TERMITE STUDY IN BORNO STATE

Photo: Mercy Corps USAID funded Emergency shelter construction in Damboa LGA. 2019

EXPLORING SHELTER SOLUTIONS FOR IDPS LIVING WITH HOST COMMUNITIES AND RETURNEES

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ABSTRACT

This applied research paper is aimed at improving the resistance of locally available timbers to termite attack using locally available and environmentally friendly materials. The timbers used in this study were obtained from the timber market in Maiduguri, Borno State, Northeast Nigeria. Specifically, the local materials with anti-termite properties used in this study include 900g of charcoal from Neem tree trunk, 1 liter of used engine oil, 1 kilo of Potash dissolved in 1 liter of water, 1 kilo of salt, 1kilo of salt dissolved in 1liter of water, Neem leaves extract, 500ml of Neem leaves extract mixed with 500ml of Neem seed oil, 500ml of Neem leaves extract mixed with 500ml of engine oil, Neem seed oil, 900g of Neem trunk ash mixed with 1liter of water, and 900g Neem trunk ash. Graveyard experiment was conducted on the timber samples for 12 weeks to determine its resistance to termite attack after application of the local anti-termites. Results from the research showed that salt, Neem tree trunk ash and used engine oil are effective against termite (0% termite effect) followed by charcoal (0.11%). Potash and salt solutions can provide temporary solution to termite attack. This applied research funded by USAID-BHA through ADAPT program was conducted by Mercy Corps in collaboration with the University of Maiduguri and Ramat Polytechnic Maiduguri.

INTRODUCTION

The commonly available timber types used for shelter framing and roofing in Northeast Nigeria are Obeche and Oro. These varieties don't resist termites and they start attacking within a couple of weeks into construction work, causing serious challenges on the lifespan of the shelters provided by humanitarian actors, thus requiring continuous maintenance to avoid severe termite attacks. Given this context, there is a need to search for local techniques and practices to improve the resistance of the available timbers against termite attack and increase the lifespan of the transitional and emergency shelters.

In 2017 to 2018, Mercy Corps consulted communities and adopted the practice of coating the timber frames with used engine oil, as the integrity of the shelter frame was constantly undermined because of the presence of termites. In addition, local people also use available anti-termite chemicals that are also seen as ineffective and have not resolved the issue. In view of these concerns, Mercy Corps deemed it necessary to carry out a study that will investigate best practices in employing local techniques and using low-cost materials to improve timber resistance to termites.

BACKGROUND OF STUDY

The provision of timber shelter structures wrapped with tarpaulin plastic sheeting has been the standard practice for lifesaving shelter assistance to displaced people in Northeast Nigeria. However, these emergency shelters need tarpaulin replenishment every 6-9 months because of the harsh weather conditions, for instance, extreme temperature, sand storms, heavy winds, rains and waterlogging. In addition, the temperature inside the shelters is typically hot and uncomfortable during the day

according to feedback from households (HHs) living in such shelters. Women and girls mentioned they do not provide sufficient privacy as reported in a consultation session for Bakasi-type shelter design review in Dikwa in 2018, adding they don't feel safe because the tarpaulin can be easily torn and the shadows of the people living inside can be seen outside once the lamps are lit.

METHODOLOGY

Mercy Corps conducted consultation sessions and Key Informants Interviews (KIIs) across communities in Bama, Gwoza, Damboa, Ngala and Maiduguri to get feedback on locally available materials with potential to treat termite attack. Eleven (11) local materials were identified by the communities which were then subjected to scientific experiment to verify its effectiveness. The local materials mentioned were:

1. 900g of charcoal from the Neem tree trunk
2. 1 liter of used engine oil
3. 1 kilo Potash dissolved in 1 liter of water
4. 1 kilo salt
5. 1 kilo salt dissolved in 1 liter of water
6. Neem leaves extract
7. 500ml of Neem leaves extract mixed with 500 ml of Neem seed oil
8. 500ml of Neem leaves extract mixed with 500 ml of engine oil
9. Neem seed oil
10. 900g of Neem trunk ash mixed with 1 liter of water
11. 900g Neem trunk ash

The timbers were dried under the sun for a day to remove moisture before application of the local anti-termites. Each of the eleven (11) local materials were applied to four pieces of timbers to determine its effectiveness. Four pieces of timbers are left untreated as shown in Table 1.

Using graveyard test[1], an experiment was carried out on the timbers for 12 weeks to determine the resistance to termite attack. A termite-infested site was identified at the University of Maiduguri to conduct the experiment. Half of the timber samples (24 pieces) were buried 100 mm below the ground level in a 5-meter square radius while the remaining samples were placed flat on the ground. Additionally, 1,200 cubic cm of termites were collected from the termitarium at the university and applied to the site. Standard method for laboratory evaluation to determine resistance to subterranean termites was adopted to evaluate the degree of resistance of the treated timbers to termite attack. Using visual observation, the samples were assessed weekly for resistance or otherwise of the wood samples to termite infestation. The percentage weight loss of the samples was evaluated at the end of the field experiment using the formula below:

$$\%\text{Weight loss} = \frac{W_b - W_a}{W_b} \times 100$$

[1] A test conducted out-of-doors on pieces of timber in contact with the ground, to determine their durability against termite attack or decay. Preservatives may be added to the timber or to the soil.

W_b = Weight of dried wood samples before graveyard field experiment
W_a = Weight of dried wood samples after graveyard field experiment

Photo 1: Graveyard experiment on Obeche and Oro timbers

RESULTS AND DISCUSSION

Table 1: Weight Loss Due to Termite Attack on Timber Samples

S/N	Timber samples treated with local anti-termites (4 timbers per test)	Initial Average Weight (g)	Final Average Weight (g)	Weight Loss (g)	% Weight Loss
1	900g of charcoal of Neem tree trunk	176.1	175.9	0.2	0.11%
2	1 liter of used engine oil	173.0	173.0	0.0	0.00%
3	1 kilo Potash dissolved in 1 liter water	158.0	154.0	4.0	2.53%
4	1 kilo dry salt	181.0	181.0	0.0	0.00%
5	1 kilo salt dissolved in 1 liter water	167.0	165.3	1.7	1.02%
6	Neem leaves extract	192.0	159.7	32.3	16.82%
7	500 ml of neem leaves extract mixed with 500ml of Neem seed oil	186.0	145.0	41.0	22.04%
8	500 ml of Neem leaves extract mixed with 500 ml engine oil	169.8	148.0	21.8	12.84%
9	Neem seed oil	176.2	133.0	43.2	24.52%
10	900g Neem trunk ash mixed with 1 liter water	172.0	161.0	11.0	6.40%
11	900g Neem tree trunk ash	175.0	175.0	0.0	0.00%
12	Untreated sample	160.2	95.7	64.5	40.26%

Table 1 demonstrates the weight loss on the timber samples treated with different materials. It shows that the termites were most active in untreated timber samples, showing significant attack on the timbers with over 40% weight loss, followed by the timbers treated with Neem seed oil with 24.52% weight loss, Neem leaves extract mixed with Neem seed oil at 22.04%, Neem leaves extract at 16.82%, Neem leaves extract mixed with used engine oil (12.84%) and Neem trunk ash dissolved in water (6.4%). The loss of weight for charcoal was at 0.11%, salt solution at 1.02% and Potash solution at 2.53% which showed better resistance to termite attacks than the other materials, while the Neem tree trunk ash, used engine oil and dry salt showed the highest resistance to termite attack with 0% weight loss.

CONCLUSION

The study showed that salt, Neem tree trunk ash and used engine oil are effective against termite (0% termite effect) followed by charcoal (0.11%), hence are recommended for usage. Potash and dissolved salt solution can provide temporary solutions to termite attack while the other local materials were not effective against termite. The identified local materials are readily available and economical in Northeast Nigeria with the local communities showing social and cultural acceptability for their usage to treat termites. The materials were also more environmentally friendly as compared with the conventional chemical anti-termite available in the market.

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CONTACT:

Umar Jidda
Senior Shelter Officer | Shelter Sector
ujidda@mercycorps.org

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45 SW Ankeny Street
Portland, Oregon 97204
888.842.0842
mercycorps.org
nigeria.mercycorps.org