3 R's of Resilient Housing

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In the last decade, more than 500,000 vulnerable people died in earthquakes and hurricanes. 5 million more lost their homes.
The world’s response has been lackluster.

Post-disaster recovery doesn’t fix the problem.
By 2030, 3 billion people will live in substandard housing.

Homeowners struggle to get financing.

Governments struggle to enforce codes.
Quiz
Quiz

Port-au-Prince  Manila  Guatemala City
Resilient Housing 3 R’s:  R1= Rebuild

Jojutla de Juarez, México, 2017
Ixtaltepec, Oaxaca, Mexico, 2017
Rebuild:
• Homeowner driven
• Locally accepted techniques and systems
• Impact construction value chain to achieve permanent change: Homeowners, workforce, materials producers and suppliers, government officials.

Nepal 2017
Resilient Housing 3 R’s: R2 = Relocate

Canania, México, 2018
Relocate:
• Usually expensive and socially traumatic.
• Requires strong community engagement.
• Needs viable land, or area to re-densify.

Salgar, Colombia, 2017
Resilient Housing 3 R’s: R3= Retrofit

Canania, México, 2018
Earthquake shaking
Unstable slopes
Landslides
Flooding
Liquefaction
Surface fault rupture
Landslides
Storm surge
Tsunami

RETROFIT
RELOCATE
Why Retrofit?

- Save lives
- Better health, safety
- Solve housing crisis
- Local jobs, incomes
- Reduce risk
- Change construction practice
**Repair vs. Retrofit**

- **Repair**
  - Addresses damages only
  - Does not resolve structural deficiencies.
  - Unknown performance vs disasters.

- **Retrofit**
  - Evaluates the structure
  - Life-safety performance standard
  - Predictable performance vs disasters.
Calculate Retrofitted costs.

- *Retrofit* costs are calculated based on the *renovation* costs, reconstruction costs, and the *cost* of *building materials*.

- The chart shows a comparison of costs per m² (USD) for different scenarios:
  - *Retrofit*
  - *New construction*
  - *Temporary shelter*

- *Retrofit* mediamente estropeado
- *Retrofit* muy estropeado
- *Nueva construcción*
- *Refugio transicional*
Haiti post disaster – preventative approach

Home owner driven assisted reconstruction, for community sustainability

Safer construction practices remain in the community and outlast reconstruction efforts.
Retrofitting in Haiti post-earthquake

Before

After
Retrofitting in Nepal post-earthquake

Before

After
Guatemala Housing Retrofits

Before

After
Streamline Every Step for Scale:

1. Risk Assessment – Hazard, Vulnerability, Exposure
2. Regional Inventory
3. Building Typologies and Type Design/Retrofit Card/Revit
4. House-by-House Assessment
5. Homeowner Demand Creation
6. Construction Documents, Permits
7. Construction and On-the-Job Capacity Building
8. Financing
9. Policy Changes
THANK YOU

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