Millennium Cities Initiative

EARTH INSTITUTE | COLUMBIA UNIVERSITY

KISUMU MILLENNIUM DEVELOPMENT GOALS MULTI-SECTOR HOUSEHOLD SURVEY

FINAL REPORT

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December 2012

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ACKNOWLEDGEMENTS

I would like to thank His Worship, the Honorable Mayor Samuel Okello, Mayor of Kisumu, for supporting this survey and all Millennium Cities Initiative (MCI) research activities in Kisumu.

In addition, the project would not have been feasible without the leadership of the Principal Investigator and MCI Director, Dr. Susan Blaustein, as well as the logistical support of MCI Public Health Specialist in Kisumu, Ms. Beldina Opiyo-Omolo, and MCI Volunteer Ms. Matilda Buberwa.

I must also thank the Kisumu City Council's Community Development Assistants and the communities of Nyalenda and Obunga, who shared the contents of their lives with us, and gave MCI such valuable feedback.

EXECUTIVE SUMMARY

An estimated 60 percent of Kisumu's population lives in informal settlements. More importantly, this population is rapidly expanding as a result of natural growth and continuing migration from the surrounding areas into the city. Many households in the city's informal settlements do not have adequate access to such basic services as water and sanitation, and they often do not have electricity. In addition, there are few public schools, and residents have to travel long distances to public health facilities. Kisumu slum dwellers also have limited access to credit and formal job markets. To better understand challenges facing Kisumu informal settlements, MCI designed a household survey that was implemented in three areas— Nyalenda A, Nyalenda B and Obunga.

This report presents key findings from the Millennium Cities Initiative's (MCI's) Millennium Development Goals (MDG) Multi-Sector Household Survey. The survey was designed to examine poverty at the household level, gleaning information on the quality of life experienced by individuals residing in informal settlements. Most poverty-oriented research in Africa has focused chiefly on rural areas, to-date; however, the urbanization of poverty has made it imperative to focus as well on disadvantaged communities within cities. The operating premise of this survey is that poverty-reduction and the MDGs can be achieved by focusing on populations living in low-income areas and by according special emphasis to providing social services, improving infrastructure (especially roads) and promoting employment opportunities. In addition, the survey is guided by the belief that MDG-based, integrated urban planning requires good quality information about the physical, socio-economic, spatial and environmental conditions of poor neighborhoods.

Several household surveys have been conducted in Kisumu, but this survey is unique and can be used for evidence-based policy making, as it is the first survey focusing on the MDGs and the urban poor. MCI hopes that the findings will allow stakeholders to develop policies that are verifiably based on the facts on the ground and that will enable the city administration and non-government organizations to design interventions that address the needs of people living in Nyalenda and Obunga.



Figure 1. Map of Kisumu Showing Main Areas, Sub-locations and Informal Settlements

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ABBREVIATIONS

AFD	French Agency for Development (Agence française de développement)
BCG	Bacillus Calmette–Guérin
CBS	Central Bureau of Statistics
CBD	Central Business District
ССК	City Council of Kisumu
CRC	Citizen's Report Card
CWS	Cities Without Slums
DMM	Delegated Master Operator Model
DPT	Diphtheria, Pertussis, and Tetanus
GoK	Government of Kenya
HPI	Human Poverty Index
JMP	Joint Monitoring Programme
KIWASCO	Kisumu Water and Sewerage Company
KSH	Kenyan Shilling
KUP	Kisumu Urban Project
MCI	Millennium Cities Initiative
MDGs	Millennium Development Goals
MoF	Ministry of Finance
MPI	Multi-Dimensional Poverty Index
NGO	Non-governmental Organization
SANA	Sustainable Aid in Africa
UN-HABITAT	United Nations Human Settlements Programme
UNICEF	United Nations Children's Fund
WATSAN	Water and Sanitation
WHO	World Health Organization

CHAPTER 1: INTRODUCTION

Target 11 of Millennium Development Goal (MDG) 7 focuses on slums and the improvement of the lives of slum dwellers. However, as a UN-HABITAT Policy and Strategy Paper notes, this target "is rarely prioritized and often overlooked." The Kisumu MDG-based household survey is a multi-sectoral sample survey conducted in three informal settlements— Nyalenda A, Nyalenda B and Obunga— designed to provide information that can be used to guide municipal policies regarding what needs to be addressed to achieve the MDGs. The underlying premise is that a multi-sector survey conducted in informal settlements has the potential to supply the kinds of information needed to assess progress towards attaining MDGs at the city level.

Kisumu is the third largest city in Kenya, after Nairobi and Mombasa, and it is the country's poorest city (CBS, 2005). A unique feature of Kisumu is a belt of slums surrounding the formally planned city center in a semi-circle (see Figure 1). It is useful to conduct a survey focusing on such informal settlements because almost three out of every four urban residents in Africa live in slums, most of which are growing rapidly (UN-HABITAT, 2008). In Kisumu an estimated 60 percent of the population lives in informal settlements, with the majority living in abject poverty (UN-HABITAT, 2005). The MDGs will not be achieved without efforts made to gather essential data identifying characteristics of such populations, as well as their urgent needs in such sectors as education, health, water and sanitation and employment. The findings of such research will allow for sub-national MDG indicators to be developed and monitored, whilst also increasing coherence with national monitoring efforts.

Since the first goal on the MDG agenda is poverty reduction, a key objective of the Kisumu MDG survey is to calculate different poverty measures as part of an attempt to gain a more nuanced understanding of the particular combination of factors defining poverty in this city's informal settlements. This is critical because poverty-oriented research has mainly focused on rural areas. Some surveys calculate poverty measures for capital cities, but they usually do not provide such data for secondary cities or for sub-locations within cities. As a result, they promote a singular view of urban areas and urban poverty, making it difficult to isolate urban poverty levels from national averages or to distinguish between the factors inhibiting one city's growth from that inhibiting the growth of another.

The survey focuses on the following questions; how poor are the slums dwellers in Kisumu, and what factors are correlated with poverty. The hypotheses guiding this survey are:

- Policies intended to help slum dwellers cannot succeed unless local governments and stakeholders know who the poor are, where they live, and the social services they need the most.
- Inhabitants of informal settlements face unique challenges not captured in nationally or regionally representative household surveys.
- Existing household surveys do not collect sufficient data on slum residents, leading to the erroneous assumption that urban residents are socio-economically better off than rural residents. However, slums residents might be worse off than rural inhabitants with regard to several socio-economic indicators.
- Urban planning requires good quality information about the physical, socio-economic and environmental conditions of poor neighborhoods.

Kisumu City and the Informal Settlements in Context

The City of Kisumu can be broadly divided into the following three areas: the Central Business District (CBD); informal settlements (slums surrounding the town center); and peri-urban areas located on the outskirts of the CBD. Unplanned settlements in Kisumu have mostly grown as a result of rural areas being annexed to the town. Existing settlement areas within the city include Bandani, Kamenya lower, Kibos, Lumumba, Makasembo, Mamboleo, Milimani, Migosi, Manyatta, Nyalenda, Nyamasaria, Nyawita, Obunga, Ondiek and Tobert Ouko.

Numerous reports and projects on informal settlements in Kisumu have been undertaken in recent years, including the 2003 launch of the Cities Without Slums (CWS) initiative by the Government of Kenya and UN-HABITAT. Several other approaches have been used to collect data at the sub-national and sub-regional level in Kenya. For instance, in 2007, a Citizen's Report Card (CRC) was organized by the Kenyan government with support from the World Bank, and in 2010 a slum enumeration exercise was conducted by the NGO Pamoja Trust and the City Council of Kisumu (GoK/WB/WSP, 2007). However, the Kenya CRC focused on satisfaction with social services in Kisumu, Mombasa and Nairobi but did not gather information on employment or household income. The slum enumeration exercise used community organizations thereby enabling these groups to identify their key needs and plan their own solutions — but focused only on a few topics, such as poverty education and health.

The data from this MDG survey will promote better understanding of the pressing challenges facing inhabitants of Millennium Cities in their efforts to achieve the MDGs because the instrument was expressly designed to be comprehensive.

Box 1: Definition of a Slum

- "A slum is a contiguous settlement where the inhabitants are characterized as having inadequate housing and basic services. A slum is often not recognized and addressed by the public authorities as an integral or equal part of the city" (UN Inter-Agency Expert Group Meeting, Nairobi, October 2002).
- Access to Water: A household is considered to have access to improved water supply if it has sufficient amount of water for family use, at an affordable price, available to household members without being subject to extreme effort.
- Access to Sanitation: This is defined as access to an excreta disposal system, either in the form of a private toilet or a public toilet shared with a reasonable number of people, is available to household members.
- **Durability of Housing**: A house is considered 'durable' if it is built in a nonhazardous location and has a structure permanent and adequate enough to protect its inhabitants from the extremes of climatic conditions (rain, heat, cold, humidity).
- Sufficient Living Area: A house is considered to have a sufficient living area for the household members if not more than two people share the same room for cooking, sleeping, and other household activities.
- **Secure Tenure**: The right of all individuals and groups to effective protection by the State against forced evictions.
- Note: Criteria for slums include differing thresholds concerning the number of people in a room, the number of households or the density of dwellings in an area.

According to the 2009 Census, Kisumu had a population of 404,160, with slightly more males (50.1 percent) than females (49.8 percent).¹ The city occupies an area of 297 square kilometers (sq. km) and has an overall population density of about 1,392 people per sq. km. However, the population densities in the different sub-locations vary considerably. Table 1 below features some population statistics for the study areas obtained during the last census.

	2009					
Sub Location	Male	Female	Total	Households	Area (sq. km)	Density
Nyalenda A	14,829	13,440	28,269	8,070	3.2	8,953
Nyalenda B	16,189	16,241	32,430	8,561	4.7	6,886
Kanyakwar (Obunga)	6,447	6,107	12,554	3,553	6.6	1,913

Table 1. Population Breakdown by Locations, Sex, Households and Density (2009)

Source: Central Bureau of Statistics

A map of Kisumu City showing locations of the study areas—Nyalenda A, Nyalenda B and Obunga—is provided in Figure 2.



Figure 2. Map of Kisumu City Showing Study Areas and Survey Households

¹ Kisumu City is located in Kisumu East District, which consists of Winam Division, but does not include Miwani or Kadibo.

The Study Areas

Nyalenda is the second largest informal settlement in Kisumu, after Manyatta, and is situated to the south of the CBD. The name "Nyalenda" means "a place where people are called upon to come and share the land" (Karanja, 2010). The area is bounded by Ring Road to the north and marshlands to the south and consists of two separate settlements, Nyalenda A and B. Nyalenda A is subdivided into four units (Central, Dago, Kanyakwar and Western), while Nyalenda B features five smaller units (Kilo, Got Owak, Dunga, Nanga and Western). The two slums occupy a total land area of 3.2 and 4.7 sq. km, respectively, with a population density of 8,953 people per sq. km in Nyalenda A and 6,886 people per sq. km in Nyalenda B.

Table 2 lists the units within the informal settlements where the interviews were conducted.

	Nyalenda A	Nyalenda B	Obunga
U	Western	Dunga	Central
Ν	Central	Kilo	Kamakowa
Ι	Kanyakwar	Western	Kasarani
Т	Dago	Nanga	Sega Sega
S		Got Owak	

Table 2. Kisumu Household Survey Study Sites and Units

There are seven public primary and two public secondary schools in Nyalenda and two health centers (Nyalenda Sub-Health Center and Kowino), as well as several private clinics and dispensaries. None of these facilities are centrally located, so residents have to travel long distances. Moreover, even though Kisumu's main water pipe passes within Nyalenda, many residents do not have access to piped water. There is also a shortage of adequate toilet facilities, and not many households have electricity.

Obunga is a densely populated informal settlement occupying a total land area of 1.39 sq. km and with a population density of 6,200 people per sq. km. The area derives its name from flowers that used to grow along a stream that flows through the settlement (Karanja, 2010). It is located in the East Kisumu sub-location and encompasses four smaller areas: Central, Kamakowa, Kasarani and Sega Sega (Munala, 2009). The settlement is adjacent to the city's industrial area, and many of its inhabitants are from surrounding rural areas and migrated to the slum in the hopes of finding work at the Kenya Breweries factory.

There are no public primary and secondary schools and no government health facilities in Obunga settlement (Karanja, 2010). As shown in Figure 9, the nearest public primary school is Kudho, located about 1 km away in Kanyakwar B (north of Obunga). The closest secondary school is Kanyamedha, in a settlement called Bandani (north-west of Obunga). The nearest public health facility is New Nyanza General Hospital, and many residents rely on this hospital and private clinics or dispensaries located in the CBD area, which is 4 km away. Many households do not have electricity or access to piped water in their homes.

Survey Objectives

The purpose of this multi-topic household survey was to gather information on household characteristics, education, health, water and sanitation, energy, employment and infrastructure that can be used to guide municipal policies on what needs to be addressed to achieve the MDGs.

CHAPTER 2: SAMPLE AND SURVEY METHODOLOGY

Sample Design

The survey was designed to provide information on households, education, health, water and sanitation, energy, employment and infrastructure.² A two-stage sampling design was used to select households. The first stage involved selecting study areas within each informal settlement. In the second stage, households within the selected study areas were randomly selected. Considerable care was taken at every stage in the design and implementation of the survey so that it could produce reliable estimates, and respondents were notified about the survey and its objectives prior to data collection. This section gives a brief account of the methodology used to carry out the survey.

Questionnaire

One questionnaire was used to collect information on all *de jure* household members (usual residents), the household and the dwelling. To obtain a picture of poverty and living standards in the three informal settlements, the questionnaire included questions on education, health, household assets, housing amenities (drinking water, sanitation, energy, etc.), accessibility of facilities (schools, health establishments, water sources, sanitation facilities, transportation/roads, etc.) and vulnerability (shocks and coping mechanisms). The questionnaire included the following nine modules:

 Table 3. Questionnaire Modules

- Demographics and Household Characteristics
- Health
- Education
- Water and Sanitation

- Energy
- Labor
- Enterprise
- Infrastructure
- Credit

The questionnaire was translated from English into Kiswahili, and participants could choose to answer questions in English or Kiswahili. The geographic locations of households were recorded using handheld Global Positioning System (GPS) devices that identified the latitude and longitude coordinates of each household. The GPS devices were password protected and were also used to map facilities such as schools, health facilities and water points.

Survey Personnel

Survey staff consisted of 12 enumerators and three field supervisors. MCI recruited survey personnel based on prior experience in informal settlements. Chiefs and Community Development Assistants (CDAs) from the City Council of Kisumu (CCK) served as local guides. Engaging local persons who were already known to inhabitants of slum areas was essential in conducting the research.³

 $^{^2}$ The household was the unit of enumeration. A household is defined as a person or a group of persons living in the same compound who share a common source of food and/or income.

³ Outsiders tend to be viewed suspiciously in informal settlements, but walking through a slum with a local resident or an official increases residents' level of trust and facilitates the start of a conversation.

Training of enumerators and field supervisors was carried out over a four-day period during the third week of March 2011. The purpose of the survey was clarified, and topics covered during the training included: interviewer's role and responsibilities; proper interviewing techniques; understanding the questionnaire; and how to record responses. The enumerators were also instructed to interview the most knowledgeable adult person in the household. Consequently, for most questions, the household head was interviewed, but if the spouse of the household head was better qualified to answer certain questions, he or she was also interviewed.

Training and Fieldwork

Training included lectures on interviewing techniques and the contents of the questionnaires, as well as mock interviews to gain practice in asking questions. All survey personnel also completed a human subjects protection training that is equivalent to Columbia University's Institutional Review Board's on-line training course. The training was conducted by MCI's Associate Director for Research, who also served as Co-Principal Investigator (Co-PI). After the personnel completed the training, each signed a confidentiality statement attesting that he or she had completed the training and would protect the confidentiality of the data. At the end of the training period, enumerators and field supervisors spent one day pre-testing the questionnaire and practicing how to use GPS devices to record geo-coordinates. Problems encountered during the pre-test were discussed before data gathering began.

Data Collection and Response Rates

The data were collected by three teams; each comprised of a supervisor and four enumerators. Data collection started on March 22 and was completed on April 2, 2011. Households in each of the study areas were selected using simple random sampling. Information on demographic characteristics such as age, sex and relationship to the head of the household was collected, along with data on education, health services (family planning, immunization, etc.), ownership of assets, household expenditures, occupations and infrastructure. Verbal informed consent was sought to administer the questionnaire.

A total of 659 households were contacted in the three localities, and 626 households were successfully interviewed, yielding a response rate of 95 percent. Non-response was primarily due to the absence of knowledgeable adult household members after two visits. To obtain quality data, supervisors were instructed not to make any changes to the questionnaire. If inconsistencies were found, the enumerator was asked to resolve them, going back to the household if necessary.

Data Processing

The Co-Principal Investigator (Co-PI) observed the data entry operation periodically during and after data collection. Data processing began simultaneously with data collection and was completed in April 2012. Editing activities concentrated on consistency checks. Data were then analyzed using the STATA computer software package and syntax and tabulation plans developed by MCI.

Handling of Missing Values

Data appear to be missing at random, and the main reason for missing values was refusal or inability to respond. When a household lacked data for a substantial number of variables, the

case was dropped. Listwise deletion—when an entire record is excluded from analysis if any single value is missing—was not used because it could have drastically reduced sample size and the statistical power of study results (Vyas and Kumaranayake, 2006). Missing values on several variables were imputed, and new variables with corrections for missing data were computed.

Demographics

The results show that 51 percent of the inhabitants in the surveyed households were female and 49 percent were male. The age and sex distribution of the survey population is shown in Figure 3.





This pyramid shape is typical of cities and countries in the developing world. The base of the pyramid shows that there are a large number of male and female children under five years old. The proportion of youth between the ages of 10 and 19 is also quite high. The top of the pyramid indicates the impact of mortality on those older than 44 years old.

The average size of a household in the sample was 6.2, with Nyalenda B having the largest household size (6.4 members per household) and Obunga having the lowest (5.9 members per household). The 2009 Census found that the average household size in the city was 4.07, but a study undertaken in Kisumu by Muchai (2009) revealed that, in Obunga, it was 5.1 persons, and it was equally high in settlements such as Kanyakwar.

Poverty in Kisumu

Poverty levels in Kisumu City, Kisumu District and Nyanza province are quite high. The first map in Figure 4, ("Poverty in Kisumu City"), shows the incidence of poverty in the city's 10 main locations. The mean poverty incidence for Kisumu City in 2005 was about 62 percent, compared to 53 percent nationally (CBS, 2005). Nyanza province, where Kisumu is located, had the highest poverty incidence rate in Kenya, at 63 percent.

The second map ("Povery in Kisumu District") reveals that the highest poverty rates in the city are in Kolwa West sublocation, where Nyalenda A and B are located, and East Kisumu, where Obunga is located. Sublocations such as Township, Central Kisumu, Central Kolwa and West Kajulu appear to be more or less equal in their poverty distribution. Poverty rates in areas

surrounding the city— such as Miwani, Kapkures, Terik, West Kisumu and South Maragoli—are not as severe as rates in peri-urban areas where informal settlements are located.



Figure 4. Incidence of Poverty in Kisumu City and Kisumu District



Measuring Poverty

Many different indicators have been used to determine and monitor poverty levels. Surveys have mainly relied on an income/consumption threshold (the so-called poverty line) below which an individual can be classified as being poor or not. Researchers then compile measures such as the proportion of a population living below a poverty line (also known as the headcount index). Sen (1976) argues that there are major problems with defining poverty in terms of poverty lines because the methodology is completely indifferent to the intensity of poverty - how poor are those below the poverty line - and to inequalities among the poor or between poor and rich. A decade ago, Reddy and Pogge (2002) criticized the poverty line method as a misleading and inaccurate measure of purchasing power. This is partly because, in calculating poverty lines, researchers typically identify a normative basket of goods (food or basic needs) but prices may not be accurate for some goods.

Another approach that has gained popularity in research on poverty is collecting information on asset ownership and then constructing a composite wealth index using techniques such as principal component analysis (PCA) or cluster analysis (Filmer and Pritchett, 1998; San and Stifel, 2003).⁴ The wealth index has been employed as an appropriate indicator of household economic status mainly because, in Africa, the type of household that one lives in and material possessions owned by the household are good indicators of the economic status of household members in terms of their economic abilities or purchasing power (Hobcraft, McDonald and Rutstein, 1984; United Nations, 1985).

Three poverty measures are derived in this study: a headcount index, a wealth index and a Multi-Dimensional Poverty Index (MPI). The MPI is a new measure developed by University of Oxford and United Nations Development Programme (UNDP) to replace the Human Poverty Index (HPI), which has been included in the annual Human Development Reports since 1997. This is because the headcount index is a useful tool to raise awareness about poverty but poverty is not simply about a household's level of income.

Box 2: Poverty Measures

Poverty Lines

- To date, the most popular method of measuring poverty is by setting an incomebased poverty line— often based on the cost of minimum daily/monthly food and nonfood consumption.
- The threshold set by international institutions such as the World Bank used to be \$1 per day, but was recently upgraded to \$1.50 per day.
- This method often fails to take into account the cost paid by the urban poor for housing (which can take 10-20 percent of income), water (5-10 percent) and other services such as sanitation, healthcare, education and transport.

Wealth Index

Filmer and Pritchett (1998) demonstrated that it is possible to construct measures of relative wealth from household survey data as follows:

- 1. Household questionnaires collect asset data (e.g., roof and floor material, electricity, water supply, possession of goods such as a bicycle and television, and so forth);
- 2. Techniques such as principal component analysis (PCA) or multiple correspondence analysis (MCA) are used to construct household wealth scores.
- 3. The household's wealth score is assigned to all its members, and the population is ranked by wealth scores from lowest to highest.
- 4. Finally, the resulting distribution is ranked into equal-sized quintiles. The lowest twothree quintiles (40-60 percent of the population) are typically considered poor.

Multi-Dimensional Poverty Index

- Developed by UNDP and Alkire, Foster and Santos (2010), MPI uses 10 indicators to measure poverty in three dimensions (health, education, living conditions).
- Each indicator is equally weighted, and a household is defined as poor if it is deprived in at least 30 percent of the weighted indicators.
- MPI reflects both the incidence of poverty and the average intensity of deprivation.

⁴ PCA and cluster analysis are data reduction techniques used to aggregate a set of variables (indicators) into a synthetic index.

The wealth index is a valuable poverty measure that focuses on the stock of resources/assets a household controls but it does not capture the complexity of poverty. Indicators such as the MPI have gained wide acceptance in recent years, partly because of a growing consensus that poverty is also about relative deprivation and lack of access to health, education and other services.

Headcount Index

The headcount index is the ratio of people living below the poverty line compared to the total population. This measure gives an idea of the proportion of people consuming less than \$1 or \$2 per day per capita. In this survey, monthly expenditure is used as a household welfare indicator, and it is combined with a poverty line to determine whether a household is poor or non-poor. In 2005, the Kenvan Government's Central Bureau of Statistics (CBS) and Ministry of Planning and National Development estimated poverty lines in urban and rural areas, taking into account differences in purchasing power, and found that there were significant differences.⁵ In 2005, the poverty line for urban households in Kenya was established at Ksh. 2,648 (\$45.52) per month, while the rural poverty line was set at Ksh. 1,239 (\$21.30).⁶ The conversion from Ksh. per month to Ksh. per day set the national urban poverty line at Ksh. 87.10 (\$1.50) per day.

To calculate the headcount index, the survey collected information on household expenditures on the following food items: cereals, roots and tubers, meat/fish, vegetables, fruits and dairy products. To complete the poverty line, non-food components (rent, transportation, communication, education and health expenses, clothing, footwear, energy) were added to the food poverty line.⁷ The 2005 urban poverty line was then updated annually, using consumer price indices (CPI) to incorporate changes in price levels, and households whose monthly expenditure was less than the threshold level of Ksh. 4,769 (\$54.55) per month in 2011 were defined as poor.⁸ The results indicate that the incidence of poverty was 65.8 percent.

	Nyalenda A	Nyalenda B	Obunga	Total
Poor	78.3%	65.3%	55.6%	65.8%
Non-poor	21.7%	34.7%	44.4%	34.2%
Total	100%	100%	100%	100%

Table 4. Poverty Incidence, Percent of Households Below the Adjusted Urban Poverty Line

Wealth Index

The wealth index is a non-money-metric measure of poverty assumed to capture the underlying long-term wealth through information on the household assets such as a TV, radio, refrigerator, car, bicycle, type of toilet used and access to services such as piped water. The index is intended to produce a ranking of households by wealth from poorest to richest, but it does not provide

⁵ Kenva is one of the few countries to define an urban poverty line. Morocco and South Africa have also set urban ⁶ Monthly expenditure per household.

⁷ Note: An additional 25 percent can be arbitrarily added to the food poverty line, with 15 percent allocated for clothing and shoes and another 10 percent for condiments, leisure goods and miscellaneous expenses.

⁸ The 2011 exchange rate (\$1=Ksh. 87.42) was used. The Consumer Price Index (CPI) is a measure of the average change over time in the prices paid by urban consumers for a market basket of consumer goods and services. It is based on the expenditures of almost all residents of urban or metropolitan areas, including professionals, the selfemployed, the poor, the unemployed, and retired people, as well as urban wage earners and clerical workers.

information on absolute poverty. It is usually constructed by using the PCA technique, which assumes a normal distribution, and hence continuous variables. The problem is that most asset variables are either binary or categorical. To address this issue, Booysen et al. (2005) have proposed that multiple correspondence analysis (MCA) is better at dealing with categorical variables than PCA. As a result, MCI employed MCA to construct a wealth index for this survey. The construction of the asset index is based on indicators such as: television, radio, fridge, phone, watch, iron, bicycle, cart or car. Categorical variables of dwelling characteristics such as type of roof (5 categories) and wall type (7 categories), as well as the type of toilet facilities (5 categories) and main water source (8 categories), were also included. The total number of components used was 34.

Each household asset and service for which information was collected was assigned a weight or asset index score. The standardized scores were then used to create breakpoints that defined wealth quintiles. Households belonging to the three lowest quintiles (bottom 60 percent) were identified as poor households, i.e., the group that deserves the most policy attention in poverty reduction discussions.

	Nyalenda A	Nyalenda B	Obunga	Total		
Poor	54.0%	67.5%	61.6%	62.4%		
Non-poor	46.0%	32.5%	38.4%	37.6%		
Total	100	100	100	100		

Table 5. Wealth Index

Using the wealth index approach, 62.4 percent of households are poor. The above results are in line with findings from a 2010 baseline household survey conducted by Tupange/Measurement, Learning and Evaluation (MLE) project, which also calculated a wealth index and found that 64 percent of households in Kisumu were poor.⁹ However, neither the headcount nor the wealth index takes into account education or health indicators. It is therefore useful to compile a poverty measure that includes education, health and living conditions, because individuals/households may experience varying deprivations regarding the different indicators.

The Multi-Dimensional Poverty Index (MPI)

The MPI is intended to complement monetary measures of poverty and is derived from information on several dimensions of deprivations that a household may suffer, including household size, education, health and living conditions. Unlike the HPI, which used country averages to reflect aggregate deprivations, the MPI can identify specific individuals, groups or households that are jointly deprived.

Ten indicators, drawn from the MDGs, are used to compile MPI. They include nutrition (MDG 1), child mortality (MDG 4), access to improved water sources and improved sanitation facilities (MDG 7), use of improved cooking fuel (MDG 9), household characteristics and access to electricity. Each dimension is equally weighted, and a household is considered poor if it is deprived in at least 30 percent of the weighted indicators (see Appendix 1). Figure 5 shows the dimensions and indicators used to compile the MPI.

⁹ The Tupange/MLE survey collected information from 13,000 households in five cities (Nairobi, Kisumu, Mombasa, Kakamega and Machakos) and focused on reproductive health.

Figure 5. Three Dimensions and 10 Indicators Used to Compile MPI



The survey did not collect data on mortality and nutrition but relied on two other health indicator proxies, the location for giving birth (MDG 5) and ownership of a mosquito net (MDG 6). It is assumed that households where women give birth at home and which do not have a mosquito net are likely to be poorer and less healthy. The living conditions indicators used are: whether a household has electricity, access to clean drinking water, access to improved sanitation, type of wall the house is made of, type of fuel used for cooking and ownership of assets (car, television, radio, phone, etc.).

	Nyalenda A Nyalenda B Obunga Total					
Poor	58.0%	63.7%	52.8%	59.3%		
Non-poor	42.0%	36.4%	47.2%	40.7%		
Total	100	100	100	100		

 Table 6. Multi-Dimensional Poverty Index

All three poverty measures confirm that poverty rates in informal settlements are quite high, exceeding poverty rates in rural Kisumu and other Kenyan cities. However, there are discrepancies and the three different measures of poverty are not directly comparable. This is because the poverty line is based on consumption/expenditure, the wealth index estimates relative wealth by analyzing household assets and housing characteristics, and the MPI focuses on deprivations and reveals a different pattern of poverty than income poverty.

It should be noted that the poverty line method is sensitive to the food and non-food items included, and the consumption basket used to estimate an urban poverty threshold may take insufficient account of the nonfood expenditures that urban households need in order to meet their basic needs, given that virtually all consumption requires a cash outlay.

The wealth index is also an imperfect measure because the extent to which it is robust depends on the assets/variables included. For instance, a household's access to piped water could be the result of government policies rather than a consequence of households being wealthy, in which case it would be inappropriate to include piped water as one of the variables in the MCA or PCA.

The MPI also has several limitations. For instance, standard indicators for health and quality of education are often not regularly collected. At the city level, this includes data on child mortality. In addition, nutrition and mortality are not the only indicators of health and wellbeing; as examples, maternal health and HIV indicators could also be taken into account when compiling the MPI.

CHAPTER 3: KEY FINDINGS

Household Construction Materials

Almost half of the households used cement for the construction of walls of dwelling units. The proportion of walls constructed with mud and sticks is about 41 percent. However, in Nyalenda A, the majority of households do not have cement walls, and in Obunga, about half the households have walls made from mud and sticks. The use of other materials for the construction of walls of dwelling units is not very common. For example, the proportion of dwelling units with corrugated metal sheet walls is six percent.

Corrugated metal sheeting is the main roofing material used in the settlements, followed by mud roofs.¹⁰ Ceramic roofing and asbestos tiles are less common roofing materials in slums.

Educational Indicators

A high proportion of the respondents in the surveyed population (83.7 percent) reported having had some formal education, but 16.3 percent have never attended school. In all age groups, except the pre-primary school cohort (0-5 years old), more males have attended school than females. In terms of educational attainment, 52 percent of the respondents have attended primary school, about 21 percent have studied in a secondary school and eight percent of study subjects reported having studied at a university. Further analysis by groupings reveals that there are differences in education attainment depending on gender and area of residence. For instance, as Figure 6 shows, in Nyalenda A and Obunga, a significant number of women (1 out of 5) has never attended school. It can also be seen that, overall, fewer women than men have received any post-primary education.



Figure 6. Highest Level of Schooling Attained by Household Members, by Gender

Almost 60 percent of households reported that schools located in their informal settlement do not provide meals to students. Priority needs to be accorded to providing school meals, which promote school attendance and academic performance.

¹⁰ This is consistent with results obtained during the 2000 census (NBS, 2009- Census, Vol. II, Table 5-7).

Most respondents stated that there is an Early Childhood Care and Education Center (ECCE) near their households, but as Figure 9 shows, Obunga residents reported fewer ECCE facilities than Nyalenda A and Nyalenda B residents.



Figure 7. Percentage of Households with an ECCE Center Nearby

There are more than 30 pre-primary institutions in Nyalenda A and B, and most of them are located about 1 km from the homes. In Obunga, however, a quarter of the households reported that the nearest pre-primary institution was two to three kilometers away—the Kenyan government recommends that the ideal distance is half a kilometer from the household.

Distance (in km)	Nyalenda A	Nyalenda B	Obunga	Total
1	91.87	96.07	73.79	89.03
2	8.13	3.93	24.32	10.46
3	0	0	1.89	0.5
Total	100	100	100	100

Table 7. Distance from ECCE to Household

Expenditure on Education by Households

Table 8 presents the mean monthly expenditures on school fees in the three Kisumu slums for poor and non-poor households. Overall, the poor spend less on education than the non-poor.

Table 8. Average Household Spending on School Fees per Month

	Nyalenda A		Nyalenda B		Obunga	
	Poor	Non-Poor	Poor	Non-Poor	Poor	Non-Poor
Ksh.	215.4	400.6	192.7	300.6	165.0	277.5
n	126	35	186	99	100	80
Ksh.	25	56	23	30	2	15
n	161		285		180	

Figures 8 and 9 depict the locations of households surveyed, as well as some education facilities in Nyalenda and Obunga.



Figure 8. Pre-Primary Schools in Nyalenda A and B



Figure 9. Primary Secondary Schools in Nyalenda A, Nyalenda B and Obunga

Health Indicators

Antenatal visits are important for maternal and child health because they provide an opportunity to supply mothers with information on birth spacing, nutrition, possible pregnancy complications and child health. WHO recommends a minimum of four antenatal visits, but as Figure 10 shows, about 60 percent of women in Nyalenda A and Obunga attend four or more antenatal visits. In Nyalenda B, only 43 percent of expectant women are abiding by the WHO's recommendation.

Figure	10	Women	Attending	Antenatal	Visite
rigule	10.	women	Altenuing	Amenatar	VISIUS



Two additional health indicators that are valuable markers of progress towards MDG 5 are the proportion of births assisted by skilled personnel—nurse midwife, doctor and community health worker— and the percentage of contraception use among women. Figure 11 illustrates that about 76 percent of households say that their last delivery was assisted by skilled personnel. This result is consistent with the 2010 Tupange/MLE survey finding that 75 percent of births in Kisumu were assisted by skilled health workers.



Figure 11. Women Assisted by Skilled Personnel During Delivery

The proportion of births delivered by traditional birth attendants remains high. This is probably because there are few public health facilities in the three informal settlements, as previously noted. Figures 12 shows the distribution of health facilities in Nyalenda and Obunga.

Figure 12. Health Facilities in Nyalenda A, Nyalenda B and Obunga



Table 9 reveals that the use of contraceptives such as injectables, intra-urine devices (IUD), pills, condoms and sterilization was reported by about 40 percent of households with women of reproductive age. This is a low percentage, since the Kenyan government's MDG target is to increase the use by women of family planning services to 70 percent by 2012. Over 50 percent of respondents reported that they were using other forms of family planning but did not specify which methods. About 44 percent of the households obtained the contraceptives from hospitals, health centers and clinics, and 56 percent obtained family planning materials from other sources. More than half of the households (57 percent) said that they have access to family planning services that are free of charge.

Nyalenda A	Nyalenda B	Obunga	Total
62.11	49.47	61.02	56.02
26.09	32.28	25.42	28.73
4.97	2.46	2.26	3.05
3.11	9.12	5.65	6.58
1.86	4.91	3.39	3.69
1.86	1.4	2.26	1.77
0	0.35	0	0.16
100	100	100	100
	Nyalenda A 62.11 26.09 4.97 3.11 1.86 1.86 0 100	Nyalenda A Nyalenda B 62.11 49.47 26.09 32.28 4.97 2.46 3.11 9.12 1.86 4.91 1.86 1.4 0 0.35 100 100	Nyalenda ANyalenda BObunga62.1149.4761.0226.0932.2825.424.972.462.263.119.125.651.864.913.391.861.42.2600.350100100100

Table 9. Percentage of Women Using a Family Planning Method

Immunizations have saved the lives of millions of children in Kenya and around the world. UNICEF and WHO guidelines recommend that, by the age of 12 months, a child should have received a BCG vaccination to protect against tuberculosis, three doses of DPT to protect against diphtheria, pertussis (whooping cough), and tetanus, three doses of polio vaccine and a measles vaccination. As Figure 14 shows, most children in Nyalenda A and Obunga have received BCG and polio vaccinations, but in Nyalenda B only four out of five children have been immunized against these diseases. About 80 percent of children in study areas have been immunized against DPT and only 67 percent have received the measles vaccine. It should be noted, however, that survey findings on immunization mainly relied on mothers' recall; hence, the results should be interpreted with extreme care. Respondents were asked to show documented records of children's immunization history (cards), but in many cases, mothers were unable to produce such records.





Malaria is one of the major public health problems in Kisumu and a leading cause of under-five mortality. Preventive measures, such as the use of insecticide treated mosquito nets (ITNs), can significantly reduce malaria morbidity and mortality rates, particularly among children. Table 10 shows the percentage of households with at least one mosquito net and how the net was obtained. It can be seen that about three out of four households have at least one mosquito net, but Obunga residents have the fewest number of ITNs. Respondents reported that they obtain the nets from public and private sources.

	Nyalenda A	Nyalenda B	Obunga	Total
Yes	73.3%	77.9%	70.6%	74.6%
No	26.7%	22.1%	29.4%	25.4%
Total	100%	100%	100%	100%
Provided by Government	34.8%	43.5%	30.1%	37.6%
Purchased at Store	38.5%	29.1%	36.7%	33.7%
Other source	26.1%	20.0%	27.1%	23.6%
Provided by NGO	0.6%	7.4%	5.7%	5.1%
Total	100%	100%	100%	100%

Table 10. Percentage of Households with a Mosquito Net and Net Source

Two-thirds of households surveyed had nets treated to repel mosquitoes, but many respondents in the three settlements did not know if their nets had been treated. In Nyalenda A, 25 percent of respondents were unaware of the status of their nets, and in Nyalenda B and Obunga, 13 and 15 percent of households, respectively, could not provide answers. This lack of awareness of the actual effectiveness of this potentially life-saving public health tool suggests that there is need for a sensitization campaign on ITNs.

Main Source of Water

As can be seen in Figure 15, the main source of water in Kisumu slums is public tap/standpipes. The next major sources of water are piped water and boreholes.

Figure 14. Main Sources of Water used by Households



A household is considered to have access to an "improved water source," as defined by WHO/UNICEF Joint Monitoring Programme (JMP), if it obtains water from a private or public water tap, boreholes, protected wells/springs and rainwater harvesting. Although Figure 15 indicates that most people have access to "improved water," several households in peri-urban areas still rely water from shallow wells situated in close proximity to the pit latrines, thereby increasing the chances of cross-contamination.

Residents in the informal settlements tend to pay higher costs for water than non-slum residents. Water vendors in slums charge between Ksh. 2.00-5.00 (\$0.02-0.06) per 20-liter Jerrican (plastic container). In time of shortages, vendors sell water for up to Ksh. 40 (\$0.47) per 20-litre Jerrican, depending on distance to the water source. The average monthly water expenditure for Obunga residents is Ksh. 797 (\$9.30), while Nyalenda A residents spend about Ksh. 755 (\$8.80), and Nyalenda B inhabitants spend Ksh. 636 (\$7.40). These expenditures are consistent with sources such as CRC (2007), which found that households relying on kiosks were spending as much as Ksh. 700 (\$8.20) per month.

Until recently, vandalism, illegal connections and water leaks have been serious problems in informal settlements. KIWASCO reports show that the utility company was losing over 80 percent of water produced, most of this in the informal settlements. Interventions such as the *Agence francaise de developpement's* (AfD's) Delegated Management Model¹¹ are helping water utilities improve services to informal settlements (Castro, and Morel, 2008). Under the DMM, KIWASCO selects contractors, called 'master operators' (MOs), through a publicly-advertised and competitive process, and offers them a bulk supply tariff. In turn, the MOs bill customers, collect revenue and are responsible for minor maintenance, such as the repair of small leaks.

NGOs such as Cordaid have also been actively involved in promoting Obunga residents' access to piped water. Participants at a July 2012 MCI workshop, where results of the household survey were shared with stakeholders, informed that the Delegated Management Model is being introduced in Obunga.

Figures 16 depicts locations of households and water points in the three settlements. It is evident that many Nyalenda A and B residents have access to water kiosks and connection chambers, but there are still numerous households near the Lake Intake that are underserved (see Figure 16). The number of water kiosks and standpipes in Obunga is considerably less than in Nyalenda and the water points are unevenly distributed

¹¹ KIWASCO developed the DMM with the Water and Sanitation Program-Africa (WSP-Africa) and the French Embassy in Kenya in 2004. It was piloted in Nyalenda, a Kisumu slum.





Sanitation Facilities

The main mode of sanitation for disposal of human excreta in Kisumu slums is the pit latrine. About 86.7 percent of the respondents reported that they used pit latrines, with only 4.5 percent using flush toilets. Using the UN's Joint Monitoring Programme's definition of what constitutes an improved sanitation facility, we estimate that 7.2 percent of informal settlement households in Kisumu rely on unimproved sanitation facilities.¹²

	71				0
		Nyalenda A	Nyalenda B	Obunga	Total
Improved	Pit Toilet	85.09	83.86	93.89	87.06
	Composting Toilet	0	2.45	0.55	1.28
	Flush Toilet	3.11	7.72	0.56	4.47
Unimproved	Bush/No Toiilet	11.18	3.86	3.89	5.75
Unimproved	Other Toilet	0.62	2.11	1.11	1.44
	Total	100	100	100	100

Table 11. Types of Toilet Facilities Used by Households (Percentage)

¹² It is estimated that 94.1 percent of the Kisumu County population relies on pit latrines. https://opendata.go.ke/Water/Main-Source-of-Sanitation/zc24-4q3i

It is important to accord primacy to sanitation in slum areas because improper fecal disposal and poor hygiene contribute to the spread of such waterborne diseases as diarrhea and cholera, particularly among children (UN-HABITAT, 2005). KIHBS estimates show that 15.9 percent of children under five in Kisumu District suffered from diarrhea in 2005/06.



Figure 16. An Inadequate Pit Latrine (left) and a Drain Clogged with Solid Waste

Source: Moumié Maoulidi

Indiscriminate disposal of waste products into gutters and drains (as shown in Figure 18) is also problematic, as it contributes to disease and flooding during rainy seasons, since most of the gutters are blocked by rubbish. Stagnant water forms breeding places for mosquitoes, with serious detrimental health consequences. The Ministry of Health (MOH) Annual Reports for Nyanza Region indicate that malaria remains a leading cause of outpatient morbidity in Kisumu. This can be partly attributed to stagnant pools of water. To improve progress towards MDG 7 on environment sustainability, the CCK, in conjunction with community groups and NGOs such as World Vision, has embarked on monthly clean-up and tree-planning activities.

Solid and Liquid Waste Disposal

Solid waste disposal in Nyalenda and Obunga is highly inadequate. Many households use rubbish pits on their plots, but due to lack of space, waste is also disposed of along footpaths and in drains. Less than seven percent of survey households have their waste collected. As Figure 19 shows, in Nyalenda A and B, most households burn their solid waste or dump it indiscriminately, which is not hygienic. Households in which waste was collected by the city or by private companies reported paying as much as Ksh. 400 (\$4.60) per month for solid waste collection.



Figure 17. Method Used by Slum Households to Dispose of Solid Waste

The prominent method used to dispose of liquid waste in Nyalenda and Obunga is throwing it on streets/outside of the dwelling unit.

Main Source of Lighting

Only 39 percent of the respondents in the three slums reported that they have electricity.¹³ However, results reveal that over 60 percent of the non-poor have electricity, but the majority of poor residents (72.6 percent) do not have electricity.

Has Electricity	Nyale	nda A	Nyalenda B		Obunga		Total	
Thas Electricity	Poor	Non-Poor	Poor	Non-Poor	Poor	Non-Poor	Poor	Non-Poor
Yes	18.3	60.0	24.7	61.6	44.0	66.2	27.4	63.0
No	81.8	40.0	75.3	38.4	56.0	33.8	72.6	37.0
Total	100	100	100	100	100	100	100	100

Table 12. Percentage of Households with Access to Electricity

About one out of every three households in Nyalenda A and B informed that they experienced electricity interruptions during the past year. In Obunga, almost one out of every two households reported experiencing such interruptions.

Main Fuel Used for Cooking

Respondents revealed that charcoal, firewood and kerosene are the main sources of fuel used for cooking. The proportion of households that use charcoal for cooking is 74 percent, while 15 percent of survey households rely on firewood. Nyalenda has the highest number of households relying on firewood, and Obunga is where most households used charcoal. The relatively high use of firewood and charcoal as the main cooking fuel has serious health implications, as cooking with charcoal is known to lead to high levels of indoor smoke and to produce health-damaging pollutants. It is also detrimental to the environment, as it depletes forests.

¹³ The 2010 Tupange/MLE survey found that 44.9 percent of Kisumu City households had electricity.



Figure 18. Distribution of Types of Fuel Used by Households

Infrastructure

The survey revealed that less than 35 percent of households surveyed had access to a usable road during the rainy season. This is a major concern, because flooding is a serious problem in Obunga and Nyalenda, particularly during the long rains between March and June (Karanja, 2010). Obunga and the Kapuothe area in Nyalenda B are particularly prone to flooding, mainly because the topography consists of black cotton soils that quickly become water-logged when it rains. Households also experience flooding because there are few drainage channels. In Nyalenda and Obunga, naturally formed open gullies, as opposed to proper drainage channels, often serve as drains.

Asked what infrastructure projects would improve their lives, approximately 30 percent of households surveyed reported that they would like the roads to be fixed. The road infrastructure in Obunga is one of the worst in Kisumu, and many roads are impassable during the rainy season due to poor drainage. In addition, respondents reported that they would like more bus routes and street lights where they live. Table 13 shows the community members' answers to this particular query.

	Nyalenda A	Nyalenda B	Obunga	Total
Fix Road	30.4	28.8	29.4	29.4
Other	29.8	19.0	18.9	21.7
More Bus Routes	3.1	22.5	32.2	20.3
Street Light	18.6	11.9	12.2	13.7
Add Walkway/Bikeway	17.4	17.5	3.9	13.6
More Buses	0.6	0.4	1.7	0.8
Missing	0.0	0.0	1.7	0.5
Total	100	100	100	100

Table 13. Projects that Would Improve Life

Household Income

Respondents were asked to provide their monthly incomes, but the reliability of information provided is questionable, due to its sensitivity. For instance, respondents may deliberately underestimate their incomes, or refuse to provide this information, for fear of leakage to tax authorities.

Household Enterprises, Access to Credit and Shocks

Most Nyalenda and Obunga residents do not have formal employment. Instead, they earn income by engaging in entrepreneurial activities such as fish frying or the sale of various items like firewood, charcoal or baked goods. In addition, as Figure 21 shows, many households specified their source of income as 'other,' which could refer to such informal activities as the sale of various goods, illegal brewing of alcohol, or operating bicycle taxis, known as *boda boda*. A high proportion of the households (40 percent) are engaged in selling food, operating kiosks or tailoring/textile activities.





Respondents were also asked if they have access to credit, an important issue because access to credit provides households with income stability in times of crisis (Beegle et al. 2006). This is consistent with the permanent income hypothesis, which argues that households smooth their consumption during income shocks. Without access to credit, households are often forced to rely on child income when facing economic hardships.

Survey results show that credit was mainly sought for unspecified needs, subsistence needs, construction expenses, school fees and medical expenses, in that order. Households are able to access credit from sources such as micro-finance institutions, banks and neighbors/friends. NGOs, merchants and religious organizations were not major sources of credit.

However, as Table 14 shows, only about 45 percent of Nyalenda and Obunga residents have a bank account. This is a relevant indicator because it is a good proxy for access to credit.

	Nyalenda A	Nyalenda B	Obunga	Total
Yes	42.9	46.3	43.5	44.6
No	57.1	53.7	56.5	55.4
Total	100	100	100	100

Table 14. Percentage of Households with a Bank Account

CONCLUSIONS AND RECOMMENDATIONS

One of the major challenges facing policymakers in many countries today is how to improve the quality of life of the poorest and most disadvantaged populations. The results of the Kisumu Multi-Sector Household Survey provide a multi-dimensional "snapshot" of Nyalenda's and Obunga's status in several sectors relating to MDG attainment, confirming that residents in the three settlements face unique challenges as Kisumu City endeavors to reduce poverty levels and achieve the MDGs.

Key challenges include high poverty rates, lack of adequate water and sanitation facilities and poor access to infrastructure services (such as electricity, roads). Access to potable water is improving, but too many residents still rely on pit latrines known to contaminate water tables, solid waste is never collected in some places and poor drainage often contributes to flooding. Less than 40 percent of the respondents in the three slums report having electricity. Regarding education attainment, approximately 52 percent of the respondents have attended some level of primary school, and about 21 percent have studied in a secondary school; however, many adult women in Nyalenda A and Obunga reported never having attended school. Results also show that residents in the study areas are forced to travel long distances to public health facilities, contraceptive prevalence is low and too few births attended by skilled health personnel. Finally, the survey shows that many households rely on firewood and charcoal as their main cooking fuel, which has serious deleterious implications for health and the environment.

Urban poverty reduction requires an integrated approach. There is no single solution to poverty. Instead, a package of interventions needs to be developed for Kisumu. A summary of some recommendations is provided below.

- While designing strategies to achieve the MDGs and reduce high poverty levels, it is recommended that the City Council of Kisumu, development partners and researchers include the perspectives of the target population. Inclusion promotes community buy-in and sustainability and ensures that proposed packages of interventions are relevant to the community members.
- Providing school meals should be considered a priority intervention because it promotes school attendance and academic performance. Interventions to reduce illiteracy among adult women in informal settlements are also urgently needed.
- Health projects, such as training Community Health Workers, need to be actively pursued so that communities can be sensitized on the importance of expecting mothers delivering babies in health institutions and attending four antenatal visits while pregnant. Moreover, there is a need to encourage more women (and men) to use modern family planning methods and to educate mothers on the benefits of vaccinating children. A sensitization campaign on insecticide-treated nets is also recommended because many households are not sure if their nets were treated.
- Special emphasis should be accorded to the provision of such public services as water points, health facilities and public schools, and on improving infrastructure (especially roads and electricity) in informal settlements.
- Recent water and sanitation initiatives, such as extending access to piped water to populations in informal settlements, need to be scaled up.

- Garbage collection and recycling must also be given due consideration. The city needs to expand clean-up campaigns, address poor drainage and promote recycling because investments in sanitation contribute to improved health and a sustainable environment.
- Urban poverty cannot be effectively addressed without promoting income-generating activities for youth and women.

The results obtained from this survey can be utilized in multiple-sector planning processes aimed at promoting progress toward achieving the MDGs. For instance, the survey results could be used to validate interventions in ongoing initiatives such as the Kisumu Urban Project (KUP). They can also ensure that future policies are shaped and driven by data and objective evidence. Up-to-date information about MDG indicators regarding the urban poor is essential to assisting the City Council of Kisumu in designing effective policies for reducing poverty.

The collection and use of highly specific, localized data, particularly in informal settlements, is critical to attaining the MDGs. With less than three years remaining before the 2015 MDG deadline, it is imperative to take stock of the progress and gaps in the ongoing efforts to achieve them. As Bourgignon et al. (2008) advised four years ago, "improving data gathering and its quality...should be a central focus of the second half of the MDG time frame and beyond."

It is relevant to note that people in the study sites indicated that although they have repeatedly been studied by researchers asking for similar information, they have neither seen any results or received any feedback from this research. MCI has also found this to be the case in similar settings in other Millennium Cities. Survey respondents wish and deserve to see the fruits of their participation, and communities are understandably eager not only to receive feedback from surveys, but also to witness the effective implementation of game-changing programs in their areas.

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Appendix 1. Survey Pictures



Solid waste indiscriminately discarded near households

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Typical unpaved road in an informal settlement

Appendix 2. Survey Personnel

Nyalenda A	Nyale nda B	Obunga		
Sospeter Onyango	Zedy Tunya	John Omondi Okello		
Aggrey Otieno	Joseph Owenga	Stanley Manyasi		
Joab Onunga Oloo	Jane Adoyo Omunga	James Aswoga		
Patrick Odhambo	Joseph Onongino	Alice Omany		
Anditi Andiwo	Donnie Odour	Francis Nyasio		
Edwina Olewe	Tom Obuya Omolo	Dennis Achola		

Coordinators and Community Development Assistants

Supervisors, Enumerators and Data	Clerks
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Supervisors	
Charles Obiero Angira	Nyalenda "A"
Moses Ooko	Nyalenda "B"
Perez Akelo	Obunga
Enumerators	
Inviolata Merende	Nyalenda A
Laureen Laura Lumumba	Nyalenda A
George Owino	Nyalenda A
Sheik Ouoch	Nyalenda A
Erick Gari	Nyalenda B
Jude Lwanga	Nyalenda B
Lameck Onyango Okeyo	Nyalenda B
Wicklife Awuor Akello	Nyalenda B
Donah A Onyango	Nyelenda B
Zuhura Moga	Obunga
Anne Awino	Obunga
Joseph Argwengs	Obunga
Data clerks	
Nicholas Adera	
Elias Ojwang	

Appendix 3. The MDGs

Goal 1: Eradicate extreme poverty and hunger

- Reduce by half the proportion of people living on less than a dollar a day.
- Reduce by half the proportion of people who suffer from hunger.

Goal 2: Achieve universal primary education

• Ensure that all boys and girls complete a full course of primary education.

Goal 3: Promote gender equality and empower women

• Eliminate gender disparity in primary and secondary education preferably by 2005, and at all levels by 2015.

Goal 4: Reduce child mortality

• Reduce by two thirds the mortality rate among children under five.

Goal 5: Improve maternal health

• Reduce by three quarters the maternal mortality ratio.

Goal 6: Combat HIV/AIDS, malaria, and other diseases

- Halt and begin to reverse the spread of HIV/AIDS.
- Halt and begin to reverse the incidence of malaria and other major diseases.

Goal 7: Ensure environmental sustainability

- Integrate the principles of sustainable development into country policies and programmes; reverse loss of environmental resources.
- Reduce by half the proportion of people without sustainable access to drinking water.
- Achieve significant improvement in the lives of at least 100 million slum dwellers by 2020.

Goal 8: Develop a global partnership for development

- Develop further an open trading and financial system that is rule-based, predictable, and non-discriminatory, includes a commitment to good governance, development and poverty reduction nationally and internationally.
- Address the least developed countries' special needs. This includes tariff and quota-free access for their exports; enhanced debt relief for heavily indebted poor countries; cancellation of official bilateral debt; and more generous official development assistance for countries committed to poverty reduction.
- Address the special needs of landlocked and small island developing states.
- Deal comprehensively with developing countries' debt problems through national and international measures to make debt sustainable in the long term.
- In cooperation with the developing countries, develop decent and productive work for youth.
- In cooperation with pharmaceutical companies, provide access to affordable essential drugs in developing countries.
- In cooperation with the private sector, make available the benefits of new technologies especially information and communications technologies.

Appendix 4. Kisumu Millennium Development Goals Household Survey Questionnaire

GPS LOCATION OF HOUSEHOLD	Capture the geo-coordinates of household. Write the code in the space provided
HOUSEHOLD NUMBER	
ENUMERATION AREA NUMBER	
INTERVIEWER'S NAME	
TOTAL PERSONS IN HOUSEHOLD	

I. DEMOGRAPHICS AND HOUSEHOLD CHARACTERISTICS MODULE (Information on Respondent, Household Members and Dwelling)

1.1.MAIN RESPONDENT'S NAME	1	MALE	2	
1.2. IS MAIN RESPONDENT Male or Female?	1.	MALE	۷.	FEMALE
1.3. AGE OF MAIN RESPONDENT				
1.4. HOW MANY MONTHS HAS RESIDENT LIVED DWELLING?	1	VES	2	NO
1.5. HAS RESIDENT EVER ATTENDED SCHOOL?	1.	I Lo	2.	NO
1.6. WHAT IS THE HIGHEST LEVEL OF SCHOOL COMPL Please select ONLY one	ETE	D BY MAIN RESI	PONDE	ENT?
Primary			01	
Secondary			02.	
Higher			03	
None			04	
Don't know			08	
1.7. WHAT IS THE HIGHEST GRADE COMPLETED BY M INFORMATION ON OTHER HOUSEHOLD RESIDEN	AIN	RESPONDENT? (FILL THE FOLI	.OWIN	NG SECTION FOR
RESIDENT'S NAME	41416	5		
IS RESIDENT Male or Female?	1.	MALE	2.	FEMALE
AGE OF RESIDENT'				
HOW MANY MONTHS HAS RESIDENT LIVED				
HERE?				
HAS RESIDENT EVER ATTENDED SCHOOL?	1.	YES	2.	NO
WHAT IS THE HIGHEST LEVEL OF SCHOOL COMPLETE	ED B	Y RESIDENT? Pl	ease se	lect ONLY one
Primary			01	
Secondary			02.	
Higher			03	
None			04	
Don't Know			08	
WHAT IS THE HIGHEST GRADE COMPLETED BY RESID	DEN	Г?		

1.8. DO YOU OWN THIS DWELLIN	[G?	YES	NO
1.9. HOW MUCH DOES YOUR HOU	JSEHOLD PAY IN CASH TO REN	NT THIS	
DWELLING EACH MONTH?			
1.10. WHAT IS THE MAIN	NO ROOF		01
MATERIAL OF THE ROOF? BOARDS AND PIECES OF TIMBER			02
MUD AND BAMBOO			03
	IRON SHEET AND TIMBER		04
	TINS AND IRON SHEET		04
	CARDBOARD/CARTON		05
			00
1.11. WHAT IS THE MAIN	TIMBER		01
MATERIAL OF THE WALL?	BOARDS AND PIECES OF TIM	IBER	02
	TINS AND IRON SHEET		03
	IDON SHEET AND TIMPED		04
	POLYTHENE PAPER AND CA	RTONS	04
	IRON SHEET AND TIMBER	RIONS	05
	Other		06
1 12 DOES YOUR HOUSEHOLD HA	VE ELECTRICITY?	VES	NO
1.12. DOES TOOR HOUSEHOLD HA		VES	NO
	VE A TELEVICION?		NO
1.14. DOES YOUR HOUSEHOLD HA	VE A TELEVISION?	YES	NO
1.15. DOES YOUR HOUSEHOLD HA	VE A TELEPHONE, ETHER	YES	NO
1.16. DOES YOUR HOUSEHOLD HA	VE A REFRIGERATOR?	YES	NO
1.17. DOES YOUR HOUSEHOLD HA	VE AN IRON, EITHER CHARCO	AL YES	NO
1.18. DOES ANY MEMBER OF THIS	HOUSEHOLD OWN A WATCH?	YES	NO
1.19. DOES ANY MEMBER OF THIS	HOUSEHOLD OWN A BICYCLE	E? YES	NO
1,20. DOES ANY MEMBER OF THIS	HOUSEHOLD OWN A	YES	NO
1.21. DOES ANY MEMBER OF THIS	HOUSEHOLD OWN A CART?	YES	NO
1.22. DOES ANY MEMBER OF THIS	HOUSEHOLD OWN A CAR OR	YES	NO
1.23. DOES ANY MEMBER OF THIS	HOUSEHOLD OWN A BOAT?	YES	NO
1.24. HOW MUCH DID YOUR HOUS	EHOLD SPEND ON AVERAGE,	PER DAY, ON	
1.25. HOW MUCH DID YOUR HOUS	EHOLD SPEND ON AVERAGE, 1	PER DAY, ON	
1.26. HOW MUCH DID YOUR HOUS	EHOLD SPEND ON AVERAGE,	PER DAY, ON	
COMMUNICATION?	,	,	-
1.27. HOW MUCH DID YOUR HOUS SCHOOL TRANSPORT AND MEALS			
1.28. HOW MUCH DID YOUR HOUS			
FUEL AND POWER?			
1.29. HOW MUCH DID YOUR HOUS MEDICAL CARE?			
1.30. HOW MUCH DID YOUR HOUS ROOTS AND TUBERS?			
1.31.HOW MUCH DID YOUR HOUSI CEREALS?	EHOLD SPEND ON AVERAGE, F	PER DAY, ON	
1.32. HOW MUCH DID YOUR HOUS	EHOLD SPEND ON AVERAGE.	PER DAY, ON	
VEGETABLES?			

1.33. HOW MUCH DID YOUR HOUSEHOLD SPEND ON AVERAGE, PER DAY, ON FRUITS?	
1.34. HOW MUCH DID YOUR HOUSEHOLD SPEND ON AVERAGE, PER DAY, ON MEATS/FISH?	
1.35. HOW MUCH DID YOUR HOUSEHOLD SPEND ON AVERAGE, PER DAY, ON DAIRY PRODUCTS/EGGS?	

II. HOUSEHOLD ENTERPRISE MODULE

2.1. WHAT TYPE OF ENTERPRISE DOES YOUR	TAILORING/TEXTILE	01
Select ONLY one	HAIRDRESSING/BARBER	02
Select OILE I Olic	KIOSK SELLING	03
	FOOD SELLING	04
	SHOE REPAIR	05
	FURNITURE	06
	INTERNET/VIDEO	07
	CONSTRUCTION	08
	OTHER	09

2.2. WHICH HOUSEHOLD MEMBER SPENT TIME IN THIS ENTERPRISE DURING THE LAST 12 MONTHS? (Name of Resident)

ASK THE MOST KNOWLEDGEABLE PERSON THE FOLLOWING QUESTIONS

2.3. ON A GOOD DAY, HOW MUCH DO YOU RECEIVE FROM YOUR ENTERPRISE? (WRITE AMOUNT IN KSHS)

2.4. ON A BAD DAY, HOW MUCH DO YOU RECEIVE FROM YOUR ENTERPRISE? (WRITE AMOUNT IN KSHS)

2.5. IN A GOOD MONTH, HOW MUCH DO YOU RECEIVE FROM YOUR ENTERPRISE? (WRITE AMOUNT IN KSHS)

2.6. IN A BAD MONTH, HOW MUCH DO YOU RECEIVE FROM YOUR ENTERPRISE? (WRITE AMOUNT IN KSHS)

III. LABOR MODULE

ASK MOST KNOWLEDGEABLE HOUSEHOLD MEMBER (AGED 18 YEARS AND OLDER) 3.1. RESIDENT'S NAME

(Enter DK for Don't Know)

ENGAGED IN?

Select ONLY one

3.2. DURING THE PAST WEEK, DID (RESIDENTS NAME) DO ANY KIND OF WORK	YES PAID YES UNPAID	02
FOR SOMEONE WHO IS A MEMBER -	NO	03
3.3. ABOUT HOW MANY HOURS PER WEEK DID FOR SOMEONE WHO IS NOT A MEMBER OF THI	(RESIDENTS_NAME) DO THIS WORK . IS HOUSEHOLD?	
3.4. FOR THE HOUSEHOLD MEMBER WHO IS	Farming and Fishing	01
EMPLOYED, DESCRIBE THE TYPE OF	Stone Quarrying and Mining	02
INDUSTRY THAT (RESIDENTS_NAME) IS	Electricity, Water and Other Utilities	03

Manufacturing	04
Construction	05
Wholesale and Retail Marketing	06

01

Transport and Communication	07
Finance and Business	08
Social and Community Services	09
Soft Drink Manufacturing	10
Printing/Publishing	11
Health, Personal Care, Pharmacy	12
Hotel, Rest House	13
Street Food Sales	14
Radio/TV Broadcasting	15
Artist	16
Electrical Repair	17
Inter-Urban and Rural Bus/Minibus	18
Transport	
Taxi Operation	19
Elementary and Secondary Schools	20
Colleges, Universities, and Professional	21
Schools	
Justice, Police Activities	22
Funeral Services	23
Other Personal Services	24
General Government	25
Other	26

IV. EDUCATION MODULE

4.1. ARE THERE ANY EARLY CHILD	HOOD EDUCATION	YES	NO
AND CARE CENTERS NEAR WHERE	YOU LIVE?		
4.2. HOW FAR AWAY IS THE PRE-PR	IMARY SCHOOL FROM	M THE HOUSEHOLD IN	
KILOMETERS			
4.3. IF YOU WERE TO WALK TO	LESS THAN 30	BETWEEN 30 MINUTES	MORE THAN
THIS PRIMARY SCHOOL, HOW	MINUTES	AND 1 HOUR	1 HOUR
LONG WOULD IT TAKE?			

4.4. IN GENERAL, WHAT MEANS OF TRANSPORTATION DO YOUR CHILDREN USE TO GO TO PRIMARY SCHOOL? Select ONLY one.

Select ONL I Olle.					
Walking	01	Taxi			05
Bicycle	02	Car			06
Microbus/Bus	03	Other			07
Shared Taxi	04				
			YES	NO	DON'T
4.5. DOES THE SCHOOL PROVII STUDENTS ?	DED MEALS T	°O			KNOW
4.6. IN THE LAST SCHOOL YEA SCHOOL FEES PER CHILD?	R, HOW MUC	H DID YOUR	HOUSEHOLD SH	PEND FOR	

V. HEALTH MODULE

5.1. DID YOUR CHILD EVER RECEIVE ANY VACCINATIONS TO PREVENT HIM/HER FROM GETTING DISEASES, INCLUDING VACCINATIONS RECEIVED IN A NATIONAL IMMUNIZATION DAY CAMPAIGN? Ask to see Vaccination Card. If not available, Ask the following				NO	
5.2. PLEASE TELL ME IF (NAME) HAS RECEIVED: I AGAINST TUBERCULOSIS	BCG	YES	NO	DON'T KNOW	
5.3. PLEASE TELL ME IF (NAME) HAS RECEIVED: POLICO VACCINE, DROPS IN THE MOUTH		YES	NO	DON'T KNOW	
5.4. PLEASE TELL ME IF (NAME) HAS RECEIVED A VACCINATION THAT IS AN INJECTION GIVEN IN THIGH OR BUTTOCKS, SOMETIMES AT THE SAME AS POLIO DROPS.	A DPT THE E TIME	YES	NO	DON'T KNOW	
5.5. PLEASE TELL ME IF (NAME) HAS RECEIVED: MEASLES VACCINATION		YES	NO	DON'T KNOW	
5.6. DOES YOUR HOUSEHOLD HAVE ANY MOSQU NETS THAT CAN BE USED WHILE SLEEPING?	ITO	YE	S	NO	
5.7. WHO SLEPT UNDER THIS NET LAST NIGHT Enter 'DK' if Don't Know5.8.WHERE DID YOU GET THE NET(S)? Select ONLY one.		Head of Househo Spouse of Housel Grandparent Child Relative Other Purchased at Stor Provided By Gov Provided By NGC Other Source	01 02 03 04 05 06 01 02 03 04		
5.9. WHEN YOU GOT THE NET, WAS IT PRE-TREATED, OR NON-TREATED TO REPEL MOSQUI	ГЕD, ГOES?	YES	NO	Don't Know	
NOW I WOULD LIKE TO ASK ABOUT ALL THI Check for the Presence of Others Before Con	E BIRTH tinuing, I	S YOU HAVE HA Make Every Effort	AD DURING Y t To Ensure Pi	OUR LIFE.	
5.10. HAVE YOU EVER GIVEN BIRTH?		YES		NO	
5.11. WHERE DID YOU GIVE BIRTH? Select ONLY	Home			01	
one.	Hospita	Hospital or Clinic			
	Other Not Ar	Other			
	Not Ap No One	e		01	
5.12. DID YOU SEE ANYONE FOR ANTENATAL	Comm	unity Health Worke	r	02	
CARE FOR THIS PREGNANCY? Select ONLY one.	Traditi	ıt	03		
	Auxilia	ary Midwife		04	
	Nurse/I	Midwife		05	
	Doctor Other			00 000	
	onici			,,,	

5.13. HOW MANY TIMES DID YOU GO TO AN ANTENATAL CLINIC WH (Record Number 0 to 4, 999 if she has never been pregnant)	IEN PREGNANT	
5.14. WHO ASSISTED WITH THE DELIVERY OF YOUR LAST CHILD ?	No One Community Health	01
	Worker Traditional Birth	02
	Attendant	03
	Auxiliary Midwife	04
	Nurse/Midwife	05
	Doctor	06
	Other	999
5.15. DID YOU EVER BREASTFEED?	YES	NO
5.16. ARE YOU CURRENTLY DOING SOMETHING OR USING ANY	Female	
METHOD TO DELAY OR AVOID GETTING PREGNANT?	Sterilization	01
	Male Sterilization	02
	Pill	03
	IUD	04
	Injections	05
	Condom	06
	Female Condom	07
	Other	999
		01
5.17. PLEASE IDENTIFY WHERE YOU OBTAINED THE METHOD TO	Hospital	
DELAY OR AVOID GETTING PREGNANT THAT YOU MENTION	Health Center	02
ABOVE?	Family Planning	03
	Clinic Malific Olivita	0.4
	Mobile Clinic	04
	Other	999
5.18. WAS IT FREE OR DID YOU HAVE TO PAY ?	FREE	NOT FREE
5.19. I DON'T WANT TO KNOW THE RESULTS, BUT WERE YOU TESTED FOR HIV/AIDS AS PART OF YOUR ANTENATAL CARE?	YES	NO

VI. WATER AND SANITATION MODULE

6.1. WHAT IS THE MAIN SOURCE OF DRINKING	G WATE	R FOR YOUR HOUSEHOLD OVER	THE PAST
MONTH? (Please select one)			
Home Piped Water	01	Protected spring water	06
Public Tap/Standpipe Water	02	Surface water (Lake/Pond/Stream)	07
Borehole	03	Rainwater	08
Tanker Truck	04	Other	999
Protected dug well	05		
6.2. HOW MUCH WATER DO YOUUSE PER DAY	? (Write	as told)	
6.3. WHAT WAS THE TOTAL COST OF WATER	FOR YOU	JR HOUSEHOLD LAST MONTH?	
6.4. DO YOU TREAT YOUR DRINKING WATER ANY WAY TO MAKE IT SAFER TO DRINK?	IN	YES NO	DON'T KNOW

6.5. WHAT KIND OF TOILET FACILITY DO MEMBERS OF YOUR HOUSEHOLD USUALLY USE? (Please

select one)				
Flush Toilet	01	Buck	et Toilet	04
Pit Latrine	02	No Fa	acility/Bush	05
Composting Toilet	03	Other		06
6.6. HOW DOES THE HOUSEHOLD DISPO	SE OF ITS GA	ARBAGE	? (Please select one)	
Collected by Local Authority	01	Burni	ng	04
Collected by Private Firm	02	Dum	bed	05
Garbage pit/Buried	03	-		
6.7. IS THERE A FEE FOR HAVING ONE'S COLLECTED?	GARBAGE		YES	NO
6.8. WHAT IS THE MONTHLY AMOUNT C	F THE FEE?	Enter 'DI	X' if Don't Know	
VII. ENERGY MODULE				
7.1. DOES HOUSEHOLD HAVE ELECTRIC	ITY?		YES	NO
7.2. WHAT WAS THE TOTAL COST FOR E	LECTRICITY	Y IN THE		
HOUSEHOLD LAST MONTH? Enter 'DK' if	Don't Know			 NO
7.3.DID YOUR HOUSEHOLD EXPERIENCE TO ELECTRICITY SUPPLY IN THE LAST Y	E ANY INTEF YEAR?	RRUPTIO	YES	NO
7.4. WHAT TYPE OF FUEL DOES YOUR H	OUSEHOLD	MAINLY	USE FOR COOKING?	
Electricity	01	Wood		07
Natural Gas	02	Straw/S	Shrubs/Grass	08
Biogas	03	Agricu	ltural Crop	08
Kerosene	04	Animal	Dung	09
Coal. Lignite	05	No Foo	od Cooked	10
Charcoal	06	Other		11
7.5. WHAT WAS THE TOTAL COST FOR F LAST MONTH?	UEL IN THE	HOUSEF	IOLD	
VIII. INFRASTRUCTURE MODUL	Έ			
8.1. ARE THE ROADS NEAR YOUR HOME DAUGHTER TO GO TO SCHOOL BY HERS	SAFE FOR Y SELF?	YOUR	YES	NO
			YES	01
8.2. IS THE ROAD TO YOUR HOUSE USAF	BLE DURING	THE	MOST OF THE TIME	02
RAINY SEASON?			RARELY	03
			NOT AT ALL	04
8.3. DO YOU HAVE STREET LIGHTS IN YO	OUR STREET	Г?	YES	NO
9.4 WILLAT DO VOU THINK WOLLD DE TI	TE	Dorrin	a the Dead in Front of House	01

IX. CREDIT MODULE

9.1. WHAT ARE THE (NAMES) OF PERSONS OR				
INSTITUTIONS FROM WHO YOU OR ANYONE	ELSE IN	1.		
THE HOUSEHOLD BORROWED OVER THE PAS	T 12			
MONTHS? Enter 'DK' if Don't Know		2.		
9.2. WHAT WAS THE SOURCE OF THE LOAN ?				
Banks	01	Local Me	rchant	06
Micro-Finance Institution (Sacco)	02	Employer		07
Other Financial Institution	03	Ngo		08
Neighbors/Friends	04	Religious	Institution	09
Money Lender	05	Other		999
9.3. WHAT IS THE MAIN REASON FOR OBTAIN	ING TH	E LOAN?	WAS IT (READ)	
Subsistence Needs	01	Construct	ion	07
Medical Costs	02	Ceremony	/Wedding	08
School Fees	03	Other		999
9.4. DOES THIS HOUSEHOLD MEMBER HAVE A	A BANK		VEG	NO
ACCOUNT?			YES	NO
Survey Completion Status				
COMPLETED		01	POSTPONED	04
NO HOUSEHOLD MEMBER AT HOME OR NO		02		05
COMPETENT RESPONDENT			REFUSED	
ENTIRE HOUSEHOLD ABSENT FOR EXTENDED)	03		06
PERIOD OF TIME			OTHER	

Appendix 5. Formula for Multi-Dimensional Poverty Index

MPI = Multidimensional poverty headcount (H)* Intensity (breadth) of deprivation

where

$$H = \frac{\sum_{i}^{n} C_{i}}{\sum_{i}^{n} Household \ size_{i}}$$

and

$$C_i = (sum of each deprivation multiplied by its weight)$$
$$C_i = \sum_i^n (D1 + D2 + D3 + D4) * \left(\frac{5}{3}\right) + \sum_i^n (D5 + D6 + D7 + D8 + D9 + D10) * \left(\frac{5}{9}\right)$$

and

$$I = \frac{\sum_{i=1}^{n} (C_i * Household \ size_i)}{[\sum_{i=1}^{n} Household \ size_i] * 10}$$