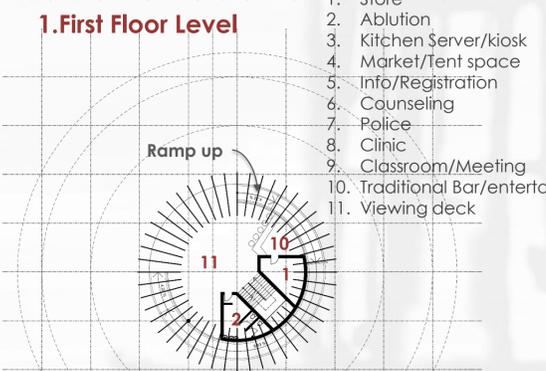
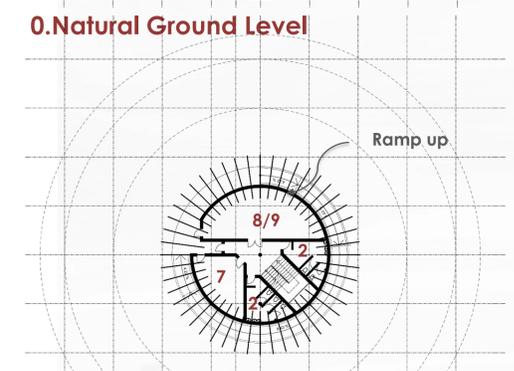
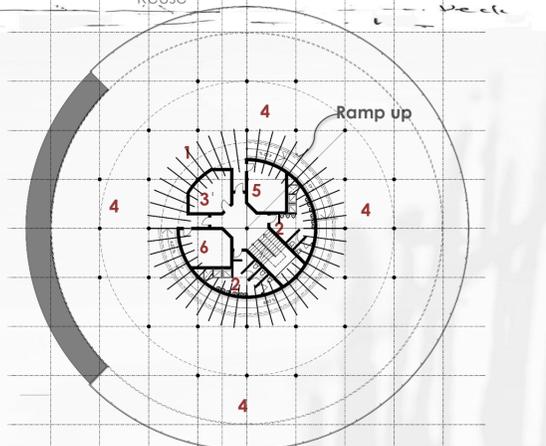
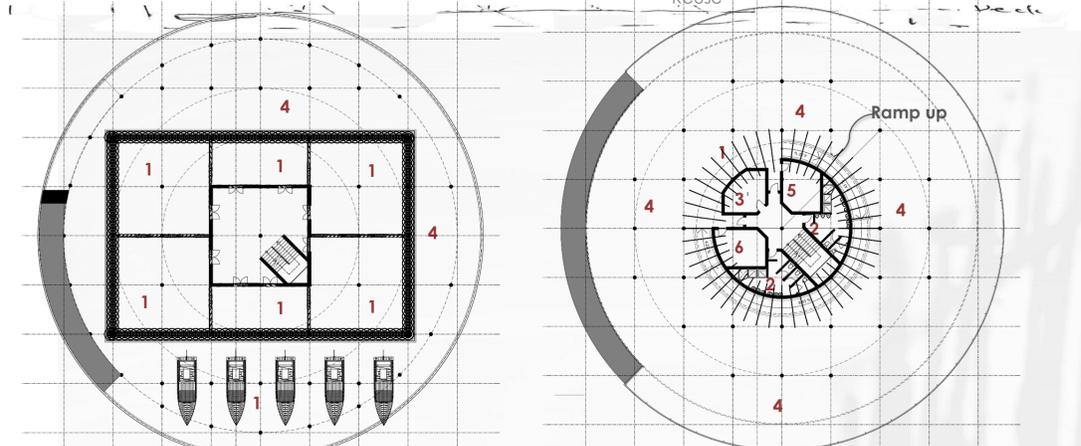
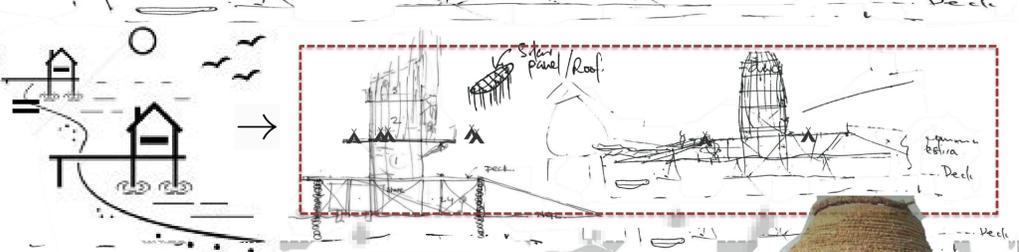
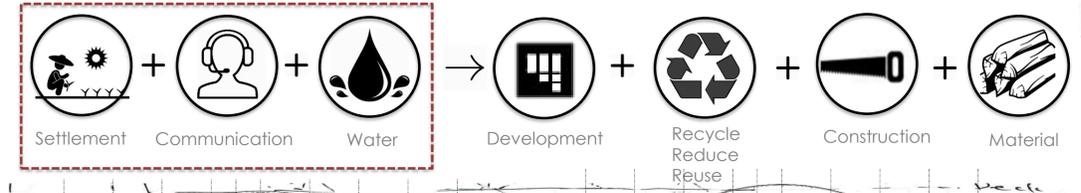


A general view of several Namibian homes submerged in water after recent floods in Ondangwa on May 7, 2009, some 700 km north of the Namibian capital Windhoek. At least 102 people have died this year in the worst flooding since 1972, which has affected 600,000 people across northern Namibia. The flood caused disrupts access to many basic facilities

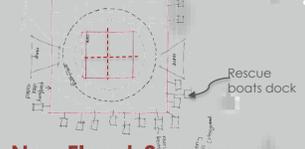
Concept Diagram



1. Store
2. Ablution
3. Kitchen Server/kiosk
4. Market/Tent space
5. Info/Registration
6. Counseling
7. Police
8. Clinic
9. Classroom/Meeting
10. Traditional Bar/entertainment
11. Viewing deck

Flexibility & Adaptability

The tower will be a reminder that residents should always be prepared for possible floods as well as a local open market during non-flooding seasons. Depending on placement, the tower will be minimum 4 layers/story's high structure, throughout Ondangwa.



FLEXIBLE CORE LAYOUT (PARTIAL WALLS) ALLOWS FOR ADAPTABILITY DEPENDING ON THE NEED OF THE AREA



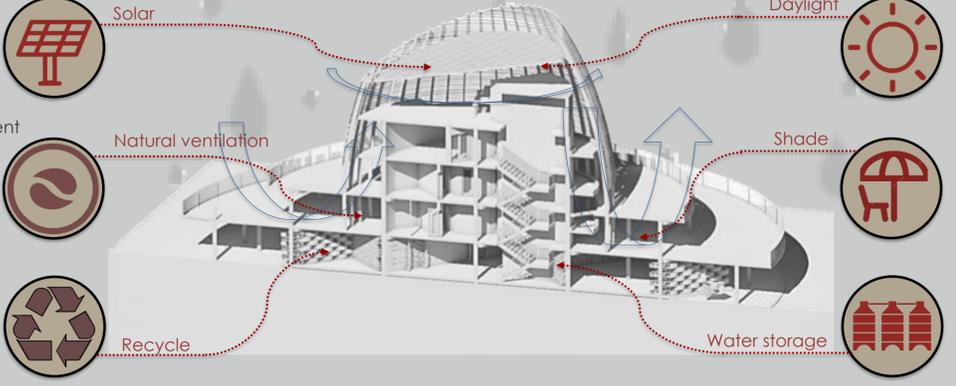
Concept

Eshisha - Traditional Granary Storage: Large basket/huts made to store mahangu (Sorghum). The basket is sealed with clay, and keeps moisture and insects out. This keeps the grain for several years.

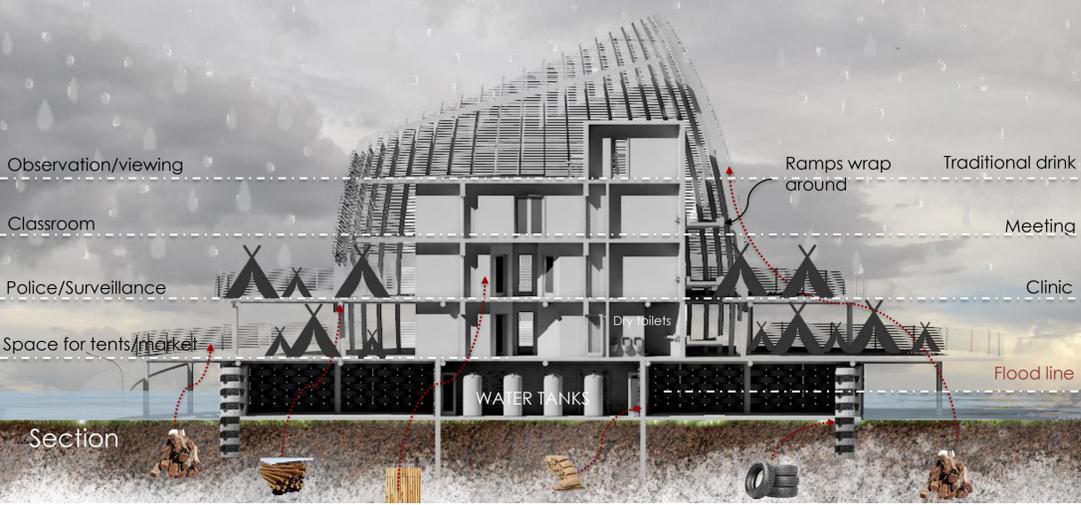
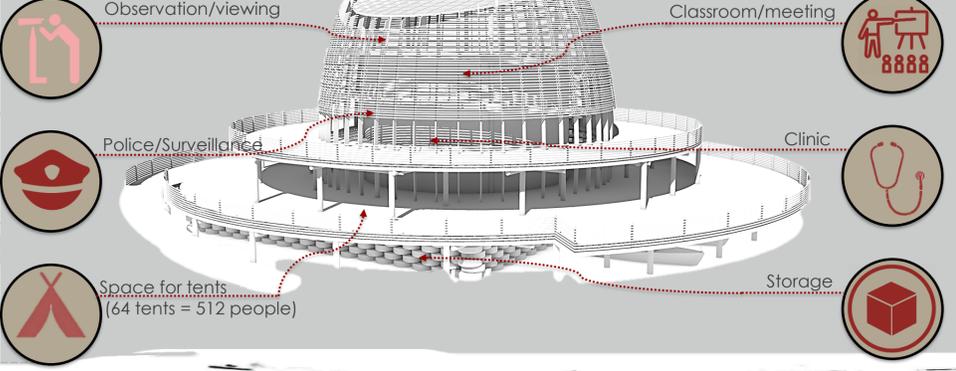
Non Flood-Season

THE TOWER BECOMES A MARKET PLACE FOR THE COMMUNITY

Sustainability



Activities



Key: Local Materials - built by locals

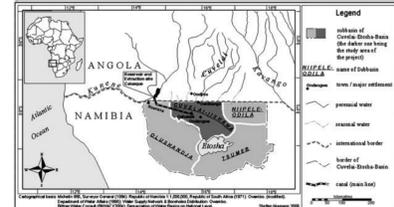


The common hazards, with potential for disasters, in Namibia include floods, droughts, veldt fires, shack fires, and human and animal disease outbreaks. These have had adverse effects on the communities, the economy, infrastructure and the environment, as well as the development priorities of the country.

Major concerns identified in Namibia:
a. Removal of vegetation and degradation around informal settlements
b. Open solid waste and pollution of water resources
c. Flooding and Shack-Fire.



CUVELAI DELTA:
The Cuvelai basin is characterized by an interconnected system of shallow water courses, called Oshanas, which is the "life-support system" to the most densely populated area in the country. The water in the basin comes from local rainfall, runoff in rivers and underground water storage. The Cuvelai drainage system originates in Angola and spreads across the flat plains in Namibia. Major floods from local rainfall and floods from Angola, contribute to the formation of a wide network of waterways



Topography: There are no major views/vistas that surround the land, as Namibia is one of the flattest places on earth, with a typical gradient of 1:10 000 (slight drop of 1m every 10km), major contributing factor to the flooding.

MAIN CAUSES OF FLOODS IN THE CUVELAI BASIN AREA

The main cause of the floods, is the modification of the natural environment through the construction of new roads without proper environmental impact assessments to protect them and to preserve water courses through natural ways, by building the necessary facilities, such as bridges.

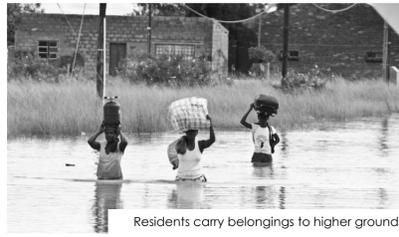
- Existing informal settlements in the main urban centers located in the water natural ways, blocking the water courses.
- Insufficient maintenance of the storm water systems (natural or man-made)
- Lack of proper Master Plans in the urban centers that consider storm water systems solutions and land use regulation.
- Fragility of building materials used for house construction in rural areas.
- Irregular land use process.
- Low perception of the flood risk.
- Traditions, way of life of local population

PROBLEM AT REGIONAL LEVEL: Based on recorded 2009 Flooding Statistics

- An average of 670,000 people are affected in the 6 regions, representing 83 percent of the total population in the region
- 21,000 of the affected population is displaced and 4000 were relocated.
- The floods resulted in the closure of more than 900 SMEs (small & medium enterprises, 24 roads, and 135 schools.
- Three settlements had their sewerage systems washed away, twelve clinics were cut off, 45,000 ha of agricultural land destroyed, and 3,000 livestock were lost (mostly goats).
- 71,000 people were estimated to be in critical need of food relief.
- Although higher water levels boosted fish capacity, these were feared to be contaminated from broke sewage systems.



Local Children excited to catch fish

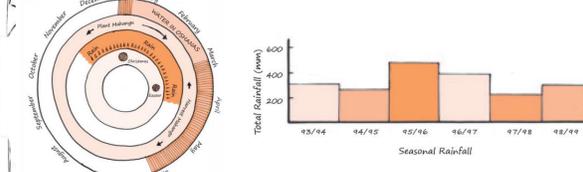


Residents carry belongings to higher ground



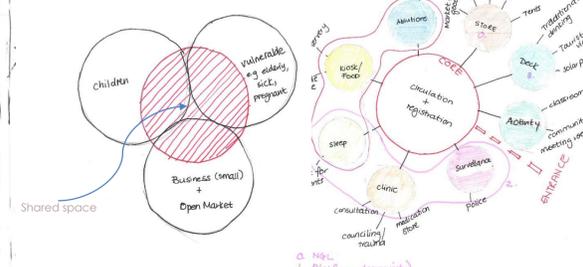
Floods displace businesses

Although though it is hard to predict the effects of future climate; Farmers, resources, users and inhabitants are at risk and need an intervention to manage the associated seasonal flooding.



What is the Relief tower?

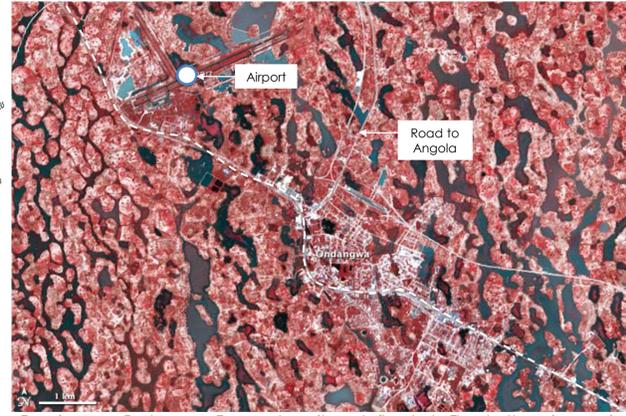
A Flood Relief Tower is a vertical element, situated in areas of high flood risk in the rural and informal settlements, which provides residents with an alternative means of evacuation, storage, reduced levels of property loss and provides visual orientation in a low-rise landscape.



The purpose of this RESILIENT DESIGN PROPOSAL is to find a solution to the problems identified, by developing an urban spatial framework for Ondangwa town, Namibia. This will be catalysts for surrounding towns in the region of similar nature. The design may not resolve the natural disaster, but it will formulate a response at macro level (town scale) and micro scale (community scale) post disaster.

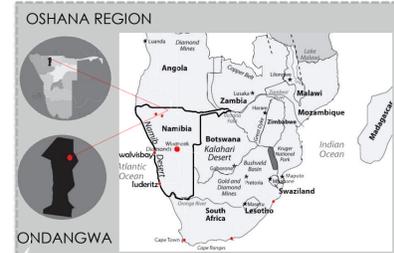


Ondangwa town; GOOGLE EARTH: 17.9052° S, 15.9759° E



Top image: Ondangwa Town when its not flooded. The bottom image is Ondangwa Town illustrating the Flood impact at Town Scale - as if it is built on a pond. Red areas show the land covered by Plants, the white is the bare earth and the tiny red flecks show the agricultural fields (punctuate the landscape). Photo: earthobservatory.nasa.gov

Concept Diagram



SITE - ONDANGWA TOWN
Ondangwa is situated in the Oshana region in northern Namibia. The name "Oshana" comes from the description of the prominent landscape; as shallow, seasonally flooded depressions.

The Oshana region has 3 major towns; Oshakati, Ongwediva and Ondangwa. The 3-town complex has experienced dramatic urban growth in recent years and forms an important commercial and potential industrial focus.

As a whole, it forms the second largest population concentration in Namibia after Windhoek, but it still lacks basic infrastructure, services and facilities.

The small rural town of Ondangwa is under developed and serves as a gateway to the northern towns, villages and Angola. Currently it is only a pass-through settlement for travelers on the national road from Windhoek to Angola.

The town has approximately 30 000 inhabitants. About 1000 stay in the 'town' and 29 000 reside in the surrounding farms.

Almost 40 % of the population residing in Ondangwa town is at risk during a flood event particularly those living in informal settlements and low-lying areas. The less populated central areas are characterized by subsistence farming and few settlements, so the major affectations are mostly related to the loss of crops and livestock. In both cases, during flood events, many roads are washed away, and some communities are isolated on islands in the middle of pools of water.



Homes submerged in water

INTERVENTION AT THE TIME

- 110 relocation camps were set up in the six Northern regions to host the displaced (2009).
- The regional authorities set up and administered the camps - installed
 - pit latrines,
 - showers/bathing facilities
 - basic water supplies
 - Tents and blankets
 - water purification
 - And mosquito nets for the displaced community.



MAJOR PROBLEMS IDENTIFIED AS A TOWN:

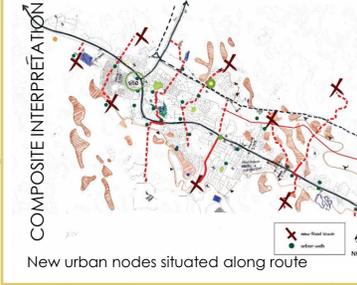
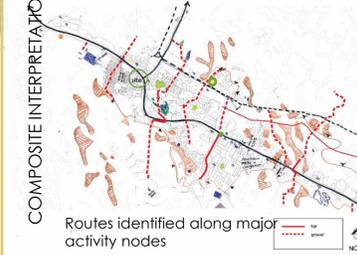
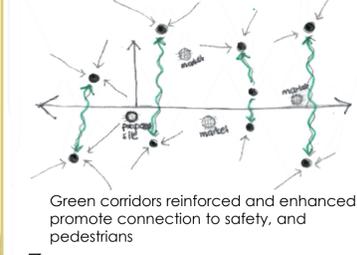
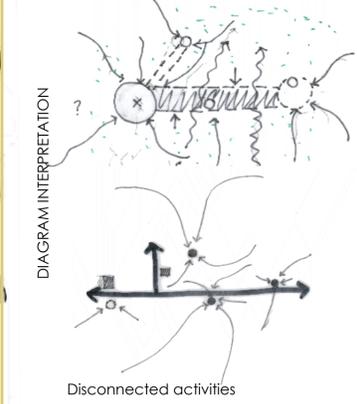
- Canals that are meant to direct the water cannot cope
- Sewerage overflows
- Water supply is disrupted.

The danger of flooding has been a major challenge in the past and still is presently. The impact goes beyond farming -

- Children cannot attend school
- Damages and losses to the public and private sectors/buildings
- Business income decreases (months at a time)
- Many people are forced to move to emergency camps, which creates further challenges (unhealthy)
- Harsh health risks (water-borne diseases and increased malaria) are worsened because people are unable to access nearby health facilities
- Increase in drought
- Loss of human lives due to drowning and attack by wild life animals.
- Lack of accessibility to some basic social services as well as settlements
- Contamination of the superficial and underground water due to the overflow of wells and septic tanks located in some parts of the town and overflow of the oxidation ponds.
- Relocation of affected population to the safer areas into the town or in other high places cannot accommodate the crowds
- Loss of crops/Agriculture

CONCEPT AT TOWN SCALE [DIAGRAM]

The intervention will be to introduce flood relief towers along strategic routes that provide safety for the community



SETTLEMENTS AFFECTED:

Rural and informal settlements across the town/regions

SPATIAL REQUIREMENTS:

- (Activities) that take place
 - Registration/information space
 - Community groups/ police/ emergency gathering when it is not flooding season
 - Clinic (for medication -HIV & TB)
 - Counselling/psychological support
 - Classroom + activities (traditional games) space
 - Viewing tower for tourists
 - Small shops/Kiosk
 - Temporary accommodation space - allow for tents
 - Storage facility for those near or without vehicle access in transporting their belongings to higher ground; Space for Emergency equipment (food, supplies, water purification, mattresses, blankets)
 - Toilets/bathroom (avoid people using the bushes that is unhealthy and cause malaria and increase in cholera outbreak
 - and increase in cholera outbreak

CONSTRUCTION FEATURES

- Sustainable
- Cost-effective and feasible
- Adaptable & Flexible (Versatile and convertible)

OPPORTUNITY AT COMMUNITY SCALE:

Flood mitigation for the Town (connecting linear routes supported by the different nodes - towers, urban agricultural wells, markets)

USERS CONSIDERED:

The community that are affected by the flood, especially vulnerable people (Pregnant women, Disabled persons, children, elderly people, HIV & TB patients). Currently residents are relocated to safe houses i.e. Ondangwa Community Hall and traditional authority buildings, schools; and a relocation camp (an area near the airport)

INTERVENTION OBJECTIVES

- To Create a sense of place
- To Save lives
- Prevent Mass Migration
- Ensure access to public services for all the people
- Establish conditions for restoring self - reliance
- Minimize damage resulting from flood emergency
- Sustainable Solution: natural environment & human development
- Uniqueness

DESIGN STRATEGY

The concept for the community aims to respond to the natural and manmade disturbances, as a long-term change, that resulted from the hazards.

- Study and critically analyse the Town and its relationship with flood plains/Oshanas; formulate a response at macro level (town scale) and investigate the spatial characteristics that are relevant at community scale.
- The Intervention supports the relationships between interaction of work (income generating) and building the community - this will in turn provide a sense of ownership by improving quality of life.

CONCLUSION

Investing in an integrated urban strategy is less costly than taking a risk and not doing anything about it. The platform serves as a catalyst for other villages in and around the regions, to form a flood response strategy. It can also be adapted (size) depending on the need of the area.

CAPACITY PER TOWER

