</p> <p><i>MHT, Janadhar Constructions</i></p>	<ul style="list-style-type: none"> <li>▪ <i>Livelihoods of the urban poor are often in the vicinity of their homes; access to their place of work is essential for uptake</i></li> <li>▪ <i>Procuring land use rights and dealing with zoning laws can slow down affordable housing projects</i></li> <li>▪ <i>Access to finance is essential to enable the capacity to pay</i></li> </ul>
	<p>Some builders, including <b>large corporations</b> have launched successful projects</p> <p><i>Tata Housing, Value and Budget Housing Corporation, CEMEX - "Patrimonio Hoy"</i></p>	
<b>Low Cost Rentals</b>	<p>Some exploratory activity by <b>SEs</b>, none by <b>large corporations</b></p> <p><i>Aarusha Homes Private Ltd., Micro Housing Solutions</i></p>	<ul style="list-style-type: none"> <li>▪ <i>Proof of concept required to increase private sector participation</i></li> <li>▪ <i>Government support on pricing regulation, land use and tax incentives to encourage land and building use for affordable housing</i></li> <li>▪ <i>Proximity to livelihoods is essential to ensure operation at capacity</i></li> </ul>
	<p><b>Government</b> dormitories do not meet demand; most met by informal solutions</p>	

### Case Study – Proof of Concept, Willingness to Pay for Strengthening Homes



Development Workshop France developed a program under which coastal communities in Vietnam are encouraged to apply safe construction principles to fortify homes, as they are extremely vulnerable to sea level rise and cyclones. Communities and individual households contribute up to 60% of the cost of strengthening works.

The program has supported over 1,300 low-income households, and provided sufficient proof of concept for the Ford Foundation to enter into agreements with the Social Policy Bank of Vietnam in order to provide guarantees against household home improvement grants.

## Outlook – Proof of Concept by Early Movers Will Catalyse Growth

The global market for low-income housing is estimated at USD 332 billion.<sup>19</sup> In the Asian countries studied, between a fourth and a fifth of the population lives in slums or sub-standard housing units. Population growth and pressure on the urban housing markets creates immense opportunities for the growth of the affordable housing sector. The role for the private sector varies based on regulation, government involvement in the low-income housing market and access to micro-housing finance. In addition, cities with high migrant or floating populations are more conducive to affordable rentals, while cities with large long-term slum populations are likely to demonstrate greater demand for affordable buildings and community-driven slum up-gradation.

- SEs and CBOs will dominate slum up-gradation projects, given the context-specificity of technical assistance required
- Large housing developers are likely to participate in the BOP market as early projects show viability
- Opportunities in home strengthening yet to demonstrate proof of concept
- Patient capital will be key to show proof of concept in the affordable rentals market
- Developing large affordable housing projects with forward contracts could help bring down the cost of materials, and encourage more large corporations to enter the market
- Builders, finance providers and other key stakeholders will need to partner with CBOs, MFIs and others to provide demand-responsive services

Country	Potential	Outlook for Private Sector Engagement
India	High	<ul style="list-style-type: none"> <li>▪ Projected shortage of 80 million housing units by 2050</li> <li>▪ 25 developers offer apartments in the INR 300,000-700,000 (USD 6,520-15,215) range; proven model with high potential for replication across the country<sup>20</sup></li> <li>▪ Increased growth in micro-housing finance providers and products</li> <li>▪ High potential in slum up-gradation in areas with long term slum inhabitants</li> <li>▪ Limited affordable, quality rental housing to serve the growth in migrants</li> <li>▪ Low-cost rentals likely to pick up rapidly once proof of concept is shown</li> </ul>
Indonesia	Low	<ul style="list-style-type: none"> <li>▪ High demand for affordable housing, ~800,000 units per year, as the need to relocate is increasing with continued land subsidence in coastal areas</li> <li>▪ Market ripe for first movers to show viability across micro-housing finance, affordable construction, slum up-gradation and low-cost rentals</li> </ul>
Thailand	Low	<ul style="list-style-type: none"> <li>▪ Successful Government schemes – <i>Baan Mankong</i>, <i>Baan Euaarthorn</i> – providing quality, demand-responsive housing solutions</li> <li>▪ Private sector unlikely to be able to compete with state subsidised credit and construction or up-gradation services, given their ability to legalise existing settlements, minimising the need to relocate</li> <li>▪ Housing security is an issue facing the urban poor, especially migrants; opportunity for private enterprise in low-cost rentals as migration and population growth start to put pressure on small cities<sup>21</sup></li> </ul>

26 19. Ashoka Foundation

20. Monitor, White Paper: Building Houses, Financing Homes, 2010

21. UNDP, Thailand Human Development Report 2009

## Off-grid Renewable Energy

Energy is typically associated with climate change mitigation, where the focus is on controlling carbon emissions. However, climate change impacts common energy sources too. On one hand, flooding and natural catastrophes lead to frequent power grid failures. Changing rainfall patterns, on the other, impact the amount and predictability of rainwater supplies for hydropower plants, leading to massive shortages in water-dependent countries. In addition, population growth and urbanisation is increasingly resulting in a demand for more sustainable energy sources.

The majority of the large urban areas in Asia are fairly well developed in terms of linkages to electricity grids. Yet, energy shortages exist due to inadequate generation, pilferage and mismanagement. These are further exacerbated by the drastic weather events induced by climate change.

Opportunities for the private sector to provide energy access in the case that the grid fails and to bolster intermittent grid supply exist both in the provision of renewable energy household appliances and in small scale power generation.

**Renewable energy appliances** for households such as solar lighting products have proven to be useful in meeting the energy needs of the urban poor both in terms of affordability and reliability. Solar powered lanterns and home systems including multiple lights and mobile charging points have high utility for the urban poor in areas with frequent power cuts and for households that are not connected to grid power. Various small enterprises have been successful in supplying such products to the poor. To increase uptake and reach, these enterprises have also partnered with MFIs and banks to provide products on credit. However, single unit lighting products have been more successful than lighting systems including large attached solar panels. Other appliances such as solar fans and water heaters have seen limited uptake amongst low income households.

**Off-grid renewable energy generation** can also bolster household and community energy access. Access to grid power does not directly translate into improved supply for poor households owing to delivery and management issues. Dedicated off-grid production for these communities has the potential to overcome grid shortcomings and build the resilience of the community. Energy is often the harbinger of industry, services and thus development. While mini-grids have higher potential in rural areas where land availability is not an issue, smaller cities such as Gorakhpur and Chiang Rai too have access to land, and could see uptake of mini-grid generation.

### Case Study – Scale through Customised Lighting Products on Credit



SEWA Bank initiated project Urja in 2006. Under this initiative SEWA partnered with SELCO to provide affordable and reliable solar and biogas-run cooking and lighting devices for vegetable vendors, small service providers and home based workers in urban areas across Gujarat, India. SEWA provided financial support to its members purchasing lighting. By providing solar light, SELCO substantially enhanced its customers' livelihoods by extending their working hours. Further, SELCO also set up independent charging facilities to help female entrepreneurs establish their own franchisees and rent out solar devices.

Product or Service	Current Activity	Challenges
<p><b>Household Solutions:</b> Renewable Energy Appliances</p>	<p>Numerous <b>SEs</b> focus on the energy needs of the BOP primarily in rural markets; however they are gradually moving into urban markets</p> <p><i>Selco, D.Light, Barefoot Power, Intelizon, Grameen Shakti, PT Sudimara Energi Surya</i></p> <hr/> <p><b>Large corporations</b> have begun to launch products in limited geographies</p> <p><i>Schneider, Philips, Tata BP</i></p> <hr/> <p><b>Governments</b> at both national and state-level often develop subsidy schemes and promote distribution of renewable energy products</p> <p><i>Non-conventional Energy Development Agency provides rural household products through MFIs in India</i></p>	<ul style="list-style-type: none"> <li>▪ <i>Access to credit</i> is often required in order to facilitate the ability to pay</li> <li>▪ <i>Demand generation</i> is key to create willingness to pay for products in urban areas where shelters are temporary and ambient lighting is common</li> <li>▪ <i>Need for adaptation</i> to urban markets, as solar products have traditionally been designed to meet the needs of the rural population</li> <li>▪ <i>Donor campaigns</i> often distort the market through free distribution of solar products damaging consumer perceptions and negatively impacting the willingness to pay</li> </ul>
<p><b>Community Solutions:</b> Off-grid Renewable Energy Generation</p>	<p><b>SEs</b> have been successful in developing off-grid solutions mainly in rural markets by producing renewable energy from biomass such as rice husk and bagasse</p> <p><i>Husk Power Systems, Kotak Urja, Saran Renewable Energy</i></p> <hr/> <p><b>Large corporations</b> will remain relevant in terms of large scale energy projects involving renewable sources such as wind and water</p> <p><i>Honeywell, Vestas</i></p> <hr/> <p><b>Governments</b> are essential for large scale projects in terms of land, infrastructure, grid connections and forward contracts</p>	<ul style="list-style-type: none"> <li>▪ <i>Innovation</i> for urban markets in power generation and distribution is needed as activity has largely focused on rural markets due to poor grid connectivity</li> <li>▪ <i>Regulation</i> constraining the integration of off-grid solutions with the grid is a deterrent to private sector entry in some countries</li> <li>▪ <i>Populist pricing</i> impedes the viability of energy production in many developing nations, as power is highly politicised, impeding the viability of energy production</li> </ul>

## Outlook – Product and Process Innovations in Off-grid Appliances

While large-scale power generation and supply to the grid will remain a state provided or controlled utility in most countries, private sector engagement in affordable alternate energy home solutions will increase dramatically. Solar lanterns and home lighting systems with charging points are expected to take off, especially in areas where consumers have access to finance. Both SMEs and large corporations are set to innovate and develop new products and applications for the urban BOP market, and their number and reach is likely to grow in the near term.

- CDM funding and carbon credits are likely to further attract private sector interest
- Partnerships with SEs and CBOs will be critical to catalysing the growth of off-grid renewable energy appliances
- Access to finance to improve the urban poor's ability and willingness to pay for products
- Facilitative government policy to encourage off-grid renewable energy production will be important to private sector participation

Country	Potential	Outlook for Private Sector Engagement
<b>India</b>	High	<ul style="list-style-type: none"> <li>▪ 45% of all households have no access to electricity – power shortages are estimated at 15% of peak capacity requirements, and are likely to increase</li> <li>▪ Projected to become the most rapidly emerging solar energy market in the world – theoretical solar potential is 5,000 Trillion kWh of solar power p.a.</li> <li>▪ Market for solar lanterns projected to grow at a CAGR of about 40% between 2009 and 2012 across urban areas</li> <li>▪ High potential for both SEs and large corporations in small scale off-grid energy production, using biomass, waste to energy and wind as inputs, especially in peri-urban and rural areas</li> </ul>
<b>Indonesia</b>	Medim	<ul style="list-style-type: none"> <li>▪ 35% of all households do not have access to the grid, although connectivity in urban areas on the island of Java is fairly widespread</li> <li>▪ High potential for household solar energy products in urban and rural areas to supplement grid power during blackouts or in lieu of grid power</li> <li>▪ Potential to leverage geothermal energy for large scale grid production and for mini -hydro power projects in peri-urban and rural areas, surplus of which could supply urban areas too</li> </ul>
<b>Thailand</b>	Low	<ul style="list-style-type: none"> <li>▪ Grid connectivity in both rural and urban areas including in slums is very high</li> <li>▪ Solar energy market estimated to be growing at about 10% p.a., lower applicability in urban areas where municipal provided energy access is high</li> <li>▪ Potential for biomass and biogas based small scale off-grid energy production in agricultural areas – surrounding cities could benefit from surplus production</li> <li>▪ Policy incentivises prudent use, offering subsidies to households consuming less than the prescribed monthly limit</li> </ul>

## Microfinance

The history of microfinance has shown that at a minimum access to credit helps smoothen household cash flows. Credit and other financial services such as savings, investments and remittances help to overcome income shocks and health issues resulting from climate change and support building or acquiring assets and thus improving livelihoods. MFIs serve those who would otherwise be unbanked and thus highly vulnerable, such as informal sector workers and micro entrepreneurs. In addition to financial services, the joint liability model used by many MFIs helps to strengthen social networks, also contributing to resilience building.

Across countries, regulation of the microfinance sector defines the scope of private sector participation, products that can be offered, scale and other limitations.

**Credit** for income generation is the extension of small loans for use towards a business to those who lack collateral and a verifiable credit history and therefore cannot access traditional debt. This is the most standard product offered by MFIs, NGOs and CBOs that promote access to finance and could be an input towards resilience building, depending on the household's specific vulnerabilities.

Credit for access to products and services including the purchase of resilience building products or services such as education, home up-gradation or purchase, healthcare, skill development and small assets such as household water purifiers, solar lanterns and mobile phones could also build resilience.

**Savings** options for the urban poor are unsecure and are rarely able to generate returns. In India, for example, as much as 65% of the population do not have a bank account. The demand for savings products is thus very high and far outstrips demand for credit; however the ability of MFIs to accept client savings depends on the regulatory environment of the country they operate in.

**Micro-investments** can also be used as proxy savings. Offering participation in mutual funds, pension schemes or loans for purchase of gold coins are examples of products that MFIs could offer. Having a pool of savings or investments to dip into in times of disaster can go a long way in building resilience.

**Remittances** play a key role in helping migrant workers and students channel money to and receive funds from their families in rural areas. The urban poor otherwise resort to more expensive, less reliable means and efficient, secure remittance services can significantly improve liquidity in times of crisis.

Finally, MFIs can also act as a channel for numerous corporations looking for ways to deliver products to and source from the population beyond the reach of traditional supply chains. MFIs can provide this **last-mile link**, and although marketing, transport, delivery and partnership management are essential components for such collaborations; many corporations are investing in developing this channel.

### Case Study – Bank Rakyat Indonesia, one of the Most Profitable MFIs



Bank Rakyat Indonesia (BRI) is considered one of the best and most profitable microfinance institutions in the world. It began operations in 1968 by providing rural banking services and promoting the development of the agricultural sectors. The bank has one of the largest networks in the country including over 4,000 retail outlets, known as BRI village units that each acting as a semiautonomous entities and individual profit centers serving micro and small customers. Besides offering a loan product, Kupedes, the savings product, Simpedes, is one of the banks key successes leading to a deposit-to-loan ratio of over 225%. However unlike most MFIs all disbursed loans require collateral reducing its relative risk profile.



Product or Service	Current Activity	Challenges
<b>Access to Credit</b>	<p><b>SEs</b> as MFIs, cooperatives, NGOs and other forms have been actively innovating to offer micro-credit products to the poor; some have seen significant scale</p> <p><i>SKS, Spandana, Share, BASIX, Bank Rakyat, CODI, Financiera Independencia</i></p>	<ul style="list-style-type: none"> <li>▪ <i>Access to credit</i> is often required in order to facilitate the ability to pay</li> <li>▪ <i>Market perception</i> around high interest rates charged by MFIs to the poor poses political risks and could threaten the growth of MFIs</li> </ul>
	<p>Demonstrated proof of concept and scale has also attracted <b>large corporations</b> to enter mature markets such as India</p> <p><i>L&amp;T Finance, Bajaj-Allianz, Uninor</i></p>	<ul style="list-style-type: none"> <li>▪ <i>Populist policies</i> such as loan waiver programs that distort the market and ruin credit discipline</li> </ul>
	<p><b>Governments</b> drive the financial inclusion mandate in most countries, dictating regulation and thus scope for private participation</p>	<ul style="list-style-type: none"> <li>▪ <i>Restrictive regulation</i> limiting sources of funds, requiring high capital adequacy requirements or limiting geographic expansion constrain MFIs' growth and efficiency</li> </ul>
<b>Access to Other Financial Products:</b> Savings, Investments and Remittances	<p><b>SEs</b> offering remittances, gold loans and other investment or proxy-savings products have seen high uptake, as have MFIs with deposit-taking licenses</p> <p><i>SEWA Bank, Bank Rakyat Indonesia, Equitas</i></p>	<ul style="list-style-type: none"> <li>▪ <i>Regulations</i> could constrain the ability of MFIs to accept savings or offer investment products to the urban poor</li> </ul>
	<p><b>Large corporations</b> are increasingly partnering with MFIs to provide other financial services</p> <p><i>Western Union, World Gold Council</i></p>	<ul style="list-style-type: none"> <li>▪ <i>Deposit risk</i> associated with unregulated institutions collecting money from the poor is clear and requires higher institutional standards in transparency, governance and treasury management</li> </ul>
	<p><b>Governments</b> often create savings schemes and bank linkage programs</p>	
<b>Access to Other Products and Services</b>	<p><b>Large corporations</b> are increasingly partnering with MFIs to procure produce from the BOP, identify value chain actors such as micro-franchisees and sell products, where MFIs provide both access to the BOP and credit</p> <p>Product sales have been limited to high utility products that indirectly benefit livelihoods, such as insurance, water filters, solar lanterns and mobile phones</p> <p><i>MFIs such as SKS, BASIX and Spandana have partnered with companies such as HUL, SELCO, Airtel, ITC, PepsiCo</i></p>	<ul style="list-style-type: none"> <li>▪ <i>Regulations</i> governing the MFI legal entities could disqualify MFIs from acting as retailers or traders of goods and services</li> <li>▪ <i>Over-indebtedness</i> of clients is a key risk MFIs need to be mindful of, before sanctioning credit for consumption that carries higher risk than that for income generating activities</li> <li>▪ <i>Reputational risk</i> for MFIs, as clients associate purchased products with them, and any malfunction could negatively impact the MFI's portfolio</li> <li>▪ <i>Operational risks</i> posed by such partnerships could include misaligned incentives for MFI loan officers, leading them to devote less time to their core portfolios</li> </ul>

## Outlook – Credit to Lead Other Financial Services

Across Asian cities, the scale of microfinance and the kinds of products and services that MFIs can offer is limited by regulation and the state of existing government credit schemes. Across the board, demand for financial services amongst the urban poor is high.

- Both rural and urban microfinance markets are expected to grow in the coming years, especially in hugely underserved markets such as Indonesia and India
- Partnerships between MFIs and insurance, consumer goods, telecom companies and others who could drive innovation in products, services or models for the BOP will continue to grow
- Investment in financial products tailored to build resilience against climate linked vulnerabilities, such as instalment deferral or forgiveness is likely to become increasingly relevant

Country	Potential	Outlook for Private Sector Engagement
<b>India</b>	High	<ul style="list-style-type: none"> <li>▪ MFIs serve less than 10% of estimated demand; high potential for growth</li> <li>▪ Urban MFIs have shown that repayment rates are as good as in rural areas, and the high population density creates a strong opportunity</li> <li>▪ High potential for proxy savings products such as micro-investment plans and gold loans, as regulation prohibits acceptance of client deposits</li> <li>▪ High potential for remittances and credit products tailored to the needs of the urban poor, such as for home up-gradation and education or VET</li> </ul>
<b>Indonesia</b>	Medium	<ul style="list-style-type: none"> <li>▪ Limited opportunity for private enterprise in providing access to finance as regulation limits scale, and entry barriers are high</li> <li>▪ One of the largest microfinance markets in the world; scope for innovation and growth in products such as remittances, housing finance and insurance</li> <li>▪ Urban microfinance will continue to grow through multiple regional banks and cooperatives</li> <li>▪ Disaggregated nature of the market increases the number and kind of partners an insurance company or corporation looking to use MFIs as a delivery or procurement channel will have to partner with to achieve scale</li> </ul>
<b>Thailand</b>	Low	<ul style="list-style-type: none"> <li>▪ Subsidised government credit programs have strong last mile reach; micro-credit interest rates are lower than commercial bank rates making it unviable for private enterprise to compete</li> <li>▪ The Microfinance Plan (2009-2013) is set to relax some financial regulations to attract banks and new players into the industry to link the formal banking system to existing last mile financial service providers – village banks and savings groups</li> <li>▪ Plans to transform post offices into Microfinance Centres to serve as distribution channel for rural communities</li> <li>▪ Opportunity for enterprises in partnering with the Community Organizations Development Institute, savings groups and village banks to provide micro-insurance, remittances and micro-investment products</li> </ul>

## Information and Communication Technology

The power of information in building urban resilience is immense, as it can inform the action of the government, media, private sector, consumers, producers and donors spurring them on to develop appropriate early warning systems and insurance products or select the right crops. Information is essential to assess and understand the direct impacts of climate change and the indirect vulnerabilities that result and to then react and adapt. Accurate weather data, region-specific forecasts, disease mapping, market information on jobs and produce pricing are examples of vital information for building the resilience of the urban poor.

Opportunities exist for the private sector in this space, as the applicability of information goes beyond a single sector or market segment. The ability to cross-sell information and bundle it with other services make it a lucrative proposition. Aside from weather information where the link with climate change resilience building is direct, enterprises in the ICT business also build resilience indirectly, without the intent to do so. ICT applications can provide direct and indirect livelihood support.

**Direct livelihood support** through weather and market information is crucial for those whose livelihoods are dependent on minor variations in the climate, such as fishermen and farmers. The provision of SMS-based weather and crop information that mobile phone users can subscribe to is a clear opportunity. Clubbing information with other livelihood related services that enhance market linkages increases the service's utility and uptake. Provision of real time commodity price information could support farmer livelihoods immensely. The peri-urban and rural poor could be charged for such value added services by the telecom provider who would indirectly pay the technology and information provider. Market linkage also includes linking job seekers with employers, a service that has huge resilience building effects.

### Case Study – Positive Externalities, Indirectly Serving the Urban Poor



Skymet is India's first weather forecasting company supplying accurate weather information to farmers through telecom-television and to energy companies to facilitate power trading. Skymet also sends weather information to city utilities enabling them to make better purchase decisions, shipping companies, media companies – print and television channels – and insurance companies.

In partnership with Nokia, Skymet provides SMS-based weather forecasts through Nokia Life-Tools to 110,000 farmers, helping them to make better decisions on irrigation and storage. In both India and Indonesia, Nokia Life-Tools provides hyper-localized information on agriculture, education, and entertainment over SMS.

**Indirect resilience building**, in the case that the product or service is a positive externality of some other business is also an important avenue for private sector engagement. In such cases, the poor are not the target market for the product and often do not pay for the benefit. Indirect resilience building opportunities include data provision for media coverage of weather forecasts, weather-based micro-insurance products, public early warning systems that utilise weather data and web-based disease mapping systems.

Product or Service	Current Activity	Challenges
Direct Livelihood Support	<p><b>SEs</b> have setup kiosks in under-served areas; primarily rural. Few serve those engaged in fisheries or other urban informal sector livelihoods such as street vendors</p> <p><i>Drishtee, Atyati, Comat, Kissan Kerala</i></p>	<ul style="list-style-type: none"> <li>▪ <i>Cost of data collection</i> can be a challenge given required depth to provide targeted information in under-served areas</li> <li>▪ <i>Ensuring data quality</i> is a challenge, and requires engagement with reliable content providers on local information to get higher quality data than existing offerings</li> <li>▪ <i>Developing viable models</i> for the BOP market is often a challenge for large corporations</li> </ul>
	<p><b>Large corporations</b> collaborate with other information providers to offer SMS-based weather, crop and market information services</p> <p><i>Reuters Market Light, Kenya Agriculture Commodities Exchange, RCom, Tata Docomo, Nokia Life-Tools, ITC e-choupal</i></p>	
Indirect Resilience Building	<p><b>Large corporations</b> provide local content on weather, crops and market to large scale service providers such as telecom, media channels, government agencies and insurance providers</p> <p><i>Skymet, Weather Risk, Nokia</i></p>	<ul style="list-style-type: none"> <li>▪ <i>Customising data</i> to suit needs of various types of service providers</li> <li>▪ <i>High cost</i> of equipment and operations as initial infrastructure required is high, while the ability to monetise data is not always clear up front</li> </ul>
	<p><b>Government</b> entities collect data on health indicators, weather and markets that can be leveraged</p> <p><i>GPHIN</i></p>	

### Case Study – Technology Enabled Early Disease Detection



Global Public Health Intelligence Network (GPHIN) was developed by the Canadian Government’s Health agency to electronically monitor infectious disease outbreaks. It famously detected SARS in time for the world to respond. It is an “early warning” system which scans 20,000 sources of information in eight languages from around the world from news wires and local newspapers on the web. It tracks topics such as disease outbreaks, infectious diseases, contaminated food and water and natural disasters. Used by the global public health community it is today an important model for early detection of disease outbreaks. The role of private enterprise in replicating and monetising such models could be explored, possibly in collaboration with governments.

## Outlook – High Potential for BOP ICT Applications Across Countries

ICT holds immense promise for lowering the cost of reaching the urban poor, and providing them with resilience building information directly and indirectly. Across Asian countries, the rise in mobile and internet connectivity is rapidly opening up this market.

- Large corporations, governments and academic centres alike will continue to invest in ICT applications for the BOP, and the number of enterprises serving this market are set to grow
- Current technologies are likely to find new applications in the area of urban resilience building, especially in market linkage, delivery of financial services and weather information
- Growth in information provision will encourage a rise in the number of SMEs providing content, leading to a growth in local, direct to consumer services, using kiosks and SMS based technology
- Investment in developing models by which information can be packaged for multiple purposes in order that BOP access can be cross-subsidised, is likely to catalyse the growth of the sector
- Coordination across key stakeholders for each sector will continue to be the key to accuracy and viability of information based enterprises

Country	Potential	Outlook for Private Sector Engagement
India	High	<ul style="list-style-type: none"> <li>▪ Mobile penetration is as high as 65% – 650 million users,<sup>22</sup> with strong growth amongst the lower income group</li> <li>▪ Potential to extend the activity by enterprises in weather and agri-based information to the fisheries sector and to insurance companies</li> </ul>
Indonesia	High	<ul style="list-style-type: none"> <li>▪ Mobile penetration is high at 80% – 180 million users<sup>23</sup></li> <li>▪ Potential for weather and health related data and analysis on the impact on agriculture, health and fisheries provided directly through SMS and other media, and indirectly to insurance companies and early warning systems</li> </ul>
Thailand	High	<ul style="list-style-type: none"> <li>▪ 47.2% of the population has a mobile phone</li> <li>▪ Potential for both SMS based weather and crop related information as well as for kiosk networks that provide those in rural areas dependent on the urban economy with market information, best practices and industry news</li> </ul>

22. TRAI – Telecom regulatory authority of India

23. Bisnis Indonesia. July, 2010

## Livelihood Promotion

In Asian cities the most vulnerable population tend to be those whose livelihoods are highly dependent on the weather, such as fishermen and agri-linked workers, and those in the informal sector. Common informal sector jobs include street vending, rag picking, construction and other daily wage jobs. Those engaged in these sectors are often migrant workers from rural areas. Incomes in these sectors are variable and household cash flows are thus precarious, further exacerbated by excessive rain, flooding and other changes in the environment. This population is ill-equipped to respond to changes in the environment and has limited flexibility to meet the needs of a changing job market.

Enterprises that enhance the employability of this group, help organise worker groups, support their upward movement in the value chain, improve incomes and build cash flow predictability are highly relevant to building urban resilience.

**Vocational education and training** can play a strong role in improving employability and helping those in the informal sector command higher pay. Opportunities to serve this market need and to provide specialised trainings to help integrate the urban poor into the economy at fair wages exist. Industries suited to absorb trained individuals include construction, heavy-machinery operation, retail, hospitality and nursing, as these employers are often willing to pay a premium for trained workers.

**Job market information provision** can reverse the information asymmetry that often causes the exploitation of the urban poor. Inadequate information on skill requirements and their worth drastically impact the income workers, most often leading to lower wages and under-utilisation. Employment exchanges that connect job seekers with appropriate opportunities are clear solutions; potential for enterprise participation in both online platforms and physical employment exchanges. While the latter has yet to show viability in the BOP context, a few innovative approaches to online enterprises, including some using crowdsourcing<sup>00</sup> to give people micro work, have been launched.

**Enterprise creation and promotion** for informal sector workers could help them benefit from collectivisation and enjoy the economies of scale that arise from being able to aggregate produce. While the impetus to collectivise and to form cooperatives sometimes comes from within the group, often, an external catalyst is required. There are also opportunities for private enterprises to patronise community-based enterprises as a part of their sourcing or of micro-franchisors as part of their distribution strategy.

### Unable to Keep Pace with Orders for Trained Labour



Pipal Tree Ventures Pvt. Ltd. aims to provide livelihoods to poor unemployed youth in India through training for the skills required by the construction industry. The company has been very successful in collaborating with various construction companies, and ensures a guaranteed a job at the end of a one month-long training which pays at least INR 5,000 per month.

Students pay 15% of the total training fees upfront. The company then deducts the remaining fees through payroll deductions over the course of a year and a half. Pipal Tree Ventures tracks each student to evaluate their progress and tweak future training sessions. The response from the industry has been overwhelming, and the company is now having trouble keeping pace sourcing and training labour to meet demand.

Product or Service	Current Activity	Challenges
<b>Vocational Education and Training</b>	High <b>SEs</b> activity, though most are small scale. Some MFIs have designed special VET loans <i>Pipal Tree Ventures, TeamLease, LabourNet</i>	<ul style="list-style-type: none"> <li>▪ <i>Low willingness to pay for classes without a job guarantee</i></li> <li>▪ <i>Establishing credibility with reputed employers and obtaining contracts in order to guarantee placements</i></li> <li>▪ <i>Sourcing of reliable trainees who are keen to work and maintain the institute's reputation in the market</i></li> <li>▪ <i>Access to credit for students who do not have a track record of earning and saving</i></li> </ul>
	<b>Large corporations</b> focus on computer based courses more relevant to those at the middle and top of the income pyramid. Few target the BOP as part of CSR <i>Dr. Reddy's Foundation, Educomp</i>	
	<b>Government</b> programs have been successful in training and placing youth in jobs with the private sector, typically through PPPs <i>Employment Generation and Marketing Mission</i>	
<b>Job Market Information Provision</b>	<b>SEs</b> have set up migrant worker information portals and web-based employment exchanges <i>Babajob.com, Samasource, LabourVoices</i>	<ul style="list-style-type: none"> <li>▪ <i>Lack of reliable internet connectivity among the BOP</i></li> <li>▪ <i>Establishing the credibility of both employers and job seekers is important to attract talent; could be a hurdle for start-ups</i></li> <li>▪ <i>Sourcing or enrolling reliable job seekers, verifying the credentials of each candidate raises costs</i></li> </ul>
	No <b>large corporations</b> have ventured into this sector so far	
	<b>Governments</b> provide physical employment exchanges, but often have low placement rates, due to inadequate industry linkages	
<b>Enterprise Creation and Promotion</b>	<b>SEs</b> provide increased employment opportunities in services such as digitizing or transcribing data <i>Source Pilani, Mirakle Couriers, Jaipur Rugs, Industree, FabIndia, Amul</i>	<ul style="list-style-type: none"> <li>▪ <i>Collectivising informal workers requires support from local CBOs</i></li> <li>▪ <i>Management quality of community owned companies</i></li> <li>▪ <i>Limited scale as the models rely primarily on local sourcing to provide local solutions</i></li> </ul>
	Few <b>large corporations</b> have ventured into this sector, especially in urban areas <i>Nestle, Dupont Solae, SC Johnson</i>	
	<b>Government</b> livelihood promotion schemes exist but are often targeted at rural livelihoods, rather than at the urban poor	

## Outlook – Partnerships and Innovation to Tackle Local Labour Market Issues

Population growth in urban centres will result in increased pressure on the job markets. Skilling the urban poor and creating jobs will thus increase in relevance across countries. Countries in which subsidised vocational skill programs are not available, and those in which MFIs are willing to finance students will see higher VET activity than others. Across the board opportunities to create and promote community based enterprises exist, as does the potential to engage large corporations in patronising such models.

- SEs are likely to dominate livelihood promotion in the near term, as needs are localised; many enterprises providing similar services could mushroom in diverse geographies
- Large corporations are likely to focus on VET for highly replicable offerings such as in retail, hospitality or language training, and on sustainable sourcing and supply chains
- Large corporations will require support from NGOs and CBOs and patient capital to innovate and invest in engaging the urban BOP in sourcing and distributing their products and services

Country	Potential	Outlook for Private Sector Engagement
India	High	<ul style="list-style-type: none"> <li>▪ 12.8 million new workers to be absorbed into the workforce each year<sup>24</sup></li> <li>▪ Increased growth in SEs focused on livelihood promotion, bolstered by growth in access to and knowledge of the internet</li> <li>▪ Enterprise creation by SEs and large corporations likely to pick up rapidly once proof of concept is shown by early movers</li> </ul>
Indonesia	High	<ul style="list-style-type: none"> <li>▪ Urban unemployment is twice as high as rural unemployment<sup>25</sup></li> <li>▪ Strong sense of community, easier to collectivise workers</li> <li>▪ Early activity by SEs across sectors</li> <li>▪ Market ripe for first movers to show viability for corporate engagement with community based or owned enterprises</li> </ul>
Thailand	High	<ul style="list-style-type: none"> <li>▪ 0.6-1.3 million urban poor; majority are migrants in the informal sector<sup>26</sup></li> <li>▪ Reduction in the high proportion (57.3%) of people employed in the informal sector identified as the key to building economic security in Thailand<sup>27</sup></li> <li>▪ One tambon, one product scheme by the Government encourages collectivisation and regional specialization, with facilitative policy and funding</li> <li>▪ Successful Government funded schemes, such as those run by the Mah Fah Luang Foundation, provide training, access to markets and enterprise management support to CBOs</li> <li>▪ Opportunity to create and promote community based enterprises in rural areas around cities such as Chiang Rai building on the ground work done by Government institutions such as the Population and Community Development Association</li> </ul>





# Enablers for Private Sector Engagement in UCCRB



## Enablers for Private Sector Engagement in UCCRB

The terms “adaptation” and “resilience building” in the context of climate change are unlikely to become common parlance amongst businessmen and investors in the near future as businesses do not start with the sole intent of building resilience. Thus, clear opportunities to engage the private sector in building resilience to climate change will remain elusive going forward. Yet, private sector activity in the field has the potential to grow as immense opportunities exist across sectors to directly address climate-linked vulnerabilities and indirectly build resilience by creating a more robust ecosystem for the urban poor.

Across the key sectors identified for UCCRB, private capital already funds bankable businesses that target less vulnerable markets. The challenge then is to increase the focus of the private sector in these industries on more vulnerable geographies and populations. The lack of understanding of these markets, combined with tough operating environments, high risk and limited proof of concept, make the private sector extremely reticent. Enablers to the growth of private sector engagement in UCCRB lie in constructive action across government, demand, supply and finance, and are as follows:

### Governmental Enablers

#### A Champion

Climate change impacts cut across sectors such as health, agriculture, water and waste management, and so lack a single owner. Coordination of efforts and collation of information between agencies in the public and private sectors is a challenge, and thus inferences and insights on climate change impacts and adaptation needs often fall through the cracks. An objective champion, preferably from the public sector or civil society, could raise awareness and engage with all necessary parties to ensure coordination.

#### Facilitative Policy

Government commitment to encourage private sector participation in building urban resilience can significantly impact the business environment, and positively influence private sector engagement in the space. Tax breaks for serving the urban poor, subsidised access to utilities, reduced red tape in acquiring permits for land use and setting up operations can go a long way in encouraging private sector market entry.

#### Integration with Socio-economic and Urban Development

The inclusion of climate change adaptation and resilience building needs in city master plans and the overall urban development agenda could avoid duplication of efforts, maximise sector-specific impact and help harness existing funding opportunities, knowledge and other resources with better effect.

## Demand-side Enablers

### Financial Products to Enhance the Capacity to Pay

Access to credit and savings through MFIs, cooperatives and banks could catalyse demand for resilience building products and services such as water purifiers, home up-gradation, weather-proofing and healthcare.

### Demand Generation

To convert latent demand to explicit demand, awareness building of the associated benefits and opportunity costs through demand generators such as CBOs, NGOs, cooperatives or MFIs are important to create the willingness to pay.

### Community Buy-in

The demonstration effect can greatly increase uptake in the case that a resilience building product or service requires a change in consumption or spending patterns, attitude, or behaviour; the role of early adopters is important.

## Financial Enablers<sup>28</sup>

### Patient Capital

Funding by way of guarantee funds, concessional debt, angel investments and venture capital with longer term exit horizons could jump start early stage enterprises in sunrise sectors by allowing them the flexibility to innovate and develop the model in order to show proof of concept and establish viability. There is a strong need for patient capital for UCCRB businesses as:

- **There is a major funding gap:** Although bilateral and multilateral funding pledges are on the rise, the gap between funding and estimates of annual adaptation costs from UNFCCC, World Bank, Oxfam International, and UNDP, all around USD 100 billion, remains vast<sup>29</sup>
- **Existing funds do not serve the purpose:** Most funds setup by governments and multilaterals have a dual adaptation and mitigation mandate and offer a mix of grant funding, concessional loans and other risk mitigation instruments for large infrastructure. The few private sector funds that are mandated to provide equity funding focus on renewable energy enterprises

### Technical Assistance Facility

The dearth of investible resilience building businesses for the few funds earmarked for equity investments in the field and the fact that even large corporations with access to capital have seen limited success in pursuing inclusive business suggests that enterprise capacity building and business model development could require grant funding.

## Supply-side Enablers

### The Climate Angle

Building resilience to climate change could be a strategic angle to take when approaching business opportunities, as it can open doors to engage with other stakeholders and generate the interest required to develop an opportunity. However, not all relevant actors in the private and public sectors relate with the concept of UCCRB, in which case it could be avoided. Messaging should be modulated as needed in order to encourage key actors to respond to market needs.

### Market Makers

Given that UCCRB businesses operate primarily in under-developed markets, work with highly vulnerable populations and have few precedents, an external catalyst can support market development and engage key stakeholders to demonstrate proof of concept. For example, the microfinance industry that has now shown significant scale and viability was nurtured for years with technical assistance and social capital from donors and patient investors.

### Shift from TOP to BOP

In order to provide relevant UCCRB offerings, large corporations will need to shift product research and innovation efforts down market, as these are largely focused on the top of the pyramid (TOP) markets. Products such as disaster resistant housing materials and design techniques and water recycling technologies could build urban resilience if adapted for the BOP markets.

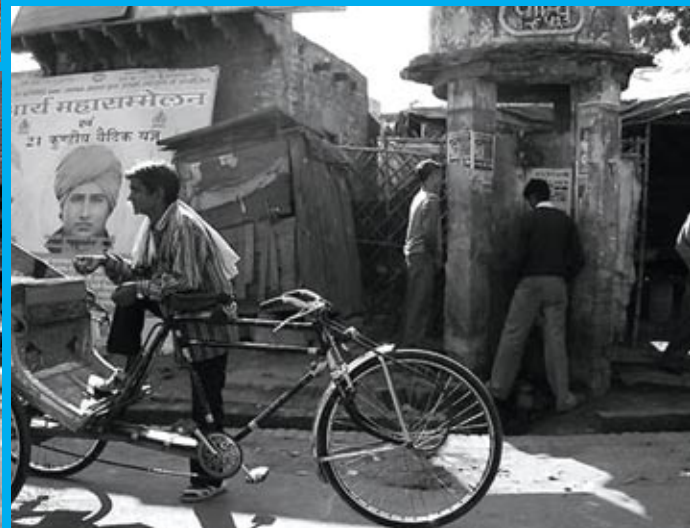
### Business Model Innovation

Resilience building businesses often need to be structured such that disaster response can be cross-subsidised by the primary business. In other cases multiple revenue streams, tiered pricing structures, cross-selling, process and / or product innovations will be required to serve the needs of the urban poor while remaining profitable.

### Partnerships

Forging partnerships with market aggregators, micro-franchisors and technology platforms are examples of measures to reduce the cost of last-mile delivery and ensure accessibility and convenience to consumers in times of need. Aggregators such as CBOs, NGOs, cooperatives and MFIs are also a way to ensure the critical mass required to make an opportunity viable and attractive to large private sector actors.

# Opportunities in Select ACCCRN Cities



## Surat, India

Surat is the ninth largest city in India and is a major commercial centre in Southern Gujarat. Located close to the Gulf of Khambhat on the Arabian Sea with an elevation of approximately 10 m above sea level, the high tide often reaches the western edge of the city. Surat is also situated on the banks of the Tapti River, which flows into the Arabian Sea 16 km outside the city. As a result, the city faces the risks of both sea level rise and flooding from the river. The river is mainly regulated by the Ukai Dam, 94 km inland.

Surat has a tropical monsoon climate, with summer temperatures ranging from 37-44°C and winter temperatures dropping to 22°C. Average annual rainfall is 1143 mm.

The city has experienced high population growth rates over the past decades mainly driven by the influx of migrants, seeking higher paying jobs in the city. Surat has grown about 40 times by area since 1961, when it was spread over just 8.12 sq km.

Surat is an economic centre; the diamond capital of the world and the textile capital of India. Over 42% of the world's rough diamond is cut and polished in Surat, and more than 40% of the country's man made fabric is produced here. The labour intensive nature of these industries provides ample employment opportunities for migrants, attracting people from across Gujarat and other states. Other relevant sectors are the petroleum and heavy machinery industry. Despite the large number of people working in the informal sector, the Municipality is one of the few in the country able to claim zero unemployment.

The city administration has taken extensive measures to improve governance through greater transparency and accountability. The Surat Municipal Corporation (SMC) is planning to mainstream informal trade by providing services and necessary public amenities and infrastructure including toilets, vending platforms, power and water supply. It is also taking measures to ensure that reliable water supply is available, at a significant cost – INR 1,530 lakhs (USD 3.3 million).

### Demography

**Population:** 4.5 million

**Area:** 326 km<sup>2</sup>

**Population growth:** 5.82% annually

**Population density:** Approx. 16,460 people per km<sup>2</sup>

**Literacy rate:** 83%

**Poverty ratio:** 17.5%

**Economic Sectors:** Diamonds, textiles, petrochemicals

### Critical Urban Issues

<b>Population Growth</b>	About 40% of the population are migrants from semi-arid and arid regions of Gujarat, Maharashtra, Orissa and parts of Uttar Pradesh and Bihar 22% of the total labour force is unskilled and accounts for more than half of all slum dwellers; 37% of city inhabitants live in slums or slum-like conditions
<b>Inadequate City Infrastructure</b>	Population growth is putting excessive pressure on the city's existing infrastructure; waste management, drainage and health facilities in particular River management is critical in limiting floods and reducing associated vulnerabilities for the urban poor

River management is a major issue for Surat. Large areas that were previously agricultural fields and thus open, have been brought under the city limits and been developed into residential and commercial areas. In addition, construction in flood plains, embankments, reclamation of land around the Hazira industrial area,

silting of the riverbed due to tides and construction of dams and new bridges have reduced the carrying capacity of the river, calling for better river management to regulate the overflow.

The Ukai dam coordinates the release of excess water, and has been mismanaged from time to time. While near real time weather and hydrological information based management of the Ukai dam can overcome minor Tapti floods, the competing objectives of the dam – irrigation, drinking water, power and flood control - make the late monsoon floods inevitable. With population increase in the Ukai command area, water demands are only expected to grow, further complicating flood management.

## Climate Change Impact

It is estimated that Surat will face a **temperature rise** of 2.5-5°C over the next 90 years. Precipitation projections indicate a further **increase in rainfall** in Gujarat of 250-500 mm especially over the Tapti basin. There are also estimates of increased frequency of heavy rainfall events separated by **longer dry spells**, potentially increasing flood frequency and peak discharges into the Ukai dam. The relationship between discharges and inundation is expected to be amplified significantly by the loss of flood plain area as well as sea level rise. Other major climate threats include coastal storms, cyclones and associated inundation.

## Vulnerability Analysis

The vulnerability assessment studies carried out by ACCCRN partners and observations made over the course of this study suggest that the combination of climate change, urbanisation and socio-economic issues have led to the following vulnerabilities for the urban poor:

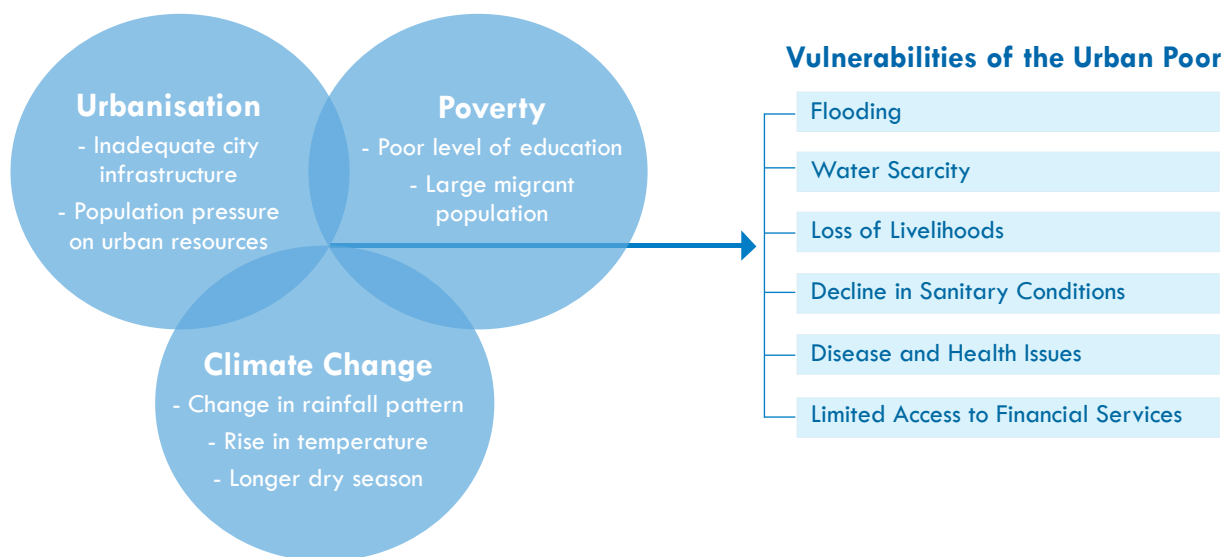


Figure 6: Vulnerabilities of the Urban Poor in Surat

**Flooding:** Surat experiences a major flood almost every 5 years. In addition to the Tapti, two streams passing through the southern part of the city also flood. These streams overflow only during heavy rains and cause major damage to settlements located on their banks. The 2006 floods are reported to have caused property damage worth INR 21,000 crores (USD 4.7 billion) following which the SMC developed a City Disaster Management Plan to better cope with floods and tidal surges.



Those living in slums along the river banks are also highly exposed to flooding; approximately 5,000 households are located along the tidal creek. Most of these are single or two storied houses. Thus, the most common adaptation measure is to construct an additional story or elevated shelves.

**Water Scarcity:** Longer dry periods will pose a major risk for the city's water supply. 90% of the gross daily water supply is currently sourced from the Tapti River and purified. 95% of the population has access to approximately 120 litres per capita per day. 70% of all houses in the slums are served through a piped water supply network while the rest of the city is served through stand posts or tankers.

An increase in energy and water needs due to population growth will result in shortages and call for the development of alternate sources. Owing to an increase in algae and weed growth in the river, water quality is expected to decline during peak summers. These factors indicate that water for household consumption, the Hazira industrial area and irrigation further upstream will face shortages in the future.

**Loss of Livelihoods:** Most migrant workers support the diamond or textile industries or other informal sectors such as construction and vegetable vending. Although average incomes and labour costs are higher in Surat than in the rest of India, stability remains a major issue amongst informal workers. This population is most vulnerable during droughts and floods as their incomes are largely based on daily work. Unskilled workers are also vulnerable to changes in labour requirements or in the business environment.

**Decline in Sanitary Conditions:** The growth rate of slums has historically been higher than that of the entire city population resulting in a decline in sanitary conditions in the city. Although new housing projects are being developed by the SMC in the city outskirts, the issue of migrant workers living in unsanitary temporary shelters remains.

As the population of Surat grows contamination of water will too, requiring stronger sewage and waste management facilities. Although Surat is considered to be a model city in terms of sewage treatment, having a treatment plant for each zone, only a small proportion of households have sewerage connections. The SMC prepares for the monsoon by clearing sewage lines and surface drains in all slums which are also cleaned on a weekly basis. This minimises the risk of disease outbreaks during floods.

The city generates over 2,000 tons of solid waste daily which is collected by the SMC through private contractors and by rag pickers.<sup>30</sup> While door-to-door collection is limited to middle and high income households, neighbourhood waste bins are commonly used in slums. Although the system is more efficient than in many Indian cities, and the engagement of private contractors is fairly high, the city still lacks effective technology for scientific disposal of solid waste.

**Disease and Health Issues:** Flooding and open sewage pose immense risks for the urban poor as water becomes contaminated and provides an optimal breeding ground for mosquitoes and other bacteria. However, the greatest challenge to healthcare is the large influx of migrant workers. These workers are inadequately prepared to deal with illness and often lack education and the capacity to pay for treatment.

Surat has the highest HIV/AIDS rate in Gujarat, mostly due to the high migratory population. The textile sector is highly affected by malaria, as migrant workers from Orissa and the South sometimes carry malaria to the city. The SMC is currently the only administration in India with its own malaria unit that works to detect mosquito-borne disease outbreaks during the monsoon and times of flood. 274 surveillance centres have been set up, of which 90% are located in slums enabling the city to locate epidemics early on.

**Limited Access to Financial Services:** The demand for micro-credit in urban areas of Surat district is estimated to be INR 644.04 crore (USD 145 million) for those households with a family income of under INR

150,000 per annum (USD 3,375).<sup>31</sup> Yet, only a few non-profits such as the Rickshaw Bank and the Vikas Centre for Development currently provide micro-credit in the city, meeting a mere fraction of this demand. Leading MFIs have refrained from entering the market primarily because unlike in the South, Gujarat does not have a history of government credit programs. The lack of credit culture impedes rapid scale of micro-lending operations. While Amul has done some work in forming cooperatives in the state, Surat district was largely left out, given its industrial economy. In addition, the willingness of MFIs to provide credit to a floating population is often limited. If the reach of microfinance increases in Surat, the delivery channel for micro-insurance will be laid, and other products such as savings and asset and health insurance could see strong uptake.

## Surat – Drivers and Inhibitors for Private Sector Involvement

### Drivers

#### Agile administration: Surat Municipal Corporation

- Model city for urban management in India; highest revenue collection in Gujarat
- Highly efficient and effective, and is very keen to engage the private sector
- Undertake pro-active preventive measures:
  - Clean drains and sewerage in preparation for the monsoon
  - Emergency evacuation drills
  - Flood early warning system in place – transmitted through megaphones

#### Community ownership

- Social networks and mutual support are traditionally high amongst the middle and higher income group, but lower amongst the less homogeneous migrants
- Could be mobilised for demand generation, driving and implementing projects
- Will have to be improved amongst the poor, can facilitate the growth of MFIs

#### High education

- The sense of belonging and therefore participation in community efforts is lower amongst migrants
- Limited access to credit creates higher vulnerability when faced with income shocks and inhibits capacity to pay for some products and services

### Inhibitors

#### High migratory population

- The sense of belonging towards the city and therefore participation in community efforts is lower amongst the migratory population (~40% of the city)

#### Limited presence of MFIs

- Limited access to credit creates higher vulnerability when faced with income shocks and inhibits capacity to pay for some products and services

## Private Sector Opportunity Identification and Evaluation

Vulnerabilities	Responses	Potential for Private Sector Participation
<p><b>Flooding:</b> Increased intensity of rainfall and inefficient river management</p>	<p>Affordable rental: temporary housing</p> <p>Asset micro-insurance</p> <p>Better floodgate management</p> <p>Improved drainage systems</p> <p>Raising or relocating houses</p> <p>Improved water management</p> <p>Access to potable water/purification</p>	<ul style="list-style-type: none"> <li>Opportunity to provide affordable rentals and dormitories to migrants and temporary residents</li> <li>As part of the Zero Slum scheme, the SMC has developed subsidised housing units on the outskirts of the city for the urban poor – offered at 10% of the cost payable over a period of 10 years</li> <li>Limited potential in the near-term as the lack of MFIs impede delivery</li> <li>No direct opportunity; scope to support government projects through                             <ul style="list-style-type: none"> <li>Provision of weather related data and technology</li> <li>Building homes under the Zero Slum Scheme</li> </ul> </li> <li>Limited scope for private enterprise as government water provision and quality is good even in slums</li> </ul>
<p><b>Water Scarcity:</b> Longer dry seasons</p>	<p>Provision of alternate livelihoods</p> <p>VET and organised employment opportunities</p>	<ul style="list-style-type: none"> <li>Potential to establish VET institutes</li> <li>Scope for private enterprise to organise rag pickers and include them in an integrated waste management system</li> </ul>
<p><b>Decline in Sanitary Conditions</b></p>	<p>Improved city-wide sanitation and waste management</p>	<ul style="list-style-type: none"> <li>High potential to scale waste management enterprises that integrate collection, segregation, aggregation, transport and disposal</li> <li>Opportunity to provide portable toilets and cleaning services</li> </ul>
<p><b>Disease and Health Issues:</b> Outbreak of vector and water borne diseases</p>	<p>Health micro-insurance</p> <p>Affordable preventive care</p> <p>Affordable treatment facilities</p>	<ul style="list-style-type: none"> <li>Private participation across insurance, in-patient and out-patient treatment in conjunction with government insurance schemes could have potential. Willingness and capacity to pay premiums is limited, as public health facilities are well stocked and offer high quality</li> <li>Government provides subsidised healthcare, runs malaria programs and conducts surveillance programs</li> </ul>
<p><b>Limited Access to Financial Products</b></p>	<p>Access to credit, savings, pensions and other financial services</p>	<ul style="list-style-type: none"> <li>Opportunity for MFIs, as the micro-credit market is largely unserved</li> </ul>

Key:

High potential opportunity for private sector engagement; detailed below
Future opportunity for private sector engagement exists if constraints outlined are overcome
No clear business opportunity for private enterprises in building urban resilience

## Portable Pay and Use Toilets

### Demand

An estimated 54.71% of urban slums in India have no toilet facilities. Free community toilets built by the state government are often unusable owing to the lack of maintenance and pay-and-use toilets built by NGOs, while better maintained are too few.<sup>32</sup> In Surat, 48 slum pockets are being upgraded under the “National Slum Development Programme” while others are being redeveloped and shifted to new social housing locations. In addition to the 136 toilet complexes constructed by NGOs, Sulabh and Paryavaran, the SMC estimates that at least 30 more pay and use toilets will have to be installed in slums at a cost of approximately INR 240 lakhs (USD 540,000).<sup>33</sup> Public areas, industrial and construction sites too lack sanitation facilities, leading labourers to defecate in the open.

### Service Offering

Portable toilets, that overcome the constraints of traditional fixed units that require land, a scarce commodity, especially in un-authorized slums, hold promise for rapidly growing cities. These toilets can be set up at construction sites, events and at large public gatherings as well. Each unit is equipped with enzymes and bacteria to degrade the waste. In addition, the enterprise provides regular maintenance services include on-site cleaning and water evacuation using its mobile cleaning trucks. The model addresses public health, sanitation and hygiene issues without being dependent on other public utilities, and is thus more responsive to demand. The waste can either be disposed off in sewage treatment plants or be processed for use as manure.

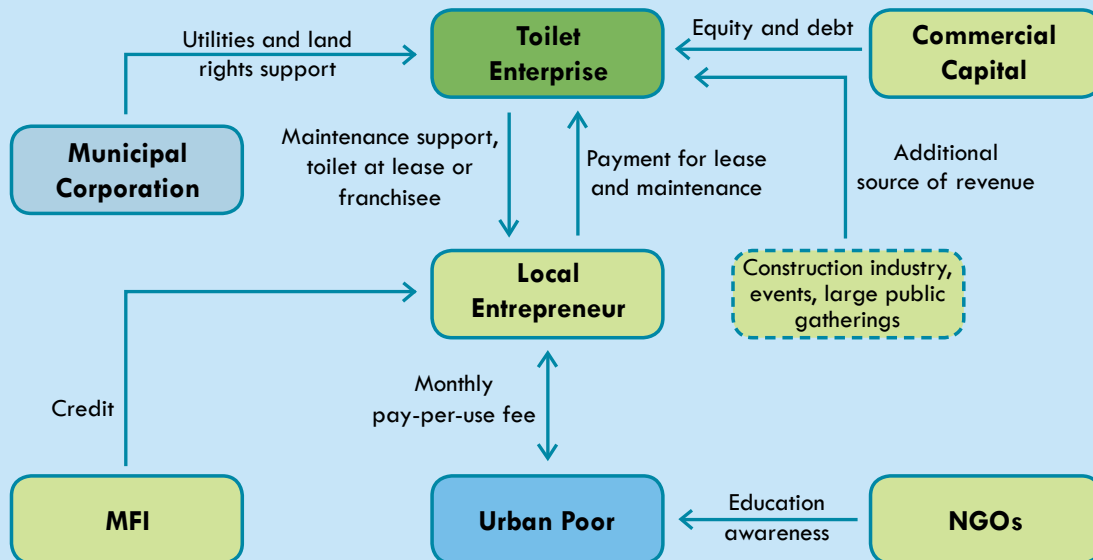


Figure 7: Portable Pay-and-Use Toilets Model

## *Operating Model*

The enterprise develops the technology, manufactures the toilets from plastic and creates the infrastructure to clean and maintain them. The facilities can then be leased to micro-entrepreneurs who manage them and collect a user fee. Regular cleaning and servicing is carried out by the enterprise, for which the micro-entrepreneurs pay a flat fee. Such an enterprise thus has wide application, and could scale across cities. There is also potential to explore rural markets through large contracts.

## *Revenue Model*

Each unit costs approximately INR 40,000-60,000 (USD 900-1,350) to manufacture and has the capacity to serve 50-60 people a day, assuming 4 visits per person. Depending on the demand, multiple units can be clubbed together to serve an entire community. The micro-entrepreneur can collect approximately INR 2 (USD 5 cents) per use ensuring revenue of at least INR 12,000 (USD 225) per month. This could cover the cost of the lease and maintenance, and leave the micro-entrepreneur with a fair income. In the case that the toilets are offered on lease to construction sites or events, the facilities could be maintained entirely by the enterprise on a contractual basis.

## *Potential Partners*

The government, financiers and civil society organisations are all potential partners for such an enterprise. The Municipal Corporation can facilitate implementation by granting required land use permissions and water connections, and could also encourage such an enterprise by contracting it for government projects and public events. Start-up capital to invest in setting up manufacturing facilities is essential. NGOs will be crucial in generating demand and facilitating acceptance and usage of the toilet facilities through awareness and education campaigns on the importance of hygiene and the impact of open defecation on health.

## *Precedents*

Shramik Sanitation Systems (3S) is the largest professional company to provide public utility-free portable sanitation facilities with cleaning, evacuation and disposal of waste per International Standards and waste regulation norms. 3S provides sanitation facilities and maintenance services to construction sites and public gatherings across India.

## Integrated Waste Management

### *Demand*

Surat generates on average 2,000 tons of waste daily. While the municipality collects and segregates the waste, there is scope for improvement, as litter is a common sight in public areas, and drains often get choked, adding to the water logging and flooding in the city during the rains. The resulting stagnant water forms breeding grounds for mosquitoes and leads to further health hazards.

Middle class households are typically willing to pay a modest monthly fee for household collection of waste, and the municipality spends a significant amount daily on collection and transport of waste. In addition, the city has over 2,000 rag pickers, who are often migrants from Maharashtra, and the most vulnerable population in the city. Their incomes are seasonal, as waste loses value when wet in the monsoon and the rag pickers are highly dependent on middlemen for credit and purchase of their collections, and thus often get ill-treated and cheated.

### *Service Offering*

The integrated waste management company will collect, segregate, transport, recycle and on-sell or dispose waste for the entire city. In doing this it will mainstream the most vulnerable population in the city via employment, and improve the overall state of sanitation in the city. The value proposition of the model is that it will reduce the amount to be spent by the government on waste management, increase the amount of waste collected and recycled and raise the incomes of rag pickers at least three-fold.

### *Operating Model*

The company would hire rag pickers, organise them into groups of 5, and assign zones by which they can collect waste from households, shops, businesses and public areas. Each rag picker will be assigned an area of operation, and be given a cycle rickshaw on loan if needed. The waste is segregated at source, to the extent possible, and taken to neighbourhood transfer stations rented by the company for further segregation. Rag pickers will also have the right to the recyclables collected, and will thus be incentivised to maximise collections including from public areas.

At the transfer station, waste is separated into organic waste, recyclables and inert material, and then transported to the composting centre, recyclables collection point and landfills respectively. It is estimated that each transfer station can handle waste collected by 35 rag pickers, and that three trucks can transport waste from five transfer stations. Organic waste is then made into compost and sold, recyclables are sold to recycling plants and inert material is disposed off at the landfill. The enterprise will negotiate bulk contracts with industries for all recyclables and pay clusters of rag pickers based on weight. The landfill site would be owned by the government, as would the trucks for transporting waste. The company will operate the municipality's truck, charging a fee over and above running costs.

### *Revenue Model*

The waste management company gets its revenue from multiple sources: (i) monthly fee paid by each household for waste collection – typically INR 50 (USD 1.1), (ii) fee from the government to collect and transport the waste, (iii) income from sales of compost and (iv) income from sales of recyclables

Rag pickers will earn a daily wage of INR 137 (USD 3) that translates to a fixed monthly income of INR

3,288 (USD 71). In addition, the variable component could amount to as much as an additional INR 250 (USD 5.4) per day, depending on collections. It is estimated that by such an arrangement, rag picker incomes will increase three fold at a minimum.

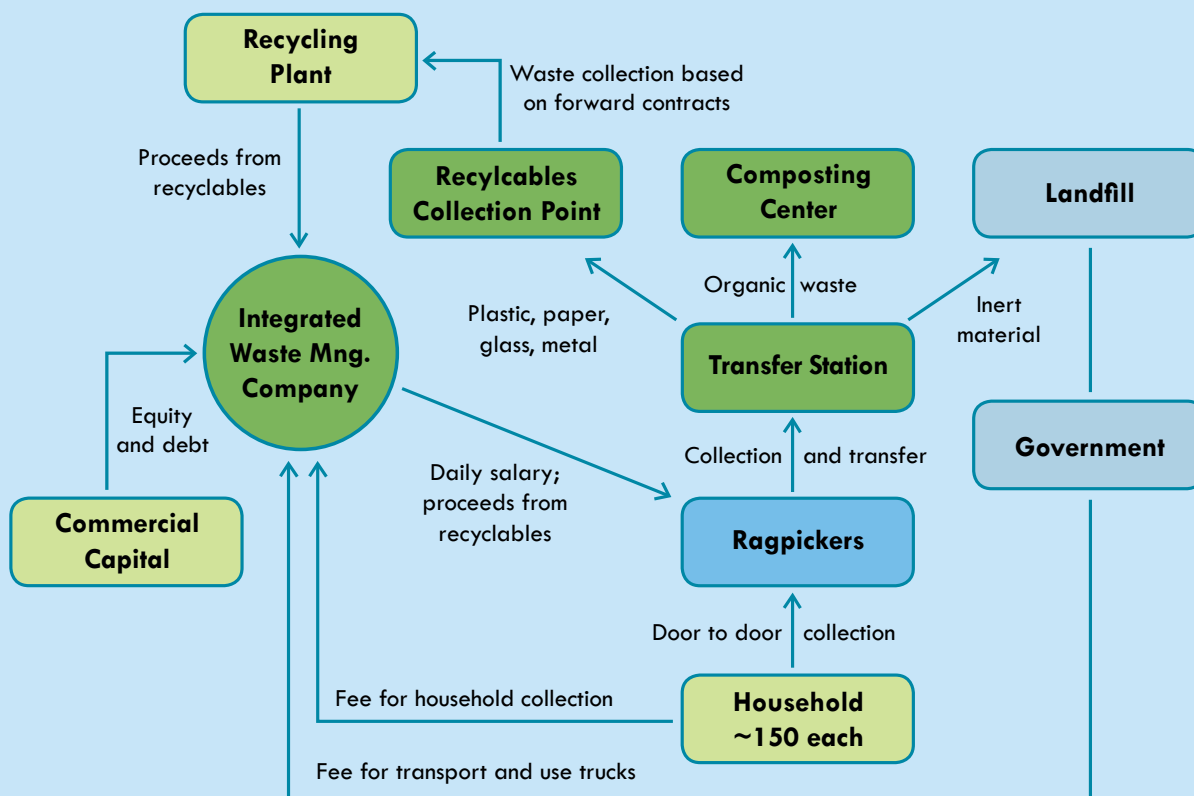


Figure 8: Integrated Waste Management Model

Assuming that 22% of all households in Surat will be willing to pay for such a service, and that all 2,000 rag pickers can be integrated and the municipality is able to provide their waste collections trucks, the business could generate a net margin upwards of 20%. Thus, operations would be most lucrative if expansion across the city is possible. The model could be replicated in other cities too once proof of concept is clear.

### Potential Partners

The Surat Municipal Corporation has already expressed interest in such a model, and is likely to support implementation if an entrepreneur is able to organise the rag pickers and act as the interface with the municipality. The current tender system in Surat solicits interest from the private sector separately for waste collection and transport for each zone of the city. Integrating the bidding process for collection and transport in all zones would encourage one player to provide more holistic services, and be able to take advantage of economies of scale.<sup>34</sup> In addition, the municipality's support in identifying suitable land for transfer stations and in maintaining the landfill will be essential for the long term sustainability of the model.

NGOs can play an important role in both training and mobilising rag pickers, and in sensitising households to the need for segregation at source and sustaining their involvement in door-to-door garbage collection.

34. Cities in Punjab including Ludhiana and Patiala have already demonstrated the value of such a system

Navsarjan, for example, is already working on organising 1,000 rag pickers in Surat, and would be a key stakeholder in such a model.

### *Precedents*

Nidan and Kanak Waste Management both offer integrated waste management practices through rag pickers thereby greatly improving their livelihoods. While Nidan incorporates rag pickers into a company as shareholders, Kanak provides them with a greater and more stable source of revenue through salaries and the sale of recyclables.

## Affordable Rentals: Temporary Housing

### *Demand*

The large, ever growing migrant population engaged in the informal sector in Surat puts pressure on the temporary affordable housing market. This population is typically not interested in owning permanent homes as their stay is dependent on the job market and they don't necessarily have long term visibility. These are often people who rent slum units or sleep on the street for which they have to pay as well.

The slum eradication program leaves the needs of this group unmet, as under the "Zero Slum City" initiative the SMC will only agree to relocate slum dwellers who already own housing units. Thus, rentals for migrant workers are an opportunity with high growth potential and scope for innovation.

### *Service offering*

Under the rental housing scheme, housing units and night shelters will be built in order to provide the urban poor with adequate shelter and basic services. To minimise costs of infrastructure, the enterprise could choose to manage Government shelters or refurbish abandoned buildings. Government shelters have a cap on user fees at INR 7 (USD 0.15) per night, thus in order to make the enterprise viable it will have to cross subsidise the stay with charges from other services such as storage, showers and food. A major constraint of the government shelter model is that those seeking shelter face the risk of being turned away on any given night, as these operate on a first come first serve basis.

### *Operating Model*

The Temporary Housing Enterprise would provide affordable dormitories and / or short- to long term rental options. The enterprise would choose to invest in constructing new buildings, refurbish abandoned ones or manage Government shelters. Further, it will also maintain the building and could choose to offer other facilities such as showers, lockers and canteen services. The Government will further be key in procuring land use rights.

### *Revenue Model*

The Temporary Housing enterprise could collect its revenues on a daily, weekly or monthly basis by renting out apartments and charging additional fees for the usage of other services such as showers, security boxes and food. In addition it could charge fees from the Government for managing existing city shelters or



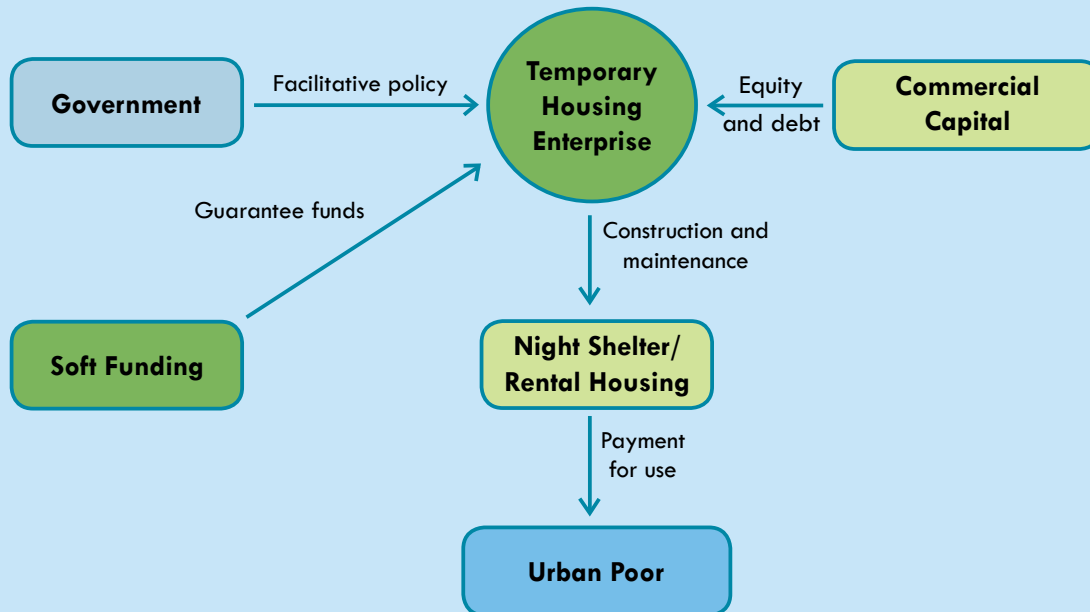


Figure 9: Temporary Housing Model

refurbishing old buildings. The model could take 4-5 years to break-even at a minimum; however it can be brought to scale with optimal technical design and access to finance in order to construct additional units.

### *Potential Partners*

Government support in facilitating land acquisition and land use rights will be crucial to the sustainability of the model. The government could also encourage private sector participation via tax incentives to land and building owners for providing affordable rentals, and contract out the management of Government shelters. In addition, the enterprise would need to continuously liaise with local builders to ensure the most efficient materials and techniques are used and that quality is maintained.

### *Precedents*

Micro Housing Solutions is a social enterprise providing economically viable housing solutions for the under-served population. Options include dormitories, short- to long-term rental, rent to ownership models and direct ownership with access to finance. Aarusha Homes Private Limited also offers affordable dormitories to migrant workers and students across urban India.

## Gorakhpur, India

Gorakhpur is the second largest city in Eastern Uttar Pradesh situated on the left bank of the Rohini River in the Middle-Ganga plain. The land has a north to south gradient and the elevation is higher in the west than the east, thus creating a bowl-like structure on the north-west and centre. The average elevation of the city is between 75-85 m above sea level.

Based on estimates, the population of Gorakhpur will increase by 40% over the next 20 years.<sup>35</sup> The total literacy rate in Gorakhpur is 78% whereas the rate for the low income group is as low as 56%. This is largely due to the fact that livelihood activities are often prioritised over school enrolment.

The economy of the city is largely dependent on organised sectors based on retail and whole sale markets. 30% of the population is considered low income and is often employed as domestic help or in other types of labour-intensive or informal activities such as rickshaw pulling, street vending or rag picking. The agricultural sector is a major income source for wealthier city residents own agricultural land, although they reside in the city.

Low income households typically house six people in a 1-2 room house; have irregular income and no vehicle. In the city, 90% of the houses are *pucca*<sup>36</sup>, but liveable conditions in the majority of them are at par with slums. 33% of the population lives in slum-like conditions across 110 settlements in different parts of the city. Due to Gorakhpur's strong rural linkages, the influx of rural migrants has created stress on the housing market resulting in a major housing gap. Moreover, the infrastructure is deteriorating and the city is unable to cope with the high population density. It is noteworthy that land availability is not the key issue; instead affordability of land and houses is.

### Demography

**Population:** 0.68 million

**Area:** 137 km<sup>2</sup>

**Population growth:** 2.3% annually

**Population density:** Approx. 4,970 people per km<sup>2</sup>

**Literacy rate:** 83%

**Poverty ratio:** 17.5%

**Economic Sectors:** Agriculture and Service Industry

## Critical Urban Issues

Overall, the city's urban issues arise primarily from inadequate city infrastructure.

Critical Urban Issues	
<b>Solid Waste Management</b>	300 tons of solid waste generated per day; 45% of which is biodegradable
	Inadequate waste management system; collection at open dump sites, results in surface water contamination, and creates breeding grounds for mosquitoes and other health related issues
	Doorstep collection only in ten out of two hundred residential colonies
<b>Sanitation and Drainage Systems</b>	Public sanitation has deteriorated over the past decades due to high population growth, rural migration and the mushrooming of slums
	Only 22% of the city has an underground sewer network and the ratio of sanitary workers to the population is only 1:605
<b>Energy Shortages</b>	Power supply is intermittent; those connected to the grid experience 10-12 hours of power cuts each day due to inadequate power generation, poor transmission management and theft

56 35. Gorakhpur Environment Action Group, Vulnerability Analysis Gorakhpur City, December 2009

36. Pucca houses have walls made of burnt bricks, stones, cement concrete, timber; and roofs made of tiles, reinforced brick and cement concrete, timber, etc.

Part of the solid waste generated by the city is disposed along the roads, while some of it is transported to land fill sites. The city's large floating population has low civic sense and contributes to littering public areas. Only 14% of the waste is recyclable, some of which is collected manually by the city's 1,000 rag pickers.<sup>37</sup> However, not all recyclable waste is collected and disposed, resulting in large portions being left in dump sites, road sides and in drains.

The existing drainage system was designed to carry domestic sewage only, however as most drains are open, storm water also enters the trunk sewer leading to tremendous pressure on the network, and the sewerage lines are prone to choking and leakage. Polythene and other waste clog the lines leading to the formation of stagnant pools of water, a major source of malaria and diarrhoea. In addition, the city does not have a raw sewage treatment plant and its six pumping stations along the Rapti River pump untreated sewage into fresh water streams posing a serious threat to the environment and public health.

## Climate Change Impact

For the past four decades the city has experienced a **rise in temperature** and **longer dry seasons**. Summers and winters have become more severe and there have thus been incidents of water scarcity in the summers, a trend projected to intensify in the future.

Annual rainfall has also been continuously on the rise, but is now more intense, spread over fewer days. In 2001, the city received 132 cm of rainfall which increased to 194 cm in 2008. This **increased intensity in rainfall** has severe effects on the city's infrastructure, and thus on the urban poor. Moreover, the gradient of the land, with the Rapti River at a higher elevation than the city, makes Gorakhpur highly flood-prone. The river overflows into the city during the monsoon and causes major water logging and flooding issues in the city.

## Vulnerability Analysis

The vulnerability assessment studies carried out by ACCCRN partners and observations made over the course of this study suggest that the combination of climate change, urbanisation and socio-economic issues have led to the following vulnerabilities for the urban poor in Gorakhpur:

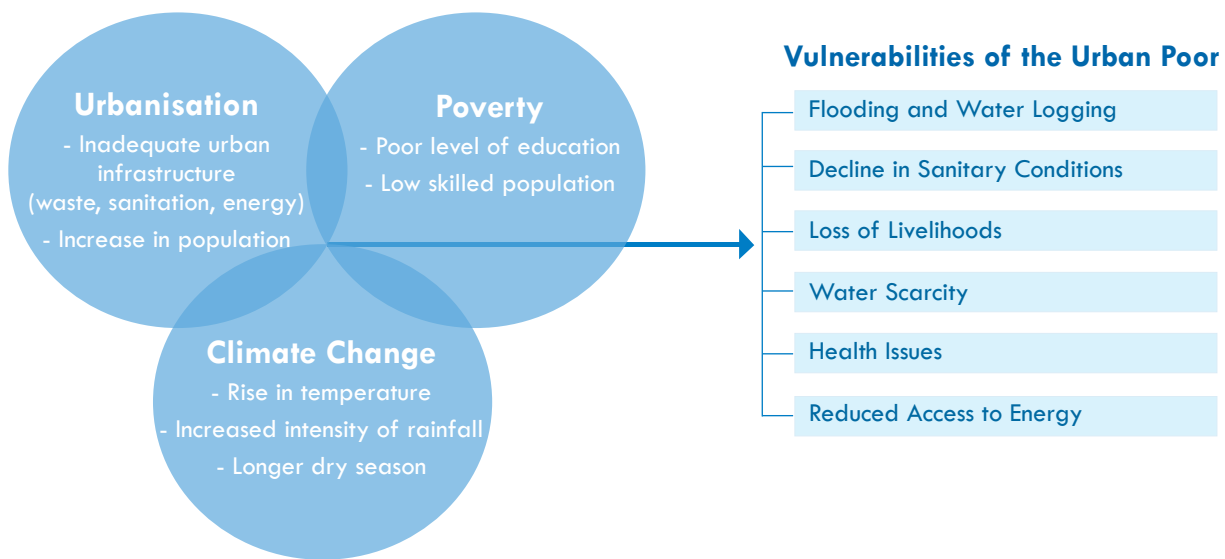


Figure 10: Vulnerabilities of the Urban Poor in Gorakhpur

**Flooding and Water Logging:** As the Rapti River flows at a higher elevation than the city, flooding and water logging have been a common problem for many decades. The issue is further exacerbated by poor sewage and solid waste management. 40% of the city is currently affected by water logging, a figure that is projected to increase further.

**Decline in Sanitary Conditions:** Flooding and water logging further exacerbate the inadequate waste and sanitation infrastructure. Although the Municipal Corporation, along with 12 other municipalities in the state, have contracted a private operator for waste collection and disposal, there is scope for further improvement in the system as very few homes are being served.

**Loss of Livelihoods:** The majority of the low income population work in the informal sector, and are the most vulnerable to climate risks. Increased rainfall lowers the number of working hours for this group, and in the case of rag pickers and rickshaw pullers, negatively impacts earnings. This group does not have high literacy levels and lacks training in professional skills, and the city is unable to offer sufficient alternate livelihood opportunities for this segment.

**Water Scarcity:** The primary drinking water source for the city is its ground water. Drinking water scarcity has been a major concern, as ground water sources are fast depleting and are energy intensive given the constant pumping required. The water table is also contaminated by sewage seepage.

The majority of the city does not have access to safe drinking water, and only 65% of the population is connected to the municipality's water supply. Moreover the water supply and quality varies significantly throughout the year, as pumping stations are interrupted due to power shortages in the summer. It is estimated that the population of the city will increase to over one million by 2031, while the production capacity of water will not increase proportionally. Thus, the demand-supply gap will expand further and pose greater risks for the urban poor, who are least able to pay the premium required to procure scarce resources.

**Health Issues – Water and Vector Borne Diseases:** The stagnant pools of water created as a result of water logging encourage mosquito breeding, especially given the overall rise in temperature and increase in humidity during the monsoon. Incidences of malaria, diarrhoea, dengue and encephalitis are common in the city. Over the past three decades, 30% of admitted patients have reportedly died of Japanese Encephalitis making it the most deadly disease in the region.

**Reduced Access to Energy:** Power supply is intermittent and non-payment and illegal tapping of electricity lines are common. The Municipal Corporation's inability to enforce rules and collect revenues, heavy rains, flooding and water logging further deteriorate the condition leading to frequent grid failure and disconnection of power cables. Moreover, the rise in water logging increases the city's energy consumption, as running the drainage pumps throughout the monsoon months is highly energy intensive.

## Gorakhpur – Drivers and Inhibitors for Private Sector Involvement

### Drivers

#### Few decision makers

- Given the small size of the city and limited number of decision makers, any private enterprise with strong buy-in from key stakeholders in the municipality and business community, could obtain required permissions and implementation support to push through an idea relatively easily, expediting red tape

### Inhibitors

#### Sluggish administration

- The Municipal Corporation experiences a high turnover of senior officials; Gorakhpur has seen five municipal commissioners within the last year. This leads to limited follow-through on projects, and an inconsistent policy outlook as regulations change with governments, adding to delays in obtaining permissions and registrations
- State politics come to bear on the city's functioning; each government that comes to power appoints civil servants in their favour to high positions
- Populist politics reduces the incentive for long-term visionary policy making it difficult for a government to push through rate hikes in utilities or enforce tax and other revenue collections

#### Apathy towards the poor

- The traditional feudal culture still prevalent manifests as general indifference towards pro-poor policy or business
- 50% of the high income population are either current or ex-government or civil service employees having a vested interest in retaining feudal culture
- Bankers too are reluctant to lend to entrepreneurs or social enterprises

#### Lack of funds

- Revenue collection is poor, thus budgets are very limited, constraining the ability of urban local bodies to fund infrastructure or utility projects
  - The Nagar Nigam, water and sanitation implementation body, estimates that only 40% of their users have registered connections for which they pay
- Resulting inadequacy in public infrastructure such as power and water pose a challenge for corporations looking to setup businesses in the region
- In order to garner Central and State Government support for infrastructure development projects, the urban local body has to front 10% of the projected budget. Even this small amount is typically a barrier to development, limiting opportunities for PPPs

#### Low level of education

- Low willingness to pay for hygiene, community cleanliness and other related services
- Habits and attitudes are hard to break and only increased education and awareness building programs can make an impact and increase demand for new products and services
- Few highly educated people who could be employed in professionally managed enterprises
- Lack of community ownership, as many low income people have families in the village and are less inclined to spend money on their homes

## Private Sector Opportunity Identification and Evaluation

Vulnerabilities	Responses	Potential for Private Sector Participation
<b>Flooding and Water Logging</b>	Building river embankments Pumping flood water Extending drainage	<ul style="list-style-type: none"> <li>No direct opportunity; scope to support government projects through                             <ul style="list-style-type: none"> <li>Provision of building services</li> <li>Implementation of projects</li> </ul> </li> </ul>
<b>Decline in Sanitary Conditions</b>	Improved city-wide sanitation and waste management	<ul style="list-style-type: none"> <li>Potential to engage the private sector in waste management and to integrate waste collection, segregation, transport and processing</li> <li>Potential to provide public toilet facilities</li> </ul>
<b>Loss of Livelihoods</b>	Livelihood promotion	<ul style="list-style-type: none"> <li>Opportunity to include rag pickers the formal waste management system</li> <li>Potential to establish VET institutes with employer linkages to enhance skills and employability – construction industry, security services, etc.</li> </ul>
<b>Water Scarcity</b>	Water management Access to alternate sources	<ul style="list-style-type: none"> <li>Potential for household water purifiers: awareness building and creating the capacity and willingness to pay is however a precursor</li> </ul>
<b>Health Issues:</b> Water and vector borne diseases	Affordable treatment facilities and drugs	<ul style="list-style-type: none"> <li>Potential for private hospitals empanelled with government health insurance schemes such as – Rashtriya Swasthya Bima Yojna (RSBY)                             <ul style="list-style-type: none"> <li>Potential for MFI linkage to increase outreach and build awareness</li> </ul> </li> </ul>
	Affordable preventive care and awareness	<ul style="list-style-type: none"> <li>Limited business potential for stand-alone awareness building programs; however, as marketing campaigns or in conjunction with insurance and treatment facilities could support demand generation</li> </ul>
	Health micro-insurance	<ul style="list-style-type: none"> <li>Potential in conjunction with government insurance schemes                             <ul style="list-style-type: none"> <li>Low willingness and ability to pay premiums – under RSBY the government pays for coverage</li> </ul> </li> </ul>
<b>Reduced Access to Energy:</b> Insufficient provision of electricity	Access to off-grid energy solutions	<ul style="list-style-type: none"> <li>Opportunity to provide affordable, renewable household energy appliances such as solar lanterns and home lighting systems</li> </ul>
	Increased electricity generation	<ul style="list-style-type: none"> <li>Biomass-based energy production also has potential in the area, but would have to overcome regulatory hurdles to be able to sell to the grid</li> </ul>

Key:

High potential opportunity for private sector engagement; detailed below
Future opportunity for private sector engagement exists if constraints outlined are overcome
No clear business opportunity for private enterprises in building urban resilience

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## Integrated Waste Management with Rag Pickers

### *Demand*

Poor waste management and public sanitation are major issues in Gorakhpur that exacerbate the vulnerabilities of the urban poor. While the municipality has contracted a private company to collect waste from neighbourhood dump sites, door-to-door collection, street sweeping and transport of waste to neighbourhood dumping sites continue to be the municipality's responsibility. Door-to-door collection however is only effective in some affluent neighbourhoods.

Approximately 1,000 rag pickers and scavengers collect recyclables and other valuable waste informally from dump sites, working in parallel to the municipality, leaving the rest of the waste to get scattered in the surroundings and clog the drain pipes and contaminate water. Rag pickers are amongst the most vulnerable population in Gorakhpur, as they are at risk of exploitation by middle-men, and have regular incomes as their collections lose value during the rains. There is scope to improve the efficacy of the waste management system and also integrate rag pickers into the formal sector, assuring them an enhanced, reliable basic income.

### *Service Offering*

Formalising the work of rag pickers could supplement the municipality's waste management efforts, expanding the reach of door-to-door collections and coverage of public areas too. The enterprise could collectivise and train rag pickers and pay a daily wage for door-to-door collections. In addition, rag pickers would be granted the rights to all recyclables collected, such that they receive the proceeds of the sales of recyclables based on their contribution. With rag picker incentives aligned to the city's objectives, cooperation between the formal and informal sectors could vastly improve the state of sanitation in Gorakhpur. The transport, recycling of organic waste and on-selling or processing of recyclables can continue to be outsourced by the municipality to the enterprise.

*Please refer to the 'Waste Management Model' described in the Surat City Section for more details.*

## Primary Care Hospital and Micro-clinics

### Demand

The combination of poor sanitation, constant water logging and rising temperature has led to an increase in vector and water borne diseases in Gorakhpur. By some estimates, 80% of disease is due to poor water quality. Between 2002 and 2008 the number of cases of Japanese Encephalitis has risen from 700 to 2,500<sup>38</sup> and in 2008 alone, 500 of those infected died. 30% of the population in the city live in slum-like conditions and earn an irregular income. Yet, this group spends between a fourth and a fifth of their income on health care, demonstrating that the willingness to pay clearly exists, and needs to be coupled with affordable, effective treatment facilities and awareness of disease in order to bring down the number of fatalities.

Gorakhpur has both private and government owned hospitals and clinics. However, although private hospitals offer superior service, only the wealthiest 20% of the city's population can afford them. For low income households, the sole option is government hospitals which are poorly equipped and often offer inadequate treatment. Thus, the majority of the population is unable to afford or access necessary treatments for even common diseases.

### Service Offering

To effectively deal with water and vector borne diseases in Gorakhpur, awareness building, preventive care through water management, vector control and vaccinations, and access to affordable treatment is required. A model that could integrate these elements is one that leverages the efficacy of private enterprise with available Government subsidies. The national health insurance scheme for families below the poverty line, Rashtriya Swasthya Bima Yojana (RSBY), provides medical coverage for up to INR 30,000 (USD 660) per family, per annum to be availed of at empanelled facilities. While most services covered are in-patient care, developing the product to also cover most out-patient care could add significant value and drive uptake.

A 20 bed hospital offering basic primary care including treatment of most water and vector borne diseases, that is empanelled with RSBY could serve this purpose, along with a pharmacy and feeder micro-clinics setup at MFIs branches, Public Health Centres and Mother and Child Welfare Centres.

### Operating Model

The hospital would be a no-frills model with investments only in appropriate technology, rather than in all state of the art facilities. The pharmacy could be outsourced to a generic drug chain such as *Jan Aushadhi*<sup>39</sup> to ensure availability of cheap drugs for in-patient and out-patient care. The feeder clinics serve the dual purpose of spreading knowledge of available facilities by enrolling those below the poverty line in RSBY and raising awareness about preventive care and vector management. The clinics would be staffed by a paramedic for a few hours a day, with a doctor visiting twice or thrice a week.

To keep capital costs low, the property will be rented. In addition, to ensure maximum throughput of assets, and specialists' time, ward management and other clerical and administrative functions can be handled by management staff, for who the company will incur a lower cost.

### Revenue Model

The hospitals will have a dual pricing structure, one for RSBY beneficiaries, and one for other clients. The hospital will claim reimbursement for services provided from the insurance company or third party administrator. As serving clients through RSBY is a low margin business, the hospital will be incentivised to increase volumes,

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62 38. Gorakhpur Environment Action Group research, interviews with the Municipal Health Officer, Mr. Khare

39. Department of Pharmaceuticals initiative: generic drug pharmacy chain



and serve more of the poor population. The feeder clinics would receive a commission per insurance policy sold and would see value in offering such a service on their premises as it could improve customer stickiness for MFIs and Public Health Centres alike. The model has the potential to scale to serve the entire district and can be replicated in others cities facing the need.

With 40 out-patient visits per day, an occupancy rate of 35% and given RSBY reimbursement rates, the hospital is projected to break-even within four years.

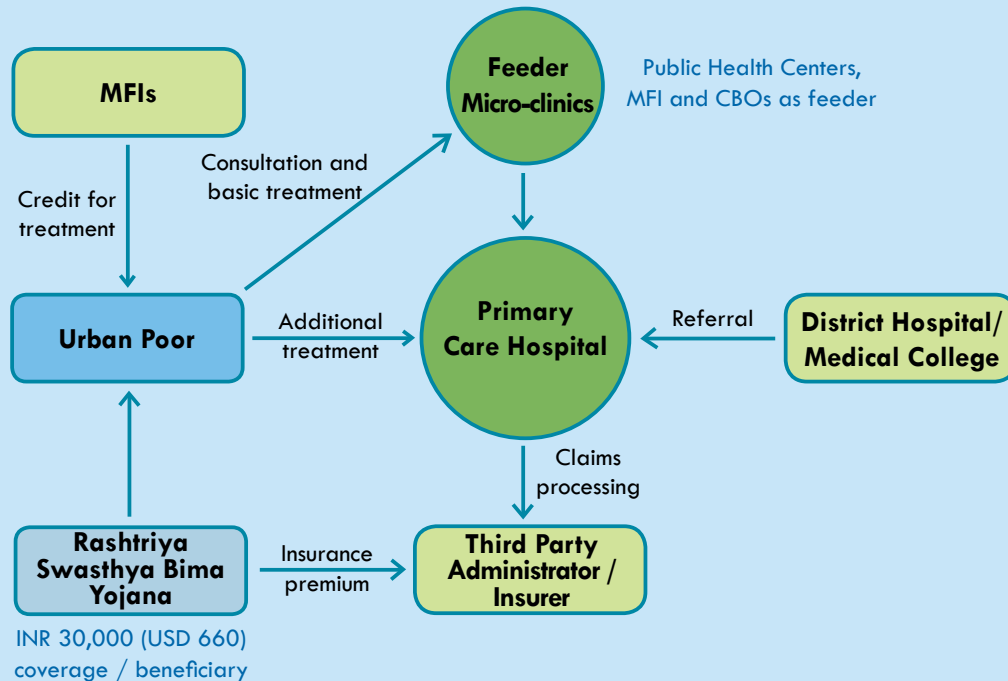


Figure 12: Primary Care Hospital Model

### Potential Partners

A number of government agencies are key actors in such a model; Public Health Centres as feeder clinics from where to procure referrals, Jan Aushadhi to ensure a supply of affordable drugs and RSBY for the insurance coverage that will allow the poor to avail of these services. Insurance companies that can design appropriate products for RSBY and financiers willing to lend to and invest in such enterprises too are crucial. MFIs could support low-income patients who incur treatment expenses above the insurance coverage, or for preventive care, including vaccines, which are not covered by the insurance. CBOs can also play an important role in generating demand, promoting awareness of available services and disease control and supporting RSBY enrolment.

### Precedents

GV Meditech, Vatsaalya, Life Spring Hospitals and Aravind Eye Care have all shown that low cost healthcare is viable in India. While the first two models have provided generalist services, the latter have chosen to specialise, making it easier to take advantage of economies of scale. GV Meditech is also empanelled with RSBY in Varanasi and has seen significant uptake.

## Vocational Education and Training (VET)

### Demand

Education and reliable cash-flows are critical to building resilience amongst the urban poor. Risks and vulnerabilities are enhanced by the lack of education, as people are less employable and unaware of appropriate responses to disasters or changes in the environment. In Gorakhpur, only 55% of the low income group is literate, of which almost 80% has below higher-secondary level education. Inadequate education facilities, irregular livelihoods and other urban issues such as diseases lead to a high drop-out rate. This results in poverty, unemployment and insecurity, increasing this population’s vulnerabilities.

On the other hand, the want of a skilled, well-educated labour force is a major deterrent to industries and large businesses looking to setup in Gorakhpur. Some of the sectors that could benefit from vocational training institutes in the region are construction, mechanics, retail, tourism, information technology and the traditional crafts and cottage industries.

### Service Offering

VET can play a vital role in skilling this population and enhancing employability as it prepares trainees for jobs that are based on manual or practical activities that are traditionally non-academic but geared to a specific vocation. Although VET has been traditionally the domain of NGOs, government agencies and foundations, the private sector can play a defining role in growing the industry. Training can be imparted at a secondary or post-secondary level. In the Gorakhpur area, trainees could be absorbed by both large corporations and SMEs across sectors, especially in construction; a model that incorporates training and employer linkages has the potential to be highly successful.

With vocational training, those who would otherwise earn minimum wages, if any, can increase their earnings by 40-50%, often more, as employers see the value of trained employees via higher productivity in operations.

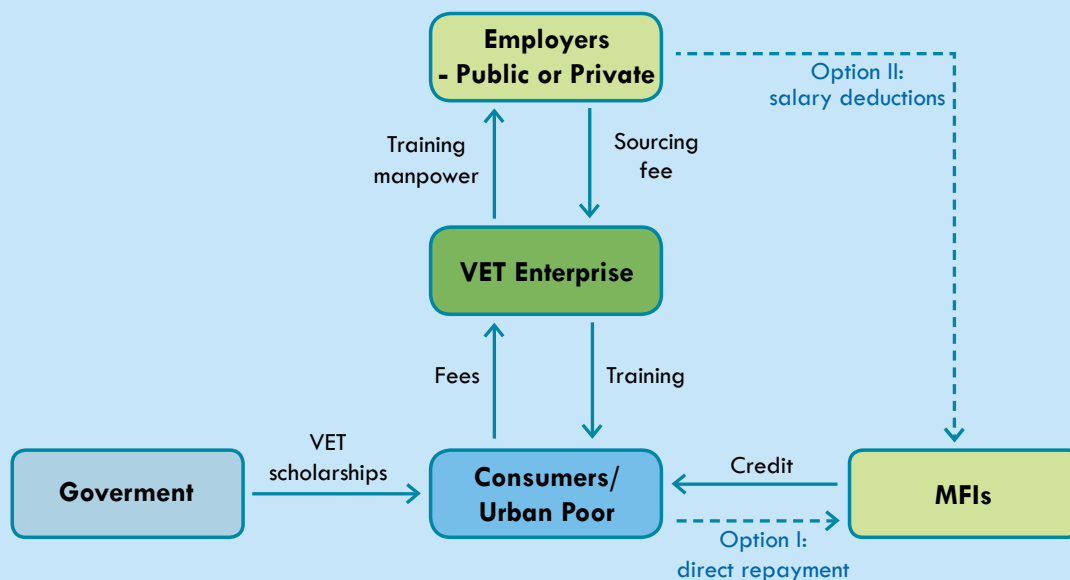


Figure 13: VET Enterprise Model

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## *Operating Model*

The VET enterprise would provide training on specific skills that are mapped to local needs, such as operation of heavy machinery. The enterprise would source and screen appropriate candidates from the city and collect a fee for the trainings. It would also establish linkages with target employers from both the public and private sectors, to ensure that trainees are absorbed. Employers would pay a fee for sourcing trained manpower contracts. The enterprise can also collaborate with MFIs to finance the course fee.

## *Revenue Model*

The enterprise would receive revenues from two sources – training fees from candidates and order/ contract fees from employers. The training fees could be received through upfront payment by candidates or through salary deductions once the candidate has been placed. While an enterprise may need to carry the credit risk initially, until proof of concept is clear, it is advisable to partner with financial institutions that are better placed to do so – either banks or MFIs. The financial institution could extend credit and collect payments overtime from the trainee, his or her family or through periodic salary deductions post placement.

Sourcing reliable candidates who can be placed in jobs accounts for a large part of the investment in such a model, in addition to costs associated with training and certification. While costs are subjective based on the skill, industry and location that such an enterprise operates in, initial scoping of Gorakhpur suggests potential for viability of an enterprise serving the construction industry based on precedents.

## *Potential Partners*

Private and public sector employers of trainees and MFIs and banks to extend credit to trainees unable to front the cost of training fees are essential partners to the model and support the development of both the demand and supply side of the market.

## *Precedents*

One of the exemplary models operating in India is that of Pipal Tree Ventures Pvt. Ltd. which specifically deals with imparting training in various skills required for the construction industry. The model has been so successful, that in 2009 the enterprise has been overwhelmed with contracts from the industry and is rapidly scaling to meet them.

## Solar Household Products

### Demand

Gorakhpur faces severe energy shortages due to inconsistent electricity supply as well as pilferage. Up to 12 hours of power cuts daily reduce the number of working hours, time for study and thus overall productivity. Low income households spend a significant amount of money each week on kerosene and candles, to light their homes, but the quality of light is rarely sufficient for productive work. While solar pumps and larger lighting systems are being sold in rural areas on the outskirts of Gorakhpur through a regional rural bank, there is a dearth of viable options for poor households in urban areas.

### Service Offering

Off-grid appliances such as solar lanterns and home lighting systems that can provide backup for basic lighting and light loads such as cell phone charging can improve overall efficiency. These are good alternatives for both those connected to the grid and those who are not as such appliances are both energy and cost efficient, in addition to being reliable energy sources. Depending on the make and capacity such appliances cost between INR 500 and 25,000 (USD 11-525). The bottom and mid-range of these products have high applicability for Gorakhpur’s urban poor.

### Operating Model

Given the challenge in accessing urban poor consumers, product manufacturers will have to partner with MFIs and other CBOs for last mile reach. The products require a shift in consumption habits and would thus need some demand generation. In addition, many urban poor households will be unable to front the cost of such appliances, as they are used to paying a small amount each week for kerosene and candles. The model would thus be one in which marketing and distribution to consumers is done by the partner and the manufacturer in collaboration, while consumer credit is provided by MFIs and regional rural banks as needed.

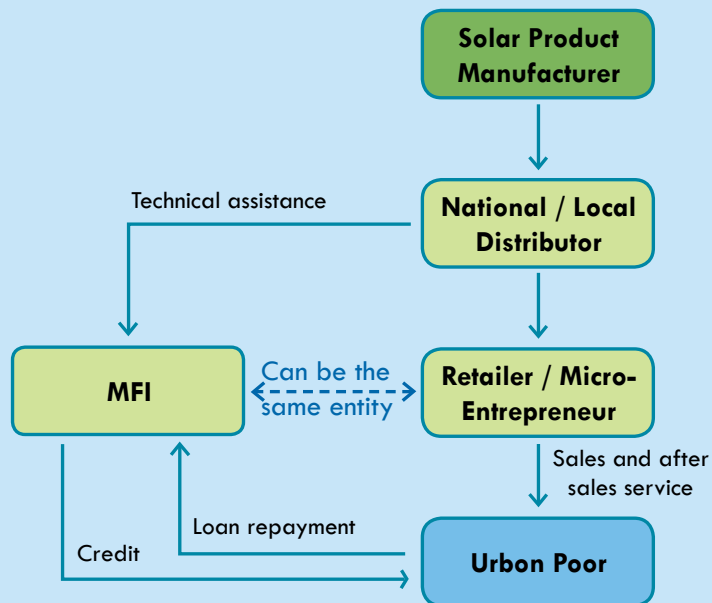


Figure 14: Solar Distribution Model

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### *Revenue Model*

The product manufacturer will be paid upfront either by the consumer or the credit provider and would pay the partner a fixed commission per unit sold through the channel. In the case that consumer credit is offered, the financial institution will levy interest and collect the additional revenue over time using their regular weekly or monthly collection model.

### *Potential Partners*

MFIs and regional rural banks in Gorakhpur district, such as Purvanchal Grameen Bank, Basix and SKS would be ideal partners for the product manufacturer. One higher-end product is already being sold through Purvanchal Grameen Bank, largely in rural areas, and there is scope to expand this model to sell less expensive products on credit to urban households.

### *Precedents*

A number of large corporations including Tata BP, Phillips, Schneider Electric and BPL and smaller enterprises, such as Barefoot Power, Intelizon, Solkar and Su-kam offer a range of solar lighting systems. Many have partnered with MFIs for last mile distribution and consumer credit and are seeing uptake.

## Semarang, Indonesia

Semarang is Indonesia's fifth largest city. Situated on the Northern coast of Java, it is divided into lowland and highland, both of which are affected by climate change in different ways. The lowland extends into the city centre, makes up 34% of the total area and has a maximum elevation of five meters above sea level. The upland in the South forms two thirds of the city's area and has an elevation of up to 348 m above sea level. Only a third of Semarang's total area is built up, while the remaining areas are agricultural land, conservation areas, forests or coastal fishponds.

The economy of Semarang is largely dependent on trade, tourism, industry and services. It has been growing at a rate of 4.61% from 2001-2006, largely thanks to hotels and restaurants that account for 35% of the economy, followed by industry that accounts for 27%. In addition to these sectors, the urban poor are also engaged in fisheries, the herbal Jamu industry, as rickshaw pullers, as *pemulung* or waste pickers, all of which are highly vulnerable to climate change.

### Demography

**Population:** 1.5 million

**Area:** 373 km<sup>2</sup>

**Population growth:** 1.86% annually

**Population density:** Approx. 3,965 people per km<sup>2</sup>

**Literacy rate:** 90.4%

**Poverty ratio:** 5.5%

**Economic Sectors:** Tourism and Service Sector

### Critical Urban Issues

<b>Solid Waste Management Sanitation</b>	While ~90% of the daily waste production of 4,651 m <sup>3</sup> is collected, very little of it is processed
	Liquid industrial waste is disposed untreated in the Tapak River, polluting surface and ground water
<b>Water Supply</b>	42% of the population lacks access to potable water
	Daily shortage of 53 million litres of water in Semarang
<b>Drainage Facilities</b>	Insufficient capacity during the rainy season; only two flood ways provide relief

Semarang lacks efficient water and sanitation facilities as the local government tap network is only able to provide potable water to 58% of the community. A tenth of the community lives in slum areas, of which half live in very poor sanitary conditions, lacking toilets and proper waste management facilities. Although no direct plans to improve the waste management system exist, community sanitation programs such as Sanimas are efforts towards improving the situation. Local initiatives are also being carried out by *Koperasis* or cooperatives in Kemijen and other slums, to provide microloans to improve sanitation facilities including household toilets and drainage.

## Climate Change Impact

Climate Change will result in a **rise in temperature** over the coming years. An **extended dry season** will lead to increased water scarcity. The city will also experience more frequent occurrences of cyclones due to differences in air pressure. Trends have shown that the amount of rainfall has been increasing, although

showers have become more intermittent over the past years, resulting in **more intense rain** spread over fewer days. This has led to lower agricultural outputs, impacting paddy and durian harvests.

**Sea level rise** is causing rob or tidal flooding and in combination with over-usage of ground water is also leading to salinity intrusion and thus to a decrease in potable water. The rise in sea level is also causing coastal erosion, inundation of wetlands and lowlands, flooding of fishing ponds and land subsidence that damages coastal homes and businesses.

## Key Vulnerabilities

The vulnerability assessment studies undertaken by ACCCRN partners and observations made over the course of this study suggest that the combination of climate change, urbanisation and socio-economic issues have led to the following vulnerabilities for the urban poor in Semarang:

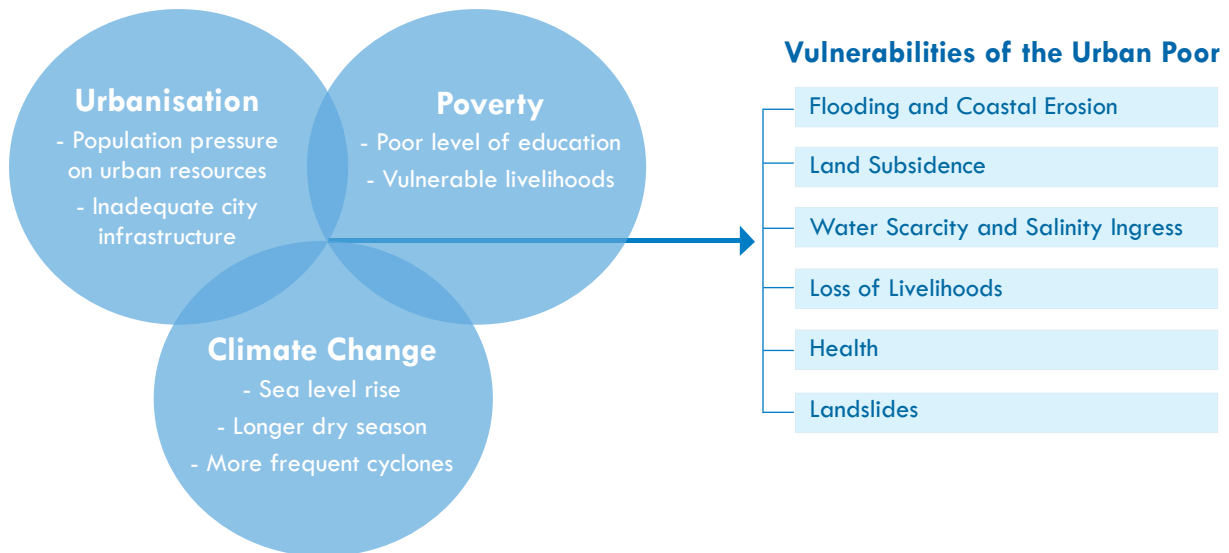


Figure 15: Vulnerabilities of the Urban Poor in Semarang

**Flooding and Coastal Erosion:** Flooding alone is responsible for the majority of all hazards in Semarang. The city suffers from both tidal and flash floods, as increased precipitation and sea level rise are both issues. The sea level is projected to rise by approximately 0.8 m over the next 100 years, having an impact up to 4.49 km inland.<sup>40</sup> It will have serious impacts on coastal erosion, inundating wetlands and lowlands, destroying fish farms and increasing coastal storm flooding.

**Land Subsidence:** In Semarang subsidence is a major issue, as parts of the city are sinking by up to 10 cm per annum as a result of the rising sea level and over extraction of ground water. In coastal areas, slum dwellings are sinking and families either construct additional stories above existing homes or abandon these homes.

**Water Scarcity and Salinity Ingress:** 30% of all natural hazards in Semarang are a result of droughts, forest fires and heat waves.<sup>41</sup> Water scarcity is further exacerbated by salinity ingress, and will become a major concern for the city in the future. The water table is shallow, thus tidal flooding causes high salinity content in the ground water. Extended drought periods will also affect the agricultural sector.

**Loss of Livelihoods:** Sea level rise will have major impacts on the livelihoods of coastal communities. Fish farmers are especially affected as tidal flooding and coastal erosion are leading to the destruction of

40. Ristek, DKP, Undip, IPB, 2009

41. Marfai, Muh. Coastal Flood Management in Semarang, Indonesia. Environmental Geology. October 2008

fishing ponds. In addition, farmers are witnessing a decline in soil quality and in water for irrigation which are likely to impact both yield and thus income. In times of flood and intense rain, the livelihoods of fishermen, farmers, rickshaw pullers, waste pickers and other informal sector workers are adversely affected and alternate opportunities are hard to come by.

**Health:** Rising temperature and water logging along with poor sanitary conditions result in a higher likelihood of diarrhoea, dengue and other water and vector borne disease outbreaks. The level of education is however fairly high, and thus awareness of disease and water impurities also exist. Water is generally boiled before use and poor households often obtain free health care and access to low cost medication from *puskesmas* (public health centres), state or regional hospitals.

**Landslides:** The South of Semarang is a hilly and geologically unstable area, where rocky slopes are prone to landslides triggered by heavy rains and earthquakes.

## Semarang – Drivers and Inhibitors to Private Sector Engagement

### Drivers

#### Strong sense of community and self-reliance

- Urban poor communities in Semarang demonstrate high levels of collaboration and have organised themselves to take civic decisions and have formed *Koprasis* (cooperatives) to better respond to the changing environment given their means

#### Existing adaptation activities

- NGOs and the Department for Environment are already successfully involved in climate change adaptation activities
- Knowledge and experience of current pilot projects (mangrove plantations, flood and waste management) could be leveraged and integrated with private sector activities in the space

### Inhibitors

#### Lack of coordination between key actors

- NGOs and private sector actors contribute to climate change related programs, however programs are implemented partially with limited coordination among stakeholders. Poor government understanding of resilience building and the role of the private sector in UCCRB furthers this issue

#### Limited government funding

- Local government budget is largely allocated for infrastructure, with little allocation for environmental improvements or ecosystem rehabilitation – in the last three years, only 5-6% was allocated to programs related to climate change

#### Poor business environment

- Local governments have the authority to administer business licenses
- Amongst the 14 largest cities in Indonesia, Semarang ranks last in terms of registering a business largely due to inefficient government bureaucracy and corruption<sup>44</sup>

#### Cultural issues

- The mind-set of the poor in Semarang is that environmental and other problems are fate and thus unavoidable. Demand generation and willingness to pay for resilience building activities are thus challenges for enterprises operating in the field



## Private Sector Opportunity Identification and Evaluation

Vulnerabilities	Responses	Potential for Private Sector Participation
<b>Tidal Flooding</b>	Relocating houses to flood- and landslide proof areas	<ul style="list-style-type: none"> <li>Strong business potential for developers building affordable housing units, and micro-housing finance companies that can extend credit to the urban poor to enhance their capacity to pay, as willingness to pay for appropriate, affordable solutions is high</li> </ul>
<b>Flash Flooding</b> <b>Coastal Erosion</b>	Asset micro-insurance	<ul style="list-style-type: none"> <li>While there is a strong need for home and asset insurance coverage, insurance companies have been unwilling to insure the urban poor against natural catastrophes, and appropriate affordable products are few, requiring consumer education to drive uptake</li> </ul>
<b>Land Subsidence</b> <b>Land Slides</b>	Building sea walls Pumping flood water Extending drainage	<ul style="list-style-type: none"> <li>No direct business opportunity; scope to support government projects through implementation contracts, advisory services and the provision of appropriate technology</li> </ul>
<b>Water Scarcity</b>	Water management Alternate sourcing	<ul style="list-style-type: none"> <li>Limited scope for enterprises as capacity to pay amongst the urban poor is low</li> </ul>
<b>Loss of Livelihoods</b>	Livelihood promotion	<ul style="list-style-type: none"> <li>Scope for a livelihood promotion enterprise to train those in the informal sector and support the creation of alternate livelihoods for fisheries and affected farmers, however capacity to pay amongst the ultra-poor segment is limited</li> </ul>
	Micro-insurance	<ul style="list-style-type: none"> <li>Potential for private enterprise engagement in crop insurance and other business interruption insurance products created for the fisheries and other vulnerable communities</li> </ul>
<b>Health Issues:</b> Water and vector borne diseases	Affordable preventive care and awareness	<ul style="list-style-type: none"> <li>Limited business potential for stand-alone awareness programs; however, as marketing campaigns or along with insurance or treatment facilities could support demand generation</li> </ul>
	Affordable treatment facilities and drugs	<ul style="list-style-type: none"> <li>Potential to explore private sector treatment facilities (clinics / hospitals) empanelled with government health scheme – <i>Jamkesmas</i>, if buy-in from the health ministry obtained</li> </ul>
<b>Health Issues:</b> Water and vector borne diseases	Health micro-insurance	<ul style="list-style-type: none"> <li>Potential for enterprise participation in conjunction with government insurance schemes</li> <li>Will require multiple partnerships with MFIs, BPRs and Roscas; difficult to scale</li> <li>Health micro-insurance products cannot be credit linked; potential to bundle with life coverage</li> </ul>
	Waste management	<ul style="list-style-type: none"> <li>Strong potential to engage the private sector in waste management, especially in processing</li> </ul>
	Water purification	<ul style="list-style-type: none"> <li>Well-developed market, multiple private enterprises deliver affordable purified water</li> </ul>
	Improved access to sanitation facilities	<ul style="list-style-type: none"> <li>Potential to improve access to water connections, household toilets and community drainage infrastructure, through provision of credit and technical support</li> </ul>

Key:

High potential opportunity for private sector engagement; detailed below
Future opportunity for private sector engagement exists if constraints outlined are overcome
No clear business opportunity for private enterprises in building urban resilience

## Affordable Housing for Relocation

### *Demand*

The most severe effects of climate change in Semarang are increased flooding and land subsidence, which have the most adverse impact on the urban poor living in coastal slums. Although 88% of Semarang residents have homes with masonry walls, almost 35% of all houses get damaged by floods. Thus the need for affordable, strong homes in safer areas is high both amongst those with permanent homes as well as amongst those in temporary dwellings made of wood or bamboo.

### *Service Offering*

The urban affordable housing market has so far not been developed to allow for strong private sector participation. Access to finance to enable the capacity to pay for new homes, and cooperation with the government agencies on land acquisition have been systemic lacunae. To enable and encourage private enterprise participation, these ecosystem partners are stakeholders and also must be engaged and developed. An integrated approach that engages both builders and financiers could change the current offerings in affordable housing and develop the market for future private sector participation.

### *Operating Model*

**Housing Finance Provider:** Semarang Housing Finance (SHF) would be formed to provide credit products tailored to the cash flows of the urban poor. The company could minimise risk by ensuring that clients are purchasing affordable homes with the intent of relocation and that they have been long-term residents of vulnerable areas, as proven by utility bills and guarantors. SHF could require a 10-15% down-payment followed by equated monthly instalments for 10 to 15 years, based on the client loan application appraisal. The SHF will need to raise capital from National Banks, other wholesale funders, donors and social investors willing to invest patient capital, given the model's long gestation period.

**Builders:** Large developers would draw up floor plans that match community needs and source material that would allow for affordable, robust construction. There is scope for both modular housing and traditional brick constructions, depending on the demand and affordability. The builders will play a key role in lobbying the government to acquire land in desirable locations for housing projects.

The SHF and the builders will be expected to work in tandem to create housing and financial products that are demand driven and to source clients by raising awareness for the project.

### *Revenue Model*

The apartments will be priced at a cost plus rate that makes it viable for builders, given the scale. The builders would be paid upfront by the SHF, as with traditional home financing. There is scope for the builders to choose to cross subsidise affordable housing units by charging higher rates per square foot on other top of the pyramid focused developments.

The SHF will recover only the down-payment initially and then collect monthly principal and interest payments over time. Interest charged will depend on the SHF's cost of funds but will include sufficient buffer to cover operating expenses from client acquisition to servicing to delinquency management. Once proof of concept is shown, there is high scope for replication within Semarang and to scale across Indonesian cities.

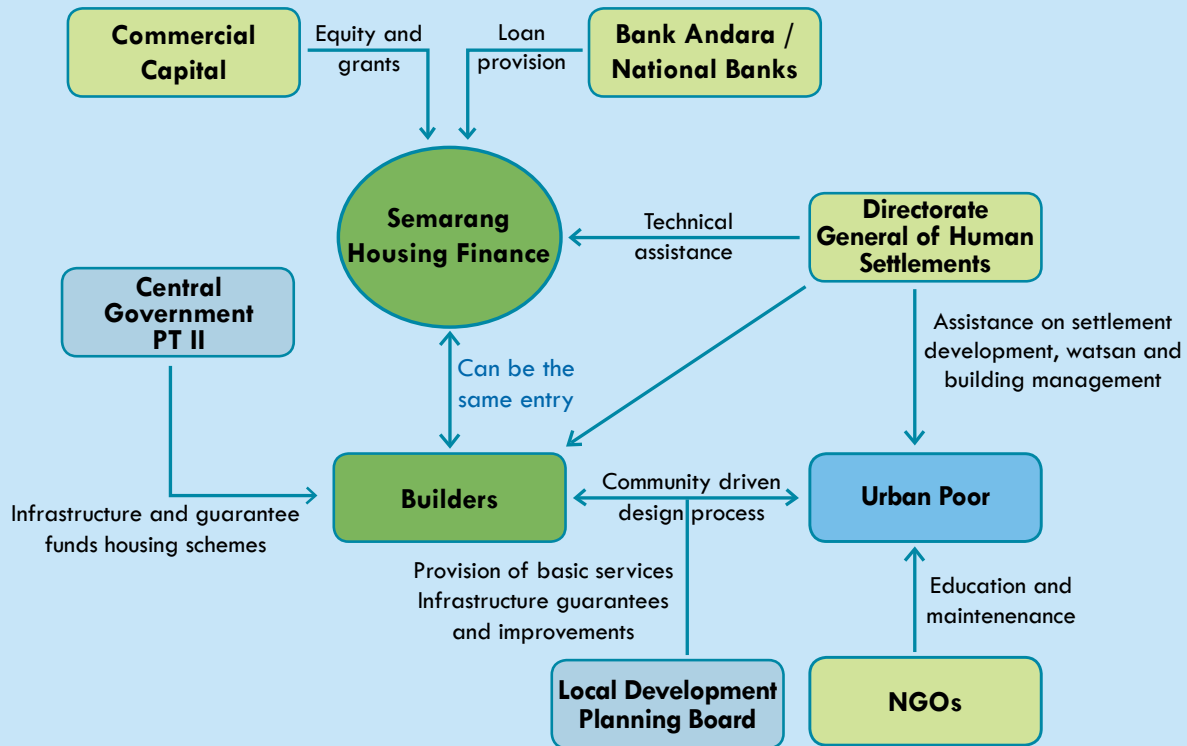


Figure 16: Semarang Housing Finance Model

### Potential Partners

A number of different kinds of actors are essential to creating a viable model. Builders will need to collaborate with contractors, architects and other actors to design demand driven, affordable products, while retaining quality and delivering on time. On the funding side, financiers including wholesale lenders providing debt to retail housing finance providers at fair rates are key. CBOs and NGOs are important partners in the case that there is resistance to relocation, as families need support to adjust to the move, access their places of work and develop alternative livelihoods if necessary. Finally, the government is a crucial stakeholder in ensuring the viability and success of such a model, and has multiple roles to play:

- Support in land acquisition and in procuring land rights
- Access to concessional funding, such as through *PT Penjaminan Infrastruktur Indonesia (PTII)* that offers interest rate concessions of up to 3% for PPP infrastructure projects
- Technical assistance from the settlements body on documentation for long term residents to be relocated and in explaining available products – apartments and financing options
- Developing basic amenities for new developments including transport, schools and healthcare

### Precedents

The Micro Housing Finance Company, India Shelter Finance Company, Janalakshmi Financial Services and numerous other MFIs in India offer loans for low cost apartments built by builders that are targeting the low income market such as Tata Housing and Value Budget Housing Corporation.

## In-situ Slum Up-gradation: Improved Sanitation

### Demand

Many slums in Semarang have poor sanitary conditions, including open drains and sewers. Households often do not have water connections or toilet facilities installed. In slums where land subsidence is not a major threat, communities do not intend to relocate, and upgrading public infrastructure and household water and sanitation facilities could greatly reduce the vulnerabilities arising from the decline in sanitary conditions owing to increased rainfall and flooding.

As much as 87% of all slum residents own their homes and are keen to invest in upgrading them to improve living conditions and be better prepared against flooding and rains. However, given the nature of household cash flows, the urban poor often lack the resources to get this done well, and measures taken are usually piece meal and inadequate.

### Service Offering

An enterprise that provides technical assistance to upgrade household and community infrastructure including sanitation facilities and household toilets could address this issue. Services could include paving common areas, covering drains and sewage lines, building a septic tank, landscaping public areas, building household and community toilets and household water connections.

### Operating Model

The enterprise would provide technical assistance including design, access to appropriate building materials and workers and project implementation support, while community leaders organise the community to ensure adequate financial and in-kind contributions, in terms of volunteering time and labour. The enterprise would also provide credit to households that need it to pay for the services upfront, or collaborate with a *Koprasi* or MFI to do so.

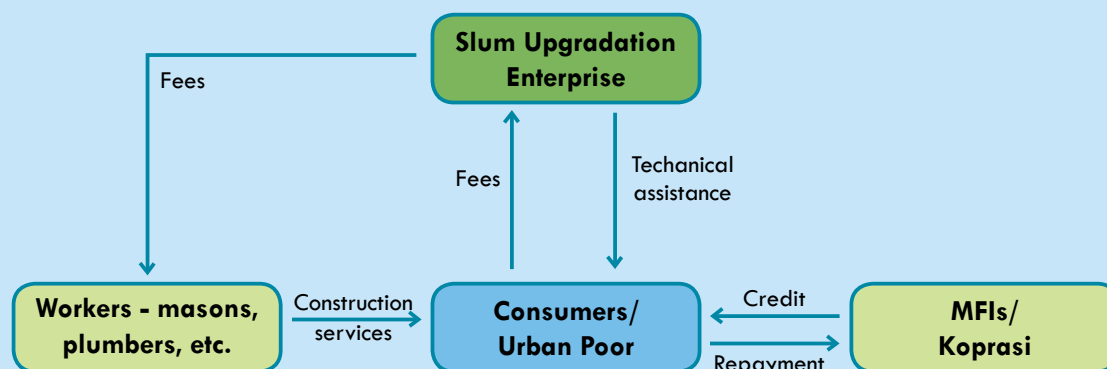


Figure 17: Slum Upgradation Enterprise Model

### Revenue Model

Critical mass is key to ensure viability, which community buy-in can create. For a fixed fee per household, the entire community can benefit at an affordable rate. The enterprise could offer households two to three options to meet their needs given their existing water and sanitation infrastructure and budgets, while still

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ensuring that each household contributes equally to the public infrastructure. Although some standardisation can be achieved, the model will have to be customised for each community and a reliable local network of masons, plumbers and other workers is essential to success, constraining scale.

### *Potential Partners*

The community and any local bodies that organise it such as *Koprasis* or citizen groups are critical to the success of such a model. Government support in the case that there are subsidies available for each household under a sanitation or slum up-gradation scheme and for required permissions such as for water connections, is also important.

### *Precedents*

The Mahila Housing Trust (MHT) in India and the Community Organisations Development Institute (CODI) in Thailand both facilitate access to finance, legal advice and technical assistance to improve slum infrastructure, procure land rights and upgrade sanitation systems. While MHT is a non-profit and CODI a government initiative, both show that viability as an enterprise can be achieved.

## Integrated Solid Waste Management

### *Demand*

The inadequacy of solid waste disposal is a major concern for Semarang as sanitation issues are aggravated by the constant tidal and flash flooding. Slum settlements that have limited drainage facilities are especially vulnerable to inadequate waste management, as the rapid decline in sanitation can lead to major health hazards. Semarang generates on average 4651 m<sup>3</sup> of waste daily, of which ~90% is collected, although very little is processed. Industrial waste is often disposed, untreated in the Tapak River, polluting surface and ground water.

There are currently no major private companies involved in waste collection and segregation which is formally undertaken by the government and informally by the *pemulung*, or scavengers who collect waste and sell it to agents based on weight. The *pemulung* are dependent on multiple intermediaries in the collection chain that often involves up to five middlemen. They earn between IDR 50,000-80,000 (USD 5.5-9) per week as subcontractors, an amount well below the local minimum wage of IDR 500,000 (USD 55) per month.<sup>43</sup> Yet, the market value of waste in Semarang is estimated at about IDR 8 billion (USD 900,000) per year.<sup>44</sup>

### *Service Offering*

An integrated waste management enterprise that employs the *pemulung*, and offers end to end waste management from household collection, to segregation to transport, disposal and processing would be viable, improve livelihoods and enhance the efficiency and sustainability of the city's waste management. The enterprise could form city level units and scale across cities.

Profits from the enterprise would enhance the livelihoods of the *pemulung* community, who would earn additional income over and above the daily wage based on the value and volume of their collections. CBOs would be important to support the development of recycling centres and to develop the capacities of the rag pickers, to increase their collections and standardise and professionalise operations.

*Please refer to the 'Waste Management Model' described in the Surat City Section for more details.*

## Chiang Rai, Thailand

Chiang Rai city is the capital of the Chiang Rai province in the North of Thailand. Located in the midst of the Golden Triangle it has strong trade links with China, Myanmar and Lao PDR and is likely to experience rapid economic growth in the future. Numerous tribes have migrated to this fertile land from neighbouring countries and the province is thus home to a number of hill tribes. Chiang Rai province is the country's twelfth largest both in terms of physical area and population; the majority of who lives around the provincial capital.

The province is a large fertile plain elevated at approximately 580 m above sea level. While over 30% of the land area is classified as farmland, only about 19% is actually suitable for cultivation. Due to its higher elevation, Chiang Rai is generally cooler than the rest of the country. The city has three distinct seasons; a hot, cool and rainy season with a monsoon that lasts from May till October during which heavy rains and flash floods are common.

The province has strong urban-rural linkages given the economic dependence on agriculture and the tourism sector, and is what is considered a *Desakota*<sup>45</sup> region, connoting closely interlinked rural and urban livelihoods, communication, transport and economic systems. In this emerging system, large sections of the population operate a mixed household economy that straddles the urban and the rural, as well as the formal and informal sectors.<sup>46</sup>

### Critical Urban Issues

Thailand has a large informal sector that employs 58.3% of the population primarily in small scale family farming. With increased climate change, small farmers who are unable to absorb short-term losses will be driven off farms, resulting in increased urbanisation.

In Chiang Rai, given the high urban-rural economic links, this is especially relevant. There is a sizeable rural hill tribe population, that lives largely on subsistence farming, and whose young people are increasingly driven to cities in search of more lucrative job opportunities. Some of these people are not Thai citizens and most are not highly educated, limiting their options. While this is not a sizable issue for the city as yet, it is likely that in the future, with population growth and declining agricultural output, this migration could begin to put significant pressure on the city's infrastructure and economy.

Critical Urban Issues	
<b>Numerous Hill Tribe Migrants to the Province</b>	The North is affected by large population shifts from neighbouring areas; owing to political or economic
	~10% of the population are non-citizens, primarily hill tribes from neighbouring countries
	Non-citizen migrants have limited rights in terms of legal status and thus in terms of access to health care and employment, making them highly vulnerable to exploitation, and least able to cope with climatic variances: <ul style="list-style-type: none"> <li>▪ Not subject to the minimum wage of 157 Baht (USD 5) per day</li> <li>▪ Living facilities not subject to municipal amenities – waste disposal, schools, electricity, etc.</li> </ul>

45. Desakota means "village town" in Bahasa Indonesian

46. Moench, Marcus; Gyawali, Dipak. Desakota: Reinterpreting the Urban-Rural continuum. March 2008

## Climate Change Impact

Thailand has experienced an average minimum temperature rise of 1.35°C since 1951 which is projected to increase by another 2-4°C by 2070. While the most prominent change is in the temperature during the cool season, the hot season too is likely to see a rise in temperature and the occurrence of heat-waves.

The increase in rainfall is also projected to result in flooding along the river during the monsoon, causing an extended dry season and thus off-season droughts. More extreme weather patterns are expected to reduce crop yields and increase the frequency of crop failures. It is predicted, for example, that paddy yields will fall by 10% for every 1% rise in temperature during the growing season.

## Key Vulnerabilities

The shared learning dialogues conducted by the Thai ACCCRN partners and observations made over the course of this study suggest that the combination of climate change, urbanisation and socio-economic factors in Chiang Rai have led to the following vulnerabilities for the urban poor:

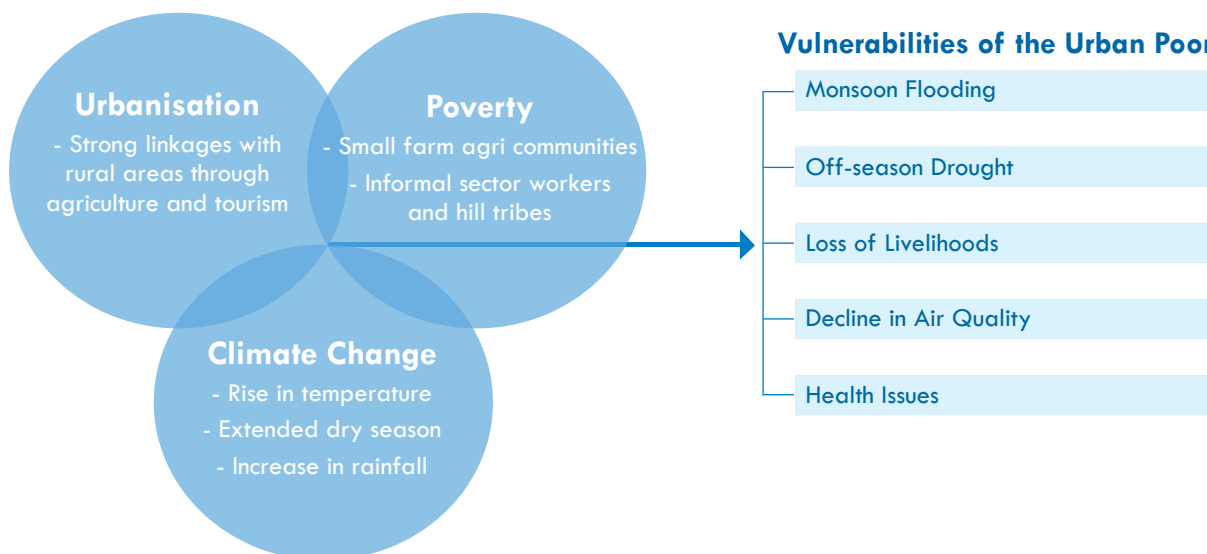


Figure 18: Vulnerabilities of the Urban Poor in Chiang Rai

**Monsoon Flooding:** As the Mae Kok River capacity is exceeded during the monsoon owing to more intense rainfall, its banks are likely to flood from May to October. Floods are also projected to intensify owing to deforestation. While these floods currently affect only 2.7% of the population in the province, and are unlikely to have an adverse impact on crop yields or on urban infrastructure, harvesting and storing this rain water will become critical to both urban water supply and irrigation needs during the dry season.

**Off-Season Drought:** A sixth of the agricultural area in Thailand is highly drought prone, and faces water shortages every one to three years. 26.3% of the population of Chiang Rai province is affected by severe droughts.<sup>47</sup> With population growth and development, increased competition for available water resources is likely to heighten this shortage in the near future.



To overcome off-season drought, storage of the ample monsoon rains is essential. However, this measure leads to poor water quality. In urban areas households use primarily bottled water, while in the surrounding rural areas stored rainwater is still used for drinking and cooking.

**Loss of Livelihoods:** The rural economy has traditionally been the backbone of the Thai urban economy. During longer recessions unemployed workers would migrate back to rural areas to find temporary employment with relatives. This informal social security provided by the village household is slowly disappearing. Rural households are increasingly subsidised by remittances from family members in urban areas, estimated to have contributed 9% of all rural income in 2009.

The fall in crop yields and farming incomes is a result of the rise in temperature, as evidenced by the decline in litchi, pineapple and paddy harvests in the last few seasons. The effect of the changing climate is compounded by poor availability of market and weather information which limits farmers' ability to plant the right crops and obtain fair pricing for produce. In addition, the government used to support a floor price for key crops, at which farmers could sell their crops to the state, if the open market price were lower. However, these heavy subsidies resulted in significant outlays, overpurchasing and stockpiling.<sup>48</sup> Under a new insurance program, the government only pays the difference between the market price and the floor, for a limited quantity of crop, further reducing farmer revenues.

Finally, as more young people migrate to Chiang Rai city in search of work in the tourism and service sectors, not all can get absorbed. Few young people wish to work on farms having been high school or college educated, resulting in non-employment rather than unemployment.

**Decline in Air Quality:** A major environmental problem in the North of Thailand is severe air pollution, owing to slash and burn farming along the Thai-Myanmar border and from Lao PDR and Cambodia. Forests are burnt to make way for agriculture and in some cases post-harvest fields are burnt in order to prepare the land for the next planting season. Over the past years Chiang Rai has been continuously declared a disaster zone as smoke levels exceed acceptable norms.

The rising temperature intensifies low-pressure pockets that trap smoke from forest-fires, further exacerbated by the fact that Chiang Rai is surrounded by mountains. There are also proponents of the theory that insufficient economic opportunities increase the frequency of forest fires – as more land becomes available for cultivation, and the Forest Department offers handsome rewards to those who put out forest fires, leading some to start them too.

**Health Issues:** Instances of malaria and dengue in the North of Thailand are increasing, especially along the Thai-Myanmar border where political instability restricts the access of health personnel. The rise in temperature promotes mosquito breeding and the spread of vector-borne diseases.

Respiratory diseases are the most common illnesses amongst outpatients at public hospitals, as they are closely correlated to air pollution. In addition, Chiang Rai also has one of the highest HIV/AIDS rates in Thailand and cases of tuberculosis have become more frequent over the past years.

The Universal Health Care (UHC) system which was rolled out in 2001 covers about 97% of the population, and facilitates access to health care for as little as 30 Baht (USD 1) While this is extremely beneficial to the urban poor, the most vulnerable people in Chiang Rai are sometimes excluded on account of being non-citizens. Yet, the program covers treatment and the Chiang Rai Government Hospital has an estimated 18 million Baht (USD 600,000) in arrears as a result of providing free treatment to non-citizens.

48. [http://www.readbangkokpost.com/business/agriculture/tdri\\_on\\_thailands\\_new\\_rice\\_pri.php](http://www.readbangkokpost.com/business/agriculture/tdri_on_thailands_new_rice_pri.php)

## Chiang Rai – Drivers and Inhibitors to Private Sector Engagement

### Drivers

#### Active business community

- Industry bodies and a strong business environment can support the entry of corporations and new enterprises

#### Supportive administration

- The mayor and other municipal bodies are keen to promote social enterprises and can reduce regulatory or legal hassles for new entrepreneurs

#### Strong civic sense

- High appreciation for conservation of natural resources, facilitating easier entry for triple bottom-line businesses

### Inhibitors

#### Enterprise promotion

- Those looking to start a social enterprise have fewer precedents to refer to and limited support in terms of access to credit and capacity building services

#### Culture of aid and philanthropy

- Strong outreach of Royal projects, populist policies and active NGOs while building the capacities of the province's poor and helping them access products and services more affordably, have limited the number of entrepreneurial initiatives coming from the BOP in the province

#### Stigma against tribes and immigrants

- Both government and private sector actors are hesitant to include hill tribes and other indigenous groups in the urban development agenda
- The impact of increased migration to the city is largely neglected

## Private Sector Opportunity Identification and Evaluation

Vulnerabilities	Responses	Potential for Private Sector Participation
<b>Monsoon Flooding</b> <b>Off-Season Drought</b>	Water management Alternate sourcing	<ul style="list-style-type: none"> <li>Limited scope for enterprises in recycling water or in rainwater harvesting as the capacity and willingness to pay amongst the urban poor is low</li> </ul>
	Access to potable water	<ul style="list-style-type: none"> <li>Limited potential as 97% of the urban population have access to bottled water</li> </ul>
<b>Loss of Livelihoods: decline in small scale farming</b>	Livelihood promotion	<ul style="list-style-type: none"> <li>Potential to create employment opportunities for fresh migrants from the rural areas into the city as the formal economy is unable to absorb them</li> <li>Opportunity to slow urban migration by developing livelihood options for provincial folk</li> </ul>
	Micro-insurance	<ul style="list-style-type: none"> <li>Future potential for private enterprise in the provision of crop micro-insurance                             <ul style="list-style-type: none"> <li>Micro-insurance market in Thailand is nascent, demand generation is required</li> <li>Populist policies have lowered farmers' perceived needs for insurance</li> </ul> </li> </ul>
<b>Decline in Air Quality</b> Due to slash and burn agriculture	Promote improved farming practices	<ul style="list-style-type: none"> <li>Role for private enterprise to create alternative livelihoods that promote agro-forestry or non-timber forest produce, if feasible, such as honey and oil</li> </ul>
	Promotion of renewable energy, technology	<ul style="list-style-type: none"> <li>Limited incentive for enterprises to build awareness on farming; potential as CSR activity</li> <li>Role for government agencies to allocate alternate land for cultivation</li> </ul>
<b>Health Issues</b> Vector borne diseases	Affordable preventive care and awareness	<ul style="list-style-type: none"> <li>Opportunity for the private sector to provide the government with mobile air quality monitoring vehicles and other related technologies, if demand exists</li> </ul>
	Affordable treatment facilities and drugs Health micro-insurance	<ul style="list-style-type: none"> <li>Limited stand-alone business potential for awareness building; potential if part of marketing campaigns or in conjunction with insurance or treatment facilities</li> <li>Limited willingness to pay for private provision of preventive or curative health care as government and foundation schemes are generous, offering:                             <ul style="list-style-type: none"> <li>Subsidised access to vaccines and holding awareness building campaigns</li> <li>Universal Health Care: doctor consultation for 30 Baht (USD 1) or less</li> </ul> </li> </ul>

Key:

High potential opportunity for private sector engagement; detailed below
Future opportunity for private sector engagement exists if constraints outlined are overcome
No clear business opportunity for private enterprises in building urban resilience

Given the early stage of the ACCCRN project in Chiang Rai, opportunities identified for private sector engagement in building resilience are concepts based on primary and secondary research. These will need validation once full vulnerability assessments are completed and more robust information is available to corroborate the resilience building potential of each. At this stage, enterprises in livelihood promotion for rural migrants, current and future, to the city of Chiang Rai hold the highest resilience building potential.

Enterprises that promote market linkage could fortify rural livelihoods and stem the flow of migration to Chiang Rai city in search of work. Concepts for such enterprises are as follows:

## Aggregator for Hill Tribe Handicrafts

### *Demand*

Numerous foundations and CBOs are working with groups of artisans from the hill tribes to encourage the production of traditional embroidery and handicrafts. These groups build capacities of the artisans by procuring material, showcasing products at stores and in getting handicrafts fair trade certified. Yet, these efforts remain disaggregated, and unprofitable for each individual organisation. Stores often work on a consignment basis, meaning that each organisation is required to front the cost of a large inventory that may not get sold. In addition, tourists are able to buy non-fair trade products in the night markets at throw-away rates, and the hill tribes' handicrafts thus remain undervalued.

### *Service Offering*

There is a role for an enterprise to aggregate the activities from multiple artisan groups, to improve market linkages for each producer group more efficiently. Consignments could then be filled jointly by multiple artisan groups, reducing the burden on any one. The enterprise, having more specialised capabilities than each artisan group, could provide access to national and international markets through various media.

The enterprise would understand market needs and ensure that artisans are producing demand-driven goods rather than pushing goods into the market. At scale, the enterprise could build brand equity for tribal handicrafts and create significant value for each artisan group. If the enterprise were to collect a percentage of sales made through it from artisan groups, the model has the potential to be highly viable.

## Contract Farming

### *Demand*

As farmers have limited knowledge of what the market needs, and what price a crop could fetch, production is often based on which crop did well in the previous year, leading to over-supply. The rising temperature is also leading to lower yields, and farm incomes and viability are thus falling. Household cash flows are less predictable, exacerbated by the changing climate and thus harvest quality.

### *Service Offering*

There is scope for enterprises that use agricultural inputs to engage farmers in Chiang Rai to produce on contract. The province produces litchis, pineapples, paddy, coffee, macadamia nuts and a host of other crops that grow well in the region. Contracts would enable predictability in farm incomes, access to best practices and other inputs such as fertiliser, irrigation tips and seeds from the enterprise. For the enterprise, it is assurance of quality and volume of fruits, grain or vegetables as the case may be. For example, in India,

PepsiCo has a very successful project with farmers to source potatoes for Lays Frito chips.

Enterprises that create opportunities for the urban poor in the formal economy of Chiang Rai, are largely those that enable participation in tourism. Some enterprise concepts that could do so are as follows:

## Language Training: Enhancing Employability in the Tourism Industry

### *Demand*

13% of the population in Chiang Rai province is not educated.<sup>49</sup> The majority of those with limited education are likely to be from remote areas in the province, dependent on agriculture. Many of these people migrate to Chiang Rai city in search of work, a trend expected to become more prominent in the future. As the economy is primarily dependent on tourism and associated services, most such workers end up at restaurants and gas stations at below minimum wage, as their lack of education, sometimes along with the lack of citizenship, puts them at a disadvantage.

Knowledge of Chinese or English could make a significant difference to the opportunities afforded by this segment, but the chance to study either is limited. While some foreign language schools exist in Chiang Rai, they are targeted at the middle and upper income segments.

### *Service Offering*

A language training institute that offers classes in English and Chinese could make a major difference to the employability of the most vulnerable people, as the ability to communicate with tourists is a highly valued skill. It could also help to integrate the hill tribes and other migrants in to the formal urban economy. Both education practitioners and the provincial government, especially the Mayor of Chiang Rai, are especially keen to attract foreign teachers to the province who could build on language skills.

Language skills are relevant for all segments of the population, and classes could be designed to cater to various needs, such as training for those wishing to enter the tourism services industry, individual coaching, after-school classes at private Thai-medium schools and colleges and workshops for tourism industry professionals. The classes for the urban poor could then be made affordable through cross-subsidisation, by charging different rates for the various classes. If the institute were to focus only on the needs of the urban poor, it could also work with the Government Savings Bank and other microfinance providers to enable students to access education loans for the course. In addition, the enterprise could also branch out into tailored courses such as guide and hospitality services training, which meet the needs of the tourism industry and ensure job placements in the industry.

*Please refer to the 'Vocational Education and Training Model' described in the Gorakhpur City Section for more details.*

## Community Owned Tourism Enterprise

### *Demand*

The majority of Chiang Rai city's revenue is generated through the tourism and agricultural sectors. Yet, the chamber of commerce estimates that only about 10% of tourist money stays in the province, with the majority being collected by tour operators and hotel owners based in Chiang Mai, Bangkok and elsewhere. The province's selling point is its natural beauty and unique culture, and those from the remote rural areas would be best placed to expose tourists to it. Unfortunately this group is often excluded from the industry all together.

Some NGOs offer home stays in tribal villages to raise funds for their tribal advocacy work, while other tour operators show off villages without the permission or welcome of its inhabitants. There are no known enterprises that offer tourists an experience of the culture and countryside owned and managed by the indigenous people.

### *Service Offering*

As the industry grows, there is scope to create more opportunities for both tourists and the indigenous people of Chiang Rai. A community owned enterprise that takes tourists on exposure trips to villages, on treks and to view tribal handicraft work and eat local cuisine could be setup and run by the hill tribes themselves. There is high scope to build on the current eco-tourism offerings, and provide an authentic experience that caters to tourist demand. For example, there may be a case to develop a package that is less rough than current village stays, but more genuine than the existing comfortable tours.

Such an enterprise would need external capacity building support to get off the ground initially, but has high scope to become a viable, independent entity. It would help to integrate the hill tribes into Thai society, and break down current stigma against them. In addition, if more money were to flow to the villages through such projects, there would be less need for people to migrate to the city, and would also help ensure that a larger share of tourism revenues are collected and retained locally.

## Appendix I: Selection of Cities for the Study

Of the 10 cities under the ACCCRN program, four were selected for the study. Through the selection process, the guiding principle was diversity. The process sought to ensure representation from all three countries, a mix of geographic elements, level of private sector activity, vulnerabilities and size of the city.

The seven cities in the three countries were evaluated on a dual axis of vulnerability and ease of execution of the project. Vulnerability was evaluated on various parameters such as density of population, poverty ratios and the state of flooding, drought, energy shortages, sanitation issues, water pollution and health indicators. Ease of execution on the other axis, was measured on parameters such as accessibility of information, political and social environment, private sector participation, city layout and key indices on the ease of doing business.

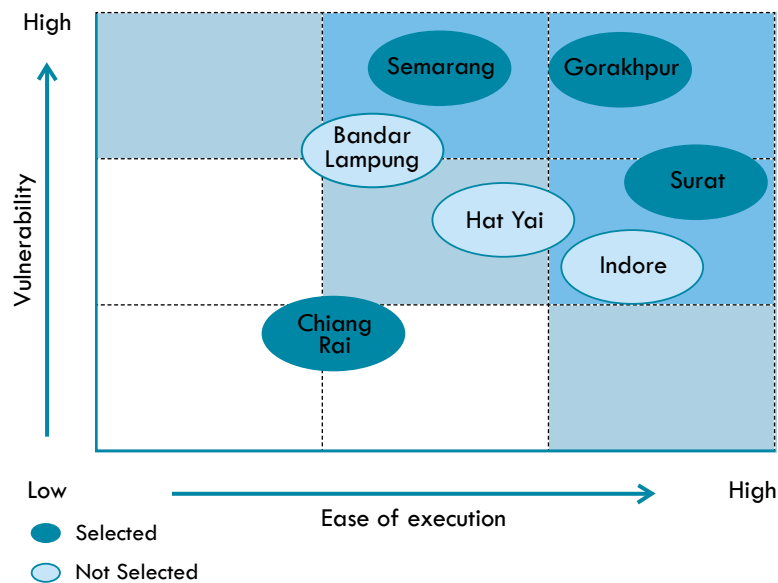


Figure 19: City Selection Framework

Semarang, Gorakhpur and Surat were clear choices for the study on private sector engagement in resilience building given the vulnerabilities and ease of execution, and ensured a spread across both India and Indonesia. Of the two Thai cities, Chiang Rai was selected over Hat Yai given its mountainous topography and variance in vulnerabilities when compared with the other three cities selected, two of which are on the coast.

## Appendix II: Climate Change Adaptation Funds

Government, Bilateral and Multilateral Funds	
Name	Description and Areas of Investment
<i>GEF Trust Fund</i>	<ul style="list-style-type: none"> <li>Disbursed over USD 2.55 billion to 663 Climate Change projects</li> <li>Provides loans, grants for projects in biodiversity, climate change, international waters, land degradation, the ozone layer, and persistent organic pollutants</li> </ul>
<i>Special Climate Change Fund</i>	<ul style="list-style-type: none"> <li>Supports capacity building for preventive measures, planning, preparedness and management of disasters related to climate change, including contingency planning for droughts and floods in areas prone to extreme weather events</li> <li>Sectors include technology transfer and capacity building, energy, transport, industry, agriculture, forestry, waste management and economic diversification</li> </ul>
<i>Adaptation Fund</i>	<ul style="list-style-type: none"> <li>Finances concrete adaptation projects and programs in developing countries that are particularly vulnerable to the adverse effects of climate change</li> <li>Financed from the share of proceeds of the Clean Development Mechanism (CDM) project activities and other sources of funding</li> </ul>
<i>Clean Technology Fund</i>	<ul style="list-style-type: none"> <li>Scaling-up financing for demonstration, deployment and transfer for low carbon technologies with potential for long-term greenhouse gas emissions savings USD 4.3 billion will be disbursed as grants, highly concessional loans, and risk mitigation instruments with a focus on transport and energy efficiency</li> </ul>
<i>Strategic Climate Fund</i>	<ul style="list-style-type: none"> <li>Provides financing to pilot new development approaches or to scale-up activities aimed at a specific climate change challenge</li> <li>Programs include Forest Investment Program, Pilot Program for Climate Resilience and for scaling-up renewable energy in low income countries</li> </ul>
<i>Least Developed Country (LDCs) Fund</i>	<ul style="list-style-type: none"> <li>Addresses needs of LDCs, which are vulnerable to the impacts of climate change</li> <li>Focus areas include preparing and implementing National Adaptation Programmes of Action (NAPAs)</li> </ul>
<i>Climate Change Fund</i>	<ul style="list-style-type: none"> <li>Set up in by the Government of Australia with a loan size of USD 700 million</li> <li>Focus areas include helping business, households, schools, communities and government save water, energy and greenhouse gas emissions</li> </ul>
<i>Bangladesh Climate Change Fund</i>	<ul style="list-style-type: none"> <li>Established by the Bangladeshi Government with initial contributions of £25 million (USD 40 million) with another £250million (USD 400 million) expected</li> <li>Focus areas include developing new flood and drought-resistant crops, raising embankments and flood defences to protect homes</li> </ul>
<i>Canadian Cooperation Fund on Climate Change</i>	<ul style="list-style-type: none"> <li>Assists and engages ADB's developing member countries at the programming and policy level in the management and abatement of climate change</li> <li>Focus areas include greenhouse gas emission reductions (China and India), carbon sequestration (Indonesia), climate change adaptation (Pacific countries)</li> </ul>
<i>Indonesia Climate Change Trust Fund</i>	<ul style="list-style-type: none"> <li>Investment towards low-carbon growth strategy and greater resilience to the negative impacts of climate change</li> <li>Focus areas include agriculture, health, water resources and coastal zone management</li> </ul>



In addition to the funds from multilateral organisations and governments, there are a number of funds that accept investments from private and institutional investors.

Private Investment Funds	
Name	Description and Areas of Investment
<i>World Bank / SEB “Green Bonds”</i>	<ul style="list-style-type: none"> <li>▪ Opportunity to invest in climate solutions through credit fixed income product</li> <li>▪ The inaugural issue of the product had USD 1.5 billion as investments</li> <li>▪ Sectors include flood protection, food security, stress-resilient crops and sustainable forest management</li> </ul>
<i>WHEB Sustainability Fund</i>	<ul style="list-style-type: none"> <li>▪ £20 million Environmental fund targeting companies involved in climate change, water treatment and demographics</li> <li>▪ Aims to achieve medium- to long term capital growth, exceeding the MCSI World Index’s performance</li> </ul>
<i>Schroders’ Global Climate Change Fund</i>	<ul style="list-style-type: none"> <li>▪ Investments in equities and securities of worldwide issuers which will benefit from efforts to accommodate or limit the impact of global climate change</li> <li>▪ Fund size of £29 million (USD 47 million); achieved a return of 15% in 2010</li> <li>▪ Targets companies that are going to be affected by global climate change and picks out 50-80 of those who are actively engaged in either mitigation</li> </ul>
<i>Calvert Investment Funds</i>	<ul style="list-style-type: none"> <li>▪ Provides climate specific funds (e.g. global alternative energy fund and water fund)</li> <li>▪ Assesses both risks and opportunities associated with climate change for companies across all sectors including an examination of GHG emissions inventories, mitigation efforts, adaptation strategies, and alternative energy investments in R&amp;D and/or clean-technology improvements</li> </ul>
<i>Triodos Climate Change Bonds</i>	<ul style="list-style-type: none"> <li>▪ Launched in December 2009 offering fixed interest rate for an agreed period of time</li> <li>▪ Assesses social and environmental benefits as criteria for financing</li> </ul>
<i>Tiburón Green</i>	<ul style="list-style-type: none"> <li>▪ Aims to tackle climate change in Asia, by investing in renewable energy</li> <li>▪ Focus areas include wind equipment developers and solar energy companies</li> </ul>
<i>Good Energies</i>	<ul style="list-style-type: none"> <li>▪ Global private equity investor in renewable energy and energy efficiency industries</li> <li>▪ Invests in solar, turbine-based renewables, green building technologies and other emerging areas within clean energy</li> </ul>
<i>Generation Investment Management</i>	<ul style="list-style-type: none"> <li>▪ Investments in private equity, restricted and unrestricted public equity with a focus on sustainability factors, including social and environmental responsibility and corporate governance</li> <li>▪ Focused on deploying capital into companies that are part of the transition from a high-carbon to a low-carbon economy</li> <li>▪ Key areas include renewable energy, energy efficiency, carbon markets and climate-related financial services and solutions for the biomass economy</li> </ul>
<i>Epuron</i>	<ul style="list-style-type: none"> <li>▪ Provides development and project financing services for renewable energy markets - wind, bio, solar</li> </ul>

## Abbreviations

<b>ACCCRN</b>	Asian Cities Climate Change Resilience Network
<b>BOP</b>	Base of the Pyramid
<b>CBHI</b>	Community Based Health Insurance
<b>CBO</b>	Community Based Organisation
<b>CDM</b>	Clean Development Mechanism
<b>COC</b>	Community Owned Company
<b>CODI</b>	Community Organisations Development Institute
<b>CSR</b>	Corporate Social Responsibility
<b>ICT</b>	Information and Communication Technology
<b>MFI</b>	Microfinance Institution
<b>NGO</b>	Non-governmental Organisation
<b>POU</b>	Point of Use
<b>PPP</b>	Public Private Partnership
<b>RSBY</b>	Rashtriya Swasthya Bima Yojana
<b>SE</b>	Social Enterprise
<b>SHF</b>	Semarang Housing Finance
<b>SMC</b>	Surat Municipal Corporation
<b>SME</b>	Small and Medium Enterprises
<b>TOP</b>	Top of the Pyramid
<b>TPA</b>	Third-party Administration
<b>UCCRB</b>	Urban Climate Change Resilience Building
<b>UHC</b>	Universal Health Care
<b>VET</b>	Vocational Education and Training

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ACCCRN aims to catalyse attention, funding and action to building climate change resilience for the urban poor by creating robust models and methodologies for assessing and addressing risks through the active engagement of ten cities in four Asian countries: India, Indonesia, Thailand and Vietnam. Through a consortium of organisations including experts, national partners, local governments, and other organizations, ACCCRN enables each partner city to confront the complexities of climate change and develop local capacities to address specific challenges.

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