Informality and Resilience: Bidhannagar Solutions Basket

Background

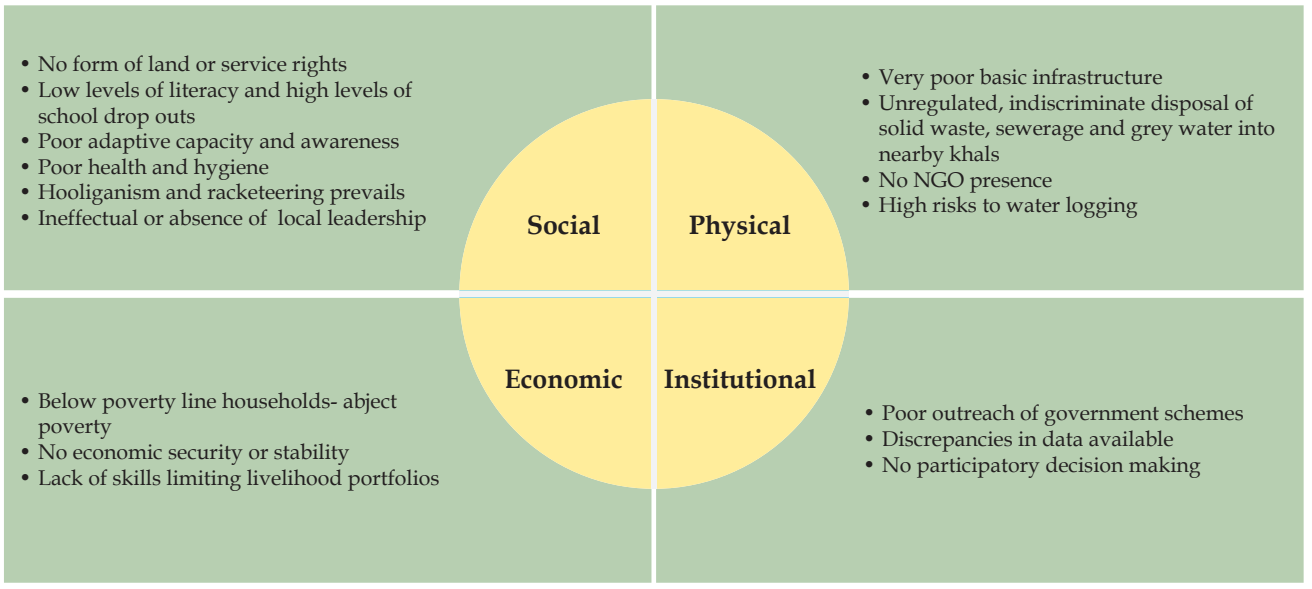
Bidhannagar is located on the north and north eastern edge of the city of Kolkata, West Bengal and occupies an area of 65.5 sq km. It is administered by Bidhannagar Municipal Corporation (BMC) which was notified on 18th June 2015 by amalgamating two municipal areas and one gram panchayat, namely, Bidhannagar, Rajarhat-Gopalpur and Mahisbathan-II respectively and has a total population of 6,34,107 (Census 2011). Each of these areas has distinctly different characteristics. Rajarhat-Gopalpur and Mahisbathan-II Gram Panchayat (GP), being densely populated suburbs with only basic infrastructure facilities and Bidhannagar mainly a planned township with advanced infrastructure. There are around 202 slums in Bidhannagar with a population of 1,795,817 making up 29% of the total city's population.

The Informal Settlements

Udayanpally is a notified slum occupying around 85,000 sq m area on land belonging to the Irrigation Department in the old Bidhannagar area of the newly formed BMC. The slum is located on the banks of Krishnapur Khal occupied by 800 households who are mostly migrants from surrounding areas of West Bengal like Murshidabad, Medinipur, Sunderbans, Burdwan, Howrah and some parts of Bangladesh. Majority of the people living here belong to the Scheduled Caste (SC) category. Municipal services within this slum are poor however, a number of interventions have been planned, and some initiated by the BMC to improve the conditions in the slum through existing government schemes.

Harichandpally is a non notified slum occupying an area of 47,850 sq. m. on land belonging to the Public Works Department (PWD) and a private college called IIBRAD in the Prafulla Kanan-West area of the newly formed BMC. The slum is located very close to a canal-Kestopur Khal and is inhabited by 320 families who are mostly permanent migrants from surrounding areas like the Sunderbans and Bangladesh. Majority of these people are Tribal and Dalit Hindus who fall in the Below Poverty Line (BPL) category. Municipal services within this slum are largely absent and the situation of the slum is reflected in its surroundings.

Problem Statement



Slums in Bidhannagar fare poorly irrespective of their legal status. Lack of any form of service or land rights and awareness levels on the same has resulted in not just poor basic physical infrastructure, but also poor social infrastructure. High poverty levels, no economic security and limited livelihood options drive down literacy and education levels in the slum and vice-versa. Minimal existing service infrastructure like water supply, sanitation, drainage and solid waste will be further compromised by climate shocks affecting health, livelihood and quality of life. Existing barriers to institutional support, if not rectified, will restrict resilience building and adaptation within these slums.

Suggested Interventions

In order to address the issues identified in the problem statement, a solutions basket was developed. Solutions have been put forward sector wise (Physical, Economic, Social and Governance- Table 1), keeping in line with the thread as identified in the problem statement.

a. Methodology

A combination of different methods was employed to identify appropriate solutions that aptly address the problems faced by informal settlement dwellers in the context of building climate resilience.

Workshops

'Reality check' workshops were organized as part of a regional conference- Resilient Cities Asia Pacific 2016 (RCAP) in the month of March at Melaka, Malaysia to gather external inputs. In these workshops, inputs were sourced from a panel of experts who were presented with the problems faced by informal settlers of the selected cities. Panel experts comprised organizations like ARKOJAM, YUVA, GIZ (through the Nexus programme); city mayors and administrators from cities across Asia- Pacific and subject matter specialists. The workshops helped to identify a bigger basket of possible solutions, which would help address the issues faced by informal settlements.

Literature review

To supplement the deliberations from the workshops, an exhaustive literature review was conducted. Case studies from across the world were analysed for their feasibility of implementation within the context of the selected city and problems. Solutions that fit within the four sectors of the problem were included as part of the city specific solutions basket.

Discussions with the City and the Community

Discussions were carried out with the city municipal officials and their feedback was sourced. The primary stakeholder- the community- was approached and consulted with regards to the prioritized solutions. Relevant inclusions and modifications were made to the interventions as per the results of these discussions.

Resilience and Feasibility assessment

The identified climate resilience actions were then evaluated in terms of their resilience (redundancy, flexibility / robustness, responsiveness / re-organisation, capacity to learn), feasibility (technical, political, cost), and benefits of the action (short term/ medium term/long term). On the basis of these criteria their applicability for the city has been identified.

b. Solutions baskets

The solutions basket thus developed for Bidhannagar is presented in Table 1. Solutions are categorized by Sectors- Physical, Economic, Social and Governance. Any government funds (schemes, programmes, missions) that link with the solution, the reactions of city officials and community representatives are mentioned. Finally, the association of solutions with other sectors is suggested to qualify the magnitude of impact that it might have.

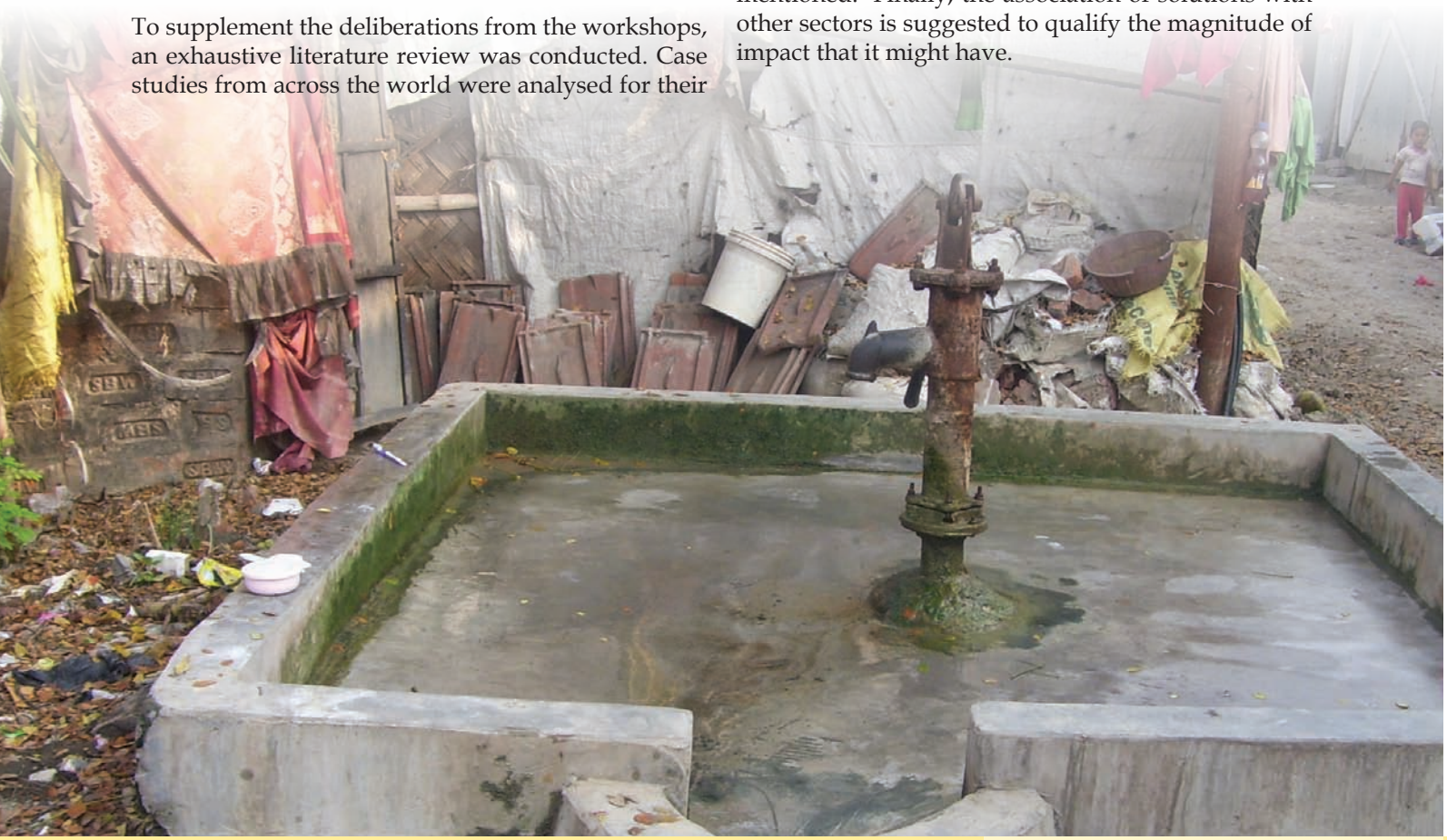


Table 1: Solutions Basket for Bidhannagar City

Solution intervention with details	Any city scheme/ funds addressing the same	City reactions	Community reactions
Physical (interlinks with Economic, Social and Governance Sectors)			
Slum Reblocking*- rearrangements of densely-packed shacks are rearranged to open up common public space, access roads, and basic service infrastructure installation	Basic Services to the Urban Poor (BSUP)	As this intervention is not in the scope of the project, these reactions were not solicited	
Low cost green housing*	BSUP	As this intervention is not in the scope of the project, these reactions were not solicited	
Development of a comprehensive City Sanitation Plan with special focus on slums	Ministry of Urban Development (MoUD)	The city is in the process of developing a solid waste management plan.	N/A
Composting and small resource recovery centre	Swatch Bharat Mission (SBM)	This has been planned by the Mayor in Council of Bidhannagar and discussions are underway.	The community is open to this if there is the option of some income from the activity
Toilet ■ EcoSan Toilet ■ Biodigestor toilet ■ Pay and Use community toilets ■ Solar powered bio toilets	SBM, Integrated Low Cost Sanitation Scheme (ILCS)	As sanitation is a priority of the central, state and local governments, this suggestion was well received.	Due to the lack of proper toilets and the unhygienic conditions within the slum, the community was very interested in the construction of individual toilets or toilets that could be shared between two-three households.
DEWATS (Decentralised Waste water Treatment Systems)	SBM, Atal Mission for Rejuvenation and Urban Transformation (AMRUT)	The municipality is not fully appraised of the advantages of DEWATS and expressed reservations with regards to the state of the DEWATS during the monsoons when the city is at risk to water logging.	The community felt it was not aesthetically pleasing and were worried about odour and hygiene.
Storm water management ■ Storage type devices*: Detention ponds, Retention ponds, Onsite Detention, Rainwater Harvesting, Green roofs/ vertical gardens, Constructed wetlands ■ Infiltration devices*: infiltration trenches, grass filter strips, grass swales, pervious pavements, infiltration basin	AMRUT	As this intervention is not in the scope of the project, these reactions were not solicited	
■ Storm water drainage and sewers-concrete/stone closed drains	AMRUT	The municipality is incrementally working on expanding the coverage of drainage within slums.	The community felt that it was important to have covered drains to prevent the spread of disease in the area.

Solution intervention with details	Any city scheme/ funds addressing the same	City reactions	Community reactions
Water Infrastructure ■ Rain Water Harvesting ■ Water ATMs ■ Water supply infrastructure from Municipality	AMRUT	The city was eager for additional assistance in providing water infrastructure to the slums.	Unreserved acceptance as they have to buy water and carry it across a long distance. The community appeared to prefer Water ATMs
Phyto-remediation*	N/A	As this intervention is not in the scope of the project, these reactions were not solicited	
Revival of Khals- Fencing, cleaning, using reed beds	SMART city, City beautification funds	Irrigation department does the cleaning of Khals on an annual basis across the city.	The community has been involved in the cleaning of Khals and sometimes is employed by the irrigation department.
Economic (interlinks with Physical, Social and Governance Sectors)			
Formation of Savings Groups- where members of Savings Groups (SGs) save together, lend their savings to each other with interest, and share the profits.	National Urban Livelihood Mission (NULM)	There were no reservations to the initiative and the city was happy to support it if tangible results could be demonstrated.	The community was interested to know how the formation of such groups could benefit them.
Communal refrigeration* for informal food vendors	NULM	As this intervention is not in the scope of the project, these reactions were not solicited	
Activities that will contribute to economic wellbeing ■ Briquette making ■ Composting: Pot Composting; Pit composting; Drum composting; Vermiculture/ Vermibeds; using black soldier flies ■ Construction materials eg; Stabilised, soil bricks (SSB), plastic beams ■ Upcycling ■ Vertical food gardens/garden in a sack ■ Tailoring ■ Trash to Cash	NULM	The officials suggested that this could be linked with the National Urban Livelihood Mission.	The community was interested to know how they could generate additional income from these activities.
Hygiene and food handling training* for informal food vendors	NULM	As this intervention is not in the scope of the project, these reactions were not solicited	
Informal worker associations*	N/A	As this intervention is not in the scope of the project, these reactions were not solicited	
Social (interlinks with Physical, Economic and Governance Sectors)			
Formation, development and capacitating local SHGs which can then be organized into Area Level Federations	NULM	The National Urban Livelihood Mission supports the formation of Self Help Groups and Area Level Federations.	The community is eager to take this forward.
Family Planning programmes	National Urban Health Mission (NUHM)	Under the National Urban Health Mission family planning and family welfare is targeted.	The community has limited awareness on this.
Capacity building and awareness generation on key behaviours to facilitate better sanitary and health practices, water treatment, maintenance of infrastructure	N/A	The city believes that soft measures are required to supplement infrastructure.	Community is open this activity.

Solution intervention with details	Any city scheme/ funds addressing the same	City reactions	Community reactions
Mobile hospitals and health camps*	NUHM	As this intervention is not in the scope of the project, these reactions were not solicited	
Establishment of a non-formal education centre within the community centre	N/A	N/A	Previously in one of the slums there was an NGO working on education, however currently there is no one facilitating the provision of this service. The community requested that this is restarted.
Setting up of information booths to better equip slum dwellers with the knowledge on latest schemes, how to approach the city and the corporators, their right to information, and advocacy.	N/A	The city already provides an information desk at the municipality level and do not have the capacity to do so at a slum level.	The community suggested this as they felt oftentimes information is presented to them based on the political motive and they are unable to get the full picture. They are unsure as to how to approach the municipality with grievances other than through informal leaders.
Governance (interlinks with Physical, Economic and Social Sectors)			
Legal recognition of slums*	N/A	As this intervention is not in the scope of the project, these reactions were not solicited	
Affordable Housing *	Pradhan Mantri Awas Yojana	As this intervention is not in the scope of the project, these reactions were not solicited	
Adopt different conceptions of tenure security*	N/A	As this intervention is not in the scope of the project, these reactions were not solicited	
Slum land buy back at discounted rates where possible for slum dwellers*	N/A	As this intervention is not in the scope of the project, these reactions were not solicited	
Update slum information using slum residents as enumerators	N/A	The city is unsure as to how this can be implemented.	The community is open to this, especially if there is monetary compensation.
Use a community partnership model* for the delivery of services within slums.	N/A	As this intervention is not in the scope of the project, these reactions were not solicited	

**** Outside the scope of the project***

Table 2 comprises of the short-listed solutions after discussions with the city and community. Each intervention that is short-listed is detailed with its location, number, cost, conditions necessary to implement, the responsibility of management and monitoring.

Table 2: Prioritised Interventions for Bidhannagar City

Suggested intervention	Unit cost (INR)	Preconditions	Monitoring mechanism
Pit composting and small resource recovery centre.	7,00,000	0.5-0.6 acre of land is required for this. Site selection should avoid water logging prone areas	This intervention will be linked with the activities that contribute to economic wellbeing i.e. Composting. A self-financing mechanism will need to be put into place with monitoring by community themselves wherein community members derive a source of income from the activity.
EcoSan Toilet	11,000	Area feasibility	The councillor, informal leadership within the community and the Swachhata doots (if any) or members from the SHGs can comprise a committee overseeing the continued use of the toilets. Nashik Municipal Corporation will also ensure appropriate O&M.
Biodigestor toilet	15,000		
Biogas linked toilets	21,200		
Solar powered biotoilets	60,000		
Twin pit pour flush	7,300		
Portable toilet cabins	30,000		
Sulabh two pit toilet	30,000		
Sulabh community toilet	17,000-25,000		
Revival of Khals	Approx 16 lakhs	N/A	This intervention will need to be implemented along with the relevant training on hygiene and cleanliness. The families living close to the Khal and the informal leaders can be constituted into a committee who will be responsible for ensuring that no solid waste is thrown/ open defection occurs near the Khals.
Rain Water Harvesting structure	Between 30,000- 4.5 lakh	Feasible community structure	Monitoring of the structure will be done by setting up of a committee composed of the local councillor, community, municipality members (essentially a stakeholder representation).
Water ATMs	5,00,000	Feasible Water source	
Water Supply infrastructure	Depends on material and diameter of pipe used, labour charges.	Municipality commitment	
Briquette making	7 lakh INR	Scale dependent, market viability	Baseline survey before the intervention and follow up survey after the intervention. Documentation of the skill development programme and a follow up assessment after 3 months
Tailoring	NGO fee	Market viability	Baseline survey before the intervention and follow up survey after the intervention. Documentation of the skill development programme and a follow up assessment after 3 months

Suggested intervention	Unit cost (INR)	Preconditions	Monitoring mechanism
Composting: a) Pot Composting (HH or community); b) Drum composting; c) Vermiculture- vermi bed; d) using black soldier flies	a. 1200 75,000 depending on scale b. 4.5/l drum capacity c. 1250-1500 d. very low cost as black soldier flies occur naturally	N/A	Baseline survey before the intervention and follow up survey after the intervention. Documentation of the skill development programme and a follow up assessment after 3 months in addition to ensuring the success of a self financing mechanism to generate enough income opportunities for the employment of at least 3 people who will collect segregated waste and compost the same.
Construction materials- a. SSB; b. plastic lumber	a. 143,000- 199,500 b. unknown	Availability of space, Raw materials	Baseline survey before the intervention and follow up survey after the intervention. Documentation of the skill development programme and a follow up assessment after 3 months. The members interested in the same will need to be given access to micro-credit options.
Upcycling- Trash to cash	NGO fee	Market viability	Baseline survey before the intervention and follow up survey after the intervention. Documentation of the skill development programme and a follow up assessment after 3 months with extensive handholding by the NGO involved.
Formation, development and capacitating local SHGs which can lead to formation of Area Level Federations	NGO fee	Strong community presence	List with details of the members of the SHGs and documentation on the training and capacity building programme carried out supported by a pre and post training assessment.
Saving groups	NGO fee	Established SHG group or community group	Internal monitoring mechanism where group itself monitors the inflow and outflow of funds. Follow-up monitoring by NGO.
Capacity building and awareness generation on key behaviours to facilitate better sanitary and health practices, water treatment, maintenance of infrastructure	NGO fee	N/A	Reports on the programmes supported by pre- and post-training assessments.
Establishment of a non-formal education centre within the community centre	NGO fee	Availability of physical space to hold the classes.	Number of enrolments and subsequent follow ups regarding progress of students.

The short-listed interventions were then assessed by their resilience capacity in terms of their redundancy, flexibility, responsiveness and ability to increase access to information. The prioritised climate resilience interventions that had a medium or high score were then assessed for feasibility (technical, financial and political) and their impact (short, medium or long term).

Table 3: Resilience Prioritization and Feasibility Assessment of Short-listed Interventions

Suggested intervention	Overall Resilience	Overall Feasibility	Impact**
Pit composting and small resource recovery center	Medium	High	Short Term
Toilet infrastructure	Medium	High	Short Term
Revival of Khals	Medium	High	Short Term
Rain Water Harvesting structure	Medium	High	Short Term
Water ATMs	High	High	Short Term
Water Supply infrastructure- laying of water pipelines to provide House hold connections.	Low	Medium	Medium Term
Briquette making	Medium	High	Short Term
Composting	Medium	High	Short Term
Construction materials- a. SSB; b. plastic lumber	High	Medium	Short Term
Upcycling- Trash to cash	High	High	Short Term
Tailoring	High	High	Short Term
Formation, development and capacitating local SHGs which can lead to formation of Slum Level Federations	High	High	Long Term
Saving groups	High	High	Long Term
Capacity building and awareness generation on key behaviours to facilitate better sanitary and health practices, water treatment, maintenance of infrastructure	High	High	Long Term
Establishment of a non-formal education centre within the community centre	High	High	Medium Term

**Refers to duration of action

Both types of slums surveyed in Bidhannagar suffer from lack of basic infrastructure. Residents have no access to safe drinking water or sufficient sanitary facilities and are economically poorly off. Of the 15 interventions short-listed post discussions with the community and the city, one rated low on the resilience parameters and can be discarded from the list. The rest scored medium to high on the resilience criteria and were further assessed on feasibility parameters. It is important to focus on interventions that can not only fulfil basic needs of residents but also build resilience and provide some measure of economic welfare, for eg; setting up of a composting and material resource recovery center which will divert solid waste from the khals, bring in additional income from the selling of recyclables and compost, be used in agriculture and livestock rearing and prevent the flooding of the khals; rain water harvesting structures which will ensure a source of water supply, minimise non remunerative activities of having to fetch water from other wards and localities and act as a storage device for storm water management. Each intervention should be supplemented with a capacity building or awareness generation programme to ensure sustainability of the intervention.