

## **Research Project-**

### **Developing high performance textiles for use in temporary shelters in disaster stricken areas**

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## **Summary**

This research began with the assumption that the reason for the prevalence of Gender-Based Violence in disaster stricken areas was due to the weakness of textile structures used in making tents. Shelters made from tarpaulin and canvas are physically unable to protect inhabitants from break-ins and violent attacks.

Initial research showed that GBV is most prevalent in areas on refugee camps that are centred around water. However, further research as funded by the Mori Grant revealed that rather than the nature of physical structures, it is the spatial planning of camps that is more crucial in ensuring safety rather than the strength of textiles used to make shelters.

Therefore, the focus of research was shifted from developing high performance textiles to analyzing and providing better solutions to the spatial planning of existing displacement camps the author was able to visit across Asia.

## **Water Sanitation and Hygiene (WASH) on Displacement Camps**

### **1.1 Logistics of Camp Formation and WASH, and their Influence on Women's Safety**

Architectural or spatial planning of displacement camps has long been an after thought of relief efforts, if factored in at all. This is attributable to several challenges that governments and relief organizations face in the immediate response phase, the most apparent being sheer urgency. Immediately after a disaster or influx of refugees, it may be difficult to tell the number that needs to be housed and exactly how much land is available, especially in cases of unpredicted disasters like earthquakes, and a lack of a thorough emergency preparedness plan. Even so, large numbers of people are without shelter and need to be settled as soon as possible. What results is often extraordinarily cramped, unplanned physical space, which is presented as a temporary solution but more often than not remains so for years after the disaster. It is therefore to be assumed that the initial moves made are permanent moves, as far as the life span of the camp goes. Hence, it is critical to rethink strategies to setting up camps with haste, but also with logical and sustainable planning decisions. This is easier planned than executed, but the social repercussions, particularly for women as this research focuses on, are lasting and damaging to communities beyond loss of property

or other such trauma. One of the first notable works that calls for the rigorous spatial planning of displacement camps is the aforementioned *Traditional Settlement Displaced Populations* by Tom Corsellis and Antonella Vitale.

According to Corsellis and Vitale (2005), there are six types of displaced settlement. These are, host family settlement, rural self-settlement, urban self settlement, self settled camps, planned mass or collective shelters and planned camps. These six can be divided into categories depending on the viewpoint. They can either be divided into, four self-settled patterns versus two government or agency planned patterns, or they can be seen as three dispersed settlement patterns versus three grouped settlement patterns. This research is only concerned with those patterns that fall under the grouped, and government or agency planned categories. It is these patterns that can be affected positively by architectural planning and design against GBV. More specifically, these patterns are where WASH spaces will inevitably be shared by a greater number of people and therefore have an increased likelihood of anonymity of users and creation of crime opportunity. For clarity, the term government or agency planned settlement as used here does not suggest that the camps are planned architecturally but means that an authority allots an amount of land for the temporary refuge of a usually large displaced population. Planning therefore refers to the decision made by said authority on the location and area of the land, how long the refugees are allowed to occupy the land, and by extension what type of structures are permissible on that plot of land.

## **4.2. Primary Research**

Comparing Three Cases in Asia: An urban planned camp, Nepal ; A planned Mass Shelter, Japan; A Self Settled Rural Camp, Thailand

Research Conducted in Thailand was funded by the Mori Grant.

The author conducted fieldwork on six refugee settlements, in three disaster areas across Asia. The selection of sites was based on the coinciding of the disasters with the timing of this research, their proximity to Japan, resources available to the author in getting to and from these sites, and the thesis advisors' prior affiliation with agents in these disaster areas. The sites may each be categorized differently in accordance with the Shelter Project's stratification of the types of refugee settlements. Choosing refugee settlements that are categorically different broadens the scope for understanding the relationships between social and physical environments and GBV. The difference in economic status of each of the nations also allows for findings that can substantiate the claim that GBV is an issue regardless of economic, social, or cultural circumstance. Below the selected sites are juxtaposed based on simple criteria to contextualize them and the comparisons and findings that follow. The sites are namely:

### Type of Disaster and Economic Status

	Developed	Developing	Developing
Social Disaster			Nepal 1
Human Conflict		Thailand-	-Myanmar
Natural Disaster	Japan 1 & 2		Nepal 2 & 3

Fig. ~

### Types of Grouped Settlement

	Developed	Developing	Developing
Collective Centre/Mass Settlement	Japan 1 & 2		
Self-Settled Camp		Thailand/Myanmar	
Planned Camp			Nepal

Fig. ~

The circumstances of each disaster are outlined in further detail in the following sections.

#### 4.2.2. Objectives of Fieldwork

- To observe women's, and men's use of WASH on each camp
- To assess the WASH areas themselves, as well as their context
- Measure these camps against UNHCR (and other leading humanitarian relief organization's) standards to understand the extent to which these standards are adhered to, and whether adherence or lack thereof becomes a reason for GBV and generally unsafe environments or not.

#### 4.2.3. Fieldwork Methodology

- Photographs
- Videos
- Interviews with willing IDPs living on each camp
- Measured Survey (pen, paper, measuring tape used to record physical environment by sketching.)

#### 4.2.4. Strategy to uncover patterns in the physical environment that encourage GBV

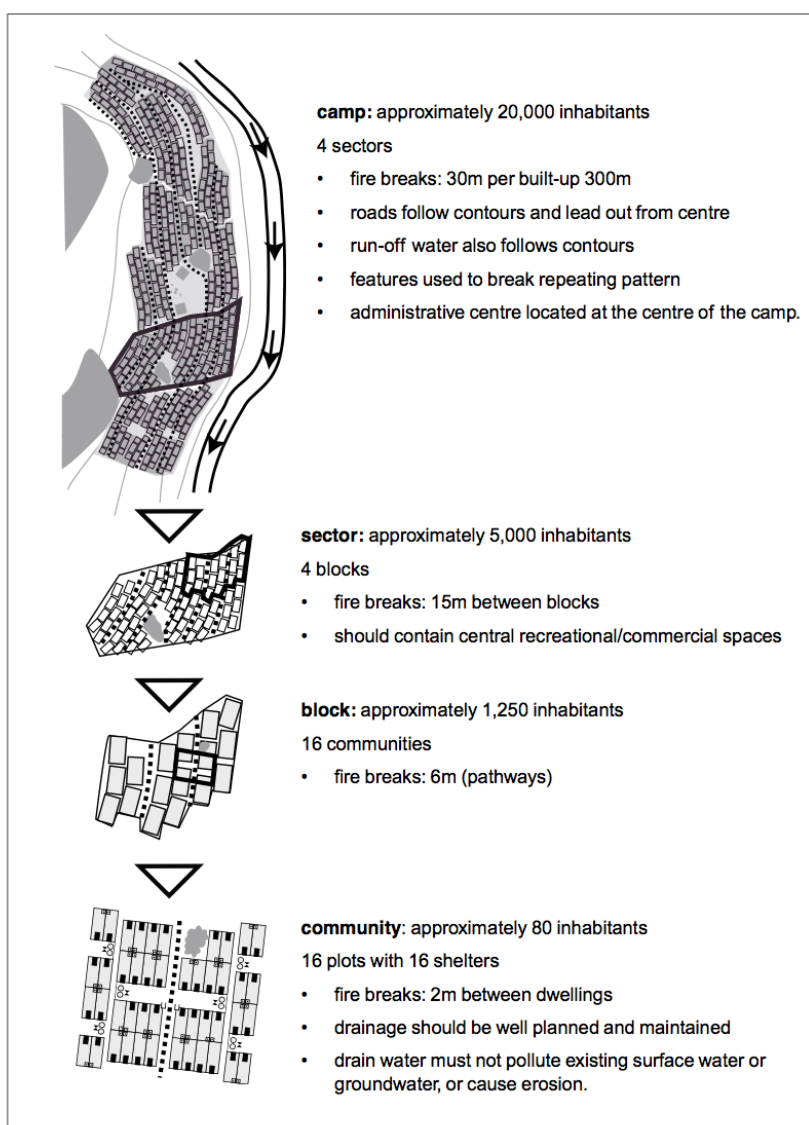
- Divide camps by GBV Prevalent vs. GBV Free and compare measured survey drawings all camps.
- Compare primary research with secondary case studies of camps with particularly frequent occurrences of GBV to further uncover patterns in the physical environment.

All patterns will be quantified measurements.

#### 4.2.5. International Standards for Camp Planning and Implementation

The UNHCR and the Sphere Project provide in their publications step by step procedures to be followed for the life span of emergency shelter provision initiatives, from the beginning process of site selection to the dismantling of camps. This section of the thesis will focus on the UNHCR's mandates in camp planning and community development on camp. In this section it is assumed that a site has already been selected and the next step is to plan the site itself. It is concerned with community development as well as camp planning itself as the presence of community is a proven element in eliminating GBV.

figure 8(e): camp sub-divided into sectors, blocks, and communities



Source: Corsellis and Vitale (2005) *Transitional Settlement Displacement Populations*, p. 380

### **Location 3: Thailand**

#### **Koung Jor Refugee Camp, Thailand**

Fieldwork date: April 28, 2017

**The fieldwork conducted at Koung Jor was done with slightly different objectives. Given the camp has been established for fourteen years now, it is certainly not a camp for immediate disaster response. It's length in establishment makes a study of Koung Jor uniquely able to offer lessons in the long term consequences of implementations made in the immediate response phase, among other invaluable revelations.**

The author visited the Koung Jor Refugee camp located in Northern Thailand, along the border of Thailand and Myanmar in April 2017 . Koung Jor falls under the category of a rural settlement camp. The Shan ethnic group escaping persecution in Myanmar moved as a community to the land now called Koung Jor between 2002-2003. Therefore the camp has been established for over fourteen years. All camp planning and infrastructure were designed and executed by the Shan people themselves, with assistance from various NGOs over the years.

Therefore, this camp is not the target site for this proposal. As assumed prior to the visit, a camp of familiar faces with a relatively small population is less likely to have occurrences of GBV, especially in the public spaces. It is in large camps, with populations in the thousands and tens of thousands, where it is difficult to get to know everyone, to tell who belongs and who doesn't that GBV tends to be rampant. In fact, on Koung Jor camp the author observed that bathing spaces were open-air and not gender segregated. Men and women bathe together openly, and did not mind my presence during their bath time . This is due to a few specific reasons; the Shan people are one of the ethnic groups of Myanmar that generally shows gender equality; culturally bathing is not concealed and both men and women bathe in public but with a cloth rapped around their bodies.

The Shan people are also a testament to the level of self-help and self sustainability that is possible when refugees remain in unbroken communities and promote gender equality within their camps. The author interviewed the leader of the camp committee -- of which there are eight members (two of whom are female)-- a gentleman named Sai Leng. He is a builder, specialized after years of experience in the construction of the vernacular bamboo houses and concrete block WASH spaces, and in the plumbing and water engineering skills required to supply the camp with sufficient bathing and laundering water.

Rural Self-Settled Camp

# Koung Jor Refugee Camp, Chiang Mai

# case 3.1

## LOCATION

Wiang Haeng District, Chiang Mai Province  
(approx. 500 meters from Shan border, Myanmar)

## REASONS FOR DISPLACEMENT

Human Conflict in Myanmar

## DISASTER/ CAMP ESTABLISHMENT DATE

2002- 2003

## FIELDWORK DATE

April 28, 2017

## CAMP POPULATION

Approx. 400

## POPULATION BREAKDOWN

- Total no. of families: not determined
- No. of males: approx 200
- No. of females: approx 200
- Total no. of children (under 5 years): not determined
- Total no. of adolescence: not determined
- Total no. of latrines: 48

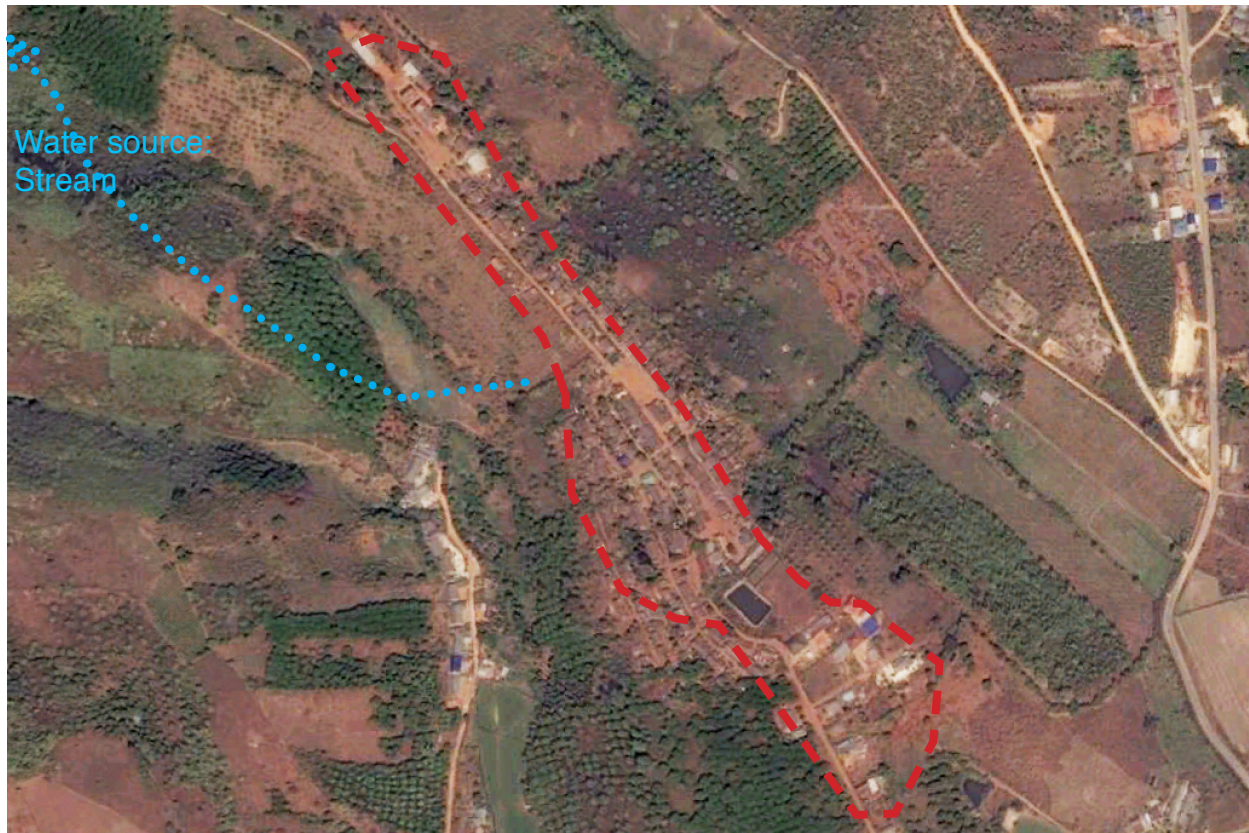
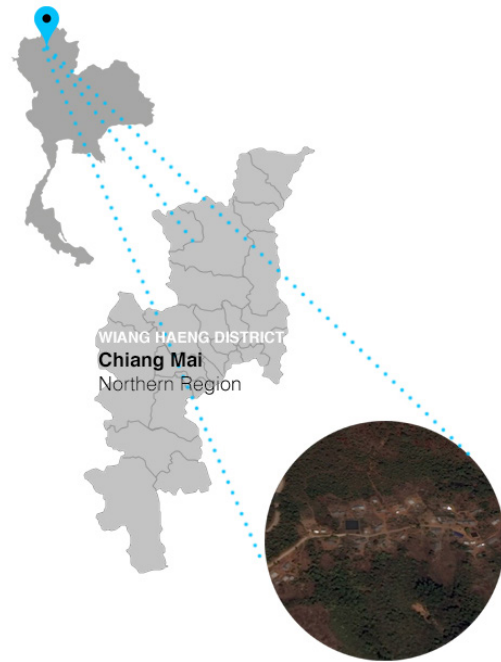


Image Source: Google Earth, Sourced: April 29, 2017

### **Background: On Koung Jor and the Shan people**

The Shan people fled to Thailand to escape civil conflict between the Burma army and the army of their state, the Shan State Army-South (SSA-S). This was not their first relocation, they had fled their original land from around the year 1996 when the Burma Army forced a mass relocation. They fled to an area closer to the Thai border and settled there until 2002 when the SSA-S attacked the Burma Army and they were forced to flee once again, this time across the border to Wiang Haeng, Thailand. In 2002, temples in the mountains of Wiang Haeng sheltered over 600 refugees in cramped conditions for one year. They they shared very limited amenities such as WASH and cooking facilities, which according to Sai Leng caused great frustration among the population. There was a problem of alcoholism and resultant violence in those first years, but Sai Leng says once they settled on the land now called Koung Jor and individual families received a parcel of land for their own, things settled down. The legacy of that time is that most of the older people suffer from high blood pressure and other health problems related to alcoholism, but since around 2005 there has been no problem of violence, domestic, gender-based or otherwise. As for the permanence of the camp, Sai Leng says the community of over 400 does not want to return to Myanmar. Their children have already learned the Thai language, have better education opportunities in Thailand, and only face persecution if they return home.

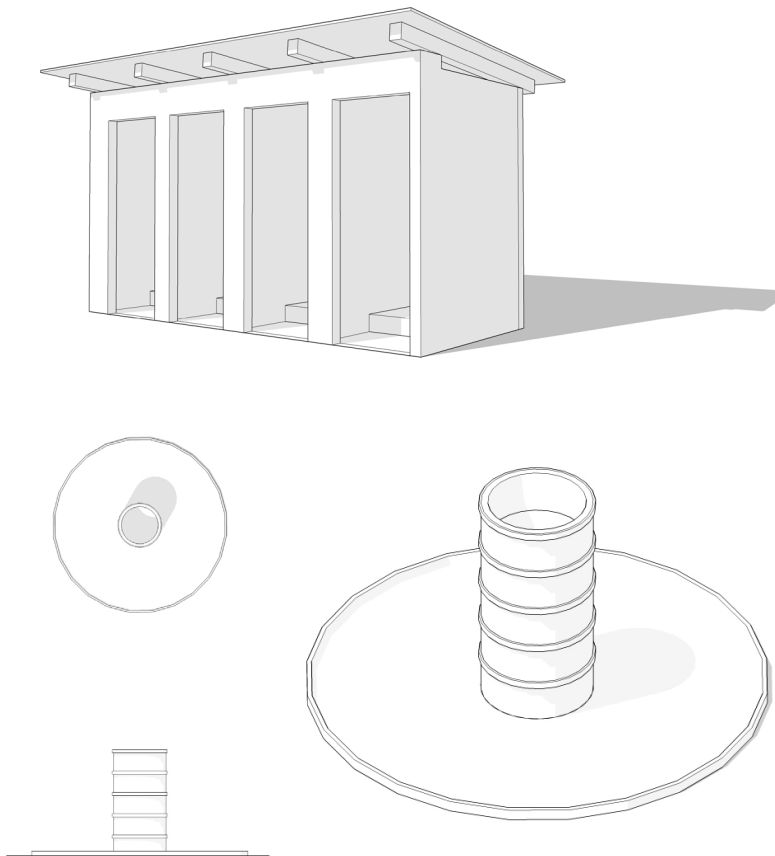
### **Planning and Construction on Koung Jor Camp**

As previously stated for their first year in Thailand (2002), the Shan people were hosted by temples near the Thai/Myanmar border. The conditions were cramped and inconvenient and bred frustration and conflict among the Shan people. According to Sai Leng, in 2003 when they were able to move on to the land they now occupy, they were still forced into cramped conditions with 7-10 families in one tent and all sharing one kitchen. Shai Leng as a respected leader of the Shan, began to lead the initiative of planning a more sustainable physical environment for his people. It took a month for him and his committee to meet with the head of each family, as well as people who were on their own, and determine how to allot property and materials for building a house to each family unit. The layout was guided by the terrain as well as pre-existing dirt roads that connected to the border and the town about 3.5 km down the hill.

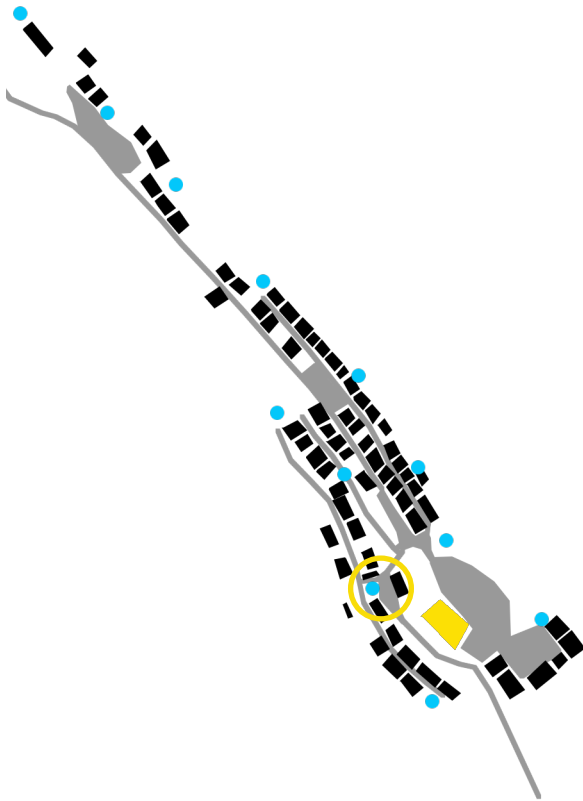
No master plan was drawn, however the camp has one main artery or road that is approximately 700m long. Nearly perpendicular to that road is another at about 500m in length. Upon observation, each family was given approximately 30-40m<sup>2</sup> for their homes. The homes are spaced closely together with generally very little space for even one person to walk between them.

## WASH facilities on Koung Jor Camp

In the first year of the camp's establishment, the people were simply using the bushes to relieve themselves, which Sai Leng and the other committee members found dangerous and unsustainable if they were to be staying on the land indefinitely. By Sai Leng's design, with the help of various NGOs, there are now twelve water tanks on Koung Jor Camp that supply the population of four hundred. Each tank serves three to four toilets and bathing/laundry space for four people at a time. Each toilet and bathing cluster is shared by about forty people and are not gender segregated. Their water source is a stream higher in altitude to the camp. They were supplied PVC pipes to harvest from the stream by ~. and NGO ~. There is no lighting as they are not legally permitted to access the power grid for purposes outside of their education centre, and sewing and weaving machines for their textiles production.







**CRIME DETERRENTS**

**Helpful proximity** to WASH- closest shelters are well within 10m of range

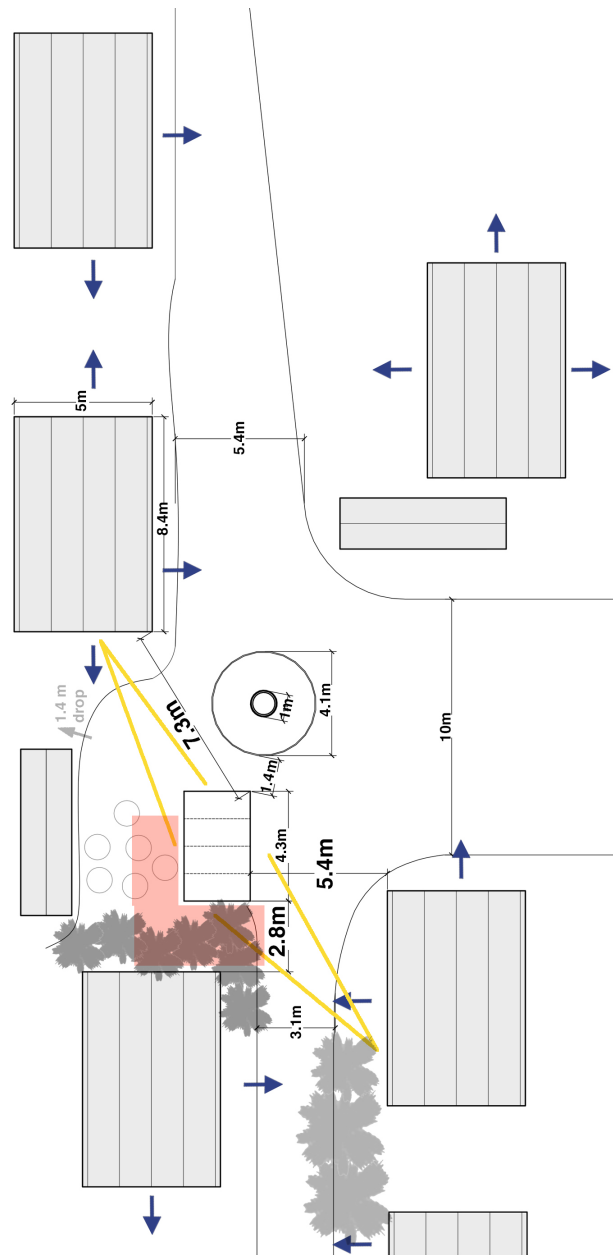
➤ **All shelters are not focused on the WASH** but enough exposure is given to all 4 sides of the toilet block, therefore providing **natural surveillance**.

**CRIME OPPORTUNITIES**

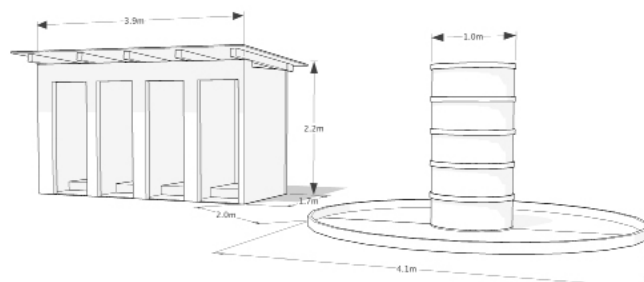
Thick natural foliage at the side of the toilet block provides a **hiding place**.

**Escape route is difficult** compared to other camps but still clear. The steep downhill escape route would make it difficult to follow a determined perpetrator.

**SHELTER TO WASH CLUSTER RELATIONSHIP**



**WASH CLUSTER TYPOLOGY**



**Proposal made to the Committee: Results**

A scaled model at 1:5 was presented to Sai Leng, the head of the camp committee. Due to his diligent and innovative work, the Koung Jor Camp no longer has need for temporary protective WASH facilities such as this design thesis proposes.



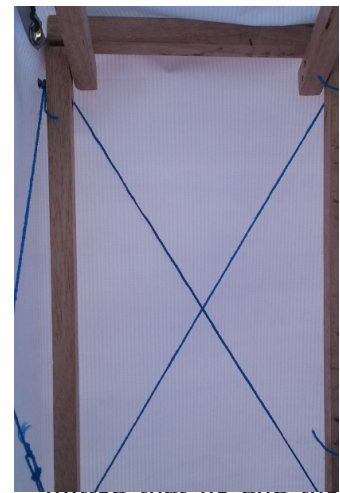
1:5 Model presented to Committee  
 Pictured left to right: Dr. Lynn Thiesmeyer , Annabell Stubbs (thesis author), Shai Leng, Khun Jack (Carpenter)

He remarked that in 2002, when the Shan people were in camp conditions and using the bushes to relieve themselves, this sort of prototype would have been suitable. This reinforced the appropriateness for the proposal in the immediate response phase when it is most chaotic and difficult to construct permanent structures.

Dr. Lynn Thiesmeyer opened discussion with Sai Leng about the possibility of more refugees coming to Koung Jor in the near future. The Mong Tong dam, a dam being constructed by the Chinese government running from south of Myanmar, near the Thai border all the way to the Chinese border has already forced the evacuation of over 200,000 people to accommodate the flooding of the river bed according to Professor Thiesmeyer. It is difficult to predict exactly where this large number of people will settle, with an even larger number of people certain to be displaced in the near future. However, Dr. Thiesmeyer states based on her experience that significant numbers of people will be on the move and will be in need of temporary and portable WASH facilities.



1:5 Model presented to Committee  
 Materials:  
 Water proof, Fire proof Vinyl  
 Wooden frame with rope cross-bracing (hypothetical)  
 Left: 1:5 Model  
 Centre: Annabell Stubbs, Dr. Lynn Thiesmeyer  
 Right: Interior shot



committee have not the space nor resources to accommodate an influx of people and were not planning for it. He also states “... but if they come, of course I cannot say ‘No.’ and in that case, maybe we will need more toilets fast.

### **Findings: What makes Koung Jor Successful in eliminating possibilities of GBV**

According to Sai Leng, the leader of the camp committee and respected figure among the Shan people, there is no GBV on Koung Jor refugee camp. Taking into account that he is male, and that women often keep silent particularly about traumatizing experiences of sexual assault, it is difficult to determine whether Sai Leng's word is enough to confirm a complete absence of GBV. There are a few possible reasons that GBV is either non-existent or occurring at very low rates in Koung Jor.

#### Community and lack of anonymity

As previously stated, the camp is inhabited by approximately four hundred people, all of whom belong to the same ethnic group and moved as a group to escape persecution. There are various studies that suggest crime and sexual assault are less likely to occur in communities where everyone knows each other and strangers are easily identifiable. The informal social monitoring that occurs in a well formed community prevents outsiders from acting deviantly, if that were their intention. It also prevents members of the community from acting anti-socially towards one another, as it is unlikely that one can escape persecution from the community as a whole. Anonymity and an escape route are two of several critical factors that determine whether a person decides to commit a crime or not. In a tight knit community, these two factors or opportunities are hard to come by.

#### Pre-existing cultural norms

As observed first-hand by the author, the Shan already practice public gender integrated bathing. According to the Shan people, they are also among the more gender-equal ethnic groups in Myanmar.

#### Opportunities for work and recreation

The Shan people are not citizens of Thailand, and the Thai government does not recognize the Shan people as official asylum seekers nor Koung Jor as an official refugee camp. However, the Thai government and several NGOs over the years have provided the Shan with food, water, electricity and materials for building their homes and WASH facilities. Specifically, an organization called The Branch Foundation, TBF, since 2009 has been funding an education centre for the Shan children and creating livelihood by providing looms for textile weaving for the Shan women. Officially the Shan are not allowed to leave Koung Jor or seek employment in Thailand. Even so, the young boys and men do keep occupied with construction projects on camp, though infrequent,

and do venture out seeking work for small wages.

## Education

The education offered to them and their children gives the Shan people hope for their stay in Thailand. More importantly, many of the Shan adults were already well educated prior to their displacement. Teachers and volunteers have come and gone from various international and local NGOs but it is the Shan people who implemented and continue to maintain the small school built on camp.

## Passage of Time Since the Immediate Response Phase

Hopelessness and desolation have also been outlined as causes for males to turn to assaulting women and children in situations of displacement. The community and its men perhaps are not feeling a strong sense of hopelessness as they did in the initial years (2002-2004) and it is perhaps due to this that civility and social norms have been maintained.

## **Conclusion**

The following characteristics of Koung Jor set it apart from other displacement camps in terms of safety for women in WASH spaces and on the camp in general:

- Pre-existing cultural norms of relative gender equality
- The camp is well planned
- The camp was planned and is maintained by the refugees themselves
- The population of the camp is approximately only four hundred people
- The camp population all knew each other before the camp was established
- Strangers and outsiders are easily identifiable but also safe on camp
- The level of education among the adult population was already high before displacement
- The refugees continue to educate themselves and their children
- Options for livelihood and a lack of stagnation in their daily lives
- WASH elements are never isolated, the functions of toilet use, showering and laundry are clustered around a storage and collection tank
- Natural Surveillance WASH Clusters are always surrounded by shelters, if not formally on all four sides then shelters are arranged in such a way that all four sides of the WASH Cluster are visible
- Hiding places and escape routes for criminals are few

- The presence of a respected community leader, who happens to be well educated and experienced in construction and self motivated enough to educate himself and his people on proper waste water management

These are characteristics to be considered and replicated in the planning of displacement camps. Ways in which these characteristics can be converted into enact-able protocols are:

### **1. Investigate the Gender Climate**

Humanitarian workers should be trained to investigate the cultural background(s) of their displaced population and identify where gender equality or inequality manifests in the practices and spatial-use tendencies. After gaining an understanding of the gender climate, decisions can be made about the physical design of WASH spaces. For example, whether or not to separate latrines, showers, etc. by gender and how that translates into tangible measurements given to distances between gender separate spaces etc.

### **2. Prioritize Planning In spite of Challenges**

As highlighted in various iterations throughout this research, it is difficult to plan camps in the immediate response phase and design decisions made while in that phase rarely change even years later. However, making the extra effort to plan amidst the chaos can prevent many problems such as GBV and the spread of disease, fire hazards, etc. in the long term.

### **3. Self-Build: Involve Refugees in Planning and Construction**

The UNHCR already mandates in their *Handbook* that refugees are to be allowed an active role in the planning and construction of their camps and personal shelters. Koung Jor is an example of the merits refugee participation affords.

### **4. Reduce Populations to Reduce Anonymity**

If camps are uncontrollably large at least forming communities in smaller sub-clusters where anonymity will not be allowed to thrive can yield the results of cooperation and peace as seen in Koung Jor thanks to its relatively low population.

5. Similarly, it often cannot be helped that strangers from various backgrounds end up living together in camps. Lack of ownership and responsibility for one another in most cases proves to be the source of crime, violence, littering and pollution among other anti-social behaviours. The absence of anti-social phenomena at Koung Jor is less attributable to the fact that they are all of the same ethnic group than to the fact that they all know each other prior to displacement. Belonging to the same ethnic background does not guarantee familiarity and a complete absence of anti-social behaviour.

6. On the macro scale, anonymity is eliminated by virtue of the small population and familiarity amongst the Shan people. The planning decision made by Sai Leng to place twelve WASH clusters to serve an average of 30-40 people each further clarifies who belongs to each cluster. Reducing the ratio of people to toilets and showers to less than 20:1 further strengthens the natural surveillance around each cluster.

7. No matter how short or long the projected life of a given camp is planned to be, it is important to make provisions for educating children and adult refugees alike. For children, to do otherwise would mean a potentially large gap in their education which could greatly affect their learning potential later on, as pointed out by Sai Leng. For adults, whether their education level is high or not, it has proven critical in many camp cases that adults must be educated on how to operate in their new environment. This can mean anything from learning the local language, as many of the Shan were better off for having learned Thai, to learning how to play their part in preventing the spread of disease through latrine use and maintenance training. The children on Koung Jor are happier, healthier and have more promising futures thanks to the education provided to them. Likewise the adults have proven better off thanks to their attitude towards continued learning, the proof of which stands in the general cleanliness of Koung Jor achieved by years of slow but determined improvement of their WASH amenities.

8. The Koung Jor Camp Committee was pro-active in seeking the resources and external support they needed to see their textiles production come to fruition. This sort of community self empowerment was rarely the case in displacement camps studied in this research. Humanitarian workers should be trained to facilitate, rather than lead, similar initiatives that empower refugees in finding financial stability through their own initiatives.

#### 4.4 Quantitative Data Comparison: Against the International Standards for Camp Planning and Implementation

In *Transitional Settlement Displacement Populations* Corsellis and Vitale collate standards presented by both the UNHCR and the Sphere Project and illustrate what these standards might look like if implemented.

##### standards for camp-site layouts

table 8(b): minimum provision of communal facilities

facilities required	per number of sites	estimated population
1 hospital	10	200,000
1 health centre	1.5	30,000 (1 bed per 2,000–5,000 refugees)
1 health post or clinic	(per sector)	approximately 5,000 (1 community health worker per 1,000 and 1 traditional birth attendant per 3,000 refugees)
4 commodity distribution sites	1	20,000
1 market	1	20,000
1 school	(per sector)	5,000

(UNHCR 2000)

1

As is clear in the table above, these provisions are for populations estimated to be considerably large. The largest site among the six case studies visited in this research held a population of only 4,500 people.

	Hospital	Health Centre	Health Post	Distribution Site	Market	School
Nepal 1	x	x	o	o	x	x
Nepal 2	x	x	x	o	x	x
Nepal 3	x	x	x	o	x	o
Japan 1	x	x	o	o	x	x
Japan 2	x	x	o	o	x	x
Thailand	x	x	o	x	x	o

o - Present

x - Absent

It is noted that both the UNHCR and the Sphere Project have given no standards regarding showers and laundry facilities. Whether this has had a top down influence on how WASH was implemented in Nepal is unclear. Findings from primary research in Nepal show camps with significantly less showers than latrines, and showers being located on average at much further distances than latrines. The urgency of latrines in contrast to showers for daily use is also noted, however that distance traveled and isolation of either facility results in the same level of risk to the user.

1 Corsellis and Vitale (2005) *Transitional Settlement Displacement Populations*, p. 377

Source: Corsellis and Vitale (2005) *Transitional Settlement Displacement Populations*, p. 378

The following section collates data gathered from the six case study sites with emphasis on comparing WASH related elements to the standards of the UNHCR and the Shelter Project.

For further insight how women use the WASH facilities in terms of times of day is also shown and compared across the six camps.

#### 4.4.1 Conclusions: 6 Cases, 3 Disasters, 3 Countries

##### 1. Population Data Comparison

**The camp with the populations over 1000 had occurrences of GBV.**

	Population	No. Families	No. of Males	No. Females	Adolescents	Child under 5
Nepal 1	4500	500	1800	2700	1125	225
Nepal 2	229	56	90	139	67	25
Nepal 3	144	36	58*	68*	32	35
Japan 1	1300					
Japan 2	100-200*					
Thailand	approx. 400	not determined	approx. 200	approx. 200	not determined	not determined

\* Estimate based on statistic: 9 Emergency Shelters and 971 IDPs in Minami-Aso (Japan 2), [www.bousai.co.jp/updates](http://www.bousai.co.jp/updates)

##### 2. No. of persons to each toilet/ No. of persons to each shower stall

**The camps with ratios over 20 toilets to 1 person had occurrences of GBV.**

**UNHCR and Sphere Project make no mandates on people to shower ratios, but the severe lack of showers increased women's fear of using shared amenities, which affects their freedom on camp.**

	No. of Toilets	Person : Toilet	Person: Shower
Nepal 1	26	173 : 1	750 : 1
Nepal 2	10	22 : 1	114 : 1
Nepal 3	12	12 : 1	No Showers
Japan 1	*	50 : 1*	
Japan 2	21	10 : 1	
Thailand	48	8 : 1	8 : 1

\* Government of Japan's Disaster Prevention Database disaster toilet provision guidelines stipulates there should be one toilet to every fifty IDPs in an emergency shelter.



### 3. Distance from Tents/Shelters to Nearest Toilets

*UNHCR Standard: 6-50m*

*Sphere Project Standard: Max. 50m or less than 1 minute's walk*

**The camps with average distances over close to or over 50 m had occurrences of GBV, even when some tents were within 5m of toilets.**

	Avg.	Shortest	Longest
Nepal 1	60m	3m	Approx. 100m
Nepal 2	30m	12m	Approx. 90m
Nepal 3			Approx. 40m
Japan 1			
Japan 2			
Thailand	50m	4m	Approx, 100m

### 4. Distance from Tents/Shelters to Nearest Showers

*No standard from neither UNHCR no Sphere Project.*

**Similar consequences are seen when showers are too far (more than 50m away for each woman) and force women to travel out of safety zones.**

	Avg.	Shortest	Longest
Nepal 1	70 m	3m	Approx. 150m
Nepal 2	30 m	12m	Approx. 90m
Nepal 3	No Showers	-	-
Japan 1			
Japan 2			
Thailand	90m	5m	200m

### 5. Distance from Tents/Shelters to Water Source

**Few cases were seen where women were forced to travel far distances, as seen in the secondary study of Haiti. The length of 170m on Nepal 1 is an exceptional case.**

	Avg.	Shortest	Longest
Nepal 1	10m	2m	170m
Nepal 2	7m	7m	7m
Nepal 3	12m	6m	25m
Japan 1			
Japan 2			
Thailand	30m	10m	50m

## 6. Distance from Toilets/Showers to Water Source (if separate)

	Avg.	Shortest	Longest
Nepal 1	55m	10 m	120m
Nepal 2	10m	5m	27m
Nepal 3	25m	20m	30m
Japan 1	Not separate	-	-
Japan 2	Not separate	-	-
Thailand	4 m	2 m	10 m

7. Women's Use of 6 WASH Spaces: Time of day by latest hour (starting hours assumed to be dawn between 4-6 a.m.)

	Cooking	Collecting	Grooming	Laundry	Toilet	Shower
Nepal 1	20:00	24 hrs	18:00	18:00	24 hrs	18:00
Nepal 2	19:00	24 hrs	18:00	14:00	24 hrs	19:00
Nepal 3	18:00	24 hrs	10:00	14:00	24 hrs	18:00
Japan 1		No collecting			24 hrs	
Japan 2		No collecting			24 hrs	
Thailand		24 hrs				

Average time of day women use each space until

**The later at night the use, it is assumed to more dangerous the activity and therefore showing the greatest need for fortification. Therefore, toilets and water collection points such as community taps and water trucks parked on camp over night must be first priority for 24 hour security.**

## 8. WASH Typologies

Connections were found between the physical typology of WASH clusters and the occurrence of GBV. Typologies are defined here based on the configuration of elements within WASH clusters, and on the relationship between said WASH cluster and the closest Shelter Cluster on the given camp.

Figure ~ on the following page illustrates the categorization of the six cases. In the previous section of this chapter, each case was analyzed for the crime opportunities presented by the configuration of the WASH elements within their cluster and the relationship of the WASH cluster to its immediate context, to show in particular **hiding places**, **escape routes**, and **lack of natural surveillance**. The straight row typology, whereby toilets and/or showers are lined off in a row allowing for a **front** and **back** was found to provide opportune hiding places, especially when the **back** is put against a boundary wall or against a **function-less space** that no one watches or uses.