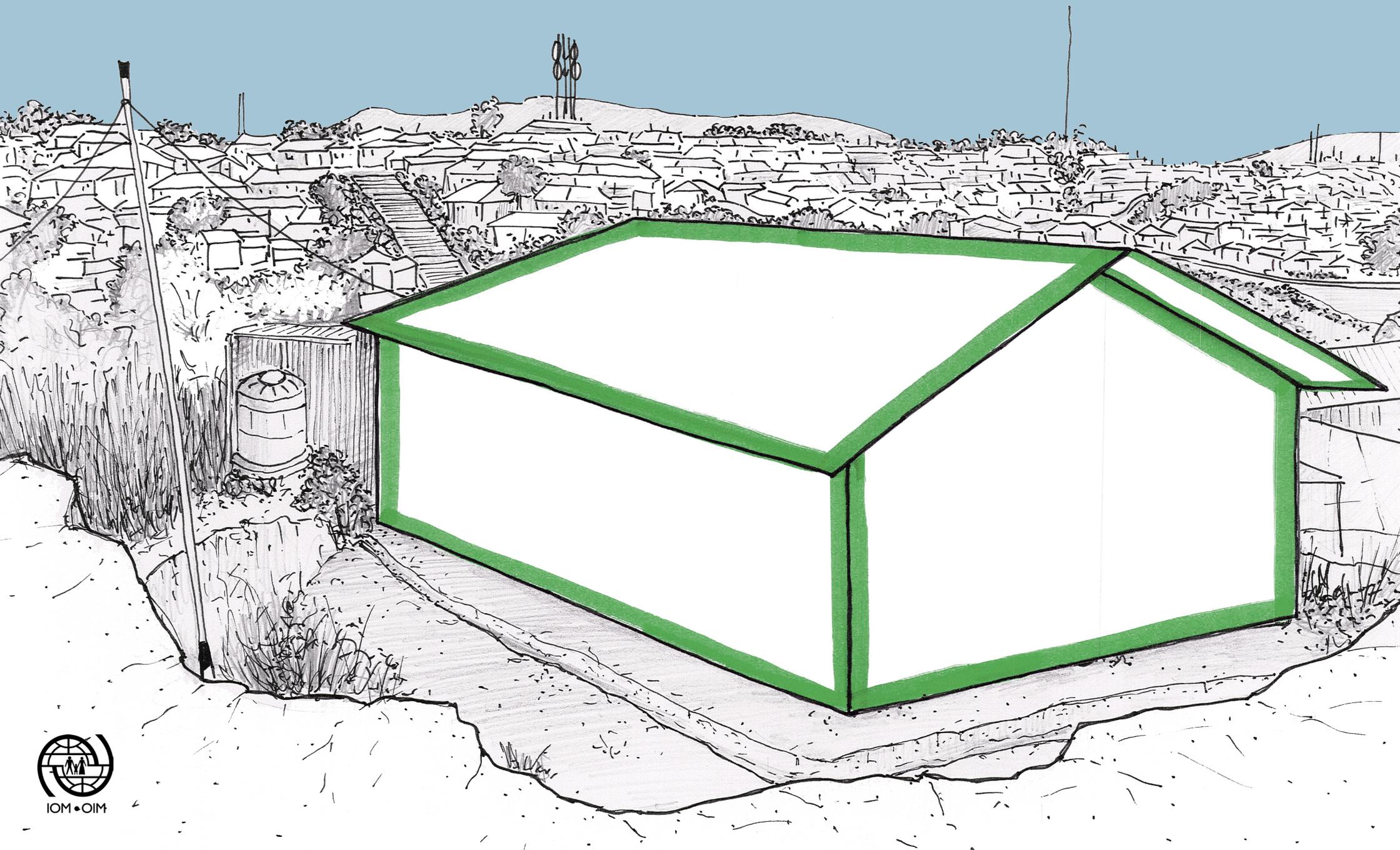


Basic Guidance on Shelter Improvement & Maintenance



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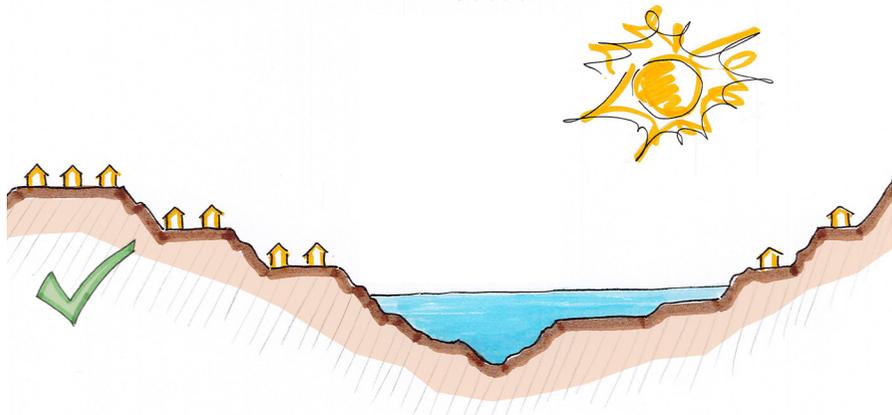
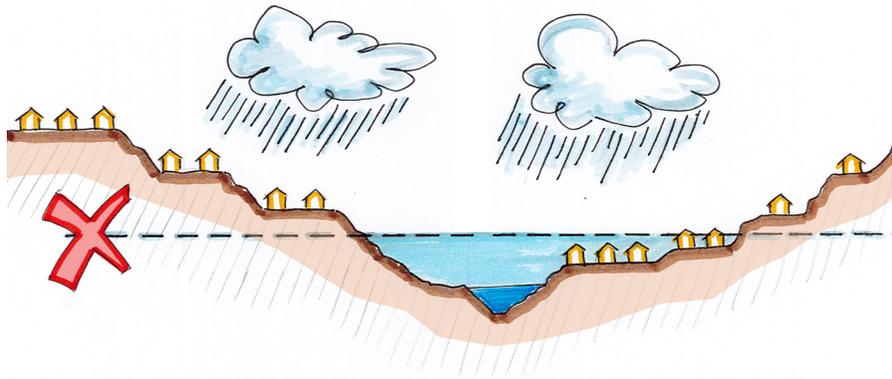
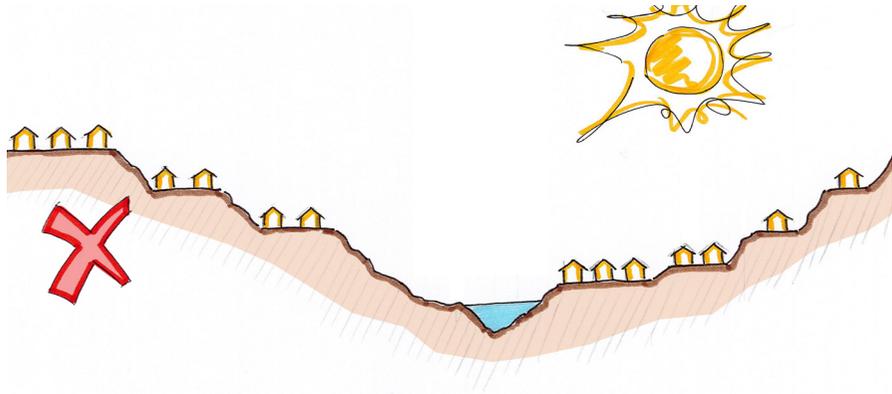
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Basic Guidance of Shelter Improvement & Maintenance

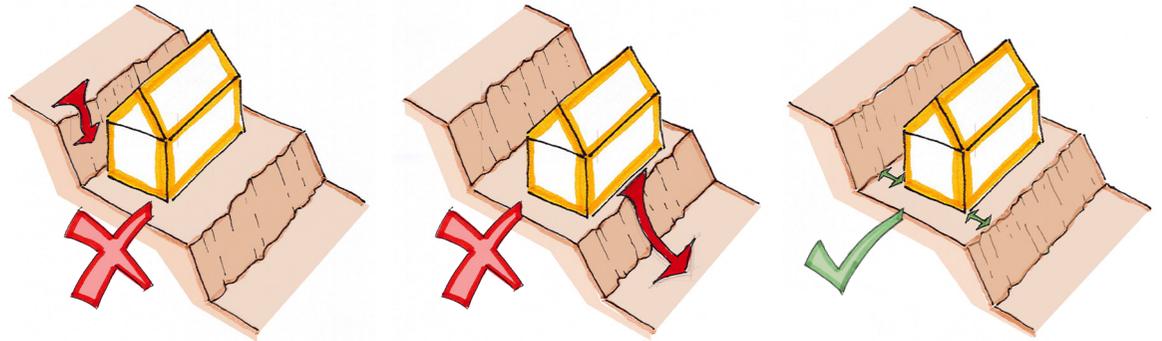
The purpose of this booklet is to provide basic guidance on shelter improvement and maintenance at household level. The guidance included in this booklet is to be used by beneficiaries in order to improve the conditions and durability of their shelters. Small scale and simple interventions may provide a significant improvement of both life quality inside the shelters, and durability of different elements that are part of the built structure. The guidance provided may be labelled under different categories, since it covers issues related with maintenance of the shelter elements, but also covering issues regarding habitability of the shelters as well as disaster risk reduction issues. The development of the content of this publication took in consideration the need to be accessible to a very large and diverse group of people – the use of visuals was considered preferable in order to target and deliver its messages to as many people as possible, regardless of age, and gender.

1. Site

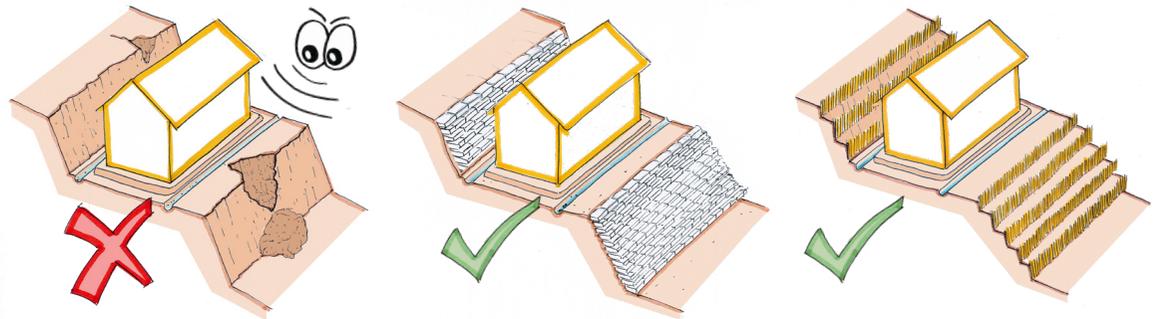
be aware of flood hazard



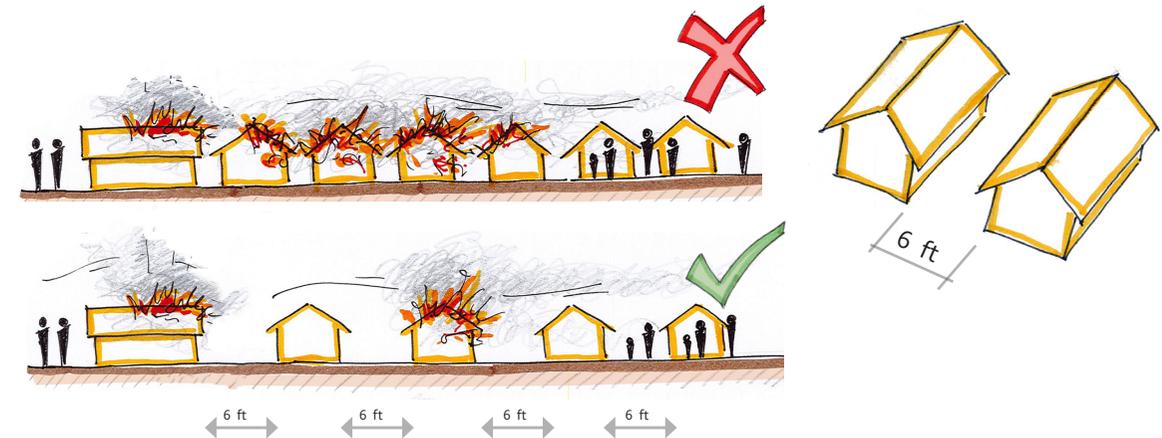
locate your shelter in the middle of the plot



inspect the slopes next to your shelter and stabilize them regularly using sand bags / plastic sheeting / bamboo fence / vetiver grass

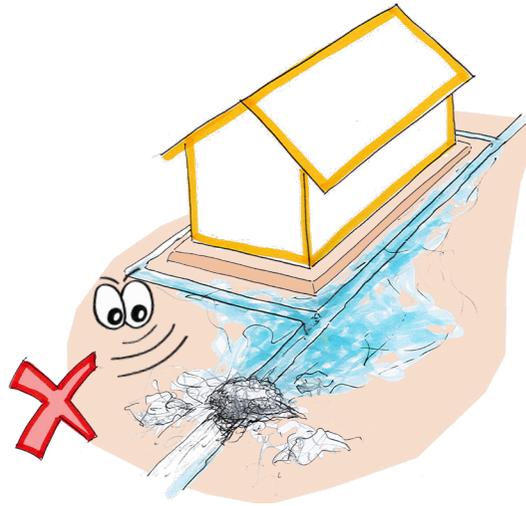
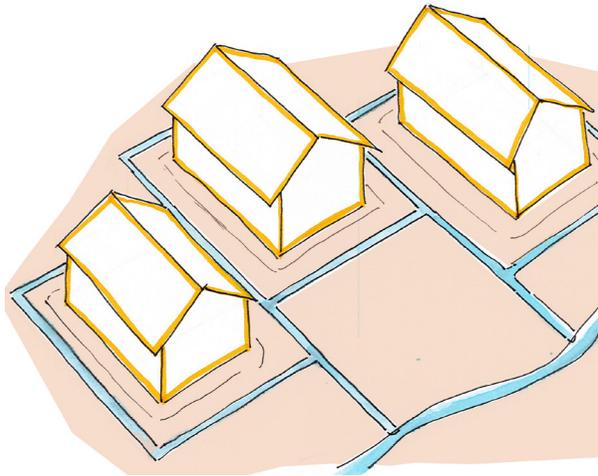


be aware of fire hazard | keep a distance in between shelters

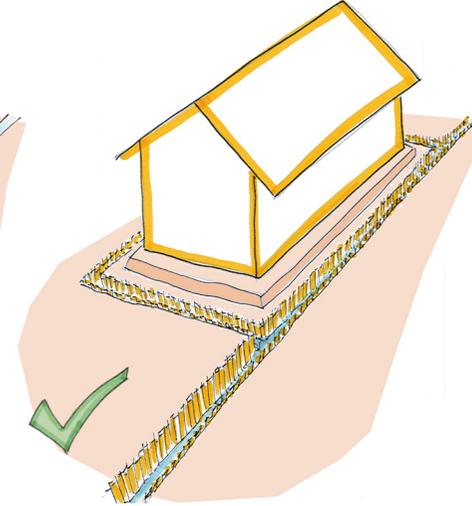


1. Site

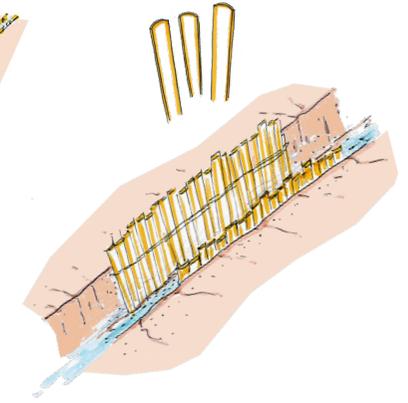
create drainage around your shelter and connect
Your drainage to the main drainage system



regularly clean your drainage

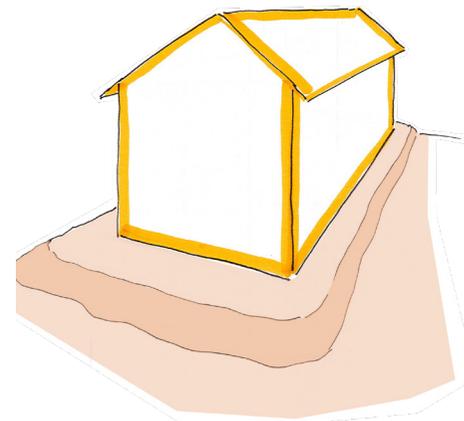
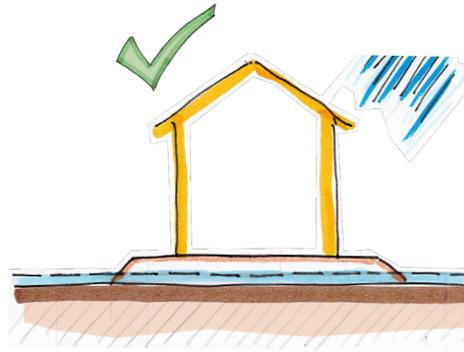


ensure that waste water from
cooking / bathing is also drained

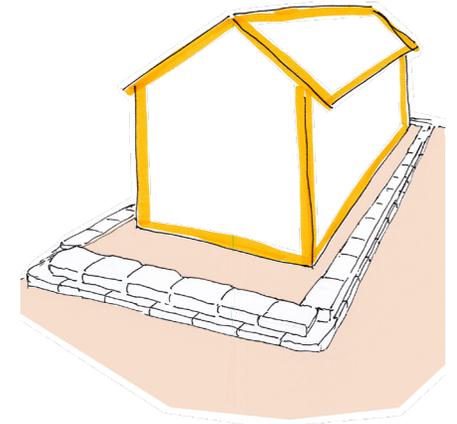


you may use split bamboo
to stabilize the sides of the
drainage canal

raise your shelter's plinth from ground level to avoid rain water getting inside



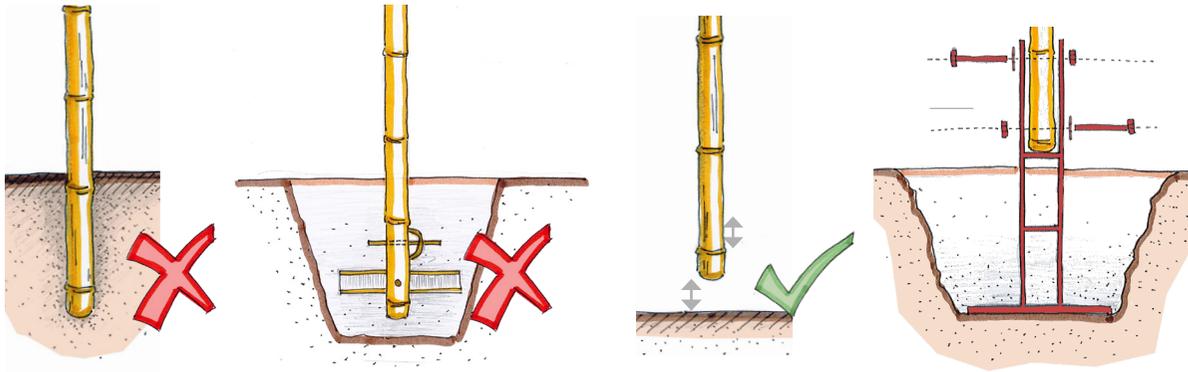
raise your shelter's plinth using
compacted soil



you may also use sand bags /jute bags
filled with 1:6 ratio cement : sand mix
around the plinth

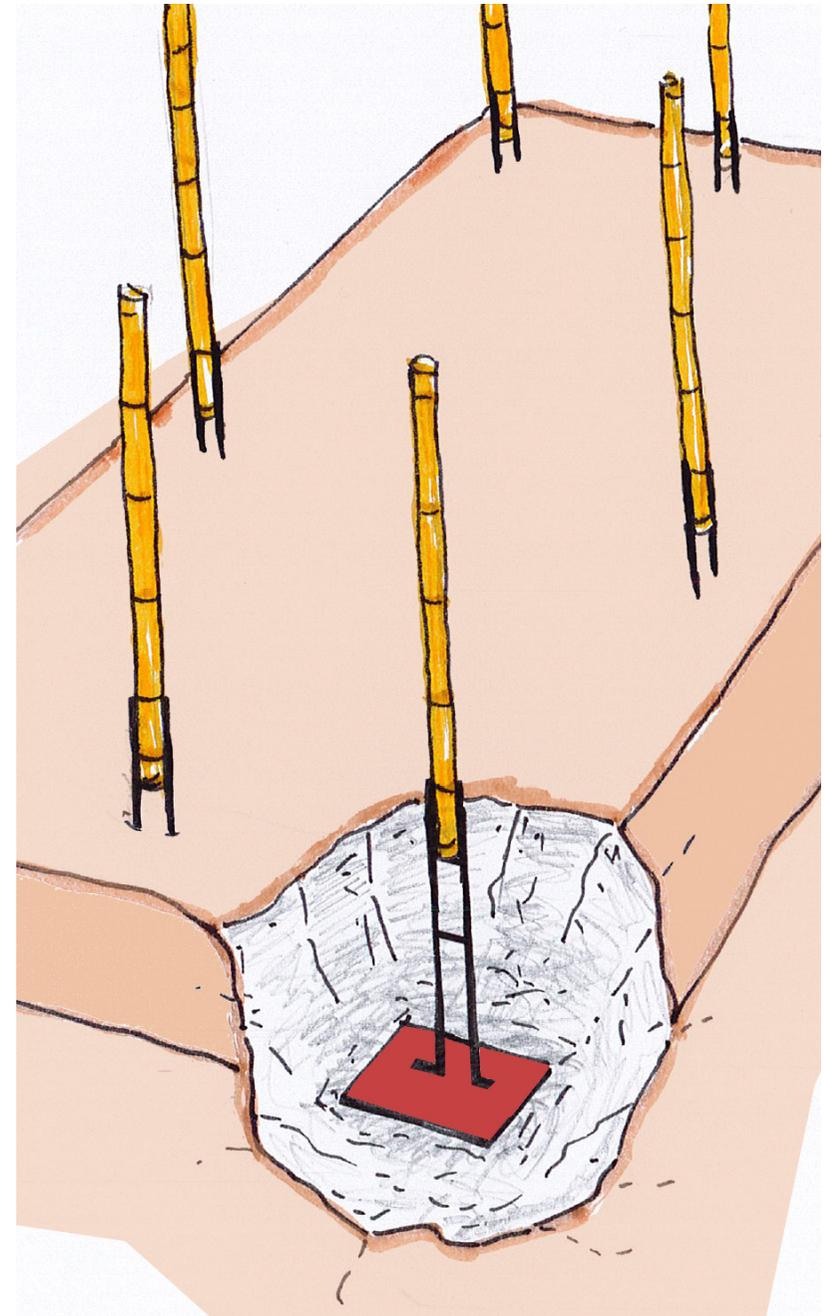
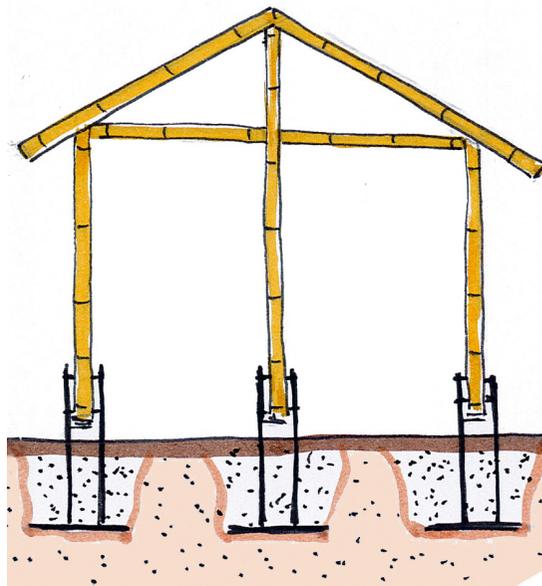
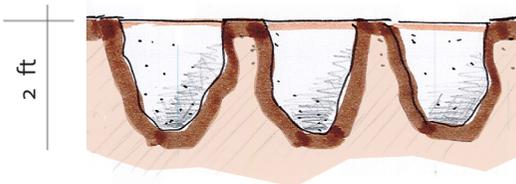
2. Foundation

have a strong foundation and raise the bamboo poles from the ground to prevent decay



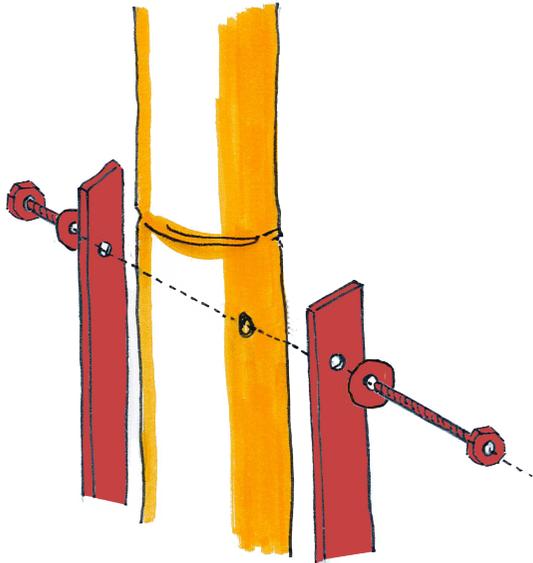
keep the bamboo off the ground

dig 2 feet deep footing pits. Place the footings. fill the footing pits with soil and compact the soil firmly



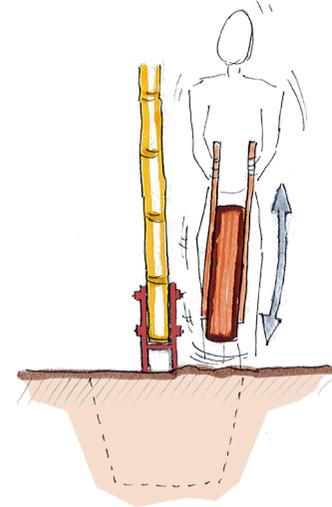
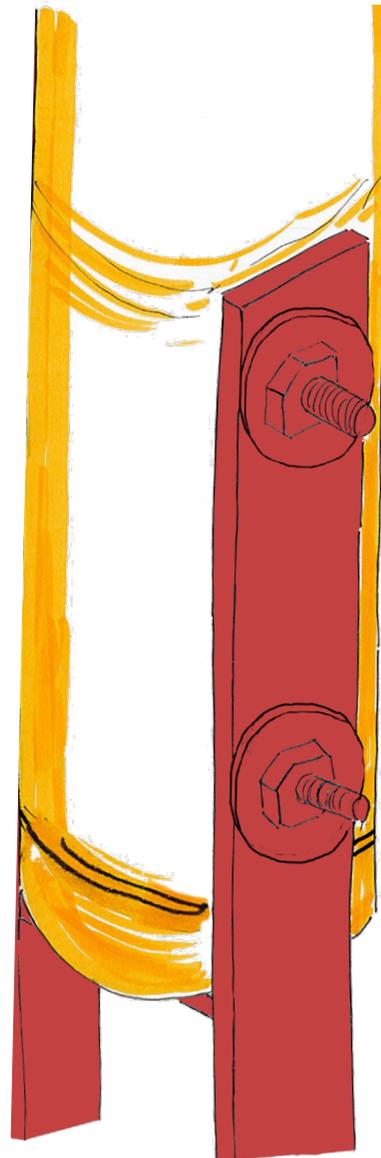
2. Foundation

check for rust and if needed paint with anti-corrosive paint

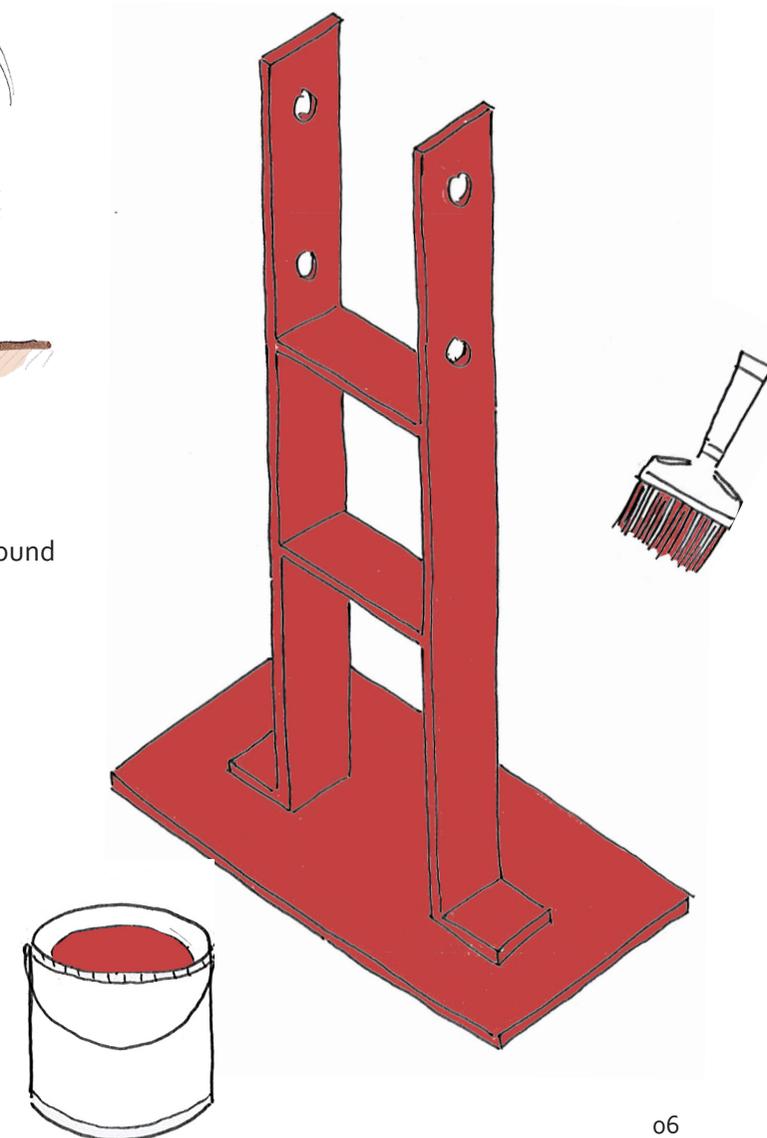


cut the bamboo so there would be a node below the connection bolt to prevent splitting

regularly inspect the bolts, the washers and the nuts in the connection between the foundation and the bamboo pole. tighten them regularly, but be careful not to crush the bamboo

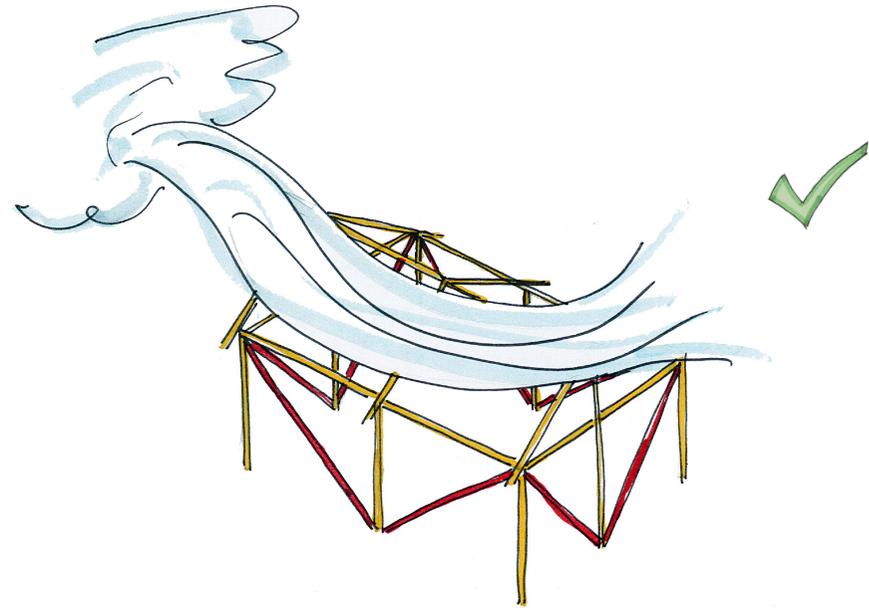
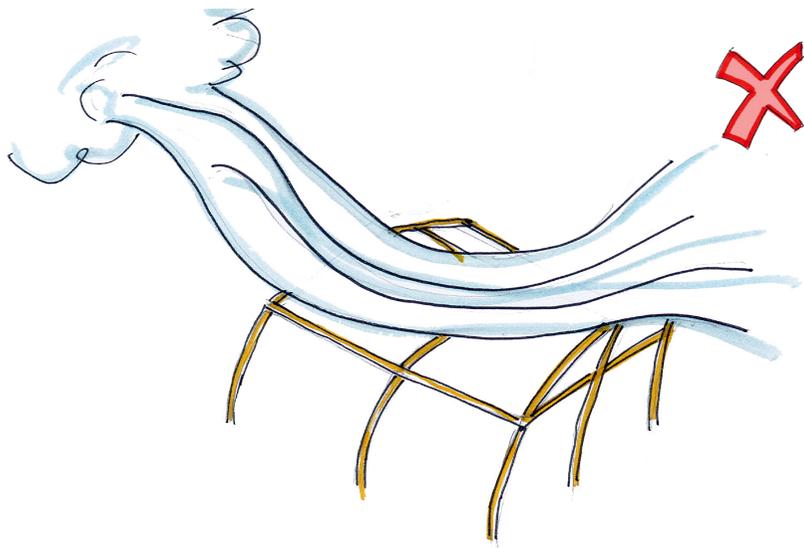


compact the soil around the footings

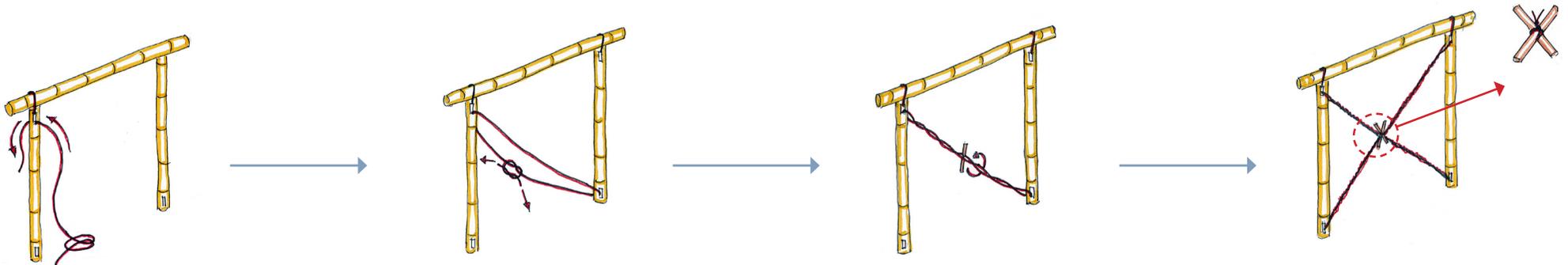


3. Shelter structure

reinforce your shelter structure with rope or bamboo diagonal bracing

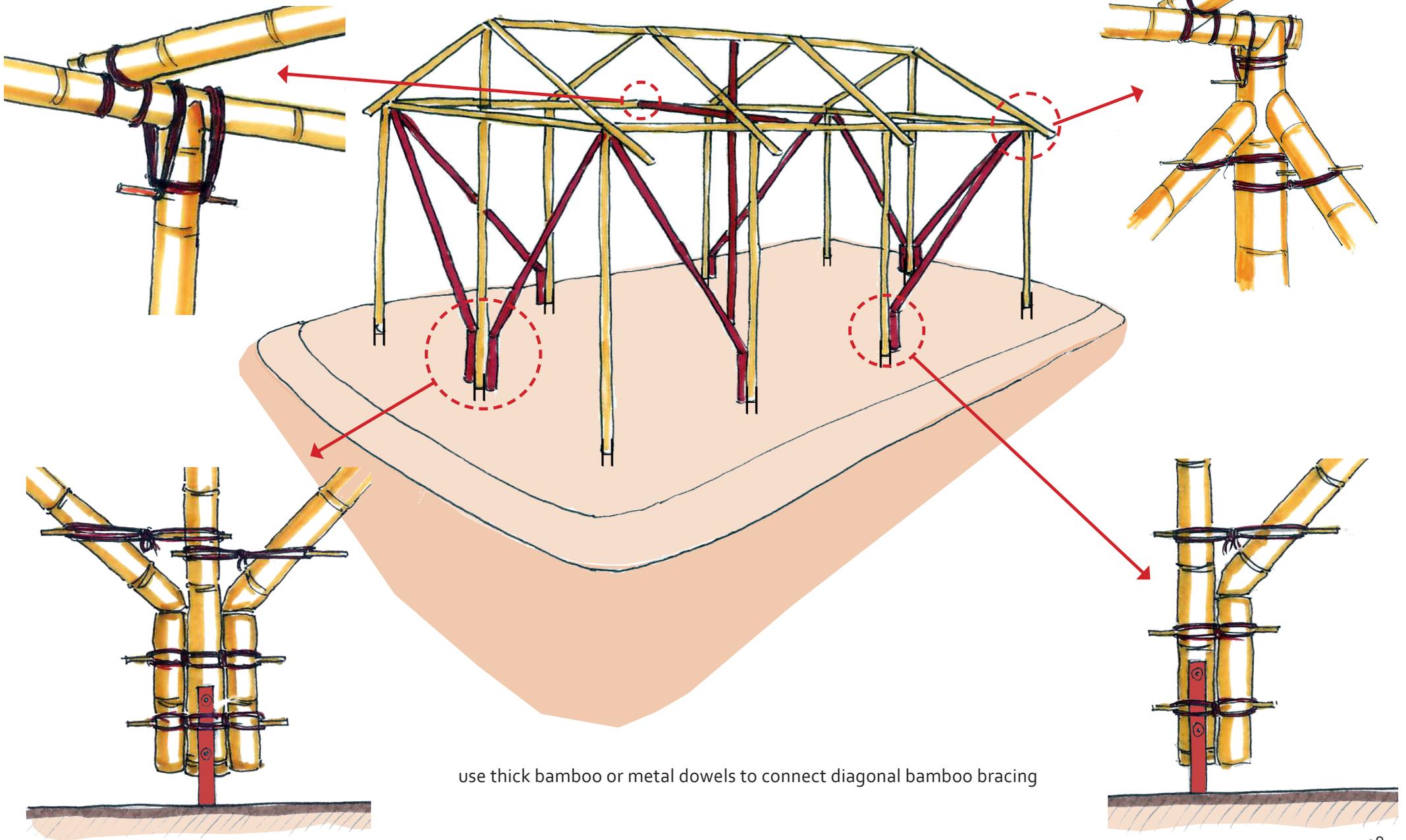


rope bracing



3. Shelter structure

bamboo bracing

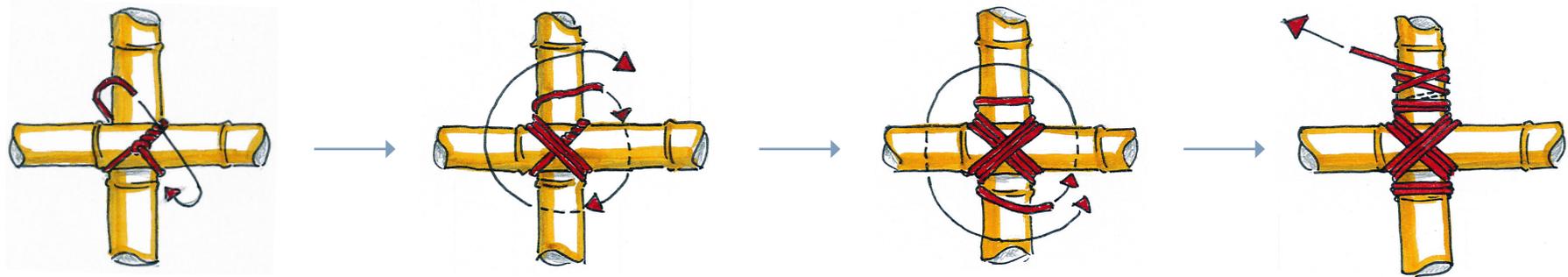


use thick bamboo or metal dowels to connect diagonal bamboo bracing

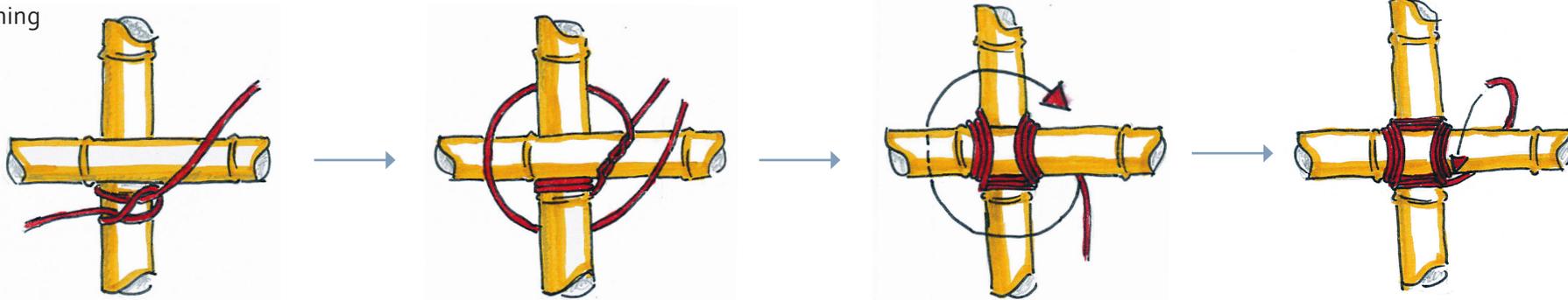
4. Ties | connections

have strong ties and connections in your shelter

diagonal lashing



square lashing

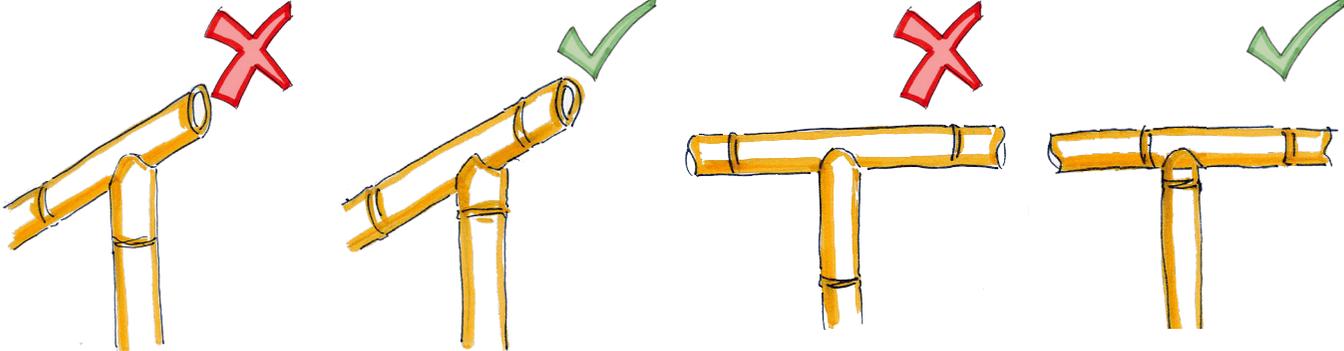


column / beam / fish mouth connection

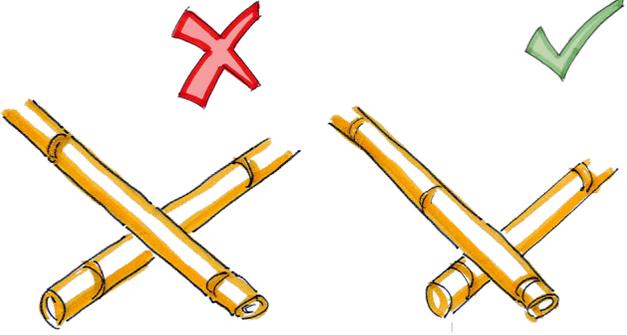


4. Ties | connections

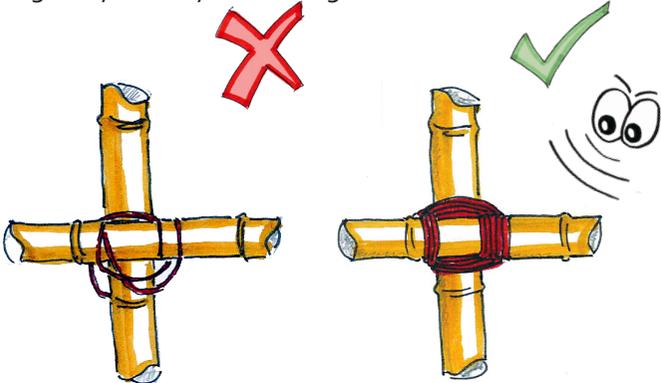
be aware of the nodal placement importance while making bamboo connections



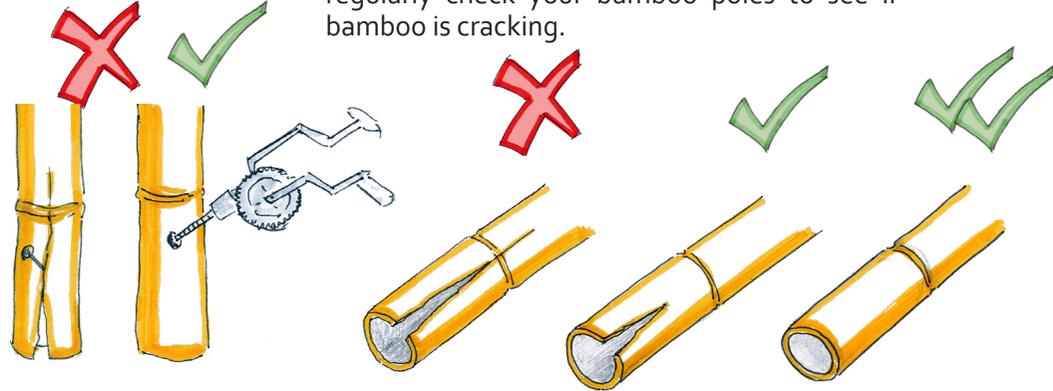
always leave a node after the joint



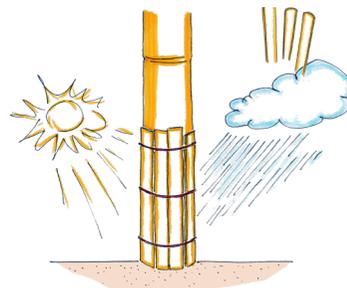
regularly check your lashing



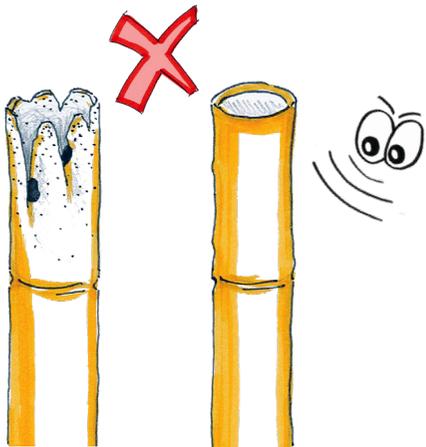
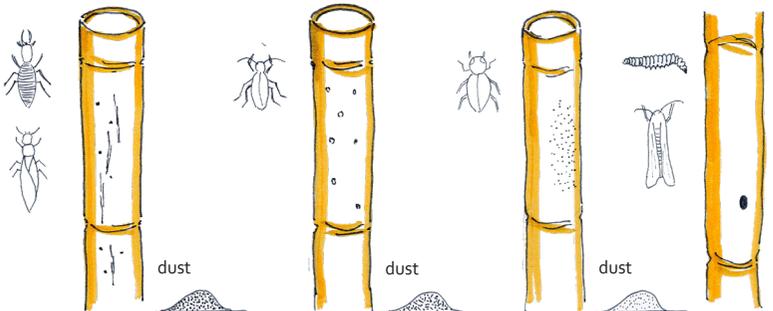
regularly check your bamboo poles to see if bamboo is cracking.



protect the bottom section of bamboo poles from sun and rain using small pieces of split bamboo

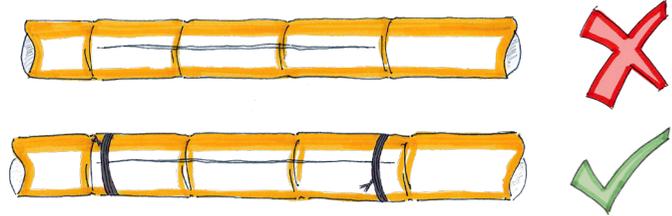


regularly check if the bamboo poles have any pest infestation - dust is a sign of pest infestation



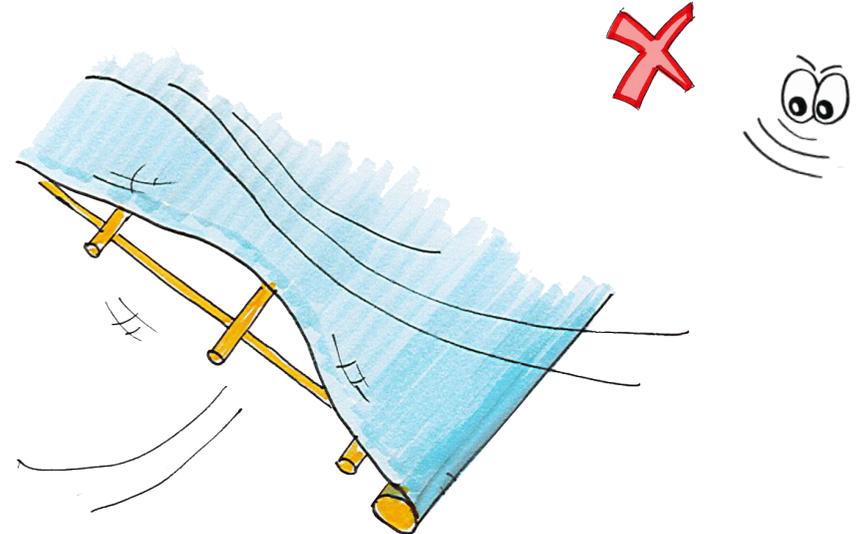
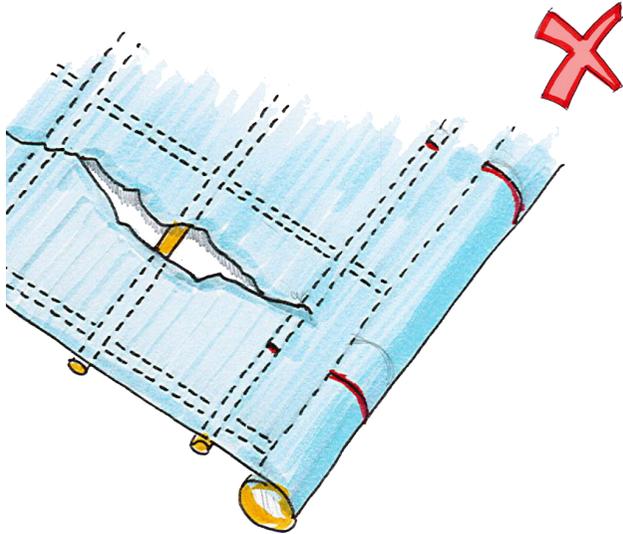
replace rotten or pest infested bamboo

use GI wire to reinforce the nodes and to stop further cracking

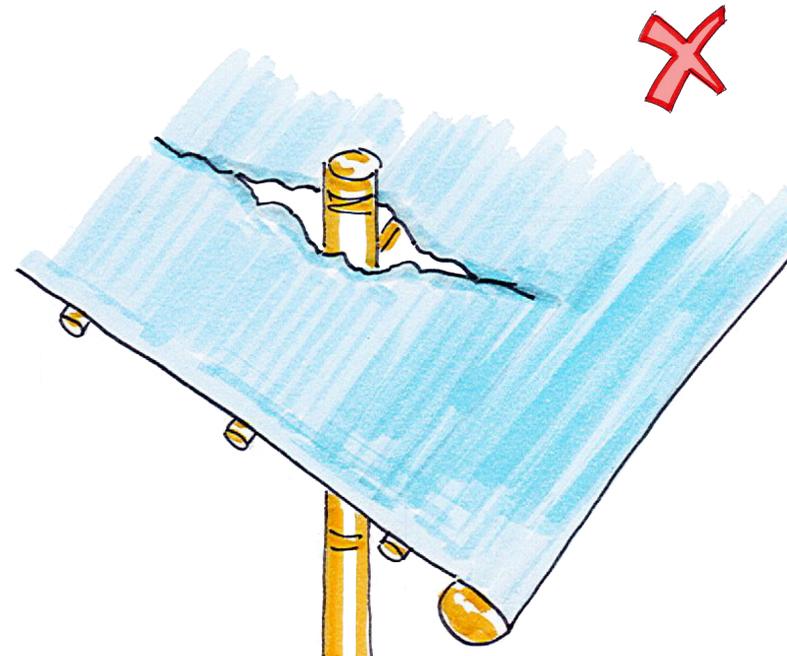
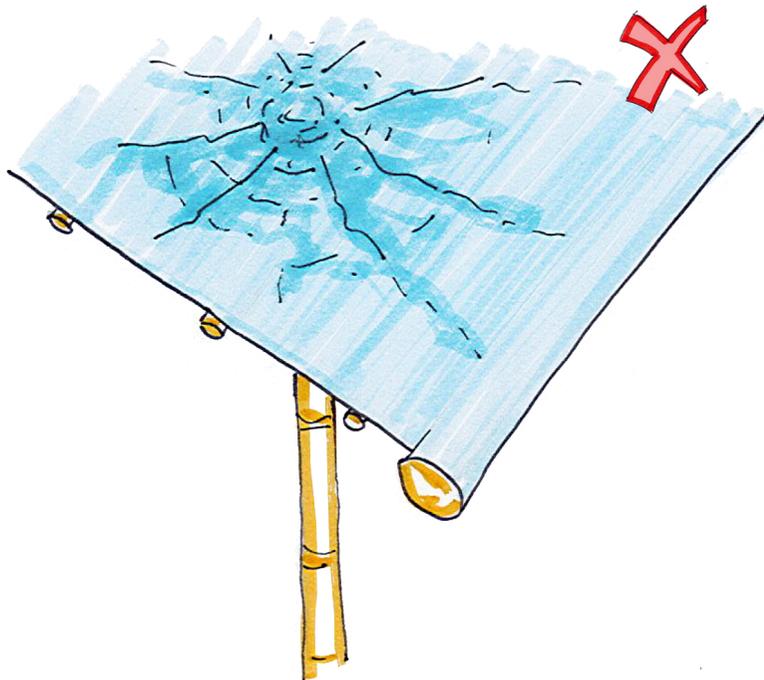


5. Tarpaulin /roof

secure the tarpaulin to roof structure and regularly inspect the tarpaulin

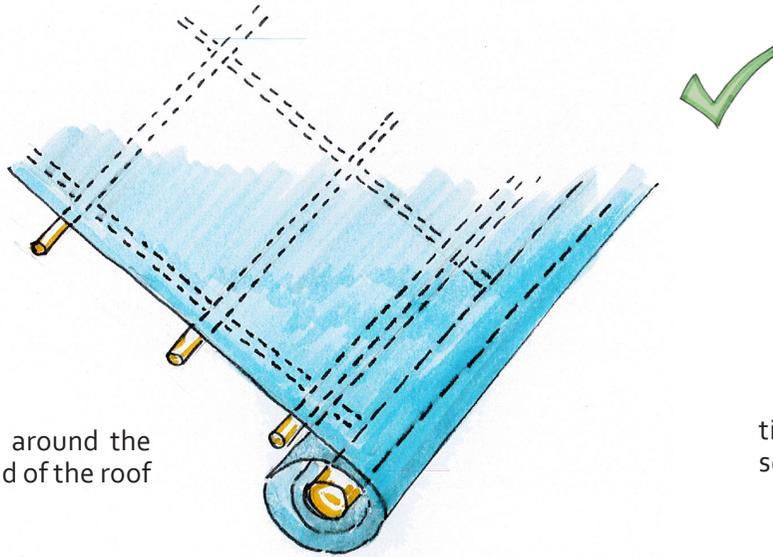


avoid having sharp edges pushing against the tarpaulin



5. Tarpaulin /roof

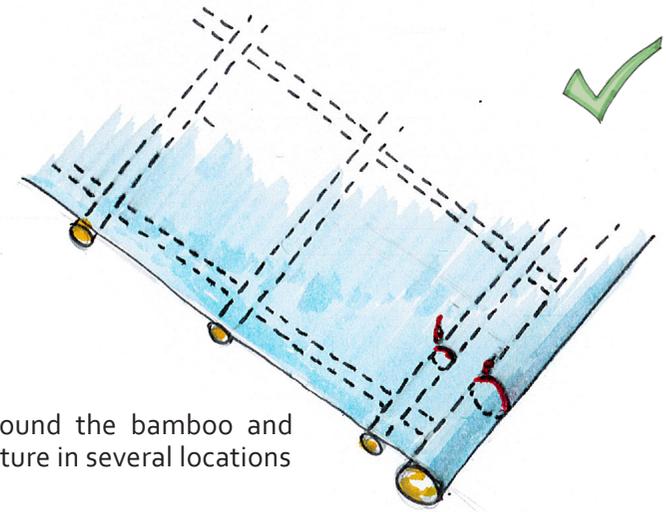
regularly check if the tarpaulin has any holes or any other kind of damage. make sure the tarpaulin is tightly stretched



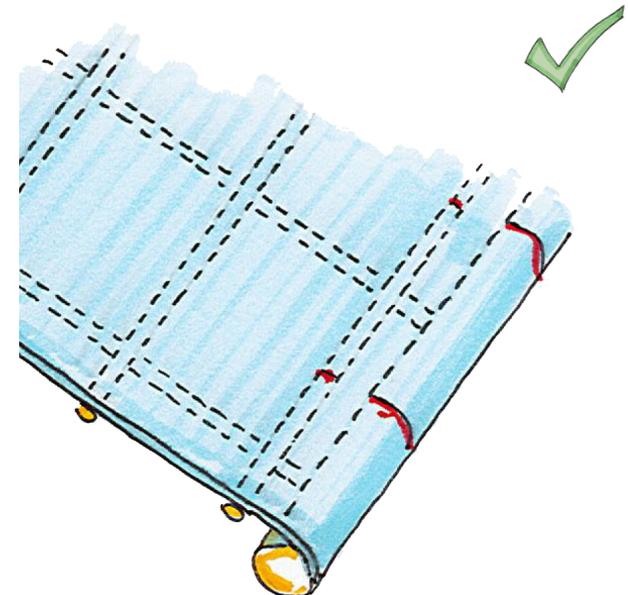
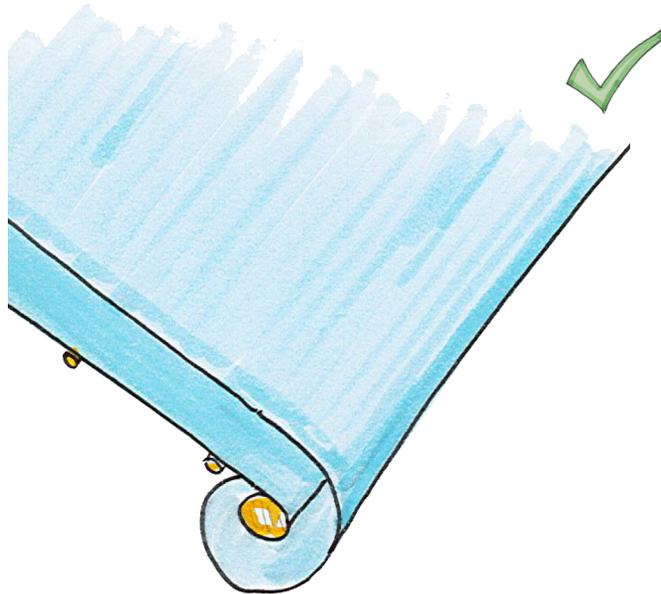
roll the tarpaulin around the bamboo at the end of the roof



tighten the tarpaulin around the bamboo and secure it to the roof structure in several locations

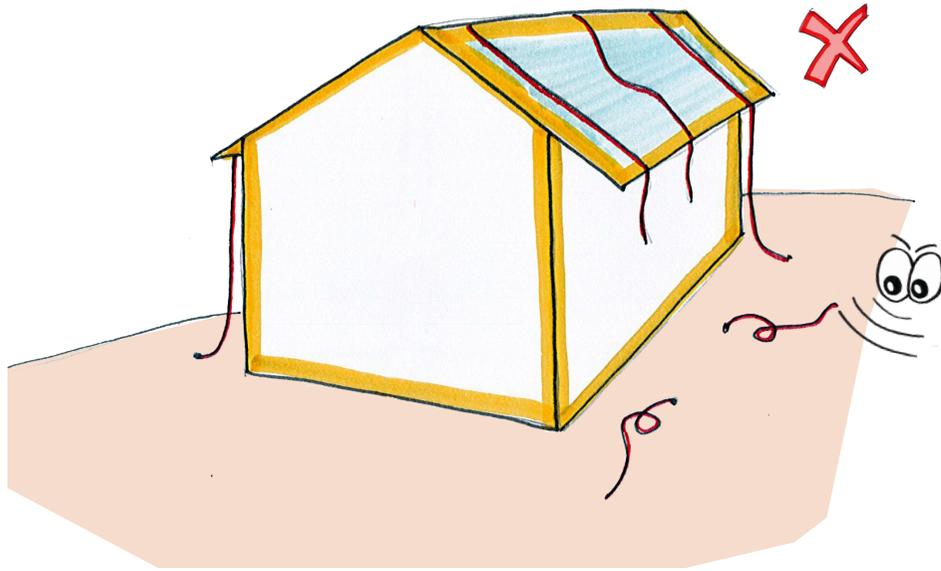


you may use a second tarpaulin to cover the damaged tarpaulin. This will also provide better insulation.

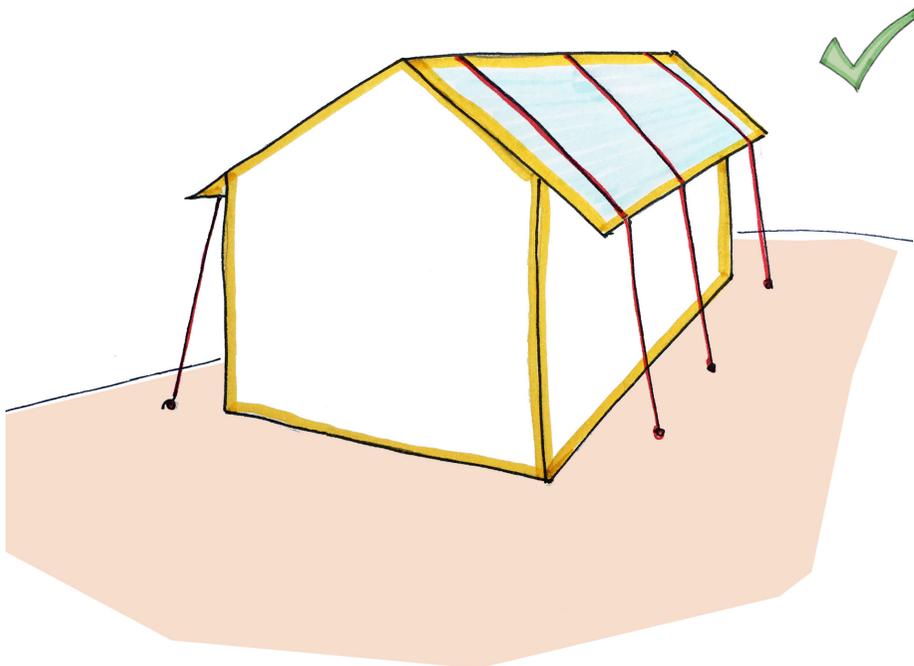


5. Tarpaulin /roof

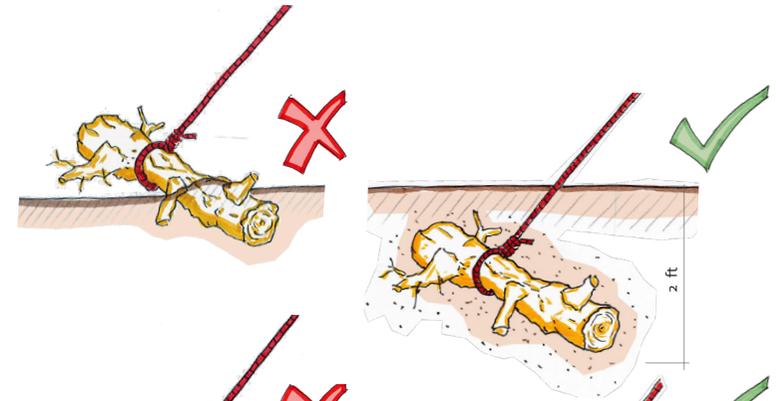
secure the roof structure using rope and anchor it to the ground



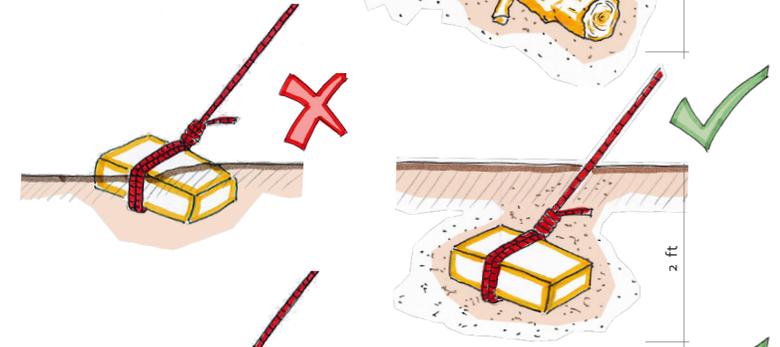
regularly inspect the rope securing the roof and its anchoring



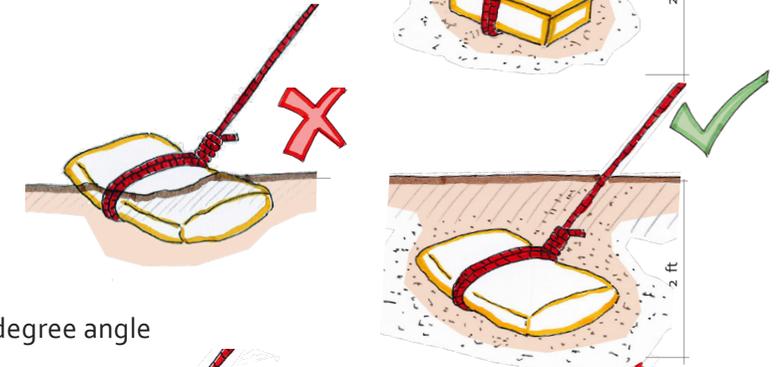
tree stump



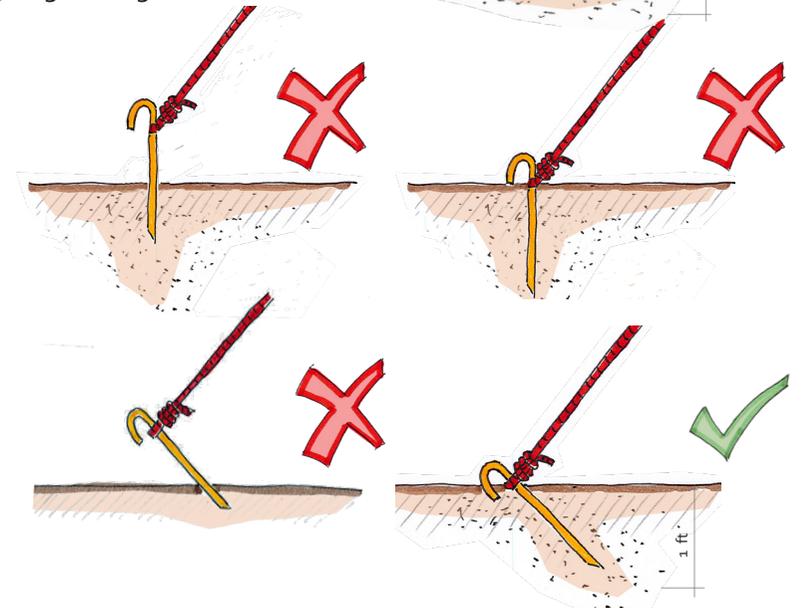
brick



sand bag

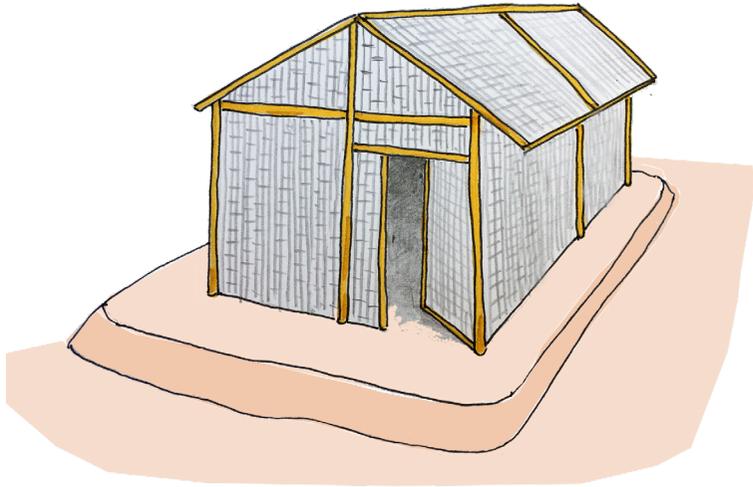


steel peg at 45 degree angle

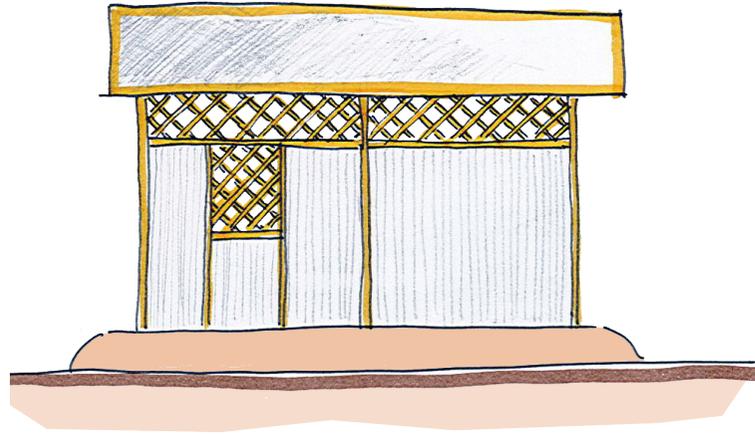


6. Walls | openings | ventilation

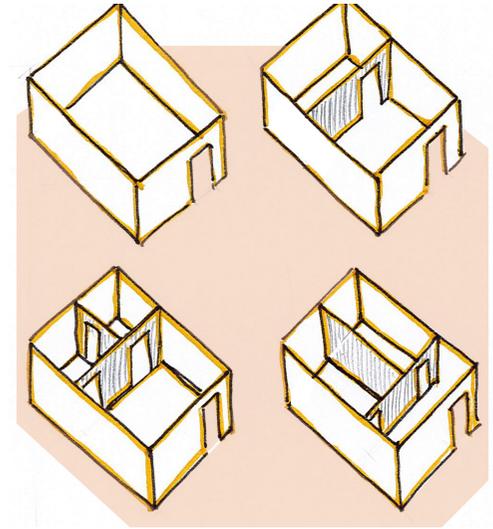
use bamboo weaving on walls and roof to improve insulation



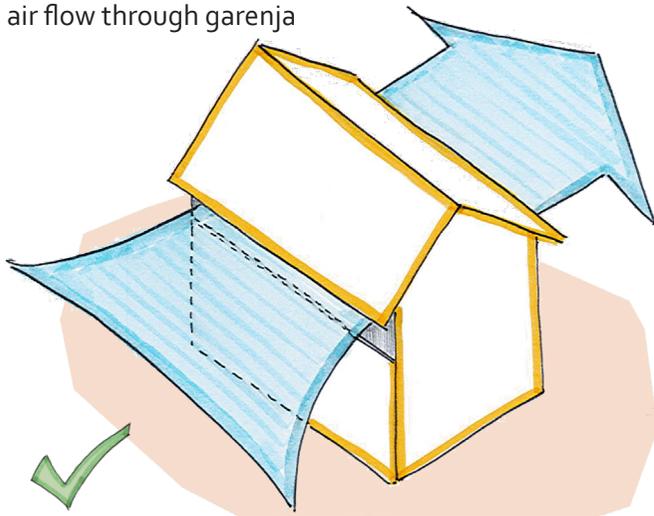
make windows and garenja for air flow, to cool the interior of the shelter and to allow daylight



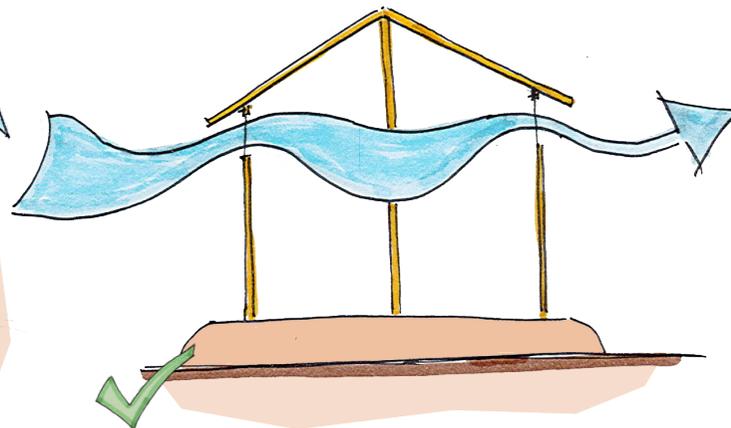
make partitions for privacy



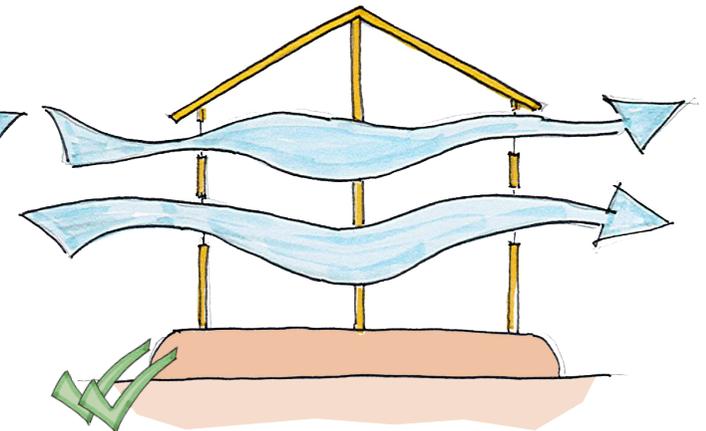
air flow through garenja



air flow through garenja prevents shelter from being blown away by wind

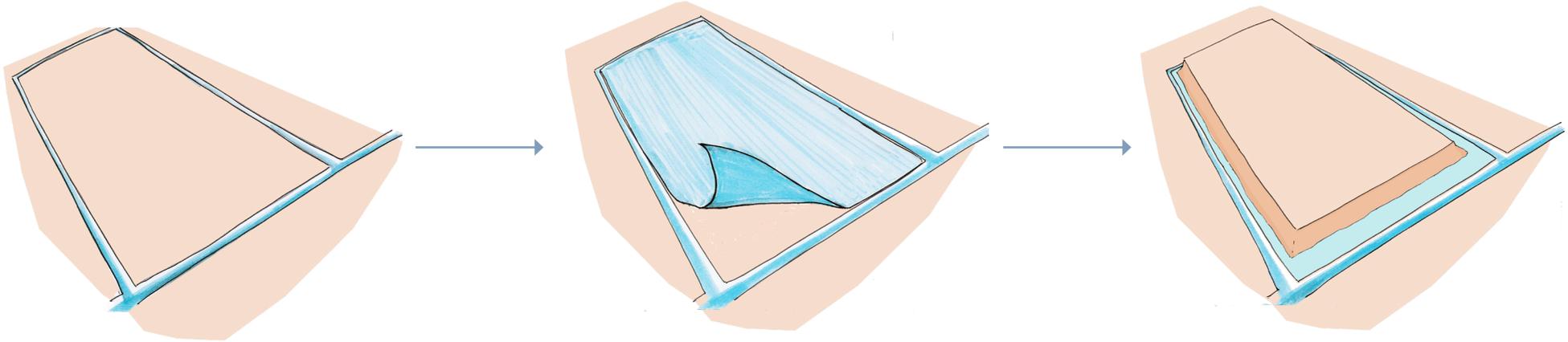


air flow through garenja and windows



7. Flooring / dampness barrier

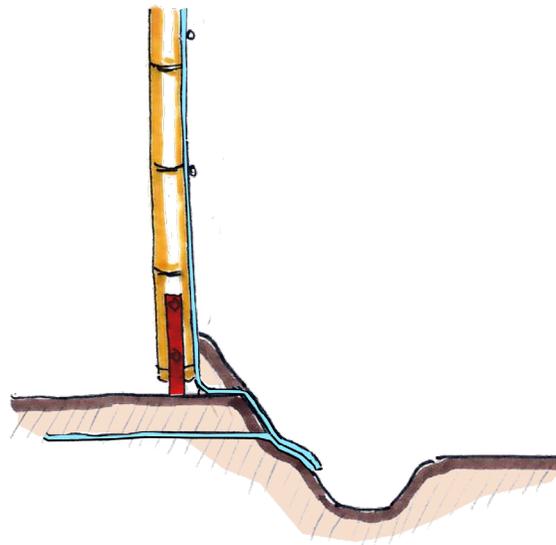
create a dampness barrier inside the plinth/floor in order to reduce floor humidity



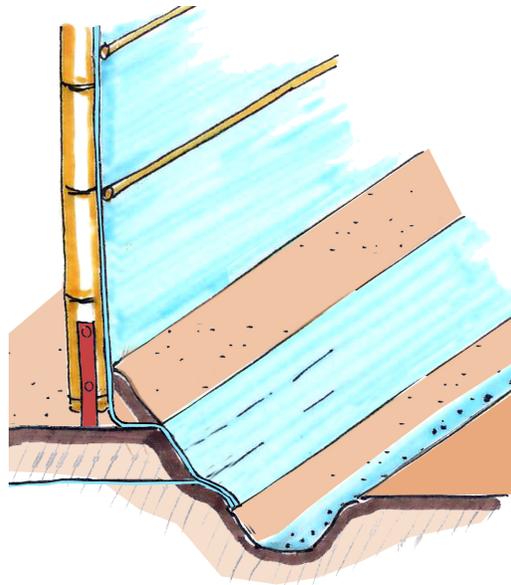
create the drainage at your plot. Level and clear the ground.

cover the ground with a tarpaulin or plastic sheeting all the way to the drain.

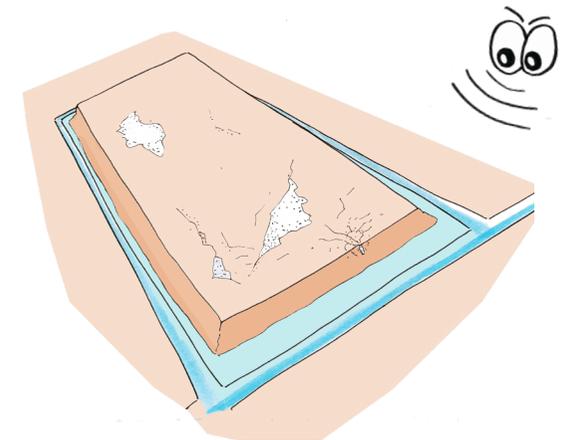
cover the tarpaulin with minimum 6 inch plinth, if possible add a layer of cement stabilized mud as finish.



extend the tarpoulin or plastic sheeting underneath the plinth all the way to the drain.



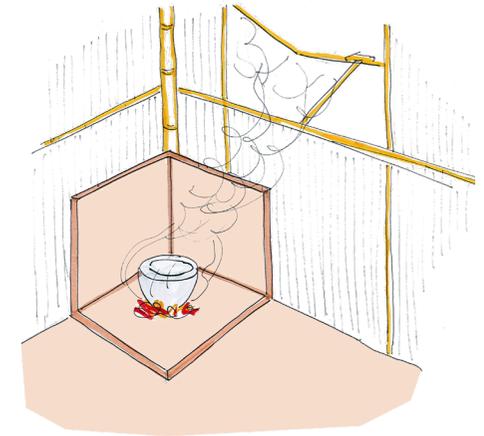
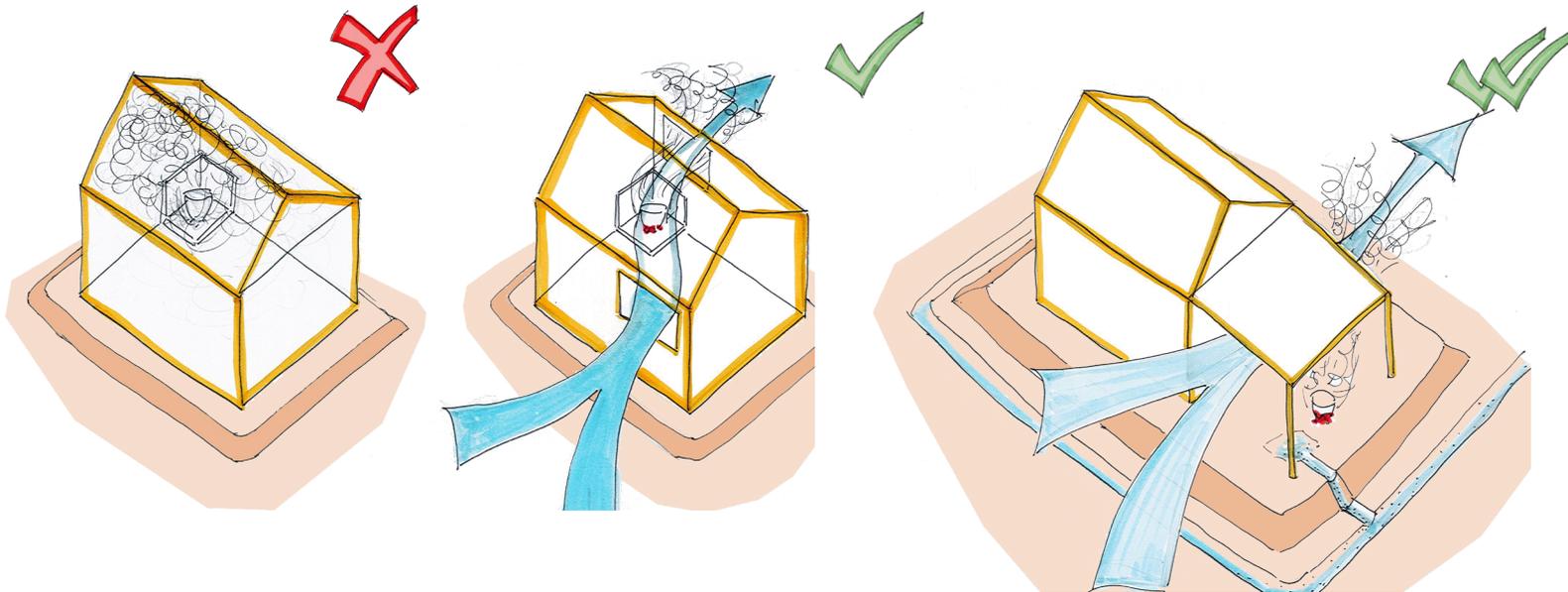
extend tarpaulin from walls underneath plinth to drainage to avoid rain or flood water from entering the shelter



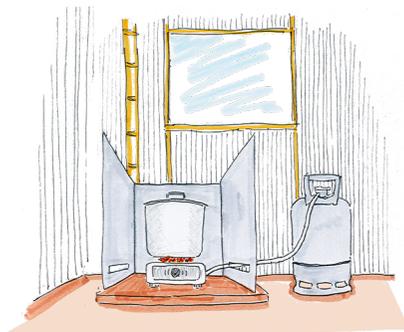
regularly inspect the floor and look for cracks or holes in the top layer. Fix them using a coat of cement stabilized mud plaster

8. Cooking

do not cook inside a completely closed shelter

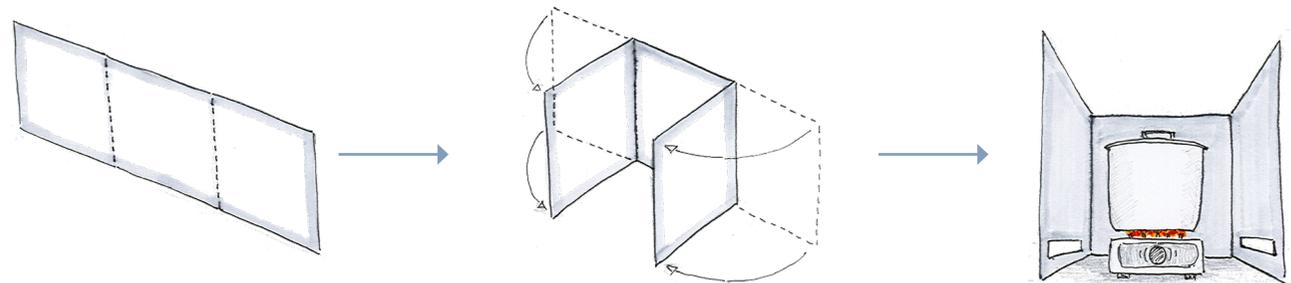


if you have to cook inside the shelter install your cooking area next to a window. Built mud walls around the fire to protect the bamboo



4 ft

if you cook with gas, do it next to a window and place the gas cylinder at least 4 feet away from the stove and the flame.



you may use metal sheeting to protect your cooking area

