
PHNOM PENH

MULTIPLE INDICATOR ASSESSMENT OF THE

URBAN POOR



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DISCLAIMER

The recommendations contained in this report are not necessarily endorsed or proposed by UNICEF or PIN in preference to any other alternatives that are not mentioned.

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ACRONYMS

ANOVA	Analysis of Variance
BMI	Body Mass Index
CDHS	Cambodia Demographic And Health Survey
CI	Confidence Interval
CSES	Cambodia Socio-Economic Survey
CSI	Coping Strategies Index
DEFF	Design Effect
ENA	Emergency Nutrition Assessment
FGD	Focus Group Discussion
GAM	Global Acute Malnutrition
GNP	Gross National Product
HAZ	Height-For-Age Z-Score
IYCF	Infant And Young Child Feeding
LBW	Low Birth Weight
M	Arithmetic Mean
MUAC	Mid-Upper Arm Circumference
NGO	Non-Governmental Organisation
PCA	Principal Component Analysis
PIN	People In Need
PLW	Pregnant And Lactating Women
PPS	Probability-Proportional-To-Size
SAM	Severe Acute Malnutrition
SD	Standard Deviation
SE	Standard Error
SMART	Standardised Monitoring And Assessment Of Relief And Transitions
SPSS	Statistical Package For Social Sciences
UNICEF	United Nations Children's Fund
WASH	Water, Sanitation, and Hygiene
WAZ	Weight-For-Age Z-Score
WFP	United Nations World Food Programme
WHZ	Weight-For-Height Z-Score

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01

EXECUTIVE SUMMARY

People in Need (PIN) and UNICEF has been present in Cambodia for a long time, supporting poor communities in various parts of Cambodia. To further expand the target groups and acknowledging a fact of rapid urbanisation, UNICEF and PIN are looking to support the urban poor communities in systematic and coordinated manner. Phnom Penh has experienced rapid urbanisation and growth in recent years, resulting in expansion of 'urban poor' settlements. Such settlements often fall outside of the normal provision of public amenities including supply of water, sanitation, sewage, and power, all of which are complicated by issues of land tenure.

Unlike other assessments of the urban poor in Phnom Penh, this one included a household survey, which aimed to improve understanding of the food security, care practices, and nutritional outcomes of pregnant and lactating women & children (aged 6-59 months). Subsequent consultation with stakeholders explored what interventions would be best suited to assist the urban poor population, as well as what funding is available for such activities. This process, based on the findings and analysis of the assessment, formulated the recommendations found in this report.

¹ In August 2014, UNICEF reported several SAM cases in urban poor communities in Phnom Penh.



In summary, the assessment observed higher levels of underweight (35.6%), and stunting (29.1%) in children aged 6-59 months compared to figures from the 2010 CDHS for Phnom Penh (25.1% and 18.5% respectively). High levels of acute malnutrition in children aged 6-59 months (11.2%) were the same as for Phnom Penh in the 2010 CDHS. Although there was no severe acute malnutrition observed at the time of the survey, this situation represents a very poor environment for childhood development¹. Equally, pregnant women were seen to have a nutritional status that suggested that up to 16% were at risk of having low birth weight children. Vaccination status (fully vaccinated by two years) was also unsatisfactory

(<60%). A very high level of illness was reported in children 6-59 months, with almost three quarters of children having had some sort of illness in the previous 2 weeks. The overall health environment and nutritional outcomes for children are not favourable for optimal growth.

Poverty levels were considerably higher than the official incidence for Phnom Penh (29%, compared to 12.8% using the adjusted absolute poverty rate for Phnom Penh). However, a wide variation in degrees of poverty was demonstrated in these communities with implications for the modalities of interventions. It was clear that both wealth status (as measured by asset ownership) and

poverty (as measured by expenditure per capita per day) were important in the success of the household and their children. Education of the parents also played an important role in vaccination, as well as apparent income generation potential.

The sanitation situation is of some concern. Although water supply is generally good, lack of access to improved sanitation was significantly correlated with increased prevalence of diarrhoea of children in the household. This is commensurate with current global research that indicates associations between stunting and good sanitation. With 12% of the surveyed households reporting no access to sanitation at all,

there is concern that the situation will further deteriorate once the rainy season starts. Since there are high levels of stunting in this population, interventions to address sanitation² offer a good entry point to provide meaningful assistance to reduce the risk of stunting and improve nutritional status of children.

The recommendations cover a range of themes, including nutrition and young child feeding practices, health and water and sanitation, education, labour and food security and loans and debt.

We hope that the findings of the report as well as recommendations will shed more light on the problem of undernutrition in urban poor areas and help Development Partners designing robust interventions leading to poverty reduction and better future of the urban poor including women and children.

***Piotr Sasin- Country Director (PIN),
September 2014***

² [http://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(13\)60996-4/fulltext?_eventId=login](http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(13)60996-4/fulltext?_eventId=login)







02

INTRODUCTION

As part of its on-going efforts to assist the poorest households in Cambodia, People in Need (PIN) and UNICEF are expanding its support by considering what can be done to assist the increasing needs of the urban poor in Phnom Penh. This rapidly growing population has a wide array of potential needs but until now, there have been no recent quantitative household level surveys to support the development of assistance plans or advocacy messages to tackle the issues facing some of the poorest households in Phnom Penh. This study, with financial and technical support from UNICEF, aimed to further

understand and demonstrate what issues are facing the urban poor populations.

1 OVERVIEW

This assessment was aimed at providing key quantitative indicators for understanding the situation and circumstances of the urban poor in Phnom Penh, in order to highlight key areas of need and possibly point towards programme activities that would assist the population in these settlements.

The principle indicators were anthropometric of children aged 6-59 months (weight, age, and height) and pregnant



and lactating women, (Mid Upper Arm Circumference), recent child illness, infant and young child feeding practices (IYCF), dietary patterns, other indicators related to socio-economic situation, education, and key water and sanitation indicators. These were all collected according to internationally recognised standards or relate directly to the Cambodia Demographic Health Survey (CDHS) (2010). The survey was conducted in Dangkor, Mean Chey, Porsen Chey, Russey Keo, and Sen Sok Khans of Phnom Penh.

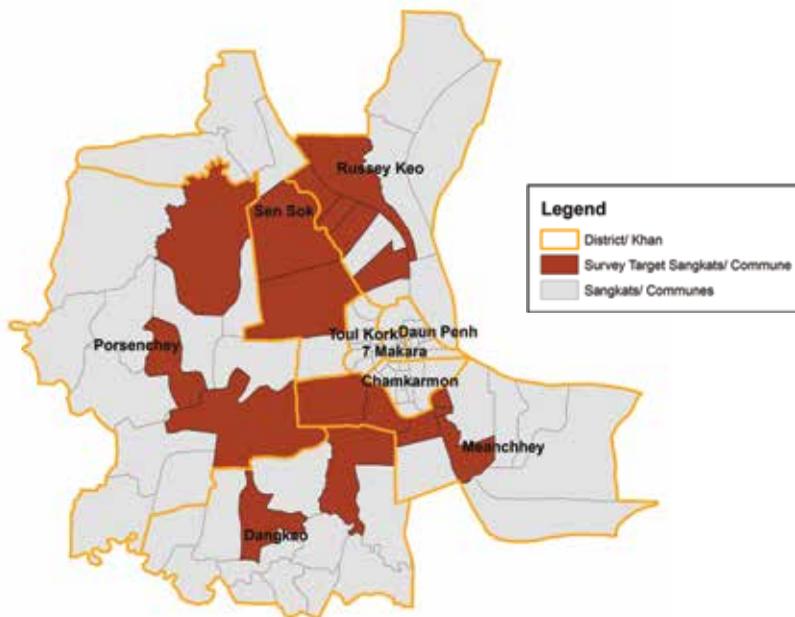


Figure 1: Survey target Sangkats/Communes in Phnom Penh

1.1 FOOD SECURITY DEFINED

Food security exists when “all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life”.³

The analysis of this survey is based on the Food Security and Nutrition Conceptual Framework⁴.

It is understood as a multidimensional function of:

- 1. Food availability:** the amount of food physically available to a household (micro level) or at the national level (macro);
- 2. Food access:** the physical (e.g. road network, market) and economical (e.g. own production, exchange, purchase) ability of a household to acquire adequate amounts of food; and
- 3. Food utilization:** the intra-household use of the food accessible and the individual’s ability to absorb and use nutrients (e.g. function of health status).

Within this survey we aimed to measure and analyse food access and food

³ World Food Summit, 1996

⁴ Comprehensive Food Security & Vulnerability Analysis Guidelines (January 2009), World Food Programme (WFP), Food Security Analysis Service

⁵ Poverty In Cambodia – A New Approach: Redefining the poverty line. Ministry of Planning 2013.

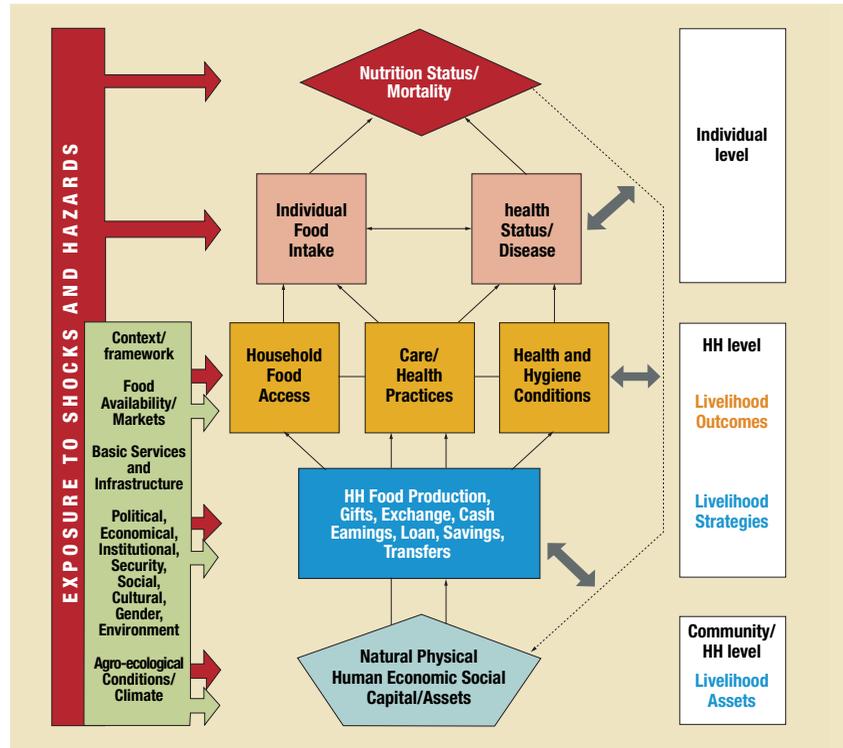


Figure 2: Food Security and Nutrition Conceptual Framework

utilization and use this information to appreciate the situation of the households living within these predefined urban poor settlements.

Statistical analysis within this survey is intended to identify the most important influences within this causal framework, not to determine if they exist. The conceptual framework is a guide based on specific studies to determine their role in undesirable outcomes, and their influence is most likely to remain in any given population. As this survey is for a point in time, any absence of statistical associations is likely to indicate that they are not influencing outcome at this time, rather than not at all. The identification of strong associations

helps to target more pressing needs currently influencing poor outcomes.

2 WHO ARE THE URBAN POOR IN PHNOM PENH?

The notion of “Urban Poor” is wide and covers a large number of sub-populations within any given urban environment. There are numerous poverty indicators that can be used. One that fits the data that this assessment has collected are poverty lines (with various thresholds). One of the most commonly used is <1.25USD/day. An additional threshold is the result of revision to the absolute poverty thresholds based on local minimum expenditure patterns for an adequate diet⁵ and established at 1.58

USD/day. Unfortunately it is not easy to identify households based on these criteria, let alone groups of households. Thus, for the purposes of the survey it was important to identify sampling units and discreet locations where the Urban Poor can be found (despite this excluding households / individuals such as the homeless).

For this purpose People in Need (PIN), with support from UNICEF, used the following definition of urban poor populations, which is in line with UNHABITAT's definition⁶:

A group of ten or more adjacent households whose housing structures are of visibly poor quality, and/or whose homes have been laid out in a non-conventional fashion without adherence to a ground plan. In addition, the lack of one or more of the following criteria:

- Durable housing of a permanent nature that protects against extreme climate conditions
- Sufficient living space, which means not more than three people sharing the same room

- Easy access to safe water in sufficient amounts at an affordable price
- Access to adequate sanitation in the form of a private or public shared toilet by a reasonable number of people
- Security of tenure that prevents forced evictions

This definition allows us to clearly define not only our sampling universe but provides relatively homogenous groups for which we can interpret the data for and potentially target for assistance. However, it is likely to not include very small groups of homeless, or buildings not fitting these criteria. Thus the challenge of surveying the poorest of the poor presents itself.

One of the restrictions of this study is that the urban poor settlements are not classified into the general quality of the housing in the settlement or poverty levels within each. Thus, the entire dataset for urban poor settlements from which the sample for this study was drawn assumes that all settlements are relatively equal. This is clearly not the case but would require a specific study to classify all such settlements on a case-by-case basis.

3 BACKGROUND TO KEY ISSUES FACING THE URBAN POOR⁷

There are common features of the urban poor in Phnom Penh that can be seen in similar populations around the world.

3.1 LAND TENURE

Most of the urban poor do not have tenure security because their dwellings are:

- built on public land; or
- constructed on private property not belonging to the owner; or
- built on shared title land; and/or
- constructed without occupancy or construction permits; or
- rented in slums without formal renting contracts

The situation in respect to land tenure in Cambodia is highly complicated with considerable change over the last number of decades and intertwined with the radical changes in political ideologies over this period^{8,9,10}. Various commentators provide different perspectives on progress in this area from some to inadequate and even none (see previous references).

The Khmer Rouge regime shifted the notion of private land tenure (under the previous monarchy) to state owned land, destroying all previous records. In 1979 Phnom Penh was vacant. The families who came to the city simply took whatever they could. In 1992, as a response to the rapid irregular settlements, the municipality of Phnom Penh started to force families to relocate outside Phnom Penh. This turned out to be unsuccessful as there were no employment opportunities in these new areas.

Today, Cambodia has yet to establish a rational and equitable system for

⁶ http://www.unhabitat.org/jo/en/inp/Upload/1051050_Part%20two%205.pdf

⁷ Sections from: http://www.habitat.org/lc/theforum/english/rights/tenure_problems.aspx

⁸ http://usaidlandtenure.net/sites/default/files/country-profiles/full-reports/USAID_Land_Tenure_Cambodia_Profile.pdf

⁹ http://www.habitat.org/lc/theforum/english/ig-hts/tenure_problems.aspx

¹⁰ www.researchgate.net/publication/200538441_Urban_Slums_report_The_case_of_Phnom_Penh_Cambodia

registering land and recognizing ownership rights. A new law has been developed, stating that private ownership for residential and agricultural holdings that had not been under conflict in the preceding five years were allowed. A relocation guideline/policy has also been developed with the assistance of the United Nations Development Program, the Department for International Development and UN-Habitat that is intended to ensure that the relocation does not have physical, social, economic or psychological impacts. However, the provisions of these recent developments are yet to be fully realised and people continue to fear relocation to the outer limits of the city¹¹ at this time.

3.2 LABOUR OPPORTUNITY ¹²

The unemployment rate is generally very low in Cambodia, in large part because most people of working age cannot afford to spend time looking for their desired job, especially in the absence of unemployment benefits or

¹¹ Based on discussions with community leaders in surveyed settlements

¹² Excerpts from: Decent Work Country Profile Cambodia - International Labour Organization 2012

¹³ NIS: Labour and Social Trends in Cambodia 2010 (National Institute of Statistics, Ministry of Planning, Phnom Penh, September 2010)

¹⁴ <http://pubs.iied.org/pdfs/10574IIED.pdf>

¹⁵ http://www.nis.gov.kh/cpi/CPI_Report_Jan_2014_E.pdf

¹⁶ Terms of trade is used to assess household purchasing power by taking the ratio of the daily wage rates of unskilled laborers and the retail price of lowest quality rice in the market. This gives an indication of the amount of rice that an unskilled wage laborer can purchase with a daily wage. <http://documents.wfp.org/stellent/groups/public/documents/ena/wfp264526.pdf>

family savings¹³. Such high levels of employment in Cambodia are more likely a symptom of the necessity to work than the economy's ability to create decent jobs.

The unemployment rate offers no insight into whether employment in a country is full or productive, nor does it embrace other key principles of decent work. As already noted, low incomes and a widespread absence of social protection compel many Cambodians to work just to survive, often in unfavourable conditions including low pay, insufficient or long hours, inadequate protection of fundamental rights and entitlements at work, poor working conditions, poor health and safety, job insecurity, and gender salary inequalities. Furthermore the vulnerable employment rate (i.e. the sum of "self-employed" workers and contributing family workers as a proportion of total employment) remains high (the most recent figures being 73.4% in 2009) and indicates widespread incidence of poverty.

3.3 MARKET ACCESS

The urban poor, due to reliance on purchased food are highly dependent on markets and household food security is sensitive to changing market dynamics¹⁴. The period January 2013 to January 2014 indicates an increase in the Consumer Price Index (CPI) of 4.5% with a 2.8% increase in the price of rice¹⁵. According to WFP's market analysis, urban areas experience different dynamics in terms of market accessibility, such as

changes in unskilled labour rates and terms of trade. As of March 2014 labour rates had increased slightly (2.9%; month to month) and although the terms of trade¹⁶ had also increased it wasn't as great as that in the rural areas (1.4% and 2.7% respectively).

Inflation is currently at 4.5%, with increases in rice prices (2.8%) contributing to 0.1% of the total increase. Large increases in prices of eggs, fish (fresh or processed), fruits, and vegetables represented some of the highest increases in prices (from approximately 9-11%). Although the terms of trade figures indicate only small changes in urban environments this is based on rice purchasing power and larger changes in other food products may put increased pressure on maintaining a varied diet, or at least cost the household more proportionately than last year (although the absolute amount is likely to be small).

3.4 CREDIT ACCESS

There are a large number of registered microfinance institutions in Cambodia as well as a number of NGOs practising such activities. However, gaining access to credit for some households entails high interest rates (up to 20-30% for a one month loan) according to discussions with participants in this survey's focus groups. It is understood that loans tend to be paid back quickly and taken as required, although with increased likelihood of taking them out during the rainy season. Loans seem to be typically

taken for food and repair of housing, rather than large durable or consumer items that appear to be purchased from savings.

3.5 SERVICES ACCESS AND PROVISION

Water provision by the Phnom Penh Water Supply Authority (PPWSA), is hailed as a “model public sector water utility” and claims 100% coverage of the inner city with 24-hour treated supply¹⁷. However, other more recent studies of urban poor settlements suggest that there are still gaps in their coverage with around 15% of surveyed settlements not being connected to water supplies¹⁸. In terms of sanitation the same report

¹⁷ Asian Development Bank (ADB) (2007) “Phnom Penh Water Supply Authority – An Exemplary Water Utility in Asia”.

¹⁸ The Phnom Penh Survey: A Study on Urban Poor Settlements in Phnom Penh, Sahnakum Teang Tnaut (2014).

¹⁹ <http://ije.oxfordjournals.org/content/early/2011/06/30/ije.dyr102.full>

²⁰ http://www.ucl.ac.uk/dpu-projects/Global_Report/pdfs/PhnomPenh.pdf

²¹ <http://unesdoc.unesco.org/images/0018/001880/188018e.pdf>

²² http://siteresources.worldbank.org/INTCAM-BODIA/Data%20and%20Reference/20182374/Cambodia_PRSP.pdf

²³ <http://unesdoc.unesco.org/images/0018/001880/188018e.pdf>

²⁴ Health Service Access Among Poor Communities in Phnom Penh (2009)

²⁵ Infant mortality rate is the number of infants dying before reaching one year of age, per 1,000 live births in a given year.

²⁶ Cambodian Demographic and Health Survey (2010).

²⁷ Ibid.

²⁸ Height for Age measurement that is < -2 standard deviations (SD) away from the mean reference value (WHO 2006).

²⁹ Weight for Height measurement that is < -2 SD away from the mean reference value (WHO 2006).

³⁰ Weight for Height < -3 SD from the mean (WHO 2006)

indicates that, in the same areas as this assessment covered, about two thirds of the urban poor settlements are without adequate sewage systems and about 70% without garbage collection. Poor drainage systems seem to result in prolonged periods of flooding, although no consideration was given to location and elevation of settlement plots. Regardless of why, the consequences are increased exposure to disease through direct contact with polluted water and for increase in vectors of disease. Poor sanitation is also linked to undesirable nutritional outcomes¹⁹.

3.6 EDUCATION

It is estimated that approximately 74% of adults in urban poor areas have received some form of education. Basic education is seen as an important investment in the household’s economic success. This is illustrated by the household’s apparent willingness to spend money on the “informal-fees” (200-500 Riels per student) that are applied by teachers²⁰.

Limited government investment in education of the poor (1.4% of GNP in 2001 and remaining less than 3% by 2007²¹) as well as high unofficial fee systems, low teacher salaries, high pupil teacher ratios, and poor resource availability for classrooms, have all been highlighted as problematic and impeding progress²². Dropout rates of children are high with only just over half of children completing the first 6 years of education (primary school)²³.

In the latest Cambodia DHS, level of education was linked to vaccination

status of children as well as nutritional status (CDHS 2010). It was also linked to earning potential and other socio-economic indicators.

3.7 HEALTH & NUTRITION

A study by UNICEF/MoH from 2009²⁴ suggests that despite poor outcomes of individuals in urban poor environments there is good knowledge of basic health-care messages and nutrition, such as HIV transmission, vaccine preventable diseases as well antenatal care. Health care facilities were accessible, if expensive compared to income.

Despite such availability of health care services and knowledge, the infant mortality rate²⁵ is very high compared to other countries in Southeast Asia (45 deaths per 1,000 live births)²⁶. Coverage of vitamin A for children under five years was about 67%, and anaemia in this age range was also high, with 55% of children having mild to severe anaemia²⁷.

Stunting²⁸ rates in Phnom Penh (25%) are lower than the rest of the country (40%) according to the CDHS (2010). Wasting²⁹ rates were high in the city (11%). A mass screening of children under 5 years of age in 160 urban poor communities by UNICEF beginning in August 2014 identified already more than 25 severe acutely malnourished children in their first month which needed treatment in health facilities. The current approach to the treatment of acute malnutrition³⁰ is focused on an integrated facility based treatment approach, rather than a community based approach.



03

METHODOLOGY

1 SURVEY METHODOLOGY

This assessment was based on the principles of the SMART (Standardized Monitoring and Assessment of Relief and Transitions) approach. This included sampling, questionnaire design, and analysis of the anthropometric data.

Anthropometric indices were calculated using the Emergency Nutrition Assessment (ENA) software recommended by SMART and calculated using the 2006 WHO growth standards.

For the purposes of brevity, the details of the survey are presented in Annex 1. The details are summarized here.

1.1 SURVEY DESIGN

The survey was a 2-stage random cluster survey. Households were selected probability proportional to size and all eligible children, within each household, aged 6-59 months were selected.

The sample size was calculated based on the estimate of 11% acute malnutrition and 35% prevalence of stunting³¹, 5% precision (7% for stunting), an average of 0.47 children 6-59 months in each household, and an estimated design effect of 1.4. This required a maximum number of 272 children.

³¹ Adjusted from Cambodia DHS 2010 to ensure adequate sample size was taken



The sample universe was based on a recent study by STT (Sahmakum Teang Tnaut; a local NGO) on the urban poor, which identified settlements in Phnom Penh that met criteria for urban slums as set out by UNHABITAT. These were listed with estimated population size and used to attribute clusters with probability proportional to size (PPS), the first stage of the sample procedure. The assessments covered 5 Khans (Dangkor, Mean Chey, PorsenChey, Russey Keo, and Sen Sok) between 19 – 27 May 2014.

The second stage of selection was determined by whether or not the settlement had a list of the households within it. For those where a list was

available a simple random selection of households was made using a random number generator. For those settlements without a list a systematic random selection approach was used based on the total number of households. Households were informed about the purpose of the exercise and what it involved before they were asked for consent for their participation. If they refused any reason given was recorded. If households were not present at the time of the survey, arrangements were made to visit at a convenient time. However, if they had relocated for a period longer than the duration of the survey they were not replaced. If children were not in the household at the time of the survey, the reason for this was

recorded and instructions given to find children and measure them if they were close by. If the household or child was too far away or would not return within the period of data collection they were not included.

2 DATA COLLECTION PROCESS

There were five teams of six people collecting the data; one supervisor, three interviewers, and two measurers. All teams received at least two visits from staff of People In Need, Nutrition Works, and UNICEF.

Two main tools were used to collect data, one for household data and the second for children and mothers. These

were developed by “NutritionWorks” and finalized in agreement with People in Need and UNICEF. A community focus group discussion tool was developed by “NutritionWorks” to be carried out as a qualitative assessment to supplement ambiguous data in the quantitative data collection tools. The tools covered a variety of data aimed at quantifying the situation faced by households in these urban poor settlements. For the most part internationally recognized tools were used for the assessment of food security and nutrition of households and children. The data collection tools were translated from English to Khmer and back to ensure translation quality.

Training was carried out over four days with one practical day of carrying out the questionnaire with households in a settlement, not included in the survey sample. Measurers carried out a standardization test to ensure that they had completed the training successfully.

Data collection was carried out over a period of eight days, with multiple supervision visits to the teams to ensure they were correctly collecting the data. Completed questionnaires were collected after two to three days so that data entry could be completed.

³² mainly descriptive statistics, independent t-tests, and chi-squared tests.

³³ See Annex 1 (Methodology) for details

	Number
Households	429
Interviewed	420
No Consent Given	9
Response rate	97.9%
Eligible Children	277
Complete Information	264
Partial Information	6
No Anthropometric data	13
Response rate	95.3%

Table 1 Households & children within the sample

A sub-contractor carried out data entry, using the double-entry method to ensure data was correctly represented in the final dataset. Both the data entry and data analysis³² used SPSS (Statistical Package for the Social Sciences). Throughout the report the term “significant” indicates a p-value of <0.05. As the data was being collected the completed child questionnaires were entered into the ENA software to keep track of the data quality by the measurers.

3 LIMITATIONS

During the course of the survey, it was not possible to gain access to 5 of the selected clusters. During the design phase 4 additional clusters were assigned

as “spare” clusters in case there were difficulties during data collection, and were allocated in a second round of PPS selection. These were utilized for this survey. However, the net result is that one cluster was lost to the survey (13 households). However, the design requirements³³ were met due to a larger than anticipated number of children in the sample.

The timing of the survey was the week after the commencement of the Khmer New Year. One possible limitation this brings is that the expenditure data on “ceremonies”, which may have been exceptional rather than typical. However, compared to other surveys carried out at other times of the year the proportion

of expenditure on ceremonies was not considerably higher (12% compared to this survey's observation of 16%)³⁴. However, to reduce the potential complicating factors the recall period for expenditure on food was kept to the previous week, and a day-to-day statistical analysis of food expenditures indicated that there was no difference between the start and finish of the survey. Therefore no adjustments were made to the original data to compensate for this issue.

Despite all good intentions of the survey design, efforts of the training team, and assistance of the supervisors, those being interviewed in every case did not always understand some of the concepts of questions, such as the coping strategies. This may have had some small effect on the results of these indicators. In addition, some of the children in the households were not available at the time of interview, having travelled too far as to reasonably visit for measurement. In these cases it can't be confirmed that they were not sick and/or malnourished. This is a possible explanation for not seeing any severe acute malnutrition. However, based on the community interviews, it seems unlikely that very sick children are taken far from their homes and therefore, although unusual, the lack of severe acute malnutrition in the sample is possible.

³⁴ Cambodia Post-Flood Relief And Recovery Survey (Multi Agency), May 2012





04

RESULTS

1 HOUSEHOLD CHARACTERISTICS

This study of the urban poor in Phnom Penh used the definition of a household as those having a common cooking arrangement and recognising a single person as the head of that unit. In most cases the sampling was carried out using household lists provided by community leaders. There is a wide diversity of people within these urban poor communities, in terms of wealth and other indicators of poverty. General observations, based on supervision visits and community interviews, raised the question as to the acquisition of

what appeared to be ubiquitous consumer goods and durable assets such as cellular phones, televisions, and motorbikes. From the community focus groups it appears that these goods are paid for in cash, after saving.

The following indicators are taken from households (as previously defined), unless otherwise stated.

1.1 DEMOGRAPHICS

The mean household composition was reflective of that collected in the last CDHS (2010), with a mean size of just over five household members, although



by comparison there are twice as many households with nine or more members in them. Additionally, about one third of households are female-headed (32.7%). Female-headed households are commonly more vulnerable than male-headed households throughout the world³⁵ and in this case we shall see that similar patterns emerge.

The dependency ratio is commonly used by institutions, such as the World Bank, to provide an indication of the burden on the economically active individuals (15-64 years) within the household (or population). A higher dependency ratio represents fewer individuals within

the household able to raise income. The mean value was 0.72 indicating that in this population there were, on average, more economically active members than not. However, less than a sixth of the households interviewed (17.6%) had dependency ratios higher than one, indicating a greater number of non-economically active individuals. The importance of this is illustrated when we observe that the poorest (as defined by wealth quintiles, described later) of the households in the sample had higher dependency ratios compared to the better off, although they did not appear to have significantly larger

household sizes (see Table 7, Table 8, Table 9; independent t-test, $p > 0.05$). With this the increased pressure for resources to non-productive households may contribute to the household's poverty.

Just over one percent (1.3%; 29 individuals) of the population are physically impaired. About three percent (2.7%) of the male household heads are physically impaired, compared to less than one half of one percent (0.4%) of the female household heads. As there were very few cases in the data it was not possible to correlate the presence of physical impairment in the household or of the household head to any other indicators.

³⁵ <http://unstats.un.org/unsd/demographic/products/Worldswomen/Executive%20summary.htm>

1.2 EDUCATION

During the survey the number of years of education were asked for the mother and father of the children.

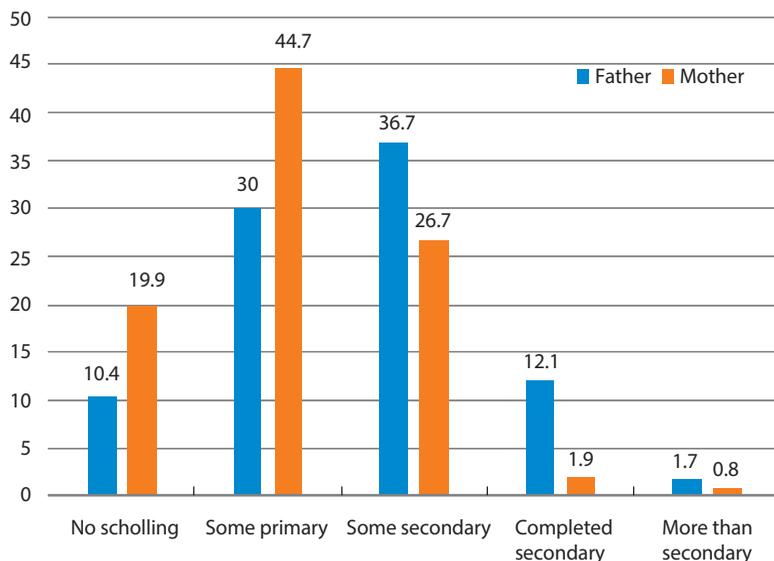


Figure 3: Level of Education attained by parents of child (%)

The levels of education were observed to be very mixed in these communities. Around a third of the fathers had some secondary education (only a quarter of mothers). Few had managed to complete secondary education (Figure 3).

However, there was no evidence to suggest that education is related to differences in nutritional status³⁶ in this data set (Independent t-test, $p > 0.05$). However, highest levels of education of either parent was related to the child having received all the basic vaccinations (see Figure 4).

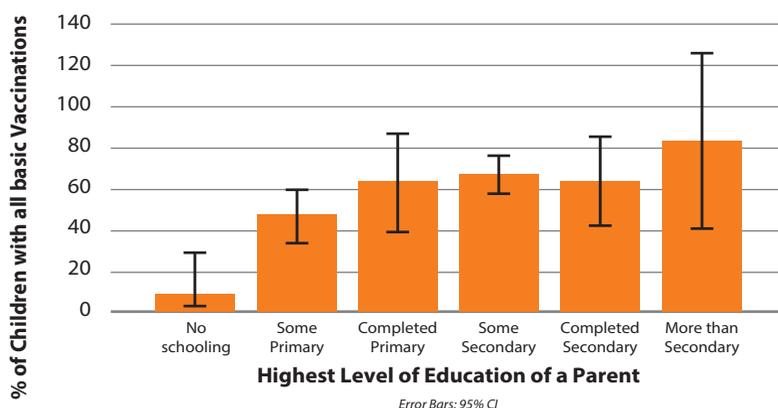


Figure 4: % of Children with All Basic Vaccinations by highest level of education of either parent.

³⁶ Wasting, stunting, or underweight

In this assessment the highest level of education in the household was reflected in the household’s wellbeing. Households with little or no education were much more likely to experience difficulties in accessing food (reduced Coping Strategy Index (CSI) was higher³⁷), they lived in households with higher dependency ratios, were more likely to purchase food on credit and generally their circumstances were more indicative of poverty (Independent t-test, $p < 0.05$; See Table 7).

1.3 POVERTY INDICATOR ³⁸

The development of a poverty indicator is to measure the theoretical degree of poverty in the settlement that we have assessed. Its use is as a comparative analysis that allows us to understand what type of household is the poorest in these communities, what attributes these households have (indicating the problems that they may face) and if there are greater risks related to such poverty.

³⁷ This indicator is explained in section 2.3 of the results

³⁸ It is important to note that although these indicators are standard indicators for the measurement of poverty, the data collection was not as comprehensive as large-scale surveys like the Cambodia Socio-economic Survey (CSES). As full enumeration of expenditure was not possible in the context of this survey these It is important to note that although these indicators are standard indicators for the measurement of poverty, the data collection was not as comprehensive as large-scale surveys like the Cambodia Socio-economic Survey (CSES). As full enumeration of expenditure was not possible in the context of this survey these indicators should only be used in the context of the survey, or indicative when comparing to other large-scale surveys.

³⁹ The analysis for this is weighted by the size of the household (as it is a per capita indicator).

⁴⁰ Poverty in Cambodia – A New Approach: Redefining the poverty line. Ministry of Planning 2013.

There are a large number of indicators available for the analysis of poverty. However this analysis will use two. One is a wealth index, which is based upon asset ownership. It is calculated by running a Principle Component Analysis on the assets (1 = possession of any number of the items, 0 = not having the item at all), summing the factors and ranking the result into quintiles. The second set is based on expenditure data. This allows the estimation of the \$1.25 and \$1.58 a day per capita poverty lines (the international poverty line and **absolute poverty line** calculated for Phnom Penh)³⁹.

This analysis will focus on these two poverty indicators to explore how poverty affects them.

Table 2 indicates the percentage of households living below the predefined poverty levels. Almost 30% of the households were classified as being below the absolute poverty line. This is almost twenty percentage points higher than the official figure for Phnom Penh of 12.8% ⁴¹.

Poverty Line	< \$1.25	< \$1.58*	< \$2	Above
% of HH	19.8	29.1	42.2	57.8
*Absolute Poverty Line (Adjusted Figure for Phnom Penh) ⁴⁰				

Table 2: Poverty Rates (USD /day / capita) % of Population surveyed

⁴¹ http://www.jica.go.jp/activities/issues/poverty/profile/pdf/cam_03_01.pdf

⁴² Referred to throughout as expenditure quintiles to avoid confusion with the absolute poverty threshold. However, the expenditure quintiles indicate the degree of poverty.

⁴³ Independent t-test for each variable of interest, $p < 0.05$

The total expenditure per capita was ranked into quintiles⁴². An analysis of this indicates that with increasing poverty, life clearly becomes harder for these households, as illustrated using the following indicators: Poorer households are larger (poorest having 6.4 members compared to the better off having 4.2 on average) and have more dependents in them (children and elderly), with the poorest quintile having a dependency ratio of > 1 , indicating fewer productive members than dependents⁴³. They also have poorer diets as indicated by lower HDDS, rely on a more diverse set of food sources and experience food shocks more frequently or of a more severe kind (as illustrated by higher CSI scores), the details of which are presented in proceeding analytical sections. See Table 7 for details.

An alternative approach to the classification of poverty is by material wealth. This is generally a simpler alternative than enumerating expenditure, although providing a less robust indicator of poverty. That is, because assets that are

already owned by the household are not counted towards recent expenditure a household that is currently spending frugally may still have reasonable or substantial material wealth. Thus the Wealth Index may better reflect a longer-term status of cumulative wealth. The Wealth Index helps to understand what type of assets the household owns and which are attributed to better off households. Although there is a statistical relationship between expenditure and wealth (with expenditure increasing for households in the higher wealth quintiles and asset ownership being lower in the lower expenditure quintiles), one metric is not a diagnostic of the other, as the specificity of the wealth indicator for identifying households under the absolute poverty line is moderately low (34%, with a positive predictive value of 50%, i.e. those that are identified as below the absolute poverty line are just as likely to be in the lowest wealth quintile as not)⁴⁴.

Households that were ranked as poorest using asset ownership indicated even a lack of common household items such as tables and chairs (the summary tables can be seen in Annex 2). Despite this, one third owned a motorbike, possibly indicating the importance of such transportation to livelihoods in these communities. One additional observation

that is interesting is that for poor households, classified by expenditure or asset ownership, cell-phone ownership was also significantly lower (independent t-test, $p < 0.05$), although more pronounced with asset poverty (with one third of households not owning a cell-phone).

1.4 INCOME ACTIVITIES

Information was collected on income activities of the households, either as a main or other source, as well as who in the household was engaged in these activities. The intention was to understand better what activities households in these settlements were engaged in, to what extent and to identify which income activities the poorest households were participating in.

Data from the questionnaires was regrouped into similar occupations and “other” occupations were classified into existing income activities. Some of the “other” activities were classified as “skilled workers”, this included mechanics and tradesmen.

As can be seen in Figure 5 about one third of the households reported any member being employed as a factory worker. A quarter of all of the households had individuals in them engaged in public sector or work with formal contracts. This figure could be higher as a number of jobs were uncategorized during the fieldwork.

The most frequently reported main activities for households were formal or public sector workers (18%), Construction Workers (17%), Factory Workers (17%), Motodop / Tuk Tuk drivers (16%), and Traders (small shop or street vendor; 13%). Table 12 in Annex 3 shows that women are predominately engaged in factory labour and men in construction, formal occupations, and motodop / tuk tuk drivers.

A full table of the main indicators of food security and poverty of the main income sources of the households is presented in Annex 3, Table 11. There we can see that waste pickers, although few households reported this as a main activity, were clearly the poorest (based on expenditure and wealth). They were also, along with cart pullers, currently experiencing the highest levels of stress in terms of food access (as measured by the reduced CSI, and comparable to victims of the floods in rural Cambodia in 2012). There are a few domestic workers, and whilst these particular households were not living below the poverty lines they were the least wealthy households of the income activity groups.

Additional analysis was carried out to explore “other” income sources or if the household engaged in “any” of the income sources and their roles. However, no clear patterns emerged when they were included into a data reduction process (principle component analysis) and clustering.

⁴⁴ Specificity, sensitivity, and positive predictive value are calculated using cross tabulation of the expenditure and wealth quintiles, see http://www.medcalc.org/manual/diagnostic_test.php for calculations

Over two thirds of the households in the urban poor settlements declared more than one source of income. There was no significant improvement in poverty status (expenditure) or wealth with more income activities within the household (Independent t-test, $p < 0.05$).

1.5 EXPENDITURE

Comparing the percentage of the total expenditure (per capita) that is used to purchase food helps to understand food access and it can also be used as a proxy for poverty (where the greater the percentage of expenditure allocated to food indicates less disposable income).

There is no absolute threshold for this comparison but the higher the percentage expenditure on food the less disposable income the household is anticipated to have. For households living below the absolute poverty line, expenditure on food (% of the total) was significantly higher (47.8%) compared to those above this poverty line (36.2%).

As the survey was conducted within the same month as the Khmer New Year it is important to consider how households spent money on ceremonies. The decision to remove expenditure on ceremonies from the poverty indicators is based on the disproportionate contribution to the total expenditure. In addition the Khmer New Year is the most important celebration on the Cambodian calendar, and by implication an unusual contributor to household expenditure. However, it does provide an interesting

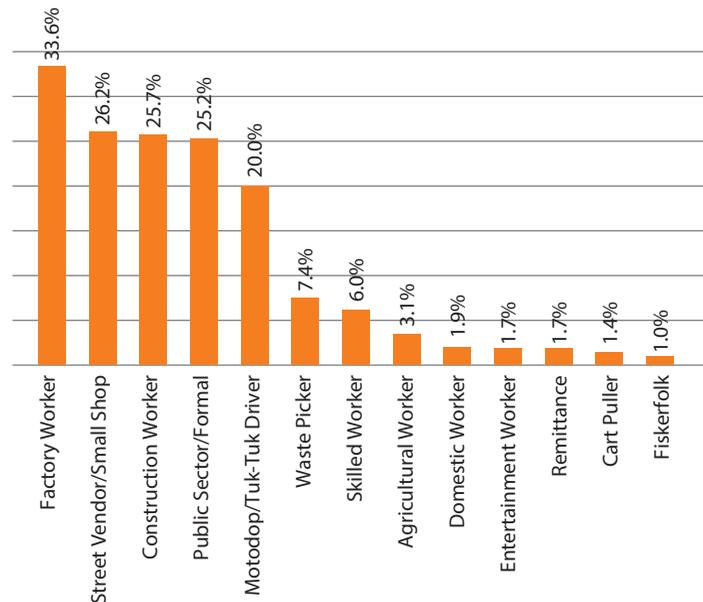


Figure 5: Frequency of reported Income activities by any HH member

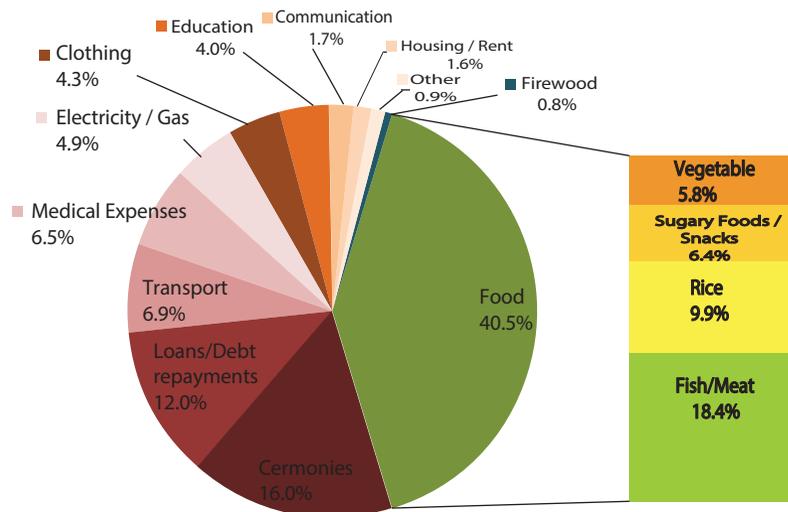


Figure 6: Categories of expenditure as a % of the total reported expenses

opportunity to explore the importance of the celebration to poor and better off households.

The mean expenditure, as a percentage of the total, on ceremonies in the month prior to the survey was almost 16% of the total (Figure 6). The proportion of total expenditure on ceremonies only decreases significantly (Independent t-test; $p < 0.05$) in the poorest of the expenditure quintiles. However, having debt had a modulating affect. Comparing households below the absolute poverty line indicated that they spent about 10% of the total on ceremonies regardless of having debt or not, but those above the absolute poverty line spent significantly more (t-test; $p < 0.05$) on ceremonies with no debt (16% compared to 23%). This clearly indicates some degree of financial savvy in terms of contextualizing expenditure in the light of debt. Households above the absolute poverty line spent an average of \$113 in the previous month (compared to those with debt; \$82). For households below the absolute poverty line there was no significant difference between households with or without debt on expenditure on ceremonies (an average of \$27 in the previous month). The role of debt in the profile of expenditure

seems only to be important in modulating actual expenditure in the highest wealth quintile.

Considering the mean expenditure profile (see Figure 6), the expenditure on rice is not the highest of the food expenditures, given the importance of rice in the Cambodian diet. Meat/Fish constitute almost one fifth of the overall food expenditure. This observation is relatively in line with the notion that inflation is occurring to a higher degree in meat, fish, eggs, vegetables etc. than in rice. This is unlike that of the profile observed in rural areas⁴⁵ where rice expenditure is around 20-30% of the total expenditure. One explanation of this could be that households purchased rice in bulk prior to the survey recall period and was not reported. However, over the expenditure quintiles and comparison of the absolute poverty threshold the range of percentage of expenditure on rice is between 5% (for the better off) and 18% in the poorest (see Table 16). Additionally, expenditure on vegetables and sugary foods as well as other snacks remained a consistent 6-7% of the total expenditure. This may suggest that sugary foods and other snacks maintain a constant factor in the diet of this population. However,

total expenditure increases between poverty groups (from \$1.24 in the poorest quintile to \$11.15 per capita in the highest⁴⁶), which are likely to reflect an increase in the actual amount of these foods with a risk of obesity and other associated conditions.

1.6 LOANS AND DEBT

Households were asked what their current level of debt was. Of the households that responded, 69% reported to have debt; of these, 30% reported debt of more than \$400. Households with larger debts have much higher pressure when it comes to repaying with over a fifth of their expenditure going towards debt repayment.

Looking deeper into this issue it appears that the depth of debt is probably higher in the better off households. This is clearly illustrated when comparing repayments of households with reported debts over \$400 according to their expenditure poverty quintile: households in the lowest quintile with large debt repaid, on average, \$40 in the month prior to the assessment (16% of the total expenditure) compared to \$315 in the month prior for households (30% of the total expenditure) in the highest poverty quintile.

⁴⁵ Cambodia Post-Flood Relief And Recovery Survey (Multi Agency), May 2012

⁴⁶ independent t-test, $p < 0.05$

Those with lower levels of debt (<\$400) expend \$25 - \$80 per month on debt repayments (10-15% of their total expenditures). The interviews with the communities also indicated very high levels of interest for loans (20-30%) and many attempt to repay such loans before taking further loans. It is clear that more than two thirds of the urban poor have debts that constitute a significant proportion of their expenditures, much of which goes towards interest on the loan. Such a high proportion of households with loans indicate that households are not able to immediately pay for the needs of their households, and it appears that those in a position to provide loans take advantage of this with high interest rates.

An observation from the community interviews was that loans are taken mainly for food, medical expenses, home repair etc. but not for assets such as motorbikes or other luxury goods, which are purchased with cash from savings.

It should be noted that the data collected did not quantify the dynamics of loan acquisition, repayments, purpose of loans, attitudes towards loans, or pressure of such loans on daily life at a household level. However, it is quite possible that those in the better off households have quite different attitudes towards loans and access to better terms and conditions, allowing for the maintenance of higher loans.



1.7 WATER, SANITATION, AND HYGIENE

Overall, only about 6% of the households interviewed took drinking water from non-improved water sources (see Table 13). Of those sourcing water from improved water sources more than two thirds treat the water before drinking in some way, mainly boiling (77%) or using ceramic filters (20%). Those that drink from non-improved water sources also treat the water using similar methods; only 17% do not treat the water with anything. The other method of treating water was using bleach or chlorine, however this was uncommon, with only 5% among those with non-improved water sources and 2.2% among those with improved source.

The majority of households washed their hands within their own dwelling

(84%), although 3% of these households did not have any hand-washing materials. Of the 16% that did not wash their hands within their own dwelling only 10% of these households that responded reported not having some form of hand-washing material. The most common type of hand-washing material was detergent (50%), as opposed to soap (33%), whilst a significant number of households reported using liquid soap (14%). This may be a result of reducing expenditure on multiple hygiene products, even though detergent is more expensive than soap.

Households were asked to indicate what type of toilet facility they had access to. Figure 7 shows that better off households have increased access to improved sanitation⁴⁷, and that they are less likely to have to share such

facilities. This trend is also seen in the expenditure quintiles. Twelve percent of households reported having no facilities at all (either open or buried), see Table 15. This has a large public health implication in these settlements and is illustrated in households without improved sanitation where children are more than twice as likely to have diarrhoea as those with improved sanitation (OR 2.68, (95% CI; 1.42 to 5.04) z-statistic = 3.05). In addition, during some of the supervision visits open sewage was observed in the streets. Children were more stunted in households that did not have improved sanitation (41% compared to 26%), although improved sanitation only had a small effect on stunting prevalence (independent t-test, $r=0.12$, t-statistic = 2.08, $p<0.05$), and is in line with previously referenced studies.

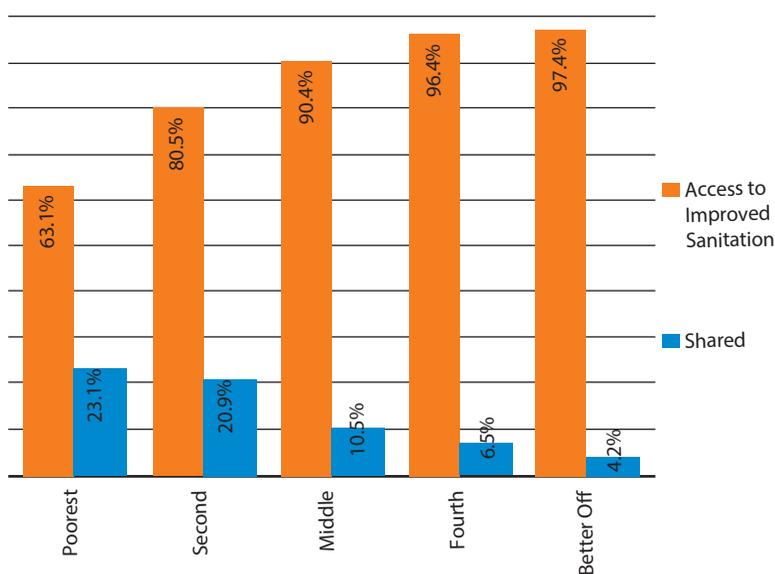


Figure 7: Access to improved sanitation by wealth quintile

2 HOUSEHOLD FOOD SECURITY

Household food security has many aspects. In this assessment we have incorporated two indicators of food access, an important component of household food security. The first was household dietary diversity. This measures the variety of food groups that the household consumes in the 24 hours prior to the interview. This indicator was used because it helps to

⁴⁷ Improved Sanitation: Flush or Pour toilets. Unimproved Sanitation: Traditional pit latrine, bucket, open pit latrine, open defecation, buried.

understand the consumption of nutrient rich components of the diet as well as providing an absolute score for determining shortcomings in minimum diversity, generally considered to be less than four food groups.

The second is the reduced coping strategy index, which is another internationally recognized scale of the relative measure of stress in accessing food.

2.1 HOUSEHOLD DIETARY DIVERSITY

The Household Dietary Diversity Score (HDDS) is one such measure of food access. This is based on a 24 hour recall of what anyone in the household ate within the home. The various food types are recoded into 12 food groups⁴⁸ and totalled to create the HDDS indicator. Increases in dietary diversity are linked to improvements in food security and generally thought to reflect both nutritional adequacy (micro and macro) and household food access⁴⁹. However, consumption of food outside of the household is not reported. This means that the HDDS is more likely to be applicable as a measure of food access, rather than adequacy of individual diets. Additional analysis can be carried out to identify the absence or presence of certain nutritionally dense food groups (particularly

Vitamin A and Iron). The analysis of the HDDS provided the following insights.

The overall mean HDDS was 7.1 (see Table 16) and suggests a quite varied diet, not uncommon in Asian countries. There was little progression of dietary diversity when comparing quintiles of poverty (wealth or expenditure poverty). However, the difference between the poorest of both wealth and expenditure quintiles (as well as households below the absolute poverty line) indicated that they consumed one full food group less than the better off. For food groups of micronutrient importance the mean percentage of households consuming food items within them was quite high. With 81% of households consuming plants rich in Vitamin A, 57% consuming meats rich in Vitamin A, and virtually all households consuming iron rich food (96%), see Table 16. Consumption of milk and milk products increase with wealth. Eggs are eaten by 40% of the population on average, fish by almost all households (80%), and legumes by only around 15%. This remains consistent through wealth and expenditure quintiles.

An additional measure of household food security is consuming a diet that contains less than four food groups. However only 2.5% of households consumed less than four food groups and only 10% consumed less than five. For those that were consuming less than four (or five) food groups this was clearly linked to poverty and wealth status, with virtually no households consuming less than

five food groups in the higher wealth or expenditure quintiles (significantly less than the poorest or least wealthy).

Changes in diet, with respect to micronutrient rich food groups, occur only gradually with increases in expenditure with those in the better off range consuming more vitamin A rich fruits. However, when it comes to a comparison of wealth quintiles there is a clear progression in terms of the diet preferences Table 16.

The use of specially fortified fish sauce was investigated to see what the penetration of this product was into the urban poor context. Only 9% of households reported using specially fortified fish sauce.

2.2 FOOD SOURCES

In an urban environment access to arable land is difficult, restricted, or not possible. Households tend to rely on markets and are therefore vulnerable to inflation and other market factors, both locally and internationally. From the analysis, purchase with cash was the main source of food (94%). This was slightly less for the poorer households and alternative food sources for the poorest households included gift (6%), own production (2.5%), and credit (up to 3%, in the second poverty quintile), Table 17. Scavenging food was seldom reported in these communities and is likely to be restricted to those that are living rough in the streets (or people

⁴⁸ http://www.fao.org/fileadmin/user_upload/wa_workshop/docs/FAO-guidelines-dietary-diversity2011.pdf

⁴⁹ <http://www.fao.org/docrep/014/i1983e/i1983e00.pdf> (and references therein).

under-reported this because they are simply embarrassed to say so). Receiving food as a gift was not beneath any household (wealthy or poor), but was more frequently reported in the least wealthy and poorest households (4% and 6%, compared to less than 2% in the better off quintiles). Gift was an important source for those living on less than \$1/day/capita (9% of food coming from gift). Food purchased on credit was seldom reported as a main source (although sometimes this is confused as a cash transaction). However, the level of education of any member of the household seems to influence the decision to purchase food on credit, although this could simply be a reflection of these households level of poverty. About 2% of food was reported as having come from own production, although this was higher in poorer households (expenditure quintiles) rather than wealth quintiles.

2.3 REDUCED COPING STRATEGY INDEX (CSI)

The Reduced Coping Strategy Index (referred to as CSI in this report) is a weighted analysis of the household reporting having experienced certain issues around accessing food in the previous week (see footnote for reference to the complete explanation of this indicator)⁵⁰. This is an internationally

recognized indicator and helps to account for food stress in the household. It is a useful tool for tracking how a community responds to a variety of shocks over time or as an indicator of food stress when comparing various groups within a survey or population. The higher the CSI of the household reflects increased difficulties in accessing food.

Using this indicator it is clear that poorer households (defined by either the absolute poverty line, expenditure quintiles, or wealth quintiles) all experienced greater issues accessing food in the week prior to the survey. The scores are between two and three times higher when comparing between the poorest and better off groups (see Table 7, Table 8, and Table 9). For example, households living under the absolute poverty line had a significantly higher average of 12.3 compared to 6.8 for those above it (independent t-test, $p < 0.05$). As the CSI allows for comparison between groups in any location or context we can compare this with the floods in rural Cambodia in 2012 where the mean value for the poorest households was 27.1 and the better off was 17.0⁵¹. Although the CSI for the urban poor is not as high, this is not an environment for which there has been a recent shock and suggests that the underlying difficulties in accessing food are quite high for the poorest households.

Children with acute malnutrition (yes/no variable) also live in households that have higher CSI scores although the effect is small (Arithmetic mean (M) = 14.4, t-statistic = 2.587, $r = 0.16$, $p < 0.05$). However, factoring for absolute poverty this no longer becomes the case, suggesting that how a household copes with its circumstances is more important than poverty itself (M = 16.9, t-statistic = 1.873, $r = 0.18$, $p > 0.05$).

3 HEALTH AND NUTRITION

In this section we shall consider the health and nutrition of pregnant and lactating women aged 15-49 years as well as children aged 6-59 months.

When trying to explain the influences of various household indicators and attributes of the child on nutritional outcomes only very weak models were possible when using regression modelling, and thus no clear combination of issues can be presented as factors for malnutrition in this population. However, as presented below, there were strong associations between changes in nutritional status and coping strategy status, any index of poverty, as well as the child ever having been breastfed combined with early initiation, as might be expected.

⁵⁰ http://home.wfp.org/stellent/groups/public/documents/manual_guide_proced/wfp211058.pdf

⁵¹ Cambodia Post-Flood Relief And Recovery Survey (Multi Agency), May 2012

3.1 NUTRITIONAL STATUS OF PREGNANT AND LACTATING WOMEN

Of the sample just over half the female population were aged 15-49 years (of child bearing age) at the time of the survey. Of these women, 5.4% were pregnant and 12.6% were lactating.

The quality of the MUAC measurement was significantly higher than that of MUAC taken for children⁵². MUAC was taken from pregnant (n=25) and lactating women (n=65)⁵³.

By conservative estimates (MUAC <23 cm)⁵⁴ 16% of pregnant women were at risk of low birth weight children. Although the sample is very small (thus the extrapolation of this to the wider population is difficult) this requires further attention. MUAC was also taken from lactating women. Although there is no agreed global threshold available, the percentages of lactating women falling into the MUAC categories considered to be of concern are presented in the table below:

From the table it appears that there are more than twice as many women with a MUAC below 21cm. This could indicate that post-natal weight gain is a problem, or that weight loss from having had a child and the additional burden of caring for them has decreased nutritional status in these women.

3.2 VACCINATION STATUS OF CHILDREN UNDER FIVE YEARS

The importance of being fully vaccinated is becoming more and more heightened as we see resurgence in once controlled diseases throughout the world, such as polio and measles, through a reduction in vaccination uptake. In Cambodia, the majority of children have vaccination cards available and in this assessment 97.8% of the vaccination data information came from these cards.

The full results can be seen in Table 18. However compared to the CDHS (2010) vaccination coverage seems to be a little lower. The level of measles vaccination is 70% for children aged

12-23 months. This would indicate that vaccination programmes might miss children in these settlements or reflect poor access to health care. Households were categorised according to the highest level of education of either parent. Subsequently a dichotomous variable was used to identify households having neither parent having had any education for comparison with those that had at least some. Using a Chi-squared test, children were significantly less likely to be vaccinated if both parents were uneducated ($\chi^2 = 11.4$, $p < 0.05$), with the risk of the child not being vaccinated being more than twice that of having any education at all (RR=2.28). Number of years of completed education of mothers was also significantly higher ($t(213) = 3.25$, $p < 0.05$) for children that had been fully vaccinated (M=5.1 years) compared to those that had not (M=3.6 years). The same pattern was seen for the father of the child ($t(142.8) = 3.47$, $p < 0.05$), but the mean number of years was greater (M=7.2 for fully vaccinated children, and M= 5.4 for not fully vaccinated). Although both factors were significantly different the size of the effect was small ($r = 2.2$ for mother's education and $r = 2.8$ for father's education).

MUAC	% Pregnant women	% Lactating women
<21cm	4.0%	9.2%
<22cm	12.0%	12.3%
<23cm	16.0%	13.9%

Table 3: % of pregnant and lactating women below MUAC thresholds indicating risk

⁵² According to the ENA quality control (plausibility) checks

⁵³ pregnant women and 8 lactating women refused permission to be measured.

⁵⁴ http://whqlibdoc.who.int/publications/2010/9789241599290_eng.pdf

(95% CI)	Wasting*	Under-weight	Stunting
All Mal-nourished	11.2 % (7.6 - 16.3)	35.6 % (29.7 - 42.0)	29.1 % (23.2 - 35.9)
Moderate	11.2 % (7.6 - 16.3)	31.4 % (25.7 - 37.8)	22.2 % (17.1 - 28.4)
Severe	0.0 %	4.2 % (2.4 - 7.4)	6.9 % (4.6 - 10.2)

Table 4: Summary of malnutrition in children aged 6-59 months

3.3 NUTRITIONAL STATUS OF CHILDREN 6-59 MONTHS

The nutritional status of children aged 6-59 months was investigated to understand to what degree children that live in the urban poor settlements are malnourished.

Wasting

Wasting is defined as children being too thin for their height and is measured according to their weight for height. What is known as the global acute malnutrition (GAM) rate describes both moderately (<-2 z-scores from the mean and >-3 z-scores) and severe acute malnutrition (SAM) when the child is <-3 z-scores from the mean.

Of the 259 children eligible for the analysis of wasting 11.2% (7.6 - 16.3%; 95% confidence interval) were acutely malnourished. There were no severe cases of severe acute malnutrition. For

the SAM cases, although this is unusual, it is not unheard of.

Comparing acute malnutrition in children 6-24 months (M=-0.92, SE=0.104) and children 25-59 months (M=-0.88, SE=0.084) there was no significant difference ($t(261) = -0.312, p > 0.05$), however the effect of age was small ($r = 0.019$). Differences between wealth quintiles were not significant, but acute malnutrition was significantly higher ($t(261) = -1.99, p < 0.05$) in children in households below the absolute poverty line (M=-1.05, SE=0.92) compared to those above (M=-0.79, SE=0.09); however, this effect was very small ($R = 0.0012$).

The presence of an illness in the two weeks prior to the survey did not relate to the presence of acute malnutrition; nor did the status of the mother (pregnant or lactating)⁵⁵. There were no strong indicators as to the underlying factors leading to an increase in acute malnutrition, other than expenditure poverty.

Stunting

The rates of stunting in the urban poor population were similar to that of the CDHS (2010), 29% compared to 25%. Given that the sample for the CDHS (2010) was not disaggregated any further, the risk factors in the urban settlements are not much different than that of the general population of the main city of Cambodia. Further investigation of these findings would require a specialised and separate analysis.

Again, there was no statistically significant relationship found between any of the poverty indicators or mother's nutritional status.

Underweight

The prevalence of underweight children in this urban poor population was double than observed by the CDHS (2010), 35.6% compared to 18.5%. Underweight is a measure of malnutrition that is better used when tracking the child over time and is a composite of stunting and wasting. Growth charts used in clinics will use weight and age to track child development during monthly visits. Caretakers of children not gaining weight or losing weight, between visits would be counselled to find out why and treatment for any illnesses present would be given.

Again correlations between poverty, wealth, expenditure, and dependency ratios were not found. However, one of the IYCF practices would suggest that children who are breastfed up to one year are less likely to be underweight ($p < 0.05$).

⁵⁵ http://whqlibdoc.who.int/publications/2010/9789241599290_eng.pdf

3.4 HEALTH STATUS OF CHILDREN 6-59 MONTHS

Recent illness (within 2 weeks of interview) linked to acute malnutrition and health of the child is an important understanding of the public health environment that the child lives in and the risk to malnutrition (both long term, stunting, and short term, wasting).

The survey asked the caretaker about the recent history (2 weeks prior to the interview) of illness of the child. On average almost a third (60.8%) of children reported difficult or rapid breathing with a cough, 40% reported the child having had diarrhoea⁵⁶, and almost three quarters reporting having had a fever (72.5%).

Additional indicators that reflect both access to health care and reduced risk to disease (in particular measles) is vitamin A supplementation and deworming tablets. Within this survey 78% of the children were reported to have received a Vitamin A capsule in the past 6 months and only 53% had received deworming tablets.

⁵⁶ 3 or more loose stools in a 24hr period.



Box 1 Infant Young Child Feeding indicators (from guidelines)

IYCF Indicator 4: Introduction of solid, semi-solid or soft foods: Proportion of infants 6–8 months of age who receive solid, semi-solid or soft foods.

IYCF Indicator 5: Minimum dietary diversity: Proportion of children 6–23 months of age who receive foods from 4 or more food groups.

IYCF Indicator 6: Minimum meal frequency: Proportion of breastfed and non-breastfed children 6–23 months of age, who receive solid, semi-solid, or soft foods (but also including milk feeds for non-breastfed children) the minimum number of times or more.

IYCF Indicator 7: Minimum acceptable diet: Proportion of children 6–23 months of age who receive a minimum acceptable diet (apart from breast milk).

IYCF Indicator 8: Proportion of children 6–23 months of age who receive an iron-rich food or iron-fortified food that is specially designed for infants and young children, or that is fortified in the home.

IYCF Indicator 9: Proportion of children born in the last 24 months who were ever breastfed.

3.5 INFANT AND YOUNG CHILD FEEDING PRACTICES

There are standardized measures of infant and young child feeding practices. These are used to understand how caretakers feed their children compared to recommended guidelines⁵⁷. The total sample size of this indicator was 97. It should be noted that these indicators exist because they are a known factor in the underlying increases in risk for malnutrition. The main purpose of their inclusion in this report is to illustrate the degree to which they are complied with and not to suggest that without any strong statistical associations to

⁵⁷ http://whqlibdoc.who.int/publications/2010/9789241599290_eng.pdf

⁵⁸ no significant differences between gender

outcome indicators there is any reduced confidence in their importance for the children living in these urban poor areas.

Appropriate infant and young child feeding (IYCF) practices include timely initiation of feeding solid and semisolid foods from age 6 months and

increasing the amount and variety of foods and frequency of feeding, as the child gets older while maintaining frequent breastfeeding. See Box 1 for the indicator definitions.

An analysis of the diet diversity and minimum acceptable diets against household indicators of wealth, expenditure, and the HDDS proves interesting. Comparing IYCF 5 between households in the better off quintile to the poorest quintile (25% of children), those in the better off households (63% of children) were more likely to feed children the minimum dietary diversity ($p < 0.05$). However, there were no significant improvements in the other IYCF indicators with wealth or economic improvement. Households with a more diverse diet (higher HDDS) are more likely to ensure children have the minimum acceptable diet (IYCF 7). Children are also more likely to meet minimum dietary diversity if the household dietary diversity was also greater. This might suggest

IYCF Indicator		Gender ⁵⁸	
		Male	Female
4	Introduction of solid, semi-solid or soft foods (n=16)	66.7%	77.8%
5	Minimum Dietary Diversity (≥ 4 Food Groups) (n=97)	37.3%	46.7%
6	Minimum Meal Frequencies Met (n=97)	47.1%	64.4%
7	Minimum Acceptable Diet (n=97)	21.6%	24.4%
8	Consumption of Iron Rich/Fortified Food (IYCF) (n=97)	76.5%	75.6%
9	Child Ever Breastfed (n=97)	84.3%	91.1%

Table 5 : Summary of Infant and Young Child Feeding Indicators

if healthy foods are available in the household they are also made available to children (not kept for certain people within the household, heads of household or adult men, as found in some cultures or societies).

There were few strong correlations found between IYCF indicators and nutritional outcome. However, this is most likely attributable to the small sample sizes. Using the z-scores as a scale variable⁵⁹ and using a series of regression models, the only indicator related to underweight was appropriate introduction of solid, semi-solid or soft foods at 6-8 months (IYCF Indicator 4). Other correlations did not provide any significant connections between nutritional outcome and feeding practices.

In addition the survey asked who normally looked after the child. In more than a quarter of the cases (27%) this was the grandmother and not the mother of the child, with less than three percent reporting the main caretaker was some other relative

⁵⁹ that is, not using thresholds to classify cases of severity of malnutrition





05

DISCUSSION

The observations made on the degree of poverty in the settlements identified as “urban poor” are certainly pertinent for raising awareness of the situation of this population. The proportion of households living under the various poverty levels, although double that of the government figures for Phnom Penh, are less than one would expect in “urban poor” settlements. Although there are still some better off households in the sample the percentage of households below the absolute poverty line (<\$1.58/day/capita) is much higher than the surrounding areas, at least according to national figures (12.8% in 2009). Thus, these Urban Poor

settlements have a greater concentration of poor than the average population of the city.

However, such diversity of wealth has implications for community based programming in that blanket activities, particularly livelihood activities, are as likely to be aimed at better off households as those living under the generally accepted poverty lines. The wider implication is that simply living within the boundaries of such settlements is not necessarily for the reason of being poor. Why this is so is not clear in the data, however it could be related to land tenure and affordable housing



alternatives. It is suffice to say that when approaching such communities, assumptions as to uniformity of poverty should not be made, and targeting of programme activities should be thought through.

1 NUTRITION AND FEEDING PRACTICES

There is no internationally recognized way to easily determine the nutritional status of pregnant women that allows a point in time measurement. BMI is useful but requires good knowledge

⁶⁰ <http://www.ncbi.nlm.nih.gov/pubmed/23787989>

of the gestational age of the child and weight gain is a better marker of risk to low birth weight.

The recommendations coming from a large meta-analysis of data indicate:

“MUAC values below which most adverse effects were identified were <22 and <23 cm. A conservative cut-off of <23 cm is recommended to include most pregnant women at risk of LBW for their infants in the African and Asian contexts”⁶⁰.

The nutritional status of women in these settlements is really quite poor. With 16% of pregnant women below a MUAC of 23cm (considered to increase risk to low birth weight children) there

is some work to be done to improve nutritional condition of pregnant women in these settlements and the situation is likely to require further investigation. This would also apply to lactating women, with high prevalence of women with a MUAC less than 21cm (9.2%). Although it is difficult to pinpoint under what conditions this occurs (as this study was not specifically designed to investigate pregnant and lactating women), poverty is certainly a contributing factor, as well as the general conditions in these settlements, access to adequate post-natal health care, and sufficient nutritional intake. However, additional workload of having an infant

and continuing to work could add to increased energy expenditure that is not balanced by increased energy intake.

Child malnutrition rates were similar to the CDHS (2010) prevalence. Levels of acute malnutrition are high (11.2%) but there was no severe acute malnutrition reported. That is not to say that the situation is not concerning. MUAC measurements of children were not conducted well and would suggest that using this as a screening tool to identify malnourished cases requires close oversight. Bad practices by those taking the MUAC measurement should be considered as a supervision issue, which requires close attention when MUAC is used in programming or future surveys. It is important that screening activities are maintained throughout the year, particularly during the rainy season when risks are higher.

The immediate, underlying, and basic contributors of acute malnutrition (as outlined in the conceptual framework used for this survey; Figure 2) have been thoroughly researched. This survey analysis is thus intended to identify the factors that have the strongest influence in this community. However, the data did not provide clear guidance directing us to any specific area, for assistance or intervention, of the conceptual framework for this acute malnutrition. Acute malnutrition was, however, associated with expenditure poverty. The possible mechanisms underlying this are that households

are expending less money, particularly on food; this increases the risk of acute malnutrition. However, in the survey data the effect of poverty is relatively weak. Food stress (as measured by the CSI indicator and reflecting a reduction in food availability in the household) also appears to result in increased prevalence of malnutrition as well as reduced expenditure on food.

This, combined with the CDHS (2010) data observing similarly high rates of acute malnutrition in the general population of Phnom Penh, would suggest that poverty isn't the strongest driver of increased acute malnutrition. Focus on dealing with acute malnutrition in these communities should remain wide and consider all aspects of the conceptual framework.

From discussions with the primary caretakers of children it seems that there is a reasonable knowledge of feeding practices. However, it would seem that there is a gap between knowledge and the ability to provide adequate food. In addition, grandmothers acted as the primary caretaker for 25% of the children in the survey. This is likely to have an effect on how children are fed as well as breastfeeding practices.

2 HEALTH SECTOR AND WASH

PPWSA water is treated, and it is likely that any piped water is from this source, and thus most of the water accessed in these communities is likely to be rela-

tively safe. One particular observation is the availability of ceramic filters, used to purify water. Due to the low frequency of reporting, little else can be said about this, but the filters may have been provided by external assistance, as such approaches to water treatment are uncommon. Increased frequency of the use of treatment for even relatively safe water would suggest that either experience has proven that the water is associated with illness or that the general understanding is that any water is unsafe and requires treatment. Whether this is true or not, boiling water requires energy and therefore expense to the household.

Although hand-washing compliance is quite high the use of detergent is perhaps an additional expense and possibly results in small amounts being used (and being less effective). There are opportunities for income generating activities for the production of soap locally if it can be done safely and relatively cheaply. However, the preference for detergent may be a cost cutting exercise and so these households may not be interested in purchasing soap, even if locally produced.

With around 15% of households using unimproved sanitation and 12% not using any facility at all, there are serious implications for public health; particularly in the rainy season as such communities are prone to flooding. This has clear implications for nutritional status, normally associated with acute

malnutrition. The data was collected during the dry season and associations between acute malnutrition and diarrhoea were not observed. However, there was a two and a half-fold increase in risk of diarrhoea for children in households without improved sanitation and a two-fold increase in risk for children to be stunted. This analysis should be taken as indicative only, as both compared events (stunting, diarrhoea) occur frequently in the population and this reduces the reliability of the Odds Ratio analysis⁶¹.

Practically all the children included in the survey were reported to have had either diarrhoea, cough or fever in the two weeks prior to the survey interview.

It is important that access to health care and improvements in the environmental health are considered within these urban poor settlements with a degree of urgency. Poor Measles vaccination (and vitamin A) coverage is less than the target of 80% coverage⁶² and is something to be addressed. This could either be poor recording in the vaccination cards or a gap in the coverage of these settlements. The importance of education of the parents was clearly an important factor in the child being fully vaccinated (the father's education being more important than the mother's level of education, which may indicate where the decision making lies).

⁶¹ <http://bmj.com/cgi/content/full/317/7168/1318>

⁶² <http://www.measlesrubellainitiative.org/learn/the-solution/the-strategy/>

3 EDUCATION

Adult education is perhaps a neglected area. It is very clear from the analysis that households with higher levels of education were better off and had better access to food. It could be suggested from the data that better decision-making is associated with improved education, as exemplified in the improved vaccination status of children. However the level of education expresses itself, it is clear that adult education is an important influence on the household and level of poverty. The increase in the percentage of expenditure on education of poorer households would suggest that the importance of education is understood and even poorer households maintain children in school regardless of the cost. However, the additional strain of the informal payments to poorly paid teachers is one that could be directed to food or healthcare.

4 LABOUR & FOOD SECURITY

From an analysis of the main income activity of the households it was clear that the most vulnerable households were those that relied financially on waste picking (or recycling activities) and cart pullers. They are experiencing similar levels of food stress (as measured by CSI) as households having experienced floods in rural Cambodia during late 2011 / early 2012. There are clearly very vulnerable households within these communities. Whilst other groups are

vulnerable it is likely that this is a case-by-case issue and that there are plenty of other households that are vulnerable that could not be defined simply by their main income activity.

With a large number of households having more than one income source (67%), this is likely to put pressure on caretaking of children. This also shows that income sources from "main" income source are unlikely to be adequate. The lack of association between wealth groups and number of income groups could suggest that income diversification is simply a way of meeting minimum needs rather than expanding wealth in these communities, the premise being that households with more incomes should have more capital wealth.

In the analysis the lack of relationship between asset wealth and expenditure poverty could be explained, for example, by a relatively recent change in circumstance of the "wealthier" households. That is, falling upon harder times without a household yet resorting to selling material wealth (non-productive capital assets). However, this depth of information was not collected in the survey.

When it comes to engaging in income generating activities (or even future surveys) this should be taken into consideration, in that people are already busy trying to make sufficient money to live on. Livelihood based programming should provide either added value to existing incomes or long term,

sustainable alternatives to activities currently engaged in. For example skilled construction workers appeared to be much better off than construction workers without any (declared) skills.

Throughout the poverty groups almost all of the household's food supply comes from purchase (94% on average) in the markets. As such, household food security is vulnerable to fluctuations in market prices. This vulnerability leads to a larger proportion of total income being spent on food and not being available for other important areas, such as health care, rent, education etc.

Ownership of motorbikes was high even in the poorest of the households (either by wealth or by expenditure). The importance of this mode of transportation may be linked to livelihoods and could then be an entry point into assistance in terms of repair facilities or cheap rental facilities (not to say that adding to traffic is a desirable outcome or intended consequence of any recommendation from this report).

5 HOUSEHOLD DYNAMICS

Some simple observations of the dynamics of the household structure would suggest that female-headed households are more vulnerable and poorer than male-headed households. In addition, larger households are not necessarily more likely to be poor. It would appear that households with high dependency ratios are also those that are least well off. The reason for households with such structure is not clear from the survey. However, poorer households tend to have younger household heads. Physical impairment was not commonly present in the population and therefore the influence of this factor could not be adequately explored. However, the types of income generating activities in which these households participate may be less economically productive, although the evidence for this is anecdotal and the data does not provide strong statistical evidence for this.

6 LOANS AND DEBT

The level of debt in poorer households is generally low, most households with loans of less than \$100. However, purchasing food on credit is more common in poorer and less wealthy households, although the interpretation of the observations in the wealth quintiles is more complicated, due to the fact that material wealth is not necessarily connected to poverty defined by expenditure. From information gathered during the community interviews interest rates are incredibly high (20-30% of the initial loan). Repayments are a considerable percentage of total expenditure and, given the interest rates, much of this is money that could be put to better use. A more thorough investigation of the microfinance systems and loans may shed more light on how poor households access credit facilities, their regulation, and if any improvements can be made to this situation, particularly in terms of equitable terms of loans.





06

RECOMMENDATIONS

1 NUTRITION AND FEEDING PRACTICES

- **Women of reproductive age, a key target group to prevent child malnutrition:** As highlighted in the survey, 16% of pregnant women were at risk of giving birth to low birth weight children. Therefore there is the need to support nutrition counselling, calcium supplementation and weight monitoring during pregnancy to ensure the optimal development of the foetus. Upstream interventions to prevent low BMI should also be tested to ensure nutritious foods are consumed. Those sets of interventions are already promoted in the latest Fast Track Road Map for improving Nutrition (2014-2020) launched by the Minister of Health. Urban poor settings should be the starting point of future national scale-up.
- **Continue mass screening:** Routine growth monitoring is a critical first step to ensure that severely acute malnourished children are referred to health facilities. In addition, other services can be provided during those monitoring visits such as deworming, MNP and/or vitamin A supplementation. In the meantime community



ers conducted by Nutrition Works in June 2014 there is a clear need for developing new ways of communication with dispersed and hard to reach urban poor populations. The mHealth model developed by PIN in the rural areas is a good example of a technology based solution that is easily transferable to the urban context and could tackle the challenge⁶³, particularly through focusing on improving post natal care and associated visits to the health centre.

2 HEALTH SECTOR & WASH

- based solution to manage moderate acute malnourished children and severely and moderately underweight children should be identified and tested.
- **Behaviour change campaigns to encourage families to prepare nutritious meals:** The evidence from this survey shows that a significant amount of families' income is spent on snacks and sweets which have a low nutritional value. One of the activities to consider is a city wide, visually attractive, trend setting campaign involving celebrities and respected individuals. The use of social marketing tools for behaviour change, especially among young parents is potentially significant.
 - **Positive deviance:** For children in poor communities, positive deviance models have been effective in pro-

viding meal models allowing women to manage food acquisition with limited budget and still maintain healthy, well-nourished children. It is recommended that further review of the evidence on positive deviance models is undertaken to inform how this might bridge the gap between knowledge and practice in urban poor settlements.

- **Creating urban focused mass media messages:** To date in Cambodia, most of the nutrition messages are linked to rural settings and therefore it is difficult for the urban population to feel engaged with the issues raised in the TV or radio spots. Developing partners and the Government need adapt materials for those targeted groups.
- **Innovations and mHealth:** Based on interviews with various stakehold-

- Establishing health referral links in the urban poor communities:

The 2009 UNICEF Health Service Access among Poor Communities in Phnom Penh report finds that the vast majority of the urban poor population have access to health facilities, although this remains limited for the most vulnerable groups, for reasons including stigma and high unofficial costs of services⁶⁴.

⁶³ Evidence from PIN mHealth program implemented in the rural areas in Kampong Chhnang indicates new avenues for supporting hard to reach, dispersed populations in an environment where more than 90% of the population has access to mobile phones (Open Institute, 2014)⁶³. According to PIN research more than 60% of young mothers applied at least 2 voice messages sent to their (or their family members) mobile phones by PIN. The messages included series of understandable and culturally adapted post natal health advices. Based on this initial success, PIN develops additional content covering 1000 days of pregnancy and first 2 years of life of a child, including nutrition and reproductive health related information. While there are many similarities, voice messages for urban women may have to be further adjusted.

- **Continue providing training to community health workers:** While Urban Poor Women Development (UPWD) Health Workers in the urban poor communities are fairly well trained and knowledgeable regarding reproductive health, they currently do not provide advice on neo and post natal care or nutrition. Providing further training and support to those individuals is therefore strongly recommended.
- **Advocacy for stronger partnership and coordination of environmental sanitation improvements in urban poor settlements:** Development partners shall channel their advocacy efforts through the recent initiative of Phnom Penh Municipality i.e. Urban Poor Poverty Reduction Working Group, bringing additional opportunities for a coordinated response to the sanitation crisis in the city and strengthening the voice of Civil Society Organisations. Effective collaboration between Phnom Penh Municipality, Development Partners, Private Sector and communities can stimulate more investment in housing and sanitation infrastructure. Accompanying promotional campaigns and law enforcement will further lead to improvement of living conditions for the urban poor.
- **Behavior change campaigns:** Link all three WASH key messages (always use toilet for defecation, washing hand with soap at critical times and always drink safe water) to any health interventions or outreach activities.
- **Vaccination campaign:** lower than national average rates of childhood vaccinations are present in the communities assessed. It is recommended that a 'catch-up' campaign for childhood vaccinations is implemented, with particular focus on measles vaccination.
- **Small loans, entrepreneurship trainings, saving groups:** The lessons learnt from the past projects involving small loans provision, entrepreneurship trainings and support for savings groups shall be thoroughly studied as such actions produced mixed results and have often failed to generate positive outcomes for the poorest category of beneficiaries.
- **Supporting community organising and advocacy:** training and coaching support for community organising and advocacy can help to empower communities coordinate and negotiate with relevant authorities to improve their accessibility to clean water, electricity, health services, education and a clean environment. For example, UPWD experience with training urban poor groups on advocacy skills, community organising, and community action planning and facilitation have improved the voice and engagement of urban poor groups with local authorities, and have resulted in tangible health benefits including greater access to health services, waste collection systems and infrastructure.
- **Addressing the informality of labour:** it is important to keep the main focus on developing existing markets even if they are informal. Agencies shall study feasibility of their formalisation as this can lead to improved protection mechanisms

3 EDUCATION

- **Link pre-school education, vaccination, WASH and nutrition:** In those urban communities, comprehensive preschools where children 24-59.9 months old receive nutritious food supplements, deworming, health screening and referrals, and access to clean water could be a good entry point to prevent stunting.

4 LABOUR & FOOD SECURITY

- **Scaling up vocational trainings programmes:** existing programmes run by national and international NGOs (e.g. Friends) bring tangible benefits and should be continued and scaled up, especially when combined with employment opportunities and based on market analysis.

⁶⁴ Urban Poor Women Development's (UPWD) program implemented across 25 urban poor communities in Phnom Penh proves that supporting community health workers through establishing links to health centres and posts' staff nearest to the urban poor settlement is an effective way for improving access of urban poor to health system.

and access to social insurance. On the other hand, studies from other countries show that formalisation processes may become very sensitive and it can be unwelcomed by the urban poor dwellers due to the trust gaps between them and duty bearers.

- **Strengthen the awareness and application of labour rights.** The working conditions and rights of formal workers can have a significant impact on their health and nutrition. For example, in Cambodia's garment factories, one of the leading causes of mass fainting - a regular occurrence in Cambodian garment factories - has been found to be poor or insufficient nutrition, which stems from low wages amongst other factors⁶⁵. Concerted efforts are required from the private sector, industry bodies and the RGC to improve industry standards, labour law compliance and awareness of and respect of worker's rights in the formal sector. This includes the upscaling of best practice interventions, such as the implementation of meal programmes, which have been proven to improve both the productivity and nutritional status of workers in the garment industry.

- **Urban agriculture** is another concept gaining recognition worldwide though it has not been widely explored and/or tested in Cambodia. Further research and/ or small pilot project generating evidence on the impact should be encouraged and supported. For example, the seasonal production of vegetables by some of Phnom Penh's riverside communities provides important nutritional and livelihood benefits to the households involved in these activities. There is a potential for these production practices to be upscaled and replicated in other areas.

5 LOANS AND DEBT

- **Financial Education:** 69% of the surveyed households reported significant levels of debts. On average 16% of incomes go to managing families' debts. Many families reported having problems with paying money back. Financial education programs and campaigns bringing more awareness and advice to the urban poor results in better informed financial decision making, more manageable levels of debt, and improved household budget management. However, more formative studies are required to better understand how loans are being spent by the urban poor, and to design appropriate responses to address this. While we need to recognise that access to credit is in principle

very positive and can foster entrepreneurship as well as serve as a coping mechanism during the time of shocks, urban poor very often become prey for loan sharks and/ or fall into a vicious cycle of unmanageable debts offered by MFIs and moneylenders. While support for income generation activities can improve the financial decision making power and options available to poor families, this needs to be combined with financial education to ensure better planning and responsible spending practices.

6 FURTHER RESEARCH

- Further research is needed to investigate the degree of poverty in each of the settlements identified in the list of "urban poor" settlements. This should also include an indication of why better off households are located in such areas.

⁶⁵ Labour Behind the Label and Community Legal Education Centre, 'Shop 'til they drop: Fainting and Malnutrition in Garment Workers in Cambodia' (Report) (September 2013).



07

ANNEXES & TABLES

1 SURVEY METHODOLOGY

1.1 SURVEY DESIGN

The assessment was carried out using a population-based survey of urban settlements using two-stage random cluster sampling with urban settlements as the primary sampling unit. The first stage allocation of clusters using probability proportional to size and the second stage using simple randomization techniques (detailed later in this document). The methodology is based along the Standardised Monitoring and Assessment of Relief and Transitions (SMART), and used the Emergency

Nutrition Assessment tool for planning and analysis.

Sample Size

The size of the sample was based on the prevalence of stunting estimated in the urban poor areas. Stunting was used to calculate the sample size because of its higher prevalence in the population which gives a larger sample size than that for wasting (weight for height). Thus the degree of precision will be higher for wasting.

The sample size was calculated using the following formula used to estimate prevalence.



Indicator	Est. prevalence*	Est. DEFF	Desired precision	No. of target children / HH	Number of HH Required	Non-Response Rate	Total No. Of HH
Wasting	0.11	1.2	0.052	0.47	430	0.02	438
Stunting	0.35	1.2	0.079	0.47	432	0.02	441

Table 6 : Sample Size Calculation

*proportion estimations based on CDHS 2010 data

$$n = \frac{1.96^2 (p \times 1-p)}{d^2} * DEFF$$

n: minimum sample of households required

DEFF: estimated design effect

p: estimated prevalence of indicator (as a proportion of 1)

d: desired precision

A non-response estimate of 2% of children was added to the final total so as to ensure sufficient sample size by the end of the data collection, and to reduce increased bias from reselection of households.

Table 6 shows the assumptions made for each of the stratifications:

The total sample size for the survey was 34 clusters x 13 households = **442**

Sampling

The first stage of the sampling process used the list of settlements identified of the urban poor. A selection of clusters was made according to probability proportional to size. This was achieved by dividing the total number of households in the survey population by the number of clusters to provide the sampling interval.

A random number was chosen between 1 and the sample interval (inclusive) to indicate the first cluster. The settlement in which this lay is where this number is in the cumulative population number of the settlements as listed. Adding the sampling interval to the previous figure identified each subsequent cluster (and settlement). In some cases there were multiple clusters per settlement.

The second stage was one of two simple random sample techniques, depending on the information available for that settlement.

For settlements where lists of households were available:

- i. The total number of households was confirmed and each was given a unique number.
- ii. The total number of households was communicated to the overall supervisor and, using a random number generator, they provided the necessary random numbers for the sample to be taken.
- iii. These numbers identified the households to be interviewed from the list and the community leader / focal point assisted in identifying the household.

For settlements that did not have a list the process was similar.

- i. A rough map of the settlement was made, identifying the streets/alleys/paths within it.
- ii. An estimate of the total number of households was confirmed with the community leader / focal point.
- iii. The total number of households was communicated to the overall supervisor.
- iv. A systematic sampling approach was taken using the total number of households divided by the sample required to attain the sampling interval (X). A random number between 1 and the sample interval was randomly assigned (inclusive) as the first number (Y). The sample interval

was added to the first number to identify the second number (Y + X) and so on. These numbers were then communicated back to the team supervisor via SMS.

- v. The first household was selected by starting at an entry point to the settlement (a road or alley) and counting the number of households on the left until reaching the first randomly assigned number.
- vi. The second household was found by continuing to count households that the team past on the left until reaching the next number assigned, and so on.
- vii. By choosing left each time the map could be covered relatively easily. When any given section was completed, by returning to the same starting point or coming full circle, the team started in a different direction until all the households were covered, and the sample was complete.

Exclusions

Children aged 6-59 months who were physically handicapped were not included for anthropometric measurement. This was due to the difficulties in ensuring accurate height/length measurements of these individuals.

Informed Consent & Refusals

All respondents were informed about the purpose and the benefits of this study before conducting the interview

or focus group discussion with them. Each respondent was asked to sign a consent form (stating confidentiality) if she agreed to participate in the survey. Respondents had the right to refuse to participate in the survey or refrain from answering any question they might not want to answer.

Geographical Coverage

The assessment covered settlements located in the five Khans⁶⁶ of Phnom Penh that lie outside of the inner city area. These areas are the newer parts of the city and are the location of the more recent arrivals, as well as those that have been relocated from the inner parts of the city.

Study population

The assessment population was households located in settlements described as urban poor. Such settlements are defined by UNCHR as:

- a. A group of ten or more adjacent households whose housing structures are of visibly poor quality, and/or whose homes have been laid out in a non-conventional fashion without adherence to a ground plan.
- b. In addition, the lack of one or more of the following criteria:
 - i. Durable housing of a permanent nature that protects against extreme climate conditions

⁶⁶ A Khan is administrative unit 3

- ii. Sufficient living space, which means not more than three people sharing the same room
- iii. Easy access to safe water in sufficient amounts at an affordable price
- iv. Access to adequate sanitation in the form of a private or public shared toilet by a reasonable number of people
- v. Security of tenure that prevents forced evictions

1.2 QUESTIONNAIRE DESIGN

Data was collected using two questionnaires. The household questionnaire focused on household attributes, access to amenities, and food access. The child questionnaire focused on child health, nutritional status, and infant and young child feeding practices. Internationally recognized indicators were used to assess diet⁶⁷, WASH⁶⁸, food access⁶⁹, and nutritional status⁷⁰ to ensure the information relating to the household's and individual's circumstances are adequately represented and the information can be interpreted for action.

⁶⁷ <http://www.fao.org/docrep/014/i1983e/i1983e00.pdf>

⁶⁸ http://www.childinfo.org/files/MICS4_Manual-Instructions_for_Interviewers.doc

⁶⁹ http://home.wfp.org/stellent/groups/public/documents/manual_guide_proced/wfp211058.pdf

⁷⁰ http://smartmethodology.org/documents/manual/SMART_Methodology_08-07-2006.pdf

⁷¹ In statistical significance testing, the p-value is the probability of obtaining a test statistic result at least as extreme as the one that was actually observed, assuming that the null hypothesis is true. A researcher will often "reject the null hypothesis" when the p-value turns out to be less than a predetermined significance level, often 0.05 or 0.01. Such a result indicates that the observed result would be highly unlikely under the null hypothesis." from wikipedia <http://en.wikipedia.org/wiki/P-value>

1.3 SURVEY TEAMS

There were five teams of six people. Three were dedicated to carrying out the household interviews and two dedicated to measuring children and conducting the interview for the data in the child questionnaire along with the supervisor.

The teams were designated settlements to visit and randomly selected the households for interview. Once the data collection was complete, the team moved to the next settlement. The supervisor was required to check the survey before the enumerator left the household to go to the next. In households with children aged 6-59 months the supervisor ensured that the measurement team came to the household to complete the information required.

Training & Testing

All of the enumerators were trained in the questionnaires that required completion in the assessment over a period of 4 days. Some of the enumerators were designated as measurers to take anthropometric measurements of children (and women aged 14-49 years who were pregnant or lactating). They received practical training and were tested on accuracy and precision using a "standardization test" module in the ENA software. The household interviewers gained practical experience by interviewing households in a location outside the selected survey communities for one day.

All enumerators were expected to achieve a very good standard before commencing the data collection.

Fieldwork

The data collection occurred over a period of 8 days, from the 21st April 2014 to 28th April 2014.

Supervision

There were five supervisors overseeing the sampling and data quality, in addition to the enumerators, one per team. Further supervision was provided by UNICEF and the lead consultant.

1.4 DATA HANDLING

Data entry was done using a double entry technique and data entered into SPSS. Where discrepancies were located the errors were checked against the original forms and corrected before final use of the data for analysis.

During the analysis stage the data was checked for consistency of responses and plausible answers. In the case that implausible answers were found they were excluded from the analysis of that indicator.

Data Analysis

Data analysis of the anthropometric information was carried out using Emergency Nutrition Assessment software and the main analysis carried out using SPSS.

Associations were examined between variables and where significant have been highlighted in the text, with p-values⁷¹ recorded.

2 ASSET OWNERSHIP BY WEALTH QUINTILE AND POVERTY QUINTILE

Item/Indicator	Poorest (n=83)	Second (n=84)	Middle (n=84)	Fourth (n=84)	Better Off (n=84)
HH Size	6.4	6.4	5.4	5.3	4.2
Head of HH Age	45.4	47.7	45.0	49.1	44.8
HH Head Physically Disabled	2.4%	6.0%	3.6%	1.2%	3.6%
Dependency Ratio	1.06	0.753	0.653	0.614	0.622
Indicator of Wealth (smaller is poorer)	-1.445	-0.033	-0.230	0.564	1.048
Household Dietary Diversity Score (12 Food Groups)	6.2	7.2	7.0	7.3	7.7
Reduced CSI Variable	14.1	9.1	7.9	6.3	4.6
Total Food Expenditure (% of Total)	51.1	41.7	43.6	37.9	28.9
1. Electricity?	84.3%	97.6%	97.6%	100.0%	98.8%
2. A radio?	16.9%	33.3%	23.8%	39.3%	33.3%
3. A CD or DVD player?	15.7%	44.0%	46.4%	46.4%	67.9%
4. A television?	66.3%	83.3%	95.2%	95.2%	92.9%
5. A mobile telephone?	72.3%	88.1%	92.9%	95.2%	96.4%
6. A fixed phone?	2.4%	4.8%	13.3%	9.5%	16.9%
7. A refrigerator?	1.2%	3.6%	16.7%	15.5%	24.1%
8. A table?	30.1%	57.1%	53.6%	58.3%	77.4%
9. A chair?	33.7%	56.0%	58.3%	61.9%	75.0%
10. A sofa set?	0.0%	1.2%	3.6%	2.4%	6.0%
11. A bed?	68.7%	75.0%	58.3%	73.5%	81.0%
12. A cupboard/wardrobe?	21.7%	52.4%	47.6%	62.7%	71.4%
13. A clock?	24.1%	38.1%	34.5%	44.0%	53.0%
14. A bicycle?	45.8%	52.4%	47.6%	59.5%	49.4%
15. A motor-scooter or motorcycle?	38.6%	66.7%	71.4%	72.6%	84.5%
16. Generator/Batter/solar?	1.2%	0.0%	2.4%	3.6%	2.4%
17. Sewing Machine?	4.8%	4.8%	8.3%	7.2%	20.2%
18. A watch?	9.6%	25.0%	17.9%	28.6%	36.9%

Table 7: Poverty Quintiles (Percentile Group of Tot. Expenditure)

Item/Indicator	Poorest (n=84)	Second (n=83)	Middle (n=83)	Fourth (n=83)	Better Off (n=78)
HH Size	5.1	5.9	5.4	5.7	5.6
Head of HH Age	41.4	45.0	46.3	47.4	51.2
HH Head Physically Disabled	2.4%	2.4%	3.6%	3.6%	3.9%
Dependency Ratio	1.107	0.781	0.602	0.572	0.649
Indicator of Wealth (smaller is poorer)	-2.950	-1.346	-0.048	1.062	3.342
Household Dietary Diversity Score (12 Food Groups)	5.9	6.9	7.1	7.8	7.8
Reduced CSI Variable	12.3	9.7	9.9	5.7	4.7
Total Food Expenditure (% of Total)	48.5	43.4	37.8	38.4	35.5
1. Electricity?	84.5%	97.6%	97.6%	98.8%	100.0%
2. A radio?	3.6%	13.3%	18.1%	39.8%	70.5%
3. A CD or DVD player?	3.6%	21.7%	42.2%	65.1%	87.2%
4. A television?	51.2%	88.0%	97.6%	96.4%	100.0%
5. A mobile telephone?	64.3%	92.8%	91.6%	96.4%	100.0%
6. A fixed phone?	4.8%	6.0%	9.6%	9.6%	17.9%
7. A refrigerator?	0.0%	6.0%	4.8%	13.3%	35.9%
8. A table?	15.5%	33.7%	57.8%	77.1%	94.9%
9. A chair?	14.3%	31.3%	66.3%	81.9%	91.0%
10. A sofa set?	0.0%	0.0%	0.0%	0.0%	12.8%
11. A bed?	23.8%	71.1%	78.3%	88.0%	94.9%
12. A cupboard/wardrobe?	7.1%	25.3%	57.8%	72.3%	92.3%
13. A clock?	4.8%	14.5%	49.4%	43.4%	79.5%
14. A bicycle?	19.0%	47.0%	57.8%	60.2%	71.8%
15. A motor-scooter or motorcycle?	33.3%	57.8%	68.7%	81.9%	93.6%
16. Generator/Batter/solar?	0.0%	0.0%	0.0%	2.4%	7.7%
17. Sewing Machine?	4.8%	4.8%	8.4%	16.9%	9.0%
18. A watch?	2.4%	4.8%	16.9%	33.7%	61.5%

Table 8 : Wealth Rank (Quintiles from PCA of Asset Ownership)

Item/Indicator	Above the Absolute Poverty Line (\geq \$1.58) (n=297)	Below absolute poverty line ($<$ \$1.58) (n=122)
HH Size	5.1	6.6
Head of HH Age	46.2	46.9
HH Head Physically Disabled	3.1%	4.1%
Dependency Ratio	0.64	0.98
Indicator of Wealth (smaller is poorer)	0.399	-1.047
Household Dietary Diversity Score (12 Food Groups)	7.3	6.5
Reduced CSI Variable	6.8	12.3
Total Food Expenditure (% of Total)	37.6%	47.8%
1. Electricity?	98.7%	88.5%
2. A radio?	32.7%	21.3%
3. A CD or DVD player?	52.5%	23.8%
4. A television?	93.6%	69.7%
5. A mobile telephone?	93.6%	77.9%
6. A fixed phone?	11.5%	4.1%
7. A refrigerator?	16.2%	2.5%
8. A table?	63.6%	35.2%
9. A chair?	64.6%	38.5%
10. A sofa set?	3.4%	0.8%
11. A bed?	71.6%	70.5%
12. A cupboard/wardrobe?	59.1%	32.0%
13. A clock?	43.6%	27.0%
14. A bicycle?	52.7%	46.7%
15. A motor-scooter or motorcycle?	74.4%	48.4%
16. Generator/Batter/solar?	2.4%	0.8%
17. Sewing Machine?	11.1%	4.1%
18. A watch?	27.3%	14.8%

Table 9: Absolute Poverty Line ($<$ \$1.58) for Phnom Penh

		No Debt	1-50USD	51-200USD	201-400USD	>400USD
Estimated Poverty Levels	Above Poverty line	31.7%	7.5%	17.4%	9.6%	33.8%
	Absolute Poverty Line or below	29.4%	16.8%	27.7%	6.7%	19.3%
Poverty Quintiles (Total Expenditure / Capita)	Poorest	30.9%	21.0%	27.2%	6.2%	14.8%
	Second	25.3%	12.0%	27.7%	6.0%	28.9%
	Middle	34.1%	8.5%	15.9%	13.4%	28.0%
	Fourth	28.9%	7.2%	18.1%	7.2%	38.6%
	Better Off	36.1%	2.4%	13.3%	10.8%	37.3%
Wealth Rank	Poorest	20.5%	22.9%	26.5%	8.4%	21.7%
	Second	25.0%	8.8%	32.5%	12.5%	21.3%
	Middle	24.7%	9.9%	18.5%	8.6%	38.3%
	Fourth	36.1%	4.8%	16.9%	9.6%	32.5%
	Better Off	50.0%	5.1%	7.7%	3.8%	33.3%

Table 10: Debt Levels by Poverty / Wealth Groups

3 INCOME ACTIVITIES

	% HH under stated poverty lines			Wealth Score (Lower is worse)	HDDS (12Gps)	Dependency Ratio (Higher is worse)	Reduced CSI (Higher is worse)	Main Income (% of HH)
	N	<\$1.25 / day / capita	<\$1.58 / day / capita*					
Entertainment Worker	1	100.0%	100.0%	0.956	6.0	0.33	12.0	0.2
Waste Picker	20	80.0%	80.0%	-2.047	6.5	1.33	16.3	4.8
Cart Puller	2	50.0%	50.0%	-0.612	7.0	1.00	21.5	0.5
Construction Worker	72	38.0%	39.4%	-1.171	6.7	0.83	10.7	17.1
Agricultural Worker	6	33.3%	33.3%	-0.273	6.5	1.12	13.0	1.4
Factory Worker	70	32.9%	40.0%	0.008	6.9	0.62	8.5	16.7

Traders (Small shop / Street Vendors)	55	29.1%	32.7%	-0.179	7.3	0.80	8.3	13.1
MotoDop / Tuk Tuk Drivers	67	23.9%	22.4%	0.151	7.3	0.74	7.6	16
Other	23	17.4%	21.7%	0.601	7.7	0.66	8.2	5.5
Remittance	6	16.7%	16.7%	1.424	6.0	0.90	8.3	1.4
Formal / Public Sector Workers	77	9.1%	6.5%	1.176	7.5	0.56	4.4	18.3
Skilled Labour	18	5.6%	11.1%	0.574	7.4	0.79	6.7	4.3
Domestic Worker	2	0.0%	0.0%	-3.926	4.0	0.00	11.5	0.5
Fisherfolk	1	0.0%	0.0%	1.999	7.0	0.00	9.0	0.2

Table 11: Indicators by Main Income Activity of Household

	Men	Women
Factory Worker	10.7%	36.6%
Waste Picker	4.0%	4.2%
Cart Puller	2.0%	0.4%
Construction Worker	29.3%	3.0%
Domestic Help	0.0%	2.7%
Agricultural Worker	1.0%	1.2%
Entertainment Worker	1.1%	1.1%
Remittance	0.5%	0.7%
Other	13.0%	14.2%
Formal / Public Sector Workers	14.3%	7.5%
MotoDop / Tuk Tuk Drivers	14.4%	0.6%
Traders (Small shop / Street Vendors)	6.3%	24.8%
Fisherfolk	0.3%	0.4%
Skilled Labour	3.2%	2.6%

Table 12: Other Adults in the household income activities (% of Households)

4 WATER & SANITATION

	N	%
Improved water source		
Piped water	247	58.8
PPWSA piped water	93	22.1
Purified water (bottle or container)	38	9.0
Pump well	8	1.9
Private piped water through an external supplier / middleman	6	1.4
Non-Improved Water source		
Water bought from a vendor or tanker truck	14	3.3
Pond, rice field, river	9	2.1
Open Well	1	.2
Other (specify:)	4	1.0
Total	420	100.0

Table 13: Where do you usually get the water which people drink?

Water Source for Household		
Water Treatment	Non-Improved Water Source	Improved Water Source
Boil	80.0%	77.0%
Add bleach or chlorine	5.0%	2.2%
Straining through a cloth	0.0%	0.0%
Use water filter (ceramic / sand / composite etc.)	15.0%	19.7%
Solar disinfection	0.0%	0.0%
Let it stand and settle	0.0%	1.1%
Other (specify)	0.0%	0.0%
Don't know	0.0%	0.0%

Table 14: Water Treatment according to Source Type

	n	%
Flush or pour flush toilet	359	85.5
Traditional pit latrine (no water)	2	0.5
Open or partly open pit (no roof or wall)	3	0.7
Bucket latrine	3	0.7
No Facility/ Open water/ bush/ field	44	10.5
Burying in back yard	8	1.9
Other	1	0.2
Total	420	100.0

Table 15: Frequency of Sanitation types reported

5 HOUSEHOLD DIETARY DIVERSITY

⁷² <\$1.58 /per capita / day

	Absolute Poverty ⁷²		Poverty Ranks (Quintiles of Total Exp. per Capita)					Wealth Rank (Quintiles of PCA of Asset ownership)				
	Above	Below	Poorest	Second	Middle	Fourth	Better Off	Poorest	Second	Middle	Fourth	Better Off
Cereals	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
White Tubers & Roots	7.1%	5.7%	2.4%	8.3%	7.1%	7.1%	8.3%	7.1%	6.0%	2.4%	7.2%	11.5%
Vegetables	86.9%	72.1%	73.5%	77.4%	83.3%	91.7%	86.9%	71.4%	78.3%	86.7%	91.6%	84.6%
Fruits	56.2%	50.0%	43.4%	53.6%	53.6%	51.2%	70.2%	32.1%	50.6%	51.8%	62.7%	76.9%
Meat	64.6%	45.9%	41.0%	59.5%	63.1%	61.9%	70.2%	46.4%	56.6%	50.6%	72.3%	69.2%
Eggs	42.1%	39.3%	37.3%	50.0%	45.2%	36.9%	36.9%	31.0%	45.8%	38.6%	45.8%	48.7%
Fish and Other Seafood	78.5%	79.5%	83.1%	73.8%	76.2%	83.3%	77.4%	70.2%	80.7%	83.1%	81.9%	76.9%
Legumes, Nuts and Seeds	15.8%	10.7%	6.0%	16.7%	14.3%	14.3%	20.2%	6.0%	14.5%	20.5%	12.0%	17.9%
Milk and Milk Products	24.9%	19.7%	10.8%	29.8%	17.9%	26.2%	32.1%	11.9%	18.1%	22.9%	30.1%	32.1%
Oils and Fats	84.5%	75.4%	74.7%	81.0%	83.3%	82.1%	88.1%	64.3%	79.5%	84.3%	92.8%	88.5%
Sweets and Sugary Food	71.0%	57.4%	53.0%	70.2%	57.1%	71.4%	83.3%	46.4%	65.1%	69.9%	83.1%	70.5%
Spices, condiments and beverages	99.7%	99.2%	98.8%	100.0%	98.8%	100.0%	100.0%	98.8%	98.8%	100.0%	100.0%	100.0%
Vitamin A Rich Plants	83.2%	75.4%	72.3%	82.1%	77.4%	82.1%	90.5%	65.5%	77.1%	85.5%	88.0%	88.5%

Vitamin A Rich Meat	58.9%	53.3%	47.0%	66.7%	59.5%	53.6%	59.5%	42.9%	59.0%	56.6%	63.9%	65.4%
Iron-rich Food	98.3%	91.8%	92.8%	92.9%	98.8%	98.8%	98.8%	90.5%	97.6%	97.6%	98.8%	97.4%
HDDS (12 Food Groups)	7.3	6.6	6.2	7.2	7.0	7.3	7.7	5.9	6.9	7.1	7.8	7.8

Table 16: Food Consumption, by Main Food Groups, grouped by Poverty Indicators

6 HOUSEHOLD FOOD SOURCES

	Absolute Poverty ⁷³		Poverty Ranks (Quintiles of Total Exp. per Capita)					Wealth Rank (Quintiles of PCA of Asset ownership)				
	Above	Below	Poor-est	Second	Middle	Fourth	Better Off	Poor-est	Second	Middle	Fourth	Better Off
Gift	1.9%	4.5%	6.3%	2.0%	1.8%	1.9%	1.5%	4.1%	3.7%	2.7%	1.8%	1.2%
Purchased on Credit	1.6%	1.4%	1.5%	3.3%	2.4%	0.4%	0.3%	2.8%	1.4%	0.3%	2.7%	0.8%
Purchased with Cash	95.5%	89.6%	87.6%	91.9%	94.4%	97.3%	97.8%	89.3%	93.2%	94.9%	94.6%	96.9%
Borrowed	0.0%	0.1%	0.2%	0.0%	0.1%	0.0%	0.0%	0.3%	0.0%	0.0%	0.0%	0.0%
Scavenged	0.1%	0.9%	1.3%	0.2%	0.2%	0.0%	0.0%	0.9%	0.1%	0.7%	0.0%	0.0%
Hunting	0.2%	0.6%	0.6%	0.6%	0.6%	0.0%	0.0%	0.5%	0.8%	0.4%	0.0%	0.0%
Own Production	0.6%	2.8%	2.6%	2.0%	0.7%	0.4%	0.5%	2.2%	0.9%	0.9%	1.0%	1.1%

Table 17: : Percentage of Food Sources by Wealth and Poverty Groups

7 VACCINATION STATUS OF CHILDREN UP TO 24 MONTHS

Guidelines developed by the World Health Organization define children as fully vaccinated when they have received a vaccination against tuberculosis (BCG); three doses each of the diphtheria, pertussis, and tetanus (DPT) and polio vaccines; and a measles vaccination by the age of 12 months. BCG should be given at birth or at first clinical contact; DPT and polio require three vaccinations at approximately 4, 8, and 12 weeks of age. Measles should be given at or soon after 9 months of age. In 2006, the Cambodian National Immunization Program replaced the DPT vaccine with a tetravalent vaccine that includes DPT and Haemophilus influenzae type b vaccine (Hib) and a pentavalent vaccine that includes DPT, Hib, and hepatitis B vaccine (HepB). The program also administers HepB vaccine at birth or at first clinical contact (HB 0).

		6-11 months	12-23 months	CDHS (2010 Phnom Penh)
	BCG	95.8%	98.4%	96.6%
Tetravalent (DTP-HepB-Hib)	1	87.5%	95.3%	93.7%
	2	70.8%	81.3%	92.1%
	3	58.3%	70.3%	90.2%
	HB 0	70.8%	82.8%	91.5%
Polio (OPV)	1	83.3%	96.9%	93.7%
	2	75.0%	81.2%	92.1%
	3	56.5%	68.7%	90.2%
Japanese Encephalitis		0.0%	9.5%	-
Measles		25.0% ⁷⁴	69.2%	84.2%
All Basic		20.8%	56.9%	84.2%
No Basic		0.0%	0.0%	3.4%

Table 18: Vaccination Status of children <24months using information from vaccination card or mother's recall (5 cases)

⁷⁴For measles the age group is 9-11 months, since vaccination is not offered before 9 months.

8 NUTRITIONAL STATUS OF CHILDREN 6-59 MONTHS

% (95% Confidence Interval)	All (n = 259)		Boys (n = 144)		Girls (n = 115)	
	%	n	%	n	%	n
Prevalence of global malnutrition (<-2 z-score and/or oedema)	11.2 % (7.6 - 16.3)	29	12.5 % (8.0 - 18.9)	18	9.6 % (4.9 - 17.9)	11
Prevalence of moderate malnutrition (<-2 and >=-3 z-score, no oedema)	11.2 % (7.6 - 16.3)	29	12.5 % (8.0 - 18.9)	18	9.6 % (4.9 - 17.9)	11
Prevalence of severe malnutrition (<-3 z-score and/or oedema)	0.0 %	0	0.0 %	0	0.0 %	

The prevalence of oedema is 0.0 %

Table 19: Prevalence of acute malnutrition based on weight-for-height z-scores (and/or oedema) and by sex

Age	Total no.	Severe wasting (<-3 z-score)		Moderate wasting (>=-3 and <-2 z-score)		Normal (> = -2 z score)		Edema	
		No.	%	No.	%	No.	%	No.	%
6-12	36	0	0.0	5	13.9	31	86.1	0	0.0
13-24	70	0	0.0	6	8.6	64	91.4	0	0.0
25-36	53	0	0.0	3	5.7	50	94.3	0	0.0
37-53	71	0	0.0	12	16.9	59	83.1	0	0.0
54-59	29	0	0.0	3	10.3	26	89.7	0	0.0
Total	259	0	0.0	29	11.2	230	88.8	0	0.0

Table 20: Prevalence of acute malnutrition by age (months), based on weight-for-height z-scores and/or edema

% (95% Confidence Interval)	All (n = 259)		Boys (n = 144)		Girls (n = 115)	
	%	n	%	n	%	n
Prevalence of underweight (<-2 z-score)	35.6 % (29.7 - 42.0)	93	32.9 % (26.2 - 40.3)	48	39.1 % (28.9 - 50.5)	45
Prevalence of moderate underweight (<-2 and ≥-3 z-score)	31.4 % (25.7 - 37.8)	82	28.8 % (22.3 - 36.3)	42	34.8 % (24.4 - 46.8)	40
Prevalence of severe underweight (<-3 z-score)	4.2 % (2.4 - 7.4)	11	4.1 % (1.8 - 8.9)	6	4.3 % (1.6 - 11.3)	5

Table 21: Prevalence of underweight based on weight-for-age z-scores by sex

Age	Total no.	Severe underweight (<-3 z-score)		Moderate underweight (≥ -3 and <-2 z-score)		Normal (≥ -2 z score)	
		No.	%	No.	%	No.	%
6-12	35	0	0.0	6	17.1	29	82.9
13-24	70	7	10.0	15	21.4	48	68.6
25-36	54	2	3.7	8	14.8	44	81.5
37-53	72	4	5.6	19	26.4	49	68.1
54-59	29	0	0.0	8	27.6	21	72.4
Total	260	13	5.0	56	21.5	191	73.5

Table 22: Prevalence of underweight by age, based on weight-for-age z-scores

% (95% Confidence Interval)	All (n = 261)		Boys (n = 145)		Girls (n = 116)	
	%	n	%	n	%	n
Prevalence of stunting (<-2 z-score)	29.1 % (23.2 - 35.9)	76	33.1 % (25.4 - 41.9)	48	24.1 % (17.3 - 32.7)	28
Prevalence of moderate stunting (<-2 z-score and ≥-3 z-score)	22.2 % (17.1 - 28.4)	58	24.8 % (17.5 - 33.9)	36	19.0 % (13.3 - 26.2)	22
Prevalence of severe stunting (<-3 z-score)	6.9 % (4.6 - 10.2)	18	8.3 % (5.1 - 13.1)	12	5.2 % (2.4 - 10.9)	6

Table 23: Prevalence of stunting based on height-for-age z-scores and by sex

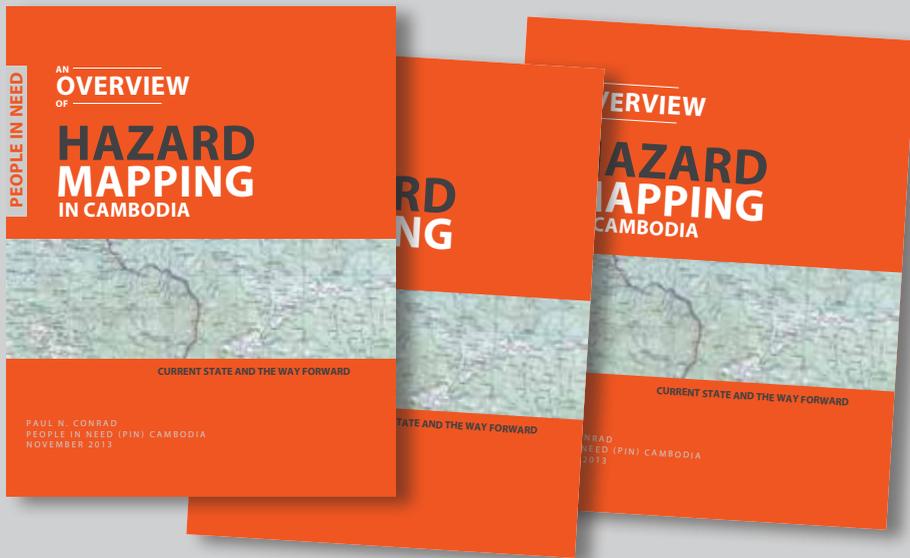
Age	Total no.	Severe underweight (<-3 z-score)		Moderate underweight (≥-3 and <-2 z-score)		Normal (≥-2 z score)	
		No.	%	No.	%	No.	%
6-12	36	0	0.0	2	5.6	34	94.4
13-24	69	9	13.0	19	27.5	41	59.4
25-36	54	2	3.7	14	25.9	38	70.4
37-53	72	5	6.9	17	23.6	50	69.4
54-59	29	2	6.9	6	20.7	21	72.4
Total	260	18	6.9	58	22.3	184	70.8

Table 24: Prevalence of stunting by age based on height-for-age z-scores

Indicator	n	Mean z-scores \pm SD	Design Effect (z-score <-2)	z-scores not available	z-scores out of range
Weight-for-Height	259	-0.96 \pm 0.91	1.15	13	4
Weight-for-Age	261	-1.46 \pm 0.91	1.45	12	3
Height-for-Age	261	-1.42 \pm 1.07	1.22	12	3

Table 25: Mean z-scores, Design Effects and excluded subjects

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