

THE SUITCASE

Rapid Deployment for Volunteer Tourism



Sena Başargan

C O N T E N T

A modern building with a curved roof and wooden slat walls, set in a tropical landscape with palm trees and a sunset sky. The building is elevated on a concrete base and has a large open area. The background shows a hillside with trees and a sunset sky.

01 BACKGROUND INFORMATION

02 SITE ANALYSIS

03 LITERATURE REVIEW

04 CASE STUDIES

05 PROJECT



0 |

BACKGROUND
INFORMATION

WILDLIFE ANIMALS



Since the Africa has valuable and appropriate environmental conditions for a lot of different animal species, continent includes many unique animal species. In terms environmental factors, it provides different options for animals to live friendly.

Africa is blessed with a stunning variety of wildlife – it has more species of charismatic megafauna than any other continent. However, sadly, with ever expanding human populations and their increasing demand for land, food and water, exacerbated by poaching, more and more species are becoming endangered.

ENDANGERED ANIMALS



Aardvark



Buffalo



African Hare



African Wild Dog



Eland



Elephant



Elephant Shrew



Ethiopian Wolf



Baboon



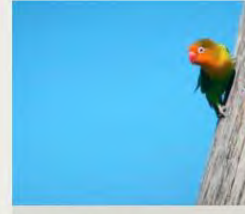
Bat



Bat-Eared Fox



Bongo



Fischer's lovebird



Forest Elephant



Gelada



Genet



Bonobo



Bushbuck



Cheetah



Chimpanzee



Gerenuk



Giraffe



Grant's Gazelle



Grevy's Zebra



Colobus Monkey



Dik-Dik



Duiker



Dwarf Mongoose



Hartebeest



Hedgehog



Hippopotamus



Hyena

ENDANGERED ANIMALS



Hyrax



Impala



Jackal



Kob



Sable



Serval



Sitatunga



Springhare



Kudu



Leopard



Lesser Bush baby



Lion



Thomson's Gazelle



Topi



Vervet Monkey



Vulture



Mountain Gorilla



Oryx



Ostrich



Pangolin



Warthog



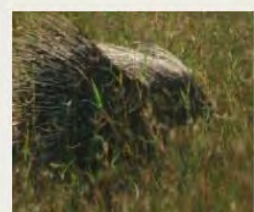
Waterbuck



Wattled Crane



West African Giraffe



Porcupine



Ratel



Rhinoceros



Roan Antelope



Wildebeest

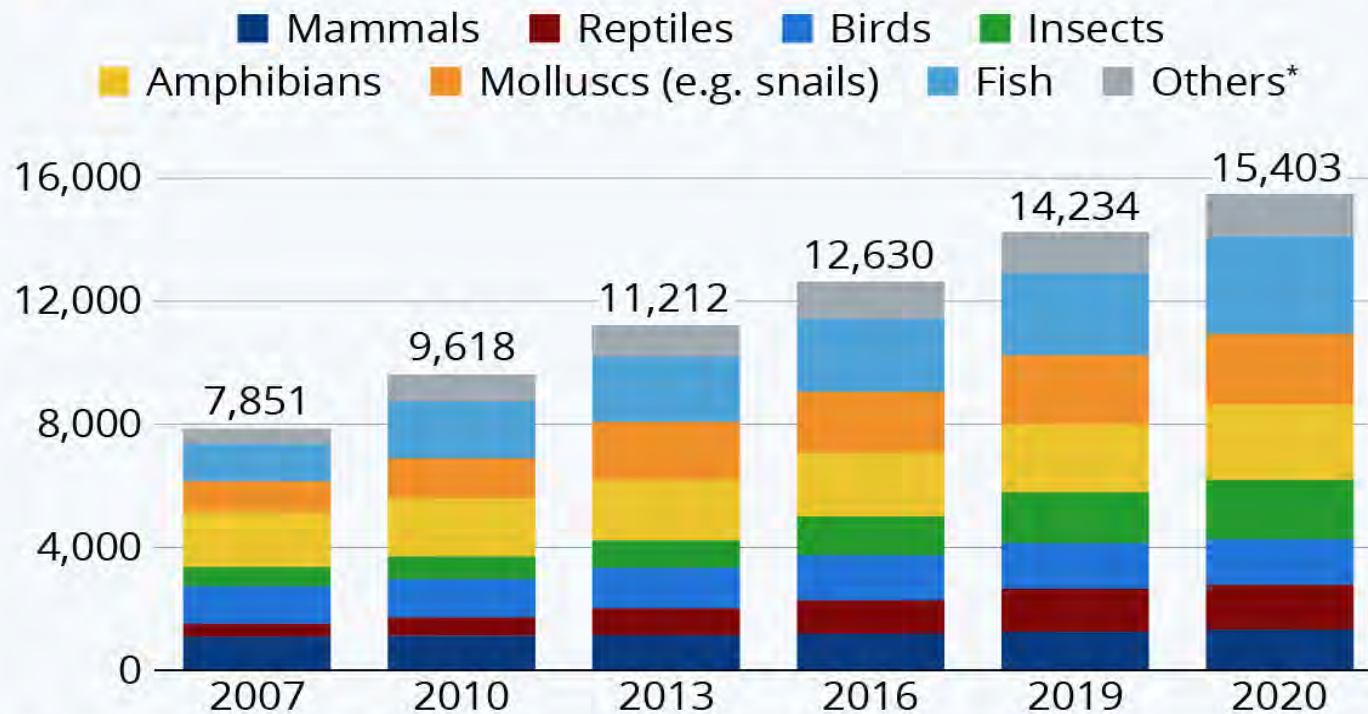


Zebra

NUMBER OF ENDANGERED SPECIES

The Number of Endangered Species is Rising

Number of animal species of the IUCN Red List, by class

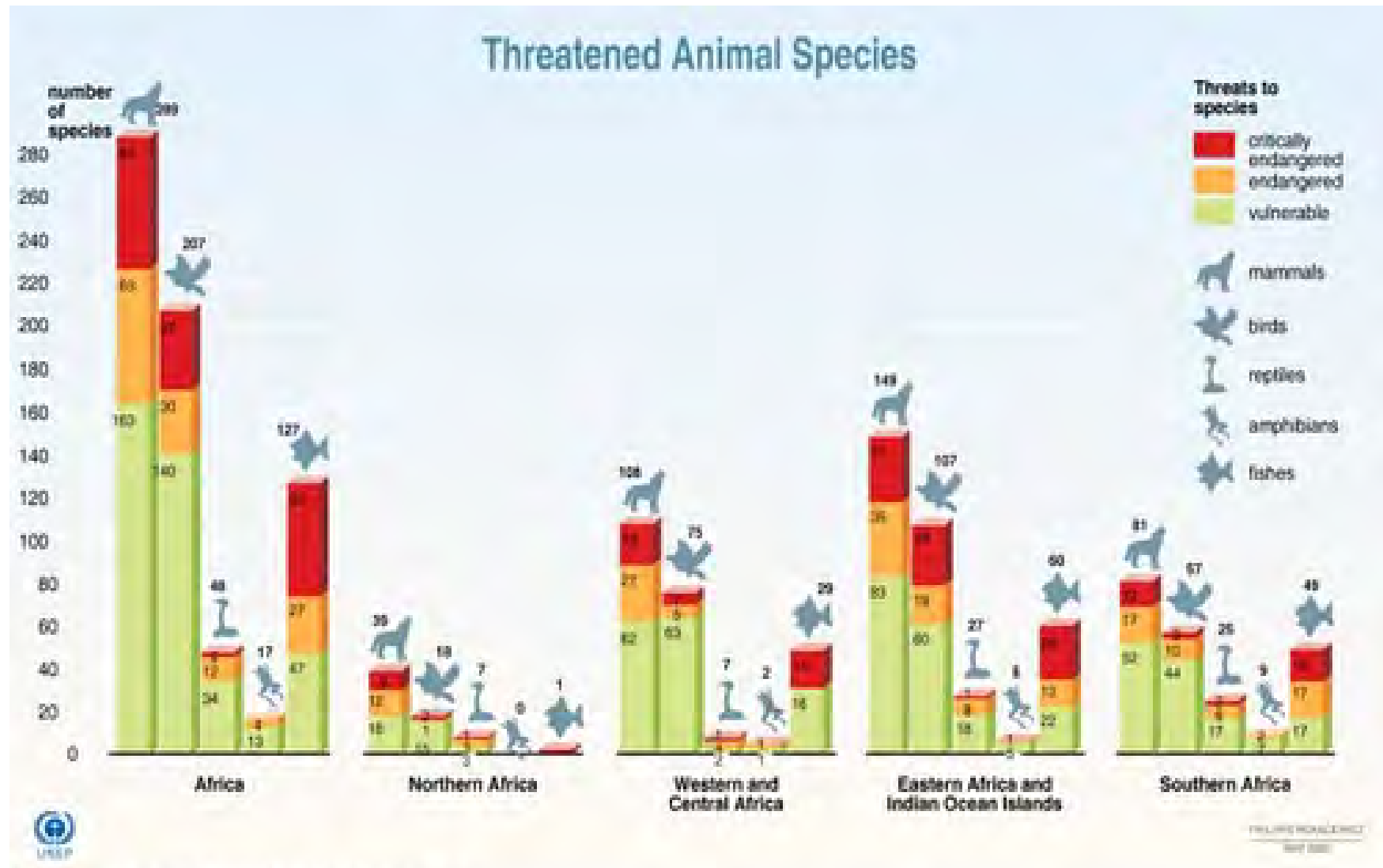


* other invertebrate (spineless) animals, such as crustaceans, corals and arachnids (spiders, scorpions)

Source: IUCN Red List

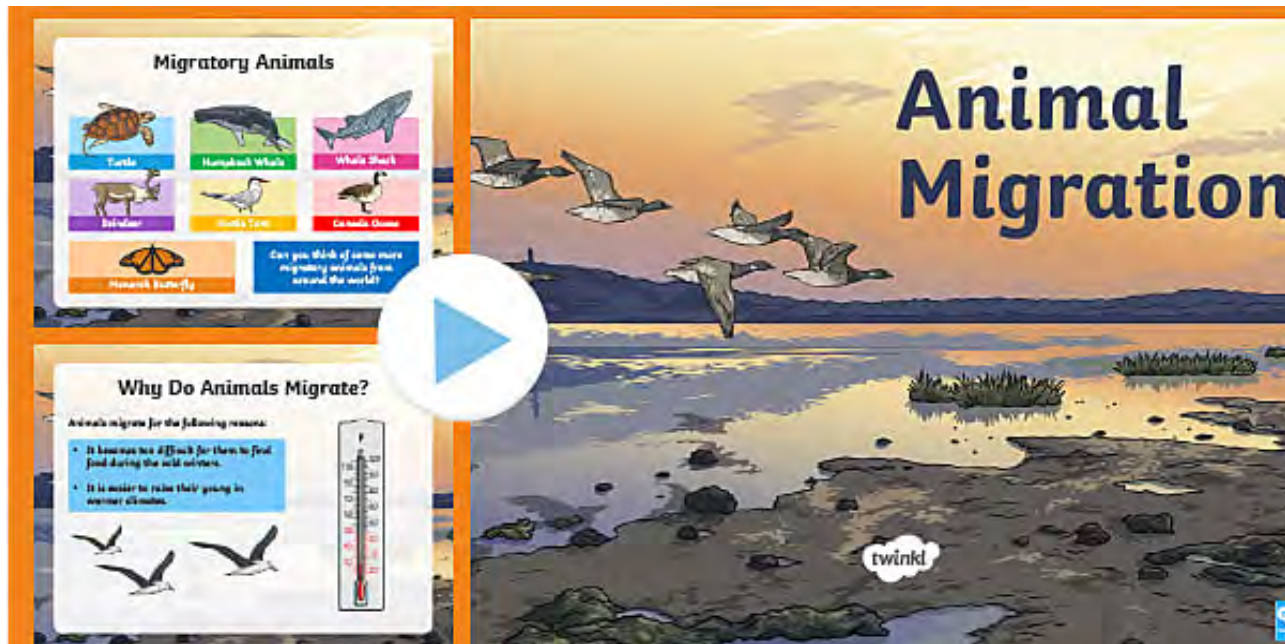
It can be observed that number of endangered animal species are rapidly increased. Although the reasons of extinction are quite wide, one of the most essentials are generally related with humans. Artificial impacts destroy not only the animals but also their living environment. Hunting, tourism and negative effects of global warming are common factors for the issue.

DISTRIBUTION OF ENDANGERED SPECIES BY CONTINENT

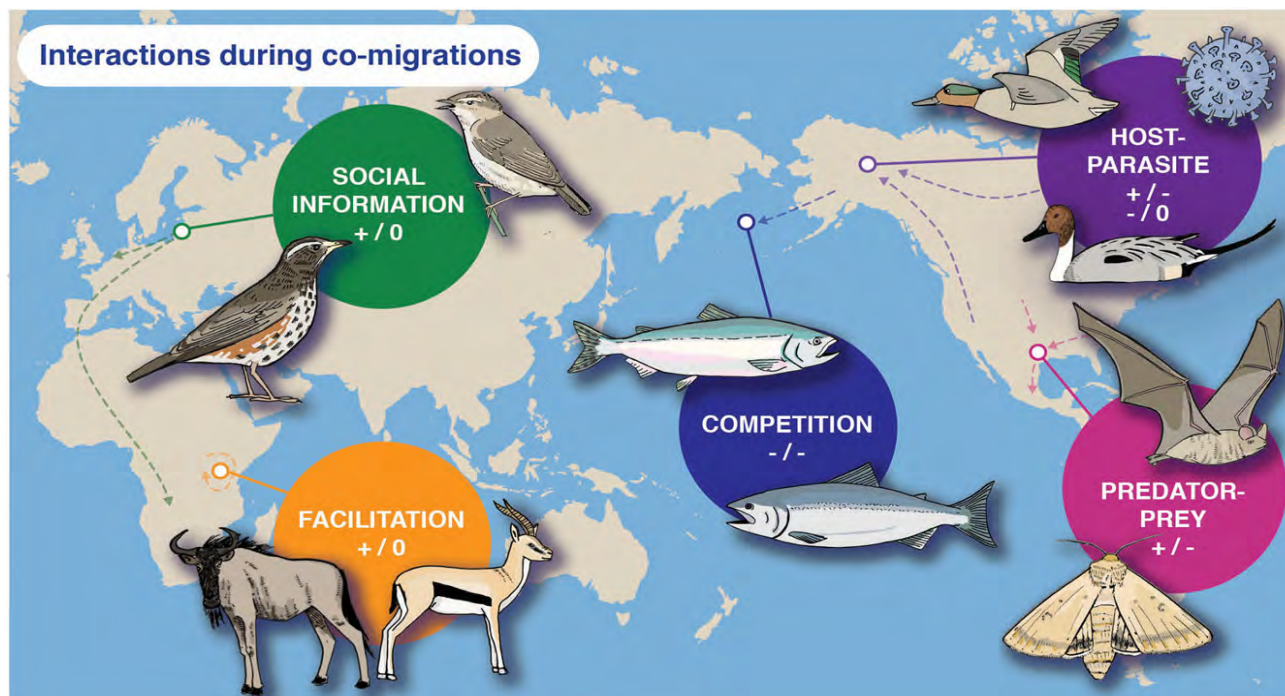


Sources: WCM/ICN-The World Conservation Union, 1998.

WHY DO ANIMALS MIGRATE?



Animal migration is the large-scale movement of a species from one place to another. Most species migrate during specific seasons, in search of food or water, or for mating reasons. Migration is a pattern of behavior in which animals travel from one habitat to another in search of food, better conditions, or reproductive needs. There are two important factors that make migration different from other types of animal movement: First, migration happens seasonally, and second, migration involves a return journey.



ELEPHANTS' MIGRATION ROUTE

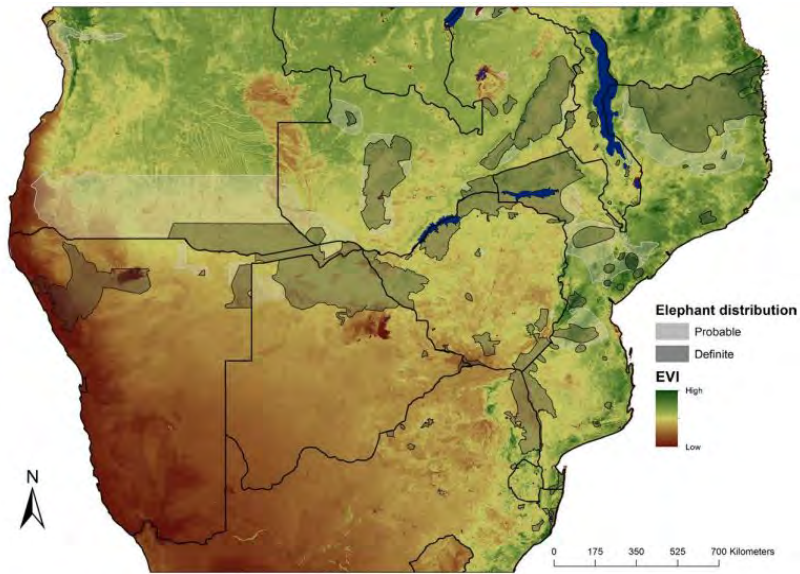


Figure 1. Map of southern Africa illustrating the known and probable present-day savanna elephant distribution⁵⁸. The map colour represents a measure of primary productivity (the mean Enhanced Vegetation Index (EVI) over a 16-year time period from 2000 to 2016; see Supplementary Information Materials and Methods for details). This map was generated with the software ArcGIS ver. 10.3.1 (<https://www.arcgis.com/features/index.html>).

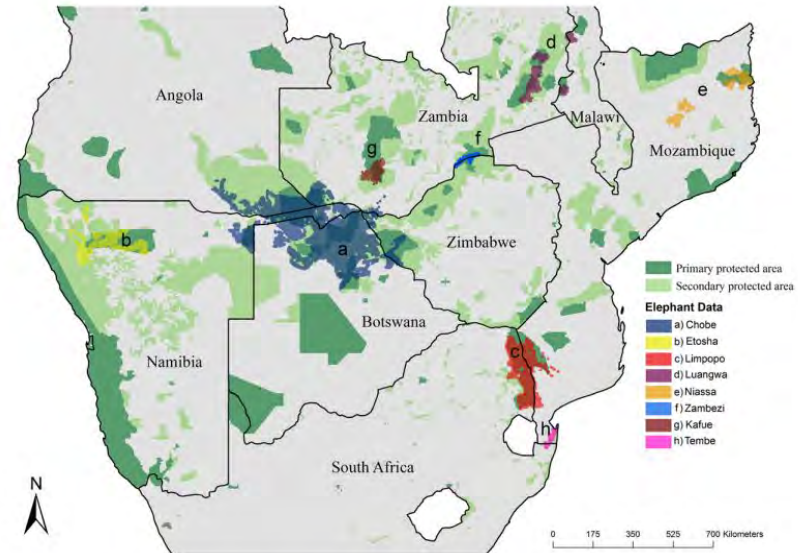


Figure 2. Map of southern Africa showing the distribution of the elephant location data. The elephant location data are coloured according to cluster. Protected areas were sourced from the World Database on Protected Areas⁵². Primary protected areas are national parks and game reserves and secondary protected areas are game/wildlife management areas, communal conservancies, hunting reserves, and forest reserves. This map was generated with the software ArcGIS ver. 10.3.1 (<https://www.arcgis.com/features/index.html>).

Both Asian and African elephants migrate and generally follow the same migratory routes annually. Migration distances vary considerably depending on environmental conditions. African elephants usually migrate at the beginning of the dry season, between June and November; heading toward more hospitable locations near rivers and water sources that are not prone to drying. When the rainy season arrives, usually from October to December and March to June, elephant herds return to native regions to feed on the lush, green vegetation the rains helped regenerate. Elephant migration allows time for the re—growth of vegetation in exhausted grazing areas.

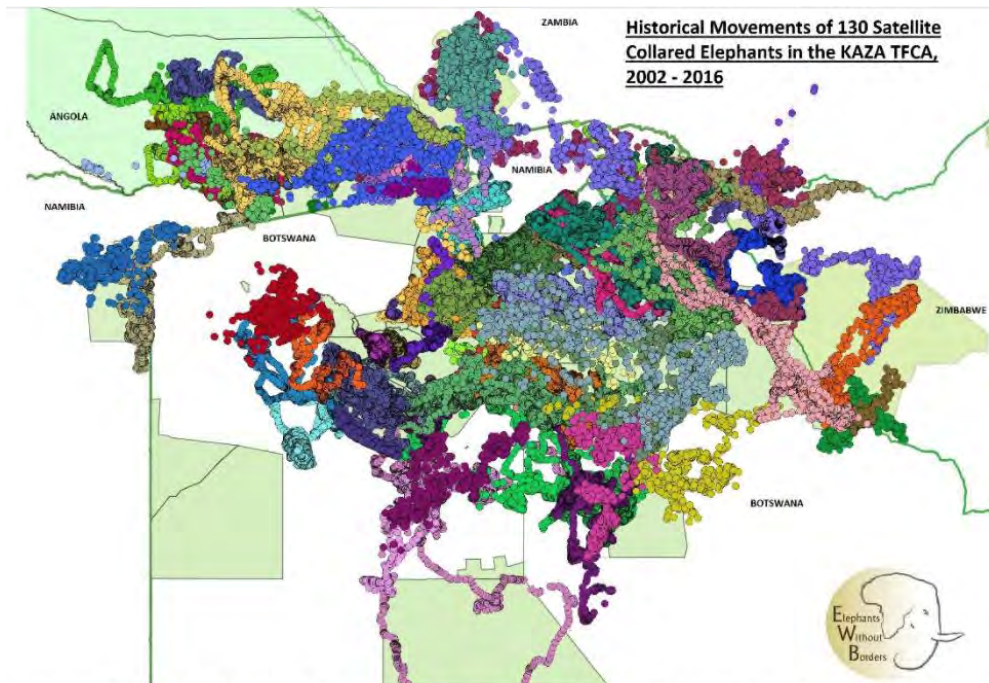
PROTECTION of ELEPHANTS

Since the destruction of elephant species are increased highly in the last decades, some charity organizations started to regulate in order to prevent further damage. One of the charity organization is Elephants Without Borders, the organization is aiming to conserve wildlife and natural resources. They said that we strive to encourage mankind to live in harmony with wildlife and the natural world. Also they explained that the African elephant is an ambassador for conservation, providing motivation for raising awareness, stimulating action, encouraging funding for conservation efforts, and generating opportunities to reconsider the boundaries between conservation and rural development. Having these kind of organization and awareness are really valuable in terms of wildlife animals and environment which future animals and people will live.

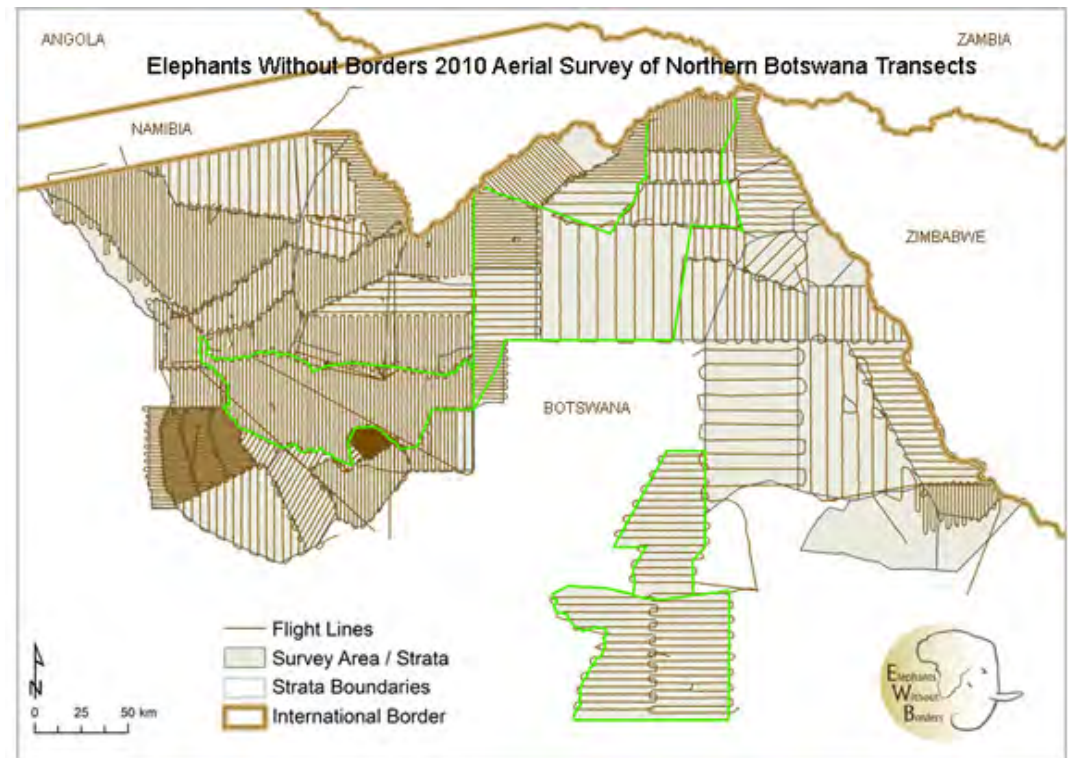


PROTECTION of ELEPHANTS

The organization are utilizing highly developed technological techniques in order to track the elephants. Moreover, they are conducting a survey that can help to determine the number of elephants. They are using satellite monitoring to follow the elephants. They highlighted the importance and benefits of the system “tracking to study the spatial ecology of wildlife is an effective approach to develop novel solutions for maintaining and protecting wildlife populations and their environment. It is a tool that provides us with a baseline of information about their habitat needs, density and distribution, demography, ecology, behaviour and social organization.



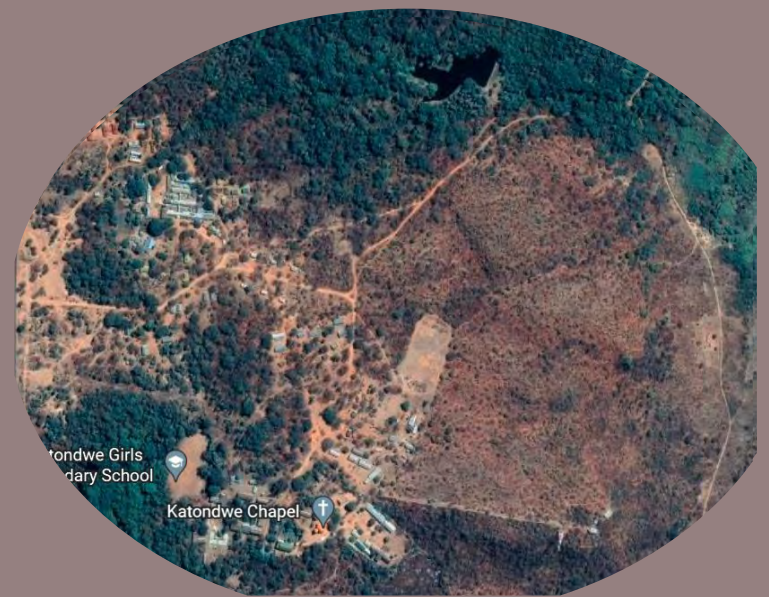
Tracking of individual elephants by the non-profit Elephants Without Borders in Botswana shows the animals' movements within and across the five Kavango Zambezi Transfrontier Conservation Area (KAZA TFCA) member countries — Angola, Botswana, Namibia, Zambia and Zimbabwe. Colored dots represent GPS locations of the individual tagged elephants. Image courtesy of Elephants Without Borders.





02

SITE ANALYSIS



02

SITE LOCATION

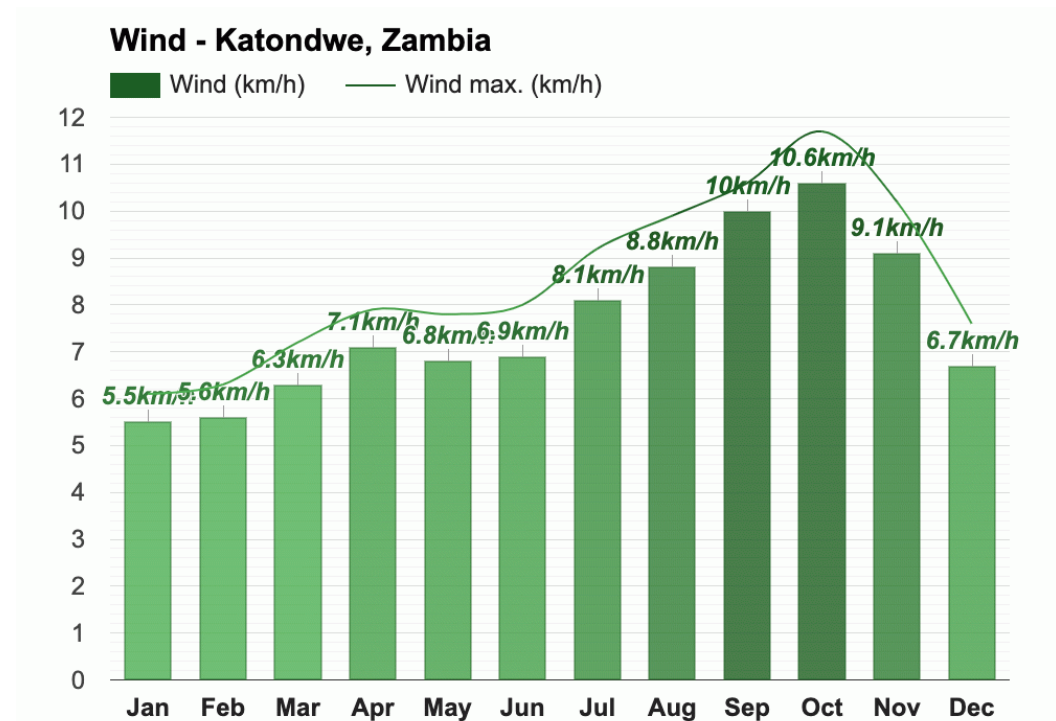
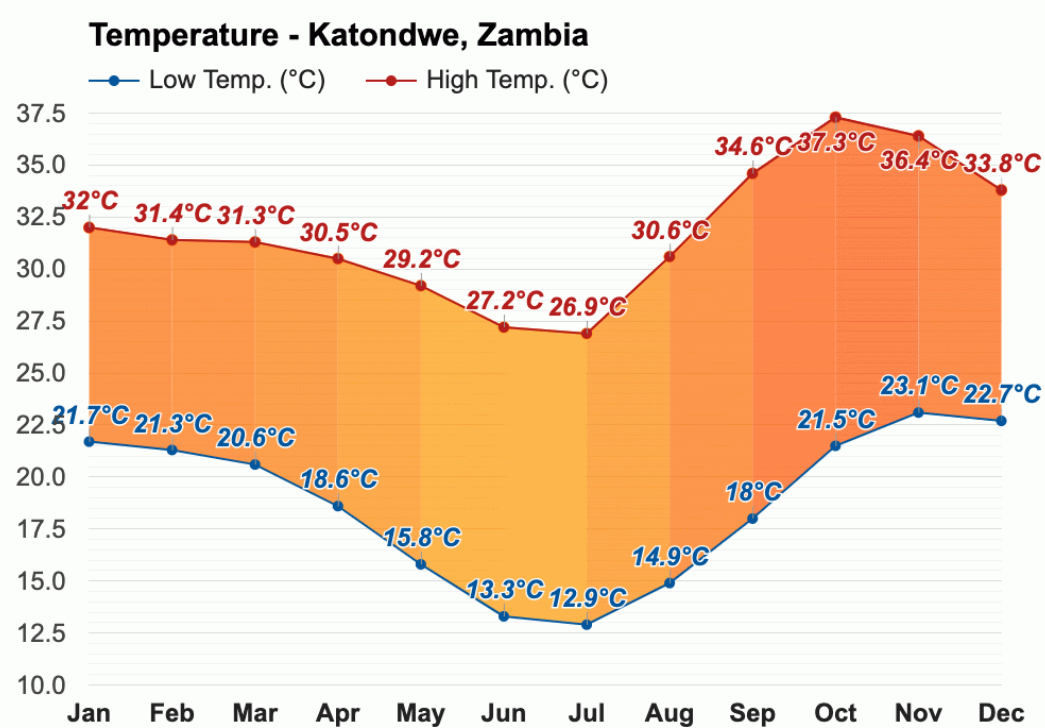
SITE PHOTOS and INFORMATION

Although the project is aimed to design in order to be adjustable for different sites, there is sample site is chosen to show and highlight the design strategies and working principles. Site is located in Katondwe, Zambia. It is small rural town which includes small chapel, undeveloped hospital and small school. The place is clearly undeveloped and needs to be cared.



CLIMATE CONDITIONS

Zambia experiences a predominantly sub-tropical climate characterized by three distinct seasons: a hot and dry season (mid-August to mid-November), a wet rainy season (mid-November to April) and a cool dry season (May to mid-August). Katondwe, the warmest month (with the highest average high temperature) is October (37.3°C). The month with the lowest average high temperature is July (26.9°C). The month with the highest average low temperature is November (23.1°C). The coldest month (with the lowest average low temperature) is July (12.9°C).



SITE PHOTOS and INFORMATION

In Katondwe, there is small lake which is very close to the town. Lake is covered with trees and it is very suitable for elephants, since it has water, plants and trees. Also the site is located on the their migration route.





TYPES of PLANT and TREES



Acacia Tree



Acacia Penninervis



Acacia Tree



Acacia Fasciculifera

TYPES of PLANT and TREES





03

LITERATURE REVIEW

VOLUNTEER TOURISM



Volunteer tourism, which is also known as voluntourism, is a form of altruistic travel. Essentially, people choose to do voluntary work while travelling and explore their destination while they're working. Since the project is mainly aimed to protect the eco-system and wildlife, one of the most important aspects is volunteer tourism. By involving the tourists into the travel, it contributes to the wildlife, environment and protecting them. Moreover, travel becomes more valuable and unforgettable experiences for them. Being in nature and understanding the importance of animals and ecosystems are quite essential both for humans and animals.



SUSTAINABLE TOURISM

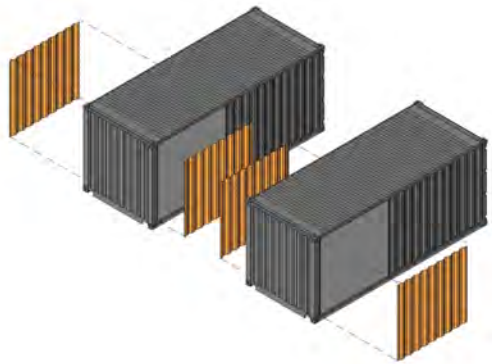


Sustainable tourism is a concept that covers the complete tourism experience, including concern for economic, social and environmental issues as well as attention to improving tourists' experiences and addressing the needs of host communities. Sustainable tourism emerged as an outcome of preventing the uncontrolled and excessive use of mountain tourism resources. Having a sustainable tourism is crucial since the resources are decreased day by day. Knowing their importance and creating tourism strategies according to that contribute both for economy and environment.



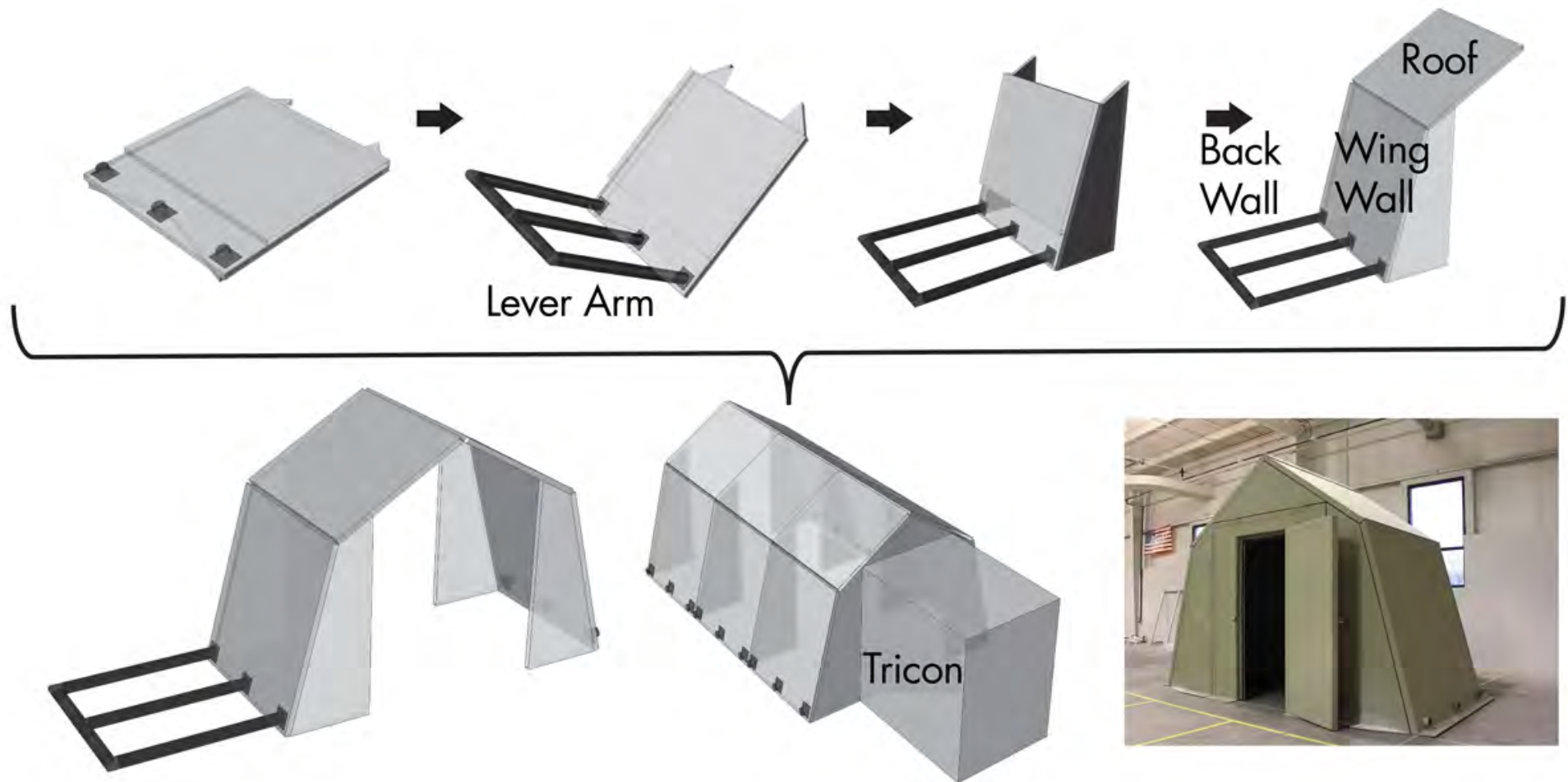
RAPID DEPLOYABLE STRUCTURES

Rapid Deployment Modular Systems incorporate a unique design that utilizes standardized frame and wall panel assemblies that enable stacking and connecting in any direction on the X,Y & Z axis. There are several advantages of rapid deployable structures. They are simply assembled, their transportation are easy and they can be adjustable in many different sites.



RAPID DEPLOYABLE STRUCTURES

Rapid deployable structures are serving many different functions such as military conditions and emergency situations etc. They are reliable, durable and field maintainable engineered structures, suitable for areas of difficult terrain and challenging climatic conditions.



RAPID DEPLOYABLE STRUCTURES

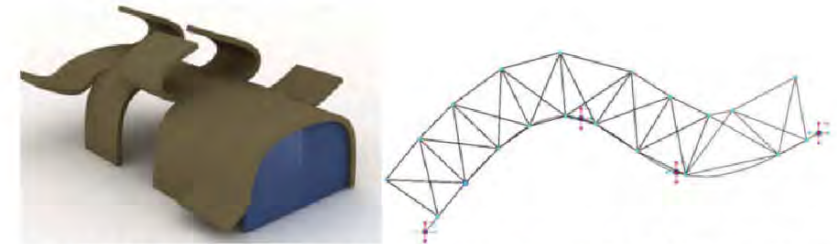
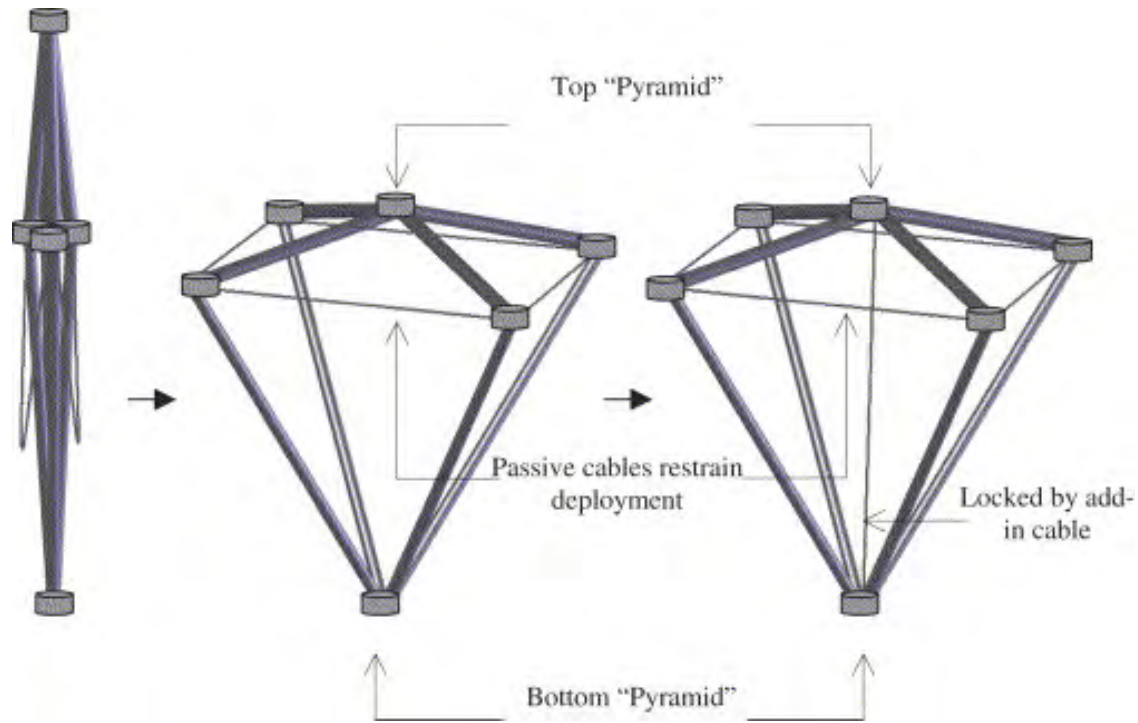


Fig. 2.38: Single-curved tensegrity grids for responsive architecture by A. Herder [Herder]

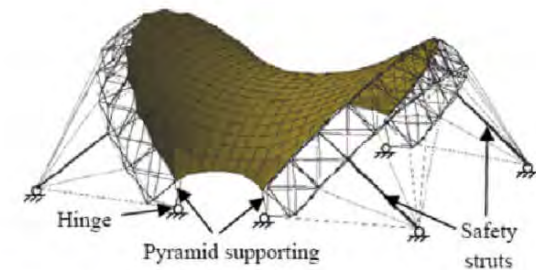
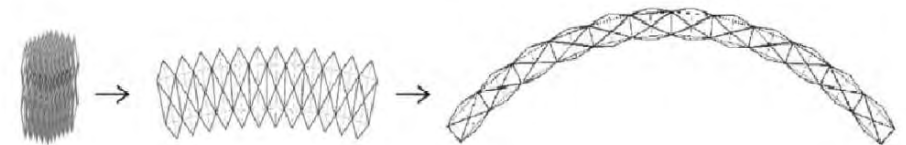
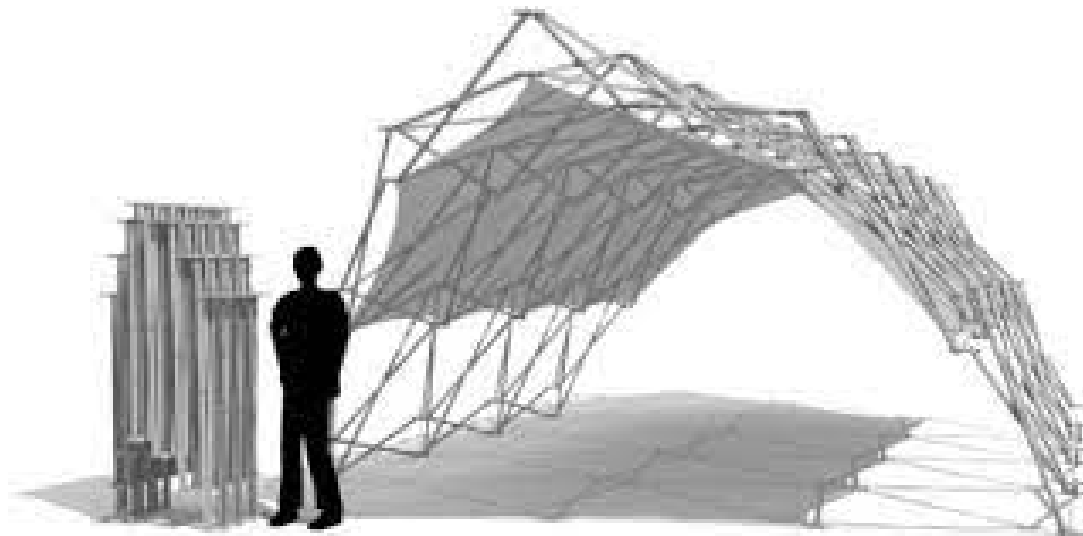


Fig. 2.43: Deployable arches by cable-strut-pantograph elements for a two-wing butterfly membrane structure: deployment of arches and the model of the structure [Tran et al., 2006]



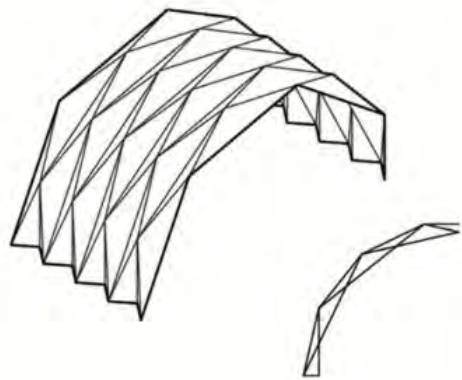
MOVEABLE STRUCTURES

Movable structure means a permanent structure designed, sited, and constructed to be readily relocated at minimum cost and with minimum disruption of its intended use. Access to and from the site shall be of sufficient width and acceptable grade to permit the structure to be re-located

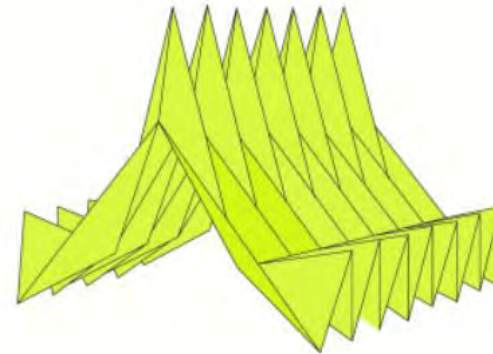


FOLDEABLE STRUCTURES

Folded structures are three-dimensional structures - spatial structures and they belong to the structural systems. The term folded structure defines a folded form of construction, including structures derived from elements which form a folded structure by their mutual relationship in space. For very long time this type of construction has been realized in practice only in of reinforced concrete and made on site, which conditioned the use of a very complicated shell. Development of prefabricated building led to improvements of this type of construction so that the folded structures could be derived by assembly of prefabricated elements and their relationship - monolithization on site



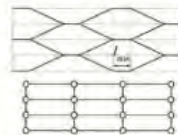
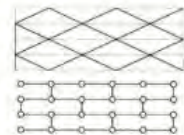
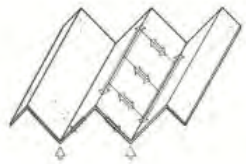
ANTI-PRISM BASED FORMS ARE AMONG THE BIDIRECTIONAL FOLDED FORMS OF FOLDED PLATES. THE FOLDING PATTERN WE ACHIEVE THIS FORM THROUGH IS CALLED YOSHIMURA OR DIAMOND PATTERN WHICH IS FORMED OF OBTUSE ANGLED ISOSCELES TRIANGLES. THESE FORMS ARE UNABLE TO CREATE FLAT SURFACES DUE TO THEIR GEOMETRY AND THEIR CROSS SECTIONS ARE CYLINDRICAL. MAIN STRUCTURAL PROPERTY OF FOLDED PLATE STRUCTURES IS THE TRANSFER OF LOAD THROUGH INCLINED SURFACES. IN LONGITUDINAL DIRECTION INCLINED PLANES ACT LIKE RIGID SUPPORTS. THE LOADS NEED TO BE TRANSFERRED TO THE GROUND THROUGH EITHER VERTICAL SUPPORT ELEMENTS OR OTHER ADJACENT PLATES. IN ANTI-PRISMATIC FOLDED STRUCTURES, THIS OCCURS THROUGH ADJACENT PLATES SINCE THE TOP PLATES HAVE LESSER OPPORTUNITIES TO TRANSFER THEIR LOADS VERTICALLY, MAXIMUM VERTICAL DISPLACEMENT OCCURS AT THE TOP



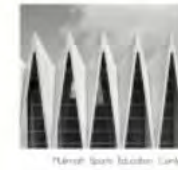
Origami
Origami is an ancient form of art that has emerged from Japan. It is achieved by folding one piece of paper to create shapes without further intervention like stitching or gluing the material. Folded plate structures originate from the same principle - as they consist of rigid surfaces that can serve as both beams and plates, a quality that is achieved by the folded form of it. The quality also means that it is a very material efficient structure that can span a considerable length.

Folding's Effect on Load Distribution
The load is transferred to the short edge of the element that is folded. Then the force is divided between the elements that are loading. Lastly the force is transferred to the bearings.

Pros
It is a quite light construction. It requires little thickness to span large distances.
It is cost effective because of the use of concrete.
Aesthetic merit
Cons
Shifting is hard.
Requires greater attention to detail and accuracy.
Good workmanship is a real necessity.
Use of roof may be a disadvantage.



Maximum moment
Fig. 10
Fig. 11
Fig. 12
Fig. 13



Air Force Academy Chapel

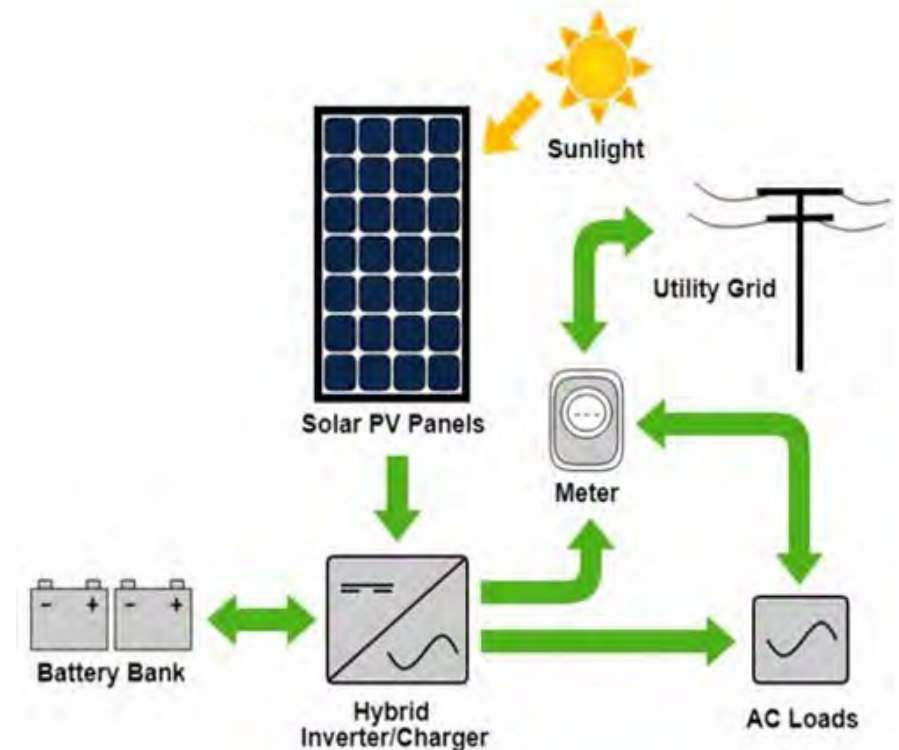
Tokushima Memorial Storage Terminal

National Sports Stadium, Tokyo

St. Peter Church

PHOTOVOLTAIC SYSTEM

A photovoltaic (PV) system is composed of one or more solar panels combined with an inverter and other electrical and mechanical hardware that use energy from the Sun to generate electricity. The modules are arranged according to the sun angle and solar panels were placed in such a way as to obtain maximum efficiency. Since the project is aiming to have sustainable tourism and use as little energy as possible.



TELESCOPIC COLUMNS



Telescopic lifting columns are designed for medical, radiological, ergonomical and industrial applications. The pillars are constructed with aluminum tubes and long life pads, combined with a very tight tolerance assembly – where others squeeze – we fit. The columns perform a stable, reliable and maintenance free guiding system without any play. Since the project's sites are different and the sites' conditions are different, having telescoping column provides flexibility and adjustability for the users.





04

CASE STUDIES

CASE STUDIES

Wooden Cabins and Tents, South Korean glamping site

For the camping ground, the architects introduced two types of habitation units called the Rock Flower and Dynamic Triangle, which are both made from metal frames covered in a protective membrane. The project's intention was to revitalise the concept of glamping – a kind of camping providing luxury facilities – which the architects feel has been devalued by poor-quality accommodation.

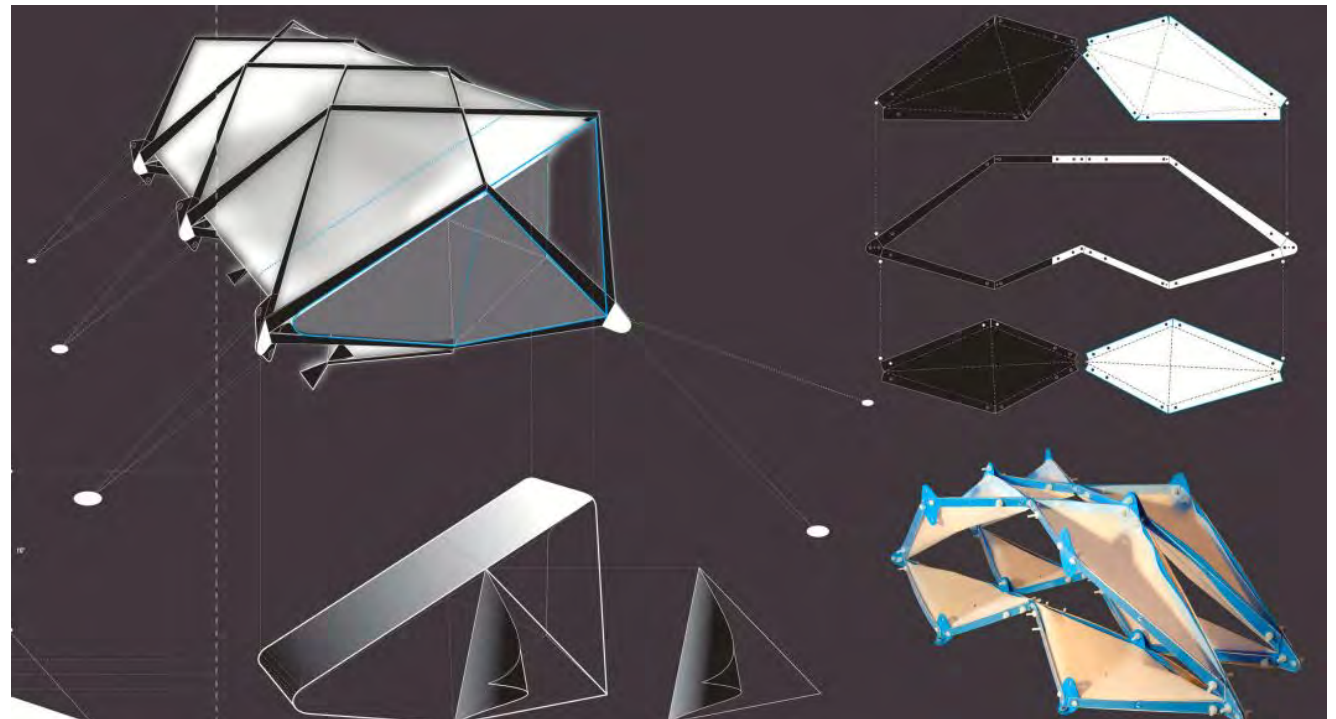


CASE STUDIES

Deploy+ Geometry, Paul Henry Frederickson



The project is employing aggregations of deployable and portable geometries in order to attain temporary harsh environment relief, research and traverse. The project is aiming to make the structure adjustable for the different site conditions.

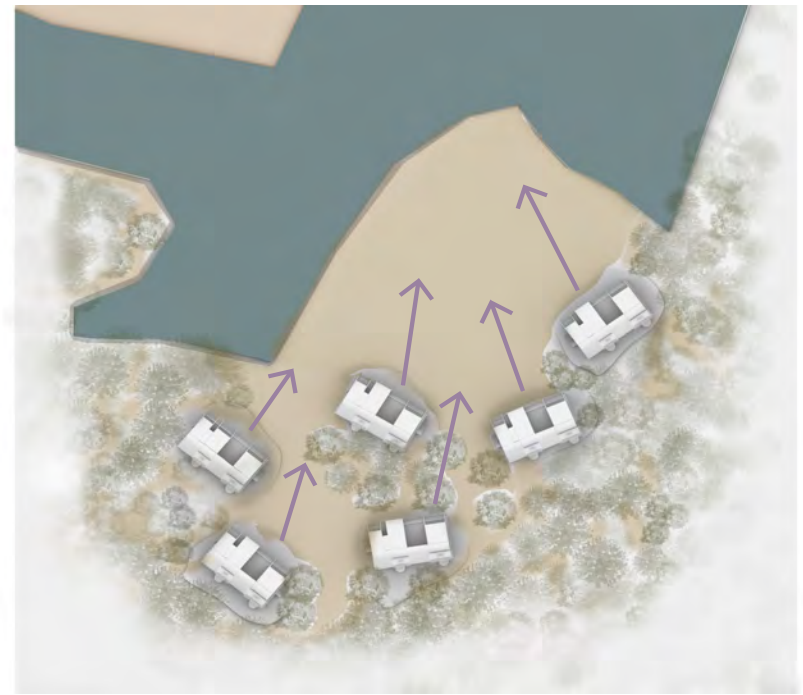




05

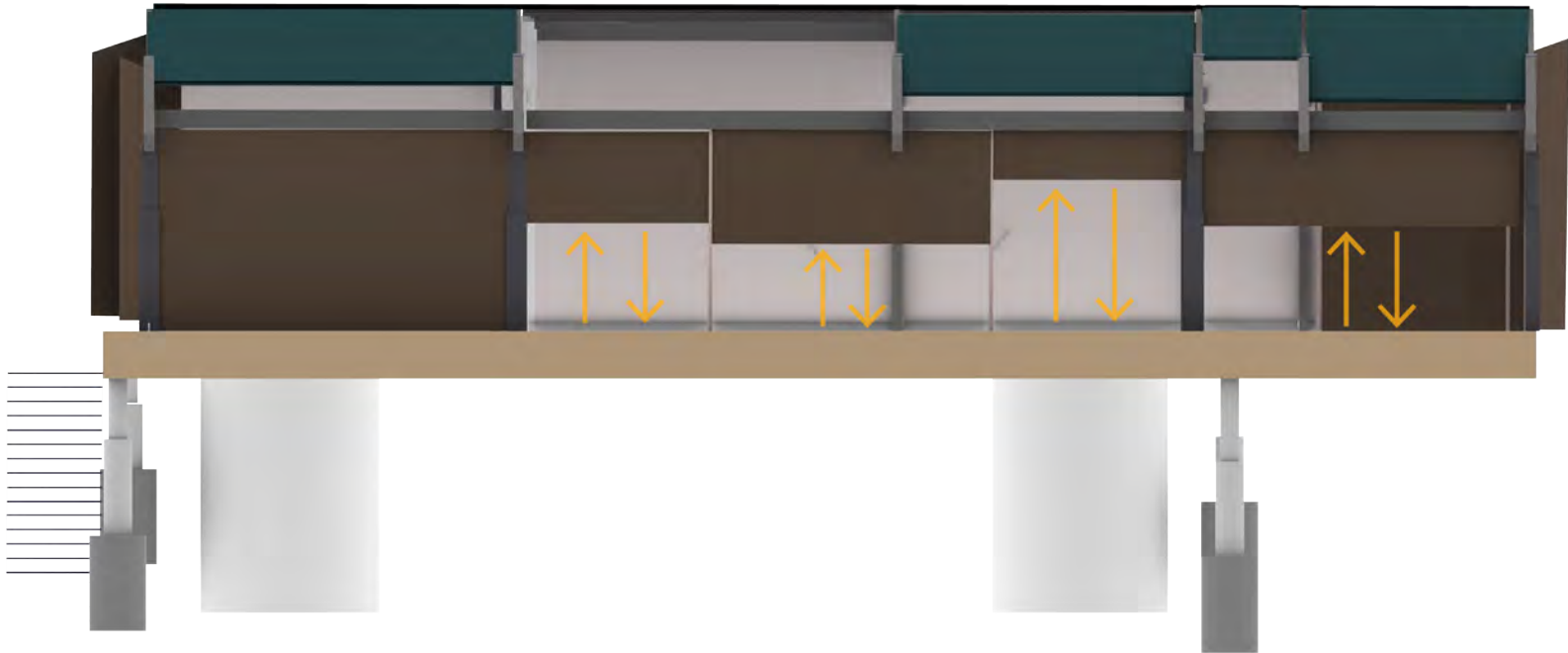
THE PROJECT

SETTLEMENT STRATEGIES

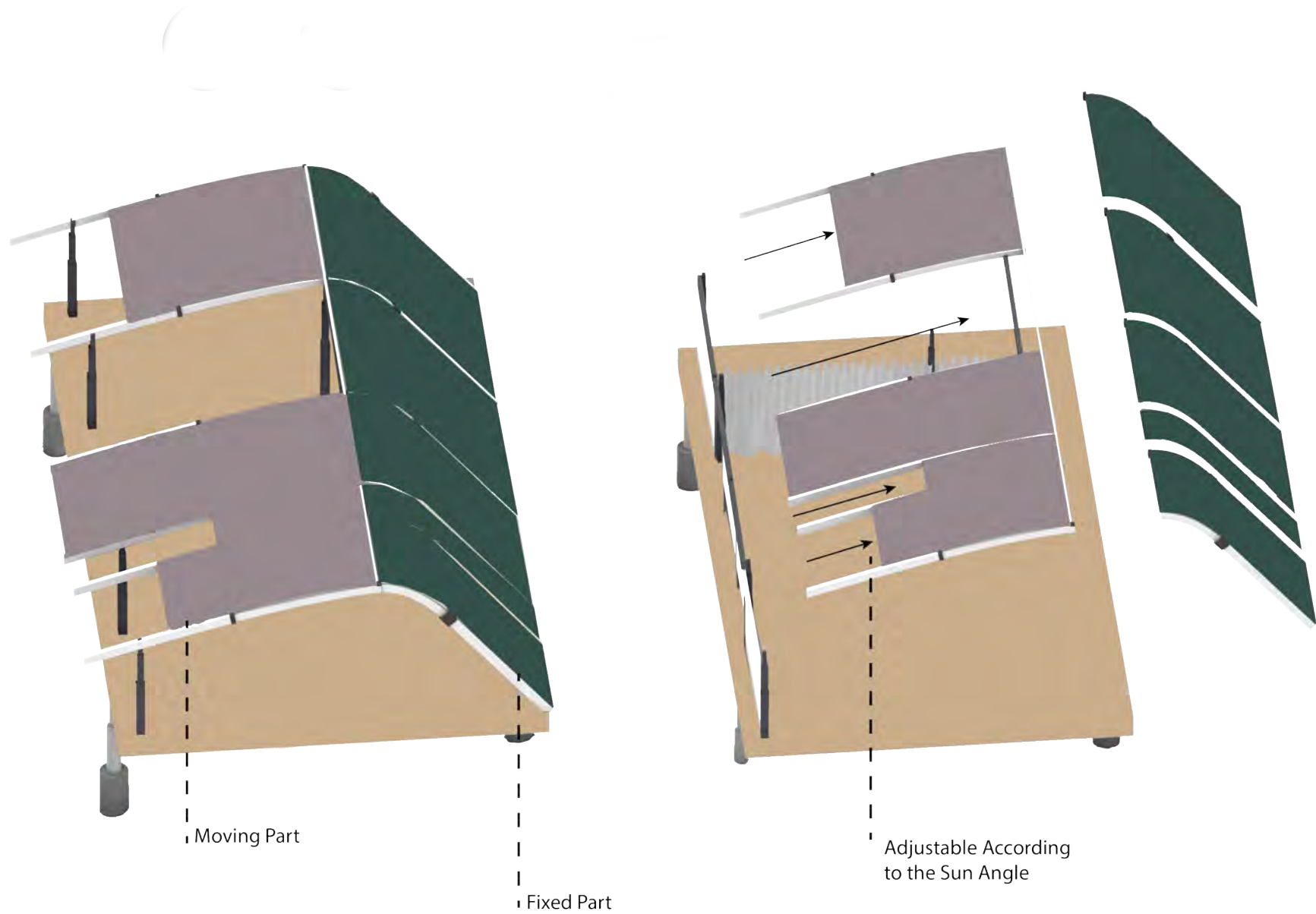


MODULE WORKING PRINCIPLE

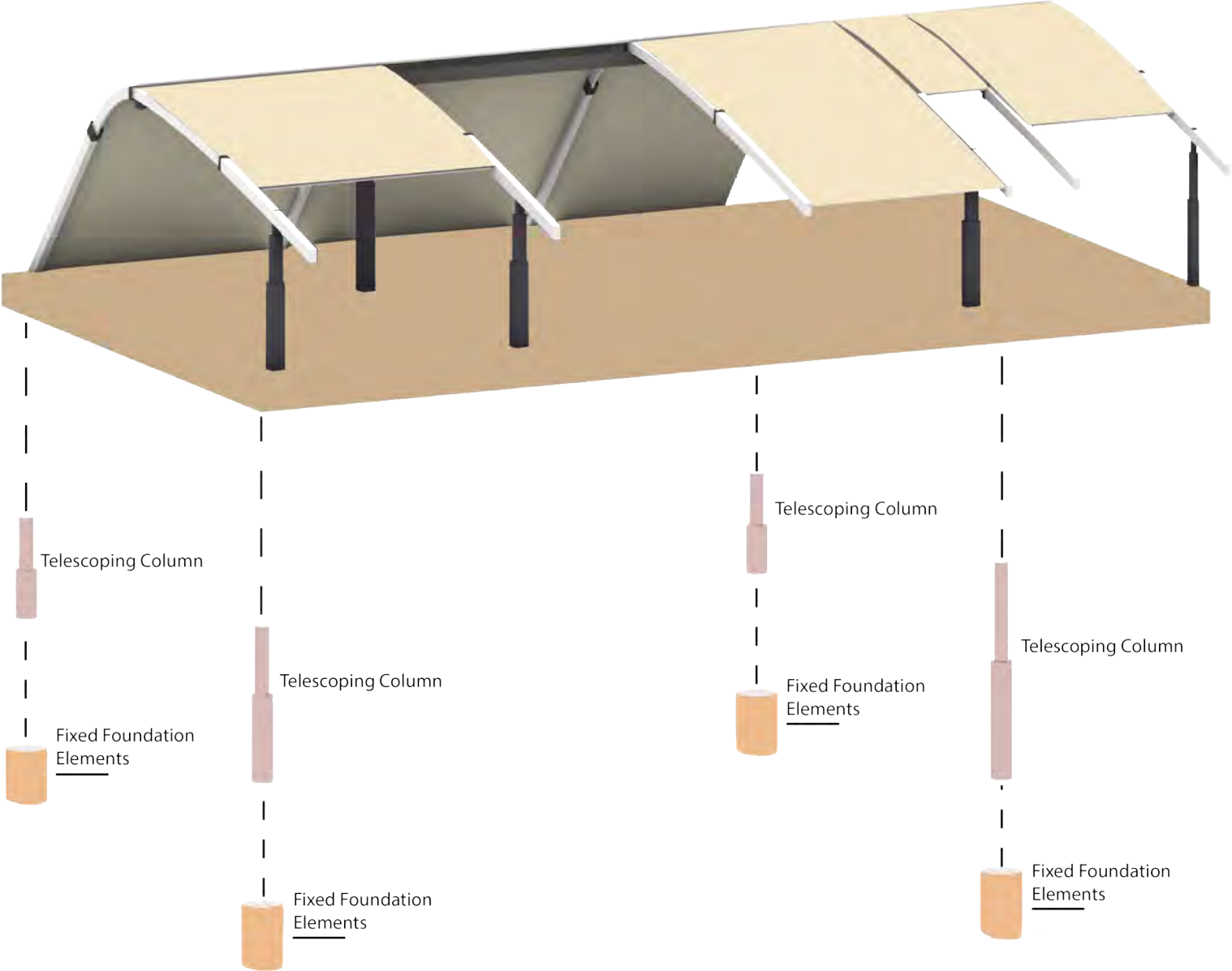
BAMBOO CURTAIN WALL WORKING SYSTEM



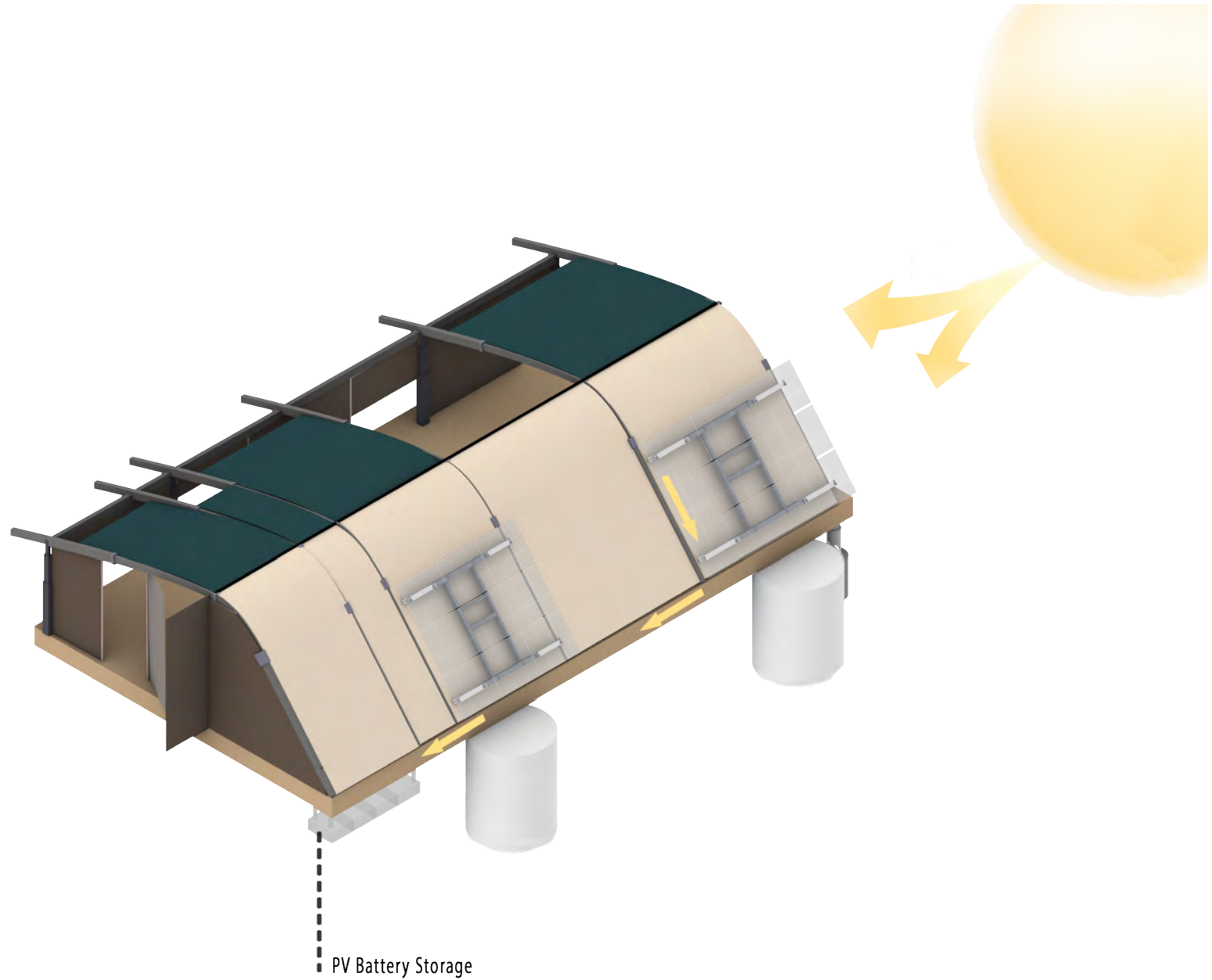
MOVEABLE ROOF WORKING SYSTEM



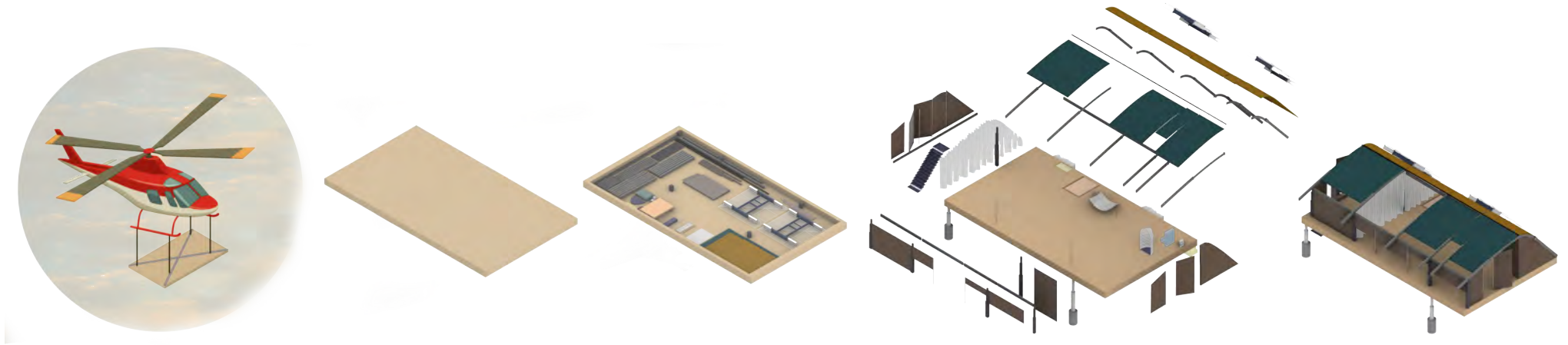
SITE FIXED FOUNDATION ELEMENTS and TELESCOPIC COLUMNS



PV SOLAR PANEL AND BATTERY SYSTEM



SUITCASE BUILDING WORKING PRINCIPLE



RAIN WATER COLLECTING SYSTEM and WASTE HAULING SYSTEM

RENDERS



RENDERS



RENDERS



RENDERS



RENDERS



RENDERS



REFERENCES

<https://www.stratejikortak.com/2018/07/afrika-maden-haritasi.html>

https://energyeducation.ca/encyclopedia/Photovoltaic_system

<https://www.awf.org/wildlife-conservation/all>

<https://www.safaribookings.com/blog/endangered-animals-africa>

<https://www.statista.com/chart/17122/number-of-threatened-species-red-list/>

<https://www.nationalgeographic.org/activity/why-animals-migrate/#:~:text=Animal%20migration%20is%20the%20large,water%2C%20or%20for%20mating%20reasons.>

<https://www.nationalgeographic.org/encyclopedia/migration/>

<https://seaworld.org/animals/all-about/elephants/habitat/#:~:text=African%20elephants%20usually%20migrate%20at,are%20not%20prone%20to%20drying.>

[https://climateknowledgeportal.worldbank.org/country/zambia/climate-data-historical/#:~:text=Zambia%20experiences%20a%20predominantly%20sub,May%20to%20mid%2DAugust\).](https://climateknowledgeportal.worldbank.org/country/zambia/climate-data-historical/#:~:text=Zambia%20experiences%20a%20predominantly%20sub,May%20to%20mid%2DAugust).)

