# The Pakistan Floods 2022

# 1 million Households

# Building Sustainable Communities
# Immediate Recovery/Rehabilitation

5 December 2022

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*Marshall Professor of Sustainable Design, University of Cambridge*
*Co-Founder and CEO, Heritage Foundation of Pakistan*

# Heritage Foundation of Pakistan

**Not-for-profit social & cultural entrepreneur organization,1980 for safeguarding Pakistan's cultural heritage. Since 2005 it provides humanitarian assistance by linking heritage to innovative social and eco-led initiatives.**

Heritage Management

Humanitarian Assistance

# BASA - Barefoot Social Architecture

1. Social engineering for social change.

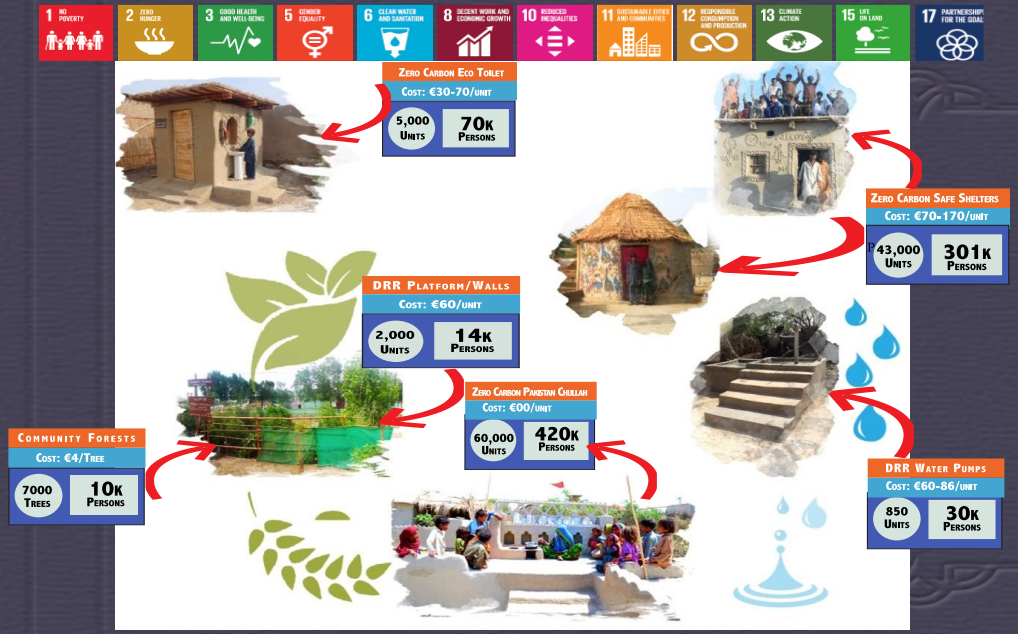
2. Incorporates environmental, cultural and technical attributes

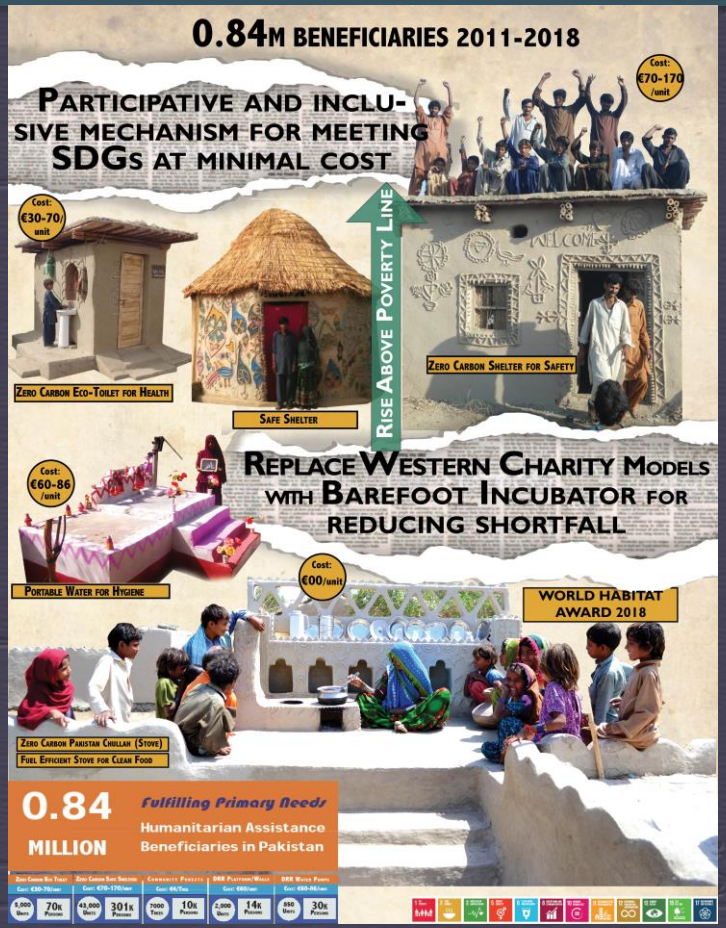
3. Helps rise from a cycle of dependency to a culture of pride and self reliance.

1. Fosters democratization of architecture for well being and self esteem of the marginalized.

2. Promotes 4 Zeros: Zero Carbon, Zero Waste, Zero Cost (to donor) leading to Zero Poverty.

# Impact of BASA




- 12 SDGs
- 100,000+ persons/year

# Post Flood 2011-2014 International Models

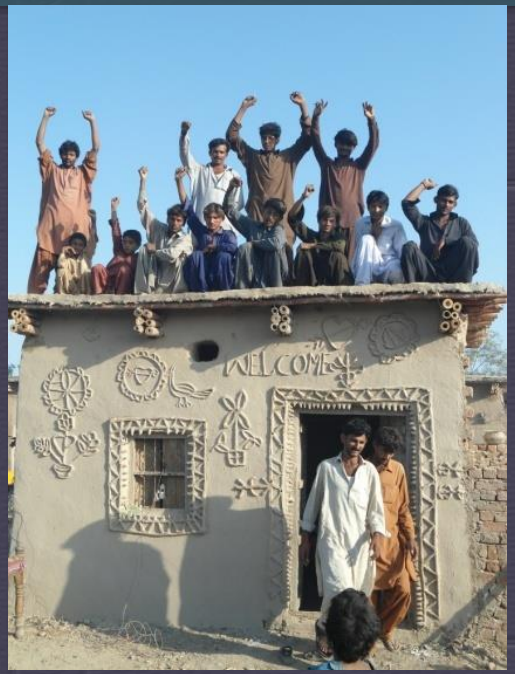
## 40% Carbon Emission Due to Coventional Construction

ONE ROOM SHELTERS AT $1,000 TO $1,600

RCC frame, CC block construction
100,000 units
$CO_2$ emissions expected to be twice that of burnt brick structure

Burnt brick walls, steel girders roof.
100,000 units =550m bricks=50,770 acres deforestation for 10 years
316,470 tons $CO_2$ emissions

# Post Flood 2011-2014 Lari Models – 40,000 Units



ONE ROOM ZERO CARBON SHELTERS AT $300

Earth Masonry salls, bamboo roofs Self built under guidance, with cool, healthier indoors..

**With IOM**

***Largest Zero Carbon Shelter Program***

- ***No Carbon Emissions***
- ***No trees felled***
- ***1750 Villages 300,000 persons housed***

**Materials Used**

- ***Locally Sourced Clay***
- ***Low-energy Lime***
- ***Renewable Bamboo***

# Bamboo Structures, Kot Diji Park, Built in 2014

Pictures taken after the deluge, 21 August 2022

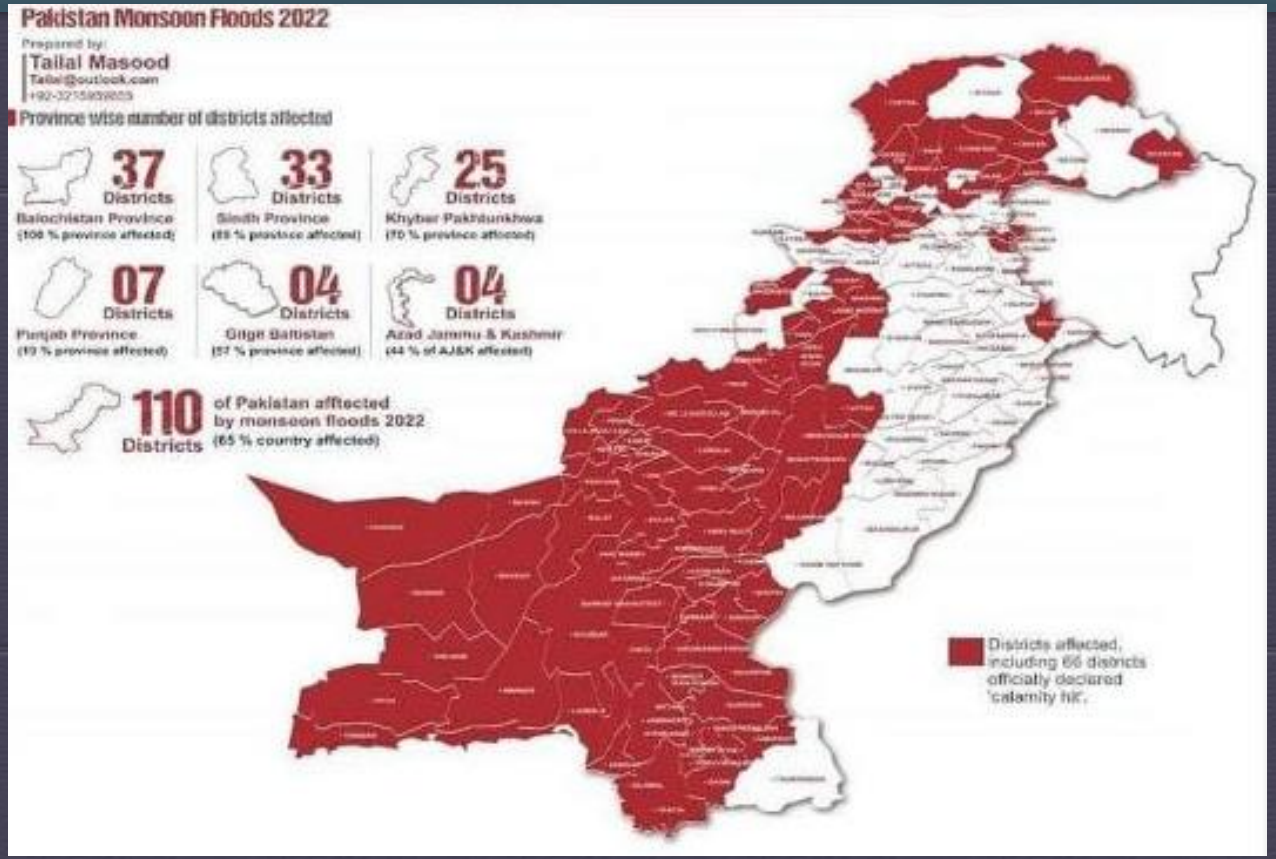
# Bamboo Structures, Kot Diji Park, Built in 2014

Condition of structures after water receded, 3 December 2022

# Case Study: Pono Village & Its Satellites

## Resilience Through Community Partnership

# Floods 2022




***More than 1/3 of Pakistan, size of UK, submerged.***

A bank of windcatchers.

# Catastrophic Floods, 2022

*Concrete buildings collapsing.*

*Submerged in a sea of water.*

**33 m. displaced. 5 m. families without shelter,**
**10 m. children exposed to disease.**

*A bank of windcatchers.*

# Paradigm Shift in Culture of Giving

***No to Handouts. Yes to Self Reliance*!**

**Empowering Communities for Post-Disaster Development with Women in the Lead.**

- Empowerment instead of handouts.
- Self reliance instead of dependence.
- Partners instead of victims
- Rise above adversity through skill training / capacty building.

# Zero Carbon Disaster Resilient Buildings

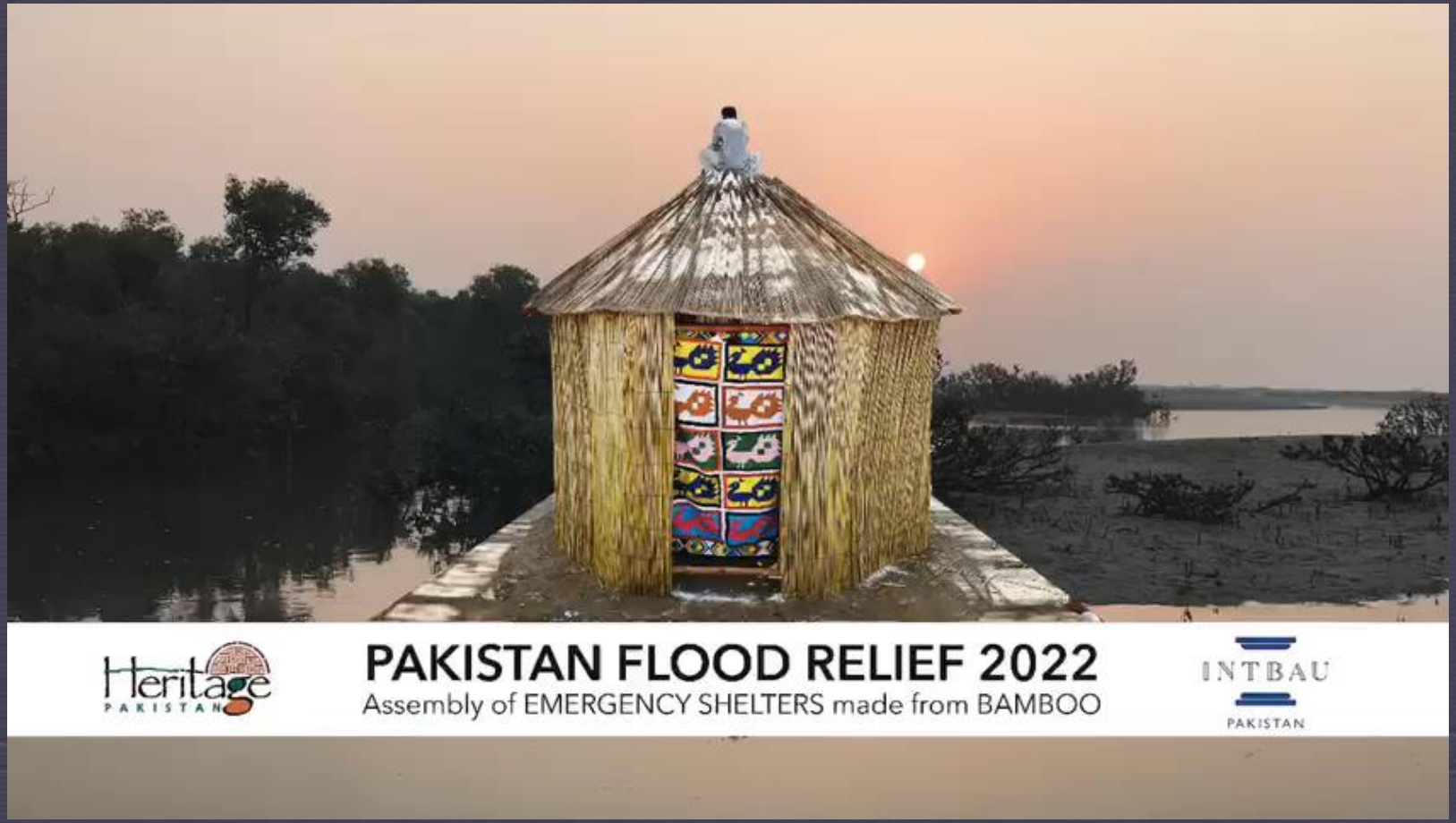
*Earth lime masonry Elevated school, 2014.*

*Double storey bamboo Women's Centre, 2010.*

*INTBAU Research Centre, Makli, 2019.*

# Production of LOG Emergency Shelter

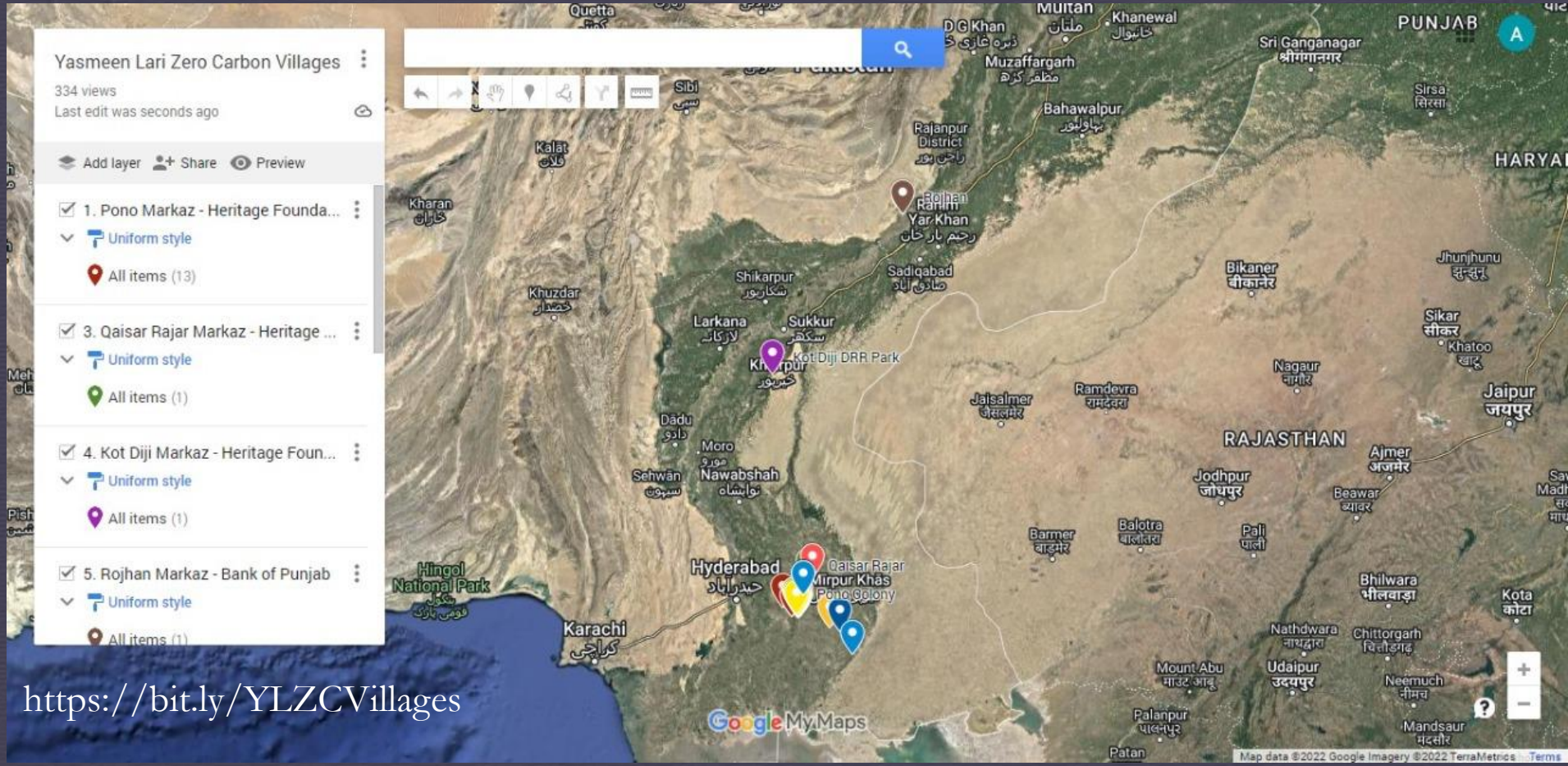
## 1000 Units Fabricated in a month - September 2022



# Versatile Bamboo LOG Panels for Safe Construction

Bamboo LOG one room unit, 2018

# 60+ Zero Carbon Villages in Sindh and Punjab




https://bit.ly/YLZCVillages

# Pono Village During Floods August 2022

# Permanent LOG – 100 Built by Bank of Punjab Loans

*Disaster resilient permanent LOGs*

***Micro Loans disbursed through 4 Women's Committees/***
***Interest free loans to be returned within 5 years for community buildings.***

***100 one room shelters and 50 eco toilets built providing safety and dignity to housewives and their families.***

# Zero Carbon Villages & Specialised Barefoot Enterprise

# Flood Affected Villagers Towards Self Reliance

*Village assembly.*

*Learning bamboo construction.*

# Artisan Training

# Artisan training

# Bamboo Emergency LOG (Lari Octagreen @ Rs 25,000/Unit)

1. Prefab Bamboo Sketleton erected in 2 hours.

2. Immediate enclosure witih reed matting.

3. Personalized with earth plaster and decoration.

# Bamboo Instant Shelter – Rs 2,500/ unit

*1. Structural bamboo kit is being erected by family members.*

*2. Enclosure with self made reed matting.*

*3. Finishing with earth plaster and special windows*

# Rights-Based Development 1,000 Families

## APPLICATION OF HOLISTIC MODEL
## 15/9 TO 30/11, 2022

1. Shelter: 100% complete
2. Sanitation – eco toilets – 60% complete
3. Lighting – Solar panels – 100% complete
4. Water – Hand pumps – 100% complete
5. Clean Food – Earthen Pakistan Chulah – 100 complete

# 1. Prefab Bamboo Shelters

Emergency LOG

Instant Shelter

# Personalizing Shelters

# 2. Sanitation – eco toilet 3. Lighting – Solar Panels

Inset: Interior of Instant Toilet

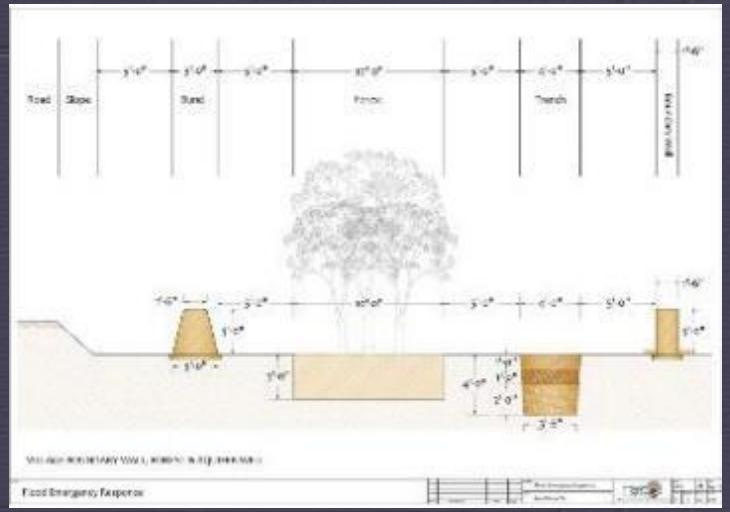
# 4. Water Handpump 5. Clean Food-Pakistan Chulah

Elevated handpump

Elevated Earthen Stove

# Community Disaster Preparedness– Progress in 8 Weeks

1. Earth lime Platforms for water and food: 100%
2. Raised farming beds for kitchen garden: 100%
3. Extended family enclosure dwarf walls: 90%
4. Dining platforms of each family:80%
5. External boundary, removal of bushes: 90%
6. Community forests 10 saplings / family: 100%
7. Aquifer wells: 5%

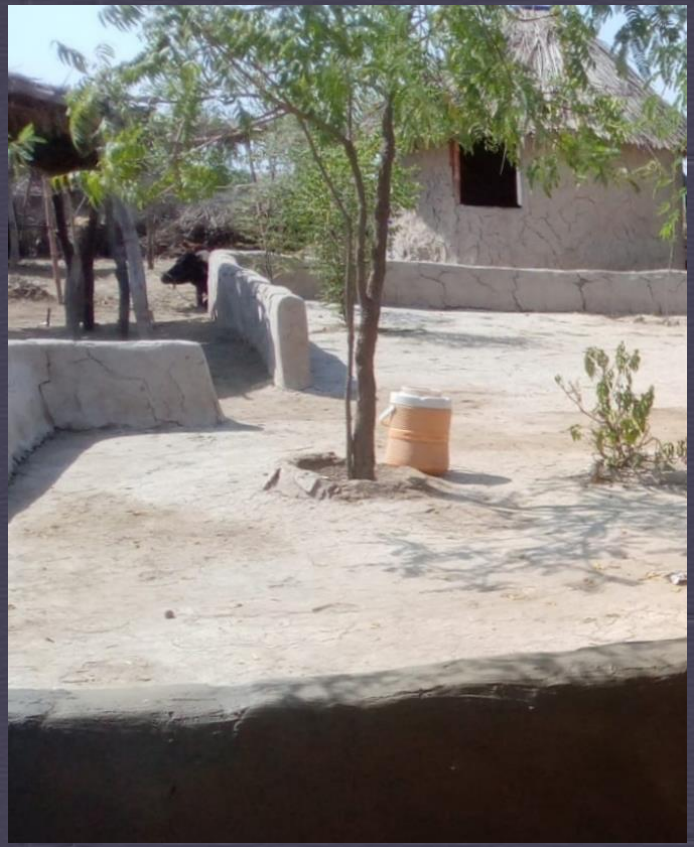


# Disaster Preparedness – Water/Food/Vegetable platforms

Elevated solar water stand

Raised bed farming

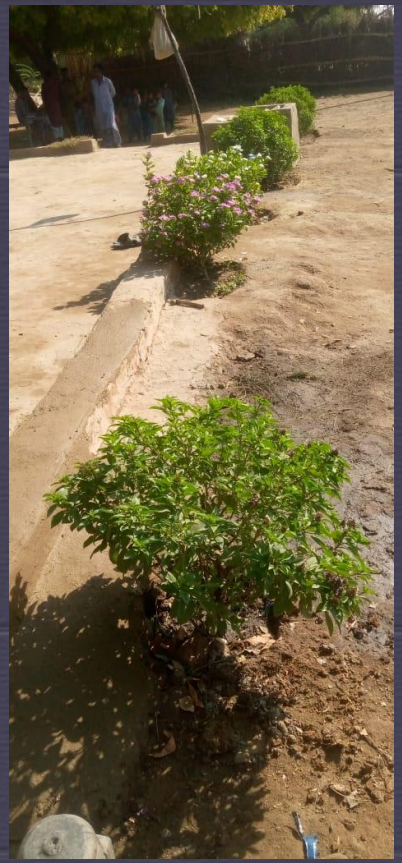
# Disaster Preparedness – family Enclosures, Raised Dining



Family Enclosure

Raised Dining Platform

# Disaster Preparedness – Peripheral Barrier



Village Boundary

Household Boundary

# Disaster Mitigation -Community Forests /Aquifer Wells

Community Forest

Saplings @ Community Forest

# Zero Carbon Villages - Specialized Barefoot Enterprise

## PONO VILLAGE CENTRE – Training Village

1. Fish farming and Azzolla growing
2. Bamboo Instant Shelters and Instant Toilets
3. Chicken Farming
4. Roof thatch panels
5. Goat rearing
6. Green fodder for Cattle
7. Reed matting panels for walls
8. Mother earth products e.g. fuel briquettes, organic soap
9. Mosquito netting production
10. Stitching and sanitary pads
11. Nursery and plants
12. Terracotta Pottery

# Specialized Barefoot Enterprise – Pono Training Village

Stacked Prefab Bamboo Panels

# Specialized Barefoot Enterprise – Nursery Village

Village farm

Saplings at Village farm

# Specialized Barefoot Enterprise – Fish Farming

Azzolla Farming

Fish Farming

# Specialized Barefoot Enterprise – Matting, Thatching

Thatch Roof Making

Wall Matting

# Specialized Barefoot Enterprise –Chicken & Goats

Chicken Farming

Goat Rearing

# Specialized Barefoot Enterprise – Pottery

Pottery Making

# Immediate Recovery/Rehabilitation

## 1 million Households 2023-2024

# 1 Million H/H Recovery/Rehabilitation Plan

- Delivery of 'Rights based' elements for fulfillment of basic needs: Safe shelter, toilet, water, lighting, clean food/Pakistan Chulah
- Affordable, Sustainable, locally sourced construction
- Adoption of co-building, co-creation, low impact, low tech techniques
- 4 Zeros: Zero Cost/Zero Waste/Zero Cost (to donor) = Zero Poverty
- Partnership with local communities – skill training and knowledge sharing
- Community disaster preparedness/environmental improvement
- Training for barefoot enterprises for income generation
- Women led community engagement for speedy action.

# Recovery Elements-1 Total Rs 45,000/unit

## FULFILLMENT OF BASIC NEEDS

Bamboo LOG shelter (1 per H/H)

Instant eco-toilet (1 for 2 H/H)

Handpump (1 for 8 H/H)

Solar light (1 for 12 H/H

Pakistan Chulah Stove (1 per H/H)

# Recovery Elements-2 Total Rs 45,000/unit

## DISASTER PREPAREDNESS/ENVIRONMENTAL IMPROVEMENT

Earth Platforms for Water and Food

Raised Farming on Earth Platforms

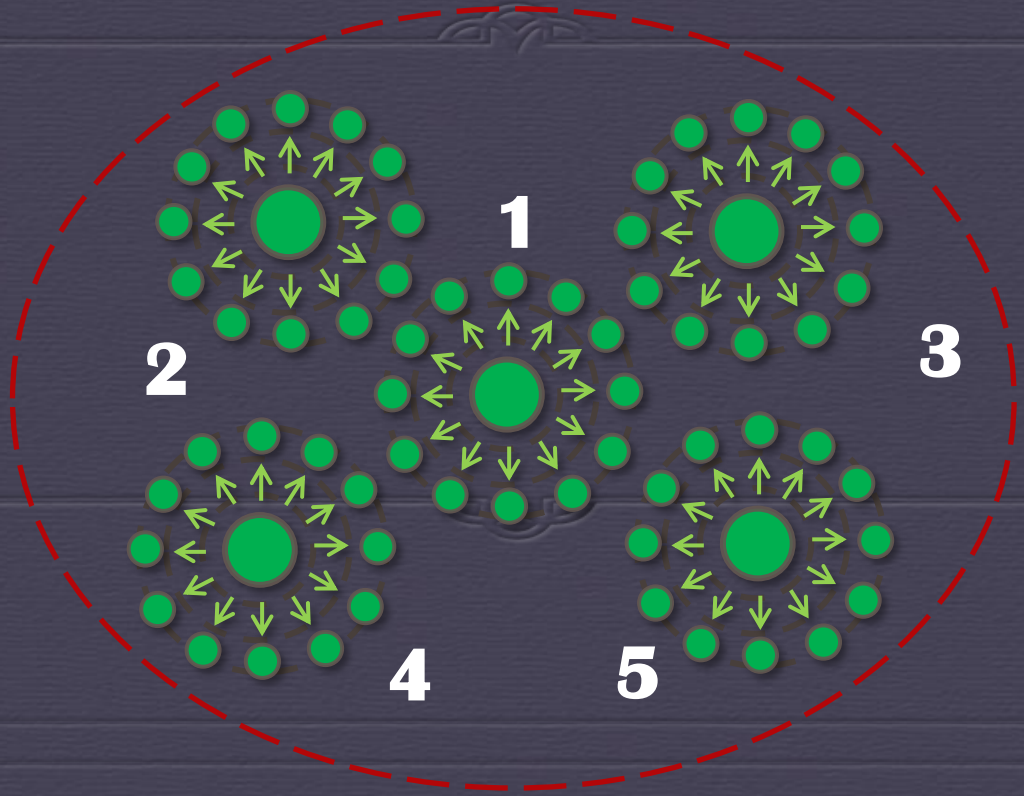
Dining Platforms

Community Forests for Water Retention

Village Boundary for Flood Water Prevention

# Hubs = 5000 Households

Hub (H) = 5 Groups of 1,000 H/H each



# One Million Households (H/H) – 200 Hubs (H)

PDMA Damage Assessment Sindh 1.8 million, Baluchistan 80,000, Punjab 70,000

Year 1 2023 Reaching 450,000 Households

| | | | |
|---|---|---|---|
| 1.1 Jan-Mar: | Sindh 60,000 (12 H) | Baluchistan 00 | Punjab 00 (0H) |
| 1.2 Apr-June: | Sindh 90,000 (18 H) | Baluchistan 00 | Punjab 00 (0H) |
| 1.3 July-Sep: | Sindh110,000 (22 H) | Baluchistan 20,000 (4 H ) | Punjab 15,000 (3 H) |
| 1.4 Oct-Dec: | Sindh115,000 (23 H) | Baluchistan 20,000 (4 H) | Punjab 20,000 (4 H) |
| | 375,000 (75 H) | 40,000 (8 H) | 35,000 (7 H) |

Distribution of Units

| | Sindh | Baluchistan | Punjab |
|---|---|---|---|
| 1.1 | Mirpur Khas 12H | Nil | Nil |
| 1.2 | Matiari 9H , Sanghar 9H | Nil | Nil |
| 1.3 | Tando A Yar 11H, Tando M Khan 5H, Dadu 6H | 4H | 3 H |
| 1.4 | Naush. Feroz 11H, Shah. B Abad 12H | 4H | 4 H |

# One Million Households (H/H) – 200 Hubs (H)

Year 2 2024 Reaching 550,000 Households

| | | | |
|---|---|---|---|
| 2.1 Jan-Mar: | Sindh 115,000 (23 H) | Baluchistan 20,000 (4 H) | Punjab 15,000 (3 H) |
| 2.2 Apr-June: | Sindh 115,000 (23 H) | Baluchistan 20,000 (4H) | Punjab 20,000 (4H) |
| 2.3 July-Sep: | Sindh 120,000 (24 H) | Baluchistan 00 (0H) | Punjab 00 (0H) |
| 2.4 Oct-Dec: | Sindh 125,000 (25 H) | Baluchistan 00 (0 H) | Punjab 00 (0H) |
| | 475,000 (95H) | 40,000 (8H) | 35,000 (7H) |

Distribution of Units

| | Sindh | Baluchistan | Punjab |
|---|---|---|---|
| 2.1 | Thatta 6H, Sujawal 5H, Qamber 12H | 4H | 3H |
| 2.2 | Badin 9H, Sukkur 14H | 4H | 4H |
| 2.3 | Larkana 9H, Shikarpur 9H, Jacobabad 6H | Nil | Nil |
| 2.4 | Jacpnanad 6H, Kashmore 7H, Ghotki 12H | Nil | Nil |

# 1 Million H/H – Funding Requirement 2023

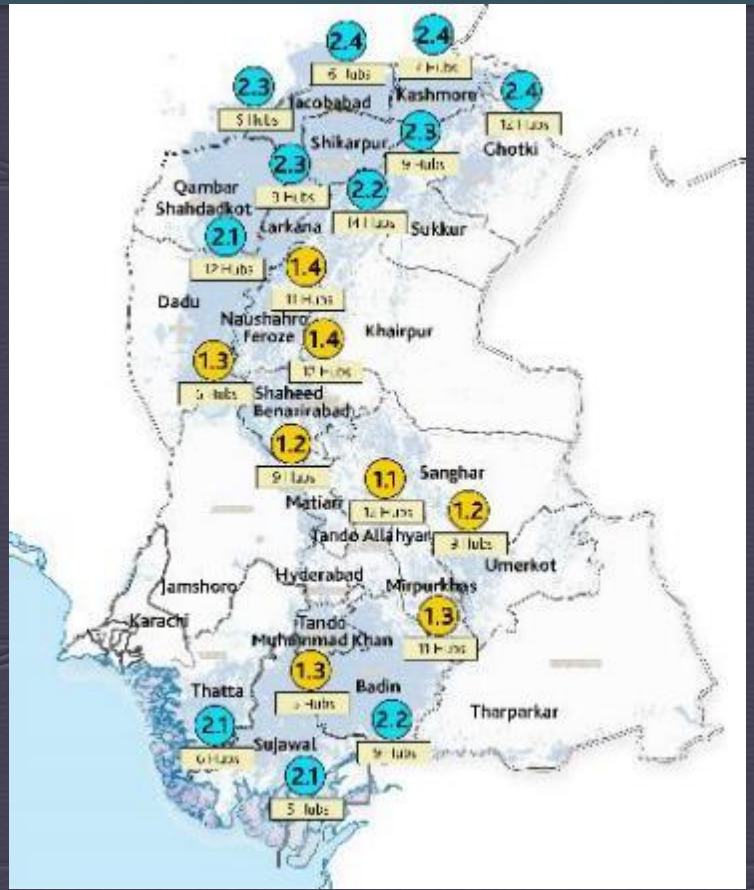
Funding required: 450,000 units @ $ 222 (Rs. 40,000)/unit = $ 99,900,000

Sponsorship Methodologies

| | | Village by Village INGO/NGOs | Segment by Segment UN Agencies | Susidised micro loans |
|---|---|---|---|---|
| 1.1 Jan-Mar | 60,000 units | $ 13,302,000 | 00 | 00 |
| 1.2 Apr-Jun | 90,000 units | $ 19,980,000 | 00 | 00 |
| 1.3 Jul-Sep | 145,000 units | 00 | $ 32,190,000 | 00 |
| 1.4 Oct-Dec | 155,000 units | | | $34,410,000 |

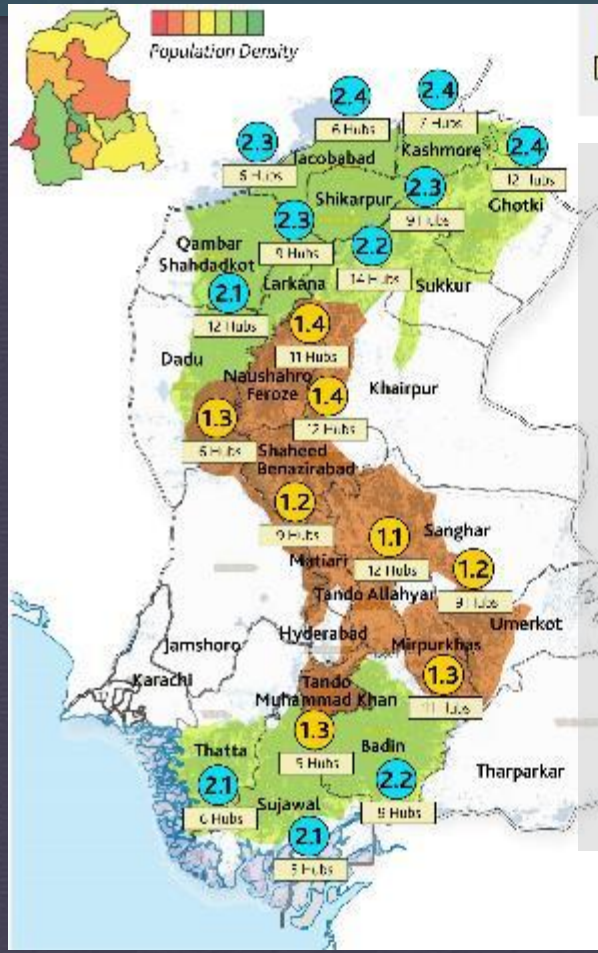
# Sindh Map: Density Levels and Flood Impact

*Population Density.*




*Flood affected area.*

# Sindh Map Showing Distribution of 1 M. Units




1.4 Year: 1 Quarter: 4 Hubs: 13
1 Hub = 5,000 Households

2.3 Year: 2 Quarter: 3 Hubs: 12
1 Hub = 5,000 Households

Year 1
375,000 Households
Q1 - 60,000 (12 Hubs)
Q2 - 90,000 (18 Hubs)
Q3 - 110,000 (22 Hubs)
Q4 - 115,000 (23 Hubs)

Year 2
475,000 Households
Q1 - 115,000 (23 Hubs)
Q2 - 115,000 (23 Hubs)
Q3 - 120,000 (24 Hubs)
Q4 - 125,000 (25 Hubs)

## Year 1

1.1: 60,000 Households
Mirpurkhas (60,000)

1.2: 90,000 Households
Matiari (45,000)
Sanghar (45,000)

1.3: 110,000 Households
Tando Allahyar (55,000)
Tando M Khan (25,000)
Dadu (30,000)

1.4: 115,000 Households
Naushro Feroze (55,000)
Benazirabad (60,000)

## Year 2

2.1: 115,000 Households
Thatta (30,000)
Sujawal (25,000)
Qambar Shakot (60,000)

2.2: 115,000 Households
Badin (45,000)
Sukkar (70,000)

2.3: 120,000 Households
Larkana (45,000)
Shikarpur (45,000)
Jacobabad (30,000)

2.4: 125,000 Households
Jacobabad (30,000)
Kashmore(35,000)
Ghotki (60,000)

# 1 Million H/H First Quarter – Material Requirement

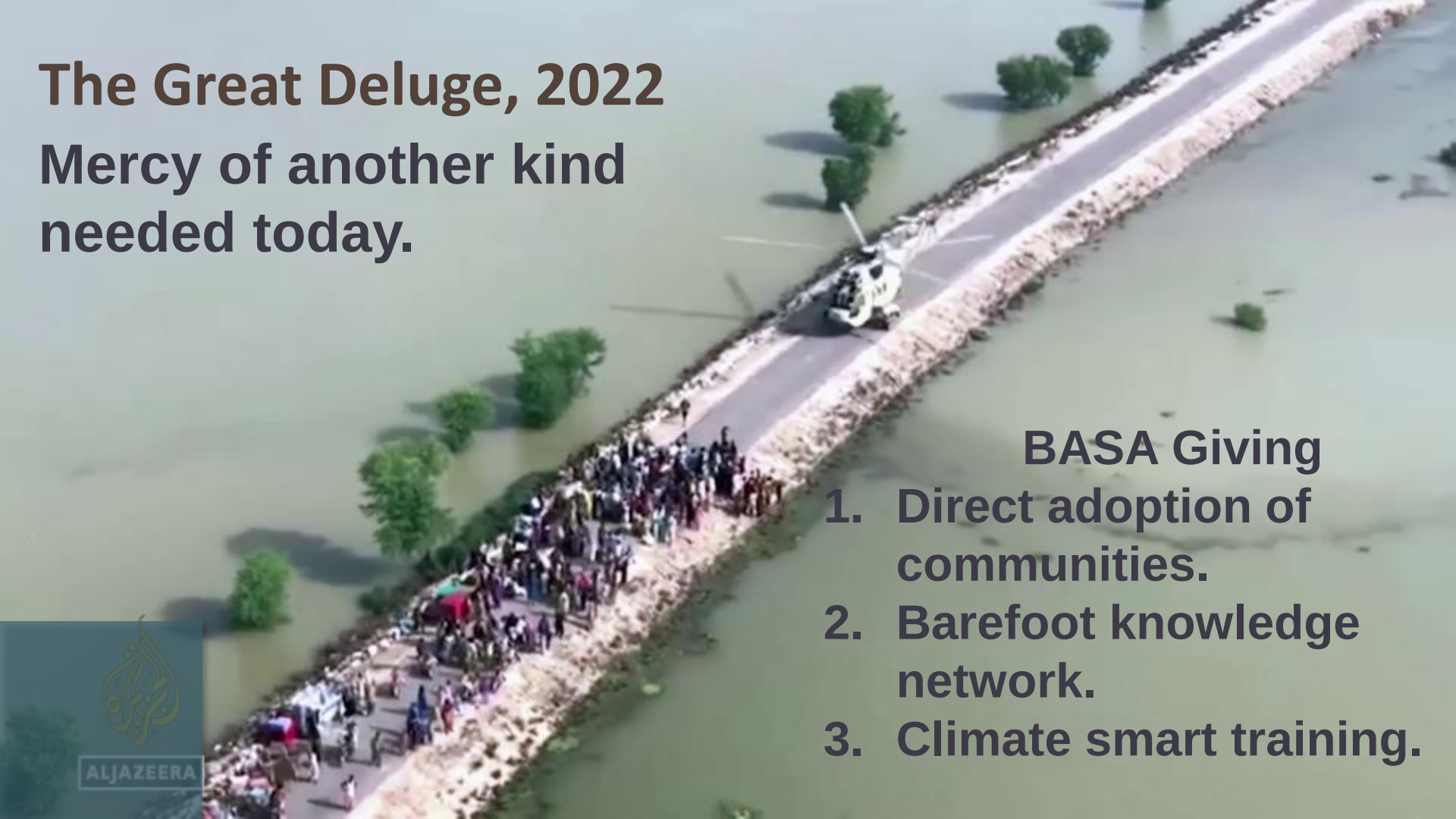
## 1.1 Jan-Mar : 60,000 units

Bamboo 3”-4” dia., 2” dia.
Hardware: nails, bolts, screws, hinges
Lime for lime concrete and earth stabilization
Plant saplings for community forests 10/family.

| | | |
|---|---|---|
| Bamboo 3-4” dia. | 450 rft/unit or | 27,000,000 rft |
| Bamboo2” dia. | 210 rft/unit or | 12,600,000 rft |
| Hardware | 8 kg/unit or | 480,000 kg |
| Lime kg bags | 18 no./unit or | 1,080,000 bags |
| Tree saplings | 10/unit or | 10,000 trees |

# The Great Deluge, 2022

## Mercy of another kind needed today.




**BASA Giving**

1. Direct adoption of communities.
2. Barefoot knowledge network.
3. Climate smart training.