

# RAPID PLANNING



URBAN CONSUMPTION PATTERNS BASED ON BUILDING STRUCTURES

SECTOR SPECIFIC DATA GATHERING AND DATA ANALYSES (WP3)

STAKEHOLDER MEETING, KIGALI, 09 Nov. 2016

## CONCEPT FOR KIGALI

Aim: determine consumption/generation patterns for sectors energy, water, waste, waste water and food, based on household/building types

### Methodology

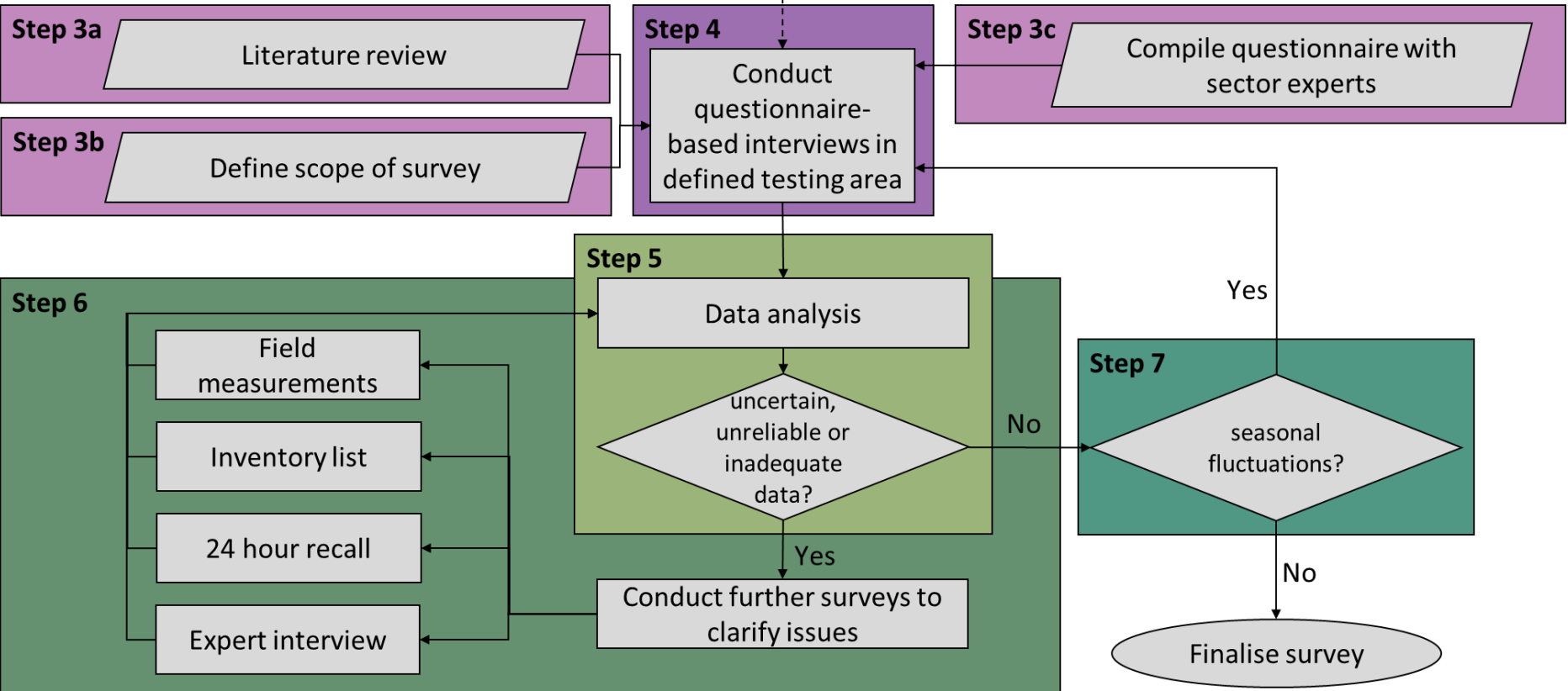
1. Data collection by means of an interview with questionnaires (using tablets to reduce transfer mistakes, local assistants for translation) in the WP1 testing areas
2. Consolidation of results with field measurements, 24 h recall and expert interviews e.g. for solid waste (field measurements with COPED),
3. Letting people make a (daily) inventory list over a period of time, e.g. for food purchase

### Restrictions / Challenges for questionnaires

- To cover all sectors and keep it short simultaneously (interview time < 30')
- Seasonal/weekly variations must be regarded
- Proof of validity often difficult (missing electricity or water bills)
- Answers heavily depend on willingness to participate

## DATA GATHERING AT THE HOUSEHOLD LEVEL (RESIDENTIAL)

### Sector specific survey (Task 3.1)



## LOOK & FEEL INTO THE TABLET-BASED QUESTIONNAIRE

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Finished scanning. All forms loaded.

**Household Survey**  
Added on Fri, Nov 20, 2015 at 09:02

**Public and Commerce Survey**  
Added on Sun, Nov 15, 2015 at 20:53

**Sector specific survey in the residential sector in Da Nang\_English version**  
Added on Mon, Feb 29, 2016 at 11:58

**Sector specific survey in the residential sector in Da Nang\_Vietnam version**  
Added on Sun, Mar 06, 2016 at 00:00

**Sector specific survey in the residential sector in Kigali\_Rwandan version**  
Added on Sun, Nov 22, 2015 at 23:09

**Survey**  
Added on Sun, Nov 15, 2015 at 20:40

ODK Collect > Main Menu

**ODK Collect 1.4.10 (1061)**  
Data collection made easier...

Fill Blank Form

Edit Saved Form (1)

Send Finalized Form (3)

Get Blank Form

Delete Saved Form

ODK Collect > ...

**Imiterere y'ibikoreshwa mu ngo mu Muji wa Kigali, Rwanda**  
(Consumption patterns in the residential sector in Kigali, Rwanda)

## PREPARATION OF INTERVIEWS WITH LOCAL ASSISTANTS





## INTERVIEWS AT HOUSEHOLD AND PUBLIC & COMMERCE LEVEL

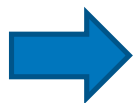
Level	Households	Public & Commerce
Survey period	June 2015 and Nov 2015	Nov 2015
No. of questions	46	25
Sample size	842	440
Share in building/ facility type	<ul style="list-style-type: none"> <li>• Luxury Villa: 12.1%</li> <li>• Villa: 26.2%</li> <li>• Rudimentary: 61.1%</li> <li>• Local type: 0.5%</li> </ul>	<ul style="list-style-type: none"> <li>• Shop: 52.0%</li> <li>• Restaurant: 6.0%</li> <li>• Market: 4.0%</li> <li>• Office: 5.0%</li> <li>• Other: 33.0%</li> </ul>

## EXEMPLARY RESULTS: ENERGY CONSUMPTION IN BUILDING TYPES

Building type	Electricity [kWh*cap <sup>-1</sup> *a <sup>-1</sup> ]	LPG <sup>a</sup> [kWh*cap <sup>-1</sup> *a <sup>-1</sup> ] ([kg*cap <sup>-1</sup> *a <sup>-1</sup> )	Charcoal <sup>b</sup> [kWh*cap <sup>-1</sup> *a <sup>-1</sup> ] ([kg*cap <sup>-1</sup> *a <sup>-1</sup> )	Total [kWh*cap <sup>-1</sup> *a <sup>-1</sup> ]
Luxury villa	689	419 (33)	1,329 (165)	2,437
Villa	530	355 (28)	1,532 (190)	2,417
Rudimentary	79	165 (13)	1,290 (160)	1,534
Local type	-	-	-	-
<b>Weighted Average</b>	<b>301</b>	<b>279 (22 )</b>	<b>1,363 (169)</b>	<b>1,943</b>

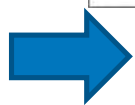
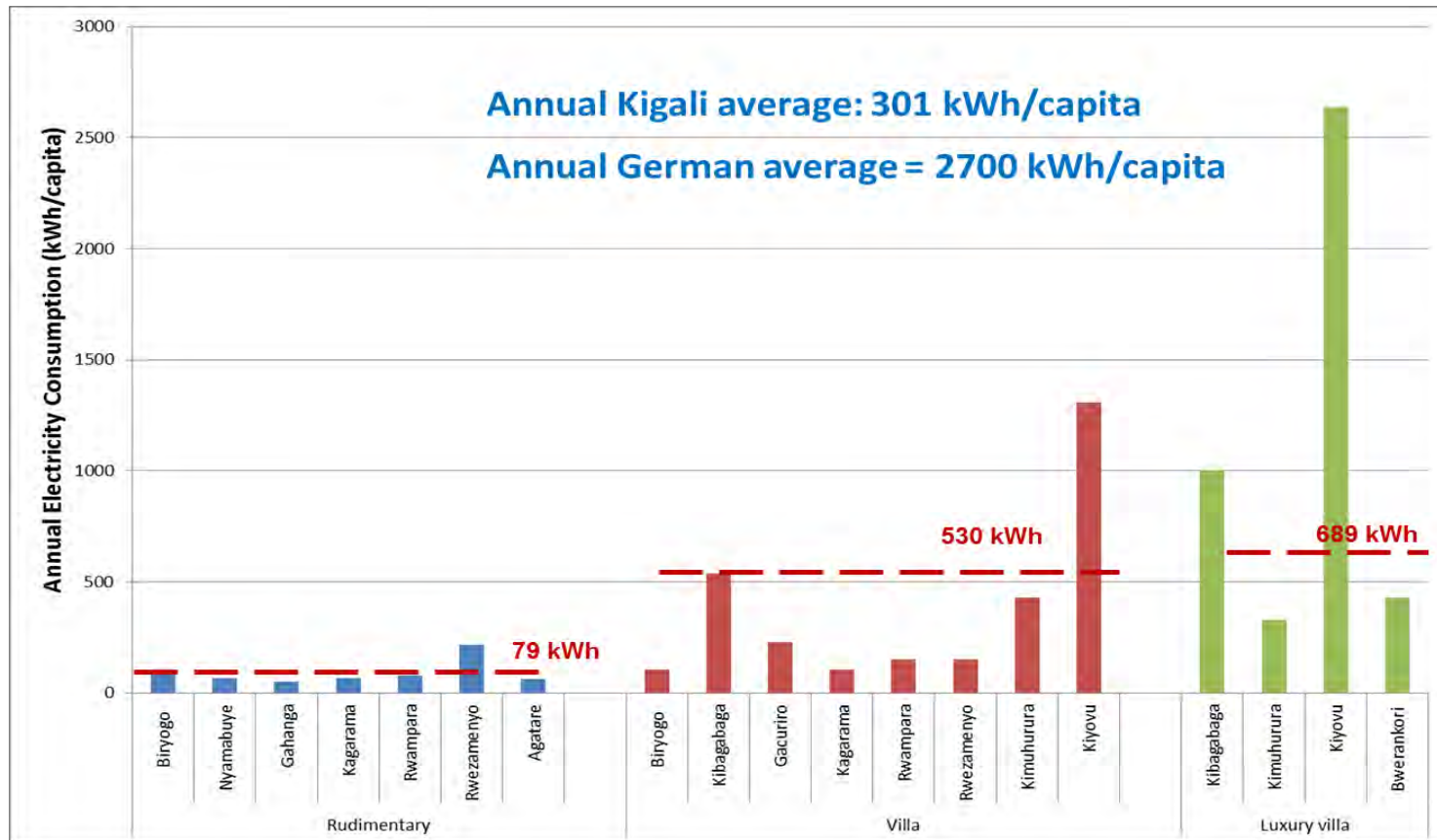
<sup>a</sup> LPG usually bought in bottles, although assumption H<sub>i</sub>(butane) = 12,70 kWh/kg

<sup>b</sup> assumption H<sub>i</sub>(charcoal) with 80% carbon = 29 MJ/kg (1 MJ = 0,278 kWh)



- Total energy consumption in rudimentary buildings is not exceptionally low
- Large difference in electricity consumption, but not in charcoal

## VARIABILITY IN ELECTRICITY CONSUMPTION IN CELLS



Variability is extremely high, average values have limited validity



## WATER CONSUMPTION & EXPENDITURE IN KIGALI

Building type	Consumption [l*cap <sup>-1</sup> *d <sup>-1</sup> ]	Expenditure [RWF*cap <sup>-1</sup> *m <sup>-1</sup> ]
Luxury villa	302.30	5,651
Villa	254.84	4,126
Rudimentary	42.61	759
Local type	-	-
<b>Weighted Average</b>	<b>131.53</b>	<b>2,288</b>
Avg. in Rwanda (EICV 3, 2011 (NISR))	13.00	N/A
Avg. in Rwanda (EICV 4, 2016 (NISR))	N/A	2,398
Avg. in Agatare (GISTech Report, 2015)	N/A	795

- **Avg. monthly expenditure in Rwanda (EICV 4) & Kigali (RP survey) show similar trends**
- **No reliable data were available on average water consumption in Kigali**

## STATUS OF DATA COLLECTION IN KIGALI

Sector	Household level	Public & commerce level
Energy	Completed	Completed
Food & UA	Underway (Oct/Nov 2016)	Completed
Solid Waste	Data are being analysed & supplemented	to be conducted in Dec 2016
Waste water	Completed	Completed
Water	Completed	Completed

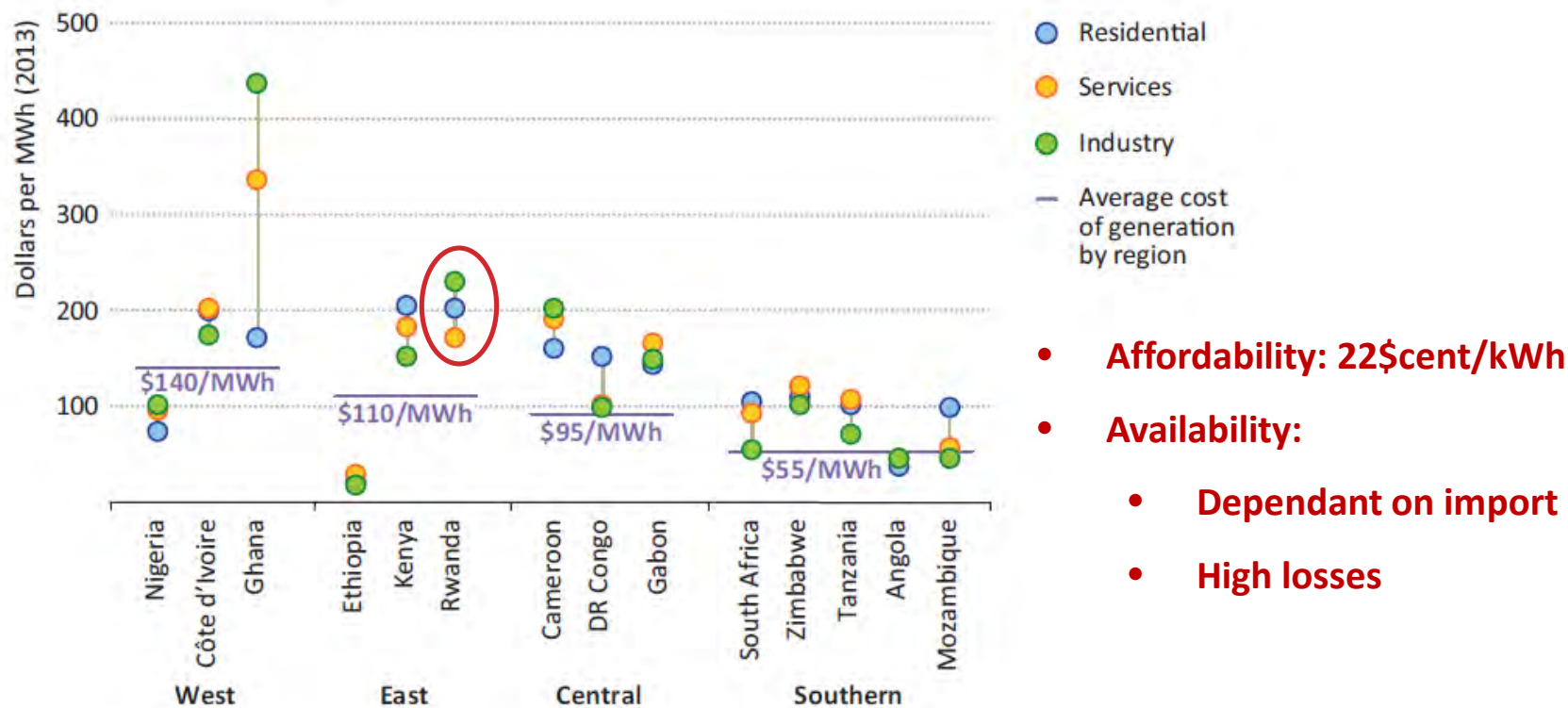


# Thank you



## ELECTRICITY CONSUMPTION IN KIGALI

**Figure 1.30** ▷ Grid electricity prices by end-use sector in selected countries, 2013





## KIGALI: OVERVIEW OF SURVEYED AREA



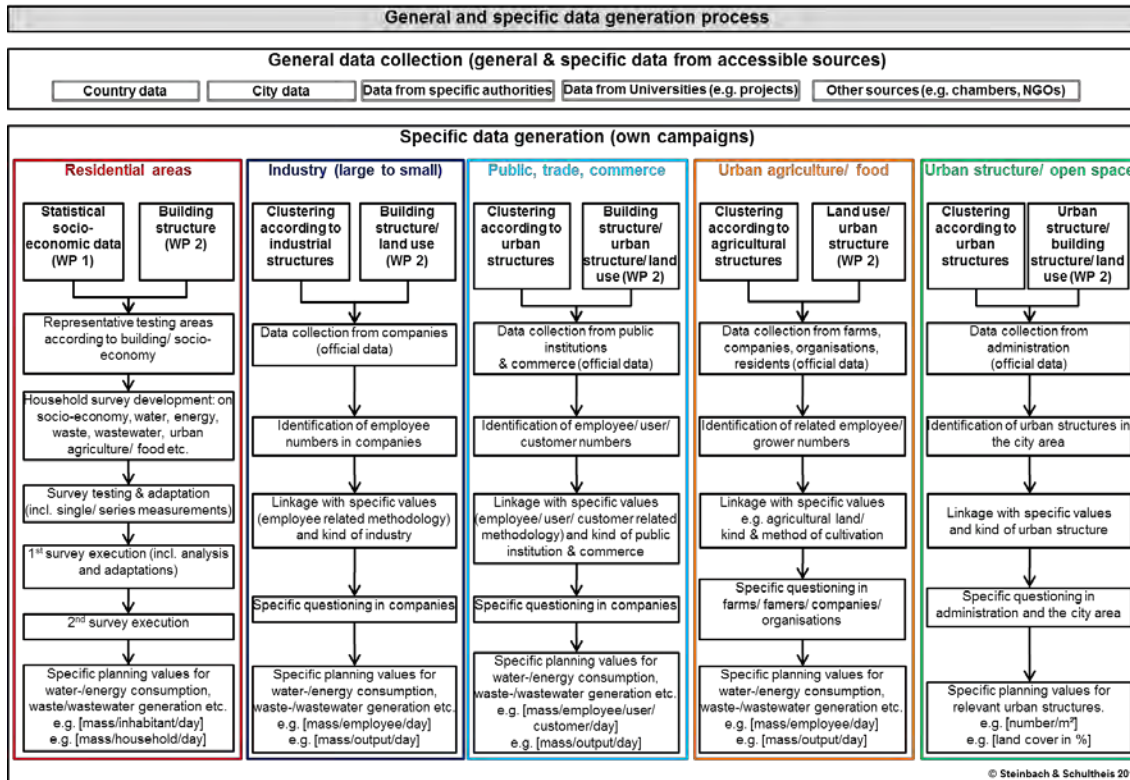


## FOOD & BEVERAGES EXPENDITURE IN KIGALI

Building type	[RWF*HH <sup>-1</sup> *m <sup>-1</sup> ]	[RWF*cap <sup>-1</sup> *m <sup>-1</sup> ]
Luxury villa	325,817	96,861
Villa	242,632	78,541
Rudimentary	80,952	24,929
Weighted Average	<b>115,628</b>	<b>43,802</b>
Average in Rwanda (EICV3, 2011)	N/A	13,831
Average in Agatare (GISTech Report, 2015)	N/A	18,505

- **Per capita expenditure in building type ‘Rudimentary’ is similar to that in Agatare**
- **Unfortunately, no comparable data were available for other building types or income groups**

## RP METHODOLOGY



- **Trans-sectoral approach**
- **Sector specific data gathering in target groups**
- **Specific data means**
  - Data per capita
  - Per product unit
  - Per employee
- **Target groups:**
  - Households
  - Industry
  - Public & commerce
- **Base-line information provided by WP1 & WP2**

## DATA GATHERING CONCEPT

Aim: Gathering specific data (e.g. per capita) in all five sectors at the level of household (IER), industry (IUWA) and public & commerce (IER)

Sector	Specific data such as,
<b>Energy</b>	Consumption of electricity, LPG
<b>Food &amp; UA*</b>	Consumption of food & beverages, production for own consumption
<b>Solid Waste</b>	Amount of waste, expenditures
<b>Waste Water</b>	Waste water generation, expenditures
<b>Water</b>	Water consumption, expenditures

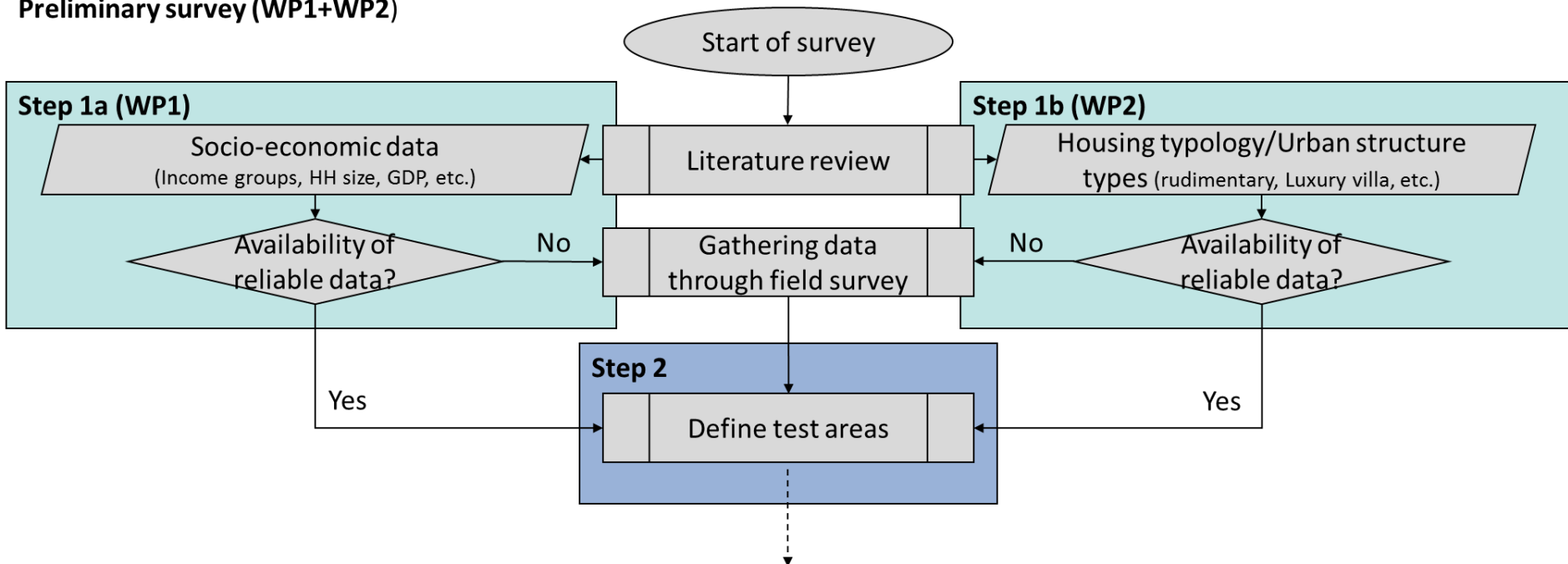
\*UA = urban agriculture

## VARIOUS SURVEY METHODS

Methods used in WP3	Objective	Sectors covered
Questionnaire-based interview	To collect general sector data	All five
Field measurement	To collect specific data such as waste composition	Solid waste
Detailed questionnaire	To collect specific data such as eating habits	Food & urban agriculture
Field measurement	Accurate & detailed information can be collected	Difficult to cover seasonal variations, expensive
Detailed questionnaire	Accurate & detailed information can be collected	Time consuming, expensive
24 hour recall	Very useful for sectors such as food due to longer survey period	Time consuming, expensive

## DATA GATHERING AT HOUSEHOLD LEVEL

### Preliminary survey (WP1+WP2)



**Data collection in WP3 will be based on data analysis and information gathered in WP 1 and WP 2**



## AGENDA

- Data Gathering Concept & Methodology
- Overview of Surveyed Area in Kigali
- Consumption Patterns in Kigali
- Data Gaps in Kigali
- Current/Future Data Gathering in Kigali

## ELECTRICITY CONSUMPTION IN PUBLIC & COMMERCE SECTOR IN KIGALI

No. of employees	Share	Electricity consumption	Expenditure on electricity	Share spent on electricity
[#]	[%]	[kWh*a <sup>-1</sup> *empl <sup>-1</sup> ]	[RWF*a <sup>-1</sup> empl <sup>-1</sup> ]	[%]
1 - 5	81.28	569	122,219	7.39
6 – 10	8.77	484	104,013	9.49
11 – 20	5.92	455	97,742	8.91
> 20	4.03	517	111,038	8.53

- Electricity consumption per employee is independent of size of facility
- Share of electricity expenditure varies between 7.4 to 9.5%