

THE DISASTER KIT



Re-humanising disaster response solutions.

This project seeks to explore how can we better design permanent disaster response housing solutions to be sustainable, adaptable, humanistic and easy to assemble/repair whilst standing up to increasing extreme weather in pacific nations. The project draws inspiration from traditional Polynesian forms, originating in a united culture that spans over 800,000 sq miles.

The disaster kit is a simple kit of parts that can be transported on the back of a small truck, constructed using simple hand tools and can be broken into three types of unit based on the fundamental human tāwharau (shelter) requirements. Social, sleep and wash units can be combined, mixed and matched, and opened up into one large space. The kit comprises of a folding base, swivelling walls/pegboard panels, bamboo poles, triangular panels, adjustable cane shading, and Hubs geodesic dome connector kit. This modular kit can also be added to with transparent photovoltaic panels, grow zones and other customisable options, offering the option for communities to become self-reliant.

The disaster kit offers the option for locals to replace components if damage occurs, rather than undertaking larger construction jobs that often require highly skilled individuals. This helps the community to focus on what matters most to them post disaster, and allows them to remain geographically close to their whenua (land).



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The Brief.

During a semester abroad in New Zealand, I decided to partake in the 2019 climate strike. 40,000 people took to the streets of the nations capital, walking through the CBD to the parliament square (or "beehive") to witness and join in showing a united community, worried about our planets rising sea levels, forest fires and increasingly violent weather. It was during this walk, when the crowd suddenly spontaneously started singing a traditional Māori folk song called "Te iwi e", with everyone joining in, regardless of nationality, in one united community. The song is about ties to land, home and heritage in response to urbanisation.

I became aware of a growing problem in pacific Polynesian nations, rising sea levels meant many were losing their homes to cyclones, flooding, and tremors, all increasing in severity and frequency. A group called the Pacific Climate Warriors spoke of what it was like to see their relatives repeatedly lose their homes, to be waiting for a new home, or for some, to have never visited where their family is from, due to migration to other nations for safety. But many still remain unwilling to move despite fears. They spoke of their anger and refusal to move saying:

"We are not drowning, we are fighting"

The disaster kit is a project that hopes to empower communities that disaster response housing can be simple and something that doesnt require 3rd parties. With a few kits on site, when a disaster strikes, a community can take action without the aid of outsiders to quickly construct refuge. The project is also self aware to know that such a large problem requires a much larger solution than a kit can offer, and that this issue is something I am lucky enough to have not experienced, but I do hope with being culturally sensitive and aware, the disaster kit can at least contribute to a solution.



George Nacewa works as part of climate action group 350 Fiji, part of the larger 350.org group. He is also part of the Pacific Climate Warriors Fiji team. George lives in Suva, in Fiji, and has first hand experiences in communities post disaster and has cultural and social knowledge of the communities that the disaster kit hopes to help.

1 connected culture spanning 3,000 years.



A Culture.

Despite Polynesia being made up of 10 million people who's nations are geographically so remote from each other that they span 8,611,912 sq miles, an area larger than continental Africa, there is a strong sense of fellowship and shared identity between nations.

The night sky is what was used for century's to navigate the ocean. Traditional stick maps and hands were used to align with the stars to guide the way. Kāpehu Whetu is a star compass which first divided the sky into 4 winds, each containing 7 houses. The full horizon holds 32 houses.



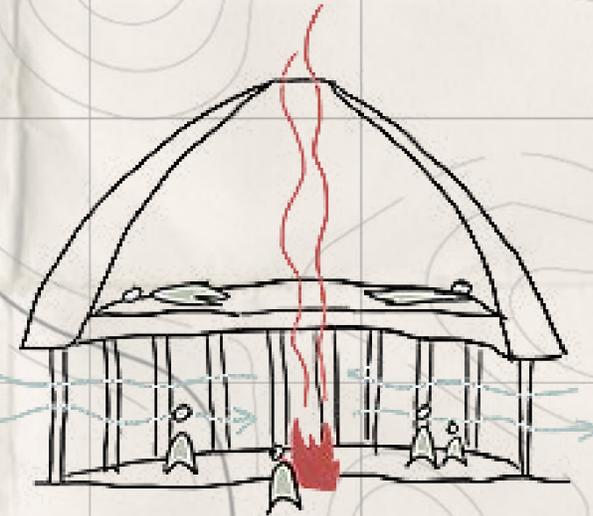
Tāwharau - To Shelter.



Tradional fale - Samoa = Bure - Fiji

A Fale/Bure is a traditional style of housing found all over Polynesia. It is circular/domed and allows cool air to be drawn in and circulated upwards.

George Nacewa says these tend to be at the heart of the community, where gatherings often happen and a structure which is able to withstand a disaster.

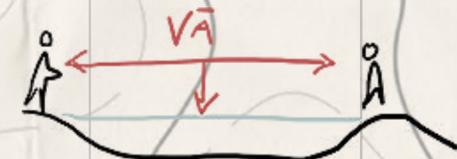


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**IS THE SPACE BETWEEN,
THE BETWEENESS,
NOT EMPTY SPACE,
NOT SPACE THAT SEPARATES,
BUT SPACE THAT RELATES.**

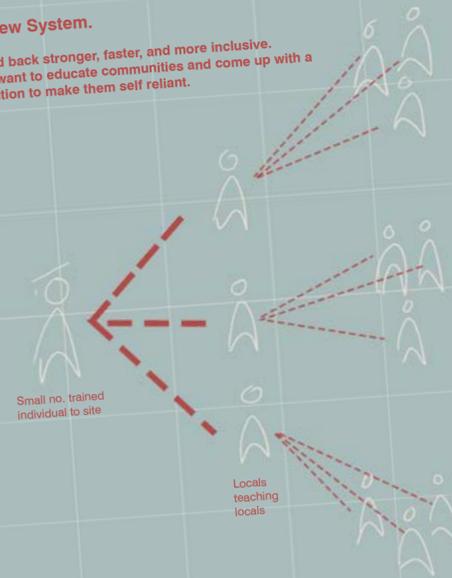
The ocean is the va between Polynesian island nations. The ocean provided separation & connection, the in-between space where commonality and difference co-exist.



Project Concept.

A New System.

Build back stronger, faster, and more inclusive. We want to educate communities and come up with a solution to make them self reliant.

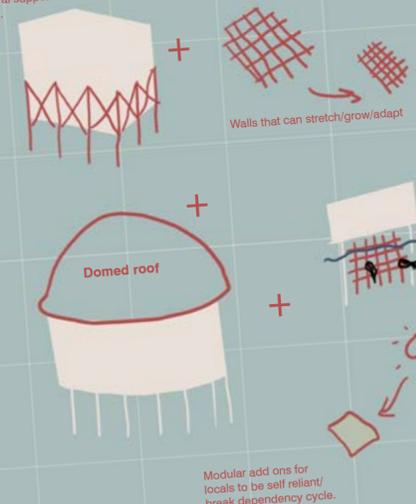


Small no. trained individual to site

Locals teaching locals

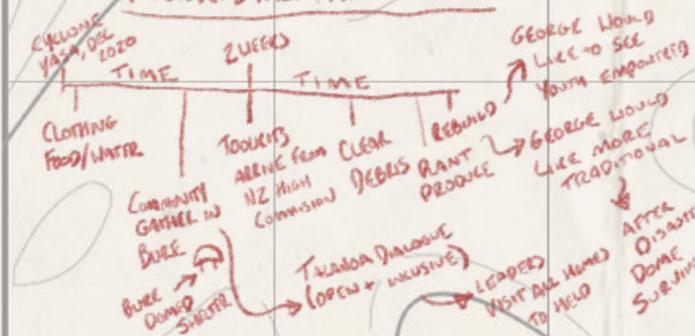
A Simple Kit Of Parts.

A sustainable/locally sourced flexible structural support system.



Modular add ons for locals to be self reliant/ break dependency cycle.

A CONVERSATION WITH GEORGE



The Modular Kit.



01.

The bamboo pole cladding is mobile and can be altered to provide shade where needed. The poles collapse similar to tent poles for transport.

02.

Geodesic dome which can be split into social, sleep and wash sections. It is made up of 3 lengths of prefab bamboo poles, 4 types of triangular panels made of Ecocoboard, recycled plastic or can be swapped for photovoltaic panel. Some of these panels are cut with the night skies constellations to allow a starry night to appear when light passes through.

03.

Swivelling CNC routed ply pegboards support the dome between units. A layer of plastic is sandwiched between layers of ply to stop draughts. These can be use as doors, storage, ventilation and allow light to pass through unused holes

04.

The large base separates into 3 sections and then folds for transportation. It is centred around a hole which allows for the grow space to flourish.

05.

Supporting bamboo poles spider out to the edges of the base. This splits into 3 sections which lock into a central support and fold for transportation.



1:4 Model.

The easiest way to test how easy the kit was to put together, was to try and construct it. I decided to only test constructing the base, panels and geodesic dome due to the costs and complexity of prefabbing the stilts and cladding at a 1:4 scale. This was an amazing learning experience.



Materials.

Bamboo - Grows in abundance in Pacific. Light, flexible, strong



Ecocoboard - Made from coconut husk, a waste product in Pacific



Aurora - Renewable energy and UV sequestration sheets provide income



The base was designed to fold for ease of transportation and was CNC routed using 12mm birch ply. Hinges were then attached and the base raised on different stilts at a similar height as specified.



Numbered laser cut panels were then slotted into grooves in the base.



The geodesic dome was then assembled starting from the centre. I quickly found that the weight had to be supported during construction otherwise tension was put on the dowel plugs. This meant one broke.



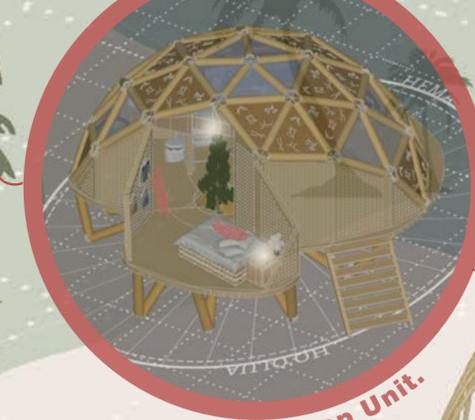
This ended up being a positive as it allowed me to the theory about being able to replace broken components, and it was very easy to pop out and replace.

Lastly, panels were zip tied in place. This replicates what would normally be the panels in grooves but allowed me to do so in a more efficient manner.



Our sleep is where we journey most within ourselves or away to other worlds. It is a vital part of our daily cycle as it lets us prepare for the challenges the days ahead may hold. In times of stress, a safe, comfortable place to unwind is invaluable.

A large bed is prioritised to make the most of space for its intention. It is supported on wooden pallets which the disaster kit travelled on. A starry night appears overhead when light shines through the panels creating a calming atmosphere. Space behind the bed is also utilised with a chest for storage which doubles as a bedside table. This is in addition to customisable pegboard storage. The unit can be closed off via a drop down screen.



The Sleep Unit.



Being able to wash in a space in which we are safe, have privacy and is sanitary is something which we can often take for granted.

The wash unit is oriented east to catch the sunrises when getting ready for the day. Triangular panels on the geodesic dome can be swapped to allow for more or less privacy.

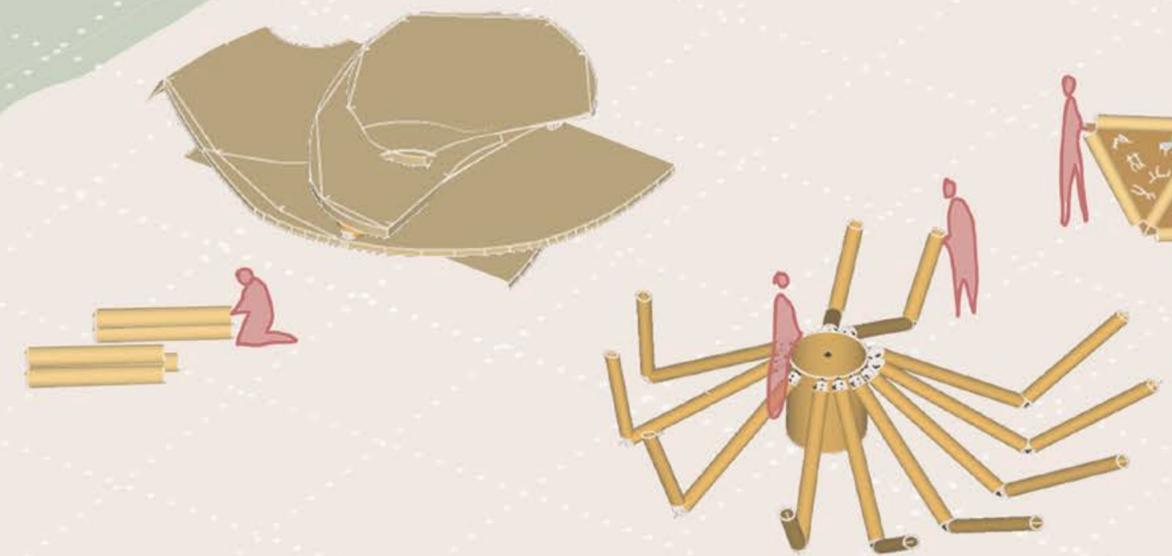
Despite its small size, the wash unit is able to fit in a toilet, sink and deep tub.

A self contained composting toilet has been specified due to its ability to safely contain waste rather than rely on the installation of waste pipes. This compost can then be used to grow produce.

A deep but small in area tub is optional but allows users to bathe when running water may not be an option.



The Wash Unit.



The Disaster Kit hopes to empower and bring together communities by ensuring that when a disaster strikes, with simple tools and a Disaster Kit, communities can take ownership of rebuilding and customise a solution to their taste. The disaster kit knows that we cannot fight nature, but simply adapt and overcome the challenges it throws our way. The kit hopes to ensure that communities affected by natural disasters remain close to their land and community, staying resilient.

The social unit of the disaster kit is a space which facilitates a major part of Polynesian culture. A central space is needed for talanoa dialogue (open and non-judgemental conversation). This is often where the community makes key decisions.

One side of the unit houses a kitchen area and the other an informal open space to gather. The kitchen looks south out towards the sun, but panels can be customised to change viewports. Two benches allow for seating, but traditionally all meals and gatherings are held on a mat on the floor.

A va is created where the units are joined (although they can be shut off with drop down screens) where a vertical garden allows users to grow produce and unite around a central life. Pegboards are able to be used for storage but swivel open to be used as a door or for ventilation.



The Social Unit.

