

TBBC
SHELTER REPORT 2009

TWENTY-FIVE YEARS UNDER THATCH – WHERE TO
FROM HERE?



TABLE OF CONTENTS

1 Introduction	4
1.1 Context of consultancy	4
1.2 History of shelter provision.....	4
1.2.1 <i>Responsive to community needs</i>	5
1.2.2 <i>Camp growth</i>	5
1.2.3 <i>Shelter materials</i>	6
1.3 Dynamic operating environment	6
1.3.1 <i>Situation in Burma</i>	6
1.3.2 <i>Thai situation</i>	7
1.3.3 <i>International situation and camp churn</i>	7
2 Aims and Objectives	8
3 Executive Summary	10
4 Methodology.....	12
5 Observations	13
5.1 General construction	13
5.1.1 <i>Ethnicity</i>	13
5.1.2 <i>Construction process</i>	14
5.1.3 <i>Construction knowledge</i>	14
5.1.4 <i>Size of House</i>	14
5.2 Design quality.....	16
5.2.1 <i>Stability</i>	1
5.2.2 <i>Durability</i>	16
5.2.3 <i>Habitability</i>	17
5.3 Materials	18
5.3.1 <i>Posts and foundations</i>	18
5.3.2 <i>Roofing</i>	19
5.3.3 <i>Walls</i>	20
5.3.4 <i>Flooring</i>	21
5.3.5 <i>Fastenings</i>	21
5.4 Quantity	22
5.4.1 <i>Shelter Ration Summary</i>	23
5.5 Bamboo life cycle	26
5.5.1 <i>Current procurement, receipt and distribution process</i>	26
5.5.2 <i>Crop management</i>	26
5.5.3 <i>Age at harvest</i>	27
5.5.4 <i>Time of harvest</i>	28
5.5.5 <i>Poor harvesting and crop extraction practice</i>	29
5.5.6 <i>Species selection</i>	29
5.5.7 <i>Size</i>	30
5.5.8 <i>Leaching</i>	30
5.5.9 <i>Protective Treatment</i>	30
5.5.10 <i>Storage and Handling</i>	31
5.5.11 <i>Design</i>	31
5.5.12 <i>Construction</i>	32
5.5.13 <i>Maintenance</i>	33
5.5.14 <i>Disposal</i>	33
5.5.15 <i>written specifications for receiving of goods</i>	33
5.5.16 <i>Net positive environmental impact</i>	34
5.6 Equity	34

5.6.1	<i>Vulnerability assessment</i>	35
5.6.2	<i>New arrivals</i>	35
5.6.3	<i>Ethnic and Religious minorities</i>	36
5.7	Policy	37
5.7.1	<i>Camp Level</i>	37
5.7.2	<i>agency Level</i>	38
5.7.3	<i>Interagency level</i>	38
5.7.4	<i>Regional Government Level</i>	38
5.7.5	<i>National Government Level</i>	39
5.7.6	<i>International</i>	39
5.8	Procedures	40
5.8.1	<i>Timing</i>	40
5.8.2	<i>Supply chain management</i>	40
5.9	Settlement planning	40
5.10	Cross-cutting and related issues	42
5.10.1	<i>Environmental Impact</i>	42
5.10.2	<i>Livelihoods</i>	42
6	Recommendations	43
6.1	Immediate	43
6.1.1	<i>Procedures</i>	43
6.1.2	<i>Plastic sheeting</i>	45
6.1.3	<i>Posts & foundations</i>	47
6.2	Short- medium term	49
6.2.1	<i>Policy & Strategy</i>	50
6.2.2	<i>alter distribution system</i>	53
6.2.3	<i>Staffing</i>	54
6.3	medium - long term	55
6.3.1	<i>Best Practice Manual</i>	55
6.3.2	<i>Master carpenter training</i>	56
6.3.3	<i>Growing bamboo</i>	57
6.3.4	<i>Leaching</i>	58
6.3.5	<i>Smoking bamboo</i>	59
6.3.6	<i>Borax & Boracic acid</i>	62
6.3.7	<i>Other areas</i>	65
7	Concluding comments	66
8	Appendix	67
8.1	<i>Terms of Reference</i>	67
8.2	<i>Glossary of terms and acronyms</i>	72
8.3	<i>Common health problems and their preventive measures</i>	73
8.4	<i>'Ladder' for Durability of Bamboo</i>	76
8.5	<i>Plastic Sheet Suppliers</i>	77
8.6	<i>BAMBOO: Species, Availability and Common Usage</i>	79
8.7	<i>HARD WOOD: Species, Availability and Common Usage</i>	83
8.8	<i>CONCRETE POSTS: Availability, Size and Cost</i>	86
8.9	<i>Draft Position Description for Shelter Manager</i>	87

1 INTRODUCTION

The following report summarises the observations and recommendations of Benchmark Consulting after extensive fieldwork in the Burmese refugee camps, consultations with camp members, discussions with TBBC staff and other key informants, and review of available documentation. This report is intended to serve as the basis for further discussion by the Thai Burma Border Consortium, and in particular, for the development of a comprehensive shelter policy and ‘toolkit’ of methods for its effective implementation.

1.1 CONTEXT OF CONSULTANCY

The need for a comprehensive review of provision of shelter in the Thai-Burmese border camps had become evident in the last couple of years due to a series of interlinked factors including:

- *Constraints on funding* available to supply housing materials to camp inhabitants, as several sources of reliable funding either ended or diminished, and as competition developed between providing for shelter and other basic needs.
- Concerns being expressed in the camps by both residents and staff about the deteriorating *quality and quantity of materials* distributed, in part due to difficulties in managing and monitoring supply chain procedures.
- Increasing *inadequacy of established practice* to meet the needs of all camp residents, and especially the need to ensure *better equity* by distributing materials on a basis commensurate with needs and vulnerability, rather than uniform blanket coverage.
- Concerns around *growing house size*, and possible inequities in the *practice of selling houses* between camp dwellers.
- Increased evidence of the *negative environmental impacts* of the sourcing of some shelter materials, particularly bamboo and timber, and a desire to mitigate or reverse these as far as possible.
- Impact on the forests immediately surrounding the camps, and strongly linked to this, impact on *relations with neighbouring Thai communities*.
- Growing concern within TBBC and its affiliate organisations around the *lack of a clear policy* to guide response to these concerns.

For the above reasons, TBBC decided to commission a consultancy to examine shelter needs in depth, and to develop effective strategies to deal with them in a manner which is both sustainable and commensurate with TBBC’s principles and resources. While there are some variations between camps, the key issues are common to all camps along the border.

Objectives were initially set as investigating the following:

1. Alternatives to and options within current building materials.
2. Treatment options for bamboo to ensure longer life span.
3. Needs assessment for vulnerable groups.
4. Legal aspects of outsourcing materials.
5. Camp-specific recommendations for shelter provision.

1.2 HISTORY OF SHELTER PROVISION

TBBC has been providing food, shelter and non-food items (NFIs) to Burmese refugees along the Thai-Burmese border since 1984. The earliest focus was largely on Karen and Karenni communities, but this has

since diversified to cover the full range of refugee communities from Burma, in a range of locations along the border.

1.2.1 RESPONSIVE TO COMMUNITY NEEDS

A separate shelter policy and practice standards were not necessary at the outset, as camp communities collaborated along similar lines to their previous practice in rural villages to cooperatively build houses with familiar and readily available materials. TBBC's initial role was responsive in meeting the needs expressed to them by camp communities. The standard housing designs used were similar to those built in villages inside Burma, and the quantities for the supply of bamboo and other building materials were based around this through requests from the camp committees. Hence the distribution of shelter materials has been done as one of several NFIs, rather than in the framework of a distinct shelter strategy.

This 'hands off' approach has had both advantages and disadvantages:

The advantages include:

- Organic, community-determined development of the camps, using familiar styles of vernacular construction.
- A high level of internal camp shelter economy as materials and labour are traded or bartered, leading to a more normal means of distribution and exchange than with food or standard NFIs.
- High degree of family and community autonomy in constructing and maintaining shelter.
- Overall quite competent management of resources and designs by camp committees; residents' control constitute a level of real empowerment.

The main disadvantages include:

- The difficulty for TBBC as the coordinating body to control a whole range of shelter-related issues, including quality of construction and minimum standards of house design.
- Settlement planning has also been outside TBBC's management, with some negative consequences now becoming apparent.
- TBBC staff have in general felt out of their depth and lacking empowerment to deal with what are very complex issues, which are becoming more complex as time goes on.
- This role has left TBBC with low awareness of shelter-related issues, and little participation in the learning across the global shelter sector. This in turn potentially deprives camp residents of benefits from shared learning and sectoral awareness.

1.2.2 CAMP GROWTH

Camps have grown a lot and evolved greatly over the time TBBC has been involved. This has meant an ever-growing shelter need. This has caused a range of issues to be exacerbated including:

- Ever-increasing local environmental impact.
- Increasing density of population and housing in highly contained camps.
- Increasing reliance on a limited number of supply contractors.
- Increasing pressure on a limited resource that has low overall resource management in the local and national contexts.

1.2.3 SHELTER MATERIALS

Initially, supplies of bamboo, thatch and other building materials were relatively abundant and easily available locally. Progressively, however, decreasing supplies of bamboo and timber alongside increasing prices have led to restrictions in availability, as well as perceived decrease in quality. This in turn means that houses have not lasted as long, which has further boosted demand for scarce supplies. The logistical challenges of a complex supply chain have presented further challenges.

At the same time, funding for TBBC reached a plateau, which affected shelter material supply in particular as it was perceived as being more able to tolerate cuts than food, water or healthcare. Recent cost-cutting measures for shelter materials has been reactive, based more on the need to fit shelter rations to the available budget rather than on a balanced assessment of shelter needs and best strategies to optimise shelter supplies.

1.3 DYNAMIC OPERATING ENVIRONMENT

TBBC continues to operate in a rapidly evolving and highly dynamic environment. This stands in direct contrast to common external perceptions of the Thai-Burma border as a stagnant situation with no hope of a political solution. TBBC appears to be dealing well with this rapidly changing environment, but the situation is placing huge strains on camp leadership and overall camp management. On the other hand, the external perception, even among supporters, of a continuing and persistent need is creating fatigue amongst donors, and generating political interest in an in-country solution. Both the UN and the Thai government appear to have reached a stand-off with the refugees by ignoring the ongoing situation in the hope it will go away. This leaves little political will at the level of national government or UN for addressing changing shelter needs or emerging shelter issues.

1.3.1 SITUATION IN BURMA

The situation inside Burma continues to push large numbers of people to seek refuge across the country's borders. Despite a steady process of third-country resettlement of long-standing camp residents, the camps' population continues to increase, due both to the natural birth rate as well as to new arrivals from within Burma.

Particularly significant factors include the continued militarisation of the regime and moves by the armed forces into areas of eastern Burma to accelerate natural resource exploitation. This is done at the expense of the human rights of the local populations, which are from several different ethnic groups.

Whilst there are increases in the numbers of refugees from ethnic groups traditionally represented in the camps, the spread of military abuses, including practices associated with the response to Cyclone Nargis in the Irrawaddy Delta, have caused an influx of new arrivals from other ethnic groups which have not historically been part of the flow of refugees. The camp populations now include members of nearly all ethnic groups within Burma.

Ineffective international measures against the Burmese junta, and the strong backing provided by China and others, means that no early end is in sight to the humanitarian situation as it now stands. The inflow of refugees to the camps will continue, despite efforts by both Burmese and Thai military to stop or restrict the flow. This has obvious implications for shelter needs, as a growing camp population needs to be catered for at a time when funding is static or diminishing.

1.3.2 THAI SITUATION

The Royal Thai Government's (RTG) attitude to the refugee population is ambivalent: on the one hand, offering asylum, and on the other, seeking to reduce 'pull' factors by requiring refugees to be confined to camps, not allowing 'permanent' housing to be constructed within the camps, nor allowing more regular economic activity which might reduce donor dependence. Domestic politics also directly affect the RTG's response to refugees; most dramatically, with the towing out to sea of some Rohingya boat people, and get-tough measures on undocumented Burmese workers, many of whom are in fact refugees. At the same time, the RTG has assented to the screening of camp residents for third-country resettlement.

Domestic policy on forest resource management has also changed since TBBC began operations, with increasingly tight controls on forest cutting as the impacts of environmental devastation (mainly by commercial loggers) have become obvious. One of the largest impacts has been restriction of supply to poor communities for which forest products are the only affordable building material – camp populations are among these.

The instability of the national government in Thailand has resulted in a challenging policy environment for TBBC's work into the future, as government policy remains uncertain, and refugees are an obvious scapegoat in times of stress.

1.3.3 INTERNATIONAL SITUATION AND CAMP CHURN

After 25 years of displacement, and with a number of competing humanitarian crises worldwide, the Thai-Burma border also suffers from some 'donor fatigue'; while the humanitarian need is no less, it is becoming increasingly difficult to raise the funds to cover basic necessary rations. As is noted above, this has tended to have a greater impact on shelter provision more than other basic supplies.

The US government recently decided to accept as prima facie eligible for resettlement all of those in the camps who had been screened in as bona fide refugees. In the last year, over 17,000 camp residents were resettled abroad. The impacts of this on the shelter situation include:

- UNHCR ceasing to register new arrivals for resettlement, causing a growing difference between official and unofficial figures.
- Increasing diversity of camp populations, with some fragmentation of the organic social networks which previously provided some safeguards for the more vulnerable families and individuals. Language differences can also make communication difficult.
- A growing sense of inequity and status differentiation between those deemed eligible for resettlement and those not, further fragmenting community cohesion.
- An unofficial market in housing, as dwellings are vacated by those chosen for resettlement.
- 'Brain-drain' from the camps, as those with clear skills are picked first for resettlement, leaving fewer competent local organisers and managers in place.

Despite ongoing resettlement, the net effect is still of increasing camp populations, and increasing diversity of communities within them, as new arrivals from around Burma enter camps previously dominated by ethnic groups from eastern Burma.

2 AIMS AND OBJECTIVES

Benchmark aims to provide guidance for development of shelter policy and strategy, focused on the following key areas:

Quality

- Are shelter materials provided of a sufficient *quality* for the intended purpose?
- Do they have sufficient *durability*?
- Is it possible to *improve* durability and/or quality?
- Is there any clear *benefit* of doing so, in terms of either quality of life, reduced environmental impact or financial cost benefit?

Quantity

Benchmark will provide some analysis of quantity of materials supplied, both as an overall figure and on a per household basis, including recent trends in rations and their implications. Linked to this are tentative indicators of what proportion of responsibility TBBC should take for overall quantity provision on a material-by-material basis.

Equity

Some guidance is offered on current shelter-based equity issues in the camps. Key equity issues as relayed by TBBC staff at the start of the contract appear to be:

- The need for vulnerability-based distribution, particularly with potential diminishing funding sources due to the global recession.
- Unequal access to market benefits of house buying and selling.
- The current informal shelter economy, which offers unequal benefits to those able to participate.
- Identifying whether the most vulnerable are being sufficiently assisted, in terms of both quantity of supplies, and resources for construction.
- Variations in house size between better- and worse-resourced residents.

Cost-benefit

One of the key criteria for any form of cost-benefit analysis is knowing the desired usable life of the item being evaluated. Currently, there is no clear timeline for how long the border camps will need or be allowed to keep operating. International shelter guidelines for humanitarian 'temporary settlement' tend to talk in terms of 18 to 24 months' life expectancy for both materials and structures.

Camps are generally achieving this, but in reality, the situation has been going on for over 20 years, with no clear end yet in sight. A better minimum design criterion for materials would be 5 years, with a realistic expectation that it may be at least 10 years before the situation is resolved.

Given high mobility through resettlement and Thai government regulations on houses being decommissioned and deconstructed prior to space being allocated to new tenants, buildings also need to be designed for deconstruction and reconstruction; all materials and fastenings need to be considered in this light.

Policy and procedures

Benchmark sets out here to provide advice and guidance on general policy guidelines for TBBC targeted to the above four key issues, looking at improving both procedures and standard practice, informal and formal, within the organisation and within the camps.

3 EXECUTIVE SUMMARY

Benchmark Consulting was commissioned to advise TBBC on the standard of shelter across the Thai Burmese border camps, with particular emphasis on both the quality and quantity of materials being distributed by TBBC, and the standard and equity of shelter that has resulted from the support provided. The broadness of the brief and the full access and support provided by TBBC has allowed a comprehensive overview of shelter and settlement within the camps.

Although the standard of shelter that TBBC can provide is heavily restricted both by government regulations and funding limitations, it is in general well above applicable global standards. The average family within the camps has more than adequate space for their day-to-day activities, adequate access to privacy and an admirably high degree of self-determination about the size, shape and quality of their home.

Shelters are constructed using materials and methods that are familiar to the residents. Top-up materials and labour are generally available from a healthy shelter economy that exists both within and around the camps. Vulnerable members of the community are generally supported by the strong community structures that exist within Karen and Karenni society and insofar as the Benchmark team was able to detect, corruption levels within the camps appear generally negligible.

With the above as a positive background, there are some areas in clear need of improvement. Although shelter is generally of an adequate standard, some sections or individuals within the community appear to be falling through gaps in both the informal and formal social safety nets. Additionally, there are many opportunities for improving the efficiency and quality of shelter provision and through this reducing both the shelter stress within TBBC and the affected community, as well as potentially reducing costs and environmental impact, whilst also creating a range of livelihoods opportunities.

Shelter provision by TBBC has emerged as a response to requests for assistance with materials by camp residents through the Karen and Karenni associations. This historical reality has resulted in shelter being dealt with primarily as a classic “NFI” distribution - just one part of the provision of food and other daily needs conducted by TBBC. When shelter is dealt with only as an NFI, many issues that are normally considered the responsibility of the shelter sector and its professionals are easily overlooked. This would appear to have been the case in the Thai border camps.

In general, the issues that have been most overlooked have been the cross-cutting or overview issues within the shelter domain. These issues easily fall off the primary agenda when no specific persons have been designated responsibility to ensure that they are addressed. This includes such issues as settlement planning, shelter livelihood opportunities, and the points of interaction between shelter, protection, WASH and gender issues. The results of this oversight can be seen in issues such as recurrent landslides, pollution of water sources, inadequate vector control and low quality alongside increased shelter stress in women-headed and other especially vulnerable households.

Without dedicated shelter staff, material supply and the tender process has been largely driven by funding rounds and perennial access restrictions due to the monsoon season, and less by the natural cycles of material availability. This slightly out-of-sync tender cycle puts undue pressure on both communities and suppliers, resulting in potentially higher prices, lower quality and quantity availability issues.

On the other side of the equation, it became apparent to the team that some relatively small changes in procedure and structure could quite rapidly deliver major improvements in shelter quality within TBBC’s current resource constraints, and reduce shelter stress within the camp communities. To ensure the best

possible outcomes for residents, TBBC also needs to undertake development of clear shelter policy, and improve performance in several areas.

To support the implementation of the recommendations of this report, they are broken into 3 sections: those that can be carried out immediately with little increase in resources or staffing, those requiring dedicated funds or staffing, and recommendations that should be seen as potential 'projects' requiring both dedicated funding and staff and requiring piloting prior to expansion.

All recommendations are targeted at improving shelter security within the camps, but also of potentially reducing the quantity of material needed for supply by increasing its quality and durability.

Key recommendations include:

- Implementation of a process to define and clarify shelter policies within the camps, and within TBBC.
- The hiring of dedicated shelter staff to implement internal and external shelter policy as well as pilot projects.
- The defining of minimum standards for shelter provision based on adequacy of shelter guidelines and vulnerability criteria.
- The introduction of vulnerability-based materials distribution as a complement to existing materials distribution.
- Re-tuning tender processes to match natural availability cycles of shelter materials.
- Changes to material supply for foundations.
- Improvements in the way that bamboo is dealt with as a resource, from harvest through to disposal.
- The development of training programs to improve base construction skills across the camp.
- Documenting and disseminating best practice within the camps along with areas for improvement based on international knowledge.
- The trialing of a range of projects to improve the quality of roofing and framing materials,

Benchmark is ready to proceed further in developing specific advice and guidelines on the different measures suggested in this report, in accordance with TBBC's consideration of and reaction to this initial draft.

4 METHODOLOGY

Process for researching and developing this report included the following elements. Given the size and geographic dispersal of the Benchmark team, the order was not strictly sequential, with some field- and desk-based research being run in parallel:

- After commissioning of Benchmark Consulting, several team members undertook the desk review of relevant documentation as provided by TBBC, as well as of relevant documentation on bamboo construction, and issues relating to the current circumstances in Thailand.
- It is important to note that Benchmark was commissioned by TBBC on the basis of its members' and associates' substantial pre-existing knowledge and experience of shelter provision in humanitarian contexts, particularly with relation to bamboo construction.
- An initial round of field visits to several camps was undertaken by Wan Sophonpanich, the Thailand-based construction adviser, to Ban Mai Nai Soi (Site 1), Mae Rama Luang, Mae La Oon, Mae La and Umpiam Mai camps in March 2009, with immediate circulation of her field observations reports to other team members.
- A comprehensive visit to Tham Hin, Don Yang, Mae La, Umpiam Mai and Mae Ra Ma Luang camps, as well as to TBBC's Mae Sot and Bangkok offices was undertaken by four Benchmark team members from 4-15 May 2009. This field work included direct surveys of housing conditions onsite, discussions with an estimated five families of residents per camp, more formal discussions with camp committee members, and discussions with suppliers and NGO workers.
- The visits to the camps were followed by a workshop discussion with TBBC staff in Bangkok, in which the Benchmark team members presented their initial findings for feedback.
- At this point, a variation to the Key Deliverables stipulated in the original ToR (see Attachment 1) was discussed and agreed on with TBBC: rather than Benchmark directly determining a shelter policy and toolkit, it was decided that guidance in the form of a comprehensive field report would be more effective. This would then be reviewed and discussed by TBBC, and a revised version would be used as the matrix from which the policy and toolkit would later be developed.
- Subsequent to the field visit and discussions in Bangkok, Benchmark team members have shared field notes on aspects of the research for which they individually took responsibility. The first draft report was based on this; and then circulated to TBBC staff for comment.
- On the basis of comments from several TBBC staff, dialogue on this, and provision of further information requested, the final draft as stands here has been prepared.

5 OBSERVATIONS

5.1 GENERAL CONSTRUCTION

The style of house built is similar to those that the inhabitants built in Burma, with regional and ethnic variations, although the houses are generally smaller. Whereas in Burma, the space under a house would usually be open to the air; in the camps, this area is often enclosed between the poles to allow for a larger living or working space with the smaller ground area. In Burma, a house would usually have a small adjacent vegetable patch; in the camps this space is often sacrificed for new houses, or for extensions to existing ones.

There is a lot of variation in housing style and decoration across each camp, reflecting individual, as well as ethnic, preference and style, and a healthy freedom to follow these. This also reflects differing levels of prosperity. Although both larger and smaller houses do exist across the camps, the vast majority of families are housed to a standard well above the minimum shelter requirements as accepted by the humanitarian shelter sector. Disparity in house size, whilst perhaps not precisely equitable, is a result of the diversity in wealth and capacity apparent in any healthy society. A healthy trade exists throughout the camp in bartering of excess material supplies, with some families choosing a smaller domicile and selling on extra materials to allocate this precious financial resource to other basic needs, whilst others with a higher financial capacity and space have purchased additional materials and built larger homes.

5.1.1 ETHNICITY

Ethnicity is both an indicator of diversity in housing style and quality, and also a possible marker of vulnerability within camps.

Size and type of housing is influenced by ethnic and regional traditions, which in turn are usually informed by the immediate circumstances of their area of origin. Some broad differences observed by the team and corroborated by experienced informants included:

- Karen people appear to maximize the size of their house, and if further land and building materials are available, will extend further.
- Karenni people appear to have smaller family units, as newlyweds will often move out of their parents' homes, keeping house sizes small.
- Mon houses appear to be smaller, but with overall closer attention to construction technique, and better durability.
- The Nepalese-Burmese appear mainly from Yangon, and like other former urban dwellers, arrived in the camps with few or no construction skills suitable to building with bamboo in a rural environment.
- Rohingya/Muslim communities appear to have less obviously planned settlement, but houses show a greater degree of decoration and attention to detail, and generally sounder construction.

In all cases, however, there is a tendency for those outside the dominant ethnic communities of the camps (generally Karen or Karenni) to have less access to shelter materials, and one determinant of this seems to be language. Most residents of smaller ethnic groups who were interviewed were aware of where and how decisions on shelter materials were made in the camp committees, but as they had no ability to communicate in the language in which meetings were conducted, their leverage in accessing materials was less. Other ethnicity-related access factors include the fact that the Karen and Karenni communities have had twenty years continuity in the camps, and so an internalised knowledge of 'camp history' and political

functions. Smaller ethnic groups have generally arrived more recently, and so are not as familiar with camp systems and culture. A range of other factors also feed into this, but tackling the issue of language as means of access seems to be an imperative to begin with.

5.1.2 CONSTRUCTION PROCESS

While annual rations insufficient to rebuild a house, building materials are often ‘banked’ within the community, with those houses in most need of rebuilding utilising the allocation of houses for which rebuilding is less urgent, and repaying it from the following year’s allocation. Labour is exchanged from one family to another, with a house taking around 10-20 labour days to complete, often in a 1 or 2 day blitz as neighbors and extended family chip in together, whilst the homeowners supply sustenance and contribute to their capacity.

5.1.3 CONSTRUCTION KNOWLEDGE

In Burma, as in the camps, the most common practice is for people to build their own homes with help from friends and relatives; it is not regarded as a specialist skill, and usually, no payment is required for those who help, although normally food would be provided for those who help during the construction. The general perception that “everyone can build a house” is basically true, in that nearly all families appear to have some basic understanding of bamboo construction, and the strong social ties of the extended family and social networks fill in most of the remaining gaps to a passable level. The results of this, however, do cover a wide range of quality in house construction, even between adjacent members of the same community.

The rural/urban divide is an important indicator of construction ability, but within ethnic or regional groups, there was also wide variation of the degree of background knowledge that residents brought to construction. The team put several leading questions to a range of respondents to check their knowledge of factors such as bamboo strength, harvesting, treatment etc., and there was a wide range of responses between those of otherwise similar background. This was also reflected in the variation in quality of housing observed between close neighbours, from durable construction with bamboo culms carefully sawn off and some attempt at bracing, to untidy buildings with roughly hacked-off ends of bamboo and clear instability. The principle that “everybody can build a house” holds true, but not *everybody can build a safe and durable house*.

5.1.4 SIZE OF HOUSE

There is great variation in house sizes within camps and between camps. House size is an indicator of relative wealth, power and vulnerability, but this measure also intersects with the following factors:

Ethnicity

As is noted above, Karen residents will usually build a house as big as land and materials allow, and extend further when opportunity presents. The Mon, by contrast, will tend to build smaller houses, with greater care to construction and finishing standards. There are other characteristics observable with different groups; in all cases, these need to be factored in when developing agreements on what size of shelter rations are actually needed and justified.

Religion is not in itself an indicator, but is a proxy for ethnicity, with most Muslims being ethnically as well as religiously distinct.

New arrivals

It is clearly observable that new arrivals, on average, have smaller and worse-built houses. New arrival status does in itself probably constitute an indicator of vulnerability, given the slowness of registration and eligibility for rations. There is a perception within the camps that some new arrivals who have previously been working as undocumented immigrants in Thailand are actually relatively wealthy, as they may have saved cash from their earnings; this militates against their getting equitable shares in rations once in the camps. In fact, although some may arrive with some cash in hand, the wages they are likely to have earned in the Thai informal sector will usually have left a very low margin for saving. As some Burmese immigrants work in the most dangerous occupations in Thailand, some will have had their health undermined through exposure to disease and hazardous chemicals. Some will have come to the camps without families or community ties, which will render them less able to have access to shelter rations or to call on established networks for assistance in construction. This does have to be balanced against TBBC's current Eligibility Criteria, which stipulate that new arrivals are eligible if they are fleeing conflict or human rights abuse in Burma. Flexibility should continue to be exercised where migrants who originally fled conflict or abuses had spent some time working in Thailand before coming to the camps; but across-the-board parity in shelter rations may add to camps' facilities acting as a 'pull factor' for those coming from non-conflict areas.

Given the great diversity of new arrivals in terms of background; immediate reasons for arriving in the camps; and resources in hand, it is likely to remain a continuing challenge for both TBBC and the camp committees to ensure equitable judgment and distribution of shelter rations, and especially if these continue to be constrained. However, in Benchmark's view, the right to adequate shelter for all needs to remain a core guiding principle – even allowing for the difficulties in interpreting and applying this in all situations.

Wealth and power

These are clearly very relative terms in what remains a subsistence economy in the camps. However, some relatively high-status people, usually from long-established groups, do demonstrably have greater material assets such as jewellery, cash and electronic equipment, and in nearly all cases, much larger houses than the camp average. Many of these are also camp committee members.

It needs to be stressed that all these variations occur in a situation where housing is on average of larger size and better standard than stipulated under Sphere and UNHCR minimums. On the other hand, it also needs to be noted that these standards are set for settlements where people are expected to live no more than 2 years, rather than the 20-plus years of many border camp residents.

Furthermore, variation is not necessarily a bad thing; in the case of the border camps, it seems to reflect a much more normal society and economy than that of most refugee settlements, with strong maintenance of cultural traditions and community norms. Residents frequently do have a strong sense of ownership of their homes, and critically, do see these as homes of their own making, rather than standard units provided by TBBC. Where expansion above the standard ration provision has taken place, it has been through residents' own efforts and resourcefulness – though it is acknowledged that many residents, through no lack of their own initiative, are restricted to the shelter which can be built just from the standard ration. Variation is also linked to particular local conditions. In camps located in colder or wetter areas, houses tend to be larger to provide more storage space for blankets, and to provide more indoor living space than is needed in warmer and dryer areas.

That TBBC's shelter practice has been able to accommodate these positive differences is evidence of its strong community-driven nature, and reflection of a healthier society than is normally the case for long-term displaced settlements. Where variation indicates potential vulnerability, however, it does need to be seen as a tool for better identification and addressing of this.

5.2 DESIGN QUALITY

The overall design quality of the houses appears generally adequate; the structures are based around design principles that Burmese and Thai communities have been using for thousands of years. However, limitation in quality and availability of materials has impacted on both quality and size of structures, as has constraints on land availability.

There are three main aspects of structural design quality relevant to construction in the camps, stability, durability and habitability as discussed below:

5.2.1 STABILITY

Unfortunately, this is an aspect of construction that appears sorely undervalued in Thai/Burmese housing design. Bracing has not been part of traditional building practices in any of the areas from which camp residents originate. This may be due to the semi-nomadic lifestyle of traditional communities in these areas that involved moving house location fairly regularly, in intervals as low as annually and as great as 20-30 years. The additional impact of high rainfall and political volatility has brought about a level of mobility that appears to have predicated against the development of sound structural practice.

Many of the practices common throughout the Burmese delta region and southern Bangladesh appear to have extended as far as the Thai border, with structure design similar to a parallelogram, such that they easily flatten and can be rapidly re-erected upon collapse.



House collapsing in the new arrival section of Umpiem Mai

5.2.2 DURABILITY

Components of houses are subject to greater wear and tear because of the lack of bracing, which in turn impacts on durability. This is the key issue that arises in all aspects of shelter. The average life-expectancy of a camp house is currently around 3 years. As is mentioned above and explored further below, the main constraint is the quality and life expectancy of bamboo. Small procedural changes could greatly improve this. (See Attachment 4 for the diagrammatic bamboo "Ladder of Durability")

Another factor, however, is the rapid deterioration in roofing due to high winds (notably in Umpiem Mai), coupled with sub-standard quality of thatch. Residents interviewed felt that they could produce better and more durable thatching panels, with access to the right raw materials.

5.2.3 HABITABILITY

Habitability measures well against basic Sphere standards (reference). In nearly all cases, camp residents have more than the 3.5 square metres of covered living space per person as stipulated by Sphere, and even the 4.5 square metres indicated in the transitional shelter guidelines such as those used by UNHCR (reference). At approximately 18,000 persons per square kilometre, overall camp population density is well inside the Sphere recommendation of 22,000 persons per square kilometre.

However within this, there are some points of concern. Firstly, there are no means of ensuring minimum house size, and some families currently have as little as a single-room dwelling of 7 – 9 square metres to house all members. There needs to be a camp-wide process of developing an indicator to address this, in which Sphere standards may be taken as a starting point but not necessarily as the final word, particularly as they refer to temporary settlement whereas some existing houses are 20 years old.

Secondly, chimneys and arrangements for smoke evacuation are often poor; many dwellings showed evidence of heavy smoking to roof, thatch and rafters, which is a possible indicator of dense smoke inside the house, and attendant respiratory problems.

Twelve qualities which contribute to habitability are: weatherproofing, temperature, ventilation, light, privacy, space, cooking, water and sanitation, vector control, safety (including fire and toxicity), security (personal and possessions), and structural integrity. The current status of habitability of shelters in the camps is listed in the table below.

See attached table in appendix on habitability guidelines.



Substandard housing in new arrivals area of Umpiem Mai

5.3 MATERIALS

5.3.1 POSTS AND FOUNDATIONS

Throughout out all of the camps foundations are constructed through the use of separated foundation posts embedded into the ground 50-100cm. There is no apparent use of strip or pad footings; foundation posts are made from four common materials, bamboo or eucalyptus as supplied by TBBC or scavenged hardwood and as in the case of most public buildings steel reinforced concrete posts (in order of durability).

BAMBOO FOUNDATIONS



EUCALLYPTUS FOUNDATIONS



HARDWOOD FOUNDATIONS



REINFORCED CONCRETE FOUNDATIONS



<p>Source: TBBC or surrounding forest</p>	<p>Source : TBBC;</p>	<p>Source: Neighbouring Thai villages; left over from old settlements</p>	<p>Source: Urban Markets or self made from products in neighboring villages</p>
<p>Durability: 12-18months</p>	<p>Durability 1-3 years</p>	<p>Durability: 5-15 years (possibly 20 depending on species)</p>	<p>Durability 20 years plus, reusable</p>

Whilst Bamboo and Eucalyptus are a suitably durable material for above ground post and beam construction, both clearly suffer from rot and pest infestation when used as foundation posts, with degradation of foundation posts expressed as a major concern by many residents. Concrete foundations posts are clearly the most durable solution, whilst the durability of self-supplied hardwood timbers depended greatly on the age and specific durability of the selected species.

As well as rotting or degrading themselves, bamboo and eucalyptus posts in direct contact with the ground also allow for unobservable and therefore unpreventable access by termites into the rest of the structure, reducing the overall life expectancy of the buildings.

Some attempts at increasing the durability of the foundation posts were observed. These included base treatment with used sump oil, or encasing posts in a plastic bag prior to immersion in the ground. Both of these solutions offer very limited additional protection: the trapping of rain water running down the posts

in plastic bag-encased footings may in some cases actually increase rates of degradation, whilst sump oil treatment of posts, creates a very minimalistic barrier that termites can easily penetrate through sacrificing initial members of the leading party of an infestation. The only advantage of this treatment may be in encouraging termites to look elsewhere, i.e. the neighbour's house.

5.3.2 ROOFING

Roofing across the camps is largely comprised of grass or leaf thatching, with the exception of Tham Hin, where natural materials have been banned for roofing due to a perceived increased fire risk caused by overcrowding. This combined with ban on more appropriate permanent materials CGI or roof tiles has resulted in the ongoing use of plastic sheeting in that one camp. In a number of camps, CGI sheeting has been authorized for communal buildings and is in some cases overlooked on some homes.

PLASTIC SHEETING	GRASS THATCH	LEAF THATCH	CORRUGATED IRON
			
Source: TBBC with some top up from local markets	Source : TBBC or self gathered	Source: TBBC or self gathered	Source: local markets or recycled from community buildings
Durability: 12-18months	Durability 1-3 years	Durability: 1 – 2 years	Durability 20 years plus, reusable

Grass Thatch

This is currently used in southern camps where leaves are not available, as well as being used by choice in Umpiem Mai camp as the tighter-woven grass thatch is thought to be more resilient to the high winds which are common in the area.

Leaf

There are a number of issues with the quality of the ready-made leaf thatching provided by TBBC. The leaf is normally delivered to the camps in packs of 50 sheets, within which several may not be up to standard, but the bulk-pack system makes monitoring and quality control very difficult.

Camp residents interviewed felt they could make better quality thatch themselves. Where access to forest is possible, it is common for residents to go out in February or March to collect leaves to make their own thatch. However, issues of control and ownership of forest, permission to cross camp boundaries and local

villagers' rights over resources, mean this is not universally possible, and not sufficient to meet all thatching needs. Transport difficulties also make it impractical to deliver raw leaves for on-site weaving.

Home-made thatching is more durable, as it uses a higher number of leaves per panel. The spine, rope and sometimes the leaves are commonly smoked. Several camp residents routinely do this for their own use, but there was little evidence of trade in camp-made thatching.

If possible, shifting more of the production of thatch panels to within the camps could have a significant positive impact on roof quality and durability.

5.3.3 WALLS

Woven vs. flattened bamboo walls

Walls in all camps are most commonly constructed from flattened bamboo segments fastened in alignment. In some cases woven panels are used, more commonly in what appear to be the homes of wealthier families, shops, or in particular cultural groups such as the Muslim communities where higher use of pattern is visible in construction. The make-up of woven sheets varies significantly both in thickness and the use of the inner or outer skin of the bamboo, therefore varying in the extent of protection they offer. They are also subject to the similar factors in degradation – insect infestation, basic strength of fibre, weather exposure – as bamboo materials in other points of house construction. Woven sheets offer far superior protection from wind and rain.

Protection

A common practice in some areas is to paint wall panels with used sump oil or with a special red oil product, providing a relatively low level of protection against insect pests. Where water sources are available some residents leach the sweet sap from flattened panels prior to use by soaking in water for several days, thereby making the bamboo far less attractive to insects.

FLATTENED SHEETING

WOVEN SHEETING

	
<p>Source: Bamboo from TBBC or self gathered, community production</p>	<p>Source : Bamboo from TBBC or self gathered, community production</p>
<p>Durability: 1-3 years, depending on protection from weather and quality of bamboo</p>	<p>Durability 1-3 years as per flattened sheets, 3-5 years if outer skin only, may be longer of treated. More wind and rain resistant</p>

5.3.4 FLOORING

Flooring throughout the camps consists largely of flattened bamboo sheeting as used for walling. Where families have access to forest resources, appropriate species are selected for their width and strength, otherwise TBBC supplied bamboo is utilized. In multiple story construction, many families also use earth floors for the lower floor, where possible applying a thin cement render to improve performance.

Kitchens

A common hygienic practice across most camps is to wash down kitchen floors daily, resulting much more rapid deterioration of floors in kitchen areas. Some families choose to use whole bamboo culms for the kitchen floor and other high traffic areas such as entrance ways. This has implications for the required ration of bamboo.

Leaching

As with wall materials, leaching of flooring materials is common practice where sufficient water is available. However this is generally carried out as a reactive measure: once the bamboo culms have been split and flattened, the sheets are laid out to dry, and if they are visibly attacked by insects in the first hour or two, then the bamboo may be leached in a river or stream. Leaching might take up to 10 days.

FLATTENED SHEET FLOORING	FULL CULM FLOORING	EARTH OR CEMENT SKREED FLOORING
		
<p>Source: Bamboo from TBBC or self gathered, community production</p>	<p>Source: Bamboo from TBBC or self gathered, community production</p>	<p>Source : Material gathered by community</p>
<p>Durability: 1-3 years, depending largely on species, and quality and or leaching</p>	<p>Durability: 1-3 years, though much more durable in high wear areas than flattened sheeting</p>	<p>Durability indefinite – Cement screed floors and advantage in wet season</p>

5.3.5 FASTENINGS

Across all camps the quality of fastenings used in construction varied greatly. This was one of the few areas where there was almost no consistency and commonly quite a low standard. The highest standard commonly used product was homemade bamboo string.

Common fastening materials that should be considered below standard include:

- Recycled mosquito netting, torn into strips and used as binding string on bamboo joints.
- Extremely low quality plastic 'string' that is commonly used across Asia.

- Any other string of every shape, size and colour.
- Light gauge ungalvanised wire.
- Nails, varying from large nails purportedly supplied by TBBC, connecting eucalyptus beams and posts, to small nails attaching and joining bamboo elements.
- Wooden or bamboo dowels.
- Bamboo strip string, the highest quality of which is made from the skin of the bamboo, leached and smoked prior to use.

Whilst showing great innovation, this broad variety of materials is certainly impacting on the stability and durability of structures.

The more insecure a joint becomes the more force loads on the joint are increased due to momentum, greatly increasing the probability of joint failure and potential collapse of the structure.

NAILS



MOSQUITO NETTING



BAMBOO STRING



LOW GRADE STRING



5.4 QUANTITY

Material supplied by TBBC

The volume and exact make-up of each camp's shelter package is generally consistent, though there are some minor variations at the discretion of field managers. For example, in a particular year a field office may decide to distribute more or less roofing, nails or perhaps string.

The quantity chosen for distribution appears to have been originally based on a simple house design and the materials needed to build it. In reality, current distribution quantities are more determined by TBBC's funding capacity than by a direct measurement of need, with minimum plausible levels and exact materials breakdown negotiated with Camp Committees largely within those perceived budgetary constraints. This leaves both TBBC and Camp Committees concerned about adequacy of materials supplied, whilst leaving most residents with the task of funding or finding 'top-up' materials within their limited capacity.

Sufficient quantities

The quantity of bamboo supplied by TBBC appears to be more or less sufficient. This is in part due to a lively economy existing within the camps, as well as pooling of resources.

A healthy economy exists within the camps of barter and buying and selling of bamboo. In most camps, some extra material was available from outside, either by direct harvesting or for purchase from nearby Thai villages. Although perhaps not strictly allowed – and in fact exposing those who infringe to abuse, exploitation and sanctions up to deportation - these transactions form an important part of the normalisation of life that occurs through a healthy economic sector rather than total aid dependency.

In most cases, families spoke of pooling the bamboo rations that they did not immediately require so that one family in three could undertake a total rebuild each year. Presuming that this is a fairly standard practice, and taking into account top-ups from outside, it would appear that TBBC bamboo is lasting around 2-3 years.

Setting aside the natural tendency of any recipient (or in fact of any of us) to wish for ‘more’, camp residents interviewed did not express much discontent about the volume of timber or bamboo being supplied, but rather the variable quality (although reluctance to complain about what is known to be a humanitarian donation could be a significant factor in this). The average home size across the camps was generally well above Sphere or UNHCR standards, and expressed needs for more materials need to be balanced against this. When questioned, most residents indicated that their house was small but adequate, complaining more about the amount of land they were allocated. Process for this has in fact been fairly consensual, with earlier arrivals having staked out their own plots, and subsequent divisions and encroachments usually being agreed between neighbours, as total available land is limited by camp boundaries. Most residents indicated their home was not much different to that back in the village, some stating it was the same, or down to half the size.

The only residents who strongly expressed a need for larger homes were those in the new arrival areas. There can be no doubt that these residents appear to be the rare exception in terms of adequacy of shelter., with many living in well below-standard conditions. However this is more an indicator of the problems in registration than in distribution size, as these residents are largely not registered yet and therefore not receiving TBBC shelter assistance.

In general it was clear that the average house size that camp communities were achieving with the assistance of TBBC, was much larger than that of most refugee camps. The subject of ever-increasing house size seemed to be a key issue for TBBC staff, though it was not raised with the consultants by camp residents. Staff concern seems largely around the ‘fairness’ of distribution and the targeting of the most vulnerable.

Many residents did however complain about the quantity and quality of roofing materials supplied, though this may well be the case no matter how much is distributed.

Overall, Benchmark’s assessment is that, while there are some issues around equity of distribution, improving durability is the key means to ensure greater security and improved effectiveness of provision. Better durability could in fact reduce total supply needs. The means to achieve this should be pursued in ways which remain participatory, and continue to support low aid dependency.

5.4.1 SHELTER RATION SUMMARY

The following table represents the official standard shelter ration applied by TBBC. However, in the principle of supporting community management, there are some variations between actual distributions within camps, as local camp committees are empowered to allocate according to perceived local needs and circumstances:

TBBC Building Supply Rations (2005)

Item	Size	Specification	New House		Replacement House		Annual Repairs	
			Standard 1-5 people	Large >5 people	Standard 1-5 people	Large >5 people	Standard 1-5 people	Large >5 people
Bamboo	Small Large or Standard	3" x >6m 4" x >6m	250	350	125	175	25 25 or 50	35 40 or 75
Eucalyptus	Small Large	4" x 6m 5" x 6m	4 8	6 12	4 8	6 12		
Roofing	Leaves Grass		350 250	450 350	175 125	225 175	160 80	300 150
Nails	5" 4" 3"		1kg 1kg 1kg	2kg 2kg 2kg				

Bamboo and eucalyptus – circumference measured in inches, length measured in metres

Some variations as noted camp-by-camp and reasons for these are as follows:

Mae Hong Sorn office

Site 1

Category	No. of people	Eucalyptus poles	Bamboo poles	Leaf Thatch
Small house	1-5	2	26	125
Large House	6-10	2	35	188
New House		8 + 4	200	300

New house rations are awarded to new families (newly wed, moving out of parents' house) as long as they can find land to build on. License from camp authority is also required.

It is Karenni tradition to not live with extended families so house sizes (both for no. of people and for physical size) tend to stay quite compact.

Mae Sariang office

Mae La Oon & Mae Ra Ma Lueng

Category	No. of people	Eucalyptus poles	Bamboo poles	Leaf Thatch	Nail (kg)	Wire (kg)
Small house	1-5	3	25	200	-	-
Large House	6-10	4	35	375	-	-
New House (S)	1-5	8 + 4	250	350	2	1
New House (L)	6-10	12+6	350	450	3	1

In Mae Sariang, the number of new houses ration for the year is calculated based on the budget – e.g. 10% of all houses will receive new house ration. This quota is then broken down to section level. It is then up to the section leaders to work with ten-household leaders as to which household the ration will go to.

Mae Sot office

Mae La

Category	No. of people	Eucalyptus poles	Bamboo poles	Leaf thatch
Small house	1-5	2	25	200
Large House	6-10	3	35	375

Umpiem Mai

Category	No. of people	Eucalyptus poles	Bamboo poles	Grass thatch
Small house	1-5	2	25	100
Large House	6-10	3	35	187

No new house ration here.

Sangklaburi office

Tham Hin

Category	No. of people	Eucalyptus poles	Bamboo poles	Plastic Sheet
Small house	1-5	2	25	1
Large House	6-10	3	35	2

Don Yang (not confirmed)

Category	No. of people	Eucalyptus poles	Bamboo poles	Grass thatch
Small house	1-5	2	25	60
Large House	6-10	3	35	100

5.5 BAMBOO LIFE CYCLE

As there are issues at all stages of the bamboo life cycle, bamboo deserves a separate section. The following sections detail some of the key observations regarding the current practice of bamboo procurement and usage by TBBC, its suppliers and camp residents. (A detailed listing of bamboo types and qualities is at Attachment 6)

5.5.1 CURRENT PROCUREMENT, RECEIPT AND DISTRIBUTION PROCESS

Procurement and distribution process

Most of the bamboo that TBBC supplies is procured through a national select tender process. This aims to ensure transparency and accountability whilst also reduce the excessive burden on local field staff.

In reality, the list of potential suppliers rarely changes. It is comprised of those who have supplied with some level of success in the past, with no clear mechanism for new suppliers to gain entry to the select list.

The bulk of suppliers use small local subcontractors to manage the harvesting and or transportation of bamboo to the camps. Bamboo appears to then be supplied through agreements between the local subcontractors and individual villagers to on-sell their legal bamboo-harvest entitlement per year. A percentage of the supply is harvested from across the border and brought in, with appropriate fees paid either by the subcontractors or the main contractor to the border authorities

A smaller proportion of the bamboo comes from national parks or state forests, where suppliers or their subcontractors pay for access to the resource. In one case, camp residents actually undertake the harvesting directly, with the supplier simply managing the process and smoothing over any difficulties that arise.

Bamboo is then trucked directly to the camps, arriving on an ad hoc basis for immediate offloading and distribution. Generally each sector within the camps has a “construction materials” team, who at the drop of a hat, and at any time of day, are called upon to organise the location for offloading and check both the quality and quantity of material to be offloaded. This team then organises the distribution to the individual families who have been registered for entitlement to building materials.

Implications for durability

Receiving of goods on site was perhaps the issue that had the greatest impact on the durability of housing. Concern by residents that if they don’t accept the bamboo provided they may not get anything has led to a culture of accepting almost anything. Instead of receipting acting as a “quality control” point, it has become a “low quality” control point. In such a market, any intelligent supplier would forward higher quality material to town markets where possible, ensuring the “only just acceptable” material was kept aside for the camps.

5.5.2 CROP MANAGEMENT

With much of the bamboo crop coming from sources with limited accountability, there is little incentive for suppliers, their subcontractors, or the individuals actually harvesting the bamboo to undertake any form of good crop management.

Proper management of bamboo clumps can increase their productivity by up to 300-400%, whilst poor crop management will result in ever reducing resource availability. Discussions with suppliers seemed to indicate that second was the case, with suppliers saying their harvesters were forced to harvest further and further from the road each year, making the task of supply ever more difficult and presumably driving up cost of production, hence fair market price.

The added incentive that “almost anything” will be accepted by camp receiving crews, means that subcontractors who are paid on per piece rates have no incentive to do anything but cut out as much if not all of a clump as they can with little or no consideration for next year’s crop with as greater speed as possible. Once a clump is heavily decimated it can take years to recover or even not recover at all.

This problem is exacerbated by an apparent low level of background knowledge within the camps themselves about good crop management procedures. In the many sessions where questions were asked about the communities’ bamboo practice back in Burma, little awareness seemed to exist about crop management. This is almost certainly due to the abundance of supply of bamboo in the region and the low value to which bamboo is commonly held.

All in all it would be fair to suggest that the poor crop management being undertaken by TBBC and its suppliers (amongst many other factors of course) is slowly but surely having a major negative impact on the bamboo supplies of this region of Thailand, when in theory it could be positive, or at the very least neutral.



Example of Bamboo clump decimated by over cutting

5.5.3 AGE AT HARVEST



Example of bamboo both too old and too young to be used

The age at which bamboo is harvested is of critical importance for its strength and durability. During the first few months of its life a bamboo culm shoots up out of the ground, reaching its full height and girth in a single rainy season. Over the next season the culm sprouts branches and leaves, achieving its full shape and beginning to toughen up and strengthen its wall structure. By the third year the culm has reached a level of maturity suitable for harvesting, though it will continue to harden for the next few years before finally succumbing to the relentless attack of mould, mildew, pests and rot. Depending on the species bamboo is no longer of a standard suitable for construction by around 6-8 years.

With little or no incentive for good crop management bamboo is being supplied at whatever age the subcontractor feels they can

get away with. Hence culms that are clearly too young and still pithy and weak are in amongst culms that are old, brittle and beyond their prime. This poor practice in age at harvest is not only depleting the general bamboo stock, it is impacting on the durability of camp structures.

5.5.4 TIME OF HARVEST

The exact time of year, month and day at which bamboo is harvested can greatly affect its durability. This is due largely to changing levels of sap within the bamboo and the changing sugar content within the sap as the plant goes through its natural growth cycle.

Annual harvesting cycle

Bamboo is best harvested towards the end of the dry season, prior to the burst of energy required to prepare for the upcoming rains. Harvesting during the rainy season is not only more difficult, but also damages the newly emerging shoots, greatly reducing the clump's productivity. The exact time of best harvest will vary slightly from the north to the south of Thailand (as the rainy season does) but is generally from November through December.

Current practice: Most suppliers don't receive their tenders till December or even January, forcing them to harvest during a much less suitable period resulting in greatly increased pest infestation and reduced durability.

Monthly harvest cycle

As the moon approaches alignment with the earth and sun (both full and no moon), tides rise at the equator as do sap levels in plants. For plants far from the equator the reverse effect is felt.

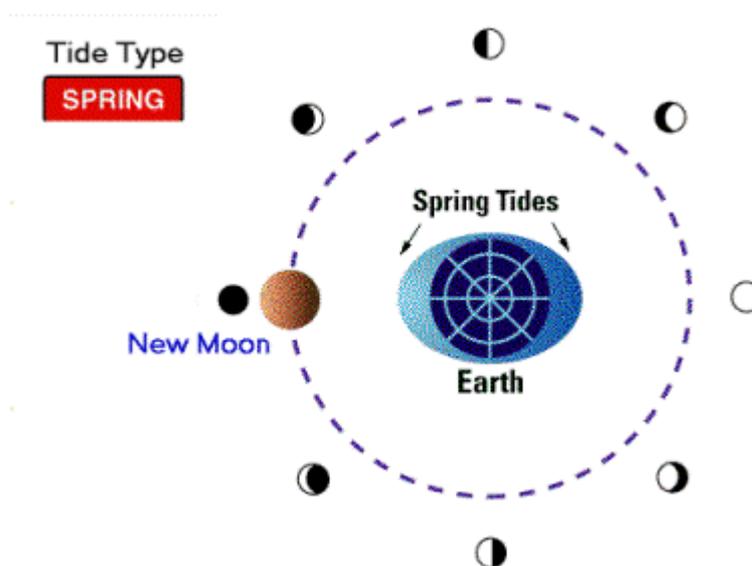
Current practice: Bamboo is harvested whenever it can be, from the moment the supplier receives their contract until camp access becomes impossible or the contract is fulfilled.

Daily cycle

Like all plants bamboo undertakes photosynthesis during the daylight hours, hence peak sap levels occur in the heat of the day. Bamboo is therefore best harvested in the early morning or late evening (this is often felt to be the least important factor of the cycles effecting pest infestation).

Current practice: Harvesters are paid on piece rates cut from dawn to dusk.

The majority of camp residents come from small rural communities with a long and close history of association with bamboo. As such there was a high awareness of correct times for harvesting amongst the more 'bamboo aware' residents that we spoke to. The most aware residents referred to a Burmese bamboo almanac that cited the exact times of day, month and year for best harvesting.



5.5.5 POOR HARVESTING AND CROP EXTRACTION PRACTICE

The rush to cut down as much bamboo as possible and get it trucked and dumped in camps as fast as possible has resulted in poor harvesting and crop extraction. Many individual culms showed classic cracks in the middle of the culm where they had been roughly fallen, many were scratched and covered in mud from being dragged through the forest, with many showing base splits from poor cutting.

Poor harvesting practice, damages the protective outer skin of the bamboo, resulting both in structural cracks that reduce the bamboo's strength but also creating more avenues for pest infestation hence reducing the product's durability



Centre split in bamboo due to poor felling practice

5.5.6 SPECIES SELECTION



Variation across species used in the camps

TBBC's current procurement guidelines do not specify species at all, rather just specifying size. The majority of bamboo currently being supplied is *Dendrocalamus strictus*, a common bamboo across Thailand, described by one bamboo builder whom the consultants spoke to as a mediocre general bamboo; adequate but not particularly good for construction.

The vast variety of bamboo and the amazing variations between species in height, width, girth, strength and durability means that different species are ideally suited to different applications. In simple construction terms, bamboos could be clumped into a few broad categories, e.g. those suitable for:

- Handicrafts: varying greatly dependant on the visual and structure effect required.
- Woven sheeting: bamboo that is easily split both in both width and depth.
- Columns and structural beams: thick walled, larger section, pest resistant species.
- General construction: stiff, medium-sized bamboos that are straight and consistent.
- Small rafters or battens: thinner sections but thicker walled, straight bamboo species.

Discussions with camp residents as well as residents of neighbouring villages confirmed that the above principles were applied in normal bamboo house construction, with the community having a clear awareness of the correct species for each application, and also an awareness of the deficit of using only the species supplied by TBBC. Communities particularly highlighted a particular larger species that was of particular benefit as flooring, due to both its width, and thickness and durability.

5.5.7 SIZE

In the past bamboo supply was specified in two sizes. From all accounts this appears to have caused more confusion and difficulty for staff than benefit for the community and hence in 2008 a decision was made to specify just one single size and length. In reality, house construction requires a range of material, both in terms of width and length.

Community members that we spoke to expressed concern that more and more commonly the bamboo was coming undersized, but again their fear of not getting anything and time pressure from delivery truck drivers at the time of receipt meant they accepted almost everything, setting aside smaller sections for use as rafters and battens. When asked to quantify this, a number of people on materials receiving committees suggested that 10-20% undersized was good, for building roofs etc, but they were tending to get 40-50% which was far too much smaller bamboo for use in the average house.

The issue of undersized bamboo is almost certainly linked to lack of species specification and more importantly, to poor crop management.

5.5.8 LEACHING

As stated earlier the durability of bamboo is directly linked to the amount of sap (sugar) present in the culm at time of harvest. A common simple method for reducing the sap in the culm prior to use is by prolonged immersion in water commonly referred to as leaching. A common example of traditional leaching in Thailand was the 3-4 week journey of freshly cut bamboo in northern Thailand, that was formed into rafts and floated down to the markets in Bangkok, where it was famous for its increased durability of local produce.

Camp communities are well aware of the benefits of leaching, though it is generally only undertaken for flattened sections which due to their much higher surface area and ease of penetration can be effectively leached in 7-10 days. This appears to be mainly undertaken for sections of bamboo that are clearly prone to infestation.

Although leaching can be undertaken with whole culms, there seemed little awareness of this as a practice prior to arrival in the camps amongst those interviewed. When questioned about this, one of the more technically-aware residents said that they did not leach because they were worried they would pollute the river for the downstream Thai community.

5.5.9 PROTECTIVE TREATMENT

There are a broad range of protective treatments that can be applied to bamboo to make it last longer. These go from simple organic traditional methods such as heat, smoking, liming, the use of salt or mud, to low chemical treatments such as borax impregnation and more technical and perhaps more toxic treatments such as copper arsenate. Post-construction treatments can include the application of oils, paints or sprayed insecticides. The application of pest treatments may increase the life expectancy of bamboo from 5-25 years or longer depending on the system used.



Protective oil treatment applied to woven sheet walls

Currently there is little use of pest resistance treatments within the camps. Although knowledge of smoking or heating bamboo over a fire to improve its durability does exist amongst the camp community, it appears to only be practiced for the treatment of bamboo string and spines for the creation of thatched roofing.

A number of community buildings have used the application of used sump oil as a preservative and for its decorative effect on woven bamboo sheeting. This is also apparently used for treating both bamboo and eucalyptus prior to embedding in the ground as footings. A second 'red' oil – usually used motor oil - was also used in some commercial buildings for protection.

A number of residents spoke about the use of a pesticide such as DDT that was sprayed within some of the communal buildings within the camp by agencies to increase durability.

Other than these limited incidences, there seemed little awareness or use of treatment technology by camp residents both prior to and since arriving in the camps.

5.5.10 STORAGE AND HANDLING

Throughout the entire process of delivery and construction, the bamboo used within the camps is poorly handled and poorly stored. Rough handling during loading and unloading of trucks, uncontrolled drying in direct sunlight, storage in contact with the earth, storage in areas with old pest-laden bamboo refuse are all contributing to the limited life expectancy of TBBC-supplied bamboo in construction.

TBBC staff, suppliers, subcontractors and the camp community, all seem largely unaware of or unconcerned about the direct relationship between durability of bamboo and outer surface damage, nor of the steps that can be taken to reduce this damage. This consistent poor handling is greatly reducing both the strength and the durability of camp construction.



Poorly stored bamboo, left in sun and rain with direct ground contact rapidly decaying

5.5.11 DESIGN

One of the remarkable features of the Thai Border camps is the freedom of expression and design that has occurred through community managed shelter construction. This has led to beautiful and insightful variations across and within the camps, creating a camp that is far from the monotonous rows of buildings that most camps present.

There appears to be a general belief both within the camp and within TBBC and other agencies that all Burmese know how to design and build a bamboo house. Whilst this statement is essentially true, that they largely do all know how to use bamboo, this does not mean they all know how to use it *well*. Hence the quality of design varies greatly across the camp.



Wall rapidly decaying from over exposure, due to inadequate eaves and ground contact.

Perhaps the best example of this is the “good boots and hat” principle of bamboo construction. This is to say that bamboo is most readily degraded by exposure to excess water and sun. Hence designing buildings with good resistance to ground water contact (boots) and good protection from the sun and rain, in the form of a well pitched roof with adequate eaves (the hat) will do more than anything else to ensure the durability of a bamboo building whether treated or untreated. The application of these principles varies greatly from house to house across the camp.

The general belief that everyone knows how to design and build their own house has also resulted in the propagation across the camps of simple design or construction errors.

Bracing

Perhaps the most apparent of these was the complete lack of the use of bracing across all of the camps. This was perhaps of greatest concern in the much larger community buildings that also had little or no bracing other than the default bracing supplied by a triangulated trussed roof. When asked, residents were quickly forthcoming with stories of buildings leaning over and falling down. Leaning doors and buildings were visible throughout the camp.

5.5.12 CONSTRUCTION

Construction quality varied greatly across the camp and was affected by a number of clear factors.

Tools

It was clear that levels of access to good quality appropriate tools varied greatly within the camps. Whilst one house had neatly sawn floor joists, another nearby had joists apparently hacked to size with a blunt machete



A carpenter's tool kit

Basic bamboo construction knowledge

The camps proved an invaluable example of both worst and best practice in bamboo construction. Whilst simple construction knowledge, such as cutting floor joists at the nodes, was apparent on one house, the next tenant appeared to have no awareness of this as best practice. Whilst the skin of the bamboo had been surface sawn or chiseled in one house to prevent splitting where a nail was applied, in the next the nail had been rammed through, splitting the bamboo in the process.

Access to skills and funds

Clearly some families had better access to skilled craftspeople whilst others did not. In a number of cases where the team investigated the apparent difference in construction quality, the answer was an issue of vulnerability, for example, the female-headed household discussed earlier. Although appearing at first glance quite similar, by no means was the quality of construction even across the camps.

5.5.13 MAINTENANCE

As with any other community, house maintenance varies from greatly family to family. Catching pest infestations early and removing the effected element, noting where bamboo is starting to rot due to excessive exposure to rain or ground water, and addressing the design issue will greatly increase the life expectancy of the building.

5.5.14 DISPOSAL

In general, when bamboo is decommissioned from its use in house construction, it is still considered a valuable household asset and goes on to be used for a multitude of uses such as fencing trellises, stakes for plantings, garden edging or firewood. It appears that little goes out as solid waste.

This reuse of bamboo is generally a good thing, but it also creates the perfect nesting environment for bamboo pests, resulting in vast amounts of pest-infested bamboo lying around across the camps, and producing a high background load of pests. Termites will merrily munch away on the stash of secondhand bamboo under the house, until it runs out, at which point the house itself, no matter how well-kept and well-built, starts to look very attractive to a hungry termite.

The second concern with the reuse of bamboo in the camps is the cupping effect caused by bamboo nodes that results in small ponds of still water in fences and the like across the camp, greatly increasing the risk of mosquito-borne diseases and vector control issues.



Waste bamboo scattered amongst houses

5.5.15 WRITTEN SPECIFICATIONS FOR RECEIVING OF GOODS

While issues that impacted on the durability of TBBC bamboo were apparent at all stages of the procurement/construction cycle, the issue of perhaps greatest impact and therefore concern was in the receiving of goods on site.

Developing agreed and documented specifications on the essential points of bamboo size and quality will greatly assist quality control and several aspects of procurement. Currently, when receiving deliveries, a lot of sub-standard material is accepted partly because there is no clear accepted and written standard to which suppliers can be held.

The process of articulating and agreeing standards must involve camp committees, shelter staff and suppliers, so what emerges becomes a consensus document. Among the key aspects this should cover are:

Size of bamboo:

Currently, TBBC has only one size standard, whereas, as noted elsewhere in this document, different lengths and thicknesses of bamboo are appropriate for different uses, whether flooring, rafters, walls, etc.

Acceptable percentage per truckload below size specifications:

The 'one size only' specification has worked as far as it has to date partly because a certain amount of each truckload does not meet the specification. However, the present practice of up to 50% of each truckload coming in under size results in a lot of waste and poor construction. There needs to be clear stipulation of the maximum quantity which is below the size stipulation that can be accepted before the shipment is rejected. Clearly, this understanding is for internal TBBC reference only, as suppliers will naturally tend to exploit to the limit any margin for sub-standard provision which they know to be set as acceptable. Also, current TBBC standards and systems including supply contracts and delivery forms need to be implemented more consistently and correctly.

Age:

As noted elsewhere, bamboo beyond a certain age is considerably weakened and provides less durable construction. This is not widely recognized by most camp residents; so setting an age specification would also be a useful educative process for those working in the shelter sector.

5.5.16 NET POSITIVE ENVIRONMENTAL IMPACT

Current environmental and economic conditions have been steadily reducing the amount of bamboo available for construction in the camps. The changes to practice proposed here would have a two-fold effect on this:

- First, better management of existing supply levels would ensure greater durability of construction, and significantly decrease total demand for bamboo and other non-timber building materials.
- Better harvesting practices would reduce environmental impact on current bamboo growth, meaning that in the medium term, more bamboo would actually become available both for camp residents, and for other communities in the area.

5.6 EQUITY

Community-led management of shelter delivery across the camps has generally resulted in very few equity-related shelter issues. Community-elected camp section leaders take on responsibility to ensure the equitable delivery of materials to all members of their section, whilst also accepting responsibility for ensuring that more vulnerable members of the community receive adequate assistance to ensure their families shelter securities. The communal nature of Karen and Karenni communities and a general sense of community within the camps produces a semi-informal vulnerability assistance awareness, conducted at the section level.



Vulnerability

One of the all female families encountered by Benchmark, who swapped their eucalyptus poles for the labour from neighbours to construct their home, leaving them reliant on poor bamboo foundations. The overall quality of construction was clearly lower, as the recipients had little power of quality control. Maintenance was also lower than in surrounding households. This entirely female family had no source of income other than limited support from one daughter's boyfriend, a Thai camp guard, and his friends.

Some specific vulnerability assessment tools are already in use, such as the IASC's format for assessing vulnerability to Gender-Based Violence, with specific addressing of shelter needs in relation to this.

Although this system of self management is generally effective and harmonious, the informality and lack of clarity of this system of support clearly has its flaws. There are some groups within the camps who are clearly not faring as well as others. A lack of defined and publicly available indicators for vulnerability and shelter need can allow personal prejudices and mis-comprehensions to cloud otherwise sound practice, and the more voiceless members of the community become easily overlooked. Additionally, there is no clear statement of what additional assistance a vulnerable household might be entitled to.

5.6.1 VULNERABILITY ASSESSMENT

Currently no real need or vulnerability assessment is undertaken prior to shelter distribution. All building materials are supplied annually on the basis of equal distribution between all those who are registered and thereby entitled, irrespective of relative need, both in terms of urgency and quantity. The only major differentiation is that between whole new house packages, and repair packages. This differentiation is currently made in some but not all camps.

Furthermore, no formal method currently appears to exist for assessing or ensuring the shelter needs of the most vulnerable are adequately addressed. In a number of cases where the consultants encountered women-headed or economically weaker households (or households from minority ethnic groups), the quality and size of these households' shelter was well below the general standard of the camp.

The Benchmark team observed three distinct areas of shelter inequity that could be addressed:

5.6.2 NEW ARRIVALS

New arrivals are a diverse group. Some arrive well-resourced after a successful life in Bangkok or one of the regional capitals of Thailand, whilst yet others arrive from the furthest reaches on Burma looking for resettlement overseas, whilst yet others are seen as 'true refugees' recently roused from their rural properties by violent military action, with no other place to turn.

New arrivals are now much more complex and diverse than the longer term inhabitants of the camp. At Umpiem Mai camp, we were informed that there were over 18 language groups and perhaps up to 30 ethnic and religious subdivisions within the camp. The complexities raised by such a diverse group of new arrivals would be a challenge for any organisation, no matter how well-resourced. In a community-based camp management model this places real strains on the community members who not only have to deal with these issues but also live within the community they are trying to objectively assist. At one point in Benchmark's discussions with camp residents, a chain of four people was required to translate questions into a language the camp resident could understand, whilst at other points it was simply not possible, and at other times communication fell back onto a resident's surprising ability to speak in English or at one point, in Hindi!

Stress of new arrivals on camp management

The high rate of new arrivals that the camps are currently experiencing is clearly placing great stress on both TBBC staff and their capacity to respond, as well as on the refugee communities that they are assisting. Many families live in over-burdened homes as newly arrived relatives and friends await registration and their house at a new house allocation. Camp management committees are clearly

frustrated and incapacitated by the continuous strain placed upon them both by the new arrivals and by the loss of skilled members of their community to transmigration.

New arrivals bring with them a whole range of new issues, and require training and awareness-raising on a range of issues that have become normal to other members of the camp, such as the importance of community hygiene and cleanliness in the crowded living conditions of the camp.

Equity issues with new arrivals

The general perception by longer term members of the community that most new arrivals are relatively well-off, combined with cultural and language divides has unsurprisingly led to the real needs and substandard living conditions of some new arrivals simply being overlooked, whether by malintent or simply misunderstanding.

A tour of one new arrival area found access to sanitation, house size, construction quality, ventilation, population density and access to essential services to all be well under international standards, and way below the average of the rest of the camp. When questioned, residents in these areas had little knowledge of their rights nor of camp management decisions, with a number stating that their sub-group had no representation or voice on the camp committees and that all meetings were conducted in languages that they simply did not understand so they did not attend. The coping capacity and community unity of each of these subgroups and its impact on shelter varied greatly from group to group. Some such as a Mon community that the team visited were living in small though perfectly built shelters with all materials and skills apparently shared equitably throughout the community, and a clear sense of settlement planning and aesthetic design. Other perhaps more marginalised or perhaps less unified communities such as the Nepalese/Burmese that the team spoke to were living in accommodation of a far lower standard.

5.6.3 ETHNIC AND RELIGIOUS MINORITIES

In addition to the specificities of vulnerability given above, it needs to be pointed out that ethnicity and language group are significant indicators of vulnerability and lack of access, especially for smaller and more recently-arrived groups. Lack of ability in the language of the camp committee is closely correlated to reduced voice in decisions around shelter (along with other matters) as well as access to rations and entitlements. Other ethnicity-related factors include the fact that many of the smaller groups are also relatively new to the camp communities, and are therefore not as well-versed in established camp politics and culture, as opposed to the mainly long-resident Karen and Karenni groups. TBBC staff have also cited other factors of culture and patriarchy which are constraints to communication with the most vulnerable groups, though there has not been space to explore these factors fully.

The language issue as such is relatively easily addressed. It would be simple to produce multilingual information materials, such as posters, explaining rights and entitlements, shelter rations, registration procedures etc. Given that in smaller ethnic groups, a large number of people are likely to be illiterate in their first language, more detailed information can be targeted to 'close people' within those communities, who are respected and trusted sources of information for others. Identification of key women community figures as potential information points in this process could also give some redress against patriarchal blockages in information flow.

These measures would not in themselves fully redress the power imbalances, but are a very achievable first step.

From Benchmark's initial assessment, it is clear that factors of ethnicity and culture bear very strongly on expectation and practice in housing and settlement practice by the communities themselves, with quite radical differences between felt needs for housing size; practice in tidiness or otherwise of the immediate environment; and many more issues. As the camp population continues to diversify, it will be worthwhile TBBC staff investing time and energy in researching and familiarising themselves with the exact nature of these variations in order to be able to support most effective equitable housing practice across the board.

5.7 POLICY

In the absence of a formal TBBC shelter policy, implicit or informal policies have come into existence by default. This is natural given TBBC's own explicit policy of maximum community control of internal camp affairs. The undocumented policies operate at several different levels, from local (single camp) to national. In some instances, they appear to constitute the most appropriate response to the situation, given available resources. In others, they are possibly constraint to improved and more equitable practice.

In all cases, as TBBC moves towards developing its own clear and targeted policies, these existing policies must be taken into account, 'outed', discussed and recorded. One important fact to note is that they show diverse response to diverse camp and community situations; TBBC's own eventual policies will likewise need to take account of differing local realities, and be built around a community education and consensus process.

Below are listed some of the areas in which implicit policy appears to exist:

5.7.1 CAMP LEVEL

Repair and rebuild by family and friends

This is understood as the *de facto* way in which construction will be done, leading on from the "everyone can build a house" principle. As noted above, this works quite well in practice in most cases, but is to the disadvantage of those with limited networks, limited access to good construction skills, and/or limited cash to substitute. This needs to be addressed in policy formulation to ensure better equity.

Materials market

Construction materials are bartered and sold, unlike practice in many refugee settlements. This is clearly factored by TBBC as a reality in making materials allocations. This has had a positive effect in generating a more normal local society and economy, and maximising flexibility in materials distribution. All of this, as well as the downside of the current trading practice, need to be taken into account in articulating formal policy.

Buying and selling houses

This is currently the most contentious aspect of the current shelter economy, as *de facto* policy was for a long time to allow sale of houses, particularly for those who were selected for third-country resettlement. Sound and strong reasons have been and are still being presented both for and against the practice, on grounds of both economic justice and equity. Careful community deliberation will be required to finalise a policy on this which most or all residents will find acceptable and equitable. The main distinction which needs to be drawn in this is between the established practice of one party (usually a family departing for resettlement) transferring the house they no longer need directly to a family (usually a new arrival) which is in need. In this case, the amount of money involved in the transaction has usually been small, or even token. The practice which the policy is needed to control, is where third parties buy the houses of departing

families on a speculative basis, and then seek to on-sell to new arrivals at maximum profit. Policy needs to acknowledge and protect the first practice by setting clear guidelines; and reduce or abolish the second by stipulating proper transfer process and monitoring of its implementation.

Rebuilding once every 3 years

It has come *de facto* into ration planning that each house will be rebuilt every three years. This is the current basis for calculating materials requirements – though as noted above, some houses lasting both longer and shorter periods than this. Refined policy will need to calculate more exactly and explicitly what the expectation is for durability and thus the basis for calculating ration size.

Building material banks

These also exist as informal policy; making the policy explicit could help what is quite an innovative and pro-flexibility approach to be optimised to provide even better benefit for more camp residents.

5.7.2 AGENCY LEVEL

It is currently *de facto* TBBC policy that shelter is considered as an NFI distribution issue, rather than a distinct sector. Moving to the latter definition is the first step towards developing clear policy, and then the toolkit needed for its effective implementation.

Crudely described, TBBC's current shelter policy could be described as "to provide enough shelter materials in responding to community requests to allow residents to keep themselves under shelter of reasonable standard". This was previously sound as a basic approach; changing circumstances and resource constraints mean that a fuller policy is now required.

5.7.3 INTERAGENCY LEVEL

Implicit policies on shelter matters appear to exist within particular ethnic groups, and especially among the Karen and Karenni. There was no time to explore fully what these actually are, but it will be essential to research these policies with communities as part of developing a formal framework.

Coordination

The Committee for the Coordination of Services to Displaced Persons in Thailand (CCSDPT) was set up in 1975 as response to influx of refugees from Laos, Vietnam and Cambodia following the Vietnam war. Members consisted of NGOs as well as representatives of Thai authorities, UNHCR, ICRC and IOM. From 1997, CCSDPT has been working almost exclusively with Burmese refugees and today there are twenty members who meet monthly in Bangkok.

CCSDPT formed several working groups/sub-committees. However, there is no specific shelter sub-group: while TBBC work border-wide, other agencies don't. For example, in the WASH sector, IRC, MI, AMI, and ARC are involved across 9 camps.

5.7.4 REGIONAL GOVERNMENT LEVEL

Officially, there is one simple set of Thai government policies towards the management of the border refugee camps, which would be expected to be uniformly applied across the board. The reality is that local governments interpret this quite differently in different locations. This points to greater potential leverage for TBBC with regard to policy advocacy, either to point out to national government where practice which differs from official policy is working to good effect for both refugees and adjacent Thai communities, or to

take those examples of flexibility found by local governments within the national framework, and cite them for replication elsewhere. Some notable examples are:

No permanent structures

This meshes with RTG view of the camp residents as in no way having the possibility of gaining permanent residence in Thailand; but in fact different local governments have interpreted quite differently what constitutes a 'permanent' structure. As is noted above, getting permission to introduce transportable concrete footings (replacing current use of bamboo or soft eucalyptus) would have major impact on housing durability.

Plastic sheeting

In Tham Hin camp, the government insists that thatch is high fire risk in the densely-packed settlement, so only allows the use of plastic sheeting for roofing. The negative impact of this, in particular thermal emission, is described fully elsewhere in this report. Conditions in this camp are also supposed to deliberately to deter new arrivals (unsuccessfully so far); plastic roofing causes unacceptable living conditions, and this does need to be taken up by TBBC in dialogue with regional and national government.

Leaving the camp

National policy is that all camp residents are confined to the camp perimeters. The reality is that in more than one camp, they are allowed to go out into the immediate surrounding area, and this is put to advantage in terms of gathering shelter materials. Advocating for limited access like this across camps, with agreed terms for what materials can be harvested, with respect to local villagers' rights, could significantly boost residents' self sufficiency in some crucial materials.

In all the above areas, the policy and practice advocacy which needs to be engaged requires that there be dedicated shelter staff within TBBC; these could engage with the national forestry department as well as with specific local governments bringing the necessary depth of information required to negotiate change and some across-the-board practice agreements.

5.7.5 NATIONAL GOVERNMENT LEVEL

House demolition

According to national policy, houses are to be demolished upon their inhabitants relocating through a resettlement programme. In fact, the practice is not strictly followed, and more commonly replaced by the practice of selling or other allocation to new arrivals. Camp committees have often taken a percentage of the sale proceeds. It is important to develop clear policy around this to ensure better equity in access.

5.7.6 INTERNATIONAL

The changing nature of the conflicts within Burma, and of the international views on and relations with the regime in power cause shifts in views taken towards the refugees, both established and newly-arriving. One reflection is in the current policy of who is accepted for third-country resettlement.

Insofar as they reflect patterns of arrival and departure in the camps, the ethnic and other composition of any influx; and their eligibility for rations once arrived, these also bear directly on shelter; and need to be considered in the framework of TBBC's shelter policy, to be followed up by shelter staff.

5.8 PROCEDURES

There are numerous instances in which current standard procedure is militating against satisfactory and sustainable shelter conditions. In most cases, these seem susceptible to positive change which could have far reaching impact. Below is a summary of the key observations of the team:

5.8.1 TIMING

The current timing of tenders puts heavy pressure on suppliers as contracts are usually issued when the possible harvest season is already underway, and there is a short window to harvest and deliver the required quantity. As above, this means much bamboo is harvested at less than optimal times, and in environmentally unsustainable manner.

The timing factor also puts pressure on the recipient communities in the camps, as they are left with a window of about one month in which construction must be completed before the onset of the wet season. This aggravates the issue mentioned above of reluctance or inability to exercise quality control, and secondly, means that construction is more hastily carried out than is desirable for quality and durability.

5.8.2 SUPPLY CHAIN MANAGEMENT

TBBC documentation lays the tender process out very well and clearly, and the process described therein is excellent. However, it is currently comprehensively undermined by the poor timing mentioned above, and the practice of receiving goods without quality control, the lack of clear designated spaces for unloading, and lack of storage and distribution facilities. There is no clear receipting process or no warehousing, and both of these feed into a lowest common denominator practice in accepting and using bamboo received.

5.9 SETTLEMENT PLANNING

Initial planning

Various parties are involved at the initial stage of this process, including MOI, Forestry Department (national park authorities, community forest authority). TBBC's essential principle to date appears to have been to trust to community wisdom and priorities in this. This worked well when the camps were on the scale of the small villages from which most residents had come, but has become insufficient for the needs of what are now town-sized populations and the differing needs of multi-ethnic, close-confined spaces without ready access to the natural resources that the residents' original villages would have had at hand. It therefore seems imperative for TBBC to take a more proactive role in settlement planning with its partners.

Physical planning

Land allocation and Initial planning has been done by the Thai Forestry Department, including land clearing, with little further concerted planning as the camps have grown and evolved

Mapping

Existing maps of the camp are very basic, showing the main infrastructure: main roads, camp offices, schools, churches, temples, etc.

Drainage and storm water control

Neither of these appears to be satisfactorily dealt with for the population size and density of the camps, and lead to noticeable erosion, downstream river and stream pollution, and in some cases landslides. All of these point to a need for more conscious planning.

Access and egress

Access roads to the camps (where the camps are off the beaten track) are maintained by COERR, MI, MOI, TBBC and IRC. In-camp roads are managed by ZOA, with emergency maintenance supported by TBBC and other agencies. The current state of the roads combined with the issues of drainage mentioned above mean that access and egress are significantly limited during the wet season, and mobility is particularly problematic for those residents with existing mobility limitations, e.g. those with disabilities.

Solid waste management

Each camp has agencies with designated responsibility for solid waste management. These agencies are IRC in Mae Hong Sorn camps and Tham Hin, MI in Mae Sariang camps, AMI in Mae Ia, and ARC in Umpium, Nu Po and Don Yang. Disposal does appear to be strained by current population size and density. Practice and effectiveness seems to vary; some camps appeared exemplarily clean, while others had waterways and badly clogged with plastic and other non-biodegradable waste.

The increase in camp population has led to problems with waste management. New arrivals are not put through 'orientation' so the adjustment period can take some time. In some camps there was mention of waste management problems after a large influx of new arrivals, with the most common statements (which are not possible to verify) being that new arrivals needed socialising in the different circumstances of waste within the camps, where there is far more inorganic waste than in their home villages, and where traditional disposal methods (e.g. consumption by domestic animals, unplanned composting) no longer work. In the meantime, this leads to large quantities of insufficiently well-handled waste.

Building waste is a final important point mentioned above, in other words the piles of used bamboo accumulating under houses. These attract termites and other pests, and also provide mosquito-breeding areas. In general, a policy is needed to stipulate how bamboo offcuts and other waste can be systematically disposed of.

5.10 CROSS-CUTTING AND RELATED ISSUES

5.10.1 ENVIRONMENTAL IMPACT

Currently the only camp where this discussion has been followed through in depth was Mae La, where UNHCR and MOI are the officially responsible parties. A summary of key shelter-linked environmental issues includes:

- Pollution of rivers with unmanaged waste, as mentioned above, and in some instances, with run-off from bamboo treatment. As above, practice varies widely, with some camps showing apparent best-practice in terms of maintaining water resources in good condition; these could serve as models for manual development.
- Surrounding forests are also clearly impacted by unsustainable harvest practice. Recommendations are given below as to how some simple changes in harvest and cultivation practice could dramatically improve this.
- Both impacts above, and all other environmental issues dealt with, link inevitably to impacts on neighbouring Thai communities. Better management would not just be a matter of mitigating damage, but creating and expanding the economic opportunities which the camps' presence offers to others in the area. These are explored under recommendations below.

5.10.2 LIVELIHOODS

Current procurement procedures seem to show a significant missed opportunity in terms of securing more normal livelihoods for camp residents and a more natural camp economy. There are several opportunities for replacing outside sourcing with inside production by residents, if the right arrangements can be made for either purchase of raw materials or their production in or adjacent to the camps.

Materials with the most potential for livelihoods opportunities are:

- Thatch: Grass for thatch could possibly be grown in or adjacent to camps, or contractual arrangements made with adjacent Thai villagers for harvesting and purchase. All indications from residents were that they could themselves produce higher-quality and more durable thatch than the panels currently provided.
- Bamboo: As is mentioned below, there could be several benefits from growing some bamboo species within the camps, including provision of shade and erosion control; the smaller species in particular could serve several important construction, repair and tool-making purposes.

The principle already cited of “whatever can be made in the camp, should be made in the camp” is the key guideline to follow here.

6 RECOMMENDATIONS

Recommendations that arise from the above observations, for ease of implementation these are broken into three groups;

Immediate:

Recommendations that can be implemented with minimal additional cost, mainly through minor changes to systems and procedures.

Short-Medium Term:

Recommendations that may require seeking additional initial funds or time to implement, though they may bring about cost savings or improvements in efficiency or shelter standards

Medium to long term:

This section of the report deals largely with “project” based recommendations, providing a list of individual projects that TBBC shelter staff may be able to pick and choose from negotiating with both camp residents and donors around which projects are felt to be most appropriate

6.1 IMMEDIATE

Benchmark believes the following recommendations should be considered for implementation as soon as possible as they incur limited additional cost, can be implemented by current staff, whilst offering clear improvements in either the quality or cost of TBBC’s shelter provision

6.1.1 PROCEDURES

Procurement timing:

Perhaps the most clear of all the recommendations that Benchmark would make is that of improved procurement timing.

The bulk of the shelter materials currently purchased by TBBC are natural materials with a natural growth and harvest cycle. As well as being influenced by these cycles, supply of materials to the camps is also limited by seasonal access issues. Finally TBBC’s capacity to supply materials is limited by funding cycles and internal decision making processes.

Juggling the above issues along with the many other issues that effect quality shelter provision, such as regulatory and staffing limitations is clearly daunting. At present, shelter provision appears to have slid into being more controlled by financial limitations and funding cycles than by the natural cycles that regulated material availability. Hence as an example; currently tenders for the procurement of thatching leaves that are ready to harvest in September are not issued till December or January.

The mismatch of tender cycles to the harvest cycles of grass, leaves and bamboo has a number of ramifications for both TBBC and camp residents.

- Procuring too late or too early in the season makes it much more difficult for suppliers to find the quantity of materials required for large TBBC contracts.
- Bamboo harvested out of season, contains much higher levels of sugar laden saps and is therefore much more prone to pest infestation.

- Supply contracts issued in December or January leave contractors with a very short window of access to the camps before rains set in around April, adding unnecessary pressure, on suppliers and their subcontractors to overly rush, leading to poor handling and a tendency to supply whatever they can whenever they can.
- Procuring materials outside the ideal harvest time, leads to much higher prices, through lack of adequate supply, or else forces suppliers to procure and deliver or store materials, simply on the belief that they will get a contract. This practice greatly increases the pressure on staff at both the field and national level to utilize contractors who have commenced supply prior to the announcement of tenders
- Concern that full supplies will not be achieved before access is no longer possible leads camp residents to accept almost anything, rejecting only materials that are so defective they simply can not be used at all. This provides the feed back to suppliers that they can supply almost anything and it will be accepted

Discussions with the finance and tendering departments indicate that current tender cycles are defined by funds generally becoming available in July, at which time, capacity to supply materials for that year is clarified to field staff who then clarify exact needs prior to tenders being announced assessed and issued.

There are two possible ways that this could be improved.

1) Shortening internal time frames

There may be opportunities to shorten the internal procedures involved in the procurement cycle. Such an action would certainly be assisted by the hiring of dedicated shelter staff (as recommended below), who throughout the entire year could focus on this issue ensuring tighter response times to funding availability and tender timeframes. Whether or not dedicated shelter staff are hired, a clearer understanding by all staff of the detrimental effect of slow procurement on both material quality and supply quantity may assist staff to find ways to shorten approval and consideration time frames

2) Jumping a year ahead on procurement cycle

On a camp by camp basis, tenders for supply of shelter materials could be brought forward by one year, so that for example tenders for supply of roofing materials for the September 2010, could be based on funding allocated in 2009; although this would seem to pose major problems for TBBC's budget and auditing procedures; but could possibly be negotiated on a camp-by-camp basis with suppliers.

Goods Receiving

Currently all main shelter materials, bamboo, timber, grass thatching and leaf thatching are received directly within the camps by residents sector construction material teams. Deliveries are on a purely ad hoc basis with suppliers drivers or those of subcontractors, driving to the camp and with little or no warning arriving ready to unload and move on as quickly as possible.

- Camp residents appear unclear about how much material is meant to be coming.
- In the past subcontractors have simply paid residents to say they have received goods, in this way legitimizing residents bribing guards or local communities to allow them to directly harvest their materials themselves. In fact enforcement of delivery of the full quota of supply is a major reason contractors have had trouble achieving their full quota this year.

- Residents are deeply concerned about whether if they reject materials they simply won't get supply in the future prior to the inaccessibility of the rainy season.
- The Materials handling committees seem to have no awareness of bamboo being too old, only of too young or too pest infested
- Very rarely is bamboo rejected, almost never for size, really only of so young it is unusable

The point at which goods are received into the camp is the ONLY point of Quality Control for the majority of shelter materials. At present there is little or no training, and very little feedback given and that in an ad hoc manner as to the quality and timeliness of materials.

Goods receiving appears to be the greatest weak link in an otherwise well-managed procurement process.

Ideally residents should receive much clearer training instructions and tools for quality control, check systems should be in place to ensure that quality control procedures are firmly in place and adhered to.

Culture changing from a culture of lowest common denominator acceptance to true control to ensure quality, may take some time and will involve devising clear standards that are agreed upon by all parties and indicators and tools for measuring those standards, to minimise disputation and risk of conflict at site.

If trainings are undertaken they should include real practical acceptance

Ideally goods should have a set receiving time and place, to ensure some hope of quality control. The place and time of delivery should be agreed on with suppliers so that they too feel assured of a clear process that they too own.

Tools, such as a piece of steel with an agreed hole size, as a minimum test of the bamboo... i.e. if the steel plate fits over the bamboo it is too small

Training should include: developing standard procedures, clearer paper work trails and paperwork being gathered and checked on the day of delivery.

6.1.2 PLASTIC SHEETING

It is clear that the distribution of plastic sheeting to the Tham Hin camp is far from ideal. Plastic sheeting is an ideal material for applications with an expected usage timeframe of 3-12 months, ideally maximum 6, whilst in reality the camp has been running now for 12 years, hence requiring continuous replacement

The high solar radiation, wind and rain load experienced in the camp means that for many families their plastic sheeting is barely surviving till the next annual distribution of roofing materials.

The cramped living conditions of the camp makes natural roofing materials such grass & leaf thatching inappropriate due to fire risk; whilst bamboo or composite sheeting would require ongoing replacement and prove far too costly.

The most appropriate roofing materials for these circumstances are either

- a) Corrugated Fibrous cement sheeting or
- b) Hand pressed masonry or cement roof tiles, or
- c) (CGI) Corrugated Iron Sheetting

The additional weight of roof tiles would require major improvements in structural design and bracing across the camps, whilst the danger of asbestos and the difficulty in guaranteeing its non-inclusion in sheets supplied, leaving CGI Sheetting as the most logical roofing material. Hence any consultant would be

lax not to recommend that strong negotiations should be undertaken with the Thai government to both, expand the area available for this camp to ensure minimum camp planning standards can be achieved and/or to allow the use of permanent roofing materials, particularly in this one highly crowded camp.

If the options are not available and plastic sheeting really must be used, then two important factors should be addressed as soon as possible. Colour and overall specifications for durability and flammability

Colour

Current plastic sheeting distribution is close to black in colour. This dark colour not only absorbs more heat, but also emits more heat, causing excessive thermal discomfort to the residents below and reducing the habitable areas of the home on hot days and cold nights, as well as reducing the life expectancy of the sheeting.

The colour and surface texture of any material directly affects that material's thermal absorptive and emitting capacity. The Table above shows the marked difference in temperature rise between a black and a white surface. Hence the simple recommendation to specify paler plastic sheeting, ideally, silver underside and white above.

Apparently the colour of current sheeting came from negotiations with the Thai military who insisted that sheets must be "green", hence any change of colour may require some renegotiation, aim for as pale as can be negotiated.

The absorption of UV radiation is one of the major causes of breakdown on plastic sheeting. Paler colours absorb less UV, hence sheets should last longer, hopefully overcoming the problem of sheets wearing out prior to annual distribution.

Specifications

Much work has been undertaken in the last few years to define what is an appropriate standard of plastic sheeting for humanitarian applications. Conclusions regarding the agreed on specifications have been documented by Joe Ashmore and posted to the web for free distribution in the Plastic Sheetings Guidelines as available from www.plastic-sheeting.org. These guidelines define minimum standards for flammability, UV resistance and degradation, thread count, materials, colour etc.

According to staff questioned, the plastic sheeting specification currently used by TBBC have been in place for many years and it appears that they could now do with upgrading g to meet the commonly agreed humanitarian standards. Supplies for large volumes of humanitarian standard plastic sheeting may be best procured through International procurement out of India, China or Dubai.

A list of suppliers is given at Attachment 5

The recommendation to improve the specification and colour selection of plastic sheeting used by TBBC is not expected to bring about cost savings as much as achieve a higher minimum quality of life for camp residents whilst ensuring that the shelter assistance provided by TBBC meets international standards

CURRENT PRACTICE:

	Material	Size	Unit cost	Cost
All houses	1 dark green or black Plastic sheet	5m x 6m	200 Baht	50x3=150Baht

RECOMMENDATION:

	1 pale coloured plastic sheet	5m x 6m	350 Baht	350 Baht
All houses	1 pale coloured plastic sheet	5m x 6m	200 Baht	220 Baht

6.1.3 POSTS & FOUNDATIONS

Where finances or access to resource permits, residents of the camps have almost universally ‘voted’ against putting eucalyptus poles in direct contact with the ground... it is common knowledge that this will not last for long.

Any family within the camp that has access to forest resources or sufficient funds, quickly makes the upgrade from the TBBC supplied Eucalyptus posts with some form of pest resistant timber footings (or in very few cases where they feel they can get away with it unnoticed, concrete foundation posts.

The more well to do, manage to install a full length hardwood post, whilst the more general solution is a hard wood post to around 600mm clear of the ground, checked to receive the TBBC posts from there above. Although a change in base timbers certainly costs more, even for poor camp residents the increased cost is clearly a worthwhile investment given the increased construction life.

Eucalyptus posts as currently distributed last 2-3 years before rot infestation requires them to be replaced. The low pest resistance of the post, also allows them to form the perfect “dark, moist, warm” corridor, ideal for supporting the infestation of the whole structure by termites and other pests, hence degrading the life span of the whole structure.

Hence the recommendation that starting sector by sector, camp by camp, TBBC reduce the supply of Eucalyptus posts, by an equivalent amount of pest resistant hardwood, Most likely, however, this would mean buying timber that has been imported from Laos and Burma as the timber from Thailand has now been restricted.

Pest resistant timber posts

A number of timber species exist within Thailand that have far higher pest resistance than the quick growing plantation eucalyptus that TBBC current supplies. Supply of more durable timber posts, although initially more expensive would pay for itself very quickly in terms of increased durability and therefore reduced replacement costs.

The increased cost of supplying more durable posts can be greatly reduced by the supply of a combination of 1.5m hardwood posts whilst reducing the Eucalyptus new house ration by an equivalent amount.

The implementation of a hardwood foundation post supply program, may also be best achieved by working with the community to replace foundation posts on a house by house basis with a set number of posts per

house irrelevant of supply. It may make most sense to undertake such a program on a camp by camp basis, replacing all eucalyptus supply in the house renovation package for that camp for that year.

- Ideally a range of pest resistant species should be selected and trialed separately in clearly identified areas so that their comparative performance can be evaluated over the medium to longer term. Such practice would not TBBC to make the best choice of most appropriate species, this diversity would reduce the environmental impact of such bulk procurement

(See Attachment 7 for specifications of durable timber supplies and costs)

Fastenings and other considerations

- Supply of either pest resistant hardwood or concrete foundation posts should also include a once off distribution of appropriate nuts bolts and washers for attachment of main bolts.

RECOMMENDATION:

	Material	Size	Unit cost	Cost
New house	2 Hardwood posts (=8 x 1.5m foundation posts)	6m x 6"	200Baht	100x2=400Baht
	10 Eucalyptus posts	6m x 6"	50Baht	50x10=500Baht Total = 700Baht
Renovation	1 Post	6m x 6"	50Baht	50 Baht
After ten years	2 hardwood			400Baht
	19 Eucalyptus posts			950 Baht 1350Baht

A percentage of funds saved through this recommendation should be allocated to a “most vulnerable based additional distribution.

6.2 SHORT- MEDIUM TERM

The majority of shorter to medium term recommendations involve a reasonable amount of work and investigation. Hence the first recommendation for dedicated Shelter staff.

Concrete Foundation posts:

It is clear that concrete foundation posts are far superior to either the use of Eucalyptus or Bamboo, both of which should actually be considered inappropriate for structures with a probable life expectancy beyond two years. The use of these posts within commercial structures within the camp, shows both community understanding and acceptance of this technology, making it a potentially simple solution to implement.

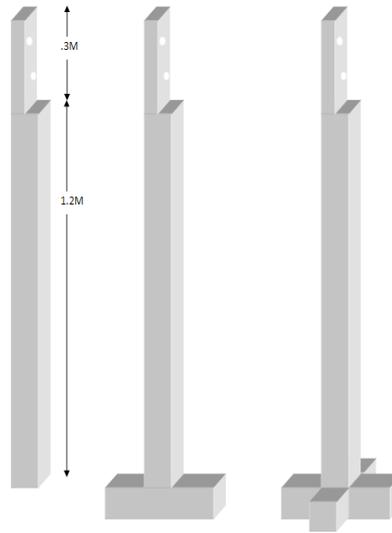
Discussions with TBBC staff indicated that there may be potential concerns by the Thai Authorities about the use of Concrete foundation posts that may could be seen as permanent construction material, and therefore ineligible for usage under current official restrictions.

It may however be possible to forward a legitimate argument to the authorities, that unlike permanent concrete pad footings and foundations, concrete stub posts can be simply removed for reuse or disposal when a house is dismantled. This argument should be backed up by discussion about the environmental and financial impact of continuous replacement of bamboo and timber as foundation material (and other elements whose usable life is diminished by increased pest infestation) as well as the potential impact on surrounding forests as residents try to deal with these issues themselves.

The onsite creation of steel reinforced concrete foundation posts, offers real potential as a community based employment project within the camps as well as having a further potential impact in addressing this poor environmental practice within the broader community if and when refugees return or resettle in other areas. These factors along with the increased life expectancy are likely to be highly appealing to donors looking for more sustainable and livelihood oriented solutions.

To implement such a project, it may make sense for TBBC to work directly with existing partners or affiliates within the camps with clear capacity in this area, such as ZOA, or to take this on board through direct negotiation with CBOs within the camps once TBBC shelter staff capacity has been addressed

See Attachment 8 for specifications of concrete posts.



Simple Concrete Foundation Post designs in or order of complexity to build but also relative strength and cost.

Material	Life expectancy	Cost estimate	Comment
Bamboo	1-2 years (at most!)	23 baht per post,	May require 3-4 posts to do the work of one timber post
Eucalyptus	1-3yrs	Not available at time of drafting	Life expectancy will depend to some extent on post size
Hardwood	5 – 15 years +	Not available at time of drafting	May last even longer depending on species
Concrete posts	20years+	Not available at time of drafting	Reusable and transportable

Fastenings and other considerations

- Supply of either pest resistant hardwood or concrete foundation posts should also include a once-off distribution of appropriate nuts bolts and washers for attachment of main bolts.

6.2.1 POLICY & STRATEGY

Internal Policy

The clearest Policy suggestion for TBBC internally is that of creating the conscious shift from dealing with shelter as an NFI to deciding to engage with Shelter as it's own sector with all the complexities and peculiarities that brings along.

Such a policy shift within the organisation would involve the creation of a shelter division/department, seeking shelter dedicated funding and starting the process of looking at Key shelter issues and slotting them into the organisation's mission statement and overall direction

Clearly this shelter review is a good first step in that process, but the review needs to be followed up by senior management to ensure concise implementation and it is clear that such implementation will require dedicated funds and staffing so as not to add even more stress to already adequately overstretched staff

External

A number of Policy decisions that are made outside the immediate sphere of control of TBBC are impacting negatively on TBBC's capacity to provide adequate shelter. Perhaps the most obvious of these are the policies of the Thai government regarding permanency of structures. This policy not only impacts on the quality and durability of buildings, but also impacts heavily on the shelter security and shelter stress of residents, whilst perhaps of even broader concern is also greatly increasing the environmental impact of the Burmese refugees on their host country, the villages, forests, national parks and rivers that surround them.

Two elements of permanency of structures that most need addressing

- 1) The demand that in Tham Hin Camp only plastic sheeting is used

Although based on a logical and reasonable concerns regarding flammability of thatching, the policy results in a less than acceptable living conditions. Plastic Sheeting should always be seen as a

temporary solution suitable for situations where the expected time frame of occupancy is below 6 months. Although sheeting may last for up to a year if well secured and maintained, it really should not be considered on a more permanent basis for reasons of thermal discomfort and 'shelter insecurity'

It would be bereft of Benchmark to not recommend strongly that TBBC take all measures to work with the Thai authorities to address the negative impact of the current enforcement of these policies. Clearly the most preferably solution would be that of increasing the land allocated to the camp to ensure that population densities are kept at a more acceptable limit and that housing density is low enough to reduce the risk of spread of flames.

Whether or not the above change in policy can be brought about, additional representations should be made around the issue of roofing in general. CGI roofing would reduce recurring costs to the community and the environment, clearly being of most benefit in the Tham Hin camp, but really having potential for improving shelter security across the camps

2) The use of non-durable "permanent" materials for foundations

This point is addressed in detail under foundation recommendations elsewhere in the report.

There needs to be discussion and interaction with the Thai government, supporting their decision for impermanent structures but identifying that non permanency of structures can be brought about through other means than biodegradability, ability to be dismantled, removability, and adaptability, are common methods throughout the world in dealing with a need for structures to be impermanent and yet adequate for purpose.

It is enough to say that the use of permanent materials does not mean permanent buildings. Concrete foundation posts that can be quickly dug up and moved, as discussed elsewhere in this report offer a perfect example of such an attitude shift, greatly reducing environmental impact with out actually increasing permanency on non-removability of the camps.

Vulnerabilities assessment

The team's overall assessment was that the community-owned and -managed nature of shelter provision had led to many common areas of vulnerability being effectively dealt with, as shelter provision was from a basis of close community knowledge and solidarity.

Within this, however, there were still notable instances of vulnerability. The team did not have time to comprehensively research and assess; but the two broad categories could be summed up as

- Families and individuals within the long-established communities who are relatively marginal, such as women-headed households, and possibly people with disabilities (no direct instances of the latter were recorded).
- Members of newer communities, especially the more recently arrived, who have been less able to integrate into the power and information systems; a particular sub-set is recent arrivals who have come not directly from areas of conflict or direct abuse, but via stints working in Thailand; and whose entitlements are controversial.
- Cross-cutting and to some extent defining these vulnerability categories are factors such as lack of labour power within the family; lack of skill in construction (common among refugees from urban areas); lack of either supplementary cash income, or means of access to supplementary building materials.

There is currently a lack of public and defined indicators of vulnerability, or clear statement or understanding of what kinds of extra assistance should be provided to different categories of vulnerable people.

It is therefore recommended that TBBC with support from Benchmark further develops its own vulnerability assessment tools; Benchmark could provide examples of systems used in other refugee camps and settlements with comparable conditions; these to be workshopped with TBBC staff and camp committee members in different locations to agree on indicators accepted in each camp, and from there developed into a standard assessment tool which could be combined with other assessment and mapping tools currently in use or under development.

Mapping

Accurate mapping provides a starting point for any discussion on Settlement Planning as well as assisting greatly in managing shelter distributions and identifying patterns in vulnerability.

Ideally mapping would be conducted utilizing GIS equipment, defining streets, contours, landmarks and creating a database down to the household level. This data base would then be used to record population and household density as well as materials distributions as they occurred, hence tracking house age and material life expectancy.

A broad range of benefits could be gained from accurate camp mapping:

- Tracking household size and population density, ethnicity, household makeup against material distribution, would provide valuable data for analyzing equity issues such as, Space allocation within camps, access to resources by sectors of the camps
- Settlement planning may be enhanced through more accurately locating needs for schools, drainage, WATSAN planning, road access,
- Contingency planning may be able to better prepare for sudden inflows of refugees, how to mitigate and respond to potential threats such as land slides, flooding, spread of fire
- Good mapping of camp needs and resources would provide clearer base line data for key actors who are not present on the ground, such as donors or for discussions with the Thai authorities, military or international agencies
- A map based database would be of great assistance in any shelter trial projects such as the introduction of treated or smoked bamboo, to track where and when specific materials were used for later back reference and tracking

It is essential that mapping activities are undertaken by objective well trained and skilled individuals. Resident databases must be managed with a degree of transparency but also with confidentiality regarding personal data

Mapping projects such as this are commonly of great interest to Universities in training Architectural and Town Planning students. Initial discussions with a number of professors by the Benchmark team indicated an enthusiasm to assist with such a mapping exercise, hence base costs could be kept quite low. Discussions were also had with key TBBC staff who are already undertaking GIS/GPS mapping exercises tracking refugee movements across the border, these staff appeared enthusiastic and capable of assisting in the setup, implementation and supervision of such a project.

Cost/benefit

There are two options:

1. The university option as mentioned above. Some teachers interviewed think it would be possible to do basic maps with GPS, Google earth, and a team of students for a summer camp. The cost here would mostly be for expenses like transport and accommodation and teachers' fees. But this would need to be assessed for match with combining the mapping with the existing TBBC database of households and population.
2. Go with the recognised expert: นายบุญชาญ บุญทศ (Booncharn Boonthos) 08-1952-9149. He has been highly recommended to Benchmark – cost would obviously depends on the size, location, difficulty, level of details,

Mapping should be done in collaboration with other sectors – e.g. WASH. This can also be a way of sharing out cost.

Comprehensive mapping does offer potential cost savings in terms of clearer needs identification; it is easier to have discussions about land and settlement equity with residents when you display information visually. Maps generated by either process could be used in conjunction with the new TBBC camp database being implemented, with additional information, such as how old the house is, in order to allow TBBC and the camp committee to further plan the camp as well as knowing better which area/sectors would require most building materials that year, taking a three-year cycle as average.

6.2.2 ALTER DISTRIBUTION SYSTEM

TBBC staff have clearly expressed concern that there is never any guarantee of ongoing funding for shelter, and that with global cut-backs in the aid sector it is important that there is preparedness for reduced shelter distributions where possible.

This analysis appears quite accurate and a simple solution proposed by both staff and some camp management committees we spoke to would be to move to a distribution based purely on assessment of vulnerability and adequacy of shelter.

A number of the camp management committees expressed real and valid concern about the increased pressure that such a system would bring to bear on those in charge of shelter distributions and the increased risk of corruption as a response to this community pressure.

As always the best way forward is probably a combination of both method of distribution. Improving material and design/build quality and durability through the adoption of a range of recommendations in this report, will result in a reduced need for shelter materials within the community to achieve a reasonable measure of shelter.

In reality, increased durability will only lead to larger houses, as families expand their homes to the maximum capacity of their resources. Hence it makes sense that improvements in durability should coincide with matching reductions in material supply, based on minimum agreed standards for shelter.

Distributing a reduced but more durable ration to all families will allow the healthy shelter economy within the camps to continue to function, if at a lesser scale. Tying into this however should be a separate distribution based on vulnerability, to act as a social net, filling in the gaps that a reduced broad based distribution could potentially create

To commence such a process of change, discussions should be undertaken within the community to define an accepted level of adequate shelter and a community agreed criteria for vulnerability. This criteria may need to vary from camp to camp or even ethnic group to ethnic group, with the most important thing being that it is agreed on, through a process that allows the community to 'own' the decisions they have made.

6.2.3 STAFFING

To date TBBC has largely treated Shelter as a NFI, conducting regular distributions with little other real involvement in the day to day practice of Shelter and Settlement planning. To move forward at all with any major changes in the way shelter is practiced within the organisation, dedicated shelter staff need to be on hand to guide the process.

Ideally Shelter staff should have current and preferably diverse experience in the Humanitarian Shelter Sector. The sector itself has changed a lot over the last 10 years, growing and developing a range of concepts and standard practices in shelter provision, some though not all of these sectoral practices are documented in a number of the reference documents as annexed, but many are still common practice items that good staff should know.

Its clearly difficult to expect non-shelter professionals to have an understanding of all of the issues around shelter, so what we see at TBBC is that the more obvious issues are dealt with well whilst more complex issues, cross cutting, site planning have tended to slip off the back burner.

Recommending the hiring of a Shelter Manager in Bangkok, who travels to the different field offices: Along with each field office having a staff member dedicated to shelter, either as their sole responsibility or if this is not financially plausible as a recognized part of their job description.

As well as the hiring or allocating of shelter staff within TBBC, the same process should be supported within both the camps and camp management committees and the other CBOs and Partner organisations that TBBC works with such as the Karen and Karenni associations

The hiring and allocation of dedicated shelter staff should be undertaken in conjunction with training as described elsewhere in this document. In saying this however it should be recognised that the majority of any training is through both mentoring and onsite learning, and adequate support systems should be put in place to ensure that the processes are in place for these forms of learning.

A brief suggested Job Description for a TBBC Shelter Manager in support of the implementation of this recommendation is at Attachment 9.

6.3 MEDIUM - LONG TERM

6.3.1 BEST PRACTICE MANUAL

As has been noted elsewhere in this report, the quality of construction varies greatly across the camps. The factors behind this have now been discussed in some detail, but include, vulnerability culture and ethnicity but also on a much more practical level, simple differences in background knowledge about bamboo construction.

TBBC and the Thai Border camps have a great opportunity to document what is current best (and worst) practice for bamboo construction, through this constructing a simple manual for bamboo transitional housing.



Example of worst and best practice in floor joist lay out.

Such a document would proffer a number of benefits to TBBC and the broader community.

Cross-fertilization

Assisting sub communities within the camps to discover the reason other members of the camp undertook a particular practice

Improving baseline of construction

The availability of such a manual to those with lesser knowledge offers a real potential for improving the base standard of shelter within the community. This base line improvement would have real benefit to communities returning or relocating

A training manual

A Best Practice manual would easily form the basis of a training program in bamboo construction. Such trainings could be based around practical sessions of building the house of a vulnerable member of the community

A document for promoting self build bamboo camps

The Thai boarder camps are a unique example of supported community managed construction on a large scale by an affected population. Document what has worked well and not so well, recording common pitfalls and simple practical recommendations, would supply the broader humanitarian sector with a valuable tools for promoting this alternative model of construction

Any such document, would ideally be extremely visual, perhaps to the point where an accompanying VCD could be an appropriate way of sharing important points and details

6.3.2 MASTER CARPENTER TRAINING

The aim of this project would be to increase the baseline of carpentry skills across the camps, and through this to create:

- a) Greater durability and stability in shelters
- b) Increasing background knowledge about all aspects of bamboo construction amongst the refugee community
- c) Providing valuable skills for return or relocation
- d) Creating employment opportunities through developing skilled teams of local tradespeople for use in the construction of public buildings within the camps
- e) Enhancing the local building economy through the creation of a pool of skilled and tooled tradespeople

The project would aim at identifying a group of already skilled bamboo tradespeople within one camp; test them on their basic knowledge of bamboo construction; then go through a project with them of developing a training manual for which they would become trainers.

It would involve an interactive process, where local skills and traditions were recognised and supported along with the introduction of improved skills and practices.

Much of what would occur would be the documenting of why people currently build in a specific way what the base construction theories are, and how we can better appropriate them into vernacular architecture. In this way, whilst promoting and protecting traditional Karen/Mon/Karenni or other architecture, we also assist them in a process of adopting easier or better methods.

Some of the areas for improvement would include;

- Bracing,
- Tiedown,
- Nodal placement,
- Harvesting theory,
- Spatial design,
- Door placement

Teams being trained would work on housing for the most vulnerable or community facilities, hence all projects would be 'real' and conducted in real time.

Ideally this project would work in with the Best Practice Manual project.

The second step of this project would be a roll- out phase, based on a T.O.T process, training the already skilled individuals who could demonstrate best practice as trainers for other tradespeople

The project should be conducted with the support of other agencies to encourage the use of these carpenters in public building construction.

Part of this process would be the documentation of minimum acceptable standards for construction.

This will require a staff member to manage it; preferably someone with curriculum development, and or training, capacity building background, either from an architectural or construction background.

The above model for carpenter training is one example of the type of training project Benchmark would see fit to design as part of the next steps for TBBC in improving overall shelter standards. If this basic approach is agreed, we would envisage designing similar modules for the following categories of people:

- a) Receiving staff
- b) Camp Committees
- c) TBBC Staff and CBO partners of TBBC

6.3.3 GROWING BAMBOO

Changing the practice from purchasing harvested wild bamboo, to actively cultivating it, could have far-reaching benefits in economic and environmental terms. Possible approaches directly by camp residents, or in collaboration with neighbouring communities, are briefly spelled out below:

In-camps:

In some camps, bamboo has already been planted by residents. One small species was noted in several camps; it has a solid non-tubular section, and is ideal for

- Producing leaves for livestock fodder
- Solid sections are ideal for tool handles; bracing; batons and small rafters
- Shoots provide a supplementary food source for residents.

The main purpose of in-camp bamboo cultivation would be less to reduce the amounts required to be purchased from outside, but to achieve several complementary benefits, of which the main ones are

- a) Educating people about bamboo growth and harvesting, potentially leading to better community understanding of benefits of good harvest practice, and so reducing current negative impacts of several camps on surrounding forests where they have harvest access.
- b) Providing both food for residents (shoots) and livestock fodder (leaves)
- c) Positive settlement planning impacts – possibly the most important reason. Bamboo clumps growing beside pathways provide shade; soften the impact of hard rain; strengthen banks of rivers and waterways; reinforce path edges; and reduce soil run-off and erosion.

Beside-camps

Initial discussions by Benchmark consultants with Forestry field staff regarding the concept of camp communities leasing land to grow some of their own bamboo supply were extremely positive. Forestry officials saw this as one good way of solving the current negative impact of some refugee populations on national parks and state forest through poor harvesting practice.

This would mean TBBC either leasing sites adjacent to camps, where bamboo could be grown and harvested; or, where local regulations or specific geographic conditions will not allow this, entering into contract arrangements with local communities to grow particular kinds of bamboo for supply. Locally-grown bamboo could reduce supply costs drastically, as up to 65% of the cost of each delivered culm is currently costs of transport and delivery from distant harvest areas. This approach would also assist in developing healthier economic and social relationships with the adjacent Thai communities.

Other benefits offered include:

- Ensuring an ethical resource supply
- Ensuring a better product and more productive areas through better harvest management
- Providing opportunities for easily incorporating different treatments, including leaching and other pest reduction methodologies, into the production chain.
- Opportunities for camp residents and TBBC staff to learn and train others in all aspects of bamboo cultivation and treatment.
- Improve relations with forestry and other government services as the impact of camps on the immediate environment comes to be seen as more positive

It is not possible at this point to give useful estimates of total likely production, as this would be dependent on a number of variables, including species; location; rainfall and cropping practice. Most importantly, this cultivation should avoid monocropping, to ensure supplies to meet diverse construction needs and minimise losses from flowering events, pest infestation, etc. At this point, a useful estimate of mixed crop production in ten very different locations cannot be given, but if TBBC chooses to pursue this path, Benchmark could research some of the available data and calculate to give some initial possible figures.

6.3.4 LEACHING

Current practice

Leaching is done far less than could optimally be done to treat bamboo for construction; the main instance in which it is done is when bamboo already cut and split for flooring is already showing signs of insect infestation. When asked why, given the benefits for reducing insect infestation and improving durability, they did not do it more routinely, camp residents generally replied that.

- The process takes too long, and there is a short window of time available between receiving bamboo and the onset of the wet season.
- Downstream effects are a problem; effluent from the bamboo pollutes the water when streams are used.
- Organising this systematically with the current distribution system and lack of warehousing would be a major challenge.

Potential practice

Given basic willingness to follow this method when feasible, the practice could be made more common through:

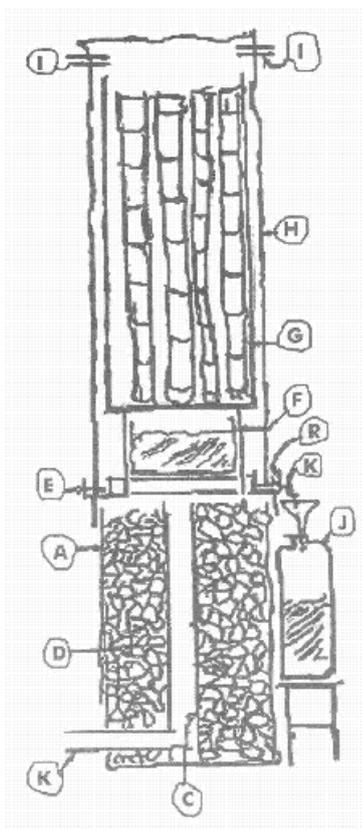
- Improving delivery times and schedule via the measures noted above.
 - Organising systematic use of streams for leaching where there are no immediate downstream communities.
 - In other cases, using either a system of pumping water over the bamboo, or digging specific leaching ponds. In both cases, the effluent can serve as a valuable fertilizer, and could be integrated into the current camp horticulture projects.
-

6.3.5 SMOKING BAMBOO

In many places across the world, one traditional method of treating bamboo to increase its usable life in construction is through smoke curing. The actual practice of this varies greatly across the world though the principles are fairly consistent. In some parts of Japan and China this practice has been used to preserve the bamboo in now ancient temples, whilst in Peru and Columbia, whole houses were closed up and smoked upon completion. These houses lasted 10-20 or even 50 years longer than their untreated neighbours.

The tradition of smoke curing bamboo is known in the camps, mainly used for treating the split bamboo used as spines in thatch roofing shingles, and for the bamboo strings used for tying the thatching to the roof frame. It is also used incidentally, with recognition that reused bamboo from burnt houses or from over kitchen areas actually lasts longer than normal bamboo,

“because the pests don’t seem to like it much”. This pre-existing knowledge and acceptance of smoke curing bamboo may make introducing this method on a broad scale more acceptable and prone to adoption than other preservation methods that could be suggested.



Sketch of combined smoke treatment system



Smoking kiln in Latin America

How it works

Smoke treatment of bamboo potentially works at four levels;

- First, for freshly cut bamboo, it is a simple and rapid method of drying out the bamboo whilst killing off any pests that may already have taken up residence,
- Secondly, smoke treatment coats the outside of the bamboo in a creosote-based residue that is unpalatable to most pests, making them less likely to eat their way into the softer inner layers of the culm.
- Thirdly, smoke treatment can penetrate deeply into the bamboo if nodes are knocked out, or culms are flattened (as in for flooring); this means both the inside and outside of the culm are less attractive to most pests.
- Finally, if bamboo is smoked in enclosed kilns for a few hours, with a controlled, relatively high moisture level and a temperature maintained at between 150-200 degrees Celsius (details

depending on species and other factors), it is possible to produce the correct conditions to cause the lignin in the walls of the culm to plasticize, binding the cellulose structure in a solid plastic-like form that is exceedingly durable, and even resistant to rot caused by excessive moisture.

Much research has been undertaken in Columbia regarding smoke treatment of common species there, perhaps culminating internationally with the design and construction of a massive bamboo pavilion at the Munich Expo by a famous Columbian architect. This was the first time bamboo had been allowed for commercial construction in the highly regulated German building industry.

More recent research has been conducted in both Japan and China, identifying why and how some traditional bamboo structures are thought to have lasted for hundreds of years, whilst the EBF in Bali is now planning its own work on smoke and heat treatment of Indonesian bamboo varieties. In Thailand, smoke treatment is traditionally used for some handicrafts such as basket weaving, but not to the knowledge of the consultants for general construction.

Some of the work conducted in Latin America has focused on producing kilns that combine charcoal production from bamboo off-cuts and bamboo waste, with smoke treatment and bamboo vinegar/creosote distillation. Such a treatment system seems ideally matched to the needs of the camp both in terms of durable building materials and charcoal for cooking.

One of the great advantages of smoke treatment over other treatment systems is that smoke treatment does not involve using harmful chemicals, or introducing processes or chemicals that could concern Thai Authorities or camp residents.

Practicalities

Setting up a combined smoke treatment and bamboo charcoal production plant would involve a reasonable amount of research and planning. Although there is extensive knowledge about bamboo charcoal production in Thailand, as far as the authors are aware there has been little or no research on smoke treatment of whole culms. This does not however preclude this as a viable project, but indicates that the project would require a budget designed to include a research component along with a piloting and testing phase.

- Such a trial project would be best conducted either in or beside one of the larger camps, where space can be found for creating trial kilns, and storing treated and untreated bamboo.
- Perhaps best to involve another NGO or CBO to do the day-to-day management, with TBBC supporting and buying the product, so this project does not become overly burdensome for TBBC staff (this would depend on TBBC's relationships with their donors and the CBO or NGO involved)
- EBF Bali are currently planning similar trials and so could be a strong support organisation, perhaps advising on setup and joining in proposal writing.

Cost-Benefit

There is no doubt that the initial cost of research and construction of a trial smoke treatment plant would be considerable, but exactly how considerable is beyond the current brief of the consultants to determine and perhaps more to do with the scale at which TBBC and funders would wish to commence such a trial.

However, with such setup costs in mind the benefits are also potentially quite significant. Once resolved such a concept could potentially be rolled out to all the camps, producing bamboo with at least a five to ten fold increase in usable life expectancy over untreated bamboo, and producing fuel stocks from waste bamboo and other offcuts. The project offers great potential in terms of in-camp livelihoods and skills

development, and a clear potential for immediate environmental gain to Thailand and the potential for adoption by refugees upon return or relocation to spread this reduced impact

The durability of smoke treated bamboo is still dependant on the broad range of factors identified elsewhere in this report that impact on bamboo durability, including design of structures for protection from wind, rain, sun and ground contact; time of harvest; and handling during transport and storage. These factors combined with the range of factors that can affect the smoking process, make it difficult to predict the durability of smoked culms. It would, however, be reasonable to expect that durability could be raised from the current 2-3 years to beyond 10 years on average. If all factors were dealt with perfectly, durability beyond 20-30 years appears achievable. Such a lifespan is far longer than the increased durability that TBBC is seeking for its projects, and hence provides some measure of flexibility to the project in achieving a sufficiently durable outcome for the given expenditure.

Risk

There are a range of risks in developing such a project that should be considered, so that appropriate amelioration measures can be put in place. These include but are perhaps not limited to:

- a) Failure to find an appropriate balance between heat, time, steam and charcoal production with Thai species of Bamboo that results in sufficient durability

The risk of this could be greatly reduced by extensive research into current practices around the world; such research could be conducted as a one-off tender by an appropriate independent consultant, or possibly by engaging a masters-level architectural or bamboo construction student.

Trials should be conducted with multiple species to ensure the greatest diversity of possible outcomes and to address the species diversity issues as identified elsewhere in this report.

It should be noted that this project would be an ongoing learning project, improving over time. Ideally, this project would include an implementing partner, interested in the long-term development of such technology in Thailand beyond the life of the camps. Finding and supporting such a partner would greatly reduce the risks to TBBC.

This project should be considered in conjunction with a range of other projects, to spread risks and to maximize benefits. Many of the other projects recommended within this report, such as planting bamboo, leaching, and bamboo theory and construction training would complement this project, and could be designed so that each project is independent, not codependent.

- b) Poor reception of smoke treated bamboo by residents, perhaps for cultural or unidentified practical reasons.

Any proposal to donors for such a project should include an initial funding round to cover such base issues, including perhaps focal group discussions with residents and informal discussions with Thai Authorities etc.

- c) Lack of funding

Negotiations with donors should be based on achievable targets for research, plant construction and material production.

A funding source for at least the first few years should be clear prior to commencement of such a project.

The project should start at scale sufficiently small to be manageable but large enough to have sufficient potential impact to make it worthwhile.

6.3.6 BORAX & BORACIC ACID

Treatment of bamboo with a range of borates such as borax and boracic acid, is perhaps the most common method of treatment within the 'modern' bamboo design world. This treatment has proven popular due to the wide range of treatment methods, its relatively low cost, low environmental impact, low danger and the reasonably long durability of the treated product. Bamboo adequately treated with borates can be expected to last for around 20-25 years in construction, though again it must be stipulated that good design, build and bamboo handling practices must be in place to achieve that goal. No amount of chemical treatment will overcome poor treatment of the base material.

Borate treatment of bamboo is already known and practised within Thailand although it is difficult to state how well, or how extensively. Bora-Care is a borate-based preservative product that can be purchased on the open market in both small and large quantities.

Borates are exceedingly fine particles that are dissolvable in water, commonly purchased in the form of borax or boracic acid. The fine particles readily penetrate throughout the bamboo, through the cell walls into every component of the culm structure, leaving the bamboo unpalatable to pest infestation, as well as acting as a flame retardant and anti-fungicide. Perhaps the only disadvantage of borate-treated bamboo is that the heightened salinity within the culm results in increased surface tension and hence an increased propensity to wick moisture when exposed to rain or ground contact. This again reinforces the need for good design and construction training.

Treatment methods

Borate-based treatment of bamboo can be conducted in a number of ways, perhaps the simplest or most common of which is simply soaking the bamboo in a watered down solution of borax and boracic acid. Soaking times can be shortened by ensuring full immersion of the bamboo, sufficient concentration of the solution, agitation or warming of the liquid, and ensuring that nodes are punched through or holes are drilled between nodes to allow easy access to all surfaces areas of the culm.

A more efficient treatment method that has been developed in Bali is the vertical soak method. In this method, all of the nodes in the culm are pierced except for the bottom node, and the culm is stood vertically. The bamboo is then like an elongated cup filled with borax solution that is continuously topped up as the liquid seeps through to a tub below where it is collected for reuse.



Indian ARTI treatment system



Diagram of vertical soakage system

Aside from simple systems based on soaking, bamboo can also be treated by pressure-based systems, such as attaching a hose to the end of the bamboo and forcing the borax/boracic acid solution through the bamboo either through the use of a pump or gravity (the *bouchure* method). Ideally, pumped treatment solutions are implemented as rapidly as possible after bamboo has been harvested, before the cellular vessels and the vascular system of the plant has collapsed (within 2-3 days).

Yet other methods of application are best conducted at the time and place the bamboo is actually cut. For example, the bamboo can be stood in a drum of the borate solution and allowing the natural process of photosynthesis and transpiration to suck the liquid up into the plant, replacing the sap. Another method involves attaching a hand pump with a pipe to the thin end of the cut bamboo, to force the sap out the base of the cut culm by injecting solution in from the top.

It would appear that of the most common borate treatments methods, vertical soak would probably be the most suitable for the Thai Burmese border camps. With this system, the time delay between harvest and treatment is not as critical as it is with some other systems, and the required land area and soaking time is less than for horizontal soak. Additionally it is felt that treatment systems that need to be conducted at point of harvest would be overly dependent on under-reliable suppliers and contractors, who could attempt to save money by using less borates, resulting in a deficient product. The final reason for recommending this system would be the high level of documentation and technical support available within the region (largely through the work of EBF and INBAR).

Practicalities

- To short-cut the research required to create a perfect treatment system, TBBC should consult directly with agencies experienced in this system of treatment - EBF or P.T Bambu in Indonesia or other INBAR members in India or elsewhere in Asia would be logical partners. It may also be possible to advertise for and hire someone with previous experience as a manager or constructor of such a plant, as these skills and such plants do exist around the world
- Onsite treatment facilities should be seen as the most preferred outcome, both for the simplicity of minimal change to the supply chain and for the livelihoods and educational opportunities such a plant would produce.
- There may potentially be issues with the Thai Authorities about bringing 'chemicals' into the camps and also about building durable structures. This may be overcome simply by using the brand name product Bora-Care or through offsite rather than onsite treatment. In some countries such as Indonesia, post 9-11 counter terrorism paranoia has left borax incorrectly perceived as a dangerous chemical such as some powdered fertilizers that can be used in bomb production, whilst in reality it is remarkably benign.
- If in-camp production is not possible due to either space or government restrictions, the setup of a warehouse and production facility within the area is also quite feasible. Suppliers could then be asked to drop materials at the warehouse in one season, with TBBC and or its partner treating and storing and delivering bamboo either in the same season or the next. The additional difficulties of

becoming involved in the transportation and delivery of bamboo across Thailand and the restriction issues that this may face must be considered in such a strategy. Possibly renting private or forestry land at the edge of the camp would overcome these issues

- It may be possible for TBBC to work with one of the suppliers to develop an external supply of pre-treated bamboo. This is quite plausible as, unlike untreated bamboo, treated bamboo can be prepared and stored for years in advance, providing a number of supply chain advantages for both the supplier and TBBC. The difficulty with purchasing from an external supplier is that the procurement system would then have to include a random checking and testing system to ensure borate penetration is consistently as extensive and potent as required. This could prove troublesome, because unless the supplier is dedicated to the production of high-quality material, reducing chemical inputs is a simple method of cost saving.

Cost Benefit

Cost benefit analysis work by a number of agencies such as EBF, INBAR and ARTI, would indicate that once up and running, bamboo treatment generally doubles the cost of bamboo, whilst increasing its durability 5-10 times. In addition to this simplistic analysis it must be noted that research, construction and trialing of the development and deployment of such a plant would incur costs that may take 1-2 years to pay back.

Risk

Thai government officials may at first approve production of treated bamboo, then change their mind

This could be ameliorated by clear discussion and written approval prior to the creation of an in-camp plant. If not politically practicable, then offsite treatment is unlikely to ever even be on the Thai government's radar and may avoid unnecessary complications

Failure in treatment process

Hiring the appropriate expertise to assist during the setup phase and to train staff

Lack of acceptance by community

Clearly documented distribution and data tracking to the down to each stick to prove to the camp the products durability

Ensure that camp residents have improved quality of tools, as treated bamboo is harder to saw, chisel, than the green bamboo they are used to dealing with

Poor treatment

Set in place a random sampling and independent testing procedure to ensure quality control

NOTES:

Failure of bamboo in construction is more likely to occur due to poor construction than poor treatment, such as excessive exposure to ground contact or to rain; hence it is essential that the creation of a higher grade material goes hand in hand with a training program on quality design and construction.

The authors feel that although potentially simpler to implement, due to the high level of available research and support in the region, Borate treatment does not have anywhere near the potential benefits that a

smoke treatment system has to offer. No use of chemicals, charcoal production, existing community knowledge of the benefits of smoke treatment all make the system more appealing in the Refugee camp situation.

6.3.7 OTHER AREAS

Other areas of construction which are susceptible to improvement through similar combinations of modified technique and training include

- Grass thatch
- Preparation of woven bamboo panels
- Woven sheeting

All of these are also susceptible of providing in-camp activity, skills building and income generation. Benchmark can readily provide outline of how the approach could be undertaken in each case should TBBC decide to explore this path.

7 CONCLUDING COMMENTS

While the overall standard of shelter in the camps is good, complex issues such as equity, construction quality, camp management and population flux continue to cause stress and concern at both the camp and organisational level. This report will hopefully enable TBBC to be better equipped to engage with these ongoing shelter issues. A major step towards dealing with those issues is recognising shelter as a sector in its own right and developing clearer shelter policies through community-orientated processes.

Although much of this report details aspects of shelter practice and procedure in day-to-day camp management, it is important to highlight areas for further possible investigation and documentation that reflect TBBC's unique experience and position globally. TBBC has much to offer the international shelter sector and global bamboo community, and equally, stands to gain much from greater interaction with these international networks.

Documenting community based camp management as best practice

The community-driven rather than agency-driven approach used by TBBC and affiliates in camp management is an exemplary instance of community-based approach to shelter. Such projects are rarely well-documented or presented within the shelter community, with the result that the shelter sector becomes overly dominated by the work of more top-down organisations such as UNHCR.

This lack of clear documentation of community-based models leaves the work of organizations such as TBBC sitting slightly outside the mainstream approach, and hence facing criticism and support rather than being celebrated as the success that is. Documenting the issues that have arisen from this approach would also be useful to provide advice to agencies doing similar work.

Documenting the Thai-Burmese border camps' use of bamboo in transitional shelter

A lack of fundamental knowledge about bamboo as a building material amongst largely western donors and large humanitarian organisations leaves this highly sustainable material largely overlooked in transitional shelter discussion. Much of the world's transitional shelter work continues to focus on wholesale use of CGI and timber, for example in the UN-lead East Timor shelter response in 1999-2001. As manager of one of the largest, if not the largest ongoing bamboo housing project in the world, TBBC has the opportunity to make a valuable contribution to the humanitarian sector in both improving and increasing its usage of this sustainable material.

Connecting into the global bamboo community

It may be of great value for TBBC to connect into the broader bamboo housing community, tapping into such organisations and networks such as the Environmental Bamboo Foundation and INBAR. The bamboo construction work undertaken in the camps could benefit greatly by research into similar large-scale bamboo temporary shelter projects, particularly in Latin America, the other major hub of bamboo knowledge in the world.

TBBC also has the potential to have a strong impact on the bamboo construction sector in assisting that sector to understand the needs of the humanitarian sector in regards to bamboo, both in terms of research and product development as well as resource supply.

8 APPENDIX

8.1 TERMS OF REFERENCE

THE THAILAND BURMA BORDER CONSORTIUM (TBBC) TERMS OF REFERENCE

Consultancy - Shelter Options and Needs Assessment Burmese Refugee Camps in Thailand

CONTEXT

The conflict in Burma has caused refugees to flee to Thailand since 1984. The number of refugees currently sheltered in camps in Thailand is around 140,000. It is not yet safe for these refugees to return to Burma. These refugees are now almost 100% dependent on relief aid. TBBC has been providing food, shelter and non-food items to Burmese refugees along the Thailand/ Burma border since 1984. TBBC's activities are based in Thailand. TBBC works under agreement with the Royal Thai Government and reports on a regular basis.

Mission Statement: The Thailand Burma Border Consortium, a non-profit, non-governmental humanitarian relief and development agency, is an alliance of NGOs, working together with displaced people of Burma, to respond to humanitarian needs, strengthen self-reliance and promote appropriate and lasting solutions in pursuit of their dignity, justice and peace.

TBBC Objectives: TBBC's core objectives as set out in its Strategic Plan for 2005-2010 are:

- To ensure access to adequate and appropriate food, shelter and non-food items for displaced Burmese people.
- To reduce aid dependency by promoting sustainable livelihood initiatives and income generation opportunities
- To empower displaced people through support for community management and inclusive participation, embracing equity, gender and diversity
- To advocate with and for the people of Burma to increase understanding of the nature and root causes of conflict and displacement, in order to promote appropriate responses and ensure their human rights are respected.
- To develop organisational resources to enable TBBC to be more effective in pursuing its mission.

CURRENT TBBC SHELTER POLICY

Bamboo, eucalypt, thatch and leaves are provided annually during the dry season for repair of houses, community buildings, warehouses and construction of new houses/common facilities. This policy does not allow for use of permanent materials but TBBC has piloted mud-brick warehousing and plans to extend this project. During the last six months of 2007 a review was carried out of ration levels, procurement options, particularly for bamboo, and building supply distribution and monitoring procedures.

Here some mention of the types of building materials that the refugees live in and that are procured and used by TBBC – eucalypt wood for posts, bamboo for flooring, walling and roof supports and also leaf and grass thatch for roofing.

An internal needs assessment carried out in May/ June 2007 was inconclusive although a majority of refugees considered the standard rations set in 2005 to be inadequate. Many refugees continue to procure or trade bamboo themselves to make up for deficiencies, while less than a quarter of those interviewed felt that a reduction of the ration was acceptable. However, even before funding shortages eventually forced ration cuts, market conditions which make the price of bamboo exorbitant and difficult to procure, were forcing TBBC to consider reduced rations.

In an effort to find cheaper and more transparent bamboo resources, TBBC reviewed all possible procurement options, including importing from neighbouring countries. This however proved not to be viable in terms of both price and availability. Legal advice was sought on procurement in Thailand and it was identified that the forestry department at the regional level can make bamboo available from forest clearing operations such as preparations for dam construction. This option will be considered for 2010 but supply is likely to be limited and not a substitute for traditional procurement sources.

TBBC must therefore continue to procure bamboo on the local market and due to the funding shortage has been forced to reduce rations considerably for 2008. The standard rations have been reduced to provide an overall saving in the operating budget. Each field office has been given flexibility to work within the reduced budget, but in general bamboo rations have been cut by 55% whilst roofing materials have been increased by 10 % to provide better weather-protection of the other materials. Overall provision for the construction of new houses has been reduced from 10% to 5%.

Given the ongoing challenge of providing adequate building materials, increased attention has been given to improving distribution and monitoring procedures to minimise diversions and better ensure that quantity and quality of supplies match contractual obligations. This is no easy task since building materials present unique challenges:

- bamboo is sourced in many places and suppliers tend to deliver as soon as it is available rather than to any set schedule. This makes delivery unpredictable for recording and monitoring purposes and results in irregularities in signing delivery receipts
- poor lines of communication between camp committees and suppliers contribute to difficulties in anticipating deliveries and confirming contractual obligations
- volumes at delivery are huge, making storage difficult. Distribution often takes place straight from the delivery vehicle making control and recording problematic
- 2 sizes of bamboo are contracted for some camps but high tolerances are expected making control very difficult.
- Many additional demands are made on building supplies delivered by TBBC. Although TBBC allows for extra needs, there are often additional requests from Thai authorities, camp committee requests for public buildings (religious, education, health) and NGOs/ CBOs who have not properly budgeted their own building materials rely on the camp supply or purchase from the refugees

- There are relationships between some suppliers, local Thai authorities and camp leaders.

For these reasons, monitoring of building supplies has not been as rigorous as for other commodities and for 2008 the following measures were introduced in an attempt to strengthen the distribution/ monitoring procedures:

At delivery:

- Set delivery dates and times in supplier contracts.
- Increase systematic monitoring checks both at the suppliers' warehouses and on delivery to the camp.
- Ensure that all camps are provided with tools and specifications with which to determine that bamboo meets specifications.
- Ensure that delivery paperwork is properly completed and that camp staff understand the importance of doing this.
- Stipulate appropriate lines of communication in dealing with quality issues. i.e. between the camp committees and TBBC field staff.
- Ensure that bamboo are set aside and counted prior to distribution.
- Order only one size of bamboo to simplify monitoring.
- Be aware of links between suppliers, Thai authorities and camp leaders

At distribution:

- Specify and agree standard distribution procedures. Families should arrive in groups of 10 households. Bamboo will be set in piles, according to the relevant ration amount and an adequate number of camp staff must be present to monitor and record the distribution.
- The receipt of building materials must be recorded in the newly designed Ration Books.
- Inform camp committees that people are entitled to their full ration without any 'taxation'.
- Inform NGOs that they are responsible for purchase and delivery of building materials for buildings used for their respective programmes.
- Inform the general population that according to TBBC policy, building materials are not to be sold. Inform NGOs and CBOs that they must not purchase supplies from refugees including the camp committees.

Post distribution:

- Formal documentation of household visits. Results are included in monthly monitoring reports.
- Check ration books to verify receipt according to ration.

Although above measures have been introduced, their implementation varies from camp to camp, and are subject to above stated relationships. Overall, the impact of above measures is questionable.

Based on our current system and the complexities around bamboo, the current procurement and distribution system is not sustainable. TBBC needs to look at options to extend the use of current bamboo

stocks or suggest new building materials and to conduct an external needs assessment of shelter needs in the camps.

OBJECTIVES OF THE EXTERNAL CONSULTANCY

1. Alternatives/options to current building materials
2. Treatment options for bamboo to ensure longer life span
3. Needs assessment (rations, vulnerabilities)
4. Look at legal options to outsourcing materials
5. Look at camp specific scenarios as some camps may provide more localised options for building materials as well as indigenous building/social structures

SCOPE OF WORK

- Review TBBC's current Shelter Policy
- Design a new TBBC Shelter Policy that looks at budgets, availability of building materials (current and recommended options), needs of the most vulnerable groups inside the camps and a general needs assessment framework.
- Analyse risks of this new Shelter Policy from the perspective of the beneficiaries.

METHODOLOGY

- Observe operations in Bangkok and Field during the delivery, distribution and post-distribution of the 2009 bamboo stock
- Meet with some of the key bamboo suppliers to understand dynamics of procurement, transportation, storage, delivery to camps and obtain their perspective.
- Desktop review of existing TBBC policies, procedures and other documentation
- Consultations with Refugees, Camp Committee Structures, Thai Authorities and other key stakeholders.
- Desktop review of alternative building materials that could be adaptable to the Thai-Burma border area

TIME FRAME

This consultancy should be completed in a span of 4 months commencing in early March, 2009:

NB: March-April: Consultant (s) need to observe the delivery of the 2009 bamboo stock (quantity, quality, distribution) to get a good understanding of current situation.

A total of 4 months consultancy to be done with final reports/recommendation (as per deliverables) to TBBC by July 1st, 2009.

DELIVERABLES:

1. A new TBBC Shelter Policy
2. A paper highlighting Recommended Long-Term Timber Construction Materials with specifications and logistics (e.g. treated bamboo or other materials...)
3. A Needs Assessment Strategy and Tool Kit to introduce in 2010 and beyond, based on needs indicators and highlighting vulnerabilities.

LOCATIONS/ TRAVEL

Mainly in the Field sites along the Thai-Burma border.

DOCUMENTATION AVAILABLE

- TBBC Strategic Plan*
- TBBC 6-monthly Programme reports*
- Financial Procedures Manual*
- Procurement Manual*
- Monitoring Procedures*
- Summary of Evaluations of TBBC since 1994, including 2007 ECHO Audit*
- ECHO Audit report 2007
- TBBC Organisation Chart

* Available on TBBC website: www.tbtc.org

8.2 GLOSSARY OF TERMS AND ACRONYMS

TERM	MEANING
Clump	Cluster of bamboo stems growing from a single rhizome
Culm	Individual bamboo stalk
Sphere	Humanitarian Charter and Minimum Standards in Disaster Response
ABBREVIATION	FULL VERSION
ARTI	Appropriate Rural Technology Institute
CBO	Community-Based Organisation
CGI	Corrugated Iron Sheeting
COERR	Catholic Office for Emergency Relief and Refugees
EBF	Environmental Bamboo Foundation
GIS	Geographic Information Systems
GPS	Global Positioning System
INBAR	International Network for Bamboo and Rattan
IRC	International Rescue Committee
NFIs	Non-Food Items
RTG	Royal Thai Government
TBBC	Thai Burma Border Consortium
UNHCR	United Nations High Commission for Refugees
WASH	Water, Sanitation and Hygiene
WATSAN	Water and Sanitation.

8.3 COMMON HEALTH PROBLEMS AND THEIR PREVENTIVE MEASURES¹

Major contributing factors

Preventive measures

Diarrhoeal Diseases

Overcrowding	<ul style="list-style-type: none"> • Adequate living space • Public health education
Contamination of water and food	<ul style="list-style-type: none"> • Distribution of soap • Good personal and food hygiene
Lack of hygiene	<ul style="list-style-type: none"> • Safe water supply and sanitation

Measles

Overcrowding	Minimum living space standards
Low vaccination coverage	Immunization of children with distribution of Vitamin A

NOTE: Immunization from 6 months up to 15 years (rather than the more usual 5 years) is recommended because of the increased risks from living conditions

Acute Respiratory Infections

Poor housing	<ul style="list-style-type: none"> • Minimum living space & proper shelter
Lack of blankets and clothing	<ul style="list-style-type: none"> • Adequate clothing and sufficient blankets
Smoke in living area	

Malaria

<p>New environment with a strain to which the refugees are not immune</p> <p>Stagnant water which becomes a breeding area for mosquitoes</p>	<ul style="list-style-type: none"> • Destroying mosquito breeding places, larvae and adult mosquitoes by spraying. However the success of vector control is dependent on particular mosquitoes habits and local experts must be consulted • Provision of mosquito nets • Drug prophylaxis (e.g. pregnant women and young children according to national protocols)
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Major contributing factors

Preventive measures

Meningococcal Meningitis

Overcrowding in areas where the disease is endemic (often has local seasonal patterns)	<ul style="list-style-type: none"> • Minimum living space standards • Immunization only after expert advice when surveys suggest necessity
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¹ Source of information, a handy guide to UNHCR emergency standards and indicators

Tuberculosis

Overcrowding	<ul style="list-style-type: none"> • Minimum living space standards (but where it is endemic it will remain a problem)
Malnutrition	
High HIV prevalence	<ul style="list-style-type: none"> • Immunization

Typhoid

Overcrowding	<ul style="list-style-type: none"> • Minimum living space standards • Safe water, proper sanitation • Good personal, food and public hygiene and public health education
Poor personal hygiene	
Contaminated water supply	
Inadequate sanitation	

NOTE: WHO does not recommend vaccination as it offers only low, short-term individual protection and little or no protection against the spread of the disease.

Worms, especially hookworms

Overcrowding	<ul style="list-style-type: none"> • Minimum living space standards • Proper sanitation • Good personal hygiene • Wearing shoes
Poor sanitation	

Scabies

Overcrowding	<ul style="list-style-type: none"> • Minimum living space standards • Enough water and soap for washing
Poor personal hygiene	

Xerophthalmia, Vitamin A deficiency

Inadequate diet following prolonged acute infections, measles and diarrhoea	<ul style="list-style-type: none"> • Adequate dietary intake of vitamin • If not available, provide vitamin A fortified food. If this is not possible, then vitamin A supplements. • Immunization against measles • Systematic prophylaxis for children, every 4-6 months
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Anaemia

Malaria, hookworm, poor absorption or insufficient intake of iron and folate	<ul style="list-style-type: none"> • Prevention/treatment of contributory disease • Correction of diet, including food fortification
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Tetanus

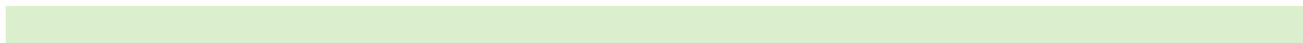
<p>Injuries to unimmunized population</p> <p>Poor obstetrical practice causes neo-natal tetanus</p>	<ul style="list-style-type: none"> • Good first aid • Immunization of pregnant women and subsequent general immunization within EPI • Training of midwives and clean ligatures, scissors, razors, etc
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Hepatitis

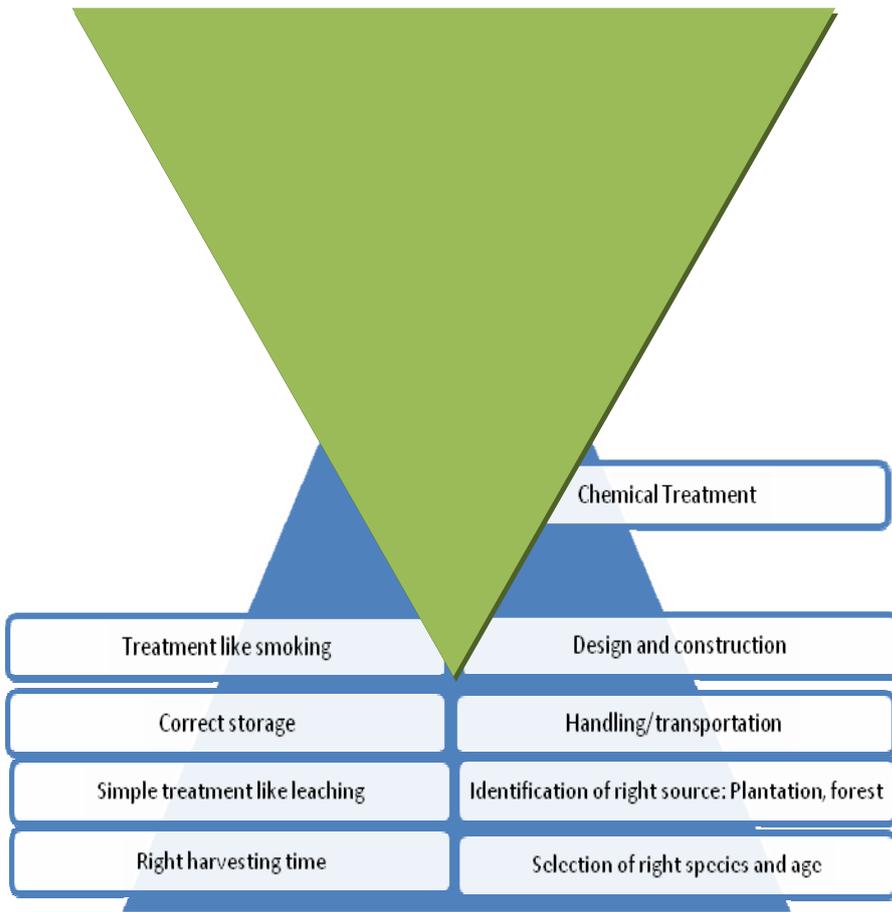
<p>Lack of proper hygiene</p> <p>Contamination of food and water</p>	<ul style="list-style-type: none"> • Safe water supply • Effective sanitation • Safe blood transfusions
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STD's/HIV

<p>Loss of social organization</p> <p>Poor transfusion practices</p> <p>Lack of information</p>	<ul style="list-style-type: none"> • Test syphilis during pregnancy • Test all blood before transfusion • Ensure adherence to universal precautions • Health education • Availability of condoms • Treat partners
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8.4 'LADDER' FOR DURABILITY OF BAMBOO



Cost Benefit of various process to ensure durability of Bamboo

8.5 PLASTIC SHEET SUPPLIERS

Bangkok

no.	Company	Answer	2. Do they have stock of them? And how many do they have in stock?			3. If they manufacture, how many can they produce? In a week? In a month?
			1. Do they manufacture Tarpaulins (= woven plastic sheet)? Specifications are minimum 190 gr / m2 and with reinforced sides.	a. Tarpaulin 4 x 5 meter	b. Tarpaulin 4 x 6 meter	
			price/baht	price/baht	price/baht	
1	Kittiwat Tarpaulins 02 4371616		1,800.00	2,160.00	19,200.00	5+++days made to order
2	Thaiwa Plastic 028630888/ 081 616 8068 Mr Katsakorn	Please check as sample they give				Qoutation
3	Bangkok Canvas 024124464	price as 120/m2 width side = 3.60m				5++ days made to order
4	Charoen Panich 02246315	Please check as sample they give width side must be 3.60 M	500.00	600.00	6,000.00	with in one month
5	YongFah Thai canvas 02 2219318	as same as sample from Charoen Panich width side =3.60 m	600.00	720.00	none	with in 20 working days
6	Park Chong Jute Mill Co., Ltd. Tel. 02 294 9222 - 36 Fax. 02 683 0704 Contact person: Mr. Teeranun					
7	Yannawa Canvas Ltd., Part. Tel. 02 211 0069 Fax. 02 211 4649 email: canvas_yannawa@hotmail.com Contact person: Mr. Kwanchai					
8	Extra Truck Cover Co., Ltd. Tel. 02 416 3456; 415 4041 Fax. 02 416 1128; Contact person: Ms. Jaithip					

Source: 1-5 CRS, as of May 2008; 6-7 ACF, as of June 2008

Dubai

no.	Company	Answer	1. Do they manufacture Tarpaulins (= woven plastic sheet)? Specifications are minimum 190 gr / m2 and with reinforced sides.	2. Do they have stock of them? And how many do they have in stock?			3. If they manufacture, how many can they produce? In a week? In a month?
				a. Tarpaulin 4 x 5 meter	b. Tarpaulin 4 x 6 meter	c. Tarpaulin rolls (normally 4 x 60 meter)	
				price/baht	price/baht	price/baht	
1	Global Relief Solution T: +971 4 341 7881 F: +971 4 341 7882 Mobile (24hrs): +971 50 552 0464 info@global-relief.com		P.E. Tarpaulin Sheets 4x5m 200gsm, UV treated, Water resistant, eyelets every 1m	4,000 in stock @ \$12.50			
			P.E. Tarpaulin Sheets 4x5m 180gsm, UV treated, Water resistant, eyelets every 1m	6,000 in stock @ \$10.00			

Mumbai

no.	Company	Answer	1. Do they manufacture Tarpaulins (= woven plastic sheet)? Specifications are minimum 190 gr / m2 and with reinforced sides.	2. Do they have stock of them? And how many do they have in stock?			3. If they manufacture, how many can they produce? In a week? In a month?
				a. Tarpaulin 4 x 5 meter	b. Tarpaulin 4 x 6 meter	c. Tarpaulin rolls (normally 4 x 60 meter)	
				price/baht	price/baht	price/baht	
1	Techno Relief Overseas	tel: +91 22 2838 3245/64, 2824 7527/28 fax: +91 22 2839 7117 india@technorelief.com www.technorelief.com	180gsm,	12,000 in stock @ \$9.75	3,000 in stock @ \$14.50	100 in stock @ \$142	

Source: ACF as of June 2008

8.6 BAMBOO: SPECIES, AVAILABILITY AND COMMON USAGE

No.	Common Name	Scientific Name	Properties	Common Usage	Soil condition	Harvesting	in Thailand	Market Price	Suppliers (for market price research only)
1	ไผ่ตง Pai Toeng	<i>Dendrocalamus aspe</i>	Larger variety, no thorn, shiny green colour, grey and white pattern at base, small fine hair throughout. There are several sub-species such as PaiToeng Mor, PaiToeng Dum (black), PaiToeng Keaw (green), PaiToeng Noo. 6-12cm diameters with 20cm between nodes.	In construction: used for posts, roofing; edible shoots	Soil: loam or sandy loam, good irrigation, pH 5.5-6.5; grow in almost all weather condition - 1,000mm annual rainfall, with access to clean water during the dry season.	From November to March at 3-5 years old	Central region, especially in Prachinburi and Karnchanaburi		Somjit Pantapeng, Trat Province t:086-077 3117
2	ไผ่สีสุก Pai SeeSuk	<i>Bambusa blumeana</i>	Large and tall bamboo, bright green, thorn-like stems at nodes, thick wall. 7-10cm or 8-12cm diameters with 4-10cm between nodes.	In construction: scaffoldings, fencing; furniture; weaving; paper making, eadible shoots.	Flood plains, river side, humidity and fertile soil.	In winter: 1-2 years old for weaving, 3-5 years for furniture making.	Central and Southern region		

No.	Common Name	Scientific Name	Properties	Common Usage	Soil condition	Harvesting	in Thailand	Market Price	Suppliers (for market price research only)
3	ไผ่ลำชะลอก Pai Lummalog	<i>Bambusa longispiculatar</i>	Medium to large bamboo, large clump with spacing between culms, upto 10-15 m high, clean culm bases, shed leaves every summer, dark green, smooth node, leafing start 6-7 m. off the ground, 1-2cm thick walls with smooth internal skin, hard walls, no thorn, medium length between nodes (?)	good for constructing scaffolding, edible young shoot, leaf used for medicine, root also used to cure renal problems	Flat ground with all year round water	during winter	All region		Somjit Pantapeng, Trat Province t:086-077 3117
4	ไผ่ป่า ไผ่หนาม Pai Paa or Pai Naam	<i>Bambusa arundinacea Willd</i>	Large bamboo, yellow-green colour, has thorn and small branches, 10-15 cm in diameter, 5-10m tall	Use for house framework, scaffolding, edible shoot	On the foot of slope, grow even in less fertile soil, require high humidity, sandy loam, good drainage.	winter	All region	Ø 7.5cm, 6m 50 -70 baht	Somjit Pantapeng, Trat Province t:086-077 3117; Suksit Saokem, Bangkok t: 02 914 5230; Saeng ChuToh, A. Taa Muang, Kanchanaburi

No.	Common Name	Scientific Name	Properties	Common Usage	Soil condition	Harvesting	in Thailand	Market Price	Suppliers (for market price research only)
5	ไผ่เอื้อง Pai Hea	<i>Cephalostachyum virgatum</i> or <i>Melocanna virgata</i> Munro	Small bamboo, straight, tall calm, grow to 6-18m, when young have white, fine hair, when old turns dark green, 1-2cm thick wall, smooth nodes, some small branches, 4-10cm diameter with 40-70cm between nodes	For use as posts, roof rafters, beam - but often in temporary construction. Use for making fishing equipments	Found in all region, esp. in rain forest, mixed forest, teak forest, along stream.	winter	All region		
6	ไผ่รวก Pai Ruak	<i>Thyrsostachys siamensis</i>	Grow in clumps, tall straight culms of 5-10m with small slender leaves, smooth skin, greyish green which turns brown when dried, no thorn, hard walls with clear nodes, 2-5cm in diameter, with 15-30cm between nodes.	good for fencing, paper fibre, grown in gardens for wind barrier, fishing pole, weaving, agricultural tools, used for rafts in shallow water. Edible shoot, used for medicine.	Good drainage, and direct sunlight,	winter	All region	Ø 2-3cm, 3-4m 50-80 baht per bunch of 10-12	Saeng ChuToh, A. Taa Muang, Kanchanaburi; Somjit Pantapeng, Trat Province t:086-077 3117; Suksit Saokem, Bangkok t: 02 914 5230;

No.	Common Name	Scientific Name	Properties	Common Usage	Soil condition	Harvesting	in Thailand	Market Price	Suppliers (for market price research only)
7	ไผ่ซาง ไผ่นวล Pai Saang or Pai Nuan	<i>Dendrocalamus Strictus (Roxb.) Nees.</i>	Similar to Pai See Suk in dimetion: 3-12cm or 8-12cm diameter, 30 cm between nodes, but no thorn. The culms can reach 10-25m in height.	Use for construction, making fences, Tasty shoots, used for making chopsticks and toothpicks	common in mixed forest	weaving: 1-2 years; furniture: 3-5 years	North and North East Region	Ø 7.5-10cm, 6m 45-50 bahts	
8	ไผ่ไร่ Pai Rai	<i>Gigantochloa albociliata Munro</i>	Small bamboo, not hollow, large leaves, grow in clumps, very strong, shoot is wrapped in spathe, covered in fine hair. 1.5-3cm diameter, 15-40cm between nodes.	Commonly used for construction and furniture making. Also used in paper production.	common in mixed forest	between December and January; weaving: 1-2 years; furniture: 3-5 years	North and North East Region		
9	ไผ่เลี้ยง Pai Leang	<i>Bambusa sp.</i>	Medium size bamboo, dark green culms, mat skin, short internode, no thorn, 1-4.5cm diameter, 20-30cm internode	used in construction, furniture making and ladder, used for paper making. Edible shoot,	Mixed forest, can survive dry spell	Winter; weaving: 1-2 years; furniture: 3-5 years	North and North East Region	Ø 5-7cm, 6m 70 baht; Ø 7.5-8cm, 8m 80 baht	Somjit Pantapeng, Trat Province t:086-077 3117

for law on bamboo cutting in national reserve:
<http://www.forest.go.th/permission/bamboo.html>

Bamboo mentioned above are those commonly found in Thai markets. These are sold as dried bamboo with no treatment.

All bamboo sold in Bangkok came from Plantations in Prachinburi and Kanchanaburi, or from forests in Kanchanaburi.

8.7 HARD WOOD: SPECIES, AVAILABILITY AND COMMON USAGE

No.	Common Name	Scientific Name	Properties	Common Usage	Area	Harvesting	Limitation	Market Price (6" x 6m)	Suppliers (for market price research only)	Longevity
1	ไม้แดง MaiDaeng	<i>Xylia xylocarpa</i> <i>Taub var. Kerrii</i> <i>Neilson</i>	reddish brown in colour, very hard, high expansion and contraction rate cause problems when used in humid area. 30-120cm diameter at 20-30m high, in some area it's 30-37m. Moisture content after drying is 0.8 and 10-12%.	used for posts, beams, flooring. Also common in railway sleepers	Found throughout North and Central regions, most common in North East region. Plantations found in Kanchanaburi and Pitsanulok (K. Sutat 081 886-3730)	average 3-5 years old	expansion and contraction, require thorough drying prior to use; expensive compared to others	713 baht/m (from Laos)	M Plus Timber http://www.mplustimber.com/yinkado_th.html ;	
2	ไม้เต็ง MaiTeng	<i>Shorea Obtusa</i>	Second to MaiDaeng in terms of hardness, has lighter colour in the core, easy to find. Moisture content is 0.75 and 14% after drying.	used for posts, floor joist and boat building	Mostly in the NorthEast region (70-80%), also found in the North, often growing in open forest, dry land, sandy loam, both on slope and flat land. No plantation located.			old (from Laos and Burma): 2, 2.5, 3, 3.5, 4m at 500 baht/m; new (from Lao): 1,026 baht/m	M Plus Timber http://www.mplustimber.com/yinkado_th.html ;	11-18 years in direct contact with ground
3	ไม้มะค่า MaiMaKaa	<i>Afzelia xylocarpa</i> <i>(Kurz) Craib</i>	Reddish brown in the centre, getting darker as it age or when exposed to sun light. Straight pattern, no smell. Very durable, pests and rot resistant, low expansion and contraction rate, maintain 8-9% moisture after drying.	Used for posts, joist, flooring. Favourable for furniture making, esp. when requiring straight pattern; frames; handicraft. Edible seeds	Primary forest, found in all regions, at around 500m above sea level with 1,000-1,500mm annual rainfall with temperature between 19-24°C. Planted using 9-12 mnths seedlings.		Darkening of colour upon exposure to sunlight		M Plus Timber http://www.mplustimber.com/yinkado_th.html ;	on average 10.5 years or more, usually between 6-19 years.

No.	Common Name	Scientific Name	Properties	Common Usage	Area	Harvesting	Limitation	Market Price (6" x 6m)	Suppliers (for market price research only)	Longevity
4	ไม้ประดู่ MaiPradu	<i>Pterocarpus macrocarpus Kurz</i>	Thick bark of brownish grey to dark grey, inner bark is brown, with the core in reddish brown. Durable, pests and rot resistant. 130-210cm in diameter, 20-40m tall	Suitable for posts, furniture, small pieces also favourable for making parquet floor	Found in mixed and open forests in the North, North East, Central and West regions, often at between 3-600m above sea level. Likes sandy loam, deep soil with good drainage and consistent moisture, close to rivers and streams. Planting from seeds or cuttings					On direct contact with the ground, can last up to 14 years.
5	ไม้ตะเคียนทอง MaiTakeanTong	<i>Hopea odorata</i>	Light yellow or grey which turns light brown on sun exposure, random black spots. Low expansion/contraction rate. 130-210cm diameter, grown to 20-40m. Moisture content after drying is 0.64 and 12%.	used for ceiling and floor panels, in boat building, railway sleepers and furnitures	Found in dry primary forest, open forest in the North and NorthEast region. Grow best in low lying land near water, with annual rainfall higher than 1,500 mm., sandy loam with good drainage. Planting from seeds or year-old seedlings - low survival rate.					On direct contact with the ground, tests have shown it to last between 3-10.5 years.

No.	Common Name	Scientific Name	Properties	Common Usage	Area	Harvesting	Limitation	Market Price (6" x 6m)	Suppliers (for market price research only)	Longevity
6	ไม้สัก MaiSak (Teak)	<i>Tectona grandis</i>	Golden yellow turning dark brown with sunlight. Contains oil. Sapwood and core has distinguished colour. Strong and durable, pests and rot resistant. 130-210cm diameter, over 20 m in height. Moisture content is 0.6 and 12-14% after drying.	Posts, beams, joists, flooring and furnitures.	mixed forests in the North region. On mountains, or well drained low land. Also found in parts of Central and West region. 1,000-2,000mm annual rainfall, no higher than 700mm above sea level. Deep sandy loam or loam. Plantings from seeds and cuttings,	3 years plus	Doesn't grow in low land, shallow sandy soil and irregular wet/dry season. LAW: All teak is type A prohibited by the forestry law 2484 B.E., requiring permission from forestry officers prior to transporting. Teak from plantations will require certifications from dept. of forestry.		M Plus Timber http://www.mplustimber.com/p/yinkado_th.html ;	10-18 years with direct ground contact.

8.8 CONCRETE POSTS: AVAILABILITY, SIZE AND COST

No.	Suppliers	Location	Base size/cm	Post size	Post height/cm	Weight/kg	Cost/baht
1	PPS Concrete	Offices in ChaingMai http://www.ppsconcrete.com		6"	50	42	150
				6"	80	57	180
				6"	100	68	220
				8"	50	85	230
				8"	80	121	260
				8"	100	126	290
2	PNP Concrete	NakornPathom http://www.pnpconcrete.com more suppliers found in the same area	30		50		215
			40		60		300
			50		70		420
			60		80		540

8.9 DRAFT POSITION DESCRIPTION FOR SHELTER MANAGER

1.0 JOB DESCRIPTION				
Position: Habitat Manager or coordinator	Department	Reports to	Reportees / Supervision	Grade
2.0 Purpose				
<p>As the Burmese regime militarises and exploits the natural resources of the border areas of eastern Burma, the human rights of ethnic groups continue to be abused and new refugees continue to flee to Thailand. It is estimated that there are now more than 40,000 unregistered people living in the camps.</p> <p>Resettlement is currently the only durable solution available for the refugees. The fact that this strategy has not significantly reduced population numbers (due both to the many new-born and the steady influx of new arrivals) makes the search for new strategies even more urgent. The resettlement process has also led to drain of camp management staff the most skilled refugee workers in the camps will leave for resettlement. These people have been crucial in the maintenance of camp services from the health and education sector, through the leadership of community based organisations. TBBC works directly with local partners in the delivery of its programme and services. Camp residents with skills hold positions that fall under camp management, including camp committees, warehouse workers, accountants, population monitoring workers and CAN (Community Agriculture and Nutrition) workers.</p> <p>TBBC has been providing shelter support to the refugees since it inception in the form of building material. TBBC and displaced population have identified issues about procurement and quality of supplies. The bulk of the materials being procured includes bamboo, thatching (leaves and grass) and timber posts. There have been issues relating to monitoring of the quality of supplies. The varying quality of material has been compounded by lack of consistent building skill. Apart from supply of building materials TBBC's planned response in the domain of shelter and settlement has been minimalistic compared to other sectors. A recent study by Benchmark consulting has suggested more investment in planning and management of shelter and settlement programme across all the camps. The organized Shelter and settlement planning is expected to contribute to enhanced human security. The position would require management of border-wide shelter and settlement programme.</p>				
Scope:				
<p>Impact and influence is expected to be border-wide within the overall humanitarian responsibility of TBBC. Planning is predominantly annual within TBBC's established frameworks.</p> <p>Manages/leads sub-unit resources including one or more of the team (staff and/or volunteers), budgets (often delegated), process and projects.</p> <p>Providing specialist advice to one or more member of line management, colleagues, supporters, and camp community representatives.</p> <p>Draft own and/or team objectives and agree with line manager. Objectives contribute to departmental strategy and can involve collaboration with other departments.</p> <p>Problems are diverse, complex, non-routine and some routine within a specialised unit/function.</p>				

The role requires the ability to analyse and communicate complex information at a simpler level to a wide audience.

Role is variable with well-defined targets and/or minimum standards and is both proactive and reactive.

In-depth knowledge of the principles underlying the key purpose and role is required in order to make decisions affecting the team and which may impact more widely in the division/programme.

Influence and promote (to achieve impact) with diverse allocated internal/external target audiences in area/region.

To be familiar with Sphere/UNHCR standards and abide by the NGO/Red Cross Code of Conduct, the People in Aid Code, TBBC procedures and other regulatory codes (e.g. InterAction Field Co-operation Protocol).

3.0 JOB RESPONSIBILITIES, DUTIES AND TASKS

3.1 Overall Programme Management

Making assessments of habitat situations and shelter needs with, or on behalf of area staff or other agency staff, reporting with recommendations and proposals for TBBC response.

Manage the realization of programme goals through planning and management of activities;

Coordinate the development of TBBC's Best Practice in Shelter Manual, including soliciting inputs from relevant stakeholders and outside experts; delegating editing and production tasks.

Report to the Team Leader to assure the overall direction and integrity of the programme;

Identify and obtain any support and advice required for the management, planning and control of the project;

Identify needs for specific consultancies in collaboration with the team; develop consultant briefs, and oversight management of consultant contracts.

Source other outside expertise and specific technical knowledge for the improvement of shelter provision.

Ensure regular flow of information to other TBBC staff and camp committee members with shelter responsibilities, in order to ensure ongoing upgrade of their knowledge and skills in the shelter field

Coordinate with the operations/support team in smooth implementation of their roles in project support function

Liaising with government officials, UN agencies, other NGO staff and camp management committee as appropriate;

Perform team management responsibility; Initiate, Recruit and supervise team members.

Ensuring staff safety and security procedures are drawn up and implemented, as appropriate.

3.2 Running projects

Plan the activities of the project and monitor progress against the quality criteria.

Initiation of a project, preparation of project and planning documents, using programme/project management tools specific to TBBC.

Mobilize goods and services to initiative activities through requisitions, including drafting TORs, Project proposals with partners, and work specifications;

Monitor events as determined in the Monitoring & Communication Plan, and update the plan as required;

Manage requests for the provision of financial resources by TBBC, using advance of funds, direct payments;

Initiate payments and track finance flow of these operations related to the project.

Monitor supplies and procurement of resources to ensure accuracy and reliability of quality of building materials and services;

Manage and monitor the project risks as initially identified in the Project Brief, Logframe and approved by the country team, submit new risks to the country team for consideration and decision on possible actions if required; update the status of these risks by maintaining the Project Risks Log;

Be responsible for managing issues and requests for change in project and programme priorities.

Prepare the Project Quarterly Progress Report (progress against planned activities, update on Risks and Issues, expenditures) and submit the report to the Team Leader and Project Assurance support to be submitted to the Country team;

Prepare the Annual review Report, and submit the report to the Team Leader and Project Assurance support to be submitted to the Project Board;

Provides support in creation of strategic partnerships and implementation of the resource mobilization strategy.

Contribute in preparing the donor reports.

3.3 Sectoral guidance and knowledge sharing

Bring entire emergency shelter and settlement planning knowledge base into the humanitarian discourse within TBBC.

Provide sectoral and technical guidance to TBBC, and the recovery/maintenance team in view of enhancing cross-sectoral Coordination, and overall to the recovery/maintenance process;

Initiate and support cross-sectoral programming within the recovery/maintenance framework.

Facilitate knowledge sharing and knowledge building by contributing to knowledge networks and communities of practice

Initiate the synthesis of lessons learnt and best practices in the area of:

- Use of Bamboo for construction.
- Relationship of shelter and settlement with refugee health (men, women and children)
- Track vulnerabilities amongst refugee population in the camps.
- Generate IEC material as per the sectoral programme priorities.

3.2 Occasional Significant Duties

4.0 JOB SPECIFICATION (MINIMUM JOB REQUIREMENTS)

<p>Education</p> <p>Bachelors in Civil Engineering or Architecture</p>	<p>Experience in humanitarian or related</p> <p>Minimum 7 years work experience of shelter provision in humanitarian contexts</p>	<p>Experience in specific field or closely related job</p> <p>Specific experience in bamboo construction is highly desirable</p>	<p>Skills</p> <p>Sector:</p> <p>Development planning, disaster management, reconstruction and resettlement, community organization, Construction management, control of use of resources, housing and habitat development, infrastructure, water and sanitation</p> <p>Functional:</p> <p>Project cycle management, partnership management, finance management / annual work plan and budgeting, documentation, governance, aid management, team management,</p> <p>Know-how:</p> <p>Need assessment, vulnerability and capacity assessment, GIS mapping, strategic alliances building, skill development, innovative initiations, coordination and networking, organising capabilities.</p>
<p>5.0 DECISION-MAKING & AUTHORITY</p>			
<p>Location:</p>		<p>Preparation Date:</p>	