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A discussion note

A new index of refugee protection -

Using data on Rohingya camps from the NPM Bangladesh Site Assessment (Round 9, March 2018)

6 August 2018

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Acknowledgment

We thank an anonymous reviewer for critical comments on an earlier draft and for the reference to the "Protection Information Management (PIM)" initiative.

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About the authors

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We conducted this research in our pastime, using publicly available data.

Summary

In 2005, the UNHCR published a report “Measuring Protection by Numbers” (UNHCR 2005). It has spawned a small literature, which appears to pursue many strands and methods, without noticeable breakthroughs in measurement methods. Recently, the “Protection Information Management (PIM)” initiative, sponsored by a number of humanitarian agencies and think tanks, restarted the discussion. A quick reading of published documents suggests that the initiative is still working on foundational tasks.

Meanwhile the need to formulate and calculate measures of protection in field operations is ongoing.

It is tempting to build measures of protection or of the lack thereof from counts of incidents and of other reported events for populations at risk. Incidents reveal major underlying problems. To give but one example, the 2018 Joint Response Plan for Rohingya Humanitarian Crisis (Strategic Executive Group and Partners 2018:55) notes that

> *“Hundreds of incidents of gender-based violence are reported weekly. Many women and girls have been exposed to widespread and severe forms of sexual violence in Myanmar before and during flight. Following displacement, they continue to be at risk of GBV, including domestic and intimate partner violence. Lack of income generating opportunity and transferable skills development has led to exploitation of women and adolescent girls in the form of forced marriage, survival sex, and trafficking for commercial sexual exploitation and forced labor. Field reports link incidents of rape and trafficking to high-risk informal work including domestic labor and hotel housekeeping. Fear of abduction, harassment, and sexual violence severely restricts freedom of movement for women and girls, which results in lack of access to service information, social support networks, and safety alternatives for those in threat of harm at home.”*

However, incidence rates are often so low, incomplete or unreliable that they frustrate robust measures. This is especially so in the Rohingya refugee crisis and, within this, in the site assessments in Bangladesh that rely chiefly on key informants. Additionally, incident reporting quality varies greatly due to differences in camp management across the settlements.

An alternative to incident-based statistics seems desirable. The International Organization for Migration Needs and Population Monitoring (IOM/NPM) Bangladesh Site Assessment datasets hold a variety of protection-related variables that affect the entire population and are not reliant on sensitive case management or incident reporting data. These data present an opportunity to work towards a more reliable protection index[1].

[1] See, e.g., https://data.humdata.org/dataset/npm-bangladesh-round-9-baseline-master-list-march-2018 .

Unfortunately, the available data do not cover all dimensions of humanitarian protection. This brief note reports the construction of a lack-of-protection index based on 18 indicators of safety problems and on a further six of movement restrictions. To feel safe and secure in one's home and surroundings is one of the core aspects of humanitarian protection, as is the freedom of movement.

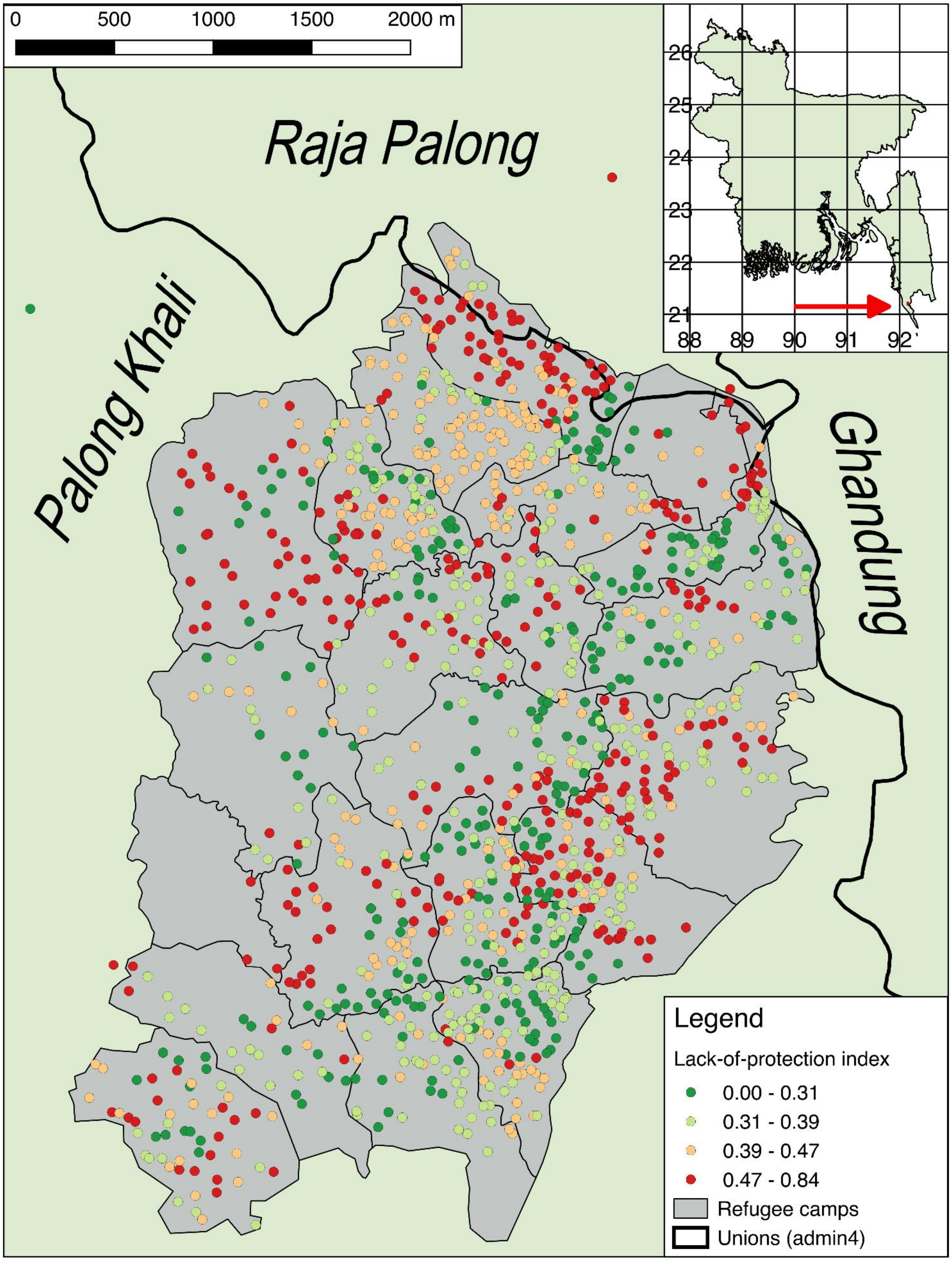
The data were collected as part of Round 9 in March 2018, at the block level. With 1,807 blocks surveyed, Round 9 fully enumerated the known settlements in Bangladesh.

The map on the next page shows clusters of high and low index values from a segment of the refugee living area in southeastern Bangladesh. The cluster of camps in Raja Palong and Palong Khali Unions hosts the majority of the almost 900,000 Rohingya refugees. Each *mahji* block or "camp point" is marked by a dot. Red dots stand for camp point populations with high index values, i.e., at substantial protection risks.

One obvious finding is that intra-camp variation is important. Small clusters of red dots and others of green dots can be found in the same camp; a cluster may cross into adjacent camps. Operationally, averaging index values to camps may not be informative. It may be more productive to drill down in the GIS to see what small clusters of camp points with similar index values have in common, and to reflect on what these commonalities could mean practically.

The substantive interpretation of the index is not definitive. Right now, we call it the "index of lack of protection". Some might see in this a reference to failure to protect and prefer a name like "index of protection risks". Ultimately, if this line of investigation is further pursued, the nature of the index will have to be further clarified and statistically validated. At this point, we report an initial experiment in hopes to stimulate new thinking on "protection by numbers". This type of thinking would potentially circumnavigate one of the major problems with using protection monitoring data (in addition to sensitivity and anonymity) – that incident reporting does not adequately reflect the pattern of protection challenges.

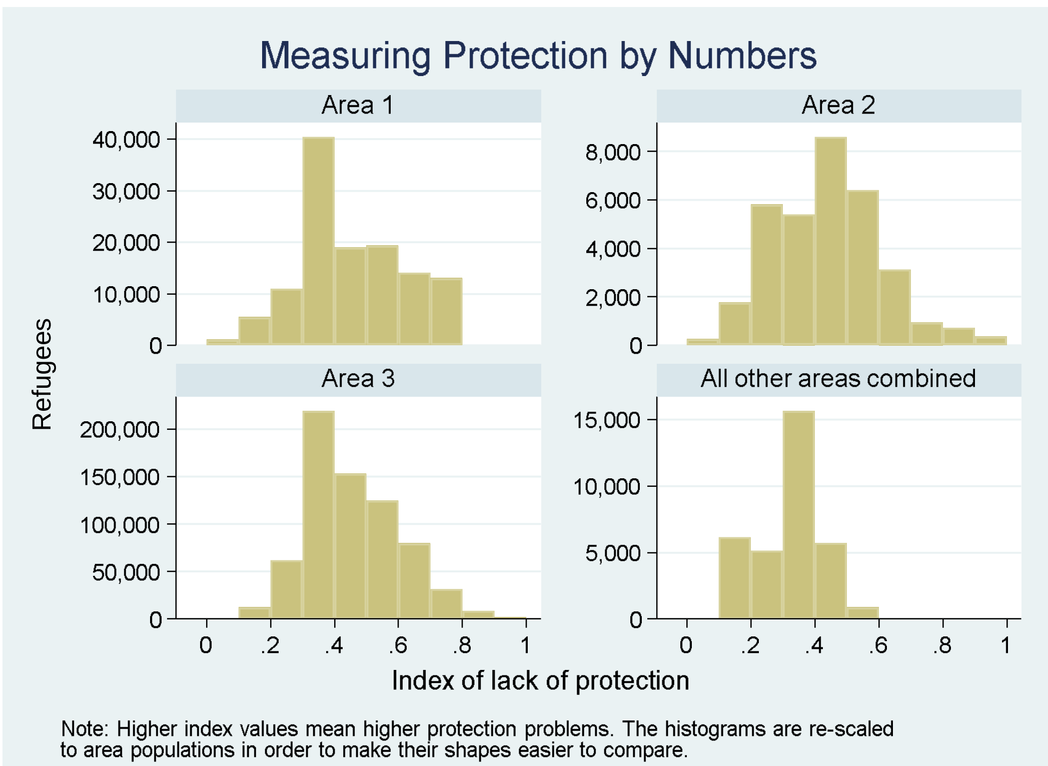
Figure 1: Map of the lack of protection levels across the so-called Kutupalong-Balukhali Expansion Sites



Introduction

The purpose of this note is to conduct a methodological experiment in constructing a quantitative measure of refugee protection. The measure can be used to highlight different degrees of protection challenges between geographical areas or groups of refugees. Notionally, this set of histograms illustrates the ambition. Practically, we exploit a dataset that the International Organization for Migration, through its Needs and Population Monitoring project (IOM/NPM), recently collected in Bangladesh. We use a statistical method borrowed from poverty research that circumvents apples-and-oranges conundrums in weighting indicators. It casts a wide net in order to capture as many aspects of protection as the indicators cover while at the same time minimizing redundancy among them. The indicators in the NPM dataset are negatively oriented; therefore, we interpret the index as one of "Lack of protection".

Figure 2: The index as a means to compare areas or social groups



Conceptual background

Measuring refugee protection is challenging. The difficulty is fundamental; "protection" is a dispositional concept. It can be observed in behaviors and situations that have a meaningful connection with the concept. However, such pertinent behaviors and situations cannot be fully enumerated[2].

[2] On dispositional concepts, Carnap (1936) is seminal. Discussions closer to the humanitarian world are rare and tangential (Benini 2008, Alzola 2009, Liang 2010).

Moreover, to add to the complexity, protection has, not one, but two dispositional connotations:

- The ability of persons at risk (potential victims) to eschew harm, and
- Organized activities to create dispositions in another set of persons (potential perpetrators) not to cause harm.

The double dispositional character calls for involved, abstract rationales whenever metrics of protection are needed. In organizations mandated to protect refugees, the discourse about measurement is, of course, not phrased in philosophical terms, but in terms of needs (e.g., for safety), activities to meet those needs as well as risks that frustrate their fulfillment.

In 2005, the UNHCR published a report "Measuring Protection by Numbers" (UNHCR 2005). It has spawned a small literature, which appears to pursue many strands and methods. Discussions in this line (among some fifty others, we refer to Franke 2009, Satterthwaite 2010, Mwangi 2014, Bado 2016, Fisk 2016) are concerned chiefly with international law. A few address fundamental issues of quantifying protection problems and activities, and others the resistance to using indicators in the protection sector long after other sectors started refining theirs (Satterthwaite 2010) (with reference to the Sphere standards).

In practice, methodologies of quantitative monitoring of protection have been more solidly developed among human rights scholars (Ball, Betts et al. 2002, and the ensuing flowering of research in this area). Their statistical models work best when prevalence and incidence rates for the objects of interest (including protection incidents) are substantial. Often, however, events and cases of interest among refugees are rare, or are rarely reported, or the reports are too summary or too unreliable.

To fix the idea, let us quickly look at incident data from the area hit by Typhoon Haiyan in the Philippines in 2013. The Protection Cluster enquired about incidents attributed to an armed opposition movement in all 408 assessed municipalities. Among them, 77 (19 percent) claimed that since 2010 between 1 and 17 such incidents had occurred on their territories, with four municipalities reporting ten or more. The mean incidence rate, cumulative for four years, works out as 0.60 incidents / municipality. Population-based, it is 0.17 / 10,000 (max. = 5.6 / 10,000), and if only municipalities with at least one incident are counted, as 0.90 / 10,000. Thus, the incident counts discriminate well between a small number of communities at elevated risk and the vast majority at lesser risk. However, whether a municipality suffered "at least one incident in the past" vs "none ever" is extremely random[3].

Statistical models for dealing with these kinds of rare events are available from the disease surveillance field (Kennedy-Kalafatis 1995, Carriere and Roos 1997, Michael and Robert 1998, Zou, Karr et al. 2014), but they are demanding and have not so far made much of an

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[3] Recalculated from a Protection Cluster dataset, December 2013. See also the sidebar in Benini, Chataigner (2014:53-54): "Constructing a special protection needs index", available at http://aldo-benini.org/Level2/HumanitData/Acaps_140527_CompositeMeasures_Philippines.pdf .

inroad into humanitarian data analysis. According to Zou et al., op.cit., the major challenges are;

- The signal-to-noise ratio is low, i.e. the detection of incident patterns is hampered by numerous random events and measurement errors.
- The optimal density of the monitoring network is hard to determine. Too few observation points miss out on local structure; too many produce low counts per point (many with zeros), which makes the modeling and estimation difficult.
- From a practical viewpoint, one can either get fast results with many false positives, or more reliable measurements with delayed detection of true epidemics.

Protection indices based on rates of rare events face the same limitations. An alternative to incidence rate-based measures is desirable.

The refugee and IDP protection community, led by the Global Protection Cluster, is keenly aware of the challenges of measuring protection. In 2015, a number of UN, Red Cross and academic organizations as well as international NGOs embarked on a "Protection Information Management (PIM)" initiative[4]. Its objective is to "provide quality data and information on people in displacement situations in a safe, reliable, and meaningful way". It has since produced a "Framework for Data Sharing in Practice"[5] and has set up a Task Team on Protection Information Management Analysis. Also, a number of participating agencies have contributed tools and case studies from their protection-focused work – InterAction's "Results-Based Protection" is just one example[6].

These collaborations offer a considerable variety of tools and templates, but apparently not yet very much in the way of empirical analyses. Meanwhile, field-based programs continue to collect and make available data on protection risks and activities, but lack synthetic measures. We tap into one such data stream in order to develop an experimental index of protection.

An opportunity for an experiment

The NPM Bangladesh Site Assessment datasets hold a variety of protection-related variables that go beyond references to incident reporting. These data present an opportunity to work towards a broadly supported, more reliable protection index. This note outlines some initial findings without the possibility yet to seriously validate the construct.

Briefly, the NPM Round 9 Assessment in March 2018 covered 1,807 refugee camp sections known as "blocks" or "camp points", the dwelling sites of close to 900,000 refugees. The camp point populations range from a low 4 to a high 4,850. Every camp point produces one observation in a dataset with 667 variables. Of these, 74 relate directly to concerns of the protection sector.

[4] https://pim.guide/ .
[5] http://pim.guide/wp-content/uploads/2018/05/Framework-for-Data-Sharing-in-Practice.pdf .
[6] https://protection.interaction.org/resources/ .

A few of those variables hold the response to questions about specific protection incidents. The incidents were rare, or underreported. For instance, key informants in only ten camp points affirmed attempts to traffic women, and in only six they said the same about trafficking children. These data are not usable for protection statistics – they are in clear contraction to the extent of protection issues such as those quoted from the Joint Response Plan in the Summary. The rates are too low, and the simple binary claim that such a problem has occurred or has never occurred so far is too coarse.

Many other variables, however, do have indicator value and can, with suitable methods, be combined in substantive sub-indices. These in turn can be combined in an index that covers a broader, albeit far from complete range of protection concerns. The elemental variables are binary, simply indicating whether the key informant confirmed the existence of a problem at the given camp point or not. As such, they are information-poor and, presumably, many of them of doubtful reliability. It is only in combination of several indicators that better differentiating measures may emerge.

The data at hand invite the exploration of sub-indices. We were able to form two that seem meaningful. We call them, for lack of better terms:

1. Sub-index of insecurity
2. Sub-index of movement restrictions.

These sub-indices have resulted from the reduction of candidate indicators to meaningful smaller sets that we retained for their ability to cover the diversity of protection aspects. Indicators with high redundancy with others either were excluded or received low weights in the aggregation to sub-indices. An earlier attempt to form a third sub-index, meant to measure the lack of incident reporting channels, did not produce satisfactory results. The concern to ensure that affected communities can effectively report threats and incidents is high on the protection agenda; experiments to measure the ability to do so should be resumed in future.

Indicators in the wider scheme of things

The scope of protection concerns and interventions is understood to be far larger than the elements incorporated in our index. For instance, stable housing, land and property rights, faith in the government and institutions, and participation in the political system are desirable components of a broad-based protection measure. When NPM conducted Round 9, those components either were uniformly weak or could not be effectively measured.

Moreover, the concept of humanitarian protection should not be limited to the footprint of the protection sector, on which UNHCR's "Measuring Protection by Numbers" (op.cit.) was necessarily focused. At its core, protection can be observed by improvements and deteriorations in the lives of affected populations.

We are not yet there. The rationales for the two sub-indices that jointly measure the lack of protection are modest. First, safety – its opposite we call "insecurity" -– whether one feels safe in their environment - is perhaps the most basic concept underpinning protection.

Movement restrictions, combined in the second sub-index, are a major determinant in how well refugees can access markets, information and populations in other settlements. They are also a factor in refugees' abilities to make use of cash- and market-based interventions.

The level of communication between Rohingya and camp administrations was also considered, as a proxy for participation. It was too distinct from the other indicators and would likely have required its own suite of variables to populate a separate sub-index with other representation and governance indicators.

Although the indicator data at our reach cover a narrow spectrum of protection, their analysis in a unified index perspective addresses an important question: whether or not the various protection risks stack on top of each other on particularly vulnerable groups or are more dispersed across the refugee population. This we want to investigate in the following sections.

Method – Strengths and Weaknesses

One of the many statistical methods for generating indicator weights and calculating sub-indices is known as the "Betti-Verma weighting scheme" or BV method. Betti and Verma (1999) and later others developed it for the measurement of deprivation (of individuals and households) in the field of poverty research. We have adopted it for our purposes because of its ability to deal with large numbers of indicators. Indicator datasets often include subsets of indicators that are highly correlated. This happens, for example, when subpopulations all experience the same phenomena. The Betti-Verma method[7] detects redundancy among indicators, reducing the weights on those that are strongly correlated with others. This allows indices to include multiple correlated indicators and to avoid bias against others of equal substantive importance, but which are less strongly correlated.

The major strength of this method is to avoid "apples and oranges" issues in aggregation. It determines weights solely on the basis of the information contributions of the indicators. Betti-Verma weights are not substantive importance weights; the method throws a wide net to capture aspects of the concept of interest that are not yet covered in the statistical correlation patterns of the other indicators[8].

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[7] It calculates weights on indicators that contribute to a sub-index or index of interest. It increases the weights of indicators that are more informative (technically: have a larger coefficient of variation) and decreases weights of indicators that are more redundant (have larger correlations with all the other indicators). Both mechanisms reward diversity, the novel information that a particular indicator provides. A simplified technical explanation may be found in the ACAPS resource "Composite measures of local disaster impact - Lessons from Typhoon Yolanda, Philippines," published in 2014; the full technical documentation on a family of multidimensional deprivation indices, of which Betti-Verma is a member, is available at medim.ceps.lu/stata/mdepriv_v3.pdf. We calculated the BV sub-indices in the statistical package STATA, using the procedure ***mdepriv*** ("Synthetic indicators of multiple deprivation") (Betti and Verma 1999, Pi Alperin and Van Kerm 2009, Betti, Gagliardi et al. 2015).

[8] For a graphic example, we turn to another sector, shelter assistance. At most camp points, rope and tarpaulin were distributed at the same time. Bamboo, another key material, however, would arrive independently. If we wanted to build an index out of three indicators of whether the point had received the respective materials or not, BV weights might be close to 0.5 for bamboo, and close to 0.25 for rope and tarp each. The rope and tarp indicators are highly correlated; together they deliver about half of the information value, not two thirds.

Its major weakness is that the method rewards measurement error. If a participating variable is measured with substantial error, its correlations with other, more reliable variables are diminished from their true values. A lower sum of positive correlation coefficients, however, increases the weight of the variable because it makes it appear to contribute more novel information.

The lack of robustness to measurement error is worrisome in humanitarian assessments. Data collection is far from ideal; a number of factors militate against good data:

- Displacement is dynamic; there is a changing geography to the crisis. Multiple displacement should be a protection risk as well, but this has not been captured in a meaningful measure.
- NPM has a wide range of responsibilities in addition to the Site Assessment – it monitors the flow of Rohingya in the settlements in Cox's Bazar; it handles incident reporting in the monsoon season; and it conducts mapping through unmanned aerial vehicles (UAVs). Collection protection data is only one of its many tasks.
- The Site Assessment is a key informant-based survey. Its main participants are block captains, locally known as *mahjis*, so named after the boatmen who helped the Rohingya cross the Naf River into Bangladesh. Many were chosen because of their ability to communicate with the Bangladeshi military. They are almost exclusively male with a markedly different understanding of the Rohingya settlements than many of the other residents (in Round 9, there was only one female *mahji)*. Although this is somewhat mitigated by their exposure to the camp's issues and problems in their roles as community leaders, the history of the *mahji* system is chequered[9].

Finally, contrary to methods that emphasize a narrow focus (scales, factor analysis), Betti-Verma, with its premium on diversity of deprivation aspects, has no ready reliability tests (e.g., no analogue to Cronbach's Alpha). This shortcoming, by itself, limits us to a very tentative experiment. This is outweighed by the ability to reduce doubts and disputes over the relative importance of the indicators within a sector like Protection. Ultimately, further down the road, Betti-Verma may encourage combined measures such as of the severity of impact in which multiple sectors and clusters are interested.

Sub-indices

In the following sections, we present select statistical output in (for now) unedited form; variables are abbreviated, and their meanings are given in lists ahead of the statistical tables in each section.

[9] The *mahji* system in registered refugee camps run by UNHCR had been closed due to widespread corruption and abuse of power. *Mahjis* remain prevalent in makeshift settlements where the majority of the Rohingya who came during the influx lived. Efforts are underway, as of drafting, to replace the *mahji* system with a more representative form of governance (ACAPS and NPM Analysis Hub 2018).

Insecurity

Indicators

For the insecurity sub-index, we used 18 indicators. The term "safety" in the NPM database is misleading; the value "1" stands for the reported presence of a safety *issue*, in other words a state of insecurity. The interviewers elicited experience with safety issues in six activities or locations: transportation, relief distribution sites, bathing and washing facilities, water points, firewood collection and visits to markets. The same options were used in separate questions about the experience of children, women and men.

Here are the question and its response options regarding safety problems for children:

Figure 3: A question on safety problems

M3- In the last 30 days have there been any safety problems for children in any of the following places?

- ☐ Bathing/Washing facility
- ☐ Market
- ☐ Transportation
- ☐ Waterpoints
- ☐ Distribution site
- ☐ Where firewood collection happen
- ☐ Prefer not to answer
- ☐ Don't know
- ☐ Other

M3_Other- Other, please specify

This question form is problematic. The high number of options presented in one question likely caused attention and question-order effects in some of the respondents. As a result, the options, to a degree, competed with each other for memory and verbalization. This, in turn, lowered the positive correlations among indicators. It may be the cause why some of the correlations are negative[10].

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[10] The tetrachoric correlation coefficients (https://www.stata.com/manuals13/rtetrachoric.pdf) among the 18 indicators range from -0.61 to +0.88. We observe -0.61 between safety problems for children while bathing or washing and while collecting firewood. There is no plausible reason why children in one place should be less at risk while bathing then while collecting firewood, and vice versa for children of other places. This negative association is an artifact of the question form.

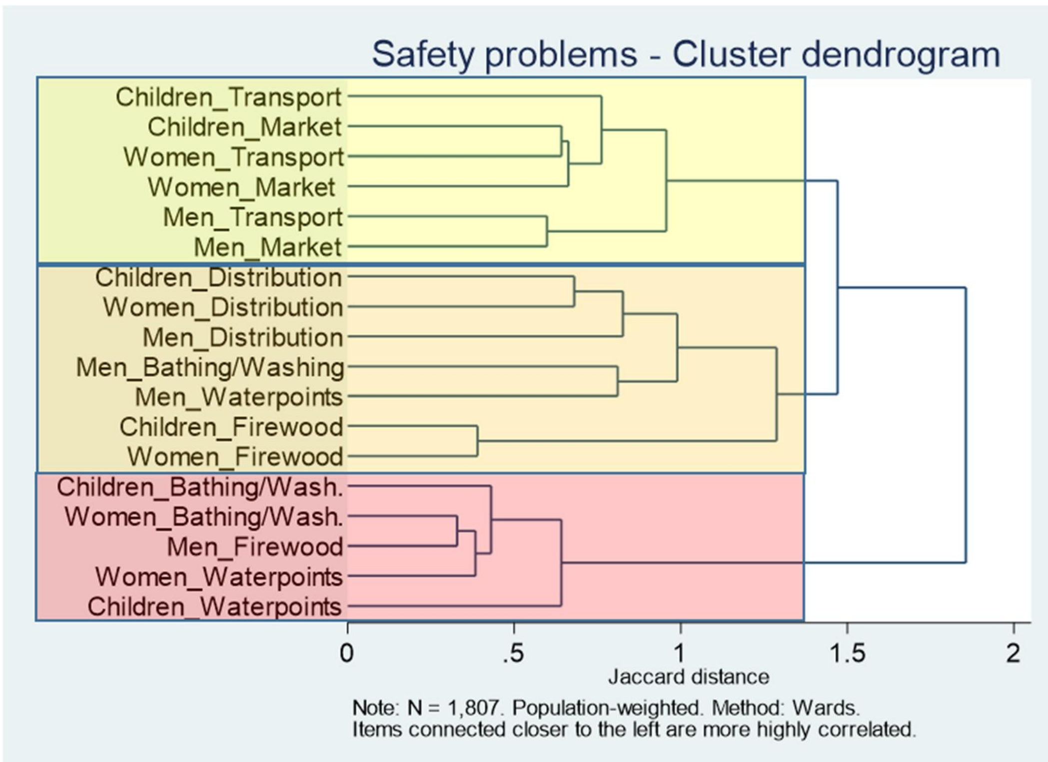
By contrast, the strongest positive correlation (+0.88) is for firewood collection by children and women. These two indicators are from the response to two different questions. The idea that women and children from the same camp point are at similar risk when collecting firewood is intuitively appealing.

Excel users can find two methods of calculating tetrachoric correlations at http://www.real-statistics.com/correlation/polychoric-correlation/tetrachoric-correlation-estimation/ . They are inconvenient.

Correlation pattern

A cluster analysis reveals five of those six problems tend to co-occur closely (red rectangle in the dendrogram). The sixth - the safety problems that men face at relief distributions – aligns more closely with the same problem of women and children (orange rectangle) The safety of the three groups during transportation and market visits forms its own cluster, but the challenges for women and children (who may rarely move very far) and those for men (who likely do the shopping and travel in search for work) are not closely correlated. Some of this clustering could be a statistical artefact, caused by the individual propensities of key informants to check few or many problems.

Figure 4: Cluster diagram for the safety problem indicators



Sub-index

We therefore kept all 18 candidate indicators in the Betti-Verma routine, with a plan to eliminate those which, because of strong negative correlations with others, would be assigned negative weights. However, with these particular data, none of the BV weights turned out negative. Thus, we include all 18 in the sub-index.

Below is the weight table. The form of the Betti-Verma output needs brief explanation. The table gives the variables names for the rows plus four columns of the results of interest.

If you wish to implement Betti-Verma calculations in Excel, "normal" (Pearson-moment) correlations, using Excel's CORREL command, should produce acceptable approximations in the resulting BV weights.

The "Index" column gives the proportions of refugees for which a particular safety problem was reported (the population-weighted prevalence among camp points). The weights are those used in the aggregation. The contributions are the prevalences multiplied by their weights; they represent the indicators' contributions to the sub-index. The sum of contributions at the bottom is a measure of the overall level of insecurity in this population, but it makes sense only in comparing subgroups (see below). The shares, summed to 1, make it easier to compare the contributions.

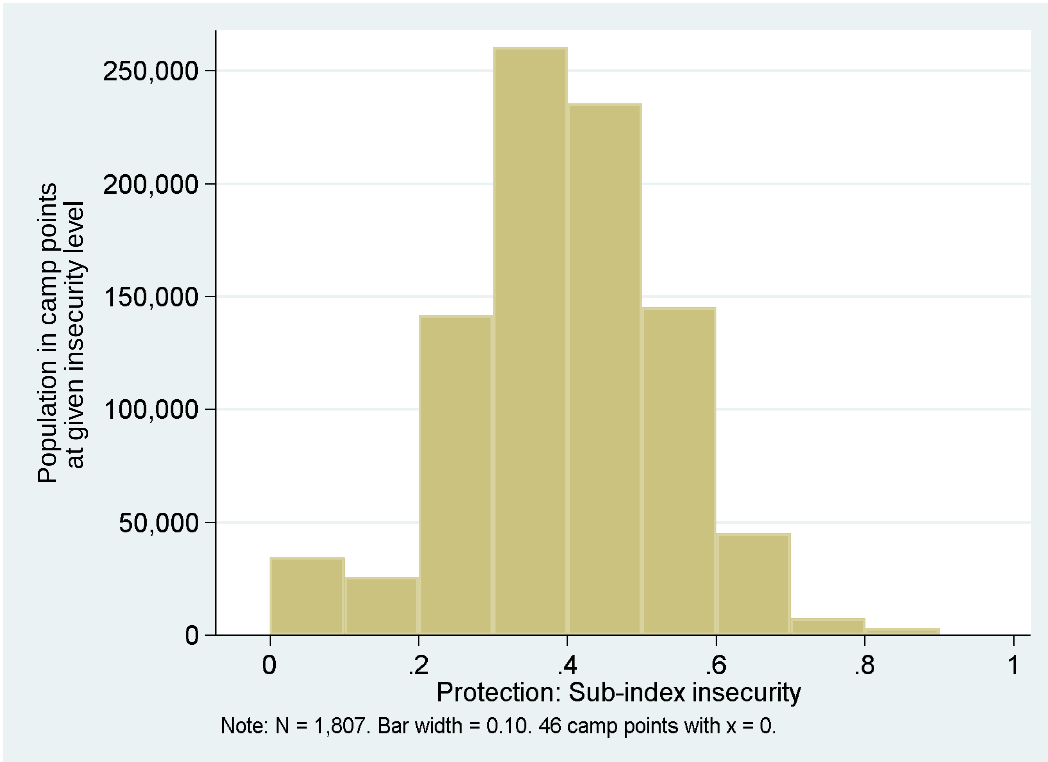
Table 1: Safety problem prevalences, weights and contribution, by indicator

Safety problem indicator	Index	Weight	Contrib.	Share
Children: Transportation	0.1832	0.0356	0.0065	0.0167
Children: Distribution site	0.1862	0.0316	0.0059	0.0151
Children: Bathing/Washing Facility	0.5697	0.1160	0.0661	0.1691
Children: Waterpoints	0.4551	0.0523	0.0238	0.0610
Children: At firewood collection	0.2656	0.0595	0.0158	0.0404
Children: Market	0.1636	0.0278	0.0046	0.0117
Women: Transportation	0.1532	0.0265	0.0041	0.0104
Women: Distribution site	0.3637	0.0475	0.0173	0.0442
Women: Bathing/Washing Facility	0.6727	0.0560	0.0376	0.0963
Women: Waterpoints	0.6731	0.0963	0.0648	0.1660
Women: At firewood collection	0.2548	0.0577	0.0147	0.0376
Women: Market	0.1051	0.0244	0.0026	0.0066
Men: Transportation	0.2707	0.0280	0.0076	0.0194
Men: Distribution site	0.3664	0.1607	0.0589	0.1507
Men: Bathing/Washing Facility	0.1013	0.0453	0.0046	0.0118
Men: Waterpoints	0.1366	0.0566	0.0077	0.0198
Men: At firewood collection	0.8962	0.0451	0.0404	0.1035
Men: Market	0.2350	0.0331	0.0078	0.0199
Total:		1.0000	0.3907	1.0000

Women and children face safety problems primarily during water-related activities (which include using latrines). Men run dangers chiefly at distribution sites and while collecting firewood.

This histogram on the next page gives the rough distribution of the sub-index.

Figure 5: Histogram of the insecurity subindex



Regional differences exist; they are minor among the three Unions with large refugee clusters (Nhilla, Palong Khali, and Whykong); for camp points outside those the average sub-index value is about 10 percent lower. Many of the refugees in these Unions live in small host communities, which, one assumes, are safer than camps. Within the big clusters, however, there is significant spatial correlation[11]; this means that camp points that are highly insecure tend to be neighbors of other highly insecure points, and vice versa.

Movement restrictions

Indicators

The presence of movement restrictions was elicited with regards to six types of locales and activities.

[11] Measured in Moran's I, with a quadratic decay function, here = 0.240 (Wikipedia 2015). This value and the values of I of the movement restriction sub-index and well as of the final index are to be taken with caution. The point coordinates of the camp blocks appear to be those of the places where NPM workers interviewed key informants, not the block centroids. It is plausible that for convenience NPM workers met with informants from two or more neighboring blocks in the same spot. If this practice was frequent, it would bias Moran's I upwards.

Figure 6: A question about movement restrictions

M7- Do the Rohingya currently experience any difficulties or feel restricted to move in any of the following places or occasions?

- [ ] Going to work (in any)
- [ ] Going to market
- [ ] At distribution site
- [ ] While collecting fire wood in the forest
- [ ] While crossing the check points
- [ ] Moving from one camp to another
- [ ] Prefer not to answer
- [ ] Don't know
- [ ] Other

M7_Other- Other, please specify

For three of the locations/activities, the proportions of camp points reporting difficulties or restrictions are elevated. People from virtually all camp points (97 percent) have experienced them at checkpoints. For the other three, the proportions are modest:

Table 2: Prevalence of particular movement restrictions

Location / activity	Affected by restrictions
Going to work	50.4%
At checkpoints	96.7%
Collecting firewood	80.3%
At distribution sites	3.3%
Going to the market	12.2%
From camp to camp	13.7%

Note: N= 1,807. Population-weighted.

Correlation pattern

The correlation pattern among the six indicators has two abnormalities – a medium strong negative correlation between movement restrictions on the way to work and at distribution sites, and a perfect positive correlation between restrictions at checkpoints and at distributions sites. The former may indicate different safety profiles for population with greater and lesser integration into local job markets. The second, seen in this cross-tabulation is more of an enigma:

Table 3: Coincidence table of two types of movement restrictions

At checkpoints	At distribution sites		Total
	No	Yes	
No	74	0	74
Yes	1,682	51	1,733
Total	1,756	51	1,807

See footnote 12.

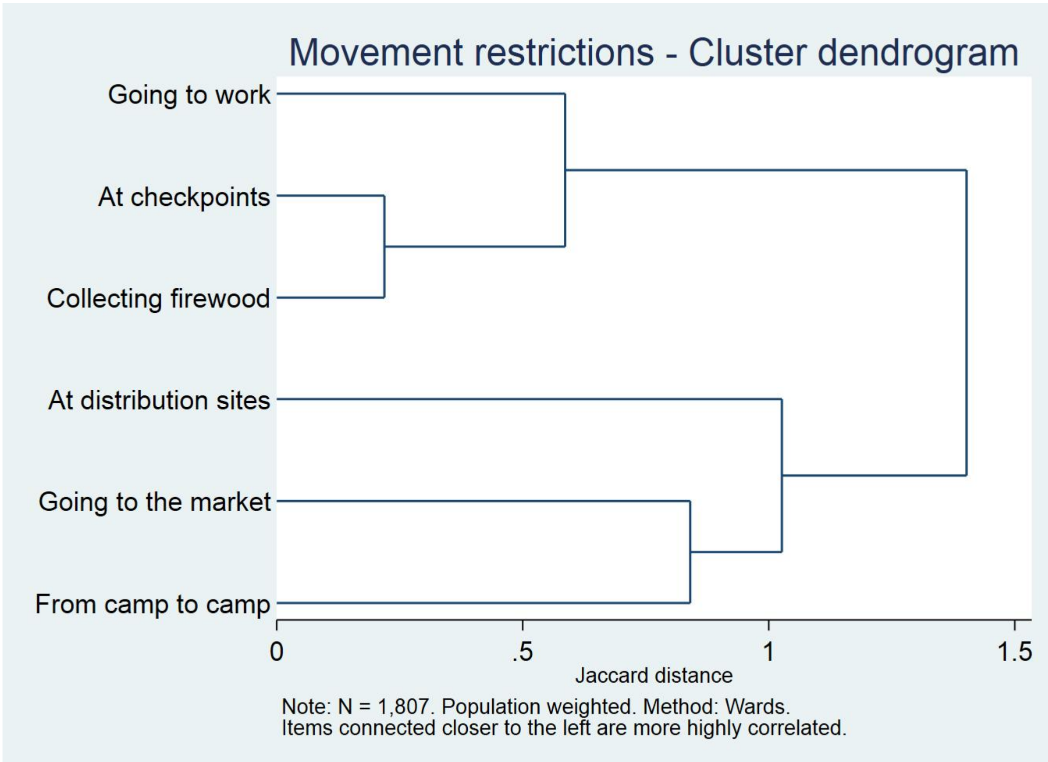
It implies that friendly checkpoints go hand in hand with safe movement to and from distribution sites, but not the reverse. The 74 camp points with zeros in both indicators reveal either an interesting protection regularity or a data management problem, using zeros inappropriately for missing values. Which it is only research on the ground will tell.

The dendrogram reflects stronger coincidences among restrictions experienced while going to work, at checkpoints and while collecting firewood. Interestingly, although restrictions at checkpoints and at distribution sites are perfectly correlated, "at distribution sites" has moved away[13]. These lower three in the graph are less strongly associated.

[12] The correlation is perfectly positive because the two variables are binary. For this type, so-called tetrachoric correlations are appropriate.

[13] How is that possible? One would expect that if X and Y are perfectly correlated, their correlations with other variables Z_1, Z_2, etc. to be identical, e.g. corr(X, Z_1) = corr(Y, Z_2). This is true of "normal" (Pearson-moment) correlations, but not of tetrachoric ones, which are appropriate for binary variables.

Figure 7: Cluster dendrogram of indictors of movement restrictions



Sub-index

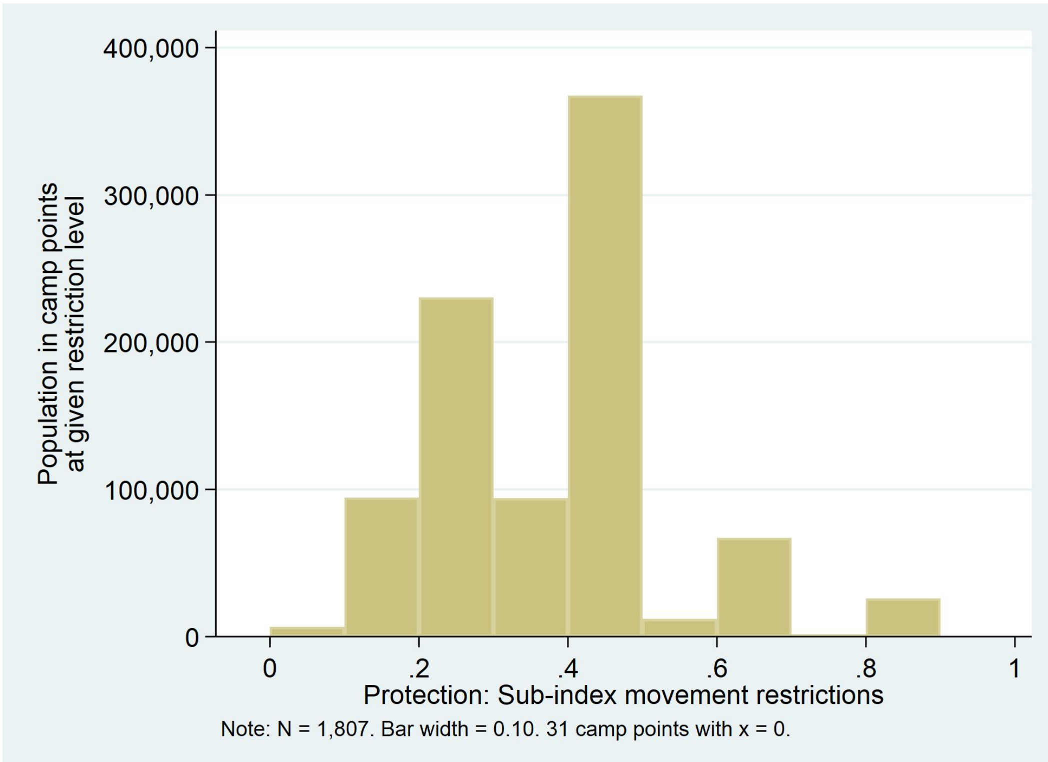
The Betti-Verma weights are positive on all indicators; thus we retain all six. The prevalences, as before, are weighted by the camp point populations.

Table 4: Means, weight and contributions of movement restriction indicators

Location / activity	Index	Weight	Contribution	Share
Going to work	0.5038	0.2235	0.1126	0.2849
At checkpoints	0.9670	0.1289	0.1246	0.3153
Collecting firewood	0.8026	0.1353	0.1086	0.2747
At distribution sites	0.0333	0.1827	0.0061	0.0154
Going to the market	0.1215	0.1191	0.0145	0.0366
From camp to camp	0.1373	0.2105	0.0289	0.0731
Total		1.0000	0.3952	1.0000

Restrictions on movements to work, at checkpoints and while collecting firewood contribute the most to the sub-index, due to their high prevalence. Note, however, that restrictions at distribution sites and from camp to camp have relatively high weights. The restrictions at checkpoints and at distribution sites are perfectly correlated. Under Betti-Verma one or the other of these two indicators is redundant; this depresses the weights on both. If we excluded distribution sites, the weight on restrictions at checkpoints would jump to 0.27, and it would contribute 51 percent of the sub-index mass.

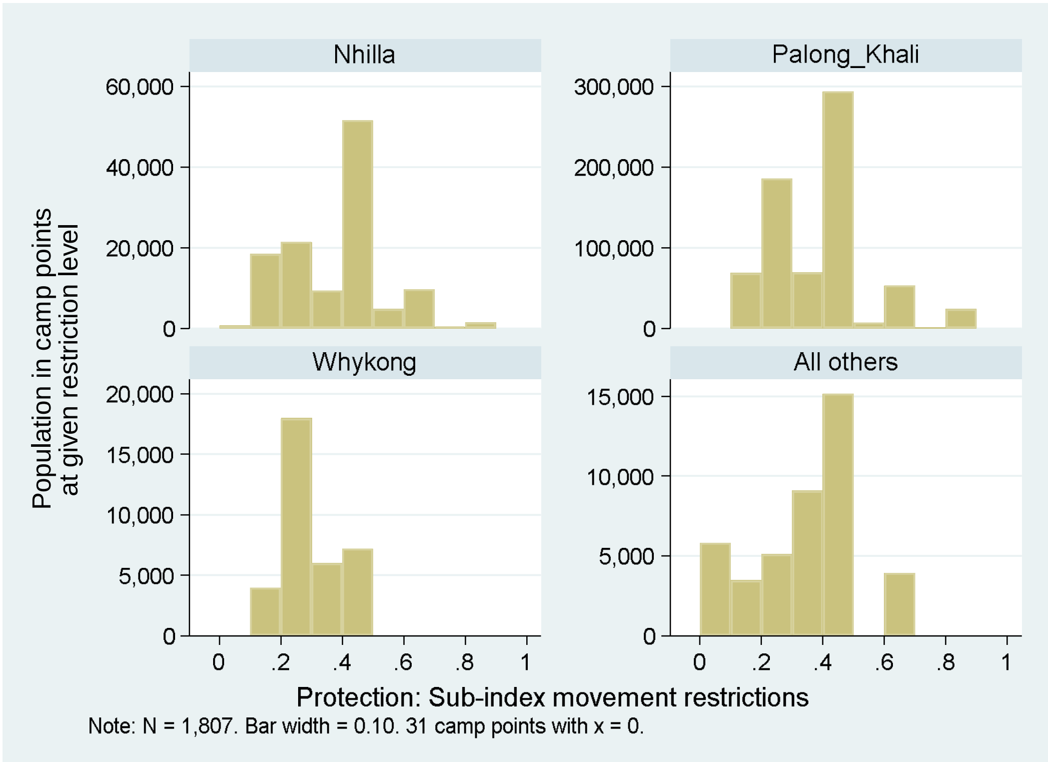
Figure 8: Histogram of the movement restriction subindex



The histogram reveals a jagged distribution. This is largely due to the fact that only three indicators contribute strongly; between the three there are 2 * 2 * 2 = 8 value combinations. Some of these occur at great frequency, which makes for multiple peaks. Nevertheless, there is clearly a minority of camp points suffering from particularly broad restrictions. There are 184 points with sub-index values greater than 0.6, with a combined population of 93,947. For one in every ten refugees, the movement restrictions are far-reaching.

There are regional differences. Restrictions are lighter in Whykong Union than in Nhilla and Palong Khali. The refugee population in Whykong is much smaller. One may hypothesize that the larger the size of the refugee camp clusters, and the attendant security and management issues, the more severe the ensuing movement restrictions.

Figure 9: Distribution of the subindex in four areas



The spatial correlation of the movement restriction sub-index is stronger than that of insecurity (Moran's I = 0.327). This applies particularly to within-camp situations and to neighboring points across the border of two camps. It means that neighboring points tend to both have either higher sub-index values, or both of them lower ones.

Aggregation to a protection index

To recapitulate, we work with two protection-relevant sub-indices – Insecurity and Movement. The first is the product of 18 indicators; the second combines six only. Not surprisingly, then, the first takes a great many distinct values (693), the second far fewer (34). The sub-indices are similar in mean and standard deviation (SD), and their skewness (a measure of asymmetry) is close to that of a normal distribution (0). The same for their kurtosis (a measure of thin or thick tails; the kurtosis of a normal distribution is 3):

Table 5: Moments of the sub-indices (population-weighted)

Statistic	Insecurity	Movement restrictions
Mean	0.391	0.395
SD	0.143	0.162
Skewness	-0.297	0.148
Kurtosis	3.578	2.938

See Footnote 14

Neither are there any missing values (both sub-indices cover the full population). Moreover, since for every sub-index Betti-Verma sets the sum of weights on the indicators = 1, the means are directly comparable.

In sum, these two constructs seem formally well-behaved even if we cannot, with the data at hand, evaluate their substantive validity. On the face of the intuitive relevance of the 18 + 6 = 24 indicators, we assume that the sub-indices are fit to form an index of protection. The index is negatively oriented ("lack of protection") because all the indicators were recorded this way (with "1" denoting a protection problem, and "0" its absence).

Relevant properties

In order to fully appreciate the Betti-Verma driven aggregation at this second level – from sub-indices to index -, three properties of the subindices need to be noted:

1. Measurement level:

The sub-indices, differently from the indicators, are no longer merely binary; they are ratio-level with multiple distinct values. The ratio-level characterization is reasonable if we think that a zero value signifies the absence of insecurity, respectively movement restrictions.

2. Information value:

Ratio-level sub-indices are more informative when their variablility, measured by the coefficients of variation (= standard deviation divided by the mean) is larger. The C.o.V. of the Insecurity subindex is 0.367; for Movement Restrictions it is 0.411.These values are similar.

3. The correlation between the sub-indices:

Since they are at ratio-level constructs, the Pearson correlation is appropriate (the type that the Excel command CORREL produces). The population-weighted correlation coefficient is 0.1915.

[14] https://en.wikipedia.org/wiki/Skewness and https://en.wikipedia.org/wiki/Kurtosis .

The two sub-indices are weakly positively correlated. This is counterintuitive. The absence of at least a modest positive correlation is hard to explain. Why would refugees subjected to more movement restrictions not feel more insecure? Formally, in the Betti-Verma mechanics, in this case it does not matter; there is only one correlation coefficient for two variables. But substantively, it is somewhat worrisome unless we can demonstrate that the conditions on the ground responsible for insecurity, respectively for movement restrictions are fairly independent the ones from the others.

Speculatively, we can invoke two hypothesis that could explain the low correlation:

- First, security may be better where the Bangladeshi military are maintaining a stronger presence. A stronger presence implies more stringent checkpoints. The coincidence in some places of better security and tighter movement restrictions would dampen the overall correlation.
- Second, the two sub-indices describe very different problems. If so, it may be necessary to rethink the combination of protection variables altogether. One way to go about this would be to take the 6 – 8 most highly weighted (in Betti-Verma) insecurity and movement restriction indicators and statistically project them onto a multi-dimensional space, and then to study the distribution of camps over that space. We have not yet gone into such procedures.

4. Substantive interpretation: Lack of protection

Because both sub-indices are oriented towards the undesirable pole of their constructs – insecurity and restrictions, not security and freedom, the resulting index substantively is an index of *the lack of protection*.

If one dislikes the negative orientation for aesthetic or other reasons, a positive protection index can simply be obtained by reversion, i.e. 1 – the lack of protection index values. However, the substantive field of such a positive construct would be no wider than what the insecurity and movement restriction indicators cover. One cannot infer that refugees in camp points with a perfect value of 1 on this reversed index were "perfectly protected" and free of the kinds of risks and exposures that justify protection measures. To safeguard against such naïve interpretations, it is better to go with the tedious "lack of protection index" interpretation.

Weights on the sub-indices

For the aggregation to the full index, Betti-Verma returns these weights and contributions:

Table 6: Sub-index means, weights and contributions to index

Subindex	Index	Weight	Contrib.	Share
Insecurity	0.3907	0.4721	0.1844	0.4692
Movement restrictions	0.3952	0.5279	0.2087	0.5308
Total		1.0000	0.3931	1.0000

Because the sub-indices are continuous (not just binary), the index column no longer gives prevalences, but the (population-weighted) means of the sub-indices. The weights are similar; the small difference is explained by the different coefficients of variation.

Distribution of the index

The resulting index "Lack of protection" comes in 905 distinct values, i.e., it is finely grained, with these population-weighted statistics:

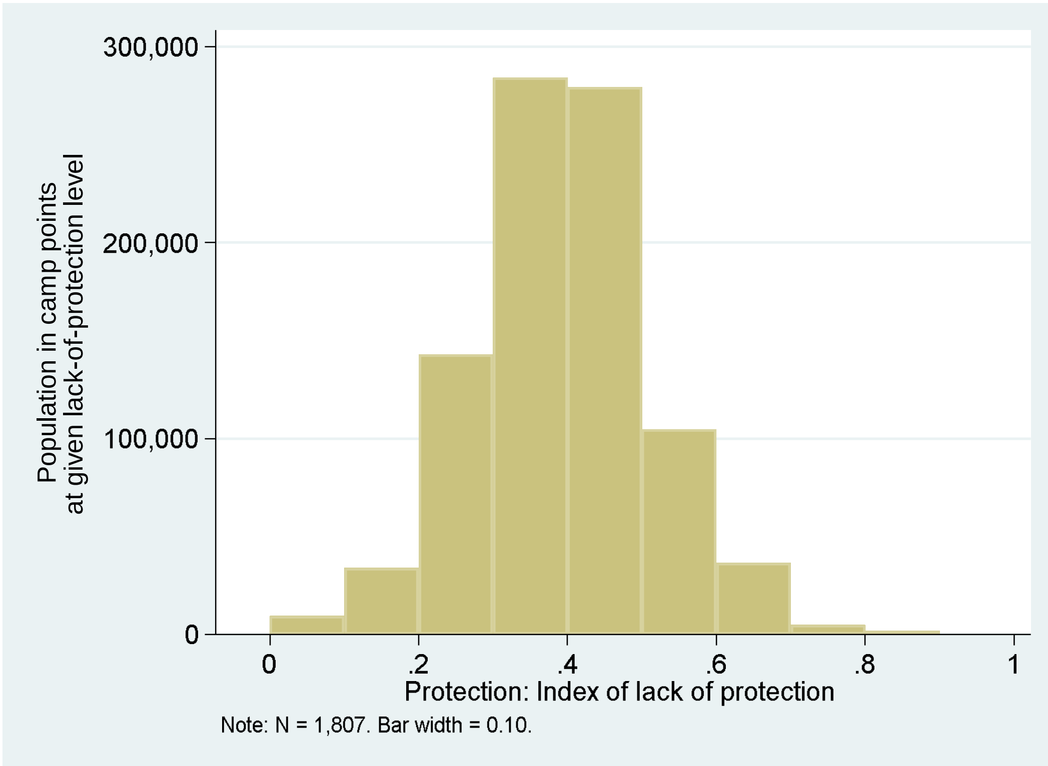
Table 7: Summary statistics of the index

```
                Index of lack of protection
-------------------------------------------------------------
      Percentiles      Smallest
 1%     .0944497              0
 5%     .2021861              0
10%     .2419113              0       Obs             898,312
25%     .3129652              0       Sum of Wgt.     898,312

50%     .3888002                      Mean           .3930958
                        Largest       Std. Dev.      .1189554
75%     .4759950       .7615862
90%     .5348022       .7617550       Variance       .0141504
95%     .5945731       .8132898       Skewness       .0163185
99%     .6876138       .8405223       Kurtosis        3.54798
-------------------------------------------------------------
```

The mean (0.393) and median (0.389) are almost identical. The distribution is almost symmetrical around the mean. Close to ten percent of the refugee population live in camp points with index values smaller than 0.24; another then percent in points with value greater than 0.53. The large majority fall into a narrow middle range. The histogram repeats these findings visually:

Figure 10: Histogram of the index of lack of protection



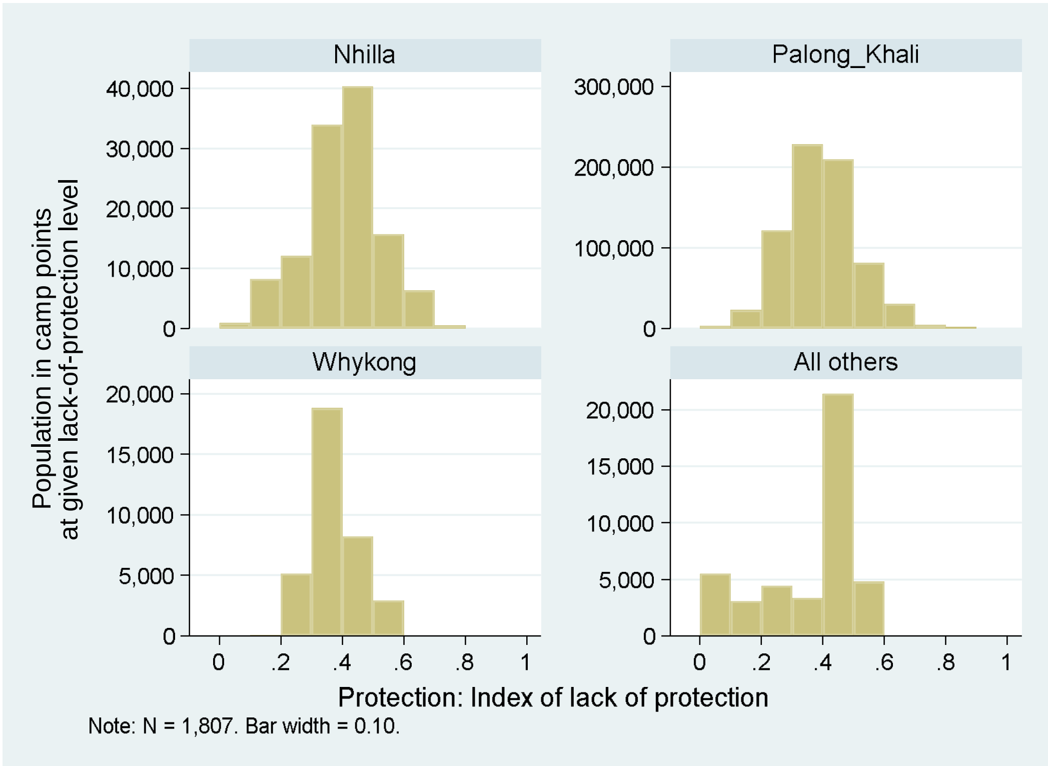
For practical purposes, the 90-percentile cutoff makes it convenient to single out a minority at higher risk that need priority attention. For visualization purposes, ranges based on quartiles are more appropriate; they let us see clusters of serious lack of protection more graphically. The quartile-based intervals were used for the map in the summary.

That said, the distribution has only one peak, and no deep troughs to suggest that we might be dealing with two or more sharply distinct populations in terms of protection needs. More importantly, the protection sector may want to look closely into clusters of camp points with high index values – the red points on the map. The measure for spatial clustering (correlations among neighboring camp points) is positive and significant (Moran's I = 0.295).

Differences by areas and camps

At larger scales of camps and Unions, there are significant differences in the lack of protection.

Figure 11: The distribution of the index in four areas



The differences that we already noted for the movement restrictions transferred to the index. Again, let us note that Whykong Union has a much smaller refugee population than Nhilla and Palong Khali.

The small host communities present a special situation. Most are in the 14 other Unions. In order to investigate the variability of the index across camps, we exclude those Unions. We consider only the 43 camps in Nhilla, Whykong and PK. The Assessment divided these camps, on average, into 1,708 / 43 = 39.7 camp points. We perform an analysis of variance of the index; the camp identifiers are encoded in the var12_NEW variable. We use the camp point populations as analytic weights.

Table 8: Analysis of variance of the index, by Union and camp

```
                     Number of obs =      1,708    R-squared     =  0.1430
                     Root MSE      =    .108711    Adj R-squared =  0.1214

              Source | Partial SS         df         MS        F    Prob>F
  -------------------+----------------------------------------------------
               Model |  3.2826397         42   .07815809      6.61  0.0000
                     |
               Union |  .00784385          2   .00392193      0.05  0.9523
          Camp|Union |  3.2059647         40   .08014912
  -------------------+----------------------------------------------------
          Camp|Union |  3.2059647         40   .08014912      6.78  0.0000
                     |
            Residual |  19.677066      1,665   .01181806
  -------------------+----------------------------------------------------
               Total |  22.959706      1,707   .01345033
```

The results demonstrate the absence of significant differences between the three "big Unions" once the different population sizes are taken into account. Differences among camps are notable, but they too explain only a small portion of the total variance in the lack of protection (about 12 percent). The only informative part, therefore, is the subset of camps and camp points with high index values. For a quick working definition, we set "high" as above 0.6. We find 81 of the camp points in that upper range. They belong to 16 camps. This table lists the camps, together with the total populations of the camp points in that range (not the total populations of the camps!).

Table 9: Camps with blocks with high index values

Union	Camp	Population of camp points with index values > 0.6
Nhilla	CXB-025	2,342
Nhilla	CXB-038	523
Nhilla	CXB-041	3,190
Nhilla	CXB-044	760
Palong_Khali	CXB-201	8,728
Palong_Khali	CXB-203	5,001
Palong_Khali	CXB-206	4,351
Palong_Khali	CXB-207	5,132
Palong_Khali	CXB-208	1,300
Palong_Khali	CXB-210	2,073
Palong_Khali	CXB-213	429
Palong_Khali	CXB-215	350
Palong_Khali	CXB-219	617
Palong_Khali	CXB-220	1,486
Palong_Khali	CXB-222	6,415
Palong_Khali	CXB-223	871
Total		43,568

We see that this is a relatively small number of refugees, but it would be interesting to have protection personnel compare the Round 9 protection indicator values to current field observations.

Outlook

An alternative to incident-based reporting

The NPM Bangladesh Round 9 site assessment collected enough protection-related information outside incident monitoring to allow for experimentation with a combined protection index. Though this experiment is entirely tentative and the resulting index has not been validated, it does introduce a method of quantitative thinking to protection. The method that we employed in this analysis - the "Betti-Verma weighting scheme" – has been proven in the field of poverty research. Its major benefit is to aggregate indicators using weights derived from plausible information measures – variability and non-redundancy –, avoiding value judgments where these would be difficult or arbitrary.

The broader scope of this investigation is to widen the view of protection indices and uncover to what extent various aspects of humanitarian protection can and should be quantified. In the analysis so far, we have considered measurable indicators of protection that apply to the Rohingya population as a whole. These indicators are an alternative to incident reporting data. Such data are, of course, important. However, they are highly sensitive, which virtually precludes sharing with researchers. They tend to be too incomplete to be part of an index that compares relative levels of protection across the refugee population. The indicators that this study uses have fewer such limitations.

The larger problem with protection monitoring

This does, however, lead to a much larger conceptual problem – one that this study does not yet address: mainly that humanitarian protection is far larger than the footprint of the protection sector. Current monitoring practices are not well suited to address issues like the lack of basic rights, despite wide agreement that disenfranchisement and discrimination are core drivers of refugee crises.

Could rights-based philosophies undergird protection monitoring more robustly? In addition to providing a fundamental rationale for protection interventions as well as an avenue to address the structural causes of exclusion and vulnerability, a rights-based approach also has legal standing, at least with the largest actor in protection – the UNHCR.

In "The Implied Human Rights Obligations of UNHCR (2016)", Niamh Kinchin (2016) argues that

> *"when UNHCR's implied powers are considered, together with its capacity to possess human rights obligations, which comes from its position as a subsidiary organ of the UN and from general principles of international law, accountability is created for UNHCR to protect the human rights of refugees in certain circumstances. In particular, UNHCR's implied power to administer refugee camps creates an obligation to respect, protect and fulfil the human rights of refugees who reside in those camps"*.

Though the identification and measurement of core issues is fundamental to the development of an evidence base and to effective programming, humanitarian protection actors are still focused primarily on tangibles and service delivery. Correspondingly, their monitoring is not yet well developed to capture the broader protection conditions of the population i.e. do refugees have freedom of movement, or do they have the right to work? In the case of the Rohingya response, many actors in Bangladesh consider it more practical to delineate problems at the border with Myanmar, with the disenfranchisement, forced displacement and ethnic cleansing not addressed in the Joint Response Plan. But protection interventions that do not seek to account for the core drivers of the crisis are programmatically unsound.

The NPM Round 9 data are valuable, but they cannot inform a rights-focused protection index. It is unclear whether future rounds will provide the material for such indices. Yet, improvements in purview and quality are expected. Site Assessment Round 11 will be released in August 2018. Once that happens, we will seek to supplement the protection index developed with a wider range of indicators.

We have also singled out a list of camps that have one or more camp points with populations reporting heightened protection issues. Field observation and the review of additional data can confirm or disconfirm whether those areas are in need of specialized attention by protection actors. And whilst field observation is not in our brief, we look forward to comparisons between this measure and, hopefully, others (and better ones) that can be built with data from NPM Round 11 and future rounds.

A note on the calculation of Betti-Verma weights

Betti-Verma determines indicator weights on the basis of two sets of statistical relationships: 1. The correlation pattern; the larger the sum of the coefficients with all the other variables, the more redundant is the indicator in point, and the smaller tends to be its weight; 2. The coefficient of variation, with indicators with higher coefficients getting higher weights.

For constructs built from binary indicators, the coefficients of variation are not helpful. This is so because they are entirely determined by the mean, which determines the standard deviation in this type. Indicators with lower means automatically will have higher coefficients of variation.

Betti-Verma allows users to switch off the effect of the coefficient of variation. We used this option in calculating the two sub-indices. For these, only the correlation pattern mattered.

The lack-of-protection index, however, was built from the two continuous sub-indices. For this calculation, the coefficients of variation were appropriate, and we did use them.

Moreover, for indices built with binary indicators, Betti-Verma has the option to use tetrachoric correlations[15]. We used this option for the sub-indices.

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[15] See https://www.stata.com/manuals13/rtetrachoric.pdf with explanations.

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