Lighting Africa Market Assessment Results

Quantitative Assessment - TANZANIA

Report Content

Background

The World Bank Group (WBG) required information to aid manufacturers to **develop, fine tune or simply launch** as they are, **low cost lighting products** to off-grid urban and rural consumers within a variety of African countries.

As such, the main objective of the research was to provide information in terms of the **suitability of different types of lighting products** in the African market, as well as quantifying the approximate size of the potential market in volume and value terms for appropriate lighting products, and providing other information of use to manufacturers

Research Objectives

Interviews focused on answering these questions:

Who is the consumer?
- Consumer Demographics and Characteristics

How does the consumer use light?
- Current Lighting Habits, Attitudes, Preferences, and Needs

What does the consumer need?
- Assessment of Need for Modern Lighting

Which modern lighting products does the consumer prefer? Lighting Product Preferences (e.g. product performance, specific design)

How much is the consumer willing to pay?
- Consumer Economics (e.g. optimum price and capacity to pay for lighting)

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Method

Household

- 1000 households, representative sample conducted in Dar es Salaam, Dodoma, Kilimanjaro, Morogoro, Mbeya, Tabora, Shinyanga, Mwanza, Tanga, Arusha and Irunga
- Interviewed main (or joint) decision maker regarding household and purchases – i.e. head of household
- Face to face interview using structured questionnaire

Retail Businesses

- 400 retail businesses, representative sample conducted in Dar es Salaam, Dodoma, Kilimanjaro, Morogoro, Mbeya, Tabora, Shinyanga, Mwanza, Tanga, Arusha and Irunga
- Covered retail businesses in informal settlements in urban and rural trading centres
- Interviewed the business owner or manager
- Face to face interview using structured questionnaire

Study conducted by: Research International Social & Public Research Division, based in Nairobi, Kenya

How to Read the Slides

Sample on which this slide is based

Mean score or average of a specific measure

Figures in the graph are percentages of the base indicated

Comment on slide content

Contributors to Household Income

CONSUMER

Q.D8 and D9 "How many people in and outside the household contribute to this monthly household income?"

Mean = 1.23

Mean = 1.04

3

16

81

3

8

89

Legend:
- 4 people or more
- 3 people
- 2 people
- 1 person
- None

Number in the HH who contribute

Number out of the family HH who contribute

The majority of households are supported single handedly with the household head as the main income earner. There are very few cases (11%) in which the household income is supplemented by people who are not part of the household.

Slide Title

Question which was asked of the respondent

Legend detailing what the different chart colors mean

Sample size on which the chart is based

Base: Total Sample = 1000

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Tanzania: Socio-Economic Environment

The population of Tanzania in 2003 was estimated by the United Nations at 36,977,000 with approximately 3% of the population being over 65 years and 45% of the population under 15 years of age.

Tanzania is one of the poorest countries in the world. The economy depends heavily on agriculture, which accounts for almost half of GDP, provides 85% of exports, and employs 80% of the work force. Topography and climatic conditions, however, limit cultivated crops to only 4% of the land area. Industry traditionally featured the processing of agricultural products and light consumer goods.

Growth in 1991-2002 featured a pickup in industrial production and a substantial increase in output of minerals, led by gold. Recent banking reforms have helped increase private sector growth and investment. Continued donor assistance and solid macroeconomic policies supported real GDP growth of nearly 6% in 2004.
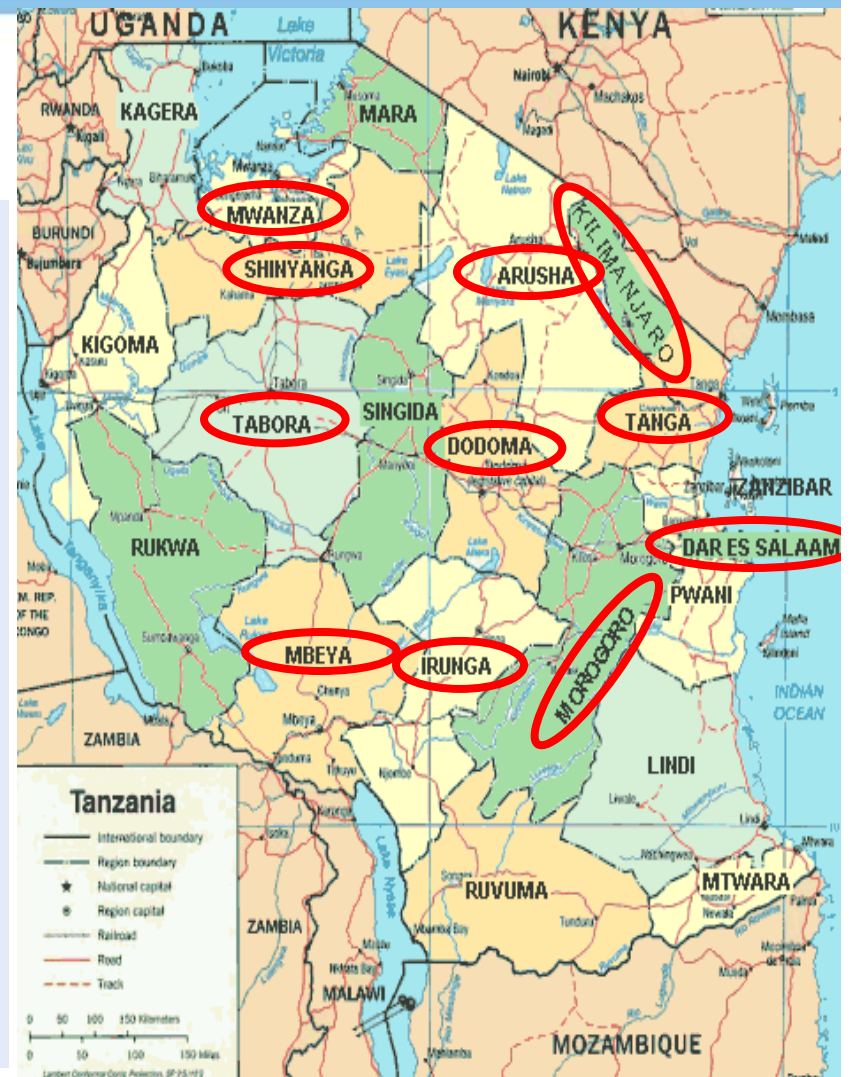
Overall opportunity in Tanzania

Regional and Welfare Ranking			
	Food Security	Unemployment	GDP per capita
1. Dodoma	3	18	3
2. Kagera	10	15	1
3. Lindi	5	6	10
4. Kigoma	6	4	2
5. Coast	4	5	7
6. Morogoro	2	8	8
7. Mara	7	9	6
8. Tanga	1	3	5
9. Mtwara	9	11	9
10. Rukwa	18	14	19
11. Arusha	8	7	18
12. Mwanza	14	18	14
13. Iringa	11	20	17
14. Mbeya	15	12	11
15. Shinyanga	16	13	15
16. Tabora	17	17	12
17. Singida	12	19	13
18. Kilimanjaro	13	2	4
19. Ruvuma	19	10	16
20. DSM	20	1	20

Source: Poverty & Welfare Monitoring Indicators, Vice President's Office, Dar es Salaam – November, 1999

6/ Rank"1" Implies most deprived region and "20" least deprived region.

LIGHTING AFRICA

Catalyzing Markets for Modern Lighting

RESPONDENT PROFILE

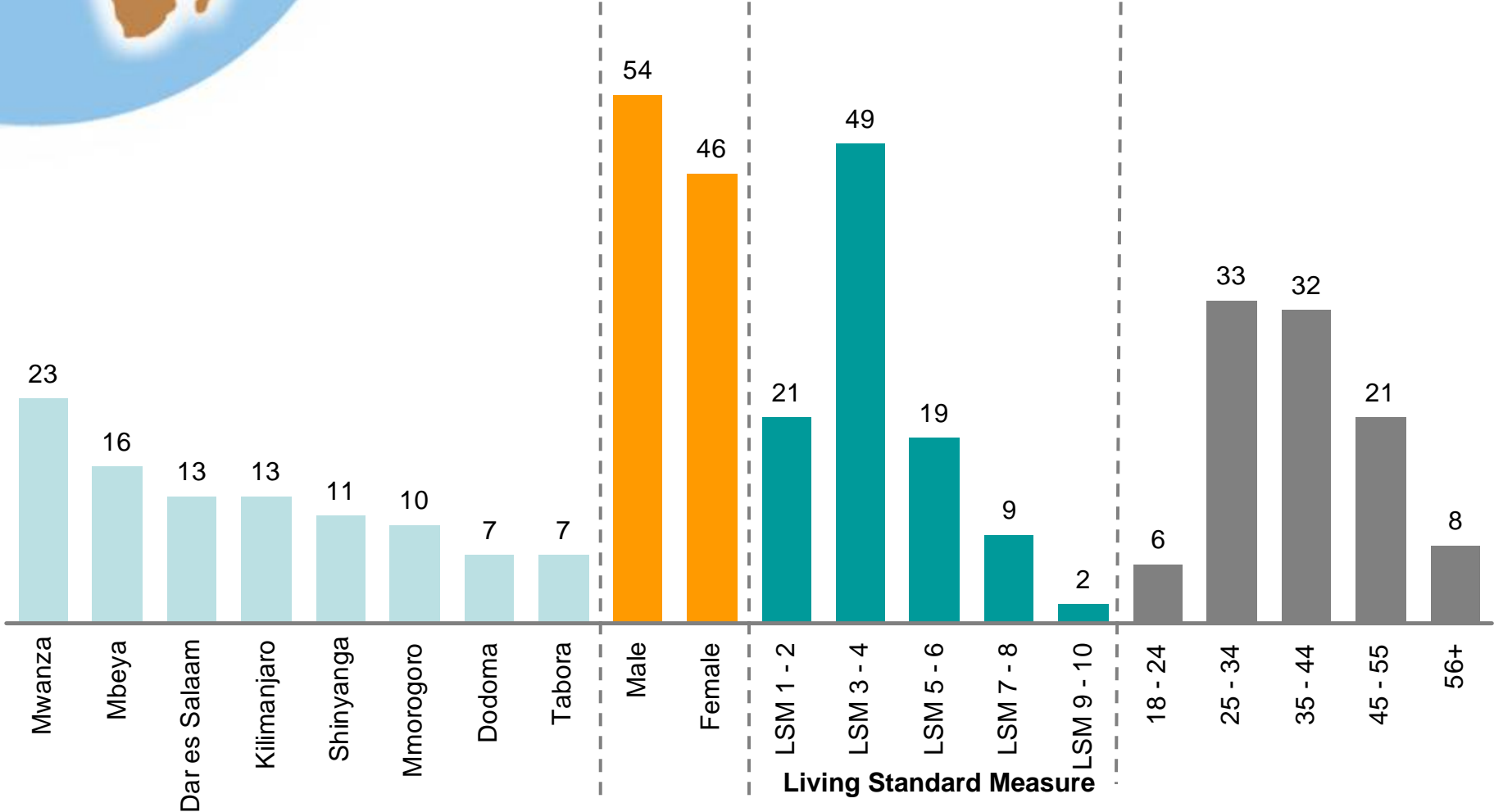# Rural Vs. Urban Sample Distribution

The urban vs. rural sample was split in line with the national distribution of the Tanzanian population

Urban
39%

Rural
61%

Base :Total sample = 1000

Respondent Demographic Profile

CONSUMER

Mwanza — 23
Mbeya — 16
Dar es Salaam — 13
Kilimanjaro — 13
Shinyanga — 11
Mmorogoro — 10
Dodoma — 7
Tabora — 7

Male — 54
Female — 46

Living Standard Measure
LSM 1 - 2 — 21
LSM 3 - 4 — 49
LSM 5 - 6 — 19
LSM 7 - 8 — 9
LSM 9 - 10 — 2

18 - 24 — 6
25 - 34 — 33
35 - 44 — 32
45 - 55 — 21
56+ — 8

Base :Total sample = 1000

Observations about Consumer Households

CONSUMER

Colour of the room in the main dwelling	%
White or Bright colour	19
Brown/ natural clay/dark clay	37
Other clay	21
Not observed	23

Dwelling environment	%
Planned urban centre	15
Unplanned/informal settlement	24
Rural -planned	22
Rural - other	39

Wall Material of Dwelling	%
Mud/mud bricks	49
Wood planks	3
Bricks or stone	44
Corrugated Iron	2
Other	2

Size of the main room	%
3 Square meters or less	39
3.1 – 8 Square meters	38
More than 8 Square meters	23

Roof Material of the dwelling	%
Grass or other thatch	16
Corrugated iron	82
Tiles	2

Type of road near dwelling	%
Tarmac	20
Murram or rough road	52
Pathway (no vehicle access)	28

Base :Total sample = 1000

TRADERS

Rural Vs. Urban Sample Distribution

The urban vs. rural sample was split in line with the national distribution of the Tanzanian population

Urban
41%

Rural
59%

Base :Total sample = 400

Respondent Demographic Profile: Traders

TRADER

Living Standard Measure

Base :Total sample = 400

Observations about Businesses

TRADER

Colour of the walls in the main business room	%
White or Bright colour	34
Brown/ natural clay/dark clay	24
Other clay	20
Not observed	22

Business Environment	%
Planned urban centre	18
Unplanned/informal settlement	23
Rural -planned	29
Rural - other	30

Wall Material of business structure	%
Mud/mud bricks	23
Wood planks	19
Bricks or stone	55
Corrugated Iron	3

Size of the Main business room	%
3 Square meters or less	47
3.1 – 8 Square meters	30
More than 8 Square meters	23

Roof Material of the business structure	%
Grass or other thatch	12
Corrugated iron	84
Tiles	4

Type of road near business structure	%
Tarmac	30
Murram or rough road	60
Pathway (no vehicle access)	10

Base :Total sample = 400

LIGHTING AFRICA

BEHAVIOUR

CONSUMERS

CONSUMER

Chart (stacked bar, Base: Total sample = 1000):

- Wood: 2
- Cement: 11
- Mud houses: 33
- Brick: 50
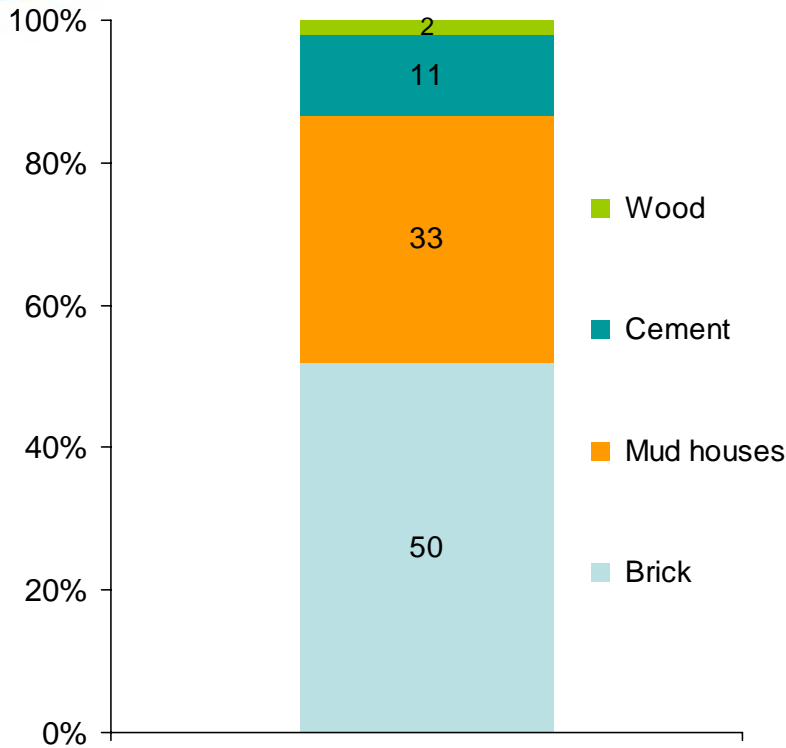
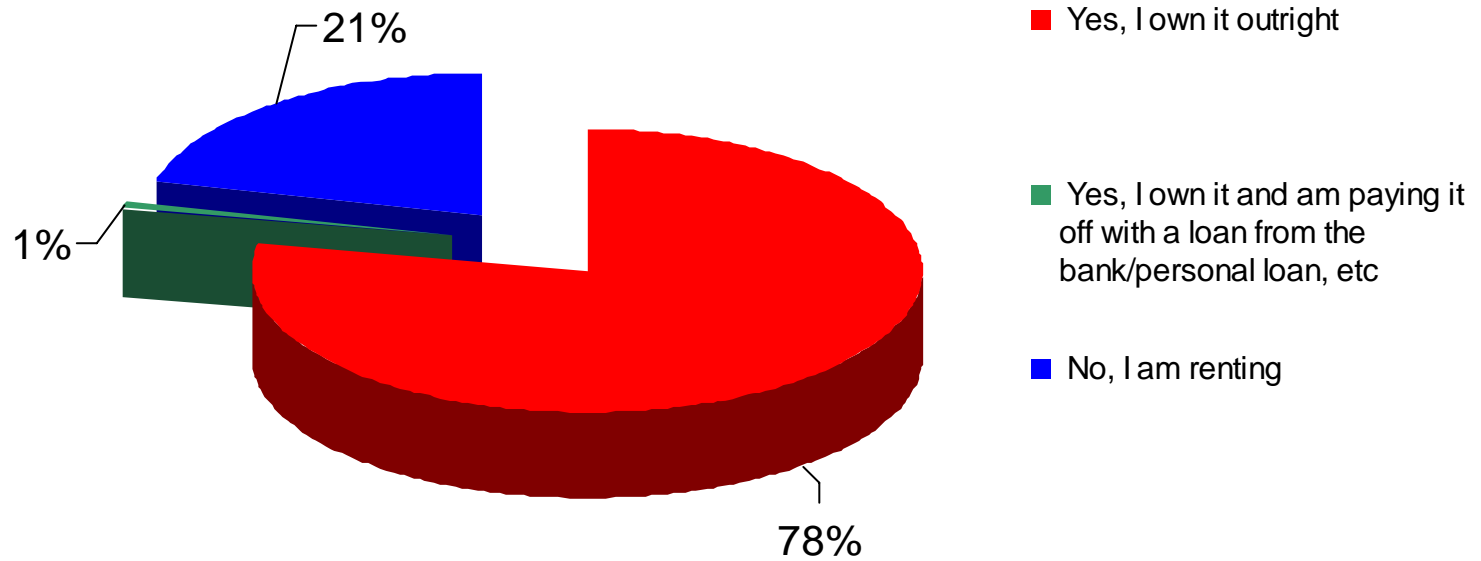Most coming types of dwelling construction material are brick and mud houses.

Consumer house/dwelling sizes, both in urban And rural settings, are small: typically families will occupy anything from a **single room** - partitioned into a living and sleeping area with a curtain – to a 4 room structure.

On average **4 to 5 people** live in the household on a permanent basis.

Base: Total sample =1000

Home Ownership

Q. 3b "Do you own the home/residence where you live?"

- 21%
- 1%
- 78%

Legend:
- ■ Yes, I own it outright
- ■ Yes, I own it and am paying it off with a loan from the bank/personal loan, etc
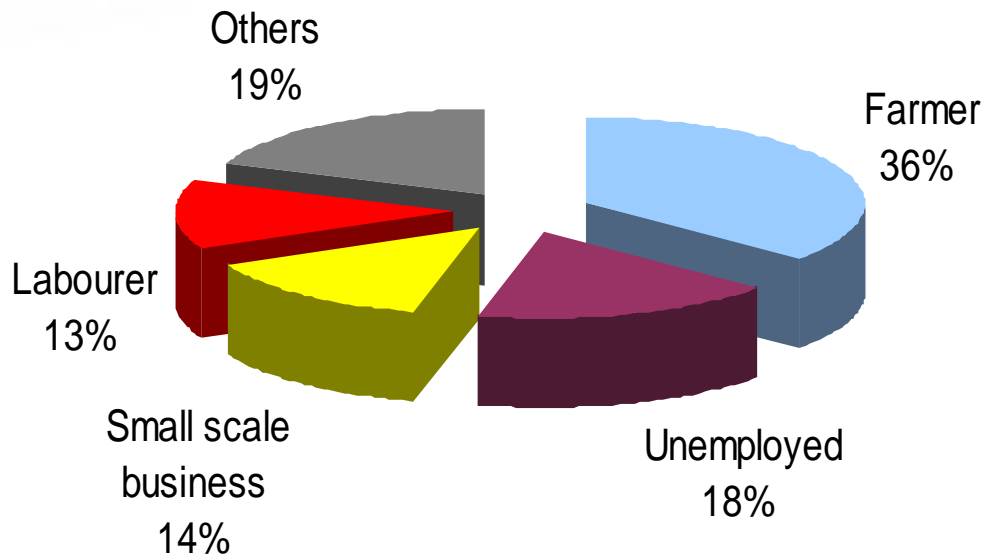- ■ No, I am renting

A majority of respondents (78%) own the homes in which they live – home ownership amongst this sample thus being relatively high

Base: Total Sample=1000

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Occupations

Q. D4 "Please can you tell me your occupation?"

Others
19%

Farmer
36%

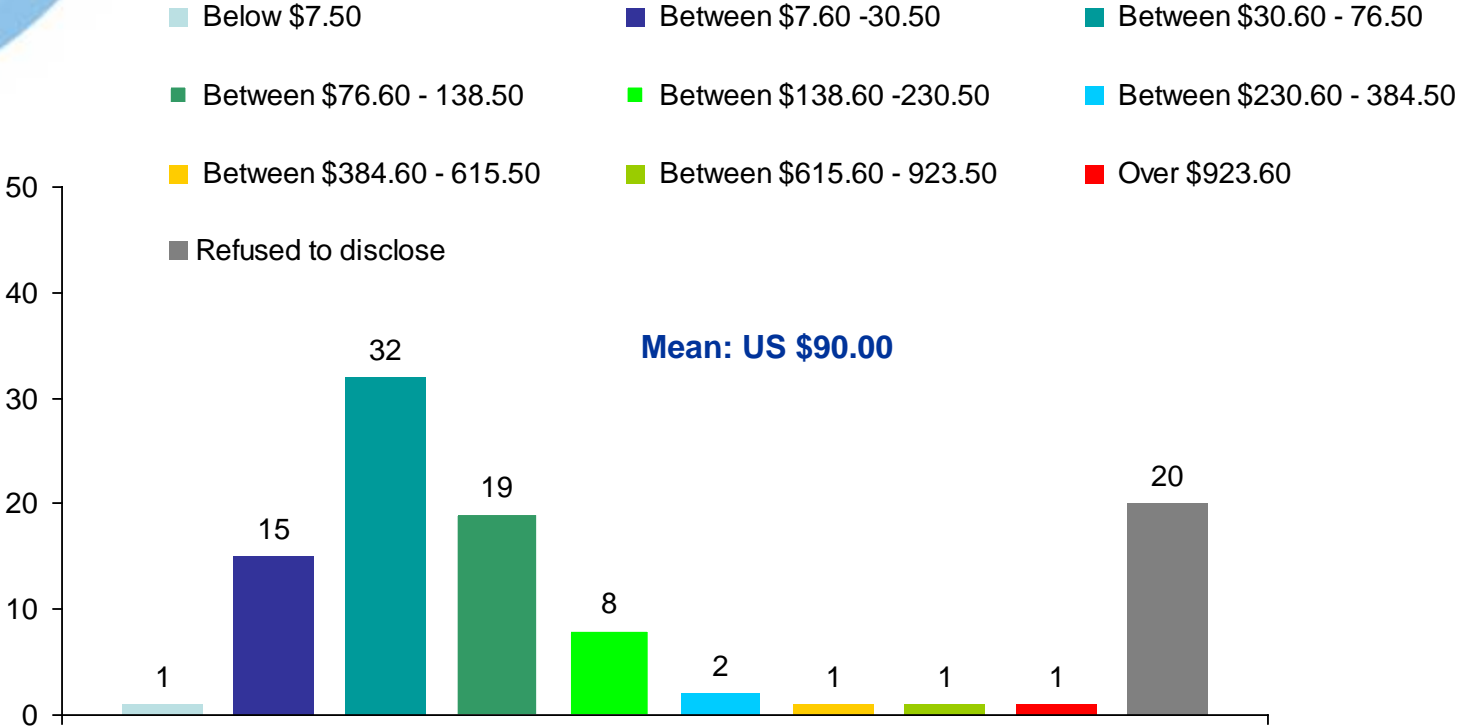Labourer
13%

Small scale
business
14%

Unemployed
18%

Farming is the most common occupation followed by blue collar jobs, such as teaching, security guard, etc. The average monthly income is US $90.

Average Tanzanian Household Income

Q. D7 "What is the average monthly income of your family"?

CONSUMER

Legend:
- Below $7.50
- Between $7.60 -30.50
- Between $30.60 - 76.50
- Between $76.60 - 138.50
- Between $138.60 -230.50
- Between $230.60 - 384.50
- Between $384.60 - 615.50
- Between $615.60 - 923.50
- Over $923.60
- Refused to disclose
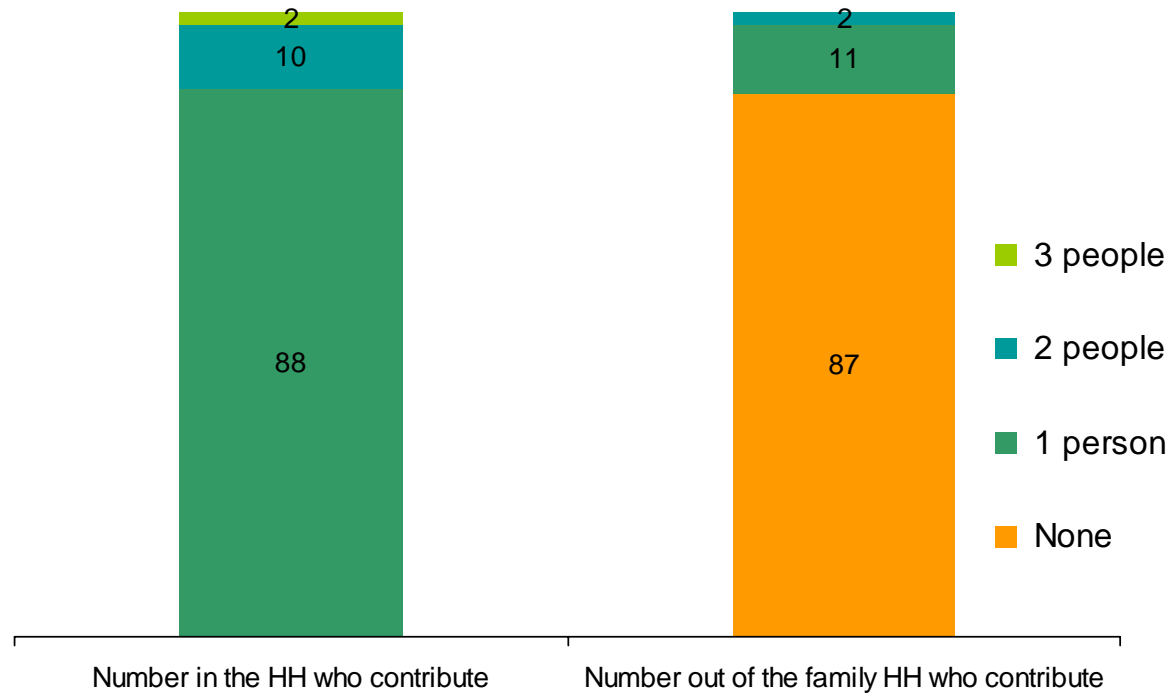
Mean: US $90.00

Bar values: 1, 15, 32, 19, 8, 2, 1, 1, 1, 20

67% of household respondents earn below US $138.50. On average the Tanzanian monthly income is **US $90.0** (majority LSM 2, 3 and 4)

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Base: Total Sample = 1000

Contributors to Household Income

Q.D8 and D9 "How many people in and outside the household contribute to this monthly household income?"
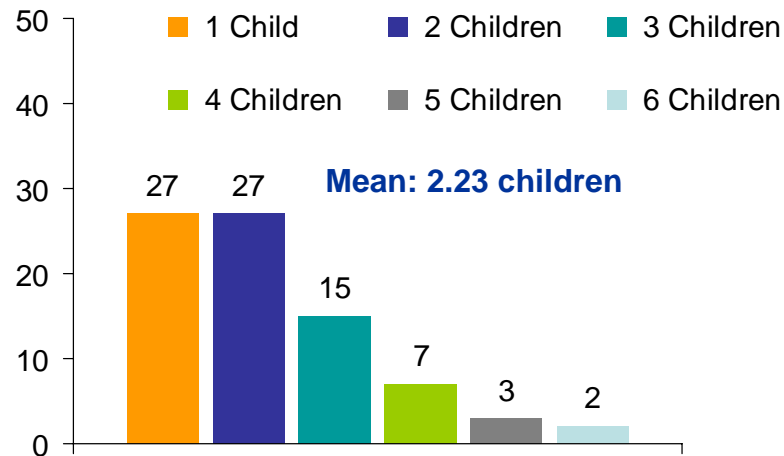
Mean=1.25

Chart data:

	Number in the HH who contribute	Number out of the family HH who contribute
3 people	2	
2 people	10	2
1 person	88	11
None		87

Legend:
- 3 people
- 2 people
- 1 person
- None

On average only 1 person contributes to this US $ 90 household income – only in very few cases are there people outside the household who contribute – 13%.
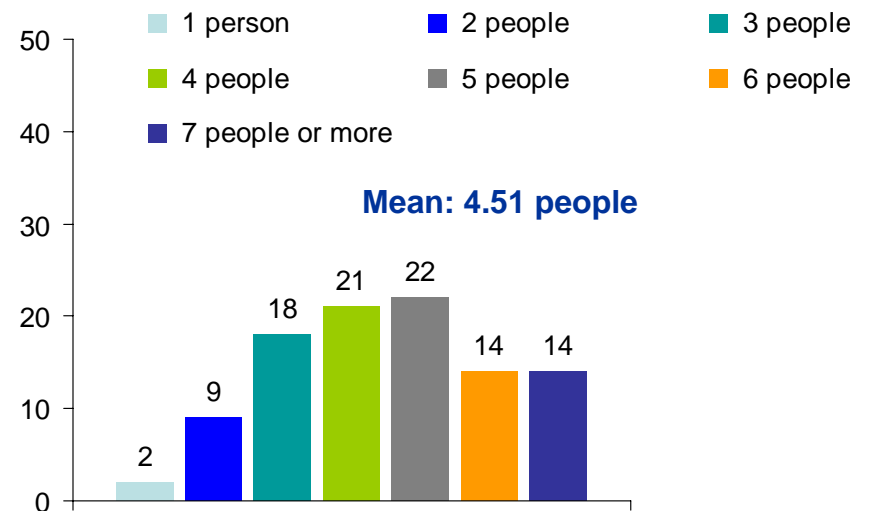
Base: Total Sample = 1000

Number of People in the Household

Q.1b "How many children (under 16 years) live in your HH in total on a permanent basis?"

Legend:
- 1 Child
- 2 Children
- 3 Children
- 4 Children
- 5 Children
- 6 Children

Mean: 2.23 children

Values: 27, 27, 15, 7, 3, 2

Q.1a "How many people live in your HH in total on a permanent basis?"

Legend:
- 1 person
- 2 people
- 3 people
- 4 people
- 5 people
- 6 people
- 7 people or more

Mean: 4.51 people

Values: 2, 9, 18, 21, 22, 14, 14

A majority of respondents have 4 to 5 people living together on a permanent basis while most households have 2 to 3 children aged under 16 years
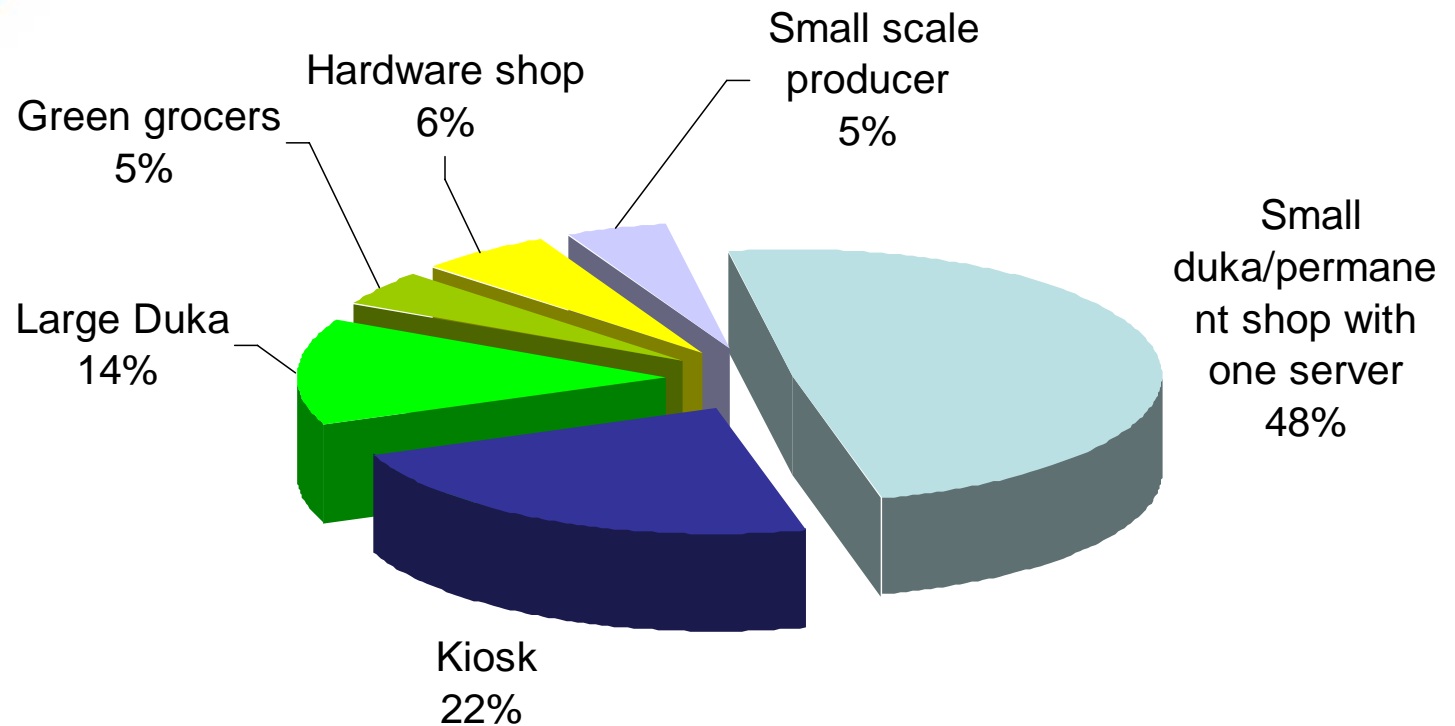
Base: Total Sample = 1000

Types Of Shop

Hardware shop
6%

Green grocers
5%

Small scale
producer
5%

Large Duka
14%

Small
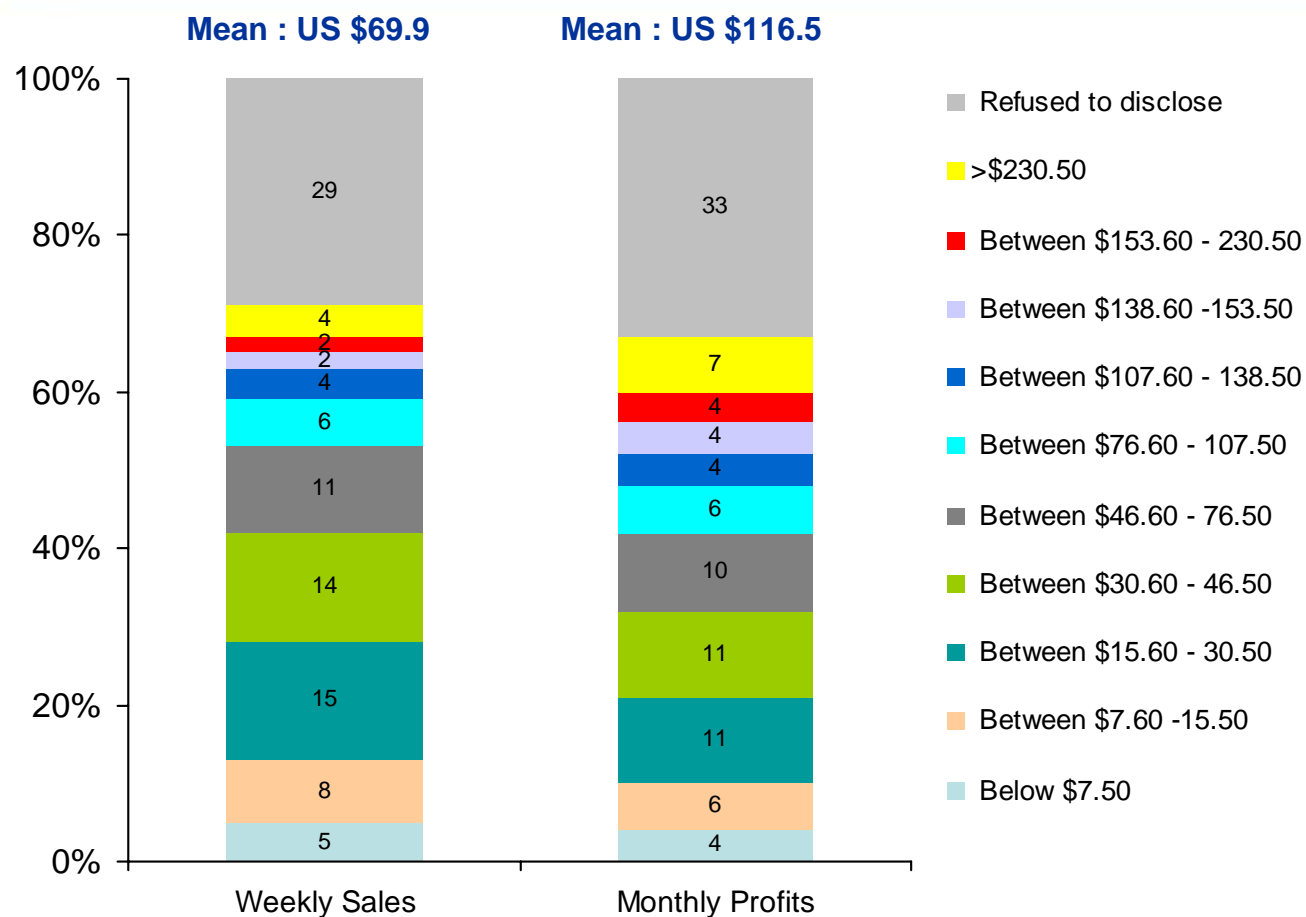duka/permane
nt shop with
one server
48%

Kiosk
22%

Most business owners run small Dukas / permanent shops, with one server who sells goods to the customer. Generally these types of stores will sell items such as food stuffs, cigarettes and newpapers.
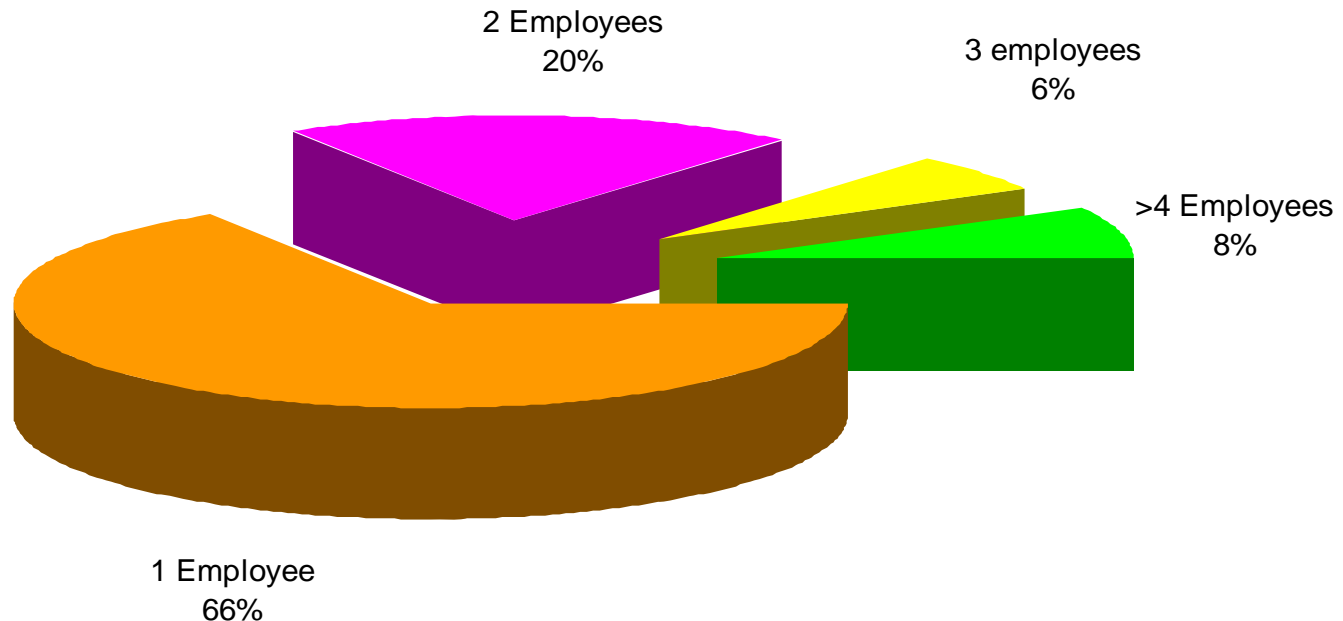
Base: Total sample = 400

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Mean : US $69.9   **Mean : US $116.5**

Legend:
- Refused to disclose
- >$230.50
- Between $153.60 - 230.50
- Between $138.60 -153.50
- Between $107.60 - 138.50
- Between $76.60 - 107.50
- Between $46.60 - 76.50
- Between $30.60 - 46.50
- Between $15.60 - 30.50
- Between $7.60 -15.50
- Below $7.50

Weekly Sales (bottom to top): 5, 8, 15, 14, 11, 6, 4, 2, 2, 4, 29

Monthly Profits (bottom to top): 4, 6, 11, 11, 10, 6, 4, 4, 4, 7, 33

Average weekly sales of Tanzanian businesses are US $69.90, while the average monthly profit is US $116.50. In Tanzania there is a high level of opposition to giving out information to researchers which is reflected by the high percentage of business owners who refused to disclose their earnings.

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Base: Total Sample = 400

Number of Employees who Work in the Business

Q. 1 "How many people work here either on casual or permanent basis

2 Employees
20%

3 employees
6%
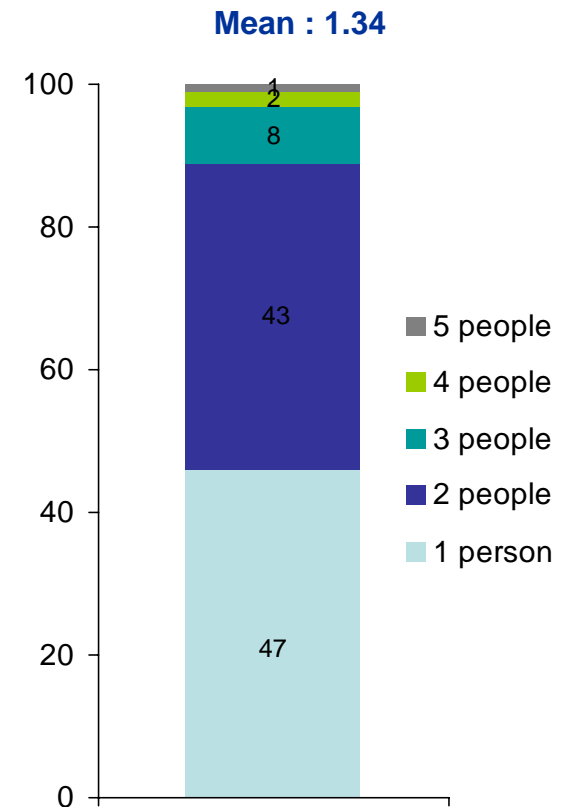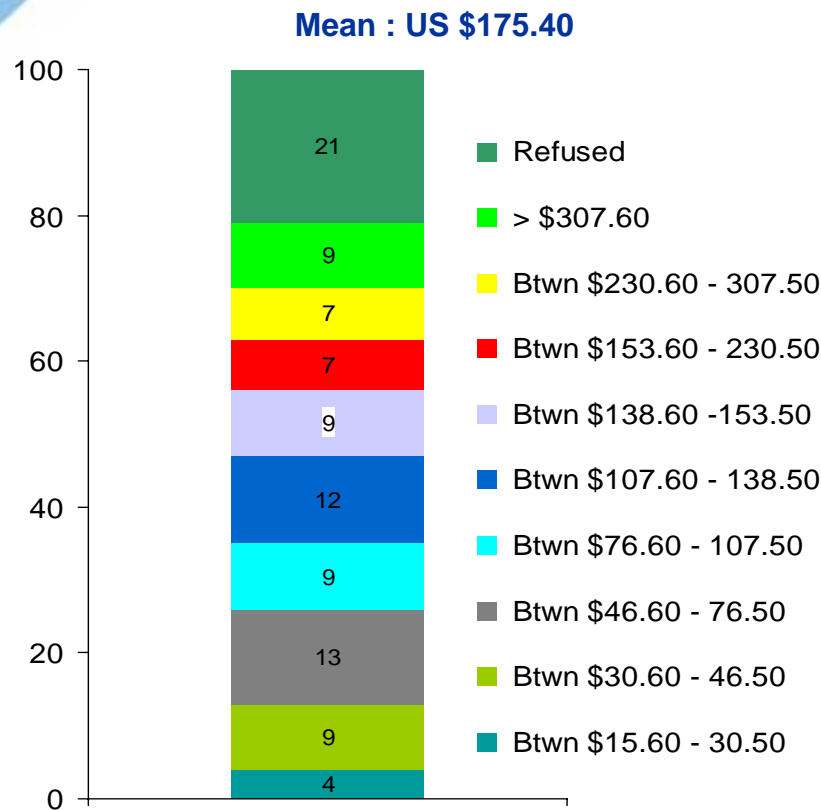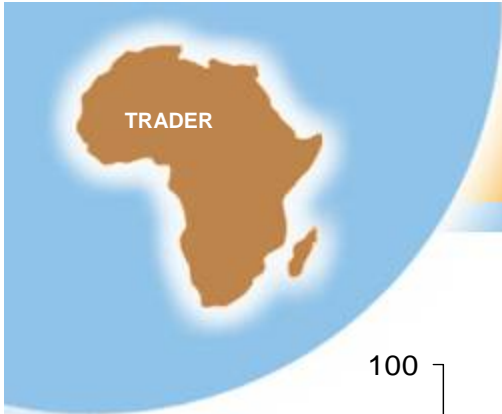
>4 Employees
8%

1 Employee
66%

Two thirds of respondents having businesses are sole proprietorships. These are usually shop owners with family members helping out where necessary. Those shops with 2 or more employees are slightly more formalised.

Base: Total Sample = 400

Monthly Income

TRADER

Mean : US $175.40

Mean : 1.34

Legend (income):
- Refused — 21
- > $307.60 — 9
- Btwn $230.60 - 307.50 — 7
- Btwn $153.60 - 230.50 — 7
- Btwn $138.60 -153.50 — 9
- Btwn $107.60 - 138.50 — 12
- Btwn $76.60 - 107.50 — 9
- Btwn $46.60 - 76.50 — 13
- Btwn $30.60 - 46.50 — 9
- Btwn $15.60 - 30.50 — 4

Legend (people):
- 5 people — 1
- 4 people — 2
- 3 people — 8
- 2 people — 43
- 1 person — 47

61% of respondents earn less than US $230. Nearly half of the households have only one person, the head, contributing to the monthly income in the home
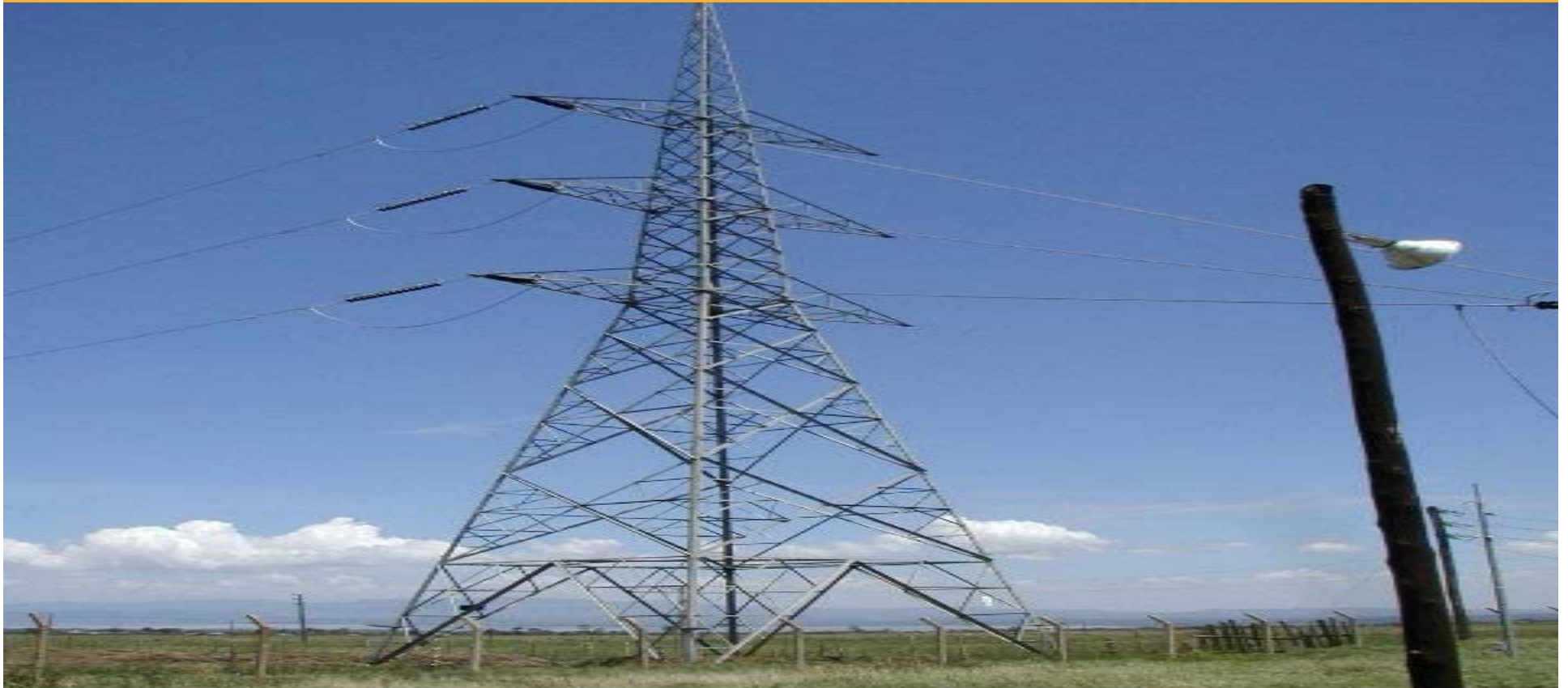
Base: Total Sample = 400

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ELECTRICITY CONSUMPTION HABITS

CONSUMERS

Connection To Main Power Grid

Q.6 "Is your household currently connected to the main power grid?"

Currently connected
10%
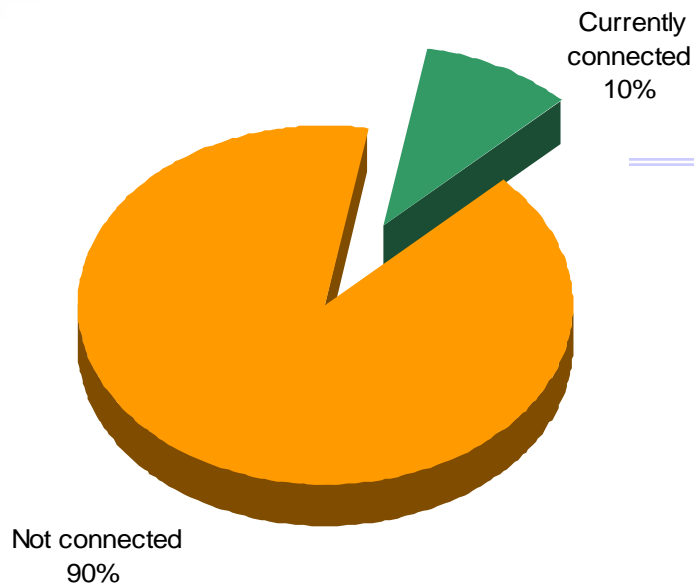
Not connected
90%

Base: Total Sample n=1000

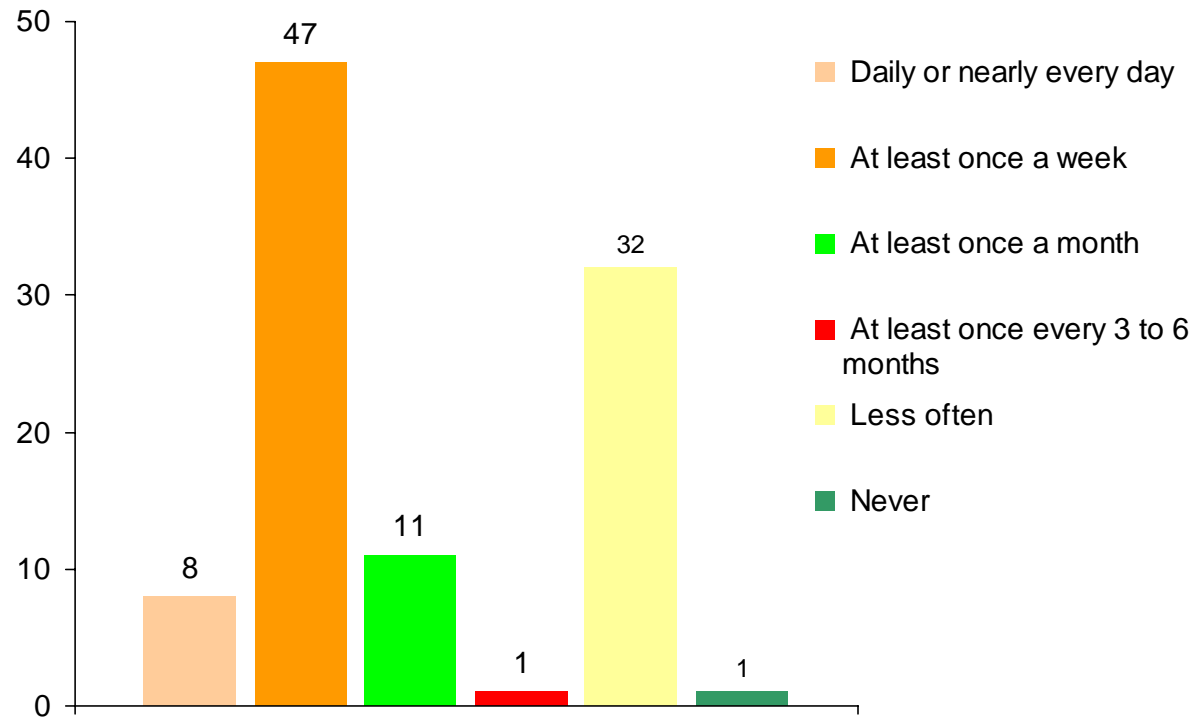| Q. 7 "Is the electricity currently working?"	Base =101: All Currently connected to main power grid
Yes	94
No	6

Of the 10% connected to the main power grid, 94% of electricity is functional with an average power cut frequency of once per week

Frequency Of Power Cuts

Q. 9 "How often if ever do you experience power cuts?"

Chart values:
- Daily or nearly every day: 8
- At least once a week: 47
- At least once a month: 11
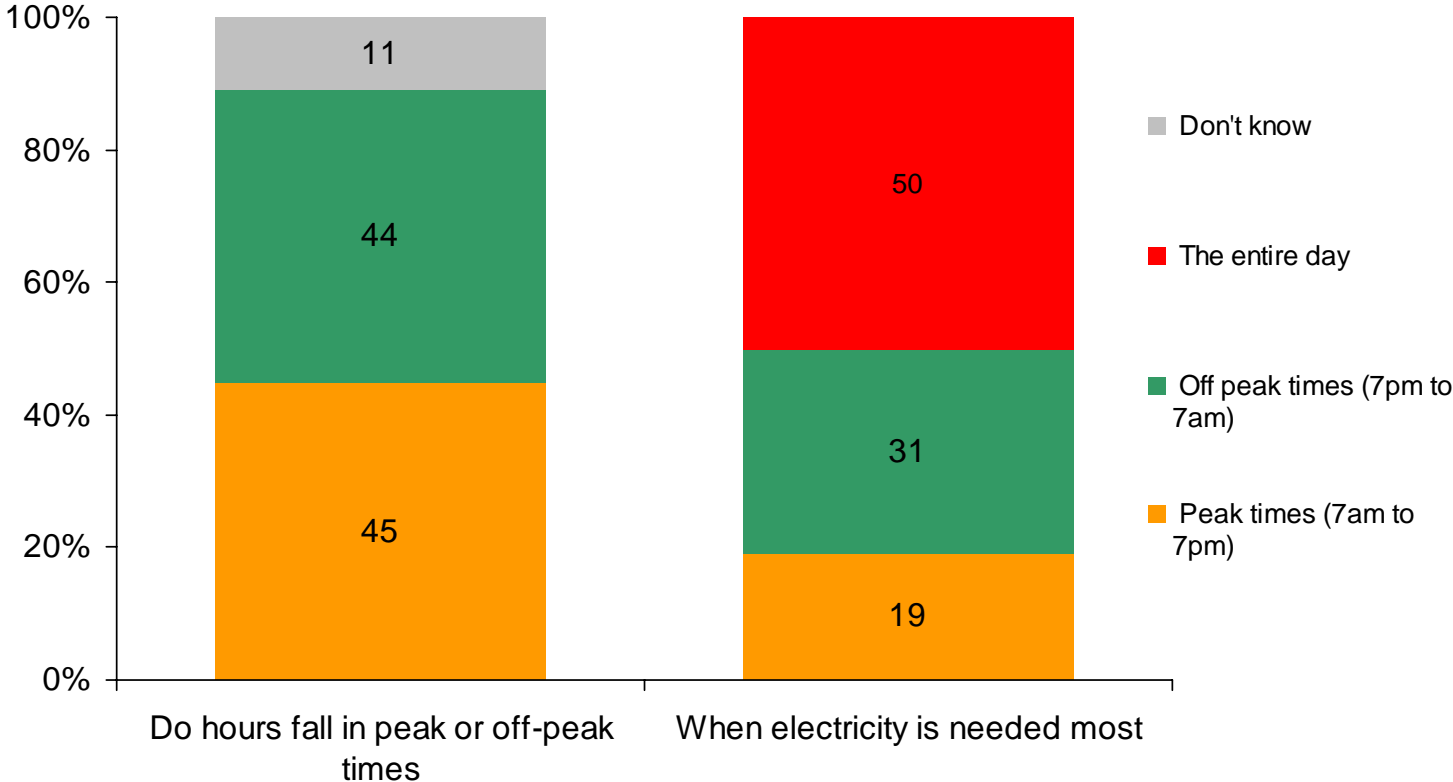- At least once every 3 to 6 months: 1
- Less often: 32
- Never: 1

Power cuts are very frequent, with more than half the respondents (52%) experiencing them at least once a week. There is therefore a great need for alternative lighting devices to be used during power cuts among those with electricity

Base: Currently connected to main power grid = 95
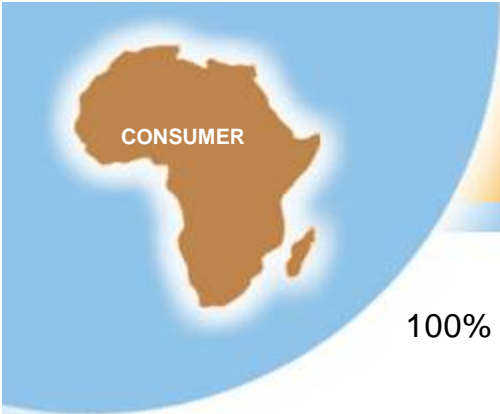
Time Power Cuts Occur

Q. 11 "Do power cuts hours fall in peak or off-peak hours ;(Q. 12) is that the time when electricity is needed most?"

CONSUMER

Legend:
- **Don't know** (grey)
- **The entire day** (red)
- **Off peak times (7pm to 7am)** (green)
- **Peak times (7am to 7pm)** (orange)

Chart: Stacked bar chart (0% to 100%)

Do hours fall in peak or off-peak times
- Don't know: 11
- Off peak times: 44
- Peak times: 45

When electricity is needed most
- The entire day: 50
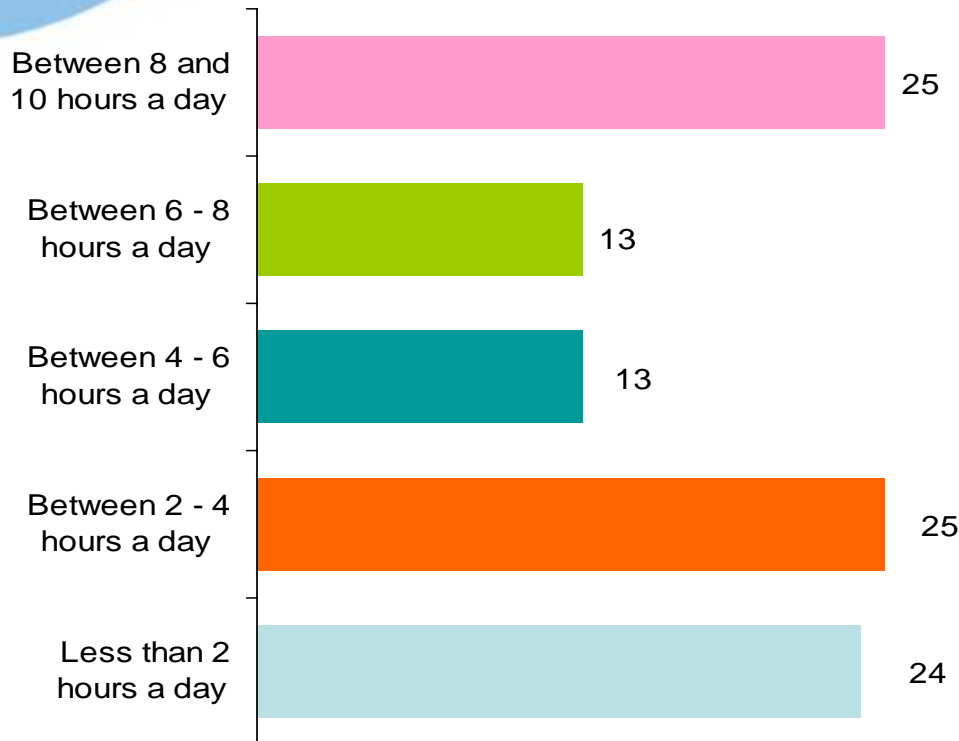- Off peak times: 31
- Peak times: 19

For households connected to the power grid, they seemingly need power most for the entire day. Power cuts occur both during peak times and off peak times in almost equal proportions.

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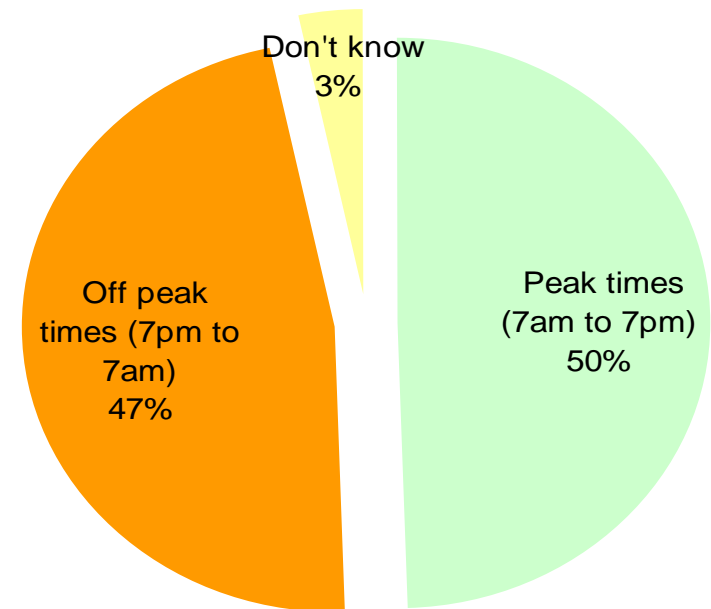IFC International Finance Corporation World Bank Group   THE WORLD BANK

Number of Hours Electricity Received in a Day

Q. 10 "On average how many hours a day do you receive electricity?"

Q. 11 "Do hours fall in peak or off-peak times?"

Bar chart — Q.10:
- Between 8 and 10 hours a day: 25
- Between 6 - 8 hours a day: 13
- Between 4 - 6 hours a day: 13
- Between 2 - 4 hours a day: 25
- Less than 2 hours a day: 24

Pie chart — Q.11:
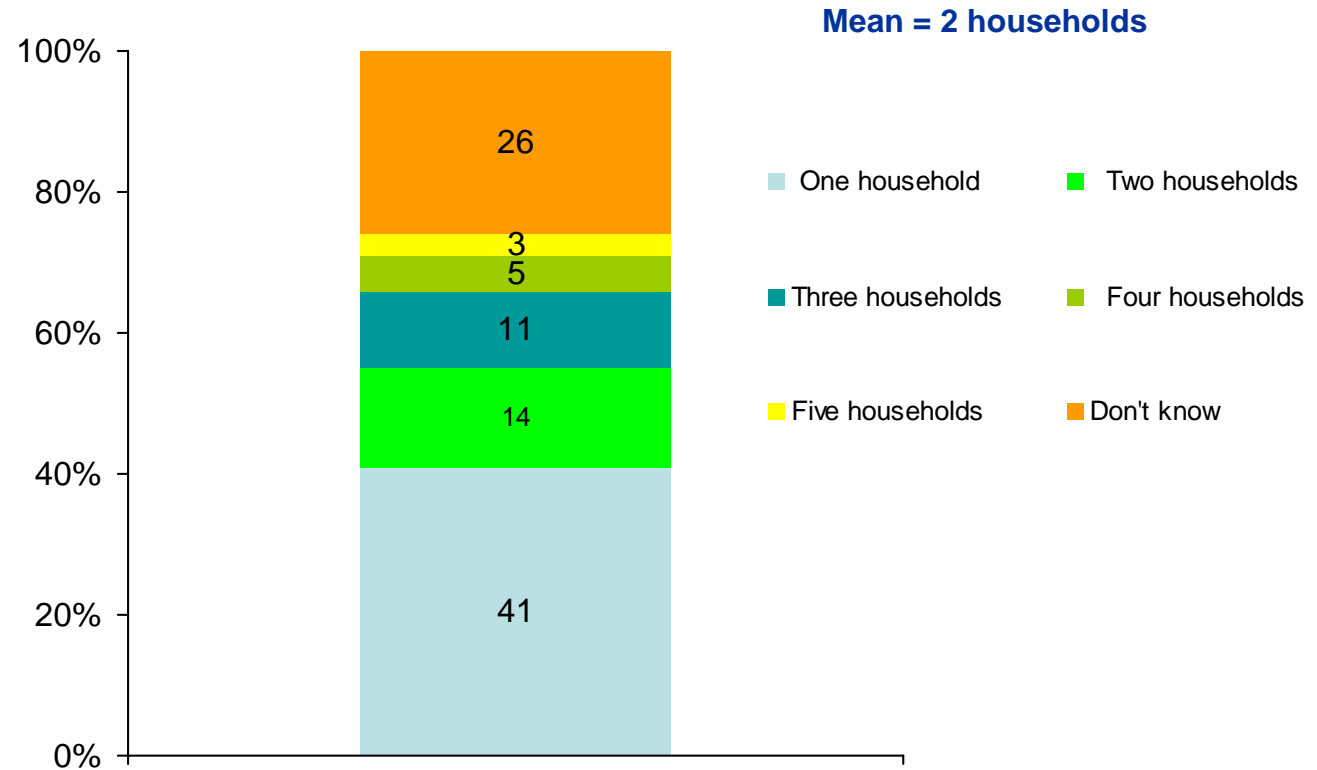- Don't know 3%
- Off peak times (7pm to 7am) 47%
- Peak times (7am to 7pm) 50%

The number of hours electricity is received In a day is distributed evenly at less than 2 hours a day, 2-4 and 8-10hrs per day

Base = 101: All who experience power cuts daily or nearly daily

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No. Of Households Sharing Electricity

Q. 13 "How many households are sharing electricity from the same source"

Mean = 2 households

Legend:
- One household
- Two households
- Three households
- Four households
- Five households
- Don't know

Bar values (bottom to top): 41, 14, 11, 5, 3, 26

Almost half of respondents (41%) do not share electricity from the same source with any other household. 26% of the respondents also do not seem to know if they share electricity source with other households and how many they share with

Base: Currently connected to main power grid = 101

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CONSUMER

Q. 14a "How often do you get your electricity bill?"

Every 2
weeks
2%

I pre pay
4%

Every
month
94%

Base: Currently connected to main power grid = 101

Q. 14b Could not be analysed due to small base sizes

Monthly Expenditure on Electricity

CONSUMER

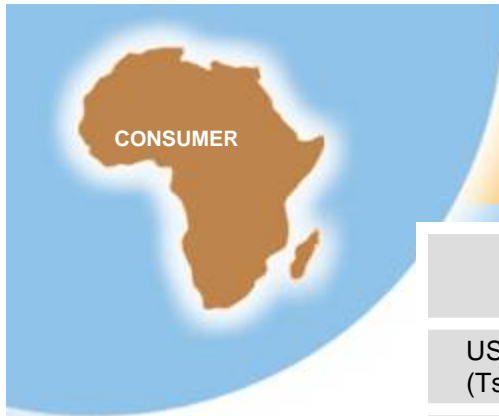*Q. 15 "On average, how much do you pay for electricity per month?"*

Conversion rate
1US $ = Tsh.1,181

	Total n=101	Dar es Salaam n=12	Dodoma n=7	Kilimanjaro n=14	Morogoro n=9	Mbeya n=16
US $1.6 – 2.5 (Tsh 1900 - 3000)	5					25
US $3 – 4.1 (Tsh 3500 - 4900)	7				22	6
US $4.2 – 5.9 (Tsh 5000-7000)	14	9	16	23	11	19
US $6.4– 8.5 (Tsh 7500-10000)	13	9	17	15	33	6
US $9.7 – 11.9 (Tsh 11500-14000)	8	9	16			6
US $12.7 – 13.6 (Tsh.15000 – 16000)	18	9	17	31		13
US $15.2 – 20.3 (Tsh.18000 – 24000)	13	37	17	15		6
US $21.2 – 25.4 (Tsh.25000 – 30000)	12	19		15	22	13
US $29.6– 42.3 (Tsh.35000 – 50000)	4	9				
>US $55 (>Tsh.65000)	4		17		11	6
Mean	US $24.4 (Tsh. 28800)	US $17.4 (Tsh.20500)	US $16.4 (Tsh. 19350)	US $12.7 (Tsh. 15000)	US $19.3 (Tsh. 22800)	US $17 (Tsh. 20100)

**Caution - Small base sizes

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Monthly Expenditure on Electricity

Q. 15 "On average, how much do you pay for electricity per month?"
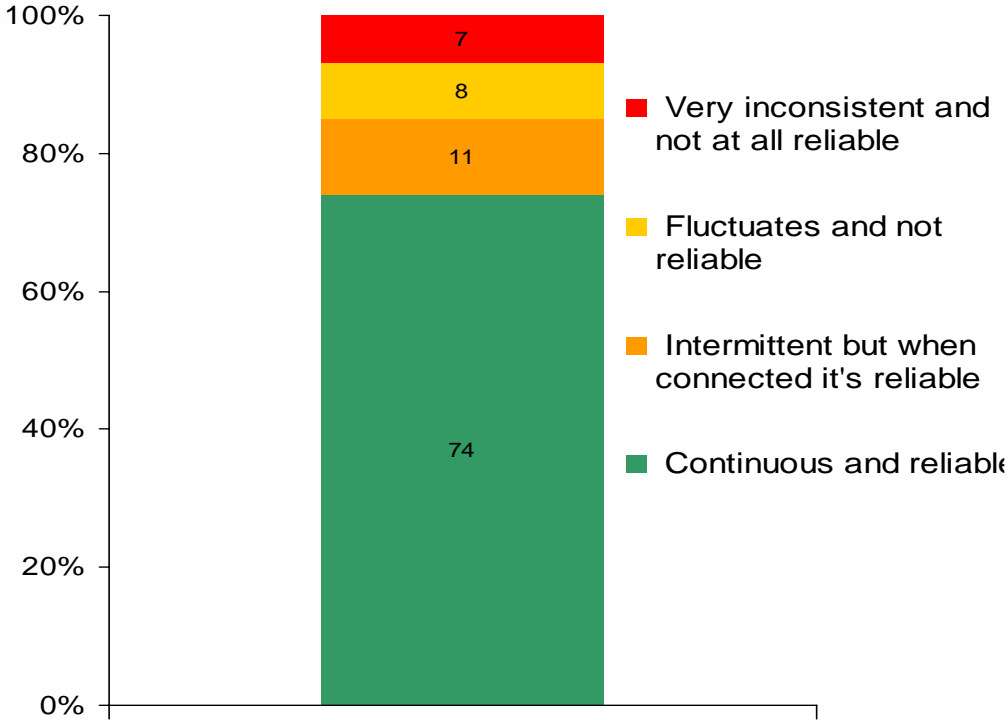
CONSUMER

Conversion rate
1US $ = Tsh.1,181

	Total n=101	Tabora n=7	Shinyanga n=9	Mwanza n=23	Tanga n=2	Arusha n=2
US $1.6 – 2.5 (Tsh 1900 - 3000)	5			4		
US $3 – 4.1 (Tsh 3500 - 4900)	7	29	11	4		
US $4.2 – 5.9 (Tsh 5000-7000)	14	14		13		50
US $6.4– 8.5 (Tsh 7500-10000)	13			22		
US $9.7 – 11.9 (Tsh 11500-14000)	8	14	33	**4**		
US $12.7 – 13.6 (Tsh.15000 – 16000)	18	29	22	23	50	
US $15.2 – 20.3 (Tsh.18000 – 24000)	13	14	11	13		
US $21.2 – 25.4 (Tsh.25000 – 30000)	12		11	9		50
US $29.6– 42.3 (Tsh.35000 – 50000)	4		11	4	50	
>US $55 (>Tsh.65000)	4			4		
Mean	US $24.4 (Tsh. 28800)	US $17.4 (Tsh.20500)	US $16.4 (Tsh. 19350)	US $12.7 (Tsh. 15000)	US $19.3 (Tsh. 22800)	US $17 (Tsh. 20100)

**Caution - Small base sizes

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Quality Of Electricity

Q. 16 "How would you rate the quality of your electricity?"

**Q. 17 "When electricity is available is the voltage level supplied enough to use as desired for appliances?"**

Very inconsistent and not at all reliable — 7

Fluctuates and not reliable — 8

Intermittent but when connected it's reliable — 11

Continuous and reliable — 74

	Base =101 All currently connected to main power grid
Yes, always	69
Sometimes	22
Hardly ever	6
No, never	3

Base: Currently connected to main power grid = 101

Voltage Sufficiency For Household Appliances

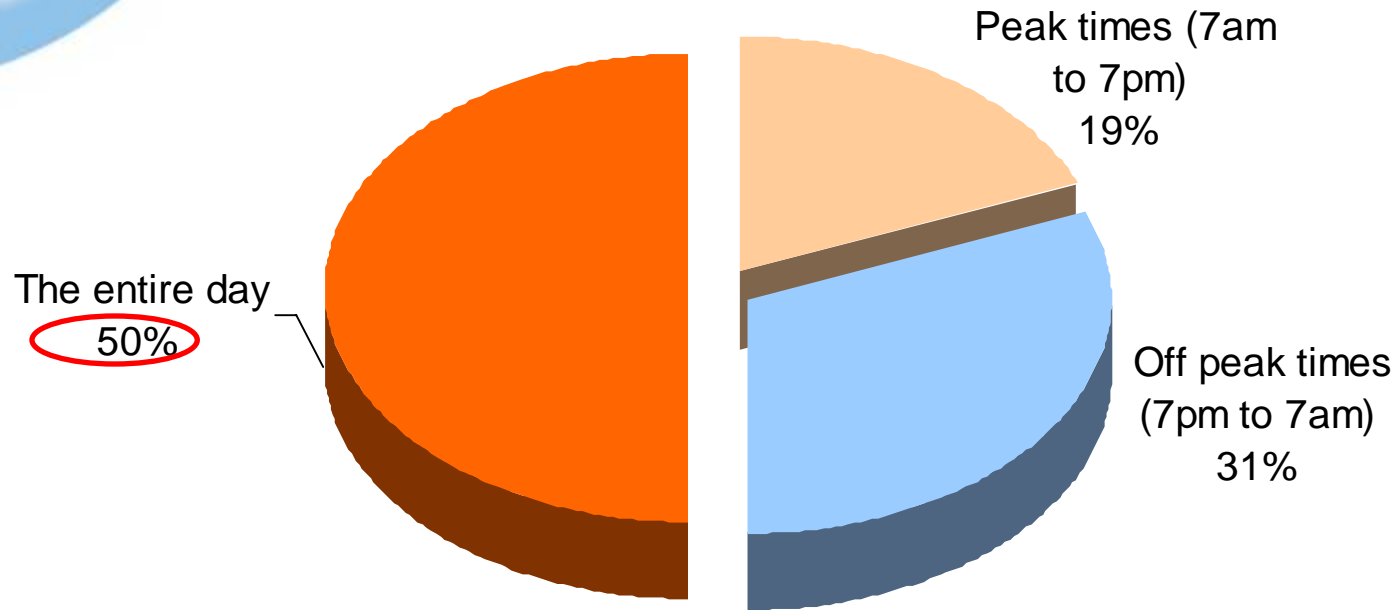*Q. 17 "Is the voltage level you are supplied with enough to use for the desired household appliances?"*
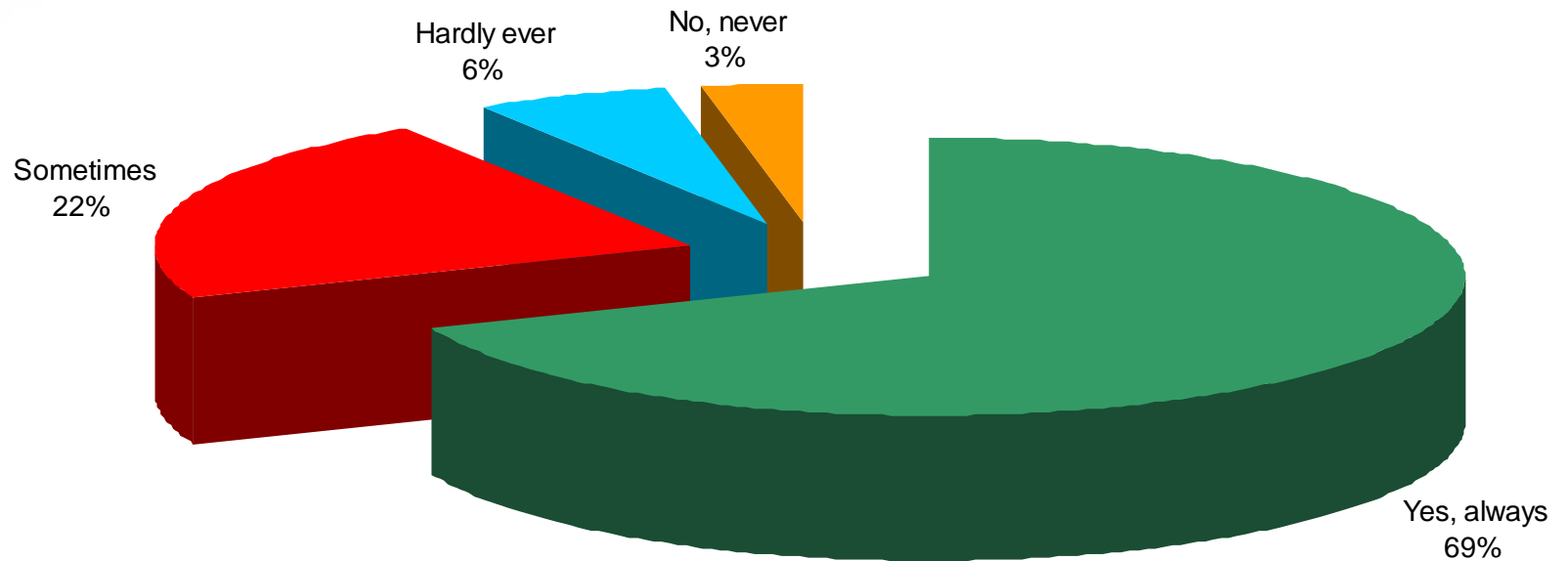
CONSUMER

Hardly ever
6%

No, never
3%

Sometimes
22%

Yes, always
69%

Time When Electricity Is Needed Most

Q. 12 "From your personal and household perspective, when do you need electricity the most?"

CONSUMER

Peak times (7am to 7pm)
19%

Off peak times (7pm to 7am)
31%

The entire day
50%

Half of all consumer interviewed alleged that electricity is needed the entire day

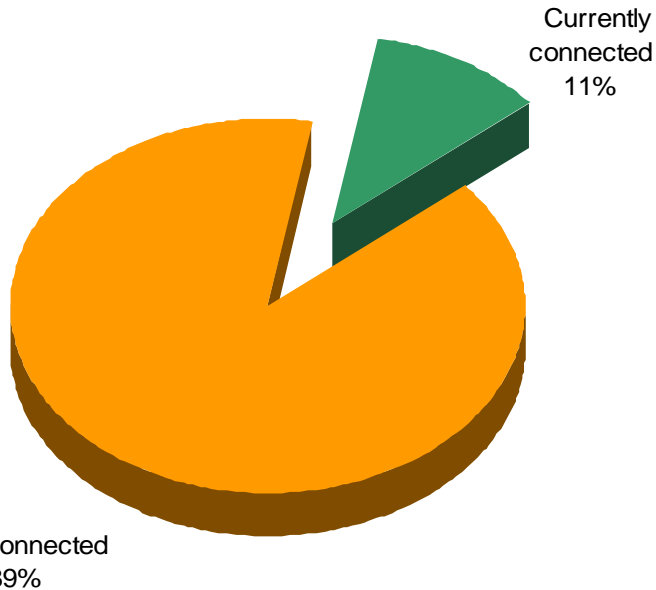Base = 101: All currently connected to main power grid

TRADERS

Connection To Main Power Grid

Q.6 "Is your business currently connected to the main power grid?"

Currently connected
11%

Not connected
89%

Base = 400: Total Sample

Q. 7 "Is the electricity currently working?"	Base = All Currently connected to main power grid = 43
Yes	88%
No	12%

Q.8 "Why is the electricity currently not working?"

Base: All without currently working electricity	5
Have been cut off - due to not having paid the bill	20
Power cut - fault is with the power company	60
Don't know why it's not working	20

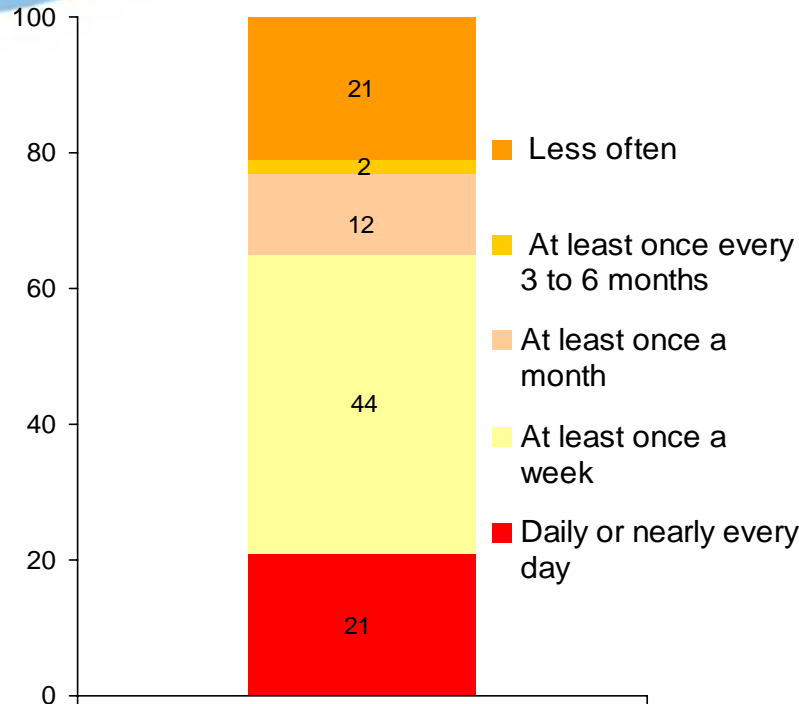****Caution - Small base sizes**

With only 89% of businesses not connected to electricity, a wide market for modern lighting products exists in Tanzania. 60% of the time, the problem with non- functional connections mainly lies with the power company
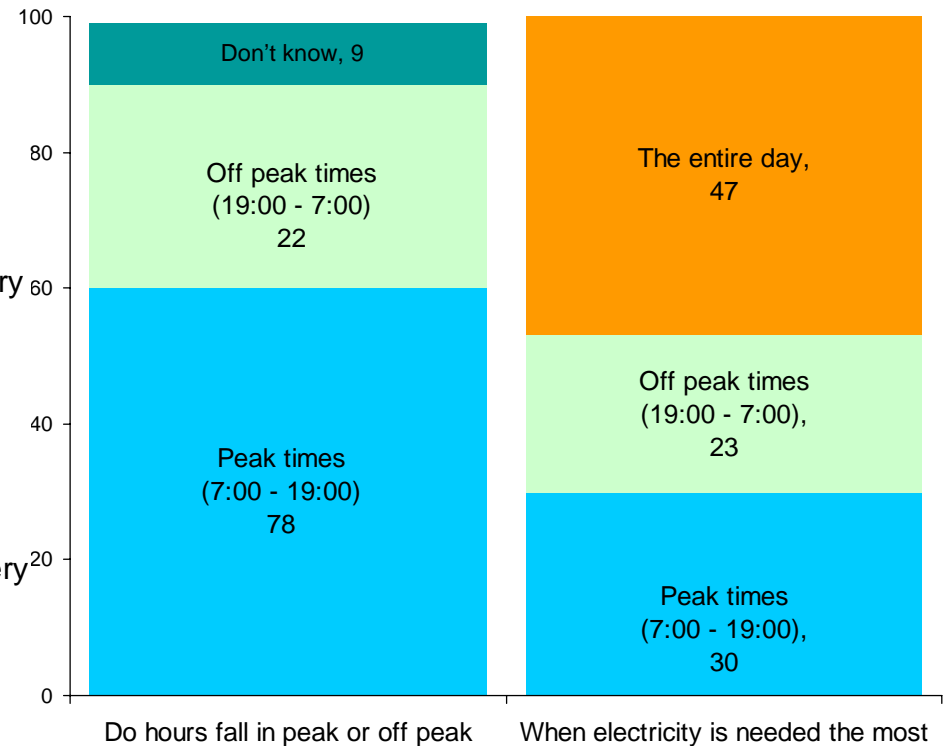
Power Cut Frequency

Q. 9 "How often, if ever, do you experience power cuts?"

- Less often
- At least once every 3 to 6 months
- At least once a month
- At least once a week
- Daily or nearly every day

Values (bottom to top): 21, 44, 12, 2, 21

Q. 11 "Do the hours in which you receive electricity mainly fall in peak or off peak times?"

Do hours fall in peak or off peak:
- Peak times (7:00 - 19:00) 78
- Off peak times (19:00 - 7:00) 22
- Don't know, 9

When electricity is needed the most:
- Peak times (7:00 - 19:00), 30
- Off peak times (19:00 - 7:00), 23
- The entire day, 47

For those traders connected to the mains, about two thirds (63%) experience power cuts every week. Almost half of them feel that electricity is needed most for the entire day, yet they receive power mostly during peak times. It therefore indicates that during off peak most traders have to source other means to light their premises

Base: Currently connected to main power grid = 43

46

Sharing Electricity From Same Source

Q. 13 *"How many businesses/households are sharing the electricity from the same source...."*

Legend:
- 1 business
- 2 business
- 4 business
- 5 business
- None
- Don't know
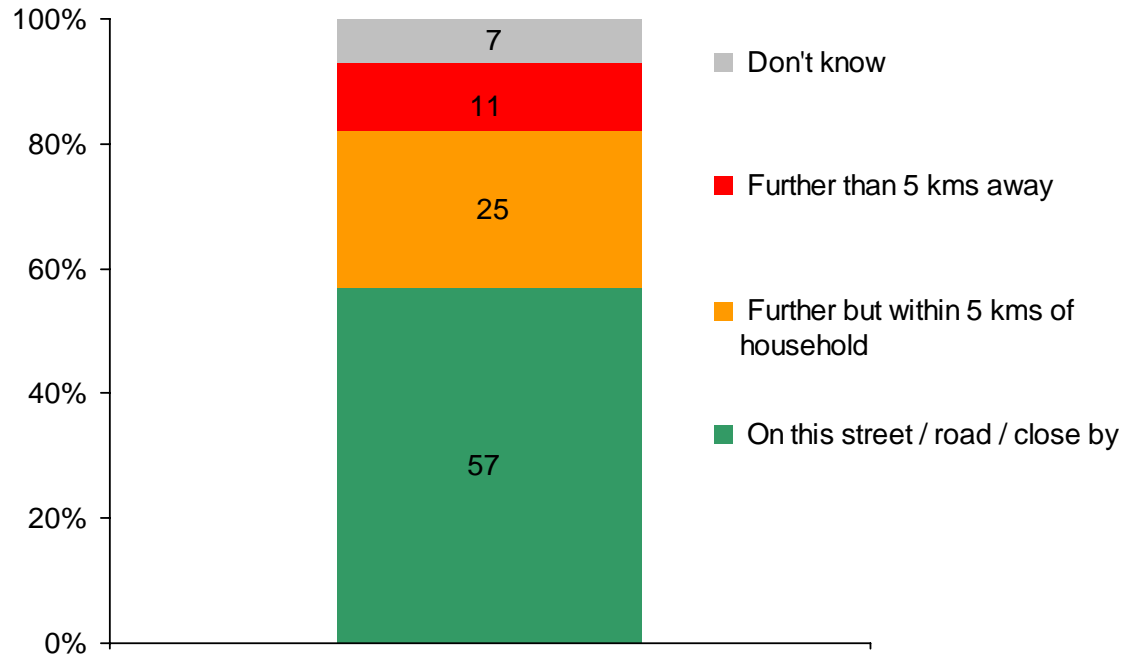
Values: 53, 21, 2, 2, 19, 2
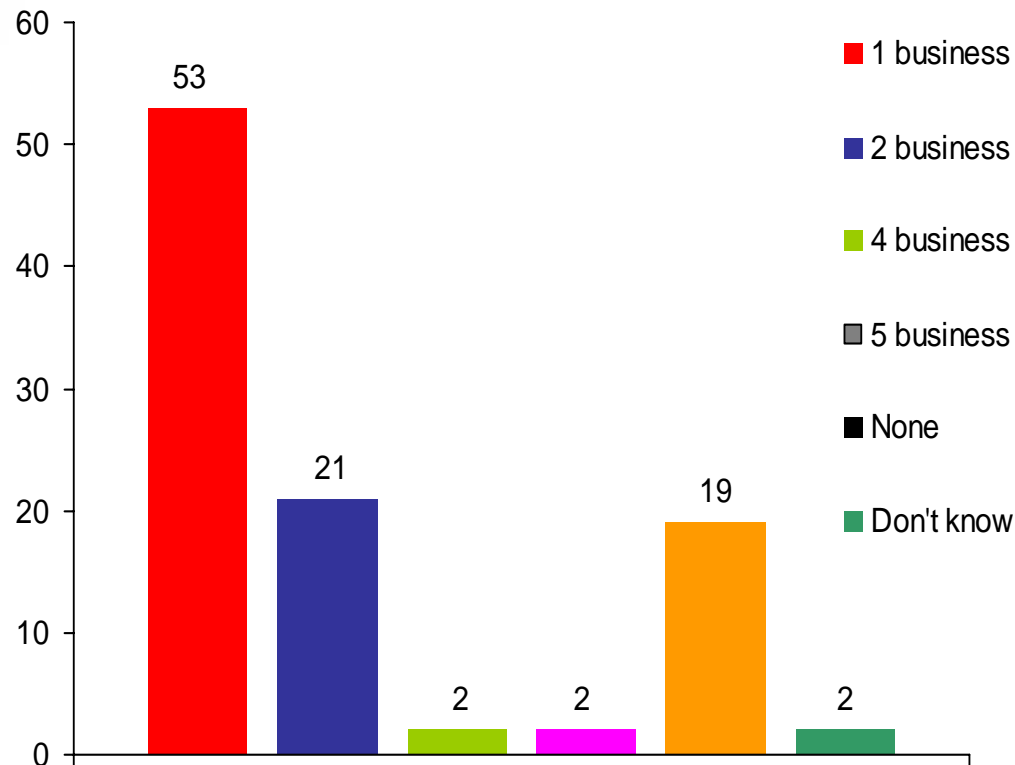
For businesses connected to the power grid, slightly over half (53%) have one business not sharing electricity with any other

Base: All currently connected to main power grid = 43

Proximity To Power Line

Q. 18 "How close is your nearest mains power line?"

TRADER

Legend:
- **Don't know** (grey)
- **Further than 5 kms away** (red)
- **Further but within 5 kms of household** (orange)
- **On this street / road / close by** (green)

Bar values (bottom to top): 57, 25, 11, 7

57% of traders who currently are not connected to the main power grid have the nearest power line close by. This means that other factors, apart from proximity, are in play making them unable to get connected.
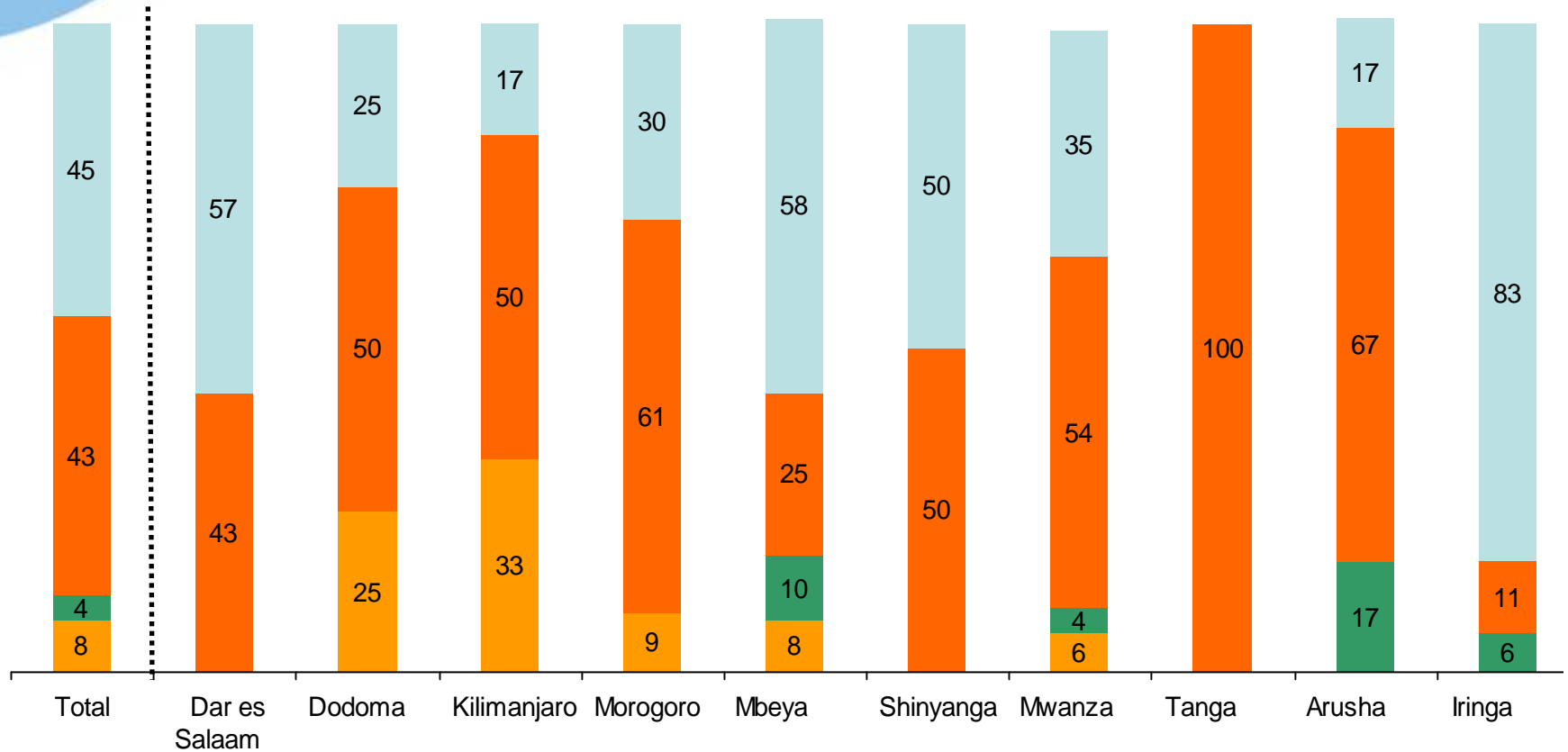
Base: Not connected to main power grid = 357

Frequency Of Receiving Electricity Bill

Q. 14a "How often do you get your electricity bill?"

- 2 (I pre pay)
- 2 (Never)
- 95 (Every month)

I pre pay

Never

Every month
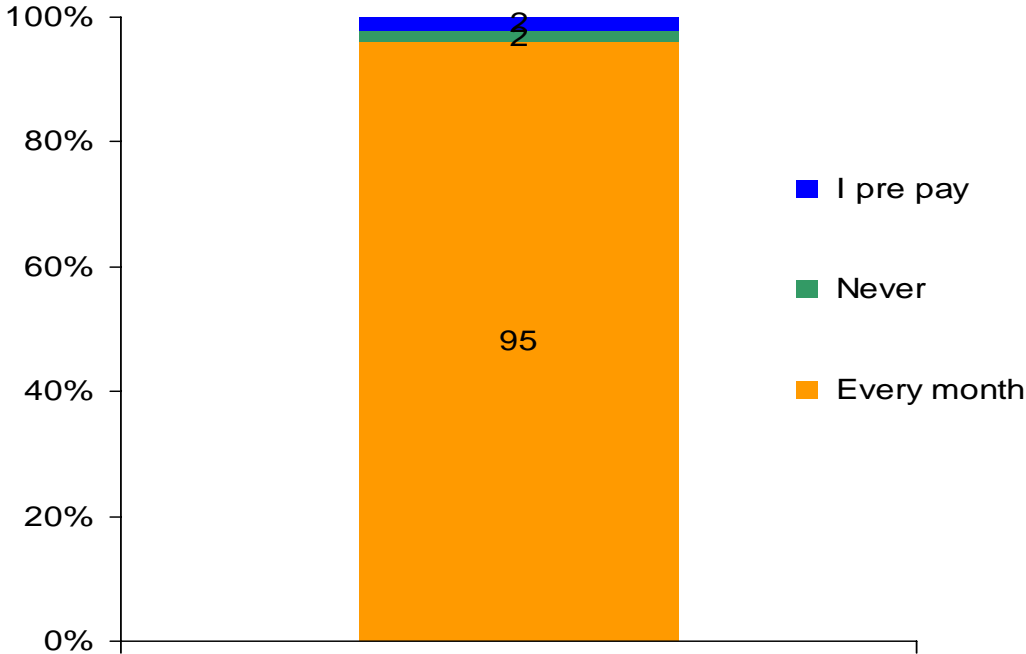
Most businesses connected to electricity receive their bills monthly. Those who recharge their electricity card (pre-paid) do so on a monthly basis

Base: All currently connected to main power grid = 43

Quality Of Electricity
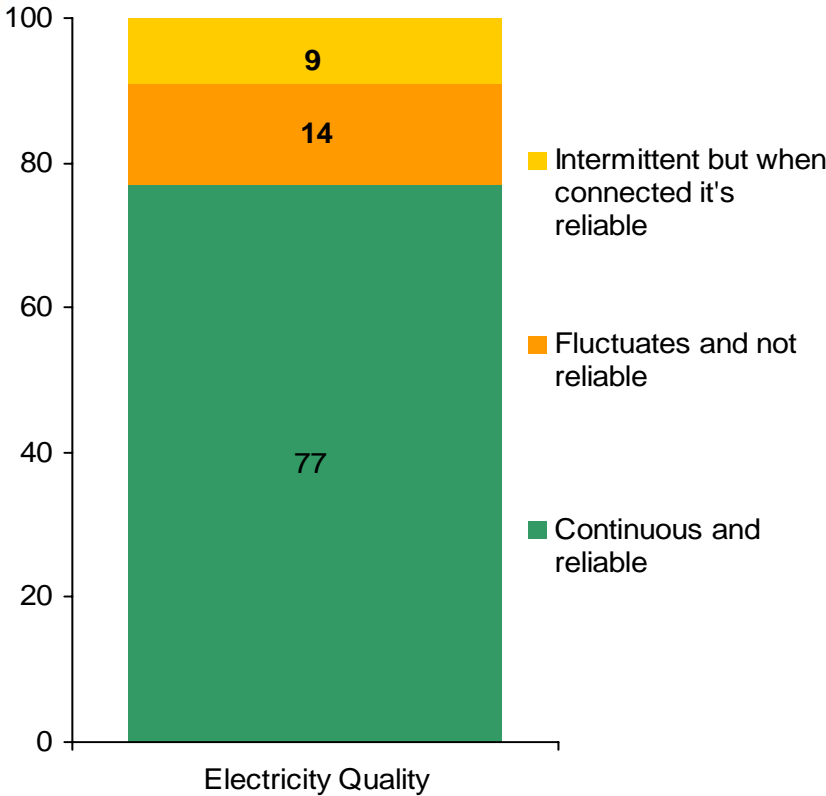
Q. 16 "How would you rate the quality of your electricity?"

Q. 17 "When electricity is available is the voltage level supplied enough to use as desired for appliances?"

- 🟨 Intermittent but when connected it's reliable
- 🟧 Fluctuates and not reliable
- 🟩 Continuous and reliable

Electricity Quality

Values in chart: 9, 14, 77

	Base = 43
Yes, always	63
Sometimes	26
Hardly ever	9
No, Never	2

Base (43) = All currently connected

77% of businesses who are connected enjoy a continuous and reliable electricity with the desired voltage

POWER & LIGHTING HABITS AND USAGE

CONSUMERS

Proximity To Power Line

Q 18 "How close is your nearest mains power line?"

- **Don't know**
- **Further than 5 kms away**
- **Further but within 5 kms of household**
- **On this street/road/close by**

Chart values: 6, 13, 32, 49
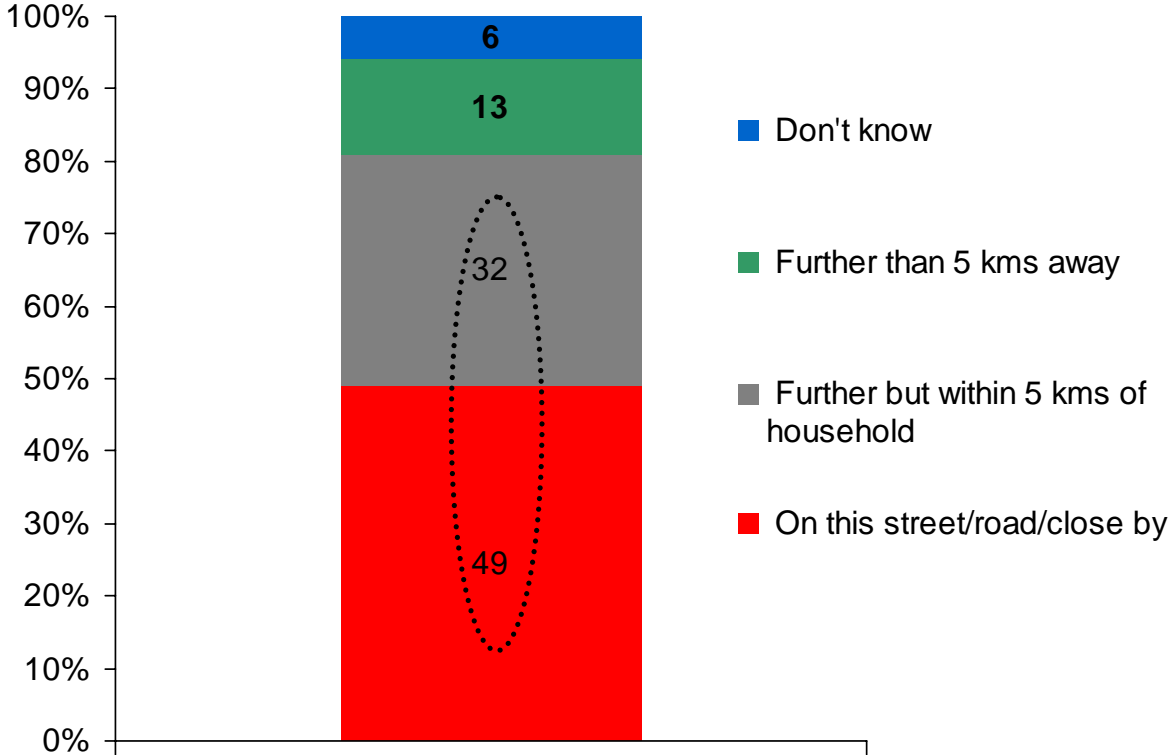
81% of households are located close by or further but within 5 kms away from the mains power line.

Base = 899: All not connected

Connection Of Unconnected Household To Grid

CONSUMER

Q. 19 "You mentioned that the nearest mains power line was close to your household. Do you know of any immediate extension plans to include your household to the grid?

Chart legend:
- No, I don't know of any extension plans
- Yes, but don't know when
- Yes, within the next 6 months
- Yes, within the next 3 months

Chart values (stacked bar):
- 47
- 44
- 6
- 3
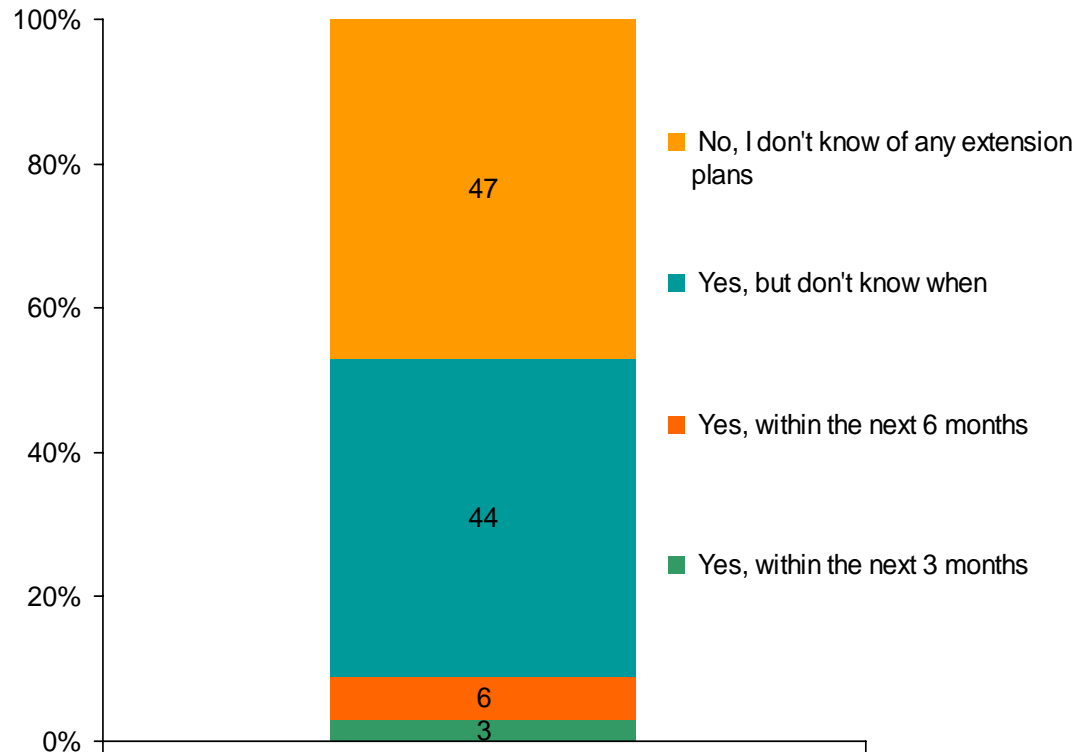
47% of those close to the main power lines are not aware of any immediate plans to get their households connected to main power grid, and 44% of those who are aware don't know when the connection will take be effected

Base: All those close to the main power line= 445

Improvements To Household

Q. 4 "If there was one thing you could do to improve your household or its facilities what would it be?"

- Better lighting
- Connect to power grid or improve power source
- Better access to water
- Increase size of home
- Other

- Improved structure itself
- Improved furniture
- Improved wall and floor coverings
- Better toilet facilities
- Better kitchen

Chart values: 32, 7, 11, 7, 15, 6, 9, 4, 6, 3
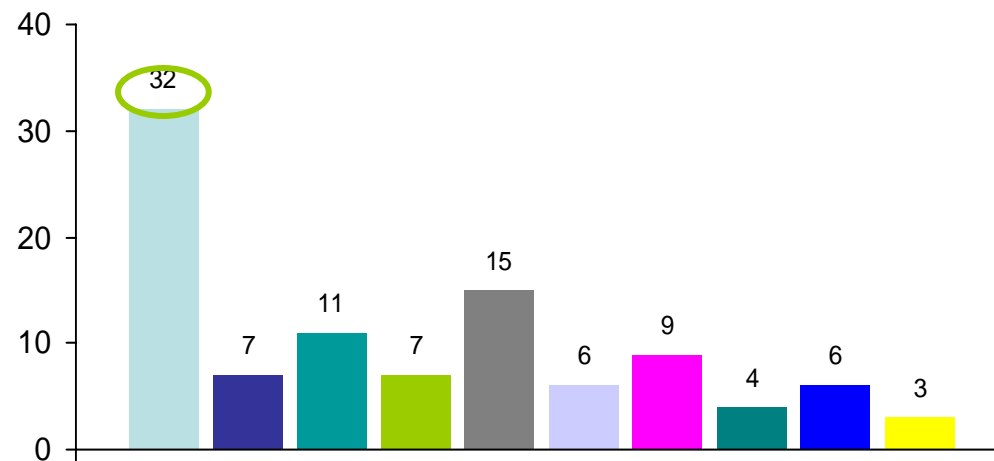
Approximately a third of all respondents interviewed view "better lighting" as the major thing that would improve their household or its facilities

Base n = 1000

Reasons For Wanting To Improve Power Source

CONSUMER

Q. 5 "You mentioned you would like to connect to a power grid or improve your power source by purchasing a generator. Please can you tell me the <u>main reason</u> why you would want to do this?"

Chart axis values: 0, 10, 20, 30, 40

Categories:
- Improve my overall standard of living
- To use household appliances throughout the day and night
- To listen to the radio/watch TV when ever I want
- Improve access to lighting
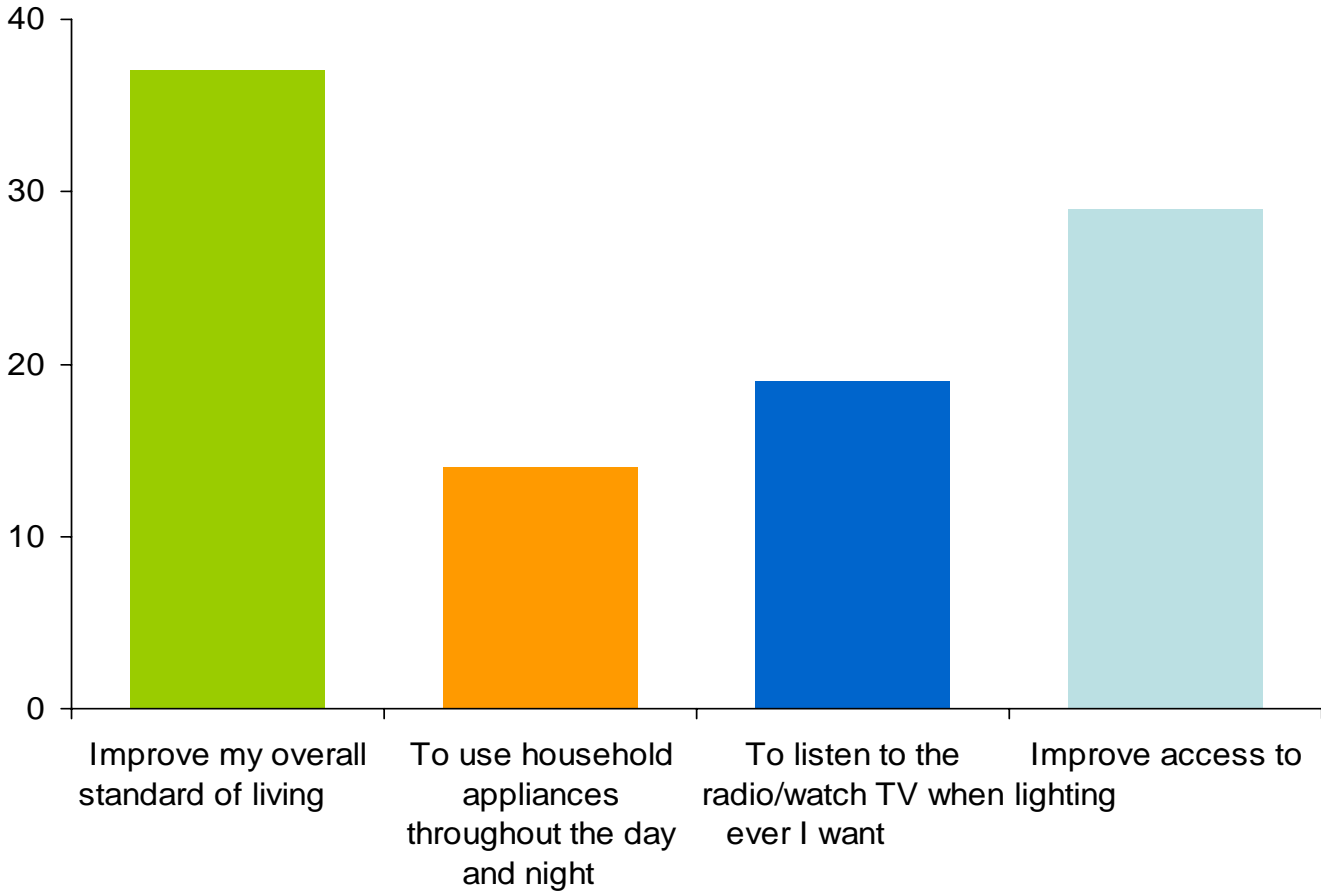
Base All who would connect to power grid or purchase a generator = 112

Energy Sources

Legend:
- None (green)
- Diesel or petrol powered generator
- Car battery
- Solar power
- Car battery with inverter

Values:
- None: 93
- Diesel or petrol powered generator: 5
- Car battery: 4
- Solar power: 1
- Car battery with inverter: 2
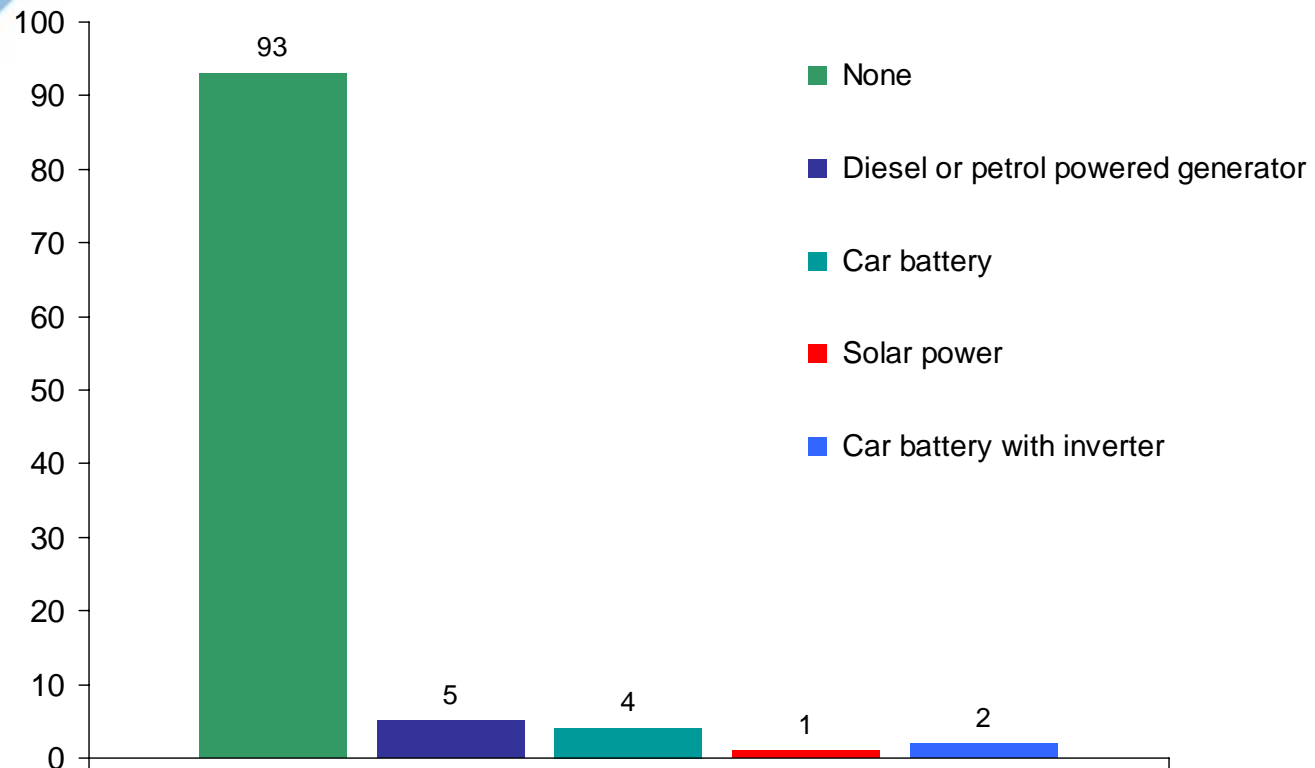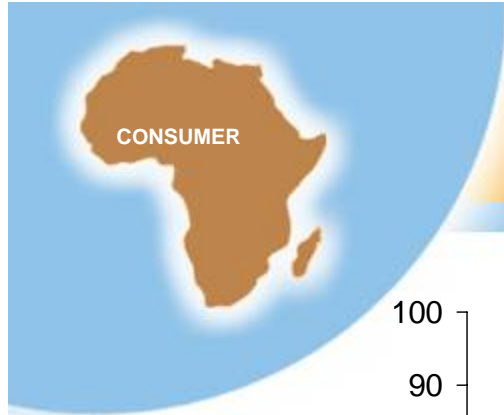
A majority of households (93%) do not have an alternative source of power.

Base: Consumers total households

Use Of Energy Sources To Power Appliances / Provide Light

CONSUMER

Q. 21a "Do you ever use any of the following sources of energy to power appliances or to create light?"

Q. 21b "Which of the power sources of energy would you say you use as your main energy source?"

- Kerosene
- Candles
- Firewood/charcoal
- None of these
- Diesel/gasoline

Ever use the given sources of energy

Kerosene	Candles	Firewood/charcoal	None of these	Diesel/gasoline
95	58	38	8	4

Main energy source

Kerosene	Candles	Firewood/charcoal	None of these	Diesel/gasoline
82	5	4	8	1
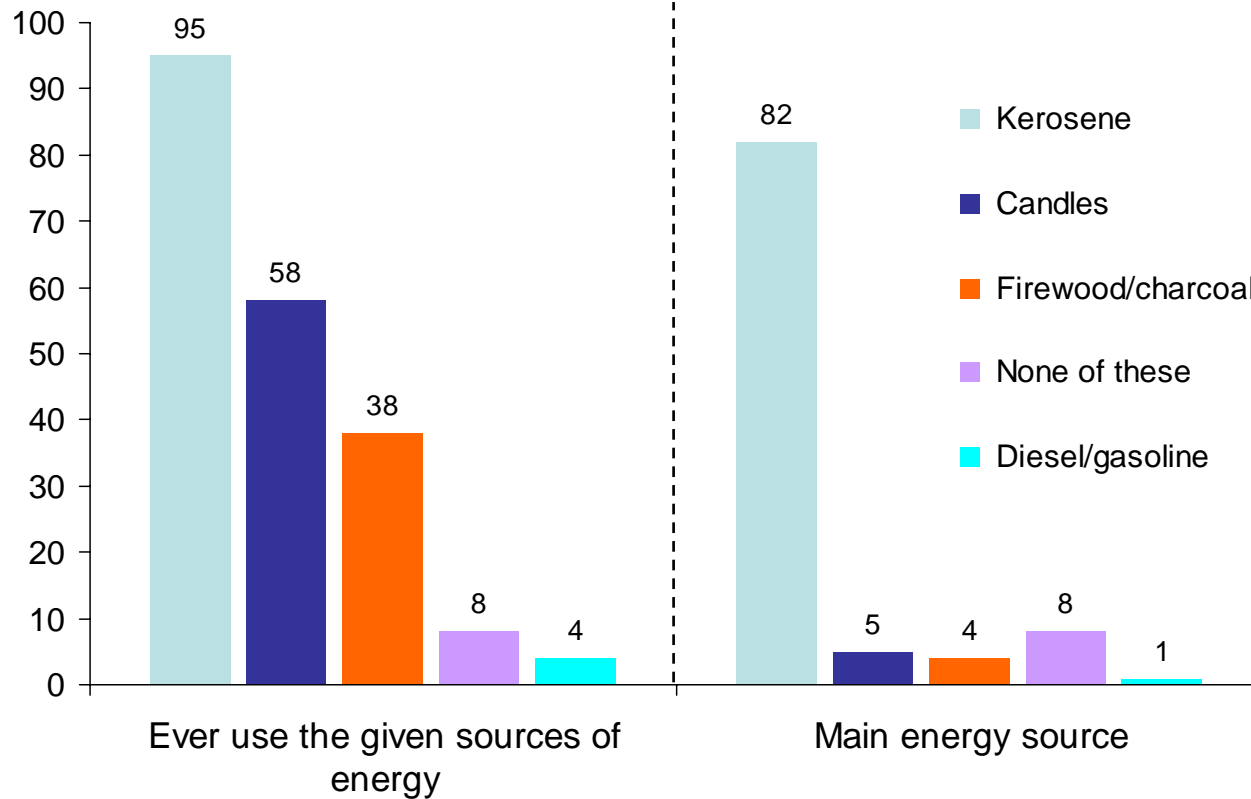
Kerosene is the main energy source used to provide light and power appliances in many households.

Base: Total sample =1000
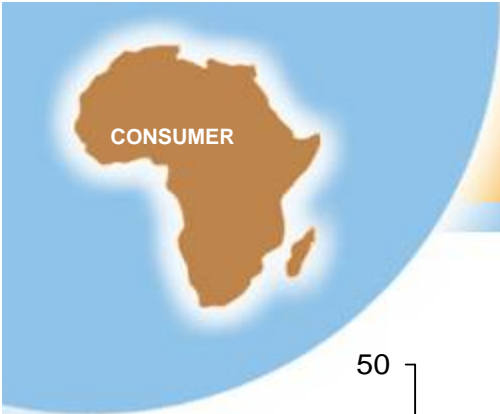
Time When Lighting Products Are Used

Q.23"On average, what time does it get dark indoors?"
Q.24"When do you begin using lighting products/devices each night?"

CONSUMER

Legend:
- What time does it get dark indoors (orange)
- When do you begin to use lighting devices each night (teal)

Chart data:

Category	What time does it get dark indoors	When do you begin to use lighting devices each night
Earlier than 17:00	2	
Between 17:00 and 17:30	4	4
Between 17:30 and 18:00	3	3
Between 18:00 and 18:30	23	12
Between 18:30 and 19:00	40	34
Between 19:00 and 19:30	26	41
Later than 19:30pm	2	6

It gets dark between 18.30 and 19.30 with majority of respondents begin to use lighting devices between the same time up to 19.30. Apparently, a considerable number (41%) start using lighting gadgets after it's already dark

Base: Total sample =1000

Time When Lighting Products Are Turned Off

Q. 25 "What time did the last light go off in the household last night?"

CONSUMER

Chart data (bar heights):

Before 21:00	Between 21:00 and 21:30	Between 21:30 and 22:00	Between 22:00 and 22:30	Between 22:30 and 23:00	Between 23:00 and 23:30	After 23:30
5	12	20	22	19	12	10
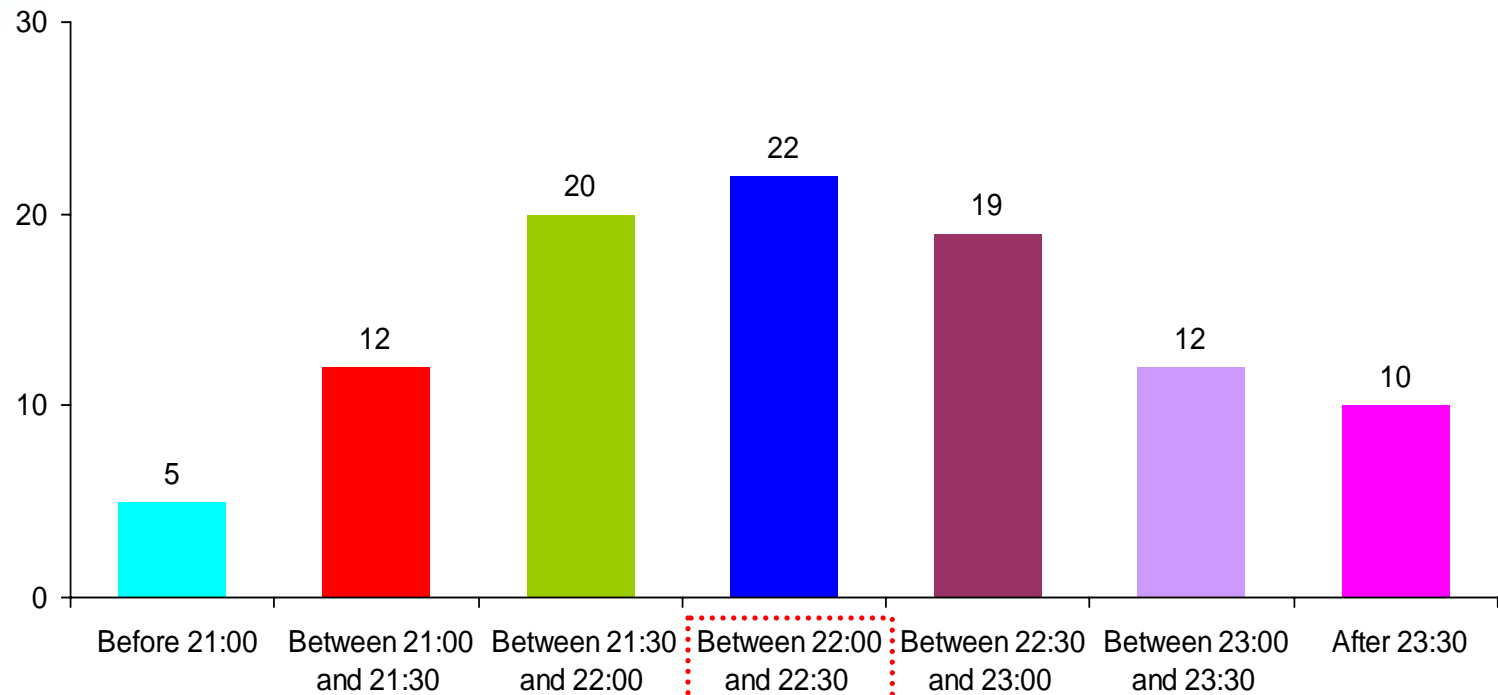
The chart shows a normal curve trait for time light is used and it peaks between 22.00 and 22.30.

Base: Total sample = 1000

Use Of Light In The Rooms

	Q. 27 "How many rooms in this dwelling were used after dark yesterday evening?"	Q. 28 "How many rooms in this dwelling were lit at all yesterday evening?"
1 room	7	12
2 rooms	25	32
3 rooms	26	29
4 rooms	21	15
5 rooms	10	6
>5 rooms	9	4
Mean	**4**	**3**

Q. 30 "Which one room/area did the HH residents use for the longest time after dark last night?"

7%
6%
8%
58%
19%

- Main living area
- Bed room (if separate from main living area)
- Dining area (if separate from main living area)
- Place for cooking (if separate from main living area)
- Outside area (patio/yard area)
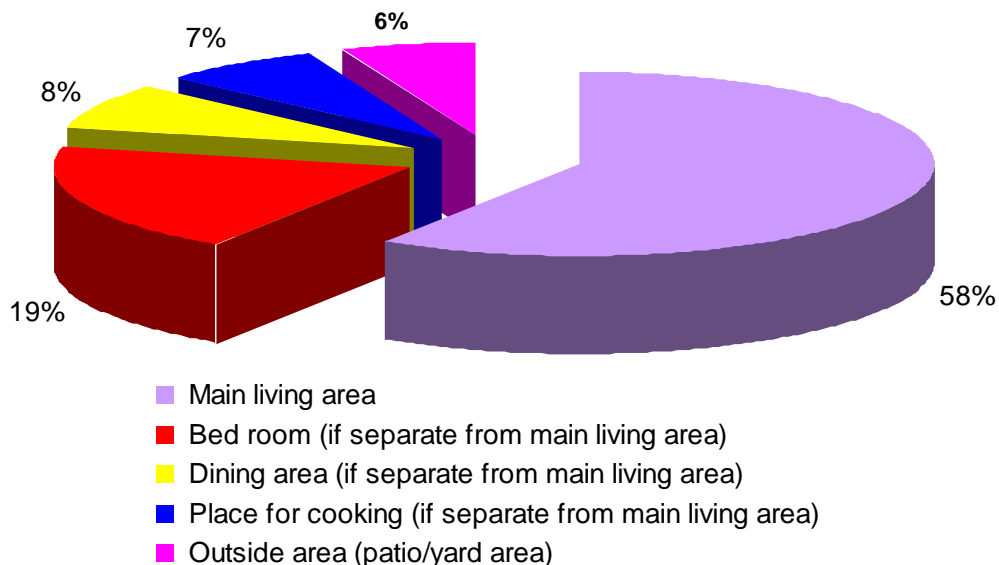
There is an indication that some rooms used are not lit. The room used longest after dark is the main living area used by 58% of households followed far behind by the bedroom at 19%

Base: Total sample =1000
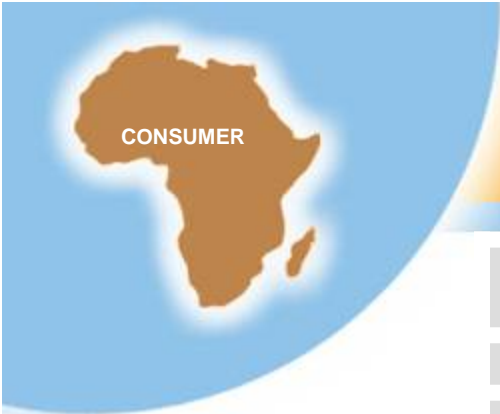
Rooms Not Lit Last Night

Q. 44 "Was your home lit in all the areas that you needed it last night?"	Base = 1000
Yes	33
No	67

Q. 45 "Which rooms or areas were not lit last night?"

Legend:
- Toilet
- Outside area (patio/yard area)
- Room for bathing (if separate from toilet)
- Place for cooking (if separate from main living area)
- Bed room (if separate from main living area)
- Main living area
- Dining area (if separate from main living area)

Bar values: 72, 59, 41, 13, 12, 9, 6
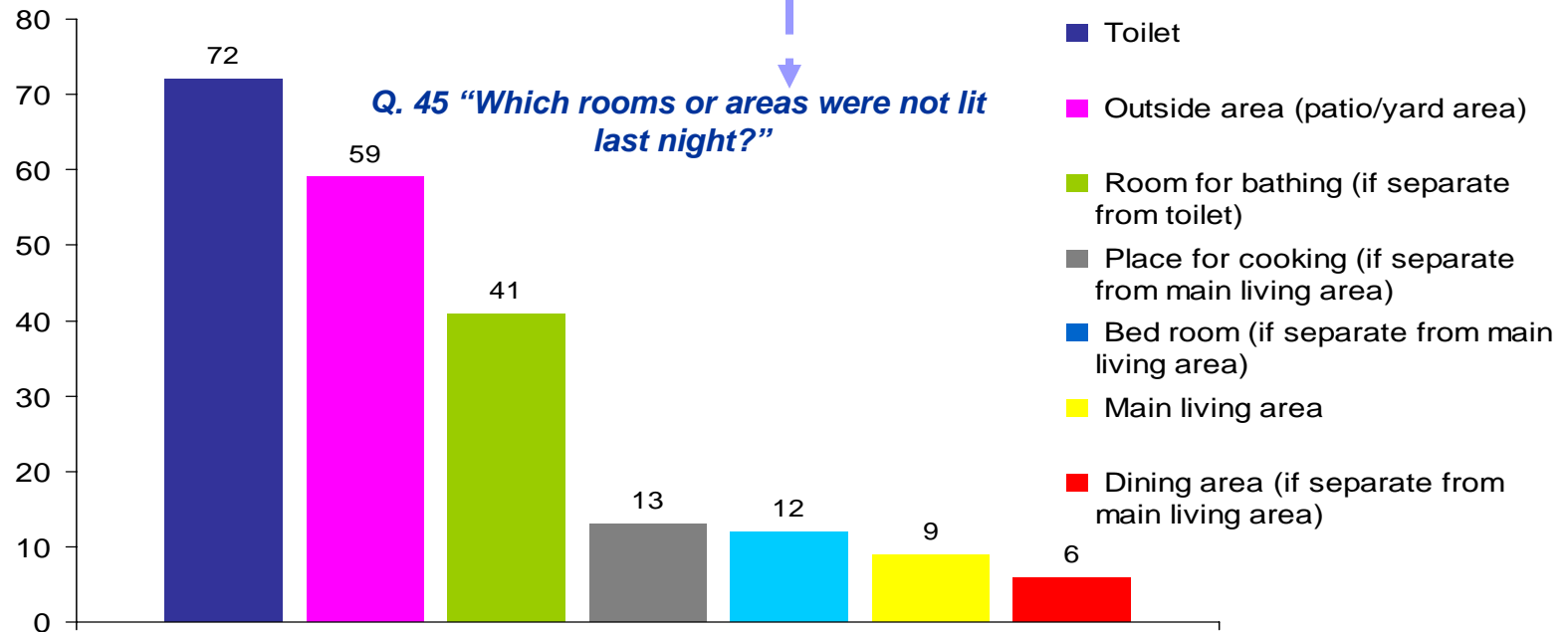
Two thirds of households had some areas not lit the previous night. Areas mostly not lit were toilet, patio/yard and bathing room. These are also the rooms that are least used.

Base: All those with homes not lit in all areas =670
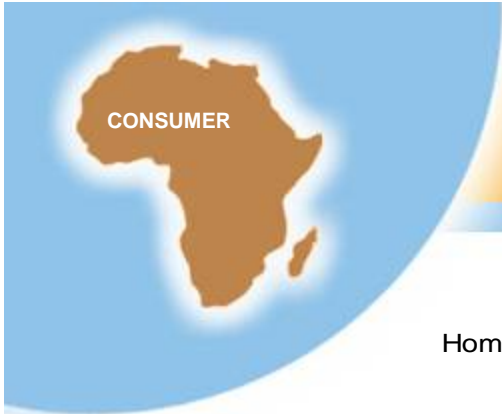
Night Time Activities

Q. 31 "Which activities were people doing last night?"

Activity	Value
Homework / studying	9
Watching TV	9
Changing/going to bed	11
Reading	22
Listening to the radio	27
Preparing and cooking food	29
Resting	34
Chatting/socialising	51
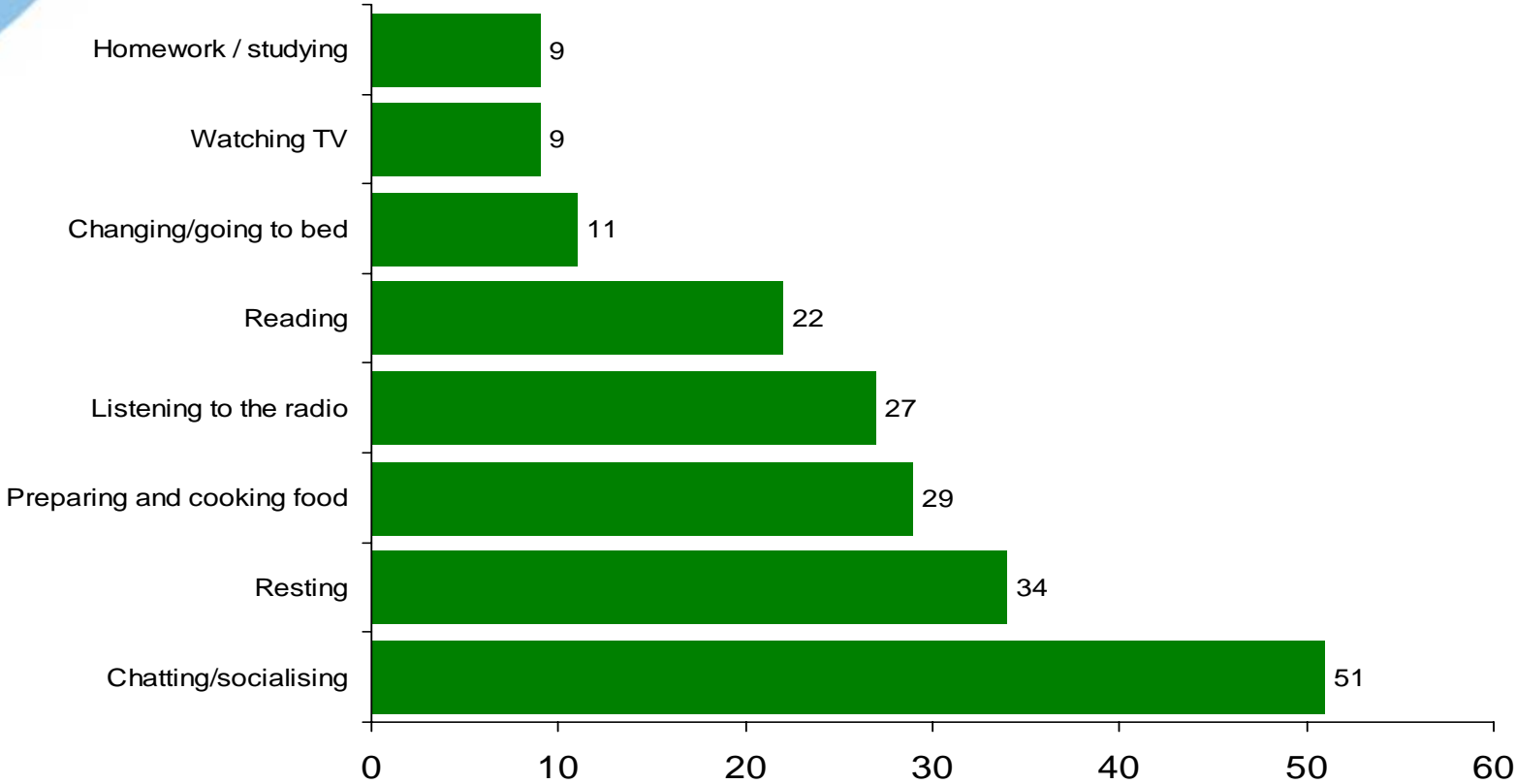
Chatting/socializing is the most common activity done during the night.

Base: Total sample =1000

Activities Unable To Perform Well Due To Lack Of Lighting

Q. 33 "Which activities could not be done well or comfortably due to lack of lighting?"

CONSUMER

Legend:
- Reading (green)
- Working (blue)
- Using the toilet (red)
- Listening to the radio (orange)
- Homework / studying (light purple)
- Preparing and cooking food (light teal)

Region	Reading	Listening to the radio	Working	Homework / studying	Using the toilet	Preparing and cooking food
Arusha n=6	50	33	50	33		17
Tanga n=12	33	17	50	67	25	17
Mwanza n=113	46	9	14	23	11	18
Shinyanga n=53	47	17	8	23	17	36
Tabora n=42	40	10	19	17	19	14
Mbeya n=93	62	4	5	13	27	16
Morogoro n=45	27	2	38	2	20	18
Kilimanjaro n=30	53	13	10	67	20	73
Dodoma n=31	52	13	6	3	32	26
Dar-es-salaam n=45	36	2	22	11	44	38

Problems Faced When Lighting The Home

Q. 46 "What was the main problem you faced when trying to light your home last night ?"

Legend:
- Did not face any problem
- I was unable to light certain areas at all
- Would have liked to keep the lights on continuously
- Would have liked to switch the lights on earlier
- Would have liked to leave the lights on later

Values: 34, 31, 14, 10, 9

Outdoor Activities Unable To Do Due To Lack of Lighting

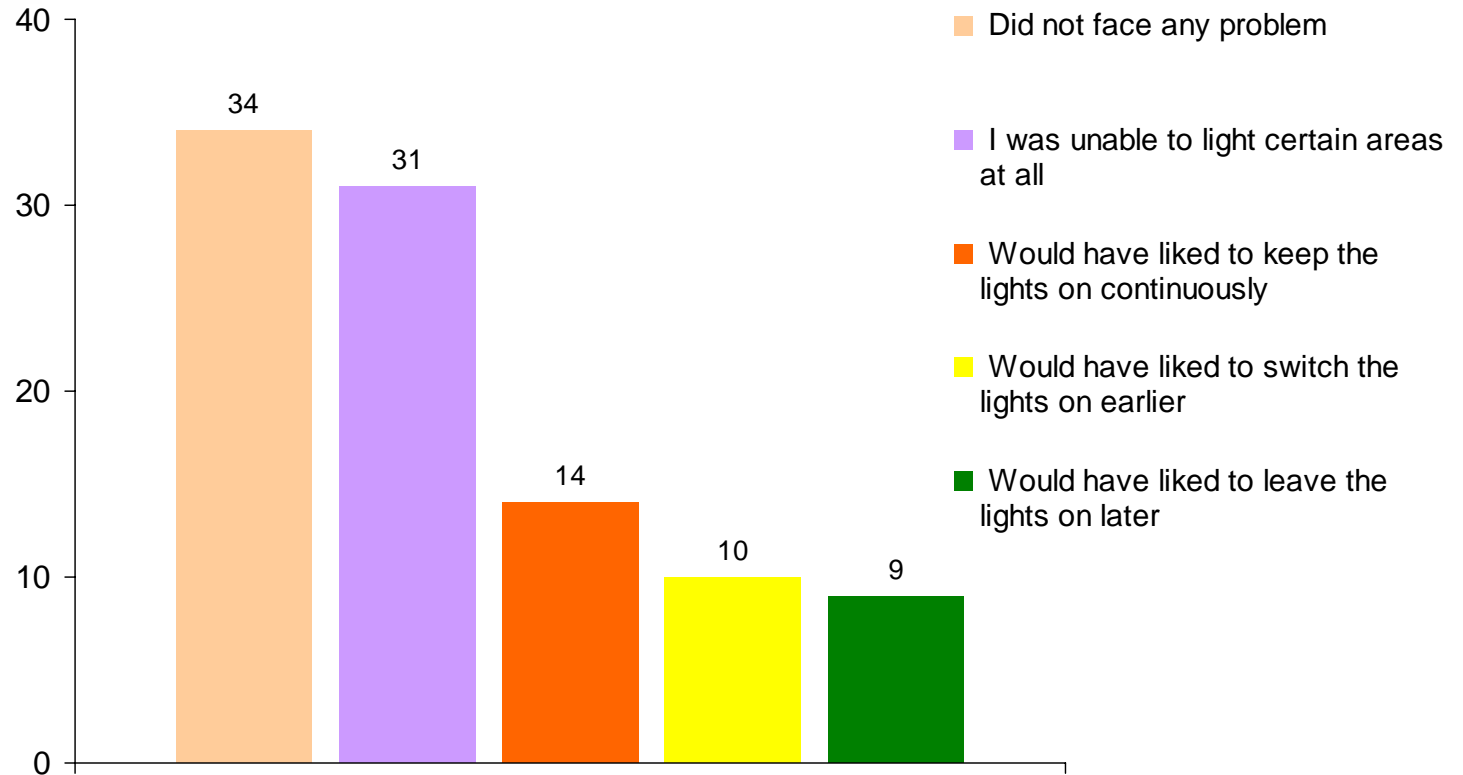**Q. 37a "Are you currently inhibited to performing certain types of outdoor activity due to lack of lighting?"**

No
53%

Yes
47%

Base: Total sample =1000
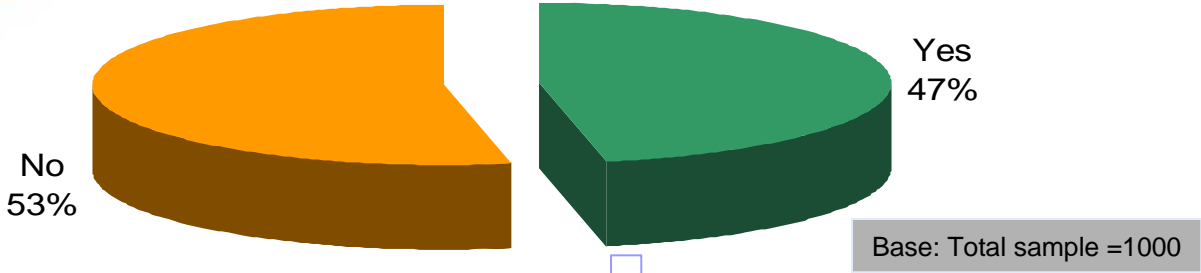
Q. 37b "Which types of outdoor activities can you currently not perform due to lack of lighting?"

- Using a communal toilet
- Getting water
- Visiting a neighbour's/friend's house
- Tending to livestock
- Going to a shebeen/bar
- Going to a meeting
- Washing clothes at night
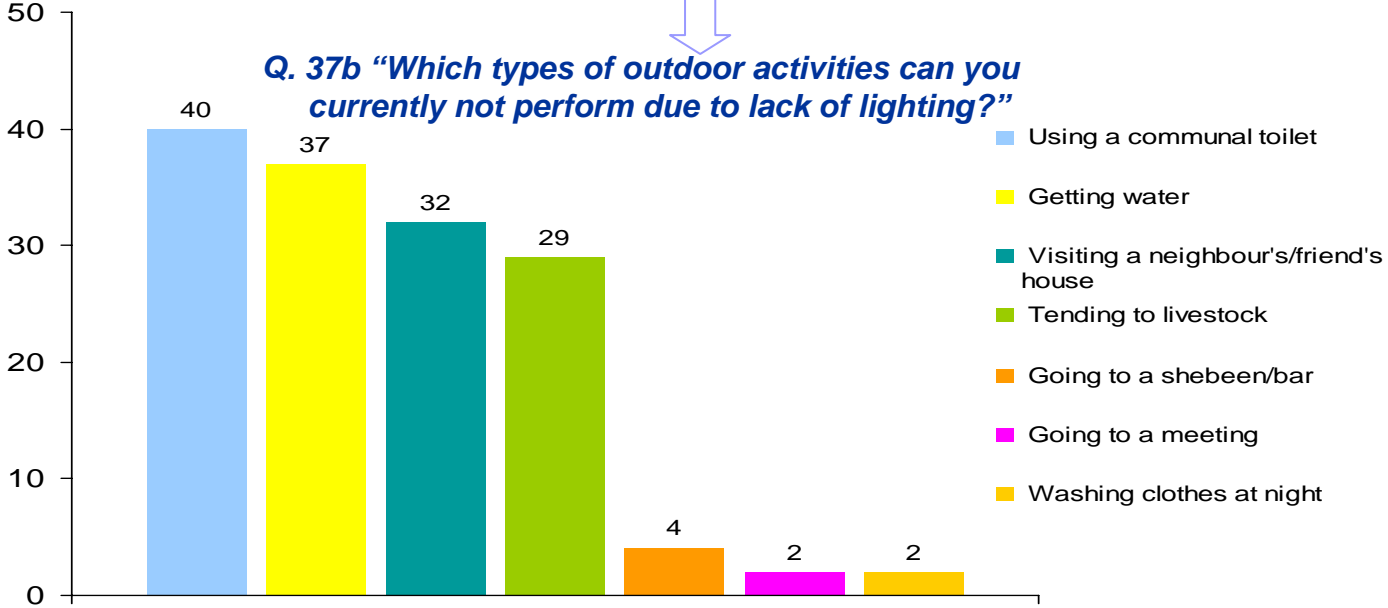
Base: All who could not perform certain types of outdoor activities due to lack of lighting =474

Problems Experienced Due To Lack Of Lighting

Q. 41 "What kind of problems/inconveniences does the current lack of lighting cause?"

One cannot extend till late due to fear of paraffin cost — **4**

Poor lighting methods are then used — **13**

It's difficult for my children to do their homework/ study for a long time — **19**

Other household chores are skipped for day time e.g. cleaning — **20**

Insecurity as one tries to perform outdoor activities — **33**

(x-axis: 0, 10, 20, 30)
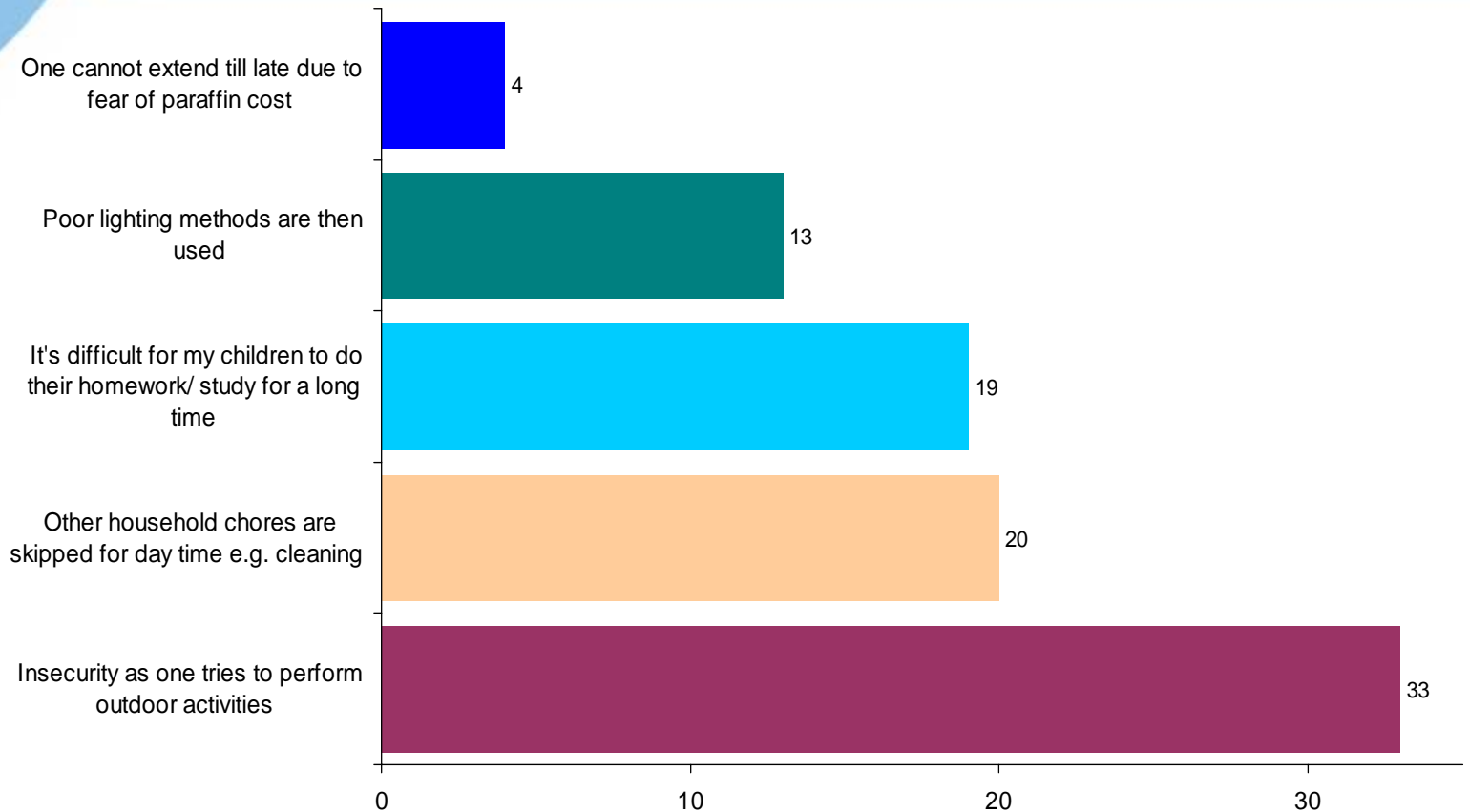
Insecurity is mentioned as the greatest problem caused by lack of lighting, making outdoor activities impossible / limited. Education is hampered as children are unable to complete their homework.

Base: All households whose light can be improved = 597

In-home Lighting

Q. 38 "How would you rate the lighting in your home nowadays?"
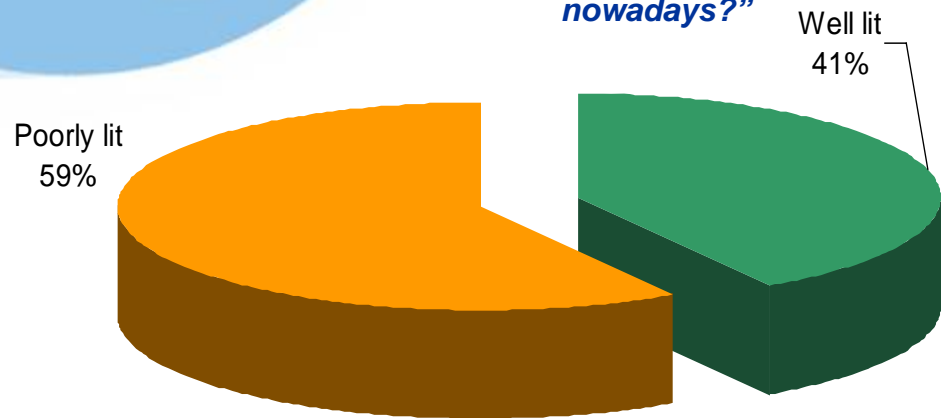
Well lit 41%

Poorly lit 59%

Q. 40 "How would you improve the lighting situation in your home?"

- ■ Add more lights
- ■ Operate the light for more hours
- ■ Increase the amount of light from each device
- ■ Use a light that can be placed in a different position
- ■ Use a light which is less glaring

	Value
Add more lights	72
Operate the light for more hours	9
Increase the amount of light from each device	8
Use a light that can be placed in a different position	8
Use a light which is less glaring	3

59% of households rate their lighting at home as poor. To counter this discontent, they would introduce more lights or add more lights.

Base: Households whose light can be improved n = 597

Aspirations If There Was Better Lighting

Q. 42 "Is there anything you or other members of your household would do differently at night if you had better light?"	Base = 1000
Yes	50
No	50

Q. 43 "What would you or other members of your household do differently if there was better light at night?"

Legend:
- My children will be able to do their homework/studies
- Doing household chores
- Chatting / Socializing
- Start a business near my home where there is security
- Watching television
- Listening to the radio fulltime
- Tending to livestock would be convenient e.g. Milking

Bar values: 37, 17, 11, 10, 9, 8, 7

Base: All those who could do things differently = 501
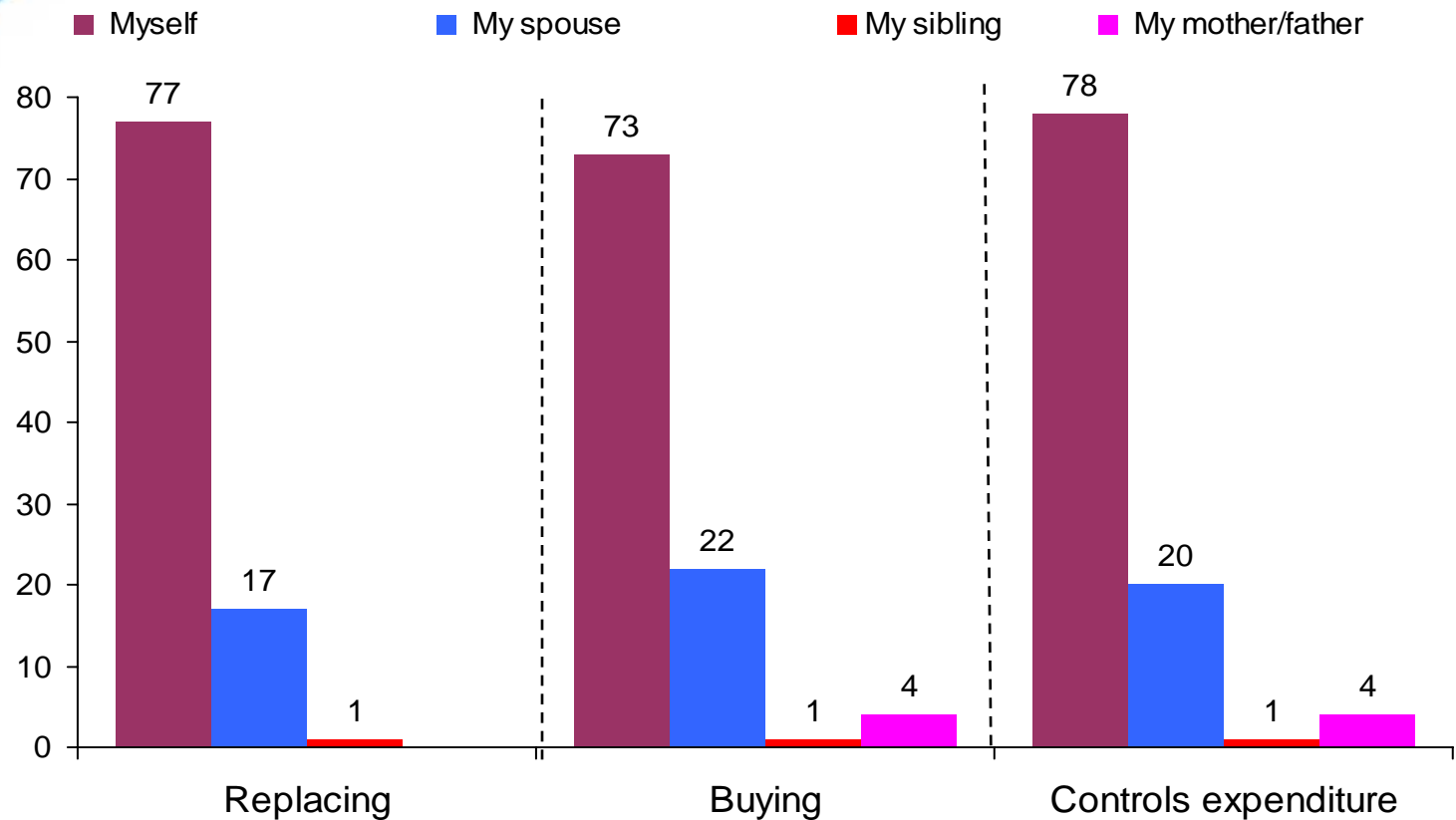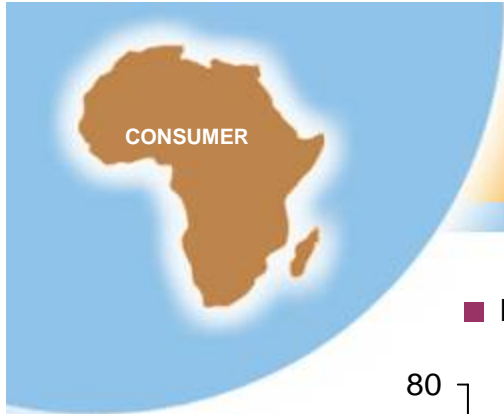
TRADERS

Improvements To Business

Q. 4 "If there was one thing you could do to improve your business or its facilities…?"

TRADER

Legend:
- Improved lighting
- Tools and equipment
- Improved the structure itself
- Getting a power connection / improved power source e.g. generator
- Better shelving / display
- Security related items
- Better decoration
- Improved furniture
- Improve security
- Cooling facilities
- Upgrading to self service

Chart values: 29, 21, 14, 8, 7, 6, 4, 2, 2, 2, 2
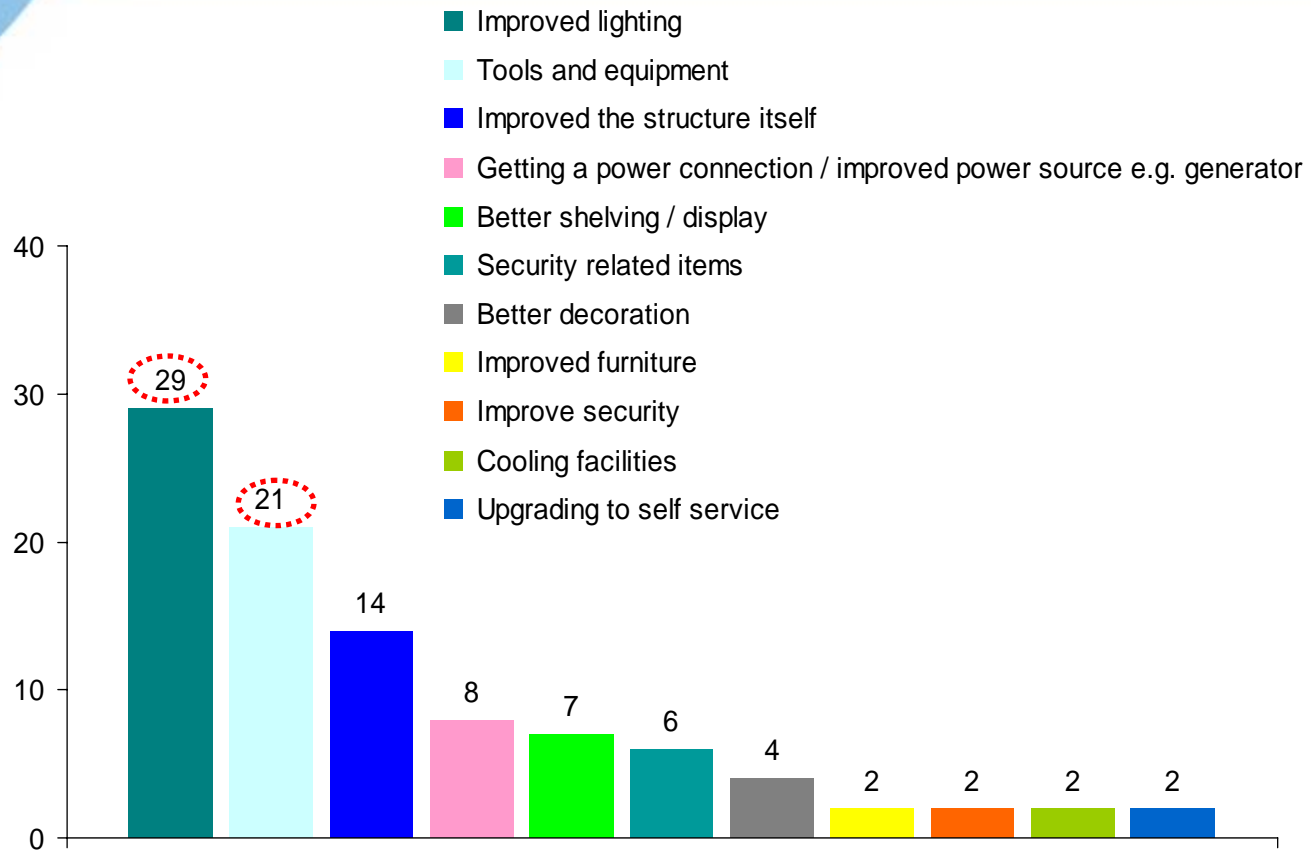
Base: Total Sample =400

Main Reason To Connect To Power Grid / Purchase a Generator

To be able to use appliances and tools necessary for the business throughout the day and night
43%

To improve the overall level of productivity within my business
27%

To be able to listen to the radio during the day
6%

To improve access to lighting
24%
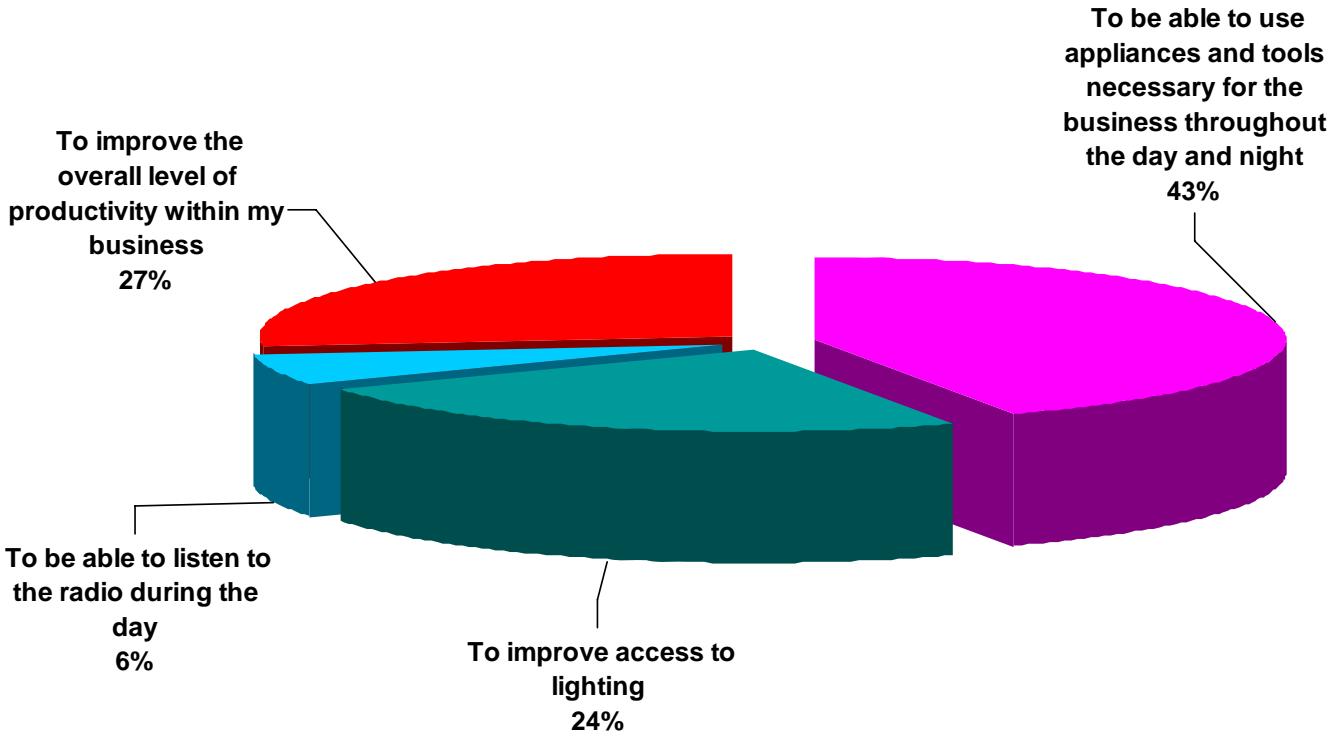
Base = Business = 33: All would like improved power source

Availability And Adequacy Of Power Sources

TRADER

Q. 20 "Do you have any of the following power sources in this business providing power generally to the business?"

Legend:
- None of the above
- Diesel or petrol powered generator
- Bio power
- Car battery
- Solar power
- Car battery with inverter

Power sources available:
- None of the above: 84
- Car battery: 6
- Diesel or petrol powered generator: 5
- Solar power: 3
- Bio power: 1
- Car battery with inverter: 1

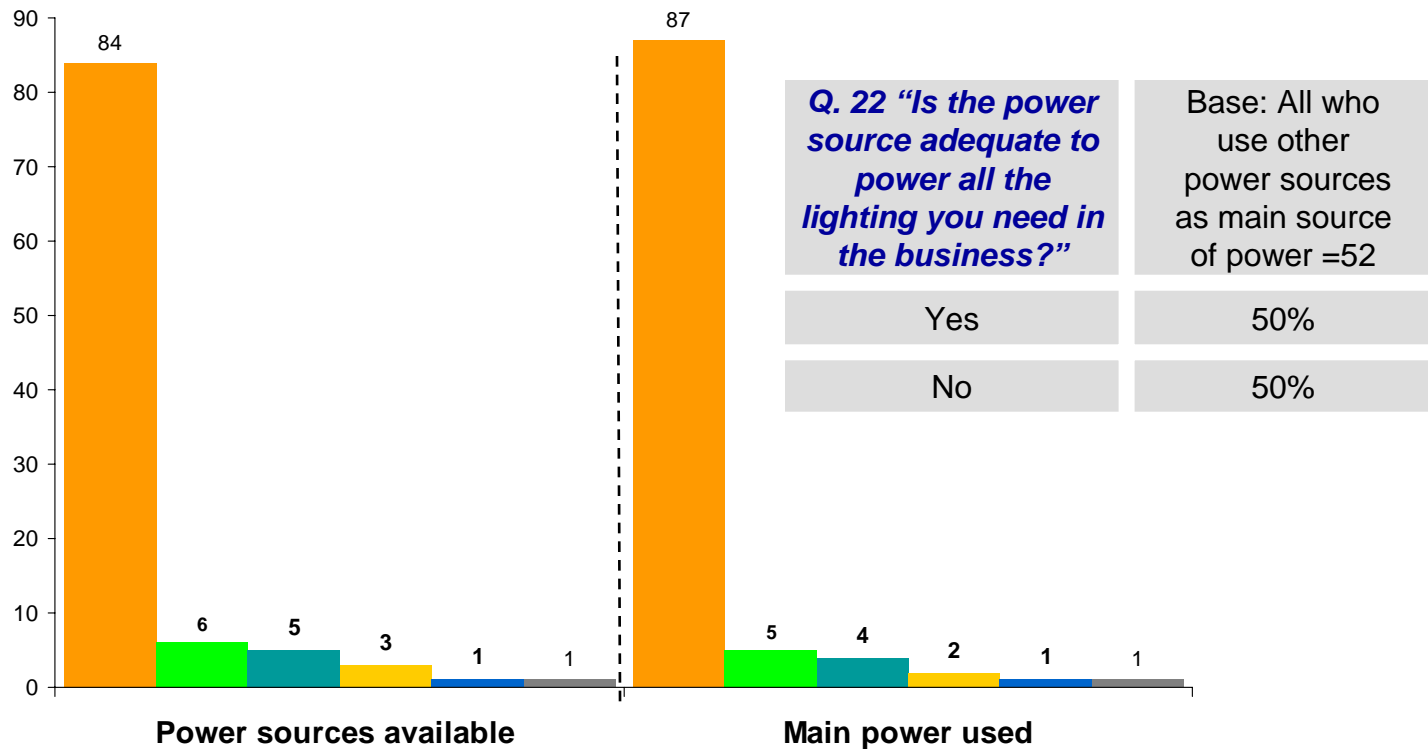**Main power used:**
- None of the above: 87
- Car battery: 5
- Diesel or petrol powered generator: 4
- Solar power: 2
- Bio power: 1
- Car battery with inverter: 1

Q. 22 "Is the power source adequate to power all the lighting you need in the business?"	Base: All who use other power sources as main source of power =52
Yes	50%
No	50%

Base: Total Sample=400

TANZANIA

Q. 21a "Do you ever use any of the following sources of energy to power appliances or to create light?"

Q. 21b "Which of the sources would you say you use as your main energy source?"

Legend:
- ■ Kerosene
- ■ Candles
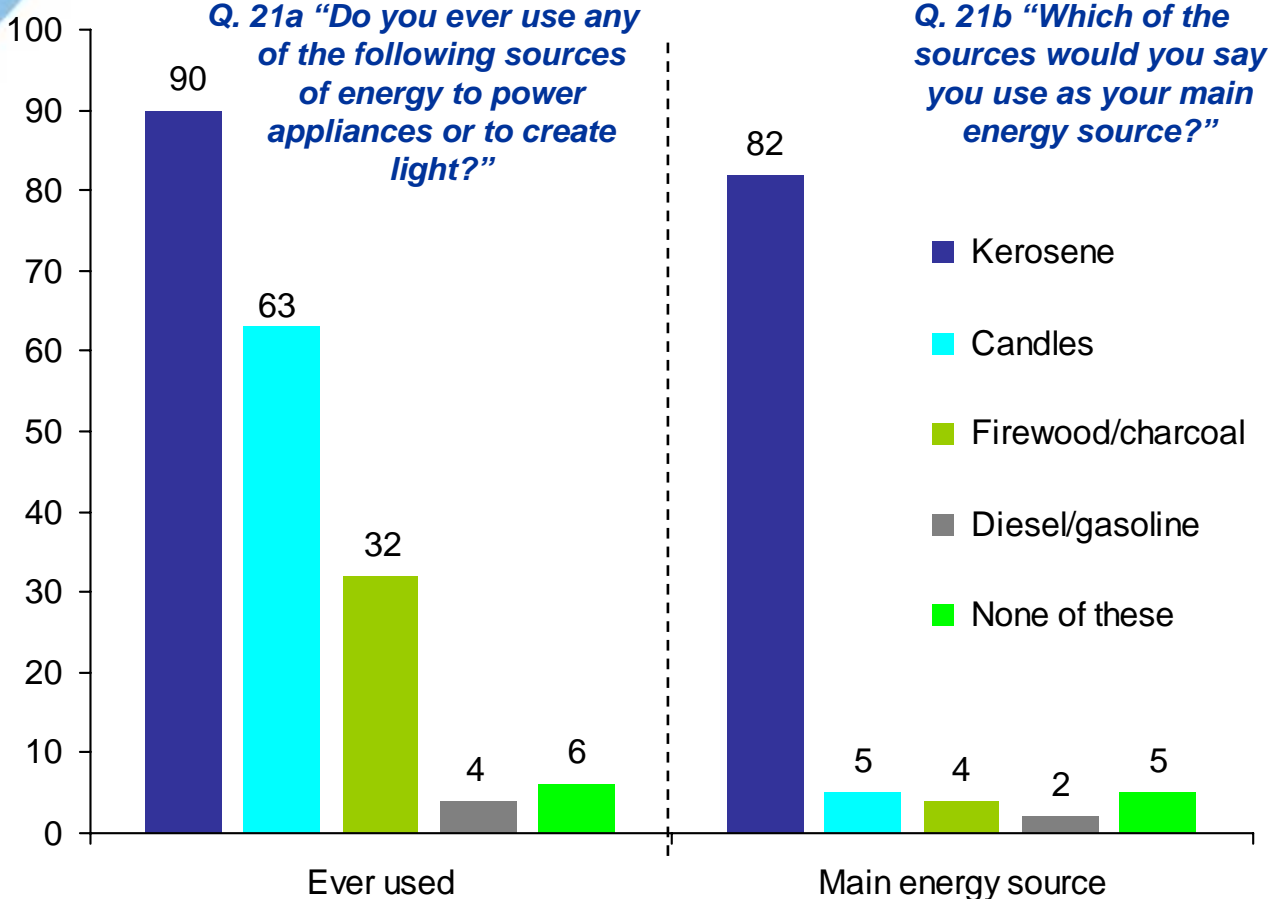- ■ Firewood/charcoal
- ■ Diesel/gasoline
- ■ None of these

Ever used:
- Kerosene: 90
- Candles: 63
- Firewood/charcoal: 32
- Diesel/gasoline: 4
- None of these: 6

Main energy source:
- Kerosene: 82
- Candles: 5
- Firewood/charcoal: 4
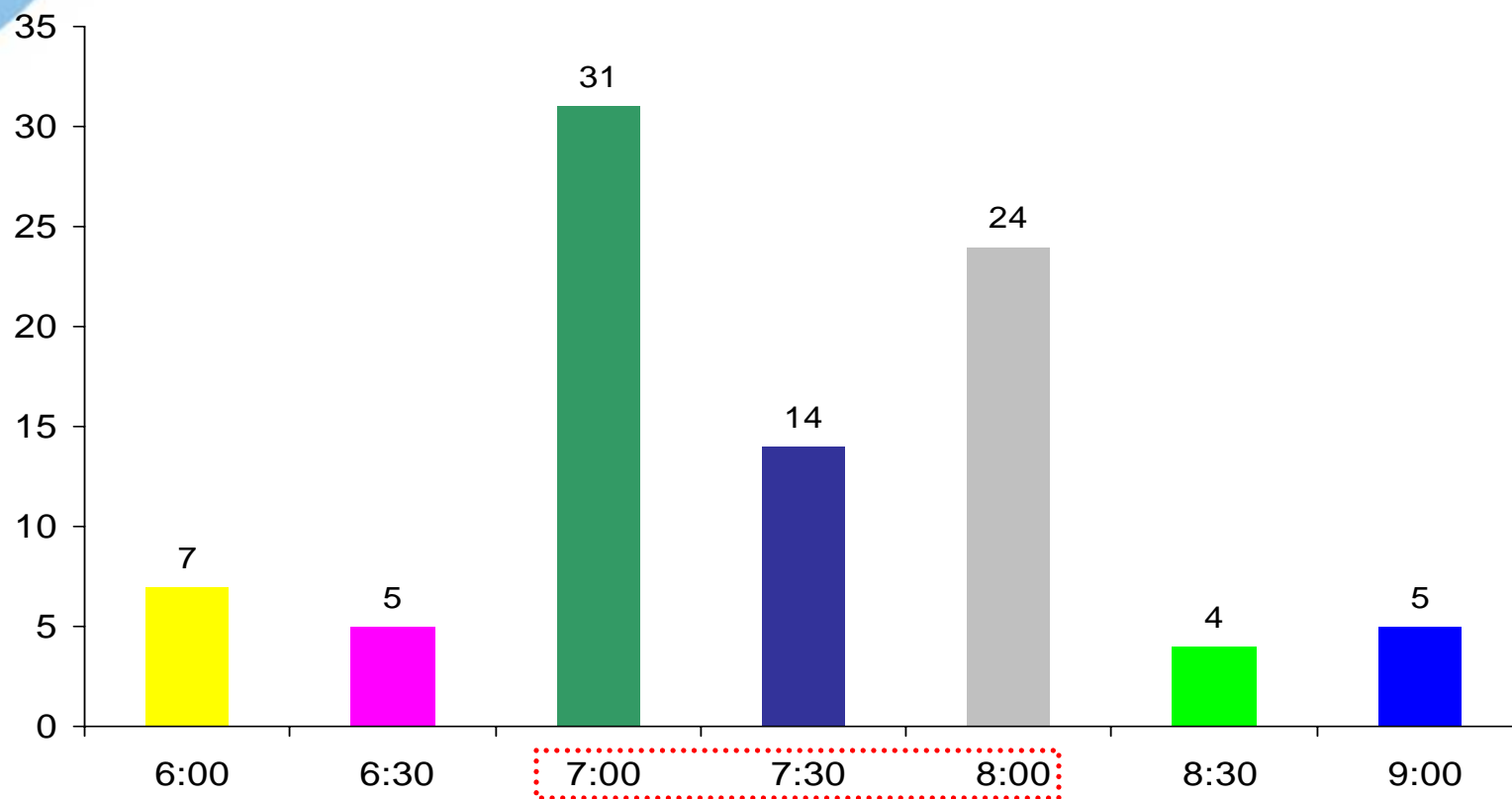- Diesel/gasoline: 2
- None of these: 5

Kerosene is the main source of energy for most traders due to its wide availability..

Base: Total sample =400

Opening Time

Q. 24a "What time does your business usually open?"

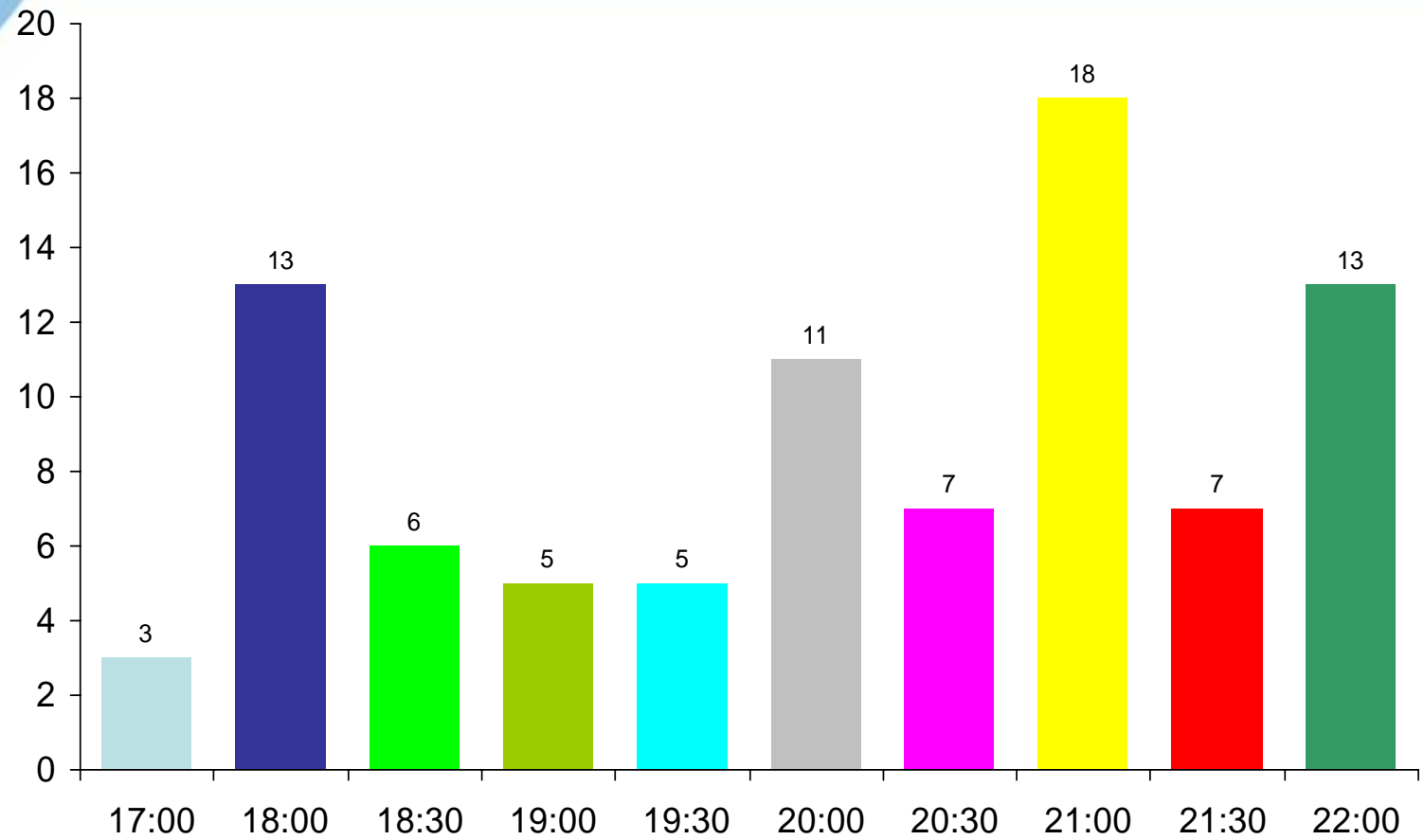| Time	Value
6:00	7
6:30	5
7:00	31
7:30	14
8:00	24
8:30	4
9:00	5

Most traders operate daily throughout the week with 73% opening on Sunday and a majority 69% opening between 7:00am and 8.00am

Base: Total Sample =400

Closing Time

Q. 24b "What time does your business usually close?"

Chart: "What time does your business usually close?"

Time	Value
17:00	3
18:00	13
18:30	6
19:00	5
19:30	5
20:00	11
20:30	7
21:00	18
21:30	7
22:00	13

Many businesses close at between 6:00pm – 22:00 pm. At this time its already dark and hence lighting devices are thus required.
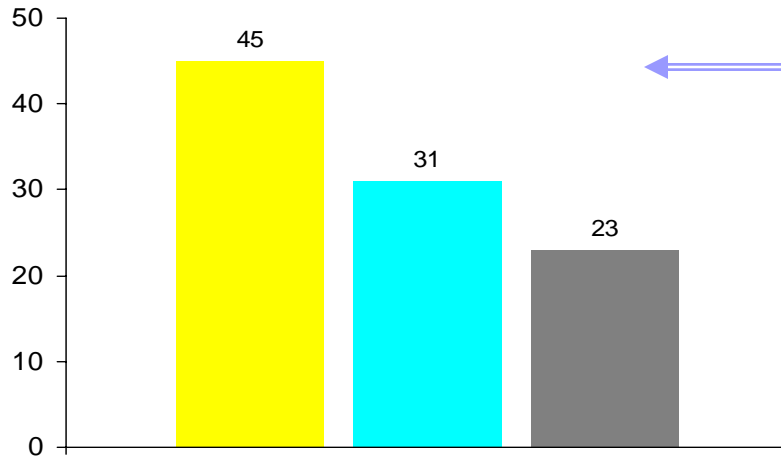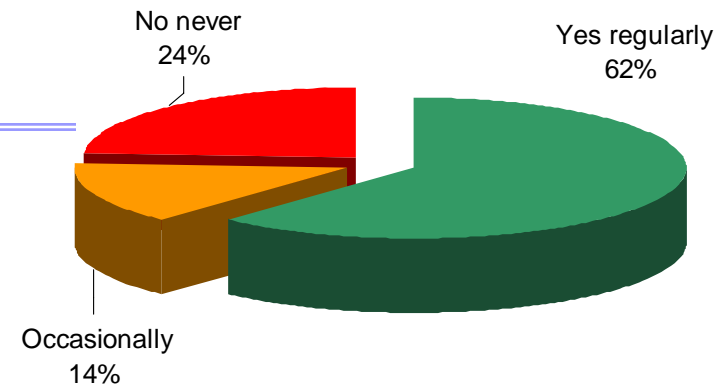
Base: Total Sample =400

Operating The Business After Dark

Q. 26 "Why do you currently not operate regularly after dark?"

- 🟨 Lack of light makes it impossible to operate
- 🟦 Increased security risk
- ⬜ Lack of customers after hours

Q. 25 "Does this business ever operate after dark?"

No never 24%

Yes regularly 62%

Occasionally 14%

Bar chart values: 45, 31, 23

Base = 151: All who do not open regularly after dark

Base: Total Sample = 400

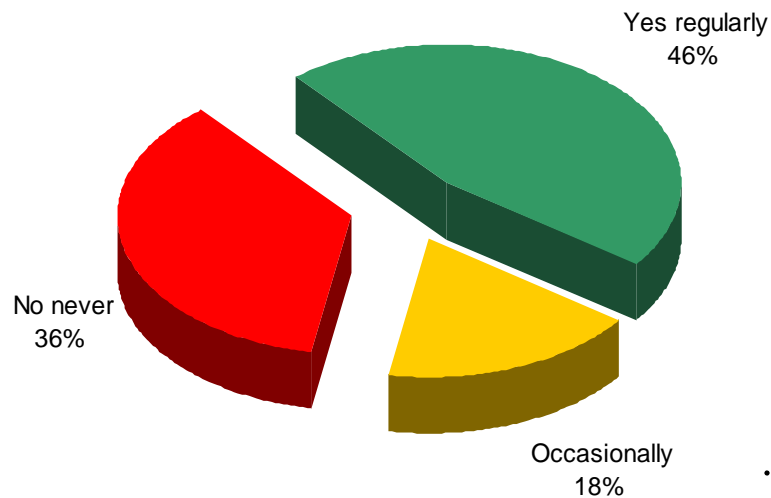| Q. 27 "If you had adequate or improved lights at your business, would you open after dark?"	Base = 151
Yes, regularly	46%
No, Never	18%
Occasionally	36%

Lack of light is identified by 45% of those who do not operate at night as the main cause for their failure not to operate then. 46% of traders would operate regularly after dark if the lighting system improved

Effects On Finances From Opening After Dark

Q. 27 "If you had adequate lights would you operate after dark?"

Q. 28 "How would staying open during dark hours affect the finances of your business?"

Yes regularly
46%

No never
36%

Occasionally
18%

Base = 151 : All who do not open regularly after dark

It would make little to no difference

It would affect them positively, i.e. I would be able to make

32

68
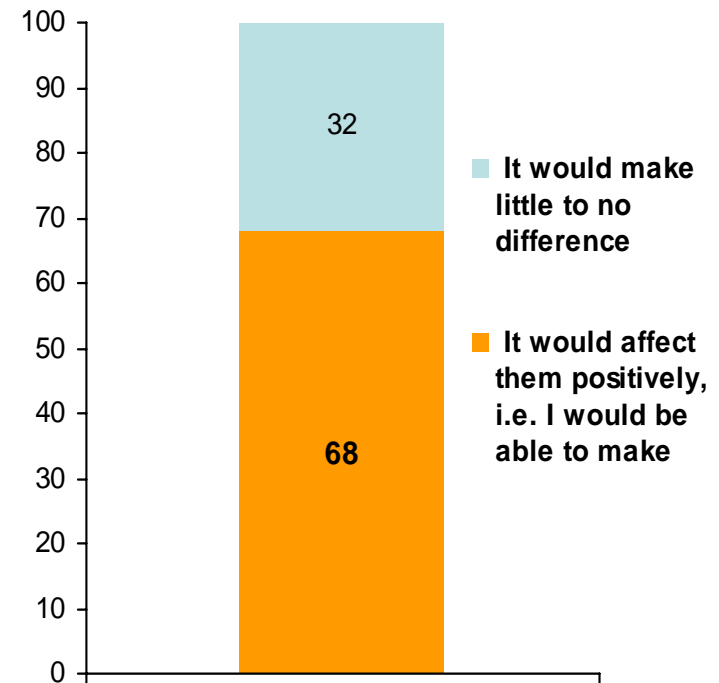
Base = 97: All who would open after dark

Most traders who would consider operating after dark (68%) believe that opening the business after dark would enable them to make more money

Use Of Light

TRADER
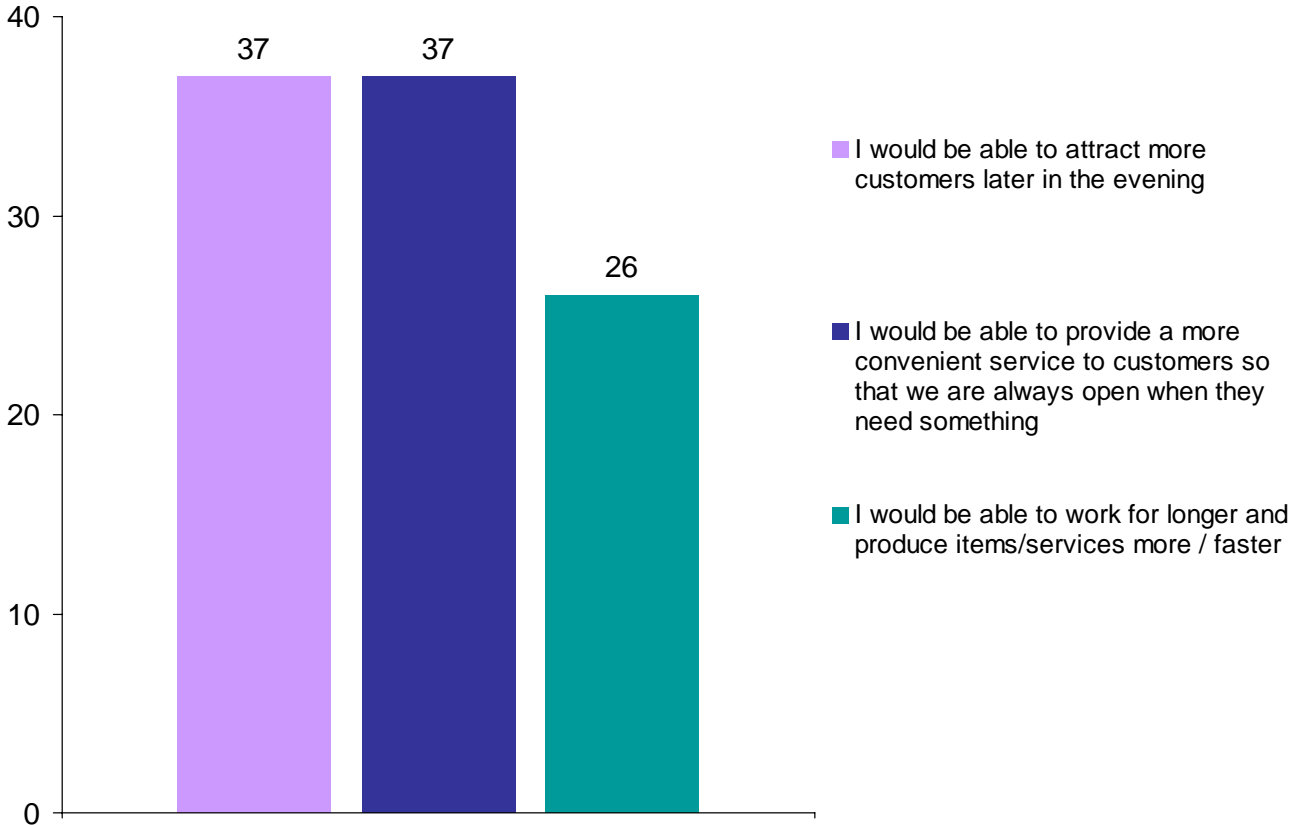
Q. 31 "Are any lights used at the premises during the day time?"

Yes
16%

No
85%
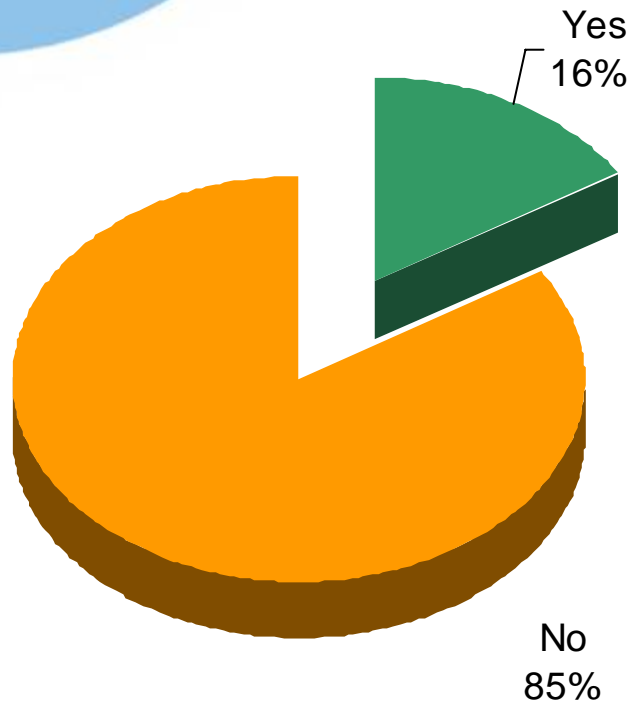
Q. 32 "Do you use these same lights after dark or during the day time or both?"

52	■ Both
22	■ During day time
26	■ After dark
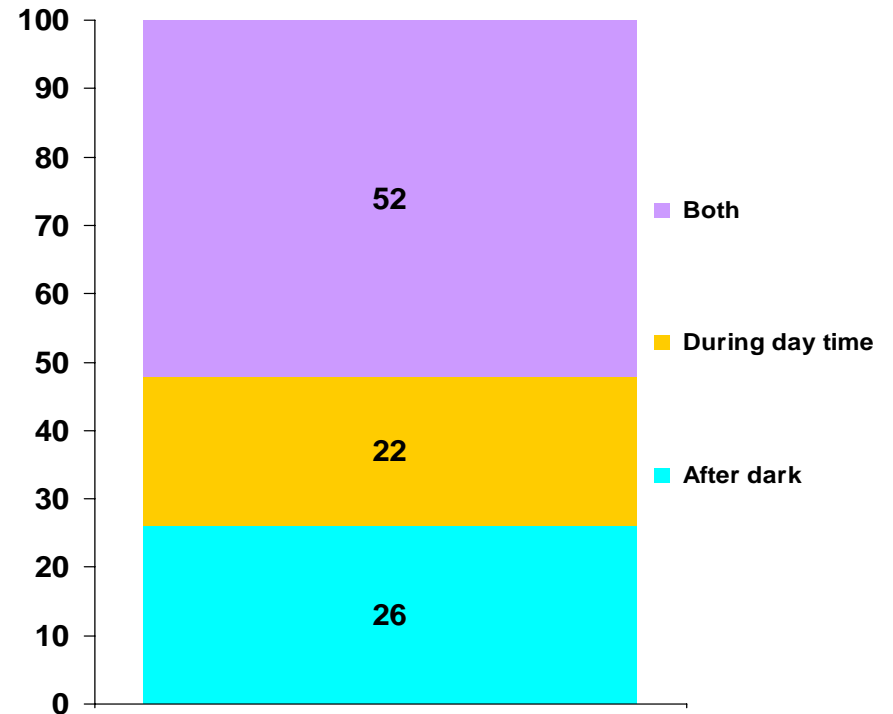
16% of traders use lights in their premises during the day with slightly over half (52%) using the same lights at night.

Satisfaction Level And Limitations With Current Lighting

Q. 39 "How satisfied are you with the lighting in your business?"
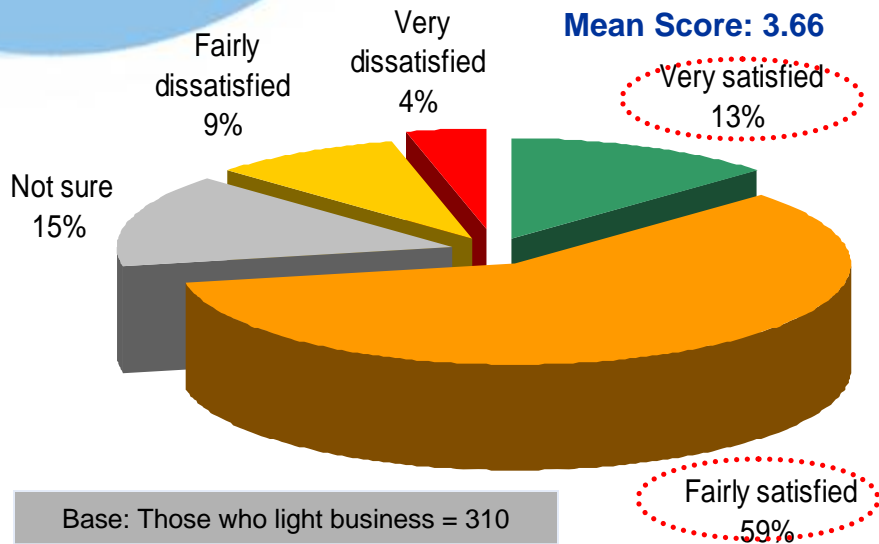
Limitations of current lighting

Mean Score: 3.66

Very satisfied
13%

Very dissatisfied
4%

Fairly dissatisfied
9%

Not sure
15%

Fairly satisfied
59%

Base: Those who light business = 310

The brightness is not enough	54%
I am unable to serve customers well	26%
Limits/discourages the flow of customers	14%
There is a lot of insecurity	4%
It is not cost effective	2%

Base those traders dissatisfied with lighting = 42

Satisfaction levels with light by the traders is high at 72%. The weakness of the light (not bright enough) is the major cause for dissatisfaction with the lighting

Rate Of Lighting Outside The Business And Its Limitations

TRADER

Q. 40b "How would you rate the level of lighting outside your business?"
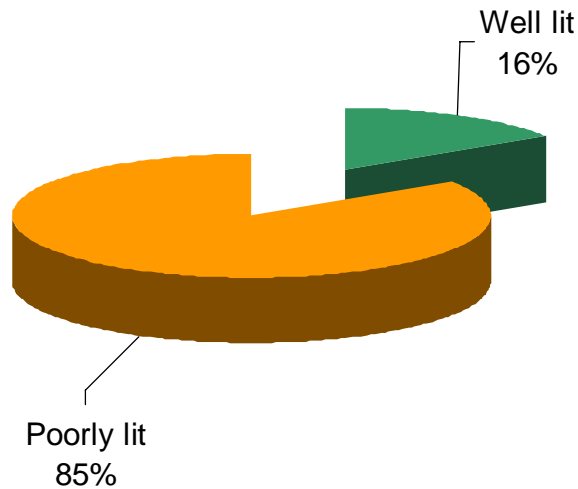
Well lit
16%

Poorly lit
85%

Base (310) = all those who light their business

Q. 40c "How does the available lighting outside of your business limit you in terms of running your business, if at all?"

There is no security, hence cannot operate the business after dark	42%
Customers don't see the shop clearly, so they don't shop after dark	19%
I cannot see customers' faces clearly because they buy from outside	12%
Sometimes customers tend to think that the business has closed down due to lack of enough light	15%
The customers feel insecure	6%
It is hard to display goods outside the shop after dark	6%

85% of traders who light their business, categorise lighting outside their businesses as poor. This limits their operation after dark with 42% mentioning insecurity and 19% mentioning customers are unable to see the shop clearly

Improvements To Business

Q. 4 *"If there was one thing you could do to improve your business or its facilities…?"*

Bar chart values: 29, 21, 14, 8, 7, 6, 4
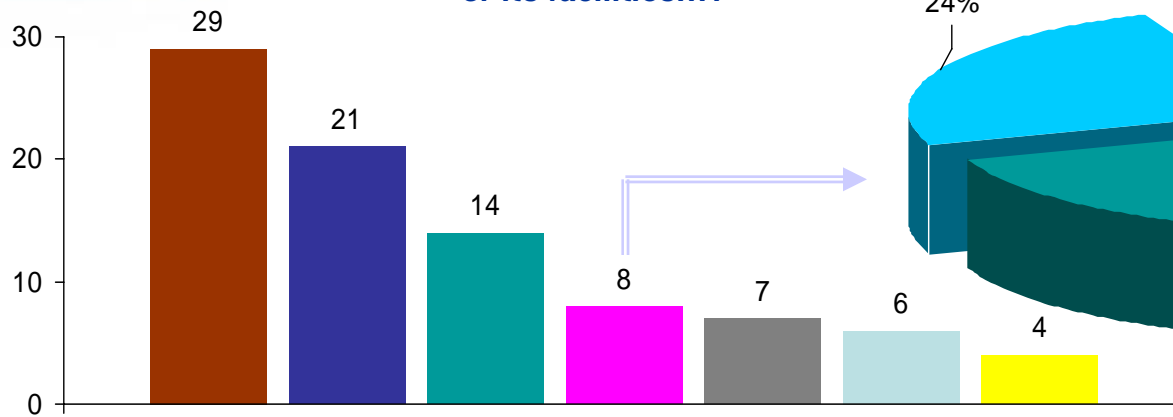
Base: Total Sample = 400

- ■ Improved lighting
- ■ Tools and equipment
- ■ Improved structure itself
- ■ Getting a power connection or improved power source like generator
- ■ Better shelving / display
- ■ Security related items
- ■ Better decoration (painting / other types of decoration)

Pie chart labels:
- To improve access to lighting 24%
- To be able to listen to the radio 6%
- To improve the overall level of productivity within my business 27%
- To be able to use appliances and tools necessary for the business 42%
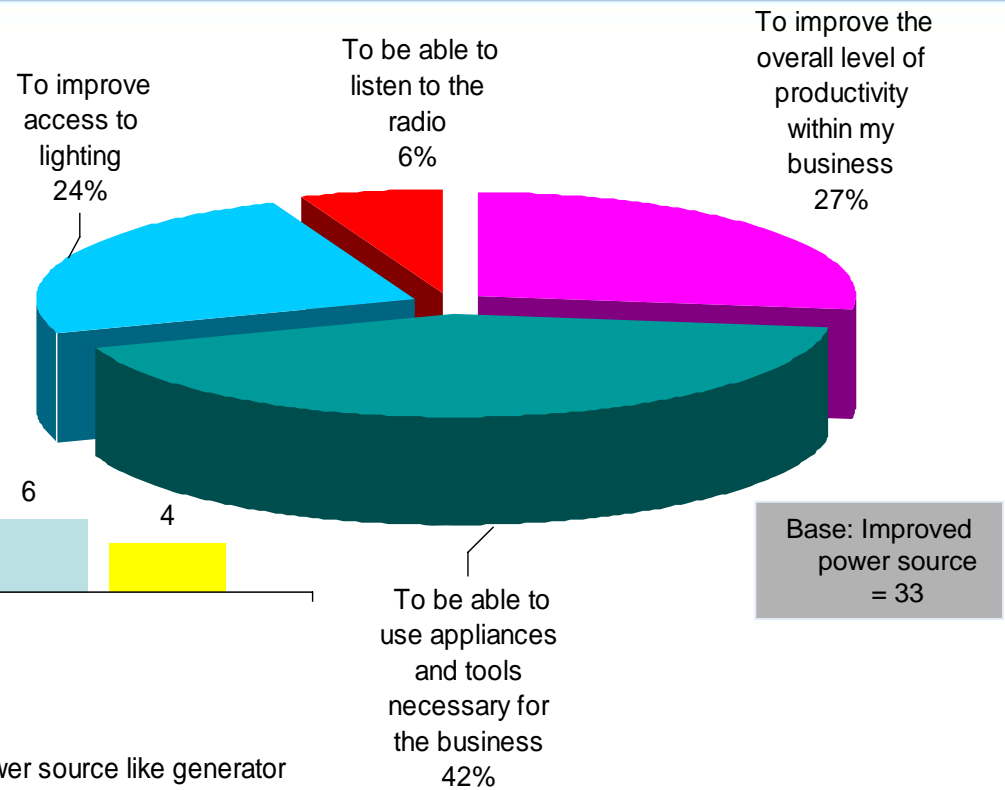
Base: Improved power source = 33

Improved lighting was named as the top priority of improvements to be done to the business facility. The 8% who mentioned they would like to have an improved power source cited their reason as the ability to be able to use appliances and tools at night

Barriers To Improving Lighting

Q. 41 "What are the barriers to improving the lighting for your business?"

TRADER

Barrier	Value
The shop is rental, and the landlord is the one who decides whether to connect to main switch	2
No better types of lights exist	11
Do not know where to get better lights	11
Do not have enough money to buy the fuel / batteries necessary to power the lights	29
Do not have enough money to purchase more lighting devices / lamps	47
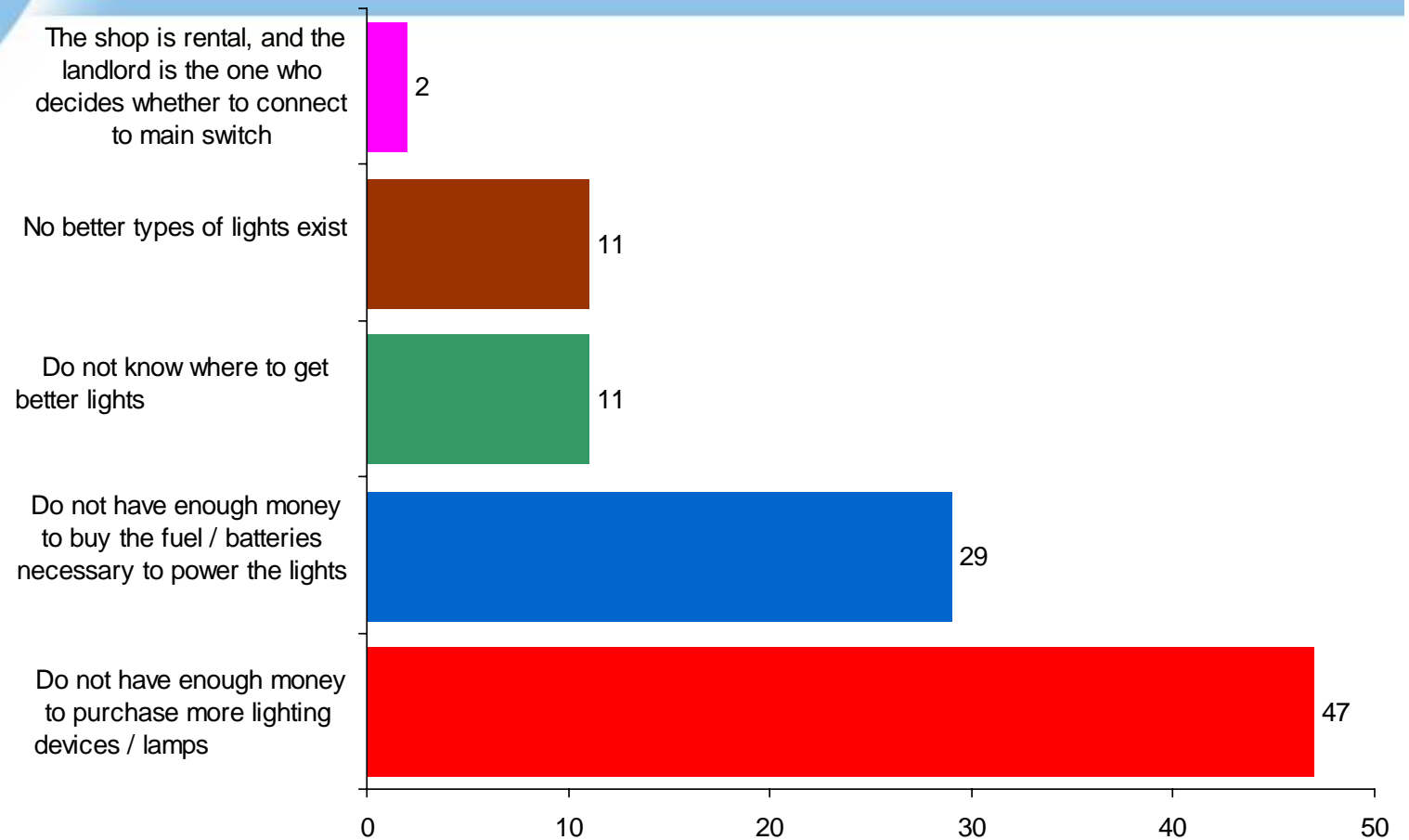
Traders who light their business cite money problems (76%) as the barrier to improving their current lighting situation

Base (310) = all those who light their business

CURRENT LIGHTING DEVICES

CONSUMERS

Types Of Lighting Devices Used

Q. 34 "What, if anything, was used to light the main room last night?"

CONSUMER

- **Paraffin lamp with glass cover**
- **Paraffin lamp with simple wick - no cover**
- **Candles**
- **Light bulb in socket or lamp**
- **Flashlight or torch**
- **Firelight**

Chart values:
- 60
- 30
- 19
- 10
- 8
- 7
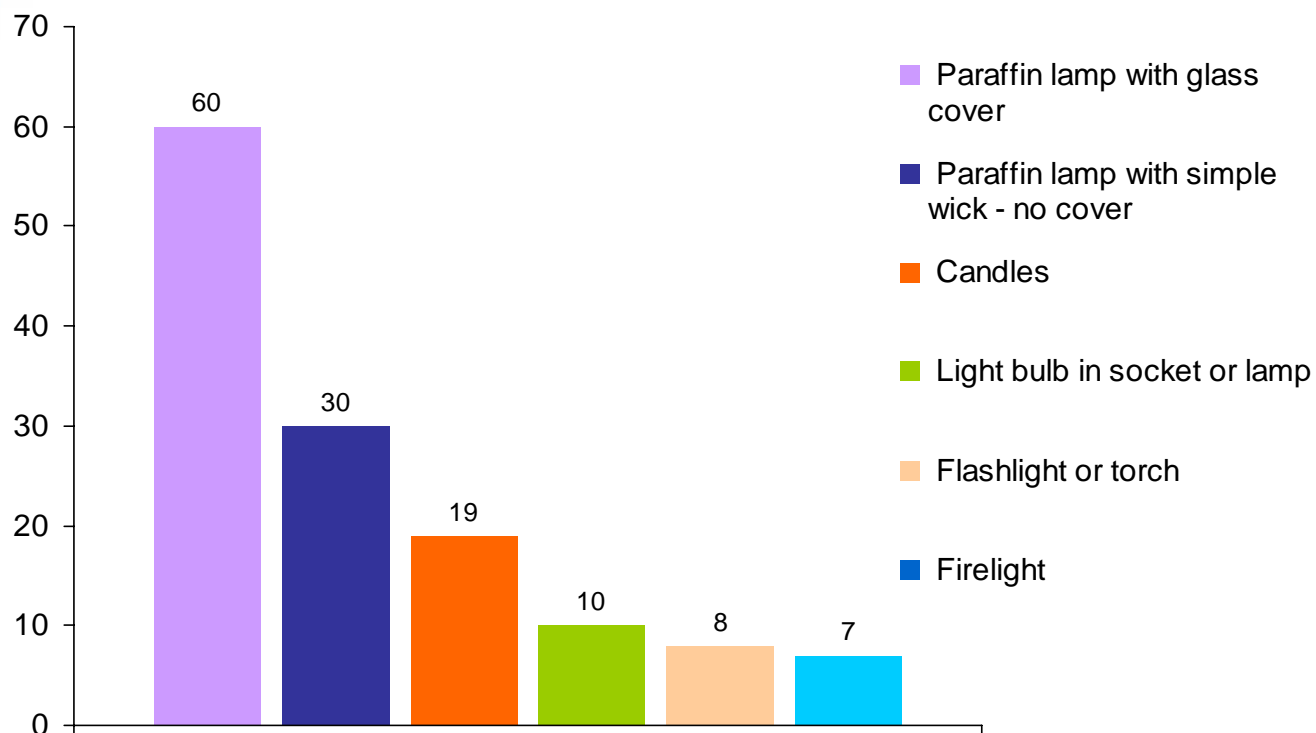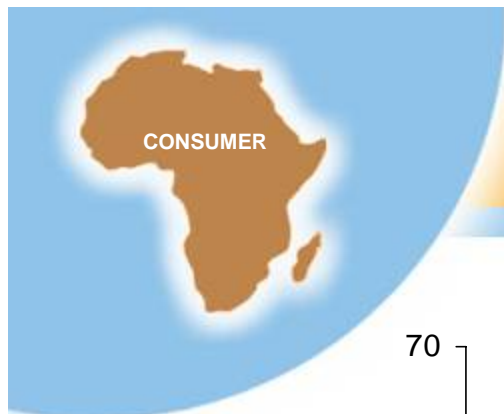
Similar to traders, paraffin lamp with glass cover is the mostly used type of lighting device while Kerosene is the mostly used power source

Base (consumers): Total sample =1000

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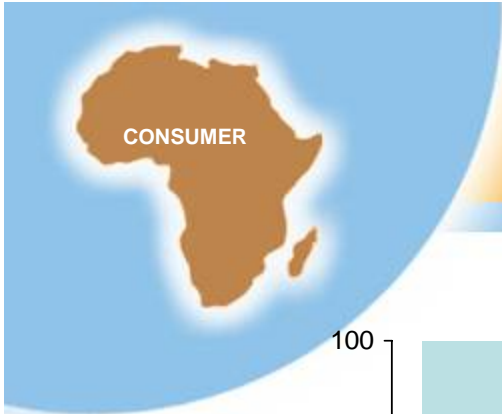
Back-Up Lighting

Q. 49d "Generally do you use ...... as a main source or a back-up when main lighting not available?"

■ Main Source   ■ Backup

Category	Main Source	Backup
Firelight n=73	30	70
Paraffin lamp with glass cover n=125	44	56
Candles n=131	18	82
Paraffin lamp - no cover n=127	28	72
Pressure lamp n=37	5	95
Lamp connected to gas bottle n=14	7	93
Light bulb in socket or lamp n=16	56	44
Lantern (battery or solar) n=10	30	70
Flashlight or torch n=250	10	90
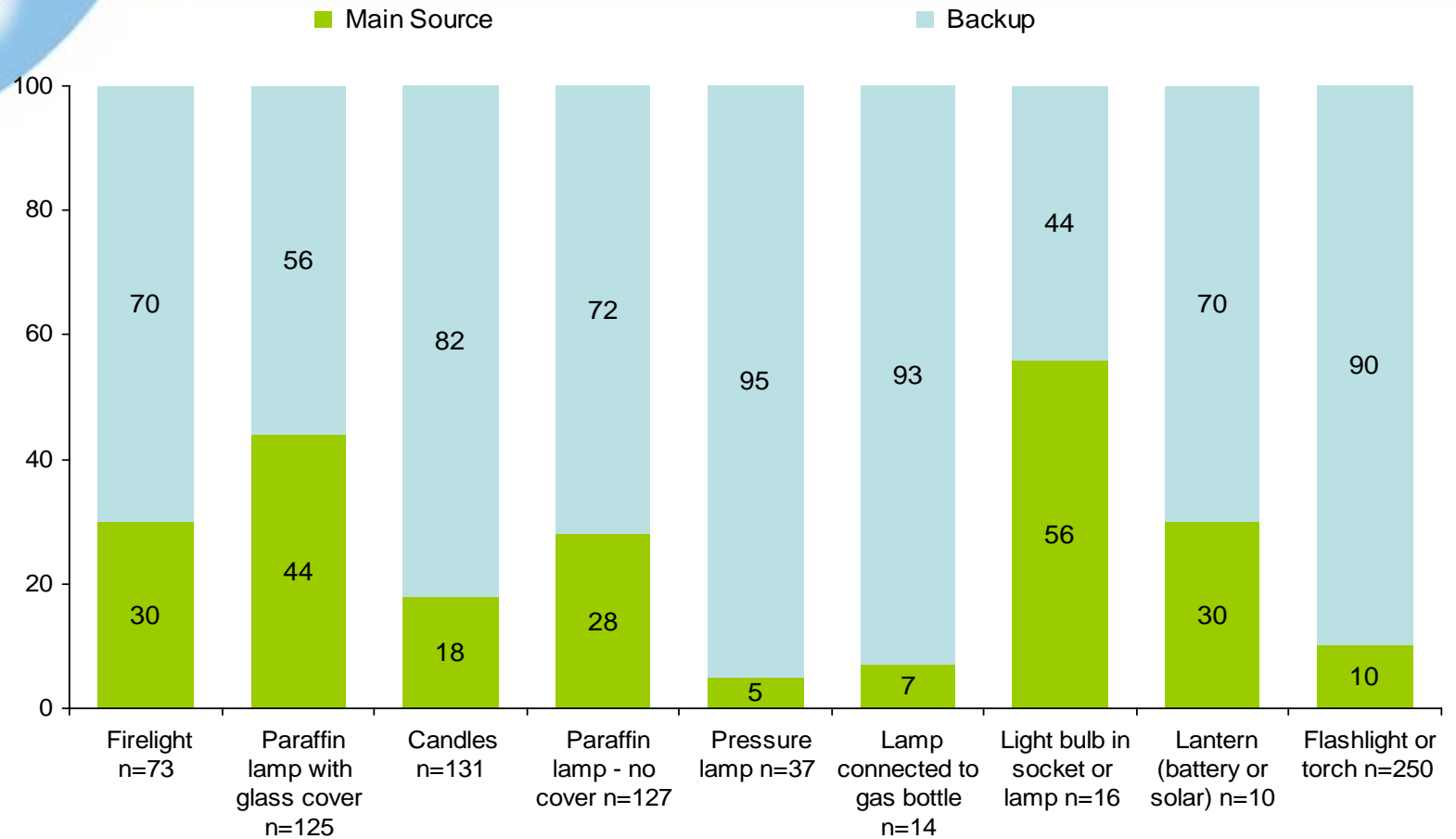
Light bulb in socket / lamp is mostly used as main source of lighting, while a Pressure Lamp is used as backup lighting device in most households

Base: All with .... in working order

Preferred Type Of Lighting Device

Q. 58 "What is your preferred type of light excluding mains powered light bulbs?"

Chart data (preference values):

- Battery powered stand up lantern — 5
- Simple paraffin lamp with wick and no cover — 6
- Light bulb in socket / lamp connected to a car battery — 8
- Pressure lamp — 11
- Solar powered lantern — 25
- Paraffin lamp with glass cover — 31
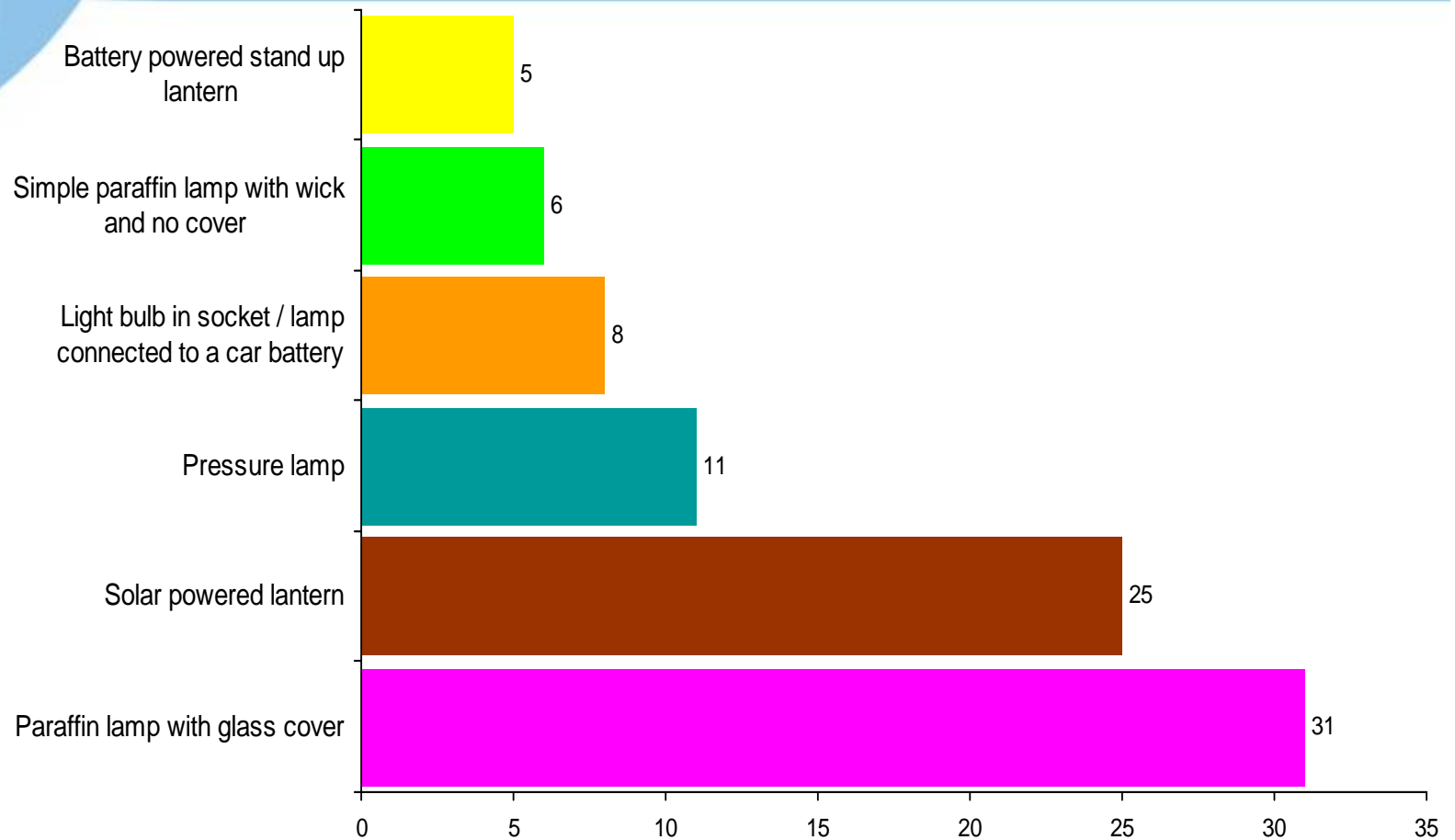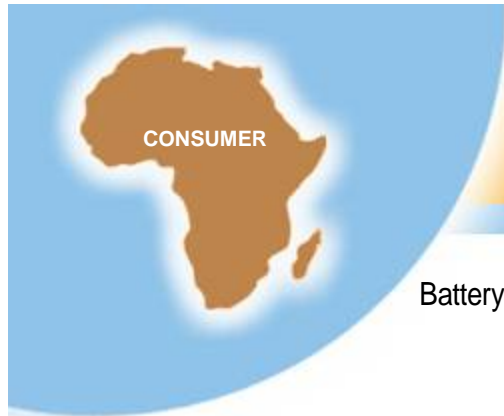
Parafin lamps with glass cover are the most preferred type of lights

Base: Total sample = 1000

Other Lighting Devices Available

Q. 49a "Apart from all the lighting methods and devices which you used last night, what other lighting devices are available to this HH in working order?"

Device	Value
Pressure lamp	4
Firelight	7
Paraffin lamp with simple wick - no cover	13
Candles	13
Paraffin lamp with glass cover	13
Flashlight or torch	25
None	40
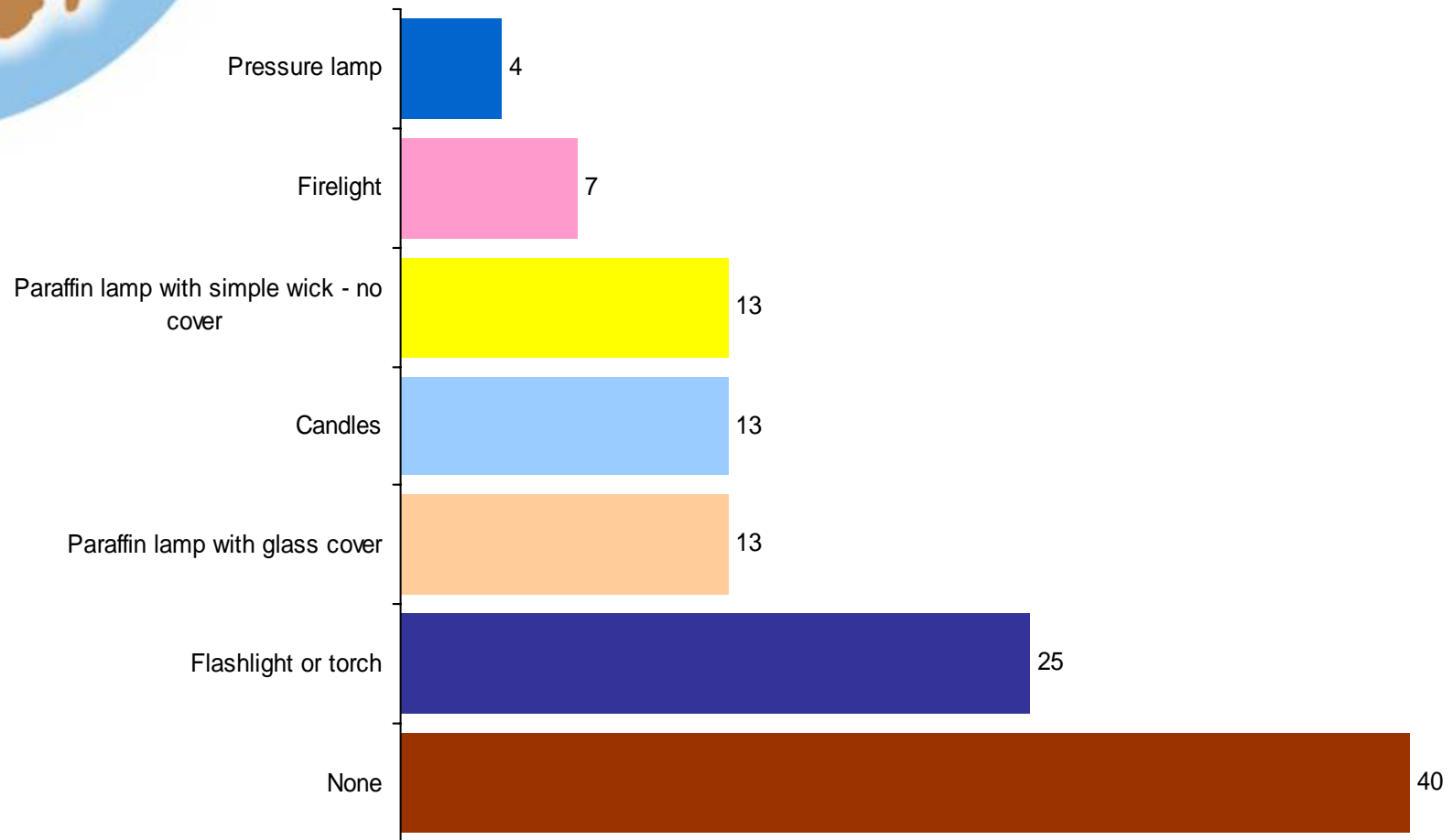
Base = Total sample=1000

Power Sources For Lighting Devices

Q. 49e "What is the power source for _____ (Mention each lighting device at a time)?"

CONSUMER

Legend:
- Main grid power
- Solar power
- Batteries (AA, AAA etc)
- Diesel or petrol powered generator
- Car battery

Device	Values
Flashlight or torch n=250	2 2 1 · 93
Lantern (battery or solar) n=10	20 · 60 · 20
Light bulb in socket or lamp n=16	50 · 19 · 6 · 6 · 19
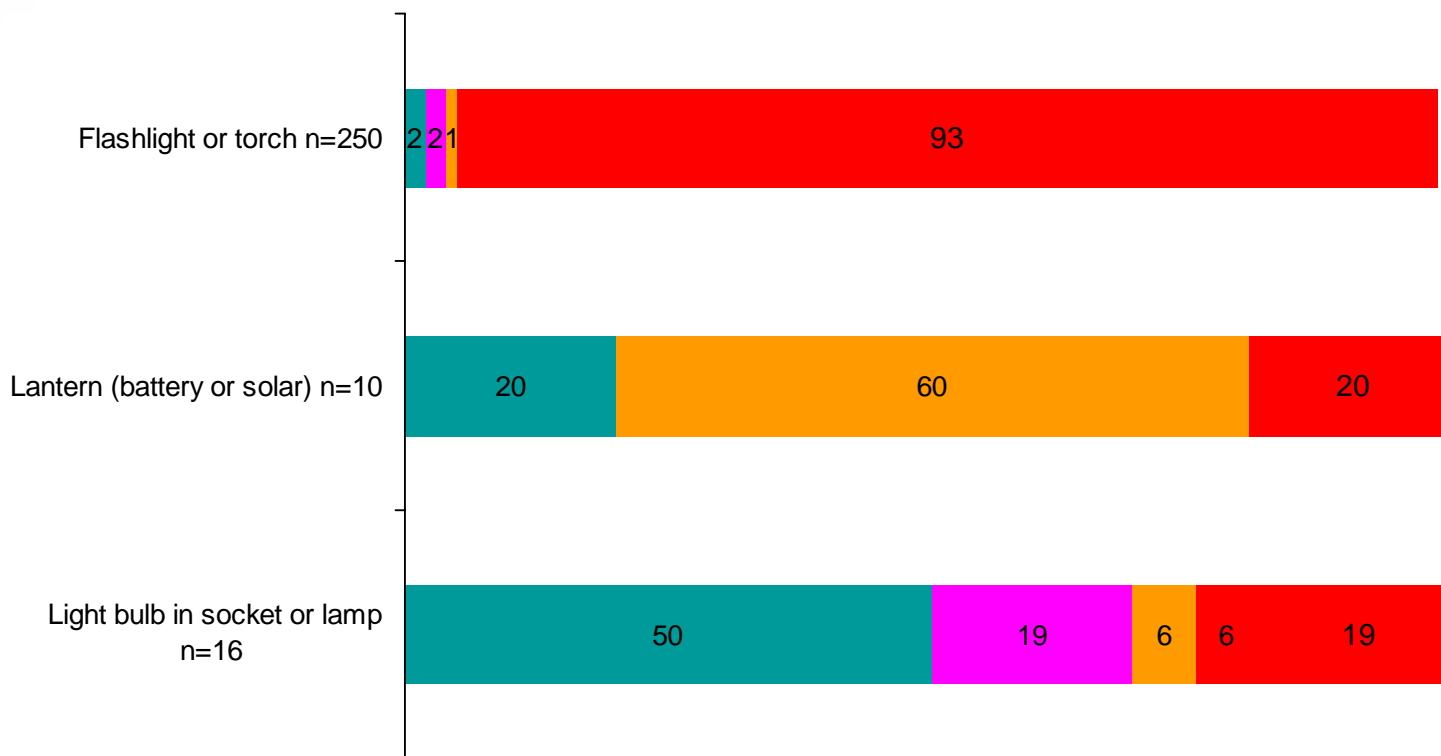
Caution: Small base sizes for Light bulb in socket and Lantern

Base: All with .... in working order
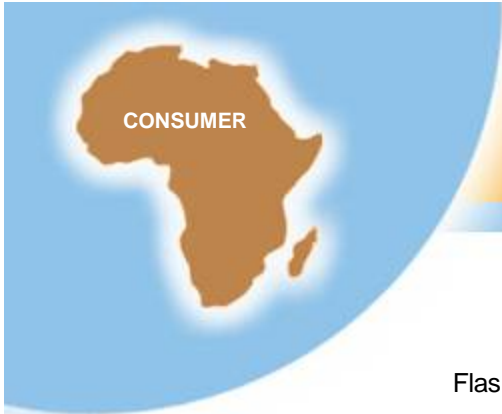
Number Of Each Lighting Device Used

Q. 35 "How many of each lighting device were used?"

CONSUMER

Legend: ■ 1   ■ 2   ■ 3   ■ 4

Device	1	2	3	4	Mean
Flash-light	89	11			1.11
Solar powered lantern	100				1.00
Battery powered stand up lantern	50	50			1.5
Candles	53	26	18	3	2.03
Light bulb in socket or a lamp connected to a car battery	48	30	13	8	1.89
Lamp connected to a gas bottle	50	50			1.5
Pressure lamp	87	9	4		1.17
Simple paraffin lamp with wick and no cover	87	9	4		1.17
Paraffin lamp with glass cover	73	24	21		1.33

Base: all who used light last night

Frequency Of Using Lighting Devices

Q. 49c "How often do you use each type of lighting owned?"

Legend:
- Every day (cyan)
- 2 to 3 times a week (orange)
- Once a week (magenta)
- Every other week (red)
- Once a month (dark purple)
- Less often than once a month (light purple)

Device	Every day	2 to 3 times a week	Once a week	Every other week	Once a month	Less often than once a month
Flashlight or torch n=250	32	34	10	10	5	8
Pressure lamp n=37	16	11	16	19	24	14
Paraffin lamp with simple wick - no cover n=127	34	30	13	6	10	7
Candles n=131	27	29	18	3	11	11
Paraffin lamp with glass cover n=125	30	29	14	2	6	19
Firelight n=73	51	14	12	3	7	14
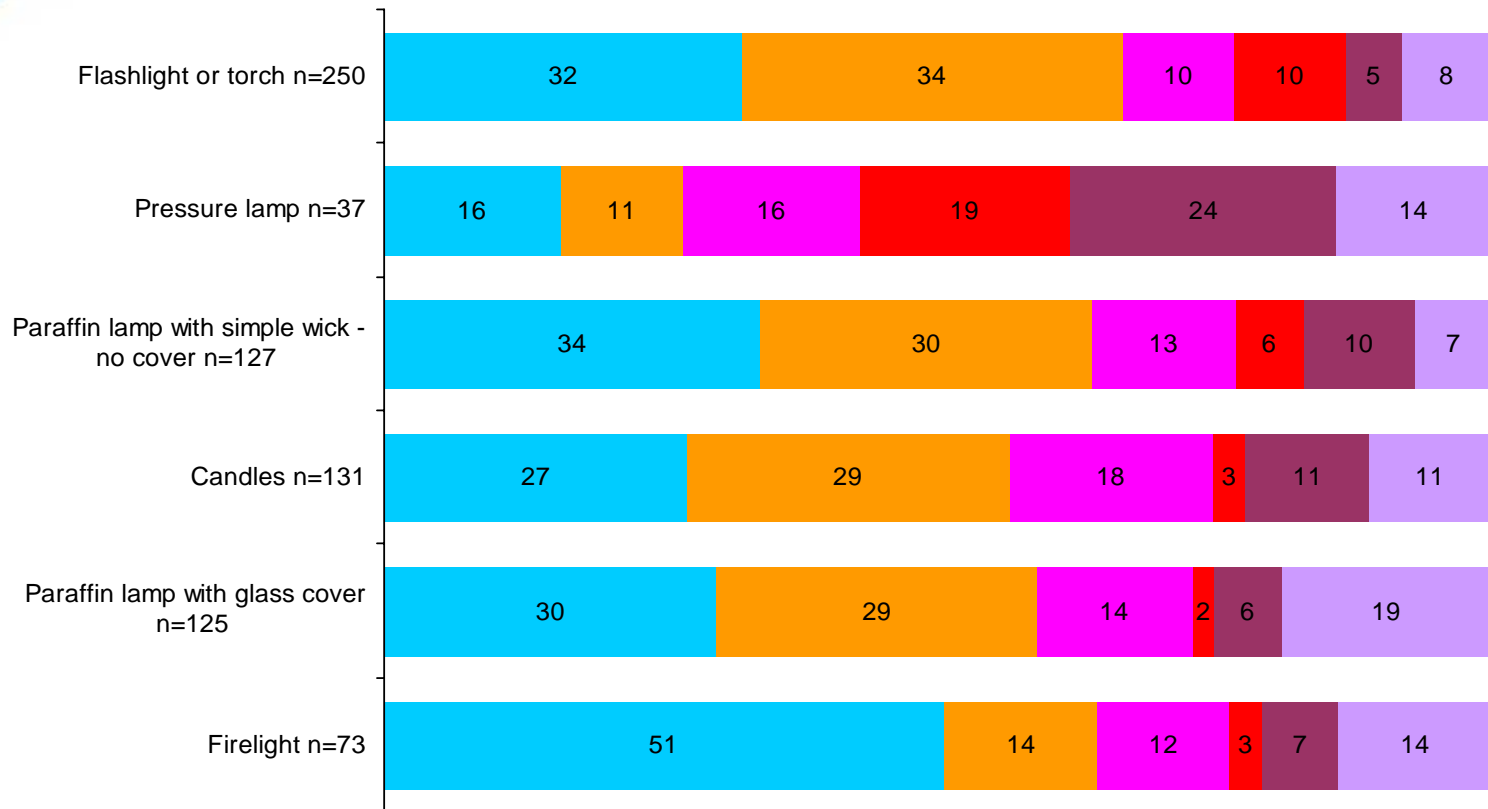
Pressure lamp is not used as often as the other devices.

Base: All with gargets in working order

Placement Of Lighting Devices

Q. 36a "Where were the lights in the main room located?"

Legend:
- On the table
- On the floor
- Moved around as required
- Hung from a hook on the wall
- Suspended from the ceiling
- Not Mentioned

Chart values:
- On the table: 68
- On the floor: 19
- Moved around as required: 18
- Hung from a hook on the wall: 10
- Suspended from the ceiling: 10
- Not Mentioned: 1
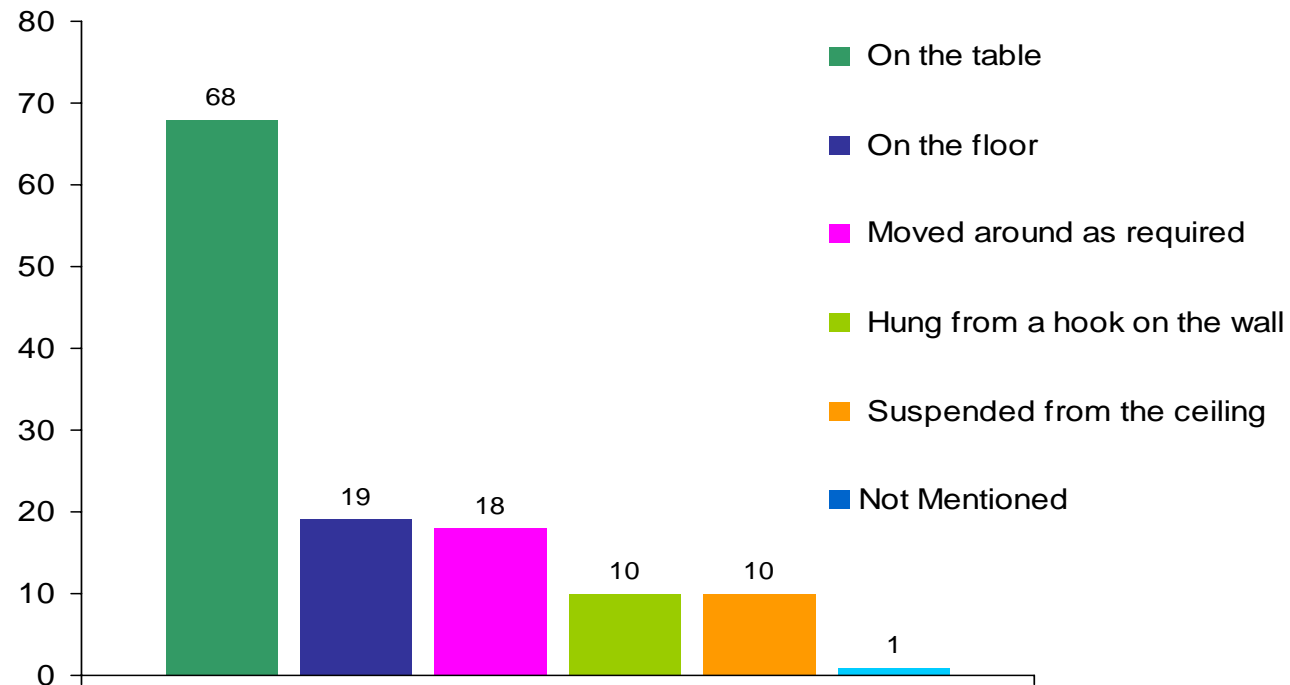
Lighting devices are placed on the table, 68% with 19% placing them on the floor while 18% move around with them

Base: Total sample =1000

Place Of Purchase

Q. 55 "I am now going to read out a list of lighting devices, for each one I would like you to tell me where you would generally purchase these?"

Legend:
- Paraffin lamp with glass cover
- Light bulb in socket
- Pressure lamp
- Battery powered stand up lantern
- Flashlight/torch
- Candles
- Paraffin lamp with simple wick - no cover
- Lamp connected to a LPG/gas bottle
- Solar powered lantern

Place	Mean
	6.3
Out of Town	3.9
Hawker	3.1
Exhibition stall	6.5
Wholesale shop	2.6
Self- Service store (super-market - i.e. with 2 tills)	2.4
Self - Service store (mini-market - i.e.with 1 till)	10.9
Kiosk	27.2
Large Duka	22.1
Small local shop/small duka	3.6
Enclosed market stall	6.8
Open market stall	

Data values by place:

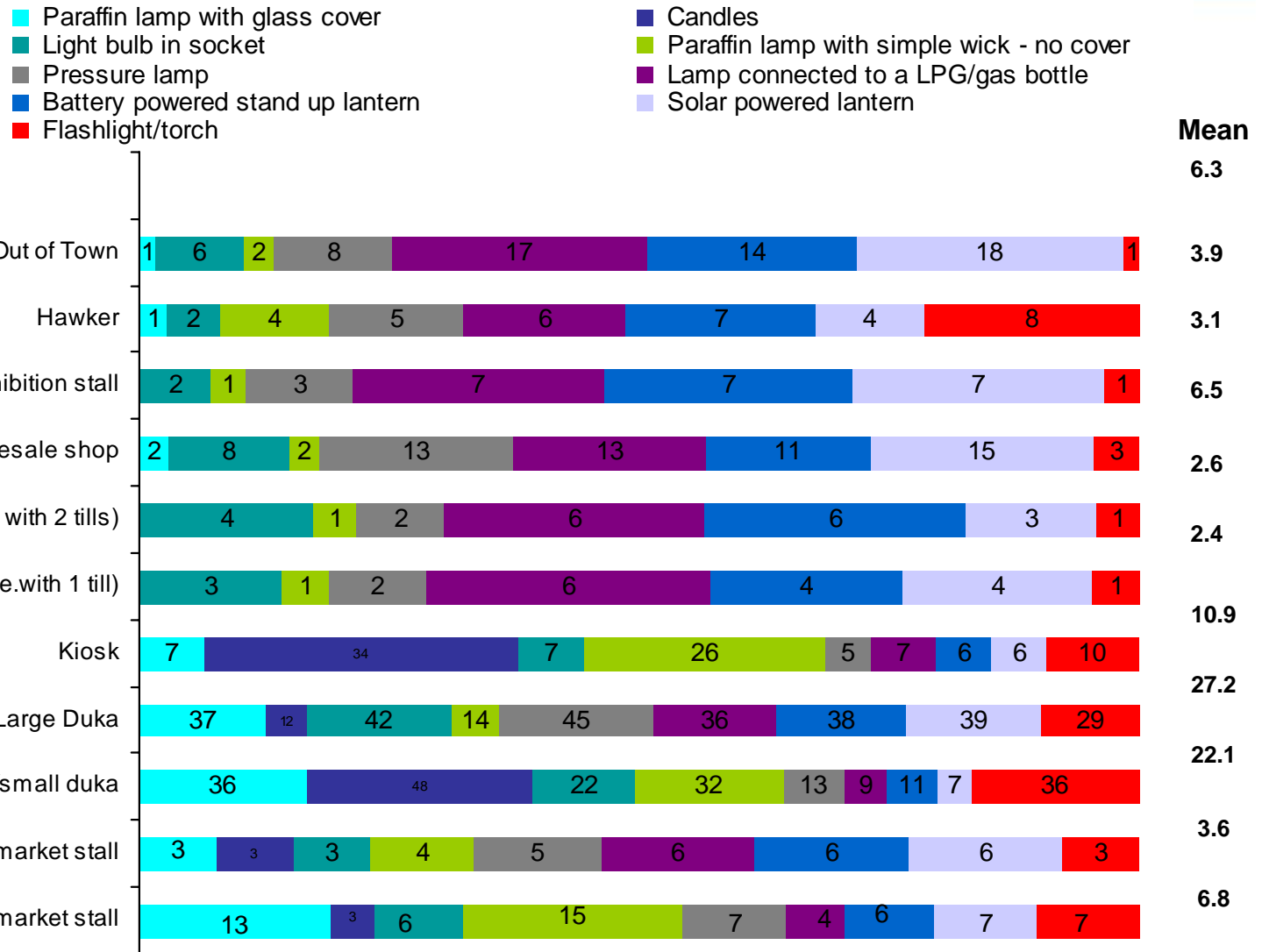**Out of Town:** 1, 6, 2, 8, 17, 14, 18, 1
Hawker: 1, 2, 4, 5, 6, 7, 4, 8
Exhibition stall: 2, 1, 3, 7, 7, 7, 1
Wholesale shop: 2, 8, 2, 13, 13, 11, 15, 3
Self-Service store (super-market): 4, 1, 2, 6, 6, 3, 1
Self-Service store (mini-market): 3, 1, 2, 6, 4, 4, 1
Kiosk: 7, 34, 7, 26, 5, 7, 6, 6, 10
Large Duka: 37, 12, 42, 14, 45, 36, 38, 39, 29
Small local shop/small duka: 36, 48, 22, 32, 13, 9, 11, 7, 36
Enclosed market stall: 3, 3, 3, 4, 5, 6, 6, 6, 3
Open market stall: 13, 3, 6, 15, 7, 4, 6, 7, 7

Base: Total Sample =1000

Purchasing Paraffin

Q. 51 "How do you usually buy your paraffin/kerosene; in litres or another measurement?"

Bottles and Gallon containers are also used to carry kerosene bought in litres from pumps.

Others 28%

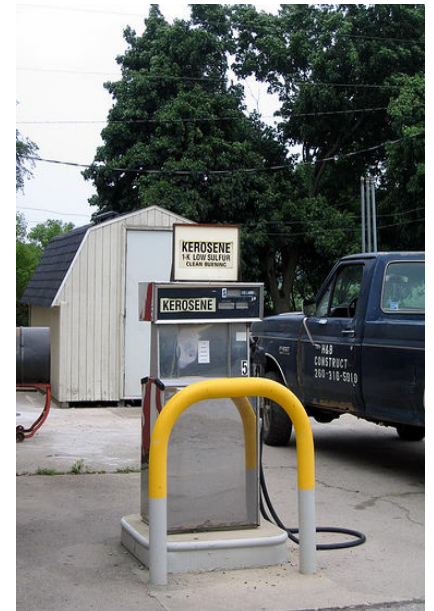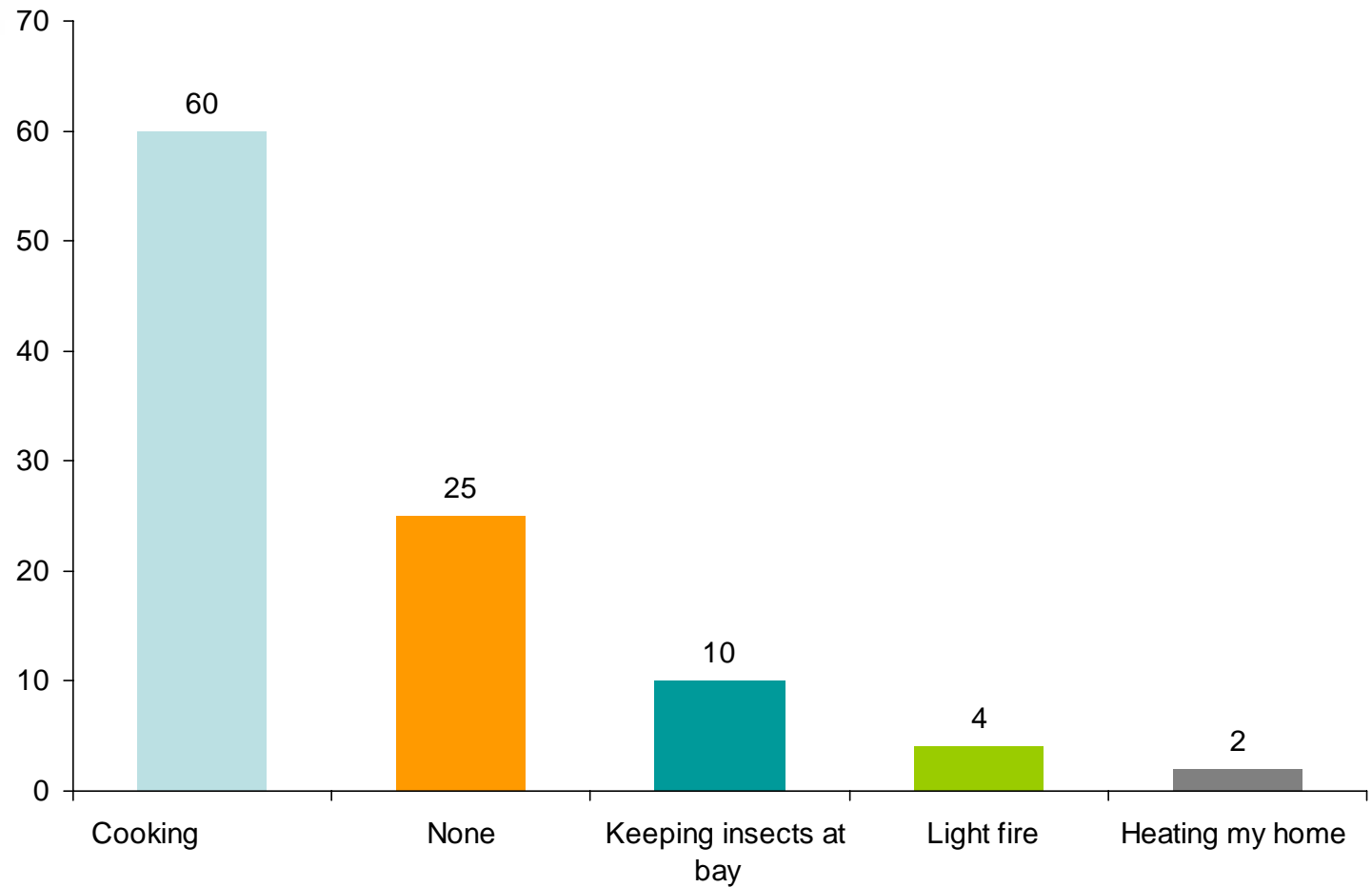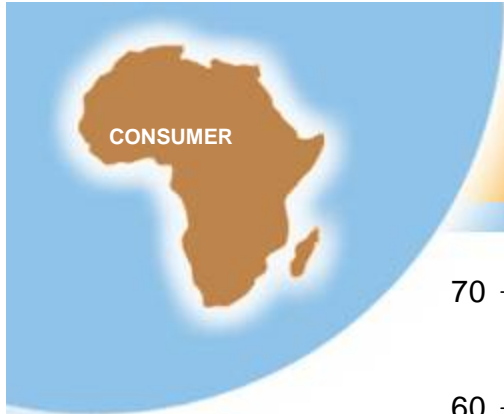**Bottles 4%**

Kerosene pump 68%

Other Activities Paraffin Is Used For

Q. 53a: What else do you use the paraffin/kerosene for besides lighting?

Bar chart values:
- Cooking: 60
- None: 25
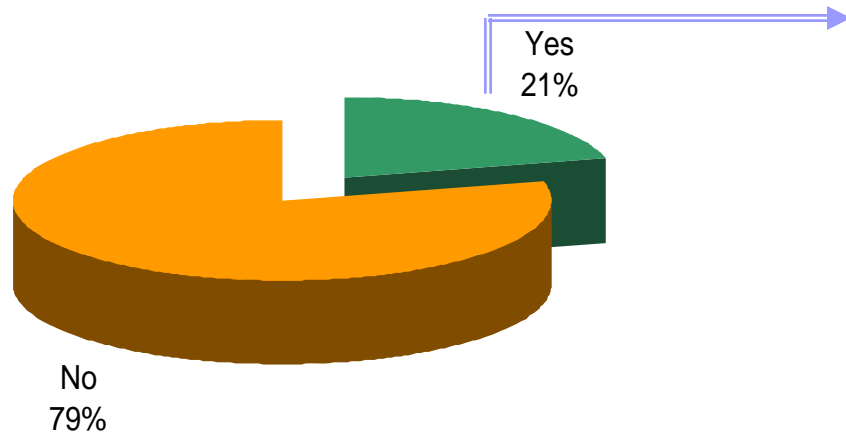- Keeping insects at bay: 10
- Light fire: 4
- Heating my home: 2

Base = 847: All who use paraffin/Kerosene

Health Effects Of Paraffin / Kerosene

Q. 53b "Do you worry about the health effects of using paraffin/kerosene?"

Q. 53c "What do you worry about in terms of health effects?"

Yes
21%

No
79%

Base: All who use Paraffin/Kerosene=847

Legend:
- Smoke produced could be dangerous - could cause Coughing
- Makes the eyes itch
- Produces a pungent smell that causes breathing difficulty
- Cause asthma
- Can cause fire in the house
- Children can drink the paraffin
- Causes headache
- Lung cancer

Bar chart values: 41, 17, 9, 10, 6, 6, 6, 6
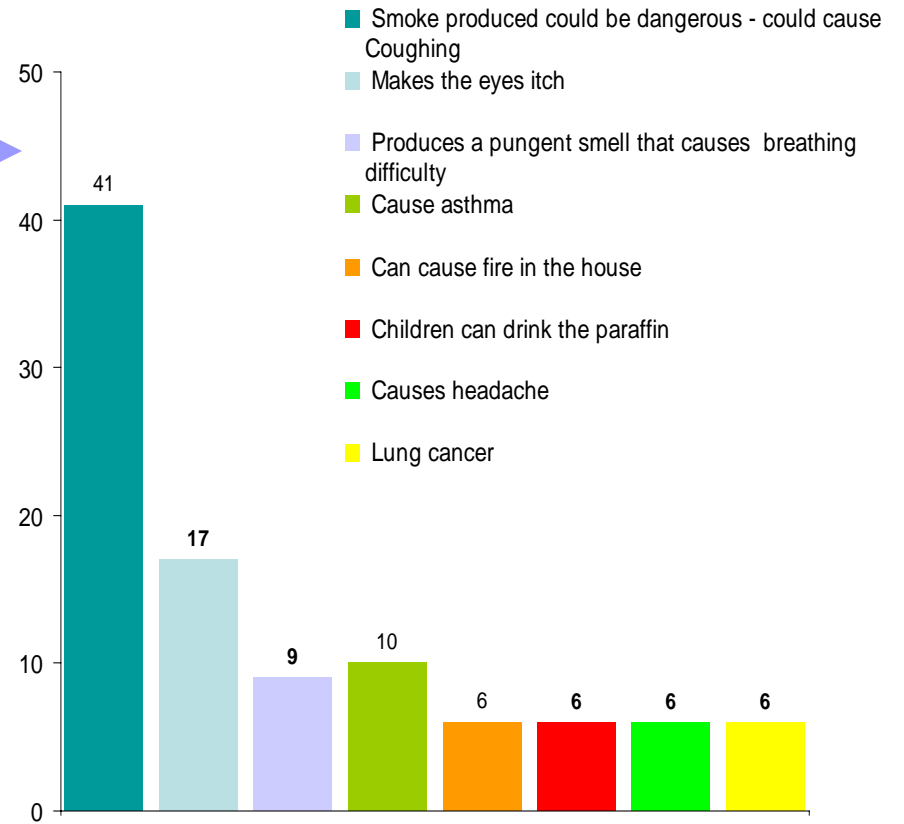
Base: All who worry about health effects= 178

A majority (79%) of households using paraffin do not worry about the health effects brought about by its usage. The few who worry about it mention coughing as their main worry followed by eye itching and asthma.
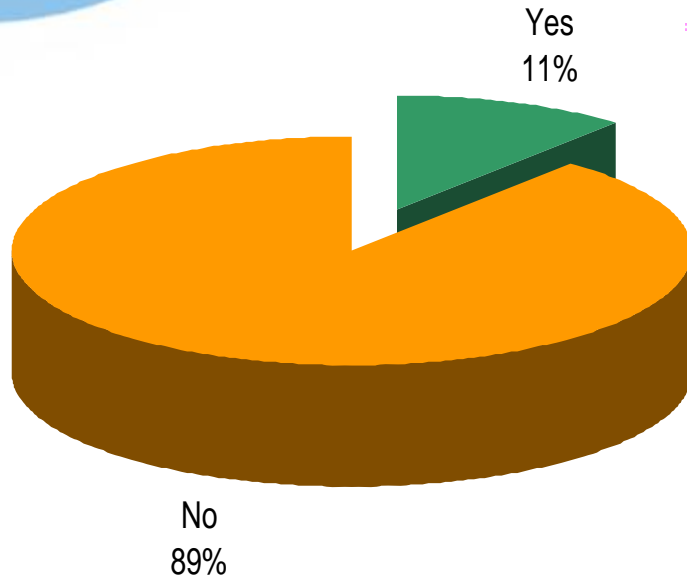
Environmental Effects Of Paraffin / Kerosene

Q. 53d "Do you ever worry about the environmental effects of using paraffin/kerosene?"

Yes
11%

No
89%

Environmental effects of using paraffin/kerosene:

The smoke produced is hazardous to vegetation and animals	49%
It can make the house get fire destroying property	55%

Base: All who use Paraffin/Kerosene= 847

Many of the people who use paraffin (89%) do not feel there is any environmental effect in using it, however, of those who say it has effects they feel the smoke produced is hazardous to the environment.

Strengths Of Types Of Lighting

Q. 36b "What would you say are the strengths of this type of lighting?"

	Total	Firelight	Paraffin lamp with glass cover	Candles	Paraffin lamp with simple wick: no cover	Light bulb in socket Or lamp	Flashlight Or torch
Base: Total Sample	1000	65	603	186	303	95	80
It has very clear lighting	39	20	39	32	28	72	40
It is portable from one place To Another	3	2	3	4	3	-	1
It is easy to operate	7	2	7	10	8	7	8
It does not produce smoke / does not pollute the air	5	5	7	6	2	1	-
It is easily available	2	-	3	5	1	1	4
The device is cheap	8	3	6	13	10	3	8
Paraffin lamp glass is Affordable	-	2	1	1	-	-	-7
It is economical to use	6	3	5	6	11	1	6
The light is not too bright butenough for the room	6	8	7	4	8	4	6
Easy to maintain the lamp	1	2	-	-	1	1	-
The device is reliable since itdoesn't go off easily	2	3	2	2	1	1	3

Very clear lighting ranks highest as the strengths of lighting.

Weaknesses Of Types Of Lighting

Q. 36c "What would you say are the weaknesses of this type of lighting?"

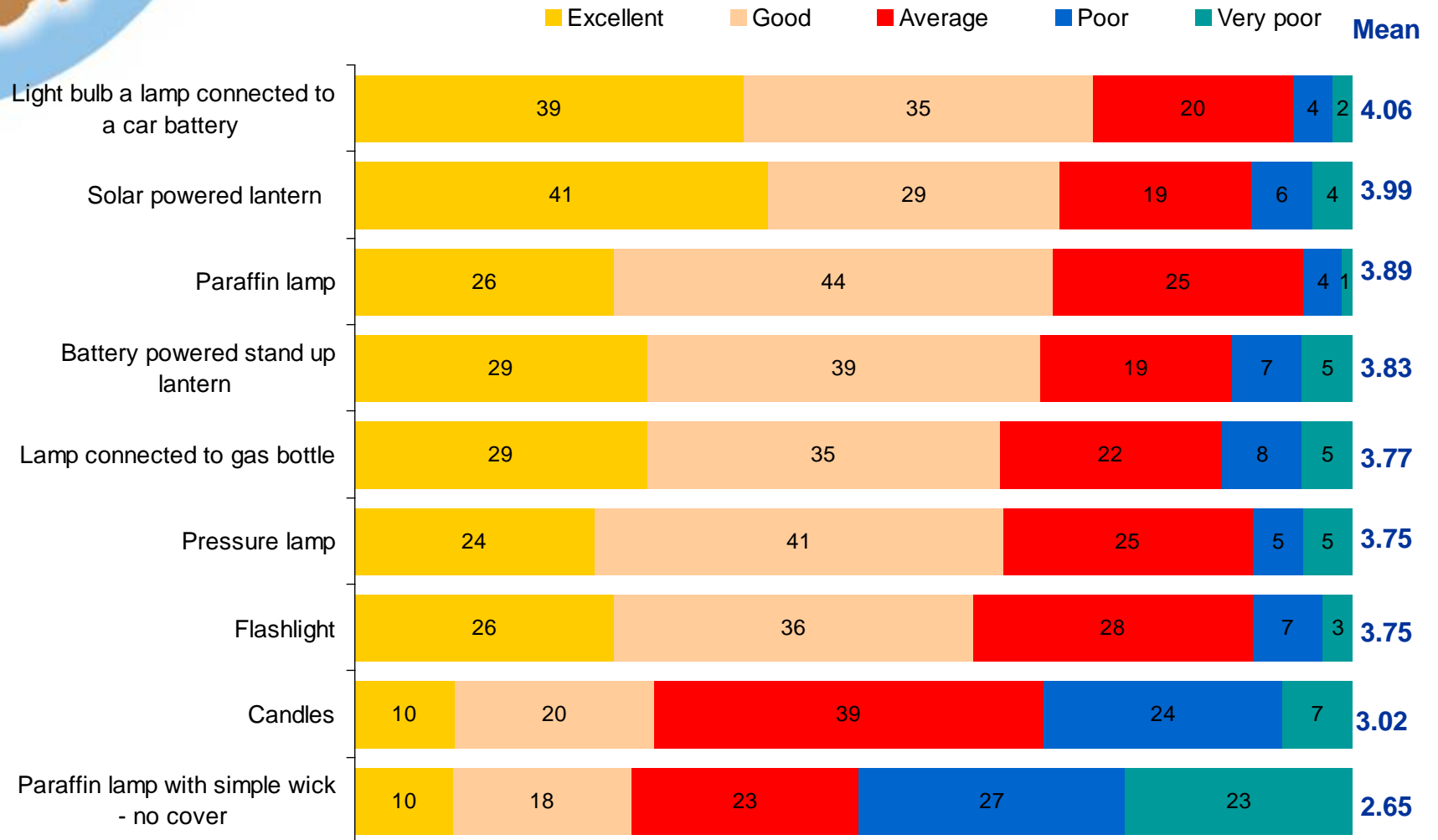|	Total	Firelight	Paraffin lamp (glass cover)	Candles	Paraffin lamp (wick: no cover)	Light bulb in socket Or lamp	Flashlight or torch
Base samples	**1000**	**65**	**603**	**186**	**303**	**95**	**80**
Does not provide adequate lighting.	28	37	32	30	31	7	23
It is expensive	12	9	14	10	7	19	11
It is too smoky, hence pollutes the air	12	11	7	10	28	1	16
It's delicate hence must be handled with care	6	3	8	6	3	1	-
Go off easily when blown by wind	3	5	2	4	6	-	1
It is a health hazard	9	3	7	10	15	1	13
It can easily burn the house	7	3	6	6	4	6	8
Stresses the eyes during use	5	5	5	4	5	4	9
It has some inconveniences like kerosene drying in the middle of the night	3	3	4	3	1	1	5
It's not long lasting	3	-	2	5	-	8	5
Power cuts are so frequent	2	3	-	1	-	17	1

Inability to provide adequate light ranks highest in assessing weakness of lighting devices.

TANZANIA
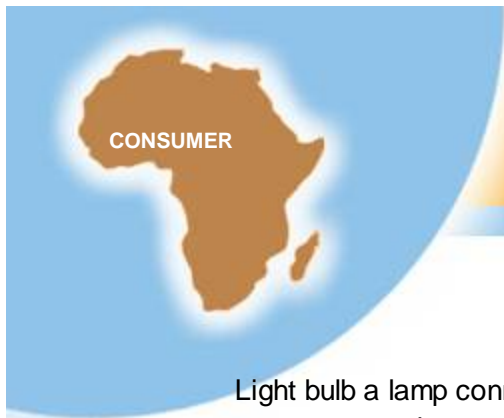
Rating On General Quality

Q. 56 "For each of the devices that I read, how would you generally rate the quality?"

Legend: ■ Excellent (yellow) ■ Good (light orange) ■ Average (red) ■ Poor (blue) ■ Very poor (teal)

Mean

Device	Excellent	Good	Average	Poor	Very poor	Mean
Light bulb a lamp connected to a car battery	39	35	20	4	2	**4.06**
Solar powered lantern	41	29	19	6	4	**3.99**
Paraffin lamp	26	44	25	4	1	**3.89**
Battery powered stand up lantern	29	39	19	7	5	**3.83**
Lamp connected to gas bottle	29	35	22	8	5	**3.77**
Pressure lamp	24	41	25	5	5	**3.75**
Flashlight	26	36	28	7	3	**3.75**
Candles	10	20	39	24	7	**3.02**
Paraffin lamp with simple wick - no cover	10	18	23	27	23	**2.65**

Base : Total sample =1000

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Rating On Ease Of Operation

Q. 57 "For each of these devices how would you rate the ease of operation?"
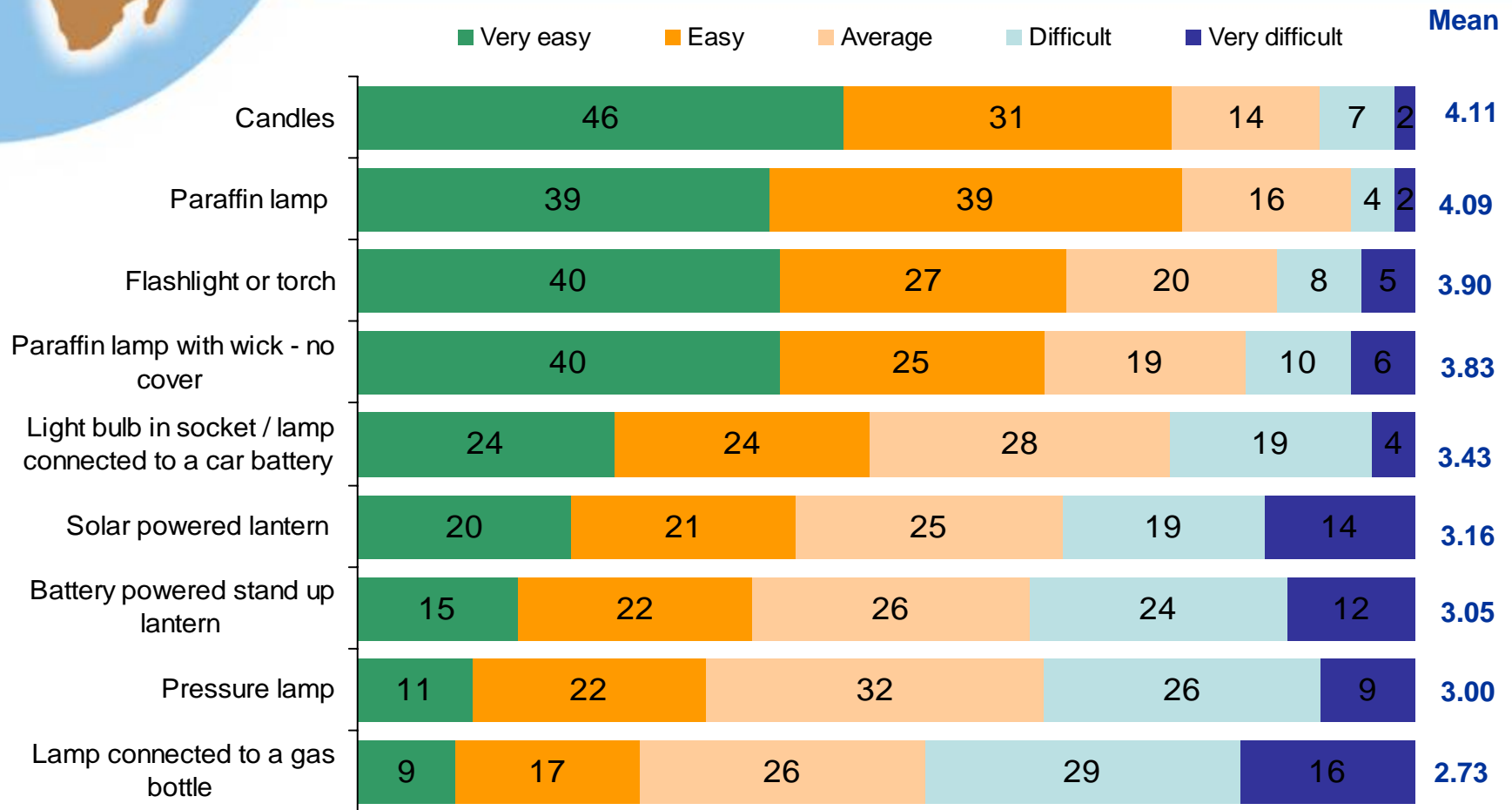
	Very easy	Easy	Average	Difficult	Very difficult	Mean
Candles	46	31	14	7	2	**4.11**
Paraffin lamp	39	39	16	4	2	**4.09**
Flashlight or torch	40	27	20	8	5	**3.90**
Paraffin lamp with wick - no cover	40	25	19	10	6	**3.83**
Light bulb in socket / lamp connected to a car battery	24	24	28	19	4	**3.43**
Solar powered lantern	20	21	25	19	14	**3.16**
Battery powered stand up lantern	15	22	26	24	12	**3.05**
Pressure lamp	11	22	32	26	9	**3.00**
Lamp connected to a gas bottle	9	17	26	29	16	**2.73**

Base: Total sample =1000

TRADERS

Types Of Lighting Devices And Where Used

Q. 33 "What if anything is used to light the business?"

- ■ Paraffin lamp with glass cover
- ■ Candles
- ■ Light bulb in socket
- ■ Flash-light / torch
- ■ Simple paraffin lamp with wick and no cover
- ■ Pressure lamp
- ■ Nothing / moonlight / starlight / natural light

Bar chart values: 75, 25, 12, 9, 7, 7, 5 (y-axis 0 to 80)
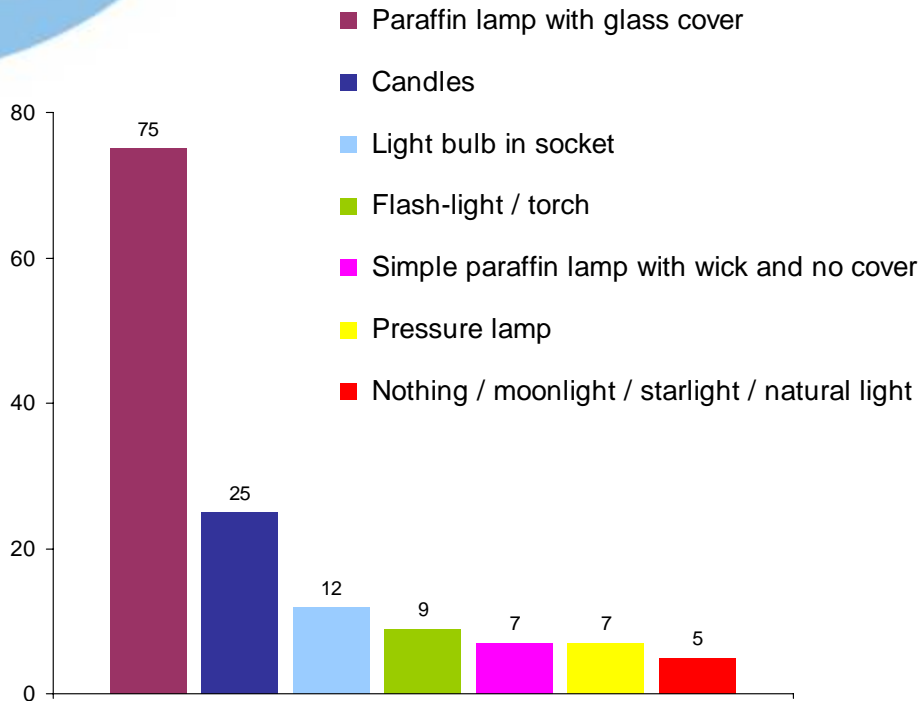
Base: All who use lights in their business = 310

Q. 38 "Whether the lights are carried home or only used at the business premises"

- Used at the business and then carried home 15%
- Not Mentioned 1%
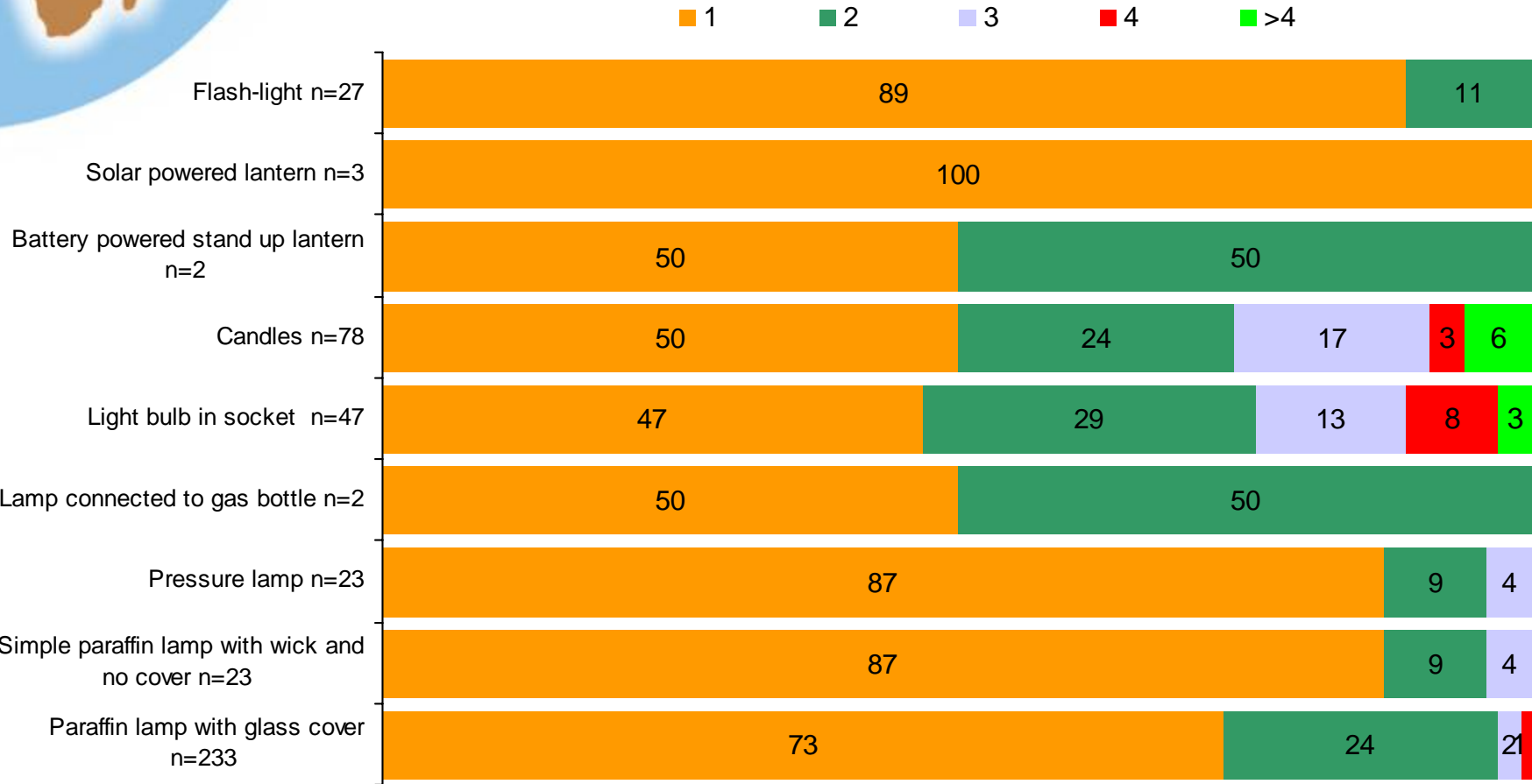- Used at the business premises only 84%
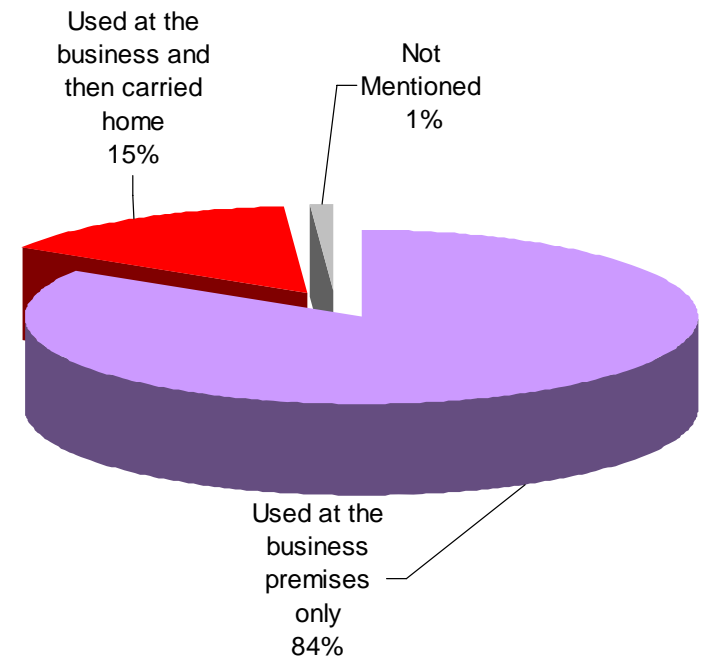
Base (310) = all those who light their business

Paraffin lamp with glass cover is the most used lighting gadget. This is because kerosene is the main power source.

Number Of Each Lighting Device Used

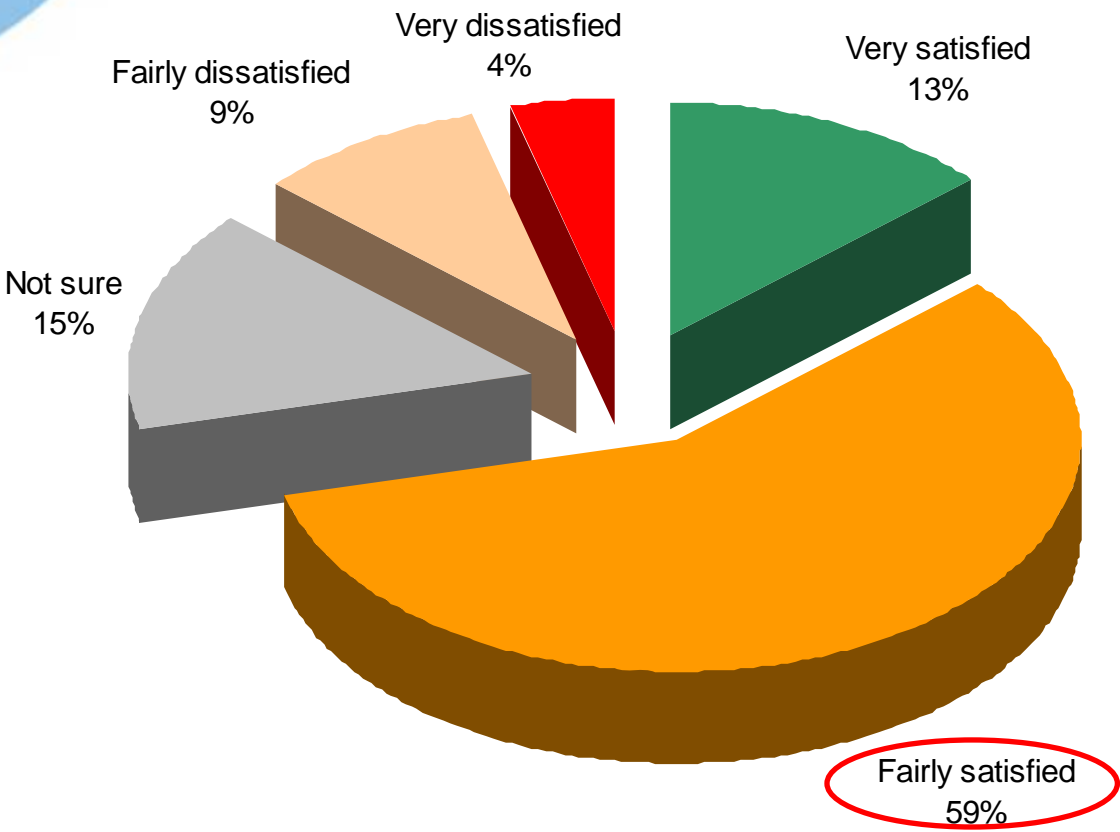*Q. 34 "How many of each type of light do you use at the business currently?"*

Legend: ■ 1 ■ 2 ■ 3 ■ 4 ■ >4

Device	1	2	3	4	>4
Flash-light n=27	89	11			
Solar powered lantern n=3	100				
Battery powered stand up lantern n=2	50	50			
Candles n=78	50	24	17	3	6
Light bulb in socket n=47	47	29	13	8	3
Lamp connected to gas bottle n=2	50	50			
Pressure lamp n=23	87	9	4		
Simple paraffin lamp with wick and no cover n=23	87	9	4		
Paraffin lamp with glass cover n=233	73	24	2	1	

Base = All who use lights in their business

**Caution - Small base sizes

TANZANIA

Satisfaction Level With Current Lighting

Q. 39 "How satisfied or dissatisfied are you with the way your business is lit?"

TRADER

Mean = 3.86

Very dissatisfied
4%

Fairly dissatisfied
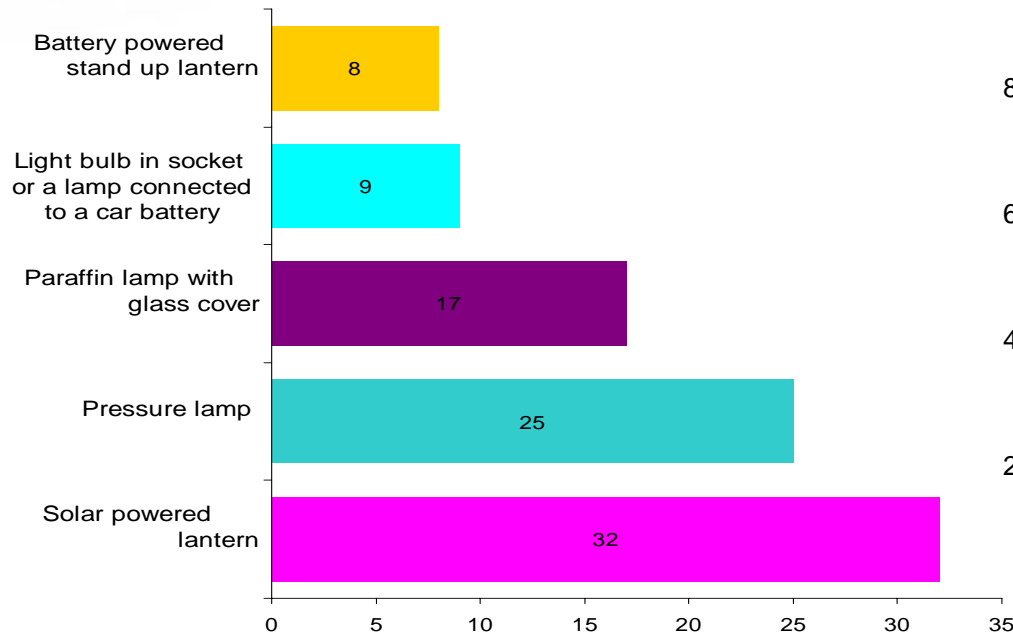9%

Very satisfied
13%

Not sure
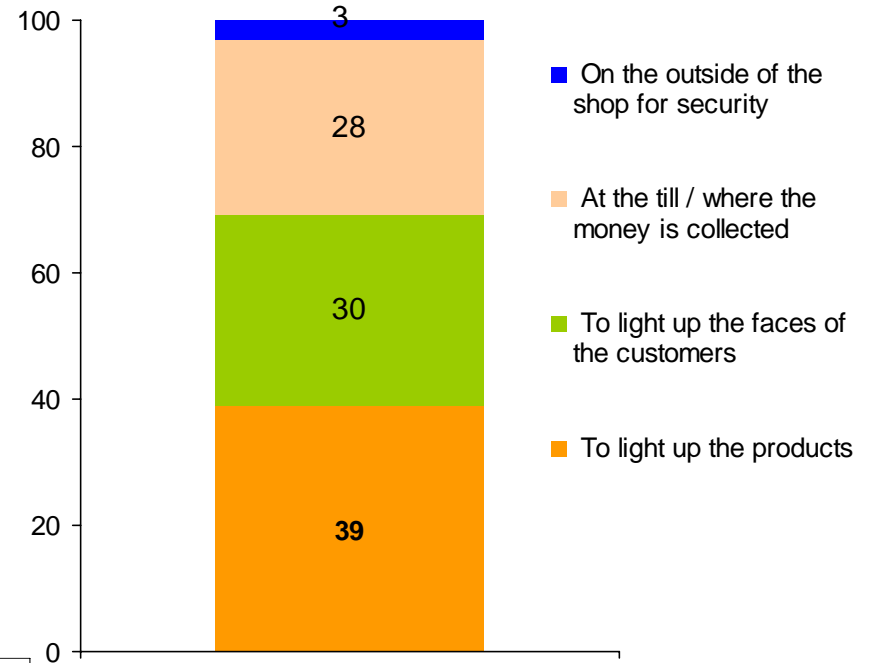15%

Fairly satisfied
59%

Base = 310: All who light their business

Preferred Type Of Light (Apart From Mains) And Preferred Positioning

Q. 43 "What is your preferred type of light …?"

Type	Value
Battery powered stand up lantern	8
Light bulb in socket or a lamp connected to a car battery	9
Paraffin lamp with glass cover	17
Pressure lamp	25
Solar powered lantern	32

Base: Total sample =400

Q. 44a "What or where in the shop would you like to position lamps?"

Stacked bar (bottom to top):
- To light up the products: 39
- To light up the faces of the customers: 30
- At the till / where the money is collected: 28
- On the outside of the shop for security: 3

Legend:
- On the outside of the shop for security
- At the till / where the money is collected
- To light up the faces of the customers
- To light up the products

Base (397) = Retail Shops

Solar powered light is the preferred type of light at 32% followed by pressure lamp at 25% preference. Traders prefer a position where the lamps can be able to light up the products

Lifespan Of Power Sources

Q. 37 "For how long do the power sources last?"

	Paraffin lamp with glass cover	Simple paraffin lamp with wick and no cover (often could be home made)	Pressure lamp	Light bulb in socket or a lamp connected to a car battery or inverter System or to a non-mains power source	Solar powered lantern (has a solar panel specifically to power it only)	Flash-light / torch (usually hand held)
Base	**233**	**23**	**23**	**38**	**3**	**27**
Less than 1 year	15	26	13	53	-	26
1- 1.5 years	11	30	22	8	67	15
1.6 - 2 years	15	22	9	13	-	15
2.1 - 2.5 years	9	4	9	13	-	19
2.6 - 3 years	9	4	-	3	-	4
3.1- 3.5 years	16	13	9	3	33	7
3.6 - 4 years	16	-	-	-	-	7
4.1 - 4.5 years	3	-	13	-	-	4
4.6 - 5 years	-	-	4	-	-	-
5.1 - 5.5 years	2	-	9	-	-	-
5.6 - 6 years	-	-	4	-	-	-
Over 6 years	3	-	9	8	-	4

**Caution - Small base sizes

Rating For Lighting Outside The Business And Its Limitations

Q. 40b "How would you rate this level of lighting outside the business?"

Well lit
21%

Poorly lit
79%

Base = 261: All who light their business

Q. 40c "How does the available lighting outside of your business limit you in terms of running your business, if at all?"

Base: All who light their business	310
There is no security, hence cannot operate he business after dark	40
Customers don't see the shop clearly, so they don't shop after dark	20
I cannot see customers' faces clearly, because they buy from outside	10
It is hard to display goods outside the shop after dark	10
Sometimes customers tend to think that the business has closed down due to lack of enough light	10
The customers feel insecure	10

LIGHTING COSTS

Consumers: Costs Of Lighting Devices

Q. 50a "How much does it cost you to buy__?, Q. 50b What is the cost of buying one of this type of lights now? Q. 50c For how long do __ last?"

Conversion rate
1US $ = Tsh.1,181

Type of power/lighting device	Base (all who use)	Average	
		Running cost	Cost of buying
(Paraffin for) paraffin lamp with glass cover	644	US $5.10 (Tsh.6,060)	US $4.98 (Tsh.5,870)
(Paraffin for) paraffin lamp with Paraffin lamp with cover	369	US $2.40 (Tsh.2,830)	US $0.60 (Tsh.760)
(Gas for) Lamp bottle	5	US $0.85 (Tsh.,1000)	US $2.75 (Tsh.3,250)
Candles	273	US $1.50 (Tsh.1,780)	US $0.40 (Tsh.430)
(Batteries for) battery powered lantern	6	US $5.00 (Tsh.5,880)	US $7.00 (Tsh.8,290)
(Batteries for) battery powered flashlight or torch	187	US $2.30 (Tsh.2,710)	US $1.50 (Tsh.1,820)

Traders: Costs Of Lighting Devices

Q. 34 "How many of each type of light do you use at the business currently?,
Q. 35 How much does it cost you per month to run? Q. 36 What is the cost of buying one of this light now?"

Conversion rate
1US $ = Tsh.1,181

	Base	No. Owned	Cost of running a month	Cost of buying now
Paraffin lamp with glass cover	233	1	US $2.20 (Tsh.2,607)	US $5.30 (Tsh.6,282)
Simple paraffin lamp with wick and no cover (often could be home made)	21	1	US $1.70 (Tsh.2,060)	US $0.55 (Tsh.650)
Pressure lamp	26	1	US $5.80 (Tsh.6,857)	US $2.30 (Tsh.2,740)
Light bulb in socket or a lamp connected to a car battery or inverter System or to a non-mains power source	30	2	US $2.60 (Tsh.3,043)	US $1.60 (Tsh.1,846)
Candles	46	2	US $1.10 (Tsh.1,287)	US $0.70 (Tsh.795)
Flash-light / torch (usually hand held)	53	1	US $1.60 (Tsh.1,918)	US $1.20 (Tsh.1,412)

Running costs for the pressure lamp are highest. The most used device, paraffin lamp with glass cover, has a low running cost per month despite being costly to buy.
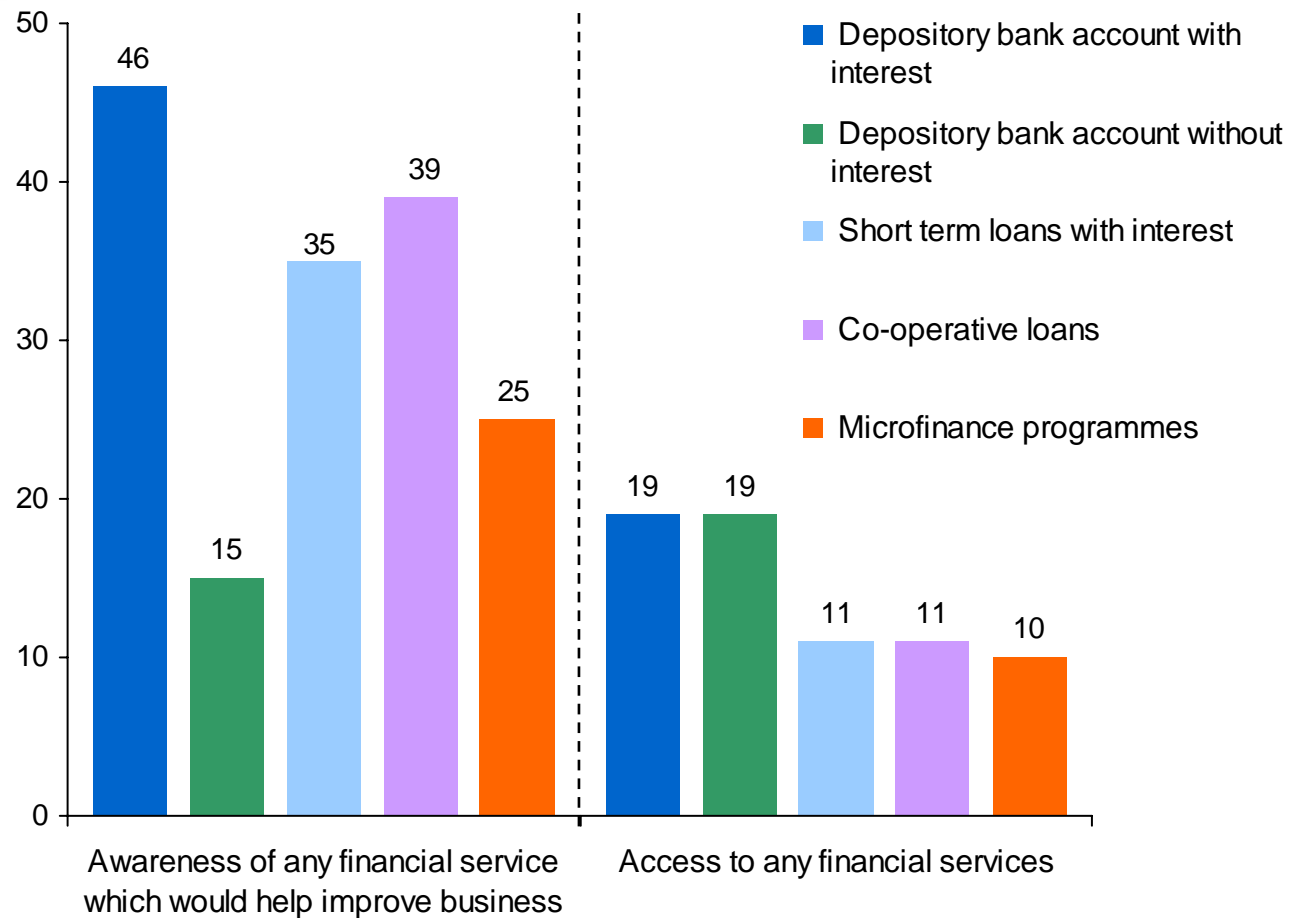
Summary: Average Claimed Spend Per Month On Current Lighting Devices

Conversion rate
1US $ = Tsh.1,181

Type of power / lighting device	App. running costs per month - HOUSEHOLD	App. running costs per month – BUSINESS	Cost of buying actual item
(Paraffin for) paraffin lamp with glass cover	US $5.10 (Tsh.6,060)	US $2.20 (Tsh.2,806)	US $5.00 (Tsh.5,870)
(Paraffin for) paraffin lamp with no cover	US $2.40 (Tsh.2,830)	US $1.70 (Tsh.2,060)	US $0.60 (Tsh.760)
Candles	US $1.50 (Tsh.1,780)	US $1.10 (Tsh.1,287)	US $0.40 (Tsh.430)
(Batteries for) battery powered flash-light or torch	US $2.30 (Tsh.2,710)	US $1.60 (Tsh.1,917)	US $1.50 (Tsh.1,820)

Traders: Financial Services

Legend:
- ■ Depository bank account with interest
- ■ Depository bank account without interest
- ■ Short term loans with interest
- ■ Co-operative loans
- ■ Microfinance programmes

Awareness of any financial service which would help improve business
- 46
- 15
- 35
- 39
- 25

Access to any financial services
- 19
- 19
- 11
- 11
- 10

TANZANIA

LIGHTING AFRICA
Catalyzing Markets for Modern Lighting

MODERN LIGHTING PRODUCT EVALUATION

- PSM – Price sensitivity measure
- Cheap/Expensive – price at which consumers consider a device to be cheap/expensive – quality /affordability not an issue
- Too Cheap – price at which consumers consider a device to be so cheap to the extent of questioning the quality
- Too Expensive – price at which consumers consider a device to be too expensive – almost unaffordable
- Recommended price – Anticipated price point at which most consumers feel that the price is neither so cheap that quality is questioned, nor too expensive
- Range – this is between too cheap and too expensive

How the Price Sensitivity Measure works

- The Price Sensitivity Measure has been devised in order to ascertain what is the most acceptable price range for a particular product or service within a given market
- In order to ascertain the range we ask each respondent 4 questions:
  - **At which point would the product/service be considered cheap**
  - **At which price would the product/service be considered expensive**
  - **At which price point would the product service be considered too cheap so that the quality would be in doubt**
  - **At which price point would the product/service be considered too expensive so that there would no longer be consideration to purchasing it**
- The responses to these 4 questions are then plotted on a chart. Where the measures 'too cheap' and 'too expensive' cross each other is considered to be the low end of the range of acceptable price and where the measures 'cheap' and 'too expensive' cross each other is considered the high end of the acceptable price range
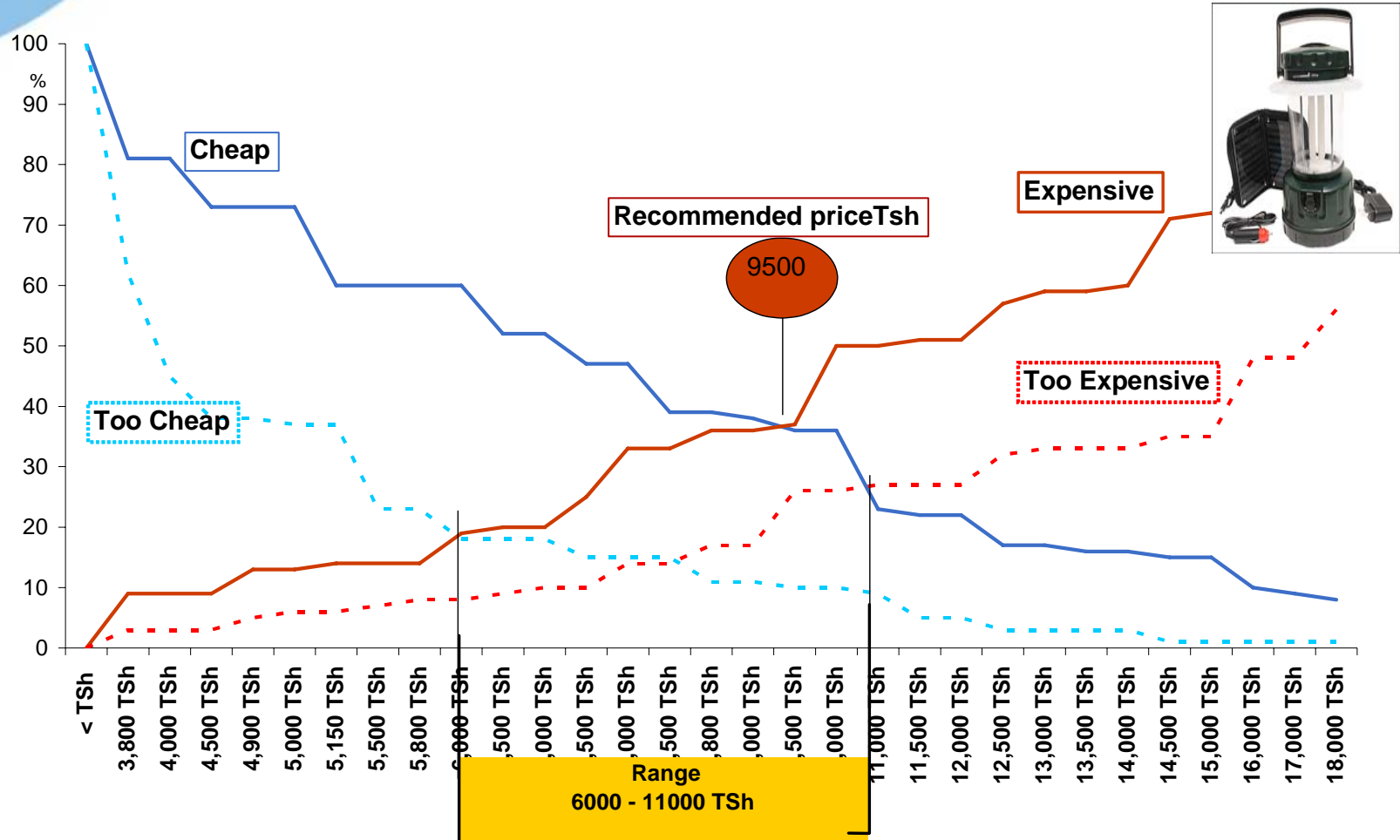- The ideal price point is where the measure 'cheap' and 'expensive' cross each other

PSM: Rechargeable Lantern

CONSUMER

Base: Total sample =1000

Cheap

Recommended priceTsh

9500

Expensive

Too Cheap

Too Expensive

Range
6000 - 11000 TSh

PSM: Rechargeable Task Light

CONSUMER

Base: Total sample =1000

Cheap

Recommended priceTsh
7050

Expensive

Too Cheap

Too Expensive

100
%
90
80
70
60
50
40
30
20
10
0

< TSh
2,700 TSh
2,800 TSh
3,000 TSh
3,500 TSh
4,000 TSh
4,100 TSh
4,500 TSh
4,800 TSh
5,000 TSh
5,200 TSh
5,500 TSh
5,800 TSh
6,000 TSh
6,200 TSh
6,500 TSh
7,000 TSh
7,050 TSh
7,500 TSh
8,000 TSh
8,500 TSh
9,000 TSh
9,500 TSh
10,000 TSh
11,000 TSh
11,500 TSh
11,700 TSh
12,000 TSh
12,500 TSh
13,000 TSh
14,000 TSh

Range
5400 - 9300 TSh

TRADERS

PSM: Rechargeable Lantern

Base: Total sample =400

Cheap

Too Cheap

Tsh 10,000

Expensive

Too E

Range 8000 - 12500 TSh
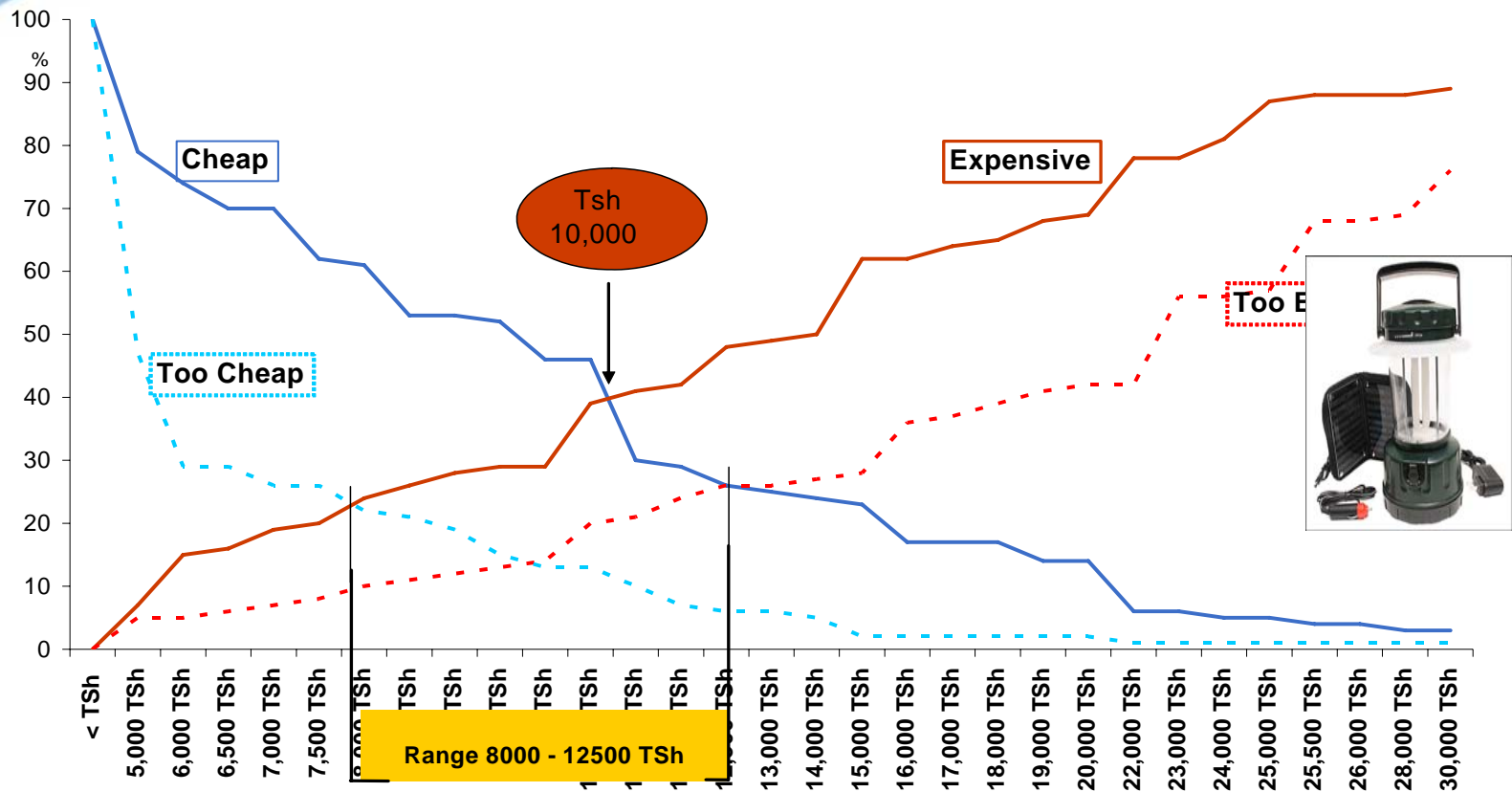
The recommended price range is 8000 to 12500 Tsh with the most recommended/optimum at 10000 Tsh
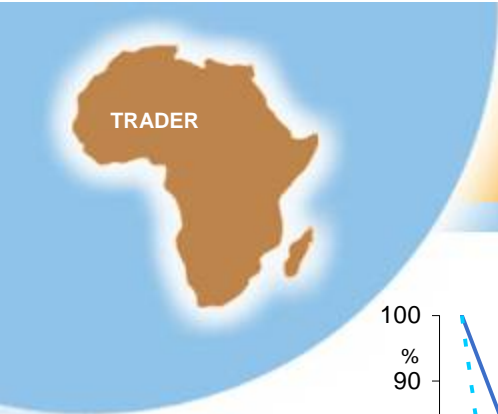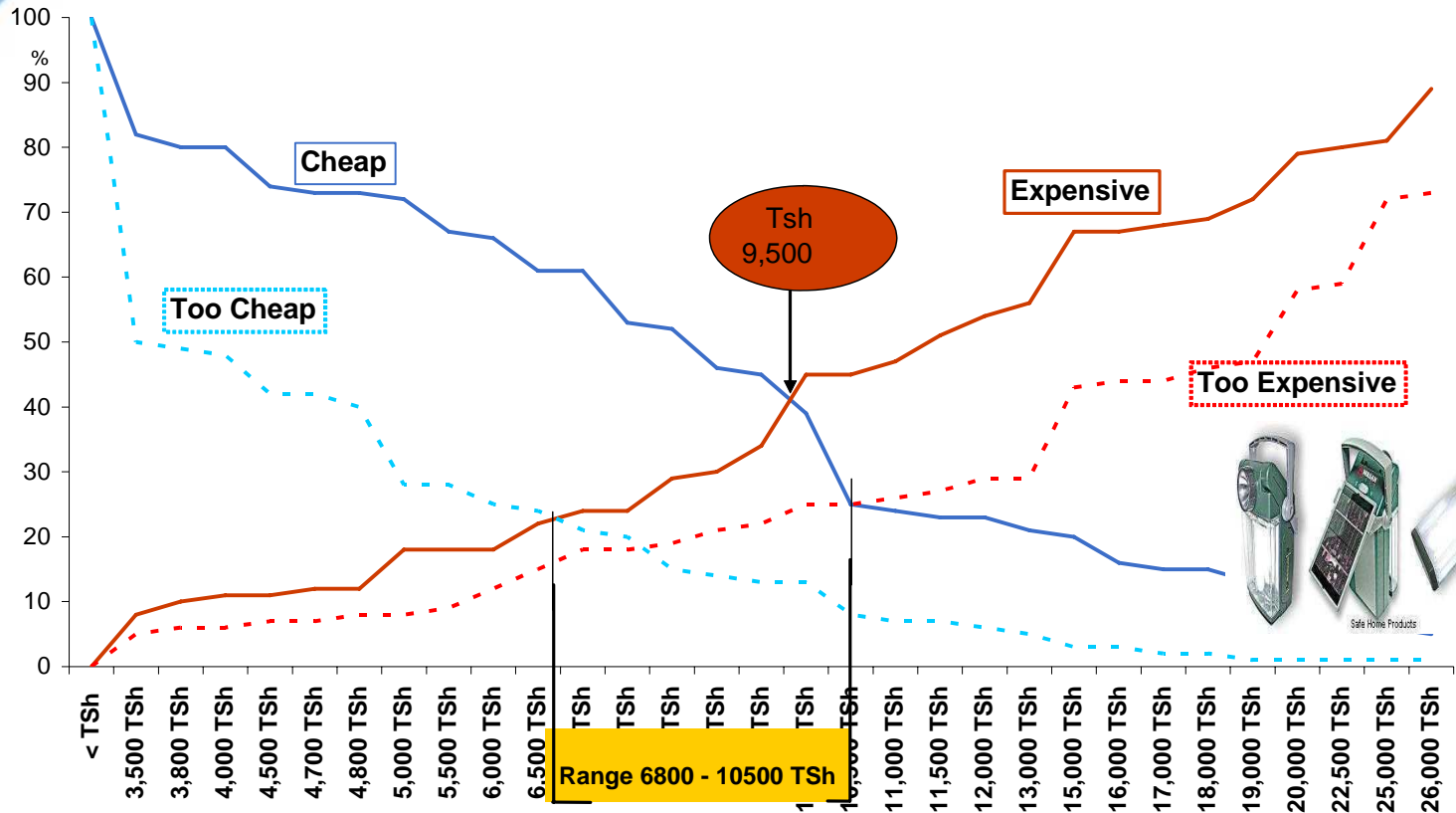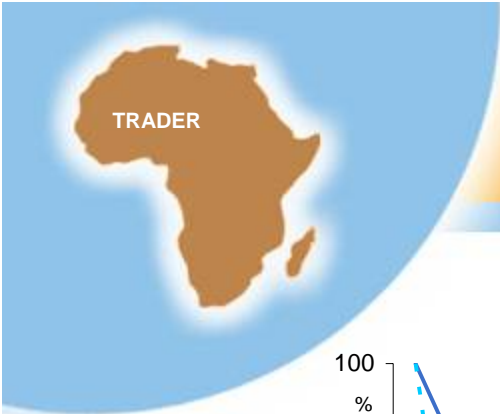
PSM: Rechargeable Task Light
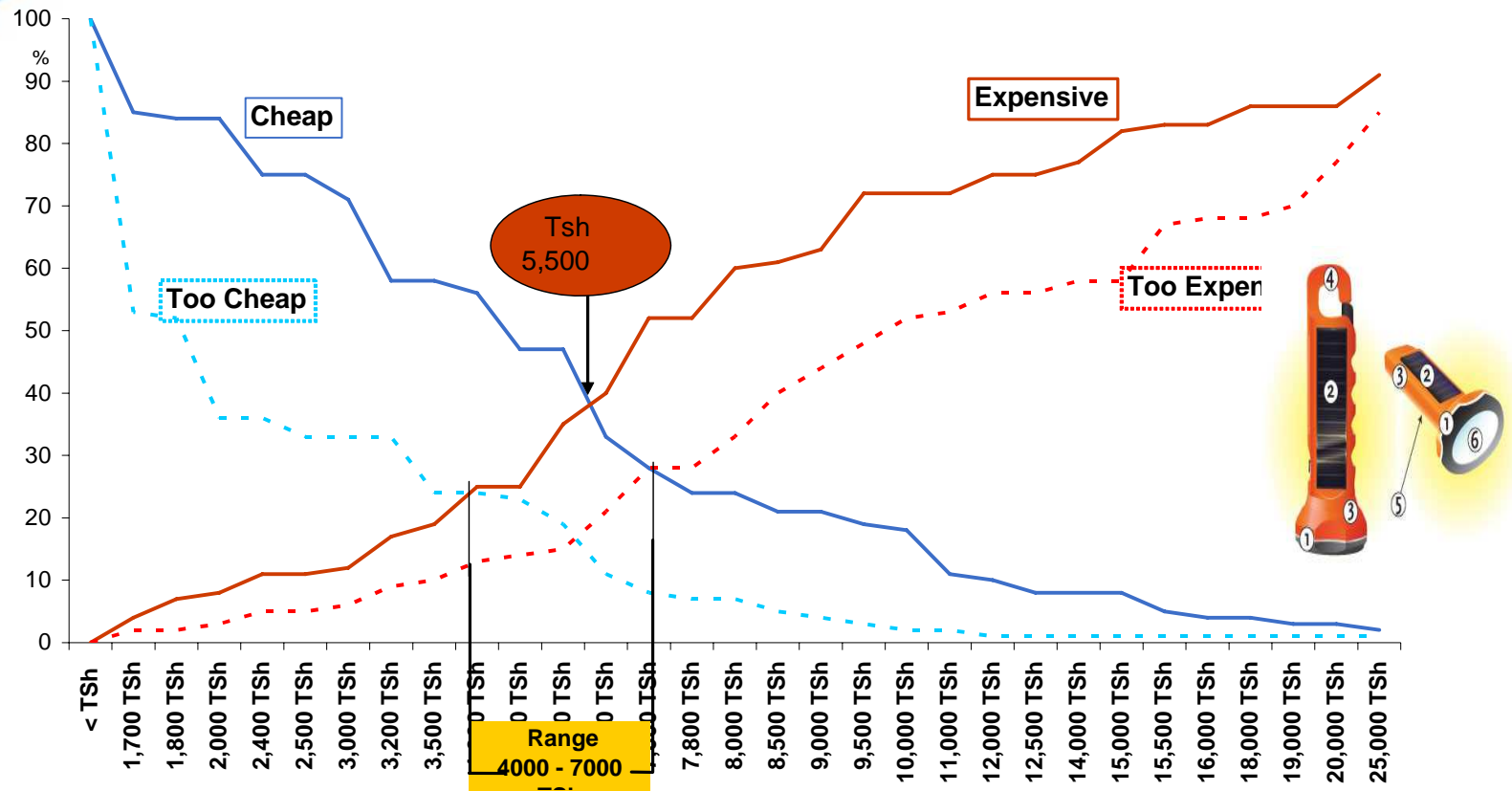
Base: Total sample =400

The recommended price range is 6800 to 10500 Tsh with the most recommended/optimum at 9500 Tsh.
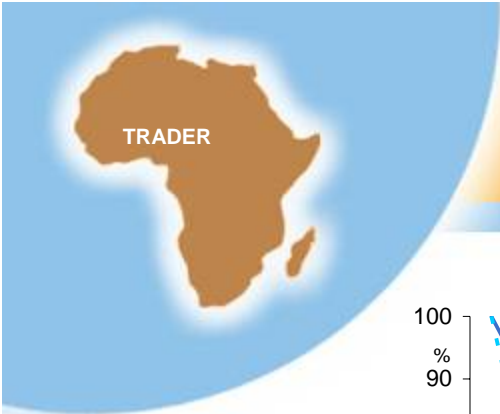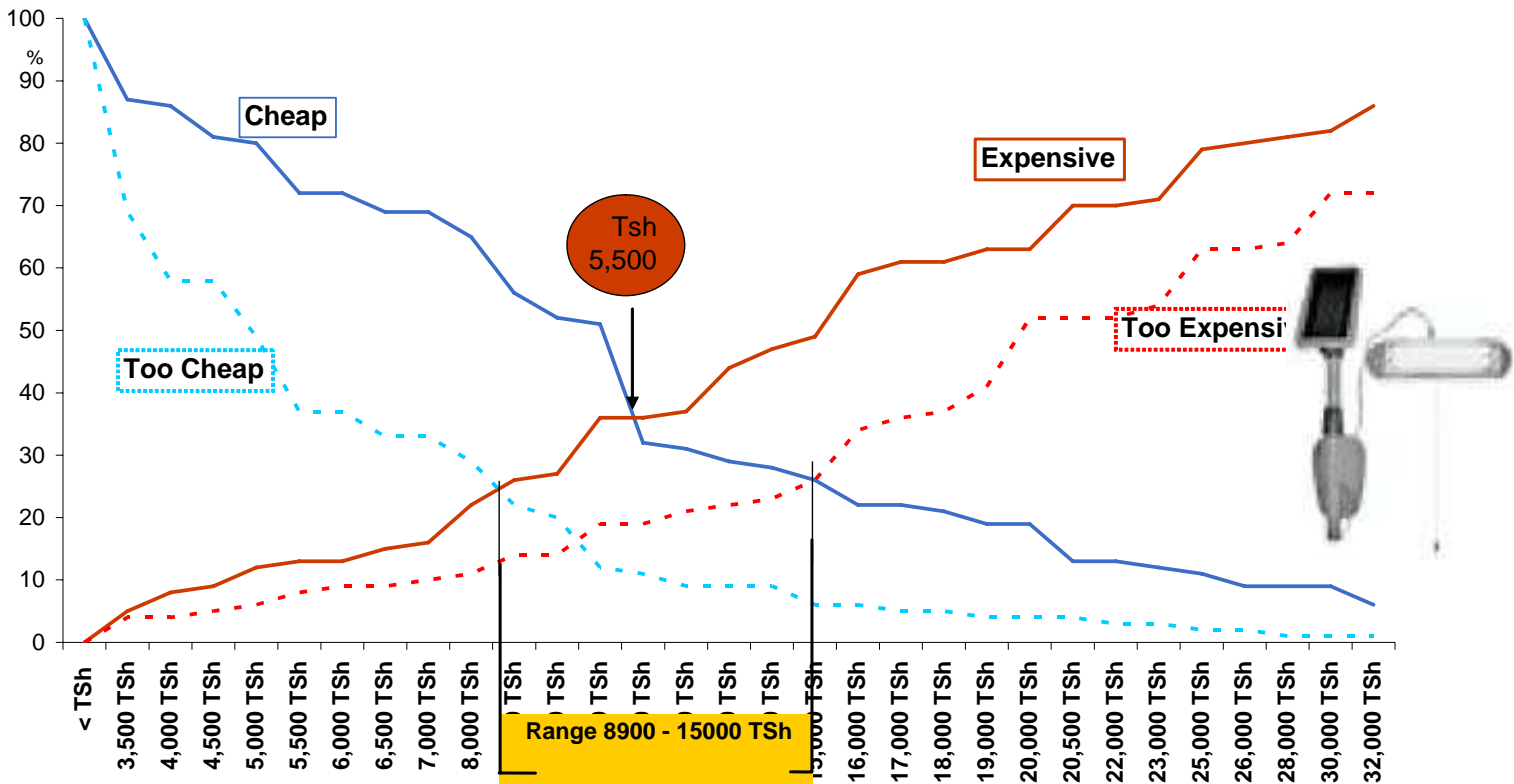
PSM: Rechargeable Torch

Base: Total sample =400

The recommended price range is 4000 to 7000 Tsh with the most recommended/optimum at 5500 Tsh.

PSM: Rechargeable Flood Light

TRADER

Base: Total sample =400

Cheap

Expensive

Tsh 5,500

Too Expensiv

Too Cheap

Range 8900 - 15000 TSh

100 %
90
80
70
60
50
40
30
20
10
0

< TSh | 3,500 TSh | 4,000 TSh | 4,500 TSh | 5,000 TSh | 5,500 TSh | 6,000 TSh | 6,500 TSh | 7,000 TSh | 8,000 TSh | TSh | TSh | TSh | TSh | TSh | TSh | TSh | TSh | 16,000 TSh | 17,000 TSh | 18,000 TSh | 19,000 TSh | 20,000 TSh | 20,500 TSh | 22,000 TSh | 23,000 TSh | 25,000 TSh | 26,000 TSh | 28,000 TSh | 30,000 TSh | 32,000 TSh

The recommended price range is 8900 to 15000 Tsh with the most recommended/optimum at 5500 Tsh
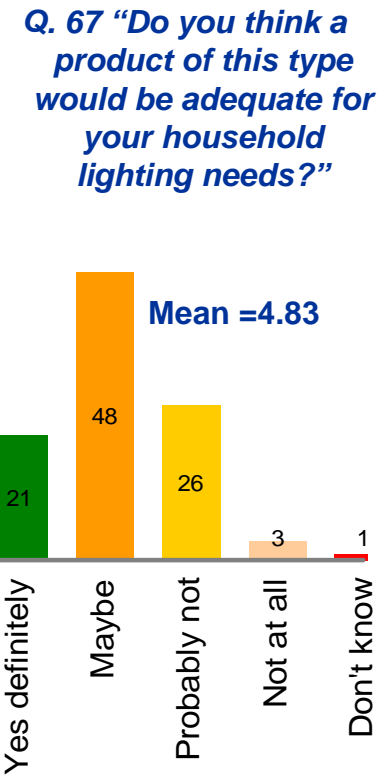
Summary: Most Acceptable Price Point

How much are Tanzanians willing to pay for the new products?

Conversion rate
1US $ = Tsh.1,181

		Household	Trade
	Lantern	US $8.00 (Tsh.9,500)	US $8.50 (Tsh.10,000)
	Torch	US $4.00 (Tsh.4,700)	US $4.70 (Tsh.5,500)
	Task Light	US $6.00 (Tsh.7,050)	US $8.10 (Tsh.9,550)
	Flood Light	N/A	US $4.70 (Tsh.5,500)

Evaluation Of Lighting Concept

CONSUMER

Q. 64 "How interested would you be in having the following lighting solution for your household?"

Mean =4.60

Q. 65 "Which of these phrases best describes how new and different you think this lighting solution is than other lighting solutions currently available in the market?"

Mean =4.19

Q. 66 "What statement best describes how much you think you would like or dislike this lighting product?"

Mean =5.11

Q. 67 "Do you think a product of this type would be adequate for your household lighting needs?"

Mean =4.83

Q. 64
- Very interested: 68
- Somewhat interested: 26
- Not sure: 5
- Not really interested: 1
- Not at all interested:

Q. 65
- Extremely new and different: 40
- Very new and different: 44
- Somewhat new and different: 13
- Slightly new and different: 2
- Not at all new and different: 1

Q. 66
- Like extremely: 37
- Like very well: 43
- Like quite well: 14
- Like somewhat: 5
- Like slightly: 1

Q. 67
- Yes definitely: 21
- Maybe: 48
- Probably not: 26
- Not at all: 3
- Don't know: 1

Base: Total sample =1000

IFC International Finance Corporation World Bank Group

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TRADER

Q. 52 "How interested would you be in having the following lighting solution for your business?"

Mean =4.60

Q. 53 "Which of these phrases best describes how new and different you think this lighting solution is than other lighting solutions currently available in the market?"

Mean =4.24

Q. 55 "Do you think a product of this type would be adequate for your business lighting needs?"

Mean =4.92

Chart values:

Q. 52:
- Very interested: 66
- Somewhat interested: 30
- Not sure: 4
- Not at all interested: 1

Q. 53:
- Extremely new and different: 43
- Very new and different: 44
- Somewhat new and different: 10
- Slightly new and different: 3
- Not at all new and different: 1

Q. 55:
- Yes definitely: 42
- Maybe: 17
- Probably not: 34
- Not at all: 4
- Don't know: 3

Base: Total sample = 400

IFC International Finance Corporation World Bank Group   THE WORLD BANK

CONSUMERS

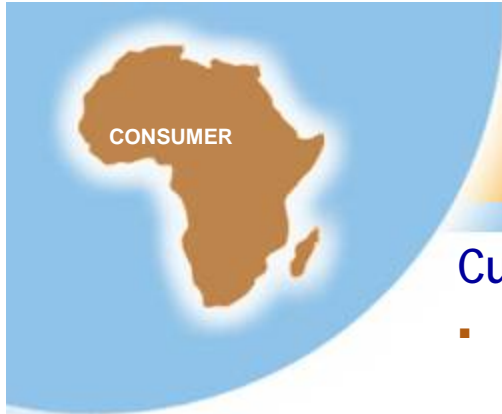# Summary: Consumers

Respondent Profile and Behaviours

- A majority of consumer respondents (67%) were of lower LSMs (2-4), and rural based with most aged between 25 and 55 years
- Wall material used for dwellings among many is mainly mud/mud bricks and bricks or stones with corrugated iron sheets roofing
- Most households have 4 - 5 people living together on a permanent basis with 2 - 3 children aged under 16 years
- Average household income is US $90.00 and the head is the sole bread winner of the household

Electricity Consumption Habits

- Power cuts are frequent with more than half the respondents experiencing them at least once a week
- Power cuts occur during both off peak and peak times
- Sharing of electricity from same source is common with an average of two consumers
- A majority of households receive electricity bills every month
- Electricity for most respondents is continuous and reliable
- Better lighting is cited as the main reason to want to connect to the main grid for those who are not connected

Summary: Consumers

Power and Lighting Habits and Usage

- Most consumers do not have power sources in their households.

- Kerosene is the main energy source.

- A majority of respondents begin to use lighting devices between 18.30 and 19.30.

- The mean number of rooms used after dark are more than those that are lit, hence need for more lighting.

- The toilet is lit for the shortest time as it is also used the least.

- The main problems experienced because of lack of lighting are insecurity, making working in non lit outside areas difficult, and being unable to complete homework by school going children.

- With enough lighting, a majority feel that education of their children will improve since they will study and do homework comfortably

Summary: Consumers

Current Lighting Devices

- Paraffin lamp with glass cover is the most used type of lighting device and firelight is the most used energy source

- About two thirds place their lighting devices on a table in a central area of a room, so as to spread the light

- Reading is the main activity that cannot be performed well due to lack of lighting

- Prices acceptable to consumers for these devices are:
    - Lantern: US$ 8.00
    - Torch: US$ 4.00
    - Task Light: US$ 6.00

Health and Environmental Considerations

- A majority do not worry about the health effects of paraffin/kerosene. The few who do mention coughing as their main worry followed by eye itching and asthma

- Most respondents do not think there is any environmental effect in using paraffin/kerosene and those that do cite that the smoke produced is hazardous to the environment

TRADERS

Respondent Profile and Behaviours

- Most trader respondents (67%) interviewed were of lower LSMs (3-5), with 62% being rural based and aged between 25 and 55 years

- Their weekly sales are about US $69.90, with an average income of US $175.40 and monthly profits of about US $116.50

- Most business owners have small Duka/permanent shop with one employee working either on casual or permanent basis

Electricity Consumption and Habits

- Power cuts are frequent with about two thirds experiencing them at least once a week

- Traders not connected to the power grid are close to a power line and hence distance is not the reason for lack of connection, but possibly cost

- Power is received mostly during peak times

- Most traders connected to the main grid receive their electricity bills every month

- Electricity is continuous and reliable for a majority and with enough voltage

Summary: Traders

Power & Lighting Habits and Usage

- Kerosene is the main energy source among traders.
- Lack of light hinders operating the businesses after dark thereby minimising the number of customers and hence profits.
- Satisfaction levels of lighting for those who light their businesses is high, with strength of light being the main cause for dissatisfaction.
- Poor lighting outside the business is a cause of insecurity hindering night shopping.
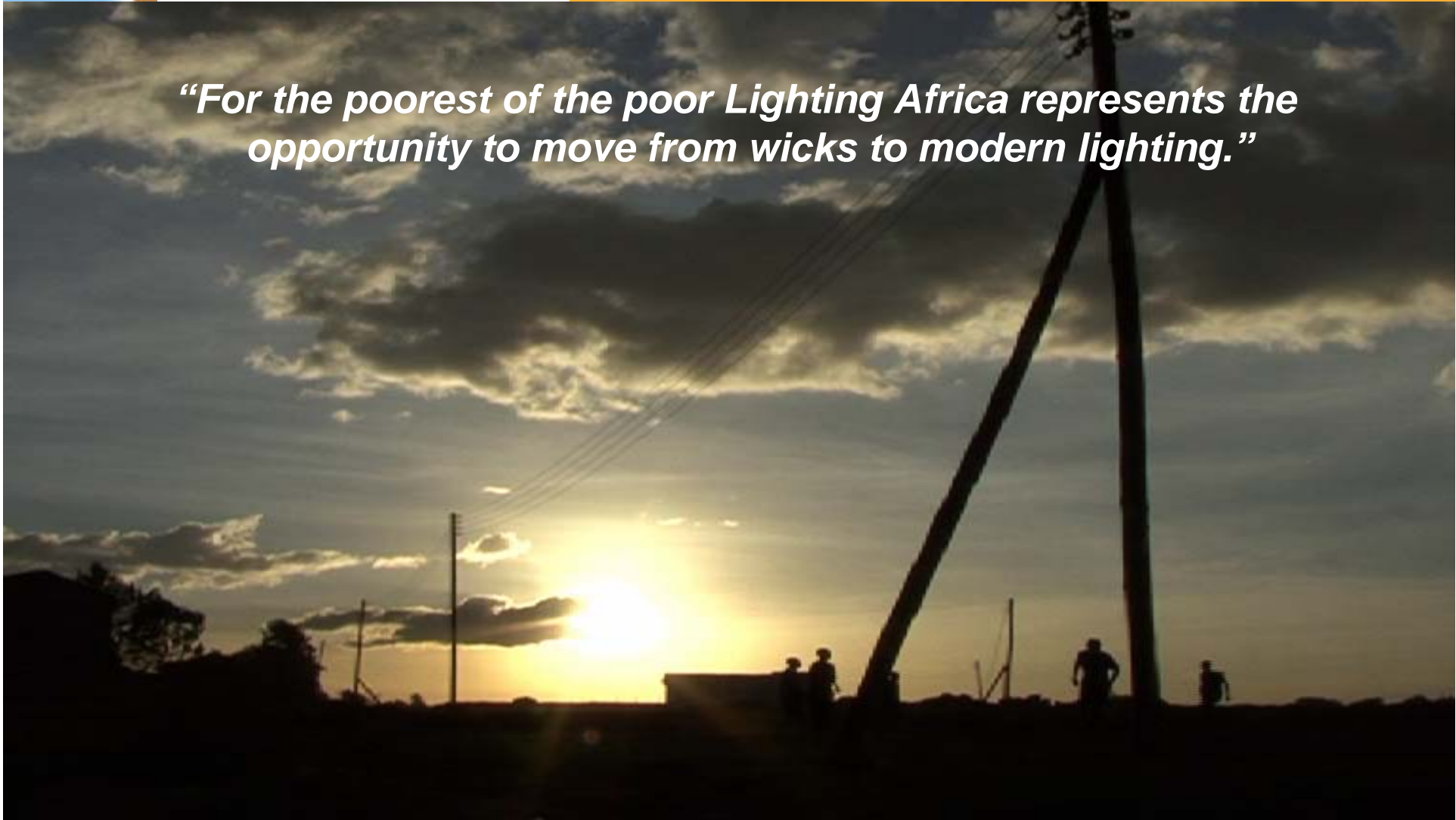- Finances are the main barriers to improving lighting at most businesses.

Current Light Devices

- Solar powered light is the most preferred type of light.
- Paraffin lamp with glass cover is the most used type of lighting device.
- Traders prefer to place lighting devices where they can see the faces of customers and at the till where they can see the money
- Prices acceptable to traders for these devices are:
  - Lantern: US$ 8.50
  - Torch: US$ 4.70
  - Task Light: US$ 8.10
  - Flood Light: US$ 4.70

"*For the poorest of the poor Lighting Africa represents the opportunity to move from wicks to modern lighting.*"

TANZANIA