

# C MAP SOLAR CASE STUDY

**SUNGAS PHASE 2 Advocacy and Pilots CMAP Solar  
Installation at the Media Shed, Okrika Waterfront**

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# EXECUTIVE SUMMARY:

## IIED/SUNGAS

The Sustainable Utilisation of Nigeria's Gas and Renewable Energy Resources (SUNGAS) project is an EC-funded project with the aim to reduce poverty and support socio-economic development in the Niger Delta by promoting decentralised access to sustainable modern energy services.

SDN's element of the project aimed at developing community-based energy initiatives in the Niger Delta using renewable energy resources.

The first phase of SDN's component of the SUNGAS project provided pilot communities opportunity to influence delivery of electricity through direct advocacy based on evidence of services in their area. The second phase focuses on creating opportunities for long-term sustainability of energy options and community involvement in the promotion of clean energy.

Between June 2012 and March 2014, SDN facilitated and implemented advocacy activities which contributed to help communities gain better access to service providers, opening communication channels between and among service providers, regulators, consumers and other stakeholders in the power sector.

Catalysing the renewable energy products' market in the Niger Delta region was a major goal of the project. Although nascent and comparatively small in terms of volume of sales, Nigeria's renewables market is dominated by various solar energy options. Thus, to catalyse this market in the sub region, SDN designed two solar pilots - solar lighting products outreach and solar powered media centre.

The overarching goal of Phase II of the SUNGAS project is to leverage on the awareness and interest generated by Phase I activities to trial and demonstrate small solar pilots in communities thereby catalysing local solar markets through demonstrations of products on commercially sustainable business models.

IIED, SDN and the Collaborative Media and Advocacy's Platform (CMAP)'s solar installation at the community radio project, Chicoco Radio's Media Shed in Okrika Waterfront Port Harcourt is a means of demonstrating the viability of solar to residents of Port Harcourt's water front slums and providing sustainable power to support CMAP's radio engineer training and cinema screening.



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## RATIONALE:

### CHICOCO RADIO MEDIA SHED

**“WE ALWAYS HAVE SPORADIC POWER SUPPLY, I USE KEROSENE FOR MY LOCAL LANTERN AND GAS FOR COOKING, I REFILL MY GAS CYLINDER FOR N 4000 EVERY MONTH”**

As speakers from Rivers State attest, unreliable energy supply costs 53.3 % of residents of low to middle income semi-urban communities in River State 1000 N per month. Due to the saturation of urban housing areas, the PHED output struggles to serve the amounting energy needs from over populated communities and the growing middle class’s need for appliances and computer charging facilities. Currently, grid electricity is cheaper (N6 per kWh), but its ‘sporadic’ and ‘erratic’ reputation means expensively fuelled generators (N35 per kWh) have become the main source of power for many urban and rural areas.

In August, 2009, the homes and businesses of 19,000 people were reduced to rubble over the course of a single weekend. As the displaced residents picked through the debris of their former lives, the governor declared his vision to transform Port Harcourt into a ‘garden city.’ Two years later the site remains derelict and overgrown. 480,000 people living in Port Harcourt waterfronts face the threat of demolition by the Rivers State Government. No plans exist to compensate or resettle residents. Given that 79% of Nigeria’s urban population live in slums, mass demolition – legal or otherwise – is unfeasible.

The purpose of CMAP’s Human City Project is to move from a process of demolition without prospect of regeneration to partnership-driven development within the waterfronts of Port Harcourt and the city at large. Following a participatory mapping of the waterfront community, Concerned Citizens came together to request a backs the development of the community, owned, governed and operated enterprise, Chicoco Radio.

Founded in response to the threat of slum demolitions, the Okrika waterfront community mobilized to form the group, the Concerned Citizens. Concerned Citizen’s works to raise awareness of citizen’s right to housing in River State.

As a response to the Concerned Citizens led community mobilisation and the subsequent local and national awareness of housing rights, the language of Amaechi’s ‘development’ has changed. There has been a marked shift in policy posture away from demolitions, toward the guised “urban renewal”.



Supported by CMAP's Human City Project, Concerned Citizens backs the development of the community, owned, governed and operated enterprise, Chicoco Radio.

The Chicoco Radio Media Shed means Waterfront communities will be able to share their vision of the city with the city. Films made by and about waterfront communities are screened in the cinema, local musicians will broadcast from Nigeria's first community radio station. The building and the area around it will provide community space for cultural and commercial activities.

In Okrika Waterfront, the Chicoco Media Centre was designed and built with local residents. The 'Media Shed' is a pilot sight to demonstrate low energy consumption and the viability of solar power, building the trust and capacity of community residents around the benefits of solar power.

"As we're in an informal, largely self-built community that has no municipal provision at all, it's really important that the facility can serve itself and can be off-grid," said M. Uwemedimo. "We have sun, we have wind, and so we want to harness that."

Demonstrating the capacity of waterfront communities to contribute to the city's development, the media centre combines local skills and materials with world-class design. Architecturally innovative, environmentally and economically sustainable, the media centre is set to be one of the city's landmark buildings promoting sustainable energy.

"All the systems will be operated and maintained by people who live here. They were installed by residents and members of the Chicoco team," said Uwemedimo.

From the offset of the design, The Media Centre was unlikely to be fully powered through renewable means given the intended expansion of the Centre and therefore demand for power and limited funding. A hybrid of solar and grid power, with a small generator for back up when both fail was designed as an achievable solution that will also act as a focal point of renewable power demonstration and meeting space throughout the Waterfront Communities.

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## **DESIGN PROCESS:** CHICOCO MEDIA CENTRE/ MEDIA SHED

**“A MICROPHONE IN THE HAND; AN IDEA IN THE HEAD;  
A NEW SOUND FOR THE CITY.”**

DJ MURPHY AMATARI POLO

### **KEY FUNCTIONAL REQUIREMENTS:**

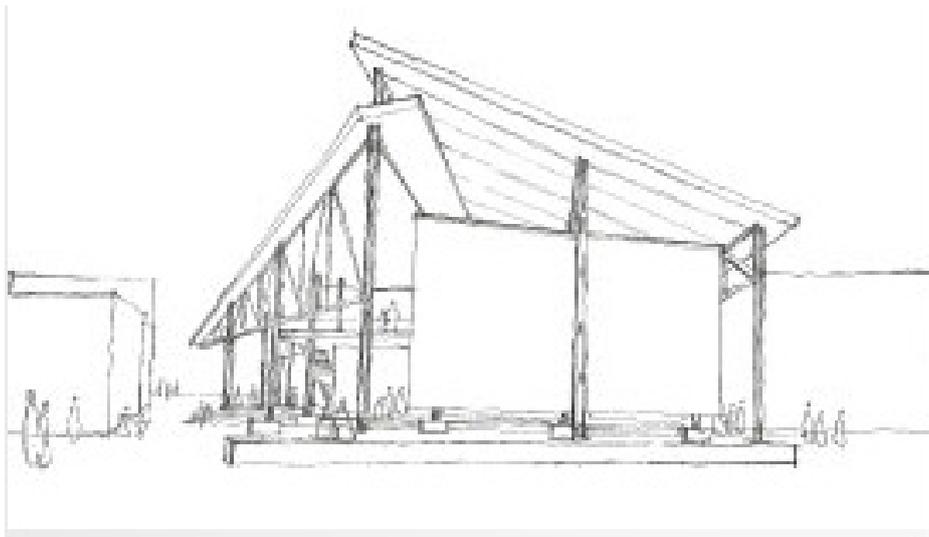
To provide a temporary radio training studio and a meeting and exhibition space for the Human City Project.

### **SECONDARY USES:**

To provide spaces for the community to use daily, including Town Hall meetings, public space, seating and sports such as climbing and table tennis.

### **OPPORTUNITIES:**

To create the first designed public space within the waterfront, to introduce simple building ideas with big impacts. To test construction ideas and understand how things get built in Port Harcourt. Conceived and constructed in collaboration with local residents, Chicoco media centre is a platform for community voice giving communities from across the city access to a radio station, recording studio, a media production suite, film library and cinema.





## OVERVIEW

Solar Powered Chicoco Radio at the Okrika Waterfront is currently being powered by a hybrid of renewable (solar) and grid power. The professional scoping of the media centre was carried out by Dr Louis Gyoh. The installation was carried out Creeds Energy, while Engr. Emmanuel Aku Collin, a solar expert, was engaged as an independent supervisor, to ensure best standards. Getting the system installed and operational was no mean feat as several hurdles and barriers had to be overcome. This notwithstanding however, SDN is proud to have been part of a ground breaking endeavour which has served as a reference point to thousands of Waterfront residents and has contributed to giving them voice and a platform to showcase their talents.

## SCOPING STUDY

The total cost allocated to the solar installation amounts to €24,000.

IIED, CMAP and SDN proposed that solar power could provide an improved options for stable power to media centre at Okrika Waterfront. As such, SDN commissioned the consultant, Dr Louis Gyoh, to make an assessment of power needs along with cost outlines of key options.

The Media Centre was considered as a solar demonstration site because of its potential to exhibit off grid power options, the scope to test combinations of wind and solar and its potential to provide data on actual performance of small solar installations.

The solar installation was installed at a stage where one media studio had been completed and equipped while further construction is being planned for a floating studio.

Dr Gyoh assessed overall power needs and options for the entire centre. He reviewed additional energy efficiency measures, however omitted them from the design following an evaluation of the steps taken to insulate the studio for sound appeared highly effective for reducing heat transmission.

A latter part of the exploration considered the options for providing a modular build of solar components where the first module can support the existing studio while being ready for upscaling once new construction is undertaken.

### OBJECTIVES OF SCOPING STUDY

- To establish the media centre energy load requirement
- To explore the potentials of the installation of solar photovoltaic power system
- To explore the possibility of a hybrid system that might include solar and wind energy.
- To examine the option of using solar powered a/c systems
- To explore design options that for prioritising energy loads connected to different circuits

### CHALLENGES

- A fixed decision had not been made, at the time of the scoping survey, as to the exact location of the second studio making it difficult to come up with a resolved design. Distances between facilities has a bearing of cable runs, cable size as well as the system voltage design
- A well-founded site plan was not developed at time of scoping. This impacts the planning phase due to the appropriate location of the solar array, so as to avoid shading and so also ensure the solar panels are properly accommodated.
- The general arrangement (GA) Drawing Plans of the media centre need to provide for appropriate housing in terms of location and ventilation of batteries and other Balance of system (BOS). At the time of the scoping survey, the GA drawings/ site plan needed to be made available for the purpose of design and specification of the proposed solar electric power system.

## PRELIMINARY PLAN

- Air conditioning at the media centre may be met by plug and play solar powered air conditioning systems. The concept of stand alone air conditioning was driven partly by availability in the market and by the idea of isolating its demand so that it does not impact on “core” demands. The use of air conditioning in the studios is seen as essential because they are highly insulated and the combination of people and equipment inevitably generates heat that will need to be dispersed both for personal comfort and maintenance of equipment.
- The proposed solar power system is design for eight hours daily use and may be configured to 24 or 48 volts. Systems connected at higher voltages draw less current and experience smaller transmission losses
- Autonomy may be built into the proposed photovoltaic power system given that Port Harcourt skies can be very cloudy and overcast.

There are several economic measures which were outlined to further reduce the building energy consumption rate and promote the renewable community radio training centre: -

1. Transition to low energy and low heat LED lighting
2. Improve thermostats for studios and temperature decision
3. Consider de-humidifier to compliment AC as a lower energy option for improving environment and comfort

## PARTNERSHIPS

CREEDS ENERGY is a professional renewable energy company dedicated to making clean energy technologies mainstream applications in households, businesses and communities.

CREEDS Energy was chosen to carry out the installation due to reliability and proven track record in renewable installations. They also have experience in the size of system proposed and a strong interest in lessons from such an pilot media installation.

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# IMPACT



## DEMONSTRATING SOLAR

Solar Demonstration points in spaces of public interest work to practically exhibit the benefits of solar, realising frequent public footfall and gaining support from public users. In Okrika, the media shed is a radio engineering training space, public shelter and further functions as an evening community meeting space. The IIED solar installation at Okrika Waterfront's Chicoco Media Centre means the community radio station functions as a 'secure and safe' meeting space after dark.

'The Media Shed is a light source at night. Light can make us feel safe' Student, Okrika

## BUILDING CAPACITY

"Out of the ghetto; over the water; across the city: i'm singing loud with chicoco radio." Sira Dumedam  
Police barracks (near cemetery waterside)

The Solar powered media shed is community space to host CMAP's broader training programs to build the capacity of marginalised communities in Port Harcourt to meaningfully participate in the development of their city, community engagement will form an integral part of the design process for the media centre.

35 waterfront residents with transferable skills in sound engineering, field recording, studio operation, news gathering and human rights journalism have completed basic radio technical training, human rights journalism training and online/social media journalism training programme in the solar powered media shed.

Increasingly, there is a need to establish a creative platform for waterfront residents to articulate their development vision for Port Harcourt and to discuss their role in it. The idea for a 'Media Centre' directly addresses this, providing a community radio station; media production facilities; as well as a meeting place for communities and international development partners. The media centre gives waterfront communities a space to come together as well as a way to reach wider audiences.

Importantly, the Media Centre is pilot demonstration phase in a participatory, pro-poor urban visioning process aimed at supporting and institutionalising more inclusive, productive and sustainable development approaches in the city.

**"MANY VOICES MAKE A CITY. SOME PEOPLE ARE TRYING TO TEAR THE CITY DOWN. BUT WE ARE CITY BUILDERS AND THIS IS OUR RHYTHM, OUR RIGHT, OUR VOICE."**

FAVOUR DARICK POLO WATERFRONT

## **AMPLIFYING VOICES FROM THE MARGINS - PATHWAYS TO PEACE**

“What a difference this could have made. All those youths who went on the outside to militancy, if instead of picking up a gun they could have used a camera or our voice... what a difference.” Fubara Tokubiye Samuel (Community Activist)

As a result of the CHicoco Media Shed construction and the radio engineering and journalism training, community peoples self-reported improved levels of confidence in their capacity to articulate their needs to government. As expressed by surveyed waterfront residents, the use of ‘voices’ not ‘guns’, suggest a steer away from violent action.

Concerned Citizens advocacy visits, as well as their support of the CMAP radio and media training, validates to the community, the benefit of using dialogue and documentation as tools for change. Interviewees see Chicoco radio as a gesture toward empowerment and employment as opposed to violent mobilisation against River State Government’s weak urban governance policies. The Media Shed is a central pilot site for green energy, community cohesion and stability in the waterfront slum.



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## PROJECT BACKGROUND

Emergent radio and media centre, Chicoco radio is a community-built waterfront radio station and media facility which aims to empowers residents to articulate their needs to authorities; develops and demonstrates local capacity; and fosters political will to transform policy. Chicoco radio is a sustainable community-owned, governed and operated radio station that serves the city. The community view the centre as a catalyst for community-led initiatives allowing people to directly improve their neighbourhoods.

Concerned Citizens and Chicoco Students co-operate with CMAP and local CSOs to research human rights abuse that worst affect their community. CMAP state that 50% of station programming addresses residents' priority issues, including those related to tenure security. CMAP further implement:

**“You Are Here”** A participatory Mapping project to collect spatial and demographic data to help inform future development plans, and literally put the waterfronts on the map.

**“The People’s Plan”** The drawing up of a policy framework for an inclusive planning process, increasing security and investment in slum upgrading and providing more sustainable development options for the city.



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## ACCESS TO POWER IN RIVERS STATE

The FGN estimates that roughly **60 % OF NIGERIANS - MORE THAN 80 MILLION PEOPLE - HAVE NO ACCESS TO ELECTRICITY** (Vision 20:2020).

The Council for Renewable Energy in Nigeria (CREN) states that erratic power supplies cripple development in the Delta, with power outages causing a loss of N126bn annually (CREN, 2009). The ‘erratic’ supply is arguably due to ‘faulty transmission and distribution lines’. In 2007, it was estimated that 20% of total electricity generated by Power Holding Company of Nigeria (PHCN) is lost through transmission and distribution before reaching the customers – losing around US\$600m a year (Lawal, 2007).

“We are connected to the grid however electricity supply is infrequent and sporadic. Majority of citizen use generator and fuel for their households and businesses” Ezekiel, Rumunduru

In line with CREN’s argument, Rivers State respondents experienced 5 months without continuous electricity in 2014. Yet, estimated and accelerated bills continued to be circulated by PHED. As such, community residents refused to pay due to the lack of service, meaning the majority of the community are still in debt to these unpaid charges.

*The money I spend to keep my business moving is more than my profit. I spend N15, 000 weekly to buy diesel and also pay my workers every month. In February, PHCN brought a bill of N31, 850. What for? Surprisingly last Saturday, they brought light that was not up to 15 minutes. To be frank, the light situation is not worth discussing because the more you are discussing it the more you will be hurt.*

**ENWEREM SANDRA, ENA CLASSIC BEAUTY HALL, RIVERS STATE**

Across urban sites in Rivers State, 96.7 % of respondents are connected to PHED supply of electricity, colloquially referred to as NEPA. However 63.3 % are dissatisfied with their electricity supply, frequently referring to the output as ‘sporadic’ and ‘epileptic’. 60% of those interviewed in urban and semi-urban areas state that electricity bills do not match their consumption.

In light of administrative neglect from PHED, solar energy is seen as a “less stressful” alternative by urban communities in our study. Residents are able to operate it autonomously, experiencing immediate gratification from the light source. However, cost implications continue to deter users.

“When I used to keep tabs last year, the nature of electricity supply was sporadic, sometimes an hour a day and other times 15 hours a day but since this year 2014 the supply has never been more than 2 hour for any day we get supply”



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## REGIONAL SIGNIFICANCE

The apparatus of oil and gas extraction has been the source of over \$300 billion in oil receipts since 1958. Nigeria is the world's seventh largest producer of oil and is a member of the BRINK countries (Brazil, Russia, Iraq, Nigeria and Kazakhstan) where production has significant potential for increase. Its gas reserves are considerable, and with new investment, will be of increasing domestic and international importance. The Niger Delta region is central to the energy security strategies of a number of major economies. Nigeria's leadership and commitment are important to the realisation of the ambitious objectives of the New Partnership for African Development (NEPAD), Millennium Development Goals (MDG) and African Union. Domestic and international observers stress the importance of the Niger Delta to the future stability of Nigeria. In turn, Nigeria is pivotal to stabilising the West African (Gulf of Guinea) sub-region both politically economically.

With the evermore rapid growth of the country's metropolitan areas - Nigeria is witnessing a massive 'urbanisation of poverty'. The nation's governance crisis is nowhere more apparent than in its cities and the human impact of the crisis nowhere more stark than in Port Harcourt. Given this context, the impacts of massive and rapid urbanisation in Nigeria are issues of national, regional, and ultimately international consequence.

For the millions of ordinary Nigerians living in poverty and held back by inadequate housing, poor services and diminished opportunities for formal employment the challenges of the cities are immediate and urgent. The Human City Project will make significant direct material improvements to the lives of tens of thousands of residents in Port Harcourt. It will enable planning for improvements to the lives of hundreds of thousands more across the city. This in itself would be a significant contribution to the Millennium Development Goal of improving the lives of one hundred million slum dwellers by 2020. While working in close collaboration with Port Harcourt's waterfront communities and other stakeholders, the Human City Project will develop solutions and models for rights protective, sustainable urban development that are scalable, replicable and globally transferable



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## Annex 1:

### Okrika Waterfront Community Profile

Population: 480,000 of Port Harcourt's population live in 49 waterfront communities. Okrika waterfront, a separate entity to Okrika Island, has three major 'polos' or districts; Darick polo, Warika polo and Aminatari polo. The smallest polo has approximately 320 buildings with an average family of 5. The approximate population of the three polos is between 15,000 and 20,000. There is currently no reliable demographic data on Okrika Waterfront. A participatory mapping with residents would provide a truer reflection of the community make-up. Moreover, the names of areas and polos are to some degree contested and reflect an underlying ethnic tension in the community.

Average income: For residents, occupations in the low income bracket earn very little disposable income beyond day-to-day necessity. Such services include: 'beauty services', tailoring repairs and small scale fishermen. Respondents note that young men in the community would be involved in casual labour and construction. The low to medium income bracket includes skilled tradesman; owners of small businesses; and small landlords or property owners. Senior civil servants and large landlords would be in the medium to high earning bracket.

Geographic area : Okrika waterfront is the result of a federal government sand fill project. As such, it could be classed as an 'informal settlement'. Although the waterside communities are home to 480,000 people, they are yet to be included on a formal map of the city.

Ethnicities: Okrika; Kalabari; Ogoni; Ibibio

Access to media: Many residents have access to DSTV, often through informally shared connections. Young people access internet through their phones. Residents use radio handsets to access news. Popular radio stations are: 'Wazobia', 'Family Love' and 'Rhythms' radio stations. 84% of adults in the Niger delta are regular radio listeners.

Political affiliations: Port Harcourt City is People's Democratic Party affiliated. River State is led by Wicke Local Government Chairman. Respondents perceive the recent former internal PDP tensions between Amaechi and President Goodluck Jonathan to disrupt the dynamic between River State and the Federal body. Moreover, interviewees in the community perceive Amaechi's forced evictions are based on an 'ethnic' agenda to remove Okrikan peoples from an Ikwerre dominated PHC. The communities questions whether the violence demolitions are centered on political hostility or tribal hatred.

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## Annex 1: ECONOMIC PROFILE

Lying on the river banks of greater Port Harcourt, the 'mother' city became the operational base for multinational petro- businesses post 1950. The oil boom led to a rapid influx of migrants in search of job opportunities.

Reliable data on Okrika Waterfront's economy is limited due to the current perception that the waterside communities are informal 'townships'. However interviewees depicted that, much like the varied districts of Port Harcourt, the waterfront houses civil servants, academics, fishermen, fisherwomen and construction workers.

Unemployment is common in Okrika Waterfront, a residents goes some way to link employment with violence:

'The driver of crimes is lack of jobs. There are so many jobless persons. We cannot take away the blame from government. The government rig elections, they hire youths, they buy arms to promote their businesses'  
- Okrika Waterfront Resident

UN Habitat's 2009 assessment of Port Harcourt stated that the growth in the number of waterfront and waterside dwellers is due to the lack of affordable housing. 'Faced with the high cost of inner-city rentals and urban shelter deficits in Port Harcourt for many households, especially rural migrants, the only access to affordable housing was through reclamation of swamps along the many waterfronts and subsequent self-help housing construction.'

Relative deprivation of Okrikans, in relation to Port Harcourt City, is manifest in the local's economic exclusion from the housing market. The communities reclaimed the sand filled river-sides; now PHC's densely populated Okrika Waterfront.

Exclusion from the housing market arguably extends to exclusion from the formal job market. Although those interviewed define themselves as construction works and civil servants, many inhabitants depend on income-generating activities in the informal sector. From Amaechi's view, the uncontrolled growth of Okrika Waterfront and influx of migrant labours to the city, means the city cannot absorb the numbers needing: health care, piped water, sewer lines, roads and street lights.

The Budgetary allocation for Okrika, EMOHUA LGA is N. 2,129,693,980.31

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## Annex 1: SOCIAL PROFILE

‘Community’ is central to Okrikan’s social development. Interviewees proclaim that their relationship to the land is tangible in their investment in their homes. ‘As communities gain wealth they reinvest in their housing and neighbourhoods’.

With a former economy reliant on aquaculture, residents align a ‘cultural bond’ with water. The river silt extends the shorelines of Okrika waterfront and is the foundation of family homes. Chicoco mud, collected from the mangrove swamps in the creeks, is dug up and taken by boat back to waterfront neighbourhoods. The Chicoco is laid to create an extended shoreline upon which residents build homes, usually in concrete block. Respondents noted an average household of five persons.

Moreover, water sanitation affects the social mechanics of the community and health of the household. ‘We dump our waste in water, where else can we put it?’ George, Okrika Waterfront

One set of eight public toilets service the community. The toilets are not maintained. Okrika waterfront is deprived of affordable, accessible and acceptable facilities. Irrespective of this, respondents note that children swim in the creek despite most of the locals waste discharging directly into the water. The Human City Project team confirm, ‘This is the biggest challenge facing this self-built neighbourhood and contributes to the negative perception of waterfront communities.’