# DATA GATHERING AND ANALYSIS AT THE HOUSEHOLD LEVEL: DETERMINATION OF CONSUMPTION/GENERATION PATTERNS FOR ENERGY, WATER, WASTE WATER, SOLID WASTE, AND FOOD SECTORS, BASED ON BUILDING TYPES

Household surveys in Kigali

The main objective of this task is to determine per capita demand for energy, food and water, and the generation of waste water and solid waste at the household level. This data is then delivered to other work packages for further integration into system modelling and simulation within RP. The households are classified in different income groups according to different building types based on the outcome of WP 1 and WP 2. The methodology of the household survey is illustrated in the following figure.

Data gathering methodology at the household level
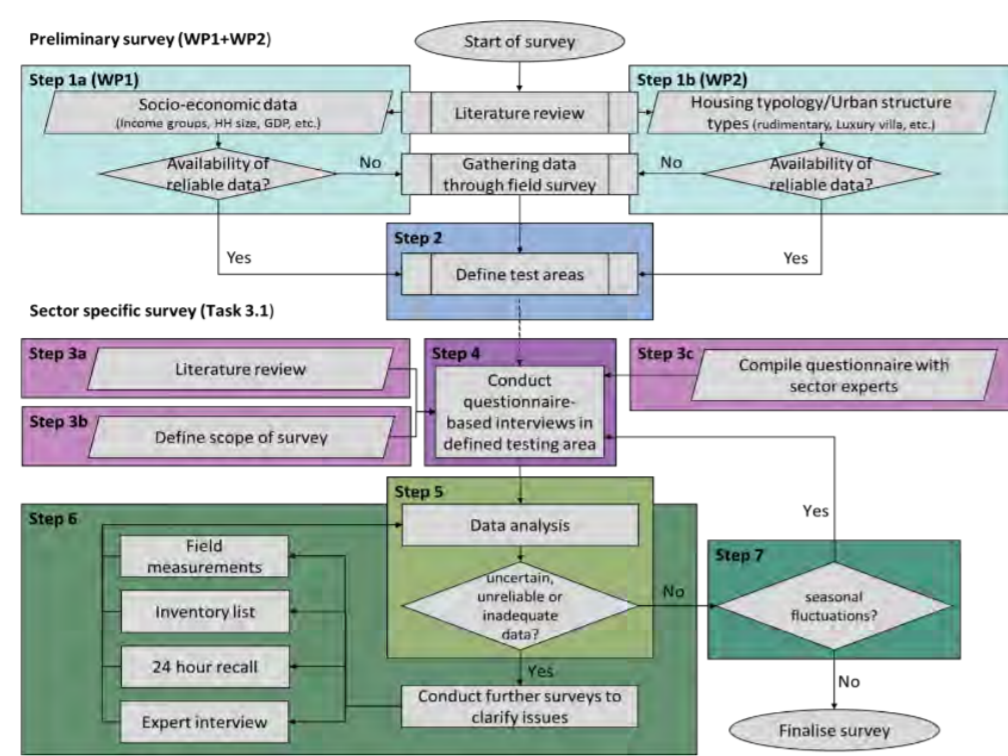
Methodology

- Data collection by means of an interview with questionnaires (using tablets to reduce transfer mistakes, local assistants for translation) in the WP1 testing areas

- Consolidation of results with field measurements, 24 h recall and expert interviews (e.g. for solid waste: field measurements with COPED)

- Letting people make a daily inventory list over a period of time (e.g. for food purchase)
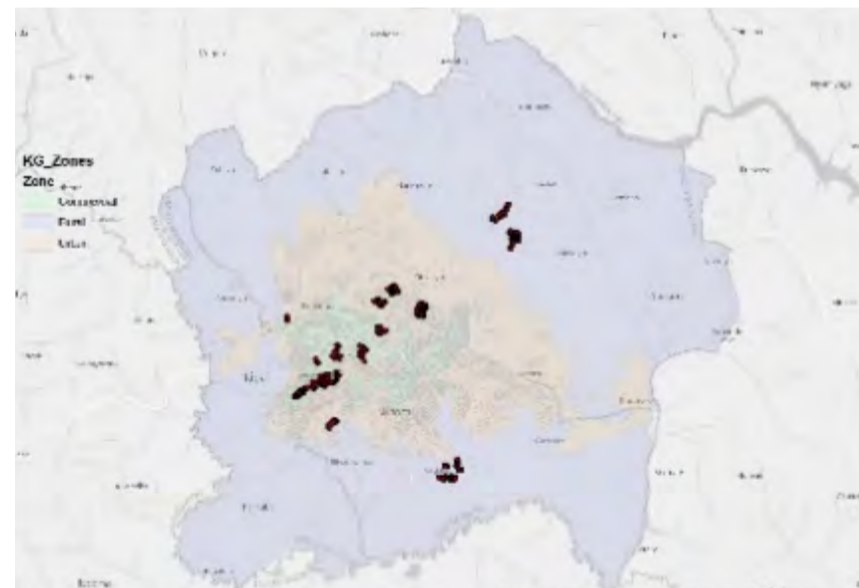
Restriction/ Challenges

- To cover all sectors and keep it short simultaneously (interview time < 30 minutes)

- Seasonal/weekly variations must be regarded

- Proof of validity often difficult (missing electricity or water bills)

- Answers heavily depend on willingness to participate

Classification of sample size

Block zone type	UST type	Life style class	Building type				Total	Acronym
			Rudimentary	Bungalow	Villa	Apartment		
Commercial	Compact/mid	mid	46	25	0	0	71	CCMM
	Compact/mid	high	0	51	13	3	67	CCMH
	Compact/small	low	171	0	0	0	171	CCSL
	Compact/small	mid	0	30	0	0	30	CCSM
	Open	high	8	9	4	0	21	COH
Urban	Compact/mid	mid	1	19	20	0	40	UCMM
	Compact/mid	mid to high	1	9	30	0	40	UCMMH
	Compact/mid	high	0	26	14	0	40	UCMH
	Compact/small	low	44	9	0	0	53	UCSL
	Open	low	8	0	2	0	10	UOL
	Open	mid	0	2	6	0	8	UOM
Rural	Open	low	88	4	0	0	92	ROL
	Sparsely built	low	78	7	0	0	85	RSL
TOTAL			445	191	89	3	728	

GPS location of surveyed households

Rudimentary building

Villa building

Bungalow

Apartment building

Impressions of survey preparation and execution

Training session with field assistants, Kigali


Interviewee 1

Interviewee 2

Practical experiences / lessons learned

- City and municipal officials play a vital role of introducing the project to the mayor, district and local staff, and getting the approval to conduct the survey

- Feedback loop: City officials must be given an opportunity to comment on the questionnaire

- After final remarks, the questionnaire must be translated into the local language. The tablet interface can shows each question in English and the local language simultaneously.

- Once the preparations are finished, the local staff/field assistants must be trained by the international consultants. The training does not only include getting familiar with the App and the tablet, but also understanding the questions and which outcome is expected.

- The questionnaire is then piloted with the field assistants observing their initial responses and making appropriate changes as the survey progresses.

- Simultaneously, the head of each district or cell should be informed beforehand to avoid encountering any possible trouble while conducting the survey in the community.

- Throughout the survey, at least two international consultants must accompany the field assistants. It is advised to attend the interview sessions at random to ensure that the survey was conducted efficiently and effectively.

- Each evening, the survey data must be transferred to the server.

Exemplary results

Household size

**Household size by building types**
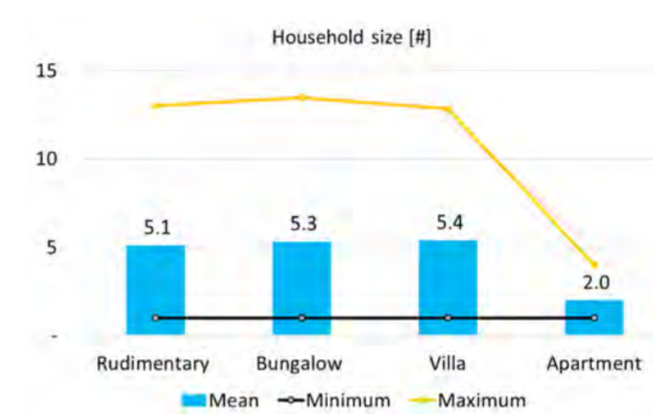
Villas have the largest household size of 5.4 persons per household, whereas apartment building has the smallest household size with only two persons. Surprisingly, there are few variations, except apartments, in the household size. The average for our sample size in Kigali is 5.2. According to a recent study in Rwanda (EICV 4, 2013), the average household size in Kigali was 4.5.

Energy consumption

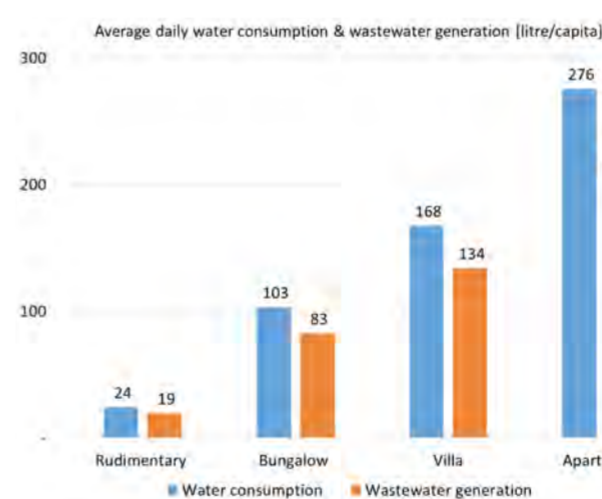**Energy consumption by building types**
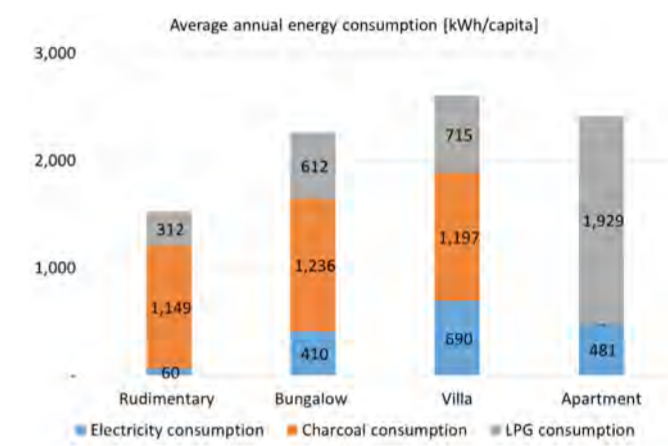
Variations in energy consumption by building types
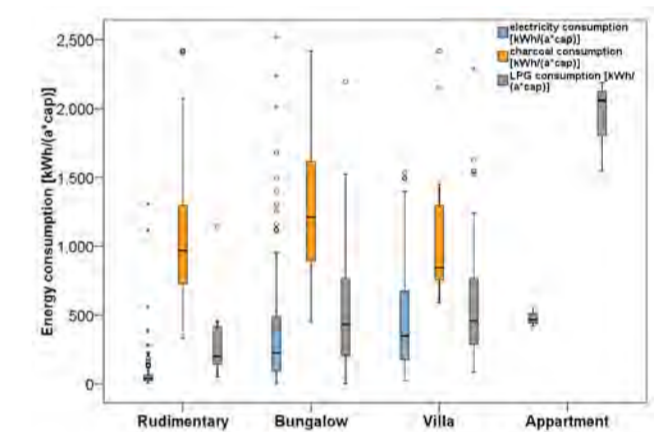
- Total energy consumption in rudimentary buildings is not exceptionally low

- Large difference in electricity consumption, but not in charcoal

- Due to lack of open space (for outdoor kitchen), charcoal is not used in apartments
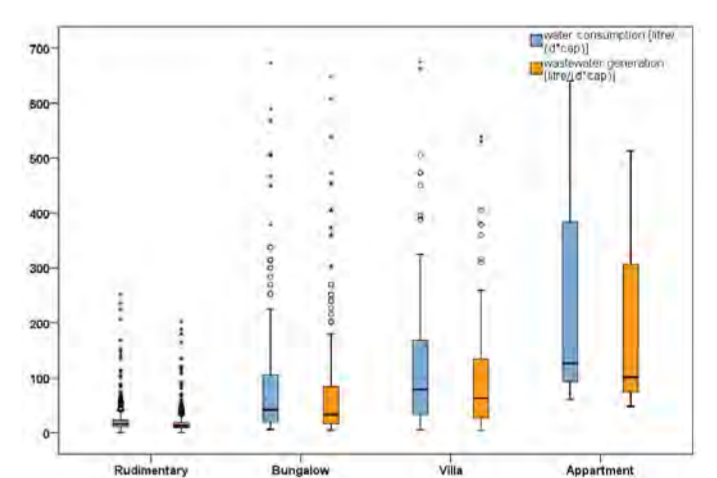
Water consumption & wastewater generation

Water consumption & wastewater generation by building types

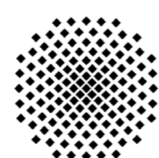**Variations in water consumption & wastewater generation by building types**

- Highest water consumption & wastewater generation is observed in apartments

- Water consumption in rudimentary building types is exceptionally low as many households do not have water connection in their dwelling