Fighting Hunger Worldwide

Impact Evaluation

The Contribution of Food Assistance to Durable Solutions in Protracted Refugee Situations; its impact and role in Bangladesh: A Mixed Method Impact Evaluation

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WFP
World Food Programme
wfp.org

UNHCR
The UN Refugee Agency

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Introduction

The present annex contains all relevant information on the steps taken in the quantitative analysis of the household survey conducted for the Mixed Methods Impact Evaluation of Food Assistance in the Protracted Refugee Situation of the Rohingyas in Bangladesh.

In the first stage, a basic exploratory analysis on the demographic and socioeconomic characteristics of Rohingya households in Bangladesh was undertaken. Tables of characteristics by type of household are presented in chapter 3 of this document. The types of household are the following: Registered refugees in Kutupalong, registered refugees in Nayapara, unregistered Rohingyas in Leda, unregistered Rohingyas in Leda and unregistered Rohingyas in Nayapara. Results are also presented for the unregistered Rohingyas living in local areas (Cox's Bazar) and Bangladeshi poor households in villages near the refugee camps, but the samples they are based on are not as representative (including 50 and 100 households respectively).

Then the construction of a set of indicators covering the following areas of interest in the evaluation was presented. These are food consumption, food security, protection and mobility. One indicator is built for each area. A fifth indicator, the Wealth Score, based on the assets owned by the household, was built to measure capital held by households. The analysis of the indicators across the types of households presented in the paragraph above concludes that significant differences between types exist for food consumption, food security and mobility. Protection depends more on the geographical area.

Multidimensional statistical techniques have been applied in the construction of the Wealth Score (based on a Principal Components Analysis), and also in the classification of households by the economic activities they undertake (K-means cluster). The latter, leading to a four-group classification, is presented in chapter 5. The analysis of the indicators across the four groups and by registration status (section 5.2) leads to the same conclusion as explained in the paragraph above: food consumption, food security and mobility depend more on the registration status than on the economic activities of households. This is not true for protection, as measured by the Protection Indicator.

Chapter 6 contains a set of regression models obtained for the four indicators covering the areas of interest in the evaluation (as dependent variables). They have been thoroughly searched for, applying different combinations of demographic and socioeconomic variables, and also of variables on registration status and type of household (as explanatory variables). Combinations have been tested using the "stepwise" method based on the AIC criteria. ANOVA tests and fitness indicators such as R^2 have also helped in the determination of best fit models.

Regression models have served to explore the correlations existing among the different areas of interest and the demographic and socioeconomic conditions of households, along with the type of household and its registration status. Again, type of household and registration status appeared as relevant conditions for food consumption, food security and mobility. But protection was more dependent on the geographical area than on anything else.

Survey Sample, Weighting and Error Estimations

The present document contains most of the data analysis conducted on the survey data for the Impact Evaluation of Food Assistance in Protracted Refugee Situation of Bangladesh. The quantitative survey was conducted by Development Research Initiative during the months of May and June 2012. A total of 1069 households were surveyed. They can be divided into different types, on which data analysis will be based, as showed in the below table

Table 1. Survey sample

Type of household (taking registration status into account)		Number of households	Number of individuals	Population size (real, in households)
Registered refugees	Kutupalong camp	174	973	1700
	Nayapara camp	175	1058	2681
Unregistered Rohingyas	Leda site	262	1797	2048
	Makeshift camp	150	795	150
	Nayapara camp	132	777	371
	Kutupalong camp	*26**	135	209
	Rohingyas living in local areas (Cox´s Bazar and Teknaf)	50	227	-
Host community in nearby villages - Most vulnerable households		100	481	-
Total		1068	6243	-

**The sample for this group being too small, results for it, if ever presented, should be interpreted with caution.*

At the first design stage, the sample targeted 6 different population types (Leda Site refugees, registered refugees in Nayapara camp, unregistered Rohingyas in the Nayapara camp, Rohingyas living in the makeshift camp near Kutupalong, Rohingyas living in local areas (Cox's Bazaar) and poorest households in the host community villages nearby).

During the evaluation mission, the team decided to extend the sample to the Kutupalong refugee camp, because due to the different location of camps (implying different work opportunities and prices), significant differences in self-reliance strategies between Rohingyas from the different camps could be expected. Due to the fact that the sample extension counted on 200 households only, and to the difficulties faced by the enumerator team in Nayapara in finding the households of the unregistered that had been selected separately (as a different stratum), households in Kutupalong were not sampled depending on their registration status.

As a consequence, if we wanted to estimate indicators for Rohingyas living in the Nayapara Camp altogether we would need to apply weights[1] on the households; otherwise unregistered households would be overrepresented (they would represent 43% of the Nayapara sample instead of 12%). However, if we wanted to estimate indicators in Kutupalong, we wouldn't need to apply any weighting, for due to random selection of households the percentage of unregistered Rohingyas is already close to the real one.

[1] Weights would be 1.56 for registered refugees in Nayapara and 0.26 for the non registered ones.

Throughout the analysis, significant differences between registered and unregistered households in Nayapara have been detected, especially for variables other than demographic variables (i.e. on activities, incomes, food consumption, etc). For this reason, we have confirmed the relevance of treating the registered and unregistered households in Nayapara as different groups. And also in Kutupalong, registered and unregistered households are treated as different groups, even though it is important to note that the sample for unregistered households in Kutupalong is not big enough to be representative, thus when comparing it to others we must be extremely careful.

Weighting

Through the various analyses presented on these pages, weighting is applied in order to assure that the proportions of the different population types are close to those in reality.

Table 2. Sample weights for the estimation of indicators and percentages

TYPE	Total population - Number of households	Sample	% in total pop	% in sample	weight
Leda	2681	262	22.68%	29.34%	0.77
Nayapara registered refugees	2721	175	23.01%	19.60%	1.17
Nayapara unregistered Rohingyas	371	132	3.14%	14.78%	0.21
Makeshift camp	4350	150	36.79%	16.80%	2.19
Kutupalong registered refugees	1700	174	14.38%	19.48%	0.74

Weighting being uniform by type of household, it is not relevant when calculating estimators by household type.

Sampling Error Estimations

TABLE 3 at the end of this subsection presents sampling error estimations by population group if results are given by household. For each population group, error calculations are based on the estimation of the variance of the dichotomous variables' estimates from a single survey, i.e. the estimate of the proportion of the population that verifies a particular characteristic. The applied formula is the following:

$$e = \sqrt{\frac{k^2 * p * q * (N - n)}{(N - 1) * n}}$$

Where,

e = sampling error

k = 1.96 = z-value for a confidence level of 95%

p = q= 0.5, which is most conservative value for the true proportion of the population that verifies a particular characteristic

N = population size

n = sample size

UNHCR provided the quantitative team with a full list of refugee households in both Nayapara and Kutupalong. Extracted from the ProGres database, it contained household member level information, such as registration status and occupation. This allowed the team to create a randomized selection algorithm, including two separate strata: Registered and unregistered households. The table in the following page presents sampling error calculation for both strata, based on the formula above.

Since it also included refugees' occupation information, the ProGres database has also allowed for the calculation of the minimal size required for samples to be used for comparing means between different population groups/strata (registered and unregistered Rohingyas).

$$n = \left(\frac{z_\alpha * \sqrt{2 * p * (1-p)} + z_\beta * \sqrt{p_1 * (1-p_1) + p_2 * (1-p_2)}}{p_1 - p_2}\right)^2$$

Where,

$z_\alpha = 1.96$, which means error is fixed to 5%

$z_\beta = 0.84$, for a statistical power of 80%

$p = \frac{p_1 + p_2}{2}$, where p_1 and p_2 are the proportion of male refugees (18 year olds and older) that have an occupation, among registered and unregistered Rohingyas respectively. The percentage of occupied refugees can indicate refugees' self reliance and therefore it is used in this estimation. It can indeed be expected that occupation is correlated with some of the variables that will be used as dependent variables in regression models, such as Household Dietary Diversity Score, Coping Strategies Index, Mobility Indicator and Protection Indicator. Females were excluded in this estimation because, for both strata, high percentages of them appear as occupied. However, the occupation of most of them is housewife, and that can't be taken into account as a self-reliance measure, for it is not remunerated.

$p_1 = 52.7\%; p_2 = 68.7\%;$

Therefore, n=114<125, which is sample size for unregistered refugees stratum. Thus, sizes are big enough for such a test for both strata.

TABLE 3: Sampling error estimations by population group

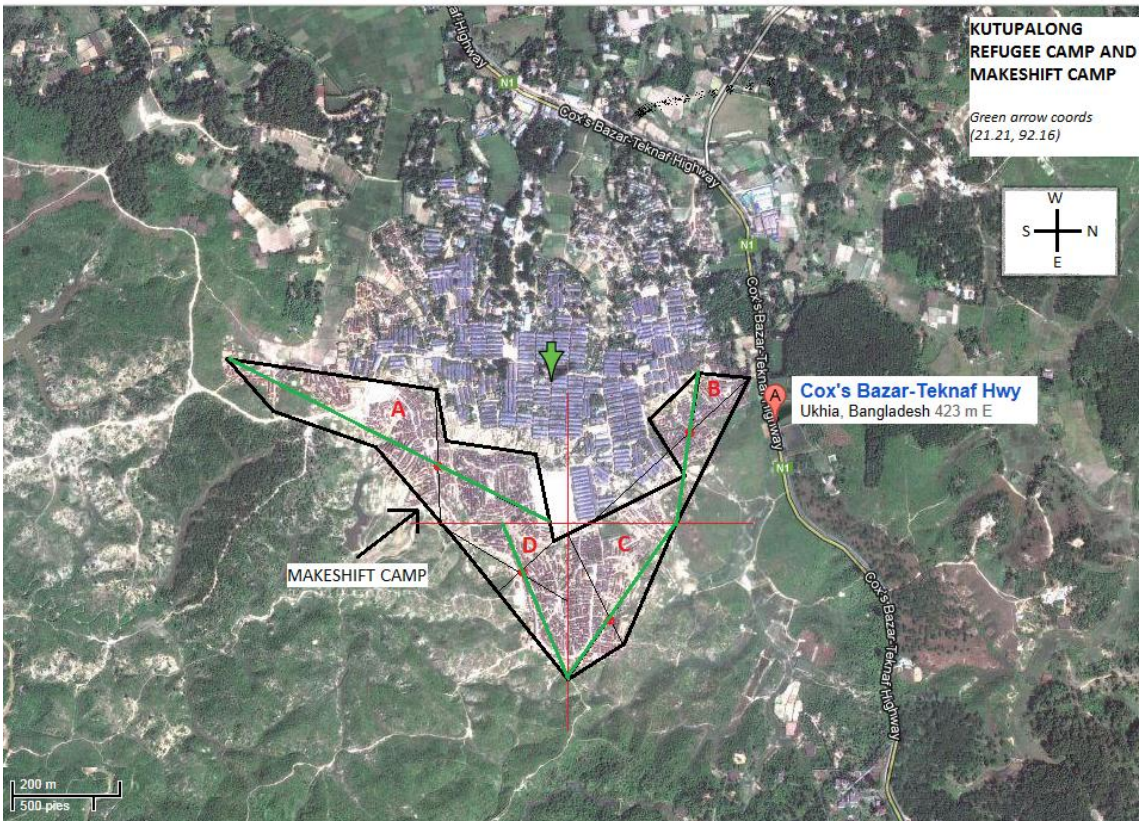
LOCATION	TARGET POPULATION	POPULATION SIZE	Population size considered in sampling	SAMPLE SIZE	ERROR (+/-, %)
NAYAPARA REFUGEE CAMP	Registered refugees	2681 households	2681	175	7.19%
	Unregistered Rohingyas	371 households	371	132	6.85%
	TOTAL	**3052 households**	**3052**	**307**	**5.26%**
KUTUPALONG REFUGEE CAMP	Registered refugees	1700 households	1700	174	7.04%
	Unregistered Rohingyas	209 households	*209*	26	18.0%
	TOTAL	**1909 households**	***1909***	**200**	**6.6%**
MAKESHIFT CAMP (KUTUPALONG)	Unregistered Rohingyas	*4350 (estimate, assuming 6 members per household, as in Kutupalong refugee camp)*	*4350*	150	7.86%
LEDA CAMP	Unregistered Rohingyas	Aprox. 2300, assuming 6 members per household	2300	262	5.70%
COX's BAZAR	Unregistered Rohingyas	??		50	
VILLAGES NEAR NAYAPARA	**Locals living in poorest households** (identified through PRA's)			100	
			Total	1069	

Aerial Sampling in Makeshit Camp near Kutapalong

Unlike in the case of the official camps, in which UNHCR ProGres refugee database was available for sampling, or the case of the Leda site, in which houses were ordered in rows and systematic sampling could be applied, sampling in the makeshift site near Kutupalong had to be done based on an aerial map.

The team based this exercise on an aerial map obtained from Google maps. Due to the difficulty of finding the exact points drawn in the map in the makeshift camp (low definition of the images provided by google maps), the team decided to not do a random selection of 25 coordinates within the camp, and survey 6 houses around each, but to manually divide the map of the camp into 4 parts (see red lines in FIGURE 1) and proceed as described below.

FIGURE 1. Aerial sampling in makeshift site near Kutupalong



In each part, a "midpoint" was selected as follows:

> Most northern corner is selected. A line is drawn to the opposite corner. Then a second line is drawn, as perpendicular to the previous as possible, going from one corner of the part to the opposite corner. The intersection between them is the midpoint. In case of part D of the map, since it is almost a triangle, three lines are drawn from the three corners to the midpoint of the opposite side of the triangle. A smaller triangle is therefore drawn in the middle of part D. The midpoint of it is guessed in the camp.

The longest line drawn for each part in the previous step will be selected (in green in the map).

Households are selected from midpoint to the west, following that line.

One of every three households is selected. In case no more houses existed, then enumerators were to follow the same line from the midpoint to the east. In case no more houses existed in that sense, enumerators were to proceed equally with the other line in the part (the next longest line drawn in case of part D).

Part A seems to have more houses in it than the rest of parts. Therefore a total of 34 households will be surveyed in parts B, C and D, while 48 will be surveyed in part A.

FIGURE 2. Selected midpoints for areas A, B C and D




Brief Exploratory Analysis

Through these pages, the exploratory analysis is complemented with the results from the t-tests applied, to determine the significant differences between those population groups for which sample is fairly representative. These are Leda Site refugees, registered refugees in Nayapara camp. Unregistered Rohingyas in the Nayapara camp, refugees living in the makeshift camp in Kutupalong and registered refugees in the Kutupalong camp. **Indeed, the analysis in the present document mainly consists in the comparison of variables for the registered refugees in Nayapara to all the previously mentioned population types.**

It is very important to note that samples are not big enough as to conduct tests including the unregistered Rohingyas in Kutupalong, the refugees living in the local areas or the host community. Moreover, all indicators calculated for these populations must be interpreted with extreme caution.

The following subsections are included

- Demographic characteristics of households by population type
- Economic activities of individuals
- Economic activities of households

Data reliability

Data reliability has been assured by hiring very qualified staff (mainly BRAC University Master students on social sciences), who went through an exhaustive enumerator training. Indeed, enumerators, many of them having already participated in similar surveys, were trained during three days. Enumerators were carefully

explained the objectives of the survey and part of the training and the mock tests focused on the exhaustive collection of all income sources of households.

Additionally, problems encountered during the data collection process were discussed on a daily basis with the consultants from Development Research Initiative in charge of the survey and also with the consultant from DARA, responsible of data analysis, and also present in the field during the survey period.

Subjectivity of data on incomes and expenditures has also been controlled:

- Data on incomes has been presented with caution, as it is the case in "Table 4. Incomes and working hours. Variable distribution by type of household", in which not just mean values but variable distributions are presented (i.e. minimum, maximum, standard deviation statistics are included in the table)
- During a field debriefing session enumerators reported that the data on household expenditures they were collecting seemed reliable. They said that household expenditures are so scarce that respondents' answers were straight. Still, data on expenditures needs to be complemented with qualitative research in order to undertake a relevant analysis.
- Wealth score (section 4.5) is based in the number of assets owned by the household instead of the value of the assets

Demographic Characteristics of Households by Population Type

Table 5. Demographic characteristics of households by population type (scale variables)

	Registered refugees		Unregistered Rohingyas				Host community in nearby villages
	Kutupalong camp	Nayapara camp	Leda site	Nayapara camp	Makeshift camp	Rohingyas living in local areas (Cox´s Bazar)	
Household size	5.6	6.1	**6.9**	5.9	**5.3**	4.5	4.8
Percentage of men of ages between 12 and 59	26.6	25.5	24.6	28.2	26.8	27.9	29.7
Percentage of women of ages between 12 and 59	32.4	32.8	**28.9**	33.1	30.5	31.6	33.3
Percentage of children below 5 years old	15.1	12.9	**19.1**	11.4	**19.3**	16.9	13.9
Percentage of children below 12 years old	37.9	37.0	**43.5**	35.0	39.2	33.5	33.3
Percentage of registered refugees	87.9	87.2	**0.0**	**4.5**	**0.0**	0.0	-
Percentage of refugees holding a national ID card	0.0	0.0	0.0	0.0	0.0	6.8	-
Age of head of household	39.7	42.0	**39.5**	41.4	37.0	39.3	37.5
Percentage of members of at least 60 years old	3.1	4.7	3.1	3.7	3.5	6.9	3.7
Number of years since head of household moved to Bangladesh	**20.6**	20.1	**14.8**	**17.2**	**9.9**	15.1	-

Households in Nayapara refugee camp, both registered and unregistered, and registered refugee households in Kutupalong, are all very similar in terms of demographic characteristics. **Indeed, the only significant difference encountered between them is the number of years since the head of household arrived to Bangladesh (unregistered Rohingyas arrived in Bangladesh three years later than the others).**

Nonetheless, households in Leda and the makeshift camp are quite different from them.

Households in Leda:

- have more members, closer to 7, instead of 6.

- present a lower percentage of women between the ages of 12 and 59 (some interviewed Rohingyas in Nayapara claimed that if a family had several sons, when grown up they would leave the camp to find a job outside, whereas several daughters could be in the same household and stay in the camp without feeling that leaving is necessary).

- have a higher percentage of below 5 and below 12 year-olds among household members.

- household head is about two years younger, on average.

- household head arrived in Bangladesh later, about 5 years later, on average.

Households in the makeshift camp have a bigger size and a higher percentage of below 5 year-olds. Please note that it could be due to the smaller size of the sample for the makeshift camp that not as many characteristics appear as significantly different.

From observing the following tables[2] it can be concluded that the Nayapara refugee camp[3] (regardless of the registration status) presents a higher percentage of female-headed households than Kutupalong and the makeshift camp. This is in coherence with the higher percentage of separated and widow household heads that can be found in Nayapara.

Therefore, a higher percentage of households are headed by women alone in the Nayapara camp, which could mean a higher percentage of vulnerable households are found there.

Leda does present a percentage of female-headed households similar to that of Nayapara. However, the percentage of separated and widows is lower.

Table 6. Percentage of female-headed households by type of household(%)

	Percentage of female-headed households (%)
Leda site (unregistered Rohingyas)	31.7
Nayapara camp- Registered refugees	32.0
Nayapara camp- Unregistered Rohingyas	34.1
Makeshift camp (unregistered Rohingyas)	13.3
Kutupalong camp- Registered refugees	24.7

[2] Significantly different figures are marked in red. For some of them there was not even a need to conduct a test of significance.

[3] The Pearson chi-square tests undertaken show that there are no significant differences for marital status of household head among registered and unregistered Rohingyas in Nayapara, but there is a significantly higher percentage of married heads in Leda (around 80% against 70%). Divorced and separated heads of households seem to be three times more frequent among Nayapara Rohingyas.

Rohingyas living in local areas (Cox´s Bazar)	10.0
Host community in nearby villages	11.0

Table 7. Marital status of head of household. Percentages by type of household (%)

	Marital status of head of household (%)				
Population type	Never married/unmarried	Married (living with spouse)	Divorced	Widow/widower	Separated
Leda site (unregistered Rohingyas)	0.8	80.9	0.4	14.5	3.4
Nayapara camp- Registered refugees	1.1	70.9	1.7	17.1	9.1
Nayapara camp- Unregistered Rohingyas	1.5	72.0	1.5	16.7	8.3
Makeshift camp (unregistered Rohingyas)	1.3	86.7	1.3	9.3	1.3
Kutupalong camp- Registered refugees	1.1	78.2	1.7	10.9	8.0
Rohingyas living in local areas (Cox´s Bazar)	2.0	88.0		8.0	2.0
Host community in nearby villages	4.0	88.0		8.0	

Table 8. Level of education of head of household. Percentages by type of household (%)

	Level of education of head of household (%)				
Population type	Never enrolled/didn´t pass any class	Primary education	Secondary education[4]	Religious education	Don´t know
Leda site (unregistered Rohingyas)	66.8	9.2	4.2	19.8	0
Nayapara camp- Registered refugees	51.4	14.3	8.6	25.7	0
Nayapara camp- Unregistered Rohingyas	63.6	14.4	4.5	16.7	0.8
Makeshift camp (unregistered Rohingyas)	75.3	10.7	5.3	8.7	0
Kutupalong camp- Registered refugees	53.4	20.1	9.2	16.7	0.6
Rohingyas living in local areas (Cox´s Bazar)	56.0	20.0	4.0	20.0	0
Host community in nearby villages	65.0	21.0	4.0	10.0	0

The variable education level of household heads has also shown significant differences when comparing different types of Rohingya population. However, in the case of unregistered Rohingyas in Nayapara, the level of education is similar to that of Leda. Indeed similar percentages of the following categories are found in Leda and unregistered household heads of Nayapara:

- never enrolled
- Junior/Secondary/Higher secondary education
- Religious education

In the meanwhile, the percentage of unregistered household heads in Nayapara that have a primary education level is more similar to that of the registered refugees in the same camp (around 14% for both).

[4] Junior/Secondary/Higher secondary education

It could therefore be concluded that unregistered Rohingyas in Nayapara profit from school services in the camp just like registered refugees at the primary education level. But for secondary school, food assistance allows some registered refugees to afford secondary school, while it is harder for unregistered Rohingyas to afford.

In any case, the percentage of Rohingyas having access to secondary school is dramatically low.

Note the high percentage of household heads having had a religious education among the Nayapara registered refugees.

Economic Activities

Economic activities of individuals

The following table shows the percentage of male and female individuals (18 year-olds and older) that realize an economic activity, by Type of household.

Table 9. Percentage of individuals that have an economic activity (%)

Percentage of individuals that have an economic activity (%)				
Population type		Male	Female	All
Registered refugees	Kutupalong camp-Registered refugees	49.7	30.5	39.5
	Nayapara camp-Registered refugees	53.2	32.3	41.7
Unregistered Rohingyas	Leda site (unregistered Rohingyas)	74.7	23.6	47.9
	Makeshift camp (unregistered Rohingyas)	80.8	22.9	50.7
	Nayapara camp-Unregistered Rohingyas	68.4	34.3	50.3
	*Kutupalong camp-Unregistered Rohingyas**	*88.5*	*56.0*	*72.5*
	Rohingyas living in local areas (Cox´s Bazar)	86.2	17.7	50.8
Host community in nearby villages		76.1	40.5	57.3

**Based on a small sample, interpret with caution*

Male Rohingyas in the makeshift camp are those who most frequently have an economic activity (80.8% of them do). Next are the refugees living in the Leda site (74.7 %), then the unregistered Rohingyas in Nayapara (68.4 %), followed by the registered ones (53.2 % in Nayapara and 49.7% in Kutupalong). Contrary to what then could be expected, female Rohingyas from the makeshift camp and Leda are those who less frequently have an economic activity (22.9 and 23.6% of them only). The percentage of women having an economic activity in Nayapara is similar for registered and unregistered Rohingyas (unregistered present a slightly higher percentage, but it is not statistically relevant).

Table 10. Economic activities for males (18 and older) by population type (%)

Economic activity (%)	Registered refugees		Unregistered Rohingyas					Host community in nearby villages
	Kutupalong camp	Nayapara camp	Leda site	Makeshift camp	Nayapara camp	Kutupalong camp	Rohingyas living in local areas (Cox´s Bazar)	
Sample size	*195*	*203*	*368*	*177*	*155*	*26*	*58*	*113*
No economic activity	50.3	46.8	25.3	19.2	31.6	11.5	13.8	23.9
Non Agro based day labour	11.3	16.7	33.2	26.0	22.6	15.4	29.3	32.7
Micro enterprise outside house	2.1	7.9	10.9	10.7	7.7	3.8	3.4	8.0
Agro based day labour (to other's land)	6.7	3.9	6.0	16.4	6.5	19.2	0.0	8.8
Fisher /Fishery	2.6	3.9	3.5	2.8	3.9	11.5	19.0	9.7
NGO worker	9.7	3.9	0.5	1.1	1.3	3.8	5.2	0.0
Restaurant/Shop worker	2.1	3.0	2.4	5.1	7.7	0.0	1.7	0.0
Imam/religious person	2.6	3.0	0.5	1.1	1.3	0.0	0.0	0.9
Farming	0.5	2.5	0.3	2.8	0.6	3.8	0.0	1.8
Teacher	2.1	2.5	0.3	0.6	0.0	3.8	0.0	0.0
Various micro enterprise in own house	4.6	2.0	1.9	2.8	1.3	7.7	1.7	0.0
Sewing/ Handy craft/ cottage industry	0.5	1.5	0.3	0.0	0.0	0.0	0.0	0.9
Maid/Servant/work in other people's house	0.0	0.5	0.3	1.7	0.6	0.0	0.0	0.0
Rickshaw/Van/Truck/Bus driver	2.6	0.5	9.2	6.2	9.7	11.5	24.1	8.0
Hawker/Mobile hawker	0.0	0.5	1.6	1.1	1.3	3.8	0.0	0.0
Skilled labour (Carpenter, Potter, Black smith…)	2.1	0.5	2.7	1.7	1.3	3.8	1.7	2.7
Beggar	0.0	0.5	0.8	0.6	2.6	0.0	0.0	0.9
Industrial labour	0.5	0.0	0.3	0.0	0.0	0.0	0.0	0.0
Livestock	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

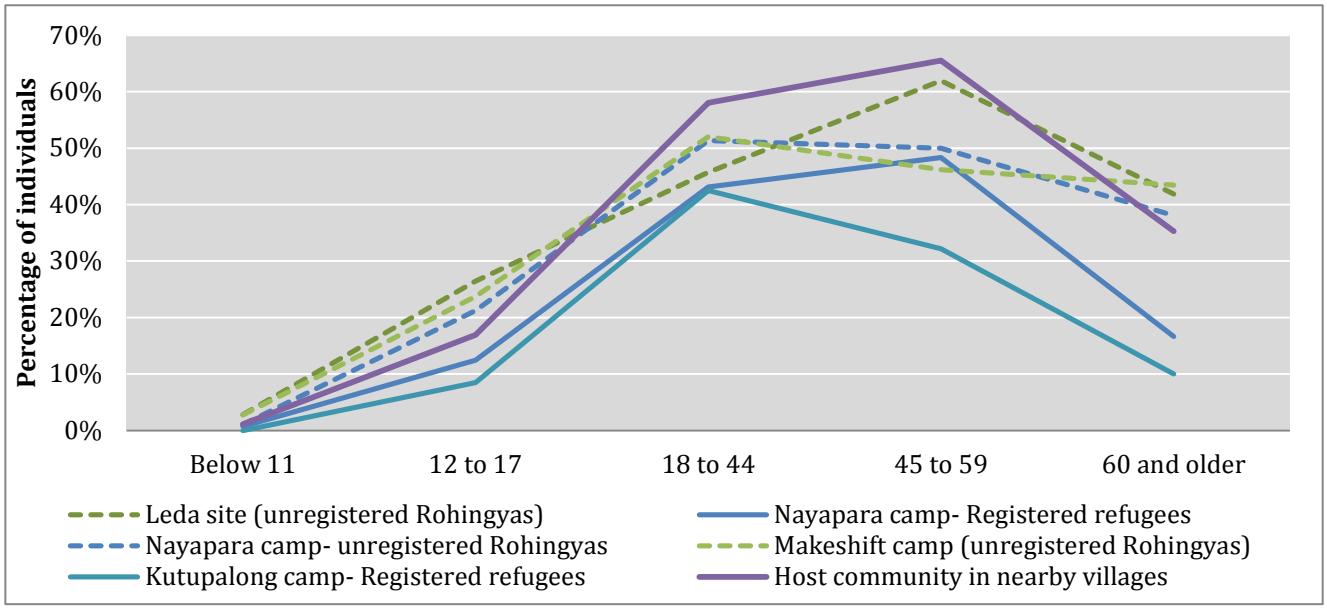
Table 11. Economic activities for females (18 and older) by population type (%)

Economic activity (%)	Registered refugees		Unregistered Rohingyas					Host community in nearby villages
	Kutupalong cam	Nayapara camp	Leda site	Makeshift cam	Nayapara camp	Kutupalong camp	Rohingyas living in local areas (Cox´s Bazar)	
Sample size	*223*	*248*	*407*	*192*	*175*	*25*	*62*	*126*
No economic activity	69.5	67.7	76.4	77.1	65.7	44.0	82.3	59.5
Poultry	11.7	13.3	4.7	4.2	4.6	12.0	1.6	23.0
Sewing/ Handy craft/ cottage industry (With payment)	13.0	8.5	2.0	2.1	6.9	16.0	6.5	4.0
NGO worker	2.2	2.8	0.7	0.0	2.9	0.0	0.0	1.6
Various micro enterprise in own house	0.9	1.6	1.0	3.1	0.6	16.0	1.6	0.8
Micro enterprise outside house	0.4	1.2	4.4	1.6	2.9	8.0	1.6	2.4
Livestock	0.0	1.2	0.0	0.0	0.6	0.0	0.0	0.8
Farming	0.9	0.8	0.2	0.0	0.6	0.0	0.0	0.0
Non Agro based day labour	0.0	0.8	0.5	0.0	1.1	0.0	4.8	1.6
Maid/Servant/work in other people's house	1.3	0.8	3.2	5.7	7.4	4.0	1.6	4.0
Industrial labour	0.0	0.4	0.0	0.0	1.7	0.0	0.0	0.0
Hawker/Mobile hawker	0.0	0.4	0.5	0.0	1.1	0.0	0.0	0.0
Beggar	0.0	0.4	5.9	5.2	1.1	0.0	0.0	0.0
Agro based day labour (to other's land)	0.0	0.0	0.0	0.0	1.7	0.0	0.0	1.6
Restaurant/Shop worker	0.0	0.0	0.5	0.0	1.1	0.0	0.0	0.0
Skilled labour (Carpenter, Potter, Black smith…)	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.8
Teacher	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Table 12. Percentage of refugees having an economic activity by type and age group

Type of respondent (taking registration status into account)		Age group					
		Below 11	12 to 17	18 to 44	45 to 59	60 and older	Total
Leda site (unregistered Rohingyas)	Total Sample size	780	242	619	113	43	1797
	% of respondents having an economic activity	2.8%	26.4%	45.7%	61.9%	41.9%	25.4%
Nayapara camp- Registered refugees	Total Sample size	406	201	355	60	36	1058
	% of respondents having an economic activity	0.7%	12.4%	43.1%	48.3%	16.7%	20.4%
Nayapara camp- Unregistered Rohingyas	Total Sample size	287	160	259	50	21	777
	% of respondents having an economic activity	1.0%	21.3%	51.4%	50.0%	38.1%	26.1%
Makeshift camp (unregistered Rohingyas)	Total Sample size	325	101	294	52	23	795
	% of respondents having an economic activity	2.8%	23.8%	52.0%	46.2%	43.5%	27.7%
Kutupalong camp- Registered refugees	Total Sample size	390	165	339	59	20	973
	% of respondents having an economic activity	0.0%	8.5%	42.5%	32.2%	10.0%	18.4%
Kutupalong camp- Unregistered Rohingyas	Total Sample size	63	21	45	3	3	135
	% of respondents having an economic activity	0.0%	9.5%	73.3%	66.7%	66.7%	28.9%
Rohingyas living in local areas (Cox´s Bazar and Teknaf)	Total Sample size	81	26	92	15	13	227
	% of respondents having an economic activity	2.5%	23.1%	52.2%	53.3%	38.5%	30.4%
Host community in nearby villages	Total Sample size	177	65	193	29	17	481
	% of respondents having an economic activity	1.1%	16.9%	58.0%	65.5%	35.3%	31.2%

GRAPH 1. Percentage of respondents having an economic activity by age group



Child labour is more frequent in Leda and the makeshift camp than in the rest of the locations. Adolescents of ages 12 to 17 tend to work more if from Leda and also if they are unregistered. According to the survey data, child labour is more frequent among boys than among girls (this is true for adolescents also).

The following table contains variables on time of work and earnings. Respondents below the age of 18 were excluded from the calculations. No t-tests have been conducted at this point, for sampled individuals are not randomly selected (selection is random at the household level). Tests will be conducted in the next section.

Table 13. Incomes and working hours. Variable distribution by type of respondent

Type of respondent	Variables	N	Minimum	Maximum	Mean	Std. Deviation
Leda site (unregistered Rohingyas)	Total money earned in the last two weeks (Tk)	371	0.00	10500.00	1406.85	1193.78
	Daily income (Tk)	371	0.00	750.00	171.31	97.42
	Number of working days in the last two weeks	371	0.00	14.00	8.65	3.90
	Hours of work per day	371	0.00	16.00	8.14	2.47
	Number of hours of work in the last 2 weeks	371	0.00	224.00	69.07	39.51
Nayapara camp-Registered refugees	Total money earned in the last two weeks (Tk)	188	0.00	7000.00	727.79	1039.14
	Daily income (Tk)	188	0.00	1000.00	99.66	125.24
	Number of working days in the last two weeks	188	1.00	14.00	9.62	4.79
	Hours of work per day	188	0.00	16.00	5.88	3.66
	Number of hours of work in the last 2 weeks	188	0.00	224.00	52.58	45.51
Nayapara camp-Unregistered Rohingyas	Total money earned in the last two weeks (Tk)	166	0.00	10000.00	1250.97	1221.48
	Daily income (Tk)	166	0.00	2000.00	141.68	174.33
	Number of working days in the last two weeks	166	1.00	14.00	9.87	4.02
	Hours of work per day	166	0.00	14.00	7.94	3.02
	Number of hours of work in the last 2 weeks	166	0.00	182.00	77.73	45.21
Makeshift camp (unregistered Rohingyas)	Total money earned in the last two weeks (Tk)	187	0.00	10640.00	1674.03	1328.07
	Daily income (Tk)	187	0.00	900.00	199.50	143.92
	Number of working days in the last two weeks	187	1.00	14.00	9.06	3.66
	Hours of work per day	187	1.00	12.00	8.24	2.51
	Number of hours of work in the last 2 weeks	187	7.00	168.00	73.70	38.61
Kutupalong camp-Registered refugees	Total money earned in the last two weeks (Tk)	165	0.00	5600.00	755.58	905.11
	Daily income (Tk)	164	0.00	800.00	102.07	120.11
	Number of working days in the last two weeks	165	0.00	14.00	9.93	4.24
	Hours of work per day	165	0.00	15.00	5.98	3.40
	Number of hours of work in the last 2 weeks	165	0.00	210.00	55.79	40.04
Kutupalong camp-Unregistered Rohingyas	Total money earned in the last two weeks (Tk)	37	0.00	2500.00	1015.68	769.62
	Daily income (Tk)	37	0.00	300.00	131.12	99.46
	Number of working days in the last two weeks	37	2.00	14.00	8.95	3.90
	Hours of work per day	37	1.00	16.00	7.54	3.77
	Number of hours of work in the last 2	37	5.00	168.00	63.59	39.35

	weeks					
Rohingyas living in local areas (Cox´s Bazar and Teknaf)	Total money earned in the last two weeks (Tk)	61	0.00	28000.00	2120.74	3884.48
	Daily income (Tk)	61	0.00	2000.00	222.46	269.04
	Number of working days in the last two weeks	61	2.00	14.00	8.38	3.97
	Hours of work per day	61	1.00	16.00	8.34	2.51
	Number of hours of work in the last 2 weeks	61	12.00	168.00	69.48	41.20
Host community in nearby villages	Total money earned in the last two weeks (Tk)	137	0.00	5200.00	1042.81	1082.73
	Daily income (Tk)	137	0.00	700.00	140.85	132.59
	Number of working days in the last two weeks	137	2.00	14.00	9.08	4.08
	Hours of work per day	137	1.00	12.00	6.41	3.19
	Number of hours of work in the last 2 weeks	137	2.00	168.00	52.17	32.87

The table below on working places of refugees by population type includes above 18 year-old working respondents only. It shows important differences in terms of working place of Rohingyas depending on their site and registration status. **Rohingyas living in Leda are those who most often work in the villages near the camp (69% of working refugees), then unregistered Rohingyas in Nayapara (54.2%).**

Refugees from the makeshift camp are those who go to Cox's Bazar or other parts of Bangladesh the most (13.4% of those who have an economic activity).

Table 14. Distribution of working places by population type

		Work Place (%)			
Population type	*Total of respondents having an economic activity (sample size)*	Inside the camp/own community	Nearby village/town	Cox´s Bazar	Other parts of Bangladesh
Leda site (unregistered Rohingyas)	*371*	19.9	69.0	6.7	4.3
Nayapara camp- Registered refugees	*188*	60.1	30.3	4.3	5.3
Nayapara camp- Unregistered Rohingyas	*166*	31.3	54.2	7.2	7.2
Makeshift camp (unregistered Rohingyas)	*187*	19.8	49.7	17.1	13.4
Kutupalong camp- Registered refugees	*165*	65.5	23.0	8.5	3.0
Kutupalong camp- Unregistered Rohingyas	*37*	48.6	35.1	13.5	2.7
Rohingyas living in local areas (Cox´s Bazar)	*61*	23.0	21.3	55.7	0
Host community in nearby villages	*137*	48.2	48.2	0.7	2.9

Table 15. Percentage of working respondents that received the payment in kind

Population type	*Total of respondents having an economic activity (sample size)*	Percentage of working respondents that received the payment in kind (%)
Leda site (unregistered Rohingyas)	*371*	15.4
Nayapara camp- Registered refugees	*188*	5.9
Nayapara camp- Unregistered Rohingyas	*166*	16.9
Makeshift camp (unregistered Rohingyas)	*187*	20.9
Kutupalong camp- Registered refugees	*165*	5.5
Kutupalong camp- Unregistered Rohingyas	*37*	2.7
Rohingyas living in local areas (Cox´s Bazar)	*61*	3.3
Host community in nearby villages	*137*	9.5

Rohingyas from the makeshift camp, the Leda site and unregistered in Nayapara are more frequently paid in kind for their work.

Economic activities of households

The table below shows that Leda households and Nayapara unregistered households are very similar in terms of percentage of active members (about 27%) and earnings per member in the last two weeks (around 350 BTK). Nayapara registered refugee households present lower figures for both variables, and figures for Kutupalong registered refugees are even lower.

The variable *Last two weeks earnings per household member* is calculated in two different manners:

1. Giving all those households in which no members have an activity a missing value, so we can explore how much a household can aspire to as an income, and see if aspirations are different per site.
2. Giving all those households in which no members have an activity the value zero. So we can explore how much is actually earned (which can serve as an estimation of what is needed) by households from different sites.

The t-test on the variables in the table below have been applied to compare the Nayapara registered refugees to the Rohingyas living in Leda, the unregistered in Nayapara, those in the makeshift camp and the registered refugees in Kutupalong. **The tests conclude significant differences in all sites compared to the Nayapara registered refugees, except for the Kutupalong registered refugees.**

Table 16. Earnings and working members. Variable distribution by type of household

Type of household	Variables	N	Min.	Max.	Mean	Std. Deviation
Leda site (unregistered Rohingyas)	Percentage of active members in the household	262	0.00	100.00	27.11	16.65
	Two weeks earnings per household member (computed for households having an income only)	244	0.00	1468.75	349.75	217.19
	Last two week earnings per household member (calculated for households without an activity also)	262	0.00	1468.75	325.73	227.54
Nayapara camp-Registered refugees	Percentage of active members in the household	175	0.00	100.00	22.17	20.71
	Last two week earnings per household member (computed for households having an income only)	124	0.00	1166.67	201.48	231.84
	Last two week earnings per household member (calculated for households without an activity also)	175	0.00	1166.67	142.76	215.47
Nayapara camp-Unregistered Rohingyas	Percentage of active members in the household	132	0.00	100.00	27.65	18.95
	Last two week earnings per household member (computed for households having an income only)	118	0.00	1827.50	340.48	272.61
	Last two week earnings per household member (calculated for households without an activity also)	132	0.00	1827.50	304.37	278.30
Makeshift camp (unregistered Rohingyas)	Percentage of active members in the household	150	0.00	100.00	30.78	17.90
	Last two week earnings per household member (computed for households having an income only)	142	0.00	1748.57	481.95	333.13
	Last two week earnings per household member (calculated for households without an activity also)	150	0.00	1748.57	456.25	341.80
Kutupalong camp-Registered refugees	Percentage of active members in the household	174	0.00	100.00	19.11	18.22
	Last two week earnings per household member (computed for households having an income only)	120	0.00	762.50	189.89	187.62
	Last two week earnings per household member (calculated for households without an activity also)	174	0.00	762.50	130.96	178.82
Rohingyas living in local areas (Cox´s Bazar and Teknaf)	Percentage of active members in the household	50	0.00	100.00	34.18	20.07
	Last two week earnings per household member (computed for households having an income only)	48	48.00	4666.67	580.91	711.71
	Last two week earnings per household member (calculated for households without an activity also)	50	0.00	4666.67	557.68	706.46
Host community in nearby villages	Percentage of active members in the household	100	0.00	100.00	34.45	20.74
	Last two week earnings per household member (computed for households having an income only)	94	0.00	1500.00	369.02	290.89
	Last two week earnings per household member (calculated for households without an activity also)	100	0.00	1500.00	346.88	295.37

Table 17. Percentage of members who have an economic activity in the household

Type of household		Percentage of members who have an economic activity in the household (%)				
		No household members have an economic activity	25% or less of household members have an economic activity	25 to 50% of household members have an economic activity	50 to 75% of household members have an economic activity	More than 75% of household members have an economic activity
Registered refugees	Kutupalong camp	31.0	42.5	21.8	4.0	0.6
	Nayapara camp	29.1	37.7	26.9	5.1	1.1
Unregistered Rohingyas	Leda site	6.9	50.0	38.2	3.4	1.5
	Makeshift camp	5.3	46.0	40.7	6.7	1.3
	Nayapara camp	10.6	47.7	33.3	6.8	1.5
	Kutupalong camp	3.8	38.5	42.3	11.5	3.8
	Rohingyas living in local areas (Cox´s Bazar)	4.0	44.0	42.0	6.0	4.0
Host community in nearby villages		6.0	31.0	52.0	7.0	4.0

The chi-square tests applied (selecting only those types of households for which sample is big enough), concluded that correlation exists between the percentages of members who have an economic activity and the population type. The variable sex of head of household appears as correlated as well (see table below).

Table 18. Percentage of members who have an economic activity in the household (2) (%)

		Percentage of members who have an economic activity in the household (%) (2)			
Sex of household head	Type of household	No household members have an economic activity	25% or less of household members have an economic activity	25 to 50% of household members have an economic activity	More than 50% of household members have an economic activity
Male	Leda site (unregistered Rohingyas)	6.7	57.5	31.8	3.9
	Nayapara camp- Registered refugees	26.1	43.7	27.7	2.5
	Nayapara camp- Unregistered Rohingyas	11.5	57.5	26.4	4.6
	Makeshift camp (unregistered Rohingyas)	5.4	48.5	40.0	6.2
	Kutupalong camp- Registered refugees	29.8	44.3	23.7	2.3
	Rohingyas living in local areas (Cox´s Bazar)		46.7	44.4	8.9
	Host community in nearby villages	6.7	32.6	53.9	6.7
Female	Leda site (unregistered Rohingyas)	7.2	33.7	51.8	7.2
	Nayapara camp- Registered refugees	35.7	25.0	25.0	14.3
	Nayapara camp- Unregistered Rohingyas	8.9	28.9	46.7	15.6
	Makeshift camp (unregistered Rohingyas)	5.0	30.0	45.0	20.0
	Kutupalong camp- Registered refugees	34.9	37.2	16.3	11.6
	Rohingyas living in local areas (Cox´s Bazar)	40.0	20.0	20.0	20.0
	Host community in nearby villages		18.2	36.4	45.5

Main Indicators Construction

This chapter presents the set of household indicators constructed based on survey data and how they are distributed by type of population. This will allow comparing the levels of food consumption, food security, mobility, protection and wealth among the Rohingya population living in Bangladesh. Regression models presented in the last chapter of this document will serve to explore the interrelations existing between these indicators.

Food Consumption. Household Dietary Diversity Score

Table 19. Percentage of households in which the following food groups were consumed the day before the survey, by type of household (%)

		Cereals	White roots and tubers	Vegetables	Fruits	Meat, poultry, offal	Eggs	Fish and seafood	Legumes, nuts and seeds	Milk and dairy products	Oils and fats	Sugar and honey	Misc.
Registered refugees	Kutupalong camp	100.0	21.3	82.8	14.4	0.6	1.7	37.4	42.5	1.1	70.7	29.9	98.3
	Nayapara camp	100.0	26.3	81.7	10.3	1.1	2.9	39.4	32.6	0.6	76.0	36.6	84.0
Unregistered Rohingyas	Leda site	100.0	35.9	82.4	12.2	1.1	1.1	45.8	18.7	0.4	43.5	9.2	93.5
	Makeshift camp	99.3	22.0	72.0	6.0	0.7	1.3	41.3	14.0	0.7	33.3	4.7	94.7
	Nayapara camp	100.0	30.3	76.5	7.6	1.5	3.0	43.2	14.4	0.0	34.1	6.1	84.8
	Rohingyas living in local areas	100.0	36.0	84.0	24.0	10.0	10.0	56.0	34.0	2.0	80.0	22.0	100.0
Host community in nearby villages		100.0	32.0	80.0	28.0	6.0	4.0	72.0	8.0	3.0	81.0	12.0	98.0

The Pearson test of chi-square concluded that **the following food groups are consumed in a significantly different manner by the different types of Rohingyas:**

- **Fruits**
- **Meat, poultry, offal (in fact it is consumed significantly more often by unregistered Rohingyas living in local areas and host communities)**
- **Fish and sea food**
- **Legumes, nuts and seeds**
- **Oils and fats**
- **Sugar and honey**
- **Miscellaneous**

For the rest, consumption is not significantly different from one type of Rohingya household to the other.

Household Dietary Diversity Score

The Household Dietary Diversity Score (HDDS) was calculated as usual, grouping the different types of food into 12 groups and counting the number of different food groups that had been consumed by the household the day before. Thus, HDDS ranges from 0 to 12. However in this case, surveyed households had consumed a maximum of 9 different types of food (see histogram below).

GRAPH 2. Histogram: HDDS

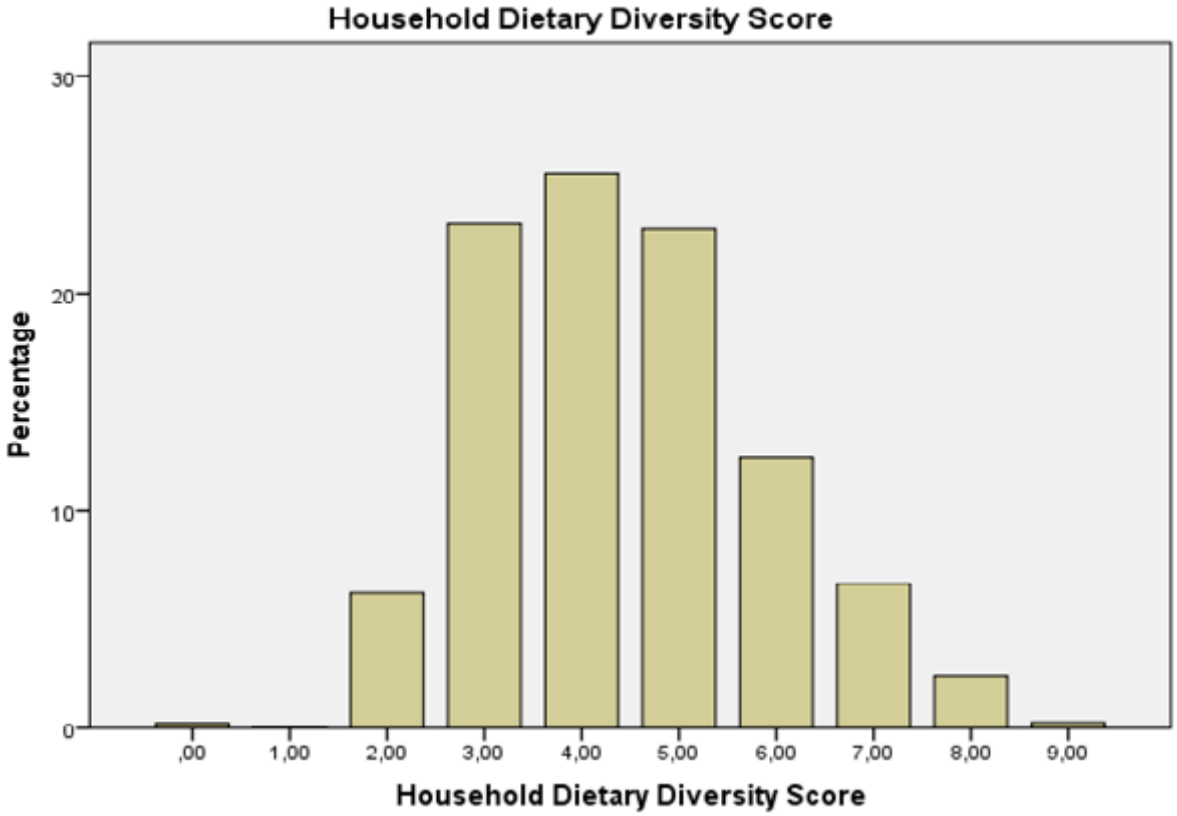


Table 20. HDDS distribution (5 main population groups)

Statistics		
Sample size		893
Mean		4.42
Std Dev.		1.46
Median		4.0
Percentiles	33.3	4.0
	66.7	5.0

Table 21. Categorisaton of variable HDDS

Categories	HDDS values	% of refugee population
Low diversity	1, 2, 3	29.7 % of population
Mid-range diversity	4, 5	48.5 % of population
High diversity	6, 7, 8, 9	21.8 % of population

Categorisation of HDDS variable (see above) is based on HDDS distribution on the main five population groups, taking their relative weight into account.

Table 22. Distribution of HDDS (categorical variable)

		HDDS - 3 categories			Total
		1- Low diversity	2- Mid diversity	3- High diversity	
Registered refugees	Kutupalong camp	8.6	59.4	32.0	100.0
	Nayapara camp	20.0	46.3	33.7	100.0
Unregistered Rohingyas	Leda site	32.5	44.3	23.2	100.0
	Makeshift camp	41.9	48.0	10.0	100.0
	Nayapara camp- Unregistered Rohingyas	34.5	51.7	13.8	100.0
	Rohingyas living in local areas	4.0	46.0	50.0	100.0
Host community in nearby villages		7.0	56.0	37.0	100.0

Table 23. Percentage of households having consumed 4 or more food groups the day before the survey

		Percentage of households having consumed 4 or more food groups the day before the survey(%)
Registered refugees	Kutupalong camp	91.4
	Nayapara camp	80.0
Unregistered Rohingyas	Leda site	67.5
	Makeshift camp	58.1
	Nayapara camp	65.5
	Rohingyas living in local areas	96.0
Host community in nearby villages		93.0

*The % of households having consumed 4 or more food groups is equal to the sum of HDDS categories 2 and 3.

Table 24. HDDS level distribution, by distance (%)

		HDDS - 3 categories			Total
		1- Low diversity	2- Mid diversity	3- High diversity	
DISTANCE	0	15.6	51.2	33.2	100.0
	1	34.5	51.7	13.8	100.0
	2	41.9	48.0	10.0	100.0
	3	32.5	44.3	23.2	100.0
Total		29.7	48.5	21.8	100.0

Table above includes refugees from five main groups and cases are weighted as explained earlier. Variable on distance from food aid distribution points was constructed as follows:

0- Registered refugees from Nayapara and Kutupalong
1- Unregistered Rohingyas from Nayapara
2- Unregistered Rohingyas from makeshift camp near Kutupalong
3- Unregistered Rohingyas from Leda

For distances up to 2, the larger the distance, the lower the HDDS score. But the HDDS in Leda (distance=3) is better than that of unregistered Rohingyas living in the official camp.

The table below shows descriptive statistics by type of population for scale variables: Household Dietary Diversity Score; Weekly household expenditure on food; Weekly household expenditure on food per member. **The t-test of difference of means shows that differences are relevant for the three variables when comparing the registered refugees in Nayapara to the unregisterd Rohingyas in Nayapara, and also to the unregistered in Leda and the makeshift camp (in all cases HDDS is higher in Nayapara refugee households, while food expenditure is lower).**

When comparing registered refugees in Nayapara to those of Kutupalong, no relevant differences emerge for the HDDS, but food expenditure, particularly when computed per household member is relevantly different from one camp to the other (expenditure is higher in Kutupalong).

When comparing registered refugees in Nayapara to host communities nearby HDDS is relevantly higher in the host community (although confidence level is not 95% but around 92%). Food expenditure is relevantly different, being much lower (less than a half) in Nayapara.

Table 25. HDDS and expenditures. Variable distribution by type of household

Type of household (taking registration status into account)			N	Minimum value	Maximum value	Average	Std dev.
Registered refugees	Kutupalong camp	Household Dietary Diversity Score	174	2.0	9.0	5.0	1.3
		Weekly household expenditure on food	174	0.0	1900.0	588.4	346.6
		Weekly household expenditure on food per member	174	0.0	350.0	114.1	68.8
	Nayapara camp	Household Dietary Diversity Score	175	2.0	8.0	4.9	1.6
		Weekly household expenditure on food	175	20.0	2000.0	512.0	354.8
		Weekly household expenditure on food per member	175	5.0	500.0	92.9	69.9
Unregistered Rohingyas	Leda site	Household Dietary Diversity Score	262	1.0	8.0	4.4	1.5
		Weekly household expenditure on food	262	0.0	3500.0	1245.6	566.0
		Weekly household expenditure on food per member	262	0.0	525.0	196.3	94.2
	Makeshift camp	Household Dietary Diversity Score	150	0.0	7.0	3.9	1.2
		Weekly household expenditure on food	150	0.0	2500.0	930.4	426.2
		Weekly household expenditure on food per member	150	0.0	433.0	188.8	75.6
	Nayapara camp	Household Dietary Diversity Score	132	2.0	9.0	4.0	1.3
		Weekly household expenditure on food	132	50.0	2500.0	796.8	459.4
		Weekly household expenditure on food per member	132	4.2	400.0	142.9	80.1
	Rohingyas living in local areas (Cox´s	Household Dietary Diversity Score	50	3.0	9.0	5.6	1.3
		Weekly household expenditure on food	50	300.0	2500.0	1213.4	446.1

Bazar and Teknaf)	Weekly household expenditure on food per member	50	150.0	1000.0	296.0	147.8
Host community in nearby villages	Household Dietary Diversity Score	100	2.0	9.0	5.2	1.3
	Weekly household expenditure on food	100	30.0	2800.0	1138.6	497.7
	Weekly household expenditure on food per member	100	6.0	700.0	260.0	117.4

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	Strategy	Registered refugees		Unregistered Rohingyas				Host community in nearby villages
		Nayapara camp	Kutupalong camp	Leda site	Makeshift camp	Nayapara camp	Rohingyas living in local areas	
1	Rely on less preferred and less expensive foods?	88.0	65.5	91.2	83.3	90.9	56.0	86.0
1	Gather wild food, hunt, or harvest immature crops?	8.6	1.7	4.6	6.7	11.4	0.0	7.0
2	Borrow food, or rely on help from a friend or relative?	46.9	54.6	63.0	69.3	66.7	58.0	55.0
2	Purchase food on credit?	49.7	64.4	70.6	76.0	65.2	34.0	57.0
2	Send household members to eat elsewhere?	9.7	3.4	13.4	6.7	25.0	8.0	12.0
3	Send household members to beg?	2.3	0.6	14.5	8.0	5.3	2.0	2.0
3	Limit portion size at mealtimes?	75.4	63.8	80.5	76.0	73.5	28.0	70.0
3	Restrict consumption by adults in order for small children to eat?	61.1	44.3	69.8	53.3	60.6	20.0	41.0
3	Feed working members of HH at the expense of nonworking members?	12.6	18.4	24.8	26.7	22.0	10.0	25.0
4	Consume seed stock held for next season?	0.6	0.0	0.4	0.7	0.8	0.0	0.0
4	Reduce number of meals eaten in a day?	56.6	53.4	69.1	74.0	62.9	26.0	55.0
4	Skip entire days without eating?	2.9	1.1	4.2	5.3	7.6	0.0	1.0

One of most important indicators of the present analysis is the Coping Strategies Index, which measures the level of food security in the households. It is based on a series of strategies (Module D of the questionnaire) where the respondent is asked how often the household had to adopt a strategy in the last month due to lack of food or money to buy it. Table below shows the set of strategies, the level of severity associated to them and the percentage of households that declared having had to adopt it sometimes or often in the last month.

adopt a strategy in the last month due to lack of food or money to buy it. Table below shows the set of strategies, the level of severity associated to them and the percentage of households that declared having had to adopt it sometimes or often in the last month.

Table 26. Percentage of household who declared having adopted each strategy either sometimes or often in the last month (%)

The construction of the CSI required a classification of the adopted strategies in terms of their severity. This was done following the concepts in the table below.

Level of severity	
1	We eat sufficiently
2	We eat sufficiently but the strategies we adopt will have consequences in the future
3	We reduce the food ration
4	We reduce the food ration and adopt strategies that will have severe consequences in the future

Then a numeric value had to be associated to the level of frequency declared by the respondents so that the CSI could be computed. This was done as shown in the table below.

Possible answers	Value
1. Never	0
2. Rarely	1
3. Sometimes	2
4. Often	3

CSI values therefore range from 0 (no strategy is ever adopted) to 96 (all strategies are adopted often).

Table 27. CSI Distribution by camp

Sites		Sample size	Minimum value	Maximum value	Mean	Std dev
Registered refugees	Kutupalong camp	174	0.0	52.0	26.6	13.1
	Nayapara camp	175	0.0	70.0	28.1	12.6
Unregistered Rohingyas	Leda site	262	1.0	70.0	33.8	11.7
	Makeshift camp	150	3.0	64.0	32.6	13.5
	Nayapara camp	132	6.0	66.0	32.9	12.1
	Rohingyas living in local areas	50	3.0	41.0	19.0	10.0
Host community in nearby villages		100	0.0	54.0	27.6	12.1

As was the case for the HDDS, to categorize the variable CSI we take into account its distribution among the 5 main refugee groups (giving each group the appropriate weight, as explained in section 2.1).

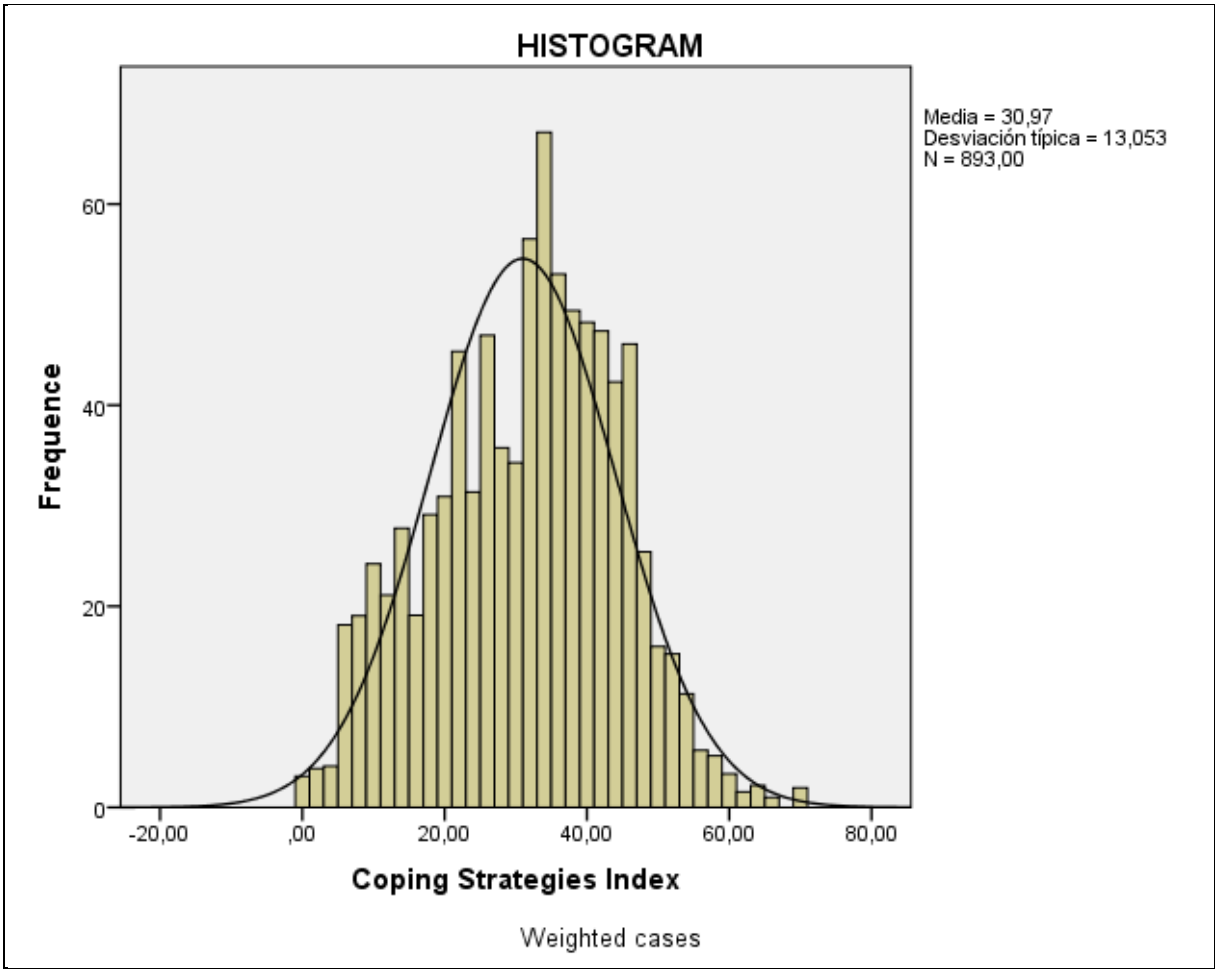


Table 28. CSI distribution (5 main refugee groups)

Statistics		
Sample size		893
Mean		31.0
Std Dev.		13.1
Median		32.0
Percentiles	33.3	26.0
	66.7	38.0

Table 29. Categorisaton of variable CSI

Categories	CSI values	% of refugee population
Severe	[38-70]	33.5 %
Mid-range	[26-37]	33.6 %
Gentle	[0-25]	32.9 %

Table 30. CSI levels by population group (%)

		Coping Strategies Index – Categories			Total
		Gentle	Mid-range	Severe	
Registered refugees	Kutupalong camp	45.3	32.0	22.7	100.0
	Nayapara camp	41.7	35.9	22.3	100.0
Unregistered Rohingyas	Leda site	23.2	37.9	38.9	100.0
	Makeshift camp	28.6	30.7	40.7	100.0
	Nayapara camp	28.6	28.6	42.9	100.0
	Rohingyas living in local areas (Cox´s Bazar)	74.0	22.0	4.0	100.0
Host community in nearby villages		48.0	24.0	28.0	100.0

CSI and HDDS present a negative correlation (-0.3)

Table 31. Distribution of CSI categories in terms of HDDS categories

HDDS categories	Coping Strategies Index categories			Total
	Gentle	Mid-range	Severe	
1- Low diversity	13.4	34.8	51.7	100.0
2- Mid diversity	37.2	34.8	28.0	100.0
3- High diversity	49.9	29.4	20.7	100.0
Total general	32.9	33.6	33.5	100.0

* 5 main population groups included only. Weighting applied.

Coping Strategies to Face Consequences of an Unexpected Crisis

Table 32. Frequency of use of different strategies to cope with crises that meant an important loss within last year, by type of household

	Type of household (taking registration status into account)							
	Leda site (unregistered Rohingyas)	Nayapara camp-Registered refugees	Nayapara camp-Unregistered Rohingyas	Makeshift camp (unregistered Rohingyas)	Kutupalong camp-Registered refugees	Kutupalong camp-Unregistered Rohingyas	Rohingyas living in local areas (Cox´s Bazar)	Host community in nearby villages
Did nothing	29%	38%	29%	22%	34%	43%	13%	26%
Borrowing	45%	37%	29%	53%	29%	29%	43%	37%
Reduce Consumption Expenditure	21%	16%	32%	19%	29%	25%	31%	26%
Asset sale	1%	3%	1%	0%	0%	0%	1%	2%
Transfer from friend/ relative	2%	2%	4%	2%	3%	0%	10%	4%
Relief Aid	0%	2%	2%	0%	1%	0%	0%	0%
Other	0%	1%	1%	0%	3%	0%	1%	4%
Sending child to other household	0%	0%	1%	0%	0%	0%	0%	0%
Begging	1%	0%	0%	1%	0%	0%	1%	0%
Sending child (less than 14) to work	0%	0%	0%	0%	0%	0%	0%	0%
Sending previously non-working adult HH member to work	0%	0%	0%	1%	0%	2%	0%	0%
Sell Advance Labour	1%	0%	0%	1%	1%	0%	0%	1%
Total number of used strategies (sample size)	*682*	*338*	*234*	*316*	*278*	*51*	*72*	*217*
	100%	100%	100%	100%	100%	100%	100%	100%

It is important to note that the most used strategy to cope with crises in Nayapara and Kutupalong among the registered refugees is "to do nothing", which leads one to think that these populations could be somewhat more dependent.

Borrowing is the most frequent strategy used by Rohingyas in Leda, the makeshift camp and local areas, and also by the host community in the nearby villages.

The most frequently used strategy among the unregistered Rohingyas in Nayapara is to reduce the consumption expenditure (though borrowing or doing nothing are used almost as frequently).

The Mobility Indicator

The Mobility Indicator is based on answers to the following question of module B3 of the household questionnaire:

"Do you or any member of your family usually go to

- *Nearby village/town?*
- *Teknaf?*
- *Cox's Bazar?*
- *Other parts of Bangladesh?*
- *Other countries?"*

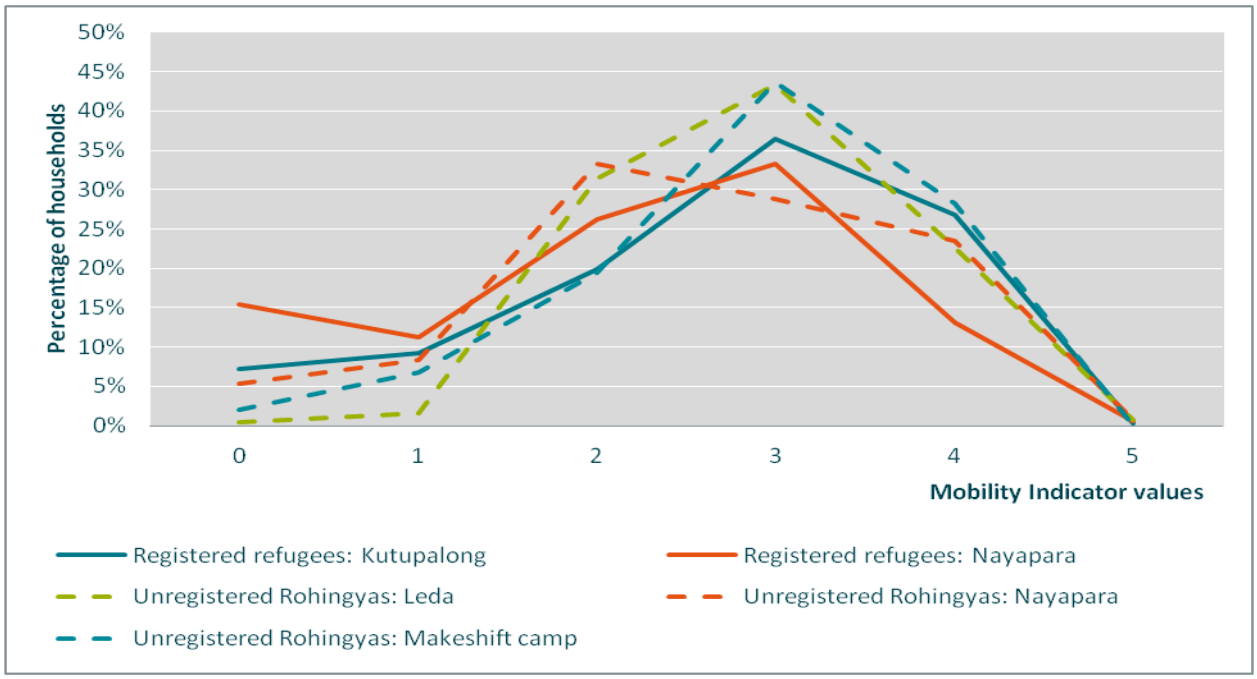
The Mobility Indicator is the number of items in the list above that are usually visited by at least one household member, ranging from 0 (none of the places is ever visited by any of household members) to 5 (all of the places are usually visited by one of household member).

A preliminary analysis indicated that those households that report visiting places far from their camp or site, report that they go to nearby places too (see table below). This is why weighting depending on distance of places is considered unnecessary and the indicator is kept in its simplest form.

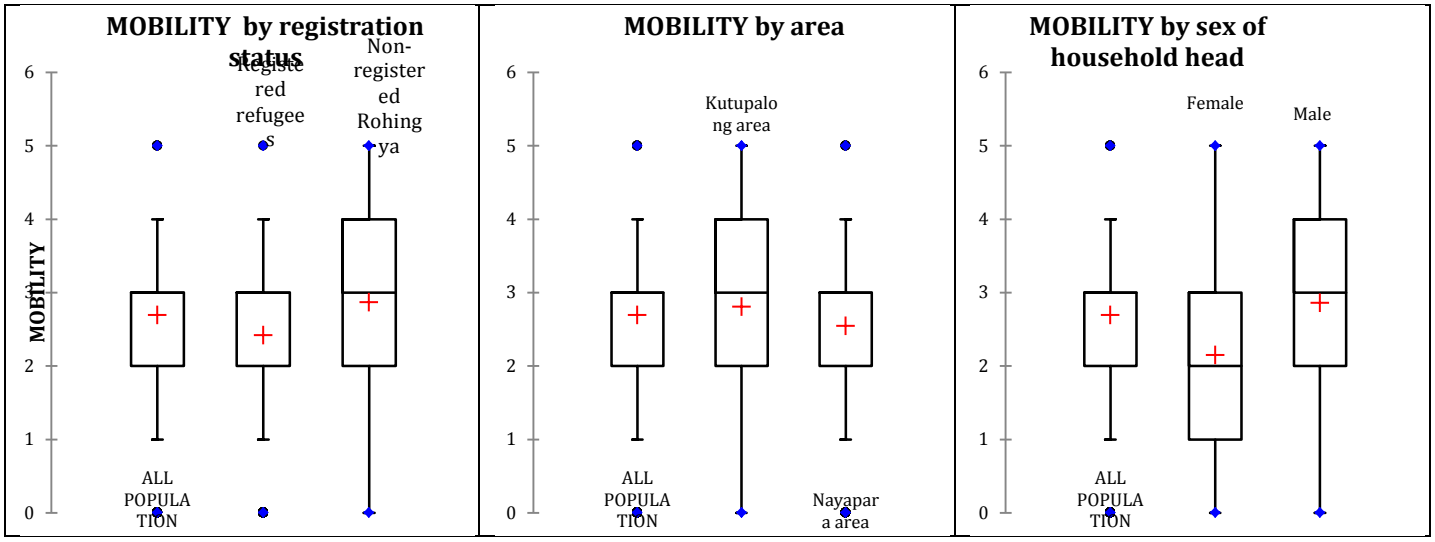
Table 33. Perc. of households having reported visiting each place by mobility indicator value

	Nearby village/town	Teknaf	Cox's Bazar	Other parts of Bangladesh	Other countries
0	0.0%	0.0%	0.0%	0.0%	0.0%
1	92.3%	7.4%	0.0%	0.3%	0.0%
2	96.4%	71.3%	28.5%	3.9%	0.0%
3	100.0%	89.9%	99.4%	10.4%	0.3%
4	100.0%	100.0%	100.0%	97.5%	2.5%
5	100.0%	100.0%	100.0%	100.0%	100.0%

GRAPH 3. Mobility Indicator distribution by type of Rohingya



Graph 4. Boxplots: Mobility Indicator by registration status, area and sex of household head



Statistic	All Rohingya population	Registered refugees	Unregistered rohingyas	Kutupalong area	Nayapara area	Female	Male
No. of observations	960	392	568	399	561	256	704
No. of missing values	0	0	0	0	0	0	0
Minimum	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Mean	2.69	2.42	2.86	2.81	2.54	2.15	2.86
Standard deviation (n-1)	1.09	1.25	0.93	1.06	1.12	1.21	0.99
Lower bound on mean (95%)	2.62	2.29	2.79	2.70	2.45	2.00	2.78
Upper bound on mean (95%)	2.76	2.54	2.94	2.91	2.64	2.30	2.93

The Protection Indicator

The Protection Indicator is based on answers to questions of module J of the household questionnaire, on Rohingyas' perceptions about the following items:

"Describe how you perceive

1 Your own or family members' safety when need to move outside from where you live?

2 The local community's perception of refugees?

3 Refugees' relationship with local communities?

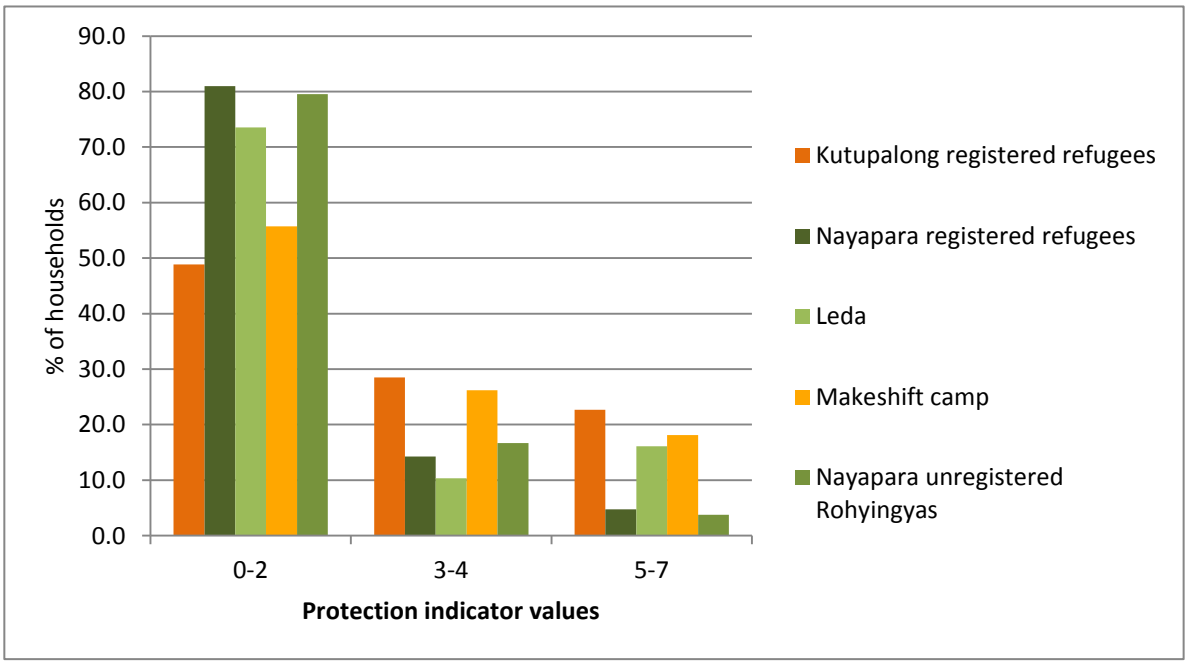
4 Refugees' relationship with local authorities?

5 Refugees' opportunities to attain self-reliance?

6 That the basic needs of your family are met (e.g. health/sanitation, education and livelihood opportunities)?

7 How would you characterize your family's safety since 2009?"

For each question, answer is codified into a dummy variable taking the value 1 when the respondent's answer is "Positive/favorable". Answers to the seven questions are added up into the Protection Indicator, ranging from 0 to 7.



Protection, or at least how it is perceived by Rohinygas, depends more on the geographical location of refugees than on their status. Rohingyas living in the Kutupalong area (the official refugee camp and the makeshift camp) are more likely to report a satisfactory protection level than those living in the Nayapara area. The table below confirms this. Differences in means are more significant when refugees are grouped by area than by registration status. This will also be confirmed by regression models, in which the geographical location appeared as a more relevant variable than the Type of household (See chapter 6).

	Protection indicator		Protection indicator	
	(not weighted)		*(weighted)*	
Protection indicator scores by registration status	*Average*	*Std. Dev.*	*Average*	*Std. Dev.*
Registered refugee	2.02	2.08	0.75	0.90
Unregistered Rohingya	1.84	2.09	0.79	0.99
Protection indicator scores by area	*Average*	*Std. Dev.*	*Average*	*Std. Dev.*
Kutupalong area	2.65	2.21	0.91	0.99
Nayapara area	1.48	1.89	0.62	0.91
Grand Total	1.90	2.09	0.78	0.96
Difference registered/nonregistered	0.18		-0.04	
Difference Kutupalong/Nayapara areas	1.17		0.29	

The Wealth Score

The wealth score is computed to measure the capital that surveyed households count on. This capital either assures their life quality and allows them to realize income earning activities nowadays, or could be used, exchanged or sold in case an unexpected event happened in the future. Indeed, the wealth score is based on household assets and the overall condition of the house. The type of ownership of each asset is not taken into account, for we consider that as long as an asset can be used by the household members, then it is part of the household's capital.

The use of the amount of units of each asset instead of the value of the asset to compute the wealth score was preferred for two reasons:

- It reduces the subjectivity on the price of assets.
- There are assets that have little value (Agricultural land appears as being of value 0 sometimes), but their use allows families to increase their life quality or earn income.

Statistical Method Applied Principal Components Analysis (PCA)

The calculation of the wealth score is based on a Principal Components Analysis (PCA) on variables on the quantity of assets owned by the household, number of rooms in the house, and overall household condition.

PCA is one of the simplest and most robust ways of analyzing multidimensional data, using the dependencies between the variables to represent it in a more tractable, lower-dimensional form, losing the least information. The concise insight in the structure of data it provides makes the PCA an ideal preliminary step in indicators construction (see subsection "GRAPHS").

At the end of this section, households' factor scores will be weighted by factor eigenvalues to compute each household's wealth score. The analysis of how the wealth score is distributed is presented at the end of this section.

Included Variables

The included variables are, for assets listed in module F of the quantitative questionnaire, the amount of units owned/used by the household. However, all variables for which all values are equal to zero are excluded from the analysis. Also, last three variables on "others" are erased from the analysis, due to their lack of precision. A total of 24 asset variables are considered.

Table 34. Excluded variables measuring the quantity of certain assets in the household

EXCLUDED VARIABLES			
1. Bull/Buffalo/horse	15. engine driven boat	24. Plough	38. VCD/DVD
5. Dairy cow	17. Cycle rickshaw/van	25. Joal	39. Refrigerator
9. Pond	18. auto rickshaw	26. Irrigation pump	45. Others (Specify)
11. pickup/vehicle	19. CNG	32. Roar pump	46. Others (Specify)
12. motor bike	20. buffalo cart	33. Paddle thresher	47. Others (Specify)
13. bicycle	23. power tiller	35. Electric fan	

Additionally, variables on number of rooms in the house, and overall household condition are included in the analysis as active. The variable on house condition is inverted as shown in the table below.

Table 35. Recodification of variable "Overall condition of the house"

Former code	New code
1 – Good	3
2 - Partial renovation required	2
3 - Major renovation required	1
4 – Terrible	0

Included Observations

To assure robustness of the analysis, only those households coming from population types for which a representative sample was designed are included in the analysis as active observations. These are households from Leda site, the Makeshift camp, Nayapara and Kutupalong registered refugees and Nayapara unregistered Rohingyas.

Households from the rest of populations in the sample (Kutupalong unregistered Rohingyas, Rohingyas living in local areas and host community) are included as supplementary observations. They will therefore be represented (projected) in the PCA space and **the wealth score will be calculated for them, but they won't participate in the determination of the PCA factor loadings or the determination of the PCA space[5], i.e. wealth score will be adapted to the wealth levels of the Rohingya households in official and unofficial camps of Bangladesh.**

Outliers

Outliers have been searched for and excluded.

Assets are grouped into 6 variables according to the types of assets they represent, as classified in the questionnaire. For each asset group (Livestock, Land, Transport, Productive assets, Agricultural tools and Appliances), the sum of the assets of that type is computed. Sums are analyzed and outliers for them are excluded from this analysis.

Observations are considered as outliers when they are far from the average value, in more than 5 standard deviations. Weighting is not taken into account at this stage of the process.

[5] Variable weight in the wealth score calculation will depend on the frequency of the possession of each asset for the Rohingya households in official and unofficial camps (Leda site, the Makeshift camp, Nayapara and Kutupalong registered refugees and Nayapara unregistered Rohingyas). Thus, wealth score will be adapted to the wealth levels of that population.

Table 36. Sample outliers

Outliers by variable	Upper Limit	DARA_ID	LIVESTOCK	LAND	PRODUCTIVE	AGRICULTURAL TOOLS	FURNITURE	SITES_labelled
LIVESTOCK	14	15	20	1	0	1	5	2. Nayapara registered refugees
	14	84	20	1	0	1	20	2. Nayapara registered refugees
	14	153	24	3	0	1	7	2. Nayapara registered refugees
	14	163	18	1	0	0	28	2. Nayapara registered refugees
	14	830	23	1	0	0	12	5. Kutupalong registered refugees
	14	962	15	1	0	0	7	5. Kutupalong registered refugees
LAND	14	104	6	79	0	1	10	2. Nayapara registered refugees
AGRICULTURAL TOOLS	4	723	12	1	0	9	29	4. Makeshift camp
FURNITURE	25	497	0	1	0	2	30	1. Leda
	25	163	18	1	0	0	28	2. Nayapara registered refugees
	25	199	10	1	0	3	30	2. Nayapara registered refugees
	25	249	0	1	0	1	44	2. Nayapara registered refugees
	25	723	12	1	0	9	29	4. Makeshift camp

A total of 11 observations (outliers) are excluded.

Weighting is taken into account as explained in section 2.1.

Principal Component Analysis Results

Data cloud shows a high variability, not summarized in a few factors.

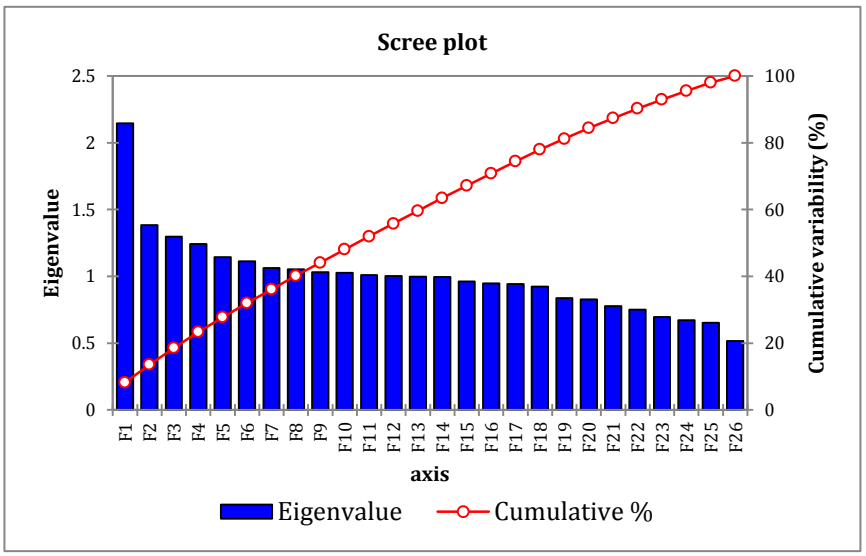


Table 37. Factor loadings and contributions

	F1	
	Contribution to factor (%)	Factor loading
40. Ornaments (gold/silver)	15.848	0.583
42. Mosquito net	13.201	0.532
36. Mobile phone	10.068	0.465
29. Kodal (Spade)	8.491	0.427
Number of rooms	7.858	0.410
30. Shabol (Shovel)	6.953	0.386
House condition	6.240	0.366
3. Poultry	5.515	0.344
21. Sewing machine	5.209	0.334
34. Radio/cassette player	3.905	0.289
4. Duck	3.775	0.285
6. pigeon/Koel	2.844	0.247
28. Axe	2.473	0.230
44. Bench	2.316	0.223
16. Fishing net	2.025	0.208
2. Goat /sheep	1.021	0.148
7. agricultural land	0.634	0.117
31. insecticide Spray machine	0.469	0.100
10. other land	0.332	-0.084
22. Carom board	0.317	0.082
43. Cot	0.293	-0.079
8. homestead land	0.164	0.059
41. Almirah (wardrobe)	0.038	0.029
14. local boat	0.009	-0.014
37. Television	0.003	0.008
27. L L P (Irrigation machine)	0.001	0.005

	F2	
	Contribution to factor (%)	Factor loading
34. Radio/cassette player	33.602	0.682
41. Almirah (wardrobe)	20.562	0.533
44. Bench	8.050	-0.334
16. Fishing net	6.820	0.307
31. insecticide Spray machine	5.233	-0.269
40. Ornaments (gold/silver)	4.478	0.249
Number of rooms	4.476	-0.249
30. Shabol(Shovel)	4.281	0.243
29. Kodal(Spade)	3.808	-0.230
42. Mosquito net	3.691	-0.226
22. Carom board	1.859	-0.160
4. Duck	0.903	-0.112
21. Sewing machine	0.613	-0.092
House condition	0.465	-0.080
2. Goat /sheep	0.361	-0.071
7. agricultural land	0.192	-0.052
3. Poultry	0.169	0.048
8. homestead land	0.139	-0.044
6. pigeon/Koel	0.095	0.036
43. Cot	0.082	0.034
37. Television	0.068	-0.031
36. Mobile phone	0.025	0.019
10. other land	0.022	0.017
27. L L P (Irrigation machine)	0.003	-0.006
14. local boat	0.002	0.005
28. Axe	0.000	0.002

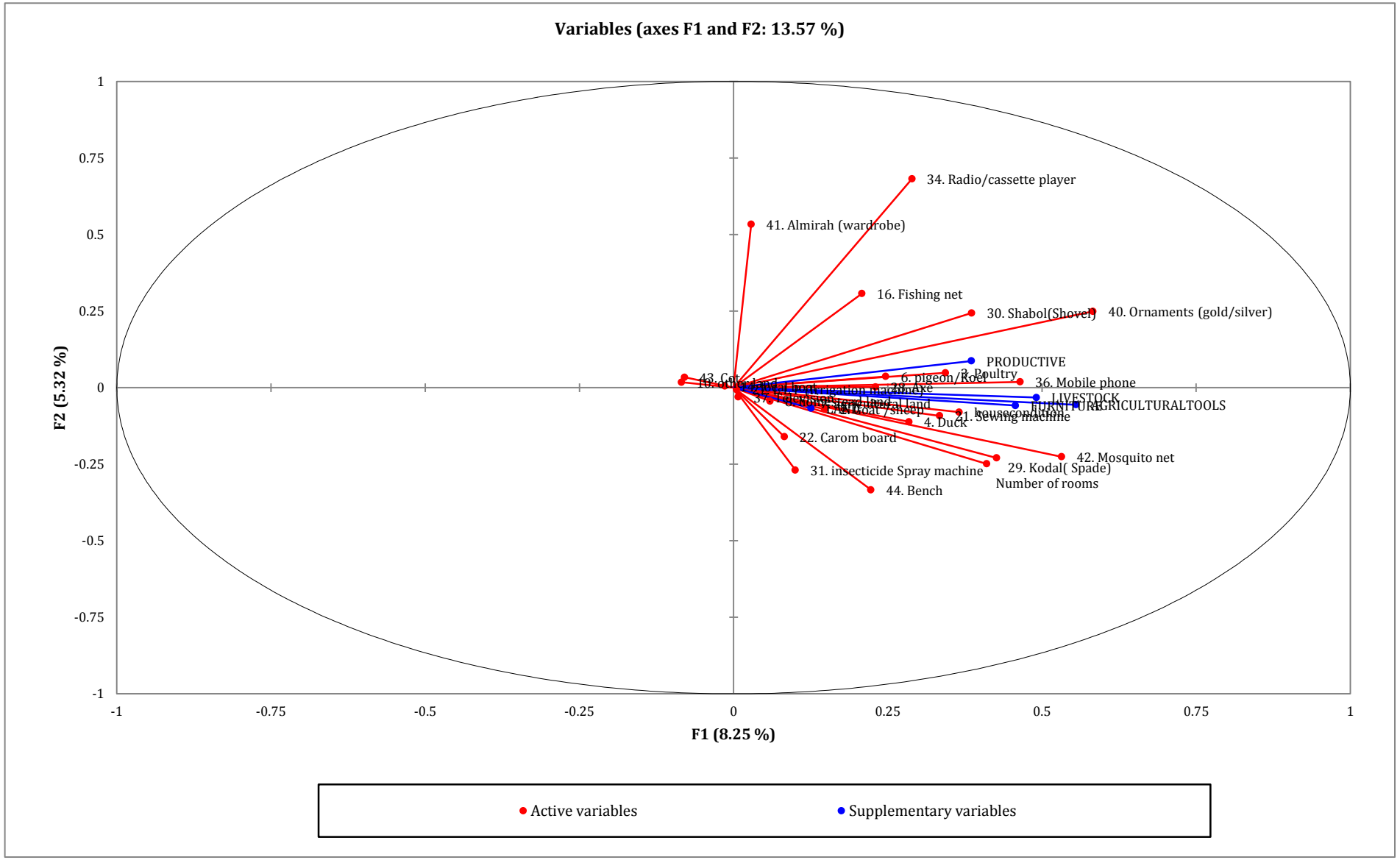
Three assets have an inverted effect (negative loading on factor 1), i.e. they are a symbol of poverty more than a symbol of wealth. However, their factor loading value is very close to zero. The assets are “other land” (other than agricultural or homestead), a local boat and a cot.

Graphs

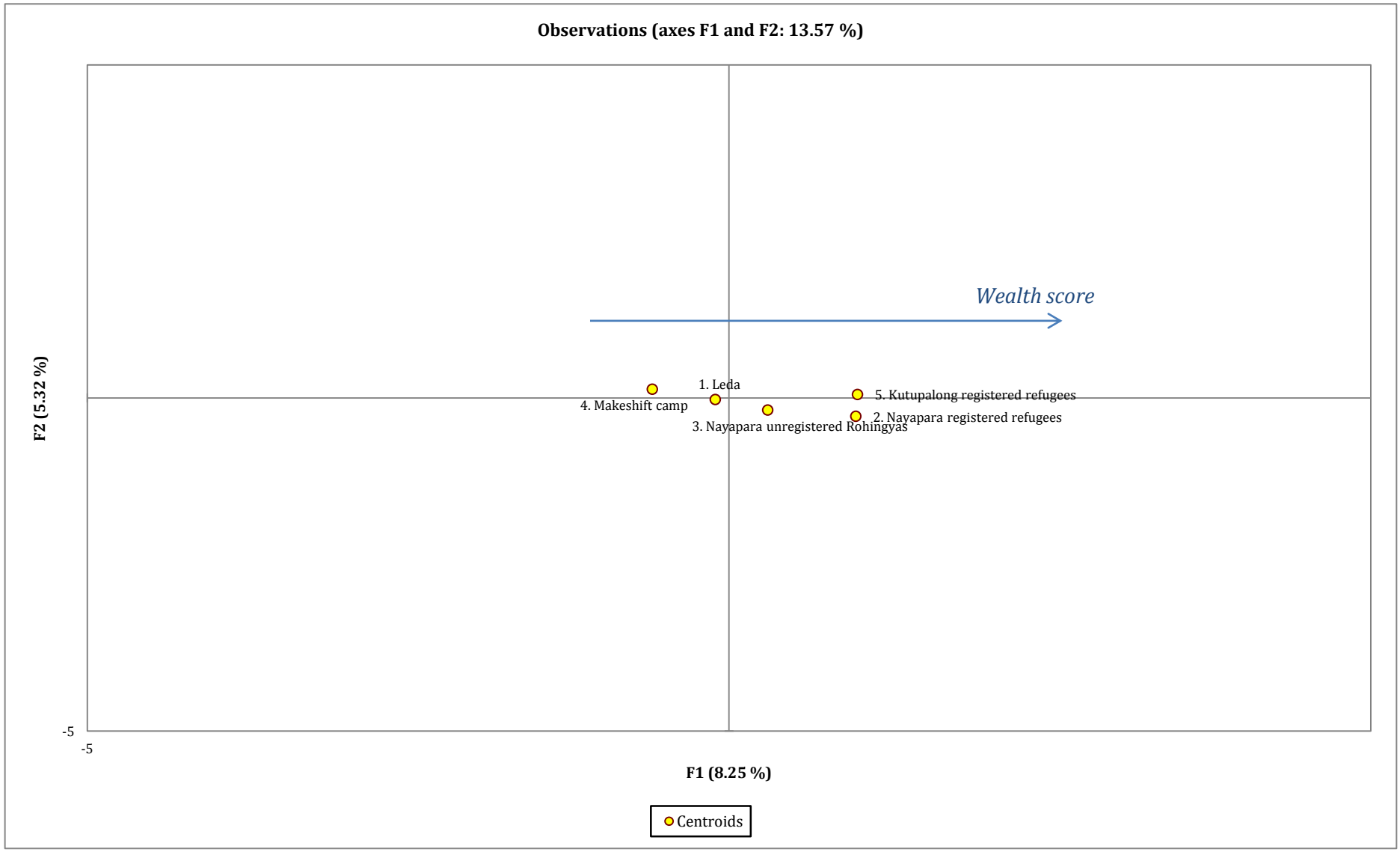
In coherence with the above tables, PCA graph in the next page shows all assets have a positive effect on the first factor (except for the three assets having a negative Factor 1 loading), and therefore in the construction of the wealth score. Thus, the wealth score increases from left to right of the plane.

GRAPH 6 shows the interrelation of the wealth score and the type of household. The different positions of the projected modalities of the variable on type of household, in relation to the first factor, imply differences in the wealth score value. Poorer wealth score values are positioned to the left of the axis, while higher are positioned to the right. Indeed, population types are sorted from poorer to wealthier: unregistered Rohingyas in the makeshift camp, in Leda, in Nayapara, and then registered refugees in Kutupalong and Nayapara (which present the same position in relation to factor 1, i.e. present same wealth score, on average).

GRAPH 5. PCA plane. Active variables



GRAPH 6. PCA plane. Supplementary variable. Type of population



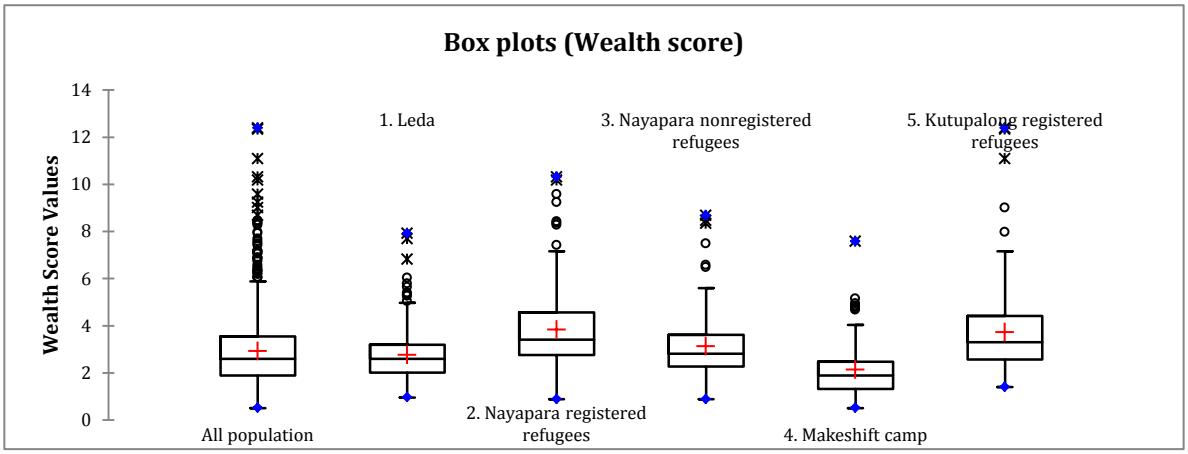
Analysis of the wealth score

The wealth score takes a wide range of values from -21.75 to 117.30, 50% of central values being between -2.83 and 1.36. PCA aggregates the number of assets owned by the household and the possible house condition categories in such a way that the average score of the population is zero. It can therefore be said that households having a wealth score below zero are poor compared to the average Rohingya household, while those holding a positive value as a wealth score are relatively wealthier.

As shown in the graph and table below, the wealth score has different distributions from one type of Rohingya household to another. The unregistered Rohingyas from Leda and the makeshift camp have lower wealth scores (below zero), and they present a small variation. Wealth scores for the registered refugees in the official camps have a larger range of variation and present higher average scores as well (above zero). The implemented tests have proved them to be significantly higher than average wealth score values for Leda and the makeshift camp (as can be confirmed by examining the lower and upper bounds on mean values exhibited in the table below). The distribution of the wealth score for the unregistered Rohingyas living in Nayapara is between the previous two locations in terms of average score and variation.

Table 38. Wealth score distribution by type of household

Sample	ALL POPULATION	1. Leda	2. Nayapara registered refugees	3. Nayapara unregistered Rohingya	4. Makeshift camp	5. Kutupalong registered refugees
No. of observations	882	261	168	132	149	172
No. of missing values	0	0	0	0	0	0
Minimum	0.51	0.95	0.88	0.88	0.51	1.40
Maximum	12.38	7.91	10.30	8.67	7.57	12.38
1st Quartile	1.89	2.01	2.76	2.26	1.32	2.57
Median	2.59	2.59	3.40	2.82	1.89	3.29
3rd Quartile	3.54	3.20	4.57	3.61	2.47	4.42
Mean	2.91	2.75	3.83	3.12	2.12	3.71
Standard deviation (n-1)	1.54	1.07	1.73	1.37	1.08	1.77
Skewness (Pearson)	1.78	1.56	1.42	1.86	1.66	2.13
Kurtosis (Pearson)	5.26	4.03	2.38	4.44	4.08	6.88
Lower bound on mean (95%)	2.81	2.62	3.56	2.88	1.95	3.44
Upper bound on mean (95%)	3.01	2.88	4.09	3.35	2.30	3.98



Classification of Households According to their Economic Activities

A clustering technique[6] has been applied to the refugee population groups for which a representative sample of households was surveyed[7]. The purpose was to classify refugee households depending on the economic activities they undertake. Indeed, the clustering technique automatically creates the classification for which households within groups are as similar as possible and households from different groups are as different as possible, always in terms of households' economic activities[8]. In other words, most homogeneous groups in terms of economic activities emerge automatically from data, without the potential influence of analysts' prejudices on the existing groups. A simplified but useful picture of the Rohingya population living in official and unofficial camps in Bangladesh is therefore produced.

The application of the clustering technique on the variables[9] has lead to a classification of refugee households into four different groups, as presented in the following page. Then a set of tables in section 5.1 presents how different indicators are distributed in the different household groups obtained through the classification. All significant differences between groups are summarized in FIGURE 3 at the end of the section. Then tables in section 5.2 show that these indicators behave differently within groups when the registration status is taken into account. Again, at the end of the section, all significant differences between registered and unregistered within group 2 are summarized in Table 58.

Table 39. Cluster variables

Variables included in the MCA (Households reported whether any of its members participated in any of the following)	Perc. of Rohingya households who declare the item is one of its economic activities (%)
Non agro based/industrial day labor	30.8
Poultry/Farming/Livestock	14.1
Micro enterprise outside house	14.0
Agro based day labour	13.0
Rickshaw	8.2
Sewing	7.7
Restaurant	6.6
Micro enterprise in own house	6.4
Maid	6.0
Beggar	5.4
NGO/govt worker	5.1
Fisher	4.7
Teacher/Imam/Religious person	4.1
Hawker	2.7
Skilled labour	2.0

[6] A k-means cluster on the principal coordinates issued from a Multiple Correspondence Analysis of the variables on economic activities of the household.

[7] These are the registered refugees in Kutupalong and Nayapara official refugee camps, and the unregistered Rohingyas in Leda, the makeshift camp of Kutupalong and the Nayapara official camp. Weighting is taken into account as presented in section 2.1.

[8] Most homogeneous groups in terms of economic activities emerge directly from data, without the potential influence of analysts' prejudices on the existing groups.

[9] Issued from module B2 of the household questionnaire

TABLE 40. Rohingya household classification in terms of economic activities

GROUPS		% of refugee population	Estimate number of households in real refugee population	Number of working members in the household	Characteristic activities	Refugee types	Perc. of registered refugee households	Perc. of female headed households	Perc. of households in which children below 14 work	Perc. of households in which no members work
GROUP 1	One to three members work.	20.6%	2440	All households have at least one working member. About 93% of these households have 1 to 3 working members and and 95% undertake 1 to 3 economic activities.	Micro enterprise outside the house, rickshaw/van driving, hawkers, servers in restaurants.	This group is characterized by including an important percentage of refugees from Leda and the makeshift camp	15.1%	26.4%	58.8%	0.0%
GROUP 2	Zero to two household members work. Lower diversity of economic activities.	42.9%	5067	29% of households have no working members. 97% of households have 0 to 2 working members.	Farming, agro based day labor, NGO workers	This group is characterized by including a relatively important percentage of registered refugees Nayapara and Kutupalong official camps (although it presents a high percentage of unregistered Rohingyas too)	49.1%	23.9%	23.6%	28.5%
GROUP 3	Zero to two household members work.	18.7%	2212	22% of households have no working members. 92% of households have 0 to 2 working members. (this group has slightly more working members/activities than group 2)	Agro based and non agro based day labor, begging, skilled labor.	This group is characterized by including an important percentage of refugees from Leda and the makeshift camp	22.0%	23.9%	26.5%	20.9%
GROUP 4	One to three members work. Higher diversity of economic activities.	17.8%	2105	All households have at least one working member. About 95% of these households have 1 to 3 working members and 98% undertake 1 to 3 economic activities (this group has slightly less working members/activities than group 1)	Fishing, industrial labor, maids, servants, micro enterprise inside the house, religious persons, teachers, servers in restaurants.	This group is more mixed. It includes important percentages of refugees from the makeshift camp, the Nayapara official refugee camp, and also from Kutupalong official camp and Leda	32.4%	23.6%	56.7%	0.0%

Household Characteristics by Group

This section presents how different indicators are distributed in the different household groups obtained through the classification (as categorical variables first, and then as scale variables). All significant differences between groups are summarized in FIGURE 3 at the end of the section.

Table 41. Household distribution by group and type of Rohingya

Groups	Kutupalong registered refugees	Nayapara registered refugees	Leda	Makeshift camp	Nayapara unregistered Rohingyas	Grand Total
1	4.1%	11.7%	**36.8%**	**43.7%**	3.8%	100.0%
2	**23.4%**	**30.8%**	14.0%	28.8%	3.0%	100.0%
3	7.5%	16.1%	**31.7%**	**41.7%**	3.0%	100.0%
4	12.9%	21.9%	18.6%	**43.5%**	3.1%	100.0%
Grand Total	**14.4%**	**22.4%**	**22.9%**	**37.1%**	**3.2%**	**100.0%**

Table 42. Household distribution by group and food consumption level

Household Dietary Diversity Score (HDDS)				
Groups	**1- Low diversity**	**2- Mid diversity**	**3- High diversity**	**Grand Total**
1	28.2%	55.5%	16.3%	100.0%
2	26.6%	52.7%	20.7%	100.0%
3	30.2%	43.1%	26.7%	100.0%
4	40.1%	37.8%	22.0%	100.0%
Total	**30.2%**	**48.6%**	**21.2%**	**100.0%**

Table 43. Household distribution by group and food security level

Coping Strategies Index (CSI)				
Goups	**Gentle**	**Mid-range**	**Severe**	**Grand Total**
1	32.4%	39.0%	28.7%	100.0%
2	37.3%	33.5%	29.3%	100.0%
3	28.9%	29.3%	41.8%	100.0%
4	23.6%	34.3%	42.1%	100.0%
Total	**32.1%**	**34.0%**	**34.0%**	**100.0%**

Table 44. Household distribution by group and wealth level

Wealth score				
Groups	**Poorer**	**Mid-range**	**Wealthier**	**Grand Total**
1	33.1%	36.5%	30.4%	100.0%
2	31.0%	34.9%	34.1%	100.0%
3	36.9%	31.8%	31.3%	100.0%
4	35.9%	26.9%	37.1%	100.0%
Total	**33.5%**	**33.1%**	**33.4%**	**100.0%**

Table 45. Household distribution by group and total earnings per household member

Groups	No activities	0-100	100-200	200-300	400-500	500 or more	Grand Total
1	0.0%	6.8%	19.5%	19.4%	11.4%	42.9%	100.0%
2	27.2%	18.0%	12.1%	8.9%	9.9%	23.8%	100.0%

3	20.5%	5.9%	14.1%	18.2%	11.0%	30.4%	100.0%
4	0.1%	22.1%	16.9%	16.7%	13.0%	31.2%	100.0%
Total	**15.2%**	**14.2%**	**14.9%**	**14.3%**	**11.0%**	**30.4%**	**100.0%**

Table 46. Indicator distribution by group (as scale variables)

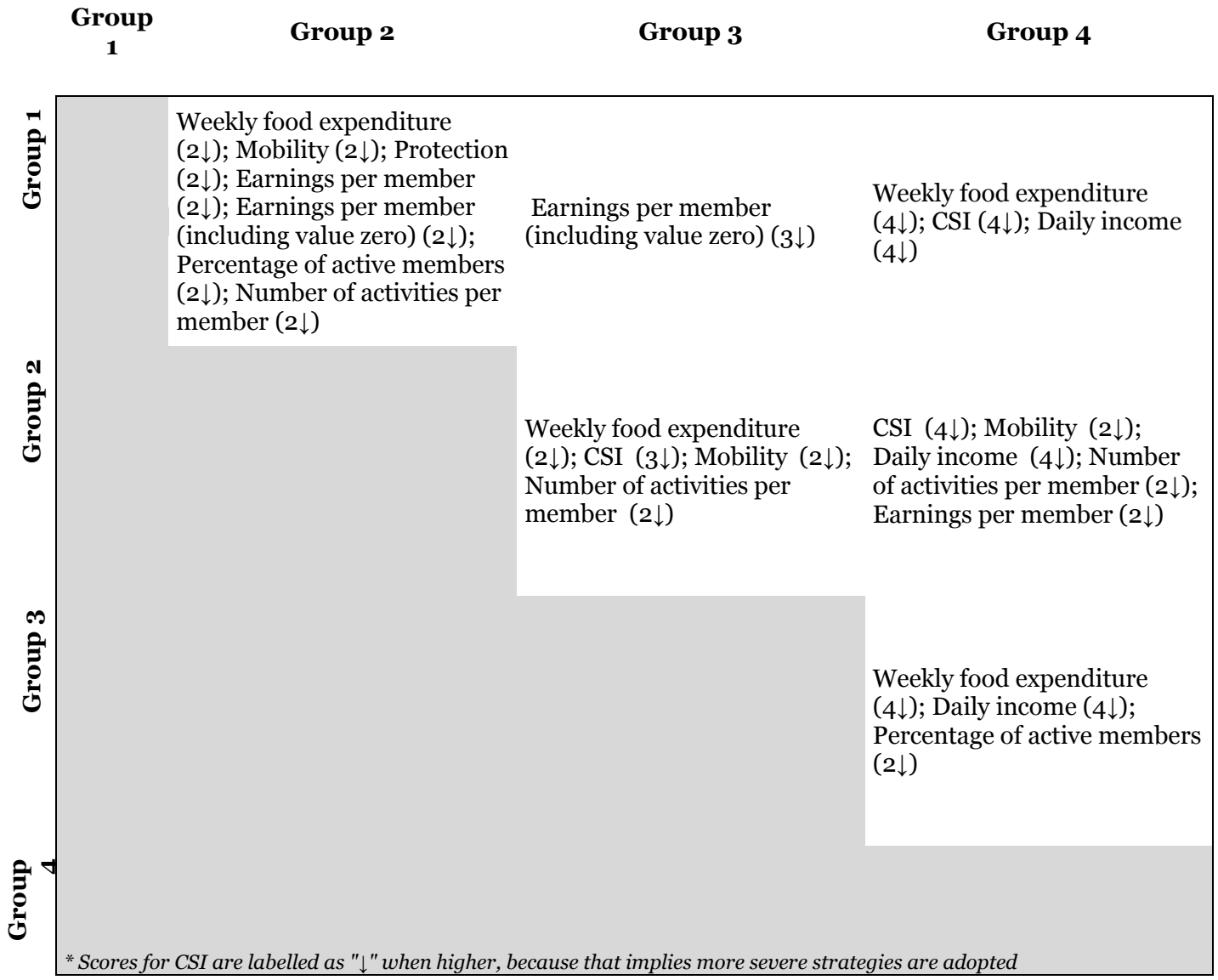
	Sample	No. of obs.	No. Of missing val.	Min.	Max.	Mean	Std dev.	Lower bound on mean (95%)	Upper bound on mean (95%)	
FOOD CONSUMPTION	HDDS	882	0	0	9	4.4	1.5	4.3	4.5	
	HDDS | 1	182	0	1	9	4.3	1.4	4.1	4.5	
	HDDS | 2	378	0	2	9	4.5	1.4	4.3	4.6	
	HDDS | 3	165	0	0	9	4.5	1.6	4.3	4.8	
	HDDS | 4	157	0	2	9	4.2	1.5	4	4.5	
	Weekly food expenditure per member	882	0	0	525	155.9	89	150	161.8	
	Weekly food expenditure per member | 1	182	0	12.5	525	174.2	86.7	161.5	186.8	
	Weekly food expenditure per member | 2	378	0	0	500	144.4	93	135	153.8	
	Weekly food expenditure per member | 3	165	0	7.5	500	178	95.1	163.4	192.7	
	Weekly food expenditure per member | 4	157	0	0	300	138.9	65.9	128.5	149.3	
FOOD SECURITY	CSI	882	0	0	70	31.2	13	30.3	32	
	CSI | 1	182	0	1	56	30.5	10.5	28.9	32	(1)
	CSI | 2	378	0	2	70	29.4	14	28	30.8	(2)
	CSI | 3	165	0	2	64	32.9	12.9	30.9	34.8	(2)
	CSI | 4	157	0	0	66	34.2	12.6	32.2	36.1	(1)(2)
MOBILITY	MOBILITY	882	0	0	5	2.7	1.1	2.6	2.7	
	MOBILITY | 1	182	0	1	5	3	0.9	2.8	3.1	
	MOBILITY | 2	378	0	0	5	2.4	1.2	2.3	2.6	
	MOBILITY | 3	165	0	0	5	2.8	1	2.6	2.9	
	MOBILITY | 4	157	0	0	5	2.7	1.2	2.6	2.9	
PROTECTION	Protection	882	0	0	7	2	2.1	1.9	2.2	
	Protection | 1	182	0	0	7	2.6	2.4	2.2	2.9	
	Protection | 2	378	0	0	7	1.7	1.9	1.5	1.9	
	Protection | 3	165	0	0	7	1.9	2.2	1.6	2.3	
	Protection | 4	157	0	0	7	2.2	2.1	1.8	2.5	
CAPITAL	Wealth score	882	0	0.5	12.4	2.9	1.5	2.8	3	
	Wealth score | 1	182	0	1.1	8.7	2.8	1.3	2.6	3	
	Wealth score | 2	378	0	0.9	12.4	2.9	1.5	2.8	3.1	
	Wealth score | 3	165	0	1	12.3	2.8	1.5	2.6	3	
	Wealth score | 4	157	0	0.5	10.3	3	1.8	2.7	3.3	

Table 47. Indicator distribution by group (as scale variables) (2)

	Sample	No. of obs.	No. Of missing val.	Min.	Max.	Mean	Std dev.	Lower bound on mean (95%)	Upper bound on mean (95%)	
ECONOMIC ACTIVTIES	Number of activities per member	882	0	0	2	0.2	0.2	0.2	0.3	
	Number of activities per member | 1	182	0	0.1	1.3	0.3	0.2	0.3	0.3	
	Number of activities per member | 2	378	0	0	2	0.2	0.2	0.2	0.2	
	Number of activities per member | 3	165	0	0	1	0.2	0.2	0.2	0.3	
	Number of activities per member | 4	157	0	0.1	1	0.3	0.2	0.3	0.3	
	Daily income	882	297	0	2000	174.5	112.3	165.4	183.6	
	Daily income | 1	182	31	0	2000	199.9	130.2	179	220.9	
	Daily income | 2	378	175	0	400	168.4	96.1	155.1	181.7	
	Daily income | 3	165	59	0	800	198.4	102.2	178.7	218.1	
	Daily income | 4	157	32	0	600	134.6	111.3	114.9	154.3	
	Hours of work last two weeks	882	297	0	224	70	39.5	66.8	73.2	
	Hours of work last two weeks | 1	182	31	2	196	72.8	38.8	66.5	79	
	Hours of work last two weeks | 2	378	175	0	168	67.6	38.2	62.3	72.8	
	Hours of work last two weeks | 3	165	59	6	140	65	30.8	59.1	71	
	Hours of work last two weeks | 4	157	32	1	224	75.2	47.7	66.7	83.6	
	Earnings per member	882	145	0	1827.5	354.9	291.5	333.8	376	
	Earnings per member | 1	182	0	28.6	1748.6	412.7	316.4	366.4	459	
	Earnings per member | 2	378	108	0	1400	324.4	287.8	289.9	358.9	
	Earnings per member | 3	165	36	0	1827.5	368	258.9	322.9	413.1	
	Earnings per member | 4	157	1	0	1422.3	330.5	286.5	285.1	375.8	
	Earnings per member (including value zero)	882	0	0	1827.5	300.8	297.2	281.2	320.5	
	Earnings per member (including value zero) | 1	182	0	28.6	1748.6	412.7	316.4	366.4	459	(1)(2)
	Earnings per member (including value zero) | 2	378	0	0	1400	236.1	284.8	207.3	264.9	(1)
	Earnings per member (including value zero) | 3	165	0	0	1827.5	292.7	274.6	250.4	334.9	(2)
	Earnings per member (including value zero) | 4	157	0	0	1422.3	330	286.6	284.9	375.2	(1)
	Perc. of active members	882	0	0	100	26	18.8	24.8	27.3	
	Perc. of active members | 1	182	0	8.3	100	29.6	14	27.5	31.6	
	Perc. of active members | 2	378	0	0	100	21.9	19.2	19.9	23.8	
	Perc. of active members | 3	165	0	0	100	25.9	22.8	22.3	29.4	
	Perc. of active members | 4	157	0	0	100	31.6	15.8	29.1	34	

In tables above, significant differences in means are determined by comparing the lower and upper bounds on mean values: when intervals don't overlap, difference is significant. When in green, mean is significantly higher, while significantly lower means are marked in red.

FIGURE 3. Summary of significant differences between groups



Household Characteristics by Group and Registration Status

In this section, the differences between the registered and the unregistered Rohingya population within groups are explored. It is important to note that when established within groups, comparisons are more relevant, for they cover similar (comparable) households in terms of economic activities. The actual sample that will be explored is distributed as follows:

Table 48. Sample by group and registration status

SAMPLE	Number
1	**182**
Registered refugee	27
Unregistered Rohingya	155
2	**378**
Registered refugee	192
Unregistered Rohingya	186
3	**165**
Registered refugee	39
Unregistered Rohingya	126
4	**157**
Registered refugee	59
Unregistered Rohingya	98
Grand Total	**882**

Results for registered refugees in groups 1 and 3 (and also 4) must be interpreted with caution, given the small sample for them. At the end of the section, all significant differences between registered and unregistered within group 2 are summarized in Table 58.

Table 49. Household distribution by group, registration status and food consumption level

HDDS				
Groups	**1- Low diversity**	**2- Mid diversity**	**3- High diversity**	**Grand Total**
1	**28.2%**	**55.5%**	**16.3%**	**100.0%**
Registered refugee	17.2%	53.1%	29.7%	100.0%
Unregistered Rohingya	30.2%	55.9%	13.9%	100.0%
2	**26.6%**	**52.7%**	**20.7%**	**100.0%**
Registered refugee	13.3%	55.6%	31.1%	100.0%
Unregistered Rohingya	39.4%	49.9%	10.7%	100.0%
3	**30.2%**	**43.1%**	**26.7%**	**100.0%**
Registered refugee	21.1%	38.9%	40.0%	100.0%
Unregistered Rohingya	32.8%	44.3%	22.9%	100.0%
4	**40.1%**	**37.8%**	**22.0%**	**100.0%**
Registered refugee	16.0%	44.7%	39.3%	100.0%
Unregistered Rohingya	51.7%	34.6%	13.8%	100.0%
Grand Total	**30.2%**	**48.6%**	**21.2%**	**100.0%**

Table 50. Household distribution by group, registration status and food security level (%)

CSI				
Groups	**Gentle**	**Mid-range**	**Severe**	**Grand Total**
1	**32.4**	**39.0**	**28.7**	**100.0**
Registered refugee	53.9	41.8	4.3	100.0
Unregistered Rohingya	28.5	38.5	33.0	100.0
2	**37.3**	**33.5**	**29.3**	**100.0**
Registered refugee	40.6	40.7	18.7	100.0
Unregistered Rohingya	34.0	26.5	39.5	100.0
3	**28.9**	**29.3**	**41.8**	**100.0**
Registered refugee	47.0	18.7	34.3	100.0
Unregistered Rohingya	23.8	32.3	43.9	100.0
4	**23.6**	**34.3**	**42.1**	**100.0**
Registered refugee	41.7	30.6	27.7	100.0
Unregistered Rohingya	14.9	36.0	49.1	100.0

Table 51. Household distribution by group, registration status and wealth level (%)

Wealth score				
Groups	**Poorer**	**Mid-range**	**Wealthier**	**Grand Total**
1	**33.1**	**36.5**	**30.4**	**100.0**
Registered refugee	7.0	29.3	63.6	100.0
Unregistered Rohingya	37.7	37.8	24.5	100.0
2	**31.0**	**34.9**	**34.1**	**100.0**
Registered refugee	12.8	34.5	52.7	100.0
Unregistered Rohingya	48.6	35.3	16.1	100.0
3	**36.9**	**31.8**	**31.3**	**100.0**
Registered refugee	2.0	36.0	62.0	100.0
Unregistered Rohingya	46.7	30.6	22.7	100.0
4	**35.9**	**26.9**	**37.1**	**100.0**
Registered refugee	2.7	19.4	77.9	100.0
Unregistered Rohingya	51.8	30.6	17.7	100.0

Table 52. Household distribution by group, registration status and earnings per member (%)

Last two weeks household earnings per member							
Groups	**No activities**	**0-100**	**100-200**	**200-300**	**400-500**	**500 or more**	**Grand Total**
1	**0.0**	**6.8**	**19.5**	**19.4**	**11.4**	**42.9**	**100.0**
Registered refugee	0.0	28.6	35.6	10.5	0.0	25.4	100.0
Unregistered Rohingya	0.0	2.9	16.6	21.0	13.5	46.0	100.0
2	**27.2**	**18.0**	**12.1**	**8.9**	**9.9**	**23.8**	**100.0**
Registered refugee	41.0	27.7	14.2	6.1	2.5	8.5	100.0
Unregistered Rohingya	13.9	8.6	10.2	11.7	17.0	38.6	100.0
3	**20.5**	**5.9**	**14.1**	**18.2**	**11.0**	**30.4**	**100.0**
Registered refugee	42.6	15.6	14.4	16.5	0.0	10.9	100.0
Unregistered Rohingya	14.2	3.1	14.0	18.6	14.1	35.9	100.0
4	**0.1**	**22.1**	**16.9**	**16.7**	**13.0**	**31.2**	**100.0**
Registered refugee	0.0	40.0	29.4	8.1	7.1	15.4	100.0

Unregistered Rohingya	0.2	13.6	10.9	20.8	15.8	38.7	100.0
Grand Total	**15.2%**	**14.2%**	**14.9%**	**14.3%**	**11.0%**	**30.4%**	**100.0%**

Table 53. Household distribution by group, registration status and number of working hours per day

Hours of work per day					
Groups	**Less than 4 hours**	**4 to 8 hours**	**9 to 12 hours**	**13 to 16 hours**	**Grand Total**
1	**6.5%**	**46.0%**	**47.1%**	**0.5%**	**100.0%**
Registered refugee	39.0%	29.7%	31.4%	0.0%	100.0%
Unregistered Rohingya	0.6%	48.9%	49.9%	0.6%	100.0%
2	**9.1%**	**43.8%**	**47.1%**	**0.0%**	**100.0%**
Registered refugee	19.7%	55.1%	25.1%	0.0%	100.0%
Unregistered Rohingya	3.6%	37.9%	58.5%	0.0%	100.0%
3	**4.4%**	**47.9%**	**47.7%**	**0.0%**	**100.0%**
Registered refugee	7.6%	52.9%	39.5%	0.0%	100.0%
Unregistered Rohingya	4.0%	47.1%	48.9%	0.0%	100.0%
4	**11.2%**	**50.1%**	**34.3%**	**4.4%**	**100.0%**
Registered refugee	17.3%	50.4%	25.0%	7.3%	100.0%
Unregistered Rohingya	8.4%	50.0%	38.6%	3.0%	100.0%
Grand Total	**8.0%**	**46.5%**	**44.4%**	**1.1%**	**100.0%**

Group 2 households share a low number of working members (0 to 1), undertaking a variety of economic activities. Table below shows that these activities are highly dependent on the registration status of Rohingyas. Registered refugee households are significantly more involved in sewing, working in NGOs, teaching, religious positions and poultry rearing, while unregistered households work more as day labourers, shop or restaurant workers, maids, servants, rickshaw pullers, street vendors (hawkers), skilled laborers, beggars…

Table 54. Percentage of households that practice each of the economic activities (%)

Note that one household may undertake several economic activities

GROUPS	**Farming**	**Day labour**	**Non Agro based day labour**	**Fisher**	**Industrial labour**	**Restaurant**	**Maid**
1	**0.0**	**9.7**	**24.3**	**2.7**	**0.4**	**8.7**	**5.2**
Registered refugee	0.0	4.3	9.7	0.8	0.0	4.3	0.0
Unregistered Rohingya	0.0	10.7	26.9	3.1	0.5	9.5	6.2
2	**3.2**	**19.1**	**30.2**	**0.0**	**0.9**	**4.7**	**0.0**
Registered refugee	3.4	8.3	17.0	0.0	0.4	2.8	0.0
Unregistered Rohingya	3.0	29.6	42.9	0.0	1.3	6.5	0.0
3	**2.5**	**13.3**	**43.3**	**0.0**	**0.0**	**6.7**	**0.0**
Registered refugee	3.2	8.4	20.5	0.0	0.0	8.4	0.0
Unregistered Rohingya	2.3	14.6	49.7	0.0	0.0	6.2	0.0
4	0.5	2.6	24.7	22.1	1.3	8.4	26.2
Registered refugee	0.0	0.4	12.3	25.9	2.2	3.6	7.1
Unregistered Rohingya	0.7	3.7	30.6	20.2	0.9	10.7	35.3

GROUPS	Sewing	Rickshaw	Hawker	Micro enterprise in own house	Micro enterprise outside house	Skilled labour	NGO worker
1	**6.6**	**38.7**	**3.9**	**0.0**	**66.0**	**0.4**	**1.6**
Registered refugee	25.4	19.4	0.0	0.0	80.6	0.0	7.0
Unregistered Rohingya	3.2	42.1	4.5	0.0	63.4	0.5	0.6
2	**8.6**	**0.0**	**3.2**	**0.0**	**0.0**	**0.0**	**7.5**
Registered refugee	14.1	0.0	0.7	0.0	0.0	0.0	13.0
Unregistered Rohingya	3.3	0.0	5.7	0.0	0.0	0.0	2.2
3	**6.0**	**0.0**	**1.0**	**0.0**	**0.9**	**10.1**	**6.3**
Registered refugee	19.9	0.0	0.0	0.0	0.0	8.6	15.6
Unregistered Rohingya	2.1	0.0	1.3	0.0	1.2	10.5	3.8
4	**8.7**	**1.4**	**2.1**	**33.8**	**1.7**	**0.0**	**1.4**
Registered refugee	16.3	0.0	2.2	32.2	1.4	0.0	1.4
Unregistered Rohingya	5.1	2.1	2.1	34.6	1.9	0.0	1.4

GROUPS	Governmental organization worker	Religious person	Beggar	Live stock	Poultry	Teacher
1	**0.0**	**0.0**	**5.8**	**0.0**	**13.0**	**0.0**
Registered refugee	0.0	0.0	4.3	0.0	25.4	0.0
Unregistered Rohingya	0.0	0.0	6.0	0.0	10.8	0.0
2	**0.0**	**0.0**	**4.6**	**0.3**	**12.1**	**0.0**
Registered refugee	0.0	0.0	0.7	0.7	18.4	0.0
Unregistered Rohingya	0.0	0.0	8.4	0.0	6.0	0.0
3	**0.0**	**0.0**	**8.7**	**0.1**	**12.9**	**0.0**
Registered refugee	0.0	0.0	0.0	0.6	18.1	0.0
Unregistered Rohingya	0.0	0.0	11.2	0.0	11.5	0.0
4	**0.7**	**10.3**	**3.3**	**0.7**	**10.8**	**12.9**
Registered refugee	2.2	20.0	0.0	2.2	22.2	19.2
Unregistered Rohingya	0.0	5.7	4.9	0.0	5.3	9.9

Table 55. Indicator distribution by group and registration status (as scale variables) (1)

	Sample	No. of obs.	No. of missing values	Min.	Max.	Mean	Std dev.	Lower bound on mean (95%)	Upper bound on mean (95%)
FOOD CONSUMPTION	HDDS	882	0	0.0	9.0	4.4	1.5	4.3	4.5
	HDDS | 1 - Reg. refugee	27	0	2.0	9.0	4.9	1.6	4.3	5.5
	HDDS | 1 - Unreg. Rohingya	155	0	1.0	8.0	4.2	1.3	4.0	4.4
	HDDS | 2 - Reg. refugee	192	0	2.0	8.0	4.9	1.4	4.7	5.1
	HDDS | 2 - Unreg. Rohingya	186	0	2.0	9.0	4.0	1.2	3.8	4.2
	HDDS | 3 - Reg. refugee	39	0	2.0	9.0	5.0	1.8	4.5	5.6
	HDDS | 3 - Unreg. Rohingya	126	0	0.0	8.0	4.4	1.6	4.1	4.7
	HDDS | 4 - Reg. refugee	59	0	2.0	9.0	5.1	1.5	4.7	5.4
	HDDS | 4 - Unreg. Rohingya	98	0	2.0	7.0	3.9	1.3	3.6	4.1
	Weekly food expenditure per member	882	0	0.0	525.0	155.9	89.0	150.0	161.8
	Weekly food expenditure per member | 1 - Reg. refugee	27	0	12.5	350.0	106.0	77.4	75.4	136.6
	Weekly food expenditure per member | 1 - Unreg. Rohingya	155	0	33.3	525.0	186.3	82.7	173.1	199.4
	Weekly food expenditure per member | 2 - Reg. refugee	192	0	0.0	500.0	98.3	74.0	87.8	108.8
	Weekly food expenditure per member | 2 - Unreg. Rohingya	186	0	0.0	466.7	188.9	87.9	176.2	201.7
	Weekly food expenditure per member | 3 - Reg. refugee	39	0	7.5	340.0	90.7	64.8	69.7	111.7
	Weekly food expenditure per member | 3 - Unreg. Rohingya	126	0	40.0	500.0	202.6	87.6	187.2	218.1
	Weekly food expenditure per member | 4 - Reg. refugee	59	0	10.7	216.7	101.3	52.9	87.5	115.1
	Weekly food expenditure per member | 4 - Unreg. Rohingya	98	0	0.0	300.0	156.9	64.1	144.1	169.8
FOOD SECURITY	CSI	882	0	0.0	70.0	31.2	13.0	30.3	32.0
	CSI | 1 - Reg. refugee	27	0	6.0	38.0	23.9	8.2	20.7	27.1
	CSI | 1 - Unreg. Rohingya	155	0	1.0	56.0	31.6	10.4	30.0	33.3
	CSI | 2 - Reg. refugee	192	0	2.0	60.0	27.5	12.3	25.8	29.3
	CSI | 2 - Unreg. Rohingya	186	0	3.0	70.0	31.2	15.3	29.0	33.4
	CSI | 3 - Reg. refugee	39	0	2.0	49.0	28.1	12.8	24.0	32.2
	CSI | 3 - Unreg. Rohingya	126	0	5.0	64.0	34.2	12.6	32.0	36.4
	CSI | 4 - Reg. refugee	59	0	0.0	47.0	27.7	12.7	24.4	31.0
	CSI | 4 - Unreg. Rohingya	98	0	10.0	66.0	37.2	11.4	35.0	39.5
MOBILITY	MOBILITY	882	0	0.0	5.0	2.7	1.1	2.6	2.7
	MOBILITY | 1 - Reg. refugee	27	0	1.0	4.0	2.7	0.9	2.3	3.0
	MOBILITY | 1 - Unreg. Rohingya	155	0	1.0	5.0	3.0	0.9	2.9	3.2
	MOBILITY | 2 - Reg. refugee	192	0	0.0	5.0	2.1	1.3	1.9	2.3

MOBILITY | 2 - Unreg. Rohingya	186	0	0.0	5.0	2.8	0.9	2.6	2.9
MOBILITY | 3 - Reg. refugee	39	0	0.0	4.0	2.3	1.3	1.9	2.7
MOBILITY | 3 - Unreg. Rohingya	126	0	0.0	5.0	2.9	0.8	2.8	3.0
MOBILITY | 4 - Reg. refugee	59	0	0.0	4.0	2.6	1.1	2.3	2.9
MOBILITY | 4 - Unreg. Rohingya	98	0	0.0	5.0	2.8	1.2	2.6	3.0

Table 56. Indicator distribution by group and registration status (as scale variables) (2)

	Sample	No. of obs.	No. of missing values	Min.	Max.	Mean	Std dev.	Lower bound on mean (95%)	Upper bound on mean (95%)
PROTECTION	Protection	882	0	0.0	7.0	2.0	2.1	1.9	2.2
	Protection | 1 - Reg. refugee	27	0	0.0	6.0	2.1	2.1	1.3	2.9
	Protection | 1 - Unreg. Rohingya	155	0	0.0	7.0	2.7	2.4	2.3	3.0
	Protection | 2 - Reg. refugee	192	0	0.0	7.0	1.8	2.0	1.5	2.0
	Protection | 2 - Unreg. Rohingya	186	0	0.0	7.0	1.7	1.9	1.4	2.0
	Protection | 3 - Reg. refugee	39	0	0.0	7.0	1.5	2.1	0.8	2.1
	Protection | 3 - Unreg. Rohingya	126	0	0.0	7.0	2.1	2.3	1.7	2.5
	Protection | 4 - Reg. refugee	59	0	0.0	7.0	2.2	2.0	1.7	2.7
	Protection | 4 - Unreg. Rohingya	98	0	0.0	7.0	2.1	2.1	1.7	2.6
CAPITAL	Wealth score	882	0	0.5	12.4	2.9	1.5	2.8	3.0
	Wealth score | 1 - Reg. refugee	27	0	1.9	6.9	3.9	1.4	3.3	4.4
	Wealth score | 1 - Unreg. Rohingya	155	0	1.1	8.7	2.7	1.3	2.5	2.9
	Wealth score | 2 - Reg. refugee	192	0	1.3	12.4	3.6	1.6	3.3	3.8
	Wealth score | 2 - Unreg. Rohingya	186	0	0.9	7.6	2.3	1.1	2.2	2.5
	Wealth score | 3 - Reg. refugee	39	0	1.4	12.3	4.1	2.1	3.4	4.8
	Wealth score | 3 - Unreg. Rohingya	126	0	1.0	8.3	2.4	1.1	2.3	2.6
	Wealth score | 4 - Reg. refugee	59	0	1.4	10.3	4.5	1.9	4.0	5.0
	Wealth score | 4 - Unreg. Rohingya	98	0	0.5	7.2	2.3	1.3	2.0	2.5
ECONOMIC ACTIVITIES	Number of activities per member	882	0	0.0	2.0	0.2	0.2	0.2	0.3
	Number of activities per member | 1 - Reg. refugee	27	0	0.1	0.8	0.3	0.2	0.3	0.4
	Number of activities per member | 1 - Unreg. Rohingya	155	0	0.1	1.3	0.3	0.2	0.3	0.3
	Number of activities per member | 2 - Reg. refugee	192	0	0.0	2.0	0.2	0.2	0.1	0.2
	Number of activities per member | 2 - Unreg. Rohingya	186	0	0.0	1.0	0.2	0.2	0.2	0.3
	Number of activities per member | 3 - Reg. refugee	39	0	0.0	0.8	0.2	0.2	0.1	0.2
	Number of activities per member | 3 - Unreg. Rohingya	126	0	0.0	1.0	0.3	0.2	0.2	0.3
	Number of activities per member | 4 - Reg. refugee	59	0	0.1	0.5	0.3	0.1	0.2	0.3
	Number of activities per member | 4 - Unreg. Rohingya	98	0	0.1	1.0	0.3	0.2	0.3	0.4
	Daily income	882	297	0.0	2000.0	174.5	112.3	165.4	183.6
	Daily income | 1 - Reg. refugee	27	4	0.0	500.0	145.7	159.7	76.7	214.8
	Daily income | 1 - Unreg. Rohingya	155	27	0.0	2000.0	209.7	122.3	188.3	231.1
	Daily income | 2 - Reg. refugee	192	113	0.0	350.0	108.8	110.6	84.0	133.6
	Daily income | 2 - Unreg. Rohingya	186	62	0.0	400.0	199.6	69.9	187.1	212.0
	Daily income | 3 - Reg. refugee	39	22	0.0	800.0	167.8	178.6	76.0	259.6
	Daily income | 3 - Unreg. Rohingya	126	37	0.0	475.0	203.	84.9	185.2	221.0

Daily income | 4 - Reg. refugee	59	12	0.0	600.0	1 103. 3	103. 7	72.8	133.7
Daily income | 4 - Unreg. Rohingya	98	20	0.0	550.0	149. 3	112. 3	124.0	174.7

Table 57. Indicator distribution by group and registration status (as scale variables) (3)

	Sample	No. of obs.	No. of missing val.	Min.	Max.	Mean	Std dev.	Lower bound on mean (95%)	Upper bound on mean (95%)
ECONOMIC ACTIVITIES	Hours of work last two weeks	882	297	0.0	224.0	70.0	39.5	66.8	73.2
	Hours of work last two weeks | 1 - Reg. refugee	27	4	2.0	168.0	60.9	46.4	40.9	81.0
	Hours of work last two weeks | 1 - Unreg. Rohingya	155	27	9.0	196.0	74.9	37.0	68.4	81.4
	Hours of work last two weeks | 2 - Reg. refugee	192	113	0.0	144.0	54.7	38.1	46.2	63.2
	Hours of work last two weeks | 2 - Unreg. Rohingya	186	62	8.0	168.0	74.3	36.7	67.7	80.8
	Hours of work last two weeks | 3 - Reg. refugee	39	22	6.0	112.0	56.7	31.1	40.7	72.7
	Hours of work last two weeks | 3 - Unreg. Rohingya	126	37	8.0	140.0	66.3	30.7	59.8	72.8
	Hours of work last two weeks | 4 - Reg. refugee	59	12	1.0	210.0	72.9	53.6	57.2	88.7
	Hours of work last two weeks | 4 - Unreg. Rohingya	98	20	6.0	224.0	76.2	44.9	66.1	86.4
	Earnings per member	882	145	0.0	1827.5	354.9	291.5	333.8	376.0
	Earnings per member | 1 - Reg. refugee	27	0	28.6	1166.7	288.7	321.1	161.7	415.7
	Earnings per member | 1 - Unreg. Rohingya	155	0	44.3	1748.6	434.7	311.5	385.3	484.2
	Earnings per member | 2 - Reg. refugee	192	78	0.0	900.0	168.0	194.0	132.0	204.0
	Earnings per member | 2 - Unreg. Rohingya	186	30	0.0	1400.0	427.9	293.4	381.5	474.3
	Earnings per member | 3 - Reg. refugee	39	16	0.0	1050.0	252.0	264.1	137.8	366.2
	Earnings per member | 3 - Unreg. Rohingya	126	20	0.0	1827.5	389.9	253.1	341.1	438.6
	Earnings per member | 4 - Reg. refugee	59	0	0.0	750.0	187.0	179.6	140.2	233.8
	Earnings per member | 4 - Unreg. Rohingya	98	1	0.0	1422.3	399.2	303.0	338.2	460.3
	Earnings per member (including value zero)	882	0	0.0	1827.5	300.8	297.2	281.2	320.5
	Earnings per member (including value zero) | 1 - Reg. refugee	27	0	28.6	1166.7	288.7	321.1	161.7	415.7
	Earnings per member (including value zero) | 1 - Unreg. Rohingya	155	0	44.3	1748.6	434.7	311.5	385.3	484.2
	Earnings per member (including value zero) | 2 - Reg. refugee	192	0	0.0	900.0	99.12	170.2	74.8	123.3
	Earnings per member (including value zero) | 2 - Unreg. Rohingya	186	0	0.0	1400.0	368.5	309.9	323.6	413.3
	Earnings per member (including value zero) | 3 - Reg. refugee	39	0	0.0	1050.0	144.5	235.0	68.4	220.7
	Earnings per member (including value zero) | 3 - Unreg. Rohingya	126	0	0.0	1827.5	334.3	271.2	286.5	382.1
	Earnings per member (including value zero) | 4 - Reg. refugee	59	0	0.0	750.0	187.0	179.6	140.2	233.8

Earnings per member (including value zero) | 4 - Unreg. Rohingya	98	0	0.0	1422.3	398.5	303.2	337.7	459.2
Perc. of active members	882	0	0.0	100.0	26.0	18.8	24.8	27.3
Perc. of active members | 1 - Reg. refugee	27	0	14.3	75.0	33.9	18.1	26.7	41.1
Perc. of active members | 1 - Unreg. Rohingya	155	0	8.3	100.0	28.8	13.1	26.7	30.9
Perc. of active members | 2 - Reg. refugee	192	0	0.0	100.0	18.1	21.0	15.1	21.1
Perc. of active members | 2 - Unreg. Rohingya	186	0	0.0	100.0	25.6	16.5	23.2	28.0
Perc. of active members | 3 - Reg. refugee	39	0	0.0	75.0	17.1	19.3	10.8	23.3
Perc. of active members | 3 - Unreg. Rohingya	126	0	0.0	100.0	28.3	23.2	24.2	32.4
Perc. of active members | 4 - Reg. refugee	59	0	7.1	55.6	25.4	11.5	22.4	28.4
Perc. of active members | 4 - Unreg. Rohingya	98	0	0.0	100.0	34.5	16.7	31.1	37.8

Table 58. Summary of significant differences between registered and unregistered within group 2

SIGNIFICANTLY HIGHER MEAN VALUES FOR "GROUP 2- REGISTERED REFUGEES "	SIGNIFICANTLY HIGHER MEAN VALUES FOR "GROUP 2- UNREGISTERED ROHINGYAS "
HDDS Wealth Score	Weekly food expenditure per member Mobility Number of activities per member Daily income Hours of work last two weeks Earnings per member Earnings per member (including value zero) Perc. of active members

Regression Analyses of Household Indicators

Multiple linear regression models of indicators on food consumption, food security, protection and mobility

The construction of multiple linear regression models in which indicators of protection, food consumption, food security, mobility and expenditures are regressed on demographic and socioeconomic variables for households, as well as on aid received, registration status and area of location, aimed to help us determine to what level the latter have an impact on refugees' lives in terms of the first set of indicators.

Moreover, regression models aimed to contribute in the answer to the following questions:

- To what point does food aid have an impact on protection, food consumption, food security and mobility?
- What is the importance of each of the explanatory demographic and socioeconomic variables compared to others in the estimation of the indicators (i.e. which has a greater influence on the indicator value)?

The following indicators are to be explained through multiple linear regression models:

CONCEPT	INDICATOR
Food consumption	Household Dietary Diversity Score (HDDS)
Food security	Coping Strategies Index (CSI)
Protection	Protection indicator (based on module J of the household questionnaire)
Mobility	Mobility indicator (based on module B3 of the household questionnaire)

Conclusions

The conclusions of the various models obtained are the following:

1. The Type of household (the camp where it's located and the registration status of its members, so therefore presumably the type of assistance received) has a great impact on the **food consumption** levels of the household, as measured by the Household Dietary Diversity Score (HDDS), but not really on the **protection** indicator.
    - Indeed, given equal socioeconomic and conditions, official camps, that is registered refugee households in Nayapara, and specially Kutupalong, present significantly higher HDDS values (above 4) than the makeshift and the Nayapara unregistered households (around 3.5). Leda, which receives some sort of assistance, is placed in between the first and the latter (around 3.7).
    - Other socioeconomic characteristics leading to variations in the HDDS values are the wealth score, the education level, the marital status, the number of activities and the activity group.
2. Not so much the Type of household, but just the registration status of its members, has an impact on the **food security** and the **mobility** levels of them. Indeed, given similar socioeconomic and demographic conditions the Coping Strategies Index shows an almost five point difference between registered and unregistered Rohingyas (27.5 and 32.2 points respectively).

- **Food security** also varies depending on size and wealth levels of household, earnings per member, marital status of the head and the participation in certain economic activities.
- **Mobility** also depends on the sex of the household head, the marital status, the percentage of adult men in the household, the wealth score, the earnings per members and the participation of any household members in some of them particularly.

3. **Protection** is linked to the area where the household is placed. Households located in the Kutupalong area show higher levels of protection than those of Nayapara, regardless of the registration status of its members, or even the camp. An even more relevant interrelation was also found between the households' level of wealth (as measured by its assets) and the protection indicator.
    - **Protection** is also linked to household's wealth and earnings per member, and the sex and marital status of household head as well. Participation in some of the economic activities implies variations in the household's protection levels too.
4. Variable *Earnings per household member in the last two weeks* is relevant as a regressor variable for all indexes except for the one on food consumption, i.e. **food security, protection and mobility depend on household earnings, but food consumption does not.**
5. The fact that the food consumption indicator depends on the Type of household and not on the household earnings per member (1+4) could be interpreted as a sign that humanitarian assistance does have an impact on food consumption, allowing households to achieve satisfactory food consumption levels regardless of the money they earn.

Applied Methodology

The construction of multiple linear regression models in which indicators of protection, food consumption, food security and mobility are regressed on demographic and socioeconomic variables for households, as well as on aid received, registration status and area of location, aimed to help determine to what extent the latter have an impact on refugees' lives in terms of the first set of indicators.

All variables presented in the table below have been tested in different combinations as explanatory variables of the dependent indicators, in the search for most relevant ones. Indeed, the search for the best models was performed with the free software R[10], using the "stepwise" and "backward" methods based on the AIC criterion, and also by comparing different combinations of independent variables using the ANOVA function and the R^2 indicator. A revision of existing correlations between variables was a requisite step in this process (See Table 59).

Initially, different combinations of explanatory variables were tested, assuming no joint effect existed between them. At a second stage, the relevance of joint effects (of most relevant variable in column 3 and variables in columns 1 and 2) was tested as well.

DEMOGRAPHIC CHARACTERISICS OF HOUSEHOLDS	SOCIO ECONOMIC CHARACTERISICS OF HOUSEHOLDS	CHARACTERISICS OF AID RECEIVED
- Sex of household head - Age and age group of household head - Marital status of household head - Level of education of household head - Household size - Percentage of women/men/children/elder - Years of residence in Bangladesh of household head	- Wealth score - Economic activity of household head - Economic activity of household head (dummy) - Percentage of household members who have an economic activity - Income per member - Activities (activities will be tested in the models one by one, to see if they have particular effects, but also as the cluster variable constructed during the classification of households in terms of economic activities)	- Percentage of registered refugees - Type of household (camp/site where the household is located and registration status) - Registration status - Area of location

Models were tested on the groups of refugee population for which we have a representative sample. These are registered refugees of Nayapara and Kutupalong official camps, and unregistered Rohingyas from Leda, the makeshift camp near Kutupalong and the Nayapara official camp. Weighting was taken into account in all models.

Thus the study of the relevance and the size of the coefficients of the regressor variables was used to complement the qualitative research which aimed to determine the extent to which food aid has an impact on protection, food consumption, food security and mobility. **Error! Reference ource not found.** summarizes all the models obtained for the different dependent variables. For each model, in addition to the socioeconomic and demographic variables, one variable on

[10] www.r-project.org

characteristic of aid received by the household (column 3) came up as highly relevant. This variable was chosen as the “principal” regression variable (in bold in table below) and results are expressed in terms of them in column 5.

More information on each obtained model is presented in the following pages. Finally, the verification of hypotheses is explained.

Table 59. Variable correlations

	Age of household head	Years in Bangladesh	Perc of below 5 years old members	Perc of below 12 years old members	Perc of above 60 years old members	Perc Of registered members	Household size	Earnings per member	Perc Of Active members	HDDS	Weekly food expenditure	Expenditure per member	CSI	Wealth score	Number of activities	Number of activities per member	Protection
Age of household head	1.00																
Years in Bangladesh	0.00	1.00															
Perc of below 5 years old members	-0.39	-0.13	1.00														
Perc of below 12 years old members	-0.40	-0.05	0.53	1.00													
Perc of above 60 years old members	0.47	0.03	-0.18	-0.34	1.00												
Perc Of registered members	0.07	0.36	-0.14	-0.09	0.03	1.00											
Household size	0.17	-0.02	-0.01	0.17	-0.20	-0.06	1.00										
Earnings per member	-0.06	-0.22	0.07	-0.09	0.03	-0.40	-0.03	1.00									
Perc Of Active members	0.03	-0.13	-0.12	-0.23	0.09	-0.20	-0.21	0.46	1.00								
HDDS	-0.02	0.09	0.04	0.05	-0.01	0.26	0.01	0.04	0.11	1.00							
Weekly food expenditure	0.03	-0.18	0.10	0.09	-0.10	-0.46	0.40	0.27	0.02	0.05	1.00						
Expenditure per member	-0.07	-0.19	0.11	-0.07	0.08	-0.43	-0.26	0.33	0.16	0.03	0.69	1.00					
CSI	0.01	-0.09	-0.03	0.03	-0.05	-0.23	0.10	-0.12	-0.05	-0.31	-0.01	-0.10	1.00				
Wealth score	0.13	0.16	-0.14	-0.09	-0.07	0.36	0.29	-0.03	0.03	0.37	-0.01	-0.20	-0.21	1.00			
Number of activities	0.04	-0.12	-0.03	-0.05	-0.08	-0.23	0.29	0.41	0.62	0.15	0.28	0.08	-0.01	0.22	1.00		
Number of activities per member	-0.04	-0.13	-0.04	-0.19	0.07	-0.19	-0.28	0.40	0.81	0.10	0.00	0.21	-0.05	0.00	0.71	1.00	
Protection	-0.07	-0.01	0.04	0.04	-0.08	0.05	-0.01	0.12	0.06	0.28	-0.02	0.01	-0.07	0.21	0.08	0.07	1.00

Table 60. Best fit models

Concept/indicator	Model	Main regressor variables	Other regressor variables	Results depending on "principal" regression variables	Goodness of fit indicators
Food consumption: Household Dietary Diversity Score (HDDS) Ranging from 0 to 12	M1. Multiple linear regression model without joint effects	**Type of household** Wealth score	Economic activity of HHH (dummy variable) Marital status of HHH Level of education of HHH Economic activity group Number of activities	**Type of household:** Unregistered in makeshift camp 3.48 Unregistered in Leda 3.79 Unregistered in Nayapara camp 3.37 Registered in Nayapara camp 4.03 Registered in Kutupalong camp 4.24	Adjusted R-squared: 0.926
	M2. Multiple linear regression model with joint effects	**Type of household** Wealth score Economic activity of HHH (dummy variable)	Type of household * Economic activity of HHH (dummy) Marital status of HHH Number of activities Type of household *Percentage of HH members older than 60 Level of education of HHH Type of household *Poultry i.o.o.h.i.g.a's* Economic activity group		Adjusted R-squared: 0.928
Food Security : Coping Strategies Index (CSI) Ranging from 0 (no strategy is ever adopted) to 96 (all strategies are adopted often)	M3. Multiple linear regression model without joint effects	**Registration status** Household size Earnings per HH member	Economic activity group Marital status of HHH	**Registration status:** Unregistered 32.18 Registered 27.51	Adjusted R-squared: 0.8749
	M4. Multiple linear regression model with joint effects	**Registration status** Earnings per HH member Beggar i.o.o.h.i.g.a's Wealth score Day labor i.o.o.h.i.g.a's	Poultry i.o.o.h.i.g.a's Fisher i.o.o.h.i.g.a's Sewing i.o.o.h.i.g.a's Refugee status*Sewing Refugee status*Fisher		Adjusted R-squared: 0.8804
Protection: Indicator based on module J of the household questionnaire Ranging from 0 to	M5. Multiple linear regression model without joint effects	Wealth score **Location** Marital status of HHH Earnings per HH member	Maid i.o.o.h.i.g.a's Beggar i.o.o.h.i.g.a's Micro enterprise in own house i.o.o.h.i.g.a's Sex of HHH Micro enterprise outside house i.o.o.h.i.g.a's Rickshaw i.o.o.h.i.g.a's	**Location:** Kutupalong 0.73 Nayapara 0.28	Adjusted R-squared: 0.4979
Mobility: Indicator based on module B3 of the household questionnaire Ranging from 0 to 5	M6. Multiple linear regression model without joint effects	**Registration status** Sex of HHH	Day labor i.o.o.h.i.g.a's Earnings per HH member Other i.o.o.h.i.g.a's Maid i.o.o.h.i.g.a's Non agro based day labour Economic activity group Beggar i.o.o.h.i.g.a's	**Registration status:** Unregistered 2.05 Registered 1.61	Adjusted R-squared: 0.9013

*i.o.o.h.i.g.a's =is one of household's income generating activities

Selected Models

Food consumption: Household Dietary Diversity Score (HDDS) M1. Multiple linear regression model without joint effects

Variables/categories	Estimate	Std. Error	t-value	Pr(>|t|)	
Type of household: Unregistered in makeshift camp	3.475	0.237	14.677	< 2e-16	***
Type of household: Unregistered in Leda	3.788	0.251	15.095	< 2e-16	***
Type of household: Unregistered in Nayapara camp	3.365	0.338	9.944	< 2e-16	***
Type of household: Registered in Nayapara camp	4.030	0.268	15.019	< 2e-16	***
Type of household: Registered in Kutupalong camp	4.236	0.275	15.391	< 2e-16	***
Wealth score	0.287	0.033	8.601	< 2e-16	***
Economic activity of HHH: No economic activity	-0.325	0.108	-2.997	0.00280	**
Marital status of HHH: Widow/widower	-0.356	0.133	-2.675	0.00762	**
Level of education of HHH: Never enrolled/didn't pass any class	-0.456	0.180	-2.533	0.01150	*
Economic activity group: 3	0.347	0.142	2.448	0.01458	*
Number of activities	0.138	0.059	2.338	0.01963	*
Level of education of HHH: Primary education	-0.389	0.209	-1.859	0.06343	.
Marital status of HHH: Separated	-0.265	0.170	-1.557	0.11983	
Economic activity group:4	-0.192	0.138	-1.388	0.16546	
Economic activity group:2	0.163	0.129	1.262	0.20732	
Level of education of HHH: Religious education	0.101	0.204	0.494	0.62150	

Residual standard error: 1.258 on 866 degrees of freedom

Multiple R-squared: 0.9273, Adjusted R-squared: 0.926

F-statistic: 690.8 on 16 and 866 DF, p-value: < 2.2e-16

Signification codes:

*0 '***' 0.001 '**' 0.01 '*' 0.05*

'.' 0.1 ' ' 1

Comments

In brief, HDDS can be explained by the type of aid received, the wealth score, the economic activities of HH, the activity group, the number of economic activities, the marital status and the education level.

The table above shows variable coefficients sorted by relevance in the model equation. Variable coefficients (column 2 "Estimate" in table above) inform us about how each variable influences households' HDDS in relation to the default situation, which is a household having at least one economic activity and classified under group 1 in terms of its economic activities, and whose head is married, living with the spouse and received a secondary-level education.

We could say that, under the default situation, HDDS takes the following value:

Default situation: Head of household married living with spouse having received a secondary level education
Model formulas by Type of household.

Type of household	Model formula	
	Constant variable	Regression variables
Unregistered in makeshift camp	*3.475*	*+0.29∗Wealth score−0.33∗Economic activity of HHH: No economic activity −0.36∗Marital status of HHH: Widow −0.46∗Level of education of HHH: Never passed any class +0.35∗Economic activity group: 3 +0.14∗Number of economic activities −0.39∗Level of education of HHH: Primary education −0.27∗Marital status of HHH: Separated −0.19∗Economic activity group:4 +0.16∗Economic activity group:2 +0.10∗Level of education of HHH: Religious education (+error)*
Unregistered in Leda	*3.788*	
Unregistered in Nayapara camp	*3.365*	
Registered in Nayapara camp	*4.030*	
Registered in Kutupalong camp	*4.236*	

According to the table above, some particular household characteristics can increase the HDDS in relation to the default situation. These are:

- Belonging to groups 3 and 2 in terms of household economic activities (0.35 and 0.16 respectively).
- Religious education of household head also leads to a higher HDDS value (0.10 points higher) than secondary-level education.

Some other characteristics imply a lower HDDS value for the household:

- The head of household having no economic activity (-0.33 decrease).
- The household head being divorced, separated or especially a widow means a decrease in the HDDS value, compared to being married and living with a spouse (-0.36 and -0.27 respectively).
- A low household head education level can have a negative impact on HDDS. This is so if it is primary-level education (-0.39) or if the head never attended school (-0.46).
- Belonging to group 4 in terms of economic activities (-0.19).

Food consumption: Household Dietary Diversity Score (HDDS) M2. Multiple linear regression model with joint effects

Variables/categories	Estimate	Std. Error	t value	Pr(>|t|)	
Type of household: Registered in Nayapara camp	3.531	0.329	10.726	< 2e-16	***
Type of household: Registered in Kutupalong camp	4.336	0.374	11.597	< 2e-16	***
Type of household: Unregistered in makeshift camp	3.379	0.278	12.146	< 2e-16	***
Type of household: Unregistered in Leda	3.938	0.342	11.514	< 2e-16	***
Type of household: Unregistered in Nayapara camp	3.933	0.673	5.847	7.14E-09	***
Wealth score	0.391	0.072	5.395	8.89E-08	***
Economic activity of HHH: No economic activity	-0.890	0.198	-4.504	7.61E-06	***
Type of household: Registered in Kutupalong camp*Economic activity of HHH: No economic activity	1.039	0.301	3.450	0.00059	***
Type of household: Registered in Nayapara camp* Economic activity of HHH: No economic activity	0.919	0.272	3.380	0.00076	***
Marital status of HHH: Widow/widower	-0.399	0.136	-2.930	0.00348	**
Number of activities	0.202	0.069	2.905	0.00377	**
Type of household: Unregistered in Leda*Percentage of HH members older than 60	0.026	0.009	2.791	0.00537	**
Level of education of HHH: Never enrolled/didn't pass any class	-0.488	0.180	-2.714	0.00679	**
Type of household: Unregistered in makeshift camp*Poultry	-0.887	0.340	-2.607	0.00931	**
Economic activity group:3	0.362	0.145	2.500	0.01260	*
Type of household: Unregistered in Leda*Economic activity of HHH: No economic activity	0.610	0.281	2.167	0.03049	*
Type of household: Registered in Kutupalong camp*Wealth score	-0.196	0.100	-1.964	0.04982	*
Level of education of HHH: Primary education	-0.395	0.208	-1.900	0.05776	.
Type of household: Unregistered in Leda*Wealth score	-0.216	0.116	-1.857	0.06361	.
Daylabour	-0.242	0.139	-1.739	0.08243	.
Marital status of HHH: Separated	-0.296	0.171	-1.729	0.08410	.
Economic activity group:2	0.200	0.135	1.477	0.14018	
Type of household: Unregistered in Nayapara camp*Wealth score	-0.246	0.192	-1.278	0.20155	
Economic activity group:4	-0.164	0.139	-1.183	0.23714	
Type of household: Registered in Kutupalong camp*Percentage of HH members older than 60	-0.006	0.010	-0.610	0.54224	

Type of household: Registered in Nayapara camp*Poultry	0.138	0.243	0.569	0.56972
Type of household: Unregistered in Leda*Poultry	0.145	0.327	0.444	0.65729
Type of household: Registered in Nayapara camp*Wealth score	-0.035	0.091	-0.380	0.70425
Type of household: Unregistered in makeshift camp*Percentage of HH members older than 60	-0.002	0.006	-0.279	0.77998
Type of household: Unregistered in Nayapara camp*Poultry	-0.224	0.938	-0.239	0.81108
Type of household: Unregistered in Nayapara camp*Percentage of HH members older than 60	0.005	0.020	0.238	0.81219
Type of household: Registered in Nayapara camp*Percentage of HH members older than 60	-0.002	0.007	-0.205	0.83777
Level of education of HHH: Religious education	0.036	0.204	0.175	0.86147
Type of household: Unregistered in Nayapara camp*Economic activity of HHH: No economic activity	0.061	0.552	0.111	0.91144
Type of household: Registered in Kutupalong camp*Poultry	-0.010	0.341	-0.030	0.97632

Comments

The introduction of joint effects in the regression model formula aims to see if certain variables have different effects on the HDDS value, depending on the camp or site where the household is placed and its registration status (i.e. the type of aid received).

The table above shows variable coefficients sorted by relevance in the model equation. Theerader must take into account that the default situation is a refugee household having at least one economic activity and classified under group 1 in terms of its economic activities, and whose head is married, living with the spouse and received a secondary-level education. Variable coefficients inform us about how each variable influences households' HDDS in relation to the default situation.

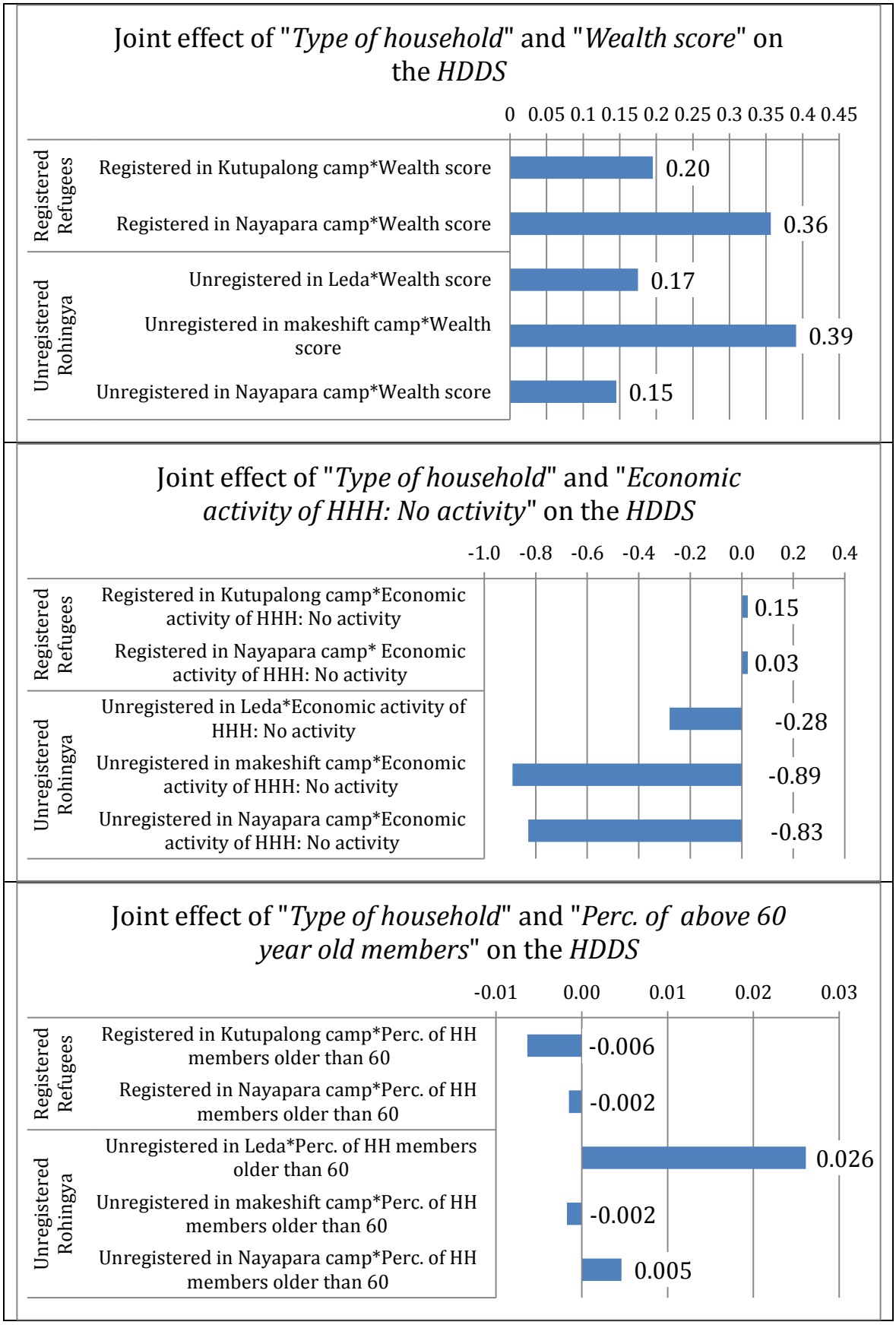
Joint effects show that the wealth score is positively correlated with the HDDS as stated in the formula above, but the strength of this correlation varies from one Type of household (i.e. type of aid received) to another. The same happens with variables "Percentage of HH members above 60 years old", "Poultry is one of HH's IGAs" and the category "Economic Activity of household head: No activity." Graphs below show variable coefficients depending on the refugee camp/site. The following conclusions can be drawn from them:

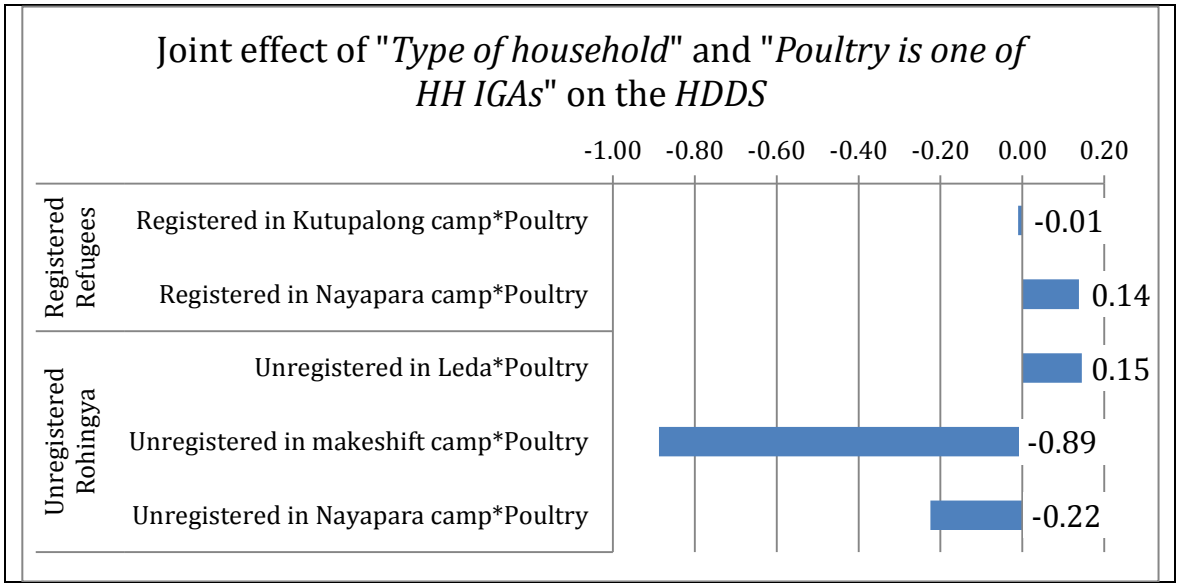
- Higher values of the wealth score imply higher values in the HDDS for all refugee types, but some of them experience bigger increases than others. These are the registered refugees in Nayapara and the unregistered in the makeshift camp.

- **Households in which the household head doesn't have an economic activity have a lower HDDS value. However this is not true for the registered refugees in the official camps, for whom the lack of activity of the head of household does not imply a decrease in the HDDS.**

- **Refugee households in Leda (who do receive some kind of assistance) do not experience such an important decrease in the HDDS value when their household head lacks an economic activity as do unregistered households in Nayapara and the makeshift camp (-0.28 for Leda against -0.89 and -0.83 for the unregistered Rohingyas in the makeshift camp and Nayapara respectively)**

- Two other variables seem to have different effects on the HDDS value depending on the camp or site the household is in. These are "poultry" being a household economic activity and the percentage of household members above age 60.
    - Poultry has a positive effect on HDDS when present among registered refugees in Nayapara or unregistered Rohingyas in Leda. However, its effect is significantly negative when present among unregistered Rohingyas in the makeshift camp.
    - The percentage of above 60 year-old members presents a higher and positive correlation with the HDDS only in Leda.


Joint effect of "Type of household" and "Wealth score" on the HDDS
0 0.05 0.1 0.15 0.2 0.25 0.3 0.35 0.4 0.45
Registered Refugees
Registered in Kutupalong camp*Wealth score
0.20
Registered in Nayapara camp*Wealth score
0.36
Unregistered Rohingya
Unregistered in Leda*Wealth score
0.17
Unregistered in makeshift camp*Wealth score
0.39
Unregistered in Nayapara camp*Wealth score
0.15
Joint effect of "Type of household" and "Economic activity of HHH: No activity" on the HDDS
-1.0 -0.8 -0.6 -0.4 -0.2 0.0 0.2 0.4
Registered Refugees
Registered in Kutupalong camp*Economic activity of HHH: No activity
0.15
Registered in Nayapara camp* Economic activity of HHH: No activity
0.03
Unregistered Rohingya
Unregistered in Leda*Economic activity of HHH: No activity
-0.28
Unregistered in makeshift camp*Economic activity of HHH: No activity
-0.89
Unregistered in Nayapara camp*Economic activity of HHH: No activity
-0.83
Joint effect of "Type of household" and "Perc. of above 60 year old members" on the HDDS
-0.01 0.00 0.01 0.02 0.03
Registered Refugees
Registered in Kutupalong camp*Perc. of HH members older than 60
-0.006
Registered in Nayapara camp*Perc. of HH members older than 60
-0.002
Unregistered Rohingya
Unregistered in Leda*Perc. of HH members older than 60
0.026
Unregistered in makeshift camp*Perc. of HH members older than 60
-0.002
Unregistered in Nayapara camp*Perc. of HH members older than 60
0.005


Joint effect of "*Type of household*" and "*Poultry is one of HH IGAs*" on the *HDDS*
-1.00
-0.80
-0.60
-0.40
-0.20
0.00
0.20
Registered Refugees
Registered in Kutupalong camp*Poultry
Registered in Nayapara camp*Poultry
Unregistered Rohingya
Unregistered in Leda*Poultry
Unregistered in makeshift camp*Poultry
Unregistered in Nayapara camp*Poultry
-0.01
0.14
0.15
-0.89
-0.22

Default situation: Head of household married, living with spouse, having received a secondary-level education

Model formulas by Type of household.

Type of household	Model formula		
	Constant variable	Regression variables	
Unregistered in makeshift camp	3.38	*−0.40∗Marital status of HHH: Widow +0.20∗Number of economic activities −0.49∗Level of education of HHH: Never passed any class +0.36∗Economic activity group: 3 −0.40∗Level of education of HHH: Primary education −0.24∗Day labor −0.30∗Marital status of HHH: Separated −0.16∗Economic activity group:4 +0.20∗Economic activity group:2 +0.04∗Level of education of HHH: Religious education (+error)*	*−0.89∗Economic activity of HHH: No activity−0.002∗*Percentage of HH members older than 60−0.89∗Poultry+*0.39∗Wealth score*
Unregistered in Leda	3.94		*−0.28∗Economic activity of HHH: No activity+0.03∗*Percentage of HH members older than 60+0.15∗Poultry+*0.17∗Wealth score*
Unregistered in Nayapara camp	3.93		*−0.83∗Economic activity of HHH: No activity −0.005∗*Percentage of HH members older than 60−0.22∗Poultry+*0.15∗Wealth score*
Registered in Nayapara camp	3.53		*0.03∗Economic activity of HHH: No activity−0.002∗*Percentage of HH members older than 60 +0.14∗Poultry+*0.36∗Wealth score*
Registered in Kutupalong camp	4.34		*0.15∗Economic activity of HHH: No activity −0.006∗*Percentage of HH members older than 60−0.01∗Poultry+*0.20∗Wealth score*

Food security: Coping Strategies Index (CSI) M3. Multiple linear regression model without joint effects

Default situation

Variables/categories	Estimate	Std. Error	t value	Pr(>|t|)	
Refugee status: Unregistered	32.177044	2.538304	12.677	< 2e-16	***
Refugee status: Registered	27.508803	2.668254	10.31	< 2e-16	***
Wealth score	-1.757016	0.315388	-5.571	3.38E-08	***
Household size	1.003795	0.189071	5.309	1.40E-07	***
Earnings per HH member	-0.006772	0.001615	-4.193	3.04E-05	***
Economic activity group:4	4.456732	1.305047	3.415	0.00067	***
Marital status of HHH: Widow/widower	4.039953	1.310843	3.082	0.00212	**
Economic activity group:3	3.143366	1.313776	2.393	0.01694	*
Marital status of HHH: Separated	2.943581	1.677974	1.754	0.07974	.
Level of education of HHH: Primary education	-2.981094	1.9863	-1.501	0.13376	
Percentage of male members of ages 18-59 in HH	-0.048703	0.035662	-1.366	0.17239	
Economic activity group:2	0.99471	1.173496	0.848	0.39687	
Level of education of HHH: Never enrolled/didnït pass any class	0.845806	1.707188	0.495	0.62042	
Level of education of HHH: Religious education	0.822116	1.923268	0.427	0.66915	

Residual standard error: 11.94 on 868 degrees of freedom

Multiple R-squared: 0.8769, Adjusted R-squared: 0.8749

F-statistic: 441.5 on 14 and 868 DF, p-value: < 2.2e-16

Signification codes:

*0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1*

Comments

In brief, CSI can be explained by the registration status of its members (i.e. the type of aid received), the wealth score, the household size, the household earnings, the economic activity group to which the household belongs and the marital status and education level of the household head. The percentage of male members between the ages of 18 and 59 is also explanatory of the model.

The previous table shows variable coefficients sorted by relevance in the model equation. The reader must take into account that the default situation is a group 1 household (in terms of economic activities) whose head has secondary education. Variable coefficients inform us about how each variable influences households' CSI in relation to the default situation.

The following conclusions can be drawn from the model:

- **Registration status leads to 5 points difference in the CSI value. Indeed, unregistered Rohingyas' CSI is 5 points higher than that of registered ones, given equal socioeconomic and demographic conditions[11].**
- The higher the wealth score, the lower the CSI. This also happens for the earnings per member and for the percentage of male members between the ages of 18 to 59 in the household (although the latter is not as relevant).
- Some particular household characteristics can increase the CSI in relation to the default situation (be aware that higher CSI values translate into more severe coping strategies adopted by the household). These are:
    - The household head having religious education or no education (+0.82 and 0.84 points respectively, while HH head having primary education reduces the CSI values).
    - Also in terms of economic activities, CSI increases for households in groups 2, 3 or 4 in terms of economic activities (+0.99, +3.14 and +4.46 respectively).

[11] The model with joint effects also concludes a 5 point CSI difference depending on the registration status.

Food security: Coping Strategies Index (CSI) M4. Multiple linear regression model with joint effects

Variables/categories	Estimate	Std. Error	t value	Pr(>|t|)	
Refugee status: Unregistered	39.780	2.429	16.379	< 2e-16	***
Refugee status: Registered	34.651	2.625	13.199	< 2e-16	***
Earnings per HH member	-0.009	0.002	-5.642	2.27E-08	***
Beggar	9.446	1.802	5.243	1.99E-07	***
Wealth score	-1.511	0.312	-4.845	1.50E-06	***
Daylabour	-5.637	1.248	-4.517	7.15E-06	***
Poultry	3.904	1.324	2.949	0.00327	**
Fisher	7.268	2.492	2.917	0.00363	**
Sewing	-8.256	2.877	-2.870	0.00421	**
Refugee status: Registered*Sewing	8.373	3.384	2.474	0.01355	*
Refugee status: Registered*Fisher	-7.909	3.865	-2.046	0.04105	*
Micro enterprise outside house	-3.301	1.747	-1.889	0.05924	.
Level of education of HHH: Primary education	-2.524	1.945	-1.298	0.19462	
Economic activity group:2	-1.611	1.645	-0.979	0.32778	
Level of education of HHH: Never enrolled/didn't pass any class	1.470	1.660	0.886	0.37608	
Economic activity group:4	1.429	1.754	0.815	0.41541	
Level of education of HHH: Religious education	1.206	1.845	0.654	0.51345	
Economic activity group:3	-0.113	1.712	-0.066	0.94732	

Residual standard error: 11.67 on 864 degrees of freedom

Multiple R-squared: 0.8828, Adjusted R-squared: 0.8804

F-statistic: 361.7 on 18 and 864 DF, p-value: < 2.2e-16

Signification codes:

*0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1*

The following aspects should be underlined about this model in relation to the model without joint effects:

- The estimation of 5 points difference in CSI values depending on refugee status (all other socioeconomic conditions equal) continues to be relevant.
- The coefficient sign of the economic activity groups are quite different, due to the inclusion of particular household economic activities in the formula. It is, however, relevant to mention the joint effects of the activities Fishing and Sewing and the registration status:

- Fishing being an economic activity of the household usually implies a 7.27 point increase in the CSI value. However, for registered refugees, this is not true. In those cases fishing implies a -0.64 decrease in the CSI value (negligible): **Fishing implies the adoption of more severe adaptation strategies for all refugee households except the registered ones.**
- Sewing being an economic activity of the household usually implies a -8.26 point decrease in the CSI value. However, for registered refugees, this is not true. In those cases sewing implies a 0.11 increase in the CSI value (negligible): **Sewing implies the adoption of less severe adaptation strategies for all refugee households except the registered ones, for whom sewing doesn't keep them from having to assume strategies that can have severe consequences in the future.**

Protection: Protection indicator (based on module J of the household questionnaire) M5. Multiple linear regression model without joint effects

Variables/categories	Estimate	Std. Error	t value	Pr(>|t|)	
Location: Kutupalong	2.2932	0.2694	8.5140	< 2e-16	***
Wealth score	0.0030	0.0005	6.1860	9.50E-10	***
Location: Nayapara	0.9529	0.2563	3.7170	0.000214	***
Earnings per member	0.0022	0.0007	3.2640	0.00114	**
Marital status of HHH: Widow/widower	-0.8404	0.2689	-3.1250	0.001838	**
Maid	0.8849	0.2909	3.0420	0.002424	**
Beggar	0.7078	0.2993	2.3650	0.018234	*
Micro enterprise in own house	-0.6538	0.2804	-2.3320	0.019936	*
Sex of HHH: Male	-0.5291	0.2274	-2.3270	0.020211	*
Micro enterprise outside house	0.4179	0.1906	2.1930	0.028598	*
Marital status of HHH: Separated	-0.5502	0.3010	-1.8280	0.067899	.
Rickshaw	0.3985	0.2404	1.6570	0.09781	.

Residual standard error: 0.8765 on 867 degrees of freedom

Multiple R-squared: 0.5065, Adjusted R-squared: 0.4979

F-statistic: 59.32 on 15 and 867 DF, p-value: < 2.2e-16

Signification codes:

*0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1*

Comments

The perception of protection of refugees depends on the area of location of the household (Kutupalong or Nayapara), the wealth score, earnings per member, the marital status and sex of the head of household and the participation in certain economic activities.

The table above shows variable coefficients sorted by relevance in the model equation. Variable coefficients (column 2 "Estimate", on table above) inform us about how each variable influences households' HDDS in relation to the default situation, which is a refugee household in which the household head is a married woman living with the spouse (which is very rare).

The main conclusion that can be drawn from this model is the lack of relevance of the type of aid received or the registration status to determine the perception of protection that refugee households have.

Mobility: Mobility indicator (based on module B3 of the household questionnaire) M6. Multiple linear regression model without joint effects

Variables/categories	Estimate	Std. Error	t value	Pr(>|t|)	
Refugee status: Unregistered	2.140	0.196	10949.000	< 2e-16	***
Refugee status: Registered	1.730	0.205	8439.000	< 2e-16	***
Earnings per member	0.001	0.000	4474.000	8.71E-06	***
Wealth score	0.105	0.024	4385.000	1.30E-05	***
Maid	0.459	0.144	3179.000	0.00153	**
Marital status of HHH: Separated	-0.479	0.156	-3077.000	0.00216	**
Marital status of HHH: Widow/widower	-0.429	0.139	-3077.000	0.00216	**
Day labour	0.279	0.101	2763.000	0.00585	**
Sex of HHH: Male	0.258	0.120	2159.000	0.03112	*
Sewing	-0.268	0.126	-2120.000	0.03433	*
Percentage of adult male in household members	0.006	0.003	2105.000	0.03557	*
Level of education of HHH: Never enrolled/didnït pass any class	-0.140	0.137	-1018.000	0.30878	
Level of education of HHH: Primary education	0.095	0.156	0.609	0.54248	
Level of education of HHH: Religious education	0.046	0.160	0.289	0.77296	

Residual standard error: 0.9566 on 865 degrees of freedom
Multiple R-squared: 0.8918, Adjusted R-squared: 0.8896
F-statistic: 419.2 on 17 and 865 DF, p-value: < 2.2e-16

Signification codes:

*0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1*

Comments

In brief, the Mobility Indicator can be explained by the registration status of its members, the wealth score, the household earnings, the sex, marital status and education level of the household head and certain economic activities.

The previous table shows variable coefficients sorted by relevance in the model equation. The reader must take into account that the default situation is a household whose head is a married woman who has secondary-level education. Variable coefficients inform us about how each variable influences households' Mobility Indicator in relation to the default situation.

The following conclusions can be drawn from the model:

- **Registration status leads to almost 0.5 points difference in the Mobility Indicator value. Indeed, unregistered Rohingyas' Mobility Indicator is 0.5 points higher**

than that of registered ones, given equal socioeconomic and demographic conditions[12].

- The higher the wealth score and the earnings per member, the higher the value of the Mobility Indicator.
- Some particular household characteristics can increase the Mobility Indicator value in relation to the default situation. These are:
    - The household head attended primary or religious education.
    - The household head being a male.
    - Day labour or being a maid are among households' economic activities.
- However, some particular household characteristics can decrease the Mobility Indicator value in relation to the default situation. These are:
    - The household head being separated or widow.
    - The household head didn't receive any education.
    - Sewing is one of the household's activities.

[12] The model with joint effects also concludes a 5 point CSI difference depending on the registration status.

Verification of Hyphtheses

The multiple linear regression model is based on the following hypotheses of the residuals:

Hyp1. Nullity of residuals' mean

Tested through the "One Sample t-test", for which the null hypothesis is "mean is equal to zero"

Hyp 2. Homoscedasticity of residuals

Tested through the "Levene's Test for Homogeneity of Variance", for which the null hypothesis is "variances are equal"

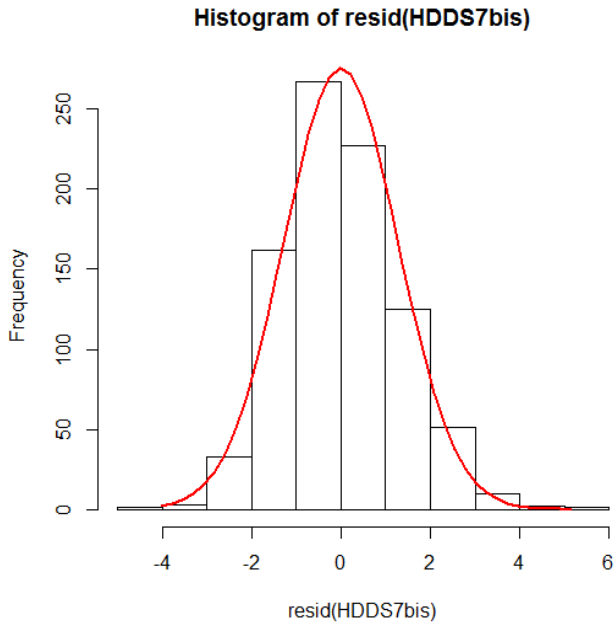
Hyp 3. Independence of residuals

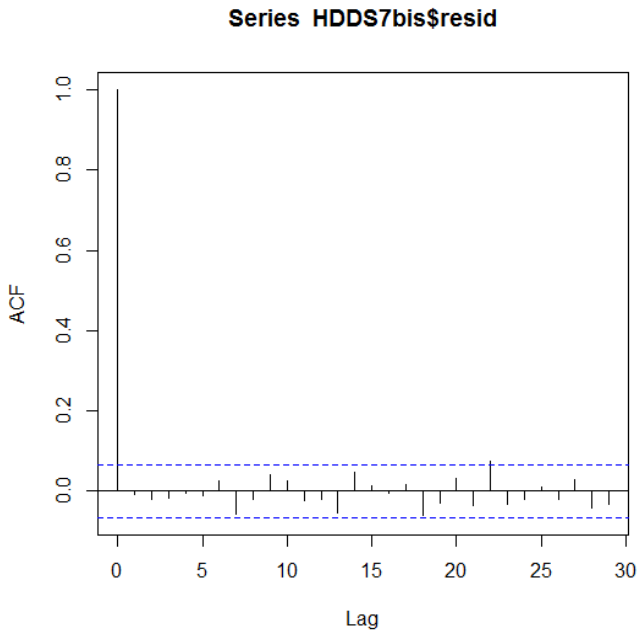
Tested through the "DurbinWatsonTest", for which the null hypothesis is "covariance is equal to zero"

The following "hard" hypothesis is not a requisite for the validity of the model, but enhances it:

Hyp 4. Normality of residuals

Tested through the "Shapiro-Wilk normality test", for which the null hypothesis is "distribution is normal".





Minimum	1er quartile	Médiane	3ème quartile	Maximum
-5.1477	-0.7882	-0.0683	0.6800	4.9628

Hyp1. Nullity of residuals' mean

One Sample t-test

data: HDDS7bis$resid
t = 0, df = 881, p-value = 1
alternative hypothesis: true mean is not equal to 0
95 percent confidence interval:
-0.08447206 0.08447206
sample estimates:
mean of x
-3.167837e-17

Hyp 2. Homoscedasticity of residuals

Levene's Test for Homogeneity of Variance (center = median)
Df F value Pr(>F)
group 1 2.2517 0.1338
880

Hyp 3. Independence of residuals

> durbinWatsonTest(HDDS7bis)
lag Autocorrelation D-W Statistic p-value
1 -0.008204198 2.014977 0.89
Alternative hypothesis: rho != 0

Hyp 4. Normality of residuals

Shapiro-Wilk normality test

data: HDDS7bis$resid
W = 0.9907, p-value = 2.33e-05

Hyp 4 is not verified.

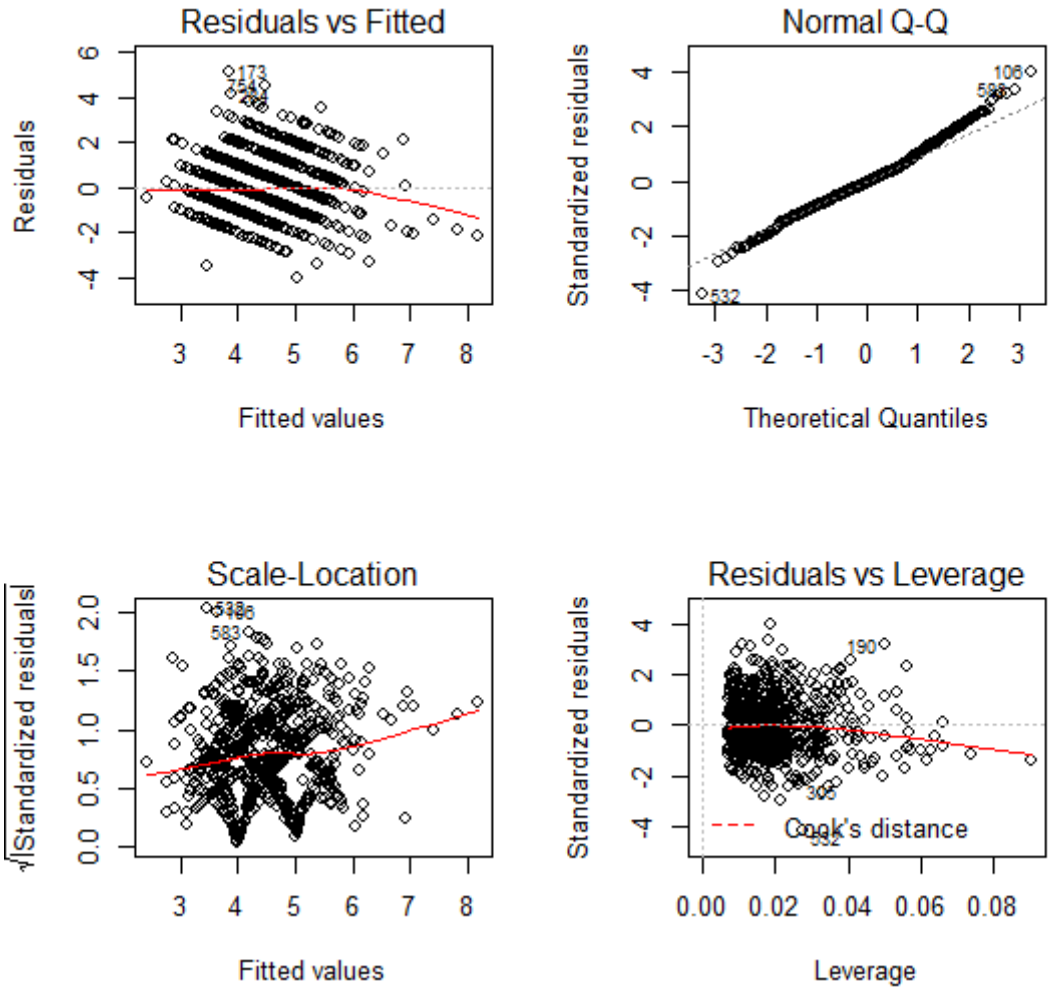
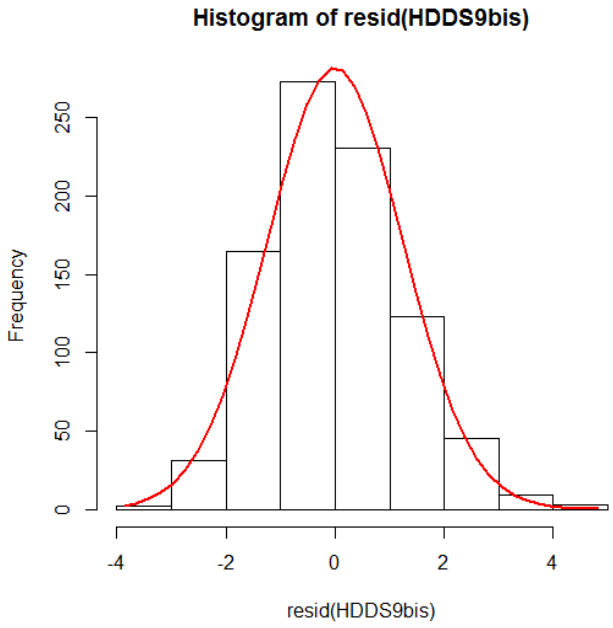
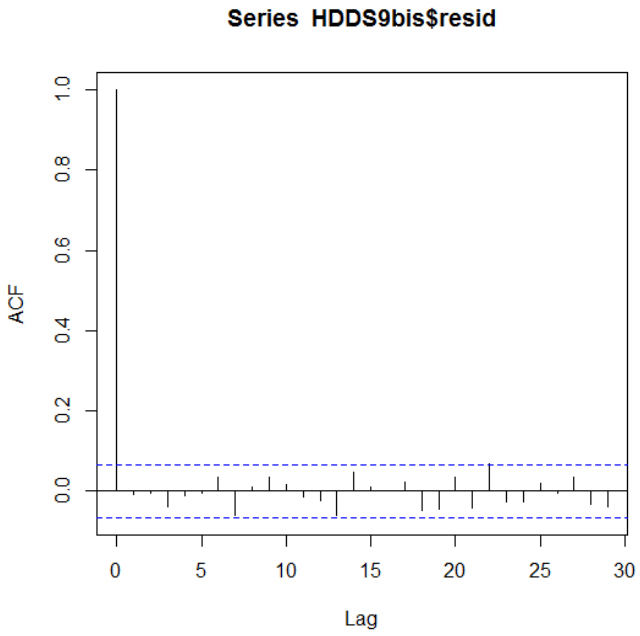


Figure 4. FOOD CONSUMPTION: Household Dietary Diversity Score -Model without interaction. Residuals





Minimum	1er quartile	Médiane	3ème quartile	Maximum
-4.3800	-0.7624	-0.0818	0.6563	4.6300

Hyp1. Nullity of residuals' mean

One Sample t-test

data: HDDS9bis$resid
t = 0, df = 881, p-value = 1
alternative hypothesis: true mean is not equal to 0
95 percent confidence interval:
-0.08242623 0.08242623
sample estimates:
mean of x
1.288996e-17

Hyp 2. Homoscedasticity of residuals

Levene's Test for Homogeneity of Variance (center = median)
Df F value Pr(>F)
group 1 2.2948 0.1302
880

Hyp 3. Independence of residuals

lag Autocorrelation D-W Statistic p-value
1 -0.009555906 2.017979 0.754
Alternative hypothesis: rho != 0

Hyp 4. Normality of residuals

Shapiro-Wilk normality test

data: HDDS9bis$resid
W = 0.9916, p-value = 6.191e-05

Hyp 4 is not verified.

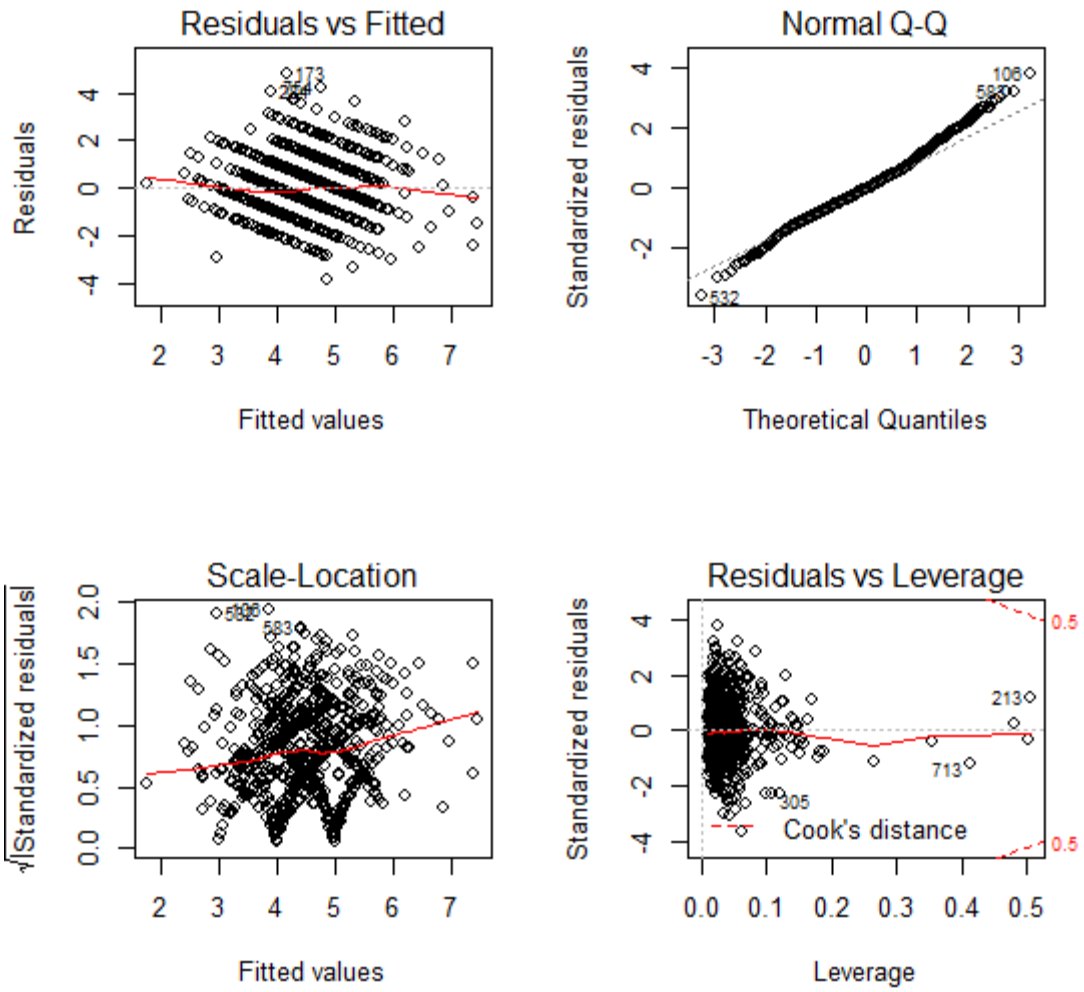
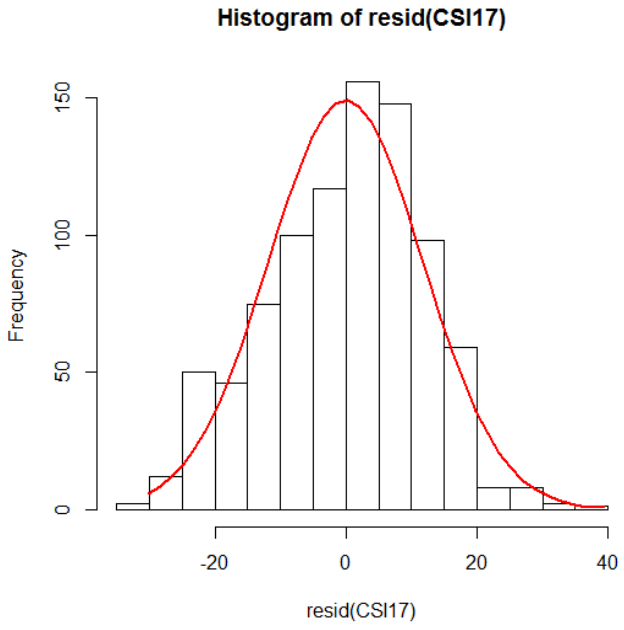
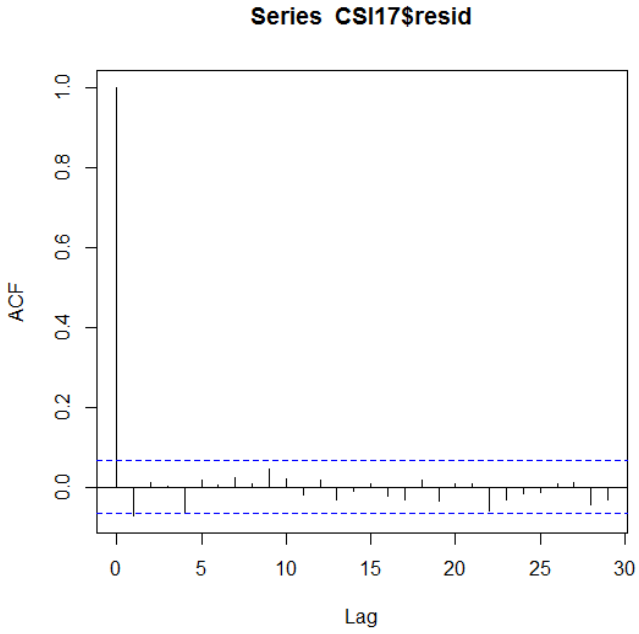


Figure 5. FOOD CONSUMPTION: Household Dietary Diversity Score -Model with interaction. Residuals

FOOD SECURITY: Coping Strategies Index -Model without interaction





Minimum	1er quartile	Médiane	3ème quartile	Maximum
-44.517	-7.426	1.004	7.332	42.807

Hyp1. Nullity of residuals' mean

One Sample t-test

data: CSI17$resid
t = -0.1312, df = 881, p-value = 0.8957
alternative hypothesis: true mean is not equal to 0
95 percent confidence interval:
-0.8311787 0.7270315
sample estimates:
mean of x
-0.05207359

Hyp 2. Homoscedasticity of residuals

Levene's Test for Homogeneity of Variance (center = median)
Df F value Pr(>F)
group 1 4.4549 0.03508 *
880

Hyp 3. Independence of residuals

> durbinWatsonTest(CSI17)
lag Autocorrelation D-W Statistic p-value
1 -0.07040567 2.1399 0.054
Alternative hypothesis: rho != 0

Hyp 4. Normality of residuals

Shapiro-Wilk normality test

data: CSI17$resid
W = 0.9882, p-value = 1.58e-06

Hyp 4 is not verified.

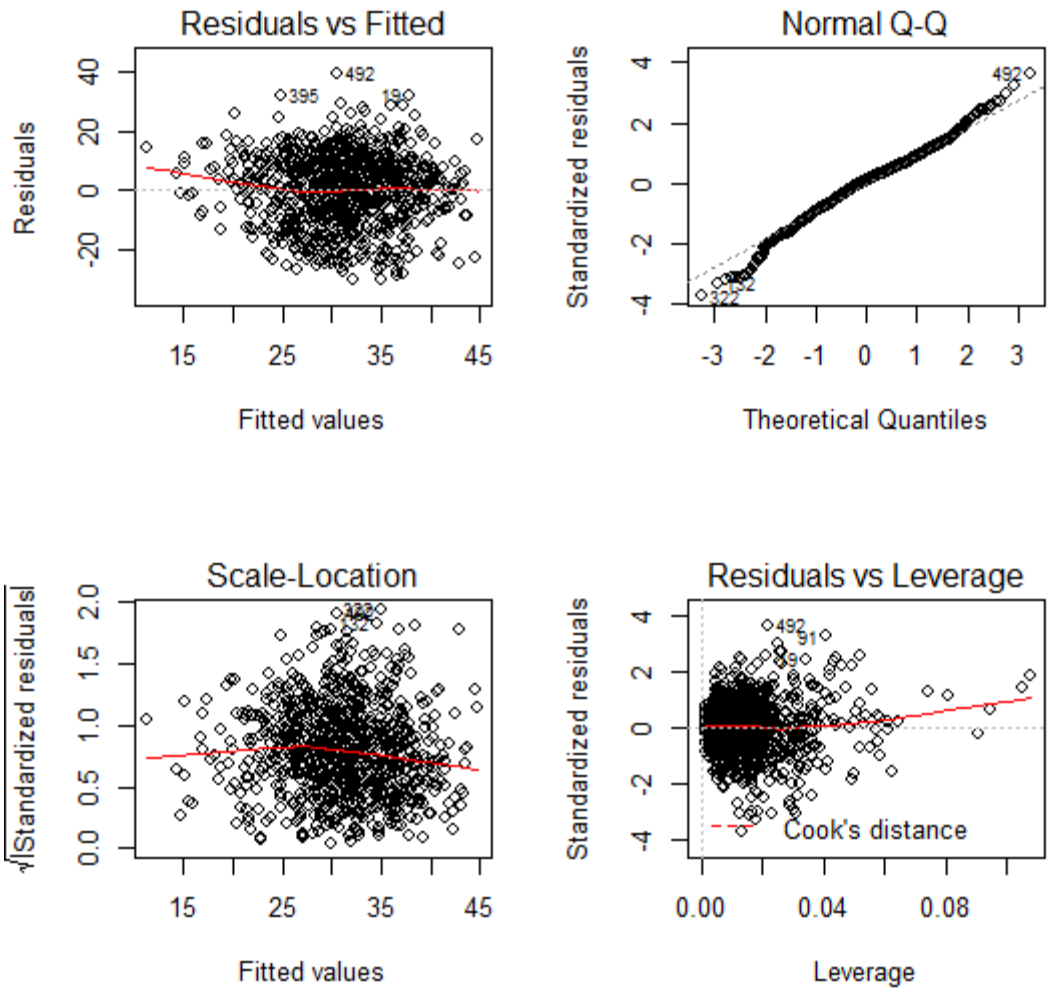
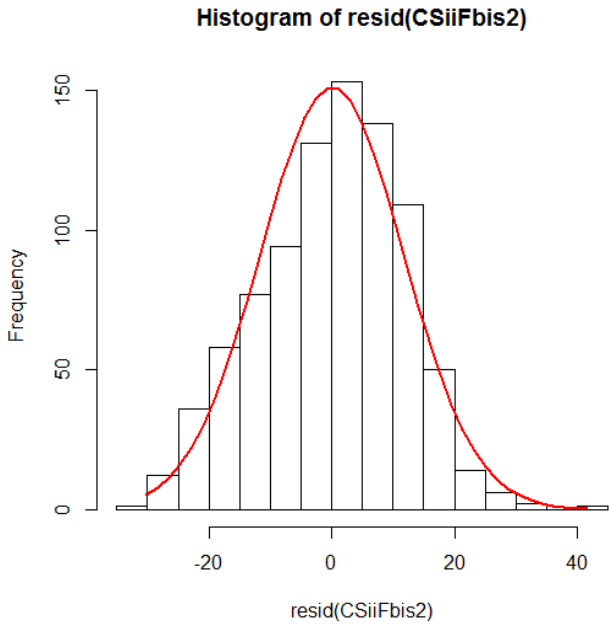
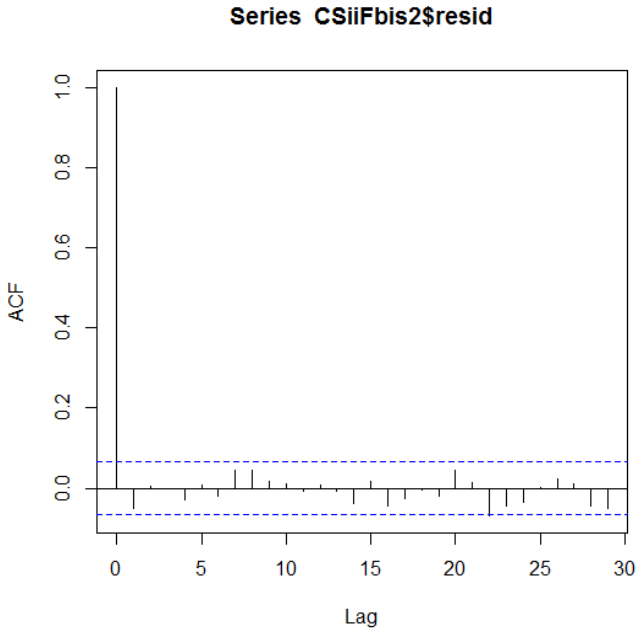


Figure 6. Food security: Coping Strategies Index -Model without interaction. Residuals

FOOD SECURITY: Coping Strategies Index -Model with interaction





Minimum	1er quartile	Médiane	3ème quartile	Maximum
-42.688	-7.272	0.850	7.537	45.068

Hyp1. Nullity of residuals' mean

One Sample t-test

data: CSiiFbis2$resid
t = 0.1003, df = 881, p-value = 0.9201
alternative hypothesis: true mean is not equal to 0
95 percent confidence interval:
-0.7312435 0.8100266
sample estimates:
mean of x
0.03939151

Hyp 2. Homoscedasticity of residuals

Levene's Test for Homogeneity of Variance (center = median)
Df F value Pr(>F)
group 1 4.7021 0.03039 *
880

Hyp 3. Independence of residuals

> durbinWatsonTest(CSiiFbis2)
lag Autocorrelation D-W Statistic p-value
1 -0.05102095 2.101598 0.152
Alternative hypothesis: rho != 0

Hyp 4. Normality of residuals

Shapiro-Wilk normality test

data: CSiiFbis2$resid
W = 0.9901, p-value = 1.113e-05

Hyp 4 is not verified.

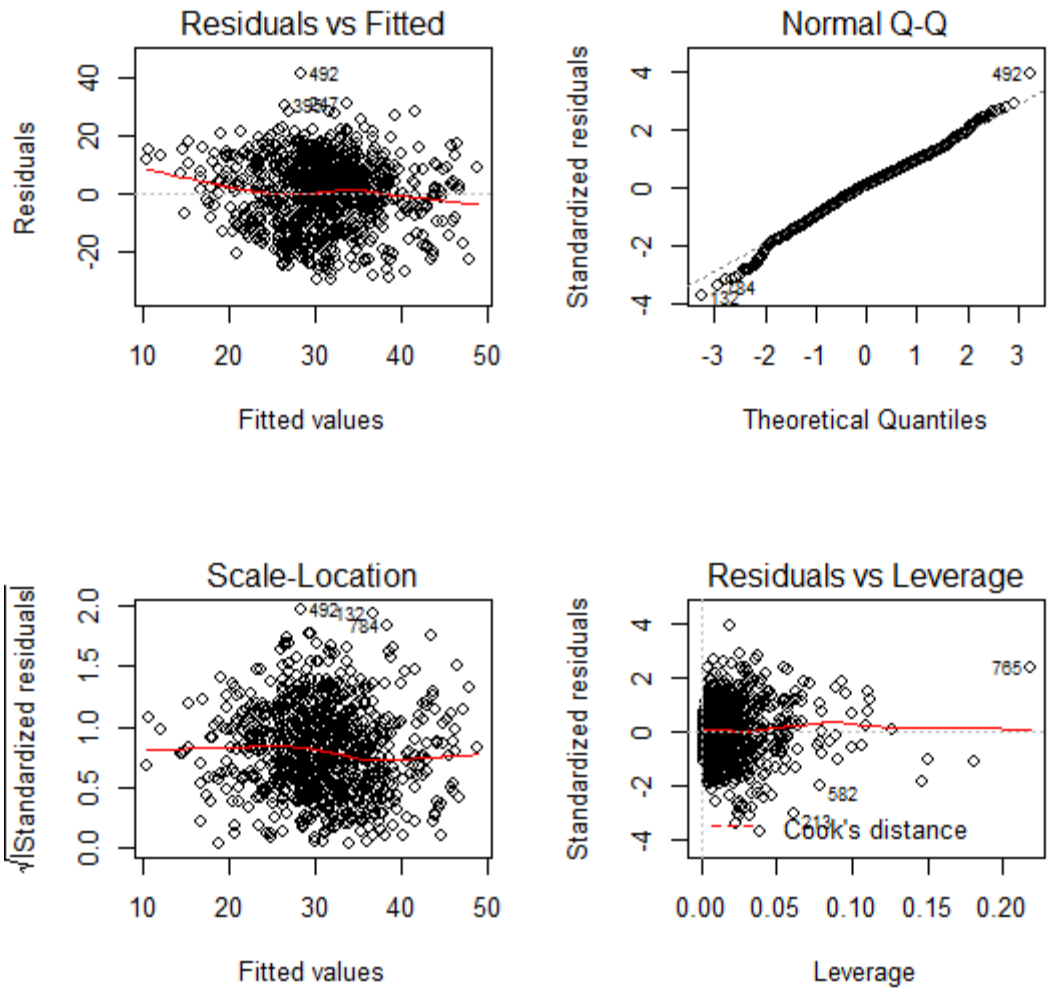
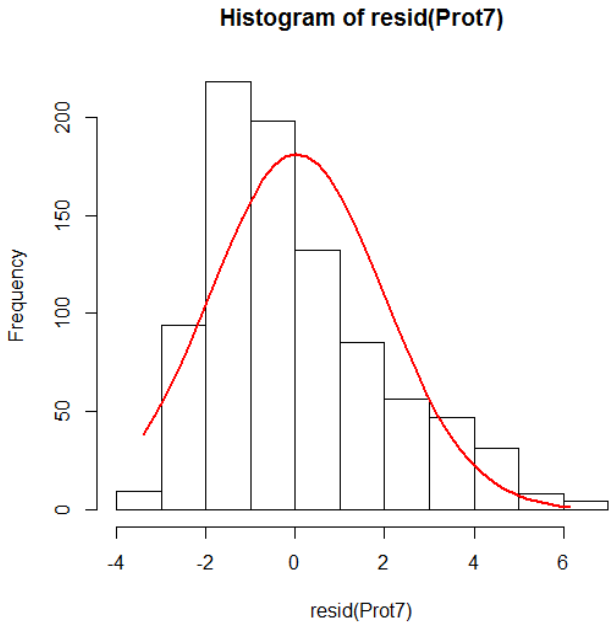
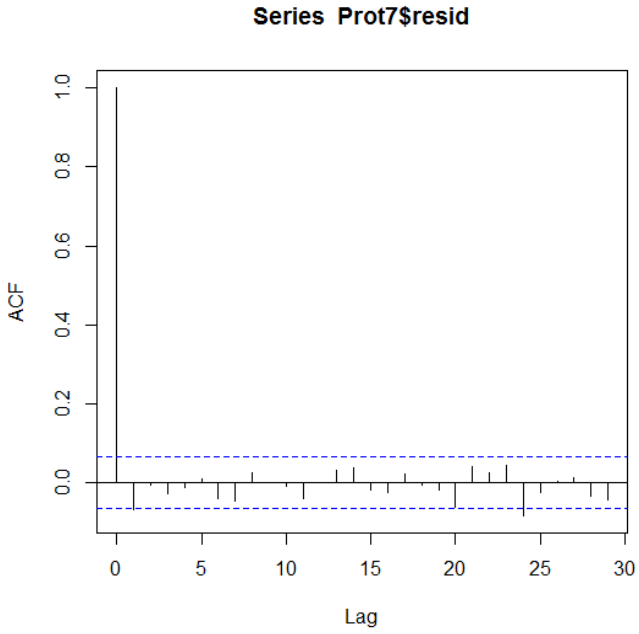


Figure 7. Food security: Coping Strategies Index -Model with interaction. Residuals

PROTECTION : Indicator based on module J -Model without interaction





Minimum	1er quartile	Médiane	3ème quartile	Maximum
-7.3887	-2.3476	-0.6409	1.7976	10.6288

Hyp1. Nullity of residuals' mean

One Sample t-test

data: Prot7$resid
t = 0.4766, df = 881, p-value = 0.6338
alternative hypothesis: true mean is not equal to 0
95 percent confidence interval:
-0.0971308 0.1594286
sample estimates:
mean of x
0.0311489

Hyp 2. Homoscedasticity of residuals

Levene's Test for Homogeneity of Variance (center = median)
Df F value Pr(>F)
group 1 0.0122 0.912
880

Hyp 3. Independence of residuals

> durbinWatsonTest(Prot7)
lag Autocorrelation D-W Statistic p-value
1 -0.06727463 2.133891 0.068
Alternative hypothesis: rho != 0

Hyp 4. Normality of residuals

Shapiro-Wilk normality test

data: Prot7$resid
W = 0.9426, p-value < 2.2e-16

Hyp 4 is not verified.

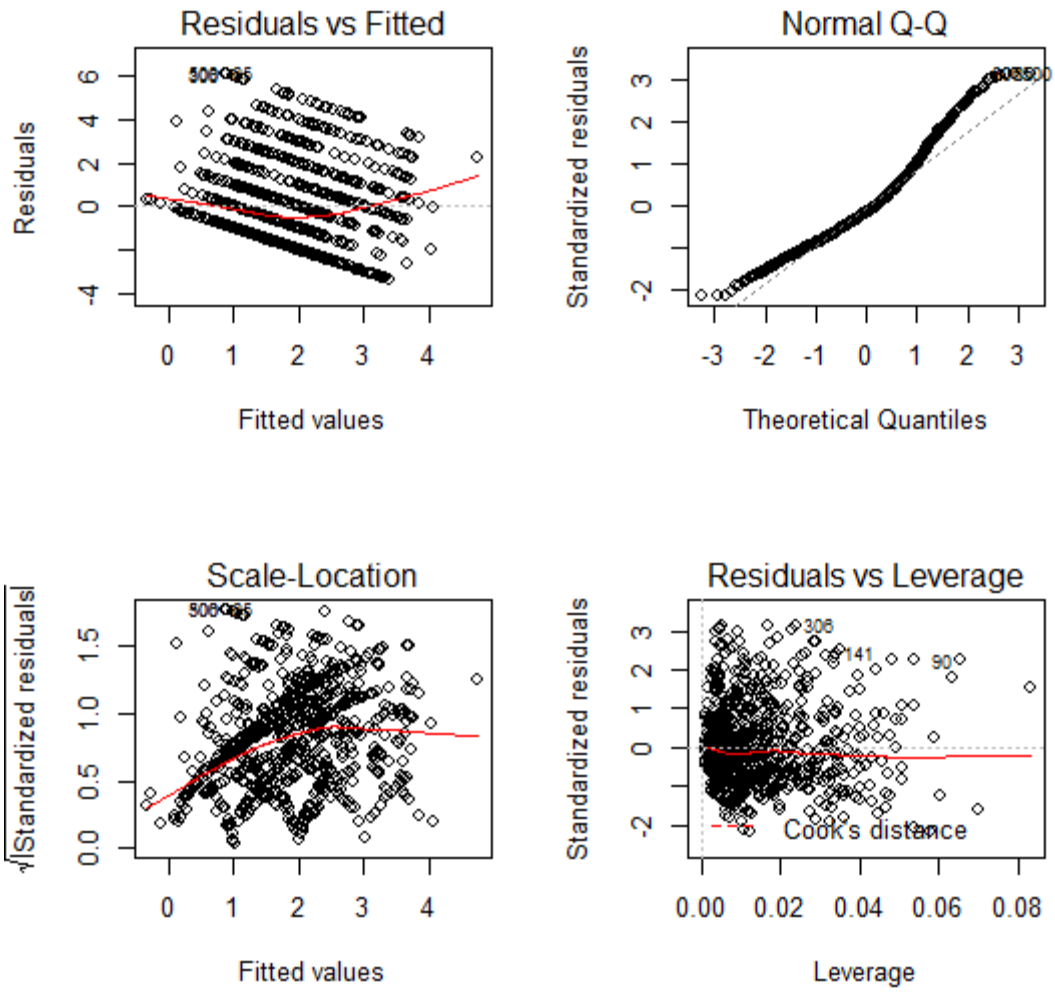
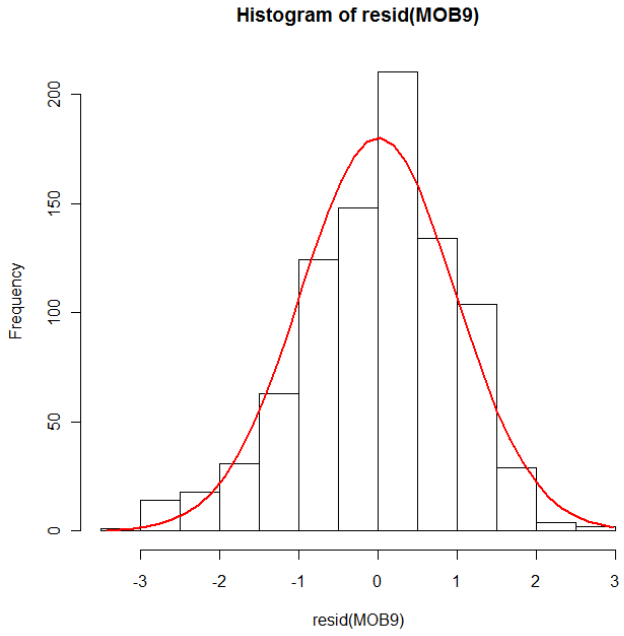
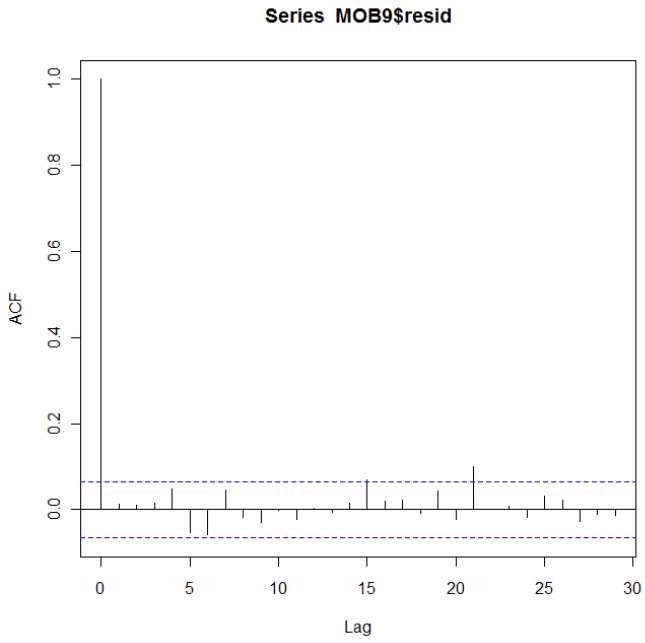


Figure 8.Protection. Indicator based on module J of household questionnaire -Model without interaction. Residuals





Minimum	1er quartile	Médiane	3ème quartile	Maximum
-3.5153	-0.5294	0.0305	0.5879	3.1434

Hyp1. Nullity of residuals' mean

One Sample t-test

data: MOB9$resid
t = 0.0182, df = 881, p-value = 0.9855
alternative hypothesis: true mean is not equal to 0
95 percent confidence interval:
-0.06399185 0.06518654
sample estimates:
mean of x
0.000597347

Hyp 2. Homoscedasticity of residuals

Levene's Test for Homogeneity of Variance (center = median)

	Df	F value	Pr(>F)
group	1	2.4666	0.1166
	880		

Hyp 3. Independence of residuals

lag	Autocorrelation	D-W Statistic	p-value
1	0.01259334	1.97478	0.696

Alternative hypothesis: rho != 0

Hyp 4. Normality of residuals

Shapiro-Wilk normality test

Shapiro-Wilk normality test

data: MOB9$resid
W = 0.9852, p-value = 9.213e-08

Hyp 4 is therefore not verified.

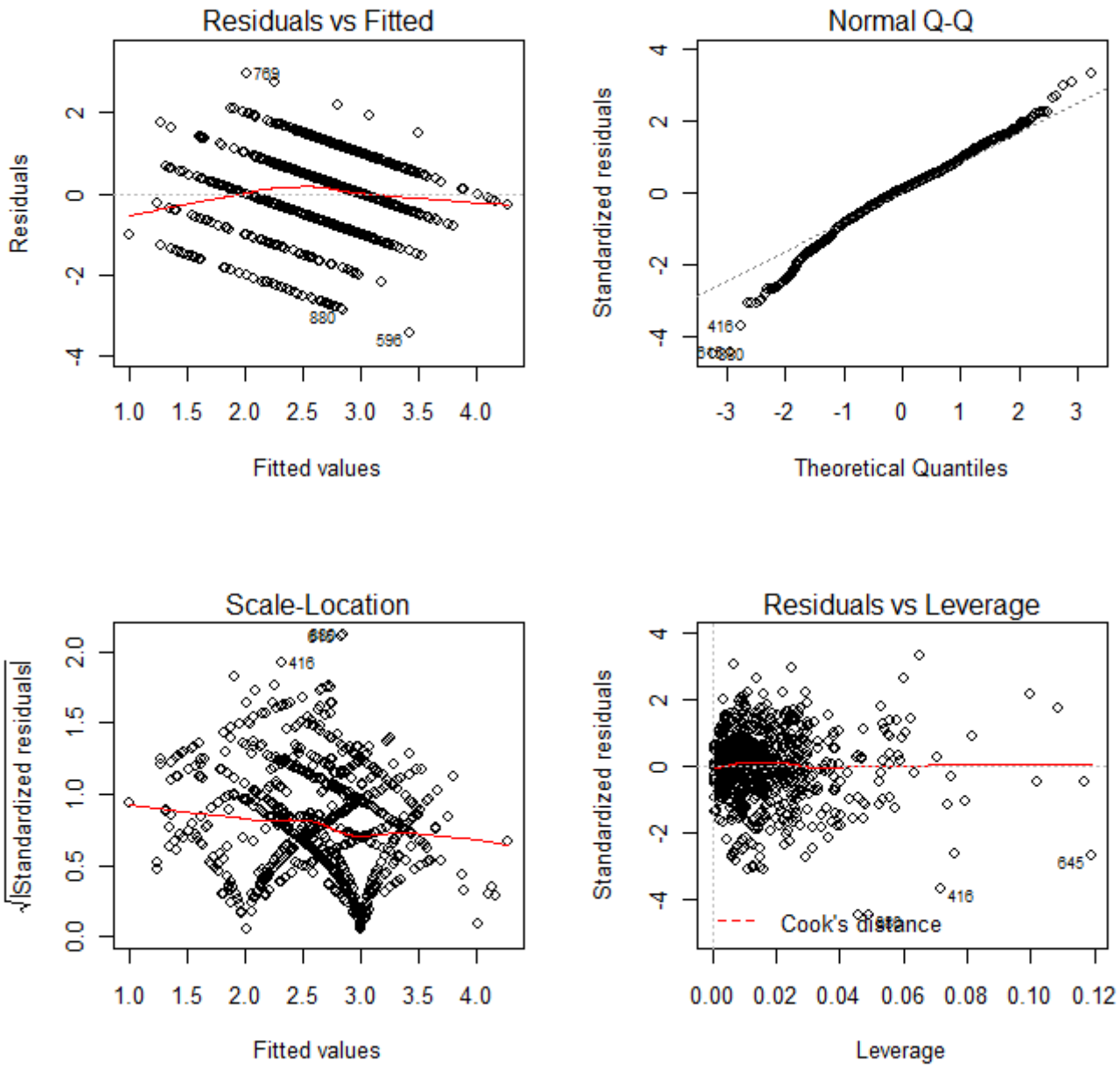


Figure 9. Mobility. Indicator based on module B3 of household questionnaire -Model without interaction. Residuals

Quantitative Approaches to the Estimation of Impact of Food Assistance

The impact of food assistance in food consumption, food security, mobility and protection is quantitatively approached in the present analysis in three different ways:

1. Comparing the registered and unregistered households that live inside the official camp of Nayapara for which representative samples are available, so as to implement tests of differences in means. Registered and unregistered households in Nayapara receive the same non-food aid and are provided with shelter and the same WASH, education, health and leisure facilities, however the registered receive food aid and the unregistered do not.

2. Comparing the registered and unregistered Rohingyas within the household groups based on economic activities.

    a. This approach assumes that food aid impact can be different on Rohingya households depending on the economic activities they undertake (i.e. the existence of differential impact is taken into consideration).

    b. This approach assumes that if registered households didn't receive any aid, they would behave as unregistered households that undertake similar economic activities (i.e. unregistered households within the same group).

3. Comparing regression coefficients

    Comparing regression coefficients of main regressor variables (see TABLE 40) allows for an estimation of the impact of the registration status or the camp where the household is located, given similar socioeconomic conditions for households.

Through these three approaches, estimations of the impact of food assistance on the different areas of interest in the evaluation are presented in this chapter. They must be taken with caution, for their coherence with the qualitative research conducted needs to be verified.

Impact of Food Consumption

Comparing the registered and unregistered Rohingyas in the Nayapara camp:

Table 61. Food consumption and expenditure indicator statistics for Rohingyas living in the official camp of Nayapara, by registration status

VARIABLE	Registration status	N	Mean	Std. Deviation	Std. Error Mean
Household Dietary Diversity Score	Registered	175	4.91	1.57	0.12
	Unregistered	132	4.02	1.30	0.11
Weekly household expenditure on food per member	Registered	175	92.90	69.87	5.28
	Unregistered	132	142.86	80.06	6.97

The implemented t-tests have shown significant differences for food consumption and expenditure among the Rohingyas living in the official camp of Nayapara, depending on their registration status. Food consumption, as measured by the Household Dietary Diversity Score (HDDS), is better for the registered and expenditure is higher for the unregistered.

Registered Rohingyas' HDDS value is almost one point higher than that of the unregistered. That means that, on average, registered s consume one food group more than the unregistered, on a daily basis.

Unregistered households spend 50 extra BTK per week per household member, on average, compared to registered ones.

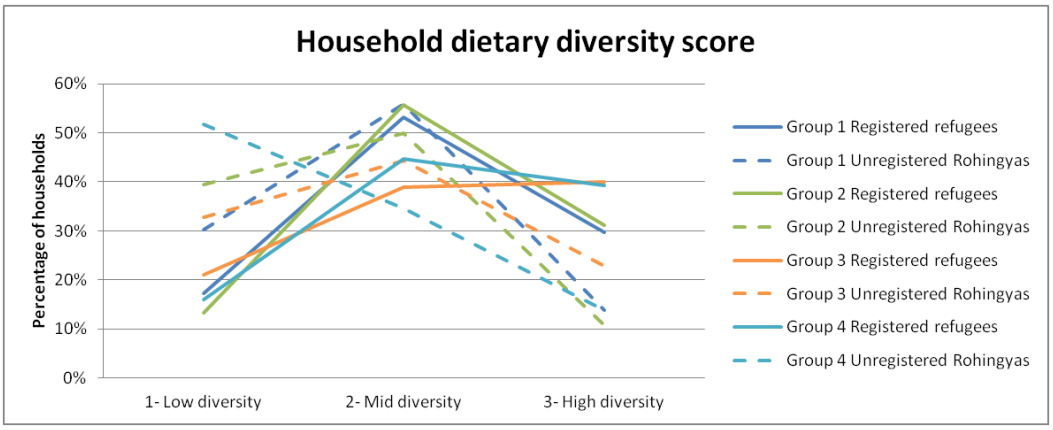
Comparing the registered and unregistered Rohingyas within the household groups based on their economic activities:

As the graph below shows, for all groups HDDS is lower for the unregistered Rohingyas. The greatest difference is found within group 4, for which HDDS drops from 5.1 to 3.9 for Rohingyas who don't have an MRC card.

This could be interpreted as follows: If food assistance was taken out, all registered refugees would have poorer nutrition levels, regardless of their economic activities, but special attention should be given to those in group 4[13], for their HDDS would be more significantly reduced. The next priority group would be group 2[14] (for its HDDS would drop from 4.9 for registered refugees to 4.0 for the unregistered).

[13] Group 4 households are those in which at least one member works and the following activities are practiced: Fishing, industrial labour, maids, servants, micro enterprise inside the house, religious persons, teachers and servers in restaurants. This group contains an estimate of 682 registered households.

[14] Group 2 households are involved in farming, agro based day labour and NGO workers. This group contains an estimate of 2,200 registered households.



Comparing regression coefficients:

According to the regression models, HDDS can be explained by the type of aid received, the wealth score, the economic activities of HH, the activity group, the number of economic activities, the marital status and the education level.

Regression model M1 indicates that given similar socioeconomic conditions, it is not just the registration status that is relevant, but the type of aid received, for significant coefficients for every different type of household were found, taking the values presented in the table below.

Type of household	*Regression coefficient of the HDDS score*
Unregistered in makeshift camp	*3.475*
Unregistered in Leda	*3.788*
Unregistered in Nayapara camp	*3.365*
Registered in Nayapara camp	*4.030*
Registered in Kutupalong camp	*4.236*

Other regression models that include joint effects of variables indicate that the lack of economic activity of the household does not imply a decrease in the HDDS for the registered refugees, while it does for the unregistered Rohingyas.

Impact on Food Security

Comparing the registered and unregistered Rohingyas in the Nayapara camp:

As shown in table below, the difference in means of the CSI depending on registration status is significant[15]. The unregistered Rohingyas present an almost 5 points higher CSI, this could be interpreted as one of three possibilities:

- the unregistered assume two mid-range severe strategies more than the registered sometimes (in the last 30 days to be able to eat enough).
- the unregistered assume a mild strategy more than the registered often (in the last 30 days to be able to eat enough).

[15] The upper bound on mean for the registered is lower than the lower bound on mean for the registered.

- the unregistered assume a severe strategy more than the registered, but rarely (in the last 30 days to be able to eat enough).

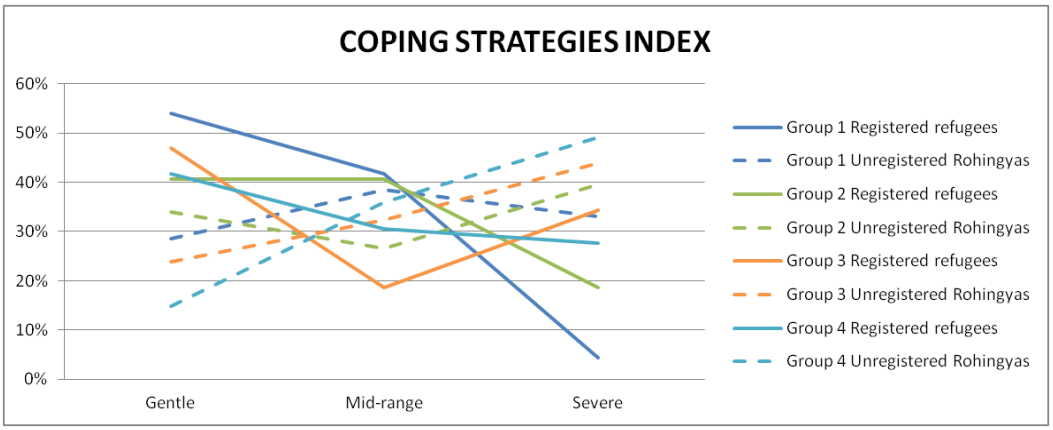
Table 62. CSI distribution statistics for Rohingyas living in the official camp of Nayapara, by registration status

Statistic	Registered	Unregistered
No. of observations	175	132
Minimum	0.00	6.00
Maximum	70.00	66.00
1st Quartile	20.00	24.00
Median	27.00	34.00
3rd Quartile	35.00	42.00
Mean	28.08	32.86
Standard deviation (n-1)	12.55	12.12
Lower bound on mean (95%)	26.21	30.77
Upper bound on mean (95%)	29.95	34.94

Comparing the registered and unregistered Rohingyas within the household groups based on their economic activities:

As can be observed in the graph below, for all groups CSI is higher for the unregistered Rohingyas. The greatest difference is found within group 4, for which CSI increases from 27.7 to 37.2 for Rohingyas who don't have an MRC card.

This could be interpreted as follows: If food assistance was removed, all registered refugees would adopt more severe strategies, but special attention should be given to those in group 4[16], for their CSI would be dramatically increased. The next priority groups would be groups 1 and 3, for which the CSI increases in 8 points for unregistered Rohingyas.



[16] Group 4 households are those in which at least one member works and the following activities are practiced: Fishing, industrial labour, maids, servants, micro enterprise inside the house, religious persons, teachers and servers in restaurants. This group contains an estimate of 682 registered households.

Comparing regression coefficients:

In brief, CSI can be explained by the registration status of its members, the wealth score, the household size, the household earnings, the economic activity group to which the household belongs and the marital status and education level of the household head. The percentage of male members between the ages of 18 and 59 is also explanatory of the model.

It can be concluded from the model that registration status leads to a 5-point difference in the CSI value. Indeed, unregistered Rohingyas' CSI is 5 points higher than that of registered ones, given equal socioeconomic and demographic conditions. This is in coherence with the conclusions from point 1 and would be interpreted the same way (in terms of increase of frequency of strategies adopted).

Impact on Protection

Comparing the registered and unregistered Rohingyas in the Nayapara camp:

As shown on the table below the difference in means for the Protection Indicator depending on registration status is not significant[17]. This would be interpreted as food assistance not having any impact on protection.

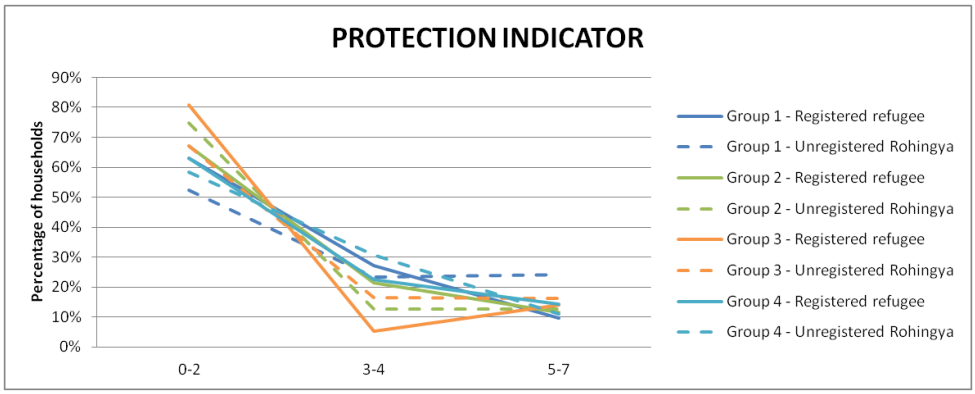
Table 63. Protection Indicator distribution statistics for Rohingyas living in the official camp of Nayapara, by registration status

Statistic	Registered refugees	Unregistered Rohingyas
No. of observations	168	132
No. of missing values	0	0
Minimum	0.00	0.00
Maximum	6.00	7.00
Mean	1.21	1.48
Standard deviation (n-1)	1.54	1.56
Lower bound on mean (95%)	0.97	1.21
Upper bound on mean (95%)	1.44	1.75

[17] The upper bound on mean for the registered is higher than the lower bound on mean for the unregistered.

Comparing the registered and unregistered Rohingyas within the household groups based on their economic activities:

Graph shows similar tendencies for registered refugees and unregistered Rohingyas. For groups 1, 3 and 4, unregistered Rohingya households present higher values for the Protection Indicator. This is not true for group 2, under which the most important part of registered refugees were classified.



Comparing regression coefficients:

The variable on type of household or registration status did not emerge as a relevant explanatory variable of the Protection Indicator. The area of location of the household (Kutupalong versus Nayapara) resulted as more relevant than the previously mentioned, with Kutupalong being a more protective environment.

Impact on Mobility

Comparing the registered and unregistered Rohingyas that live inside the official camp of Nayapara:

As shown on table below, the difference in means for the Mobility Indicator depending on registration status is significant[18]: Unregistered Rohingyas have higher mobility levels than the registered (2.59 against 2.19 in the 0 to 5 range of the Mobility Indicator).

Table 64. Mobility Indicator distribution statistics for Rohingyas living in the official camp of Nayapara, by registration status

Statistic	Registered	Unregistered
No. of observations	168	132
No. of missing values	0	0
Minimum	0.00	0.00
Maximum	5.00	5.00
Mean	2.19	2.59
Standard deviation (n-1)	1.27	1.12
Lower bound on mean (95%)	2.00	2.40
Upper bound on mean (95%)	2.38	2.78

[18] The upper bound on mean for the registered is lower than the lower bound on mean for the unregistered.

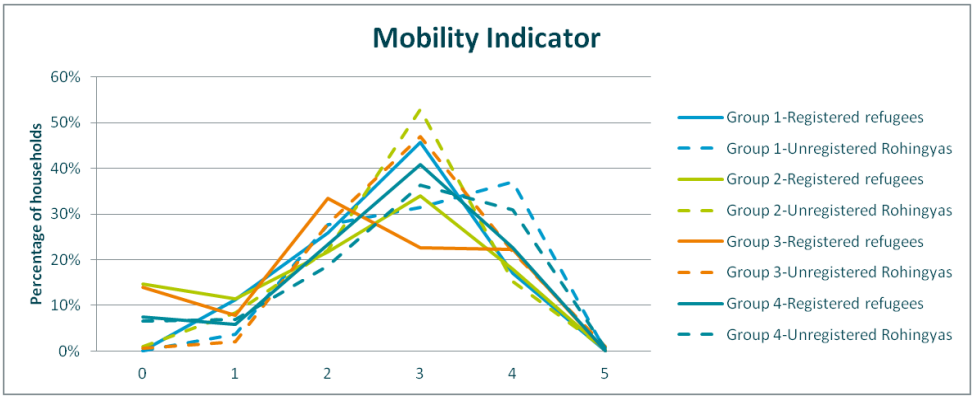
Comparing the registered and unregistered Rohingyas within the household groups based on economic activities:

As shown in the graph below, mobility is more frequent among the unregistered than the registered for all groups.

40 to 50% of registered Rohingya in groups 1 and 4 move as far as "To Cox's Bazar". If we assume that once food assistance was taken out they would behave as the unregistered of their groups, then we could expect that an important part of them would go further than Cox's Bazar, into "other parts of Bangladesh" (as we can see for the unregistered in groups 1 and 4, around 35% go as far as "Cox's Bazar" and another 35% of them go to "other parts of Bangladesh").

If Group 2 registered Rohingyas became unregistered then about 30% of them who go nowhere or to the nearby towns, would have to go to Cox's Bazar and Teknaf (as we can see in the graph below, for group 2, the Mobility Indicator distribution for the unregistered is more concentrated around the average value 3, while more dispersed for the registered).

If aid was taken out, group 3 registered Rohingyas would more often travel to Cox's Bazar, Teknaf and even other parts of Bangladesh.



Comparing regression coefficients:

In brief, the Mobility Indicator can be explained by the registration status of its members, the wealth score, the household earnings, the sex, marital status and education level of the household head and certain economic activities.

Registration status leads to almost 0.5 points difference in the Mobility Indicator value. Indeed, unregistered Rohingyas' Mobility Indicator is 0.5 points higher than that of registered ones, given equal socioeconomic and demographic conditions[19].

[19] The model with joint effects also concludes a 5 point CSI difference depending on the registration status.

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