# Rehabilitation project in Panay and construction of a student dormitory, Cuartero and Tapaz, Panay Island, Philippines.

**PCDR (Panay Centre for Disaster Response)**
**in partnership with Caritas Luxembourg**

**2015-2017**

# DRR Shelter – Training of Trainers
# Training guide

PCDR
CENTER FOR DISASTER RESPONSE

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# Acknowledgement

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*Credits photo: unless otherwise specified all photographs illustrating this guide are credited to CRAterre and particularly to Annalisa Caimi, Elsa Cauderay, Florie Dejeant and Olivier Moles.*

*Picture first page: PCDR project: Pilot house in Cuartero, Capiz.*

*Version of the DRR Training kit: September 2017*

# About this guide

This disaster risk reduction (DRR) pedagogical guide for training of trainers aims at being a tool in the field of the building and DRR sector. It can actually be used in the framework of DRR campaigns, protection of local resources' campaigns and for rural housing improvement, repairs and new construction activities or projects.

It was built up during two reconstruction projects in the aftermath of the super typhoon Haiyan and was designed along with a technical guide. Both projects were set up in Panay Island in the Philippines:

1. *Shelter and livelihood improvement project for the indigenous communities of Aklan. Project in partnership with the DSAC of Kalibo,SC/CF (Secours Catholique Français) and Caritas Belgium, 2014-2017.*
2. *Technical assistance to the Caritas Luxembourg / PCDR (Panay Centre for Disaster Response) rehabilitation project in Panay and construction of a student dormitory in Tapaz, 2015-2017*.

This training of trainers (ToT) guide goes along with the DRR Training kit which is the document to be used for the future trainers on the field. The core modules of the ToT (M1, M2, M3) follows the content of the DRR Training kit. But this guide aims to provide further information and a structured curriculum for the trainer of trainers. The training of trainers is designed to provide knowledge to a various kind of actors either with social or technical profile: engineer, architect, technician, community mobilizer, people organization (PO), etc.

The main objectives of the DRR training is to

- Raise awareness on the potential of local architecture (M1)
- Raise awareness on the interest of protecting local resources (M2)
- Develop DRR knowledge on how to improve sturdiness of the buildings by simple and economic ways (M3)

## Structure of the training guide

The Training of Trainers guide includes

- "Session plan" sheets to guide the Training Manager for each session of the ToT;
- "Text sheets" to provide further information to the Training Manager in addition to the information provided in the DRR Training kit;
- "Pictures sheets" which gives an overview of the sheets provided in the Training kit to be used for the session.

The DRR Training kit is provided separately and includes:

- "picture sheets" that are the one to be shown to the participants;
- "text sheets" that are a support dedicated to the future trainers and which should also be used by the Training Manager to guide the discussions

## Please note:

- Even if this ToT guide has been designed in the framework of specifics contexts in the Philippines, it aims to give principles that are replicable in other parts of the country. However, the Training kit should be adapted to other contexts where the awareness campaign is planned to be disseminated. An exercise at the end of the ToT is specifically added for this purpose.

  Nevertheless, if you would like to replicate this training out of the Philippines, make sure the messages and contents are adapted to this specific context.

- If you are unfamiliar to the approach promoted in this guide and are interested in it, this guide may not provide you with all the necessary information. In this case, get closer to the people and organizations that fully master the concepts proposed, so that they can advise you usefully.

# TRAINING CURRICULUM

| *Module* | *Session* | *Methodology* | *Contents* | *Dur.* |
|---|---|---|---|---|
| M0. INTRODUCTION | | | | 30mn |
| | M0.1. Introduction & Round table | Round table | | |
| | M0.2. Presentation of the training and objectives | Presentation | Presentation of the weaknesses identified in the targeted area.<br>Presentation of the objectives and the messages we want to send out to the communities.<br>Specificities among the different communities.<br>Link with the DPT (Disaster Preparedness Training) | |
| M1. RESILIENCE & POTENTIAL OF LOCAL ARCHITECTURE | | | | 45mn |
| | M1.1. Concept of local building cultures | Discussion with pictures | Pictures of Filipinos and worldwide traditional buildings, to create interest and support discussion around the concept of local building cultures | |
| | M1.2. Principle of resilience in housing | Discussion with pictures | Comparison of the resilience of a traditional "light material" building and a concrete building | |
| | M1.3. Coping strategies | Case studies | Discussion through examples of coping mechanisms in shelter known by participants and proposed by the trainer | |
| M2. RELEVANCE OF LOCAL MATERIALS | | | | 1h |
| | M2.1. Local materials: Introduction | Debate / Pictures | Introduction on the criteria that lead to choose a material or another for house construction | |
| | M2.2. Walling materials | Debate / Pictures | Questioning on the different solution of walling. The advantages and disadvantages.<br>Comparison between bamboo and plywood walling | |
| | M2.3. Roofing materials | Debate / Pictures | Debate Ambulang/CGI Sheet for the roof. Advantages and disadvantages. | |
| | M2.4. Foundation materials | Debate / Pictures | Wooden pillars / Wood quality and availability / Other solutions | |
| | M2.5. Use & protection of local materials | Debate / Pictures | Focus on conservation and protection of wood and bamboo | |
| M3. HOW TO INCREASE STURDINESS OF BUILDINGS | | | | 1h30 |
| | M3.1. House exposition | Problem / Solution | P - Building exposed to wind<br>S A - Tree barrier<br>S B - Building orientation<br>S C - Shape of the roof | |
| | M3.2. Bracing | Problem / Solution | P - The house and/or the roof lies down<br>S A - Bracing of the structure<br>S B - Bracing of the roof | |
| | M3.3. Connections | Problem / Solution | P - Some parts of the structure fall apart<br>S - Good connection of structural components | |
| | M3.4. Ties | Problem / Solution | P1 - Some parts of the structure are blown off<br>S A - Tying-down from bottom up<br>S B - Opening and crossed ventilation | |
| | | | P2 - Some part of the cover are blown off<br>S A - Tying of roof covering<br>S B - Stabilization system | |
| | M3.5. Protection and maintenance | Problem/Solution | P - Some part of the house are rotten<br>S1 - Drainage of the water<br>S2 - Protection of the base of the post<br>S3 - Maintenance | |
| | M3.6. Conclusion | Example | Example of technical proposition | |
| M4. FINAL EXERCICE | | | | 1h30 |
| | M4. Adapt the pedagogical material | Group exercise | Adaptation of pedagogical material to targeted context | |

| PCDR | M0.1 | INTRODUCTION | Session plan |
|---|---|---|---|
| | PRESENTATION & ROUND TABLE | | |

**Objective**

- Training manager and participants know each other

**Methodology and proceedings of the session**

- Welcoming and self-presentation (training manager)
- Round table of the participants
- Filling of the attendance sheet (*see annex*)

**Facilitator**:

Training manager

**Place**

Anywhere

**Duration**:

15mn

**Documentation**

**Equipment**

- Paper

**Organization**

| | |
|---|---|
| Before the session | - Preferably, organize the room in « round table »<br>- Print the attendance sheet (or use plain paper) |
| During & after the session | - Circulate the attendance sheet among participants and collect it |

| PCDR | M0.1 | INTRODUCTION | Annex |
|---|---|---|---|
| | PRESENTATION & ROUND TABLE | | |

**DRR SHELTER Training of Trainers – ATTENDANCE SHEET**

Training Manager:

Place: Date:

| N° | First name | Family name | Position | E-mail | Phone |
|---|---|---|---|---|---|
| 1 | | | | | |
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| PCDR | M0.2 | INTRODUCTION | Session plan |
|---|---|---|---|
| | PRESENTATION OF THE TRAINING & OBJECTIVES | | |

**Objective**

- Present the objectives of the training and its structuration

**Methodology**

- Presentation of the weaknesses identified in the targeted communities visited previously.
- Presentation of the objectives and the messages we want to send out to the communities.
- Specificities among the different communities.
- Link with the DPT (Disaster Preparedness Training)

**Proceedings of the session**

- Presentation of the weaknesses identified in the targeted communities visited previously.
  *For example, in Cuartero:*
  - o *Loss of confidence in local knowledge*
  - o *Prefer new modern materials over native ones & Feel safe in their new house because of the use of modern materials*
  - o *Environment severely affected (corn crops) & Non preservation of local resources and environment*
  - o *Prefer increase the size of the house rather than create a strong structure & Concept that increase the resistance of the house requires a lot of money*
  - o *Lack on DRR knowledge: Site selection / General reinforcement like bracing*
- Presentation of the objectives and the messages we want to send out to the communities.
  *For example, in Cuartero:*
  - o *Raise awareness on the interest of local architecture and the use of local resources*
  - o *Develop DRR knowledge on how to improve sturdiness of the buildings by simple and economic ways*
- Presentation of the structure of the training of trainers and the methodology (participation / discussion / debate).
- Ask participants which are the main specificities of the community they will work in (urban/rural ; main type of hazards & vulnerabilities)
- Make the link with the workshop they will implement themselves: the idea is to place them in the situation of the beneficiaries but with more precision / information. They will need to adapt and simplify the messages to their audience and in regards to the specific context of their communities. An exercise of synthesis at the end will focus on how to adapt to other situation.
- Ask if they have any question.

**Facilitator**:
Training manager

**Place**
Anywhere

**Duration**:
15mn

**Documentation**

**Equipment**

- Board or flip chart
- Markers

**Organization**

| | |
|---|---|
| Before the session | - Preferably, organize the room in « round table » |
| After the session | - |

| PCDR | M1.1 | RESILIENCE & POTENTIAL OF LOCAL ARCHITECTURE | Session plan |
|---|---|---|---|
| | CONCEPT OF LOCAL BUILDING CULTURES | | |

**Objective**

- Develop awareness on the interest of local building cultures

**Methodology**

- Pictures of Filipinos and worldwide traditional buildings, to create interest and support discussion around the concept of local building cultures
- Discussion with the audience about the specificities of the local architecture and the factors influencing its production

**Proceedings of the session**

- Show the pictures of the "DRR Shelter Kit – M1.1" and initiate a discussion by asking participants to list the selection criteria that could have guided the owners' decisions (materials, construction systems, construction sites and its environment, design, aesthetic, etc.). For this exercise use mainly the first four picture sheets show buildings from the Philippines.

  *Example of criteria: protect from rain, elevated for floods, or storage, protect from warmth, temporary use, use of available materials (wood, stones, nipa, etc.), beauty, etc.*

  *Those criteria can be classified through the followings:*

  *Climatic conditions, natural risks, environment, available resources, functional needs, comfort, social needs, etc.*

- The last two picture sheets show buildings from other countries over the world (Yemen, Burkina Faso, France & Colombia) where a different context (physical, climatic, social, economic and cultural) have led to very different architecture, even if sometimes with similar materials (mud, wood, bamboo). The idea is to show that a multitude of local building cultures exists throughout the world which are adapted to the environmental conditions of the territory in which they are established.

**Documentation**

- Lico G. (2008). *Arkitekturang Filipino. A History of Architecture and Urbanism in the Philippines.*
- Caimi A. (2015). *Assessing local building cultures for resilience & development: A practical guide for community-based assessment*. CRAterre.
- Garnier, P., Moles, O., Caimi, A. (2011). *Natural hazards, disasters and Local Development*. CRAterre.
- Ignacio J.-F. *Heritage architecture of Batanes Islands in the Philippines: a survey of different house types and their evolution*. College of Architecture University of the Philippines.

**Facilitator**:

Training manager

**Place**

Anywhere

**Duration**:

15mn

**Equipment**

- If available, laptop with projector
- Board or flip chart
- Markers

**Organization**

| | |
|---|---|
| Before the session | - Print or project the picture sheets of the "DRR Shelter Kit M1.1" |
| After the session | - |

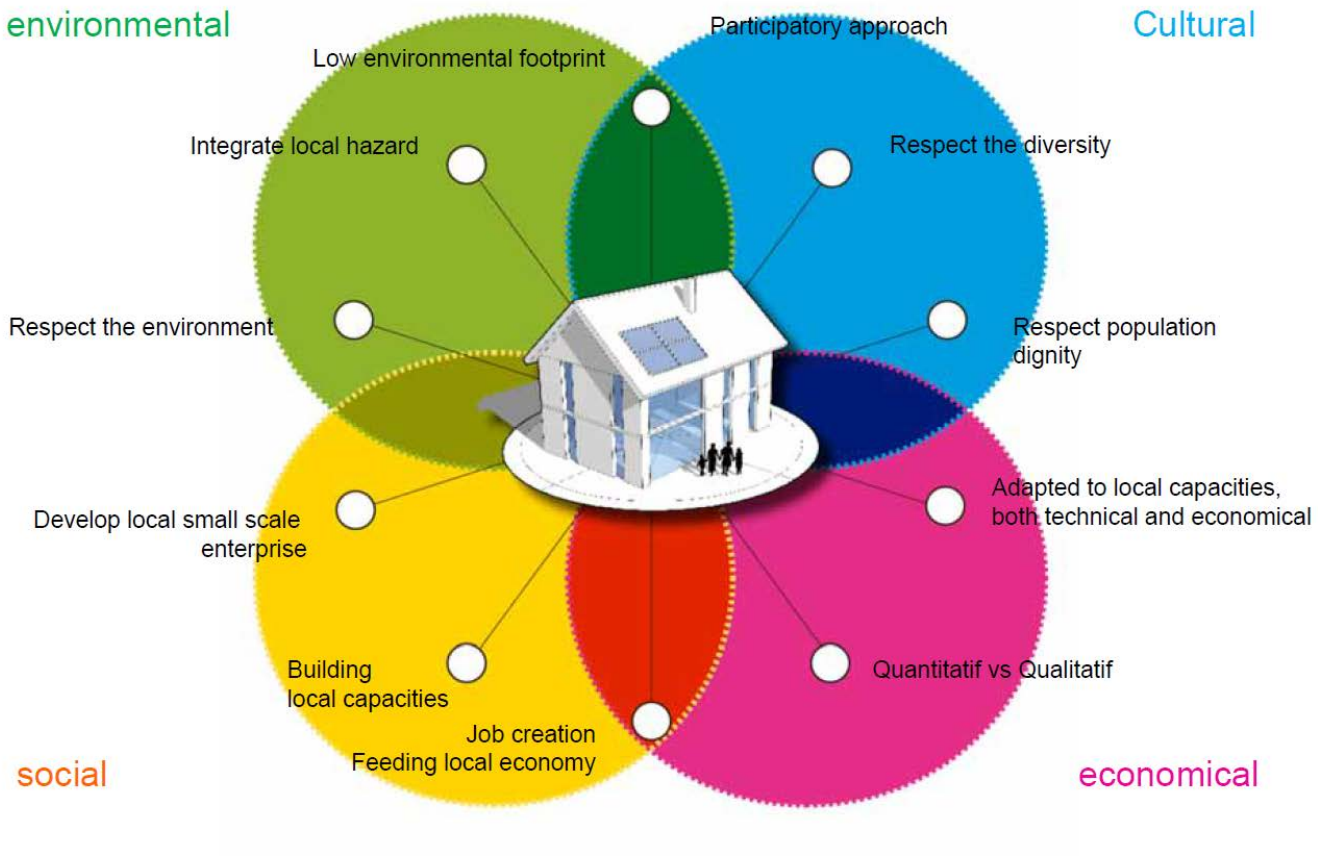
| PCDR | M1.1 | RESILIENCE & POTENTIAL OF LOCAL ARCHITECTURE | Text sheet |
|---|---|---|---|
| | CONCEPT OF LOCAL BUILDING CULTURES | | |

The history of construction shows that builders have always been able to evolve their habitat taking into account locally available resources to meet their needs, while adapting to social constraints, local climatic and natural risks.

The concept of **Local Building Culture** involves considering Habitat through the following lenses:

- the construction process (materials, techniques, structure, shape);
- the organization of the construction, its maintenance, its social and economic impact;
- the design and arrangement of spatial components (indoor and outdoor) as well as their use(s);
- the symbolic character of the structure as a whole, or of some of its specific elements.

A building culture results from the adaptation of a community to the environmental conditions of the territory in which it is established - physical, climatic, social, economic and cultural. As with biodiversity, a multitude of local building cultures exists throughout the world and it is important to consider that all of them evolve and change over time, and that several building cultures may coexist in a given territory.



| PCDR | M1.1 | RESILIENCE & POTENTIAL OF LOCAL ARCHITECTURE | Text sheet |
|---|---|---|---|
| | CONCEPT OF LOCAL BUILDING CULTURES | | |

Extract from the book "*Arkitekturang Filipino. A History of Architecture and Urbanism in the Philippines*" by Gerard Lico:

Vernacular architecture of Philippines can address the most common of structural problems with its simplicity and logical arrangement of elements, space and materials.

Vernacular Architecture of Philippines promotes natural ventilation, fast and economic construction with local and organic materials, simple structure and climate concerns.

Vernacular architecture is a pure response to a person's or society's building needs, as it is crafted by individuals, the main goal is to be resistant and tailored to what that individual particular needs. The building construction methods are considered tested through trial and error until they achieve perfection over time with concerning regarding climatic, functional and social needs. The Bahay Kubo is an example of a traditional cube house of the Philippines. It has a simple structure of bamboo with *anahaw* thatching material for the roof and besides the evolution with modern times regarding materials and technology, it maintains its raised structure on stilts and thatched steeped roof.

Extract from the article "*The Bahay Kubo*", by Ronald De Jong (2010):

The construction of a Bahay Kubo is totally based on the local needs and conditions. Fabricated with the ever dependable bamboo or *kawayan* and banded together by tree strings with dried coconut leaves or cogon grass. Walls are made of *nipa* leaves or bamboo slats and the floor is made of finely split resilient bamboo. The typical structure is raised with thick bamboo poles, one to two meters above the ground, depending on the area where the shelter is constructed, providing the inhabitants a safe shelter from wild animals, snakes and protecting them against torrential rains and floods. Bamboo is strong, lightweight and flexible; it has diverse, functional and traditional uses. It holds and mirrors much of the Philippine culture and it is part of many ceremonies, beliefs and traditions.

A Bahay Kubo is built to give a welcome refuge in the rainy season and provides shade in the hot summer. There are awning type windows on all sides, which will keep the interior well-ventilated, and that can be sealed off from the elements by a series of sliding panels. Its steeply sloping high-pitched roof shed rain and provides sufficient room for warm air to escape as a cooling air flow will enter through the porous bamboo walls and floor. The housetop is high inclined and open gabled to allow fumigation; it is fitted with wide overhang eaves, to provide shade from the hot sun and keeping the rain out.

Extract from: "*Heritage architecture of Batanes Islands in the Philippines: a survey of different house types and their evolution*" by Ignacio J.F., College of Architecture University of the Philippines:

The Historic Houses of Batanes is vernacular architecture of lime, stone, wood and thatch and constructed to withstand the harsh and unpredictable climate of the northern islands of the Philippines. They denote adaptation to severe climatic conditions and the rich cultural diversity of the province of Batanes.

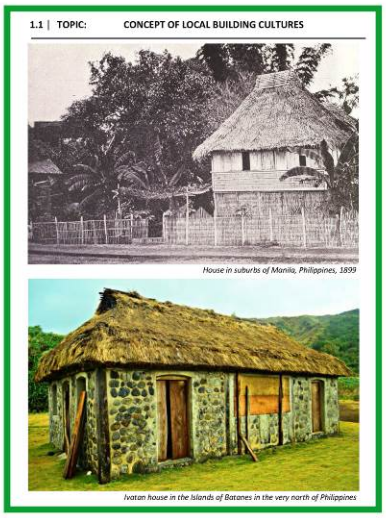
The low houses of Batanes, with their heavy stone walls covered with thick thatched roofs are not found anywhere else in the Philippines. They have been shaped in response to extreme conditions of a region dominated by earthquakes, hot-humid summer months, monsoon rains, and severe typhoons.

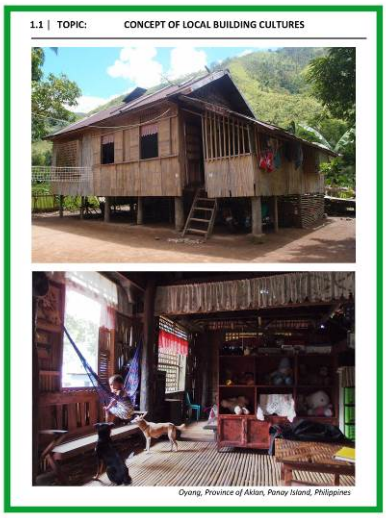
| PCDR | M1.1 | RESILIENCE & POTENTIAL OF LOCAL ARCHITECTURE | Picture sheets |
|---|---|---|---|
| | | CONCEPT OF LOCAL BUILDING CULTURES | |

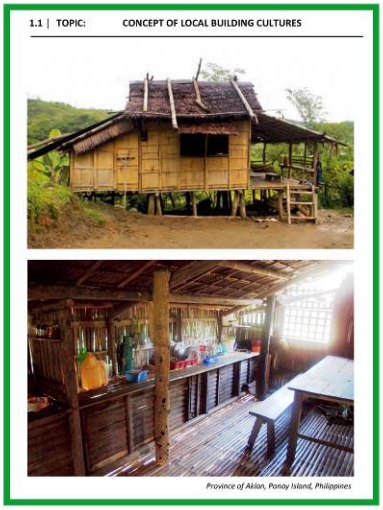
**Pedagogical content from the "DRR shelter kit", M1.1**

*6 picture sheets, 1 text sheet*

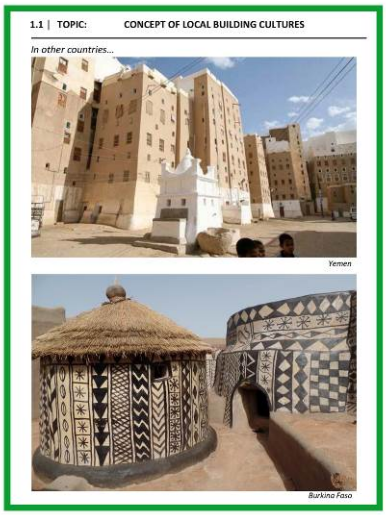
The trainers are encouraged to enrich or adapt the content to the targeted communities with pictures they can relate to and in regards to the messages the trainer want to send out to the communities.

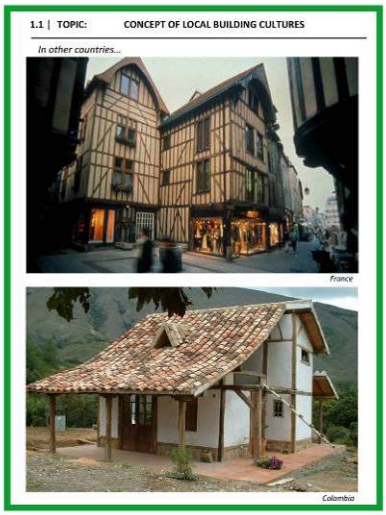






| PCDR | M1.2 | RESILIENCE & POTENTIAL OF LOCAL ARCHITECTURE | Session plan |
|---|---|---|---|
| | PRINCIPLE OF RESILIENCE IN HOUSING | | |

**Objective**

- Help the audience understand the basic principle of resilience in housing and the interest of local building cultures for a better resilience of communities

**Facilitator**:

Training manager

**Methodology**

- Debate around the concepts of “resilience” and “resistance”:
  Compare the “resilience” of a traditional “light materials” house and a “modern” house built in cement by explaining that resilience in housing reside not only in the resistance of the building but also in his flexibility, the capacity to repair it easily and at low cost, etc.
- Discussion around the concepts of flexibility / absorption / ability to recover in housing and how those principles can be a strength and not a weakness, and how it can increase a community resilience.

**Place**

Anywhere

**Duration**:

15mn

**Proceedings of the session**

- Show the pictures of the first picture sheet and initiate a discussion by asking participants which house is the most resistant / resilient.
- Explain better the concept of *resilience*. Refer to its definition.
- Use the pictures of page 2 to illustrate the concepts of flexibility / absorption / ability to recover.

**Equipment**

- If available, laptop with projector
- Board or flip chart
- Markers

**Documentation**


- Bankoff, G. (2007). *Living with risk, coping with disasters: hazard as a frequent life experience in the Philippines*. Education About Asia, 12(2), pp26-29.
- Gaillard, J.-C. (2008). *Catastrophes dites « naturelles » et développement : réflexions sur l'origine des désastres aux Philippines*. Revue Tiers Monde, n°194, pp371-390.
- Peters-Guarin G., McCall M., van Westen C. (2011). *Coping strategies and risk manageability: using participatory geographical information systems to represent local knowledge*. Disasters 36(1):1-27.


**Organization**

| | |
|---|---|
| Before the session | - Print or project the picture sheets of the “DRR Shelter Kit M1.2” |
| After the session | - |

| PCDR | M1.2 | RESILIENCE & POTENTIAL OF LOCAL ARCHITECTURE | Text sheet |
|---|---|---|---|
| | PRINCIPLE OF RESILIENCE IN HOUSING | | |

- **General definition of resilience**

The ability of a system, community or society exposed to hazards to **resist**, **absorb**, **accommodate** to and **recover** from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions.

Resilience means the ability to "resile from" or "spring back from" a shock. The resilience of a community in respect to potential hazard events is determined by the degree to which the community has the necessary resources and is capable of organizing itself both prior to and during times of need.

(*source: UNISDR terminology on DRR, 2009*)

Extracts from the article: "*Living with risk, coping with disasters: hazard as a frequent life experience in the Philippines"* by Bankoff G. (2007)

"The Philippines as a whole experiences more earthquakes, volcanic eruptions, and tsunamis than any other country on earth. Communities and individuals in the Philippines have come to accept hazard and disaster as a frequent life experience. Indeed, in a number of respects, **Philippine cultures can be regarded as the products of community adaptation to these phenomena**. As the following discussion suggests, a range of processes permit the possibility of disaster to be incorporated into daily life and allow for what might be called the "normalization of threat."

*Cultures of Disaster; Cultures of Coping*

**Filipino society has evolved certain "coping mechanisms" to come to terms with the constancy of hazard and to mitigate the worst effects of disasters**. Often, too, the way in which people deal with the emotional and psychological requirements of living with uncertainty may influence what are seen as "Filipino" beliefs and character traits.

Architecture offers a unique means of examining the human-environment interchange. **The design of homes and other buildings shows how indigenous society took notice of seismic and meteorological hazards**. **The simple *nipa* palm and bamboo hut** offers a good example: **it was easily rebuilt when damaged and was less likely to injure people during storms or earthquakes**.

Even today, adaptations to the threat of hazard can also be seen in local agricultural systems. Because of the likelihood of disaster, especially famine, these systems focus more on reduction of crop losses, rather than "normal" measures of efficiency and yield. Crop diversification is a common feature of traditional farming methods that provides access to a secure food source in times of climatic adversity.

Architectural syncretism and agricultural diversification are **impact-minimizing coping practices, since they seek to minimize loss and facilitate recovery**.

[…] Appreciating that there are both cultures of disaster and cultures of coping in all societies fosters an understanding of such events in terms of people's vulnerabilities and their **resilience to withstand them through strengthening existing capacities**. **It places less emphasis on the importance of technology as providing the only or principal means of dealing with hazards, and gives more emphasis to enlisting people's participation as an essential element in disaster management through the formation and encouragement of grassroots organizations**."

- **Resilience in housing**

Can be based on several concepts, among which:

- Appropriate combination of **flexibility** and **resistance**. "*Intelligence of the reed and strength of the rock"*: Light material houses fold and **accommodate** under stress but don't break.
- **Safe failure** refers to the ability of a system to **absorb** shocks in a way that avoids catastrophic failure. Parts of the house can be damaged or destroyed to absorb the shock and avoid the whole structure to collapse. Those parts are not a risk for inhabitants when being destroyed.
- **Ability to recover** - Easiness to repair: Some parts may be damaged but the capital is conserved. Materials can be saved and reused. Any new materials to rebuild or repair are very inexpensive and available. It is easy to repair and the skills are available.

Extract from the article "*The Bahay Kubo*", by Ronald De Jong (2010):

"Because the house is constructed with natural materials which are very inexpensive or most freely available in the near surroundings, it can quickly be rebuilt or repaired, using simple tools, if it is damaged or destroyed by fire or natural disasters like a typhoon or an earthquake. […]

The idyllic house of the past stood the test of time and nature because it is totally adapted to the hazardous environment and assembled to withstand the country's, tropical rainforest climate which is characterized by relatively high temperature, high humidity and abundant rainfall."

- **Importance of Building Resilient Communities**

Building Resilient Communities refers to communities collectively working together to reduce their individual risk to hazards and building their capacities to bounce back from the impacts of the changing environment and to reduce the risk of disasters. (*source: Cordaid*)

It puts communities at the center by empowering them to strengthen livelihoods; it connects disciplines by using the combined strength of organizations working in partnership; it expands their focus by encompassing wider ecosystems and considering wider timescales; it connects humanitarian and development focuses. (*source: Partners for Resilience, PfR*)

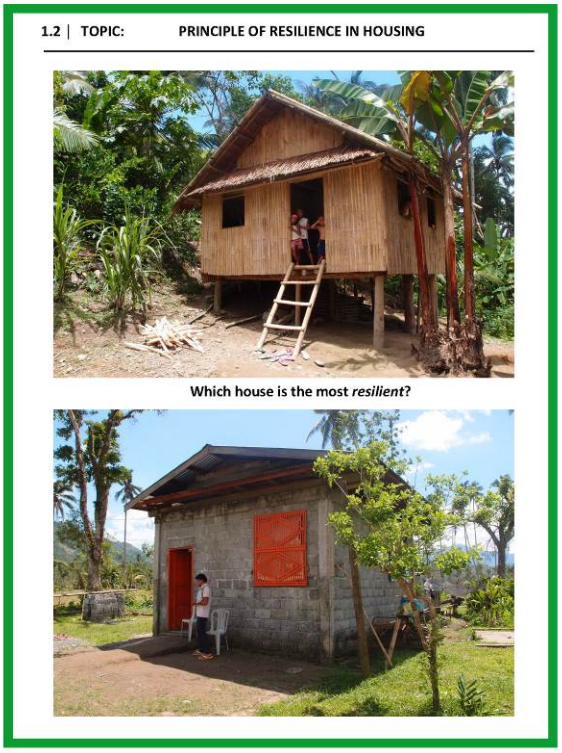
Extracts from the article: "*Living with risk, coping with disasters: hazard as a frequent life experience in the Philippines"* by Bankoff G. (2007)

[One] core Filipino value identified as a **culturally specific coping practice is *bayanihan*,** or "toiling on another's behalf and assuming another's burdens." An account written in *Ilocos Norte* recounted how following a typhoon in which nearly all the dwellings were levelled, "**The destroyed houses were rebuilt quickly as soon as the storm was over because the owners could help each other by turn in spite of their lack of funds**".

Filipinos have learnt to confront apprehensions, to become psychologically ascendant and to not be mastered by events, a trait that was recognized by the national hero, Jose Rizal (1861–96**), when he compared the character of Filipinos to the nature of bamboo that bends in the wind and is able to bounce back**.

**Pedagogical content from the "DRR shelter kit", M1.2**

*2 picture sheets, 1 text sheet*




| PCDR | M1.3 | RESILIENCE & POTENTIAL OF LOCAL ARCHITECTURE | Session plan |
|---|---|---|---|
| | COPING STRATEGIES | | |

**Objective**

- Raise awareness about existing coping mechanisms that some population in the Philippines use to apply when facing a disaster

**Facilitator**:

Training manager

**Methodology**

- Discussion around example of coping mechanisms in shelter applied before, during and after a typhoon, known by participants and proposed by the trainer

**Place**

Anywhere

**Duration**:

15 mn

**Proceedings of the session**

- Ask first the participants if they know some coping strategies when facing a disaster. Either before, during or after the disaster.
- Show the picture sheets of the “DRR Shelter Kit – M1.3” and initiate a discussion by asking participants what they understand about them and if it refers to something they know. Initiate a discussion about the reasons and interests of those mechanisms.

**Documentation**

**Equipment**

- If available, laptop with projector
- Board or flip chart
- Markers

**Organization**

| | |
|---|---|
| Before the session | - Print or project the pictures of the “DRR Shelter Kit M1.3” |
| After the session | - |

**Coping strategies observed when a typhoon is announced:**

- House relocated before the typhoon

It is still common to see existing house relocated through traditional community help (called *bayanihan*). The whole house is moved without dismantling. Volunteers from the community get together and lift up the house using the existing stilt structure or long bamboo poles placed length-wise and cross-wise under the house. The house is then carried by hand and settled on a new site.

Relocation of the house occurs sometimes when the site is exposed to floods during heavy rain and storm season. Moving the house on a safer site directly reduces the building vulnerability as well as risks for their occupants.

This practice is possible as the houses do not have fixed foundations: they are built on stilts with the main posts relying on stones or directly driven into the ground.

Relocation may also occur when the house owner does not own the land where the house is built.

- Temporary tepee as shelter for a better protection during the typhoon

Low-rise constructions with rectangular plan built using local natural materials (such as bamboo, straw, sugarcane, banana and coconut leaves) are traditionally used as family temporary shelter during and after cyclones.

The shelters are built, in a safe place, on an open site protected from falling trees or other debris. Sometimes, they are often located far away from the main house on the slopes of the mountain to avoid flash floods that may occur in the valleys.

The very low height (in some cases, it is hardly possible to stand) and the roof extended to the ground provide improved aero-dynamism to the building reducing the impact of strong winds. When a cyclone is announced, people collect their goods and move to the shelters to be protected from the possible partial or total collapse of the house and other risks caused by strong winds and heavy rain.

This practice is applied and very effective especially in remote areas where accessibility to community shelters is often impossible during heavy rains and where settlements are scattered on a large area.

- Temporary bracings/propping put outside to strengthen the house:

Population is used to reinforce their house when there is a risk of typhoon. One main type of reinforcement consists in temporary bracings or props put outside against the structure of the house. They are made out of bamboo, big branches or trunks. It’s a very useful system that gives strengths to the house to resist better the typhoon. If the house is damaged, those bracings are maintained to give better stability until the house is repaired or dismantled to build a new one.

| PCDR | M1.3 | RESILIENCE & POTENTIAL OF LOCAL ARCHITECTURE | Text sheet |
|---|---|---|---|
| | COPING STRATEGIES (*recovery after typhoon*) | | |

**Coping strategies observed after a typhoon:**

- Emergency shelter

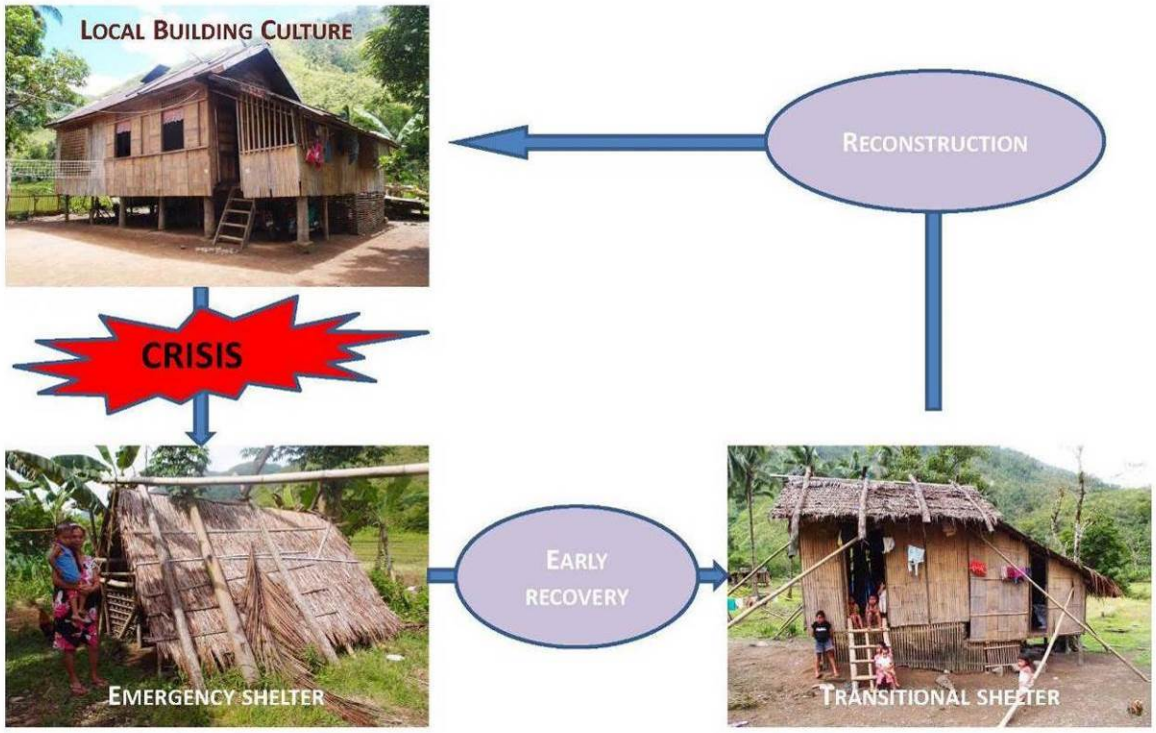
Once the cyclone is over, the temporary tepee built before the typhoon may be also used as a temporary living place when the main house is too damaged to live in and during the house repairing or reconstruction. But It is mainly used as a livelihood and construction material storage place during the period of low likelihood of typhoons.

- Transitional shelter

When a house is damaged or destroyed, reusable materials from the old house are put in a safe place just after the typhoon. Then, a “transitional house” is built out of debris and salvaged materials (wall panels, lumber pieces, CGI sheets, etc.). It is usually built using the remaining main structure of the damaged house, when the house is not too destroyed. This house serves as a temporary shelter until the household gathers the necessary resources (materials, money) to rebuild or repair the house.

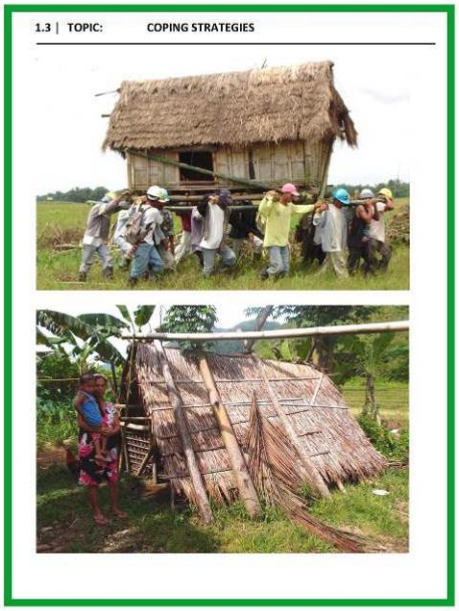
- Permanent reconstruction or repair

Depends on the extent of the damages, the household build a new house or repair the damaged one using the existing main structure. In any case, old posts, lumber and other pieces of wood and bamboo are reused. In the most common case, only the bamboo wall panels and the roof cover need to be renewed.

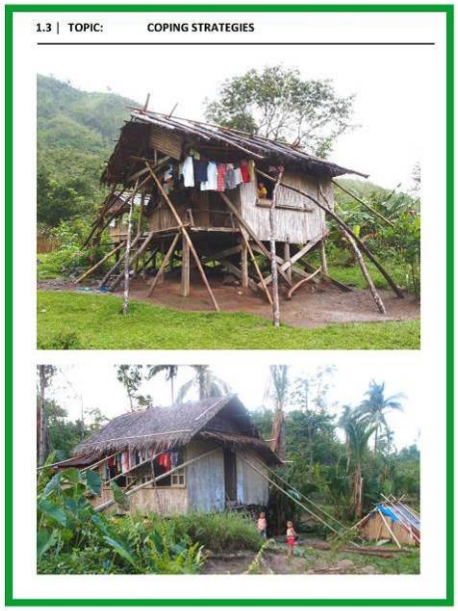


**Pedagogical content from the "DRR shelter kit", M1.3**

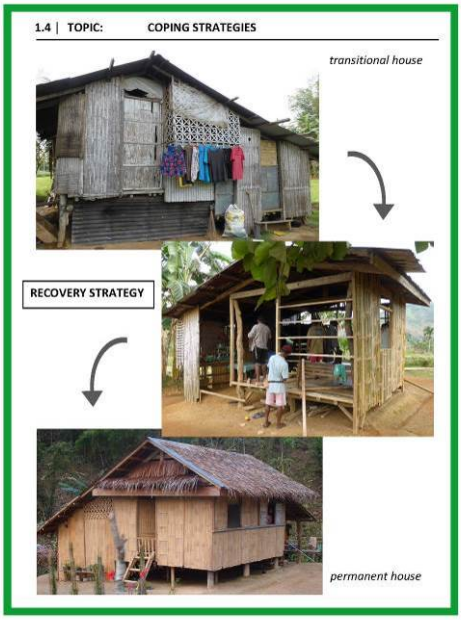
*2 picture sheets, 1 text sheet*







| PCDR | M2 | RELEVANCE OF LOCAL MATERIALS | Session plan |
|---|---|---|---|
| | INTRODUCTION / WALLING / ROOFING / FOUNDATION / USE & PROTECTION | | |

**Objective**

- Develop awareness on the use and interest of local resources

**Methodology**

- Discussion on the criteria that lead to choose a material or another for building a house
- Debate on the different materials that can be used for different parts of a house: walls, roof, foundation, their advantage and disadvantages in regard to the different criteria identified
- Discussion around the proper use and protection of local materials, focusing on bamboo and wood.

**Proceedings of the session**

- Introduce the session by initiating a discussion about the materials that can be used to build a house (making a difference between materials from local sources and imported materials). Ask the participants what are their general opinion on the use of local materials or imported materials. And finally, together with the participants, draw a list of criteria that can be considered to choose a material or another (e.g. economic, durability, etc.).
- For each topic regarding a part of the house (walls, roof, foundation), initiate a discussion on the materials that can be used for this specific part. Show the corresponding picture sheet. Make a focus on the 2 or 3 main available and accessible materials/solutions by opposing local material and imported one (e.g. bamboo/plywood for walling; vegetal cover/CGI sheets for the roof; wooden posts/concrete foundation for the foundation). Initiate a debate about the advantages and disadvantages of each material in regard to the criteria identified previously. A table can be drawn when listing those elements.
  Keep in mind that there is no “winner” material, as the final choice for a house-owner depends on the context, its needs and its capacities. Nevertheless, the idea is to show that materials from local sources can present many interests and that they should be protected.
- Initiate a discussion on the importance of a proper selection, use and protection of local materials, focusing on lumber and bamboo. Ask the participants if they know how to select and to increase the durability of those materials and then, if needed, submit also some recommendations.

**Facilitator**:
Training manager

**Place**
Anywhere

**Duration**:
1h

**Documentation**
- Humanitarian SWG Philippines (2014), *Key messages for commonly used shelter materials, nipa thatching and plywood*. sheltercluster.org
- *SKAT-CRAterre (1997), The basic of biomass roofing.*

**Equipment**

- If available, laptop with projector
- Board or flip chart
- Markers

**Organization**

| | |
|---|---|
| Before the session | - Print or project the picture sheets of the “DRR Shelter Kit M2” |
| After the session | - |

**Bamboo walling**

In the Philippines, where bamboo is available, it is traditionally used in many parts of the house: skeleton, floor, wall, scaffolding furniture, and so on. It is often called common or indigenous bamboo. Bamboo is widely available, has a rapid growth, and is easy to handle for various purposes. We can find various type of bamboo walling, even in a same area. Some systems uses nails, other not are plaited or woven, maintained by a secondary framework. When the walling is damaged by a typhoon, the nailed bamboos' panels can be reused for temporary panels. The plaited system allows bamboos elements to be reused and replaced.

The lifespan of bamboo is very short (2-6 years) if it is not well-managed. But one may expect bamboo lifetime at least 25 years if bamboo is well harvested, treated and if not exposed to humidity.

Bamboo can be treated with or without the use of chemicals. In both option there are many different techniques in order to prevent splitting, insect infection and fungal growth. Priority should be given to non-chemical preservation methods such as correct harvesting and soaking.

Depends on the area, bamboo can be directly available and costless or very cheap or bamboo can cost more than plywood walling if not available. Bamboo working needs some labour, but most of the work can be done by the household.

Finally, bamboo work allows money to be fully injected in the local economy.

**Plywood walling**

Plywood walling is becoming more and more in use in the Philippines, in particular for very low income households, in contexts where bamboo cannot be harvested locally (urban areas, deforested rural areas) and becomes expensive, and when labor is necessary or to be used as a temporary solution. It's a fast and easy solution for which no skilled labor is necessary.

On the other side it is not durable which makes it quite expensive compared to its lifespan. If untreated/not painted and not enough protected from rains, it can rapidly warp and decay within a few months. It needs to be painted in order to seal it, further protecting it from the elements and prolonging its life. This might be unaffordable for the household.

Plywood is not breathable (keep humidity inside), does not allow adequate ventilation and thermal comfort is low. It is a material bonded with chemical adhesives that can have negative environmental and health consequences.

**Thatched roof (nipa / ambulang)**

Thatched roofs using mainly palm leaves (nipa / ambulang) or grass (cogon) are widely in use in the Philippines, even if this roof system tends to be abandoned, in particular in urban/suburban areas.

Thatched roofs have many advantages:

- largely available, grows quickly (3-4 harvest/year),
- good thermal insulation in hot and humid climates,
- cost-effective (when material is available),
- though easily damaged in high winds, they are easy to repair or replace with minimum labor
- lightweight, posing minimum risk to occupants during earthquake,
- good wind resistance (as it is permeable, nipa doesn't attract suction forces as high as CGI roofing)
- can be long-lasting if properly harvested, treated, stored and maintained and double-layered shingles are used (up to 10 years reported)
- purchasing nipa stimulates local economy and provides livelihood opportunities

Challenges:

- requires regular annual maintenance,
- lifespan if not maintained or if not properly installed (min. 1-3 years), but usually longer,
- increased fire risks,
- though aesthetically attractive, traditional thatched roof is associated with temporary structures and previous generations, thus not perceived to be 'modern'.

**Corrugated Galvanized Iron (CGI) roof**

CGI roof is being used more and more by households in the Philippines as it is a light-weight solution that doesn't need as much maintenance as thatched roofs and is perceived to be more 'modern'. Its installation is easy. It can be durable (more than 20 years), though cheap CGI sheets won't last more than 10 years and even less close to the sea. Leaks are easy to repair. Its cost is usually higher than thatched roof and much higher if CGI sheets are of good quality. The thermal comfort is quite poor as well as sound insulation.

It's resistance to strong winds is quite poor as it induces high suction effect. If the roof is not well tied it will be easily blown away together with the CGI cover. When ripped away during strong winds a CGI sheet is potentially dangerous.

| PCDR | M2.4 | RELEVANCE OF LOCAL MATERIALS | Text sheet |
|---|---|---|---|
| | PILARS & FOUNDATION MATERIALS | | |

In the Philippines, different hardwood species are used and appropriate for the posts (e.g. *toog*, *kakawate / madre de cacao, tugas*) as they are dense, durable and resist to insect attacks and doesn't rot easily. The simplest type of foundation is to embed a wood post straight into the ground (minimum 1,5 feet deep).

Nevertheless hardwood availability is constantly decreasing and appropriate wood for posts are not always available.

Lumber post type foundations can eventually be protected using treatments, completed before use.

If the base of the post is rotten it's possible to replace it if well connected to the upper part (not only nailed).

When appropriated lumber for posts is not available an option is to build concrete foundation in order to prevent lumber being exposed to moisture. This type of foundation can be prefabricated in advance and the frameworks can be reused. The concrete foundation can be poured in site as well.

In all cases, a proper selection and production of good quality materials is critical to ensure durability and therefore resistance of the house.

**Increase lumber lifespan**

Using timber correctly can reduce risks of attack by fungus and insects. Fell logs preferably during winter (dry season) and store it away from the ground and pull apart with cleats to dry it. Hardwood should be sawn after drying it to prevent cracking and bending afterwards. After the construction lumber should be ventilated and not exposed permanently to moisture (except a few specific species for posts)

**Increase bamboo lifespan**

Bamboo can be treated with or without the use of chemicals. In both option there are many different techniques in order to prevent splitting, insect infection and fungal growth. Priority should be given to non-chemical preservation methods such as correct harvesting and correct structural application.

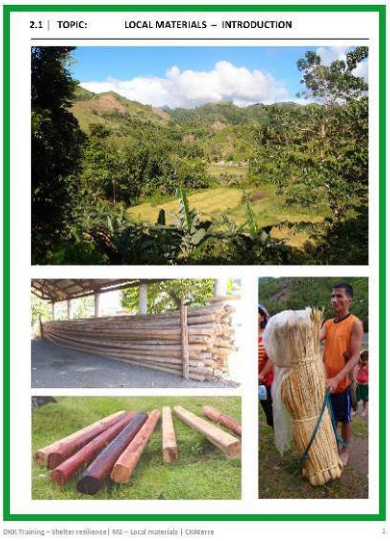
- Non-chemical treatments: (for more details ask local carpenters and farmers) it is simple and cost-effective without the use of supporting equipment. For example: harvest mature logs (3 years old min.), during dry season; soak for 2 weeks up to 2-3 months in water, salty or not (river or see); dry for 4-6 weeks depending on humidity conditions in a well-ventilated, covered area.
- Chemical treatments: as for lumber non-poisonous preservatives should be promoted (boron salt, engine oil, beeswax, local mixture based on natural leaves) and poisonous banned (like DDT).

| PCDR | M2 | RELEVANCE OF LOCAL MATERIALS | Picture sheets |
|---|---|---|---|
| | INTRODUCTION / WALLING / ROOFING / FOUNDATION / USE & PROTECTION | | |

**Pedagogical content from the "DRR shelter kit", M2**

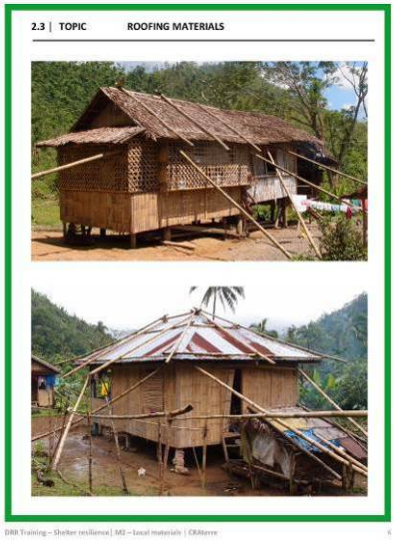
*5 picture sheets, 5 text sheets*

### M2.1. Introduction




### M2.2. Walling Materials


### M2.3. Roofing Materials




### M2.4. Posts & Foundation Materials


### M2.5. Use & protection of local materials

| PCDR | M3 | HOW TO INCREASE THE STURDINESS OF THE HOUSE | Session plan |
|---|---|---|---|
| | HOUSE EXPOSITION / BRACING / CONNECTIONS / TIES / PROTECTION & MAINTENANCE | | |

**Objective**

- Develop awareness and understanding on simple and economic ways that allow increasing the sturdiness of the house.

**Methodology**

- Discussion around illustrated exercise under the form of Problem / Solution(s)

**Proceedings of the session**

- For each PROBLEM / SOLUTION(S) set, show first the “PROBLEM” sheet (in blue) and ask the participants
  - what is the situation illustrated,
  - why this situation is a problem
  - and why this situation happened.
- Then initiate a short discussion on what could be the solution(s) to this problem. Then, show the “SOLUTION(S)” sheet(s) (in green) and ask the participants what is the solution proposed and why it can help to mitigate the problem.
  Use the text sheets from the training kit as a guide for the discussion. The text sheets in this guide provide some additional information.
  Refer also to the Technical Guide for further technical information and details.
- Note that together with a proper building site and good quality materials, three important technical principles need to be kept in mind to allow a building to be disaster resistant: bracing of the structure, proper joints and tying the house down from bottom up. Then proper maintenance ensures the house remains strong.
  Therefore, this module deals with 5 topics:
  - House exposition
  - Bracing
  - Connections
  - Ties
  - Protection & Maintenance

  They provide some recommendations, through simple and economic ways that allow increasing the sturdiness of a house, in particular against high winds and typhoons, but not only. Those recommendations are useful for both a new construction and repair/reinforcement. It is important to stress to the participants that anyone can apply those recommendations in their own situation and with little resources.
- A “CONCLUSION” sheet shows an example of proposition for a house in a specific context. Ask to the participants to describe what solutions where proposed here. Discuss about the solution that would not be appropriate in their specific context.

**Facilitator**:
Training manager

**Place**
Anywhere

**Duration**:
1h30

**Documentation**

**Equipment**

- If available, laptop with projector
- Board or flip chart
- Markers

**Organization**

| | |
|---|---|
| Before the session | - Print or project the picture sheets of the “DRR Shelter Kit M3” |
| After the session | - |

| PCDR | M3.1 | HOW TO INCREASE THE STURDINESS OF THE HOUSE | Text sheet |
|---|---|---|---|
| | HOUSE EXPOSITION | | |

**PROBLEM**: The house is exposed to wind

**SOLUTIONS**:

A – Tree barrier

For a new construction, it is important to ensure the site where the house will be located have enough vegetation cover to protect it from direct wind. A tree barrier can make a big difference in the protection of a house in case of high winds. Ask the participants if they could note a difference themselves in their area.

If the vegetation cover is too little or for an existing building not enough protected, households can plant some small and bigger trees at safe distance around the house. High trees (such as palm trees) can break under wind forces so flexible trees (such as bamboo, banana trees) should be preferred near the house.

B – Building orientation

If the roof has 2 slopes, it should be oriented perpendicularly to the main direction of the wind so the wind will easily pass over the house.

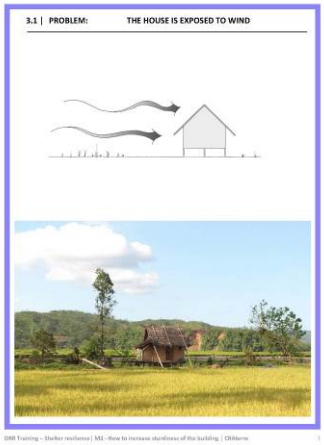
Note that the durability of a building also depends on its orientation. The orientation of the building must guarantee good protection against rains, winds, direct solar exposition.

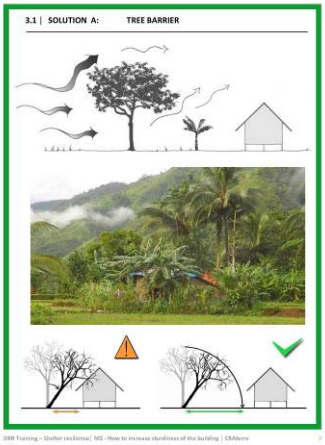
C – Shape of the roof

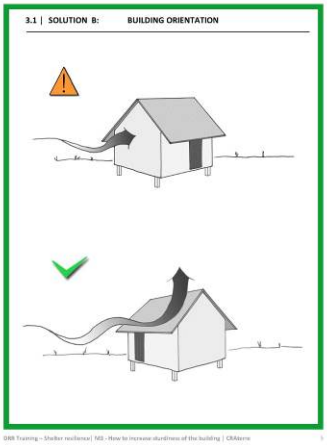
The best shape of the roof is 4 slopes, especially for CGI sheet covering.

In this way the wind can easily pass over the house from every direction, reducing risks of damages and roof up lift.

Note that the slope giving an appropriate slope for the roof is important to limit suction effects and to allow the water to run off the roof. The appropriate slope is different for a thatched roof (around 45°) and for a CGI sheet roof (around 30°, but not under).




| PCDR | M3.2 | HOW TO INCREASE THE STURDINESS OF THE HOUSE | Text sheet |
|---|---|---|---|
| | BRACING | | |

**PROBLEM**: The house and/or the roof lies down

**SOLUTIONS**:

A – Bracing of the structure

The bracing system provides strength against lateral forces caused by winds or earthquake so that the building does not collapse sideways but is held together. This is a system used in traditional houses and needs to be continued in modern houses. Bracing should be placed horizontally and vertically, this will ensure strength in all directions. The posts (under the floor, if higher than 1m above the ground), the walls, the floor and the ceiling should be braced. Corner bracing using short pieces of wood are a simple and economic way to reinforce a structure. Nevertheless, the bracing elements should be long enough (around 1/3 of the wall for example) and should present a section strong enough (e.g. 2"x3") to provide strength to the structure. Note that quality joints with posts and beams are of utmost importance.

B – Bracing of the roof

For the same reason, bracing the roof is important to prevent horizontal movements in the roof structure caused by lateral forces. Bracing can be laid either in a vertical position between trusses or in an inclined position between the rafters. When the roof uses a ridge beam, which is common in the Philippines, diagonal bracings can be put between the ridge beam and the posts in the center (adding posts may be necessary). When the roof is made of a truss system with no ridge beam, then cross bracing should be added between the trusses.



| PCDR | M3.3 | HOW TO INCREASE THE STURDINESS OF THE HOUSE | Text sheet |
|---|---|---|---|
| | CONNECTIONS | | |

**PROBLEM**: Connections are weak / Part of the structure can fall apart

**SOLUTIONS**: Good connection of structural components

Proper joints between structural components are of utmost importance to provide integrity to the structure and therefore to allow the structure to stay in place. This regards the detail of connection between components (embedded or notched joint) and the material used to fix the joint (nails, pegs, screw, bolts) or to tie it (metal strapping, vegetal or metallic ties, fish plates). A connection should not rely only on nails (those need to be sufficient and of appropriate quality and size) and it is necessary to carve properly the joints and to tie the pieces together (*see after*).


| PCDR | M3.4 | HOW TO INCREASE THE STURDINESS OF THE HOUSE | Text sheet |
|---|---|---|---|
| | TIES (1) | | |

**PROBLEM 1**: Some parts of the house are blown away

**SOLUTIONS**:

A – Tying each part of the structure together

The main principle in building typhoon resistant houses is to tie down the house from bottom up and creating a chain of anchorage. All components of the frame should be tied, in particular:

- purlins to rafters (using cleats/blocks or any vegetal or metallic tie available, even leftover pieces of electric wire!)
- rafters or trusses with upper ring beam (using cleats/block, rattan, metal strapping, rope, leftover pieces of CGI)
- upper ring beam with posts (carving “C” notch in the post to embed the beam, using rattan, leftover pieces of CGI, etc.)
- posts with foundation, if any (with metal strapping appropriately connected to the foundation) or posts to the ground

B – The wind can pass through the house

This solution doesn’t relate to tying but need can be noted a simple design principle that can avoid the roof to be blown away by allowing the wind to pass through the house. Not only opposite windows, but also ventilation grids can play a role to allow the wind to find a way out.



| PCDR | M3.4 | HOW TO INCREASE THE STURDINESS OF THE HOUSE | Text sheet |
|---|---|---|---|
| | TIES (2) | | |

**PROBLEM 2**: Some parts of the cover are blown off

**SOLUTIONS**:

A – Appropriate tying of the roof covering

*Thatched roof (ambulang / nipa):*

Ambulang/nipa shingles are tied to bamboo battens which are fixed to purlins and spaced around 15 inches apart. Bamboo battens need to be tied to purlins. Shingles are tied to rafters using rattan ties. Nylon fiber can also be used as a tie. Shingles overlap should be about 3 to 4 inches. The closer the overlapping, the longer the life of the thatched roof and the more waterproof, and 3" overlap should be better observed.

In the lower and upper part of the roof, use a double layer of ambulang/nipa. This will reduce the risk of being blown off and will ensure a better protection from water penetration.

If possible, use shingles made with double layers of leaves which will last more and give a better protection from water penetration. Nipa/ambulang roof can be long-lasting if properly harvested, treated, stored and maintained and if double-layered shingles are used (up to 10 years reported).

*CGI sheet roof:*

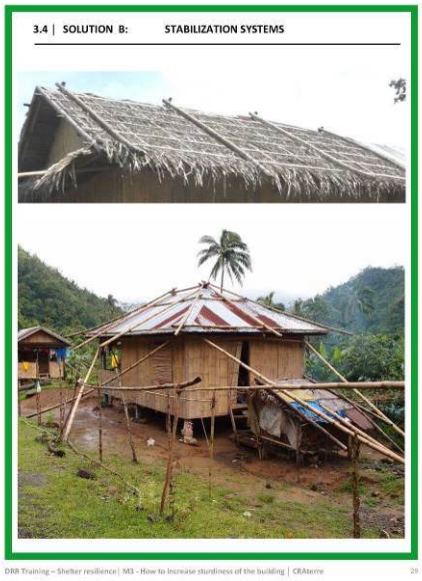
CGI sheets should be overlapped at least 2 corrugations on lateral direction and 6 inches on vertical direction. Limit the overhang of the roof on all sides to maximum 18 inches. Use proper screw or twisted umbrella nails with plastic washer. Embed to purlin at least 50 mm. At eaves, verges, ridges, and overhangs provide fixing nails at every 2 corrugations. At all other location, provide nails every 3 corrugations.

Consider the main wind direction to decide of the direction to lay the CGI sheets (start at the opposite side from where comes the main wind).

B – Stabilization systems

Stabilization systems for both thatched and CGI sheet roofs are commonly used in the Philippines. These systems are often associated to other technical solutions such as anchoring systems. All together they contribute improving in a cheap manner the resistance of 2-slope lightweight roofs otherwise vulnerable to wind, especially in the portions near the gables.





| PCDR | M3.5 | HOW TO INCREASE THE STURDINESS OF THE HOUSE | Text sheet |
|---|---|---|---|
| | PROTECTION & MAINTENANCE | | |

**PROBLEM**: Materials are rotten

**SOLUTIONS**:

A – Drainage of the water

Allow the water to be drained away from the house is of major importance to avoid the bottom of the posts and foundations to be damaged by moisture and eaten by insects. In particular, buildings situated on a slope need a proper drainage trench on the upper part of the building.

B – Clean surroundings and landscaping

The maintenance and a proper landscaping of the surrounding of the buildings will also greatly participate in the durability of the house. The direct surroundings of the building should be kept clean and free from vegetation and objects that would retain moisture around the posts and the base of the walls.

Nevertheless vegetation should be maintained a little further around the house as one solution to stabilize the soil, in particular for slopes.

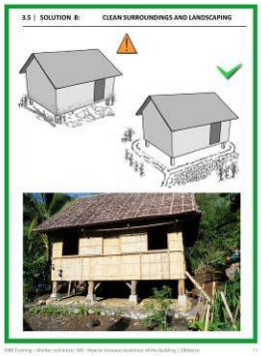
C – Protection of the base of the post

Concrete foundations are an alternative solution when appropriate hardwood is not available. Nevertheless, the connection details need be given much care. The post should not be embedded in the concrete and a slight slope under the bottom of the post is necessary to allow raining water to go away.

D – Maintenance of the house

Proper maintenance of the house is of major importance to ensure its durability and its sturdiness. If regular maintenance is respected, houses and buildings may last longer and give better protection to its inhabitants.







| PCDR | M3.6 | HOW TO INCREASE THE STURDINESS OF THE HOUSE | Text sheet |
|---|---|---|---|
| | CONCLUSION – EXAMPLE OF PROPOSITION | | |

The solutions proposed in the picture sheet are adapted to a specific context (Indigenous People, Province of Aklan) in the framework of a shelter project implemented by the DSAC of Kalibo. This solution was designed regarding the technical capacities, the availability of materials, the economical capacities, the cultural context, the disaster risks, etc. This solution may not be adapted in another context and should not be repeated for other projects. An understanding of the local context based on an assessment of the existing building cultures, the available materials, the local capacities, etc. is necessary before designing any housing solution.

As another example, in the framework of PCDR's rehabilitation project in Cuartero, it was noted that rattan ties and related know-how had disappeared in the targeted communities. Alternative solutions, yet not always ideals, had to be found for the tying of some elements (galvanized tie wire, leftover CGI sheets). It is to note that in a neighbor municipality, Tapaz, where local resources were more preserved, this material and knowledge hadn't disappeared.


| PCDR | M4 | EXERCISE | Session plan |
|---|---|---|---|
| | ADAPT THE PEDAGOGICAL MATERIAL TO EACH TARGETED CONTEXT | | |

**Objective**

- Help the participants to understand the necessity to assess the context and adapt the messages
- The participants develop some first ideas for the adaptation of the pedagogical material to their own targeted context

**Methodology**

- Group exercise, if possible in real situation: adaptation of the DRR training kit to each targeted context where the trainers will disseminate the awareness campaign.

**Proceedings of the session**

- Explain and show the structure of the DRR training kit that the participants, as future trainers, will use themselves during the DRR trainings on the field.
  The DRR Training kit includes:
  - "picture sheets" that are the one to be shown to the participants of their future trainings (community members).
  - "text sheets" that are a support dedicated to the trainers.

  They can be printed separately or the text sheet can be printed in the back of each corresponding picture sheet.
  Depends on the place where the trainings will take place, the picture sheets can be displayed on the wall in a place where the participants can circulate and then a discussion can take place. Or, the picture sheets can circulate among seated participants or be projected if a video projector is available.
- Form several groups, if possible according to the area they will work in. Each group works on a specific context.
  Context: The participants start to define the context in the light of what they already know, keeping in mind that they should gather further information to finalize their comprehension and the adjustment. The context can be defined through different factors: rural/urban, hazards, available materials and situation of the resources, local knowledge, etc. The participants should define what they think are the main vulnerabilities of the targeted communities.
  Message: The participants try to define the objectives of the awareness campaign and the messages they want to send out to the communities.
  Training kit: The participants work on some first ideas to adapt the DRR training kit: sheets to be modified removed or added; pictures to change with picture of the targeted area. The training kit should also be adapted to the targeted audience (language, level of awareness, level of education).

**Facilitator**:
Training manager

**Place**
Anywhere

**Duration**:
1h30

**Documentation**
Garnier, P., Moles, O., Caimi, A. (2011). *Natural hazards, disasters and Local Development*. CRAterre-ENSAG.

**Equipment**
- Board or flip chart
- Markers

**Organisation**

| | |
|---|---|
| Before the session | - Organize the tables in "group" |
| After the session | - |

| PCDR | M4 | EXERCISE | Text sheet |
|---|---|---|---|
| | ADAPT THE PEDAGOGICAL MATERIAL TO EACH TARGETED CONTEXT | | |

The **context** can be defined through different factors:

**Context setting**: rural, semi-urban, urban

**Hazards**: floods, cyclone, earthquake, landslide

**Geographical environment**: coastal, lowland, mountainous, river-side, plateau, etc.

**Availability of local resources**: largely available, threatened, not accessible (affordability, availability)

**Local knowledge and know-how**

**Economical context and livelihood**

**Targeted audience**: communities, neighborhood, low technical class

**Context of the intervention**: post-disaster, DRR, developing program, educational program, community empowerment (IPs or not), low technical training

The **vulnerabilities** are the characteristics and circumstances of a community, system or asset that make it susceptible to the damaging effects of a hazard. (*source: UNISDR terminology on DRR, 2009*)

It's important to identify which are the main vulnerabilities of the targeted communities. Which are the origins of their increased exposure to disasters? Those vulnerabilities are generally not directly related to housing issues. The vulnerability of their habitat usually finds their origin in deeper weaknesses in the society often related to socio-economics factors.

"The lack of urban governance, the precarious livelihoods of populations in rural areas, and the degradation of ecosystems leads to the increased exposure of disadvantaged groups around the world. The effects of natural disasters are thus both a cause and a consequence of poverty." (*source: Natural hazards, disasters and Local Development, CRAterre*).

Extracts from « *Natural Disasters and Development: Reflections on the Origin of Disasters in the Philippines »* by Gaillard (*translated from French*):

"Access to resources is directly responsible for the vulnerability and harsh living conditions faced by disaster victims on a daily basis. However, it cannot be separated from the political context at local and national levels."

"Disaster factors in the Philippines are part of the everyday difficulties faced by victims and which lead them to live in a vulnerable way in areas exposed to natural phenomena. In the minds of the victims, the risks associated with rare or seasonal natural hazards appear less relevant than the daily risks associated with poverty and food insecurity.

"Paradoxically, the dominant view of managing risks and disasters linked to natural phenomena, in the Philippines and elsewhere in the world, continues to emphasize the "exceptional" nature of the hazard, not the "daily" character of vulnerability. Following this logic, speaking of "risk and disaster management policies" means to partition the prevention and mitigation activities around hazards and to consider disasters to be events that are independent of society. This approach leads to the disassociation of risks and disasters from the "daily life" and thus underestimates the underlying structural constraints. Talking about "risk and disaster management policy" is limiting to deal with symptoms while repressing the root of the evil."