



...: **emergency** needs assessment branch

Estimating Population Size in Emergencies:

Report of the Inter-Agency
Technical Meeting

**Strengthening Emergency Needs
Assessment Capacity (SENAC)**

**26 September 2006
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This report was prepared under the umbrella of the “Strengthening Emergency Needs Assessment Capacity” (SENAC) project. The SENAC project aims to reinforce WFP’s capacity to assess humanitarian needs in the food sector during emergencies and the immediate aftermath through accurate and impartial needs assessments.

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1. Background and Purpose of the Meeting

Over the past years, WFP, donors and the Executive Board have emphasized the importance of credible and accurate needs assessments. In February 2004, WFP presented an “Emergency Needs Assessment” policy to the Executive Board, followed by a 30-month implementation plan in October 2004. The Strengthening Emergency Needs Assessments Capacity (SENAC) project is a major and essential component of WFP’s implementation plan. .

The objective of the SENAC project is “to reinforce WFP’s capacity to assess humanitarian needs in the food sector during emergencies and the immediate aftermath through accurate and impartial needs assessments”. One of its main activities is the development of improved analytical methods, tools and guidance materials. During the first phase, the project focused on five thematic areas covering markets, effects of food aid (i.e. dependency and migration), chronic and transitory food insecurity and non-food responses to food crises. Phase II of the project completes the work in these areas and addresses an additional theme: estimating the size of the population affected by the emergency.

Knowing the location and number of people affected by a shock or at risk is essential to estimate the scope and size of the responses required. However, little guidance is currently available to calculate these numbers in emergencies.

Estimating population numbers in emergencies presents several challenges:

- crises seldom occur entirely within an administrative boundary which serve as the basis for the collection and reporting of population figures;
- crises sometimes affect a specific population group such as nomads or an ethnic group for which reliable or current population data does not exist;
- in many crisis-prone countries population data are not available, outdated or inaccurate;
- geographic information systems and population databases may not be available or familiar to the teams sent for the assessment;
- crises often involve population movements, that can be temporary, permanent or back-and-forth, consequently existing demographic data would not represent the current situation;
- the crisis-affected regions may be inaccessible or insecure and make contacts with local authorities and other informants who could provide information on population size difficult; and,
- the reported population size may be influenced by political influences.

The purpose of the meeting was to discuss methods to estimate population numbers in emergencies, their feasibility, the remaining gaps in knowledge and needs for further research, guidance and training. The discussion was based on the draft desk review on “Methods to conduct rapid population estimates in emergency situations” undertaken in the framework of the SENAC Project and prepared by Alden Henderson from the Centres for Disease Control and Prevention (CDC) in Atlanta, Georgia.

2. Preliminary Findings of the Desk Review by Dr. Henderson on “Methods to Conduct Rapid Population Estimates in Emergency Situations”

Alden Henderson, Chief of Health Investigations Branch of the Centres for Disease Control and Prevention presented the main results of the desk review which were based on discussions held with various agencies, a literature review and experience using various methods. Databases providing population figures were also presented.

The main comments from the agencies were that the method should:

- vary according to the situation;
- use existing data before resorting to collecting additional data;
- fill data gaps rather than attempt to be a full survey;
- be fast, accurate and inexpensive;
- be simple and practical so that country offices with little resources and capacity can conduct the estimate; and
- be used to collect other relevant information.

However, the agencies generally do not have standardized methods. Instead, they mainly:

- cross-check numbers from different sources;
- conduct registrations or profiling exercises; or
- use figures provided by other agencies or government.

The methods¹ presented during the meeting included:

1. Methods and software developed by some agencies:
 - MSF - quadrant and T-square methods
 - FEWSNet - software being developed in the framework the project “Enhanced Tools for Demographic Data Management”
 - CDC - Geonumero software
2. Methods described in the literature², including methods used in biology and ecology:
 - Representative sampling
 - Delphi
 - Capture-Recapture
 - Respondent-driven (“snow-ball”)

The availability of a list of households and their location makes a difference in the approach to be used. If such list is available, simple random sampling or systematic sampling is possible; otherwise, the cluster method, satellite imagery or spatial method can be used.

Important challenges include:

- desired level of accuracy of the estimate;
- criteria to evaluate existing data;
- insufficiency of data;

¹ For a detailed description of the methods, please refer to Annex I.

² Sources of the literature review will be quoted in the final desk review on “Methods to conduct rapid population estimates in emergency situations”.

- possible errors of exclusion or inclusion which lead to wrong estimates;
- need for field testing to establish which is the most appropriate survey method;
- development of methods to conduct estimates in insecure areas; and
- difficulties in reaching some part of the population.

The meeting agreed that the draft desk review represented a good step forward on this topic and a detailed inventory of methods. However, step-by-step guidance would be needed on how to: 1) use secondary data, 2) make projections based on previous census, 3) triangulate data, and 4) evaluate accuracy of existing data.

Moreover, an analytical approach based on different scenarios would be useful in order to select the most appropriate method according to the emergency context, along with a clearer guidance to distinguish between “general population” and “targeted population”.

More clarity would also be required on the definition of “emergency”, i.e. at which stage of an emergency population numbers should be estimated. While population numbers are crucial during the initial phase of an emergency, most of the methods indicated in the desk review are household-based. This assumes that households are not moving even at the initial stage of an emergency. In addition, some methods assume an equal density of the population and accurate geographical knowledge of the territory, which may not be the case in actual emergencies.

Finally, crucial issues to clarify are the balance between time constraints and the level of accuracy of data, i.e. how fast is data needed and what the level of accuracy is required. A timeframe should be established within which it is acceptable and necessary to obtain the population estimates and, according to this, agree on a method/s to get the most accurate number within that time. The participants agreed that an acceptable time could be less than 15 days from the breaking out of the emergency, with a margin of error of 15-25%.

As satellite imagery methods were not discussed in the draft desk review, Giorgio Sartori, Humanitarian Information Management Expert at WFP, briefed the participants on the use of this method in WFP. Dr. Sartori commented that if accurate population figures are required within the first 10 to 15 days of an emergency, satellite imagery is not very useful because of the current long time necessary to obtain images and process the data (around 8 days). The position of the satellite is also fundamental in getting relevant images on the on-going situation, as the satellite proximity to the target area makes a difference. Moreover, the cost of this method is still high. Access to some of the images is free of charge but they often have a low resolution.

Considering that satellite imagery does not have the resolution to count individual people, satellite imagery may not be the best way to get quick estimations on population numbers. However, if combined with pre-existing data and local knowledge it can represent a tool to cross-check data and identify the general location of people. Furthermore, the access to, cost and quality of satellite imagery is expected to improve in future, in particular with the next generation of European satellites that will be launched.

3. Learning from experience – Working Group session

Four working groups were organized, according to four different “typical” emergency scenarios and related country cases (see Annex II for the participants):

1. sudden-onset natural disaster/ no pre-disaster population data/ urgency to intervene -> for example Pakistan
2. slow-onset natural disaster/ old population data/ population movements/ controversies on population figures -> such as Zimbabwe
3. complex-protracted emergency/ old population data/ population movements (IDPs)/ access constraints -> for example Darfur Sudan
4. nomads -> such as in the Horn of Africa

The countries mentioned as examples were not prescriptive and aimed at initiating the discussion and to avoid too theoretical discussions. The groups were free to use other concrete cases that fall under the same type of emergency.

The working group discussions were guided by the following questions:

- how population numbers could be estimated in practice in that particular scenario?
- what would be the practical challenges of applying the selected method(s) in that particular scenario?
- what further research/studies/tests would be required to tackle some of the challenges identified?
- what kind of practical guidance to select and apply methods to estimate population numbers would be required?

3.1 Sudden-Onset Emergency – Working Group Summary

Emergency needs assessments should estimate the number of food insecure individuals within the first 3 weeks. To achieve this, participants recommended to follow the steps below:

- *Within 1 week*
 - determine the impact of the disaster on local population, considering all the related variables (i.e. migration routes);
 - define the boundaries of the affected zone;
 - review secondary data (i.e. disaggregated census data, population density etc); and,
 - conduct aerial surveys, to verify boundaries and damages.

Recommendations ->

1. develop guidelines to critically evaluate the quality of existing data; these data should be regularly updated by Country Offices with the view to create a global dataset;
 2. enhance skills in conducting aerial surveys and in the interpretation of satellite imagery;
 3. identify external expertise in remote sensing.
- *After 1 week*
 - a joint assessment should be conducted in the area, possibly coordinated by OCHA.

Depending on possible scenarios, the following methods to quickly estimate the number of the people affected should be applied:

- Scenario A: large area / rough and disaggregated population numbers

If the density zones are known, the **density method** should be applied; in case the population location is unknown, the **quadrant** or **T-square methods** should be considered.

- Scenario B: large area/rough and disaggregated population numbers/ population movements

If the estimate is conducted in many different areas throughout the country or countries, the **snowball method** is recommended, with particular attention to local authorities and key locations, such as hospitals and camps. If the estimate is undertaken in a specific area, **representative sampling** would be the most appropriate.

- Scenario C: large area/ rough and disaggregated population numbers/ population movements/ accessibility problems

In this case, the non-representative sampling method is recommended.

Recommendations ->

1. Develop guidance on T-square and quadrant methods and agreement on the procedures for the application of these methods;
2. Test these methods during the next sudden-onset emergency;
3. Advocate for a UN joint estimate; and
4. Define resources and time requirements for different methods.

3.2 Slow-Onset Emergency – Working Group Summary

The group advised first to look at existing census and apply the **Delphi method**, trying to get an agreement on the population growth rate and between the data of the census and the new findings.

As a second step, given the slow-onset emergency setting, a survey could take place to check the consistency of the projections with estimates from the **sampling methods** recommended in the desk review, and eventually hiring a demographer to prepare the appropriate questionnaire.

Recommendations ->

Develop guidance on how to judge the reliability of the secondary data, along with indications on how to update the secondary data.

3.3 Complex/Protracted Emergency – Working Group Summary

The **capture-recapture** method would be of difficult implementation in this emergency context, unless there is a solid nation-wide system of identification, i.e. a national ID card such as in Sri Lanka or Georgia. It was also difficult to envision how this method would be used in the acute phase of an emergency. Similarly, it would be

difficult to use **respondent-driven methods** because of their assumption of population mixing at all phases of the emergency. During the acute phase, the **Delphi** method, followed by either the **quadrant** or the **T-square** method appeared to be the most reasonable and frequently implemented. The use of **satellite images** was highlighted as a promising method, but there are also important limitations on their timely access and cost. They could potentially be used to help define the target area for the Delphi approach. **Flow monitoring** was an important tool in case of border crossing, but implementation is difficult unless movement direction is clear and unique. Finally, **probability sampling** is a useful tool but it depends on the purpose of the survey, requires population data that may not be readily available or reliable, and may be better suited to later phases of an emergency.

Different methods may be appropriate depending on the size of the area. The importance of defining the sampling universe according to humanitarian need was emphasized. The choice of appropriate method depends on the objective of getting population estimates. The minimum data set required would be the total number of persons and their age and sex distribution (at the minimum, under 5/over 5 years of age). Considerations of staff (level of experience available), logistics and finance also play an important role, but are again context specific. The key issue is how to use limited resources in the best possible manner.

The Working Group recommended that different agencies and organizations conduct structured pilot studies in various settings, including urban contexts, camps, host communities and where there is population movement. In addition, the potential risks and benefits of using each alternative need to be clarified, as well as their appropriateness according to the size of the area concerned (e.g. nation-wide or province-wide estimates, smaller camp settings etc).

The following criteria were identified to help select the most appropriate method in complex/protracted emergencies:

- Political issues;
- Security concerns;
- Time available to conduct the method in the field;
- Size of the area;
- Population type;
- Phase and type of emergency; and
- Objective of the rapid estimation.

3.4 Nomads – Working Group Summary

Working Group participants highlighted the difficulty to count nomads, since the demographic baseline data possibly existing is even less reliable than for sedentary populations, and to locate nomads and actually count them may be very difficult. It was felt that an in-depth knowledge of the people and their culture was a prerequisite to any work with them. It was also mentioned that nomads' behaviour, pattern of movements and economy are rational and can be fairly well understood and predicted. Also, a lot of knowledge exists among nomads, which they can transmit to assessment teams rather easily and reliably, provided that a mutual trust exists.

After an event, an estimate to plan the intervention is generally needed in the first phase of about 10 to 15 days, and knowledge is consolidated, including the figure of

affected population in a second phase. However, it is not so common that nomads face sudden unforeseeable emergency situations. They are much more prone to slow-onset crisis (such as drought) than to rapid ones (e.g. conflict- or floods).

The Group developed an alternative phased approach according to the time when the estimation is required:

	Preliminary phase	Phase I	Phase II
Purpose	Define a baseline, i.e.: number of people for a given area which is susceptible to shock	Produce quickly an operational figure	Consolidation of population figures in order to properly quantify needs and, possibly, disaggregate populations.
Timing	Pre-crisis, when time is sufficient to obtain reliable information.	10 to 15 days after the eruption of the acute phase, when time is a big constraint.	When formal assessment takes place and along time of the intervention.
Population	Whole population in each possibly affected area	Affected population in the affected area.	Affected population in the affected areas.
Methods	Census, aerial views (including satellites pictures), field verifications.	Use of baseline, Delphi, relying on key informants, snow ball, any credible first hand information (e.g. aerial view or any sort of observation). No method is discarded at first and flexibility and method combination is highly recommended.	Registration and triangulation through many of the available methods depending on feasibility (pragmatic considerations first). Rigorous approach needed.

The Group pointed out the lack of knowledge of the suitability of most of the methods indicated in the draft desk review, apart from Delphi and some sort of snowball. It also emphasised the rigour required when conducting a census or registration, as well as the need for triangulation, and practical guidelines on each method. The “time phase” approach defines which method should be used and when. The next challenge is to gain knowledge and experience in each of these methods, develop guidelines on how to implement them and build experience in using them.

Apart from the existence of reliable secondary data and knowledge on the location of the affected area and population, further criteria to be taken into account are (by order of importance): time constraint; typology of crisis (linked to time constraint); purpose of getting the data; and context-specific constraints and opportunities.

One criterion to consider is how much confidence the surveyor has about the validity of the data to be used according to a specific purpose. This in turn depends on: the source of the data, methodology to gather the data, age and present relevance of the data, and entity which produced the data which is quite often different from the data source. Finally, the group felt that the use of key informant is indeed a very good method to estimate population numbers and should be part of the methods under review.

4. Next Steps and Conclusions

The working group discussions showed the limitations and strengths of the various approaches to estimate population numbers in emergencies. The groups agreed that Dr. Henderson will revise the draft desk review and incorporate the comments and suggestions made by the participants. In particular, the final draft will take into consideration:

- The need for a detailed guidance on how to update secondary data;
- Criteria for selecting the most appropriate method, based on the type and quality of resources available (i.e. by expanding the table attached in annex);
- Inserting a decision tree to determine the first steps to be undertaken;
- Providing guidance on remote sensing; and
- Using the level of confidence of the population number estimates recommended by the participants of this meeting (20-30% during the first 10-15 days and 10% afterwards).

In addition, testing the proposed methods in the field is a priority and should be undertaken as soon as possible, including the ones taken from biology and ecology to estimate animal and plant population sizes. This would contribute to develop a step-by-step guidance for assessment teams. Field testing should be a collaborative effort of all the participating agencies and the final guidance should be relevant to the wider humanitarian community and not only to WFP.

It was agreed to start the field testing process through the informal working group established with the agencies invited at the meeting and involved so far. The agencies could take advantage of planned assessments to test the methods³ and provide a feedback to the working group. The SENAC Advisory Group of Experts could also be used as a channel to invite non-represented agencies to join the efforts of the working group, such as NGOs or universities. Exchanges among members of the working group could take place by e-mail and through the WFP/ODAN-managed Community of Practice (CoP). It was agreed that WFP will prepare a “scope of work” and a template to formalize and share field test results between the various agencies, and circulate it for comments (see Annex III).

³ For example, assessments planned by OCHA/UNHCR in Somalia or Ethiopia

Annex I - Summary of key methods described in the literature to estimate population size

Draft Desk review 'Methods to conduct rapid population estimates in emergency situations', Alden Henderson (CDC Atlanta), WFP SENAC project, September 2006

Method	Steps	Main strengths	Main limitations	Data prerequisites
Representative Sampling				
Geographic Simple Random Sample	Uses city or village maps and a GIS program to select random points; Survey teams navigate to the random point and survey the nearest house to that point and collect occupancy and demographic characteristics on the household; Population size is calculated by multiplying the number of households in the area by the average number of people in a household	Reduces bias for selecting households that are sampled	Availability and familiarity with GIS programs and GPS instruments Requires pre-crisis population size Crisis does not significantly change population size	General location of population Estimate of proportion of total population in areas surveyed Data on household lists or population size not needed
Geographic Random Cluster Sample	Same as above and uses a 2-stage cluster sampling (see below) using lists of towns, villages, or administrative regions in the area of interest along with their population, and selecting clusters proportional to population size	More efficient way interview households	Same as above	- Population locations - Population size
Compact Segment Sample	Clusters are selected with probability proportional to the size of the population and a sketch map is drawn of every household in each cluster; Cluster is split into small segments and one segment is randomly selected; All households in the selected segment are surveyed	Reduces bias for selecting households that are sampled	Requires good pre-crisis population data	No data available on household lists
Random Cluster Sample	Expanded Programme of Immunization (EPI) Uses a 2-stage 30 x 30 cluster sampling or a 2-stage 30 x 7 cluster sampling	Easy to implement Familiar to many people who conducted nutrition or	Requires pre-crisis population size Crisis does not significantly change population size	Population locations Population size

Method	Steps	Main strengths	Main limitations	Data prerequisites
		immunization surveys		
Systematic Household Sample	Use lists of households and direct random selection on that basis	Reduces bias for selecting households that are sampled	Requires pre-crisis population data	Household lists Population locations No data needed on population size
Area-Based Sampling				
Block	Construct a map of target area by recording distance and bearing between landmarks along the border of the target area; Random drawing of 30 blocks of equal area on the map, selected with probability proportional to the pre-crisis number of housing units or population size; Survey teams navigate to 5 to 12 blocks and count the number of people in each block; Population size calculated by multiplying the average number of people per block by the number of blocks in the target area	Can be used even if there is no pre-crisis list of households and their location Well adapted to small areas	Target area may include uninhabited spaces such as schools, feeding centers, gullies and ponds No guidance on the number and size of blocks to count Assumes uniform distribution of population in target area	General location of target population No data need on household lists or population size
Density Zone	Adaptation of the above method to account for heterogeneous distribution of the population in the target area. Divide target area into density zones and estimating the population of each zone	Same as above	Target area may include uninhabited spaces such as schools, feeding centers, gullies and ponds No guidance on the number and size of blocks to count Relies on an empirical selection of density zones	General location of target population Population size Household lists not needed
Quadrat	Borders of target area drawn with GIS and GPS. Grid overlaid on map of target area; the number of grids is at least 10 times the number of grids that would be sampled (30 grids minimum); Population in each quadrat counted or in a random sample of households (for example 5 to 10) in quadrat	Well adapted to small areas Easily implemented	Can be cumbersome to delineate the grids on the ground May require satellite imagery to draw the boundaries of target area Require access to and	No data needed on population location, household list or population size

Method	Steps	Main strengths	Main limitations	Data prerequisites
			familiarity with GIS and GPS instruments	
Distance Sampling				
T-square	<p>Survey teams navigate to random points and find the nearest house to that point (called primary house);</p> <p>The distance (d1) from the random point to the primary house is measured and survey teams find the nearest house (T house) in the half-plane that excludes the random point;</p> <p>The distance from the primary house to the T house is measured (d2);</p> <p>Survey teams determine the household size for the primary and T houses;</p> <p>- The distances d1 and d2 represent density and can be converted to population size</p>	<p>Provides more reliable results than classical transects</p> <p>Does not require the size of the sample area</p> <p>Expedient and cost-effective</p>	<p>Distance from transit line must be measured accurately</p> <p>Nearly always underestimate population density and size</p> <p>Yields minimal information on population demographics</p> <p>Concept difficult to understand and train field teams</p>	<p>General location of target population</p> <p>No data needed on households lists or population size</p>
Biology and Ecology Methods				
Capture-Recapture	<p>Capture and "tag" people of interest, release "tagged population and recapture at a later time</p>	<p>Easy to use</p> <p>Provides reliable population estimates</p> <p>More accurate than single sampling techniques</p> <p>Can collect additional demographic information</p> <p>Ideal for experimental studies</p> <p>Particularly adapted for hard to reach populations such as migrant workers, nomads and IDPs</p>	<p>Can be expensive if several rounds are conducted and if large capture-recapture cycles are conducted</p> <p>Large samples are needed, and a high proportion of marked people need to be recaptured in 2nd and subsequent samples</p> <p>The tag must be acceptable for receivers</p>	<p>Areas where population of interest will gather</p>
Respondent-Driven Sampling				

Method	Steps	Main strengths	Main limitations	Data prerequisites
Snow-ball	Recruitment of initial participants who are then asked to recruit other participants	Reduces bias associated with the choice of initial participants May be appropriate for migrant, nomad and displaced populations	People tend to recruit people like themselves Need to get representative initial recruits	No data needed on population size, location and household lists
Judgment-Based Estimates				
Delphi	Uses a small group of experts who go through several rounds of anonymous information exchanges to make an educated guess of the population size	Exchange of information is controlled Participation is anonymous	The estimate cannot be verified	No data needed on population size, location and household lists
Low Level Aerial Survey				
Aerial Survey	Planes, kites or low flying aircraft take photographs of a target area	Fast Can be cheaper than surveys on the ground Can collect more detailed information than satellite imagery Provides information on geographical distribution of the population	Access to aircraft, and cost of flying time Difficult to distinguish between residential and non-residential buildings Counting errors including counting out of the target area, under-counting large groups, and failure to observe small groups Variation in aircraft height imply variation in the width of the strip observed or photographed Does not indicate with accuracy the population size Need to use factor to get from number of houses to total population	No data needed on population size, location and household lists

Method	Steps	Main strengths	Main limitations	Data prerequisites
			Only get information on total houses and special distribution of population in target area	

Annex II - List of Participants and Composition of the Working Groups

Participants:	Agency	Sudden-onset/no pre-data/urgency Pakistan	Slow-onset/old data/controversies Zimbabwe	Complex-protracted/old data/IDPs/access constraints Darfur	Nomads Horn of Africa
Wolfgang Herbinger	WFP			X	
Getachew Diriba	WFP				X
Joyce Luma	WFP		Co-leader		
Agnes Dhur	WFP	X			
Anette Haller	WFP	Co-leader			
Barbara Conte	WFP				X
Arif Husain	WFP			Co-leader	
Menghestab Haile	WFP				Co-leader
Giorgio Sartori	WFP	X			
Sheila Grudem	WFP			X	
Pierluigi Martinesi	WFP		X		
Peter Guest	WFP		X		
Alden Henderson	Centers for Disease Control	X			
Sakura Atsumi	UNHCR			X	
Kassoum Diallo	UNHCR		Leader		
Simon Bagshaw	OCHA			Leader	
Lea Matheson (IOM)	IOM			X	
Ottmar Figueroa	IOM	Leader			
Vlatko Avramovski	IOM				X
Alain Mourey	ICRC				Leader
Jens Eschenbaecher	Norwegian Refugee Council		X		
Rebecca Grais	Epicentre			X	

Annex III - Scope of Work and Template for the field-testing of methods to estimate population numbers in emergencies

1. BACKGROUND

A number of methods to estimate population numbers in emergencies have been developed over the past years, however few of them have been tested in the field in a sufficient variety of emergency contexts. While results are promising for a number of methods that were applied in specific emergency situations such as refugee or Internally Displaced Person (IDP) camps, urban settlements or localized geographical areas, the experience of applying them on a wider scale is limited. In addition, little knowledge exist on their feasibility and reliability in challenging situations such as emergencies affecting very large areas or involving highly mobile populations.

In the framework of the project for Strengthening Emergency Needs Assessment Capacity (SENAC) funded by ECHO, WFP commissioned a Desk study⁴ in 2006 to make an inventory of existing methods to estimate population numbers in emergencies and to describe their main strengths and limitations. WFP also convened an inter-agency Technical Meeting⁵ involving Epicentre/Médecins Sans Frontières (MSF), the International Committee of the Red Cross (ICRC), the International Organization for Migration (IOM), the Norwegian Refugee Council (NRC), the Office for the Coordination of Humanitarian Affairs (OCHA) and the UN High Commission for Refugees (UNHCR) in Rome on 26 September 2006 to discuss the preliminary findings and recommendations of the study. Participating agencies agreed to actively engage in field testing of some of the methods and share their experience in order to improve the collective knowledge and contribute to the formulation of operational guidance for field staff.

2. OBJECTIVE OF THE FIELD TESTING OF METHODS TO ESTIMATE POPULATION NUMBERS IN EMERGENCIES

The objective of field testing methods and tools to estimate population numbers in emergencies is to evaluate their user-friendliness, feasibility, validity and accuracy, and reliability.

The following definitions are used for the above concepts (further methodological details are provided in paragraph 5):

- **User-friendliness:** Extent to which the method or tool is easy to understand, apply and analyse by non-expert field staff in emergency contexts.
- **Feasibility:** Staff, time, logistics, and financial implications of using the method or tool.
- **Validity and accuracy:** Extent to which the data obtained from the method or tool accurately reflects what it is being used to measure.
- **Reliability:** Consistency and compatibility of data collected through repeated use of the same data collection instrument or procedure, under the same conditions.

3. EXPECTED OUTPUTS

- **Structured feedback** on the user-friendliness, feasibility, validity and accuracy, and reliability of methods and tools used to estimate population numbers in a variety of emergency contexts.

⁴ *Methods to conduct rapid population estimates in emergency situations.* Alden Henderson (draft, September 2006)

⁵ The International Federation of the Red Cross (IFRC) and the USAID-funded Famine Early Warning System Network (FEWSNET) were also invited but could not participate.

- **Recommendations** to refine the methodological guidance on methods and tools to estimate population numbers in emergencies, for use by non-expert field staff.

4. SCOPE

- **The methods and tools to be field tested are the ones for which knowledge and experience of use in different emergency contexts are the most limited** and include:
 - Area-based sampling: Block method; Density zone method; Quadrant method;
 - Distance-based sampling: T-square method;
 - Biology/ecology sampling approach: Capture-recapture method;
 - Respondent-driven sampling: Snow-ball method;
 - Aerial sampling: Satellite imagery; Low-flying aerial survey;
 - Softwares: WFP Early Impact Tool software; Epicentre software; Centers for Disease Control's *GeoNumero* software; forthcoming FEWSNET/USAID software

A description of these methods and tools can be found in the draft Desk review. The field testing may consider applying other methods for which more experience is available (such as representative sampling and registration) as a means to compare results with the less well-known methods and tools.

- **The population number of interest is the number of people affected by, or living in an area affected by, a sudden-onset, slow-onset or protracted crisis.**

This number may or may not coincide with the number of people requiring any type of assistance. The number of people needing assistance may be a sub-set of the total affected population and would be determined from a complementary (although possibly simultaneous) assessment to the estimation of the population number.

5. FIELD TESTING REPORTING TEMPLATE

The following two tables should be compiled by the lead agency testing the method(s).

Table 1: Context of the emergency and of the field testing of the method(s) to estimate population numbers

Background information - Context of the field testing		
Reporting agency:		
Names, functions and contact references of reporting staff:		
Name:	Function:	E-mail address:
Name:	Function:	E-mail address:
Name:	Function:	E-mail address:
Country:		
Type of emergency: <i>[Indicate the type of shock such as natural or man-made disaster]</i>		
Dates/duration of the emergency/shock: <i>[Specify the dates/period and clarify if sudden-onset, slow-onset, or protracted crisis]</i>		
Main areas affected: <i>[Indicate the geographical extent and main locations/regions of the country]</i>		
Main population groups affected: <i>[Indicate if the shock affected specific groups or the whole population of the area/country]</i>		
Objectives of the assessment: <i>[Specify the main objectives and clarify if the assessment focused only on estimating population numbers or had a broader scope]</i>		
Agencies/government entities having participated in the assessment:		
Dates/duration of the assessment:		
References of the assessment report (attach copy if available): <i>[Indicate title, date of issuance and author(s)]</i>		

Background information - Context of the field testing	
Method(s) used to estimate population numbers in this assessment: <i>[Specify the type of methods including: census or registration, representative sampling (geographic simple random or cluster sampling, compact segment sampling, random simple or cluster sampling), area-based sampling (Block method, Density zone method, Quadrant method), distance sampling (T-square method), biology sampling (capture-recapture method), respondent-driven sampling (snow-ball), aerial sampling (satellite imagery, low-flying aerial survey), software</i>	
Method No.1:	
Method No.2:	
Method No.3:	

Table 2: Results of the field testing of method(s) to estimate population numbers

Method No.1	<i>[Indicate the generic name of the method tested to estimate population numbers]</i>
Context of application of the method: <i>Size of the target geographical area, size of the target population (as estimated), type of habitat and constraints to produce the population number estimate</i>	
Geographical extent of the target area(s) <i>(estimation of the size of the shock-affected area into which the population is found)</i>	
Rough size of the target population <i>(estimation of the number of affected persons affected by the shock)</i>	
Type of housing <i>(e.g. camp, temporary shelters, residential housing units)</i>	
Time-frame given to estimate the population number <i>(time constraints under which the population numbers had to be estimated, such as by x days after the shock)</i>	
Physical access limitations <i>(extent to which access was limited due to security or physical constraints)</i>	
Expectations <i>(extent to which disaggregated geographic or demographic information, or additional information on the target area or population, were requested at the same time)</i>	
Brief description of the procedures used to apply the method: <i>Type of sampling approach, sources of information used, processing of the data</i>	
Sampling <i>(sampling frame and procedures)</i>	
Data collection/data acquisition <i>(secondary and primary source(s) of data, type of field work)</i>	
Data processing and results <i>(type of data processing and analysis carried out)</i>	
User-friendliness: <i>Extent to which the method or tool is easy to understand, apply and</i>	

Method No.1	<i>[Indicate the generic name of the method tested to estimate population numbers]</i>
<i>analyse by non-expert staff in emergency contexts</i>	
Understanding and applicability by non-expert field staff <i>(extent of training required for data collection, processing and analysis)</i>	
Dependency on external expertise <i>(extent of external support required for data collection, processing and analysis)</i>	
Availability of methodological guidance <i>(existence, clarity and comprehensiveness of guidance on how to apply the method or tool)</i>	
Feasibility: <i>Staff, time, logistics, and financial implications of using the method or tool</i>	
Staff requirements <i>(number and type/profile of staff required relative to the geographical area and size of the population covered)</i>	
Time requirements <i>(durations of each step including: training, data collection/acquisition, data processing and data analysis)</i>	
Logistics requirements <i>(type of equipment required for the data collection, processing and analysis)</i>	
Physical access requirements <i>(extent of to which direct access and several field visits are required)</i>	
Financial requirements <i>(estimated cost of staff, equipment, transportation etc., relative to the geographical area and size of the population covered)</i>	
Validity and accuracy: <i>Extent to which the data obtained from the method or tool accurately reflects what it is being used to measure</i>	
Objectivity <i>(extent to which the method/data collection and analysis is objective or relies on individual perception, judgement and interpretation)</i>	
Accuracy <i>(degree of accuracy of the population estimates; degree of consistency with other estimates)</i>	
Level of disaggregation <i>(extent to which the method enables to collect geographic and demographic disaggregated information)</i>	
Flexibility	

Method No.1	<i>[Indicate the generic name of the method tested to estimate population numbers]</i>
<i>(extent to which the method enables to collect other information on the affected population)</i>	
Credibility <i>(extent to which the population estimates were trusted or challenged by stakeholders)</i>	
Reliability: <i>Consistency and compatibility of data collected through repeated use of the same data collection instrument or procedure, under the same conditions</i>	
Consistency <i>(extent to which different field staff or agencies are using the method/tool in the same way and obtaining comparable results)</i>	
Overall judgement on the method: <i>Was the method appropriate to estimate population number in this particular emergency context and under the specific time-frame available to produce the number?</i>	
Main strengths/ advantages of the method or tool in that context	
Main weaknesses/ limitations of the method or tool in that context	
Recommendations to improve the usefulness, feasibility, validity, accuracy and reliability of the method or tool	