Rapid Assessment Method for Older People (RAM-OP): The Manual

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The RAM-OP Manual

Introduction

Older people (generally defined as people aged sixty years and older) are a vulnerable group for malnutrition in humanitarian and developmental contexts. Due to their age they have specific nutritional needs, such as easily digestible and palatable food adapted to those with chewing problems, which is dense in nutrients. In famine and displacement situations where populations are dependent on food distributions, older people often find the general ration inappropriate to their tastes and needs, have difficulties accessing the distributions, or have difficulties transporting rations home. As a result, older people can become malnourished and in need of specifically targeted food interventions. In times of drought or food scarcity, older people tend to reduce their food intake in order to share or give up their ration to younger members of their families. They are then at risk of malnutrition.

Despite these potential vulnerabilities in humanitarian situations, older people are rarely identified as a group in need of specific nutritional or food assistance. Surveys and assessments almost always focus on children, and sometimes on pregnant and lactating women. Humanitarian workers argue that assessing the nutritional status and needs of older people is both costly and complicated. As a consequence, the nutritional status and needs of older people in crisis go unidentified and unaddressed.

HelpAge International, VALID International, and Brixton Health, with financial assistance from the Humanitarian Innovation Fund (HIF), have developed a Rapid Assessment Method for Older People (RAM-OP) that provides accurate and reliable estimates of the needs of older people. The method uses simple procedures, in a short time frame (i.e. about two weeks including training, data collection, data entry, and data analysis), and at considerably lower cost than other methods. The RAM-OP method is based on the following principles:

- Use of a familiar "household survey" design employing a two-stage cluster sample design optimised to allow the use of a small primary sample (m 16 clusters) and a small overall (n 192) sample.
- Assessment of multiple dimensions of need in older people (including prevalence of global, moderate and severe acute malnutrition) using, whenever possible, standard and well-tested indicators and question sets.
- Data analysis performed using modern computer-intensive methods to allow estimates of indicator levels to be made with useful precision using a small sample size.

The following tools are currently available under the General Public Licence / Free Documentation License, meaning that you are free to copy and adapt these tools:

- an English language manual / guidebook
- a questionnaire (available in English and French)
- data entry and data checking software (available in English and French)
- data analysis software.

We believe that the availability of a rapid, low-cost, and user-friendly method will encourage governments, UN agencies, as well as international and local non-governmental organisations to actively assess the situation of older people in humanitarian contexts, and implement, monitor, and evaluate relevant and timely responses to address their needs.

Chapter 1

Sampling

1.1 The RAM-OP sample

RAM-OP uses a two-stage sample:

First stage sample: A sample of communities (e.g. villages or city-blocks) in the survey area is taken. A sampled community is also called a primary sampling unit (PSU).

Second stage sample: Domestic dwellings are sampled from within the communities selected in the first stage sample. All eligible individuals in the sampled dwelling are included in the sample.

1.1.1 The first-stage sample

The first stage sample is a systematic spatial sample. Two methods can be used and both methods take the sample from all parts of the survey area:

- **List-based method:** Communities to be sampled are selected systematically from a complete list of communities in the survey area. This list of communities is sorted by one or more non-overlapping spatial factors such as district and subdistricts within districts:

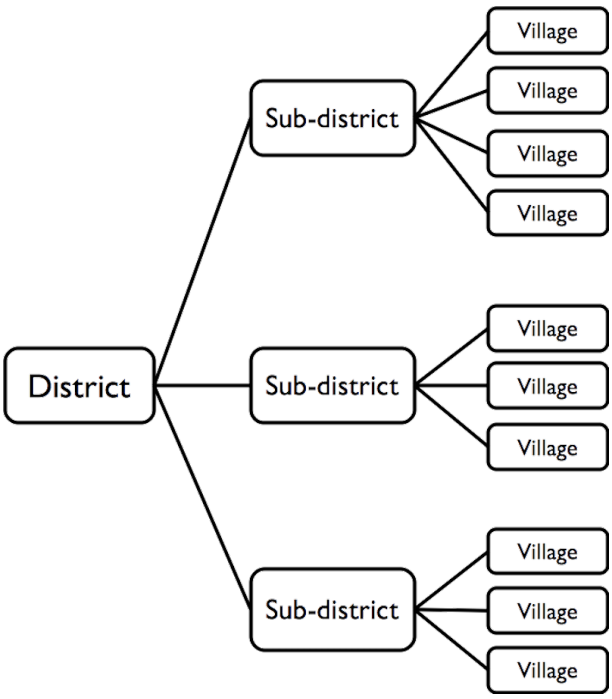


Figure 1.1: Communities listing by district and sub-district

- **Map-based method:** Communities to be sampled are selected from the centres of the squares of a grid drawn over a map. The map must be sufficiently well made and of sufficiently large scale to show the position of every community in the survey area. This type of sample is known as a centric systematic area sample and is often referred to as a CSAS sample.

Note: *Population proportional sampling* (PPS) is **not** used in RAM-OP surveys. Population estimates for all communities are **not** required for sampling purposes. Population estimates are required only for the selected communities. These are used during data analysis in order to weight results by population size. If this information is not available before the survey, it can be collected during the survey.

1.1.2 The second stage sample

The second stage within-community sample uses a method called map-segment-sample. This method takes the within-community sample from all parts of a sampled community.

1.2 Implicit stratification

Both the first and second stage samples use a form of spatial stratification:

- The list-based method's first stage systematic spatial sample stratifies the sample by non-overlapping spatial factor such as districts and subdistricts within districts.

- The map-based (CSAS) method's first stage sample stratifies the sample by grid square.
- The map-segment-sample second stage within-community sample stratifies the sample by parts of the community being sampled.
- The first and second stage samples also ensure that a reasonably even spatial sample is taken from the entire survey area and from each of the sampled communities.

These sampling procedures provide *implicit stratification* and tend to spread the sample properly among important sub-groups of the population such as rural / urban / peri-urban populations, administrative areas, ethnic sub-populations, religious sub-populations, and socio-economic groups. This often improves the precision of estimates made from survey data.

The use of implicit stratification improves the efficiency of a two-stage cluster sample and allows RAM-OP to use relatively small sample sizes compared to other methods, such as SMART surveys. The use of modern computer-intensive data analysis techniques also allows RAM-OP to make better use of the available sample than is done in other methods.

1.3 RAM-OP survey sample size

The following shorthand symbols will be used when describing sample designs:

m = Number of primary sampling units (PSUs).
n = Size of the sample of individuals or households from a PSU.
n = May also mean the overall survey sample size (this meaning will be made clear in the text).
N = Population

The overall sample size for a RAM-OP survey is about $n = 192$ individual subjects. You should aim to collect an overall sample of at least $n = 192$ individuals.

The RAM-OP sample is collected in two stages:

- The first stage sample uses a sample size of about $m = 16$ communities (or PSUs).
- The second stage sample uses a sample size of about $n = 12$ eligible subjects sampled from each of the communities selected for inclusion in the first stage sample.

The overall sample size from $m = 16$ communities and $n = 12$ eligible subjects is about:

$$\text{overall sample size} \approx m \times n \approx 16 \times 12 \approx 192$$

It is not recommended that fewer than $m = 16$ communities are sampled.

Sampling fewer than $m = 16$ communities will tend to reduce the precision with which estimates can be made. If you have the resources to sample more than $m = 16$ communities then you should do so. A sample of $m = 24$ communities and $n = 8$ eligible subjects, for example, will tend to yield estimates with better precision than a sample with $m = 16$ communities and $n = 12$ eligible subjects.

Do not be tempted to increase the size of the within-community sample in order to achieve an overall sample size of $n = 192$ from fewer than $m = 16$ communities. Doing so will tend to reduce the precision with which estimates are made. It may also be impossible to do this in many settings.

Here, for example, is a *population pyramid* for a typical developing country:

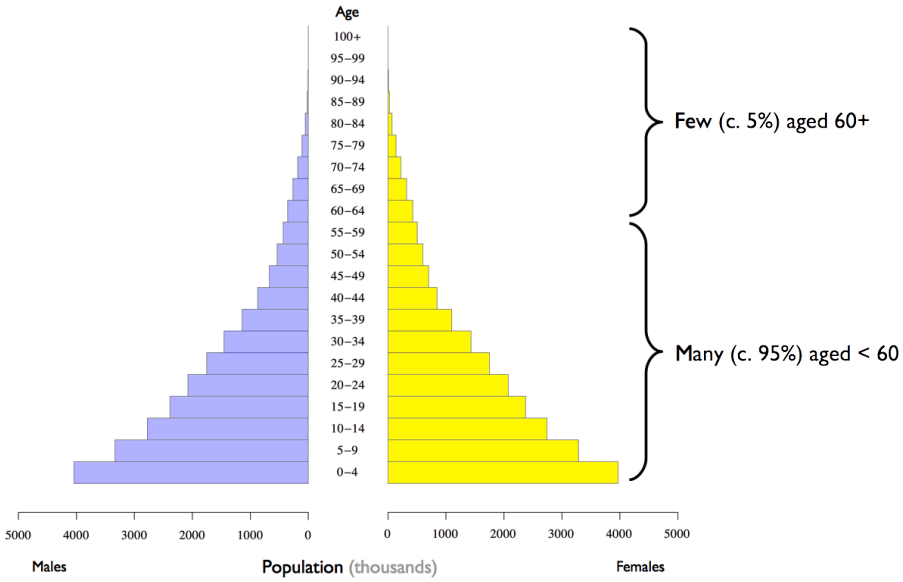


Figure 1.2: Population pyramid for a typical developing country

If the average community population is $N = 300$ then there will be fewer than 15 people aged 60 years and older in about half of the selected communities. This is because about half of the selected communities are likely to have a population below the average population.

1.4 Eligibility

Older people are usual defined as persons aged 60 years and older (UN definition). This means your sample will usually be restricted to people aged 60 years and older.

In some settings different eligibility criteria may apply. This will likely be the case in settings with very high life-expectancies (usually middle and high income countries) or very low life-expectancies (usually low income countries and in emergencies).

In a setting of very high life-expectancy you may want to restrict eligibility - to persons aged 65 years or older, for example. A local definition of older people is likely to be available.

In a setting with very low life-expectancy, very few people are aged 60 years or older. For example:

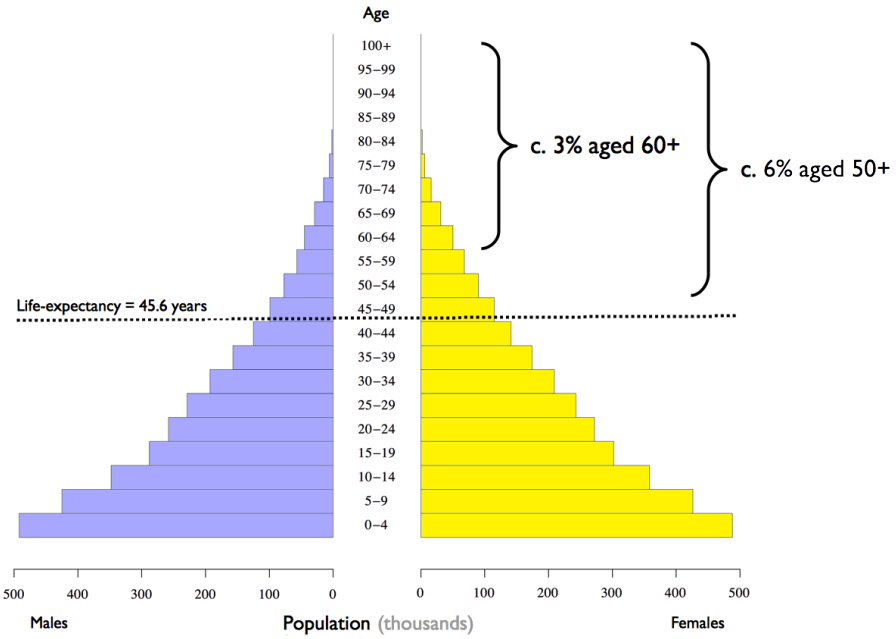


Figure 1.3: Population pyramid for a setting with low life-expectancy

It is common in such setting for there to be a local definition of older people. This will usually be "persons aged 50 years or older" or "persons aged 55 years or older".

1.5 Age distribution, eligibility criteria, and sample design

The age distribution of the population and the survey eligibility criteria will affect the sample design in terms of the number of communities that you will need to sample (m) and the number of older persons (n) that can be sampled from each community.

The overall sample size for a RAM-OP sample should be at least $n = 192$ usually collected as $n = 12$ eligible subjects sampled from $m = 16$ communities. If older people make up a very small proportion (i.e. much less than 5%) of the total population and / or the average population of communities is small then you will usually need to sample more than m = 16 communities in order to get about $n = 192$ older people in the overall sample. This is likely to occur when there are fewer than 20 to 25 older people in a community of average size.

You can calculate the number of older people that you would expect to be living in a community of average size using the following formula:

$$n_{\text{aged 60+ in an average village}} = \text{average village population}_{\text{all ages}} \times \frac{\text{percentage of population}_{\text{aged 60+}}}{100}$$

If this is below about 20 people then you should consider how you will collect the required overall sample size. Three approaches may be used:

- **Relax the eligibility criteria:** You may decide to define older people as "persons aged 50 years or older" or "persons aged 55 years or older". This may double the size of the eligible population and make the sample easier to collect. This approach is only reasonable if life-expectancy is low.
- **Increase the number of communities that you plan to sample:** You may choose to collect your sample as $n = 7$ eligible subjects sampled from $m = 30$ communities giving an expected overall sample size of $n = 210$. This would be a very good sample. The disadvantage of this approach is that survey costs increase with the number of communities that are sampled, because a lot of survey time and vehicle costs are spent on travelling to and from the selected communities.
- **Take a "top-up" sample only when you need to:** The basic procedure when a selected community is small and likely to contain fewer than $n = 12$ older people is to collect data on all older people in the selected community using a door-to-door census. If the within-community sample size is much smaller than the required one then a "top-up" sample is taken from the nearest neighbouring community using the map-segment-sample method (or a door-to-door census if this community is also small). The advantage of this approach is that travelling time and survey costs are better controlled.

If the proportion of older people is not very small and / or communities are large then you should have no problems achieving the overall sample size.

1.6 Practical sampling

1.6.1 The first stage sample - list-based sampling

The first stage sample can be drawn from a list of all communities. The list-based sample is a simple systematic sample taken from a complete list of communities in the survey area sorted by one or more non- overlapping spatial factors (such as administrative units or electoral wards) in the survey area. *Population proportional sampling* (PPS) is not used since this would concentrate the sample in the larger communities.

Below is a worked example of how a RAM-OP first stage, list-based sample can be drawn from a survey area composed of 67 villages.

Step 1: Calculate the *sampling interval* by dividing the total villages in the survey area (67 villages) with the number of villages to be drawn from the sample (16 villages).

$$\text{Sampling Interval} = \left\lfloor \frac{N_{villages}}{N_{sample}} \right\rfloor = \left\lfloor \frac{67}{16} \right\rfloor \approx \lfloor 4.19 \rfloor \approx 4$$

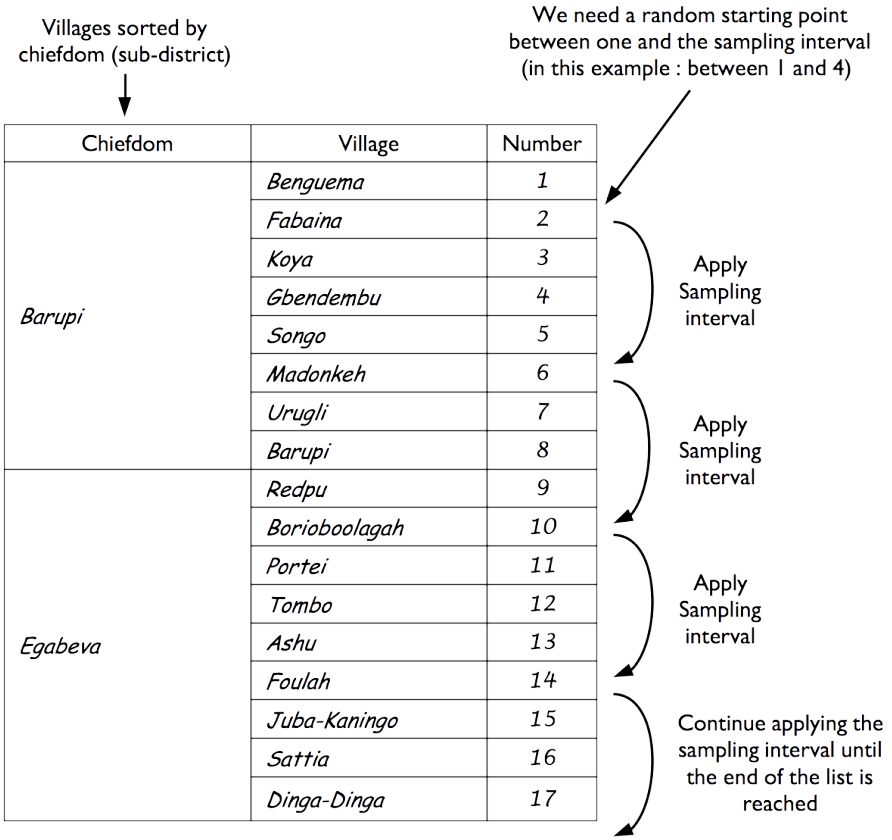
The *sampling interval* needs to be a whole number. Remember to **always** *round down* when calculating the *sampling interval* to the nearest whole number.

Step 2: Choose a *random starting point* between 1 and *sampling interval*. In this example, this would be a random number **between 1 and 4**.

A random number can be selected through simple lottery (i.e., draw from a lot of 4 numbered from 1 to 4). A standard spreadsheet software can also be used to draw the random number using the `RANDBETWEEN` function as follows:

```
RANDBETWEEN(1, 4)
```

Step 3: Using the *random starting point* and the *sampling interval*, select the sampling villages from a list of all villages organised/sorted by a **non-overalapping** spatial factor such as district or sub-district.



Chiefdom	Village	Number
Barupi	*Benguema*	*1*
	Fabaina	*2*
	Koya	*3*
	Gbendembu	*4*
	Songo	*5*
	Madonkeh	*6*
	Urugli	*7*
	Barupi	*8*
Egabeva	*Redpu*	*9*
	Borioboolagah	*10*
	Portei	*11*
	Tombo	*12*
	Ashu	*13*
	Foulah	*14*
	Juba-Kaningo	*15*
	Sattia	*16*
	Dinga-Dinga	*17*

Figure 1.4: Selection of sampling villages using lists

This procedure will sometimes select more than 16 communities.In this example, seventeen

villages (i.e. at positions 2, 6, 10, 14, 18, 22, 26, 30, 34, 38, 42, 46, 50, 54, 58, 62, and 66 in the list) will be selected.When this happens you should sample **all** of the selected communities.

1.6.2 The first stage sample - map-based sampling

An alternative approach to list-based sampling is to use map-based sampling. The map-based (CSAS) sample selects communities from the centre of squares of a grid drawn over a map. The map must be sufficiently well made and of sufficiently large scale to show the position of **all** communities in the survey area.

A square grid is drawn over the map. The size of the grid squares should be small enough so that the number of squares covering the survey area is the same as (or very similar to) the number of communities that you plan to sample. You may need to experiment with different grid sizes to achieve this. Figure 1.6 shows an example map and grid with $m = 16$ grid squares.

The sample is drawn by selecting the community that is located closest to the centre of each grid square:

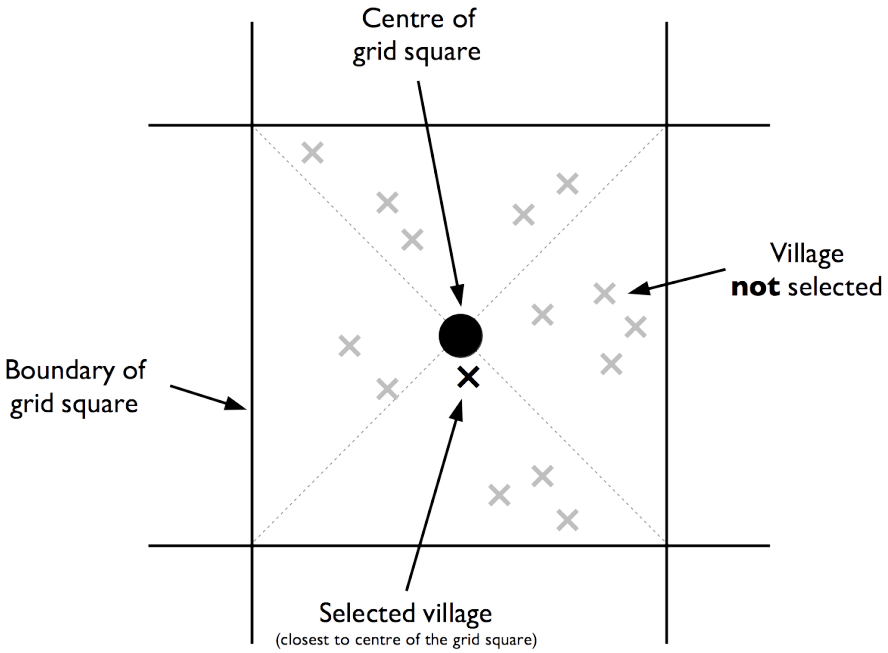


Figure 1.5: Selection of sampling villages using maps

If two or more villages are located the same distance from the centre of a grid square then a single village is picked at random, by tossing a coin for example.

Figure 1.7 shows the sample selected by this process for the area shown in Figure 1.6.

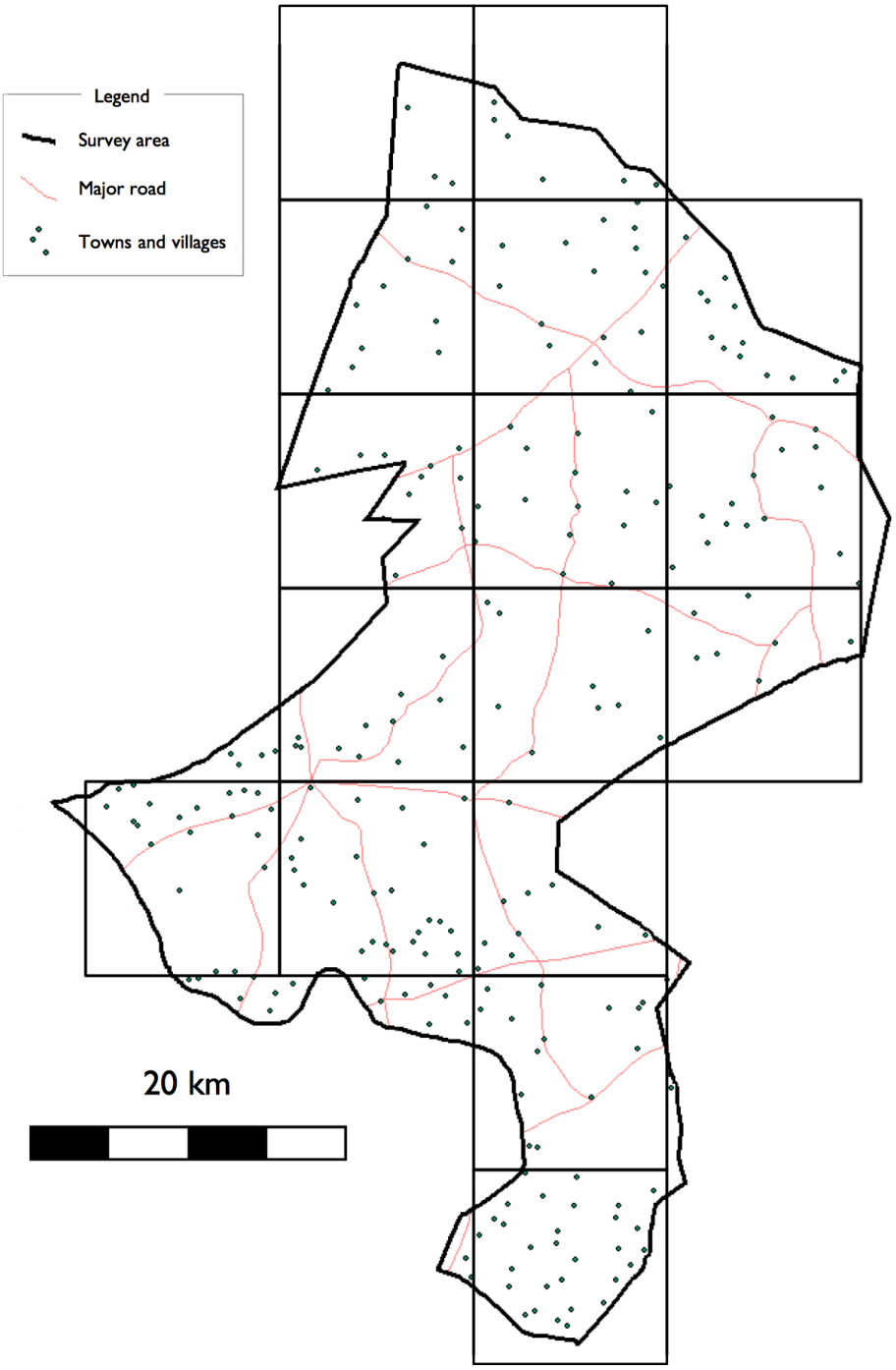


Figure 1.6: Drawing a square grid over the map

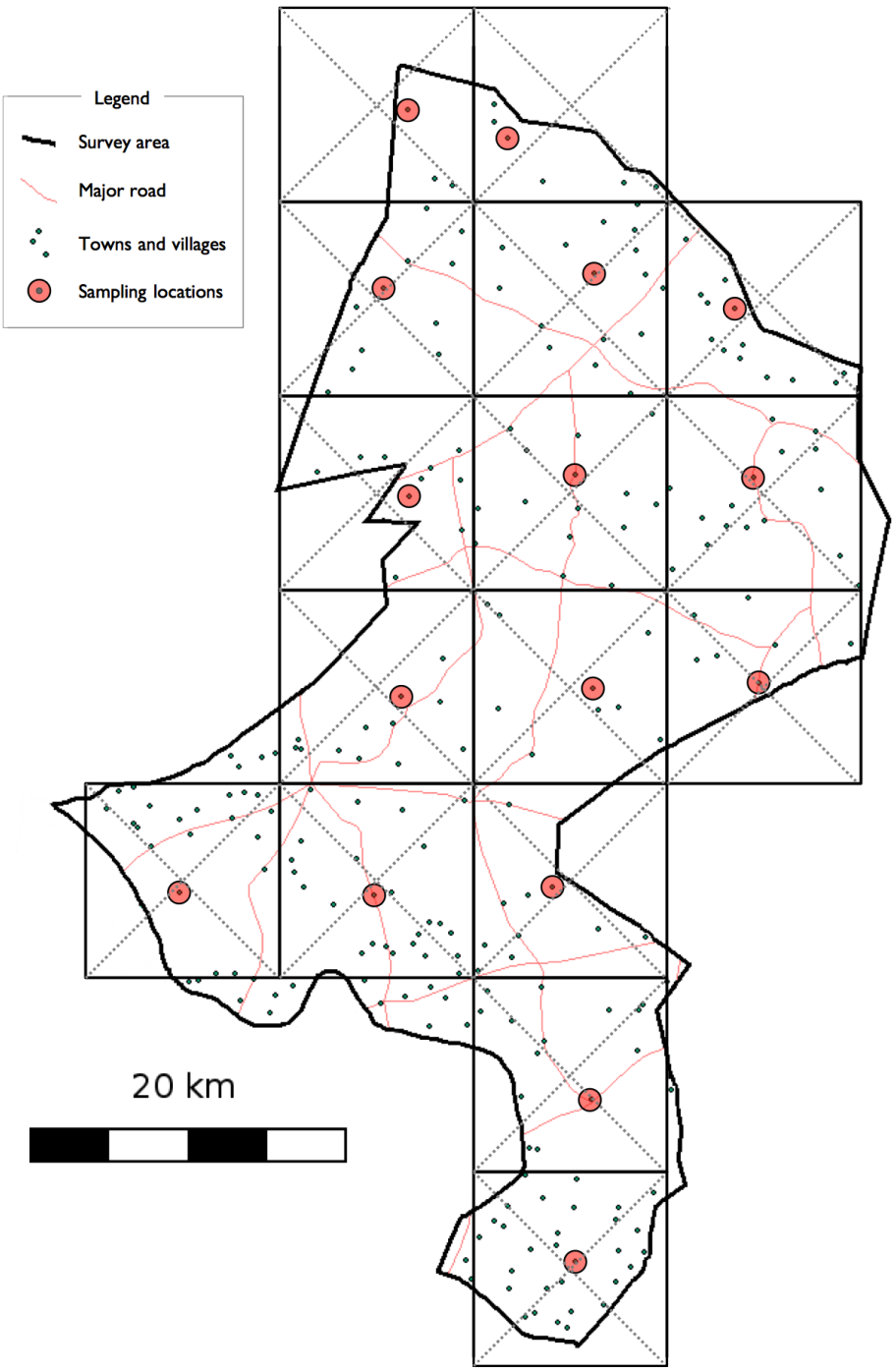


Figure 1.7: Drawing the first-stage CSAS sample

Both the list-based and the map-based (CSAS) sampling methods spread the sample of communities evenly across the entire survey area. Each community has an equal chance of being included in the sample. Population proportional sampling (PPS) is not used since this would concentrate the sample in the larger communities.

The same method can be used when sampling in urban contexts. Figure 1.8 shows a sample drawn from a list of census enumeration areas sorted by administrative district. Figure 1.9 shows a sample drawn using the map- based (CSAS) method. In both cases the primary sampling units (PSUs) are census enumeration areas.

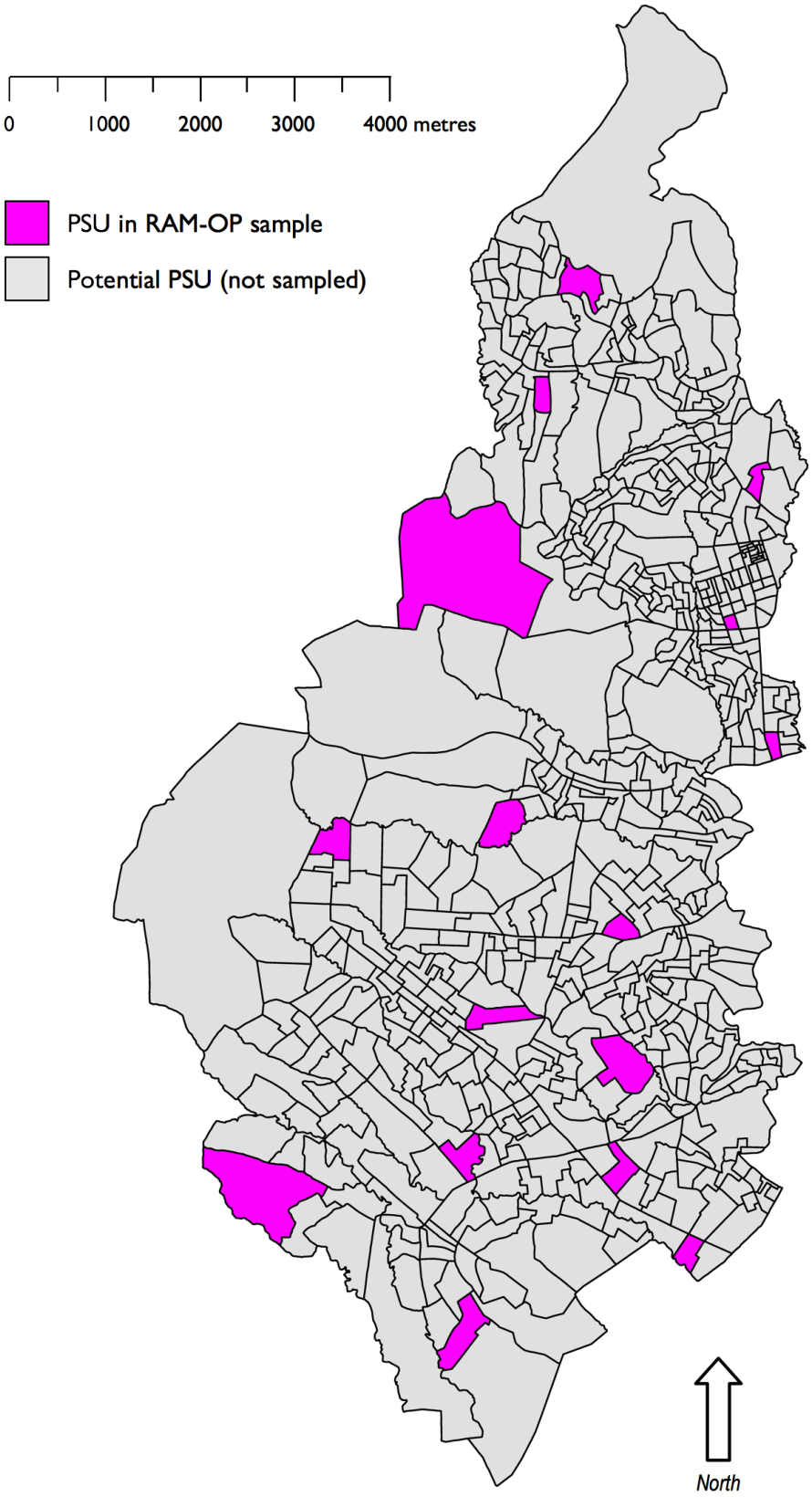


Figure 1.8: Example of an urban sample (list-based)

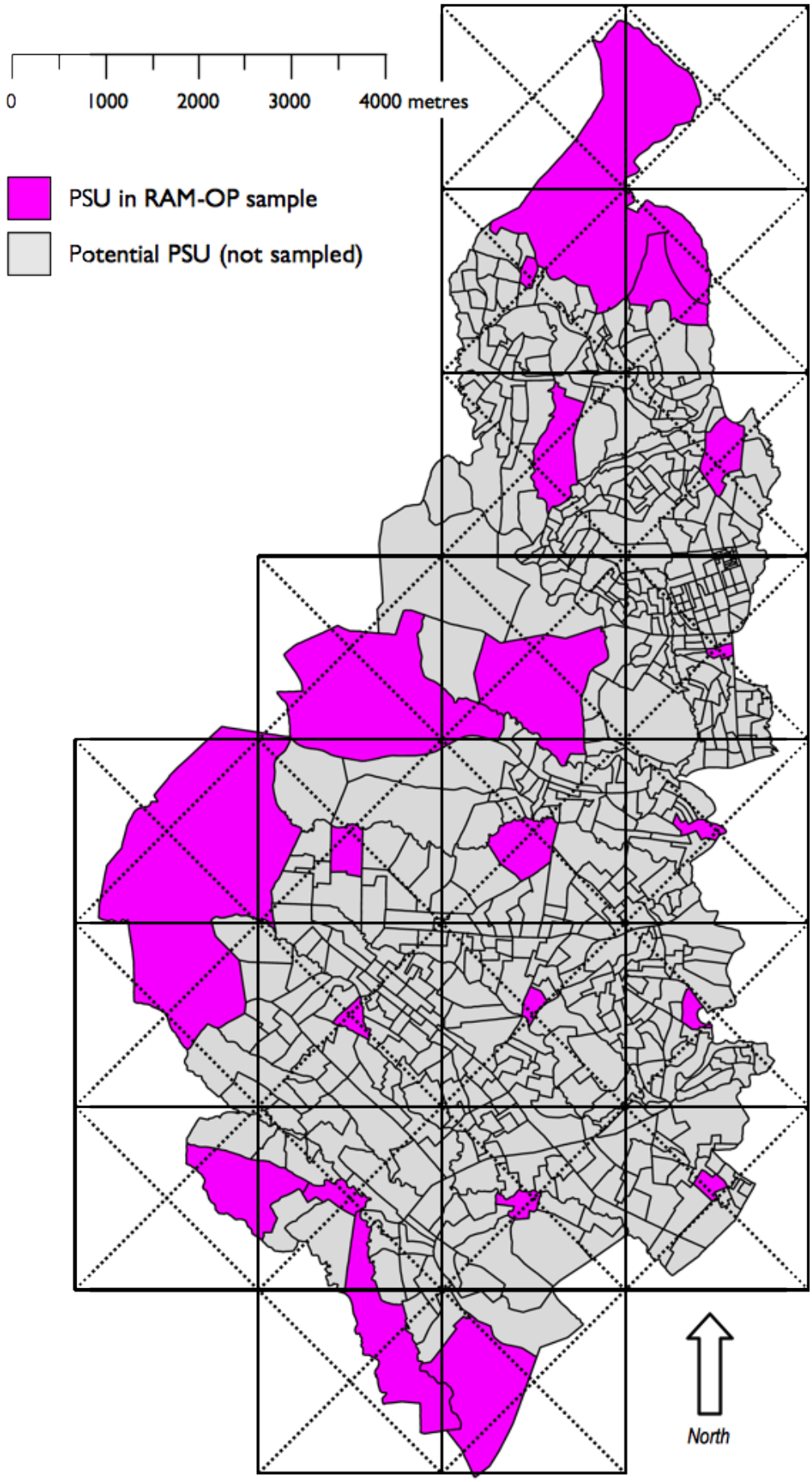


Figure 1.9: Example of an urban sample (map-based)

Note: In this example twenty-one (21) blocks have been selected. It can be difficult to achieve exactly the number of blocks that you need when using this type of sample. It is best to select more rather than fewer blocks than you need Here we would take our sample as $n = 10$ individuals from $m = 21$ blocks (overall $n = 210$).

1.6.3 The second stage (within-community) sample

The second stage (within-community) sample uses a map-segment-sample approach:

Map: Make a rough map of the community to be sampled. It is helpful to think of communities as being made of ribbons (i.e. lines of dwellings located along roads, tracks, or rivers) and clusters of dwellings.

Here is an example of a ribbon of dwellings:

Figure 1.10: Example of a ribbon of dwellings

Here is an example of a cluster of dwellings:

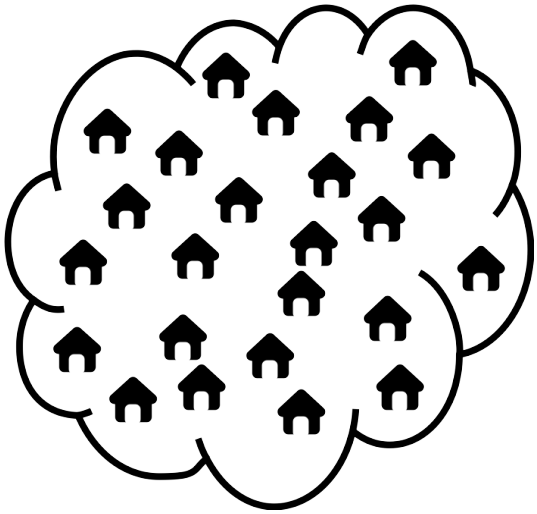


Figure 1.11: Example of a cluster of dwellings

Segment: Divide the community into ribbon and cluster segments defined by the physical layout of the community being sampled.

Sample: Ribbons and clusters are sampled in different ways:

- **Ribbons** are sampled using **systematic sampling**.
- **Clusters** are sampled using a **random walk** method.

Note: If a small community is selected that is likely to have fewer than the required number of eligible persons then **all** eligible persons in that community are sampled by moving door-to-door.

1.6.4 Mapping the community - single and multiple clusters

Some communities consist of a single cluster of dwellings:

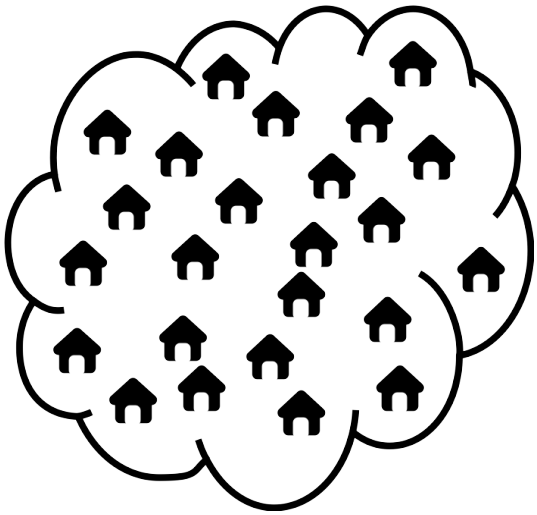


Figure 1.12: Example of a cluster of dwellings

or a set of clusters of dwellings:

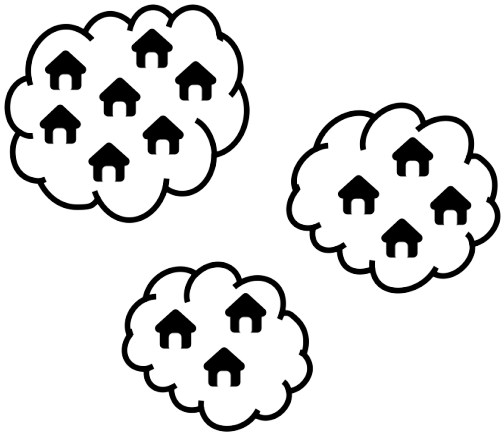


Figure 1.13: Example of a set of clusters of dwellings

For communities (or parts of communities) structured in this way we use a sampling method called the **random walk**.

1.6.5 Mapping the community - ribbon communities

Ribbon communities have dwellings arranged in a line:

Figure 1.14: Dwellings arranged in a line

or in a several lines:

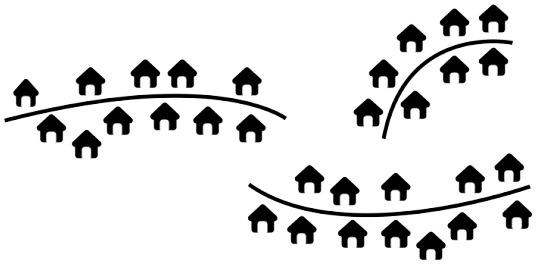


Figure 1.15: Dwellings arranged in several lines

For communities (or parts of communities) structured in this way we use a sampling method called **systematic sampling**.

1.6.6 Mapping the community - mixed communities

Some communities are a mixture of clusters and ribbons:

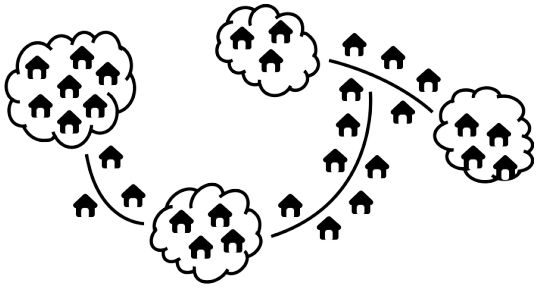


Figure 1.16: Mixture of clusters and ribbons

For mixed communities we use a mixture of the **random walk** method (in the clusters) and **systematic sampling** (along the ribbons).

Segmentation involves dividing a community into several parts and taking part of the within-community sample from each **segment**. With simple communities, segmentation is not required and we take a single sample from the entire community using the appropriate sampling method.

1.6.7 Segmentation

For more complicated communities we divide the community into several parts or segments, such as a community made up of several clusters:

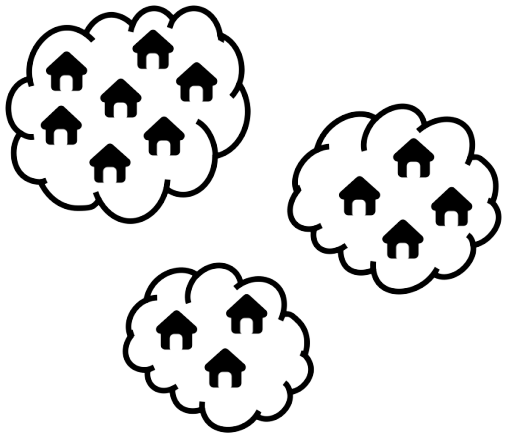


Figure 1.17: Example of a set of clusters of dwellings

or a community made up of several ribbons:

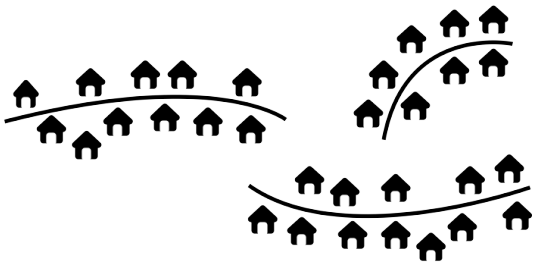


Figure 1.18: Dwellings arranged in several lines

or a mixed community:

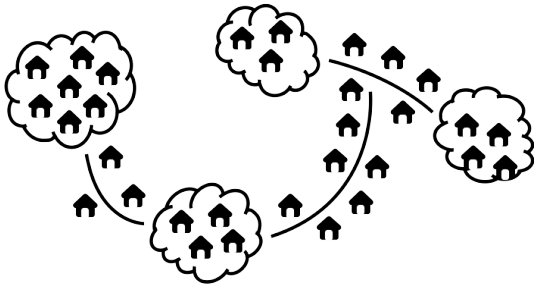


Figure 1.19: Mixture of clusters and ribbons

We take a small sample from each segment using the appropriate sampling method.

For example, with a community made up of three segments:

Figure 1.20: Community made up of three segments

we would take one third of the overall sample from each segment.

If the within-community sample size is twelve eligible subjects. we would sample four eligible subjects from each segment (i.e. $12/3 = 4$).

Dividing the sample up in this way means that we will sample from every part of the community rather than just one part of the community.

When taking the sample we use the random walk method to take part of the sample from clusters and the systematic sampling method to take part of the sample from ribbons.

Segments should be either ribbons or clusters but should **never** contain both a ribbon and a cluster. This is because clusters and ribbons are sampled in different ways.

A dwelling can only belong to one segment. Segments should **not** overlap.

1.6.8 Sample dwellings

All segments should be sampled.

If, for example, there are five segments in a community:

Figure 1.21: Community made up of five segments

and the within-community sample size is twelve eligible subjects, then you would plan to sample two eligible subjects from each segment (i.e. $12/5 = 2.4$ **rounded down** to two) and, if necessary, return to the **largest** segment to complete the sample.

All segments should be sampled, even if this means that you take a larger sample than you expected to.

Remember that different types of segment are sampled in different ways:

- Dwellings in **cluster segments** are sampled using a method called the **random walk**. This involves sampling houses by walking in random directions within the cluster.

- Dwellings in **ribbon segments** are sampled using a method called **systematic sampling**. This involves sampling houses at regular intervals along the ribbon.

We will look at each of these sampling methods in turn.

1.6.9 Random walk sampling

The **random walk** method is used to sample dwellings in **cluster segments**. Sampling proceeds as follows:

1. Move to the approximate centre of the cluster.

2. Select a **random direction** by spinning a bottle on the ground. The neck indicates the **sampling direction**. This is the direction you should walk in order to sample a dwelling. Walk in the sampling direction counting the dwellings that you pass. Sample the third **dwelling**. If there are no eligible persons in the selected dwelling then sample the **nearest** dwelling with an eligible person. Sample **all** eligible persons in the selected dwelling.

3. Apply the survey questionnaire for **all** eligible persons in the selected dwelling.

4. Select the next dwelling to sample by spinning a bottle and walking in the indicated direction. Count the dwellings you pass. Sample the **third** dwelling. If there are no eligible persons in the selected dwelling then sample the **nearest** dwelling with an eligible person. Sample all eligible persons in the selected dwelling. If you reach the edge of the cluster segment then return to the centre of the cluster and repeat step (2) above. Remember to keep count of the number of eligible persons sampled from the segment.

5. Stop sampling in the segment when you have sampled the required number of eligible persons from the segment. Since you sample **all** eligible persons in a selected dwelling, you may sample a few more eligible persons than expected. This is OK. Always sample **all** eligible persons in a selected dwelling.

If, when you have sampled all segments, you have not sampled twelve eligible persons, you should return to the **largest** segment to finish sampling using the appropriate sampling method.

The random walk method is illustrated in Figure 1.22.

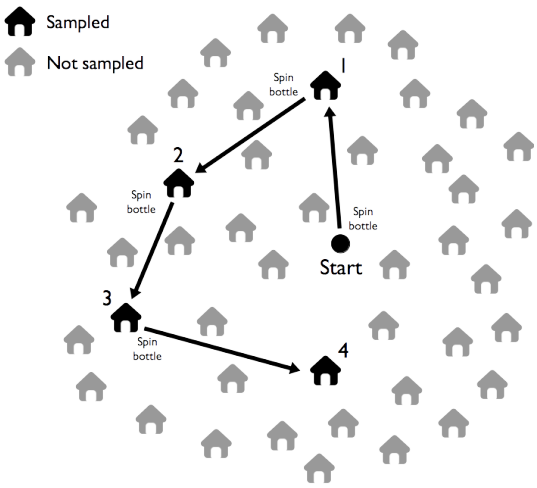


Figure 1.22: Random walk sampling in a cluster segment

1.6.10 Systematic sampling

The **systematic sampling** method is used to sample houses in **ribbon segments**.

Sampling proceeds as follows:

1. Move to one end of the ribbon segment.
2. Walk to the other end of the segment counting the houses that you pass.
3. Calculate the **step size** by dividing the number of dwellings in the segment by the required sample size for the segment. Use the **whole number** part of the result only. Do **not** round up.
4. Pick a random number between one and the step size. This is your **starting point**. Select the first dwelling to sample by walking along the segment counting the dwellings that you pass and sample the dwelling indicated by the **starting point**. If there are no eligible persons in the selected dwelling then sample the **nearest** dwelling in any direction with an eligible person. Sample **all** eligible persons in the selected dwelling.
5. Select the next dwelling to sample by walking along the segment. Count the dwellings that you pass. Sample the dwelling indicated by the **step size**. If there are no eligible persons in the selected dwelling then sample the **nearest** dwelling in any direction with an eligible person. Sample **all** eligible persons in the selected dwelling.
6. Stop sampling in the segment when you reach the end of the ribbon segment. This may mean that you sample extra eligible persons. This is OK. Do **not** stop sampling from a ribbon until you reach the end of the ribbon.

If, when you have sampled all segments, you have not sampled twelve eligible persons, you should return to the **largest** segment to finish sampling using the appropriate sampling method.

The systematic sampling method is illustrated in Figure 1.23.

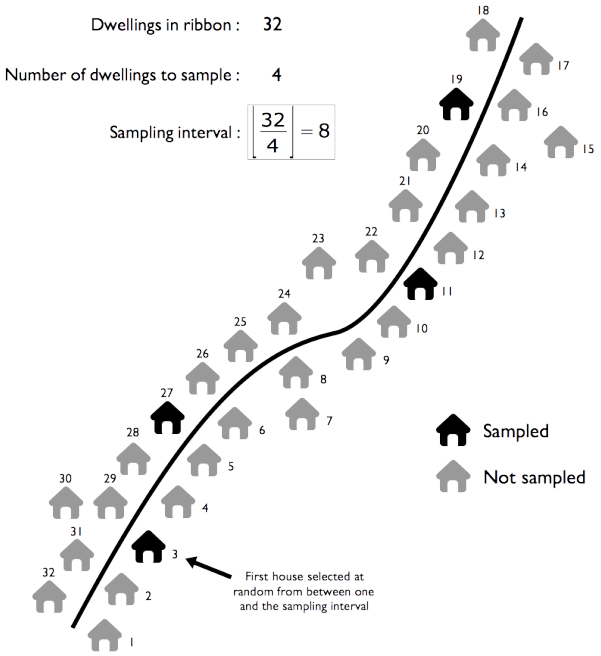


Figure 1.23: Systematic sampling in a ribbon segment

1.6.11 Sampling in urban settings

In urban areas the first stage sample is taken by replacing sub-districts with "sections" and communities with city blocks. Examples of sections may be administrative districts/sub-districts or electoral wards.

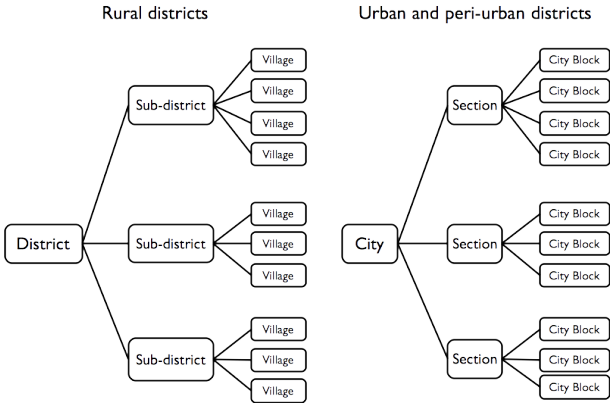


Figure 1.24: Administrative divisions in an urban setting

Census enumeration areas (EAs) are usually city blocks. Central statistics offices can usually provide lists of EAs by "section" and large-scale maps of EAs selected for sampling (See Figure 1.25 and Figure 1.26). These maps make it easy to locate EAs and their boundaries. The sample of EAs can be decided using list-based or map-based (CSAS) sampling.

In these settings, eligible persons may be sampled by moving from door-to-door. All dwellings in the selected block are sampled and all eligible persons in the selected dwellings are sampled. This means that all eligible persons in a selected block are sampled.

If city blocks are large then a type of systematic sampling may be used. With this method a rough map of the streets in the block is made and the number of doorways on each street is counted and copied onto the rough street map (as shown in Figure 1.27). The total number of doorways on all streets is calculated. A step size is calculated by dividing the total number of doorways on all streets by the number of dwellings to be sampled. A systematic sample along a route around the block that includes all streets in the block is taken. Streets can be sampled in any order. If you find that you have sampled all streets but have not yet sampled the required number of eligible persons then you should return to the street with the largest number of houses to collect the remainder of the sample.

The number of blocks to be sampled will depend on the expected number of eligible persons in each block. You should aim for an overall sample size of about $n = 192$. You should not sample fewer than $m = 16$ blocks.

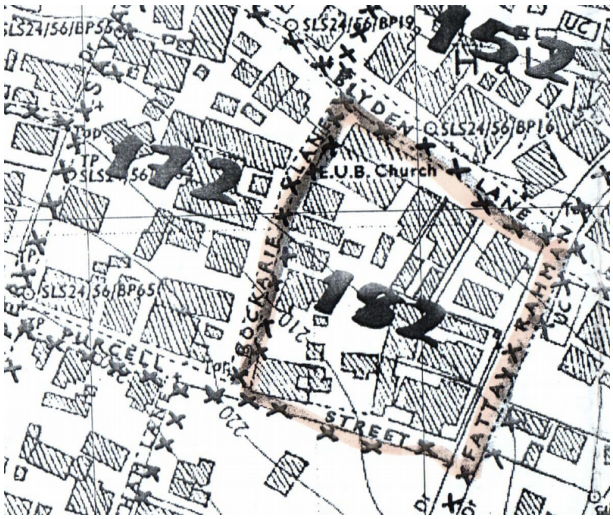


Figure 1.25: Enumeration area map for a city block in Freetown, Sierra Leone

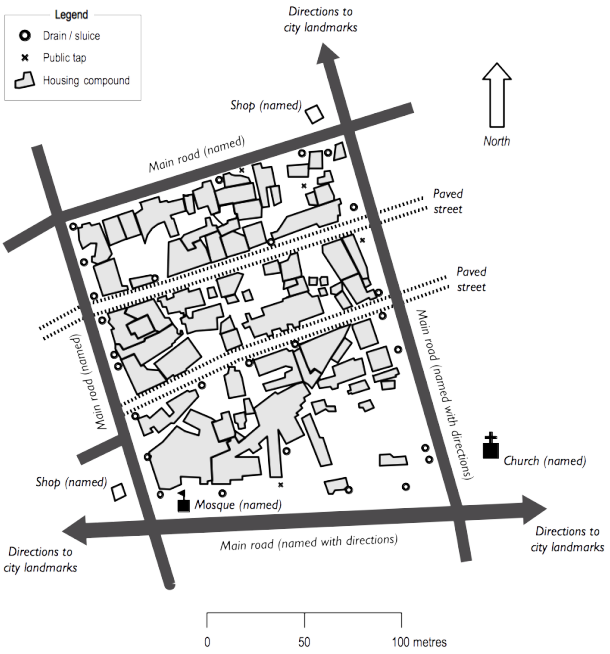


Figure 1.26: Enumeration area map for a city block in Addis Ababa, Ethiopia

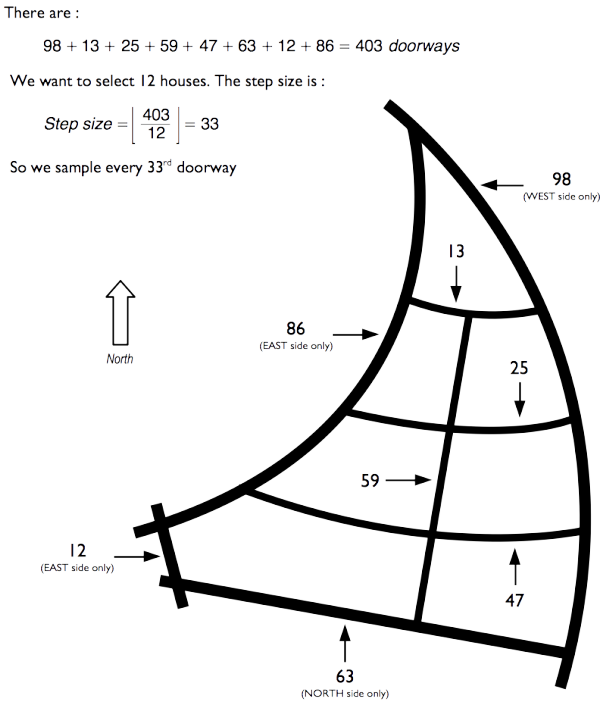


Figure 1.27: Systematic sampling in a city block

When useful lists and maps are not available then satellite imagery available though free services such as Google Earth (http://earth.google.com) may be used.

The quality (resolution) of the images available from these services is variable but is usually good enough to allow you to segment the town into small areas of approximately equal volume (approximately the same number of dwellings) in each:

Figure 1.28: Segmenting a town into smaller sampling areas

When creating segments using maps or satellite images it is a good idea to use main roads, rivers, canals, railway lines, public parks, etc as boundaries. This simplifies the segmentation process and also simplifies fieldwork by making areas and their boundaries easier to locate and sample.

The first stage sample can be list-based (such as where each area is numbered in a systematic north to south and east to west order and a systematic sample taken) or map-based (CSAS).

Larger scale "maps" of blocks to be sampled can also me made using satellite imagery (see Figure 1.29).

Figure 1.29: A large scale "map" of a city block made from satellite imagery

Chapter 2

Indicators

2.1 The RAM-OP indicator set

RAM-OP surveys collect and report on data for a broad range of indicators relevant to older people.

These indicators cover the following dimensions:

- Demography and situation
- Food intake
- Severe food insecurity
- Disability
- Activities of daily living
- Mental health and well-being
- Dementia
- Health and health-seeking behaviour
- Sources of income
- Water, sanitation, and hygiene
- Anthropometry and screening coverage
- Visual impairment

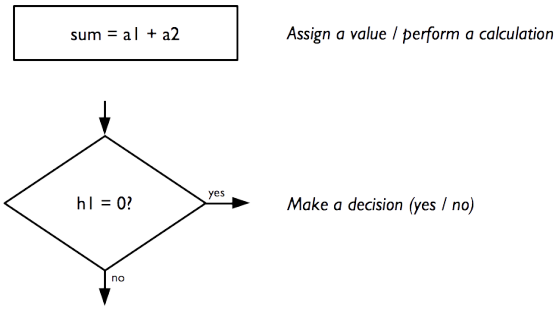
Data for a small group of miscellaneous indicators are also collected and reported.

The RAM-OP indicator set has been designed on a modular basis. Each module is a set of indicators relating to a single dimension from the list given above and is collected using a dedicated set of questions and measurements. This means that the RAM-OP questionnaire also consists of a set of modules.

Whenever possible, RAM-OP uses standard and validated indicators and question sets.

Indicators are described below, showing the questionnaire components that are used to collect and record the data required, and flowcharts of the process used to derive indicators from the

collected data. Standard symbols are used. For example:



A non-standard symbol is used to show **recode operations**. A recode operation shows changes that are made to data so that it can be used to derive indicators without having to show many decision nodes in the flowchart. They are also used to specify what should be done with missing or out-of-range values. For example:

RECODE d1 (respondent)

Old Values	New Values	Notes
1	1	subject
2	2	family carer
3	3	other carer
4	4	other
Others	1	subject

No change

For others values (including missing values) we assume the respondent is the subject

RECODE d2 (age)

Old Values	New Values	Notes
888	NA	DK / refused

Set data for don't know / refused to NA (NA = not available / missing data)

2.1.1 Demography and situation

The demography and situation indicators are used to describe the survey sample and are derived from this questionnaire component:

d1	Who is answering these questions?	1 = Subject 2 = Family carer 3 = Other carer 4 = Other	[__]
d2	How old are you (age in years)?	888 = DK / REFUSED	[__][__][__
d3	Sex	1 = Male; 2 = Female	[__]
d4	Marital status	1 = Single (never married) 2 = Married 3 = Living together 4 = Divorced 5 = Widowed 6 = Other	[__]

d5	Do you live alone?	1= Yes; 2 = No	[___]

Each of the questions yields a separate indicator:

RECODE d1 (respondent)		
Old Values	New Values	Notes
1	1	subject
2	2	family carer
3	3	other carer
4	4	other
Others	1	subject

Respondent types reported as separate indicators

RECODE d2 (age)		
Old Values	New Values	Notes
888	NA	DK / refused

Mean age is reported

Age-groups (50-59;60-69;70-79;80-89;90+) are reported as separate indicators

RECODE d5 (living alone)		
Old Values	New Values	Notes
1	1	Yes
2	0	No

Living alone is reported

Sex of the subject and marital status of the subject are also reported

2.1.2 Food intake

Food-intake indicators are derived from this questionnaire component. This data can be queried to yield a large number of useful indicators.

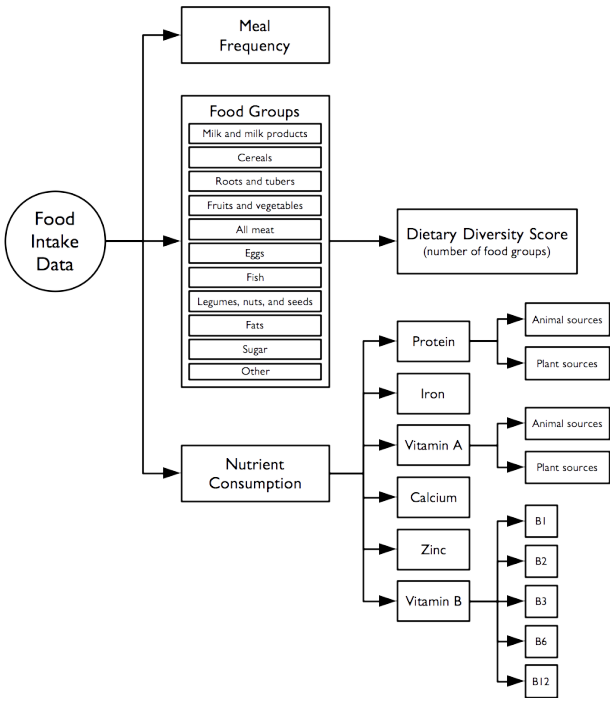
f1	How many meals did you eat since this time yesterday (Ask about breakfast, lunch, dinner, and snacks)?	Number of meals	[___]
f2	Since this time yesterday did you eat any of the following foods …		
f2a	Tinned, powdered or fresh milk?	1 = Yes; 2 = No	[___]
f2b	Sweetened or flavoured water, "soda" drink, alcoholic drink, beer, tea or infusion, coffee, soup, or broth?	1 = Yes; 2 = No	[___]
f2c	Any food made from grain such as millet, wheat, barley, sorghum, rice, maize, pasta, noodles, bread, pizza, porridge?	1 = Yes; 2 = No	[___]
f2d	Any food made from fruits or vegetables that have yellow or orange flesh such as carrots, pumpkin, red sweet potatoes, mangoes, and papaya?	1 = Yes; 2 = No	[___]
f2e	Any food made with red palm oil or red palm nuts?	1 = Yes; 2 = No	[___]

f2f	Any dark green leafy vegetables such as cabbage, broccoli, spinach, moringa leaves, cassava leaves?	1 = Yes; 2 = No	[___]
f2g	Any food made from roots or tubers such as white potatoes, white yams, false banana, cassava, manioc, onions, beets, turnips, and swedes?	1 = Yes; 2 = No	[___]
f2h	Any food made from lentils, beans, peas, groundnuts, nuts, or seeds?	1 = Yes; 2 = No	[___]
f2i	Any other fruits or vegetables such as banana, plantain, avocado, cauliflower, coconut?	1 = Yes; 2 = No	[___]
f2j	Liver, kidney, heart, black pudding, blood, or other organ meats?	1 = Yes; 2 = No	[___]
f2k	Any meat such as beef, pork, goat, lamb, mutton, veal, chicken, camel, or bush meat?	1 = Yes; 2 = No	[___]
f2l	Fresh or dried fish, shellfish, or seafood?	1 = Yes; 2 = No	[___]
f2m	Cheese, yoghurt, or other milk products?	1 = Yes; 2 = No	[___]
f2n	Eggs?	1 = Yes; 2 = No	[___]
f2o	Any food made with oil, fat, butter, or ghee?	1 = Yes; 2 = No	[___]
f2p	Any mushrooms or fungi?	1 = Yes; 2 = No	[___]
f2q	Grubs, snails, insects?	1 = Yes; 2 = No	[___]
f2r	Sugar, honey and foods made with sugar or honey such as sweets, candies, chocolate, cakes, and biscuits?	1 = Yes; 2 = No	[___]
f2s	Salt, pepper, herbs, spices, or sauces (hot sauce, soy sauce, ketchup)?	1 = Yes; 2 = No	[___]

There are three related sets of diet-related indicators:

- meal frequency
- food groups consumed / dietary diversity
- indicators of nutrient consumption.

The indicator hierarchy is:



The data on the number of meals taken in the previous twenty-four hours forms a *meal frequency score*.

Food intake data from each subject is combined into a *dietary diversity score*. The dietary diversity score is a crude measure of food security. The dietary diversity score ranges between zero (i.e. no food groups) and eleven (i.e. eleven food groups). Higher values of the dietary diversity sore are associated with better food security.

The meal frequency score and the dietary diversity score follow:

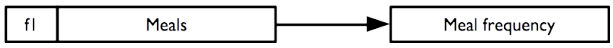
- Swindale A, Bilinsky P, *Household Dietary Diversity Score (HDDS) for measurement of household food access: Indicator guide.*,Washington DC, Food and Nutrition Technical Assistance (FANTA) Project, 2006
- Kennedy G, Ballard T, Dop MC, *Guidelines for Measuring Household and Individual Dietary Diversity*, Rome, Food and Agricultural Organization, 2010

The data on the types of food consumed in the previous twenty-four hours are analysed in order to determine the diet's content of specific micronutrients that are important for older people. This also follows Swindale & Bilinsky (2006) and Kennedy et al (2010), and:

- World Health Organisation, *The management of nutrition in major emergencies*, Geneva, WHO, 2000

2.1.3 Meal frequency

The meal frequency score indicator is the answer given to the first food intake question:

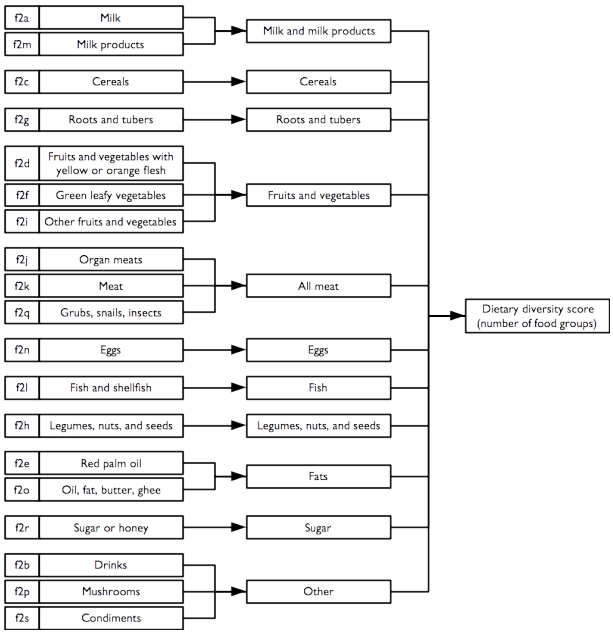


Meal frequency is a crude measure of food security.

Higher values of meal frequency are associated with better food security.

2.1.4 Food groups and dietary diversity

Questions relating to the consumption of individual food items / food types are combined to create food groups and the number of food groups consumed are counted to create a dietary diversity score:



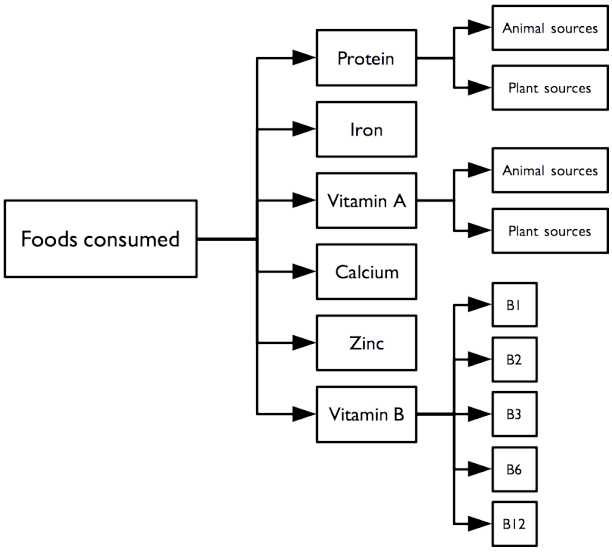
The consumption of the eleven individual food groups and the dietary diversity score are reported separately.

The dietary diversity score is a crude measure of food security. The dietary diversity score ranges between zero (no food groups) and eleven (eleven food groups). Higher values of the dietary diversity score are associated with better food security.

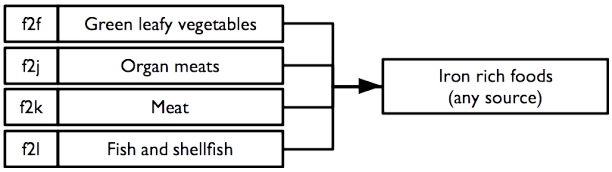
2.1.5 Indicators of nutrient consumption

Overview

Questions and combinations of questions relating to the consumption of individual food items and food types can be used to determine whether the reported diet is likely to be provide sufficient nutrients of various types:



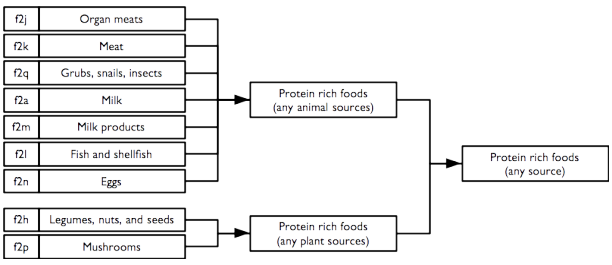
Each indicator is formed using logical "or" operations (i.e. the indicator is true if **any** of the constituent foods are consumed). For example, the indicator for the consumption of iron rich foods:



requires the consumption of one or more of green leafy vegetables, organ meats, meat, or fish and shellfish. Consumption of **any** of these foods is sufficient to indicate that the survey subject consumes iron rich food.

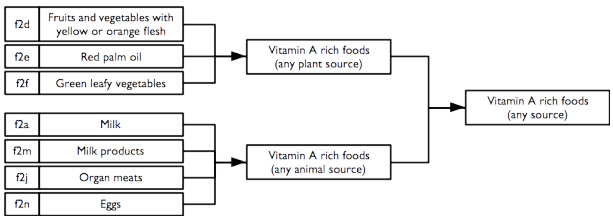
2.1.5.1 Protein rich foods

Indicators of consumption of protein rich foods from animal sources, plant source, and any / all sources are calculated as:



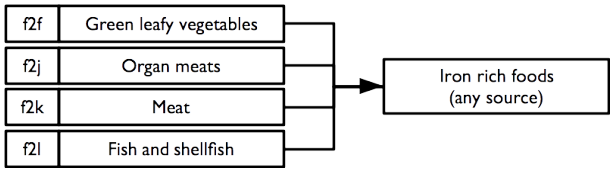
2.1.5.2 Vitamin A rich foods

Indicators of consumption of vitamin A rich foods from animal sources, plant source, and any / all sources are calculated as:



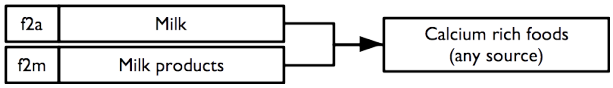
2.1.5.3 Iron rich foods

An indicator of consumption of iron rich foods from any / all sources is calculated as:



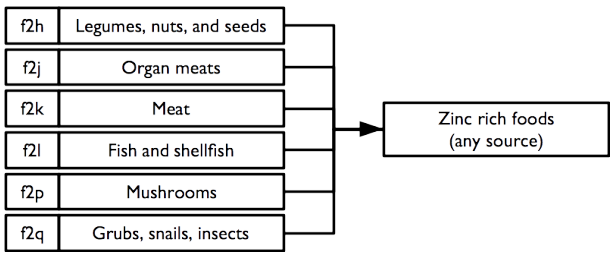
2.1.5.4 Calcium rich foods

An indicator of consumption of calcium rich foods from any / all sources is calculated as:



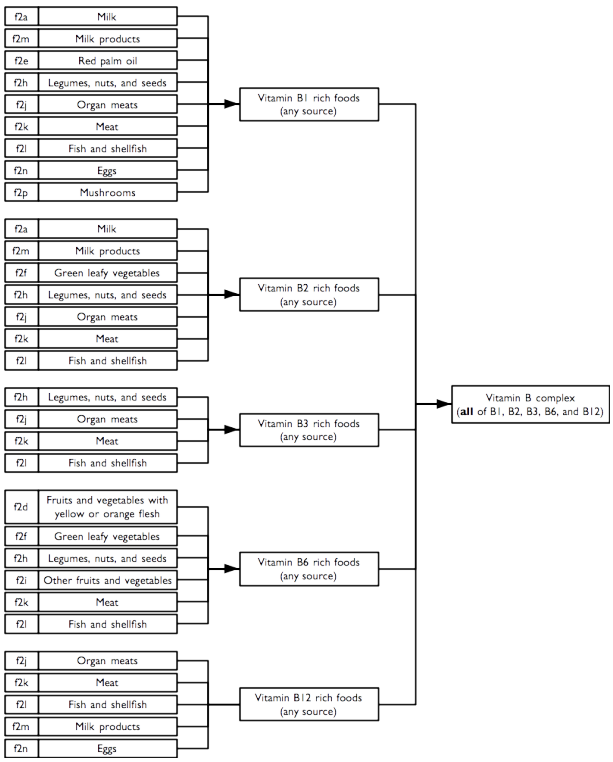
2.1.5.5 Zinc rich foods

An indicator of consumption of zinc rich foods from any / all sources is calculated as:



2.1.5.6 Vitamin B rich foods

Indicators of consumption of vitamin B rich foods from any / all sources are calculated as:



Note that the vitamin B complex indicator requires that at least one food from each of the B1, B2, B3, B6, and B12 rich food combinations is consumed.

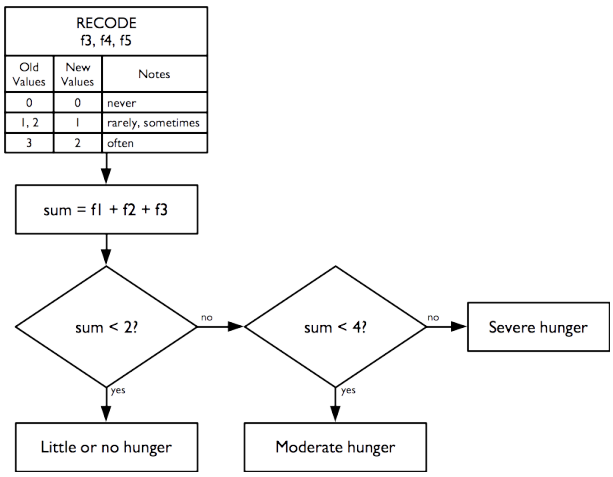
2.1.6 Severe food insecurity

An indicator of severe food insecurity (hunger) is derived from this questionnaire component:

Hunger – Ration - Relief			
f3	In the past four weeks, how often was there ever no food to eat of any kind in your home because of lack of resources to get food?	0 = Never 1 = Rarely (1-2x) 2 = Sometimes (3-10x) 3 = Often (> 10x))	[___]
f4	In the past four weeks, how often did you go to sleep at night hungry because there was not enough food?	0 = Never 1 = Rarely (1-2x) 2 = Sometimes (3-10x) 3 = Often (> 10x))	[___]

f5	In the past four weeks, how often did you go a whole day and night without eating anything at all because there was not enough food?	0 = Never 1 = Rarely (1-2x) 2 = Sometimes (3-10x) 3 = Often (> 10x))	[___]

and is calculated as:



This indicator is the *Household Hunger Scale (HHS)* and is a simple, well-validated, and widely used indicator of severe food insecurity:

- Ballard T, Coates J, Swindale A, Deitchler M, *Household Hunger Scale: Indicator Definition and Measurement Guide*, Washington DC, FANTA-2 Bridge, FHI 360, 2011
- Ruel MT, Ballard TJ, Deitchler M, *Measuring and Tracking the Access Dimension of Food Security: Available Indicators and Recommendations for Future Investments*, Global Nutrition Report 2014: Technical Note 6, Washington DC, International Food Policy Research Institute, 2014

2.1.7 Disability

Indicators of disability across six different domains are derived from this questionnaire component:

Disability (Washington Group)

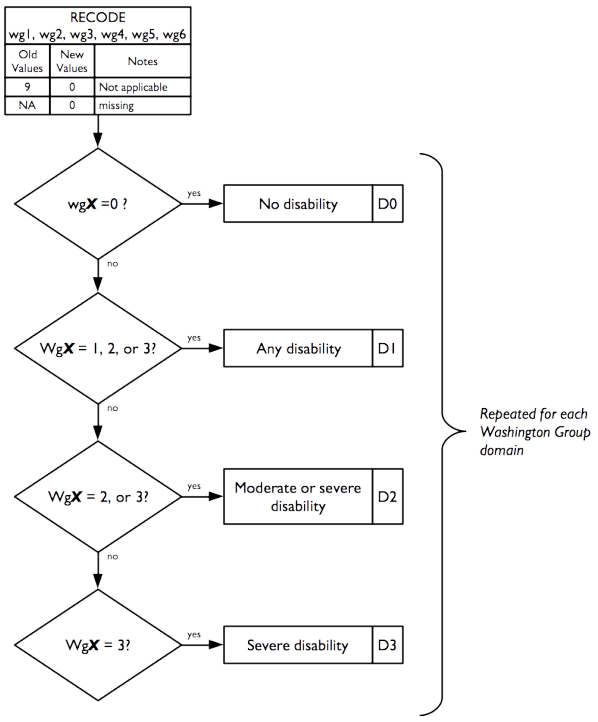
wg1	Do you have difficulty seeing, even if wearing glasses?	0 = No difficulty 1 = Some difficulty 2 = A lot of difficulty 3 = Cannot do at all	[___]
wg2	Do you have difficulty hearing, even if using a hearing aid?	0 = No difficulty 1 = Some difficulty 2 = A lot of difficulty 3 = Cannot do at all	[___]
wg3	Do you have difficulty walking or climbing steps?	0 = No difficulty 1 = Some difficulty 2 = A lot of difficulty 3 = Cannot do at all	[___]
wg4	Do you have difficulty remembering or concentrating?	0 = No difficulty 1 = Some difficulty 2 = A lot of difficulty 3 = Cannot do at all	[___]
wg5	Do you have difficulty with self-care such as washing all over or dressing?	0 = No difficulty 1 = Some difficulty 2 = A lot of difficulty 3 = Cannot do at all	[___]
wg6	Using your usual (customary) language, do you have difficulty communicating, for example understanding or being understood?	0 = No difficulty 1 = Some difficulty 2 = A lot of difficulty 3 = Cannot do at all	[___]

Individual disability indicators are reported for each domain (i.e. vision, hearing, mobility, remembering, self-care, and communication) of disability in the Washington Group's short set of question designed to identify people with a disability in a census or survey format:

- http://www.washingtongroup-disability.com
- https://www.cdc.gov/nchs/washington_group/wg_documents.htm

Overall disability prevalence indicators are also reported.

Indicators of disability in each domain are calculated as:



Overall disability prevalence indicators are calculated as:

`P0` = 1	if no domain has `D1` = 1, else = 0 (no disability in any domain)
`P1` = 1	if at least one domain has `D1` = 1, else = 0
`P2` = 1	if at least one domain has `D2` = 1, else = 0
`P3` = 1	if at least one domain has `D3` = 1, else = 0
`PM` = 1	if at more than one domain has `D1` = 1, else = 0 (M stands for "Multiple")

2.1.8 Activities of daily living

Indicators of how well the subject copes with activities of daily living are derived from this questionnaire component:

Activities of Daily Living			
a1	Do you need help with bathing more than one part of your body or getting in or out of the tub or shower?	1 = Yes; 2 = No	[___]
a2	Do you need help getting dressed partially or completely (not including tying of shoes)?	1 = Yes; 2 = No	[___]
a3	Do you need help going to the toilet or cleaning yourself after using the toilet or do you use a commode or bed-pan?	1 = Yes; 2 = No	[___]

a4	Do you need someone (i.e. not a walking aid) to help you move from a bed to a chair?	1 = Yes; 2 = No	[___]
a5	Are you partially or totally incontinent of bowel or bladder?	1 = Yes; 2 = No	[___]
a6	Do you need partial or total help with eating?	1 = Yes; 2 = No	[___]
a7	Is someone taking care of you or helping you with everyday activities such as shopping, cooking, bathing and dressing?	1 = Yes; 2 = No	[___]

Individual *independence* indicators are reported for each dimension (i.e. bathing, dressing, toilet, mobility, continence, and eating) of daily living activities.

A composite indicator of the degree of *independence* (i.e. how well the subject can cope with activities of daily living) is also reported. This indicator is the *Katz Index of Independence in Activities of Daily Living* (or the *Katz Index of ADL* for short) and is a simple, well-validated, and widely used indicator of how well the subject can cope with activities of daily living:

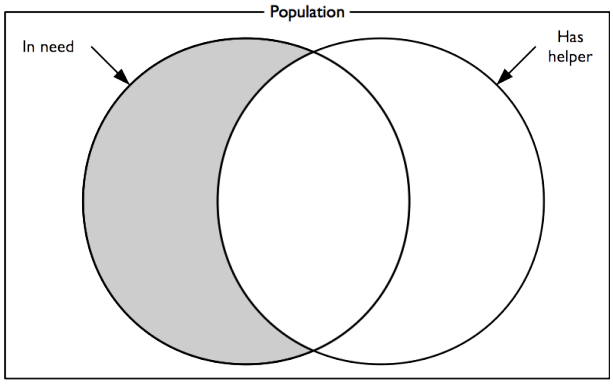
- Katz S, Ford AB, Moskowitz RW, Jackson BA, Jaffe MW, *Studies of illness in the aged. The Index of ADL: A standardized measure of biological and psychosocial function*, JAMA, 185(12), 1963, pp. 914-9
- Katz S, Down TD, Cash HR, Grotz, RC, *Progress in the development of the index of ADL*, The Gerontologist, 10(1), 1970, pp. 20-30
- Katz S, *Assessing self-maintenance: Activities of daily living, mobility and instrumental activities of daily living*, JAGS, 31(12), 1983, pp. 721-726

The Katz Index of ADL ranges between zero (complete dependence) and six (independence).

The seventh question of this module, which is not part of the Katz Index of ADL, is reported separately and indicates whether the subject has someone to help them with activities of daily living:

Activities of Daily Living			
a7	Is someone taking care of you or helping you with everyday activities such as shopping, cooking, bathing and dressing?	1 = Yes; 2 = No	[___]

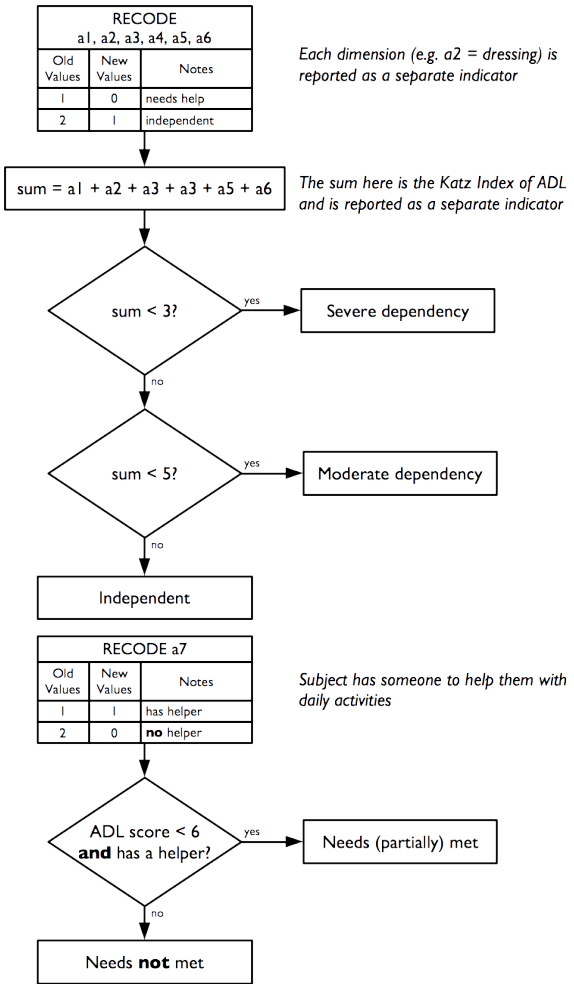
t is not possible to know if the help available completely meets a subject's needs, but we can identify the proportion of subjects needing help with one or more activities of daily living who also report not having someone to help them:



Shaded area contains only those in need and without a helper

This is an indicator of unmet need.

Indicators of how well the subject can cope with activities of daily living and probable unmet need are calculated as:



2.1.9 Mental health and well-being

Indicators of mental health and well being are derived from this questionnaire component:

Mental Health & Wellbeing			
k6a	About how often during the past four weeks did you feel nervous – all of the time, most of the time, some of the time, a little of the time, or none of the time?	1 = All of the time 2 = Most of the time 3 = Some of the time 4 = A little 5 = None 6 = Don't know 7 = Refused	[___]
k6b	During the past four weeks, about how often did you feel hopeless – all of the time, most of the time, some of the time, a little of the time, or none of the time?	1 = All of the time 2 = Most of the time 3 = Some of the time 4 = A little 5 = None 6 = Don't know 7 = Refused	[___]
k6c	During the past four weeks, about how often did you feel restless or fidgety – all of the time, most of the time, some of the time, a little of the time, or none of the time?	1 = All of the time 2 = Most of the time 3 = Some of the time 4 = A little 5 = None 6 = Don't know 7 = Refused	[___]
k6d	During the past four weeks, about how often did you feel so depressed that nothing could cheer you up – all of the time, most of the time, some of the time, a little of the time, or none of the time?	1 = All of the time 2 = Most of the time 3 = Some of the time 4 = A little 6 = Don't know 7 = Refused	[___]

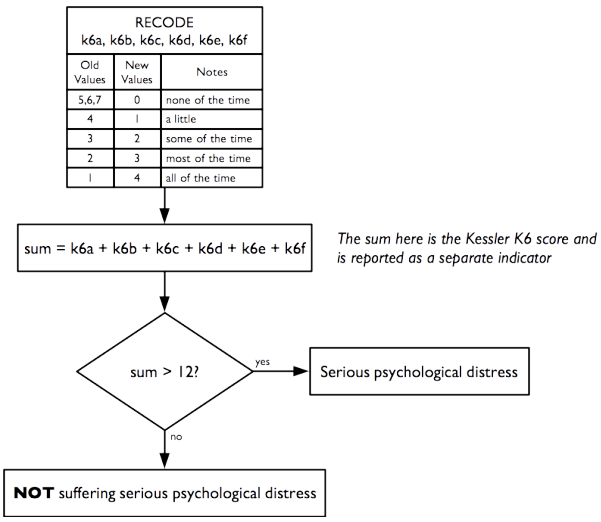
k6e	During the past four weeks, about how often did you feel that everything was an effort – all of the time, most of the time, some of the time, a little of the time, or none of the time?	1 = All of the time 2 = Most of the time 3 = Some of the time 4 = A little 5 = None 6 = Don't know 7 = Refused	[___]
k6f	During the past four weeks, about how often did you feel worthless – all of the time, most of the time, some of the time, a little of the time, or none of the time?	1 = All of the time 2 = Most of the time 3 = Some of the time 5 = None 4 = A little 6 = Don't know 7 = Refused	[___]

A score is calculated. This is the *Kessler K6 Psychological Distress Scale*. The score ranges from zero (indicating no psychological distress) to twenty-four (indicating severe psychological distress). A score of thirteen or more indicates serious psychological distress. The Kessler K6 Psychological Distress Scale is a widely recommended, widely used, accurate, reliable, and simple measure of psychological distress:

- Kessler RC, Andrews G, Colpe LJ, Hiripi E, Mroczek, DK, Normand SLT, et al, "Short screening scales to monitor population prevalences and trends in non-specific psychological distress", *Psychological Medicine*, 32(6), 2002, pp. 959–976

- Kessler RC, Barker PR, Colpe LJ, Epstein JF, Gfroerer JC, Hiripi E, "Screening for Serious Mental Illness in the General Population", *Archives of General Psychiatry*, 60(2), 2003, pp. 184-189

Indicators of mental health and well-being are calculated as:



2.1.10 Dementia

An indicator of probable dementia is derived from this questionnaire component:

Dementia Screen

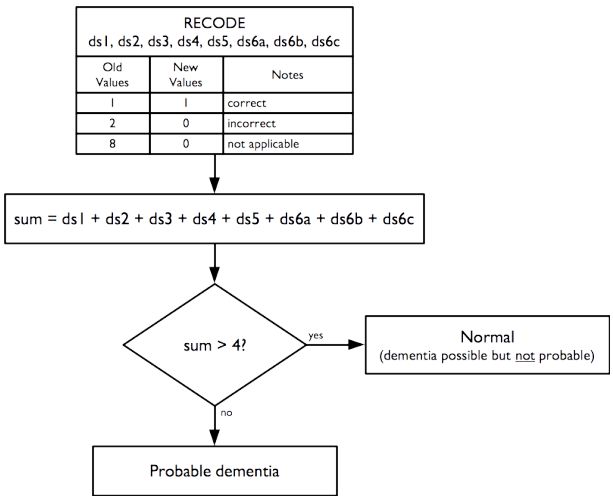
ds0 | This section can only be completed if the subject is answering for themselves. | | If the respondent is not answering for themselves then record '8' as the answer for all | questions below and continue with the interview. Write the reason why the subject is not | answering for themselves in the OBSERVATIONS section at the end of the questionnaire. | | Say : | | I am going to tell you three words. | | I would like you to repeat them after me. | | "CHILD" | | "HOUSE" | | "ROAD" | | Repeat the three words, up to a maximum of six (6) times, or until the person has | remembered them all correctly. | | Say : | | Try to remember these words. I will ask about them later.

ds1	Point to your nose and ask : `What do we call this?`	1 = Correct 2 = Incorrect 8 = Not applicable	[___]

ds2	What do you do with a hammer?
	`Accept answers such as :`
	
	`* Drive a nail into something`
	`* Straighten metal`
	`* Hit a wedge or something else`
	`* Use with a chisel`
		1 = Correct
		2 = Incorrect
		8 = Not applicable
			[___]

ds3	What day of the week is it?	1 = Correct 2 = Incorrect 8 = Not applicable	[___]
ds4	What is the season?	1 = Correct 2 = Incorrect 8 = Not applicable	[___]
ds5	Say: Please point first to the window and then to the door.	1 = Correct 2 = Incorrect 8 = Not applicable	[___]
ds6	Do you remember the three words I asked you to remember a few minutes ago?		
ds6a	CHILD	1 = Correct 2 = Incorrect 8 = Not applicable	[___]
ds6b	HOUSE	1 = Correct 2 = Incorrect 8 = Not applicable	[___]
ds6c	ROAD	1 = Correct 2 = Incorrect 8 = Not applicable	

The indicator of *probable* dementia is calculated as:



This indicator is derived from the Community Screening Instrument for Dementia (CSID) developed by the 10/66 Dementia Research Group. This is a simple, validated, and widely used indicator of probable dementia:

Prince M, et al, "A brief dementia screener suitable for use by non-specialists in resource poor settings - The cross-cultural derivation and validation of the brief Community Screening Instrument for Dementia", *International Journal of Geriatric Psychiatry*, 26(9), 2011, pp. 899–907

2.1.11 Health and health-seeking behaviour

Indicators of health and health-seeking behaviour for chronic and acute conditions are derived from this questionnaire component:

Health Seeking & Healthcare

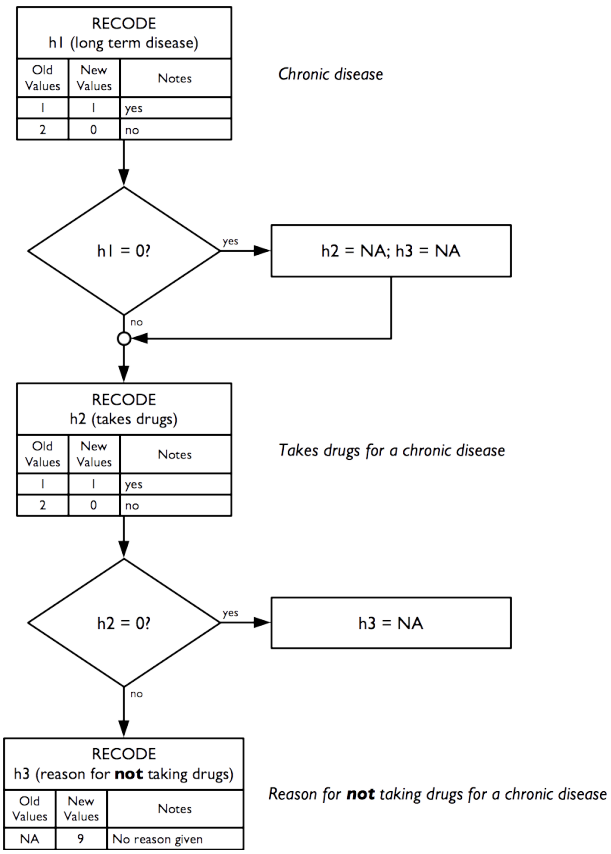
h1	Do you suffer from a long term disease that requires you to take regular medication?	1 = Yes; 2 = No	[___]
??	If ***NO*** jump to question `h4` (below)		
h2	Do you take drugs regularly for this?	1 = Yes; 2 = No	[___]
??	If ***YES*** jump to question h4		

h3	Why not?
	`Prompt for the main reason`
	`Record main reason only`
		1 = No drugs available
		2 = Too expensive / no money
		3 = Too old to look for care
		4 = Use traditional medicine
		5 = Drugs don't help
		6 = No-one to help me
		7 = No need
		8 = Other
		9 = No reason given
			[___]

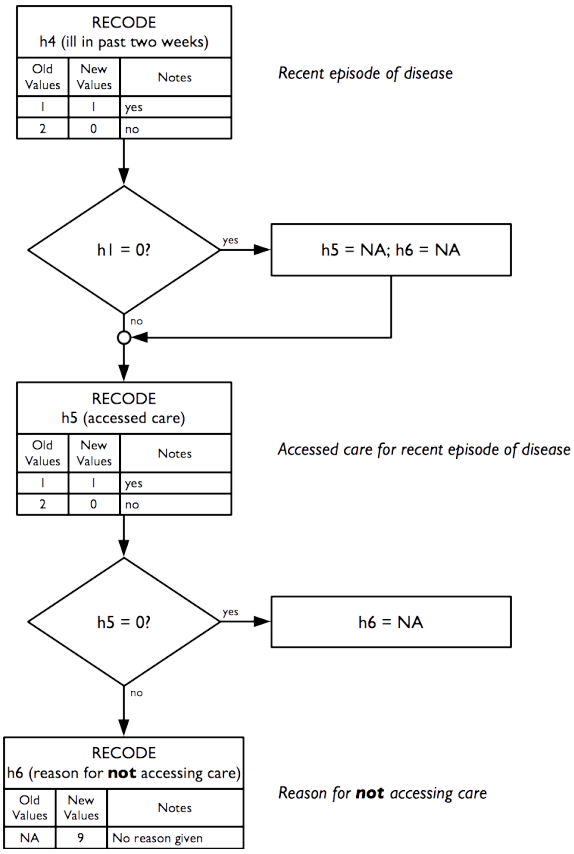
h4	Have you been ill in the past two weeks?		
??	If ***NO*** jump to question `m1` (below)		
h5	Did you go to the pharmacy, dispensary, health centre, health post, clinic, or hospital?	1 = Yes; 2 = No	[___]

?? h6	If ***YES*** then jump to question `m1` (below)
	Why not?
	`Prompt for the main reason`
	`Record main reason only`
		1 = No drugs available
		2 = Too expensive / no money
		3 = Too old to look for care
		4 = Use traditional medicine
		5 = Drugs don't help
		6 = No-one to help me
		7 = No need
		8 = Other
		9 = No reason given
			[___]

Indicators of health and health-seeking behaviour for chronic conditions are calculated as:



Indicators of health and health-seeking behaviour for acute conditions are calculated as:

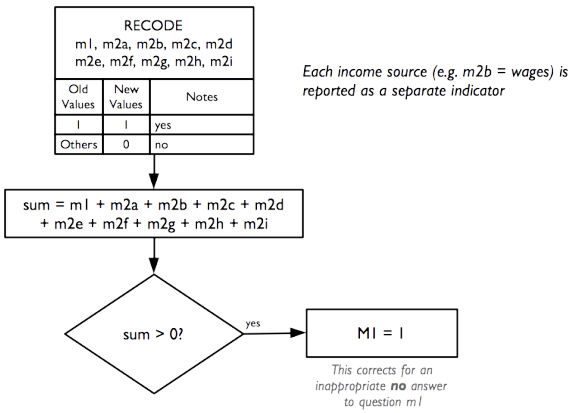


2.1.12 Sources of income

Indicators related to sources of income are derived from this questionnaire component:

Income			
m1	Do you have a personal source of income or money?	1 = Yes; 2 = No	|___|
??	Continue to question m2 even if the subject reports having no personal income…		
m2	Where does your income or money come from? (prompt "Anything else?")		
m2a	Agriculture, livestock, or fishing	1 = Yes; 2 = No	[___]
m2b	Wages or salary	1 = Yes; 2 = No	[___]
m2c	Sale of charcoal, bricks, firewood, poles, etc.	1 = Yes; 2 = No	[___]
m2d	Trading (e.g. market, shop)	1 = Yes; 2 = No	[___]
m2e	Private pension, investments, interest, rents, etc.	1 = Yes; 2 = No	[___]
m2f	Spending savings Sale of household goods, personal goods, or jewellery Sale of livestock, land, or other assets	1 = Yes; 2 = No	[___]
m2g	Aid, gifts, charity (e.g. from church, mosque, temple), begging, borrowing, or sale of food aid or relief items	1 = Yes; 2 = No	[___]
m2h	Cash transfer (NGO, UNO, government) State pension, social security, benefits, welfare program	1 = Yes; 2 = No	[___]
m2i	Other	1 = Yes; 2 = No	

and are calculated as:



The grouped income sources (i.e. `m2a`, `m2b`, etc.) and individual income sources may vary between settings. The questionnaire component shown above has proved suitable for use in Ethiopia, South Sudan, and Tanzania.

2.1.13 Water, sanitation, and hygiene

Indicators relating to water, sanitation, and hygiene (WASH) are derived from this questionnaire component:

Water, Sanitation, Hygiene			
w1	What is your main source of drinking water?		
	Piped water into dwelling	1	[___]
	Piped water into compound		
	Public tap / Standpipe		
	Tube-well / Borehole		
	Protected dug well		
	Protected spring		
	Rainwater collection system		
	Bottled water / sachet water		

	Unprotected dug well	2	
	Unprotected spring		
	Cart with small tank or drum		
	Tanker-truck		
	River, stream, dam, lake, pond, or puddle		
	Canal or irrigation channel		
	Other		

w2	What do you usually do to the water to make it safer to drink?

	Boil	1	[___]
	Add bleach / chlorine tablet		
	Use a water filter (gravel / sand / ceramic)		
	Solar disinfection		
	Strain it through a cloth only	2	
	Let it stand and settle only		
	Nothing		
	Other		
	Don't know		

w3	What kind of toilet facility do members of your household usually use?

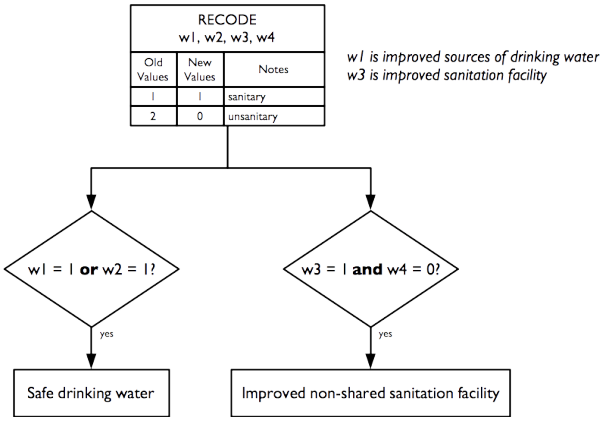
	Flush or pour flush to: Piped sewer system Septic tank Pit latrine Don't know VIP latrine Pit latrine with slab Composting toilet	1	[___]
	Flush or pour flush to: Elsewhere (anywhere not specified above) Pit latrine without slab Bucket Hanging latrine Bush or field No facilities	2	

w4	Do you share this toilet facility with other households?	1 = Yes 2 = No 3 = NA (no facility)	[___]

Indicators are calculated following:

- WHO / UNICEF, *Core Questions on Drinking-water and Sanitation for Household Surveys*, Geneva, WHO / UNICEF, 2006

Indicators relating to water, sanitation, and hygiene (WASH) are calculated as:



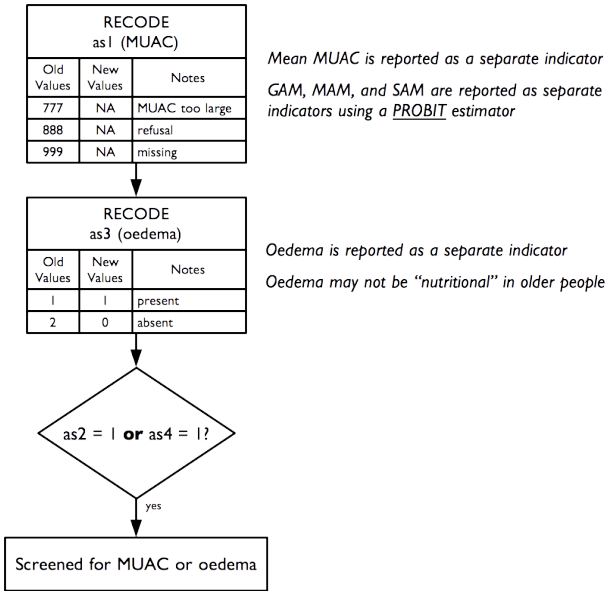
2.1.14 Anthropometry and screening coverage**

Indicators relating to anthropometry and screening coverage are derived from this questionnaire component:

Anthropometry / Screening Coverage

as1	MUAC in mm	777 = Too large 888 = Refused	[___][___][___]
as2	Has someone measured your arm like this in the previous month?	1 = Yes; 2 = No	[___]
as3	Bilateral pitting oedema	1 = Yes; 2 = No	[___]
as4	Has someone examined your feet like this in the previous month?	1 = Yes; 2 = No	[___]

And are calculated as:



Raw MUAC data (i.e. not MUAC class) is collected, entered, and analysed. This requires that an adult MUAC tape (i.e. capable of measuring MUAC to 450 mm) is used.

The presence of bilateral oedema is assessed by pressing with your thumbs **both** feet of the older person for three seconds and checking whether this creates a lasting depression or "pit" on both feet. Bilateral pitting oedema in older people may not be "nutritional" oedema (as is almost always the case with children). Older people with bilateral pitting oedema should be advised to consult a doctor.

The prevalence of GAM, MAM, and SAM are estimated using a PROBIT estimator. This type of estimator provides better precision than a classic estimator at small sample sizes:

- World Health Organisation, *Physical Status: The use and interpretation of anthropometry.*

Report of a WHO expert committee, WHO Technical Report Series 854, WHO, Geneva, 1995

Dale NM, Myatt M, Prudhon C, Briend, A, "Assessment of the PROBIT approach for estimating the prevalence of global, moderate and severe acute malnutrition from population surveys", *Public Health Nutrition*, 1–6. doi:10.1017/S1368980012003345, 2012

Blanton CJ, Bilukha, OO, "The PROBIT approach in estimating the prevalence of wasting: revisiting bias and precision", *Emerging Themes in Epidemiology*, 10(1), 2013, p. 8

The PROBIT estimator is described in Box 1.

MUAC-based case definitions for acute malnutrition are used:

```
**GAM** :   MUAC < 210 mm
**MAM** :   185 mm   MUAC < 210mm
**SAM** :   MUAC < 185mm
```

These are standard case definitions for acute malnutrition in adults and recommended by HelpAge International for use in older people in humanitarian contexts.

Note : MUAC in adults should be measured on the non-dominant arm. This is usually the left arm. The importance of high levels of accuracy and precision at the individual level is of lesser importance in survey work compared to case-finding or diagnosis in clinical contexts, for example. This means that a simple rule such as "Always measure MUAC on the left arm" may be used.

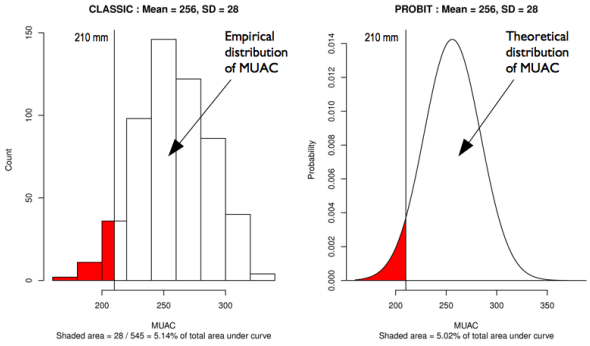
Exercise

An estimate of GAM prevalence can be made using a classic estimator:

$$\text{prevalence} = \frac{\text{number of respondents with MUAC} < 210 \text{ mm}}{\text{total number of respondents}}$$

The estimate of GAM prevalence made from the RAM-OP survey data is made using a PROBIT estimator. The PROBIT function is also known as the *inverse cumulative distribution* function. This function converts parameters of the distribution of an indicator (e.g. the mean and standard deviation of a *normally* distributed variable) into cumulative percentiles. This means that it is possible to use the normal PROBIT function with estimates of the mean and standard deviation of indicator values in a survey sample to predict (or estimate) the proportion of the population falling below a given threshold. For example, for data with a mean MUAC of 256 mm and a standard deviation of 28 mm the output of the normal PROBIT function for a threshold of 210 mm is 0.0502 meaning that 5.02% of the population are *predicted* (or *estimated*) to fall below the 210 mm threshold.

Both the classic and the PROBIT methods can be thought of as estimating area:



The principal advantage of the PROBIT approach is that the required sample size is usually smaller than that required to estimate prevalence with a given precision using the classic method.

The PROBIT method assumes that MUAC is a normally distributed variable. If this is not the case then the distribution of MUAC is transformed towards normality.

The prevalence of SAM is estimated in a similar way to GAM. The prevalence of MAM is estimated as the difference between the GAM and SAM prevalence estimates:

$$\widehat{MAM prevalence} = \widehat{GAM prevalence} - \widehat{SAM prevalence}$$

2.1.15 Visual impairment

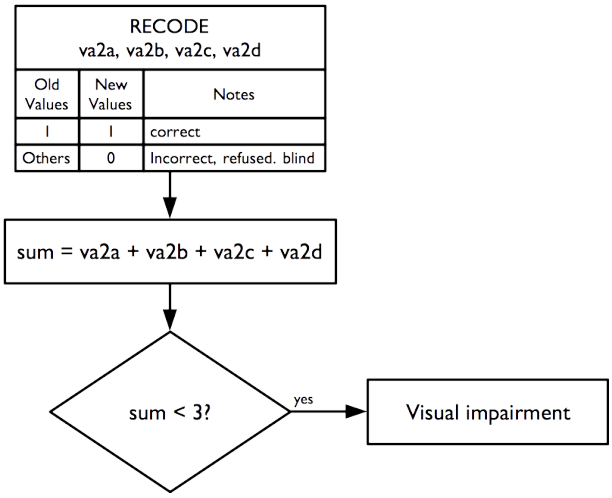
An indicator of visual impairment is derived from this questionnaire component:

Visual Acuity

va1	Do you normally wear glasses? *If the person wears glasses, ask if they are more comfortable wearing their glasses to look at your chart at 2 meters. Let the person decide.* *Demonstrate (close to the person) how to do the 'tumbling E' test:* • Show the direction the E is pointing. • Ask the person if they understand. REPEAT if needed. Test with E at 2 meters: • Use the string to measure 2 meters from the person. • Hold the card at eye level and 2 meters away from the person. • Turn the card in four different directions. Hide the card in your back before turning it each time.

va2a	First time	1 = Correct 2 = Incorrect 3 = Refused 4 = Blind	[___]
va2b	Second time	1 = Correct 2 = Incorrect 3 = Refused 4 = Blind	[___]
va2c	Third time	1 = Correct 2 = Incorrect 3 = Refused 4 = Blind	[___]
va2d	Fourth time	1 = Correct 2 = Incorrect 3 = Refused 4 = Blind	[___]

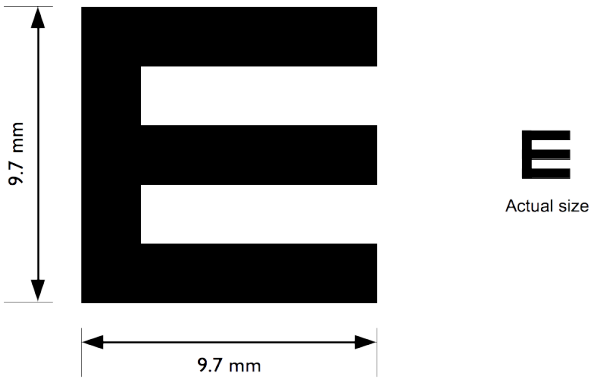
And is calculated as:



The "illiterate E" or "tumbling E" (the preferred term) is a validated and widely used method for measuring visual acuity:

- Taylor HR, "Applying new design principles to the construction of an illiterate E chart", *American Journal of Optometry & Physiological Optics*, 55:348, 1978
- Kaiser PK, "Prospective Evaluation of Visual Acuity Assessment: A Comparison of Snellen Versus ETDRS Charts in Clinical Practice (An AOS Thesis)", *Transactions of the American Ophthalmological Society*, 107: 311–324, 2009

The size of the "E" used:



as well as the distance used for the test (two metres) and the indicator calculation apply the WHO case definition of visual impairment (i.e. visual acuity $< 6 / 18$).

The tumbling E card should be laminated (i.e. plastic coated and have a two metre cord attached which helps to ensure that the visual acuity test is performed at the correct distance (See Figure 2.1).

After demonstrating to the respondent what the test is about (i.e. the subject should indicate which direction the branches of the 'E' are pointing), the test is administered at a distance of two meters, turning the card in four different directions, and asking the person to indicate which direction the branches of the "E" is pointing. If the subject wears glasses, they are allowed to use them during the test if they want to.

Note : If the person is unable to correctly answer at least three times out of four, they have a visual impairment. A simple visual acuity test such as the 'tumbling E' test also does not indicate anything about an underlying disease such as glaucoma or the need for reading spectacles (presbyopia). These conditions are common in people aged 60 years or older. Subjects failing the visual acuity test should be counselled to visit an ophthalmologist for a detailed eye examination.

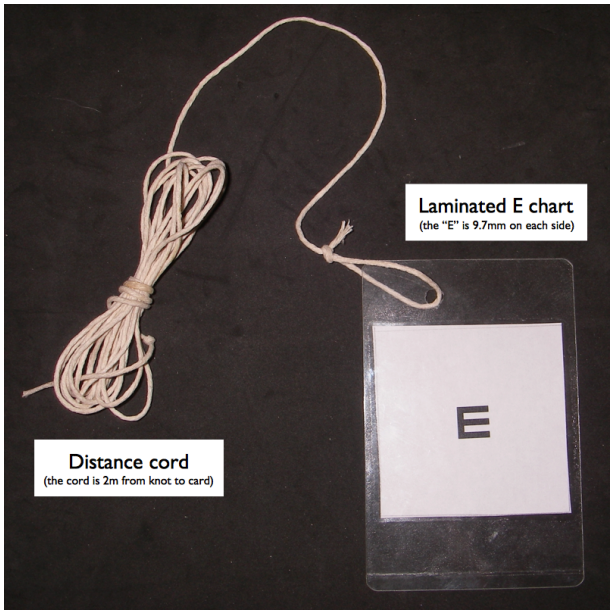


Figure 2.1: Equipment used to measure visual acuity

2.1.16 Miscellaneous indicators

Data for a small group of miscellaneous indicators are also collected and reported. These are derived from these questions:

Hunger – Ration - Relief			
f6	Are you or anyone in your household receiving a food ration on a regular basis?	1 = Yes; 2 = No	[___]
f7	Have you or another member of your household received non-food relief items such as soap, bucket, water container, bedding, mosquito net, clothes, or plastic sheet in the previous four weeks?	1 = Yes; 2 = No	[___]

Activities of Daily Living			
a8	Do you have problems chewing food?	1 = Yes; 2 = No	[___]

and are calculated as:

RECODE a8 (problem chewing food)		
Old Values	New Values	Notes
1	1	yes
2	0	no

"Problems chewing food" is reported as a separate indicator

RECODE f6 (any ration)		
Old Values	New Values	Notes
1	1	yes
2	0	no

"Anyone in household receives a ration" is reported as a separate indicator

RECODE f7 (non-food relief items)		
Old Values	New Values	Notes
1	1	yes
2	0	no

"Received non-food relief items in previous month" is reported as a separate indicator

2.2 A note on data management and data analysis

This section has described how RAM-OP data is used to create a broad set of indicators. If you do not want to use the standard RAM-OP software to do this then you can use this information to create data entry systems and data management scripts for your favoured database or statistical analysis software. See the sections on **RAM-OP datasets** and **RAM-OP questionnaire** for more compact information on variable names and codes that you may find helpful.

It is important to note that data analysis procedures need to account for the sample design. All major statistical analysis software can do this (details vary). There are two things to note:

- The RAM-OP sample is a two-stage sample. Subjects are sampled from a small number of primary sampling units (PSUs).
- The RAM-OP sample is **not** prior weighted. This means that you will need to provide per-PSU sampling weights. These are usually the populations of the PSU.

You will need to specify this sample design to your statistical analysis software. If you fail to do this then your analysis may produce estimates that place undue weight to observations from smaller communities with confidence intervals with lower than nominal coverage (i.e. they will be too narrow).

The standard RAM-OP software uses *blocked weighted bootstrap* estimation approach:

- **Blocked** : The block corresponds to the PSU or cluster.
- **Weighted** : The RAM-OP sampling procedure does not use population proportional sampling to weight the sample prior to data collection as is done with SMART type

surveys. This means that a posterior weighting procedure is required. The standard RAM-OP software uses a "roulette wheel" algorithm to weight (i.e. by population) the selection probability of PSUs in bootstrap replicates.

A total of `m'` PSUs are sampled *with-replacement* from the survey dataset where `m'` is the number of PSUs in the survey sample. Individual records within each PSU are then sampled *with-replacement*. A total of n' records are sampled *with-replacement* from each of the selected PSUs where `n'` is the number of individual records in a selected PSU. The resulting collection of records replicates the original survey in terms of both sample design and sample size. A large number of replicate surveys are taken (the standard RAM-OP software uses $r = 399$ replicate surveys but this can be changed). The required statistic (e.g. the mean of an indicator value) is applied to each replicate survey. The reported estimate consists of the 50th (point estimate), 2.5th (lower 95% confidence limit), and the 97.5th (upper 95% confidence limit) percentiles of the distribution of the statistic observed across all replicate surveys. The blocked weighted bootstrap procedure is outlined in Figure 2.2.

The principal advantages of using a bootstrap estimator are:

- Bootstrap estimators work well with small sample sizes.
- The method is *non-parametric* and uses empirical rather than theoretical distributions. There are no assumptions of things like normality to worry about.
- The method allows estimation of the sampling distribution of almost any statistic using only simple computational methods.

The standard RAM-OP data analysis software is described in the section **Standard RAM-OP software**.

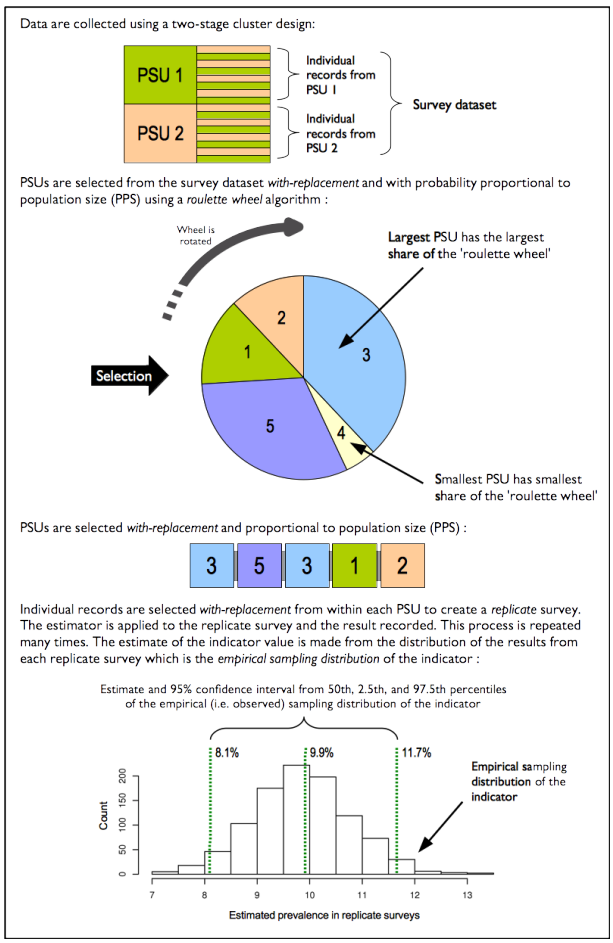


Figure 2.2: The blocked weighted bootstrap used by the standard RAM-OP software

Chapter 3

The RAM-OP questionnaire

Modules of the RAM-OP questionnaire are presented in the **RAM-OP indicators** section of this manual. The entire RAM-OP questionnaire is presented in the following pages. This questionnaire is composed of many tested and validated components. The order of the questions and the format of the questionnaire have been tested in several settings (Chad, Dadaab Camps, South Sudan, Ethiopia, and Tanzania) over a period of three years. It is strongly recommended that you do **not** change the questionnaire, other than translating it into a language other than English and necessary localisation (i.e. adapting the questions to meet the language, cultural, and other requirements of a specific target population in order to ensure that the words, names, terms, and concepts used are culturally appropriate and understandable to them), unless you are very sure of what you are doing. Modifying the questionnaire may have one or more of the following consequences:

- **Modifying the order of the questions or adding questions** : The links with the data entry, data checking, and data analysis software will be broken. You will have to modify the software to accommodate your changes.
- **Modifying the variable names** : The links with the data entry, data checking, and data analysis software will be broken. You will have to modify the software to accommodate your changes.
- **Modifying the content or the phrasing of questions** : All questions have been tested and are formulated for accuracy and reliability (precision). Modifying them may lead to loss of accuracy (bias) and precision

When translating the questionnaire you should check if validated question sets for each indicator module are already available in your local language. This is likely to be the case for the food intake, severe food insecurity, activities of daily living, mental health and well-being, dementia, water / sanitation / hygiene, and visual impairment indicator modules. There may also be local language training modules and guidelines available for these modules.

Localisation is recommended for:

- **Food groups** : Remove inappropriate foodstuffs and give examples of local foodstuffs.
- **Income sources** : Review income types and income categories.

The question numbers used on the questionnaire are the names of variables used in the RAM-OP data entry, data checking, and data analysis software. Leaving these as they are will be helpful if you intend to use the RAM-OP data-entry and data-analysis software.

The questionnaire can be downloaded (in ODT and PDF format) from http://www.brixtonhealth.com/qesRAMOP.zip

Chapter 4

Datasets

This section details the RAM-OP datasets. The information presented here is of most use if you decide not to use the RAM-OP data entry and data checking software. You might, for example, decide to enter survey data using spreadsheet software such as Microsoft Excel. If you do this and want to use the RAM-OP data analysis software then you will need to export the data as a comma-separated-value (CSV) file with the same variable names, variable types and lengths, and using the same codes as shown in the tables in this section. For the main RAM-OP survey dataset these are the same variable names, variable types, variable lengths, codes, and in the same order as shown on the standard RAM-OP questionnaire.

There are **two** RAM-OP datasets:

1. **The main RAM-OP survey dataset** : This is the data collected by the survey questionnaire. The dataset definition for the main RAM-OP dataset is shown in Figure 4.1.
2. **The PSU dataset** : This a short and narrow file with one record per PSU and just two variables:

psu	The PSU identifier. This **must** use the same coding system used to identify PSUs that is used in the main RAM-OP dataset.
pop	The population of the PSU.

The PSU dataset is used during data-analysis to weight data by PSU population.

If you do not know population sizes (as might be the case in emergencies) then you can collect this data:

- When you visit the PSU (i.e. from community leaders or health centres).
- When you visit the PSU as a doorway count or roof count.
- Using recent satellite imagery as a roof count.

Relative population sizes can be used. If no better data is available then it is reasonable to use

a simple semi-quantitative assessment such as:

Type of place	**Population range***	Features	Record population as …
Hamlet	< 1,000	Very small local market or no market	1
Village	1,000 – 4,000	Market and small shops serving the village and the surrounding hamlets	2
Town	4,000	Large market, many shops (some specialised), guest houses, bus station, government offices	4

*These ranges may need to be adjusted to match local circumstances.

The PSU dataset must be in comma-separated-value (CSV) format (see Figure 4.2) for use with the RAM-OP data analysis software.

Administrative Data		
Name	**Type***	**Codes**
ad2	##	None**
Identifying Data		
Name	**Type***	**Codes**
psu	###	None**
hh	##	None***
id	#	None***
Demography & Situation		
Name	**Type***	**Codes**
d1	#	1, 2, 3, 4
d2	###	888***
d3	#	1, 2
d4	#	1, 2, 3, 4, 5, 6
d5	#	1, 2
Food Intake		
Name	**Type***	**Codes**
f1	#	None
f2a	#	1, 2
f2b	#	1, 2
f2c	#	1, 2
f2d	#	1, 2
f2e	#	1, 2
f2f	#	1, 2
f2g	#	1, 2
f2h	#	1, 2
f2i	#	1, 2
f2j	#	1, 2
f2k	#	1, 2
f2l	#	1, 2
f2m	#	1, 2
f2n	#	1, 2
f2o	#	1, 2
f2p	#	1, 2
f2q	#	1, 2
f2r	#	1, 2
f2s	#	1, 2

Hunger – Ration - Relief		
Name	**Type***	**Codes**
f3	#	0, 1, 2, 3
f4	#	0, 1, 2, 3
f5	#	0, 1, 2, 3
f6	#	1, 2
f7	#	1, 2
Disability		
wg1	#	0, 1, 2, 3
wg2	#	0, 1, 2, 3
wg3	#	0, 1, 2, 3
wg4	#	0, 1, 2, 3
wg5	#	0, 1, 2, 3
wg6	#	1, 2
Activities of Daily Living		
Name	**Type***	**Codes**
a1	#	1, 2
a2	#	1, 2
a3	#	1, 2
a4	#	1, 2
a5	#	1, 2
a6	#	1, 2
a7	#	1, 2
a8	#	1, 2
a9	#	1, 2
Mental Health & Wellbeing		
Name	**Type***	**Codes**
k6a	#	1, 2, 3, 4, 5, 6, 7
k6b	#	1, 2, 3, 4, 5, 6, 7
k6c	#	1, 2, 3, 4, 5, 6, 7
k6d	#	1, 2, 3, 4, 5, 6, 7
k6e	#	1, 2, 3, 4, 5, 6, 7
k6f	#	1, 2, 3, 4, 5, 6, 7
Dementia Screen		
Name	**Type***	**Codes**
ds1	#	1, 2, 8
ds2	#	1, 2, 8
ds3	#	1, 2, 8
ds4	#	1, 2, 8
ds5	#	1, 2, 8
ds6a	#	1, 2, 8
ds6b	#	1, 2, 8
ds6c	#	1, 2, 8

Health Seeking & Healthcare		
Name	**Type***	**Codes**
h1	#	1, 2
h2	#	1, 2
h3	#	1, 2, 3, 4, 5, 6, 7, 8, 9
h4	#	1, 2
h5	#	1, 2
h6	#	1, 2, 3, 4, 5, 6, 7, 8, 9
Income		
Name	**Type***	**Codes**
m1	#	1, 2
m2	#	1, 2
m2a	#	1, 2
m2b	#	1, 2
m2c	#	1, 2
m2d	#	1, 2
m2e	#	1, 2
m2f	#	1, 2
m2g	#	1, 2
m2h	#	1, 2
m2i	#	1, 2
Water, Sanitation, Hygiene		
Name	**Type***	**Codes**
w1	#	1,2
w2	#	1,2
w3	#	1,2
w4	#	1,2,3
Anthropometry & Screening		
Name	**Type***	**Codes**
as1	###	777***, 888***
as2	#	1,2
as3	#	1,2
as4	#	1,2
Visual Acuity		
Name	**Type***	**Codes**
v2a	#	1, 2, 3, 4
v2b	#	1, 2, 3, 4
v2c	#	1, 2, 3, 4
v2d	#	1, 2, 3, 4

* All variables are integers. The number of # characters indicates the width of the variable.
** Codes for teams and PSU identifiers to be assigned by the survey supervisor.
*** Credible ranges should be applied to these variables.

Figure 4.1: Main RAM-OP dataset definition

The RAM-OP data analysis requires that the main RAM-OP survey dataset is supplied in either an **EpiInfo v6.xx** or **EpiData (REC)** format or in a comma-separated-value (CSV) format file The RAM-OP data analysis requires that the PSU dataset is supplied in a comma-separated-value (.CSV) format file. Figure 4.2 shows an example of a PSU dataset in comma-separate-value (CSV) format.

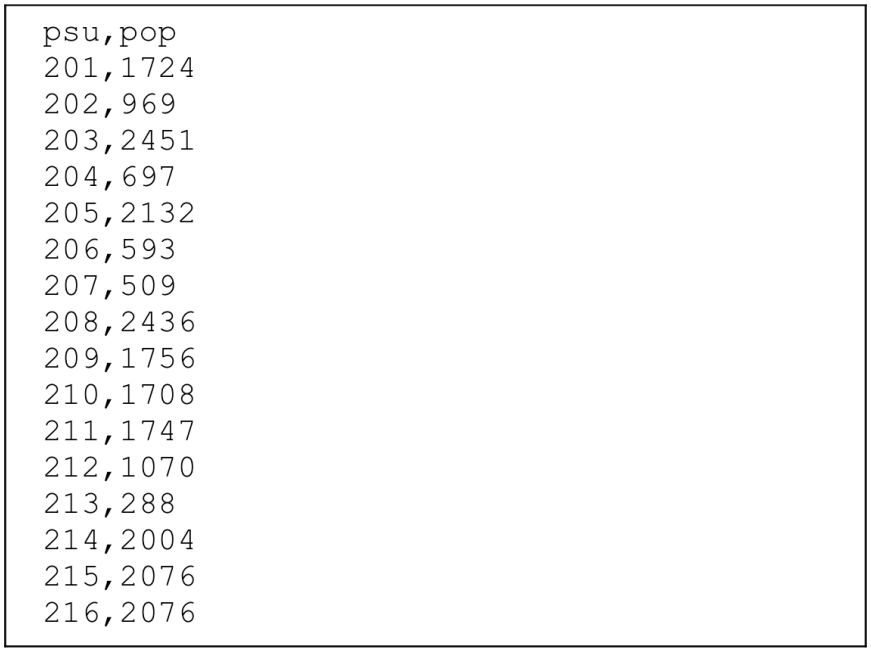


Figure 4.2: An example comma-separated-value (CSV) format file (the example is for a RAM-OP PSU dataset)

Note that the first line of a CSV format file gives the names of the variables (e.g. these are `psu` and `pop` for the PSU dataset) separated by commas. Subsequent lines contain data with items separated by commas and with one record per line. CSV format files can be created using a plain text editor (e.g. **Notepad**) or with a spreadsheet application such as **Microsoft Excel™**. If you use a spreadsheet application then you will have to be careful:

- Variable names and data items must be separated by commas (not tab characters or semi-colon characters).
- Numbers with decimal places must use the full-stop character as the decimal separator. In some settings a spreadsheet application may want to use the comma character as the decimal separator.
- Avoid using accented characters in the names of and in the data entered into text variables. These characters can sometimes confuse the RAM-OP data analysis software. A CSV file should contain only plain text, number, and commas without formatting. Do **not** use a word processor application such as **Microsoft Word™** to create or edit a CSV file.

If you have problems using a CSV file then you should check and edit the file using a plain text-editor such as **Notepad** or a dedicated CSV editor such as Ron's Editor (http://www.ronsplace.eu/Products/RonsEditor)

Remember to backup your data before editing it.

Chapter 5

Practical Fieldwork

This section is intended to guide you through the different steps leading up to the fieldwork once the survey location has been identified, and gives some tips on how the fieldwork might be organised.

5.1 Authorisations and clearances

Before implementing the survey, you will need to get all the authorisations relevant to the country in which you plan to work. These could include:

- **Clearance from the national nutrition cluster** or the equivalent structure co-ordinating national assessment activities. In humanitarian contexts, this might be the only clearance that you will need at the national level.
- **Ethical approval** : This is obtained from the country's national ethical committee (or equivalent). Some NGOs and UNOs also have ethical committees and you may also need to submit your survey plans to them for ethical approval. It may be necessary to work with both national and local ethical committees. The process of gaining ethical approval can take several months. It is important to note that RAM-OP surveys are needs assessments rather than experiments upon human subjects. This means that ethical clearance may not be required for RAM-OP surveys, or that it can be given by the chair of the appropriate ethical review committee without the need for a full meeting of the ethical review committee. It is a good idea to check this with the chair of the appropriate committees to see if permissions can be expedited. Getting ethical clearance is often very useful when applying for other permission as it shows that some technical quality assurance has been done.
- **Authorisation from the appropriate government departments** at various levels (i.e. national, regional, and at the level where you are going to implement the survey). Authorisation of the authority managing the survey site should be sought. For example,

a survey in a refugee camp will need the authorisation of UNHCR, the national administrative authority in charge of refugees and displaced persons, and the agency in charge of the camp management. In some settings you may also need to obtain authorisation from other government departments such as the Ministry of Health, the Department of Rural Affairs, or the Department of Social Affairs.

- **Authorisation from the administrative authorities at local level** : Make sure that all levels of the local administration are informed about what you intend to do (i.e. what, where, and when). It is essential to meet with the local administrative and health authorities prior to the survey. This is done to avoid problems with permissions and to involve them in the implementation of the survey. Describe the survey and explain what might be expected from their staff. You might, for example, need some help in identifying the exact location and boundaries of villages and hamlets in rural areas, or blocks and sections of towns in urban areas. You might need translators or guides to travel with the enumerators, and you might need facilitators to introduce you to village executives. Make sure that you share the results of the survey with them once it is available.

- **Security clearance** : Be aware of the potential security problems in the survey area. Inform all agencies with security responsibilities in the area about the dates and locations of the survey. The police or the army may have to be specifically informed. You may also need to negotiate access with non-state actors. Field staff should be provided with copies of official documents (in the local language) proving that they are authorised to carry out survey work in the specific area between specific dates. They will have to carry this document with them at all times during the fieldwork and present it on request to local authorities and study subjects. It can also be useful to give a copy of this and other official documents to village leaders on arrival at the survey location.

5.2 Working with a local partner

It is often very useful to prepare and carry out the survey in collaboration with one or more local partners, such as a local NGO, the local health authority, or the camp management agency in a refugee camp.

If feasible, you should recruit a representative of your local partner as a “survey facilitator” with responsibility for liaising with the national and local stakeholders.

This person will support your survey preparation with the following:

- At national or regional level, support the endorsement of the survey objectives by the national authorities, and facilitation in obtaining the relevant authorisations and clearances.

- At local level, be the link between you and the local communities informing health staff and village leaders in the areas where the enumerators are going to sample households. This information should be disseminated before the survey starts and reiterated a day or two before teams travel to survey locations either by telephone or by personal visits.
- Provide you with a list of useful contacts (with telephone numbers) for each of the areas covered by the survey. This list should be shared with all program staff.
- Identify local guides or translators to support the teams in the field.
- In-depth knowledge of the survey area, useful for checking the location of the villages to be surveyed on a map.
- Information about travel and security constraints, travel distances and times, and assist in formulating the survey travel plan.
- Support with the survey logistics, such as renting vehicles, renting accommodation and training venues, where to purchase food and drinks, where to have forms and questionnaires printed / copied, etc.
- Help with the referral of malnourished or sick older people identified during the survey by liaising with community services, ambulance services, and relevant health facilities as needed.

The local partner will also help you disseminate the results of the survey to the various stakeholders, and might be involved in response plans following the assessment.

5.3 Translating the questionnaire

Precision and accuracy are improved by translating the questionnaire in the local language appropriate to the survey area before data is collected. This allows enumerators to ask questions using the same language and terminology in every interview.

Thorough training of the enumerators in applying the questionnaire will also improve the precision and accuracy of your survey results.

A translated questionnaire may also be a requirement for getting the ethical clearance for the survey.

We advise you to use an iterative translation process and use:

- **Standard language if available** : Most indicators used in RAM-OP have question sets available in different languages. You can check for these online. You may need to alter some language to account for local dialects and idioms but using standard language, when it is available, can save you a lot of time and effort

- **Knowledgeable lead translators** : You need to use people who know the target language and culture but are also fluent in the starting language of the questionnaire.
- **Forward translation and back translation** : The questionnaire is translated from English, for example, into the local language by one person or team (this is *forward translation*) and is then translated back into the original language by another person or team (this is *back translation*). The back translated questionnaire is then checked against the original questionnaire. Differences are then analysed and a new translation produced. You may need to go through this process several times until a satisfactory version of the translated questionnaire is reached.
- **Your survey staff** to provide language and to pilot (i.e. test) questionnaire components as they are translated. Piloting can be done with community members and by role-playing between survey staff. Test interviews and group discussions usually help to improve the language used in the questionnaire.
- **Your intended survey population** to help you make sure that the language you are using is simple and to the point. Test interviews and group discussions usually help to improve the language used in the questionnaire.

Having enumerators translate the English language questionnaire (for example) each time they apply the questionnaire is **not** a good option and should be avoided.

5.4 Supervisors, enumerators, and data entry staff

The more survey teams you recruit and use, the quicker the survey will be finished. However, the number of teams should be linked to your capacity for supervision. Also, having a large number of teams usually means that you will need a large number of vehicles and drivers. This can be hard to achieve and hard to manage.

We recommend that you recruit three teams of two enumerators with one supervisor per team. The duties of supervisors and enumerators are:

Supervisors have to take all necessary actions to ensure the accuracy of the collected data, particularly:

- Checking equipment before departure and when leaving the survey site.
- Travelling with a team every day, to observe and correct the enumerators' work.
- Introducing teams to local leaders.
- Ensuring households and subjects are selected properly, that the interviews are conducted with respect and thoroughness, and that measurements are taken and recorded accurately.

Enumerators are in charge of implementing the field procedures:

- Identifying the households to survey.

- Apply the questionnaires to older people.
- Measure MUAC, oedema, and visual acuity and complete questionnaires.

If each team can complete a single PSU per day (this is the minimum you can expect from a team) then the survey may be completed in six days (i.e. three PSUs per day for five days plus one PSU on the last day). This will depend on context and on the teams' expertise. It is often possible for a team to reach more than one location per day, such as in cities or camps where sectors and blocks are close to each other and travelling time is not high. You will often find that survey data can be collected in just four or five days.

It is important not to rush data collection. It is also important to supervise the teams from day one in order to ensure they follow the proper sampling procedures and applying the questionnaires correctly.

It is advisable to enlist more enumerators to be trained than the minimum number needed. This will ensure that you have sufficient enumerators should you find, during training, that some recruits cannot perform their duties well enough. It will also provide additional trained staff should you need to cover for absences, due to illness for example. Make sure that you enlist both male and female trainees.

You will also need to recruit data entry staff. The workload for the data entry staff is usually between about thirty-six and seventy-two questionnaires per day.

5.5 Training of enumerators

Training the enumerators is a crucial step to ensuring the quality of the data collection.

At the end of training each enumerator should be able to:

- Explain the objectives of the survey.
- Sample households and older people in the survey area following the appropriate field procedures.
- Introduce themselves to older people in a polite and respectful manner.
- Apply the questionnaire smoothly and efficiently.
- Properly measure MUAC, check for bilateral pitting oedema, and properly measure visual acuity.
- Complete the questionnaire neatly and without making mistakes (including the correct numbering of PSU, households and individual subjects).
- Advise the subject or their family in case there is a need for referral, such as to a health facility.

A typical first RAM-OP training course will last for five days:

Day 1	Presentation of your organisation (mission, code of conduct, etc.) Objectives of the survey How are we going to do it? Questionnaire : First reading and explanations Recap
Day 2	Field procedures Job descriptions Measurements: MUAC, oedema, visual acuity (practice on each other) Questionnaire : Role-playing Lessons learned Recap
Day 3	Measurements: MUAC, oedema, visual acuity (practice on ten older people) Testing the questionnaire with ten older people Lessons learned Recap
Day 4	Questionnaire : Role-playing Field procedures : Recap and group work Recap
Day 5	Field test : Practical field procedures, etc. in one community Lessons learned from field test Recap

Additional notes:

- **Practising the questionnaire** : This is very important. Each training day should contain some work on the questionnaire. Particular attention is paid to the content and function of each question set, the numbering system for the PSU, household, and subject, the meaning / intention of each question set, skip / jump patterns, coding, ranges, and checking for completeness and consistency. Extensive use should be made of role-playing (in pairs and in groups) and testing with eligible subjects. Care needs to be taken to ensure that **all** field staff have extensive practice in working with the questionnaire.
- **Practising measurements** : This is very important. Most training days should contain some work on measurement. Care needs to be taken to ensure that **all** field staff have extensive practice in taking **all** measurements.

- **Standardisation of measurement** : A formal standardisation exercise for MUAC measurement is **not** required. The format of such an exercise does, however, provide a useful framework for training enumerators to measure MUAC with acceptable accuracy and precision by:
  - Comparisons of measurements made by different enumerators on the same person to explore accuracy (bias).
  - Comparisons of measurements made by different enumerators on the same person with the measurements made by the training supervisor to explore accuracy (bias).
  - Repeated measurements on the same persons by the same enumerator to explore repeatability (precision).
- **Ten older people** : The survey facilitator should be able to mobilise ten older people (women and men) to participate in questionnaire and measurement exercises. Make sure to explain to these volunteers what is going to happen to them. The exercises will last a half day (maybe longer) and may be quite tiring for older persons. Make sure they are comfortably accommodated, organise their transport to and from the training venue (which should be easily accessible and so avoiding stairs), indoors or under shelter, with chairs or benches. Provide safe drinking water and possibly tea, coffee and snacks. It is also advisable to provide them with a small *ex gratia* payment.
- **The field test** : This will put the trainees in to field conditions but without the stress of having to take a full sample. It is a "dummy run" of all survey activities. Divide the trainees into teams assigning a supervisor to each team. The test area should not be one of the areas to be sampled for the survey and can be close to the training venue.

At the end of the training week, you should be able to select the best enumerators and divide them in to teams, balancing genders and personalities, as well as strengths and weaknesses.

5.6 Survey logistics

Thorough logistics preparation is essential to the smooth implementation of a survey. Transportation is particularly important.

5.6.1 Transportation

Ideally you will need one car and driver per survey team. Depending on the area, you may be able to reduce this number and organise the survey travel plan so that vehicles can be pooled between the teams. You will need strong cars (ones adapted to the terrain) and reliable and safe drivers ready to work flexible hours.

It is very useful to brief the teams and the drivers about the management of the cars:

- Who gives instructions to the drivers on a daily basis. One person per car should be in charge.
- Who is checking the car log book every morning and every evening.
- What to do in case of an accident.

All staff should be given the contact telephone numbers of all the drivers

Safety and security procedures should be followed thoroughly, such as use of seat belts, speed limits, prohibitions on "racing", carrying of water, first aid kits, and spare wheels.

5.6.2 Tools and equipment

The equipment needed for a RAM-OP survey is minimal:

- MUAC tapes for adults (i.e. minimum 450 mm long, graduated in millimetres).
- A "tumbling E chart" to perform the visual acuity test.
- Pens, notebooks, clip-boards, etc.
- Questionnaires.
- Maps of the area showing PSU locations.
- PSU maps (if required).
- Official letters of authorisation to carry out the survey.

Every morning during the survey, each team should receive a schedule of that day's activities detailing the team's objectives for the day giving PSU numbers, location, PSU maps, sample target sizes, local contact information, emergency contact list, etc.

5.7 Data collection

Each team should be able to survey at least one PSU per day.

No community mobilisation is necessary but community officials should be informed of your arrival in advance.

Avoid sampling at special or busy times, such as holy days and market days.

When arriving in the community, the teams should introduce themselves to community leaders and explain the conduct of the survey.

The supervisor should collect and record information about the PSU's total population.

The team should then explore the boundaries of the community and perform mapping and segmentation as required.

Eligible subjects are usually people aged 60 years and older (this may differ in some settings). We accept the respondents' statement of their own age, and we do not challenge them if they appear younger or older than the age they declare. We usually do not ask for a proof of age. However, it might be useful to have compiled a list of events related to the past hundred years of the country's history, as some older people do not remember their age, but remember living at the time of some remarkable events (independence, elections, wars, etc). Women often remember the age at which they had their children

All eligible older people present in and belonging to the sampled household are interviewed and measured, even if the required quota of respondents has been reached. Older people visiting the household should only be included if they are residing there for more than two weeks. Person such as maids, houseboys, watchmen, and carers should be treated as part of the household (i.e. should be interviewed) if the sampled dwelling / compound is their principal place of residence. Older people should be interviewed in their houses. It is not good practice to have the older people in the community gathered in one place.

When entering older people's houses, the enumerators should always be polite, respectful, and attentive not to intrude on people's privacy.

Older people should not be intimidated into answering the questionnaire or being measured. They always have a right to refuse to answer some or all of the questions and to refuse measurements. Refusals should be noted on the questionnaire.

Some of the questions are of an intimate nature. Be careful not to administer the questionnaire in an open space where everybody present can hear the answers. This may embarrass the respondent or cause the respondent to answer wrongly. This is important as a "wrong answer" will tend to hide need and will bias the survey results.

Some older women may object to having their MUAC taken by a man (or vice versa). This is why it is advisable that the team has both male and female members. This not always possible, but older people are often more free from prejudices than the younger members of their community. It is rare for an older woman to refuse to expose her arms or feet before a male enumerator, and also rare that an older man objects to being measured by a female enumerator.

5.8 Survey planning

Here is a typical timetable of survey activities:

When?	What?
Several weeks in advance	• Identify survey area • Recruit local partner • Obtain ethical clearance • Obtain technical approval from relevant bodies • Obtain permissions and letters from appropriate authorities • Start translation of questionnaire • Obtain maps / lists as required • Obtain map(s) of the survey area
One month in advance	• Advertise staff positions • Recruit and contract supervisors • Define first stage sample from list / map • Make (draft) survey travel plans • Obtain permissions for travel • Book training venue • Arrange staff accommodation (if required) • Continue translation of questionnaire • Begin sourcing equipment • Identify potential suppliers and contractors
One week before the training	• Recruit enumerators • Purchase equipment • Book vehicles and drivers • Review and print / copy training manual • Print translated questionnaire for the training • Print “daily program” forms • Finalise survey travel plans • Disseminate travel plans to local authorities (with survey facilitator) • Arrange logistics for the training

When?	What?
During the training	• Arrange for ten older people to participate in training. • Revise the questionnaire with the trainees. • Print revised version of questionnaire for the field test (c. 50 copies) • Arrange the logistics for the field test (vehicles, drivers, equipment) • Review logistics arrangements with the trainees
At the end of the training	• Provide each trainee with a certificate of attendance • Pay the training incentives • Review and amend questionnaire from the feedback of the field test • Print survey questionnaires (c. 250 copies) • Recruit enumerators and data entry staff
During the survey	• Train the data entry clerk (day one) using the results of the field test • Manage survey activities (see below) • Data entry and cleaning
At the end of the survey	• Complete data entry • Provide all staff with certificates of participation • Pay incentives • Thank the local authorities • Party for all staff • Data analysis and reporting • Disseminate results

5.9 Daily survey activities

Here is a list of typical survey activities:

When?	What?
Morning	• Brief the teams on the day's objectives • Provide feedback on the previous day (success and failures, correction of mistakes made in field procedures or data collection). • Discuss problems with supervisors • Provide water and snacks (or food allowance) • Provide forms, questionnaires, maps (as required)
Evening	• Check the data entry with the data-entry staff • Identify problematic questionnaires • Identify common data collection problems • Plan the next day's programme with the facilitator and the supervisors • Discuss the problems met during the day and their resolution (particularly mistakes that they have observed in the field procedures or in the data collection). • Prepare the day programme forms for the next day • Check that there are enough forms, questionnaires, maps for the next day

Chapter 6

RAM-OP Software

6.1 Data entry

A data entry system for RAM-OP data using EpiData has been developed.

This software can be downloaded from http://www.brixtonhealth.com/enterRAMOP.zip.

This software runs on the Windows operating system. It does not need to be installed and can be run from a USB drive.

The data entry system provides facilities for entering data, interactive checking of data as it is entered, batch checking of entered data, data summary, and data export. The system creates files that can be read by the standard RAM-OP data analysis software.

Documentation of Epidata can be found here http://www.epidata.dk/index.htm.

6.2 Data analysis

This manual covers analysing your data using the **RAnalyticFlow** workflow. An **RAnalyticFlow** workflow may be thought of as an *"app"* that makes it easy to analyse your survey data.

To use the **RAnalyticFlow** workflow you must install:

- **The *R Language for Data-Analysis and Graphics* (R)** : This is the *"engine"* which does all the work of analysing your data. You can get the R installation program from: http://cran.r-project.org. Following are links to download operating sofware-specific versions of R:
  - Download R for Linux
  - Download R for (Mac) OS X

  - Download R for Windowx

- **R packages** (libraries of functions needed to work with the **RAnalyticFlow** workflow) : You can install these from within **R** using the Package Installer function within R. The libraries needed are:

Package	Comments
rJava	Required: Used by **RAnalyticFlow**
JavaGD	Required: Used by **RAnalyticFlow**
codetools	Required: Used by **RAnalyticFlow**
foreign	Required: Opens **EpiData** (REC) files
car	Required: Used for PROBIT estimator
ggplot2	Desirable: Provides many plotting functions
data.table	Desirable: Speeds up working with large dataset

The Package Installer function can be called in R using the following command:

```
install.packages(c("rJava", "JavaGD", "codetools",
                   "foreign", "car", "ggplot2", "data.table"),
                   repos = "https://cloud.r-project.org/")
```

The `repos` argument in the R command above specifies the CRAN mirror from which you to download the package/s you want to install. Here we specify the cloud-based mirror for CRAN provided by RStudio. If unspecified, the installiation process will prompt you to select a mirror from which to download packages from. If you already know the URL of the CRAN mirror you want to use, specify this in the `repos` argument.

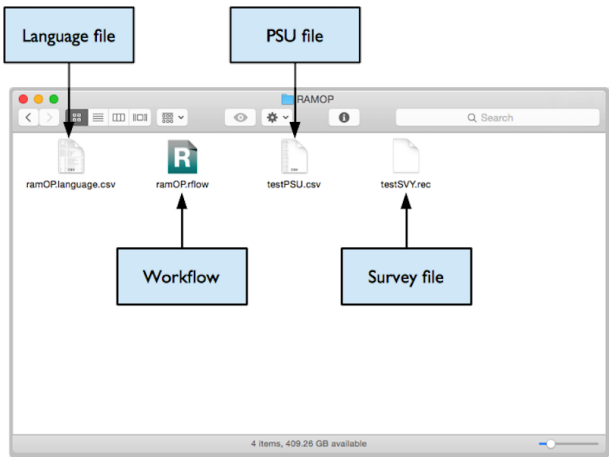
Note that **RAnalyticFlow** may require you to have **Java** installed. Check the instructions on the **RAnalyticFlow** download page and on this starter guide.

All of this software is open source and free to download, copy, and use. It will run on Windows, Mac OS X, and Linux (and other UNIX-like) operating systems. Your ICT department should be able to help you with installing this software.

In addition you will also need a copy of the **RAnalyticFlow** workflow and supporting files. These are available from:

http://www.brixtonhealth.com/ramOP.rflow.zip

You may need to extract the file from the ZIP archive before use if this is not done automatically.



Before starting to analyse your data you should create a project directory or project folder. This is just a normal folder or directory that can be created using your usual file manager (e.g. Windows ExplorerTM in WindowsTM or the FinderTM in Macintosh OS-XTM). The project directory or project folder should contain:

1. Your PSU file (here we assume this file is called testPSU.csv but it could have any name). This file must be a comma-separated-value (CSV) file.

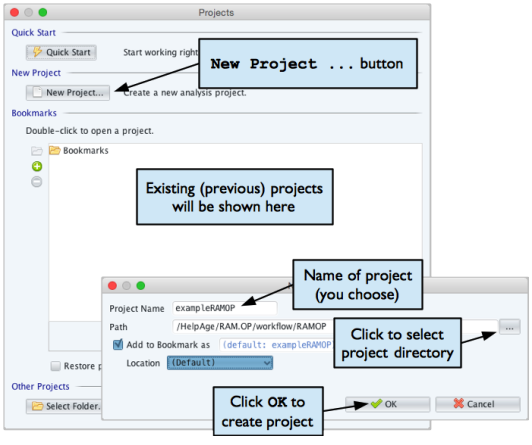
2. Your survey data file (here we assume this file is called testSVY.rec but it could have any name). This file can be an EpiData (REC) file or a comma-separated-value (CSV) file.

3. The language file (always called ramOP.language.csv). This file provides text that is used in reports and graphics. The purpose of this file is to make the data analysis software produce reports in any language. This file must be a comma-separated-value (CSV) file.

4. A copy of the file ramOP.rflow.

When you have created the project directory or project folder with the required files you can start RAnalyticFlow.

Note: The `testSVY.rec` and `testPSU.csv` files are example data files and are distributed with the **RAnalyticFlow** workflow. You can use these files to practice analysing data using **RAnalyticFlow**, and as examples of RAM-OP survey data and PSU files.



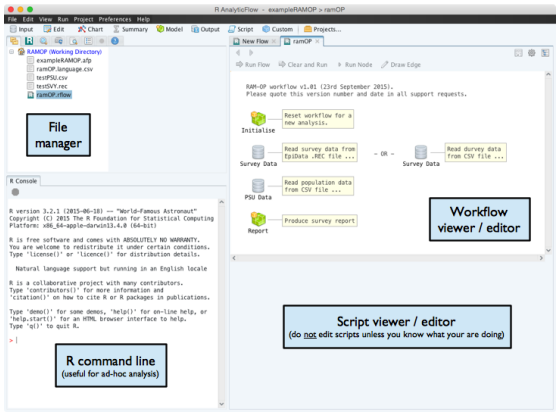
Before you start work you will need to create a project for your survey:

1. Click the **New Project...** button

2. Give your project a useful (i.e. descriptive and memorable) name. This might be a name that describes the survey. For example, if the survey was done in the Kereinik locality of West Darfur in December 2015 you might use the name **WD.Kereinik.Dec2015.RAMOP**

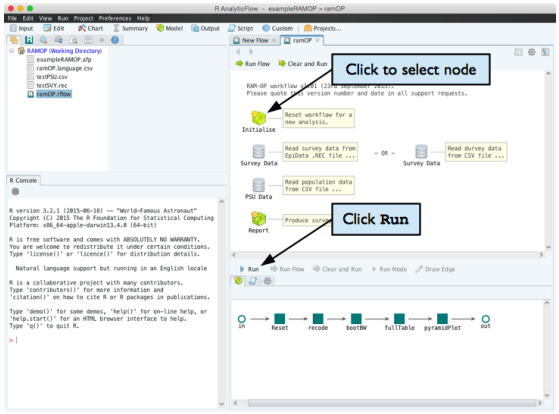
3. Give the location of your project directory or project folder. This is the directory or folder which contains your survey data file, your PSU file, the RAM-OP language file, and a copy of **RAMOP.rflow** (see previous page). The location of the project directory or project folder (labeled "Path" by the software) that **RAnalyticFlow** selects automatically will almost always be wrong. You need to specify this manually.

4. Click the **OK** button



Double click the item named **ramOP.rflow** shown in the file manager pane of the **RAnalyticFlow** window. This will open the data-analysis workflow which will be shown in the workflow viewer / editor window of the **RAnalyticFlow** window.

Once you have opened the workflow you need to initialise it (i.e. load libraries, useful analysis function, and initialise the workspace for a new analysis):



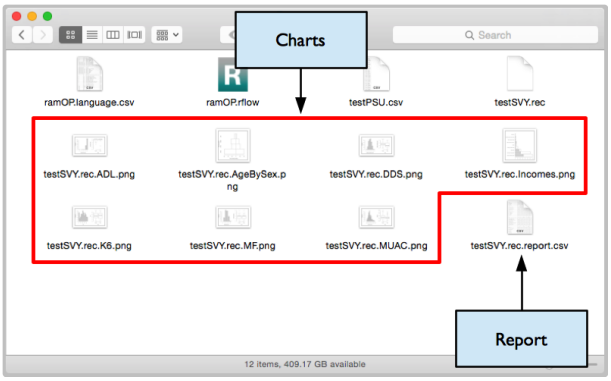
Once this is done, you should:

1. Retrieve your survey data. This can be in EpiDat (REC) format or CSV format. Select and run the appropriate **Survey Data** node and select the survey data file.

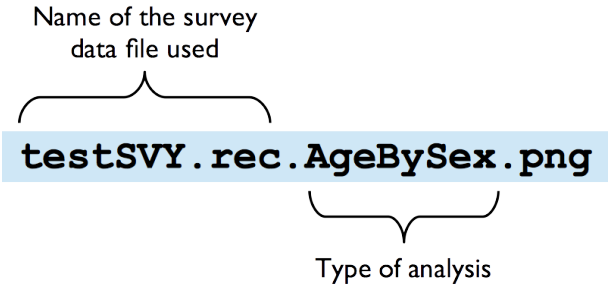
2. Retrieve the PSU date data. Select and run the **PSU Data** node and select your PSU file.

3. Produce the survey report and graphics. Select and run the **Report** node. This will take some time to complete because the analysis uses computer intensive techniques to make best use of the available data. The Report node/icon will have black lines around it has completed running the report.

When the analysis is complete your project directory or project folder should contain eight new files:



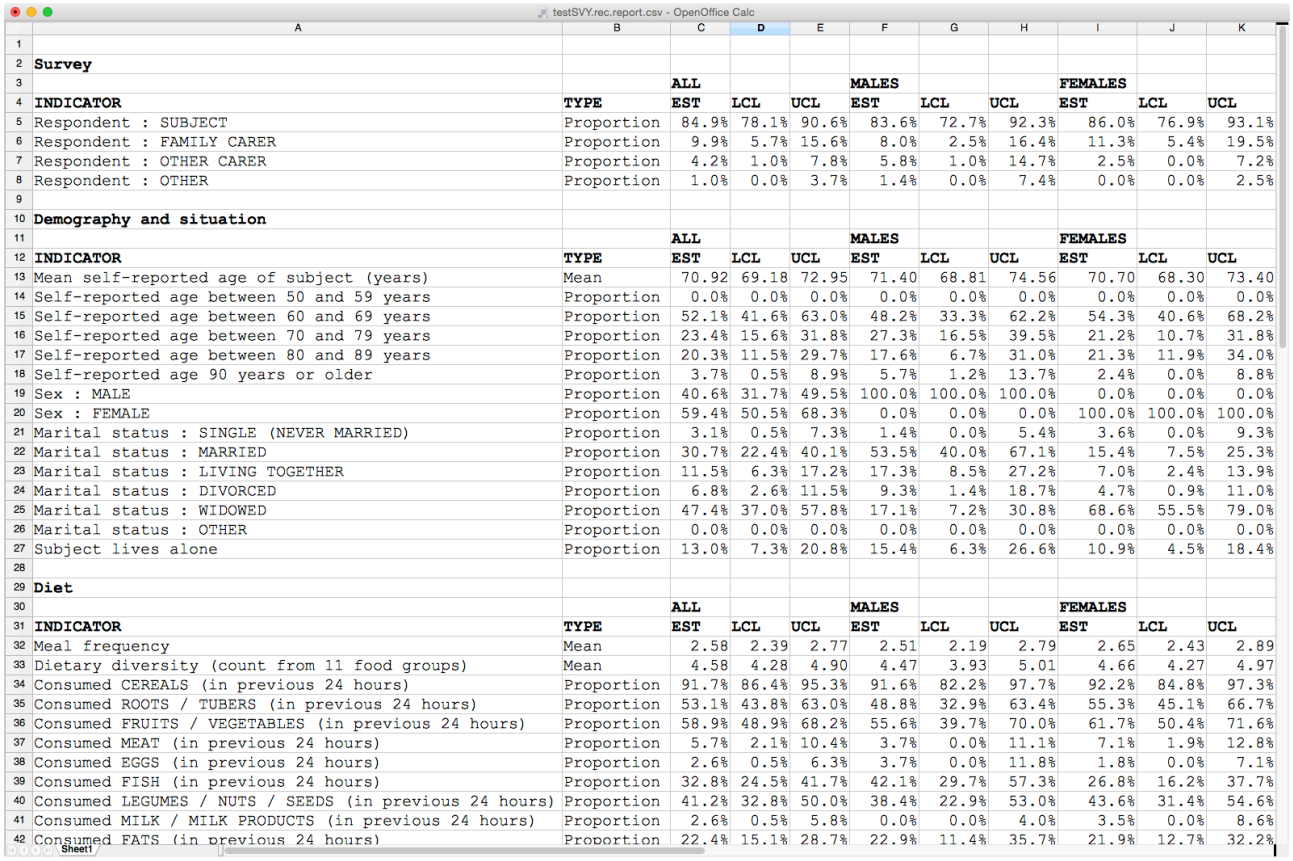
The files ending in `.png` are graphics files. The names of these files are intended to be informative. For example:



The file ending in `.report.csv` is the survey report file (see below).

There may also be a file ending in `.afp`. This is a project information file used by **RAnalyticFlow** and can be ignored.

The file ending in `.report.csv` is the survey report file. This file can be opened, formatted and edited in a spreadsheet program such as **Microsoft Excel** or **OpenOffice Calc**:


testSVY.rec.report.csv - OpenOffice Calc

	A	B	C	D	E	F	G	H	I	J	K
1											
2	**Survey**										
3			**ALL**			**MALES**			**FEMALES**		
4	**INDICATOR**	**TYPE**	**EST**	**LCL**	**UCL**	**EST**	**LCL**	**UCL**	**EST**	**LCL**	**UCL**
5	Respondent : SUBJECT	Proportion	84.9%	78.1%	90.6%	83.6%	72.7%	92.3%	86.0%	76.9%	93.1%
6	Respondent : FAMILY CARER	Proportion	9.9%	5.7%	15.6%	8.0%	2.5%	16.4%	11.3%	5.4%	19.5%
7	Respondent : OTHER CARER	Proportion	4.2%	1.0%	7.8%	5.8%	1.0%	14.7%	2.5%	0.0%	7.2%
8	Respondent : OTHER	Proportion	1.0%	0.0%	3.7%	1.4%	0.0%	7.4%	0.0%	0.0%	2.5%
9											
10	**Demography and situation**										
11			**ALL**			**MALES**			**FEMALES**		
12	**INDICATOR**	**TYPE**	**EST**	**LCL**	**UCL**	**EST**	**LCL**	**UCL**	**EST**	**LCL**	**UCL**
13	Mean self-reported age of subject (years)	Mean	70.92	69.18	72.95	71.40	68.81	74.56	70.70	68.30	73.40
14	Self-reported age between 50 and 59 years	Proportion	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
15	Self-reported age between 60 and 69 years	Proportion	52.1%	41.6%	63.0%	48.2%	33.3%	62.2%	54.3%	40.6%	68.2%
16	Self-reported age between 70 and 79 years	Proportion	23.4%	15.6%	31.8%	27.3%	16.5%	39.5%	21.2%	10.7%	31.8%
17	Self-reported age between 80 and 89 years	Proportion	20.3%	11.5%	29.7%	17.6%	6.7%	31.0%	21.3%	11.9%	34.0%
18	Self-reported age 90 years or older	Proportion	3.7%	0.5%	8.9%	5.7%	1.2%	13.7%	2.4%	0.0%	8.8%
19	Sex : MALE	Proportion	40.6%	31.7%	49.5%	100.0%	100.0%	100.0%	0.0%	0.0%	0.0%
20	Sex : FEMALE	Proportion	59.4%	50.5%	68.3%	0.0%	0.0%	0.0%	100.0%	100.0%	100.0%
21	Marital status : SINGLE (NEVER MARRIED)	Proportion	3.1%	0.5%	7.3%	1.4%	0.0%	5.4%	3.6%	0.0%	9.3%
22	Marital status : MARRIED	Proportion	30.7%	22.4%	40.1%	53.5%	40.0%	67.1%	15.4%	7.5%	25.3%
23	Marital status : LIVING TOGETHER	Proportion	11.5%	6.3%	17.2%	17.3%	8.5%	27.2%	7.0%	2.4%	13.9%
24	Marital status : DIVORCED	Proportion	6.8%	2.6%	11.5%	9.3%	1.4%	18.7%	4.7%	0.9%	11.0%
25	Marital status : WIDOWED	Proportion	47.4%	37.0%	57.8%	17.1%	7.2%	30.8%	68.6%	55.5%	79.0%
26	Marital status : OTHER	Proportion	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
27	Subject lives alone	Proportion	13.0%	7.3%	20.8%	15.4%	6.3%	26.6%	10.9%	4.5%	18.4%
28											
29	**Diet**										
30			**ALL**			**MALES**			**FEMALES**		
31	**INDICATOR**	**TYPE**	**EST**	**LCL**	**UCL**	**EST**	**LCL**	**UCL**	**EST**	**LCL**	**UCL**
32	Meal frequency	Mean	2.58	2.39	2.77	2.51	2.19	2.79	2.65	2.43	2.89
33	Dietary diversity (count from 11 food groups)	Mean	4.58	4.28	4.90	4.47	3.93	5.01	4.66	4.27	4.97
34	Consumed CEREALS (in previous 24 hours)	Proportion	91.7%	86.4%	95.3%	91.6%	82.2%	97.7%	92.2%	84.8%	97.3%
35	Consumed ROOTS / TUBERS (in previous 24 hours)	Proportion	53.1%	43.8%	63.0%	48.8%	32.9%	63.4%	55.3%	45.1%	66.7%
36	Consumed FRUITS / VEGETABLES (in previous 24 hours)	Proportion	58.9%	48.9%	68.2%	55.6%	39.7%	70.0%	61.7%	50.4%	71.6%
37	Consumed MEAT (in previous 24 hours)	Proportion	5.7%	2.1%	10.4%	3.7%	0.0%	11.1%	7.1%	1.9%	12.8%
38	Consumed EGGS (in previous 24 hours)	Proportion	2.6%	0.5%	6.3%	3.7%	0.0%	11.8%	1.8%	0.0%	7.1%
39	Consumed FISH (in previous 24 hours)	Proportion	32.8%	24.5%	41.7%	42.1%	29.7%	57.3%	26.8%	16.2%	37.7%
40	Consumed LEGUMES / NUTS / SEEDS (in previous 24 hours)	Proportion	41.2%	32.8%	50.0%	38.4%	22.9%	53.0%	43.6%	31.4%	54.6%
41	Consumed MILK / MILK PRODUCTS (in previous 24 hours)	Proportion	2.6%	0.5%	5.8%	0.0%	0.0%	4.0%	3.5%	0.0%	8.6%
42	Consumed FATS (in previous 24 hours)	Proportion	22.4%	15.1%	28.7%	22.9%	11.4%	35.7%	21.9%	12.7%	32.2%

Sheet1

In the illustration above, proportions have been formatted as percentages with one decimal place, means have been formatted as numbers with two decimal places, and column titles have been formatted as bold text.

You can edit the labels as you see fit. If you plan to do several RAM-OP surveys then you may want to edit the language file (always called `ramOP.language.csv`). This file provides text that is used in reports and graphics. The purpose of this file is to make the data analysis software produce reports in any language. This file **must** be a comma-separated-value (CSV) file.

Chapter 7

Conclusion

We live in an ageing world, where people aged 60 or over will be 2 billion or about 22% of the world's population by 2050.

Currently, two in three people aged 60 years or older live in developing countries. By 2050, nearly four in five older people will be living in the developing world.

The changing demographics of ageing combined with the increasing number of disasters will exert a disproportionate impact on the world's oldest and poorest.

In this context, identifying the needs of older people as accurately as possible is a necessity. More and more donors and UN agencies are now willing to include older people in their programmes. Age markers, to complement gender markers, will be disseminated very soon

RAM-OP is offering a fast, robust, reliable, tested and user-friendly way of assessing the needs of older people. It can be used in humanitarian situations as well as in development contexts. The modular structure of RAM-OP allows for adaptations, making it exhaustive or limited to essential indicators according to the immediate needs.

As more organisations start to use it, RAM-OP will evolve and improve. New versions of RAM-OP can be created (for example, RAM-OP for refugee or displaced people camps). We wish that a greater number of actors will start using RAM-OP and make it their own.