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**The Honourable Judges Marcel Lemonde and You Bunleng
Co-Investigating Judges
Extraordinary Chambers in the Courts of Cambodia
Phnom Penh
Cambodia**

Demographic Expert Report

**KHMER ROUGE VICTIMS IN CAMBODIA, APRIL 1975 - JANUARY 1979
A CRITICAL ASSESSMENT OF MAJOR ESTIMATES**

30 September 2009

We, Dr. Ewa Tabeau, the chief demographer in the Office of the Prosecutor at the United Nations International Criminal Tribunal for the former Yugoslavia in The Hague, the Netherlands, and Mr. They Kheam, the director of the Department for Demographic Statistics, Census and Surveys in the National Institute for Statistics of Cambodia in Phnom Penh, swear to lend our full support and assist the Co-Investigative Judges of the Extraordinary Chambers in the Courts of Cambodia, Marcel Lemonde and You Bunleng, faithfully, confidentially and to the best of our knowledge.

Herewith we submit our demographic expert report entitled "Khmer Rouge Victims in Cambodia, April 1975 - January 1979. A Critical Assessment of Major Estimates", pursuant to the mission we were entrusted with as defined in the Expertise Order No. D140, from 10 March 2009, Office of the Co-Investigative Judges, Extraordinary Chambers in the Courts of Cambodia. The details of the report were prepared personally by Dr. Ewa Tabeau, whereas Mr. They Kheam assisted Dr. Tabeau at all stages of the project by monitoring the progress and providing his support.

Respectfully,



Dr. Ewa Tabeau



They Kheam

<p>ឯកសារដើម</p> <p>ORIGINAL/ORIGINAL</p> <p>ថ្ងៃ ខែ ឆ្នាំ (Date): 29-Sep-2010, 10:55</p> <p>CMS/CFO:.....Kauv Keoratanak.....</p>
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KHMER ROUGE VICTIMS IN CAMBODIA, APRIL 1975 - JANUARY 1979
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EXECUTIVE SUMMARY

This report was written in response to the Expertise Order No. D140, from 10 March 2009, Office of the Co-Investigative Judges, Extraordinary Chambers in the Courts of Cambodia – ECCC. The report had three major objectives:

- to determine the population of Cambodia on 17 April 1975 and on 7 January 1979, and the number of deaths in the intervening period
- to specify, where possible, the national, religious and/or ethnic origin of the deceased
- to identify the causes of these deaths, and determine which of these deaths were due, directly or indirectly, to policy implemented by the CPK, and which due to external factors

In order to deal with these objectives, we took into account the historical, political, economic and other factors occurring around the 1970s. In our assessment we included two historical episodes: the civil war in Cambodia of March 1970 to April 1975 and the Khmer Rouge regime of April 1975 to January 1979. Our main focus was, however, on demographics of Cambodia in the period before, during and after April 1975 to January 1979, with the Khmer Rouge period being the main time interval of interest. In this report we studied statistical sources on the population of Cambodia; its size, sex- and age- structure, its fertility, mortality and migration; and sources on the death toll during the tragic decade of the 1970s. Our primary goal and the first research area was to identify *excess deaths* that occurred from April 1975 to January 1979, their causes, and their ethnic and religious distribution. We use the terms “excess deaths” and “death toll” as synonyms.

Excess deaths relate to all those deaths that would *not* have occurred under normal circumstances; thus all deaths beyond mortality from “natural causes”.¹ Excess deaths include, first of all, direct (or violent) excess deaths, i.e. deaths of all those executed or murdered, killed in another way (e.g. in combat), missing persons, deaths from torture during interrogation, violent deaths in detention, human shields, and other direct victims. This category is called “*violent*” or “*direct*” deaths as these deaths resulted from direct violence of the Khmer Rouge regime. Secondly, excess deaths cover *indirect* excess deaths, i.e. those who died of starvation, overwork, lack of basic health care, poor living and sanitary conditions, forced migration, victims of mines, deaths of late effects of injuries or wounds, victims of emotional hardship etc.

Our next research area was related to the identification of the population size in Cambodia in April 1975 and January 1979. The significant absolute decline in the population size between these two moments is an important indication of the enormous humanitarian crisis in the country ruled by the Khmer Rouge movement. Secondly, the size of the Cambodia population at these two moments had important practical implications for the determination of the death toll of the Khmer Rouge regime. As we showed in our report, much disagreement exists among various authors in relation to these two population sizes; so it was imperative to us to investigate and clarify this disagreement and to suggest the most likely population sizes for April 1975 and January 1979.

The first half of the 1970s was by no means a peaceful period for Cambodia. The civil war broke out in the country in March 1970 and lasted until April 1975, when the Khmer Rouge took the power by

¹ In demography “natural causes” are meant for deaths from diseases and old age. External causes, such as accidents, suicide etc. are a separate category. Here, however, by “natural mortality” we understand deaths that would occur in non-conflict circumstances.

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force from the Lon Nol government. During the years from March 1970 to April 1975, many Cambodians lost their lives in combat situations, from American bombings, or persecution by the Khmer Rouge, Lon Nol or Vietnamese forces. Many more lost their houses and were years long on move running away from the war, persecutions and the bombings. Thus, we also had to study the victims of the civil war and the internal and external migration in this period. This was our third important research area.

The method we employed in this report was an assessment of a number of sources reporting on the above mentioned research subjects (i.e. the population and general demographic trends around the 1970s, death toll in the civil war and under the Khmer Rouge regime, and finally migration trends in the 1970s). We selected our sources on the basis of an extensive literature review on the first place; secondly we also used the materials that were provided to us by the OCIJ. With regard to the death toll, the term "source" covers in this report mainly internationally published research on the demographics and history of the Khmer Rouge regime. In addition to this, we also included among our sources projects, such as the *Renakse* nation-wide survey from the early 1980s into the victims of Khmer Rouge in Cambodia, and the results of the mass grave mapping project conducted by the Documentation Centre of Cambodia in Phnom Penh (DC-Cam). In total, 12 sources have been assessed in this report. The 12 sources on the death toll include estimates made in the period from January 1980 up to the most recent estimate of September 2008. The 12 sources are by no means all available in the field; several other estimates exist and could have been included as well. We believe, however, that the estimates taken for the assessment in this report are the major ones and well represent other existing estimates. Taking more estimates for this review would not fundamentally change the outcome of this report. The internationally published research assessed in this report includes:²

- CIA, 1980
- EA MENG-TRY, 1981
- KIMMO KILJUNEN (ed.), 1984
- MICHAEL VICKERY, 1984
- JUDITH BANISTER and PAIGE JOHNSON, 1993
- MAREK SLIWINSKI, 1995
- BEN KIERNAN, 1996 and 2003
- PATRICK HEUVELINE, 1998; PATRICK HEUVELINE and POCH BUNNAK, 2007
- CRAIG ETCHESON, 2000 and 2005
- RICARDO NEUPERT and VIRAK PRUM, 2005

The national Cambodian sources assessed here are the following:

- DC-Cam mass grave mapping project
- *Renakse* nation-wide survey of the early 1980s

The method we employed in our assessment was largely (but not exclusively) qualitative. We studied statistical and other sources used by various authors; their relevance, reliability and possible biases. We investigated the methods applied in producing the various estimates; how complex or simple they were, how subjective versus objective, whether formal or informal, whether scientifically founded and satisfying modern analytical requirements or unfounded and out-dated. Finally, we looked at the transparency of the presentation of final outcomes; most importantly we assessed here the formulation of the assumptions, models, and authors' individual inputs (based on their expertise in the subject) and the relative importance of these elements in producing the outcomes, and whether or not one's analysis can be reproduced by others.

² Full references can be found at the end of the report in the "List of Internationally Published Research Assessed in This Report"

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We tried to express qualitative concepts that we were comparing in quantitative terms. That was not always easy. For this, we developed a simple scale with scores from 1 to 10 and employed this scale to all 12 sources. The result of this allowed us to assign an overall score to each source; through the overall score the sources can be compared. The scale and its results are discussed further towards the end of this summary.

In our comparisons, we also had to adapt some of the original estimates, especially those produced as intervals instead of point estimates, or if more than one estimate was produced by the same author in the course of time, or estimates expressed in relative instead of absolute terms (as percentages). The approximations were necessary in order to address our findings in a clear and transparent way. Any possible discrepancies with the original estimates are ours, but we sincerely hope we did not violate authors' original intentions.

In the remainder of the "Executive Summary" we present the reader with our major findings. We concentrate on two major issues, i.e. the population size of Cambodia in the 1970s and the death toll during Khmer Rouge regime. The remaining subjects are summarized very briefly in the final section of this Executive Summary which contains the numbers recommended for use.

Population of Cambodia in the 1970s

Statistical sources on the population of Cambodia during or around the period from April 1975 to January 1979 are non-existent. The last population census before April 1975 was taken in 1962 (Siampos, 1970; Migozzi 1973) and the next following after January 1979 in 1998 (NIS - National Institute of Statistics, 2002). This gives a data gap of 36 years; a gap that must be seen as a dramatic obstacle of reliably studying demographic developments in Cambodia in this period. Another barrier was related to the fact that a statistical evidence system of vital events, such as births, deaths, marriages etc., did not exist in Cambodia in the post-World War II period; it largely does not yet exist at the present time. A rough form of the administrative registration of vital events and socio-economic aspects of the population was (and likely still is) in hands of village chiefs, and further commune leaders, and district and provincial authorities. Occasionally, these locally generated approximate basic figures were sent to the central statistical office in Phnom Penh for producing indicative country-level statistics about the Cambodia population. The 1980 administrative count of the Cambodia population is the most widely known example of these figures.

The bad data situation from the 1960s, 1970s and 1980s has improved in recent years. After the general population census of 1998 (GPC-1998; NIS, 2002), another one was completed in 2008 (NIS, 2008; preliminary figures are available at this stage for GPC-2008; not final). Both these censuses were conducted with subject-matter and financial assistance of the United Nations Population Fund (UNFPA), active in Cambodia since the 1993 UN sponsored first democratic elections in the country, and were also supported by several individual developed countries. Both these censuses satisfied professional requirements of the up-to-date world standard for the population census. Both provided reliable data on the population of Cambodia in recent years.

In addition to the 1998 and 2008 GPCs, several country-wide representative population surveys were as well recently conducted in Cambodia.³ Based on the 1998 census and some post-1998 surveys, three sets of population projections became available for Cambodia, of which the 2nd revised projections 1998-2020, based on the 1998 Census and the 2004 Cambodia Intercensal Population Survey (CIPS-2004; comp. NIS, 2005) are the latest ones. Notably, the 1st and 2nd revised projections

³ Compare the "List of Selected Recent Publications on Statistical Sources on the Population of Cambodia", attached at the end of the report.

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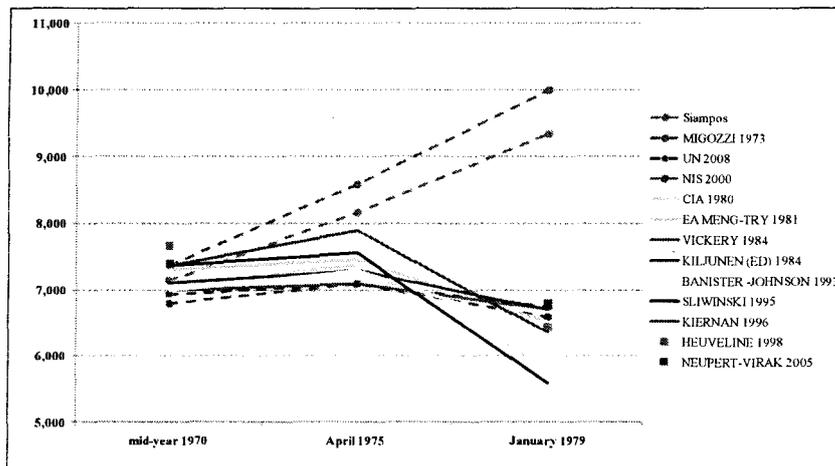
included as well a backward projection for a short period preceding the 1998 census, i.e. up until 1993, for which year the UNTAC data on registered voters are available and could serve as a reference standard for the 1993 projection. This part of the 1st and 2nd revisions (1993-1998) remains the same; the revised part relates to the years after the GPC-1998. All in all, the existing recent censuses and population projections reliably cover the period from 1993 to 2020. This is not the case with the period around the 1970s.

Table 1. Population of Cambodia According to Different NIS sources⁴

Source	Population Both Sexes	Population Males	Population Females	Remarks
1962 Census	5,728,771	2,862,939	2,865,832	Reference time of census was the night on April 17-18, 1962
1980 General Demographic Survey	6,589,954	3,049,450	3,540,504	With reference to the end of 1980
1993-94 Socio-Economic Survey of Cambodia	9,870,000	4,714,000	5,156,000	Extrapolated population with reference to April 1994 based on a sample of 5,579 households
1996 Demographic Survey of Cambodia	10,702,329	5,119,587	5,582,742	Extrapolated population with reference to March 20, 1996 based on a sample of 20,000 households
1998 Census	11,437,656	5,511,408	5,926,248	With reference to March 3, 1998. Did not include a few areas where conflict took place at the time of the census. Population in these omitted areas was estimated at 45,000.
2004 Cambodia Inter-Censal Survey	12,824,000	6,197,000	6,627,000	Estimate of population in regular households as of March 3, 2004, as the survey did not cover institutional population, homeless population etc.
2008 Census	13,388,910	6,495,512	6,893,398	With reference to March 3, 2008. Includes estimate for non-response in respect of some households.

Source: General Population Census of Cambodia 2008. Provisional Population Totals. National Institute of Statistics, Ministry of Planning, Phnom Penh, Cambodia August 2008

Figure 5. Projected Population Size in Cambodia in (or around) Mid-1970, April-1975 and January-1979 by Various Authors



Note: NIS 1975 approximated by UN 2008 estimate for 1975

⁴ All tables and charts included in the Executive Summary have *the same numbers as in the report*.

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In the absence of population data generated by professional statisticians, alternative sources must be considered for the period around April 1995 and January 1979. Two such sources exist: the administrative population count for 1980 (end-year population) and the voters register from the 1993 elections. Both of them were assessed in our report as fairly acceptable, and the voters register for the 1993 elections exceptionally reliable. Both these sources, as well as other important sources on the Cambodia population (all mentioned above) are discussed in detail in Section 2.1 of the report. Basic population figures from these sources are attached in Table 1 (reproduced from Section 2.1).

Table 1 gives a general framework on population figures available for Cambodia since 1962. In addition to the statistical authority of Cambodia (i.e. the National Institute of Statistics (NIS), Ministry of Planning, Phnom Penh), several individual authors including those whose work is reviewed in the report, made their own highly diverged projections of the Cambodia population, or produced their own guesses on this population for the period between 1970 and 1979; these figures are summarized in Figure 5 of this report (reproduced below from Section 3.1). Note that Siampos (1970) and Migozzi (1973) were pre-war analysts; their projections for 1975 and 1979 resemble the "no-war/no-turmoil" scenario.

The CIA report of 1980 was the first one after the fall of Khmer Rouge to come up with what it then seemed highly reliable and detailed figures on the population of Cambodia between 1970 and 1979. CIA produced a clearly low estimate of the population in 1970 (7.06 mln), far lower than what the pre-1970s leading analysts thought was the 1970 figure (Siampos (1970): 7.143 mln; and Migozzi (1973): 7.363 mln). Consequently, CIA also produced a low April 1975 estimate (7.384 mln) and a low January 1979 estimate (5.845 mln). Notably, CIA assumed an unrealistically high level of excess deaths in the civil war of 1970-75, i.e. about 600,000 to 700,000 deaths. Interestingly, CIA did not explicitly report the excess deaths during the Khmer Rouge period of April 1975 to January 1979, other than by mentioning about 50,000 to 100,000 executions by the Khmer Rouge regime. The extremely transparent presentation of the CIA inputs and outputs, makes it possible, however, to calculate the overall level of all deaths in April 1975 to January 1979, and by distributing it fifty-fifty into natural and indirect excess deaths, one obtains the overall number of excess deaths under Khmer Rouge equal to about 1 million (comp. Section 3.3 and Annex 3).

The CIA report, although coming from an intelligence agency of one of the greatest political powers of the world that was intensively engaged in the 1960s and 1970s politics and wars in Southeast Asia, not signed with any names and not referring to explicit sources other than the CIA own expertise in the subject, and not subjected to a peer-review process (as it remained unpublished), had become extremely popular among international and national authorities and individual researchers in the 1980s and early 1990s. The CIA report had an extraordinary yet unjustified impact on the public opinion regarding the population size of Cambodia in the 1970s and about the death tolls in the civil war and in the Khmer Rouge regime. We see this report as a source for the magic number of 1 million death toll during Khmer Rouge regime and some serious misunderstanding about the population size in Cambodia in the 1970s. In our report we show that the authors such as: Ea Meng-Try, Vickery, Kiljunen (ed.), and Banister and Johnsons are those whose work closely resembles the CIA study; all of them produced the 1970s population figures and the death tolls under Khmer Rouge which are in line with what the CIA proposed.

Unlike the CIA analysts, we believe that the 1970s population size in Cambodia was in agreement with the estimates of Kiernan (1996, 2008), Heuveline (1998), and Neupert and Virak (2005). Of these three authors, Kiernan is a renowned historian with a remarkable experience in Cambodian matters working mainly with the qualitative approach; Heuveline and Neupert/Virak are quantitative demographers, with outstanding academic and high-level international references. They published on

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the Cambodia's tragic decade in the 1990s (Kiernan earlier) and still continue working and publishing on these issues at present. It is remarkable that they came to similar conclusions on the population size and on the death tolls working from two very different methodological angles which eventually corroborated each other's results.

Kiernan proposed the mid-1970 population of Cambodia to be 7.363 million (fully consistent with Migozzi, 1973), April 1975 population 7.890 million, and January 1979 population 6.360 million. His reasoning when justifying these figures is purely qualitative. The strength of his approach is that he always uses multiple sources which he cross-references with each other. He combines results from research reports (such as Migozzi (1973) or Sampson (1977)) with those produce by official authorities (e.g. UN, 1974), any other relevant open sources, sample surveys, and his own interviews with knowledgeable persons.

Using the present-day standard population projection approach, i.e. the cohort component model, Heuveline predicted 7.662 million as the January-1970 population, 7.952 million as of around April 1975,⁵ and 6.437 million for January 1980 population.⁶ Neupert and Virak with the same method produced 7.412 million for mid-1970 and 6.803 million for mid-1980 (their number for January 1979 is unavailable).

The above mentioned projections are in line with the most likely April 1975 population of Cambodia defined in the report as an interval from **7.844 to 8.102** mln, with the central value of 7.894 million; and with the interval of **6 to 6.418** mln, with the central value of 6.209 million for January 1979 population. We accepted the two intervals after having completed a thorough review of major population sizes estimated by individual authors since the CIA report of 1980, and by statistical authorities, such as NIS (2000) and UN Population Division (2008), and after studying the intervals from the recent review article by Sharp (2008).⁷ We consider these intervals as the most likely population figures for April 1975 and January 1979. Any death toll estimate for the Khmer Rouge period produced based on population figures falling outside these two intervals must raise serious doubts and eventually be rejected as unrealistic.

Table 15. Estimated Excess Deaths and Projected April 1975 Population

Category	Pop Apr 1975	Death Toll	Average Direct Excess	Reported Direct Excess
CIA 1980	7.384	0.976	75,000	50,000 to 100,000
EA MENG-TRY 1981	7.460	1.000	120,000	120,000
RENAKSE 1983	7.098	3.314	569,000*	Min 569,000*
VICKERY 1984	7.100	0.740	300,000	300,000
KILJUNEN (ED) 1984	7.300	1.000	112,500	75,000 to 150,000
BANISTER & JOHNSON	7.300	1.050	235,000	10% men 3% women young- to mid-age
SLIWINSKI 1995	7.566	1.879	986,000	Min 39.3 to 52.5% of all deaths
KIERNAN, 1996, 2003	7.890	1.763	881,500	NA: estimated as 50% of the death toll
HEUVELINE 1998	7.952	2.200	1,100,000	1.1 mln
NEUPERT AND VIRAK	7.890	1.400	700,000	NA: estimated as 50% of the death toll
ETCHESON 2005	7.952	2.200	1,100,000	1.1 mln
HEUVELINE AND POCH	7.952	1.750	875,000	50% (0.75-1 mln)

Notes: * Renakse reported about 569,000 deaths in the forest and bodies in pits; this was assumed here as their minimum of direct excess deaths

Notes - continued: The April 1975 population is approximated in this table for: Renakse (as in UN (2008)), Etcheson (as in Heuveline (1998)), Neupert and Virak (as in Kiernan (1996)). For Heuveline (1998) and Heuveline and Poch (2007), we used the April 1975 estimate as given by Sharp (2008) based on his personal communication with Heuveline. All these approximations were made as to resemble the authors' most likely figures.

⁵ We quote this number after Sharp (2008) who refers to his personal communication with Heuveline regarding the April 1975 population.

⁶ According to Sharp (2008), Heuveline mentioned it would be about 6 million in January 1979.

⁷ Both intervals are as proposed by Sharp (2008). We cross-referenced his and our findings and concluded these intervals are the most likely ones.

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Table 15 (reproduced from Section 5.3) summarizes which authors' estimates do fall within the required intervals for April 1975, and which do not. Noteworthy, the *Renakse* study and Etcheson (2005) do not rely on any population estimate. In Table 15, values have been assigned to them merely for repairing this gap. Sliwinski (1995) did not use the estimated 7.566 million population in the extrapolation of his survey results; he then applied a different size of the April 1975 population being 7.768 million (his H1 hypothesis), which we believe is close enough to the lower end of the most likely values interval for April 1975 population.

In the view of the above explanations, Table 15 indicates that CIA (1980), Ea Meng-Try (1981), Vickery (1984), Kiljunen (ed., 1984), and Banister and Johnson (1993) do not satisfy the required April 1975 population size and therefore must be treated as not reliable enough. With regard to the January 1979 population, out of the five identified unreliable studies, only Banister and Johnson's estimate does fall within the required interval; the remaining four do not.

Excess Deaths April 1975-January 1979: Sources

Parallel to our review of population estimates for Cambodia for the 1970s, we studied the estimates of excess deaths under the Khmer Rouge regime, including the sources and methods under which they were obtained.

Generally, no victim *counts* were produced for the Khmer Rouge victims by any author; however, two attempts tried to address this issue. One is the *Renakse* nation-wide popular survey of the early 1980s and the second one is the mass grave mapping project of DC-Cam. Despite of its good intentions, *Renakse* effort was not successful in producing a reliable count due to the lack of a reliable statistical framework. The DC-Cam mapping project has been largely successful; so far it identified an estimated 1.3 mln human remains in the mapped mass graves, but the work is not yet finished and not validated other than by survivors statements.⁸ The proper exhumations of all these remains will never be done due to the large scale of the problem and gradual disappearance of the remains. A sample of exhumations could be certainly most useful but the sample would not offer a complete count of victims either.

All in all, victim counts do not exist for the Khmer Rouge regime. What exists and was used, were a number of small scale retrospective surveys conducted after 1979 and several popular sources based on monitoring of the situation in the 1970s and early 1980s by individuals and international organizations, such as for example the writings of Father Ponchaud (1978), reports and statements of international organizations such as Amnesty International or UNICEF, numerous press reports and research articles and books. All these sources are aggregate; no lists with victim names were usually compiled (except for S-21 and a few other occasional incidents). Unfortunately, popular sources are not a good replacement of professional statistical sources. They most certainly can provide some useful insights and contextual information but when it comes to victim numbers, these sources should be dealt with caution.

Sample surveys, although usually small or very small, were most certainly valuable as they increased the understanding of the Khmer Rouge victimization mechanisms and the victim numbers. However, none of these surveys could be seen as nationally representative and thus none could be used to produce the overall estimate of Khmer Rouge victims for the entire Cambodia.

⁸ There exists of course an extensive documentation of the location of the mass graves. For every site mapped so far, a DC-Cam mapping report is available and a related mission report. For a number of selected sites (about 20), OCIJ produced site identification reports that are basically consistent with the DC-Cam findings.

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With respect to the population size in Cambodia in 1970s, data sources include population estimates by the authors themselves or by others. Note that official NIS projections did not exist for the 1970s; the UN projections even though did exist for the 1970s, remained basically unrevised prior to 1980 (i.e. for 1975-79); thus were showing population development under “no-turmoil” scenario. In this situation, some authors based their estimates of the 1970-79 population on the pre-Khmer Rouge main studies of the 1962 census by Migozzi (1973) and Siampos (1970). Many authors relied on the estimates by CIA (1980). Additional estimates included by the authors are those by the Cambodia governments in the 1970s and early 1980s, including by Khmer Rouge themselves, and the (unrevised) UN Population Prospects. Occasionally, the 1980 or 1981 administrative population counts of Cambodia and the 1993 voters’ registration were referred to as well.

Diversity and high uncertainty of the 1970s population estimates is a result of the lack of reliable statistical sources which could provide assumptions in relation to 1970s trends in births and deaths. Only one demographic and health survey is mentioned (Banister and Johnson, 1993) which could give some indications for the post-Khmer Rouge period (1982; Cambodia Ministry of Planning; methodology of which is not entirely clear and most certainly does not compare with the modern demographic and health surveys supervised by the World Health Organization - WHO). No other professional surveys were used by any author for the years 1970-79 as such surveys do not exist. Migration is hazily documented too, but at least some UNHCR, UNDP and local statistics exist (e.g. Cambodian Displaced Persons Working Group; in Huguet (1991)); good migration reviews are available too (e.g. Banister and Johnson (1993)) and could be referred to. That does not mean that the existing migration statistics are all consistent.

More recent studies, starting from around 1995, were more fortunate with sources for the post Khmer Rouge period. In 1995 Sliwinski published his Cambodia survey and provided new evidence about mortality and fertility changes during the 1970s and under Khmer Rouge regime in particular. Much could be learned from this new source about excess deaths and their causes, and about fertility and natural mortality trends. From the 1993 elections in Cambodia, an excellent individual level database became available of the registered 1993 voters. Heuveline (1998) used this data in his backwards projections of the Cambodia population until 1980. In 1997 Huguet used the 1996 Cambodia Demographic and Health Survey to estimate backwards the 1980 population which confirmed that the 1980 administrative count can be trusted. In 1998, the first modern census took place in Cambodia, whose data was used by Neupert and Virak (2005) for a reliable modern backwards projection until 1993. This projection gave a link between the 1998 census and the electoral rolls of 1993. All in all, the more recent studies (1995 and later) had a better statistical basis for the period after the fall of Khmer Rouge. The basis for the years after the 1962 census and during the 1970s remained the same in any estimate, i.e. poor.

Excess Deaths April 1975-January 1979: Methods

The papers reviewed in our report are not homogenous in character. Some are articles or book chapters focused exclusively on Khmer Rouge victims and other demographic consequences of this regime,⁹ some others concentrate on the population change in Cambodia in the 1970s and analyze this change as a subject in itself;¹⁰ the remaining ones discuss it as part of a broader historical context.¹¹ Finally, some authors used unique Cambodian sources, such as DC-Cam mass grave records and *Renakse* petitions.¹² The question of victims remains central in all papers; the character

⁹ E.g. Heuveline (1998), Heuveline and Poch (2007), Sliwinski (1995), Kiernan (2003).

¹⁰ E.g. CIA (1980), Ea Meng-Try (1981), Banister and Johnson (1993), Neupert and Virak (2005).

¹¹ Vickery (1984), Kiljunen (ed., 1984), and Kiernan (1996).

¹² Etcheson (2000 and 2005) for mass grave statistics and “*Renakse* Summary” of 1983.

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of a given study might have had some impact on the type of research approach applied. It seems, however, that the research discipline the authors belong to had a fundamental impact on the approach chosen for the estimation. Demographers and statisticians relied on (quantitative) population projections and (mixed quantitative and qualitative) scenarios, political and other behavioural social scientists on sample surveys, and historians on multiple sources including interviewing survivors and other relevant persons (e.g. state and international officials), generalizing sample surveys, studying documents, such as research information, letters, press reports etc., post-conflict visits to the country and direct inspection of the situation etc. Each of these approaches is valuable in some way and complementary to others; all of them depend heavily on the inputs used by the authors (i.e. data and assumptions). Whenever poor inputs were used the results cannot be seen as reliable and meaningful.

The following groups of methods can be distinguished in the studies assessed in this report:

- Demographic balancing equation: Excess deaths as part of the demographic balancing equation for the “Population Decline” or “Population Loss” between April 1975 and January 1979
- Population Scenarios: two variants were applied, unrestricted and restricted; the restriction involved using the 1980 population size and age- and sex-structure as a limit for the population development between 1975 and 1980
- Extrapolation of Sample Surveys Results over the Entire Population
- Excess Deaths as a Residual Category between Two Projections
- Excess Deaths as Linked to Mass Grave Statistics
- Excess Deaths as a Naïve Estimate from Nation-Wide Investigation

Table 6 (reproduced from Section 2.4) gives a quantitative summary of our expert assessment of the sources, methodology, and transparency used in the international and local research on Khmer Rouge victims in Cambodia. For this summary we developed a scale (attached under Table 6) which allows for verbal expression of our scores. The maximum possible score is 40 per one estimation approach. None of the approaches used for Khmer Rouge victims obtained the maximum.

Table 6. Quantitative Assessment of Estimates of Khmer Rouge Victims Studied in This Report

Approach	Sources	Methods	Transparency	Convincing Power	Total Score
Demographic balancing equation	4	4	4	2	14
Population Scenarios	4	6	6	6	22
Extrapolation of Sample Surveys Results	5	7	8	8	28
Excess Deaths as a Residual Category	5	8	8	8	29
Excess Deaths as Linked to Mass Grave	5	7	8	8	28
Excess Deaths as a Naïve Estimate (Renakse)	4	4	4	2	14

Scale: 1-10

1. misleading 2. worthless 3. very bad 4. failed 5. average
6. satisfactory 7. good 8. very good 9. excellent 10. exceptional

According to Table 6 the most valuable studies are those that obtained excess deaths as a residual category of two separate projections. The authors of these studies include Heuveline (1998) and Neupert and Virak (2005). The second best are extrapolations based on sample surveys (Kiernan (1996), Sliwinski (1995), Heuveline and Poch (2007)), and on mass grave data (Etcheson (2000 and 2003)). The difference between the first and second scores is very small, practically insignificant. The least valuable studies are those prepared using demographic balancing equations, scenarios and the *Renakse* petitions. The number of Khmer Rouge excess deaths estimated in the highest rank studies ranges from about 1.4 to 2.2 millions. Violent excess deaths equal from approximately 700,000 to 1.1 million.

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Excess Deaths as a Residual Category

In this method an estimate of Khmer Rouge excess deaths is obtained as a residual category between two projections, one forward and one backward, that meet at the end of the 1970s. Heuveline (1998) and Neupert and Virak (2005) applied this method. A formal model is applied with well justified assumptions. The model represents the most up-to-date demographic standard in population projections. The level of subjectivism is low compared with other approaches. Both authors build up on the work of others but are critical and selective of their results. Neupert and Virak stop at presenting the overall number of excess deaths in 1970-79 (and its sex and age distribution). Heuveline goes further and separates violent and non-violent excess deaths from each other, and next subtracts civil war deaths from all 1970-79 excess deaths obtaining his estimate of Khmer Rouge victims. The separation of violent deaths and their distribution into pre-Khmer Rouge and Khmer Rouge period is certainly convincing in Heuveline's work. Interpretation of his results could be more focused on the most likely variant as his range of all possible values of the number of victims in 1970s is extremely unrealistically large. Heuveline's estimates also need to be improved by including births since 1970 and their mortality and by separation of victims of starvation in 1979 from the estimated excess in 1975-79.

Extrapolation of Sample Surveys Results

Extrapolation of sample surveys results over the entire population was done by several authors, most importantly by Sliwinski (1995), Kiernan (1996) and Heuveline and Poch (2007). This approach is often applied in the estimation of conflict mortality world-wide. It has as many advantages as shortcomings, however. What matters is the quality and reliability of the survey material and, secondly, of the population estimates at the beginning of the conflict period. The major drawback of retrospective and surveillance surveys (only such surveys were conducted for Cambodia) is their lack of nation-wide representativeness:

- Random sample surveys are not suited to provide representative record of victimization in the entire population of a conflict-affected country because respondents are selected from survivors, among whom the victims of the most dramatic episodes are underrepresented.
- Convenience samples could be a better alternative, especially if they were selected following the historical development of the conflict. But convenience samples are highly unpopular among researchers who wrongly believe that only random surveys are the appropriate tools.
- Sample drawing mechanism might produce a significant bias if it is in disagreement with conflict development; e.g. camp samples will correctly represent the victim populations from the areas the camp respondents moved from before arriving in the camp, but not necessarily the rest of the country population.
- Some groups of respondents might see the survey as a form of registration for aid distribution; this might cause another bias of over-reporting of survivors.
- There is a recall bias in sample surveys; more distant surveys are known to contain more gaps and misreporting than the early ones.

Surveys have huge advantages too, most importantly completed usually within a short period of time surveys can provide large quantities of extremely relevant information about the conflict and its victims, including the death rates that can be estimated without knowing the actual population size. In addition to this, surveys are easy to implement, require limited resources, and data quality can be efficiently controlled.

Several surveys were reviewed by Kiernan (1996, 2008) as part of his historical investigation of the victimization in the Khmer Rouge period. Kiernan as well uses additional materials when exploring victimization issues, such as his interviews with survivors and witnesses to the events under Khmer Rouge, observations from his frequent visits to Cambodia, relevant statistics from the work others,

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his personal communications with persons working in this field etc. Kiernan is the only author that integrates the results produced in a number of different surveys and survivors recollections into his integrated estimate of death toll under Khmer Rouge. The strength of his approach is that he does that on the basis of respondents' social and ethnic group; thus not by applying a single percentage obtained in one survey to the entire population of Cambodia in April 1975. He breaks down the April 1975 population into sub-populations, such as the NEW and BASE people, and within these groups into a number of sub-groups, i.e. Rural Khmer, Urban Khmer, Chinese, Vietnamese, Lao, Thai etc. Each of these sub-populations is assigned a different estimated percent of excess deaths which is further used in the extrapolation over the entire population. This makes Kiernan's approach truly remarkable.

If, however, one would like to base one's views exclusively on the surveys and neglect other sources, several of the surveys would appear too small and too insignificant to be taken seriously. The sample of 158, 168 or 350 individuals as in Ebihara (1993) and Honda (1981) can be considered a special case study and no more than that. Only three surveys seem to be large enough to accept them as serious representations of large groups of the Cambodia population that survived the Pol Pot reigns, i.e. Heder (1981), Sliwinski (1995) and Heuveline and Poch (2007). Yet even these three do not pretend to be representative of the entire population exposed to the risks of death under Khmer Rouge. It is likely that the victims of the most fatal episodes of Khmer Rouge regime are underrepresented in all three surveys. All three studies are consistent in the estimated death toll of Khmer Rouge; in the three surveyed populations the death toll is estimated at about 20 to 25 percent.

As we already noted, surveys like Heder's, Sliwinski's and Heuveline and Poch's are not that small and not that questionable. Sliwinski for example had drawn his sample from three different populations of survivors and in different periods of time (see Annex 3 for details and selected results on Khmer Rouge victims); all periods are not that distant from the fall of Khmer Rouge in January 1979. With the total number of the interviewed families being 1,296 and covering the fate of 13,163 individuals this survey is exceptional. Sliwinski estimated that the survey-based proportion of excess deaths under Khmer Rouge in the 1975 population was about 25 percent.

Another important example of a reliable sample survey is the Mekong Island Population Laboratory (MIPopLab), a demographic surveillance system established recently by Heuveline and Poch (2007) in the Kandal province near Phnom Penh. MIPopLab is an on-going demographic surveillance system launched in December 2000 in a rural district of Kandal province. The population of this district is about 10,000 persons and is questioned systematically once per year regarding their basic demographics. A special module was designed in the MIPopLab survey to explore demographic consequences of Khmer Rouge regime, including excess mortality, disruptions in marriage formation and reproductive behaviour. The module includes births and marriage histories of all women aged 15 to 75 years (2,843 histories were obtained). Data on parental survivorship were collected from all respondents of the Kandal district. Using this data, several important results were obtained not only on excess mortality but as well on declines in fertility and marriage formation during Khmer Rouge period. The MIPopLab proportion of excess deaths of Khmer Rouge regime in the population was about 25 percent.

Excess Deaths as Linked to Mass Grave Statistics

This method was applied by Etcheson (2000 and 2005). Excess deaths of Khmer Rouge, 1975-78, are composed in his approach of two parts:

- direct excess deaths seen as the number of human remains in the mass graves mapped so far

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- indirect excess deaths, whose number remains about the same as the number of individuals in the mass graves.

The proportion between the two components (i.e. direct and indirect excess deaths) equals 50:50 and is assumed after Heuveline (1998). Other proportions available from literature (and based mainly on small sample estimations) are seen as not reliable enough to be used; these other proportions relate to narrower groups of the population.¹³

It is unquestionable that the data from the DC-Cam mass grave mapping are an essential source on victims of the Khmer Rouge regime in Cambodia. Thus, using this data for an estimate of victims not only makes a lot of sense but is important and needs to be done. It is unquestionable that a vast majority of victims in the mass graves, if not all, are Khmer Rouge victims (violent or non-violent). The assumption that *all* victims found in the mass graves were killed in executions might be difficult to prove, however. One reason for this is that non-violent excess deaths were most certainly frequent during Khmer Rouge regime. It is unlikely that such deaths, if occurred in detention centers, were buried in locations other than the mass graves. Also some non-violent excess deaths from hospitals might be buried in the nearby mass graves. Another reason for this is that the usual burial practices were forbidden by Khmer Rouge and thus not commonly exercised during this period. Thus, some marginal numbers of "natural" deaths might be found in the mass graves too, especially in smaller graves located in a distance from detention and security centres. Despite of the fact some non-violent excess deaths were likely buried in the mass graves together with victims of executions and interrogations, all the victims in the mass graves cannot be considered natural deaths. The category of natural deaths must be seen completely marginal under Khmer Rouge as life circumstances the Khmer Rouge regime created for their population prevented natural death and forced unnatural death instead.

Another aspect of the massive death process during the Khmer Rouge period is that many bodies were abandoned and left on the surface exposed to the devastating and quickly progressing atmospheric influences in this region of the world; thus, a large number of bodies were never buried in mass graves but decomposed on the surface. Many other bodies were dropped into rivers, wells, single pits and whatever other (often small) places which were equally strongly exposed to the hot and humid natural environment as the unburied bodies. It is therefore highly probable that the mass grave victims identified today are just a sample of all excess deaths.

The identified graves should be thus seen as a "burial-place-sample" of all people that died as war victims during that time. Some 30 years after the end of the Khmer Rouge era the sample contains about 1.3 million remains as estimated from the current DC-Cam mass grave statistics. It is fully possible that the mass graves identified so far comprise about 50-60% of all buried and unburied individuals. It is likely that the bodies in the graves represent both executed and indirect Khmer Rouge victims; the proportion between them will vary between the different graves. In any case, it is a large and important sample and must be further studied for unfolding information about how many, how and when these persons died.

For the above reasons, we consider Etcheson's estimate of 2.2 million excess deaths fully plausible and in line with the most serious attempts of estimating the excess deaths in Cambodia.

¹³ The fifty-fifty distribution of violent and non-violent excess deaths is likely a good compromise that is strongly supported by Heuveline's solid analysis of excess deaths for Cambodia using model life tables.

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Demographic Balancing Equation

At the opposite end of our assessment of the methodologies used for various estimates of death toll under Khmer Rouge are three approaches: demographic balancing equations, scenarios, and *Renakse* petitions.

Demographic balancing equation is the most approximate and unreliable method, disregarding whether it is applied to the population decline or population loss. There are three components of the equation: births, deaths (natural and excess), and net migration. The level of analysis is the entire population of Cambodia, not even the disaggregation by age and sex is applied. Population decline (in absolute terms) is analyzed by comparing the population size between April 1975 and January 1979. The population at the beginning and end of the analyzed period is decided first, usually on subjective grounds by brief reviews of estimates by others. In the second step, assumptions are made about the magnitude of births, deaths and net migration in 1975-79 in such a way as to satisfy the equation. In this puzzle, unlike in any real puzzle, there exist several variants of alternatively shaped "pieces" that will always add up to the overall decline. This method was applied by Ea Meng-Try (1981) and Vickery (1984)).

In the case of the population loss, instead of the 1975-79 decline, a difference is analyzed between the expected (under "no-turmoil" scenario) and actual population on January 1979. Both populations are decided first; both are very hard to predict. The components of the difference are again births (actually the births' deficit which is the difference between the expected and actual births), deaths (only excess) and net migration. The balancing equation explains that the difference between the expected and actual population on a given moment is the result of births' deficit, excess deaths and net migration. Again several alternatives exist that satisfy also this equation. The authors who used this method included Kiljunen (ed.; 1984) and Banister and Johnson (1993)); the latter in combination with several other more sophisticated analysis.

There exists a third variant of the demographic balancing equation as well. In this variant the "expected" January 1979 population expresses the population that would have been observed in the absence of excess deaths but under the actual natural growth and actual net-migration in April 1975 - January 1979. The annual growth is usually assumed much lower than before 1970 (say 1% instead of the usual 2.8%). In this variant the difference between the expected and actual population on January 1979 are exclusively excess deaths, as births and net-migration are the same in both these populations.

In the absence of reliable data on the population size and structure, migration, and on fertility and mortality trends, the balancing equations have no value. They express no more than individual authors' subjective views on one of the many possible variants of population development during the Khmer Rouge period. The lack of more elaborate justifications in terms of methods and sources makes these methods hard to accept and subject to considerable distrust. Note however that demographic balancing equations can be also made as a final check up for the data resulting from a complex demographic estimation, i.e. population projection methodology or a scenario, for example. In this case the equation is not the source for its components, and for the excess deaths in particular. The equation is a summary of projection results and as such provides meaningful and important inputs. (Comp. Kiernan (2003), Banister and Johnson (1993) and Neupert and Virak (2005)).

Population Scenarios

Population scenarios, such as the one by CIA (1980) or Bannister and Johnson (1993), are more complex and better justified than the demographic balancing equations. Both these sets of scenarios

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are exceptional; both go very deeply into the details of the population development. The CIA presents a crystal clear method (“demographic accounting”, i.e. a simple projection) which is based on numerous assumptions. Sources for the assumptions are generally called “intelligence” and “CIA analysts expertise”. No list of detailed references is provided for the assumptions, which makes the CIA outcomes mysterious and questionable. Bannister and Johnson on the other hand provide numerous sources (mostly non-statistical) on every aspect discussed in their paper (except on Khmer Rouge victims). Their method used for obtaining their *plausible scenario* (and for their 1980-2050 scenarios) is somewhat unclear and the reader can judge about the method only from reading between the lines. Most likely it is a simple population projection restricted from above. Banister and Johnson impose the restriction onto the upper limit of the population change by taking the actual population size and age- and sex-structure from the year 1980, thus around January 1979, as the one being approached, in order to keep the plausible scenario as real as possible.

Scenarios are obviously based on a formal model describing population development, a model that has clear assumptions and uses transparently defined initial values of the population size. Once the model is run, its final outcome is the result of what has been put into it. CIA model has many additional structures, including the OLD and NEW people, six-month sub-periods etc. The additional structure makes the CIA model extremely transparent; anyone can re-run their analysis with the same or modified inputs. The transparency of Banister and Johnson’s model is different: the detailed model structures are unclear but each statement has its verbal justification. All these features make scenarios attractive candidates to be considered worthwhile tools; the lack of reliable population data keeps the scenarios still questionable, although more convincing than the demographic balancing equations.

Excess Deaths as a Naïve Estimate from Nation-Wide Investigation

Exhumations of mass graves began in early 1979 and were continued in the 1980s within a nation-wide effort at collecting evidence of Pol Pot’s crimes. Several other types of evidence were collected at that time, including individual and group survivors statements called “petitions”, witness testimonies, research reports, documents, lists of victims, torture and detention facilities, intelligence centres, prisons etc. All these efforts were coordinated by the Research Committee into the Crimes of Pol Pot Regime (hereafter: “Research Committee”), again a creation of the Salvation Front *Renakse*, called then the Front for National Solidarity, Reconstruction and Defence of Kampuchea. The Research Committee had a whole network of its local units, including the provincial, district and other committees. The task of all these committees was to collect evidence that could be used in persuading the United Nations (UN) to remove the Khmer Rouge representatives from their sit in the UN General Assembly and offer this sit to the legible PRK government. The national Research Committee submitted their Summary Report to the PRK government on 25 July 1983; it contained the following main findings:

- Death toll under Khmer Rouge regime: 3,314,768 persons, of which 568,000 were counted in exhumations and 2.75 mln in other settings.
- Number of informants, i.e. persons who signed or finger printed the “petitions”: 1,166,307

Acting upon their mandate, the Research Committee asked people to look into three aspects of Pol Pot’s regime: the death toll, methods of torture and killing, and destruction of property. In order to achieve their objectives, they practically initiated and completed a nation-wide survey among several groups and hundreds of thousands of individuals and families. All these groups and individuals were instructed to look into these three areas of interest and write documents called “petitions” reporting on the consequences of Pol Pot’s crimes and postulating the removal of Khmer Rouge for the UN sit. The petitions and other relevant documents were processed first at local and then national level and used to produce the final statistics on the death toll, informants and underlying documents (Annex 1).

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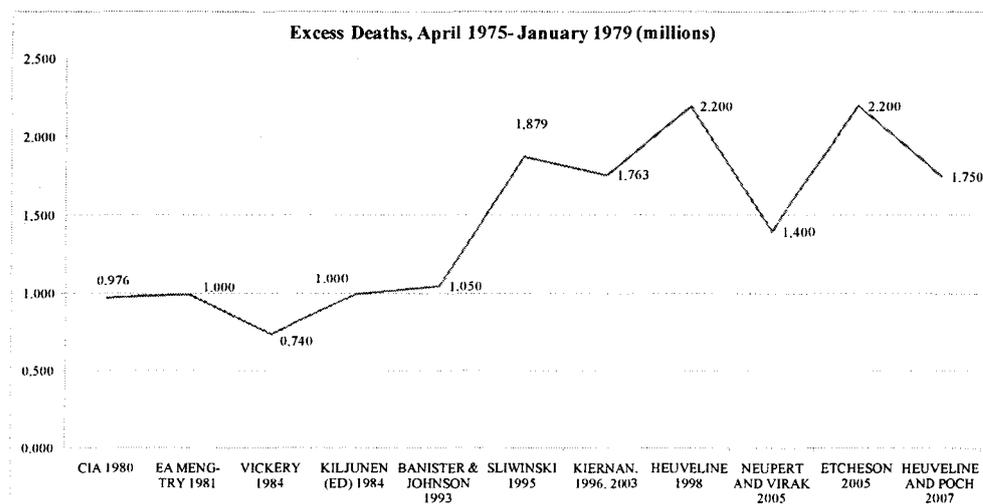
In the *Renakse* survey, no preparations in statistical sense were made at all. As far as we could see from any source materials, no standardized questionnaires were used, no trained interviewers were taking statements, no professional personnel was involved in the exhumations. Collecting all this evidence must be seen as spontaneous efforts based on qualitative data obtained from the respondents and actions taken based on the initiative of every Research Committee in the country. Importantly, several source materials stressed that with regard to the results, no pressure was exercised over the respondents; not over individuals and not over groups, and no instructions were given as to the outcomes of the survey. As such, the individual outcomes of the survey are likely true, valuable and meaningful. The same, however, cannot be said about the general country-level statistics presented in the *Renakse* Summary Report on 25 July 1983.

The main reason for this conclusion is that the degree of duplication among the death toll of 3.315 mln must be enormous. DC-Cam estimated this degree to be around 50% (after Etcheson, 2000), In addition to duplicates there are other problems, namely incompleteness; the *Renakse* death toll is still incomplete as only 15 provinces are listed in the *Renakse* Summary Report out of 21 (see DC-Cam report, March 21, 1999). It is also unclear what fraction of all actual deaths is reported for each province. The above mentioned problems are related to the lacking statistical framework of the *Renakse* survey that implies it is impossible to assess the degree of coverage of *Renakse* statistics. As such, the *Renakse* death toll of 3.315 mln must be disqualified from considering it a reliable estimate of Khmer Rouge victims.

Excess Deaths April 1975-January 1979: Estimates

Figure 7 (reproduced from Section 3.3) shows that the early estimates of excess deaths (i.e. those published between 1980 and 1993 excluding *Renakse*), consistently approach the magic figure of 1 million, quite popular in the media, politics and research in the 1980s and early 1990s, except of that by Vickery (1984) which is 740,000 and is the lowest among all ever made. Later estimates, made between 1995 and the present time, are evidently higher than 1 mln and range from 1.4 (Neupert and Virak (2005)) to 2.2 million (Heuveline (1998) and Etcheson (2005)).

Figure 7. Excess Deaths Estimates during Khmer Rouge Regime, April 1975 to January 1979. Varous Authors¹⁴



¹⁴ This and the following figures contain some approximations and averages of original estimates. All approximations were calculated by the authors of this report.

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Clearly there was a shift in the scientific thinking about excess deaths caused by the Khmer Rouge regime sometime in the mid-1990s. Regarding the reasons for this shift, some could argue data situation improved in Cambodia in the years after the 1993 elections and a better understanding of the tragic decade became possible. Some others would, however, insist on a better political climate that influenced the more courageous analysis of the demographic consequences of the 1970s. Both mechanisms could have been at work; in addition to them several other factors could have played a role as well, including a new generation of talented modern researchers, and in particular quantitative demographers and population statisticians that engaged in studying the Cambodian tragedy of the 1970s. They brought in fresh methodological approaches and new experience in dealing with deficient data. All in all, contrary to the frequent adjustment of conflict statistics from relatively high to relatively low in other contemporary conflicts of the world, for Cambodia the adjustment had the opposite direction.

The prevailing views of today indicate that excess deaths of Khmer Rouge time in Cambodia were between **1.4 to 2.2 millions**. Notably all estimates from this range belong to those most advanced methodologically. Sample survey extrapolations, deaths as a residual between two projections and mass grave statistics are all covered in this interval.

Some would argue that uncertainty of excess deaths estimates is enormous, much higher than the interval 1.4 to 2.2 millions. And indeed Heuveline (1998) who provided the broadest assessment of uncertainty ever, produced an interval of 0.68 to 3.26 mln for possible excess deaths in 1975-79 (1979 included as a whole year).¹⁵ He explains why his uncertainty range is so large: *"these were the rules of the exercise that I set for myself: each parameter of the reconstruction included a priori all existing estimates in the range of values"* (Heuveline (1998), p. 60). Thus from definition, this interval contains Vickery's extreme estimate of 740,000 excess deaths, not to mention the early estimate of 1 million. However, having produced the interval, Heuveline separates himself from it by saying: *"If pressed to provide my subjective assessment, the estimation range would be much narrower; I would venture 2.2 to 2.8 million in 1970-79 and 1.5 to 2 million in 1975-79 alone."* (Heuveline (1998), p. 60).

All in all, in order to give as realistic assessment of uncertainty as possible we follow the logic of Heuveline's statements quoted above. Compared with Heuveline's subjective assessment of uncertainty (**1.5 to 2 mln**), the interval we identified based on our review of the recent estimates of Khmer Rouge excess deaths, is broader. The interval of **1.4 to 2.2 million** is broader because of its lower end of 1.4 mln derived from Neupert and Virak (2005) and upper end of 2.2 mln by Heuveline himself and by Etcheson (2005).¹⁶ While in case of Heuveline's analysis it would be relatively easy to adjust down the upper end, which contains as well starvation deaths in 1979, to about 2 mln, we have no good reasons to make any adjustments to the lower end. Importantly, the number of 2.2 mln was proposed as well from mass grave statistics by Etcheson (2005). We therefore believe that an accurate description of uncertainty of the excess deaths estimates made so far is contained in the interval of **1.4 to 2.2 millions**.

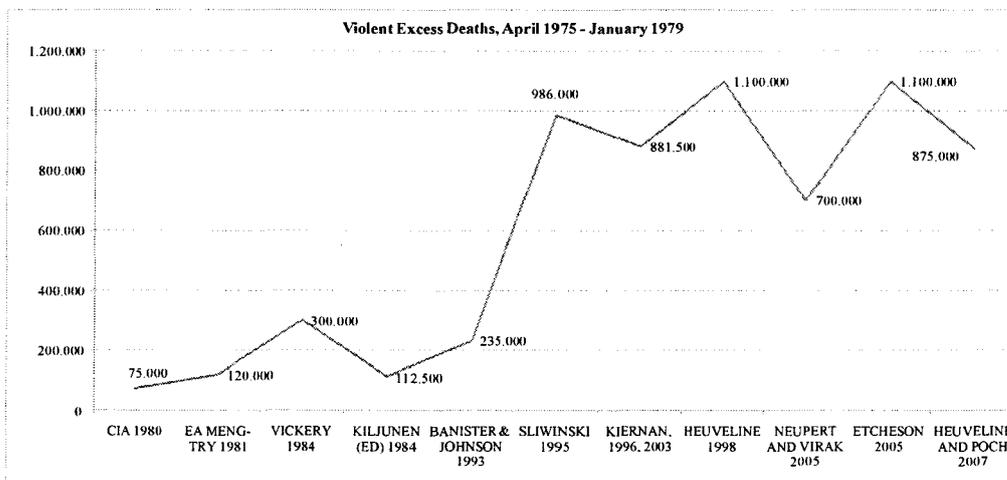
¹⁵ The range of 0.68 to 3.26 for 1975-79 can be obtained from Heuveline's Table 3 (p. 60 of his 1998 article). The main principle of the calculation is that all indirect excess deaths shown in Table 3 for 1970-79 (0.08-1.12-1.126 mln) need to be associated with 1975-79 and *not* with the civil war of 1970-75. Heuveline confirmed that in personal communication with Ewa Tabeau on 27 June 2009 in Phnom Penh. The sum of indirect and direct excess deaths Heuveline estimated for 1975-79 is thus: 0.68-2.22-3.26 millions.

¹⁶ The number of 1.4 million is actually our product based on Neupert and Virak's estimate of excess deaths in 1970-79. We obtained this number by subtracting an assumed 275,000 excess deaths in 1970-75 and about 300,000 famine deaths in 1979 from the 2 million excess deaths in 1970-79 produced by Neupert and Virak. If the same 300,000 famine deaths are subtracted from Heuveline's upper end of 2.2 millions, his upper number becomes 1.9 million.

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Sharp (2008) used his best population figures to produce yet another estimate of death toll under Khmer Rouge, 2.18 million with lower and upper end being 1.747 to 2.495.¹⁷ This estimate pushes towards higher values of the death toll. It is based on consistent population figures for 1975 and 1979. It does help to narrow down the interval we identified 1.4 to 2.2 millions. Notably, only one estimate from our interval is outside Sharp's range, i.e. 1.4 mln by Neupert and Virak (2005), which is too low to fit the lasted views of death toll. Also the upper end by Sharp has little justification. Therefore, the new interval could be **1.747 to 2.2 million deaths**. Within this group Sliwinski (1995), Kiernan (1996, 2003), Heuveline (1998), Heuveline and Poch (2007), and Etcheson (2005) produced their major estimates (Table 15). To be, however, conservative, we believe that it is rather Kiernan's initial estimate of 1.6 mln excess deaths that should be taken as the lower end for the final range of death toll under Khmer Rouge, which becomes: **1.6 to 2.2 million**. The 1.6 mln is the result of assuming most conservatively that the overall death toll reflects about 21 % of the lowest most likely population projected for April 1975 (7.844 mln). Note that Neupert and Virak's estimate does not fall within this range.

Figure 8. Violent Excess Deaths Estimates during Khmer Rouge Regime, April 1975 to January 1979. Various Authors



Notes: The following were the approximations used in the above chart:

Kiljunen (ed): average of 75,000 to 150,000

Banister and Johnson: 10% men at 15-64 years of age and 3% women at 15-64 years in 7.3 mln in Apr 1975 (Migozzi gives 49.5% of 15-64 years old in 1970; Siampos gives fifty-fifty of men-to-women at these ages for 1962)

Sliwinski: average of 32.5% of all excess deaths (taken as an average of his 2 variants)

Kiernan: 50% of all excess deaths; 50% - subjective choice of ET

Neupert and Virak: 50% of all excess deaths - subjective choice of ET

Figure 8 (reproduced from Section 3.3) visualizes estimates of direct excess deaths (i.e. executions or killings). The picture is striking. All early estimates (1980 to 1993) consistently show clearly low levels of killings equal from about 75,000 to 235,000. Sliwinski (1995) was the first author who came up with a number of around 1 million. Heuveline (1998) confirmed this scale in his formal analysis (based on model life tables) of direct and indirect excess deaths producing 1.1 mln violent

¹⁷ Sharp (2008) obtained his estimate by using the general population loss equation. In this approach the expected January 1979 population is central which he obtained by applying the expected natural growth rate during the Khmer Rouge years to his April 1975 population. Excess deaths were thus excluded from the expected population. He obtained excess deaths by subtracting the actual January 1979 population from the expected population in the same period. His estimate is thus produced from a method which is not highly valued but in this case it is based on a solid analysis of the underlying population figures and indicators of the population change between April 1975 and January 1979.

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deaths in the 1975-79 period.¹⁸ Also Etcheson (2005) strongly supports the finding that at least 1.1 million deaths during Khmer Rouge regime were violent. As we showed earlier in this report the number of human remains in mass graves is even higher than 1.1 mln and equals 1.3 million according to current statistics. Summing up, it seems that early estimates heavily underestimated the scale of the actual killing by the Khmer Rouge. According to the latest results, the scale was about 1 million, and belonged to a broader interval of 0.7 to 1.3 millions. This interval, after the final correction, becomes 0.8 to 1.3 million.¹⁹

The Numbers: Estimates of Khmer Rouge Victims Recommended for Use

The scope of this report was much broader than the above summary of the population size in Cambodia in the 1970s and excess deaths under Khmer Rouge. Several related subjects were discussed in this report too, including: excess deaths and migration during the civil war of March 1970 to April 1975, migration under Khmer Rouge, and suffering of ethnic and religious groups under Khmer Rouge. Due to the lack of space we are unable to summarize all these subjects the same way we did it for the population size and death toll under Khmer Rouge. Below we include the most essential observations and results from our study:

General Observations:

- There is generally a lack of reliable statistical sources on the Cambodia population for the period from April 1975 to January 1979; sources on the population itself, and sources on deaths, births and migration (internal and external) are largely non-existent.
- Sources that are the closest to the Khmer Rouge era include the 1962 population census, the 1980 administrative population count, and the UNTAC voters' registration for the 1993 elections in Cambodia. These statistical sources together with a number of the existing sample surveys, research reports, individual survivors' accounts, reports of international observers, journalists, NGOs and individual researchers' opinions etc. is all that can be used in estimating the death toll under Khmer Rouge regime.
- Estimates of the population size in mid-1970, April 1975 and January 1979 (or end-1978) are essential for any estimate of excess deaths in this period.
- Yet there is a wide range of estimates produced by various authors and there is a need to narrow down this range to the most likely figures. Not all estimates of the estimated population sizes are realistic; especially the early estimates produced directly after the fall of Khmer Rouge and motivated by the CIA (1980) report seem to be incorrect.
- Estimation methods used to produce excess deaths under Khmer Rouge are not all equally sound, transparent and reliable; some must be rejected as not satisfying the basic standard of reliability.
- The more reliable methods include: sample survey extrapolations used jointly with other sources, death toll as a residual of two population projections, death toll as linked to mass grave records.
- The largely unreliable methods include: demographic balancing equation, demographic scenarios, and naive estimates from the *Renakse* nation-wide survey.
- Estimates of Khmer Rouge victims must be placed in a broader context of war victims and migration during the civil war period (1970 until April 1975), which we summarized in the lines below.

¹⁸ Heuveline's original number of violent deaths in 1975-79 was 1.1 million (medium variant); this number might cover a few famine deaths in 1979. (Comp. Heuveline (1998), p. 58).

¹⁹ The lower end is corrected by taking Kiernan's minimum of 1.6 mln excess deaths as the basis for 50% of violent deaths. The upper end corrected by taking the today's estimate of 1.3 mln remains in the mapped mass graves.

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- As well, migration patterns during the Khmer Rouge regime need to be taken into account when assessing demographic consequences of the Khmer Rouge regime.
- Finally, it is clear from our review that ethnic and religious groups suffered much more than the rest of the Democratic Kampuchea population. Relevant statistics on this subject are included below.

Detailed Results:

- The following authors relied on estimates of April 1975 and January 1979 population that fall within the range of the most likely values: Kiernan (1996), Heuveline (1998), and Neupert and Virak (2005).
- Sliwinski (1995), Etcheson (2000, 2005) and *Renakse* did not explicitly estimate the population size for their excess deaths estimates, and can be thus considered as legible candidates for the most reliable figures on excess deaths under Khmer Rouge, except for *Renakse* that must fade out for other reasons. (Mainly because of the lack of statistical framework for their nation-wide survey and resulting problems, such as duplicates and incompleteness of their findings).
- The excess deaths of about 1 million estimated for the Khmer Rouge period in the 1980s studies and early 1990s are not reliable enough; they must be rejected as not fulfilling the population size and/or appropriate methodology criterion.
- The following authors produces estimates of excess deaths that fall within the range of the most likely values, are methodologically sound, and transparent: Kiernan (1996), Sliwinski (1995), Heuveline (1998), Heuveline and Poch (2007), and Etcheson (2005).

The Numbers:

- Population in April 1975: 7.844 to 8.102 mln, with the central value of 7.894 million
- Population in January 1979: 6 to 6.418 mln, with the central value of 6.209 million.
- Civil war death toll: most likely 250,000 out of 150,000 to 310,000 most likely possible.
- Internal and external migration during the civil war: uncertain but possibly up to 3.389 mln; a majority - internal
- Population of Phnom Penh in April 1975: most likely 1.5 to 2.6 million
- Death toll under Khmer Rouge: most likely 1.747 to 2.2 mln out of 1.6 to 2.2 mln
- Violent deaths under Khmer Rouge: most likely 50% of the overall excess deaths, i.e. from 800,000 to 1.3 million
- Out-Migration under Khmer Rouge: 218,000 to 268,000; of which 150,000 to 200,000 to Vietnam, 34,000 to Thailand, and 10,400 to Laos
- Suffering of Ethnic and Religious groups: Chams: about 36% perished; Chinese 50%; Lao and Thais: 40%, and almost all Vietnamese perished as well; as compared with the average rate for Khmers being on estimated 18.7 percent.

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**KHMER ROUGE VICTIMS IN CAMBODIA, APRIL 1975 - JANUARY 1979
A CRITICAL ASSESSMENT OF MAJOR ESTIMATES**

**EXPERT REPORT FOR THE EXTRAORDINARY CHAMBERS IN THE COURTS OF
CAMBODIA**

EWA TABEAU

30 September 2009

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1. BACKGROUND INFORMATION ABOUT THIS REPORT

This report has been made in response to the Expertise Order No. D140, from 10 March 2009, Office of the Co-Investigative Judges, Extraordinary Chambers in the Courts of Cambodia (hereafter: "OCIJ order"). Its goals are exactly as those specified in the OCIJ order and include the following:

- 1) Determine, to the extent possible:
 - a) The population of Cambodia on 17 April 1975 and on 7 January 1979, and the number of deaths in the intervening period;
 - b) Specifying, where possible, the national, religious and/or ethnic origin of the deceased; and distinguishing between
 - c) The causes of these deaths, in order to be able to determine those which are due, directly or indirectly, to policy implemented by the CPK and those which are due to external factors;
- 2) To that end, you will take into account all historical, political, economic or other factors occurring before, during or after the relevant period;
- 3) Specify all statistical data and/or estimations of the population used for the expertise and provide an analysis of their reliability;
- 4) Explain the methodology/methodologies used in the conduct of this expertise; and
- 5) Make any other useful observations.

The project took five months from May to September 2009. The international expert, Ewa Tabeau, visited the Extraordinary Chambers of the Courts of Cambodia in Phnom Penh between 7 and 28 June 2009 and in the remainder of this period she worked in The Hague. The national expert, They Kheam, was based in Phnom Penh during the entire duration of the project.

The project did not attempt to produce new estimates of the population size in Cambodia in April 1975 and January 1979 and no new estimates of excess deaths of the Khmer Rouge period were generated either. Our task was to give an expert assessment of the major existing estimates and recommend those estimates that satisfy scientific requirements of this research area and can thus be used in court proceedings.

Three groups of sources were studied and assessed in this project:

- Statistical sources on the population size in Cambodia since 1962
- National Cambodian sources on excess deaths during the Khmer Rouge period and in the entire decade of the 1970s
- Internationally published research on excess deaths during the Khmer Rouge period and in the entire decade of the 1970s

Our assessment was based on a critical review of the following elements:

- Data sources used for producing the estimates
- Methodologies applied in obtaining the existing estimates
- Transparency of presentation of the results
- Consistency with other authors and common findings

This report comprises five sections. Section 1 contains background information about this report. Section 2 introduces the sources assessed in this report. Section 3 gives an overview of main statistics on the population size and excess deaths in Cambodia in April 1975 to January 1979 as obtained by various authors. Section 4 discusses the same issues in relation to the civil war in

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Cambodia in the first half of the 1970s. Section 5 contains our final assessment of major estimates on excess deaths in March 1970 to April 1975 and in April 1975 to January 1979 and on the population in April 1975 and in January 1979. The last sub-section in Section 5 (5.5) gives recommendations on the best estimates of Khmer Rouge and civil war victims and the related population figures.

2. AN OVERVIEW OF SOURCES ASSESSED IN THIS REPORT

2.1 Sources on the Population of Cambodia since 1962

Statistical sources on the population of Cambodia during or around the period from April 1975 to January 1979 are non-existent. The last population census before April 1975 was taken in 1962 (Siampos, 1970; Migozzi, 1973) and the next following after January 1979 in 1998 (NIS - National Institute of Statistics, 2002). This gives a data gap of 36 years; a gap that must be seen as a dramatic obstacle of reliably studying demographic developments in Cambodia in this period. Another barrier was related to the fact that a statistical evidence system of vital events, such as births, deaths, marriages etc., did not exist in Cambodia in the post-World War II period; it largely does not yet exist at the present time. A rough form of the administrative registration of vital events and socio-economic aspects of the population was (and likely still is) in hands of village chiefs, and further commune leaders, and district and provincial authorities. Occasionally, these locally generated approximate basic figures were sent to the central statistical office in Phnom Penh for producing indicative country-level statistics about the Cambodia population. The 1980 administrative count of the Cambodia population is the most widely known example of these figures. The 1980 count is discussed in following parts of this section.

The bad data situation from the 1960s, 1970s and 1980s has improved in recent years. After the general population census of 1998 (GPC-1998; NIS, 2002), another one was completed in 2008 (NIS, 2008; preliminary figures are available at this stage for GPC-2008; not final). Both these censuses were conducted with subject-matter and financial assistance of the United Nations Population Fund (UNFPA), active in Cambodia since the 1993 UN sponsored first democratic elections in the country, and were also supported by several individual developed countries, such as Japan and Germany in case of the GPC-2008. Both these censuses satisfied professional requirements of the up-to-date world standard for the population census. Both provided reliable data on the population of Cambodia in recent years.

In addition to the 1998 and 2008 GPCs, several country-wide representative population surveys were as well recently conducted in Cambodia:¹

- The 1996 Cambodia Demographic Survey (CDS-1996)
- The 2000 Cambodia Demographic and Health Survey (CDHS-2000)
- The 2005 Cambodia Demographic and Health Survey (CDHS-2005)
- The 2004 Cambodia Intercensal Population Survey (CIPS-2004)
- The 2004 Survey of the Elderly in Cambodia (SEC-2004)

Based on the 1998 census and some post-1998 surveys, three sets of population projections have become available for Cambodia:

- The Population Projections 1998-2020 (based on the 1998 Census; NIS, 2000)

¹ For detailed references, see the "List of Selected Recent Publications on Statistical Sources on the Population of Cambodia", attached at the end of this report. Socio-economic surveys (1993-94, 1996, 1997, 1999 and 2003-2004) are not listed here although they could serve as a basis for population estimates too. Some of these surveys were not representative, however, of the entire population of Cambodia.

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- The First Revision, Population Projections 1998-2020 (based on the 1998 Census and CDHS-2000; NIS, 2004)
- The Second Revision, Population Projections 1998-2020 (based on the 1998 Census and CIPS-2004; NIS, 2005)

The subsequent revisions of the NIS projections incorporated new survey-based findings regarding fertility and mortality decline in Cambodia in the past decade; the decline appeared to be faster than expected based on GPC-1998. At present, the 2nd revised projections are the most up-to-date projections for Cambodia. Notably, both the 1st and 2nd revised projections included as well a backward projection for a short period preceding the 1998 census, i.e. up until 1993, for which year the UNTAC data on registered voters are available and could serve as a reference standard for the 1993 projection.² This part of the 1st and 2nd revisions (1993-1998) remains the same; the revised part relates to the years after the GPC-1998. All in all, the existing recent censuses and population projections reliably cover the period from 1993 to 2020.

Notably, all the above-mentioned activities (both surveys and projections) were completed with the involvement of UNFPA, and using their world-wide top level expertise in demographics and financial and expert assistance. All in all, the recent statistical practice regarding population statistics is good and improving, unlike the practice from around the decade of the 1970s.

Table 1. Population of Cambodia According to Different NIS sources

Source	Population Both Sexes	Population Males	Population Females	Remarks
1962 Census	5,728,771	2,862,939	2,865,832	Reference time of census was the night on April 17-18, 1962
1980 General Demographic Survey	6,589,954	3,049,450	3,540,504	With reference to the end of 1980
1993-94 Socio-Economic Survey of Cambodia	9,870,000	4,714,000	5,156,000	Extrapolated population with reference to April 1994 based on a sample of 5,579 households
1996 Demographic Survey of Cambodia	10,702,329	5,119,587	5,582,742	Extrapolated population with reference to March 20, 1996 based on a sample of 20,000 households
1998 Census	11,437,656	5,511,408	5,926,248	With reference to March 3, 1998. Did not include a few areas where conflict took place at the time of the census. Population in these omitted areas was estimated at 45,000.
2004 Cambodia Inter-Censal Survey	12,824,000	6,197,000	6,627,000	Estimate of population in regular households as of March 3, 2004, as the survey did not cover institutional population, homeless population etc.
2008 Census	13,388,910	6,495,512	6,893,398	With reference to March 3, 2008. Includes estimate for non-response in respect of some households.

Source: General Population Census of Cambodia 2008. Provisional Population Totals. National Institute of Statistics, Ministry of Planning, Phnom Penh, Cambodia August 2008

Table 1 contains an overview of the population size in Cambodia (observed and estimated) since 1962. The source for Table 1 is the 2008 NIS publication on preliminary statistics from the 2008

² Registration of voters took place in the course of several months in 1992; still this data can be used as reference source for the 1993 population.

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census in Cambodia. The purpose of Table 1 was to place the 2008 census figures within a broader context of population data since 1962. The figures for 1962, 1980, 1998 and 2008 are as counted in censuses (or administrative surveys as in 1980).³ The figures for 1994 and 1996 are estimates; they are not the only available and not necessarily the most reliable.⁴ Alternatives (that are generally higher) can be found for these years in the 2nd revised NIS projections. As a whole, Table 1 is, however, useful as a reference point for our further discussion of reliable population numbers in Cambodia after 1962.

In the absence of population data generated by professional statisticians, alternative sources must be considered for the period around April 1975 and January 1979. Two such sources exist and need to be mentioned. The first one is the administrative population count for 1980 (end-year population) and the second is the population of registered voters from the 1993 elections.

1980 Population

A brief but comprehensive discussion of the 1980 administrative count is available from Banister and Johnson (1993) and is based on very limited data (general age and sex structure of the population and its total size in end-1980) provided by the Cambodian Department of Statistics in 1992.⁵ The attached Table 2 from Banister and Johnson (1993) illustrates the available 1980 data (see below). The 1980 population count was carried out by the Phnom Penh government together with international aid organizations. Figures were compiled upward from villages to communes to districts to provinces and finally to the national administration. The count included the population living within the borders of Cambodia and excluded the refugees in Thailand, Vietnam and third countries. By a simple extrapolation of the 1980 population count using the assumption of a uniform 2.8% annual growth rate, NIS estimated the total and provincial populations of Cambodia for all years up to 1990. That was considered the best that could be done to obtain some population figures of Cambodia at that time (*ibid*; comp. as well Table 1 in NIS, 2000).

There was much uncertainty about the accuracy of the 1980 population count; especially in the 1980s when no additional reliable population data existed to validate it. Arguments were given for the 1980 count to have been inflated at several levels of data collection for obtaining higher aid and more extensive UN assistance (Banister and Johnson 1993; Ea Meng-Try, 1981). On the other hand, a certain degree of undercounting was noted likely too as even the regular population census is known to undercount the population, sometimes by 4-5 percent. In 1980 the Phnom Penh government did not have full access to the entire territory of Cambodia; some areas were likely not fully covered and some excluded altogether (*ibid*).

³ The term "rough data" could be used here to express the fact that the population counts obtained directly from the collected data are incomplete in some extent. The usual problem is the undercount of the population at age 0 to 4 years. Also some special groups are usually not counted such as institutional population, population living on boats, homeless etc. There other problems as well, such as age heaping and missing dates etc. Projected population gives more complete figures as the undercount and other data problems are "repaired" by the use of demographic correction techniques.

⁴ For April 1994, the population size is estimated from the 1993-94 socio-economic survey of Cambodia (SESC-1993/94) which was not fully representative of the entire country. The latest estimate for mid-1994 is based on the 2nd revised projections (NIS, 2005); it equals 10,989,922 and is higher than SESC-1993/94 estimate. For 1996, there exist two alternatives 11,668,629 from the 2nd revised projections (NIS, 2005) and 10,340,000 from the SESC-1996. The CDS-1996 estimate of 10,702,329 is somewhere in between with regard to its two alternatives.

⁵ The "Cambodian Department of Statistics" is most certainly the Cambodian NIS in Phnom Penh. The exact data source given by Banister and Johnson is: Hou Taing Eng, 1992: "Data provided to the Population Reference Bureau, Washington, D.C.". We tried to identify and collect the same data from NIS, however to no effect. Similarly, we also tried to collect the May 1981 population count referred to in Kiljunen (ed.; 1984). Also this data were not found, not even in the unpublished form.

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1993 Population

The task of conducting the May 1993 elections in Cambodia was given to the United Nations Transitional Authority in Cambodia (UNTAC) through its Electoral Component.⁹ UNTAC became involved as a result of decisions made in the Paris Agreement of October 1991, including the following:

- "The election ... will be held throughout Cambodia on a provincial basis in accordance with a system of proportional representation on the basis of lists of candidates put forward by political parties." (Annex 3, paragraph 2);
- "Party affiliation will be required in order to stand for election to the constituent assembly. Political parties will present lists of candidates standing for election on their behalf, who will be registered voters." (Annex 3, paragraph 6);
- "Voting will be by secret ballot, with provision made to assist those who are disabled or who cannot read and write." (Annex 3, paragraph 8);
- "Every person who has reached the age of eighteen at the time of application to register, or who turns eighteen during the registration period, and who either was born in Cambodia or is the child of a person born in Cambodia, will be eligible to vote in the election." (Annex 3, paragraph 4);
- "The freedoms of speech, assembly and movement will be fully respected. All registered political parties will enjoy fair access to the media, including the press, radio and television."

In addition, Section D of Annex 1 to the Paris Agreement required UNTAC to prepare **verified voter registration lists**, and stated that the duration of the electoral process could not exceed nine months from the commencement of voter registration.

Among the several phases the UNTAC completed to fulfill their mandate, the **preparation for and conduct of voter registration** were essential. This involved among other things developing procedures and manuals, designing forms (including the voter registration card); recruiting and training some 4,000 registration officers; and setting up a computer centre with several hundred staff who worked 24 hour shifts to enter voter registration data into a database from which lists of voters were produced.

-
- There was an undercount of 1.78% in the 1998 census as shown by the post-enumeration survey; the total count of the population had to be thus increased by this percent.
 - The population of four small areas was not accessible during the 1998 census; on estimated there were 45,000 persons in these areas; they were added to the census counts for these areas.
 - In March 1998, there were still about 60,000 refugees living in camps in Thailand. As they were supposed to return to Cambodia a few months after the 1998 census, they were added to the counts for the areas where they intended to go.
 - In most censuses there is an under-enumeration of children at age 0-4 years. Demographic models exist that allow estimating the scale of this phenomenon. It has been calculated for the 1998 census that the number of boys at age 0-4 should be increased by a factor of 1.2713 and the number of girls 0-4 years old by a factor of 1.2859.

⁹ The section about the UNTAC role in the 1993 elections and their voters register is based on materials obtained from Michael Maley, a former high official of UNTAC, who was personally involved in these activities. In particular the following sources were consulted:

1. UNTAC Registration Procedures Manual. UNTAC September 1992
2. UNTAC Computer System 1992
3. Cambodian Voter Registration Card
4. The UNTAC Elections. Research paper by Michael Maley presented at the Seminar on Electoral Systems and Administration. Phnom Penh, 23-25 October 1995

As Michael Maley noted in his 1995 paper: *“The registration scheme adopted was a simple one: applicants had to attend a registration station and answer questions in such a way as to establish that they were entitled to vote. They were then issued with a photographic voter registration card which they had to produce when claiming a vote. The response from the people was enthusiastic: some 4.76 million registered. (...) The turnout at 89.6% was far higher than had been generally expected, and the work of the 48,000 Cambodian polling officials was much praised by international observers, and by the international polling stations officers, around 1,000 in number, who assisted the local staff in the running of the polling stations.”* The security situation in a number of provinces, including Siem Reap, Banteay Meanchey, and Kampong Thom, deteriorated, however, in the final stage of registration preventing an even higher participation rate.

From the demographic and statistical point of view, the most impressive of all UNTAC activities was the computer system used for the registration of voters. The system was developed by a professional IT firm *Sequent Computer Systems* based in New York. It included hardware, printers, and software. The system supported over 100 simultaneous active application users online, all inputting and enquiring on databases. The system had the capacity to store over 5 million names and associated details and consisted of two (Sequent S2000/250) symmetric multiprocessing computer systems running in the UNIX operating system. To allow for the required number of users and the size of the database, two machines were used.

The system provided the necessary checks for duplicate entry and statistics by region including polling places. It was able to input and output in both Khmer and English. In accordance with this criterion a transliteration module was included in the system, thus transliterating the Khmer font to Roman font. This was the first time such a system had been designed and implemented.

Data entered for each individual included: registration number, family name, given name, date of (card) issue, date of birth, gender, age, place of registration, parents place of birth and a code indicating if a party agent had questioned the voter’s right to be registered.

The final outcome, i.e. the 1992 lists of registered voters, became a unique statistical source about a large part of the 1992 population of Cambodia. The final number of registered voters at the end of 1992 was 4,279,450 (Huguet, 1996; after Heuveline, 1996).¹⁰ About the same number of voters turned out to vote during the May 1993 elections (4,267,192; Heuveline, 1998). This was about 90% of all eligible voters and comprised a majority of the end-1992 population of Cambodia. In the 2nd revised NIS projections published in 2005, Neupert estimated that mid-1993 population of Cambodia was 10,659,466 (NIS, 2005; p. 20, Table 9).¹¹

In addition to the already discussed sources, two more recent data sets need to be addressed:

- Older Persons in Cambodia, 2005 survey (RUPP¹² and UNFPA, 2005)
- Mekong Island Population Laboratory (MIPopLab), 2000 (Heuveline and Poch, 2007)

The first one is a country-wide representative survey conducted in 2004 by a group of Western researchers in co-operation with researchers from RUPP with funding provided by UNFPA and the

¹⁰ Patrick Heuveline: “Between one and three millions: toward the demographic reconstruction of a decade of Cambodian history (1970-1979)”. Research paper presented at the 1996 annual meeting of the Population Association of America. New Orleans, 9-11 May 1996. Quoted in Huguet (1997), Table A2, p. 29. Note that at that time (end-1992) the registration was not yet finished and this explains why this number is lower than the final 4.76 million.

¹¹ This number was most certainly compensated for the expected undercount in the population of voters and for persons at ages 0-17 years not reported in voters registration; note as well that refugees abroad, especially in Thailand, who left Cambodia after January 1979 are also counted in this population as by 1998 most of them returned to Cambodia.

¹² RUPP stands for the Royal University of Phnom Penh.

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(USA) National Institutes of Aging with the aim to address the economic and health situation of the elderly in Cambodia. It is a small but important data set (1,273 persons aged 60 and over) showing exceptional problems of old age survivors of Khmer Rouge regime. This data can be used to illustrate consequences of Khmer Rouge period in the present day elderly population in Cambodia.

The second data set MIPopLab is a demographic surveillance system, most probably the first one in Cambodia, active since the year 2000 in a rural district in the Kandal province near Phnom Penh. The basic demographics of the entire district population of 10,000 residents are updated yearly with the idea of monitoring demographic events in this population and learning about its development. Two special modules were completed in MIPopLab; first one was designed to study mortality increases during the Khmer Rouge regime, and the second to study birth and marriage Khmer Rouge histories of women aged 15 to 74 years. Both modules are essential as a source to increase our knowledge and understanding of the demographics in the Khmer Rouge period and for formulating assumptions for population projections of the 1970s population in Cambodia. MIPopLab is funded by the USA National Institute for Child Health and Human Development and several other Western sources (e.g. Mellon foundation). Researchers involved in this project include among others Patrick Heuveline of the NORC Population Research Centre and University of Chicago, and Poch Bunnak of RUPP in Cambodia.

Summing up, the above-mentioned two data sets belong most certainly to important sources for producing a more complete picture of the demographic suffering of the population under the Khmer Rouge rule and of health and economic consequences of this rule in the present time.

2.2 “Renakse” Petitions and 1980s People’s Exhumations¹³

The chronologically earliest efforts at estimating the scale of victimization caused by the Khmer Rouge regime began in Cambodia directly after January 1979. At that time, the Salvation Front,¹⁴ or shortly *Renakse* from the Khmer word for “front”, as part of the government of People’s Republic of Kampuchea (PRK) encouraged people to collect evidence for the 1979 trial of Pol Pot and Ieng Sary by the People’s Revolutionary Tribunal. In particular, evidence was sought in exhumations and in counting the remains found in the mass graves. These (and later) exhumations were conducted by common people and without participation of professionals specialized in this field. The people’s

¹³ This section is based on a number of documents obtained from DC-Cam, either through their home page or directly, and a few ECCC witness statements.

- “The Petition: Summary Report”. March 21, 1991. DC-Cam document, contents summarized by Vanthan P. Dara, with introduction by Youk Chhang. (Available from www.dc-cam.org; hereafter: “*Renakse* Summary Report”)
- “Total Statistics of Genocidal Crimes of Pol Pot Regime on the People during 1975-78”, Table, Dated 25 July 1983. Table signed by the members of the (national) Research Committee into the Crimes of the Pol Pot Regime: Min Khin (chairman), Tith Sunthan (vice chairman), Chea Kean (vice chairman), Kim Ly, Srun Seang Lim, and Tes Heng. Available from DC-Cam *Renakse* records. Hereafter: “*Renakse* Summary Table”.
- William J. Schulte, (around) 2007: The History of *Renakse* Petitions and Their Value for ECCC Proceedings (Research paper available from www.dc-cam.org)
- Amy Gordon, 2007: The *Renakse* Petitions: Background and Suggestions for Future Use. (Research paper available from www.dc-cam.org)
- ECCC witness statements of [Redacted] (D125/9; translated from 00186326_00186335_KH) and [Redacted] (D125/16, translated from 00194417-00194426_KH). Including the attached tables for Svay Rieng province.

¹⁴ Salvation Front was established in December 1978 with the purpose to overthrow the Pol Pot regime. Originally it was called the National United Front for the Salvation of Kampuchea. In the early 1980s, the Salvation Front was called “Front for National Solidarity, Reconstruction and Defense”. Sometimes an alternative translation uses the name “The National Front for Defense, Restoration and Solidarity of Kampuchea”. (Gordon, 2007).

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exhumations were relatively quickly abandoned due to grave robberies and other unprofessional behavior of the grave diggers.

Exhumations were continued, however, in the 1980s within another nation-wide effort at collecting evidence of Pol Pot's crimes. Several other types of evidence were collected at that time as well, including individual and group survivors statements called "petitions", witness testimonies, research reports, documents, lists of victims, torture and detention facilities, intelligence centers, prisons etc. All these efforts were coordinated by the Research Committee into the Crimes of Pol Pot Regime (hereafter: "Research Committee"), again a creation of the Salvation Front *Renakse*, called then the Front for National Solidarity, Reconstruction and Defense of Kampuchea. The Research Committee had a whole network of its local units, including the provincial, district and other committees. The task of all these committees was to collect evidence that could be used in persuading the United Nations (UN) to remove the Khmer Rouge representatives from their sit in the UN General Assembly and offer this sit to the legible PRK government.

The national Research Committee was chaired by Min Khin (Gordon, 2007) whose name is also found among the signatories of the *Renakse* Summary Report that the (national) Research Committee prepared for the PRK government and submitted to the government on 25 July 1983 (see "The Petition: Summary Report", by DC-Cam 1999, and the Summary Table of the Research Committee, dated 25 July 1983; for the table see Annex 1). The *Renakse* Summary Report and the associated *Renakse* Summary Table contain the following main findings:

- Death toll under Khmer Rouge regime: 3,314,768 persons
- Of the 3.314 mln victims, 568,000 were counted in exhumations and 2.75 mln in other settings
- Number of informants, i.e. persons who signed of finger printed the "petitions": 1,166,307
- Number of petitions (out of 2,168 all documents reviewed by DC-Cam): 1,250

Acting on their mandate, the Research Committee asked people to look into three aspects of Pol Pot's regime: the death toll, methods of torture and killing, and destruction of property. In order to achieve their objectives, they practically initiated and completed a nation-wide survey among several groups and hundreds of thousands of individuals and families. All these groups and individuals were instructed to look into these three areas of interest and write documents called "petitions" reporting on the consequences of Pol Pot's crimes and postulating the removal of Khmer Rouge from the UN sit. The petitions and other relevant documents were processed first at local and then national level and used to produce the final statistics on the death toll, informants and underlying documents (Annex 1).

Interestingly, the Research Committee carried out serious preparations with regard to making the "petitions". There were workshops and meetings organized all over the country at which the contents and the language to be used in petitions were discussed and specific instructions were given. No comparable effort was made with regard to the remaining types of evidence to be collected, e.g. exhumation and other research reports, witness statements, or survivors' recollections. Interestingly, these were the petitions that remained central to the PRK government as they on the first place were meant to be used in PRK politics.

In any country-wide survey, including the one initiated by *Renakse* and conducted by the Research Committee into the Crimes of Pol Pot Regime, a large amount of coordination is always required in order to produce reliable and unduplicated responses. Statistically speaking, the *Renakse* survey, by the Research Committees, amounts to something directly comparable to a population census. Preparations for the census usually take a long time, often 10 years, and include among other

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developing of standardized questionnaires, producing maps of census enumeration areas and lists of households living in these areas, testing the questionnaires in pre-census settings, identification and training of the instructors and interviewers, planning a post-census control survey, developing a reporting structure and planning of publication of census results etc. In case of the *Renakse* survey, no preparations in statistical sense were made at all. As far as we could see from any source materials, no standardized questionnaires were used, no trained interviewers were taking statements, no professional personnel was involved in the exhumations. Collecting all this evidence must be seen as spontaneous efforts based on qualitative data obtained from the respondents and actions taken based on the initiative of every Research Committee in the country. Importantly, several source materials stressed that with regard to the results, no pressure was exercised over the respondents; not over individuals and not over groups, and no instructions were given as to the outcomes of the survey. As such, the individual outcomes of the survey are most likely true, valuable and meaningful. We recommend using the informant-level materials for court purposes. The same, however, cannot be said about the general country-level statistics presented in the *Renakse* Summary Report on 25 July 1983.

The main reason for this conclusion is that the degree of duplication among the death toll of 3.315 mln must be enormous. DC-Cam estimated this degree to be around 50% (after Etcheson, 2000), which is easily possible; the degree of duplication can be even higher than that. In a similar project in Bosnia and Herzegovina, run by the Research and Documentation Centre in Sarajevo, with Mirsad Tokaca as its president, 150,000 records out of the total of 250,000 records collected are duplicates (60%); only about 100,000 unique records represent different individuals - victims of the war in Bosnia and Herzegovina in 1992-95. In addition to duplicates, there are other problems, namely incompleteness; the *Renakse* death toll is still incomplete as only 15 provinces are listed in the *Renakse* Summary Report out of 21 (see DC-Cam report, March 21, 1999). It is also unclear what fraction of all actual deaths is reported for each province. The above mentioned problems are related to the lacking statistical framework of the *Renakse* survey that implies it is impossible to assess the degree of coverage of *Renakse* statistics. As such, the *Renakse* death toll of 3.315 mln must be disqualified from considering it a reliable estimate of Khmer Rouge victims.

With regard to exhumations, many reports were collected in 1979 and the 1980s and several counts of victims are available, as those for Svay Rieng province (comp. witness statements of [Redacted] and [Redacted] and the attached tables provided by these witnesses). We studied the tables provided by these two witnesses and used them to obtain Svay Rieng provincial total, which we further compared with the total for the Svay Rieng province in the *Renakse* Summary Report and *Renakse* Summary Table. The two statistics are highly consistent for this province, although minor non-significant differences do exist. This is yet another confirmation of the fact that among the source materials collected in the *Renakse* survey much can be considered useful. Assessment of these materials should be always done on case by case basis.

2.3 DC-Cam and Mass Grave Mapping

The Documentation Center of Cambodia (DC-Cam) was funded within the Yale University's Cambodian Genocide Program (CGP) in January 1995.¹⁵ In 1997, DC-Cam became an independent

¹⁵ In April of 1994 the U.S. Congress passed the Cambodian Genocide Justice Act, establishing the Office of Cambodian Genocide Investigation in the U.S. State Department's Bureau of East Asian and Pacific Affairs which awarded Yale University's Cambodian Genocide Program (CGP) a \$499,000 grant in December of 1994. In 1995-96, next grants followed from the Australian and Netherlands governments and Henry Luce Foundation, Inc. In 1997 the US State Department's Bureau of Democracy, Human Rights and Labor awarded the CGP another grant of \$1 million, and in

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organization; however, the CGP continued to fund DC-Cam through 2001. The main focus of DC-Cam was the documenting of the mass killings in Cambodia during the Democratic Kampuchea (DK) regime headed by Pol Pot between April 1975 and January 1979. According to DC-Cam's mission statement, the following are the objectives of this organization:

*DC-Cam has two main objectives. The first is to record and preserve the history of the Khmer Rouge regime for future generations. The second is to compile and organize information that can serve as potential evidence in a legal accounting for the crimes of the Khmer Rouge. These objectives represent our promotion of memory and justice, both of which are critical foundations for the rule of law and genuine national reconciliation in Cambodia.*¹⁶

As part of its mandate, DC-Cam has "located and mapped 196 prisons, 19,733 mass graves, and 81 genocide memorials," and has catalogued more than 6,000 photographs and roughly 155,000 pages of the 600,000 pages of primary Khmer Rouge documents in its possession.¹⁷

All of DC-Cam's 50 staff members, (46 full-time staff and four volunteers), are Cambodians and began working at DC-Cam as volunteers.¹⁸ The organization is advised by the 10 member Board of Directors (all of whom are Cambodian), as well as by the 15 member Board of Associate Advisors who are specialists in Cambodia.¹⁹

The Documentation Center of Cambodia began their activities related to mass graves mapping in September 1995; the activities still continue at present although a majority of the objectives have been already achieved.²⁰ The purpose of this project has been to provide the number, location and size (in terms of human remains) of mass graves in the country. A significant assistance to this project came from the New South Wales University (NSWU) in Australia which engaged in a co-operation with DC-Cam in relation to the measuring of geographic coordinates of the mass graves. NSWU researchers, with professor Helen Jarvis as the project leader, advised the DC-Cam staff not only on technical details of the Geographic Positioning System (GPS) computer programs and the use of equipment required for taking the measurements but also on a number of related issues, including the design and standardization of the mass grave information to be collected in the project.²¹ NSWU partners also provided the training of the DC-Cam staff.

The DC-Cam mapping project should be seen as a country-wide survey of mass graves in Cambodia prepared and conducted by the DC-Cam staff. Note that DC-Cam has never done any exhumations and thus did not produce direct counts of the victims in the mass graves. They made estimates of the victims based on witness statements and other related materials collected in the course of the

1999, a further \$150,000. These initial grants made it possible to establish the DC-Cam in January 1995. See: the CGP home page at <http://www.yale.edu/cgp/cgpintro.html>.

¹⁶ *Our Mission*, Documentation Center of Cambodia, available at <http://www.dccam.org/Abouts/History/Histories.htm>. Statistics as of 18 August 2009.

¹⁷ *Ibid*

¹⁸ *DC-CAM STAFF*, Documentation Center of Cambodia, available at <http://www.dccam.org/Abouts/Staff/Staff.htm>.

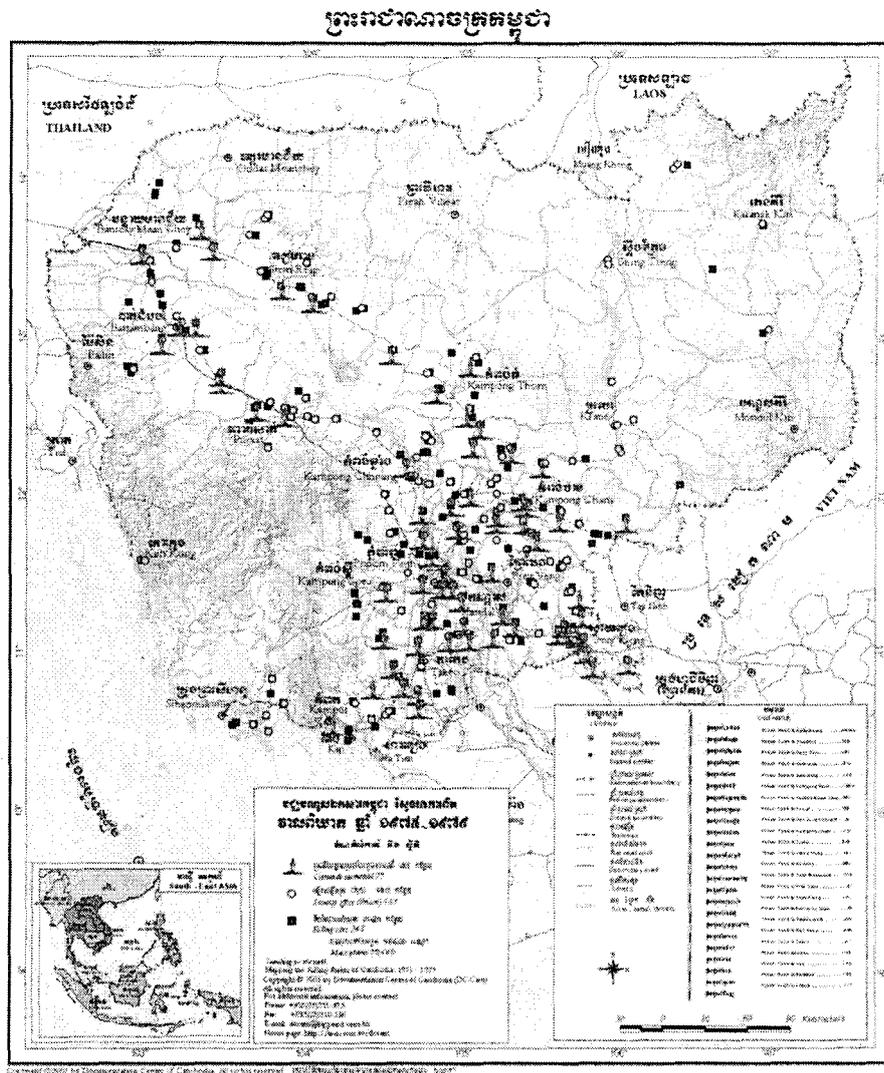
¹⁹ *Our Organization*, Documentation Center of Cambodia, available at <http://www.dccam.org/Abouts/History/Histories.htm>.

²⁰ The remainder of this section is based on the personal communication of Ewa Tabeau with Youk Chhang, the director of DC-Cam on 23 June 2009 in Phnom Penh. Also materials from the DC-Cam website have been used, including the web article by Craig Etcheson (2000): "Mapping Project 1999: The Analysis. The Number: Quantifying Crimes against Humanity in Cambodia". http://www.dccam.org/Projects/Maps/Mass_Graves_Study.htm.

²¹ See Kenneth Vong, 1997: "Geo Explorer Operation Manual and Pfinder Guide". Manual for the project "Mapping the Killing Fields in Cambodia". Also the so-called "Site Form" has been designed by NSWU staff. The original form, after a few modifications made during first missions, is used to date in all next mapping activities.

mapping project. Their surveying approach is reliable enough to consider their estimates as very serious, although at the same time still approximate.

Figure 1. Location of Khmer Rouge Killing Sites, Security Centers and Memorials in Cambodia



An important preparatory step of the mass grave mapping is the screening of the *Renakse* documents and other materials related to the 1980s exhumations available from the Cambodia Ministry of Culture for the names and locations of the mass graves.²² Once such alleged locations are established, field missions can be planned to investigate the location, take the geographic coordinates and collect additional information about the site, such as eyewitness testimonies and survivors recollections about the site, incidents, victims, perpetrators, security centers etc., and to

²² Much of these materials are now stored at the DC-Cam as both these organizations handed over their archives to DC-Cam. At the present time, DC-Cam has the largest repository of documents related to both the Khmer Rouge and the post-Khmer Rouge episodes of the Cambodian history. The post-Khmer materials include for example: “*Renakse*” petitions, People’s Revolutionary Tribunal documents, the report of the “Research Committee on Pol Pot’s Genocidal Regime,” interview transcripts, Cambodian Documentation Commission materials, witness statements, forensic evidence, computer databases, photographic archives, analytical materials, and microfiche collections.

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look for additional documents from local authorities, any existing exhumation records and other relevant materials.

Once the DC-Cam researchers reach their destination and are able to confirm the existence of the site(s), they employ the GPS technology to identify and record the location of the site(s). The GPS equipment used by the DC-Cam allows for a high accuracy of the measurement of within a few meters. This information is in the next step loaded into the GIS computer program which makes it possible to generate precise maps of the killing fields (Figure 1).

At the site, the so-called "Site Form" is filled in, which serves to record details of the site and victims statistics as reported by informants at the site. Notably, at each site 3-4 informants were usually questioned and provided corroborating statements. At the return from the field mission a proper field report is made which integrates the information from the field visit with that from other sources available at the DC-Cam. Statistics produced in the field report are often more conservative than those from the site form for if there are inconsistencies, always the conservative approach is taken in the field report. The details from both the site form and field report are later processed and included in the summary statistics of the mapping project on the DC-Cam website (see the "List of Mass Graves" available at <http://www.dccam.org/Projects/Maps/Mapping.htm>).

The initial objective of the DC-Cam field missions, i.e. identification and mapping of the mass graves, has evolved to include as well records of Khmer Rouge prisons (or security centers), in the proximity of which many mass graves are located, and records of the memorials erected by local populations during or around the post-Khmer Rouge investigation of crimes committed by the Pol Pot regime. All in all, three types of outcomes are available from the DC-Cam mass grave mapping project: the burials (i.e. mass graves and victims), prisons and memorials. It is striking how closely are these three types of objects associated with each other in the geographic sense (Figure 1). Such coincidence is impossible to result from chance and must lead to the conclusion that the mass graves are the outcome of activities conducted in the nearby Khmer Rouge security centers.

With respect to statistics, the key question relates to the reliability of the DC-Cam estimates of the number and type of mass graves, and the number of victims in the graves. This question becomes really difficult in the absence of reliable exhumation records, i.e. knowing that exhumations of the Cambodian mass graves in the 1980s were by far incomplete, many sites were never exhumed, many were partially exhumed, and many were disturbed. Moreover, the 1980s exhumations were done by local populations without the participation of forensic and other exhumation specialists. Thus, the existing exhumation figures cannot be taken as a reliable measure of the number of victims in the sites. On the other hand, the existing exhumation records, be them individual informant statements, DK crime commission reports or *Renakse* petitions, can be safely taken as the initial mark of a possible site location. Using the initial records of site location in an investigation of the site existence (based on eyewitness, other survivor's testimonies and/or local documents)²³ is fully correct and well justified. The latter approach is the DC-Cam method applied in their grave mapping project. As such the method must be seen as fully acceptable. Problems arise, however, around the quality of information provided by the DC-Cam informants in the course of the field mission, and during cross-referencing the information obtained from the field informants with other sources available for the same sites. In many cases this information is consistent, in other cases it is not. The DC-Cam way of dealing with uncertainty around the basic statistics is putting the number of victims at "0" for the

²³ Note that at the site, consistent statements of several informants are required in the DC-Cam procedure in order to declare a potential site to be the true one. Although in the course of time different DC-Cam mobiles teams might have applied slightly different standards in their assessment of reliability and consistency of informants' statements at the site, generally much effort has been invested at DC-Cam to keep these assessments at the same level.

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sites where the consistency level of cross-referenced sources is not satisfactory. These empty cells imply that DC-Cam statistics on victims are very conservative, which we demonstrate in the following parts of this section.

Detailed statistics on the sites and victims are available from the above-mentioned table “List of Mass Graves” on the DC-Cam home page. Craig Etcheson (2000) produced a summary of these statistics after five years of the mapping project and came up with figures for the entire Cambodia and for provinces. We have updated his figures using the latest information on the DC-Cam website and present new figures below. The new figures represent the status as of 18 February 2008.

It must be noted that the summary statistics initially produced by Etcheson (2000) and reproduced here are approximate which is related to the uncertainty inherent in the underlying data on mass graves, estimated victims, identified prisons and memorials. Much DC-Cam information is available in a qualitative format and needs to be coded quantitatively, which procedure will always remain subjective to some extent. The uncertainty is not such, however, that completely different pictures would emerge from alternative ways of coding the source information. Alternative coding approaches will result in slightly but *not* fundamentally different outcomes. Most differences would be seen in relative measures, e.g. “graves per prison” or “victims per grave”, as those from Etcheson’s Table 2 (see Annex 2 for Etcheson’s original and our re-calculated Table 2). Only slight differences should be expected for overall totals, such as the total number of graves or victims.

Note that the source material and methodology of Etcheson’s and our calculations are not identical. Etcheson analyzed data covering the period 1995-99, i.e. from the first five years of the mapping project. We analyzed the latest available data from February 2008, which cover the period 1995 - 2008. Our data most certainly contain corrections and improvements of the 1995-99 data that the DC-Cam staff made in the years after 1999; Etcheson did not have these improvements. Secondly, a quantitative analysis like the one of Etcheson and ours is subject to coding of *some* of the originally reported source figures on mass graves and victims. Coding needs to be done for qualitative reports; i.e. brief narratives, such as “more than 1000”, “over 300”, “hundreds”, “thousands”, “a few”, “about”, “70 families” etc. Researchers might code these narratives in different ways as no strict rules exist for the coding of such data. Secondly, many records provide intervals of values and not point estimates. The interval values need to be treated accordingly to their character too. Details of our coding and specific results from our analysis are included in Annex 2. Below only main findings are discussed.²⁴

Table 3. Summary Statistics on the DC-Cam Mass Grave Mapping Project: December 1999 versus February 2008

Category	December 1999	February 2008	Increase
Victims	1,112,829	1,298,772	185,943
Mass Graves (Pits)	20,442	23,745	3,303
Prisons	125	196	71
Memorials	71	81	10

Sources:

December 1999: Etcheson (2000)

February 2008: Tebeau and They (2009); see Annex 1

²⁴ The following maximum and minimum variants were obtained for victims:

Victims	Maximum	Minimum	Medium*
Site Formes	1,408,201	1,189,323	1,298,762
Field reports	1,409,141	998,743	1,203,942

* Medium calculated here from overall totals and not individual records.

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Generally, in our approach three variants were made:

- the minimum variant was based on lower ends of all intervals and estimated lower ends of the narratives
- the maximum variant took upper ends of all intervals and estimated upper ends of the narratives
- the medium variant was obtained as an average of the minimum and maximum; this variant is included in Table 3

We believe that our medium variant compares to that of Etcheson (2000). Further, in Table 3 we present the results based on the information from the "Site Forms", thus not from the "Field Report" (see Annex 2 for details). Field reports usually give lower statistics as pieces of information from the field informants were rejected by DC-Cam researchers as not reliable. In our opinion, however, the "Site Form" contains first-hand valuable data, which for each site was obtained parallel from several informants. DC-Cam researchers corrected this information down as much as possible to be conservative but as a matter of fact this is their subjective judgment that was used for the corrections. There is no certainty that the DC-Cam corrections were right and the field informants were wrong. Thus any of the two estimates can be taken as a source for the calculation of summary statistics. Differences between these two approaches are not fundamentally significant (Annex 2).

Table 3 shows that the progress in mass grave mapping made between 2000 until early 2008 was significant but not magnificent. About 186,000 new victims are reported over the period of about seven years and about 3,300 new mass graves. One reason for this is that the project continued in recent years at a slower pace than before due to a rather limited funding for the mapping and a more intense engagement of the DC-Cam staff in other areas of their research. Secondly, during the first five years of the project a majority of the sites had already been investigated, including those with the lowest security concerns and convenient locations. It is been estimated that at least 70% of the project objectives have been completed today, leaving the remaining 30% to be the more remote and less secure places.

At the present time, the overall number of the mapped mass graves is about 23,745 and the estimated number of victims in these graves is about 1.3 million. These numbers most certainly confirm the exceptionally large magnitude of the killings and forced death in the Khmer Rouge Cambodia.

Importantly, a part of victims will be never included in mass grave statistics; these are the surface remains; i.e. remains of the victims dropped in open paddy land, wells, lakes, ponds, eaten by animals etc. Their remains decomposed or disappeared in another way and there is no chance can be recovered. Their memory will only last in survivors recollections and in the memorials placed all over the country to acknowledge and respect their death.

The final remark must be on the type of victims in the mass graves. Etcheson discussed this issue in his 2000 article and challenged the notion that the pre-1975 victims, especially the victims of American bombings and Lon Nol soldiers, victims of the Vietnamese invasion and starvation of 1979 together with non-violent deaths of Khmer Rouge regime are allegedly buried in these mass graves as well. These issues were subject of DC-Cam interviews with informants at the sites, who exceptionally only mentioned a few such cases. Etcheson's conclusion was the following:

- *"Thus, to call into question the information collected in sub-districts across the whole length and breadth of Cambodia, where local witnesses testify to the existence of Khmer Rouge centers and the location of the mass graves in which victims' remains were discarded,*

presumes a nationwide conspiracy of unlikely proportions. Although it appears possible that certain socially acceptable and collectively-shaped myths may influence the precise contours of the narratives collected by the mass grave mapping teams, it seems highly improbable that these social pressures would extend so far as to the fabrication of ruins of former prison facilities, or placing of physical evidence such as shackles in those ruins.” (Etcheson, 2000, p. 14)

The above statement is fully consistent with the information we obtained from Youk Chhang,²⁵ the DC-Cam director and the most determined, relentless, and persistent project leader and participant of the mass grave mapping project. Also Chang was not familiar with large scale numbers of mass graves and victims originating from historical episodes that would be different than the Khmer Rouge regime. Also Chhang stressed the striking association between the location of mass graves and security centers. He mentioned as well the few natural deaths were usually buried separately, behind the houses where people lived and where they died. He as well noted difficulties in distinguishing natural from non-natural deaths in the Khmer Rouge era. Hardship of daily life, i.e. diseases, hard work, forced movements, bad accommodation, lack of food and medications, separation from the family, forced marriages etc., caused people to die far more frequently than in normal times. These deaths, although not violent, cannot be attributed to natural causes. Instead they should be seen as imposed onto the people of Cambodia. As a matter of fact, he defined a category of war victims that can be called “forced death”.

All in all, it is highly unlikely and practically impossible that the mass graves mapped so far and the remains contained in them can be linked with non-Khmer Rouge episodes of the Cambodian history. Witness statements and other DC-Cam materials documenting the mass graves prove to the contrary.

2.4 Internationally Published Research on Excess Deaths: Sources and Methods

In this section we introduce the internationally published research taken for review in this report. Despite of the fact that this section is in principle limited to international research, for comparative purposes and completeness of our review also *Renakse* methods and sources are again briefly discussed here. All other authors had published their results internationally in peer reviewed scientific journals or books, and a few on the Internet; all of them have a deep and continuing interest in the victimization of Khmer Rouge regime of April 1975 to January 1979 as well as in the history of Cambodia. Many authors represent the world top in their respective research areas.

In this section we proceed chronologically, i.e. first the early 1980s papers are reviewed and subsequently later papers, up to the most recently published. This logic has its justification in the fact that more and better statistical sources have become available for Cambodia population in the course of time. The latest sources, such as for example the 1998 and 2008 population censuses, although seem to be very distant from 1975-79, are still meaningful for the assessment of demographic consequences of the tragic decade of the 1970s and backwards projections of the Cambodia population. The second reason is that the early 1980s views evolved with time and the victim numbers of today must be shown in the context of their historical development.

The following authors are reviewed in this report:²⁶

²⁵ Personal communication of Ewa Tabeau with Youk Chhang, DC-Cam Phnom Penh, 23 June 2009.

²⁶ Full references can be found at the end of this report in the “List of Internationally Published Research Assessed in This Report”

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- CIA, 1980
- EA MENG-TRY, 1981
- KIMMO KILJUNEN (ed.), 1984
- MICHAEL VICKERY, 1984
- JUDITH BANISTER and PAIGE JOHNSON, 1993
- MAREK SLIWINSKI, 1995
- BEN KIERNAN, 1996 and 2003
- PATRICK HEUVELINE, 1998
- PATRICK HEUVELINE and POCH BUNNAK, 2007
- CRAIG ETCHESON, 2000
- CRAIG ETCHESON, 2005
- RICARDO NEUPERT and VIRAK PRUM, 2005

Sources they used in their research are closely associated with the methods they applied, which is related to the fact that sources explicitly addressing the numbers and types of Khmer Rouge victims are so extremely limited for Cambodia that (with a few exceptions) practically non-existent. The explicit sources include a few sample surveys, such as for example the one by Sliwinski (1995). None of the above authors produced empirical counts of victims, not even a minimum count. All authors took an indirect approach and derived their number of victims from a population projection or scenario, extrapolation of survey results over the entire population or another method. For these reasons, we have to discuss the sources *and* methods of international authors jointly. This is done in this section. In our discussion we do not yet make any references to the actual numbers of victims obtained by the authors. The numbers are the subject of the discussion in the next section. Our purpose here is to give the reader a good impression of the type and reliability of sources used in the international research as well as to critically assess the methods applied there.

In our discussion, first an overview is presented of sources and methods for each individual author (Table 4). The discussion that follows after Table 4 is general and meant as a summary of individual authors' inputs.

Table 4. Overview of Methods and Sources Used in Internationally Published Estimates of Excess Deaths in Khmer Rouge Regime, April 1975 to January 1979

CIA, 1980	
Data Sources	1962 Census, 1978 UN projections for Cambodia, UNHCR refugee statistics for Cambodia, intelligence and other sources including the expertise of CIA analysts specialized in this region of the world; sources not referenced one by one, except for Siampos (1970) and Willmott (1968)
Methods for Excess Deaths	Deaths statistics are a by-product of a population scenario. The standard population accounting method was used in an exceptionally detailed approach. Red Khmer period projections were made for each principal group of people (New and Old) and for a number of distinguished sub-periods (each app. six months), using assumptions formulated separately for each small set of projections.
Methods for Causes of Death	No formal methods used; deaths from executions and all remaining deaths based on subjective assessment.
Population Decline 1975-79	Not discussed
Motivation for this Paper	Research report by the Central Intelligence Agency of the USA. Unpublished.

EA MENG-TRY, 1981	
Data Sources	For <u>population size</u> : CIA (1980), Migozzi (1973), official (mainly Vietnamese) government reports, notes / statements / reports of international organizations, press reports (mainly France), historical materials/books etc. For <u>excess deaths (including executions)</u> : CIA (1980): 50,000 to 100,000 of violent deaths and several hundreds of indirect deaths, Father Ponchaud (spring 1978): 2 millions (excess), Amnesty International (1979: "Rapport sur la peine de mort"): 2 million (excess), 200,000 executions, Countries of Eastern Europe and Hanoi: 3 to 4 millions (excess).
Methods for Excess Deaths	Excess deaths obtained as a residual category from a general demographic accounting equation. Components of the equation obtained from author's own (predominantly qualitative) assessment of estimates by others.
Methods for Causes of Death	Author's own (predominantly qualitative) assessment of estimates by others.
Population Decline 1975-79	950,000; The general accounting equation explaining this decline includes: Excess Births (meant as the difference between births and natural deaths; +500,000); Excess Deaths (-1,000,000); Refugees Abroad (-250,000); Repatriation Vietnam (-200,000).
Motivation for this Paper	Article published in an international demographic journal (Population and Development Review).

VICKERY, 1984	
Data Sources	CIA (1980); some demographic rates (births 30/1000 per year and deaths 18/1000 per year) from the period around the 1962 Census; sources unclear. Some additional population projections by individual authors and organizations for contextual purposes.
Methods for Excess Deaths	Excess deaths obtained as a residual category from a general demographic accounting equation. Components of the equation obtained from author's own (predominantly qualitative) assessment of estimates by others.
Methods for Causes of Death	The overall total of excess deaths in 1975-78 from the general accounting equation was distributed into direct and indirect deaths according to subjective survivors recollections.
Population Decline 1975-79	After excluding out-migration (-200,000), the decline is 400,000 to 600,000; The minimum decline of 400,000 is further analysed according to the general accounting equation: Births added (+852,000; CBR 30/1,000/year); Natural Deaths subtracted (-511,000; CDR 18/1,000/year); Remainder (to subtract) are Excess Deaths (-740,000).
Motivation for this Paper	Book on the history of Cambodia (first published in 1984).

KILJUNEN (ED), 1984	
Data Sources	The Population "Census" of May 1981 by the government in Cambodia (Ministry of Planning, Phnom Penh); UN population projections; CIA (1980) projections; all these cross-referenced with Pol Pot's statistics
Methods for Excess Deaths	Method comprised a comparison of the <u>expected</u> and <u>actual</u> population size in 1981 (in May) and subtracting excess deaths in 1979-81. Assumptions used: Expected Population 1981: 8.3-8.5 mln (2.8% annual growth of 7.3 mln (1975; CIA (1980)); "no war" scenario); Actual Population 1981: 6.7 mln (1981 population count); Refugees 1975-81: 650,000; <u>Residual</u> : "1981 expected" - "1981 actual with refugees": about 1 mln taken as excess deaths; (<i>note: births are totally neglected</i>); Excess deaths 1979-81: Assumed as negligible: main cause for excess deaths in 1979-1981 was famine estimated to cause in reality only "a few tens of thousands" of deaths, (contrary to earlier expectations). The entire excess of 1 mln can be therefore attributed to Khmer Rouge regime.
Methods for Causes of Death	NA
Population Decline 1975-79	Not discussed
Motivation for this Paper	Chapter in a report of the Finish Inquiry Commission into the Khmer Rouge regime in Cambodia.

BANISTER AND JOHNSON, 1993	
Data Sources	Major sources: 1962 Census; 1980 administrative population count (end-1980); 1982 demographic and health survey in Cambodia (Ministry of Health); Auxiliary Sources: A large number of published and unpublished studies, personal communications, results of simulations and alternative scenarios.
Methods for Excess Deaths	Excess deaths obtained from a reconstruction of the Cambodia population between 1962 and 1980 by means of a "plausible scenario". Method of reconstruction unclear: might be a scenario based on interpolation between 1970 and 1980, or general demographic accounting equation, or a simple projection. Thereafter, an extrapolation of the 1980 count is performed up to 2050 using the usual demographic projection approach (in medium, low and high variants). The 1962 census <i>and</i> 1980 count <i>and</i> educated guesses on war related population losses were used for the "plausible scenario" of 1962-1980. War related population losses were not estimated but formulated a priori as educated guesses; their impact was tested by comparing the outcome of the "plausible scenario" with an alternative scenario that would have occurred if there was no civil war.
Methods for Causes of Death	Not discussed
Population Decline 1975-79	The decline equals 940,000; Population Loss was analyzed too: "end-1978 expected" - "end-1978 actual" = 1.8 mln; (1.8 mln= 8.2 mln- 6.36 mln). The components of the loss: Net Emigration (-218,000); Births Deficit (-570,000); Excess Deaths (-1.05 mln).
Motivation for this Paper	Chapter in a book; Scientific interest in the reconstruction of the population change in Cambodia since 1962 at the edge of the first free elections in Cambodia in 1993.

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BEN KIERNAN, 1996 AND 2003	
Data Sources	A number of small scale surveys by others were used for drawing or supporting his results. Additional sources on the population size in April 1975 and January 1979: Migozzi (1973), Sampson (1977), Banister and Johnson (1993), Sliwinski (1995), Heuveline (1998), as well as UN (mid-1974; unrevised), and DK estimates.
Methods for Excess Deaths	In his main approach (1.671 mln excess deaths), no reconstruction was made; (pre 1980 uncorrected) UN projections were used for April 1975, i.e. 7.890 mln, and his own informed guesses for the population size of Base and New People as well as of Phnom Penh and other cities. A typically historical qualitative approach was used. First, he reviewed a number of small surveys, some of which were anthropological and related to single villages. Then, the results from this review were extrapolated over the entire population by applying estimated rates of those who perished (i.e. were killed, died of indirect war-related causes or went missing). The rates were generally taken from the reviewed surveys or were produced as his own informed guesses. Kiernan also came up with separate estimates of victims among ethnic groups (Chinese, Vietnamese, Cham, Thai, Lao and "upland minorities").
Methods for Causes of Death	Not discussed
Population Decline 1975-79	Not discussed. But in Kiernan (2003), Population Loss was calculated (general accounting equation), based on the expected and actual population size in 1979 (January). Components: <u>Expected Population January 1979</u> : 8.215 mln (produced as 1% annual growth of 7.89 mln April 1975 population (his own estimate), minus 150,000 repatriated Vietnamese; 1% growth covers only the actual natural change and not excess deaths); <u>Actual Population January 1979</u> : 6.36 mln (after Bannister and Johnson, 1993); Repatriation to Vietnam, 1975-79: 150,000 (already subtracted from "expected"); Residual: "1979 expected" - "1979 actual" (no refugees); about 1.855 mln of excess deaths.
Motivation for this Paper	Book (and an article) on the history of Cambodia, 1975-79

²⁷ Kiernan is usually referred to in this report by using the first 1996 edition of his book: "The Pol Pot Regime. Race, Power and genocide in Cambodia under the Khmer Rouge 1975-79". The 3rd edition of the same book was published in 2002. Note as well that the 2003 article: "The Demography of Genocide in Southeast Asia. The Death Toll in Cambodia, 1975-79, and East Timor, 19750-80", contains a continuation of his work on the death toll and a new improved estimate.

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MAREK SLIWINSKI, 1995	
Data Sources	For excess deaths: Sliwinski's own questionnaire survey conducted in France, Thailand and Cambodia in 1989-1991. For population size: 1962 Census, Migozzi (1973), Kimmo Kiljinen (ed. 1984), CIA (1980)
Methods for Excess Deaths	Excess deaths estimated from Sliwinski's survey data. In order to extrapolate survey results over the entire Cambodia population he produced population estimates based on the 1962 Census and Migozzi (1973) projections. The projections originally made by Migozzi (until about 1970) were expanded until the end of 1989. Initial assumptions on the population size and structure in 1970 were taken from Migozzi's projections. For the later (post-1970) period, Sliwinski produced birth, deaths and migration rates from his own survey. The population size and structure during the 1970+ period was reconstructed using those estimated rates and the assumed size and structure of the population in 1970.
Methods for Causes of Death	Reports of survey respondents.
Population Decline 1975-79	Not discussed
Motivation for this Paper	Book on demographic consequences of the Khmer Rouge regime; Scientific interest in the longer episode of 1970-89, but in particular 1975-79.

PATRICK HEUVELINE, 1998	
Data Sources	<u>Key Sources</u> : 1962 Population Census, 1992 electoral rolls of the United Nations Transitional Authority in Cambodia (UNTAC); <u>Auxiliary Sources</u> : Large number of published sources were used for reconstruction assumptions and for assessment of violent and overall excess deaths in 1970-79, 1970-75 and 1975-79.
Methods for Excess Deaths	Excess deaths obtained as a residual category from comparing two sets of separately made population projections: forward 1962-1979, and backward 1992-1980. A well established demographic standard - the "intercensal cohort component method" was used. The forward projection was based on the 1962 Census and the backward one on the 1992 UNTAC voters register. Assumptions for fertility, mortality and migration balance resembled the actual trends in 1962-1969 and in 1980-1992. For the period 1970-1979 the trends observed in the 1960s extrapolated according to "actual fertility, normal mortality and actual net-migration throughout the 1970s". This approach allows for estimating the (hypothetical) population size in Cambodia at the end of the decade 1970-1979. Parallel, the second projection, from 1992 backwards to 1980, provides the actual population size in Cambodia on 1 January 1980. The difference between the population size from the forward and backward modelling represents the excess deaths in 1970-1979.
Methods for Causes of Death	Selected model life tables were applied to distinguish between non-violent and violent excess deaths in 1970-79 (by age and sex). The estimated violent deaths in 1970-79 are further split into the (pre-Khmer Rouge) 1970-75 and (Khmer Rouge) 1975-79 violent deaths based on the work of others. 300,000 violent deaths were assumed for the civil war, 1970-75 (300,000 are the most likely variant out of 150,000 to 500,000 possible). The following authors were consulted: Sihanouk, 1986; Ea, 1987; Kiljinen, 1984; Hood and Albin, 1987; Banister and Johnson, 1995; Sliwinski, 1995; Hirschman et al., 1995; Barbieri, 1995. Some victims of the 1979-80 famine should be further subtracted from 1975-79 estimates (0.7 to 3.2 mln). The overall number (1979-80) might have been up to 500,000-600,000 famine deaths. For 1979 only a part of it should be taken (e.g. 50%).
Population Decline 1975-79	Not discussed
Motivation for this Paper	Scientific article in a renowned international demographic journal.

HEUVELINE AND POCH, 2007	
Data Sources	On-going demographic surveillance system "Mekong Island Population Laboratory" (MIPopLab); Heuveline (1998), Kiernan (1996), Sliwinski (1995)
Methods for Excess Deaths	Extrapolation of MIPopLab estimates over the 1975 population of Cambodia.
Methods for Causes of Death	Not discussed
Population Decline 1975-79	Not discussed
Motivation for this Paper	Scientific article in a renowned international demographic journal

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NEUPERT AND VIRAK, 2005	
Data Sources	1962 General Population Census (GPS-1962); 1998 General Population Census (GPS-1998); 2000 Demographic and Health Survey of Cambodia (DHS-2000)
Methods for Excess Deaths	Excess deaths estimated as the 1980 residual change in the Cambodia population size as projected from two different ends: Forward projection from 1962 Census up until 1970 using the actual change scenario (Siampos, 1970) and continued until 1980 under "normal mortality, actual reduced fertility and actual net migration" scenario; Backward projection from 1998 Census until 1980 using assumptions derived from the DHS-2000.
Methods for Causes of Death	Not available
Population Decline 1975-79	600,000 in 1970-79; The overall population loss between 1970 and 1980 adds up, however, to about 3.3 mln: Birth deficit in 1970-79: 700,000 (about 200,000 in 1970-75 and 500,000 in 1975-79); Excess deaths in 1970-79: 2 mln; Out-migration in 1970-79: 570,000; The resulting "no-war" population in 1980 would have been about 10.7 million. The loss in 1975-79 is about 2.3 mln (500,000 births deficit+1.4 mln excess deaths+408,000 out-migration).
Motivation for this Paper	Scientific article published in a book on war demographics in 2005.

CRAIG ETCHESON, 2005	
Data Sources	Data collected in the DC-Cam mass grave mapping project
Methods for Excess Deaths	Excess deaths of Khmer Rouge, 1975-78, (2.2 mln) are composed of two parts: The first component is the number of individuals represented by human remains in the mass graves mapped so far in Cambodia: 1,1 mln. A second component of Etcheson's estimate are indirect excess deaths (1.1 mln.), whose number remains about the same as the number of individuals in the mass graves. The proportion between the two components (i.e. direct and indirect excess deaths) equals 50:50 and is assumed after Heuveline (1998). Other proportions available from literature (and based mainly on small sample estimations) are seen as not reliable enough to be used.
Methods for Causes of Death	By applying the "fifty-fifty" distribution. It is assumed, however, that all (or a majority of) victims in the mass graves are from executions rather than from mixed direct and indirect causes of death.
Motivation for this Paper	Chapter in a book and article on victimization of the Khmer Rouge regime and in particular on mass graves and victims from exhumations.

RENAKSE ESTIMATE, 1983	
Data Sources	Renakse petitions collected by the National Front for the Defence, Restoration, and Solidarity of Kampuchea between 1980 and 1983 (hereafter: the Front); Documents on crimes of Pol Pot regime (the Ministry of Culture)
Methods for Excess Deaths	Nation-wide action of the Front; the number of petitioners is estimated at 1,166,307
Methods for Causes of Death	Narratives of the petitioners; any other informants and sources including reports of the Research Committees, exhumations reports etc.
Motivation for this Paper	Possibly political; petitioners made claims that the Khmer Rouge representatives had to be removed from the UN General Assembly and representative of the new Vietnam-supported government should take their place. Individual sources for this report still meaningful but should be assessed on case by case basis.

Sources

Generally, no victim counts were produced for the Khmer Rouge victims by any author; however, two attempts tried to address this issue. One is the *Renakse* nation-wide popular survey of the early 1980s and the second one is the mass grave mapping project of DC-Cam. Despite of its good intentions, *Renakse* effort was not successful in producing a reliable count due to the lack of a reliable statistical framework. The DC-Cam mapping project has been largely successful; so far it identified an estimated 1.3 mln human remains in the mapped mass graves, but the work is not yet finished and not validated other than by survivors statements. The proper exhumations of all these remains will never be done due to the large scale of the problem and gradual disappearance of the

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remains. A sample of exhumations could be certainly most useful but the sample would not offer a complete count of victims either.

All in all, victim counts do not exist for the Khmer Rouge regime and thus could not be used by the authors listed in Table 4. What exists and was used, were a number of small scale retrospective surveys conducted after 1979 and several popular sources based on monitoring of the situation in the 1970s and early 1980s by individuals and international organizations, such as for example the writings of Father Ponchaud (1978), early 1980s estimates of Khmer Rouge victims by socialist countries of Eastern Europe and Hanoi, reports and statements of international organizations such as Amnesty International or UNICEF, numerous press reports and research articles and books. All these sources are aggregate; no lists with victim names were usually compiled (except for S-21 and a few other occasional locations). Popular sources are not a good replacement of professional statistical sources. They most certainly can provide some useful insights and contextual information but when it comes to victim numbers, these sources should be dealt with caution.

Sample surveys,²⁸ although usually small or very small, were most certainly valuable as they increased the understanding of the Khmer Rouge victimization mechanisms and the victim numbers. However, none of these surveys could be seen as nationally representative and thus none could be used to produce the overall estimate of Khmer Rouge victims for the entire Cambodia.

With respect to the population size in Cambodia in 1970s, data sources listed in Table 4 include population estimates by the authors themselves or by others. Note that official NIS projections did not exist for the 1970s; the UN projections, even though did exist for the 1970s, remained basically unrevised prior to 1980; thus were showing population development under “no-war/no-turmoil” scenario. In this situation, many authors listed in Table 4 based their estimates of the 1970-79 population on the 1962 population census in Cambodia, and pre-Khmer Rouge main studies of the 1962 census by Migozzi (1973) and Siampos (1970). Many authors relied on the estimates by CIA (1980), which obviously had much impact on shaping the opinions on the Cambodia population in especially the early 1980s period. Additional estimates included by the authors are those by the Cambodia governments in the 1970s and early 1980s, including by Khmer Rouge themselves, and the (unrevised) UN Population Prospects. Occasionally, the 1980 or 1981 administrative population counts of Cambodia were referred to as well.

²⁸ Ben Kiernan is among the authors who referred to sample surveys most intensively. Examples of surveys he discussed in his 1996 book (and its later editions, i.e. 2008) in victims context are listed below. The survey of Sliwinski is exceptional among all these surveys as it is the most extensive in terms of substance and based on relatively high number of respondents.

May Ebihara, 1993: Anthropological survey of a Khmer village of 158 inhabitants in Cambodia (Kandal province, south of Phnom Penh). In: M. Ebihara, *A Cambodian Village under the Khmer Rouge*, in Kiernan, 1993: *Genocide and Democracy in Cambodia*, chpt. 2 (Quoted after Kiernan, p. 459)

Stephen Heder, 1981: A survey of 1,500 refugees on the Thai-Cambodian border in 1980-81 (field data on 15,000 individuals - members of respondents' immediate families). Specific source not available. (Quoted after Kiernan, p. 456)

Katuiti Honda, 1981: Two surveys in two Khmer villages (one of 168 people and one of 728 people). *Journey to Cambodia: Investigation into Massacre by Pol Pot Regime*. Tokyo, 1981. (Quoted after Kiernan, p. 459)

Ben Kiernan, 1980: A survey of 500 respondents of whom 100 interviewed in France in 1979 and 400 inside Cambodia in 1980. In: Ben Kiernan and Chanthou Buoa, 1982: *Peasants and Politics in Kampuchea, 1942-1981*. London Zed Books.

Milton Osborn, 1980: A survey of 100 Khmers among the refugees in camps at the Thai-Cambodian border. In: M. Osborn, 1980: *Pol Pot's Terrifying Legacy*. FEER, 6 June 1982, pp.20-22. (Quoted after Kiernan, p. 456).

Marek Sliwinski, 1995: “Le genocide Khmer Rouge une analyse démographique”, Editions L'Harmattan, 1995, 175 p.

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As we will show in the next section, many discrepancies exist between all these estimates; in particular among those for January 1979. Fewer differences are seen for the projected 1970 and April 1975 population. Most importantly, no one of the above-mentioned early attempts at estimating the population of Cambodia by April 1975 and January 1979 can be conclusively seen as the most likely “only right” variant, which makes any indirect method for excess deaths estimation which is based on the estimated population size extremely uncertain.

Uncertainty of the 1970s population estimates is a result of the lack of reliable statistical sources which could provide assumptions in relation to 1970s trends in births and deaths. Only one demographic and health survey is mentioned (Banister and Johnson, 1993) which could give some indications for the post-Khmer Rouge period (1982; Cambodia Ministry of Planning; methodology of which is not entirely clear and most certainly does not compare with the modern demographic and health surveys supervised by the World Health Organization - WHO). No other professional surveys were used by any author for the years 1970-79 as such surveys do not exist. Migration is hazily documented too, but at least some UNHCR, UNDP and local statistics exist (e.g. Cambodian Displaced Persons Working Group; in Hugué (1991)); good migration reviews are available too (e.g. Banister and Johnson (1993)) and could be referred to. That does not mean that the existing migration statistics are all consistent.

More recent studies, starting from around 1995, were more fortunate with sources for the post Khmer Rouge period. In 1995 Sliwinski published results of his Cambodia survey and provided new evidence about mortality and fertility changes during the 1970s and under Khmer Rouge regime in particular. Much could be learned from this new source about excess deaths and their causes, and about fertility and natural mortality trends. From the 1993 elections in Cambodia, an excellent individual level database became available of the registered 1993 voters. Heuveline (1998) used this data in his backwards projection of the Cambodia population until 1980. In 1997 Hugué used the 1996 Cambodia Demographic and Health Survey to estimate backwards the 1980 population which confirmed that the 1980 administrative count can be trusted. In 1998, the first modern census took place in Cambodia, whose data was used by Neupert and Virak (2005) for a reliable modern backwards projection until 1993. This projection gave a link between the 1998 census and electoral rolls of 1993. All in all, the more recent studies (1995 and later) had a better statistical basis for the period after the fall of Khmer Rouge. The basis for the years after the 1962 census and during the 1970s remained the same in any estimate, i.e. poor.

Methods

The papers referred to in Table 4 are not homogenous in character. Some are articles or book chapters focused exclusively on Khmer Rouge victims and other demographic consequences of this regime,²⁹ some others concentrate on the population change in Cambodia in the 1970s and analyze this change as a subject in itself;³⁰ the remaining ones discuss it as part of a broader historical context.³¹ Finally, some authors used unique Cambodian sources, such as DC-Cam mass grave records and *Renakse* petitions.³² In all papers listed in Table 4 the question of victims remains central; it might be so, however, that the character of a given study had some impact on the type of research approach applied.³³ More importantly, it seems that the research discipline the authors belong to had a fundamental impact on the approach chosen for the estimation. Demographers and

²⁹ E.g. Heuveline (1998), Heuveline and Poch (2007), Sliwinski (1995), Kiernan (2003).

³⁰ E.g. CIA (1980), Ea Meng-Try (1981), Banister and Johnson (1993), Neupert and Virak (2005).

³¹ Vickery (1984), Kiljunen (ed., 1984), and Kiernan (1996).

³² Etcheson (2000 and 2005) for mass grave statistics and “*Renakse* Summary” of 1983.

³³ Meaning that more complex approaches were applied in studies devoted exclusively to the estimation of Khmer Rouge victims and less complex (i.e. simpler) approaches in studies that were part of bigger historical contexts.

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statisticians relied on (quantitative) population projections and (mixed quantitative and qualitative) scenarios, political and other behavioral social scientists on sample surveys, and historians on multiple sources including interviewing survivors and other relevant persons (e.g. state and international officials), generalizing sample surveys, studying documents, such as research information, letters, press reports etc., post-conflict visits to the country and direct inspection of the situation etc. Each of these approaches is valuable in some way and complementary to others; all of them depend heavily on the inputs used by the authors (i.e. data and assumptions). Whenever poor inputs were used the results cannot be seen as reliable and meaningful.

The following groups of methods can be distinguished in the studies assessed in this report:

- Demographic balancing equation: Excess deaths as part of the demographic balancing equation for the “Population Decline” or “Population Loss” between April 1975 and January 1979
- Population Scenarios: two variants were applied, unrestricted and restricted; the restriction involved using the 1980 population size and age- and sex-structure as a limit for the population development between 1975 and 1980
- Extrapolation of Sample Surveys Results over the Entire Population
- Excess Deaths as a Residual Category between Two Projections
- Excess Deaths as Linked to Mass Grave Statistics
- Excess Deaths as a Naïve Estimate from Nation-Wide Investigation

Demographic balancing equation

Demographic balancing equation is the most approximate and unreliable method, disregarding whether it is applied to the population decline or population loss. There are three components of the equation: births, deaths (natural and excess), and net migration. The level of analysis is the entire population of Cambodia, not even the disaggregation by age and sex is applied. Population decline (in absolute terms) is analyzed by comparing the population size between April 1975 and January 1979. The population at the beginning and end of the analyzed period is decided first, usually on subjective grounds by brief reviews of estimates by others. In the second step, assumptions are made about the magnitude of births, deaths and net migration in 1975-79 in such a way as to satisfy the equation. In this puzzle, unlike in any real puzzle, there exist several variants of alternatively shaped “pieces” that will always add up to the overall decline. This method was applied by Ea Meng-Try (1981) and Vickery (1984)).

In the case of the population loss, instead of the 1975-79 decline, a difference is analyzed between the expected (under “no-turmoil” scenario) and actual population on January 1979. Both populations are decided first; both are very hard to predict. The components of the difference are again births (actually the births’ deficit which is the difference between the expected and actual births), deaths (only excess) and net migration. The balancing equation explains that the difference between the expected and actual population on a given moment is the result of births’ deficit, excess deaths and net migration. Again several alternatives exist that satisfy also this equation. The authors who used this method included Kiljunen (ed.; 1984) and Banister and Johnson (1993)); the latter in combination with several other more sophisticated analysis.

There exists a third variant of the demographic balancing equation as well. In this variant the “expected” January 1979 population expresses the population that would have been observed in the absence of excess deaths but under the actual natural growth and actual net-migration in April 1975 - January 1979. The annual growth is usually assumed much lower than before 1970 (say 1% instead of the usual 2.8%). In this variant the difference between the expected and actual population on

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keeps the scenarios still questionable, although more convincing than the demographic balancing equations.

Extrapolation of Sample Surveys Results

Extrapolation of sample surveys results over the entire population was done by several authors, most importantly by Sliwinski (1995), Kiernan (1996) and Heuveline and Poch (2007). This approach is often applied in the estimation of conflict mortality world-wide. It has as many advantages as shortcomings, however. What matters is the quality and reliability of the survey material and, secondly, of the population estimates at the beginning of the conflict period. Problems around the population estimates for April 1975 have already been partly discussed. At this stage we need to summarize issues around the surveys. Only retrospective and surveillance surveys will be considered here as these were the only types used for Cambodia.³⁴

Advantages of retrospective and surveillance surveys include among others:

- Death rates can be estimated without knowing the actual population size; i.e. using the records of the survey population only;
- Death rates can be analyzed by sub-area and over different time periods;
- Can be performed in many settings including both urban and rural areas and camps;
- Data collected can be broad such that much contextual information becomes available;
- Data quality can be efficiently controlled;
- Requires limited resources for a limited duration, i.e. is easy to implement

Weaknesses of retrospective and surveillance sample surveys are the following:

- Random sample surveys are not suited to provide representative record of victimization in the entire population of a conflict-affected country. This is because respondents are selected from survivors, among whom the victims of the most dramatic episodes are underrepresented;
- Convenience samples could be a better alternative, especially if they were selected following the historical development of the conflict. But convenience samples are highly unpopular among researchers who wrongly believe that only random surveys are the appropriate tools;
- Sample drawing mechanism might produce a significant bias if it is in disagreement with conflict development; e.g. camp samples will correctly represent the victim populations from the areas the camp respondents moved from before arriving in the camp, but not necessarily the rest of the country population;
- Some groups of respondents might see the survey as a form of registration for aid distribution; this might cause another bias of over-reporting of survivors;
- There is a recall bias in sample surveys; more distant surveys are known to contain more gaps and misreporting than the early ones;
- Death rates might be biased for short periods and small areas covered by the survey

The above must apply in several ways as well to the surveys conducted in relation to Cambodia's 1970s victimization. As we show in the discussion that follows below, the main problem for

³⁴ Compare: Francesco Checchi and Les Roberts, 2005: "Interpreting and Using Mortality Data in Humanitarian Emergencies. A Primer for Epidemiologists." HPN Report No. 52, September 2005 (p.19).

Francesco Checchi and Les Roberts, 2008: Documenting Mortality in Crisis: What Keeps us from Doing Better? PLOS Medicine, Vol. 5, No. 7.

Neil F. Johnson et al., 2008: Bias in Epidemiological Studies of Conflict Mortality. Journal of Peace Research Vol. 45, No. 5., pp. 653-663.

Romesh Silva and Patrick Ball, 2005: The Demography of Conflict-Related Mortality in Timor-Leste (1974-1999): Reflections on Empirical Quantitative Measurement of Civilian Killings, Disappearances and Famine-Related Deaths. Conference paper presented at: "Documenting Mortality in Conflicts", 6 November 2008, CRED Brussels.

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Cambodia is the lack of the national representativeness of the existing surveys, especially of small surveys covering one or two villages.

Table 5 below summarizes some surveys conducted in relation to victims of the Pol Pot regime in Cambodia. Several of them were reviewed by Kiernan (2008) as part of his historical investigation of the victimization in the Khmer Rouge period. Kiernan as well uses additional materials when exploring victimization issues, such as his interviews with survivors and witnesses to the events under Khmer Rouge, observations from his frequent visits to Cambodia, relevant statistics from the work others, his personal communications with persons working in this field etc. Kiernan's opinions with regard to victims are far broader than the numbers from the surveys he refers to and therefore sound convincing. It is clear, it is Kiernan's overall expertise in the history of Cambodia, and in the Khmer Rouge episode of it in particular which makes the reader believe the opinions he puts forward in his writings.

Table 5. Overview of Surveys Discussed in Kiernan (1996)³⁵

Author of Survey	Sample Interviewed in Survey	Sample Size	Death Toll (Pol Pot)
1. Reviewed by Kiernan (2008)*			
- Ebihara (1993)	Village Svay, Kandal province	158 individuals	53%
- Heder (1981)	Refugees, Thai-Cambodian border	15,000 individuals	20%
- Honda (1981)	Two villages, Kandal province	728 and 168 individuals	41% and 45%
- Honda (1981)	Four rural communities, Eastern Cambodia	350 individuals	36%
- Osborn (1980)	Refugees, Thai-Cambodian border	100 families	25%
- PKP (Aug 1979), Doc 2.4.01c	Urban community in Phnom Penh	1,075 individuals	42%
2. Sliwinski (1995)	Refugees in Thai camps, Phnom Penh & around	13,163 individuals	25%
3. Heuveline and Poch (2007)	Rural district, Kandal province	10,000 individuals	25%

Note: Kiernan as well reviewed a large number of results he obtained from interviewees and his own work in villages. These results are not included here as they were not surveys.

Kiernan is the only author that integrates the results produced in a number of different surveys and survivors recollections into his estimate of death toll under Khmer Rouge. The strength of his approach is that he does that on the basis of respondents' social and ethnic group; thus not by applying a single percentage obtained in one survey to the entire population of Cambodia in April 1975. He breaks down the April 1975 population into sub-populations, such as the NEW and BASE people, and within these groups into a number of sub-groups, i.e. Rural Khmer, Urban Khmer, Chinese, Vietnamese, Lao, Thai etc. Each of these sub-populations is assigned a different estimated

³⁵ May Ebihara, 1993: Anthropological survey of a Khmer village of 158 inhabitants in Cambodia (Kandal province, south of Phnom Penh). In: M. Ebihara, A Cambodian Village under the Khmer Rouge, in Kiernan, 1993: Genocide and Democracy in Cambodia, chpt. 2 (Quoted after Kiernan, p. 459)

Stephen Heder, 1981: A survey of 1,500 refugees on the Thai-Cambodian border in 1980-81 (field data on 15,000 individuals - members of respondents' immediate families). Specific source not available. (Quoted after Kiernan, p. 456)

Katuiti Honda, 1981: Two surveys in two Khmer villages (one of 168 people and one of 728 people). Journey to Cambodia: Investigation into Massacre by Pol Pot Regime. Tokyo, 1981. (Quoted after Kiernan, p. 459)

Ben Kiernan, 1980: A survey of 500 respondents of whom 100 interviewed in France in 1979 and 400 inside Cambodia in 1980. In: Ben Kiernan and Chanthou Buo, 1982: Peasants and Politics in Kampuchea, 1942-1981. London Zed Books.

Milton Osborn, 1980: A survey of 100 Khmers among the refugees in camps at the Thai-Cambodian border. In: M. Osborn, 1980: Pol Pot's Terrifying Legacy. FEER, 6 June 1982, pp.20-22. (Quoted after Kiernan, p. 456).

Marek Sliwinski, 1995: "Le genocide Khmer Rouge une analyse démographique", Editions L'Harmattan, 1995, 175 p.

Patrick Heuveline and Poch Bunnak, 2007: "The Phoenix Population: Demographic Crises and Rebound in Cambodia". Demography, Vol. 44, No. 2, p. 405-426.

percent of excess deaths which is further used in the extrapolation over the entire population. This makes Kiernan's approach truly remarkable.

If, however, one would like to base one's views exclusively on the surveys and neglect other sources, several of the surveys would appear too small and too insignificant to be taken seriously. The sample of 158, 168 or 350 individuals as in Ebihara (1993) and Honda (1981) can be considered a special case study and no more than that. Only three surveys seem to be large enough to accept them as serious representations of large groups of the Cambodia population that survived the Pol Pot reigns, i.e. Heder (1981), Sliwinski (1995) and Heuveline and Poch (2007). Yet even these three do not pretend to be representative of the entire population exposed to the risks of death under Khmer Rouge. And it is likely that the victims of the most fatal episodes of Khmer Rouge regime are underrepresented in all three surveys. Still all three studies are consistent in the estimated death toll of the Khmer Rouge regime; in the three surveyed populations of survivors the death toll is about 20 to 25 percent.

As we already noted, surveys like Heder's, Sliwinski's and Heuveline and Poch's are not that small and not that questionable. Sliwinski for example had drawn his sample from three different populations of survivors and in different periods of time (see Annex 3 for details and selected results on Khmer Rouge victims); all periods are not that distant from the fall of Khmer Rouge in January 1979. With the total number of the interviewed families being 1,296 and covering the fate of 13,163 individuals this survey is exceptional:

- It is relatively big, carefully prepared, preceded by a pilot, and selected from three different populations of survivors, at three different moments of time.
- Its representativeness of the entire country cannot be assessed but most certainly it can be seen as a broad and solid case study.
- Its scope is extensive; not only Khmer Rouge revolution is covered but as well the civil war of 1970-75; comparisons of the two are possible.
- It explores areas of victimization that are of the utmost interest to a court of law, such as causes of death, timing of casualties, targeting of ethnic and professional groups, and of urban versus rural populations etc.

The extrapolation of survey results is careful; a majority of the results are reported as percentages and can be applied to any population size. The author provides his best estimates of the Cambodia population in April 1975 and January 1979; thus obtaining absolute numbers is possible. Uncertainty of Sliwinski's population estimates is expressed by presenting two very different variants (H1 and H2) which however are quite convergent when it comes to the overall number of excess deaths during the Khmer Rouge period.

Another important example of a reliable sample survey that can be used for estimates of Khmer Rouge victims is the Mekong Island Population Laboratory (MIPopLab), a demographic surveillance system established recently by Heuveline and Poch (2007) in the Kandal province near Phnom Penh.

MIPopLab is an on-going demographic surveillance system launched in December 2000 in a rural district of Kandal province. The population of this district is about 10,000 persons and is questioned systematically once per year³⁶ regarding their basic demographics. A special module was designed in the MIPopLab survey to explore demographic consequences of Khmer Rouge regime, including excess mortality, disruptions in marriage formation and reproductive behavior. The module includes

³⁶ In the beginning they were questioned twice a year but at present only one time (personal communication of Ewa Tabeau with Patrick Heuveline and Poch Bunnak, 26 June 2009).

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births and marriage histories of all women aged 15 to 75 years (2,843 histories were obtained). Data on parental survivorship were collected from all respondents of the Kandal district. Using this data, several important results were obtained not only on excess mortality but as well on declines in fertility and marriage formation during Khmer Rouge period.

Heuveline notes that regarding demographics, Kandal district cannot be seen as representative of the entire Cambodia population and not as extreme. He places Kandal somewhere between the old and new people; likely closer to the Phnom Penh population than the areas populated by base people.

Major results for Khmer Rouge regime include for example:

- The proportion of excess deaths of Khmer Rouge regime in the population was about 25 percent
- Crude fertility rates (CFR) in 1976-1978 fell to about two-thirds of their pre-war levels
- CFRs rebound was immediate and striking in 1979-80; from 3.7 births per woman in 1976-78 to 7.1 births per woman in 1979-80³⁷
- Crude marriage rates (CMR) of females aged 15 to 34 years fell to 35% of their pre-war level during 1976-78
- CMRs rebounded as early as in 1979-80 and became 86% higher than the pre-war level, mainly thanks to a significant contribution of remarriages in this period
- The overall decline in fertility during Khmer Rouge was caused by a clear general drop in fertility of married women in reproductive ages and as well by the decline in marriage formation and high proportion of widowed women in the population (20% widows among the female survivors of Khmer Rouge).

The micro approach of MIPopLab is a worthwhile extension of earlier studies of Heuveline on Khmer Rouge victims. It broadens and deepens his analysis. Read together with the 1998 main article of Heuveline, this paper becomes an important refinement and confirmation of his earlier results.

Summing up, several sample surveys provided results consistent with those of Sliwinski (1995) and Heuveline and Poch (2007); thus corroborating their findings (Kiernan, 1996, 2003). It seems that the main issue in the context of sample surveys is again the estimated population size in April 1975 which is to be used in the extrapolation of survey statistics over the entire population of Cambodia.

Excess Deaths as a Residual Category

The next group of methods applied in international research on Khmer Rouge victims obtains excess deaths as a residual category between two projections, one forwards and backwards, that meet at the end of the 1970s. Heuveline (1998) and Neupert and Virak (2005) applied this method.

This method is a transparent well formulated modern quantitative approach which leads to reliable figures on excess and violent deaths in the 1970s and in 1975-79 in particular. A formal model is applied with well justified assumptions. The model represents the most up-to-date demographic standard in population projections. The level of subjectivism is relatively low compared with other authors. Both authors build up on the work of others but are critical and selective of their results. Neupert and Virak stop at presenting the overall number of excess deaths in 1970-79 (and its sex and age distribution). Heuveline goes further and separates violent and non-violent excess deaths from each other, and next subtracts civil war deaths from all 1970-79 excess deaths obtaining his estimate of Khmer Rouge victims.

³⁷ For the recent two decades Heuveline shows that TFRs for Kandal province remain consistently lower by about 21 to 23% than the national estimates.

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The separation of violent deaths and their distribution into pre-Khmer Rouge and Khmer Rouge period is certainly convincing in Heuveline's work. Interpretation of his results could be more focused on the most likely variant as his range of all possible values of the number of victims in 1970s is extremely unrealistically large.

Heuveline's estimates are not perfect, however, and need to be improved by:

- including births since 1970 and their mortality
- separation of victims of starvation in 1979 from the estimated excess in 1975-79
- narrowing down the estimated range of all possible victims in 1970s to make it more realistic.

Also Neupert and Virak's (2005) article is based on solid data sources and sound methodology. As a matter of fact, the population projection methodology is the same as that of Heuveline (1998). The resulting number of excess deaths in 1970s obtained by Neupert and Virak is, however, lower than that of Heuveline (2 mln vs. 2.5 mln in 1970-79, and 1.4 mln versus 2.2 in 1975-79).³⁸ The authors explain this difference as follows:

- smaller volume of net migration in Heuveline (1998)
- lower normal mortality for the 1970s in Heuveline (1998)
- the 1970 population was larger in Heuveline (1998); 7.662 mln in Heuveline (1998) and 7.4 mln in Neupert and Virak (2005)

In addition to the above, the 1980 population obtained from the backwards approach (6.803 mln by Neupert and Virak) is rather high compared with the 1980 population from the Cambodia administrative count (6.590, end-1980). Huguet (1997) had also run a backwards projection from the 1998 Census until 1980 and produced 6.550 mln population for mid-1980. Heuveline's projection for January 1980 was 6.437 mln. Thus, yet another factor behind the difference with Heuveline's number of excess deaths is his smaller 1980 population.

All in all, it seems Neupert and Virak produced a relatively low estimate of excess deaths (1.4 mln in 1975-78; 1.4 mln does not include the estimated 300,000 famine deaths in 1979 and not estimated 300,000 excess deaths in 1970-75), whereas Heuveline's estimate of 2.2 mln excess deaths in 1975-78 belongs to higher ones (the 2.2 becomes 1.9 mln if it does not include about 300,000 famine deaths in 1979 and not 300,000 during the civil war).³⁹

A number of similar explanations were provided in Neupert and Virak (2005) about differences with other studies (e.g. Banister and Johnson, 1993). The main source of these differences is seen in the estimated 1970 population and assumptions used by various authors.

The overall conclusion is that even best methods do not work by themselves; assumptions used for models play an important role. It is the *methods, assumptions and expertise* the authors have in the study subject that underlie the final outcomes. Still, well defined formal methods and explicitly and

³⁸ We obtained the number of 1.4 million from the original Neupert and Virak's estimate of 2 mln for 1970-79. We assumed 300,000 excess deaths for the civil war and another 300,000 for the 1979 famine deaths; in total 600,000 deaths, which we subtracted from 2 million. What remains out of 2 mln, is the death toll of Khmer Rouge April 1975-January 1979.

³⁹ Calculations discussed in this paragraph are all produced by the authors of this report. Some 300,000 excess deaths were assumed in these calculations for the civil war and another 300,000 for the 1979 famine deaths. Subtracting these two components from the excess deaths estimated for 1970-79 by Neupert and Virak and Heuveline makes it possible for us to directly compare these figures for exclusively 1975-78. Note that the same assumptions were used for both authors as this was the most straightforward way of comparing these two different numbers.

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deeply justified assumptions make it easier for the audience to understand and accept certain outcomes compared with outcomes that are simplistic and non-transparent.

Excess Deaths as Linked to Mass Grave Statistics

This method was applied by Etcheson (2000 and 2005). Excess deaths of Khmer Rouge, 1975-78, are composed in his approach of two parts:

- direct excess deaths seen as the number of human remains in the mass graves mapped so far
- indirect excess deaths, whose number remains about the same as the number of individuals in the mass graves.

The proportion between the two components (i.e. direct and indirect excess deaths) equals 50:50 and is assumed after Heuveline (1998). Other proportions available from literature (and based mainly on small sample estimations) are seen as not reliable enough to be used; these other proportions relate to narrower groups of the population.⁴⁰

It is unquestionable that the data from the DC-Cam mass grave mapping are an essential source on victims of the Khmer Rouge regime in Cambodia. Thus, using this data for an estimate of victims not only makes a lot of sense but is important and needs to be done. It is unquestionable that a vast majority of victims in the mass graves, if not all, are Khmer Rouge victims (violent or non-violent). The assumption that *all* victims found in the mass graves were killed in executions might be difficult to prove, however. One reason for this is that non-violent excess deaths were most certainly frequent during Khmer Rouge regime. It is unlikely that such deaths, if occurred in detention centers, were buried in locations other than the mass graves. Also some non-violent excess deaths from hospitals might be buried in the nearby mass graves. Another reason for this is that the usual burial practices were forbidden by Khmer Rouge and thus not commonly exercised during this period. Thus, some marginal numbers of "natural" deaths might be found in the mass graves too, especially in smaller graves located in a distance from detention and security centers. Despite of the fact some non-violent excess deaths were likely buried in the mass graves together with victims of executions and interrogations, all the victims in the mass graves cannot be considered natural deaths. The category of natural deaths must be seen completely marginal under Khmer Rouge as life circumstances the Khmer Rouge regime created for their population prevented natural death and forced unnatural death instead.

Another aspect of the massive death process during the Khmer Rouge period is that many bodies were abandoned and left on the surface exposed to the devastating and quickly progressing atmospheric influences in this region of the world; thus, a large number of bodies were never buried in mass graves but decomposed on the surface. Many other bodies were dropped into rivers, wells, single pits and whatever other (often small) places which were equally strongly exposed to the hot and humid natural environment as the unburied bodies. It is therefore highly probable that the mass grave victims identified today are just a sample of all excess deaths.

The identified graves should be thus seen as a "burial-place-sample" of all people that died as war victims during that time. Some 30 years after the end of the Khmer Rouge era the sample contains about 1.3 million remains as estimated from the current DC-Cam mass grave statistics. It is fully

⁴⁰ The fifty-fifty distribution of violent and non-violent excess deaths is likely a good compromise that is strongly supported by Heuveline's solid analysis of excess deaths for Cambodia using model life tables. In the conflict in Timor-Leste between 1974 and 1999, such distribution was 18% of the killed and missing persons to 82% of deaths from starvation and diseases (Silva and Ball, 2005). Disregarding how similar or dissimilar these two historical episodes are, it is perfectly possible that these two proportions can have extreme values. In such situations the fifty-fifty distribution ensures the lowest error.

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possible that the mass graves identified so far comprise about 50-60% of all buried and unburied individuals. It is likely that the bodies in the graves represent both executed and indirect Khmer Rouge victims; the proportion between them will vary between the different graves. In any case, it is a large and important sample and must be further studied for unfolding information about how many, how and when these persons died.

For the above reasons, we consider Etcheson's estimate of 2.2 million excess deaths fully possible and in line with the most serious attempts of estimating the excess deaths in Cambodia.

Excess Deaths as a Naïve Estimate from Nation-Wide Investigation

The *Renakse* methodology and its flaws are discussed in Section 2.2 of this report. The conclusion is that *Renakse* statistics cannot be trusted as they contain duplications and other shortcomings. At the same time, some areas are not covered as they were inaccessible to the *Renakse* committees. Therefore this estimate, although well intended, cannot be considered reliable enough to be taken into account.

Table 6 attached below gives a quantitative summary of our expert assessment of the sources, methodology, and transparency used in the international and local research on Khmer Rouge victims in Cambodia. For this summary we developed a scale (attached under Table 6) which allows for verbal expression of our scores. The maximum possible score is 40 per one estimation approach. None of the approaches used for Khmer Rouge victims obtained the maximum.

Table 6. Quantitative Assessment of Estimates of Khmer Rouge Victims Studied in This Report

Approach	Sources	Methods	Transparency	Convincing Power	Total Score
Demographic balancing equation	4	4	4	2	14
Population Scenarios	4	6	6	6	22
Extrapolation of Sample Surveys Results	5	7	8	8	28
Excess Deaths as a Residual Category	5	8	8	8	29
Excess Deaths as Linked to Mass Grave	5	7	8	8	28
Excess Deaths as a Naïve Estimate (Renakse)	4	4	4	2	14

Scale: 1-10

1. misleading 2. worthless 3. very bad 4. failed 5. average
6. satisfactory 7. good 8. very good 9. excellent 10. exceptional

According to Table 6 the most valuable studies are those that obtained excess deaths as a residual category of two separate projections. The authors of these studies include Heuveline (1998) and Neupert and Virak (2005). The second best are extrapolations based on sample surveys (Kiernan (1996), Sliwinski (1995), Heuveline and Poch (2007)), and on mass grave data (Etcheson (2000 and 2003)). The difference between the first and second scores is very small, practically insignificant.

The number of Khmer Rouge excess deaths estimated in these studies ranges from about 1.4 to 2.2 millions. Violent excess deaths equal from approximately 700,000 to 1.1 million.

3. EXCESS DEATHS AND RELATED ISSUES IN APRIL 1975 - JANUARY 1979: SUMMARY OF EXISTING RESULTS

3.1 Population of Cambodia, 1975-79

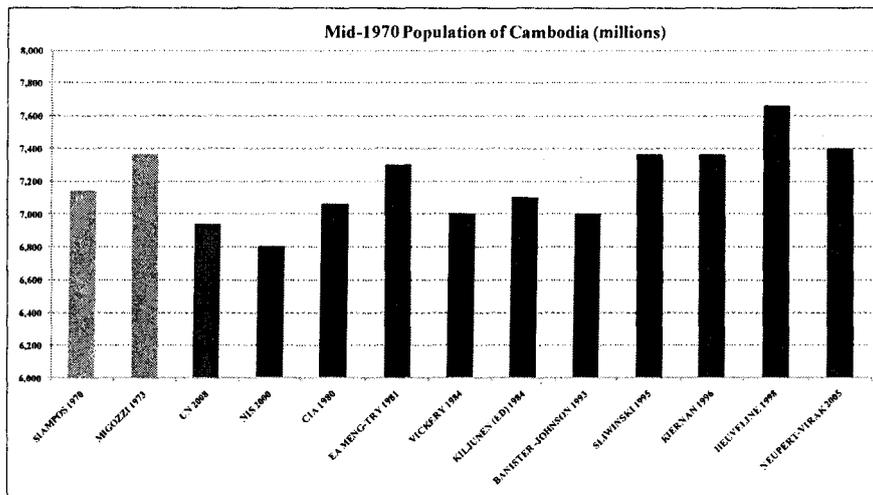
In this section we summarize our findings related to the population of Cambodia as estimated by various authors at mid-1970, April 1975 (or around), and January 1979 (or around). Any political

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estimates, i.e. estimates by the subsequent governments of Cambodia in 1970-1980, are excluded. In the lack of reliable population data, these estimates are likely to be biased by making them fit the political objectives of the governments. We include the estimates by the authors whose work is reviewed in this report on the first place. In addition to that, we as well discuss recent population estimates by NIS (Cambodia Statistical Yearbook of 2000; Annex 4) and UN (Population Prospects, 2008 edition; Annex 4). The choice of NIS and UN estimates was dictated by the need to provide a context for the estimates by our authors. However, both the NIS and UN should not be taken as the ultimate correct perspective. We will show that for the particular years 1970, 1975 and 1979 both these institutions produced unrealistically low estimates. Finally, also the pre-Khmer Rouge projections by Migozzi (1973) and Siampos (1970) are shown (for 1970 these are meaningful numbers; afterwards their projections become hypothetical and represent “what if no conflict” scenario).

Before we begin our analysis, we must stress that not all estimates are directly comparable; this is because some authors produced estimates for different moments around the required January 1979; for example, for end-1980 (NIS, 2000), start-1980 (Heuveline, 1998), mid-1980 (Neupert and Virak, 2005; UN, 2008), and May-1981 (Kiljunen ed., 1984) instead of January 1979. Secondly, NIS and UN produced their estimates as mid-year figures. Finally, Heuveline (1998) estimated “*de jure*” population (in January 1980) and not “*de facto*” living in Cambodia.⁴¹ For these reasons, our analysis must be seen as approximate. We made two variants of it, one for all available estimates and one by excluding the most incomparable figures. General findings remain, however, largely the same in both variants.

Figure 2. Population Estimates for Cambodia in (or around) Mid-1970 by Various Authors



Significant differences exist between the estimates of the Cambodia population for each of the three time points analyzed here. These differences are visualized in Figures 2 through 4 and Table 7. The UN and NIS estimates belong to the lowest projections for mid-1970 and April-1975 and to the

⁴¹ “*De jure*” represents the population that was recorded in the 1962 census in Cambodia but by 1980 they did not necessarily still had their place of residence in Cambodia. The first group of those not living in Cambodia in early 1980 were the refugees in Thailand; they were registered in the 1993 electoral rolls. Another group were those who left Cambodia after 1962 and did not return to be registered as voters in 1992. Thirdly, also those non-returnee immigrants who managed to register as 1993 voters needed to be counted (or estimated) too. All these were the requirements for the proper estimation of excess deaths in the 1970s as the residual category between two projections.

highest for January 1979. In the latter case this is partly because they both relate to the 1980 population (mid- and end-year respectively). UN figure for mid-1980 (6.748 mln) is almost identical with that of Neupert and Virak for the same period (6.8 mln). As we will see further in this section, in the latest 2008 edition of the UN Population Prospects, the UN estimates for the years 1980 and over became highly consistent with the latest second revised population projections of the Cambodian NIS; Ricardo Neupert made these projections for the NIS in 2005 (using the 1998 census and 2004 Cambodia Intercensal Population Survey).

Figure 3. Population Estimates for Cambodia in (or around) April-1975 by Various Authors

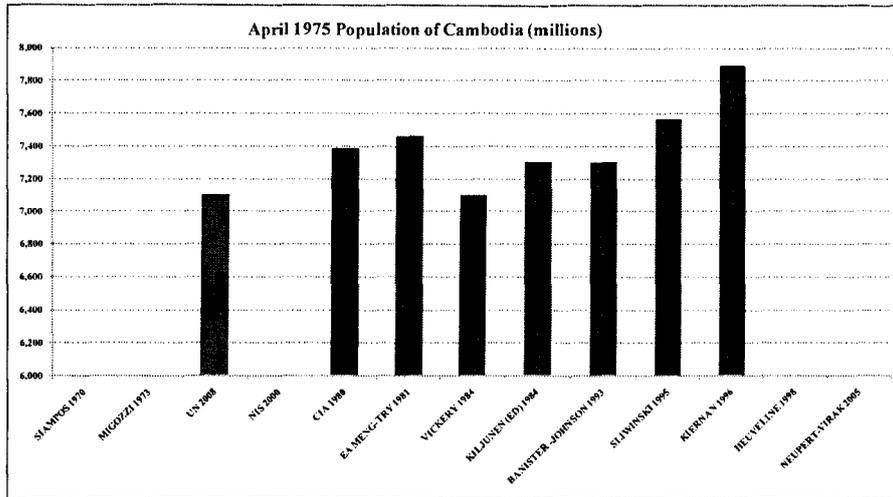
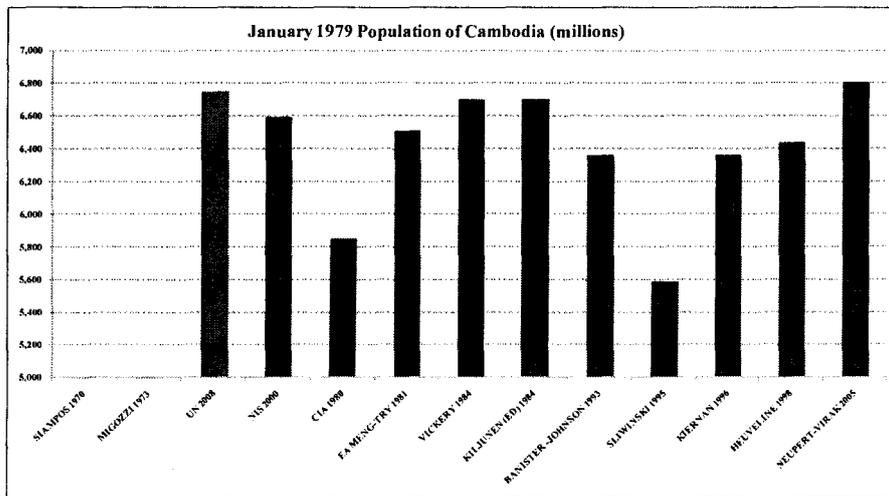


Figure 4. Population Estimates for Cambodia in (or around) January-1979 by Various Authors



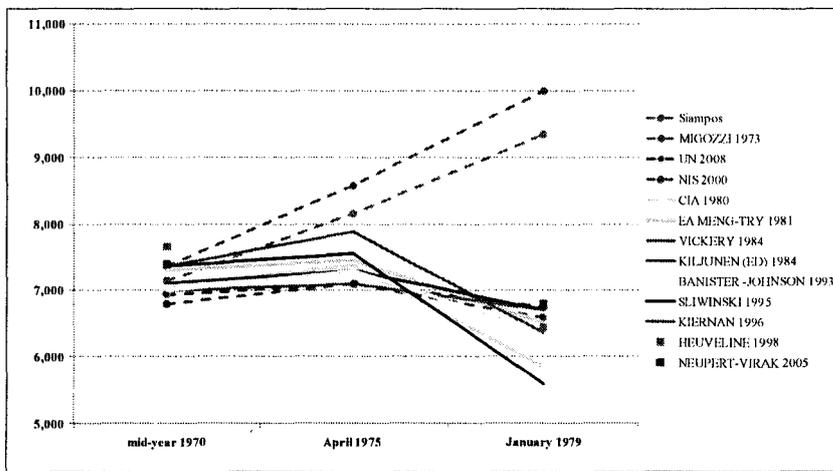
For 1970, the UN and NIS estimates (6.938 and 6.8 mln, respectively) are far lower than those by Migozzi and Siampos (7.363 and 7.143 mln), who were the leading analysts of the 1962 census in Cambodia for the period before the 1970s. It is likely that both the UN and NIS considerably underestimated the Cambodia population in 1970 (Figures 2 and 5a).

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Also the UN estimate for 1975 (7.098 mln; NIS has no estimate for this period), is the lowest of all reviewed here (Figures 3 and 5a). The situation changed with the UN and NIS projections for 1979 (actually mid-1980 in case of UN and the end-1980 administrative count in case of NIS). As shown in Figures 4 and 5a, both the UN and NIS do not go together with other estimates. The UN and NIS obviously set a new trend for the years 1980 and over; the trend is far more optimistic regarding the population size in Cambodia than most analysts believed it was (Figure 5b; for NIS 2000 reference figures and their sources see Annex 4). In Figure 5b the reference baseline for the figures from the 2008 edition of the UN Population Prospects are the rough estimates published by NIS in their Cambodia Statistical Yearbook for 2000. At the present time the prevailing official opinion on the Cambodia population is that it has been growing more quickly than anticipated around the 1998 census.

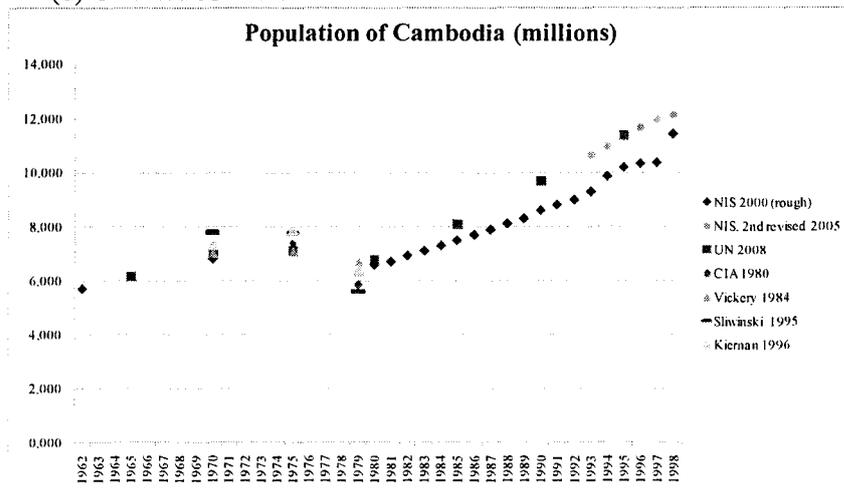
Figure 5. Projected Population Size in Cambodia in (or around) Mid-1970, April-1975 and January-1979 by Various Authors

(a) All Authors



Note: NIS 1975 approximated by UN 2008 estimate for 1975

(b) Selected Authors



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Notes: Sources for the NIS (2000) population figures:
 1962: general population census
 1980: administrative count end-year
 1981 to 1989 estimated with 2.8% annual growth rate
 1990-1993 estimated with 2.5% annual growth rate
 1994: SES93-94 and provincial reports
 1995: provincial reports
 1996: SES96 (DSC96 March 1996: 10,702)
 1997: CSES97
 1998: general population census March 1998

All in all, in the recent practice the UN and NIS were clearly conservative with regard to the population in 1970 and 1975 and projected too low sizes, and for the years 1980 and onwards they became "optimists" and estimated relatively high numbers of the population size. The change has much to do with the improved data sources available at present and more refined methodology that could be used for the latest NIS and UN projections. The result of this change is the incompatibility of these projections in long term, i.e. for the period from 1970 to 1998 and above.

Table 7. Estimated Population Size in Cambodia According to Various Sources, Mid-1970, April 1975 and January 1979 (or around)

CATEGORY	YEAR PUBLISHED	Population	Population	Population	ABS Deviation		ABS Deviation	ABS Deviation	Population*	ABS Deviation*
		mid-1970 (or around)	April 1975 (or around)	January 1979 (or around)	mid-1970	(or around)	April 1975 (or around)	January 1979 (or around)	January 1979 (or around)	January 1979 (or around)
SIAMPOS	1970	7.143	8.165	9.355	0.049		NA	NA	NA	NA
MIGOZZI	1973	7.363	8.581	10.007	0.171		NA	NA	NA	NA
UN	2008	6.938	7.098	6.748	0.254		0.289	0.327	6.748	0.327
NIS	2000	6.800	NA	6.590	0.392		NA	0.169	6.590	0.169
CIA	1980	7.060	7.384	5.845	0.132		0.003	0.576	5.845	0.576
EA MENG-TRY	1981	7.300	7.460	6.510	0.108		0.073	0.089	6.510	0.089
VICKERY	1984	7.000	7.100	6.700	0.192		0.287	0.279	6.700	0.279
KILJUNEN (ED)	1984	7.100	7.300	6.700	0.092		0.087	0.279	6.700	0.279
BANISTER -	1993	7.000	7.300	6.360	0.192		0.087	0.061	6.360	0.061
SLIWINSKI	1995	7.363	7.566	5.586	0.171		0.179	0.835	5.586	0.835
KIERNAN	1996, 2003	7.363	7.890	6.360	0.171		0.503	0.061	6.360	0.061
HEUVELINE	1998	7.662	NA	6.437	0.470		NA	0.016	6.437	0.016
NEUPERT-VIRAK	2005	7.400	NA	6.800	0.208		NA	0.379	6.800	0.379
AVERAGE		7.192	7.387	6.421	0.200		0.189	0.279	6.227	0.317
MAXIMUM		7.662	8.581	10.007	0.470		0.503	0.835	6.700	0.835
MINIMUM		6.800	7.098	5.586	0.049		0.003	0.016	5.586	0.061
DIFF (MAX-MIN)		0.862	1.483	4.421	0.422		0.500	0.820	1.114	0.774

Notes: The star (*) indicates results by excluding UN (2008), NIS (2000), Kiljunen ed. (1984), Heuveline (1998) and Neupert and Virak (2005).

Re: Pop Jan 1979 (or around): Excluded Authors:

UN (2008) mid-1980
 NIS (2000) end-1980
 Kiljunen (ed.) May 1981
 Heuveline (1998) start-1980, "de jure" population
 Neupert & Virak (2005) mid-1980, "de facto" population

Regarding the population size in the 1970s, Kiernan (1996) and Sliwinski (1995) proposed the most dramatic changes, and CIA (1980) estimated the second dramatic trends (Figure 5 and Table 7). Note that Sliwinski never used this projected population (April 1975 and January 1979) to produce his estimates of the death toll; nevertheless he presented these figures as the population framework for his survey, and as such we included them here as well. Kiernan's and Sliwinski's 1970 population was 7.363 mln (after Migozzi, 1973), that of CIA was 7.060 million. Their 1975 population was 7.890 and 7.566 mln; CIA had 7.384 mln for April 1975. Finally for January 1979 they anticipated 6.360 (Kiernan), 5.586 (Sliwinski), and 5.845 mln (CIA). It is interesting Kiernan estimated 1.671-1.855 mln excess deaths, Sliwinski about 1.869-1.888 mln and CIA about 1 mln (authors' estimate from CIA data; see Annex 3) as associated with these changes.

Vickery was at the other extreme; his predictions were the closest to the UN and NIS figures, i.e. Vickery predicted the least dramatic change between 1970 and 1979; from 7 to 7.1⁴² to 6.7 mln in

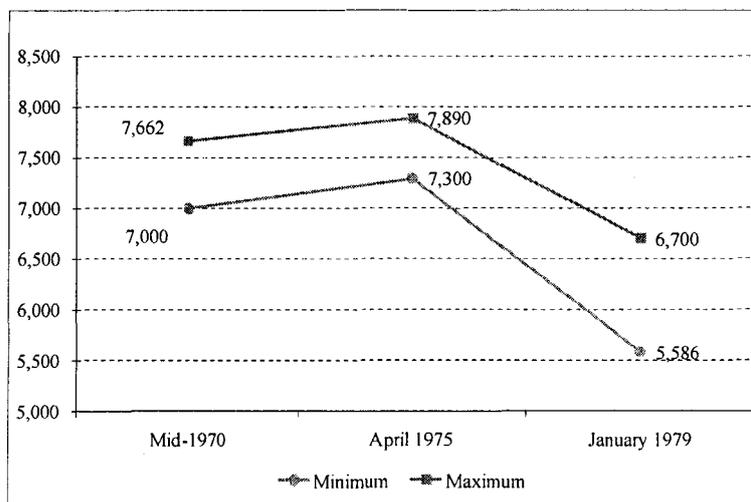
⁴² Vickery's figure for 1975 (7.1 mln) compares with that of CIA (7.3 mln) as Vickery excluded from his April 1975 population some 200,000 of Vietnamese repatriation to Vietnam in 1975.

mid-1970, April 1975 and January 1979, respectively. Vickery's estimate of excess deaths was only 740,000.

Further, Heuveline (1998) and Neupert and Virak (2005) estimated the 1970 population to be slightly higher than that of Kiernan and Sliwinski, and higher than the 1970 population according to Migozzi (1973) and Siampos (1970). Their 1980 population is close to that of UN and NIS. Summing up, Heuveline and Neupert and Virak estimated less dramatic changes in the population size between 1970 and 1980 than Kiernan and Sliwinski did. The results of the remaining authors can be placed somewhere in between the most and the least dramatic changes.

The fact that we are able to identify and understand the differences between the estimates of the various authors does not really help us to decide which of these estimates are better justified and thus more reliable than others. Most authors have a significant or even excellent expertise in the demographics of Cambodia; yet they did not present converging views on the development of the Cambodia population in the 1970s. Obviously, a high uncertainty is involved in describing the Cambodia demographics of the 1970s, and thus any point estimate of the population size in any of the three essential years would contain an error. Therefore, we decided to present intervals of the most commonly produced values for each of the three years. The source we give for the lower and upper ends of these intervals are the authors who were the first ones to produce a given value. It was often the case that other authors took these values, slightly modified them (or not), and used them in their analysis as well. The UN and NIS estimates are excluded altogether from our intervals as we believe these values have been adjusted to satisfy the objectives of UN and NIS. Also estimates by Heuveline (1998), Neupert and Virak (2005), and Kiljunen (ed.: 1984) are excluded from these intervals as these estimates are associated with 1980-1981 (start- and mid-1980, respectively; May-1981 in Kiljunen). When adjusted to January 1970, the figure of Heuveline would likely be around 6 million, and that of Neupert and Virak relatively higher.

Figure 6. Most Common Estimates of the Population Size in Cambodia, Mid-1970, April 1975 and January 1979. (In Thousands)



Mid-1970:

Minimum: 7 mln (Banister and Johnson, 1993; adapted from CIA, 1980)

Maximum: 7.662 mln (Heuveline, 1998)

Absolute Difference: 662,000

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April 1975:

Minimum: 7.3 mln (Banister and Johnson, 1993; adapted from CIA, 1980)

Maximum: 7.890 mln (Kiernan, 1996; based on multiple sources)

Absolute Difference: 590,000

January 1979:⁴³

Minimum: 5.586 mln (Sliwinski, 1995)

Maximum: 6.7 mln (Vickery; based on multiple sources)

Absolute Difference: 1,114,000

Noting that the most commonly estimated survey-based percentage of Khmer Rouge excess deaths in April 1975 population is 25 percent (comp. e.g. Sliwinski (1995), Heuveline and Poch (2007)), the absolute number of excess deaths in April 1975 to January 1979 would be roughly **from 1.825 to 1.950 mln**, when based on the above interval estimate of the April 1975 population of Cambodia.

3.2 Migration Patterns in Cambodia, 1975-79

The overall decline in the population size between 1975 and 1979 was because of two main factors: excess deaths (discussed in the next section) and negative net migration (i.e. outflow of the population into foreign countries, mainly Vietnam and Thailand). Table 8 below summarizes these outflows using information from three selected studies: Kiljunen (ed.; 1984), Ea Meng-Try (1987), and Banister and Johnson (1993). A particularly good discussion of migration issues is available from Banister and Johnson (1993), which we consider the main source for migration. Statistics of Kiljunen (ed.; 1984) and Ea Meng-Try (1987) are included for contextual purposes.

Table 8. Main Migration Streams in Cambodia, 1970-80: Selected Authors

Period	Estimate (1)	Type of Migration (1)	Estimate (2)	Type of Migration (2)	Estimate (3)	Type of Migration (3)
1970 to 1974	NA	Total outflow in 1970-74	200,000	Total outflow in 1970-74	349,000*	Total outflow in 1970-74
1970 to 1974	NA	Vietnamese expelled to Vietnam by Lon Nol government (1970)	200,000	Vietnamese expelled to Vietnam by Lon Nol government (1970)	200,000	Vietnamese expelled by Lon Nol government to Vietnam
					34,000	Refugees to Thailand (1971-74)
					120,000	Additional refugees to Vietnam
1975 to 1978	220,000	Total outflow in 1975-81	450,000	Total outflow in 1975-78	218,000	Total outflow in 1975-78
	150,000	Vietnamese repatriated to Vietnam by Khmer Rouge (1975-81)	200,000	Vietnamese repatriated to Vietnam by Khmer Rouge (1975)	NA	Vietnamese expelled by Lon Nol government to Vietnam by Khmer Rouge (1975)
	NA	Chinese and Khmers fled to Vietnam (1975-81)	200,000	Chinese and Khmers fled to Vietnam	150,000	Chinese and Khmers of Vietnamese origin fled to Vietnam
	50,000	Remaining outmigration (Thailand)	50,000	Remaining outmigration (Thailand)	34,039	Remaining outmigration (Thailand)
	20,000	Refugees to Laos (1975-81)	NA	Refugees to Laos	10,400	Refugees to Laos
					24,000	Other out-migration
1979-1981	630,000	Refugees to Thailand	NA*	Refugees to Thailand	(-) 172,380	Refugees to Thailand
1979	(+) 130,000	Returnees from Vietnam	(+) 100,000	Return of Chinese and Khmers from Vietnam	(+) 100,000	Return of Chinese and Khmers from Vietnam
1979	(+) 234,000	Returnees from Thailand	NA	Return from Thailand	NA	Return from Thailand
1979	(+) 20,000	Returnees from Laos	NA	Return from Laos	NA	Return from Laos
1980	NA	Immigrants from Vietnam (returnees and newcomers)	(+) 300,000 to 500,000	Immigrants from Vietnam (returnees and newcomers)	(+) 300,000 to 800,000	Immigrants from Vietnam (returnees and newcomers)
1975-1992	116,000	Moved to Third Countries*	190,000	Moved to Third Countries*	242,000	Moved to Third Countries*
before 1981:	116,000	Moved to Third Countries	before 1987: 190,000	Moved to Third Countries	before 1992: 242,000	Moved to Third Countries
before 1981:	116,000	Moved to Third Countries	before 1987: 190,000	Moved to Third Countries	before 1992: 242,000	Moved to Third Countries
Source:	Kiljunen ed. (1984)		Ea Meng-Try (1987)		Banister and Johnson (1993)	
		* Other than Thailand and Vietnam	* 1 mln estimated to move to Thai border		*5,000 Khmer communists returned around 1970	
			Another 0.5-0.6 mln towards Phnom Penh		They are excluded from 349,000 out-migration	

Migration streams in Cambodia in the 1970s must be divided into two main components: to and from Vietnam and to and from Thailand, and two main time periods: 1970-74 and 1975-78 (Table 8). Migration in 1979 and later years was related to other factors than those operating during 1970-78

⁴³ From this interval we excluded all estimates made for 1980 or 1981 instead of January 1979.

and resulting first from the civil war and later from the Khmer Rouge regime. Importantly, in 1970-78 it was the outflow of the Cambodia population into the main neighboring countries, i.e. Vietnam and Thailand, which took place. The out-migration contributed to the decline of the population size in this period.

For the entire period 1970-78, Banister and Johnson estimated a total of 567,000 individuals that left the country; Ea Meng-Try's estimate is higher and equals 650,000. Banister and Johnson saw the largest part of the outflow occurring during the civil war (349,000 out of 567,000) whereas Ea Meng-Try during the Khmer Rouge regime (450,000 out of 650,000). Both authors agree that the out-migration to Vietnam was the main component in the period of 1970-78, including 200,000 Vietnamese expelled to Vietnam by the Lon Nol government and another group of about 150,000-200,000 Chinese and Khmers of Vietnamese origin who left Cambodia to Vietnam after April 1975. The two studies disagree about another group of 200,000 Vietnamese that according to Ea Meng-Try were expelled by the Khmer Rouge forces after April 1975. In turn, Banister and Johnson argue that already during the Lon Nol rule most Vietnamese were expelled or left themselves; the rest of Vietnamese were persecuted by both governments and only a few of them survived until the end of 1978. Banister and Johnson assume therefore another 120,000 mostly Vietnamese residents of Cambodia who left to Vietnam in 1971-74. This disagreement is the main cause of difference in these two sets of statistics. Banister and Johnsons compiled exceptionally detailed and well documented study of migration in 1970 to 1993, and have been conservative and careful in their conclusions; we tend to accept their statistics rather than the statistics by others.

Banister and Johnson anticipated a total of 218,000 out-migration from Cambodia for the Khmer Rouge period. This total includes the above mentioned outflow of Chinese and Khmers of Vietnamese origin to Vietnam (150,000), outmigration to Thailand (34,039), and a small outflow of Cambodians to Laos (10,400). The latter returned to Cambodia by 1987.

The overall total of 218,000 is not dramatically high as Cambodia remained a closed country during the Khmer Rouge years 1975-78. There were not many successful migrants due to a strict system of internal check points of the Khmer Rouge army and all kinds of security concerns (e.g. mine fields) that made it impossible for the Cambodians to travel freely.

Many Cambodians wanted to leave their country to move to developed countries in Europe (mainly France) and North America (USA). It is hard to say how many achieved this goal already during the years 1975-78. Statistics available so far show that there were about 72,000 such persons until 1979 and another 44,000 in 1980-81 (a total of 116,000 in 1975-81; Table 8); their number increased to 190,000 by 1987 and to 242,000 by 1993. Note that all persons leaving to Western countries usually took Thailand as their initial destination. The statistics on those that moved to third countries (i.e. countries different than Thailand and Vietnam), should not be taken as new and additional to those presented in Table 8 as refugees to Thailand in 1975-78.

From Table 8 we also see that the actual migratory "boom" started after the fall of Khmer Rouge regime in the years 1979-81; and continued throughout the 1980s (which is not discussed in Table 8).⁴⁴ The years 1979-1981 were characterized by several types of movements. Most importantly a large internal movement took place towards the border with Thailand; Ea Meng-Try estimated this movement to be about 1 million, of which according to Banister and Johnsons at least 172,380 left Cambodia and became actual refugees in camps at the Thai border. Kiljunen (ed.) estimated this

⁴⁴ More about 1980s refugees from Cambodia can be found in Vickery (1987): "Refugee Politics: The Khmer Camp System in Thailand". Chapter in: D. A. Albin and M. Hood (1987): "The Cambodian Agony". M. E. Sharp, INC., Armoil, New York, etc., or Kiljunen (ed. 1984): "Refugees and Opposition Movements". Chapter 4.

group to be far larger (630,000). Another large group of the rural population moved towards Phnom Penh (500,000-600,000 according to Ea Meng-Try). Finally, and most strikingly a very high immigration took place from Vietnam. Banister and Johnson gave an interval of 300,000 to 800,000 persons as an estimate of this group (their most likely number is 500,000). It included Vietnamese soldiers and advisors and their families, Cambodian returnees (Vietnamese citizens of Cambodia, Chinese and Khmers) expelled or left in another way in 1970-78, and newcomers seeking economic, political or other opportunities in Cambodia.

3.3 Basic Statistics on Overall Excess, Violent and Indirect Deaths

This section summarizes the estimates of Khmer Rouge excess deaths obtained by the authors whose research is assessed in this report. Table 9 below is an excerpt from the more extensive summaries we made for each author separately. Individual summaries of all estimates are attached in Annex 3.

In order to present a clear pattern in the above estimates Figures 7 and 8 show their numerical values graphically. Note that presenting these pictures would not be possible without taking averages of certain interval estimates originally produced by several authors and without approximating those estimates that were not explicitly presented by the authors (such as the CIA (1980)). All these averages and approximations are ours. Our approximation of the CIA estimates is discussed in detail in Annex 3 together with the individual summary of the CIA report. In brief, we did it by first calculating the overall number of deaths in April 1975-January 1979 directly from the population data and death rates produced by CIA for the OLD and NEW people. There were about 1.753 mln such deaths. We assumed these were both natural deaths and indirect Khmer Rouge victims. We distributed these deaths fifty-fifty, applying thus the uniform distribution into natural deaths and indirect victims (0.876-0.876 mln). CIA estimated in their medium variant that there were 100,000 executions during Khmer Rouge regime. We added the executions on the top of indirect deaths (0.876 mln) and obtained the total of excess deaths being 0.976 million.⁴⁵

In our comparisons, we also had to adapt not only the CIA but some other of the original estimates, especially those produced as intervals instead of point estimates, or if more than one estimate was produced by the same author in the course of time, or estimates expressed in relative instead of absolute terms (as percentages). The approximations were necessary in order to address our findings in a clear and transparent way. We always took the simplest and most straightforward way of approximating, i.e. for intervals and multiple estimates by the same author, arithmetic averages were taken. For estimates expressed as percentages, we just applied them to the appropriate April 1975 population estimated by a given author. We also applied the fifty-fifty distribution to obtain the number of violent excess deaths if this number was not explicitly reported and the only number available was on the overall death toll.

⁴⁵ We assumed that each sub-period population estimated by CIA was given as start-period population. Alternatively this could have been the mid-period population. In this case, the estimate of all excess deaths obtained in our procedure would be 1,007,752 and of violent deaths 503,876 deaths (50% of the overall total of excess deaths).

~~CONFIDENTIAL~~Table 9. Summary of Estimates of Excess Deaths during Khmer Rouge Regime, April 1975 to January 1979. Various Authors (*see next page*)

Category	CIA 1980	EA MENG-TRY 1981	RENAKSE 1983	VICKERY 1984	KILJUNEN (ED.) 1984	BANISTER & JOHNSON 1993
Reported Excess Deaths	1.850 mln all deaths; 0.976 mln excess deaths*	1 mln	3.314 mln	740,000	1 mln	1.05 mln; 2/3 males and 1/3 females;
Reported Direct Excess Deaths	50,000 to 100,000	120,000	Not discussed	300,000	75,000 to 150,000	About 10% of men and 3% of women at young- to mid-age were killed
Time Period Covered	April 1975 to January 1979	April 1975 to December 1978	April 1975 to January 1979	April 1975 to January 1979	April 1975 to January 1978	April 1975 to January 1979
Causes of Death	Executions explicit; no other causes	Executions explicit; no other causes	Not generalized; often discussed	Executions explicit; no other causes	75,000 to 150,000 executions; no other causes	Not reported
Affected Ethnic Groups	No ethnicity available	No ethnicity available	Not generalized; often discussed	No ethnicity available	Not studied; perishing of Vietnamese and Chams assessed	Not in the reconstruction but discussed generally
Population Included in Estimate: mid-year 1970 (or around)	7.060 mln	7.3 mln	NA	7 mln	7.1 mln	7 mln
Population Included in Estimate: April 1975 (or around)	7.384 mln	7.460 mln	NA	7.1 mln	7.3 mln	7.3 mln
Population Included in Estimate: January 1979 (or around)	5.845 mln	6.510 mln	NA	6.7 mln	6.7 mln	6.36 mln
	<i>Note: Population Size: 1970: mid-year 1975: April 17th 1979: January 1st</i>	<i>Notes: Population Size: 1970: assumed as mid-year 1975: April 1979: end-year 1978</i>		<i>Notes: Population Size: 1970: mid-year (after CIA) 1975: April (Vickery's adjustment as CIA 7.3 mln - 0.2 mln repatriation to Vietnam) 1979: "early 1979" (6.7 is part of 6.5 to 6.7 mln; Vickery's own estimate)</i>	<i>Notes: Population Size: 1970: mid-year 1975: April 1979: May 1981 (administrative count)</i>	<i>Notes: Population Size: 1970: assumed as mid-year 1975: April 1979: end-year 1978</i>

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Category	SLIWINSKI 1995	KIERNAN 1996, 2003	HEUVELINE 1998	NEUPERT AND VIRAK 2005	ETCHESON 2005	HEUVELINE AND POCH 2007
Reported Excess Deaths	1.869 mln to 1.888 mln	1.671 mln to 1.855 mln	2.2 mln	1.4 mln	2.2 mln	1.5-2 mln
Reported Direct Excess Deaths	39.3 to 52.5% of all deaths	Not reported	1.1 mln	Not available	1.1 mln	50% (0.75-1 mln)
Time Period Covered	April 1975 to January 1979	April 1975 to January 1979	1975-1979 (whole years)	January 1975 to January 1980	April 1975 to January 1979	April 1975 to January 1979
Causes of Death	Murdered, Starved, Missing, War-Related, and Natural Causes	Not reported for the entire country	Direct and indirect causes distinguished	Not available	Violent and indirect deaths (fifty-fifty)	Violent and indirect deaths (fifty- fifty distribution)
Affected Ethnic Groups	Vietnamese, Chinese, Muslim Chams, Catholics	All main ethnic and religious groups discussed	Not distinguished	Not discussed	Not discussed	Not discussed
Affected Population Included in Estimate: mid-year 1970 (or around)	7.363 mln	7.363 mln	7.662 mln	7.4 mln	NA	Not presented in this paper
Affected Population Included in Estimate: April 1975 (or around)	7.566 mln	7.890 mln	Not reported	Not available	NA	Not presented in this paper
Affected Population Included in Estimate: January 1979 (or around)	5.586 mln	6.360 mln	6.437 mln	6.8 mln (around January 1980)	NA	Not presented in this paper

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Notes:

Category	SLIWINSKI 1995	KIERNAN 1996, 2003	HEUVELINE 1998	NEUPERT AND VIRAK 2005	ETCHESON 2005	HEUVELINE AND POCH 2007
	Notes: Excess deaths: 1.888 mln (7.768 mln -H1) or 1.869 mln (7.3 mln-H2) Direct Excess Deaths: Min of 39.3% of all deaths (i.e. murdered): more likely 52.5% (i.e. murdered and missing). Population Size: 1970: assumed mid-year of Migozzi (1973) 1975: 7.566 mln is April 1975 in his Table 1; but 7.768 mln (H1) or 7.3 mln (H2) in his analysis 1979: December 1978 in Table 1	Notes: Population Size: 1970: assumed mid- year (Migozzi, 1973) 1975: April 1975 (Kiernan's own) 1979: end-year 1978 (Banister and Johnson, 1993)	Notes: Excess Deaths: All Excess: 2.2 mln (most likely of possible 700,000 to 3.2 mln) Direct Excess: 1.1 mln (most likely of possible 600,000 to 2 mln) Population Size: Always on January 1st of a given year 1970: January 1970 1979: January 1980 1975: NA	Notes: 1.4 mln (out of 2 mln in 1970s); specifically 1.425 mln if 275,000 excess deaths in 1970-75 and 300,000 famine in 1979 Population Size: 1970: mid-year 1975: NA 1979: mid-year 1980		Notes: Target period: April 1975 to January 1979; survey statistics cover 1976-78 and 1979-80

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Figure 7. Excess Deaths Estimates during Khmer Rouge Regime, April 1975 to January 1979. Various Authors⁴⁶

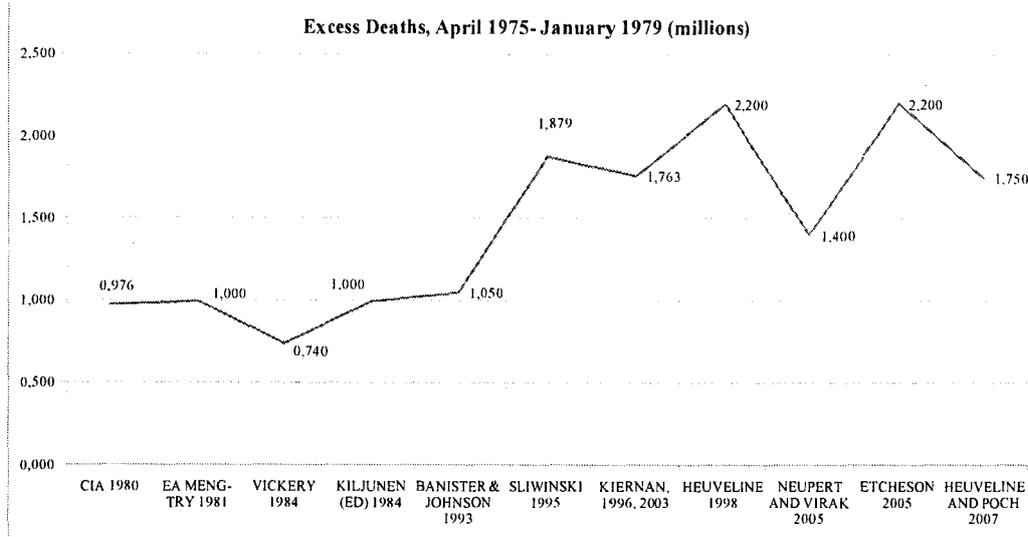
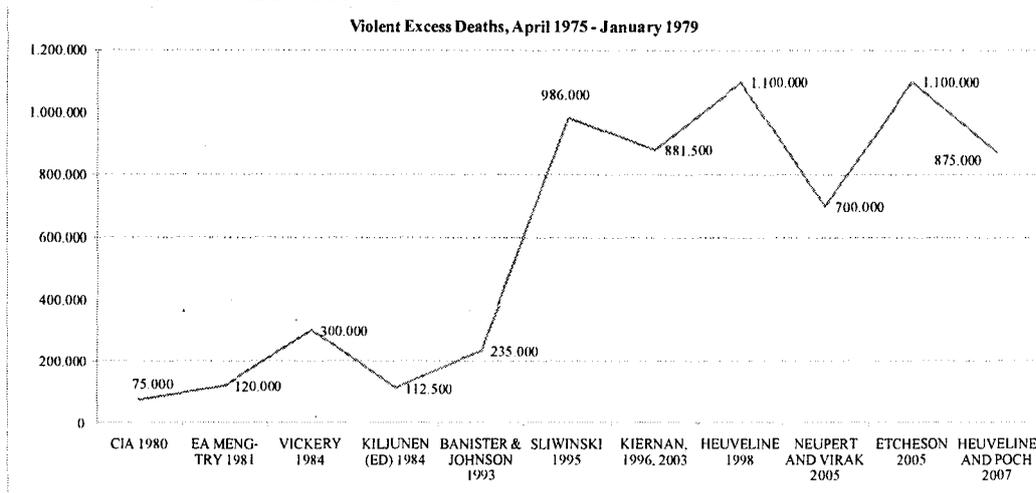


Figure 8. Violent Excess Deaths Estimates during Khmer Rouge Regime, April 1975 to January 1979. Various Authors



Notes: The following were the approximations used in the above chart:

Kiljunen (ed.): average of 75,000 to 150,000

Banister and Johnson: 10% men at 15-64 years of age and 3% women at 15-64 years in 7.3 mln in Apr 1975

(Migozzi gives 49.5% of 15-64 years old in 1970; Siampos gives fifty-fifty of men-to-women at these ages for 1962)

Sliwinski: average of 52.5% of all excess deaths (taken as an average of his 2 variants)

Kiernan: 50% of all excess deaths; 50% - subjective choice of ET

Neupert and Virak: 50% of all excess deaths - subjective choice of ET

Figure 7 shows that the early estimates of excess deaths (i.e. those published between 1980 and 1993 excluding *Renakse*), consistently approach the magic figure of 1 million, quite popular in the media and politics in the 1980s and early 1990s, except of that by Vickery (1984) which is 740,000 and is the lowest among all ever made. Later estimates, made between 1995 and the present time, are evidently higher than 1 mln and range from 1.4 (Neupert and Virak (2005)) to 2.2 million (Heuveline (1998) and Etcheson (2005)). Clearly there was a shift in the scientific thinking about excess deaths caused by the

⁴⁶ This and the following figures contain some approximations and averages of original estimates. All approximations were calculated by the authors of this report.

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Khmer Rouge regime sometime in the mid-1990s. Regarding the reasons for this shift, some could argue data situation improved in Cambodia in the years after the 1993 elections and a better understanding of the tragic decade became possible. Some others would, however, insist on a better political climate that influenced the more courageous analysis of the demographic consequences of the 1970s. Both mechanisms could have been at work; in addition to them several other factors could have played a role as well, including a new generation of talented modern researchers, and in particular quantitative demographers and population statisticians that engaged in studying the Cambodian tragedy of the 1970s. They brought in fresh methodological approaches and new experience in dealing with deficient data. All in all, contrary to the frequent adjustment of conflict statistics from relatively high to relatively low in other contemporary conflicts of the world, for Cambodia the adjustment had the opposite direction.

The prevailing views of today indicate that excess deaths of Khmer Rouge time in Cambodia were between **1.4 to 2.2 millions**. Notably all estimates from this range belong to those most advanced methodologically. Sample survey extrapolations, deaths as a residual between two projections and mass grave statistics are all covered in this interval.

Some would argue that uncertainty of excess deaths estimates is enormous, much higher than the interval 1.4 to 2.2 millions. And indeed Heuveline (1998) who provided the broadest assessment of uncertainty ever, produced an interval of 0.68 to 3.26 mln for possible excess deaths in 1975-79 (1979 included as a whole year).⁴⁷ This interval contains Vickery's extreme estimate of 740,000 excess deaths, not to mention the early estimate of 1 million. However, having produced this interval, Heuveline separates himself from it by saying:

- *"If pressed to provide my subjective assessment, the estimation range would be much narrower; I would venture 2.2 to 2.8 million in 1970-79 and 1.5 to 2 million in 1975-79 alone."* (Heuveline (1998), p. 60)

Further he explains the reasons of the uncertainty being so high:

- *"But these were the rules of the exercise that I set for myself: each parameter of the reconstruction included a priori all existing estimates in the range of values; the range was refined through a few basic internal consistency checks only; and my subjective evaluation was limited to assigning a central parameter value within the range. The estimation range for the residual number of excess deaths is therefore large (1.2 to 3.4 million (for 1970-79)⁴⁸), although it does suggest that some previous figures are less plausible than others."* (Heuveline (1998), p. 60)

All in all, in order to give as realistic assessment of uncertainty as possible we follow the logic of Heuveline's statements quoted above. Compared with Heuveline's subjective assessment of uncertainty (**1.5 to 2 mln**), the interval we identified based on our review of the recent estimates of Khmer Rouge excess deaths, is a bit broader. The interval of **1.4 to 2.2 million** is broader because of its lower end of 1.4 mln derived from Neupert and Virak (2005) and upper end of 2.2 mln by Heuveline

⁴⁷ The range of 0.68 to 3.26 for 1975-79 can be obtained from Heuveline's Table 3 (p. 60 of his 1998 article). The main principle of the calculation is that all indirect excess deaths shown in Table 3 for 1970-79 (0.08-1.12-1.126 mln) need to be associated with 1975-79 and *not* with the civil war of 1970-75. Heuveline confirmed that in personal communication with Ewa Tabeau on 27 June 2009 in Phnom Penh. The sum of indirect and direct excess deaths Heuveline estimated for 1975-79 is thus: 0.68-2.22-3.26 millions.

⁴⁸ The period of 1970-79 is added by the authors of this report.

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himself and by Etcheson (2005).⁴⁹ While in case of Heuveline's analysis it would be relatively easy to adjust down the upper end, which contains as well starvation deaths in 1979, to about 2 mln, we have no good reasons to make any adjustments to the lower end. Importantly, the number of 2.2 mln was proposed as well from mass grave statistics by Etcheson (2005). We therefore believe that an accurate description of uncertainty of the excess deaths estimates made so far is contained in the interval of **1.4 to 2.2 millions**.

Figure 8 visualizes estimates of direct excess deaths (i.e. executions or killings). The picture is striking. All early estimates (1980 to 1993) consistently show clearly low levels of killings and equal from about 75,000 to 235,000. Sliwinski (1995) was the first author who came up with a number of around 1 million. Heuveline (1998) confirmed this scale in his formal analysis (based on model life tables) of direct and indirect excess deaths producing 1.1 mln violent deaths in the 1975-79 period.⁵⁰ Also Etcheson (2005) strongly supports the finding that at least 1.1 mln deaths during Khmer Rouge regime were violent. As we showed earlier in this report the number of human remains in mass graves is even higher than 1.1 mln and equals 1.3 million according to current statistics. Summing up, it seems that early estimates heavily underestimated the scale of the actual killing by the Khmer Rouge. According to the latest results, the scale was about **1 million**, and belonged to a broader interval of **0.7 to 1.3 millions**.

3.4 Excess Deaths among Ethnic and Religious Groups

In the 1962 census, based on the criterion of nationality (or citizenship) about 93% of the Cambodia population was Khmer. There were only 4% Vietnamese (218,000), 3% Chinese (163,000), and negligible fractions of other nationalities. If instead of nationality, the mother language criterion is used, the 1962 numbers of Vietnamese and Chinese become 241,000 and 209,000, respectively (Migozzi (1973), p. 40-47; after Heuveline (1998); p.64). Banister and Johnson (1993; p. 97) further mentioned that in 1965 Sihanuk corrected the 1962 census statistics on Vietnamese and stated there were 400,000 Vietnamese in Cambodia at that time. Numbers of Chinese in Cambodia were revised in the 1960s too and ranged from 300,000 to 435,000. The population of Chams was estimated at 150,000 around 1965 and the populations of hill tribes at 90,000 (ibid, p. 97).

From the above discussion it is clear there was no consensus in Cambodia, and outside it, with respect to the size of ethnic minorities in the country at the outbreak of the tragic decade of the 1970s. An important reason for it, were the definitional problems in the 1962 census. The 1962 census did not include a separate open-ended question related to ethnicity, such that the respondents could identify themselves as Khmers or non-Khmers. Instead other questions were available, such as the nationality, mother language or religion. Based on these questions, separately or in combinations, several forms of ethnic identification of the population could be produced; each method resulting in a different picture of minorities in Cambodia at that time. Also historical data were affected by the same problem: as long as there has not been one the same question on ethnicity applied in all historical censuses, one cannot be sure that the historical data on ethnic groups show the actual development of these groups and not definitional inconsistencies. In the analysis of ethnicity in Cambodia, there is no point in going back

⁴⁹ The number of 1.4 million is actually our product based on Neupert and Virak's estimate of excess deaths in 1970-79. We obtained this number by subtracting an assumed 275,000 excess deaths in 1970-75 and about 300,000 famine deaths in 1979 from the 2 million excess deaths in 1970-79 produced by Neupert and Virak. If the same 300,000 famine deaths are subtracted from Heuveline's upper end of 2.2 millions, his upper number becomes 1.9 million.

⁵⁰ Heuveline's original number of violent deaths in 1975-79 was 1.1 million (medium variant); this number might cover a few famine deaths in 1979. (Comp. Heuveline (1998), p. 58).

hundreds of years and strictly stick to rather biased census figures; it is quite enough to start as Kiernan did with the mid-1950s data obtained in a military tally from 1955, which obviously was based on the self-identification of those counted. Thus, the common sense definition is all we can apply to quantify the death toll of ethnic groups under Khmer Rouge. There will be again large differences in the ethnic composition of Cambodia in April 1975 as provided by different authors; once again we will search for the best justifications of the available figures and for the best estimates of excess deaths within these justifications.

Table 10. Ethnic Groups in Cambodia and Their Death Tolls in April 1975 to January 1979

Ethnic Group	Census 1962	Census 1962 - Percent	Late 1960s - Revised	Late 1960s - Percent	Kiernan - April 1975	Perished by January 1979	Percent Perished
Vietnamese	218,000	3.8	400,000	5.7	20,000	20,000	100.0
Chinese	163,000	2.9	435,000	6.2	430,000	215,000	50.0
Cham	non-significant	na	150,000	2.1	250,000	90,000	36.0
Lao	non-significant	na	non-significant	na	10,000	4,000	40.0
Thai	non-significant	na	non-significant	na	20,000	8,000	40.0
Upland minorities	non-significant	na	90,000	1.3	60,000	9,000	15.0
Total Minorities	381,000	6.7	1,075,000	15.4	790,000	346,000	43.8
Khmers	5,301,000	93.0	5,920,000	84.6	7,100,000	1,325,000	18.7
Total Cambodia	5,700,000	99.7	6,995,000	100.0	7,890,000	1,671,000	21.2

Notes:

1962 Census: Ethnicity reported based on the nationality criterion; not mother language

Late 1960s: Chinese estimated at 300,000 to 435,000

Total Cambodia 1962: as reported in the 1962 census

Total Cambodia late 1960s: as projected by Migozzi for 1968

Kiernan: Three last columns are based on Kiernan (1996, 2008)

Note that the source for Kiernan's figures in Table 10 is his Table 4 (p. 458 in Kiernan, 2008).⁵¹

Vietnamese

The number of Vietnamese in Cambodia was consistently reported to be 400,000 or more around 1970 by several authors; judging from their figures on out-migration of the Vietnamese (comp. Table 10; and Section 3.2 in this report). Of those 400,000, some 200,000 were expelled by Lon Nol in 1970 and another 150,000-200,000 left Cambodia after the Khmer Rouge took power in April 1975. Many

⁵¹ Table 4, p. 458 (Kiernan, 2008):

Social Group	1975 Population	Number Perished	Percentage
NEW PEOPLE			
urban Khmer	2,000,000	500,000	25
rural Khmer	600,000	150,000	25
Chinese (all urban)	430,000	215,000	50
Vietnamese (urban)	10,000	10,000	100
Lao (rural)	10,000	4,000	40
Total New People	3,050,000	879,000	29
BASE PEOPLE			
rural Khmer	4,500,000	675,000	15
[Khmer Kron]*	5,000	2,000	40
Cham (all rural)	250,000	90,000	36
Vietnamese (rural)	10,000	10,000	100
Thai (rural)	20,000	8,000	40
upland minorities	60,000	9,000	15
Total Base People	4,840,000	792,000	16
Total Cambodia	7,890,000	1,671,000	21

Note: * not included in Cambodia total

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Vietnamese were killed according to Kiernan by Lon Nol and Khmer Rouge forces, such that hardly any of them survived until January 1979. Kiernan's figures of 20,000 Vietnamese still living in Cambodia around April 1975 are likely a good estimate; and so is his estimate that all 20,000 of them died from the hands of Khmer Rouge during the years from April 1975 to January 1979.

Also Banister and Johnson agree that most Vietnamese were expelled by Lon Nol forces in the early 1970s and the rest were killed or drove out from Cambodia during the Khmer Rouge regime (Banister and Johnson, 1993; p. 97). Sliwinski (1995; Figure 17, p. 77) claims that the percentage of Khmer Rouge excess deaths among the Vietnamese in his survey was 37.5 percent; at the same time he explains that this is an underestimate as Vietnamese community was largely outside of his survey, and thus underrepresented.

Chinese

CIA (1980) states that the Chinese community in Cambodia had 444,000 people in April 1975 and of those some 200,000 to 500,000 were repatriated to Vietnam. Later another 30,000 Chinese left to Vietnam as well. CIA report does not specify the number of Khmer Rouge excess deaths among the Chinese. Banister and Johnson (1993; p. 98) claim that many Chinese were killed by Khmer Rouge; they do not give any detailed figures either. Instead they support Kiernan's views that Chinese were "*badly abused*" under Khmer Rouge; they were targeted due to their urban entrepreneur background and suffered disproportionately more than other groups from the rigors of forced labor in the countryside due to the lack of any experience in agriculture. The Chinese language was banned exactly as the languages of all other ethnic groups; the cultural and ethnical identity of the Chinese community was meant to be destroyed as well. As Kiernan puts it: "the tragedy of the Cambodia's Chinese was not that they were singled out for special persecution by an anti-Chinese regime, but rather that a pro-Chinese regime subjected them to the same brutal treatment as the rest of the country's population" (Kiernan, 2008; p. 295). This treatment took a higher death toll among the Chinese than among other groups.

Sliwinski estimates that Chinese died unnatural deaths more frequently than the average of the entire Cambodia population (31.2% under H1); they died at 38.4 percent. According to Kiernan (2008), the respective fraction was 50 percent (comp. Table 10).⁵²

Chams

Kiernan estimates the Cambodia's population of Chams in April 1975 was 249,450 and that in January 1979 was 174,900 (including 11,700 Chams who fled abroad before January 1979).⁵³ The difference between these two, adjusting for the 1% natural growth between April 1995 and January 1979 (260,000 in January 1979), is about 85,000 victims. On the top of these 85,000 deaths Kiernan adds another 5,000 of Chams who in his calculation were assumed to die naturally but in fact most likely died prematurely due to harsh DK policies. That gives an overall total of about 90,000 Cham excess deaths during the DK rule. These victims comprise about 36% of the entire 1975 Cham population; a percentage that is considerably higher than for other groups.

⁵² Kiernan takes the size of Chinese population in Cambodia in April 1975 from W. Wilmott (1967): *The Chinese in Cambodia*. Vancouver: University of British Columbia Publication Centre (p. 16). The death toll of 50% Chinese comes from the work of S. Heder (1983) who conducted a survey among 1,500 respondents on the Cambodian-Thai border in 1980 and 1981, and collected data on the fate of 15,000 individuals.

⁵³ Comp. Kiernan, 2003: "The Demography of Genocide in Southeast Asia. The Death Tolls in Cambodia, 1975-79, and East Timor, 1975-80". *Critical Asian Studies* 35:4 (2003), p. 585-597.

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Kiernan's views are fully supported by Banister and Johnson (1993; p. 99). Also Sliwinski's results confirm that the Chams' excess deaths amounted to 40.6 percent of their population in April 1975 (Sliwinski, 1995; Figure 17, p. 77).

Kiernan's reasoning is based on the historical development of the Cham population in Cambodia. In his opinion, the 1995 tally of Cambodian males which counted 29,786 Cham men age 21 or older in this year is the first reliable number to be used. Based on the tally, the overall number of Chams in Cambodia in 1995 can be calculated as 152,126 persons. Using the annual growth rates of the entire Cambodia as estimated by Migozzi, Kiernan further obtains the 1970 Cham population to be 230,531 and the April 1975 Cham population as 249,450. He might be right if the 1955 tally was correct and indeed all Cham males were then counted.

Kiernan as well challenges both the lower and higher existing estimates of the Khmer Rouge death toll among the Chams, especially that of Vickery (1990) and that of Ysa (2003). In both cases, Kiernan proves the authors are wrong with respect to the initial population of Chams in Cambodia in April 1975; Vickery predicting too low a population and Ysa too high. Kiernan also proves they were wrong as well with regard to the January 1979 population; both authors anticipated too low a population in this case.⁵⁴

Kiernan's discussion of Ysa's figures is particularly interesting. Ysa claims there were 700,000 Chams in Cambodia in 1974 of which number only some 138,607 to 200,000 survived, resulting in a death toll of about 500,000 to 560,000 under Khmer Rouge. According to Kiernan Ysa's views are unsubstantiated, however, for these views are "*based entirely on retrospective claims advanced in 1999-2000 by interviewees asserting that in the early 1970s they had "seen statistics", or "heard announcements", or on the undocumented "memories of Cham leaders" .*" (Kiernan, p. 589). The death toll of this size would indeed exceed the entire population of Chams in April 1975.

We might accept Kiernan's opinions as the most convincing. However, these views are uncertain too. As Banister and Johnson put it in their 1993 article, in order to learn about the size of the 1970 and 1975 Cham population in Cambodia and their losses, a census would be required.

Summing up, Kiernan's research into the Khmer Rouge death toll of ethnic groups seems to be well founded and best justified, although obviously is uncertain too due to lack of reliable statistical sources on ethnic groups in Cambodia in the 1970s.

4. EXCESS DEATHS AND RELATED ISSUES DURING THE CIVIL WAR IN CAMBODIA, 1970-75: SUMMARY OF RESULTS

4.1 Basic Statistics on Excess Deaths 1970-75

Several authors of studies assessed in this reports discussed the issue of casualties during the civil war in Cambodia, July 1970 - April 1975.

The CIA research report of 1980 was one of the first ones to deal with this subject. They assumed about 600,000 to 700,000 war victims in addition to natural deaths from 1970 to April 75. (600,000 in the High and Medium scenarios and 700,000 in Low). They justified this decision as follows:

⁵⁴ Ibid, p. 588-589.

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"The assumed number of war related deaths (600,000 to 700,000) is debatable; US government sources put the figure unofficially at 600,000 to 700,000; authorities of Democratic Kampuchea say 600,000 to 800,000; Prince Sihanouk is quoted as saying 600,000. None of these estimates is well founded. However, by accepting 600,000 to 700,000 additional deaths, the death rate is about double the UN-estimated 18-per-1000 rate. From the rural Bangladesh study, it is seen that death rates rose by 40% in the civilian population after a war of only a few months; therefore, a doubling of the rates for a war of five years duration does not seem unreasonable." (CIA (1980), p. 8)

Kiljunen (ed.; 1984) too opted for 600,000 war victims (based on sources such as Democratic Kampuchea: 600,000-800,000; United States: 600,000-700,000; and Sihanuk: 600,000). Ea Meng-Try (1987) suggested 700,000 excess deaths and Hood and Albin (1987) an even wider range from 500,000 to 1,000,000. Unfortunately none of the above-mentioned authors performed any in-depth analysis of any concrete statistical source; they limited their discussion to reviewing opinions of others, mainly political agents involved in the 1970s internal and external affairs of Cambodia.

Banister and Johnson (1993) analyzed the demographic situation in Cambodia in 1970s using a high number of available statistical and other existing sources on this subject (censuses, published and unpublished research results, press reports, personal communications etc.). Their assessment of war-related deaths during the civil war is different and equals 275,000 victims. They concluded that:

"...the usual estimates of 600,000 to 800,000 excess deaths in the early 1970s are greatly exaggerated. These figures seem to refer to the total population shortfall from all causes – excess mortality, fewer births, and net emigration." (Banister and Johnson (1993), p 90)

Banister and Johnson estimated the following components of the overall population loss⁵⁵ during the Lon Nol regime:

- 275,000 excess deaths
- 70,000 fewer births
- 200,000 expelled to Vietnam
- 120,000 fled to Vietnam
- 34,000 fled to Thailand
- Total loss: 700,000 persons

Another author expressing similar views is Sliwinski (1995). In his opinion, it is hard to estimate the exact number of the civil war victims due to lack of reliable sources. He is aware of the political estimates ranging from 600,000 to 700,000 deaths, (7.7% to 9.6% of the Cambodian population in 1970). He believes, however, that these numbers are overestimated; in some cases in order to hide the magnitude of victimization during the Khmer Rouge regime.⁵⁶ Sliwinski used his questionnaire survey to estimate the birth and death rates during the civil war. Then, he decomposed them with respect to cause of death and time, in order to produce his own estimated number of war victims and show the basic distribution of this number. His starting point was the analysis of the population growth in

⁵⁵ Population loss was defined as a difference between two populations: "start-1975 expected" minus "start-1975 actual", that equaled 8.0 mln-7.3 mln = 700,000. (Banister and Johnson (1993), p. 87).

⁵⁶ Kiljunen Kimmo, Decade of the Genocide, London, Zed Books, 1984, p.5

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Cambodia between 1960 and 1974 as shown in Tables 11 and 12; the rates for 1970-74 are calculated based on Sliwinski's own questionnaire survey.⁵⁷

Table 11. Rates of Population Growth in Cambodia

Années	Taux d'accroissement %	Source
1960-65	2.9	empirique [75]
1965-68	2.8	hypothétique [76]
1970-74	2.7	" "
1970	1.47	empirique [77] " " " " " " " "
1971	1.93	
1972	1.14	
1973	0.19	
1974	1.09	
		M = 1.16

Sources: 1960-1965 – population census; 1965-1968 and 1970-1974 – Migozzi (1973); 1970, 1971, 1972, 1973, 1974 – Sliwinski's survey

Table 12. Evolution of Birth Rates in Cambodia, 1960-1974

Années	Taux des naissances %	Source
1960-65	4.68	taux empirique *
1965-68	4.58	" hypothétique *
1970-74	4.30	" "
1970	3.18	" empirique * " " " " " " " "
1971	3.24	
1972	2.88	
1973	2.48	
1974	2.65	
		M = 2.89

Sources as in the above Table XX

Table 13. Decomposition of Death Rates before and during the Civil War, 1970-75 (mortalité de guerre – war mortality)

Cause de mortalité	Période de paix 1960-65	Guerre civile 1970-74
Mortalité naturelle	1.27%	0.76%
Mortalité infantile	0.46%	0.58%
Mortalité de guerre	0.00%	0.52%
Total	1.73%	1.86%

The total death rate during the civil war was higher by 7.5% compared with the pre-war rate (1.86 versus 1.73 percent; Table 13). Based on this observation Sliwinski estimated that the war had increased the overall number of all deaths by about 50,000 individuals during the period 1970-1974.⁵⁸ However, taking into account the more detailed death rates obtained from the survey data, i.e. the increased infant death rate (0.58% versus 0.46%) and the explicitly reported death rate for war victims

⁵⁷ Tables 11 through 14 and Figure 9 are taken from Sliwinski (1995) where they are numbered Table 3 through 6 (p. 46-47) and Figure 6 (p. 43).

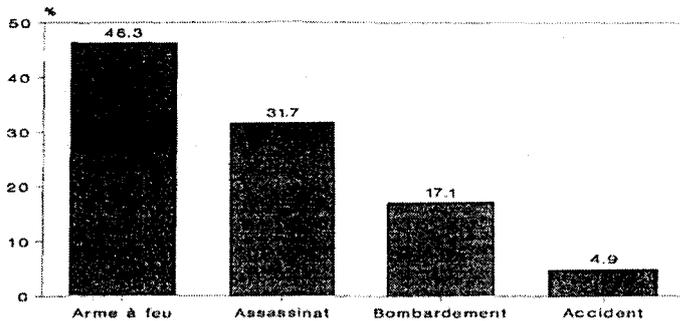
⁵⁸ This result can be reproduced by applying the deaths rates of 1.73 and 1.86 percent to the 1970 population of about 7,060 million, as assumed by the (unrevised) UN Population Prospects, and extrapolating this number over the five years 1970-74.

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(0.52%), Sliwinski estimated that altogether the civil war was a cause of death of about 0.64% of the population per year; i.e. of about 240,000 persons over the five-year civil war period.

It is worth noting, that at the outbreak of the civil war, there was a Vietnamese minority living in Cambodia, comprising of about 450,000 people in 1970. They did not participate in Sliwinski's questionnaire survey. In Sliwinski's opinion, this minority suffered most during the civil war as they were persecuted by Lon Nol government. According to Sliwinski, 310,000 of these people escaped to South Vietnam (forcibly and voluntarily). Assuming that a half of the rest were massacred (70,000) Sliwinski increased the estimate of civil war victims to **310 000** individuals.

Figure 9. Causes of Death of War Victims during the Civil War, 1970-1975.
(Arme a feu = by fire weapon; Assassinat = murdered manually)



According to Figure 9, the largest group of war victims died because of combat activates (46.3%; about 111,120 out of 240,000). The second largest group were people killed (31.7%; 76,080). Victims of American bombings were the third largest group (17.1%; in absolute terms about 41,040). Finally, the last group comprised victims of accidents (4.9%; 11,760 persons).

Table 14. Mortality Rates and Causes of Death in Cambodia during the Civil War, 1970-75
(guerre – related to war; famine – starvation)

Année	Taux de mort. †	Causes de mortalité ‡				Total
		Naturelle	Infantile [78]	Guerre	Famine [79]	
1970	1.67	53.3	33.5	6.6	6.6	100
1971	1.24	38.3	45.7	12.8	3.2	100
1972	1.72	37.3	30.2	20.9	11.6	100
1973	2.26	41.0	21.8	25.0	12.2	100
1974	1.52	34.5	30.2	26.9	8.4	100
70-74	1.68	41.0	31.1	19.0 + 27.9	8.9	100

Table 14 shows the timing of deaths during the civil war (Vietnamese excluded also from this table). Death rates of war victims were the highest in 1972 through 1974 and of famine in 1972 and 1973.

Our final remark comes from the work of Heuveline (1998) who, in order to get sense of magnitude of the Cambodian civil war victimization, referred to estimates of war casualties in the 1965-74 war in Vietnam:

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“Reviewing available estimates of these war casualties, Hirschman et al. (1995) found them to be in the range of one to three million for the 1965-74 period. Their own evaluation of these estimates leads them to opt for one of about one million. Barbieri et al. (1995, p. 635) select an estimate of 1.8 million deaths. Since the population of Vietnam was 31.6 million in 1960 compared with 5.7 million for Cambodia in 1962 (i.e. about six times larger), and the war lasted twice as long in Vietnam, if the war in Cambodia had the same intensity as the one in Vietnam, it would have accounted for about 150,000 deaths in Cambodia in the period 1970-75. To be sure, the conflicts on each side of the border were not directly comparable, but the order of magnitude in Vietnam is more consistent with estimates of the order of a few hundred thousand than of half a million or more.” (Heuveline (1998), p. 59)⁵⁹

Also Sharp (2008) discussed this issue in his review of four major estimates of Khmer Rouge victims. Using the war in Vietnam as an example, (and the ratio of civilian to military deaths from the war in Vietnam 1.45:1), he proposed 122,488 military and 177,512 civilian deaths for Cambodia 1970 - April 1975 as an example.⁶⁰ He further worked backwards from the military casualties and processed them (together with wounded soldiers that he assumed were in the 1:1 ratio with the dead soldiers) into the army sizes of both warring factions. According to some sources,⁶¹ the Khmer Rouge troops were estimated in 1973 to be about 200,000 men and Lon Nol army was around 290,000 soldiers (total of 490,000 men). Together with the military casualties estimated to be about 240,000 (dead and wounded jointly; both armies), the overall size of all fighters, including the new recruits that replaced the killed and wounded, would be 730,000 men and nearly one out of every three of them would be a victim. Sharp calls this “an incredibly high rate in comparison with other conflicts” (p. 20). Noteworthy, according to Sharp military attaches estimated the size of each army to be much smaller than the sizes he used in his calculations; only as 100,000 and 150,000 men.⁶² Thus, his numbers of approximately 122,500 killed soldiers and related 177,500 civilian deaths are unlikely and seem to be (too) high. Generally however he considers the interval of 150,000 to 300,000 as possible and 250,000 as the most likely number of war victims of the civil war (i.e. killed only).

For the above reasons, we accept the lower estimates of Banister and Johnson (1993), Sliwinski (1995), Heuveline (1998) and Sharp (2008), being 150,000 to 310,000 victims, above the likely politically motivated high estimates ranging from 600,000 to 800,000 excess deaths. Note as well the high estimates might cover both the killed and the wounded persons which had not been acknowledged in public discussion (comp. estimates of war victims discussed in the next section). The lower estimates are justified scientifically and secondly they are consistent with war victim numbers for the war in Vietnam.

⁵⁹ Hirschman, C., S. Preston, and M. L. Vu, 1995: Vietnamese Casualties during the American War: A New Estimate”. *Population and Development Review* 21 (4): 783-812.

Barbieri, M., J. Allman, B. S. Pham and M. T. Nguyen, 1995: La Situation Demographique du Viet Nam. *Population* 50 (3): 621-652.

⁶⁰ Bruce Sharp (2008): Counting Hell. (p. 20-21) <http://www.mekong.net/cambodia/deaths.htm>

⁶¹ *Ibid*, endnote 79: “Kiernan, in *Peasants and Politics in Kampuchea 1942-1981* suggests that the Khmer Rouge may have numbered 200,000 by 1973. He cites as his source 1973 hearings in the House of Representatives. (p. 219) Clodfelter's *Vietnam in Military Statistics* indicates that the Lon Nol army expanded from 40,000 to 100,000 in 1970. (p. 273) By late 1972, the on-paper strength of the Republic's forces was 223,000, but as many as 100,000 may have been non-existent “phantom” soldiers, and of the remainder, only about 80,000 were truly combat-ready. (p. 274) Late 1974 figures indicated 200,000 in the army, 11,000 in the Navy, an Air Force of 9,500, and another 150,000 paramilitary forces. Again, however, of these numbers, 80,000 or more were believed to be phantoms. (p. 277.) Clodfelter's figures also suggest that the Khmer Rouge forces were smaller than Kiernan indicates; he puts their 1972 strength at 35,000 (p. 274), and indicates 60,000 fighters in 175 battalions in 1975. (p. 277).”

⁶² *Ibid*, endnote 81: “Sampson, letter to *The Economist*, March 26, 1977”.

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4.2 Displaced Population and the Size of Phnom Penh during the Civil War, 1970-75

“Accurate statistics on the movement of refugees⁶³ in Cambodia during the civil war period are impossible to gather”. This statement is often seen in any document about numbers of refugees in Cambodia in the period of March 1970 to April 1975. The uncertainty around these numbers was particularly strongly addressed in the materials related to the April 16 1973 Hearing, lead by Senator Edward M. Kennedy, before the Subcommittee to Investigate Problems with Refugees and Escapees of the Committee on the Judiciary of the Unites States Senate, Ninety-third Congress, First Session, April 16 1973 (hereafter: “Subcommittee”).⁶⁴ These materials comprise three testimonies:⁶⁵

- Wells Klein (Subcommittee Study Mission to Cambodia - SSMC),
- Father Robert Charlebois (US Catholic Relief Services - CRS) and
- Robert H. Nooter (US Agency for International Development - USAID)

Attached with these testimonies are Appendixes, of which Appendix II contains two USAID “Official reports on the Cambodia refugee crisis”, one by Jeffrey Millington (February 10, 1972) and one by Donald Goodwin and D. Merrill, (September 2, 1972).⁶⁶

An early 1975 report on Cambodian refugees also exists and was requested by the same Subcommittee of the US Congress for the hearing at the Congress on 27 January 1975.⁶⁷ This report summarizes the issues around refugees in Cambodia in the period relatively close to the fall of Lon Nol government in early 1975. Also this report stresses the uncertainty around the numbers of refugees in Cambodia in this period.⁶⁸

⁶³ The term “refugee” is used here as defined in the GAO report of May 3, 1972 (GAO stands for the US Government Accountability Office; know as well under the name of the General Accounting Office): “Refugees and war victims” are all “those Cambodians who have fled their homes in Communist-controlled territory or who have been displaced or are war victims as a result of combat activity in that country”. Comp. p.64 in: Donald Goodwin and D. Merrill (USAID/Washington), 2 September 1972: U.S. Assistance to Refugees and Civilian War Victims in Cambodia. Report attached in Appendix II (II) to the April 16, 1973 testimony of Hon. Robert H. Nooter, Assistant Administrator for Supporting Assistance in the Agency for International Development, USA (USAID), before the Subcommittee to Investigate Problems with Refugees and Escapees of the Committee on the Judiciary of the Unites States Senate. Ninety-third Congress, First Session, April 16 1973. Available from the Internet:

<http://virtual.clemson.edu/caah/history/FacultyPages/EdMoise/congref.html>

⁶⁴ <http://virtual.clemson.edu/caah/history/FacultyPages/EdMoise/congref.html>

⁶⁵ Wells Klein, member of the Subcommittee Study Mission to Cambodia (SSMC) and executive director, American Council for Nationalities Service (ACNS), New York.

Father Robert Charlebois, regional director for Southeast Asia and the Pacific, Catholic Relief Services (CRS), New York.
Hon. Robert H. Nooter, Assistant Administrator for Supporting Assistance in the Agency for International Development, USA (USAID).

⁶⁶ Jeffrey Millington, (USAID Mission, Phnom Penh), February 10, 1972: Refugees in the Khmer Republic.

Donald Goodwin and D. Merrill, (USAID/Washington), September 2, 1972: U.S. Assistance to Refugees and Civilian War Victims in Cambodia.

⁶⁷ January 27, 1975: “Humanitarian problems in South Vietnam and Cambodia: Two Years after the Cease-Fire”. A Study Mission Report prepared for the use of the Subcommittee to Investigate Problems with Refugees and Escapees of the Committee on the Judiciary of the Unites States Senate. Ninety-Fourth Congress, First Session, January 27, 1975.

<http://virtual.clemson.edu/caah/history/FacultyPages/EdMoise/congref.html>

⁶⁸ The Subcommittee Study Mission report of January 27 1975 assessed civilian war victims as well, being both wounded and killed persons (p. 35):

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Statistics presented in these reports/testimonies were obtained by USAID officials at the request of the US Congress using all available sources that were limited to predominantly observations made during USAID missions to Cambodia in 1972-73, interviews with refugees in and outside camps, rough statistics provided by American personnel stationed in Cambodia (mainly US Embassy), even more approximate and incomplete statistics provided by the government of Khmer Republic, internal USAID sources etc. None of the reports/testimonies presented to the US Congress had a scientific foundation, a survey, or was based on reliable statistical counts of refugees, for such sources do not exist. Thus, that USAID reports from 1972, 1973 and 1975 are the best we have with regard to the population displacement in Cambodia during the Lon Nol reign, yet all this is far from perfect or reliable.

The above-mentioned reports are among the few available altogether, which provide some numbers at all. The numbers, highly questionable and approximate, were nevertheless presented in a political debate in the US Congress about the humanitarian crisis in Cambodia. As such these numbers must be suspect of political biases. In the absence of anything better, we have to discuss the statistics produced for the US Congress; obviously, we will do that with the necessary caution.

To begin with, it is useful to summarize a few basic observations about refugees in Cambodia at that time. These observations have a relatively good foundation as they come from interviews from the actual refugees.⁶⁹

A majority of refugees were farmers before the war; they used to plant rice. After two years of war, around late 1972-early 1973, most of them wanted to return to their pre-war places of residence; the fraction of those willing to return was lower among the refugees in Phnom Penh (60 to 65%) and higher among the refugees in other towns (80-90%). Reasons they gave for their displacement included:

- to escape the intensifying war, fighting and bombings
- fleeing in advance of Vietnamese troops (South or North)
- to escape territories controlled by the communists, i.e. to escape communist oppression, indoctrination and incarceration
- in hope to secure food

The refugees originally moved from rural areas to the nearest district or provincial capital, where they were able to move in with relatives and at the same to stay close to their own land; they hoped after all for a speedy return. As the war continued, the security, food, health, and employment situation

Thus, the available statistics on civilian war casualties are grossly incomplete, particularly prior to 1973. The only statistics the Khmer government has available are those on survivors who have applied for government assistance. On this basis, as of mid-1973, government reports indicate that at least 29,000 civilians had been wounded and 12,661 killed because of the fighting. However, USAID reports that last year the Ministry of Public Health estimated that the number of civilian war casualties averaged at about the rate of 7,000 per month, or 84,000 dead and wounded over the year. Unofficial estimates, however, place the toll close to 100,000, and the cumulative number of civilian war casualties since the war began is well over 450,000—an inexact but probably more realistic figure.

Striking is the discrepancy between the Khmer Republic registered (41,661) and USAID "estimated" figures (450,000). The USAID statistics clearly support the high victimization rates and thus are as required for the lobbying to help the Cambodian society; at the same time the USAID rates remain completely unjustified.

Note that in his April 16 1973 testimony in the US Congress, Klein gave the overall GKH number of registered war victims (killed and wounded) to be 41,750 since 1970. He as well referred to the unofficial estimates of killed and wounded to be "on the order of 300,000" on both sides. (p.10)

⁶⁹ See Millington (1972)

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deteriorated, which was a push factor to many refugees to proceed their journey from provinces to the capital city of Phnom Penh. Already in December 1972, over half of refugees in Khmer Republic were in Phnom Penh. Most refugees in Khmer Republic lived with relatives, and thus not in camps. It was common for two to even five families to live in one house, in obviously extremely crowded environment and poor sanitary conditions. Besides the refugees who stayed with relative, another group built their own "houses" and lived in shanty-towns, surrounding at kilometers long the cities like Phnom Penh. The last group of refugees lived in camps, at the end of 1972 at estimated about 10,000 people lived in camps, mainly women, children and the elderly who were unable to support themselves. In late-1972-early 1973 many refugees still worked, mostly as day-laborers or cyclo-drivers, or another unskilled labor; after all they were farmers and had little or no schooling or other training. Still the fathers and older sons were able to make their daily living which was just enough to cover the daily expenses of the family. It was not very common that women worked as much as men.

In the course of time, the war grew even more intense and more widespread; American bombings intensified as well until they ceased by mid-1973. The flow of refugees into Phnom Penh continued therefore "undisturbed" until the final breakdown of the Lon Nol regime in April 1975.

The latest available pre-April 1975 figures on refugees of the Lon Nol Khmer Republic are from around December 1974; these figures are summarized in the January 27 1975 report of the Subcommittee Study Mission to Cambodia as follows (p.31):

Accurate statistics on the movement of refugees in Cambodia are impossible to gather. The American Embassy conservatively reports that there are currently some 1,240,000 officially registered refugees in the less than 15 percent to 20 percent land area now controlled by the Khmer Government. According to the Embassy, the refugees represent well over 25 percent of the total population under government control.

Other estimates, including those of the Subcommittee Study Mission, indicate that the cumulative total of refugees is considerably higher. Table 12, indicates the cumulative total of refugees in Cambodia since 1970.

TABLE 12.—Cumulative total of refugees in Cambodia (as of December 1974)

1. Officially registered refugees:	
Phnom Penh.....	502, 047
Provinces	678, 413
Laos, Vietnam, Thailand.....	58, 590
Subtotal.....	1, 239, 050
2. Estimated nonregistered refugees.....	500, 000
3. Ethnic Vietnamese forced to flee to South Vietnam in 1970-71.....	250, 000
4. Military dependents displaced.....	400, 000
Subtotal.....	2, 389, 050
6. Estimated 35 percent of total population of Cambodia is outside government areas, half being displaced.....	1, 000, 000
Total.....	3, 389, 050

The above statistics are generally consistent with the earlier ones of the same source, i.e. statistics given in the April 16 1973 testimony of Wells Klein, a member of the Subcommittee Study Mission to Cambodia (p. 4; see the next overview of statistics below). The main difference between the December 1974 and April 1973 statistics is in the number of registered refugees that more than doubled by end-1974. The early 1973 USAID figures were the following:

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Table 1. Refugees/Displaced Persons in Cambodia

Officially registered refugees.....	507, 500
Estimated nonregistered.....	500, 000
Ethnic Vietnamese forced to flee to South Vietnam.....	250, 000
Military dependents displaced.....	500, 000
Total in government areas.....	1, 957, 500
Thirty-five percent of total population is outside of Government areas and an estimated half of these have been displaced.....	1, 000, 000
Total.....	2, 957, 500

Klein comments on these statistics as stated below (p. 4):

Cambodia has a population of some 6.5 million people. Over the past 3 years, in a cumulative sense, some 2.5 to 3 million people have been, or are now, refugees or persons displaced by the war. This estimate includes some 507,500 persons presently officially registered as refugees and another estimated 500,000 unregistered refugees. In Svay Rieng there were 24,188 registered refugees as of February. At the time of my visit 3 weeks ago the province chief and the American Embassy official responsible for refugee matters estimated the refugee population of Svay Rieng at around 100,000 persons.

In addition to the 1 million current refugees, one must count some 500,000 military dependents who have been forced to move by the fortunes of war, and some 250,000 ethnic Vietnamese who were repatriated or forced to flee to South Vietnam.

Finally, there are some 2 million people under the control of the Khmer Rouge or other antigovernment forces. No refugees or displaced persons statistics are available for this population. However, it is known that the other side has dealt harshly with the civilian population under its control and that extensive forced movement of population has taken place for political and military purposes. This, combined with the resumption of bombing by strategic and tactical aircraft suggests that at least half of the population under nongovernment control must be classified as refugees or displaced persons. The total is seen in table 1.

Obviously, the numbers produced for the US Senate are no more than guesses; calling these numbers educated guesses would be perhaps too much. The above-mentioned USAID 1973 statistics are in contrast with the (early) 1973 statistics produced by the government of Khmer Republic (GKR):⁷⁰

a. <i>Phnom Penh</i> , registered refugees:		
In the camps, 858 families, 3,702 people.		
Outside of the camps, 47,815 families, 286,060 people.		
b. <i>In the Provinces</i> , registered refugees:		
	<i>Families</i>	<i>People</i>
Kandal.....	2, 544	15, 706
Cudong M. Chey.....	5, 172	17, 939
Vihhear Suor.....	497	2, 307
Kompong Cham.....	5, 557	29, 373
Prey Veng.....	1, 041	5, 715
Svay Rieng.....	5, 532	24, 186
Kampot.....	786	4, 710
Takeo.....	4, 475	18, 610
Prey Kabass.....	448	2, 322
Tram Khnor.....	1, 427	6, 751
Koh Kong.....	230	1, 395
Kompong Speu.....	2, 821	13, 532
Kompong Som.....	1, 189	6, 706
Battambang.....	3, 605	16, 972
Pursat.....	1, 635	8, 308
Kompong Chhnang.....	901	5, 287
Kompong Tralach.....	65	284
Sangkum M. Chey.....	163	822
Siemreap.....	3, 101	14, 088
Kompong Thom.....	2, 904	9, 801
Preah Vihhear.....	6	38
Odar M. Chey.....	153	821
Total in the Provinces—44,252 families, 205,671 people.		
c. There are also an estimated 200,000 refugees who have not yet registered.		

⁷⁰ Jeffrey Millington, (USAID Mission, Phnom Penh), February 10, 1972: Refugees in the Khmer Republic (p. 58).

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The early 1973 GKR total of both registered and unregistered refugees is 695,433 persons versus the total of 2,957,500 in the USAID estimates for the same period. (GKR is about 24% of the USAID estimate). On the other hand at the end of 1974, the USAID was convinced there were about 3.4 million refugees in Cambodia (including the Cambodians that fled to South Vietnam) as opposed to the (estimated) tiny 800,000 refugees possibly reported by the GKR. (800,000 is our guess obtained as 24% of the USAID number for December 1974).

The government of Khmer Republic did rush to register and monitor their refugees; they did openly admit for the first time that they had a refugee problem in Cambodia only on August 10, 1972, when they submitted a formal appeal to the US and other governments for assistance to refugees and war victims.⁷¹ Refugee statistics as of August 20, 1972 show 699,875 refugees (registered and unregistered; see below); a number not very different from the early 1973 total (695,433) and not from the estimated 800,000 we guessed for December 1974. Despite that several government agencies were tasked by the government of Khmer Republic with programs meant to provide assistance to refugees and their families (i.e. Directorate for War Victims, Ministry of Labor and Social Action, Ministry of Community Development, Ministry of Health, Ministry of Public Works), even the simple task of registering the refugees could not be accurately completed.

Figure 1. *Numbers of Refugees*¹

(Source: Directorate of Refugees and War Victims.)

1. In camps in Phnom Penh.....	2, 137
2. Registered, out of camps, in Phnom Penh.....	² 269, 642
3. Refugees, registered, in provinces.....	228, 096
Total registered.....	499, 875
Estimate of unregistered refugees in Phnom Penh.....	³ 200, 000
Estimate of refugees in Cambodia as of August 20, 1972.....	699, 875

¹ For detail, see appendix.

² Most registered refugees are believed to be living with relatives and friends rather than being squatters.

³ Most of the squatters are believed to be included in this figure.

Obviously, these statistics are not fully adequate. We recommend that high priority be given to filling the vacant position of demography and statistics expert on the UNDP staff, as part of the program recommended in this report. If the position cannot be filled soon, short-term assistance for the UNDP should be obtained either from UNDP or AID staff.

Summing up, there are many uncertainties around the refugee statistics during the civil war period in Cambodia. These uncertainties prevent us from drawing any conclusions or recommendations. What we hoped for was that refugee statistics would shed some light on the size of the population of Phnom Penh. This issue was not really explicitly discussed in the US Congress, except for one time:⁷²

If one accepts this definition, it is possible to use the approach of the April UNDP Report to gain an estimate of refugees in Phnom Penh. The population of Phnom Penh was about 800,000 before the war. The 250,000 Vietnamese nationals left during 1970. The population as of April 1972 is estimated conservatively at 1.1 million to 1.2 million, although other estimates have ranged as high as 1.5 to 2.0 million. Therefore, not allowing for normal urbanization, but accepting a 1.1 to 1.2 million population, a conservative estimate would be that 550,000 to 650,000 people had come to Phnom Penh because of the war by April of 1972.

⁷¹ April 16, 1973 testimony of Robert Nooter, p.32; and Donald Goodwin and D. Merrill, (USAID/Washington), September 2, 1972: U.S. Assistance to Refugees and Civilian War Victims in Cambodia, p. 63.

⁷² Donald Goodwin and D. Merrill, (USAID/Washington), September 2, 1972: U.S. Assistance to Refugees and Civilian War Victims in Cambodia (p. 64).

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After April 1972, the movement of the rural population towards Phnom Penh continued and perhaps even accelerated. It is possible that the size of Phnom Penh increased even up to 3 millions. No scientific proof can be presented for this possibility other than some voices of experienced researchers investigating the tragic decade of the 1970s and the population of Phnom Penh in April 1975 as part of it:

- Ea Meng-Try (1981): 3 mln
- Kiljunen (ed.; 1984): 3 mln
- Banister and Johnson (1993): 1.5 to 2.6 mln
- Sliwinski (1995): 2.5 to 3 mln
- Kiernan (1996): 1.8 mln (in February 1975)

Banister and Johnson (1993; p.107) discussed the size of Phnom Penh in a broader context of urbanization of Cambodia since the 1962 census. Around 1967 the urban population of Cambodia was about 880,000 (13% of the overall population), compared to 590,000 (10%) in 1962. The warfare and bombings caused a large movement of Cambodia rural population towards the cities, and in particular Phnom Penh. In the first half of the 1970s:

"...an additional two million urban in-migrants were added to the one million former urban residents, totaling three million or over forty percent of Cambodia population of April 1975. Phnom Penh population alone reportedly reached 1.5-2.6 million by then". (Banister and Johnson (1993), p. 107)⁷³

All in all, the April 1975 Phnom Penh population was likely somewhere between 1.5 and 2.6 million, and possibly even up to 3 millions.

5. FINAL ASSESSMENT OF MAJOR ESTIMATES ON EXCESS DEATHS AND POPULATION IN THE 1970S

The main purpose of this report is to give clear guidelines with regard to the most reliable estimates of excess deaths under the Khmer Rouge regime from April 1975 to January 1979. The studies reviewed in this report were not limited to those recently made. We have reviewed here all the most significant estimates available in the literature since January 1979, i.e. since the fall of Khmer Rouge regime.

The intervals we identified so far for the population sizes and the death toll give relatively broad ranges of values. In this section we narrow them down. Moreover, until now we have studied the population size and victim estimates separately. In this section we integrate them and study them jointly. We also give some additional justification in relation to why certain estimates are plausible and certain other must be rejected as implausible. We concentrate on victims of Khmer Rouge as we believe we have discussed the victims of civil war thoroughly and there is little that could be added to the previous discussion.

In this section we frequently make reference to another independent review of estimates of Khmer Rouge excess deaths available from a recent article by Sharp (2008). Sharp only assessed five sources of the estimates of Khmer Rouge victims; Vickery (1984), Kiernan (1996), Heuveline (1998), Etcheson (2000), and Renakse (1983). These sources he believes are representative of the existing opinions on

⁷³ The following were the references used for the population of Phnom Penh: Phnom Penh Domestic Service, 1990: "Project to Expand Phnom Penh Housing Reported." (In Cambodian). *Foreign Broadcast Information Service Daily Report*, No. FBIS-EAS-90-158, Aug 15, 1990: 50-51; Ponchaud, 1977: 40; UNICEF, 1990: 9-11.

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the subject. Our review is broader than that; we included all major estimates produced since the fall of Khmer Rouge (i.e. 12 sources, of which five overlap between our and Sharp's reviews). By referring to his work, we cross-reference ours and his findings in an attempt to obtain the most up-to-date and reliable victim statistics.

5.1 Death Toll, Civil War 1970 to April 1975

Sharp (2008) made several useful observations with regard to the scale of victimization of the Khmer Rouge regime as compared with that of the civil war. He noted that:

- Substantial anecdotal evidence suggests the civil war death toll is lower than what is commonly believed (i.e. than 500,000-600,000 deaths). In particular, in the many memoirs written by Cambodians in the aftermath of the Khmer Rouge regime it is hard to find firsthand accounts of civil war deaths, as opposed to countless examples of excess deaths during the Pol Pot reign.⁷⁴
- Authors of these memoirs are most certainly a selected group; they are well-educated urban elite ("new people"), so one may claim their stories are not representative of the situation in the entire country. However, in addition to their stories, similar evidence also exists from sample surveys that confirms that the scale of victimization in the first and second half of the 1970s were incomparable; the victimization during the Khmer Rouge period being several times higher than that during the civil war.⁷⁵
- A significant bulk of this additional evidence comprises sample surveys, such as those of Ebihara (1993), Heder (1981) and Sliwinski (1995). All these surveys confirm that mortality rates were several times higher during Khmer Rouge regime than during the civil war. Based on these surveys Sharp claims (after Heder) the death toll of Khmer Rouge might be roughly seven times higher than that of civil war.⁷⁶
- Further, some deaths are not immediately recognized by respondents as war-related, especially the indirect war deaths; so these deaths are likely underreported.
- Some deaths could have been clustered (such as deaths from bombing or during Khmer Rouge purges in the East and South zones). Whole families were then killed and no one left to report these deaths during post-war surveys and other interviews with survivors. The residents of the areas close to the border with Vietnam suffered most during both historical episodes; in these areas the clustering was likely. This affected estimates of victims in both periods, and therefore should not bias the comparison of scale in each period.
- Finally, according to Sharp, the 1970s press failed to report victims of bombings. Looking for reasons of this fact, Sharp mentioned that the front lines during the civil war in Cambodia were more predictable than in Vietnam which made it possible for the population to evacuate before the battles took place.⁷⁷
- The latter observation is confirmed by the extraordinary scale of internal migration from villages to towns and cities during the Lon Nol period which too suggests that people tried to escape affected territories and find safety.

The above reasoning is convincing and supports our findings on civil war victims discussed in Section 4. With regard to the victims of the civil war in 1970-1975, we accepted the lower estimates of Banister and Johnson (1993), Sliwinski (1995), Heuveline (1998) and Sharp (2008), **150,000 to 310,000**

⁷⁴ Bruce Sharp (2008), p. 18 and endnotes 64 through 69.

⁷⁵ *Ibid*, p. 18

⁷⁶ *Ibid*, p. 18-19

⁷⁷ *Ibid*, p. 20

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victims, above the likely politically motivated high estimates ranging from 600,000 to 800,000 excess deaths. We agree with Sharp, the most likely number of civil war victims is **250,000** deaths.

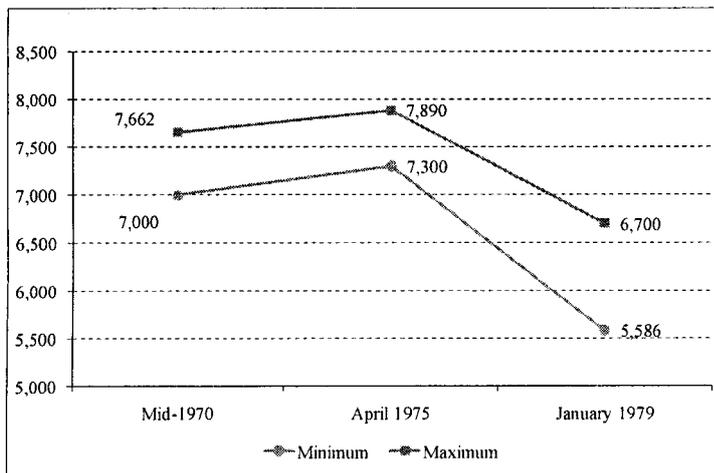
5.2 Population in April 1975 and January 1979

In the previous parts of this report we identified the range of the most frequently produced estimates of the population size in Cambodia (comp. Figure 6 - reproduced below).

However, Figure 6 does not include some important estimates as they were available on too distant moments from January 1980. Most importantly, Heuveline (1998) and Neupert and Virak (2005) are excluded from Figure 6; also NIS (2000), UN (2008) and Kiljunen (ed.; 1984) are not included, but these three are rather insignificant. There is a need to re-consider Figure 6 by incorporating additional information from other sources.

Sharp (2008) made strong recommendations about which population estimates are likely to be the best. For April 1975 population he postulated Kiernan's estimate of **7.894 mln** as the central value. In order to obtain the lower end population for April 1975, he corrected Kiernan's figure down by 50,000 to take into account the difference between Kiernan and Vickery in the estimated number of ethnic Vietnamese repatriated to Vietnam in 1975 (150,000 in Kiernan's versus 200,000 in Vickery's version). Thus, as the lower end April 1975 population he suggests is **7,844 million**. As the upper end, he proposes Heuveline's estimate of 7.952 mln corrected up by 50,000 because of the difference in Heuveline's and his own estimate of civil war victims (300,000 in Heuveline's version versus 250,000 according to Sharp). On the top of this, he added an extra 100,000 to account for any other factors (such as for example out-migration during the civil war which was lower in some studies than in other). The upper end equals thus **8.102 mln** (7.952 mln + 50,000 +100,000).

Figure 6. Most Common Estimates of Population Size in Cambodia, Mid-1970, April 1975 and January 1979. (In Millions)



The final outcome on the projected most likely April 1975 population of Cambodia is the **interval 7.844 to 8.102 mln, with the central value of 7.894 million**. We fully support this conclusion as it is in line with the latest results in the area of population projections in Cambodia, i.e. projections which were based on reliable data and modern scientific methods.

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For the January 1979 (or end-1978) population, Sharp took as the upper end the figure produced by Banister and Johnson, i.e. 6.36 mln,⁷⁸ slightly corrected up by 58,000 (out-migration to Thailand, Laos and remaining to Vietnam) to account for differences in out-migration estimates between Banister and Johnson and other authors. The upper end became **6.418 mln** (6.36 mln + 58,000). As we remember, Banister and Johnson produced their figure of 6.36 mln from the end-1980 administrative count of the Cambodia population.⁷⁹ For the lower end population of December 1978 Sharp assumed **6 million**. The central value was decided to be **6.209 mln** (Sharp claims this value is close to 6.219 mln, i.e. Kiernan's most likely figure for January 1979 population). No particular justification was given other than that these values fit the general picture of the population change.

All in all, according to Sharp the population of Cambodia estimated at the end of Khmer Rouge regime is contained in **the interval of 6 to 6.418 mln, with the central value of 6.209 million.**

Compared with the estimates of the Cambodia population identified in Figure 6, which as we remember are those most commonly produced by the authors, the above intervals are:

- considerably narrower
- for April 1975 population, concentrated around the maximum variant in Figure 6, i.e. **7.894 mln** which is Kiernan's most likely estimate
- for January 1979, concentrated around **6.209 mln** (again a value close to Kiernan's most likely estimate of 6.219 mln), which is located somewhere between the minimum and maximum variants from Figure 6.

The above-mentioned two sizes (7.894 mln and 6.209 mln) should be kept in mind as the most likely estimates of the population of Cambodia on these two moments of time. Most authors whose estimated population is reviewed in this report and shown in Table 7 of this report do not fall within the range around 7.894 mln, full interval being 7.844 to 8.102 mln, estimated as most likely for April 1975. As a matter of fact, only a few authors such as Kiernan (1996), Heuveline (1998), and Neupert and Virak (2005) fall within this range. For the two latter men, this conclusion is implied from the population estimates they produced for 1970 and 1980.

⁷⁸ Banister and Johnson (1993) worked with the end-1980 administrative count of Cambodia population that was 6.89 million (comp. p.84). The count comprised only the population living in Cambodia, and it excluded the refugees. Based on the 1980 count, Banister and Johnson estimated the mid-1980 population in Cambodia to be 6.5 million (p. 85) and end-1978 population to be 6.36 million (p. 90). As we said, out-migration was excluded. In order to make this figure comparable with estimates by Kiernan, some 58,000 refugees to Thailand, Laos and remaining to Vietnam had to be included according to Sharp; the main component of out-migration was the same in Kiernan's and Banister and Johnson's studies (150,000 to Vietnam). According to Table 8 from this report, instead of 58,000, about 68,000 migrants should be added. We leave Sharp's number (58,000) unchanged, however, as the difference is insignificant. Ea Meng-Try (1987) suggested this component was about 50,000 (comp. Table 8).

⁷⁹ Sharp justifies his choice by the following reasoning (comp. P. 21): "As difficult as it is to determine the 1975 population, it is even more difficult to accurately estimate the 1979 population. Bannister and Johnson cite an administrative count, compiled by the PRK in 1980, and estimate the population at that point to have been 6,589,954. (83) However, they note Ea Meng-Try's contention that "local and provincial officials had financial reasons to exaggerate the numbers of people in their jurisdictions." (84) Kiernan suggests that the population in January 1979 was somewhere between 6 and 6.7 million, and his own calculations of the death rates would suggest a figure of 6.219 million. Other sources, however, suggest that the number of survivors may have been lower. A 1990 UNICEF publication, charting population trends in Cambodia, cites statistics from the PRK's Ministries of Health and Agriculture indicating a 1981 population, inside Cambodia, of 6,684,000. (85) The UNICEF analysis also cites an estimate of 6.7 million for 1980; (86) as this is higher than the 1981 figure, it seems likely that this included some 300,000 refugees along the Thai border. (87) These figures are probably derived from the same survey cited by Bannister and Johnson, and Vickery."

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Note as well that Sliwinski is included in our discussion of population figures using his results from Table 1 in his book, which merely served as a context for his survey. He did not use these figures in producing his estimates of the overall total of excess deaths under Khmer Rouge. For this, in addition to his direct survey results, he used two hypotheses H1 with 7.768 mln population in April 1975 and H2 with 7.3 mln population in April 1975. The H1 seems to have practically passed the challenges of this review; in H1 the Phnom Penh population was estimated to be 2.5 mln in April 1975 (3 mln in H2).

Further, the above mentioned most likely figures on the population of Cambodia in April 1975 did not also exclude Etcheson's estimate of excess deaths under Khmer Rouge regime. Etcheson did not work with any population figures but used DC-Cam exhumation records as his source. Finally, also *Renakse* outcomes remain unaffected by our findings regarding the most likely population figures in April 1975.

Regarding the January 1979 population, the estimates of the authors identified so far as valid from the viewpoint of April 1975 population, also fall within the interval of 6 to 6.418 million of the most likely size at that time. Note again that Sliwinski, Etcheson and *Renakse* remain unaffected by any interval, for Heuveline and Neupert and Virak their implied figures are used, and Kiernan's figure is obviously contained within the interval.⁸⁰

5.3 Death Toll, April 1975 to January 1979

In this report we have shown that the prevailing contemporary views indicate estimated excess deaths of Khmer Rouge regime in Cambodia to be between **1.4 to 2.2 millions**. All estimates from this range (Sliwinski (1995), Kiernan (1996), Heuveline (1998), Heuveline and Poch (2007), Neupert and Virak (2005), Etcheson (2005)), belong to the most advanced methodologically. Sample survey extrapolations, deaths as a residual between two projections and mass grave statistics are all covered in this interval.

Sharp (2008) used his best population figures to produce yet another estimate of death toll under Khmer Rouge, 2.18 million with lower and upper ends being 1.747 to 2.495.⁸¹ This estimate pushes

⁸⁰ According to Sharp (2008), who based his statement on personal communication with Heuveline, the surviving population at the fall of Khmer Rouge regime was just under 6 million (p. 26).

⁸¹ Sharp (2008) obtained his estimate by using the general population loss equation. In this approach the expected January 1979 population is central which he obtained by applying the expected natural growth rate during the Khmer Rouge years to his April 1975 population. Excess deaths were thus excluded from the expected population. He obtained excess deaths by subtracting the actual January 1979 population from the expected population in the same period. Detail of the estimation of his expected population were the following (comp. p. 25):

- "Assuming a normal growth rate of 3%, and a normal crude death rate of 19 per thousand, the normal crude birth rate would have been approximately 49 per thousand. Heuveline and Poch estimated a 34% decrease in total fertility; and over a relatively short period of time, a decrease in fertility would have been accompanied by an approximately equal decline in the crude birth rate. (101) This would mean that the crude birth rate would have been around 32 births per thousand, which in turn would mean that the annual growth rate (crude births per thousand, minus crude deaths per thousand) would have been around 1.3%. A starting population of 8.002 million, compounded by an annual growth rate of 1.3%, would have meant an expected population of roughly **8.39 million in 1979**. (102) I would regard this as the "most likely" figure for the expected population. Given the imprecision of the data, it is probably more reasonable to specify a plausible range, rather than a single figure. The high end of the range, assuming these same growth rates, but with a starting population of 8.102 million, would yield an expected 1979 population of **8.495 million**. The low end of the plausible range, meanwhile, would be fairly close to Kiernan's estimate of an expected 1979 population of 8.215 million. On the assumption that Vickery's higher estimate of the numbers exiled to Vietnam might be correct, we could lower this figure by about 50,000, yielding an expected population of **8.165 million** for 1979." (bold by ET).

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towards higher values of the death toll. It is based on consistent population figures for 1975 and 1979. It does help to narrow down the interval we identified 1.4 to 2.2 millions. Notably, only one estimate from our interval is outside Sharp's range, i.e. 1.4 mln by Neupert and Virak (2005). This confirms that 1.4 mln is too low to fit the lasted views of death toll and must be skipped. Also the upper end by Sharp has little justification. Therefore the new interval could be **1.747 to 2.2 million deaths**. Within this group Sliwinski (1995), Kiernan (1996), Heuveline (1998), Heuveline and Poch (2007), and Etcheson (2005) produced their major estimates (Table 15). To be, however, on the safe ground, we believe that it is rather Kiernan's initial estimate of 1.6 mln excess deaths that should be taken as the lower end for the final range of death toll under Khmer Rouge, which becomes: **1.6 to 2.2 million**. The 1.6 mln is the result of assuming most conservatively that the overall death toll reflects about 21 % of the lowest most likely population projected for April 1975 (7.844 mln).

Table 15. Estimated Excess deaths and Projected April 1975 Population⁸²

Category	Pop Apr 1975	Death Toll	Average Direct Excess	Reported Direct Excess
CIA 1980	7.384	0.976	75,000	50,000 to 100,000
EA MENG-TRY 1981	7.460	1.000	120,000	120,000
RENAKSE 1983	7.098	3.314	569,000*	Min 569,000*
VICKERY 1984	7.100	0.740	300,000	300,000
KILJUNEN (ED) 1984	7.300	1.000	112,500	75,000 to 150,000
BANISTER & JOHNSON	7.300	1.050	235,000	10% men 3% women young- to mid-age
SLIWINSKI 1995	7.566	1.879	986,000	Min 39.3 to 52.5% of all deaths
KIERNAN, 1996, 2003	7.890	1.763	881,500	NA: estimated as 50% of the death toll
HEUVELINE 1998	7.952	2.200	1,100,000	1.1 mln
NEUPERT AND VIRAK	7.890	1.400	700,000	NA: estimated as 50% of the death toll
ETCHESON 2005	7.952	2.200	1,100,000	1.1 mln
HEUVELINE AND POCH	7.952	1.750	875,000	50% (0.75-1 mln)

Notes: * Renakse reported about 569,000 deaths in the forest and bodies in pits; this was assumed here as their minimum of direct excess deaths
 Notes: The April 1975 population is approximated in this table and the following figures for: Renakse (as in UN (2008)), Etcheson (as in Heuveline (1998)), Neupert and Virak (as in Kiernan (1996)). For Heuveline and Heuveline and Poch, we used the April 1975 estimate given by Sharp (2008). All these approximations were made as to resemble the most likely figures.

In Table 15 we show the projected population size in Cambodia for April 1975 together with estimated death toll by various authors. Similar tables can be made with the population size in mid-1970 and January 1979. Table 15 makes the reading of the three following figures easier. Figures 10 through 12 show the death toll in the Khmer Rouge period estimated by various authors plotted against the projected population in 1970, 1975 and 1979 (or around) by the same authors. The figures integrate the information about the estimates of the population size in three years (mid-1970, April 1975 and January 1979) with the estimates of excess deaths by various authors. The data labels are the death toll estimates by various authors as listed in the above Table 15.

All three figures consistently indicate that large differences exist between the authors in projecting the population figures under which they further obtained their estimated death toll. Some authors fall within the range of population values that we identified as the most likely. Their estimates of death toll are encircled. The un-encircled estimates are those that do not satisfy the most likely population estimates criterion or must be rejected for other reasons, including the methodology on the first palace.

⁸²Table 15 is based on Table 9 from this report. In both tables some values are approximations of the originally reported estimates of excess deaths.

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The first figure (Figure 10) summarizes that with the increase in the projected mid-1970 population size, also higher death toll estimates were produced. The *Renakse* estimate (3.314 mln in the upper left corner) is an outlier and is excluded from acceptable estimates. The estimates located in the lower left corner represent the early 1980s estimates and the Banister and Johnson (1993) estimate of 1,050 mln excess deaths. The group of encircled estimates to the right are those we recommend as the most reliable and well justified. Kiernan, Sliwinski, Heuveline, Heuveline and Poch, Neupert and Virak, and Etcheson belong to this group. The same group is as well encircled in the following Figures 11 and 12.

Figure 10. Estimates of Excess Deaths in the Khmer Rouge period Plotted against Projected Population Size in Mid-1970

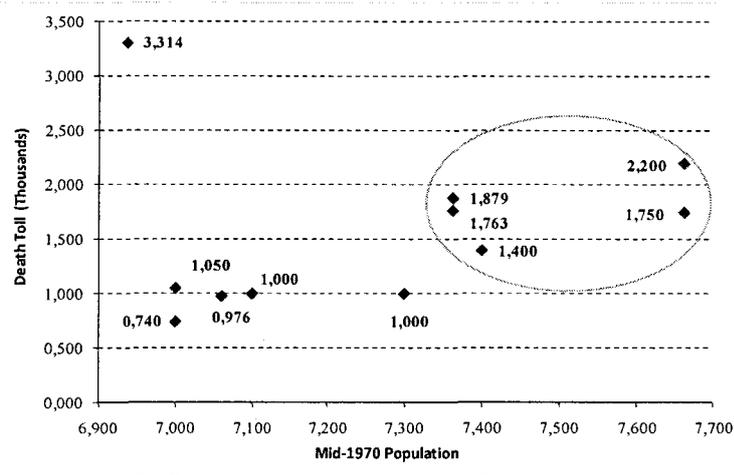
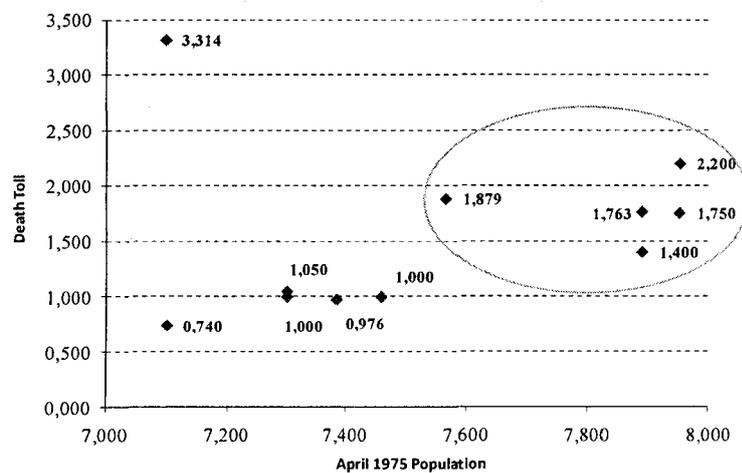


Figure 11. Estimates of Excess Deaths in the Khmer Rouge period Plotted against Projected Population Size in April 1975



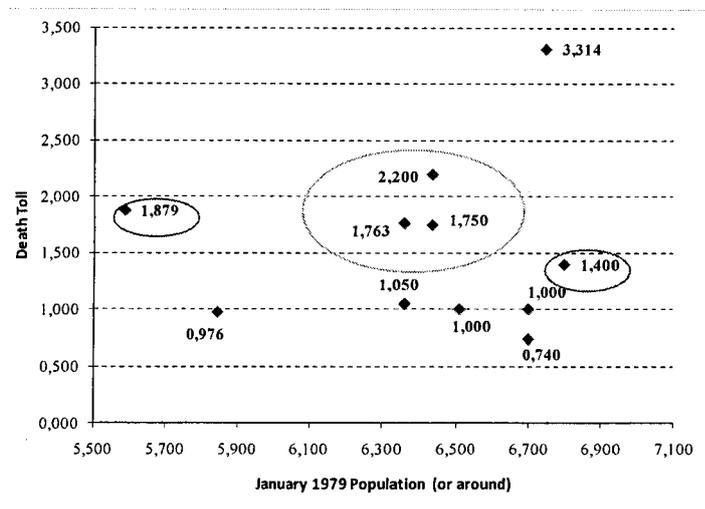
The two first figures (for 1970 and 1975) present a similar consistent pattern. The third figure (the January 1979 population plotted against death toll estimates) is different. It indicates that much disagreement existed among the authors with regard to the projected January 1979 population and related death toll figures. The main bulk of projections (concentrated around 6.3 mln population in

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January 1979), confirm that the projected population of 6.3 mln is associated with higher estimates of death toll (1.750 to 2.2 mln; comp. the green circle) and higher projected population is associated with death toll estimates of around 1 million. Some exceptions from this rule include for example the Banister and Johnson estimate of 1,050 mln death toll and 6.36 mln population in end-1978.

Two small circles, one to the left and one to the right, are associated with Sliwinski's and Neupert and Virak's estimates. As we already explained Sliwinski did not obtain his death toll estimate from the 1979 population estimate included in Table 15 and Figure 12. The April 1976 population he used was 7.768 million (H1 hypothesis); Sliwinski's end-1978 population associated with the (H1) 7.768 mln April 1975 population is not exactly known; we might guess it was likely higher than 5.586 mln taken for Figure 12. Thus, the left red circle can be neglected. The right red circle confirms a particularly high estimate of the mid-1980 population produced by Neupert and Virak (2005), the estimate that was one of the reasons their estimated death toll is too low to be accepted as the one of the most likely ones.

Figure 12. Estimates of Excess Deaths in the Khmer Rouge Period Plotted against Projected Population Size in January 1979 (or around)



The above charts, especially Figure 12, confirm that the most likely and reliable estimates of excess deaths under Khmer Rouge regime are within the range 1.747 and 2.2 million. All these estimates were obtained by using April 1975 population of around 7.89 mln and January 1979 population of around 6.36 million.

5.4 Why Vickery is Wrong?

Here we comment on some problems inherent in the estimate by Vickery (1981).⁸³ We have chosen his estimate as it is the lowest and most extreme among all. (It uses one of the lowest April 1975 population and one of the highest January 1979 population). Several portions of our criticism against Vickery are relevant to other low estimates produced in the early 1980s. We are not going, however, to discuss every rejected estimate one by one.

- The method Vickery used to produce his estimate belongs to those with the lowest scores among other estimates produced for Khmer Rouge death toll (see Table 6). Even when used for

⁸³ Comp. Sharp (2008) who criticizes Vickery along similar lines (p. 3-6).

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indicative initial estimates the method is known to have series flaws; most importantly the method does not have a unique solution in terms of excess deaths for two pre-selected population estimates. Several estimates are possible depending on the assumptions used for birth, deaths and net migration.

- Also Banister and Johnson (1993) worked with similar population sizes for April 1975 (7.3 mln) and end-1978 (6.4 mln); Vickery used 7.3 mln and 6.5-6.7 mln, respectively. Their estimate of excess deaths in this period is 1.050 mln. This is possible as there exist more than one solutions satisfying Vickery's equation of the population change.
- The method of Vickery's calculation heavily depends on the population sizes in April 1975 and in January 1979 and on assumptions used to fill in the "gap" between the population size on these two different time moments. Vickery used 7.3 mln and 6.5-6.7 mln, for April 1975 and January 1979, respectively. If instead of 6.7 mln people in January 1979, he would have taken 5.8 mln population (same period; after CIA), and kept his assumptions regarding births and natural deaths unchanged, the resulting number of excess deaths, that his method had produced, would have been 1.641 mln and not 740,000. Of this total, about 665,000 would be violent deaths and 976,000 indirect excess deaths.⁸⁴
- Vickery accepts the CIA 1975 population estimate of 7.3 mln above the estimates by others ranging between 7.9 to 8.8 mln in the same period; this has a significant impact on his final results.
- Similarly to CIA, Vickery also assumes the death toll of civil war was around 500,000, which is questionable. As we showed, most authors believe the death toll of the civil war was much lower, and most likely around 250,000 victims.
- If he assumed a lower death toll in the civil war, his estimate of excess deaths during Khmer Rouge would become automatically higher.
- He conveniently neglects his own higher guess of the 1975-79 population decline (600,000 based on 6.5 mln population in January 1979) and the resulting higher number of excess deaths (940,000). This suggests he might have some pre-determined views on what kind of outcome should be obtained.
- Vickery neglects completely any evidence related to mass graves. Already in 1983, *Renakse* published their final report on the death toll of Khmer Rouge regime. In this report the overall total of victims is 3.314 mln deaths, of which 568,000 are human remains in mass graves and bodies found in the forest (i.e. executions) and 2.75 mln are remaining victims of Khmer Rouge regime. This numbers are serious enough to call for investigation into their sources, methodology and reliability and to cross-reference them with any other estimate one can produce. Vickery has not done that, some authors did (e.g. Etcheson (2000, 2005) and Sharp (2008)). Having investigated the *Renakse* numbers, Vickery would most likely come to the same conclusions as others (i.e. that the *Renakse* statistics are flawed), but would have realized too that the scale of the death toll was enormous and his own low number of 740,000 excess deaths does not fit the overall picture.
- Finally, the latest DC-Cam statistics from the mass grave mapping project point to about 1.3 million remains in the mass graves (comp. Sharp (2008) and this report). The previously published statistics (by Etcheson (2000)) indicated about 1.1 mln remains in the mass graves. Both these numbers are obviously higher than his estimate of 740,000 excess deaths produced by Vickery. We have not seen any notes, articles, or books from Vickery in which he would have revised his death toll.

⁸⁴ The calculation is the following: "absolute population decline, 1975-79" = "actual 1975" - "actual 1979" = 7.1 mln - 5.8 mln = 1.3 mln. The category "excess births" equals 341,000 and must be added to 1.3 mln giving the overall total difference of 1,641 mln. This number represents the overall excess deaths in Vickery's "model".

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5.5 The Numbers: Estimates of Khmer Rouge Victims Recommended for Use

We came up with several main findings and conclusions:

General Observations:

- There is generally a lack of reliable statistical sources on the Cambodia population for the period from April 1975 to January 1979; sources on the population itself, and sources on deaths, births and migration (internal and external) are largely non-existent.
- Sources that are the closest to the Khmer Rouge era include the 1962 population census, the 1980 administrative population count, and the UNTAC voters' registration for the 1993 elections in Cambodia. These statistical sources together with a number of the existing sample surveys, research reports, individual survivors' accounts, reports of international observers, journalists, NGOs and individual researchers' opinions etc. is all that can be used in estimating the death toll under Khmer Rouge regime.
- Estimates of the population size in mid-1970, April 1975 and January 1979 (or end-1978) are essential for any estimate of excess deaths in this period.
- Yet there is a wide range of estimates produced by various authors and there is a need to narrow down this range to the most likely figures. Not all estimates of the estimated population sizes are realistic; especially the early estimates produced directly after the fall of Khmer Rouge and motivated by the CIA (1980) report seem to be incorrect.
- Estimation methods used to produce excess deaths under Khmer Rouge are not all equally sound, transparent and reliable; some must be rejected as not satisfying the basic standard of reliability.
- The more reliable methods include: sample survey extrapolations used jointly with other sources, death toll as a residual of two population projections, death toll as linked to mass grave records.
- The largely unreliable methods include: demographic balancing equation, demographic scenarios, and naive estimates from the *Renakse* nation-wide survey.
- Estimates of Khmer Rouge victims must be placed in a broader context of war victims and migration during the civil war period (1970 until April 1975), which we summarized in the lines below.
- As well, migration patterns during the Khmer Rouge regime need to be taken into account when assessing demographic consequences of the Khmer Rouge regime.
- Finally, it is clear from our review that ethnic and religious groups suffered much more than the rest of the Democratic Kampuchea population. Relevant statistics on this subject are included below.

Detailed Results:

- The following authors relied on estimates of April 1975 and January 1979 population that fall within the range of the most likely values: Kiernan (1996), Heuveline (1998), and Neupert and Virak (2005).
- Sliwinski (1995), Etcheson (2000, 2005) and *Renakse* did not explicitly estimate the population size for their excess deaths estimates, and can be thus considered as legible candidates for the most reliable figures on excess deaths under Khmer Rouge, except for *Renakse* that must fade out for other reasons. (Mainly because of the lack of statistical framework for their nation-wide survey and resulting problems, such as duplicates and incompleteness of their findings).

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- The excess deaths of about 1 million estimated for the Khmer Rouge period in the 1980s studies and early 1990s are not reliable enough; they must be rejected as not fulfilling the population size and/or appropriate methodology criterion.
- The following authors produces estimates of excess deaths that fall within the range of the most likely values, are methodologically sound, and transparent: Kiernan (1996), Sliwinski (1995), Heuveline (1998), Heuveline and Poch (2007), and Etcheson (2005).

Regarding the most likely estimates that we have identified in this report, the following can be reported:

- Population in April 1975: 7.844 to 8.102 mln, with the central value of 7.894 million
- Population in January 1979: 6 to 6.418 mln, with the central value of 6.209 million.
- Civil war death toll: most likely 250,000 out of 150,000 to 310,000 likely possible.
- Internal and external migration during the civil war: uncertain but possibly up to 3.389 mln; a majority - internal
- Population of Phnom Penh in April 1975: most likely 1.5 to 2.6 million
- Death toll under Khmer Rouge: most likely 1.747 to 2.2 mln out of 1.6 to 2.2 mln
- Violent deaths under Khmer Rouge: most likely 50% of the overall excess deaths, i.e. from 800,000 to 1.3 million
- Out-Migration under Khmer Rouge: 218,000 to 268,000; of which 150,000 to 200,000 to Vietnam, 34,000 to Thailand, 10,400 to Laos, and about 24,000 remaining (to Vietnam)
- Suffering of Ethnic and Religious groups: Chams: about 36% perished; Chinese 50%; Lao and Thais: 40%, and almost all Vietnamese perished as well; as compared with the average rate for the Khmers being on estimated 18.7 percent.

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LIST OF CAMBODIAN SOURCES ASSESSED IN THIS REPORT

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DC-CAM, 2009: Mass Grave Mapping Project

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JUDITH BANISTER and PAIGE JOHNSON, 1993: "After the Nightmare: The Population of Cambodia". In: Ben KIERNAN, ed., Genocide and Democracy in Cambodia: The Khmer Rouge, the United Nations and the International Community;

MAREK SLIWINSKI, 1995, "Le genocide Khmer Rouge une analyse démographique", Editions L'Harmattan, 1995, 175 p.

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CRAIG ETCHESON, 2005: "After the Killing Fields: Lessons from the Cambodian Genocide", pages 107-127 and the DC-Cam mapping project.

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Escapees of the Committee on the Judiciary of the United States Senate. Ninety-third Congress, First Session, April 16 1973.

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LIST OF STATISTICAL SOURCES ON THE POPULATION OF CAMBODIA IN RECENT PRACTICE

Censuses in Cambodia:

- The 1998 Population Census
- The 2008 Population Census

Country-wide representative population surveys in Cambodia:

- The 1996 Cambodia Demographic Survey (CDS-1996)
- The 2000 Cambodia Demographic and Health Survey (CDHS-2000)
- The 2005 Cambodia Demographic and Health Survey (CDHS-2005)
- The 2004 Cambodia Intercensal Population Survey (CIPS-2004)
- The 2004 Survey of the Elderly in Cambodia (SEC-2004)

Population Projections for Cambodia:

- The Population Projections 1998-2020 (based on the 1998 Census)
- The First Revision, Population Projections 1998-2020 (based on the 1998 Census and CDHS-2000)
- The Second Revision, Population Projections 1998-2020 (based on the 1998 Census and CIPS-2004)

LIST OF SELECTED RECENT PUBLICATIONS ON STATISTICAL SOURCES ON THE POPULATION OF CAMBODIA

CENSUSES AND PROJECTIONS:

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NIS, 2005: Cambodia Inter-Censal Population Survey 2004: Demographic Estimates and Revised Population Projections. National Institute of Statistics, Ministry of Planning, Phnom Penh, Cambodia.

NIS, 2008: General Population Census of Cambodia 2008. Provisional Population Totals. National Institute of Statistics, Ministry of Planning, Phnom Penh, Cambodia.

⁸⁵ NIS stands for the National Institute of Statistics, Cambodia Ministry of Planning, in Phnom Penh.

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~~PROJ. D140/1/1~~**LIST OF ACRONIMS**

CIA	Central Intelligence Agency, USA
ECCC	Extraordinary Chambers in the Courts of Cambodia, Phnom Penh
DC-Cam	Documentation Centre of Cambodia, Phnom Penh
DK	Democratic Kampuchea, April 1975 - January 1979
GAO	Government Accountability Office, United States Government
GKR	Government of Khmer Republic
KR	Khmer Republic, March 1970 - April 1975
MIPopLAB	Mekong Island Population Laboratory, Kandal Province, Cambodia
NIS	National Institute of Statistics, Phnom Penh
NORC	National Opinion Research Center, with headquarters on the University of Chicago, and offices in Chicago's downtown Loop, Washington DC, Bethesda, Maryland, and Berkeley, California
OCIJ	Office of the Co-Investigating Judges, ECCC, Phnom Penh
PRK	People's Republic of Kampuchea
PRT	People's Revolutionary Tribunal
RUPP	Royal University of Phnom Penh
UN	United Nations
UNDP	United Nations Development Program
UNECAP	United Nations Economic Commission for Asia and Pacific
UNFPA	United Nations Population Fund
UNICEF	United Nations Children's Fund
UNTAC	United Nations Transitional Authority in Cambodia
USA	United States of America
USAID	United States Agency for International Development

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ANNEX 2. UP DATE ON DC-CAM STATISTICS ON MASS GRAVES AND MASS GRAVES VICTIMS

Detailed statistics on the sites and victims are available from the “List of Mass Graves” and those on DK prisons and memorials from the tables “List of Prisons” and “List of Memorials”; all three are available from the DC-Cam home page (<http://www.dccam.org/Projects/Maps/Mapping.htm>). Etcheson (2000) produced a summary of these statistics for 1995-99, i.e. after five years of the mapping project, and came up with figures for the entire Cambodia and for provinces. We have updated his figures using the latest information on the DC-Cam website and present our new figures below. The new figures represent the status as of 18 February 2008.

As noted in Section 2.3 of this report, the methodology and source material of Etcheson’s and our calculations are not identical. Etcheson analyzed data covering the period 1995-99. His source were individual mass grave mapping reports from 1995-1999. We analyzed the latest available data, i.e. dated as of February 2008, from the Internet web-page of the DC-Cam. From the attached samples of this data it is clear that DC-Cam staff have processed the information from the original mass grave mapping reports and included relevant pieces of it in tabular form. Our data contain corrections and improvements of the 1995-99 data that the DC-Cam staff made in the years after 1999; Etcheson did not have these improvements. Secondly, a quantitative analysis like the one of Etcheson and ours is subject to recoding of the reported source figures on mass graves and victims. Recoding can be done in several alternative ways for the source information is qualitative in many records; i.e. it has the form of a brief narrative, such as “more than 1000”, “over 300”, “hundreds”, “thousands”, “a few”, “about”, “70 families” etc. Researchers might recode these narratives in different ways as no strict rules exist for the recoding of such data. Secondly, many records provide intervals of values and not point estimates.

A third source of differences between our update and Etcheson’s results is that in our approach, three variants were made; the medium variant was taken in presentation of our results:

- the minimum variant was based on lower ends of all intervals and estimated lower ends of the narratives⁸⁶
- the maximum variant took upper ends of all intervals and estimated upper ends of all narratives
- the medium variant was obtained as an average of the minimum and maximum.

We assume that our medium variant compares to that of Craig Etcheson. Further, we present the results based on the information from both the “Site Form” and the “Field Report”. Field reports usually give lower statistics as pieces of information from the field informants are rejected as not reliable. We believe that “Site Form” contains first-hand valuable data and should be taken for analysis on the first place. For completeness, we also included statistics from the “Field Report”. Our results are available from Tables A2.1 to A2.3. Etcheson’s original tables are included here as Tables A2.4 to A2.6.

⁸⁶ The following were our ways of coding in the minimum and maximum variants:

Minimum Variant	Maximum Variant
1. lower ends for intervals	1. upper ends for intervals
2. thousands=1000	2. hundreds=200, thousands=2000 etc.
3. hundreds=100	3. more than/over: +1/2*100 or +1/2*1000
4. more than/over: lower end	4. family size=4 persons
5. family=4 persons	5. N/A=0
6. N/A=0	

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Table A2.1 Updated Mass Graves Statistics as of February 2008. Victims of Khmer Rouge Regime in Cambodia, 1975-79. Absolute Numbers.

a) Site Form Perspective. Medium Variant (SF-Mid)

Province	# Pits (SF-Mid)	# Wells (SF-Mid)	# Prisons (*)	# Prisons (all)	# Memorials	# Victims (SF-Mid)
Banteay Meanchey	567		1	6	0	36,440
Battambang	625		4	10	1	45,321
Kampong cham	4,213	14	14	28	5	205,205
Kampong Chhnang	3,254	1	11	19	1	351,788
Kampong Som (Sihanouk Ville)	568		4	5	0	2,625
Kampong Speu	1,502		1	8	0	63,846
Kampong Thom	1,331		1	10	1	99,208
Kampot	4,081		2	7	1	54,775
Kandal	943	6	8	20	4	110,693
Kratie	202	5	6	10	0	11,889
Mondul Kiri			0	1	0	
Phnom Penh	130		2	2	1	28,013
Prey Veng	1,682	3	9	16	1	76,259
Pursat	1,450		4	11	0	36,650
Ratanak Kiri	37		0	2	0	1,590
Siem Reap	318	1	2	13	1	77,771
Stung Teng			1	4	0	1,000
Svay Rieng	646		5	12	9	35,916
Takeo	2,199	1	6	11	5	59,786
Total	23,745	31	81	195	30	1,298,772

Note: (*) denotes only the prisons with exactly the same site codes.; of all prisons, one in Koh Kong is excluded

b) Field Report Perspective. Medium Variant (FR-Mid)

Province	# Pits (FR-Mid)	# Wells (FR-Mid)	# Prisons (*)	# Prisons (all)	# Memorials	# Victims (FR-Mid)
Banteay Meanchey	160	1	1	6	0	38,320
Battambang	674		4	10	1	45,106
Kampong cham	3,907	14	14	28	5	182,238
Kampong Chhnang	1,896		11	19	1	269,760
Kampong Som (Sihanouk Ville)	205		4	5	0	120
Kampong Speu	1,361	2	1	8	0	60,981
Kampong Thom	1,388		1	10	1	151,734
Kampot	4,225		2	7	1	51,220
Kandal	597	2	8	20	4	100,162
Kratie	349	1	6	10	0	11,914
Mondul Kiri	1		0	1	0	200
Phnom Penh	1		2	2	1	13
Prey Veng	1,559	5	9	16	1	54,677
Pursat	878		4	11	0	20,388
Ratanak Kiri	6		0	2	0	640
Siem Reap	244	4	2	13	1	43,234
Stung Teng			1	4	0	
Svay Rieng	790		5	12	9	23,690
Takeo	2,466		6	11	5	149,552
Total	20,705	29	81	195	30	1,203,947

Note: (*) denotes only the prisons with exactly the same site codes.; of all prisons, one in Koh Kong is excluded

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Table A2.2 Updated Mass Graves Statistics as of February 2008. Victims of Khmer Rouge Regime in Cambodia, 1975-79. Relative Numbers.

a) Site Form Perspective. Medium Variant (SF-Mid)

Province	# Districts	Pits per District	Pits per Prison	Prison per District	Victims per Pit	Victims per District	Victims per Prison
Banteay Meanchey	7	81	95	0.86	64	5,206	6,073
Battambang	7	89	62	1.43	73	6,474	4,532
Kampong cham	15	281	150	1.87	49	13,680	7,329
Kampong Chhnang	7	465	171	2.71	108	50,255	18,515
Kampong Som (Sihanouk Ville)	2	284	114	2.50	5	1,313	525
Kampong Speu	7	215	188	1.14	43	9,121	7,981
Kampong Thom	8	166	133	1.25	75	12,401	9,921
Kampot	6	680	583	1.17	13	9,129	7,825
Kandal	10	94	47	2.00	117	11,069	5,535
Kratie	5	40	20	2.00	59	2,378	1,189
Mondul Kiri	1	0	NA	1.00	NA	0	NA
Phnom Penh	2	65	65	1.00	215	14,006	14,006
Prey Veng	11	153	105	1.45	45	6,933	4,766
Pursat	5	290	132	2.20	25	7,330	3,332
Ratanak Kiri	2	19	NA	1.00	43	795	NA
Siem Reap	9	35	24	1.44	245	8,641	5,982
Stung Teng	2	0	0	2.00	NA	500	250
Svay Rieng	7	92	54	1.71	56	5,131	2,993
Takeo	8	275	200	1.38	27	7,473	5,435
Total	121	196	122	1.61	55	10,734	6,660

b) Field Report Perspective. Medium Variant (FR-Mid)

Province	# Districts	Pits per District	Pits per Prison	Prison per District	Victims per Pit	Victims per District	Victims per Prison
Banteay Meanchey	7	23	27	0.86	240	5,474	6,387
Battambang	7	96	67	1.43	67	6,444	4,511
Kampong cham	15	260	140	1.87	47	12,149	6,509
Kampong Chhnang	7	271	100	2.71	142	38,537	14,198
Kampong Som (Sihanouk Ville)	2	103	41	2.50	1	60	24
Kampong Speu	7	194	170	1.14	45	8,712	7,623
Kampong Thom	8	173	139	1.25	109	18,967	15,173
Kampot	6	704	604	1.17	12	8,537	7,317
Kandal	10	60	30	2.00	168	10,016	5,008
Kratie	5	70	35	2.00	34	2,383	1,191
Mondul Kiri	1	1	NA	1.00	200	200	NA
Phnom Penh	2	1	1	1.00	13	6	6
Prey Veng	11	142	97	1.45	35	4,971	3,417
Pursat	5	176	80	2.20	23	4,078	1,853
Ratanak Kiri	2	3	NA	1.00	107	320	NA
Siem Reap	9	27	19	1.44	177	4,804	3,326
Stung Teng	2	0	0	2.00	NA	0	0
Svay Rieng	7	113	66	1.71	30	3,384	1,974
Takeo	8	308	224	1.38	61	18,694	13,596
Total	121	171	106	1.61	58	9,950	6,174

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Table A2.3 Updated Mass Graves Statistics as of February 2008. Victims of Khmer Rouge Regime in Cambodia, 1975-79. Analysis.

a) Site Form Perspective. Medium Variant (SF-Mid)

Province	Pop June 75	% Total Pop	# Victims (SF-Mid)	% Total Victims	Victims/Pop (%)	Brutality Index
Banteay Meanchey	na	na	na	na	na	na
Battambang	962	13.3	81,761	6.3	8.5	0.47
Kampong Cham	1226	17.0	205,205	15.8	16.7	0.93
Kampong Chhnang	287	4.0	351,788	27.1	122.6	6.82
Kampong Som (Sihanouk Ville)	0	0.0	2,625	0.2	na	na
Kampong Speu	299	4.1	63,846	4.9	21.4	1.19
Kampong Thom	580	8.0	99,208	7.6	17.1	0.95
Kampot	435	6.0	54,775	4.2	12.6	0.70
Kandal	618	8.5	110,693	8.5	17.9	1.00
Kratie	317	4.4	11,889	0.9	3.8	0.21
Mondul Kiri	16	0.2	na	na	na	na
Phnom Penh	142	2.0	28,013	2.2	19.7	1.10
Prey Veng	571	7.9	76,259	5.9	13.4	0.74
Pursat	444	6.1	36,650	2.8	8.3	0.46
Ratanak Kiri	48	0.7	1,590	0.1	3.3	0.18
Siem Reap	377	5.2	77,771	6.0	20.6	1.15
Stung Teng	46	0.6	1,000	0.1	2.2	0.12
Svay Rieng	190	2.6	35,916	2.8	18.9	1.05
Takeo	591	8.2	59,786	4.6	10.1	0.56
Koh Kong	42	0.6	na	na	na	na
Preah Vihear	39	0.5	na	na	na	na
Total	7,230	100.0	1,298,772	100.0	18.0	1.00

c) Field Report Perspective. Medium Variant (FR-Mid)

Province	Pop June 75	Pop Jun 75 (%)	# Victims (FR-Mid)	% Total Victims	Victims/Pop	Brutality Ind
Banteay Meanchey	na	na	na	na	na	na
Battambang	962	13.3	83,426	6.9	8.7	0.52
Kampong cham	1226	17.0	182,238	15.1	14.9	0.89
Kampong Chhnang	287	4.0	269,760	22.4	94.0	5.64
Kampong Som (Sihanouk Ville)	0	0.0	120	0.0	na	na
Kampong Speu	299	4.1	60,981	5.1	20.4	1.22
Kampong Thom	580	8.0	151,734	12.6	26.2	1.57
Kampot	435	6.0	51,220	4.3	11.8	0.71
Kandal	618	8.5	100,162	8.3	16.2	0.97
Kratie	317	4.4	11,914	1.0	3.8	0.23
Mondul Kiri	16	0.2	200	0.0	1.3	0.08
Phnom Penh	142	2.0	13	0.0	0.0	0.00
Prey Veng	571	7.9	54,677	4.5	9.6	0.58
Pursat	444	6.1	20,388	1.7	4.6	0.28
Ratanak Kiri	48	0.7	640	0.1	1.3	0.08
Siem Reap	377	5.2	43,234	3.6	11.5	0.69
Stung Teng	46	0.6	0	0.0	0.0	0.00
Svay Rieng	190	2.6	23,690	2.0	12.5	0.75
Takeo	591	8.2	149,552	12.4	25.3	1.52
Koh Kong	42	0.6	na	na	na	na
Preah Vihear	39	0.5	na	na	na	na
Total	7,230	100.0	1,203,947	100.0	16.7	1.00

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Table A2.4 Reference Mass Graves Statistics as of End-1999. By Etcheson (2000). Absolute Numbers.

Table 1: Summary Statistics on Mass Grave Surveys, 1995-1999*
Documentation Center of Cambodia

Province	Total # of Sites	Estimated # of Pits	Wells/Other Used as Graves	Prison Sites	Memorial Sites	Estimated # of Victims	**Estimated # of Complainants
Banteay Meanchey	17	567	0	4	3	40,782	***
Battambang	22	1,070	0	8	6	37,195	429,480
Kampong Cham	61	3,035	11	13	9	176,423	79,450
Kampong Chhnang	30	3,143	1	8	3	253,154	44,865
Kampong Speu	20	1,549	1	4	2	24,332	50,808
Kampong Thom	18	1,427	5	6	5	123,808	118,578
Kampot	22	2,761	0	7	3	55,625	25,632
Kandal	43	504	4	13	9	102,804	68,680
Koh Kong	1	0	0	1	0	17,349	9,670
Kratie	9	7	1	1	4	13,339	---
Monduliri	2	1	0	1	0	0	---
Phnom Penh	7	0	0	3	2	0	---
Preah Vihear	Not Yet Surveyed	---	---	---	---	---	---
Prey Veng	43	1,604	12	8	3	89,406	68,351
Pursat	21	2,167	10	13	3	53,050	38,576
Ratanakiri	4	33	0	1	0	2,300	---
Siem Reap	29	715	5	9	2	77,873	3,952
Krong Preah Sihanouk	15	570	0	6	0	2,600	---
Stung Treng	8	61	0	4	1	4,000	8,053
Svay Rieng	35	166	0	9	11	5,107	34,737
Takeo	25	862	0	8	5	30,662	72,244
Totals	432	20,442	50	125	71	1,112,829	1,050,676

* The data is drawn from the 1997, 1998 and 1999 Mass Grave Mapping Reports. Documentation Center of Cambodia; 1995 and 1996 data is summarized in the 1997 report.

** Estimated number of complainants from Report of Research Committee on Genocide Crime, July 25, 1983.

*** Included in data for Siem Reap.

Table A2.5 Reference Mass Graves Statistics as of End-1999. By Etcheson (2000). Relative Numbers.

Table 2: Descriptive Statistics on Mass Grave Surveys, 1995-1999
Documentation Center of Cambodia

Province	Graves per Site	Graves per District	Graves per Prison	Prisons per District	Victims per Grave	Victims per Site	Victims per District	Victims per Prison
Banteay Meanchey	33	71	142	0.50	72	2,399	5,098	10,196
Battambang	49	134	134	1.00	35	1,691	4,649	4,649
Kampong Cham	50	190	254	0.91	59	2,892	11,028	13,571
Kampong Chhnang	155	383	524	0.75	81	6,438	31,644	42,182
Kampong Speu	78	194	386	0.50	16	1,217	3,042	6,083
Kampong Thom	60	179	239	0.75	87	6,878	15,478	20,635
Kampot	126	345	394	0.88	20	2,526	6,953	7,946
Kandal	12	46	39	1.18	264	2,391	9,346	7,908
Koh Kong	0	0	0	0.14	---	17,349	2,478	17,349
Kratie	1	2	6	0.20	1906	1,482	2,668	13,339
Monduliri	1	0	1	0.20	0	0	0	0
Phnom Penh	0	0	0	0.43	0	0	0	0
Preah Vihear	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Prey Veng	42	151	227	0.87	90	2,079	7,451	11,176
Pursat	104	435	167	2.60	24	2,526	10,610	4,081
Ratanakiri	8	4	33	0.11	76	575	256	2,500
Siem Reap	25	51	80	0.64	109	2,665	5,562	8,653
Krong Preah Sihanouk	38	190	95	2.90	5	173	867	433
Stung Treng	8	12	15	0.80	66	500	800	1,000
Svay Rieng	5	28	18	1.50	31	146	851	567
Takeo	34	86	108	0.80	39	1,347	3,368	4,210
Averages	42	132	150	0.87	168	3,016	6,429	9,278
Average number of victims/mass grave (excluding anomalous Kratie)	---	---	---	---	57	---	---	---

Note: N/A = data currently unavailable

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Table A2.6 Reference Mass Graves Statistics as of End-1999. By Etcheson (2000) Analysis.

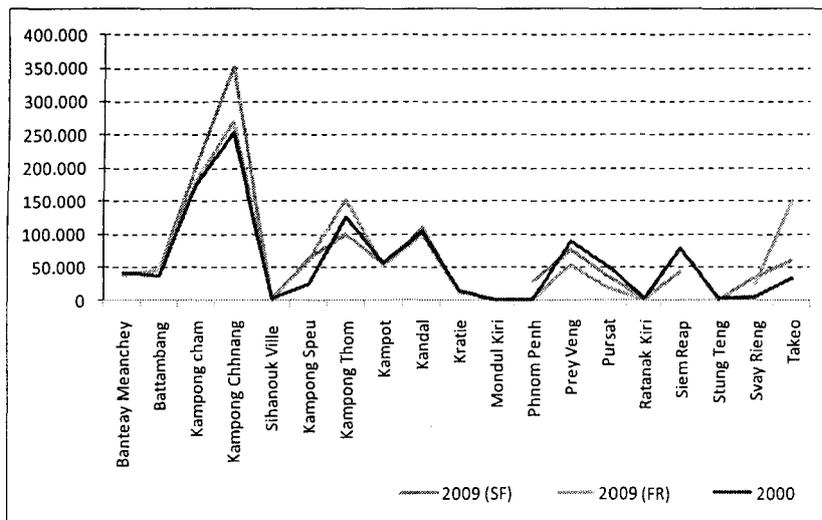
Table 3: Analytical Statistics on Mass Grave Surveys, 1995-1999
Documentation Center of Cambodia

	Population at June 75*	% Total Population	Victims per Province	% Total Victims	Victims/ Population	Brutality Index
Banteay Meanchey**	--	--	--	--	--	--
Battambang	962	13.31%	77,977	7.01%	8.11%	0.53
Kampong Cham	1,226	16.96%	176,423	15.85%	14.39%	0.93
Kampong Chhnang	287	3.97%	253,154	22.75%	88.21%	5.73
Kampong Speu	299	4.14%	24,332	2.19%	8.14%	0.53
Kampong Thom	580	8.02%	123,808	11.13%	21.35%	1.39
Kampot	435	6.02%	55,625	5.00%	12.79%	0.83
Kandal	618	8.55%	102,804	9.24%	16.63%	1.08
Koh Kong	42	0.58%	17,349	1.56%	41.31%	2.68
Kratie	317	4.38%	13,339	1.20%	4.21%	0.27
Monduliri	16	0.22%	0	0.00%	0.00%	0.00
Phnom Penh	142	1.96%	0	0.00%	0.00%	0.00
Preah Vihear	39	0.54%	--	--	--	--
Prey Veng	571	7.90%	89,406	8.03%	15.66%	1.02
Pursat	444	6.14%	53,050	4.77%	11.95%	0.78
Ratanakiri	48	0.66%	2,300	0.21%	4.79%	0.31
Siem Reap***	377	5.21%	77,873	7.00%	20.66%	1.34
Krong Preah Sihanouk	0	0.00%	2,600	0.23%	0.00%	--
Stung Treng	46	0.64%	4,000	0.36%	8.70%	0.56
Svay Rieng	190	2.63%	5,107	0.46%	2.69%	0.17
Takeo	591	8.17%	33,682	3.03%	5.70%	0.37
totals	7,230	100.00	1,112,829	100.00		
averages					16.30%	

* Population in 1000's by province as of June 1975 from Sliwinski (1995) Table 1, Page 26.
 ** Banteay Meanchey was incorporated into Battambang in 1975.
 *** Siem Reap data includes population numbers for Oddar Meanchey

Differences between our and Etcheson's results are summarized in Figures A2.1 to A2.3. Both types of 2009 results are shown; those based on the "Site Form" ("SF") and those on "Field Report" ("FR"). In both cases only the medium variant is included. In case of prisons, the series labeled with (*) depicts only those prisons that have identical locations as the mass graves. "All" prisons include the prisons identified *within a given province*; not of all them are located exactly at the mass graves but nearby.

Figure A2.1 Number of Victims Estimated Based on DC-Cam Mass Grave Statistics: Etcheson's 2000 Statistics versus 2009 Update



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Figure A2.2 Number of Pits Estimated Based on DC-Cam Mass Grave Statistics: Etcheson's 2000 Statistics versus 2009 Update

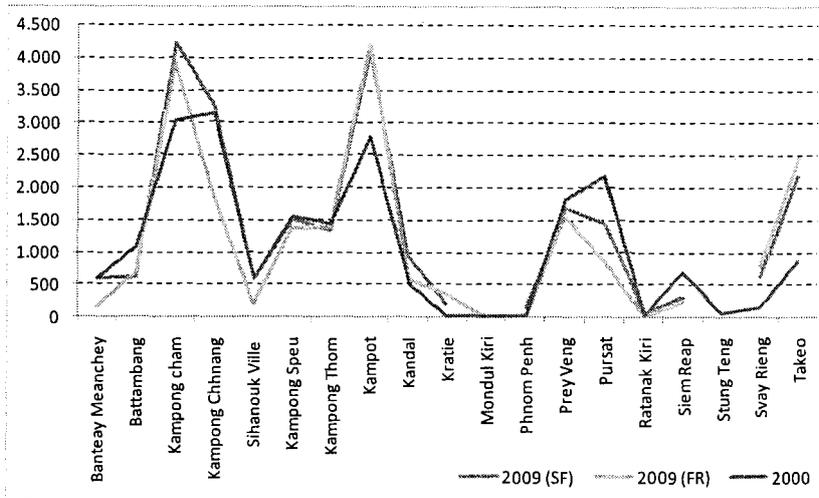
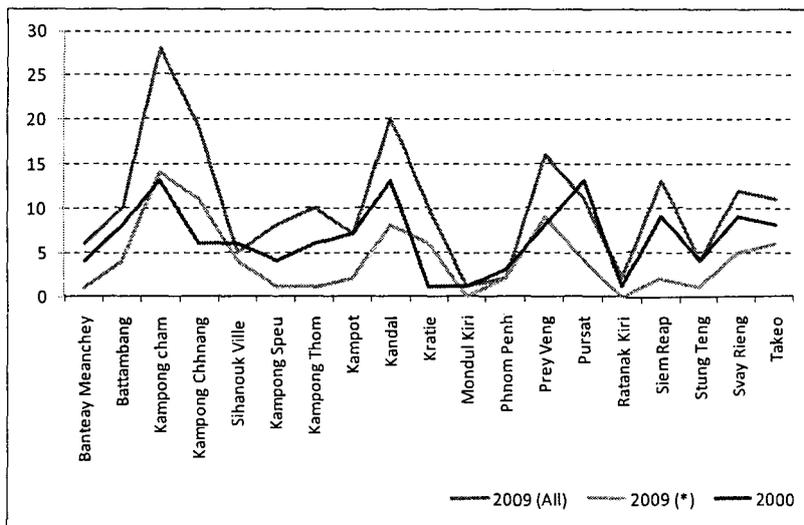


Figure A2.3 Number of Prisons Estimated Based on DC-Cam Mass Grave Statistics: Etcheson's 2000 Statistics versus 2009 Update



Some differences obviously exist between our and Etcheson's figures; generally however, the patterns are very similar. As expected the 2009 results indicate higher levels of all three categories: the numbers of mass grave pits, victims, and the prisons. Some definitional problems are likely behind some of these differences but not all. It is certain that progress has been made in mass grave mapping between 1999 and 2008 and this resulted in increased summary statistics.

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ANNEX 3. SUMMARIES OF EXISTING ESTIMATES ASSESSED IN THIS REPORT

ESTIMATE BY CIA, 17 January 1980⁸⁷

Reported Excess Deaths	Total of <u>all deaths</u> : 1.850 mln in medium variant. This total includes 100,000 victims of executions. <i>Note: 1,850 is not explicit in CIA report but could be calculated from projection inputs</i>
Reported Direct Excess Deaths	50,000 to 100,000 (1975-1976)
Time Period Covered	April 1975-January 1979
Total Number of Months	45: April 1975-January 1979
Causes of Death	Executions explicit (same as direct excess deaths); no other causes
Affected Ethnic Groups	Entire society; no mention of excess deaths for a particular ethnic or religious group
Data Sources	1962 Census, 1978 UN projections for Cambodia, UNHCR refugee statistics for Cambodia, intelligence and other sources including the expertise of CIA analysts specialized in this region of the world; sources not referenced one by one, except for Siampos (1970) and Willmott (1968)
Methods for the Overall Number of Victims	<p>The primary goal was to reconstruct the Cambodia population and its losses in the entire decade of 1970s. Deaths in the Khmer Rouge regime were part of the reconstruction. The authors applied a demographic scenario technique using the standard population accounting method, i.e. the start-of-year population was increased by the number of births in one-year (or shorter) period, and decreased by the number of deaths and refugees in the same one-year (or shorter) period. The approach was exceptionally detailed:</p> <ul style="list-style-type: none"> - The entire period of 1970-79 was divided into sub-periods following historical developments: <ul style="list-style-type: none"> • (1) 1 July 1970 to 17 April 1975 • (2) 17 April 1975 to 1 January 1979 • (3) 1 January 1979 to 1 December 1979 - The Red Khmer period was further divided into even smaller sub-periods, each six months long, except for the first 10 weeks from 17 April to 1 July 1975, and as well into two principal population groups, i.e. the New and Old people. <p>Red Khmer period projections were made for each principal group of people (New and Old) and for a number of distinguished sub-periods (each app. six months), using assumptions formulated separately for each small set of projections. Indeed, detailed knowledge of history, including demographics, was required to specify these</p>

⁸⁷ CIA, 1980: "KAMPUCHEA: A DEMOGRAPHIC CATASTROPHE". Research Paper, 17 January 1980.
<http://www.mekong.net/cambodia/demcat.htm>

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	assumptions.
Methods for Cause of Death Distribution	No formal methods used; deaths from executions as well as all remaining deaths are based on subjective assessment.
Affected Population Included in Estimate: mid-year 1970 (or around)	7.060 mln (1 July 1970; after UN)
Affected Population Included in Estimate: April 1975 (or around)	7.384 mln (17 April 1975; min 7.278 to max 7.384 mln)
Affected Population Included in Estimate: January 1979 (or around)	5.845 mln (1 January 1979; min 5.452 to max 6.225 mln)
Absolute Decline in Population Size between April 1975 to January 1979 (or around)	1.539 mln (min 1.2 to max 1.8 mln)
Motivation for this Report	Unclear. The organization that authored this scenario is the Central Intelligence Agency of the USA, which country was present in the region in the 1 st half of 1970s. They were the first ones to publish on this subject soon after the fall of Khmer Rouge in January 1979. For several years, this paper, being based on largely subjective and possibly politically biased judgments, was giving the lead to many others working in this field. The report had serious impact on their work.

Major Contribution/Failure of this Paper:

The report is extremely transparent and can easily be (and often was) used for reference purposes by other authors. Its results are highly uncertain and questionable, however. The most important reason for this is the general lack of data sources for the projection assumptions. All assumptions come from the authors' largely subjective judgments of demographic implications of historical developments in Cambodia during the 1970s. The paper is of no value from the view point of Khmer Rouge (and civil war) casualties. The lack of explanation of sources and methods of the CIA number of 50,000-100,000 Khmer Rouge executions must be seen as a major unacceptable deficiency.

Other main results include some statistics on refugees and on the Chinese population in Cambodia during Khmer Rouge; again characterized by the same deficiencies.

Refugees:

- Repatriation to Vietnam: 200,000-500,000 - April 1975
- Refugees to Vietnam: 30,000 - after April 1975
- Refugees to Thailand: 20,000-55,000 - after April 1975

Chinese:

- About 444,000 in April 1975 declined to 259,000 in the end of 1979; by about 200,000

Some other statistics relate to **victims of civil war** during the Lon Nol regime:

- About 600,000 war victims in addition to natural deaths from 1970 to April 75

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Table A3.1 Estimation of Overall and Excess Deaths from CIA Data.
Source: Authors of this Report

New People, Medium Variant

Time Period Khmer Rouge	Population Size (Thousands)	Crude Death Rate (Per 1,000)	Number of Deaths (Per Sub-Period)	Number of Deaths (Per Year)	Year
17 Apr 75 to 1 Jul 75	4,000	547	518,009		
1 Jul 75 to 1 Jan 76	3,576	240	403,740	921,749	1975
1 Jan 76 to 1 Jul 76	3,153	87	134,372		
1 Jul 76 to 1 Jan 77	3,025	86	127,431	261,802	1976
1 Jan 77 to 1 Jul 77	2,902	50	71,750		
1 Jul 77 to 1 Jan 78	2,838	50	70,175	141,925	1977
1 Jan 78 to 1 Jul 78	2,776	50	68,650		
1 Jul 78 to 1 Jan 79	2,716	50	67,163	135,813	1978
1 Jan 79	2,657				
Total Khmer Rouge	na	na	1,461,289	1,461,289	1975-78

Note: We assumed the population size is given for start of period

Old People, Medium Variant

Time Period Khmer Rouge	Population Size (Thousands)	Crude Death Rate (Per 1,000)	Number of Deaths (Per Sub-Period)	Number of Deaths (Per Year)	Year
17 Apr 75 to 1 Jul 75	3,134	18	14,139		
1 Jul 75 to 1 Jan 76	3,150	25	39,425	53,564	1975
1 Jan 76 to 1 Jul 76	3,158	25	39,525		
1 Jul 76 to 1 Jan 77	3,166	25	39,600	79,125	1976
1 Jan 77 to 1 Jul 77	3,170	25	39,650		
1 Jul 77 to 1 Jan 78	3,174	25	39,706	79,356	1977
1 Jan 78 to 1 Jul 78	3,179	25	39,763		
1 Jul 78 to 1 Jan 79	3,183	25	39,819	79,581	1978
1 Jan 79	3,188				
Total Khmer Rouge	na	na	291,627	291,627	1975-78

New and Old People, Medium Variant

Time Period Khmer Rouge	Population Size (Thousands)	Crude Death Rate (Per 1,000)	Number of Deaths (Per Sub-Period)	Number of Deaths (Per Year)	Year
17 Apr 75 to 1 Jul 75	7,134	307	532,148		
1 Jul 75 to 1 Jan 76	6,726	136	443,165	975,313	1975
1 Jan 76 to 1 Jul 76	6,311	56	173,897		
1 Jul 76 to 1 Jan 77	6,191	54	167,031	340,927	1976
1 Jan 77 to 1 Jul 77	6,072	37	111,400		
1 Jul 77 to 1 Jan 78	6,012	37	109,881	221,281	1977
1 Jan 78 to 1 Jul 78	5,955	37	108,413		
1 Jul 78 to 1 Jan 79	5,899	36	106,981	215,394	1978
1 Jan 79	5,845				
Total Khmer Rouge	na	na	1,752,915	1,752,915	1975-78

Our approximation of the CIA estimates is done by first calculating the overall number of deaths in April 1975-January 1979 directly from the population data and death rates produced by CIA (see Table A3.1). There were about 1.753 mln such deaths. We assumed these were both natural deaths and indirect Khmer Rouge victims. We distributed these deaths fifty-fifty, applying thus the uniform distribution into natural deaths and indirect victims (0.876-0.876 mln). CIA estimated in their medium variant that there were 100,000 executions during Khmer Rouge regime (Table A3.2 below). We added

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the executions on the top of indirect deaths (0.876 mln) and obtained the total of excess deaths being 0.976 million.

Table A3.2 Executions, Only New People, Medium Variant. Source: CIA (1980)

Year	Victims
1975	80,000
1976	20,000
1977	0
1978	0
Total	100,000

Overall Deaths, April 1975-January 79 (CIA): $1,752,915 + 100,000 = 1,852,915$

Excess Deaths, April 1975-January 79 (CIA): $50\% \text{ of } 1,752,915 + 100,000 = 976,458$

~~CONFIDENTIAL~~**ESTIMATE BY EA MENG-TRY, 1981⁸⁸**

Reported Excess Deaths	1 mln (from massacres, undernourishment, hard treatment, deportation)
Reported Direct Excess Deaths	120,000 (included in 1 mln); of which 35,000 (29.2%) in 1975, 15,000 (12.5%) in 1976, 40,000 (33.3%) in 1977, 30,000 (25%) in 1978.
Time Period Covered	April 1975 to December 1978
Total Number of Months	45; April 1975 to December 1978
Causes of Death	Executions explicit; no other causes
Affected Ethnic Groups	Entire society; no mention of excess deaths for a particular ethnic or religious group
Data Sources	For population size: CIA (1980), Migozzi (1973), official (mainly Vietnamese) government reports, notes / statements / reports of international organizations, press reports (mainly France), historical materials/books etc. For excess deaths (including executions): <ul style="list-style-type: none"> - CIA (1980): 50,000 to 100,000 of violent deaths and several hundreds of indirect deaths - Father Ponchaud (spring 1978): 2 millions (excess) - Amnesty International (1979: "Rapport sur la peine de mort"): 2 million (excess), 200,000 executions - Countries of Eastern Europe and Hanoi: 3 to 4 million (excess)
Methods for the Overall Number of Victims	Excess deaths obtained as a residual category from a general demographic accounting equation. Components of the equation obtained from author's own (predominantly qualitative) assessment of estimates by others.
Methods for Cause of Death Distribution	Author's own (predominantly qualitative) assessment of estimates by others.
Affected Population Included in Estimate: mid-year 1970 (or around)	7.3 mln (after Migozzi, 1973)
Affected Population Included in Estimate: April 1975 (or around)	7.460 mln
Affected Population Included in Estimate: January 1979 (or around)	6.510 mln (December 1978)
Absolute Decline in Population Size between April 1975 to January 1979 (or around)	950,000; the general accounting equation explaining this decline includes: <ul style="list-style-type: none"> - Excess Births: + 500,000 - Excess Deaths: - 1,000,000 - Refugees abroad: - 250,000 - Repatriation Vietnam: - 200,000
Motivation for this Report	Article published in an international demographic journal

⁸⁸ Ea Meng-Try, 1981: "Kampuchea: A Country Adrift". Population and Development Review 7, No. 2 (June 1981).

~~CONFIDENTIAL~~**Main Contribution/Failure of the Paper:**

The results of EA Meng-Try must be taken with caution. It is a very subjective assessment, based on a qualitative approach that was made in a difficult period directly after the Khmer Rouge regime ended in Cambodia and a new regime supported by Vietnam established themselves in the country. In this period, in the absence of reliable data on the population, and in the absence of the necessary historical distance to political realities of that time, it was hard to assess the population losses in a reliable way. No uncertainty assessment is presented in this paper. Even though Ea made a serious effort to analyze views of the opposing parties on the population development, we do not believe he succeeded to present reliable figures.

Other relevant results:

- Population of Phnom Penh, April 1975: 3 mln

Refugees, April 1975 to December 1978:

- Refugees to Thailand: 30,000 (until start of 1978)
- Refugees to Vietnam: 50,000
- Repatriation to Vietnam: 200,000 (April 1976)

~~CONFIDENTIAL~~ESTIMATE BY VICKERY, 1984⁸⁹

Reported Excess Deaths	740,000
Reported Direct Excess Deaths	300,000
Time Period Covered	April 1975 to January 1979
Total Number of Months	45: April 1975 to January 1979 (January not counted)
Causes of Death	Violent (i.e. direct) versus indirect deaths ⁹⁰
Affected Ethnic Groups	No ethnicity available
Data Sources	CIA (1980); some demographic rates (births 30/1000 per year and deaths 18/1000 per year) from the period around the 1962 Census; sources unclear. Some additional population projections by individual authors and organizations for contextual purposes
Methods for the Overall Number of Victims	Excess deaths obtained as a residual category from a general demographic accounting equation. Components of the equation obtained from author's own (predominantly qualitative) assessment of estimates by others.
Methods for Cause of Death Distribution	Author's own (predominantly qualitative) assessment of estimates by others. The overall total of excess deaths in 1975-78 obtained from the general accounting equation (740,000) was distributed into direct and indirect deaths according to subjective survivors' recollections.
Affected Population Included in Estimate: mid-year 1970 (or around)	7 mln (CIA, 1980)
Affected Population Included in Estimate: April 1975 (or around)	7.1 mln; obtained as CIA 7.3 mln – 0.2 mln (repatriation to Vietnam); All living in Cambodia in April 1975, excluding those who were forced to Vietnam at the beginning of the Khmer Rouge conflict. These would be app. 200,000 Cambodian Vietnamese that left to Vietnam.
Affected Population Included in Estimate: January 1979 (or around)	6.5 to 6.7 mln; author's own estimates
Absolute Decline in Population Size between April 1975 to January 1979 (or around)	400,000 to 600,000; the minimum decline of 400,000 is further distributed according to the general accounting equation: <ul style="list-style-type: none"> - Out-migration eliminated from 7.3 mln for simplicity - Births 1975-78: (+) 852,000 based on crude birth rate of 30/1,000 per year - Natural Deaths 1975-78: (-) 511,000 based on crude death rate of 18/1,000 per year - Excess Births 1975-78: (+) 341,000 - Excess Deaths 1975-78: (-) 741,000
Motivation for this Report	Writing history of Cambodia and publishing it.

⁸⁹ Michael Vickery, 1984: "Cambodia 1975-1982", Silkworm 1984, D113.2 (case file 002) (ERN: 00236060-00236064; extract)

⁹⁰ According to Vickery, clearly controversially, mass burial places contain mainly indirect excess deaths and hidden burial places – different from known mass graves – contain bodies from executions.

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Major Contribution/Failure of this Paper:

The method of Vickery's calculation heavily depends on the population sizes in April 1975 and in January 1979 and on assumptions used to fill in the "gap" between the population size on these two different time moments. Vickery used 7.3 mln and 6.5-6.7 mln, for April 1975 and January 1979, respectively). If instead of 6.7 mln people in January 1979, he would have taken 5.8 mln population (same period; after CIA), and kept his assumption regarding births and natural deaths unchanged, the resulting number of excess deaths, that his method had produced, would be 1.641 mln and not 740,000. Of this total, about 665,000 would be violent deaths and 976,000 indirect excess deaths.⁹¹

Vickery's results have no source foundation other than subjective guessing and his own intuition; his reasoning is simplistic and assumptions completely unjustified. Interestingly, Vickery accepts the CIA 1975 population estimate of 7.3 mln above the estimates by others ranging between 7.9 to 8.8 mln in the same period; this has a significant impact on his final results. Another observation is that he conveniently neglects his own higher guess of the 1975-79 population decline (600,000 based on 6.5 mln population in January 1979) and the resulting higher number of excess deaths (940,000). His writing is not transparent, and hard to follow.

Also Banister and Johnson (1993) worked with similar population sizes for 1975 (7.3 mln) and end-1978 (6.4 mln); Vickery used 7.3 mln and 6.5-6.7 mln, respectively. Their estimate of excess deaths in this period is 1.050 mln. This is fully possible as there exist more than one solutions satisfying Vickery's equation of the population change.

⁹¹ The calculation is the following: "absolute population decline, 1975-79" = "actual 1975" - "actual 1979" = 7.1 mln - 5.8 mln = 1.3 mln. The category "excess births" equals 341,000 and must be added to 1.3 mln giving the overall total difference of 1,641 mln. This number represents the overall excess deaths in Vickery's "model".

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Reported Excess Deaths	1 mln (based on comparison with a hypothetical growth rate of 2.8% until 1981)
Reported Direct Excess Deaths	75,000 to 150,000 suggested as realistic
Time Period Covered	April 1975 to January 1978
Total Number of Months	45; April 1975 to January 1978 (January not counted)
Causes of Death	Not studied; but 75,000 to 150,000 of executions suggested as realistic (sources: Kurt Jansen, the UNICEF representative in Cambodia in 1980-81, 70,000 to 100,000; likely also CIA (1980) 50,000 to 100,000)
Affected Ethnic Groups	Not studied; but perishing of Vietnamese and Chams has been assessed (250,000 Khmer Vietnamese were forcibly moved out to Vietnam and 150,000 Chams out of 200,000 before the conflict perished too).
Data Sources	The Population "Census" of May 1981 by the government in Cambodia (Ministry of Planning, Phnom Penh); UN population projections; CIA (1980) projections; all these cross-referenced with Pol Pot's statistics
Methods for the Overall Number of Victims	<p>Method comprised a comparison of the <u>expected</u> and <u>actual</u> population size in 1981 (in May) and subtracting excess deaths in 1979-81. Assumptions used:</p> <ul style="list-style-type: none"> • Expected population 1981: 8.3-8.5 mln (2.8% annual growth of 7.3 mln (1975; after CIA (1980)); "no war" scenario) • Actual population 1981: 6.7 mln ("1981 census") • Refugees in third countries, 1975-81: 650,000 • The 1981 actual population with refugees: 7.4 mln • Residual: "1981 expected" – "1981 actual with refugees": about 1 mln <p>The residual of 1 mln are excess deaths in 1975-81. Excess deaths 1979-81: Assumed as negligible: main cause for excess deaths in 1979-1981 was famine estimated to cause in reality only "a few tens of thousands" of deaths, (contrary to earlier expectations). The entire excess of 1 mln can be therefore attributed to Khmer Rouge regime.</p>
Methods for Cause of Death Distribution	NA
Affected Population Included in Estimate: mid-year 1970 (or around)	7.1 mln (UN, prior to 1980)
Affected Population Included in Estimate: April 1975 (or around)	7.3 mln (CIA, 1980)
Affected Population Included	6.7 mln (1981 "census")

⁹² Kimmo Kiljunen (ed.), 1984: "Kampuchea: Decade of Genocide". Report of the Finish Inquiry Commission. Zed Books Ltd. London.

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in Estimate: January 1979 (or around)	
Absolute Decline in Population Size between April 1975 to January 1979 (or around)	600,000
Motivation for this Report	Chapter in a report of the Finish Inquiry Commission into the Khmer Rouge regime in Cambodia. The chapter and the entire book have a clearly scientific (historical) orientation.

Main Contribution/Failure of the Paper:

The results of Kiljunen (ed.) are heavily dependent on the population sizes (expected and actual) for 1981 (8.3-8.5 and 6.7, or 7.4 including refugees) respectively. No critical assessment was made of any these two sizes. The 1981 "Census" is known as actually non-existent. The "census" was merely an administrative count whose precision and reliability are unknown. Also the expected population size is very uncertain; it is the result of the assumed population size in 1975 (7.3 mln after the CIA) and the 2.8% growth rate of the population in 1975-81. No justification is presented for any of these components. Developments in births are completely neglected. Note that a higher expected 1981 population (say 9 mln. instead of 8.3-8.5 mln.) would give far more excess deaths (1.6 mln. instead of 1 mln.). So would be the case if there were excess births in 1975-78 (i.e. all births above the natural deaths). This approach is thus extremely subjective and cannot be taken seriously.

Other results:

Migration in 1975-1981 (Kiljunen (ed.) chapter 4):

Refugees to Thailand:	300,000
Refugees to Western countries:	100,000
Repatriation to and Refugees in Vietnam:	250,000
Total:	650,000

Population of Phnom Penh April 1975: 3 mln (sources: July 1997 hearing in the US Congress, Committee on International Relations; interview with Ieng Sary "Der Spiegel", No. 20 1977)

Excess deaths in 1970-75: 600,000 approximately (sources: Democratic Kampuchea: 600,000-800,00; United States: 600,000-700,000; Sihanuk: 600,000)

~~ASSIGN: DINE/1/1~~BANISTER AND JOHNSON, 1993⁹³

Reported Excess Deaths	1.05 mln; 2/3 males and 1/3 females;
Reported Direct Excess Deaths	“For each of these four years, in addition to high underlying mortality conditions, about 10% of men and 3% of women in these ages (“from the mid-teens through middle age”) were killed”. It can be calculated, 235,000 were direct excess deaths. ⁹⁴
Time Period Covered	April 1975 to January 1979
Total Number of Months	45; April 1975 to January 1979 (January not counted)
Causes of Death	Not reported
Affected Ethnic Groups	Not included in the reconstruction scenario but discussed for the 1962 Census, later revisions by Sihnouk, and in the context of migrations. <ul style="list-style-type: none"> • 1962 Census figures (based on “nationality”): <ul style="list-style-type: none"> - 93% Khmer - 4% Vietnamese (218,000) - 3% Chinese (163,000) • Sihanouk’s and other revisions in late 1960s (over 1 mln minorities; 16-17 percent): <ul style="list-style-type: none"> - Vietnamese in Cambodia: 400,000 - Chinese in Cambodia: 300,000-435,000 - Muslim Cham: 150,000 - Hill tribes: 90,000 • Migration/killings of ethnic groups from Cambodia: <ul style="list-style-type: none"> - Vietnamese: most expelled by Lon-Nol in 1970-74, the rest killed or drove out by KR in 1975-78; - Chinese: many killed or drove out by KR in 1975-78; - Muslim Cham: They follow Kiernan’s view that up to 90,000 were exterminated (killed) by KR in 1975-78
Data Sources	Major sources: 1962 Census; 1980 administrative population count (end-1980); 1982 demographic and health survey in Cambodia (Ministry of Health) Auxiliary Sources: A large number of published and unpublished studies, personal communications, results of simulations and alternative scenarios
Methods for the Overall	Excess deaths were obtained within a reconstruction of the

⁹³ Judith Banister and Paige Johnson, 1993: “After the Nightmare: The Population of Cambodia”. In: Ben Kiernan, ed.: Genocide and Democracy in Cambodia: The Khmer Rouge, the United Nations and the International Community

⁹⁴ Age was assumed 15-64 years; the 15-64 years old were assumed to comprise 49.5% of the April 1975 population (after Migozzi (1973)); sex distribution at this age fifty-fifty (after Siampos (1970)). The full calculation is included below:

April 1975 Population	15-64 1975 Population	15-64 years men	15-64 years women	Total 15-64 Men & Women
7,300,000	7,300,000*0.495=3,613,500	1,806,750	1,806,750	3,613,500
Violent Deaths	na	180,675	54,203	234,878
<i>Notes:</i>				
	Migozzi (1973)	15-64 years: 49.5% in 1970 population		
	Migozzi (1973)	15-64 years: 53.4% in 1962 population		
	Siampos (1970)	15-64 years: 51.7% in 1962 population		
	Siampos (1970)	15-64 years: 50% men and 50% women in 1962 population		

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Number of Victims	<p>Cambodia population between 1962 and 1980 by means of a “plausible scenario”. The focus of the study is on the Cambodia population just before the UNTAC supervised first democratic elections of 1993. A reconstruction of the 1970s decade is attempted, using a “plausible scenario” obtained from the interpolation of the size and structure of the Cambodia population between 1962 census and 1980 administrative count. Thereafter, an extrapolation of the 1980 count is performed up to 2050 using the usual demographic accounting approach (in medium, low and high variants).</p> <ul style="list-style-type: none"> • 1962 census <i>and</i> 1980 count <i>and</i> educated guesses on <i>war related population losses</i> were used for the “plausible scenario” of 1962-1980 • <i>war related population losses</i> (deficit of births, out-migration, and war-related excess deaths) used in the “plausible scenario” expressed the impact of civil war March 1970- April 1975 and KR regime April 1975- January 1979 on the population change • <i>war related population losses</i> were not estimated but formulated <i>a priori</i> as educated guesses; their impact was tested by comparing the outcome of the “plausible scenario” with an alternative scenario that would have occurred if there was no civil war/no Khmer Rouge regime • this comparison was crucial for obtaining the estimates of the losses <p>In extrapolation (1980-2050), assumptions regarding fertility and mortality were based on the 1980 administrative count and the 1982 demographic and health survey of the Cambodia Ministry of Health (comp. 83-87 and 93-95). Assumptions regarding migration came from a thorough overview of migration flows from and into Cambodia in the period 1970-1992 summarized in Appendix A and based on a variety of (un)published sources and estimates. The following types of migration are discussed:</p> <ul style="list-style-type: none"> - Non-Khmer/Khmer migration to and from Vietnam - Migration to and from Thailand - Migration to and from third countries
Methods for Cause of Death Distribution	Not available
Affected Population Included in Estimate: mid-year 1970 (or around)	7 mln (“plausible scenario”)
Affected Population Included in Estimate: April 1975 (or around)	7.3 mln (“plausible scenario”)

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Affected Population Included in Estimate: January 1979 (or around)	6.36 mln (end-year 1978; "plausible scenario")
Absolute Decline in Population Size between April 1975 to January 1979 (or around)	940,000 ("plausible scenario"); More importantly a population loss equation was analyzed as well: "end-1978 expected" - "end-1978 actual" = 1.8 mln (1.8 mln= 8.2 mln- 6.36 mln= the overall population loss). The components of the loss are the following: - Net emigration 218,000 (Apr. 1975-Jan. 1979) - Dearth of births 570,000 (Apr. 1975-Jan. 1979) - Excess deaths 1.05 mln (Apr. 1975-Jan. 1979)
Motivation for this Report	Scientific interest in the reconstruction of the population change since 1962 at the edge of the first free elections in Cambodia in 1993.

Major Contribution of this Paper:

A sizeable collection of figures on Cambodia's demographic trends and patterns are brought together in a single paper. All components of the population change are covered. Political, economic, and social background of Cambodia is discussed for 1970-1992. The plausible scenario offers an interesting view on the demographic consequences of the civil war in 1970-75 and KR regime 1975-79. However, it is hard to determine the validity of this scenario, other than by enjoying the views of the obviously highly competent and experienced authors. The reason for this is that again these are the subjective views of the authors on the first place that speak up in the plausible scenario and not reliable and exhaustive sources (those are lacking) and objective measurement approaches.

A useful outcome of this study is the data on the projected Cambodia population:

Year	Mid-Year Population (Plausible)	Mid-Year Population (Min)	Mid-Year Population (Max)	Mid-Year Population (No War)
1962	5.76	na	na	
1970	7.00	na	na	
1975*	7.30	na	na	8.00
1978**	6.36	na	na	8.20
1980	6.50	6.00	7.00	
1993	9.90	9.00	11.20	
2000	12.1	10.7	14.2	

* Beginning-of-year status

** End-of-year status

Population losses during the Lon Nol regime (again as a difference between "start-1975 expected" minus "start-1975 actual": 8.0 mln-7.3 mln=700,000):

- 70,000 fewer births
- 275,000 excess deaths
- 200,000 expelled to Vietnam
- 120,000 fled to Vietnam
- 34,000 fled to Thailand
- Total loss: 700,000 persons

~~ANNEX A~~

The population of Phnom Penh in April 1975 is estimated at 1.5-2.6 million.

Another useful outcome is the review of migration flows (see below). For the Khmer Rouge period 1975-78, the following main flows are distinguished:

- 150,00 Chinese and Khmer Cambodians fled to Vietnam
- 34,039 Cambodians fled to Thailand
- 10,400 Cambodians fled to Laos (not included in Table A-1)
- Other out-migration: about 24,000 (not included in Table A-1)
- Total of 218,000 (184,039 listed in Table A-1)

Table A-1. Cambodia Assumed International Migration

Year	To/From Thailand	To/From Vietnam	Cambodia net intl. migration
1970	0	-195,000	-195,000
1971	-8,500	-30,000	-38,500
1972	-8,500	-30,000	-38,500
1973	-8,500	-30,000	-38,500
1974	-8,500	-30,000	-38,500
1975	-17,038	-37,500	-54,538
1976	-6,428	-37,500	-43,928
1977	-7,045	-37,500	-44,545
1978	-3,528	-37,500	-41,028
1979	-137,894	100,000	-37,894
1980	-34,586	41,666	7,080
1981	-16	41,666	41,650
1982	-14	41,666	41,652
1983	0	41,666	41,666
1984	-208,995	41,666	-167,329
1985	-70,000	41,666	-28,334
1986	-4,997	41,666	36,669
1987	-5,769	41,666	35,897
1988	-4,410	41,666	37,256
1989	-6,936	41,666	34,730
1990	-1,551	41,666	40,115
1991	-1,157	41,666	40,509
1992	220,000	0	220,000
1993	150,000	0	150,000
Net Migration	-174,364	134,992	-39,372

Note: A positive number indicates migration into Cambodia. A negative number indicates migration from Cambodia to other countries.

Source: Banister and Johnson (1993), Annex A (p. 121-124), Table A-1 (p. 125)

~~CONFIDENTIAL~~ESTIMATE BY MAREK SLIWINSKI, 1995⁹⁵

Reported Excess Deaths	1.888 mln (24.3% of 1975 population of 7.768 mln -H1) or 1.869 mln (25.6% of the 1975 population of 7.3 mln -H2) In 1975-1979, 31.2% (32.5%) of the 1975 Cambodian population perished due to natural <i>and</i> revolution-related reasons. Mortality, fertility and migration rates varied substantially across the country. The provinces from which Red Khmers originated experienced five times lower mortality rates than the southern provinces during the 1975-1979 period.																		
Reported Direct Excess Deaths	A minimum of 39.3% of all deaths (i.e. murdered; see "causes" below); more likely about 52.5% of all deaths (i.e. murdered and missing).																		
Time Period Covered	April 1975 to January 1979; part of 1970-1989 covered by the survey																		
Total Number of Months	45; April 1975 to January 1979 (January not counted)																		
Causes of Death	Reported as: <table border="1"> <thead> <tr> <th>Cause of death</th> <th>Percent of All Deaths</th> <th>Percent of 1975 Population</th> </tr> </thead> <tbody> <tr> <td>Murdered</td> <td>39.30%</td> <td>12.50%</td> </tr> <tr> <td>Starved to death</td> <td>36.30%</td> <td>11.50%</td> </tr> <tr> <td>Missing</td> <td>13.20%</td> <td>4.20%</td> </tr> <tr> <td>Natural causes</td> <td>9.80%</td> <td>3.10%</td> </tr> <tr> <td>War related causes</td> <td>1.60%</td> <td>0.50%</td> </tr> </tbody> </table> <i>Source: Sliwinski's survey</i>	Cause of death	Percent of All Deaths	Percent of 1975 Population	Murdered	39.30%	12.50%	Starved to death	36.30%	11.50%	Missing	13.20%	4.20%	Natural causes	9.80%	3.10%	War related causes	1.60%	0.50%
Cause of death	Percent of All Deaths	Percent of 1975 Population																	
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War related causes	1.60%	0.50%																	
Affected Ethnic Groups	Reported as: <table border="1"> <thead> <tr> <th>Minority</th> <th>Death rate 1975-1979</th> </tr> </thead> <tbody> <tr> <td>Overall rate</td> <td>31.2%</td> </tr> <tr> <td>Vietnamese</td> <td>37.5%</td> </tr> <tr> <td>Chinese</td> <td>38.4%</td> </tr> <tr> <td>Chams - Muslims</td> <td>40.6%</td> </tr> <tr> <td>Khmers - Catholic</td> <td>48.6%</td> </tr> </tbody> </table> <i>Source: Sliwinski's survey</i>	Minority	Death rate 1975-1979	Overall rate	31.2%	Vietnamese	37.5%	Chinese	38.4%	Chams - Muslims	40.6%	Khmers - Catholic	48.6%						
Minority	Death rate 1975-1979																		
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Vietnamese	37.5%																		
Chinese	38.4%																		
Chams - Muslims	40.6%																		
Khmers - Catholic	48.6%																		
Data Sources	For excess deaths: Sliwinski's own questionnaire survey conducted in France, Thailand and Cambodia in 1989-1991. For population size: 1962 Census, Migozzi (1973), Kimmo Kiljunen (ed. 1984), CIA (1980)																		
Methods for the Overall Number of Victims	Author used his own data collected between 1989 and 1991 in a questionnaire survey with respondents in France, Thailand and Cambodia (details of the survey under this table). In order to extrapolate survey results over the entire Cambodia population he produced population estimates based on the 1962 Census and Migozzi (1973) projections.																		

⁹⁵ Marek Sliwinski, 1995, "Le genocide Khmer Rouge une analyse démographique", Editions L'Harmattan, 1995, 175 p.

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	The projections originally made by Migozzi (until about 1970) were expanded until the end of 1989. Initial assumptions on the population size and structure in 1970 were taken from Migozzi's projections. For the later (post-1970) period, Sliwinski produced birth, deaths and migration rates from his own survey. The population size and structure during the 1970s was reconstructed using those estimated rates and the assumed size and structure of the population in 1970.
Methods for Cause of Death Distribution	Reports of survey respondents
Affected Population Included in Estimate: mid-year 1970 (or around)	7.796 mln (mid-1972; after Migozzi, 1973)
Affected Population Included in Estimate: April 1975 (or around)	7.768 mln (H1) or 7.3 mln (H2) 7.566 mln (his projection in Table 1 of his book)
Affected Population Included in Estimate: January 1979 (or around)	5.586 mln (his projection in Table 1 of his book)
Absolute Decline in Population Size between April 1975 to January 1979 (or around)	1.980 mln (based on his projections from Table 1 in his book)
Motivation for this Report	Scientific interest and writing demographic history of Cambodia, 1970-89.

Details of the Study

The Survey

The collection of the data for the study commenced in 1989 in France and Thailand and finished in 1991 in Cambodia. The sample consisted of three distinct categories:

1. Cambodians living in France. This category consisted of former intellectual elite or so called "old emigration", people who left Cambodia during the 1960- 1975 period. There were 63 families in this category, which constituted a small, non-representative sample. They were addressed with a pilot questionnaire.
2. Cambodians living in the refugee camps in Thailand near Cambodian border. This category consisted of the former inhabitants of Cambodian provinces of Battambang, Siem Reap and d'Oddar Mean Chhey. In this category, there were also people who combated Vietnam forces - Son Sann guerrillas, Sihanouk guerrillas and Red Khmers. They originated from all Cambodian provinces. This category was represented by 589 families, living in the camp controlled by the Son Sann guerrillas.
3. Cambodia inhabitants. The study area was limited to Phnom Penh and the 150 km radius around it due to security reasons. The sample structure corresponded to the Cambodian population structure in 1970. 644 questionnaires were obtained this category.

~~PHNOM PENH~~

A total number of 1,296 questionnaires were collected, with information on the fate of 13,163 distinct individuals, as the questionnaire traced the history of the entire family of the interviewed person. The rejection rate equaled to 25%. The questionnaire was aimed to reconstruct the main demographic events of the respondents and their families. It included the following information:

- Enumeration of all family members, living, died or missing after March 1970 (including family members born after that date)
- Province of inhabitancy during all major historic periods
- Sex, religion, nationality, year of birth, and place of birth
- Dates, places and circumstances of deaths and disappearances
- Dates, places and circumstances of injuries and other traumatic experiences
- Socio-economic status in the past and present
- Level of education

Alternative Variants in Sliwinski's Projections

The first aim of Sliwinski's analysis was to reconstruct the size and structure of the Cambodian population in the period before April 1975 and estimate the size and direction of internal migration during the 1975-1981 period. This was because the death and extermination rates were considerably different across Cambodia and forced migrations were responsible for the high mortality rate in that period. Reliable statistical estimation of internal migrations is not available for the period 1972-1981. However, it can be assumed that the migration to Phnom Penh (and other big cities) progressed geometrically, reaching up to three 3 mln in 1975. Below selected results are included for illustrative purposes. All tables and charts and their numbering are original as in the book by Sliwinski (1995).

Table 1. Evolution of Cambodian Population during the Period of 1962-1981, By Province (p. 26)

Source*:	(1)	(1)	(1)	(2)	(3)	(2)	(2)	(2)	(2)	(2+4)
Année :	1962	1968	1972	1974	1975	1975	1975	1978	1979	1981
Mois :		déc.		déc.	avr.	avr.	juin	déc.	jan.	
Prov./Région:										
Phnom Penh + agglom.	430	570	1450	1863	3000	2500	142	96	0	281
Kandal	709	775	765	707	513	604	618	499	492	616
Capitale	1139	1375	2215	2570	3513	3104	760	595	492	897
Takeo	465	541	534	475	340	401	591	509	502	454
Kampot	341	414	409	364	261	308	435	346	341	303
Sud-Ouest	806	955	943	839	601	709	1026	855	843	757
Kg Chhnang	273	331	327	291	208	245	287	203	200	189
Kg Speu	308	361	357	317	228	268	299	228	225	290
Koh Kong	45	60	59	52	38	45	42	27	27	67
Ouest	626	752	743	660	474	558	628	458	452	546
Battambang	552	685	676	814	678	798	962	794	784	615
Pursat	182	223	220	196	140	165	444	276	272	150
Nord-Ouest	734	908	896	1010	818	963	1406	1070	1056	765
Siem Reap	314	371	366	326	233	275	334	307	303	408
O. Méan. Chh	60	50	49	44	31	37	43	42	41	
P. Vithear		45	45	39	29	34	39	29	29	60
Nord	374	466	460	409	293	346	416	378	373	468
St. Trang	35	44	44	39	28	33	46	49	48	33
Ratanakiri	49	56	55	49	35	41	48	52	51	38
Mondulkiri	15	17	17	15	11	13	16	17	17	14
Nord-Est	99	117	116	103	74	87	110	118	116	85
Kratie	126	162	160	144	102	120	317	309	305	134
Pr. Veng	488	588	581	490	352	414	571	479	472	574
Sv. Rieng	228	346	341	304	218	257	190	142	140	250
Est	716	934	922	794	570	671	761	621	612	824
Kg Thom	321	379	374	333	239	282	580	454	448	324
Kg Cham	819	977	965	860	616	726	1226	901	889	915
Centre	1140	1356	1339	1193	855	1008	1806	1356	1337	1239
Cambodge	5760	6995	7796	7619	7300	7566	7230	5759	5586	5715

*Sources : (1) Migozzi; (2) MS (enquête); (3) CIA; (4) Kiljunen.

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Assumptions regarding fertility, mortality and migration were made using the questionnaire study data. In case of migration, people who left Cambodia for Thailand or France were not represented in the study sample. One can find the exact numbers for migration rates for every province in Cambodia in the book. According to the author, all migrations were forced. Author does not make any assumptions on the natural migration rates.

Khmer Rouge Victims: Selected Results

Sliwinski's estimates of excess deaths are computed under two distinct assumptions; so called Hypothesis 1 (H1) which assumes: population of Cambodia before the Khmer Rouge - 7.768 mln; population of Phnom Penh - 2.5 mln and Hypothesis 2 (H2) which assumes: population of Cambodia - 7.3 mln; population of Phnom Penh - 3 mln. Most results in his book are available for the H1 hypothesis. Note that neither the H1 nor H2 populations are consistent with his population figures in Table 1. Table 1 provides the structure of the Cambodia population by province and a general context for his study; figures from Table 1 are not used in his extrapolations of survey results.

According to Table 2, the estimated proportion of displaced persons is 46,6% under H1 (54,1% under H2). Some 2,2% of the population in 1975 managed to escape abroad. Deportation rates varied substantially across provinces. After exclusion of the capital city, only 14,6% of the population was displaced.

Table 2. Proportion of Displaced Population during Khmer Rouge Regime, 1975-1979 (p.32)
First column: Proportion of Displaced in a Given Province
H1, H2: Proportion of National Population Displaced by Province under H1 and H2

Province :	Proportion des déportés :	Proportion de population nationale déportée	
		H1	H2
Phnom Penh + agglom.*	1.000	0.322	0.411
Koh Kong**	0.559	0.003	0.003
Sv. Rieng	0.511	0.020	0.018
Kandal	0.471	0.043	0.038
Kg Speu	0.366	0.015	0.013
Takeo	0.104	0.006	0.006
Kg Chhnang	0.216	0.008	0.007
Kampot	0.193	0.009	0.008
Pursat	0.177	0.004	0.004
Pr. Veng	0.168	0.011	0.009
Kg Cham	0.144	0.016	0.014
Kg Thom	0.102	0.004	0.004
O.Méan Chhay	0.063	0.001	0.000
Siem Reap	0.046	0.002	0.002
Battambang	0.027	0.003	0.003
Kratie	0.020	0.001	0.001
P. Vihear***	?	0.000	0.000
St. Treng ***	?	0.000	0.000
Ratanakiri***	?	0.000	0.000
Monduliri***	?	0.000	0.000
Total I		0.468	0.541
Total II**** extrapolation		0.614	0.671

Table 7 shows that during the four years of Khmer Rouge regime 31,8% of the Cambodian population perished or was reported missing and 68.2% were survivors. Among men, some 40.8% died or disappeared and among women 22.6 percent.

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Table 7. Deaths, Survivors and Missing Persons during Khmer Rouge Regime, 1975-1979 (p. 52)
(Total I – Without Missing, Total II – With Missing)

Age :	Hommes		Femmes		Ensemble	
	morts	surv.	mortes	surv.	morts	surv.
0 - 10	22.9	77.1	20.1	79.9	21.6	78.4
10 - 20	18.4	81.6	14.9	85.1	17.5	82.5
20 - 30	34.3	65.7	19.1	81.9	26.9	73.1
30 - 40	40.0	60.0	20.6	79.4	30.0	70.0
40 - 50	43.4	56.6	25.7	74.3	33.7	66.3
50 - 60	49.6	50.4	31.7	68.3	40.6	59.4
60 - +	58.7	41.3	47.6	52.4	53.7	46.3
Total*I	31.9	68.1	21.8	78.2	26.5	73.5
Disparus	8.9		0.8			
Total*II	40.8	59.2	22.6	77.4	31.8	68.2

In Table 8 Sliwinski shows that the Khmer Rouge regime was responsible for the death of 24,3% of the population (H1; 25,6% under H2).

Table 8. Deaths, Missing Persons and Survivors during Khmer Rouge Regime. By Province (p. 57)

Province de séjour au 17.4.1975	Morts %	Disp. %	Surv. %	Victimes des Khmers Rouges (1) en 1.000 (2)	
				H1	H2
Phnom Penh	34.3	7.6	58.1	34.8	1044
Kandal	37.2	5.0	57.8	35.3	173
Kompong Cham	25.9	2.9	71.2	21.7	133
Battambang	17.8	2.1	80.1	12.7	91
Prey Veng	22.4	2.5	75.1	18.0	63
Svay Rieng	30.0	4.9	65.1	27.7	60
Kompong Speu	29.6	2.8	67.6	25.5	58
Kompong Chhnang	30.0	0.8	69.2	23.9	50
Kampot	19.3	6.7	74.0	19.1	50
Takeo	18.0	2.4	79.6	13.5	44
Kompong Thom	22.4	2.4	75.2	17.9	42
Pursat	20.0	2.1	77.9	15.2	21
Siem Reap	14.2	0.7	85.5	7.7	18
Koh Kong (3)	31.2	9.6	59.2	33.7	13
Kratie	8.3	6.2	85.5	7.6	7
Oddar Méan Chhey	9.5	0.0	90.5	2.6	1
Ratanakiri (4)				2.6	1
Stung Treng (4)				2.6	1
Preah Vihear (4)				2.6	1
Mondulakiri (4)				2.6	0
TOTAL en 1.000				1.843	1.871
TOTAL en %				24.3%	25.6%

During Khmer Rouge regime the sex ratio (male/female) dropped from 0,999 to 0,767. The sex ratio for cohorts in reproductive age was disturbed even more. (Figure 7).

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Figure 7. Sex and Age Mortality Rates during Khmer Rouge Regime, 1975-1979 (p. 53)

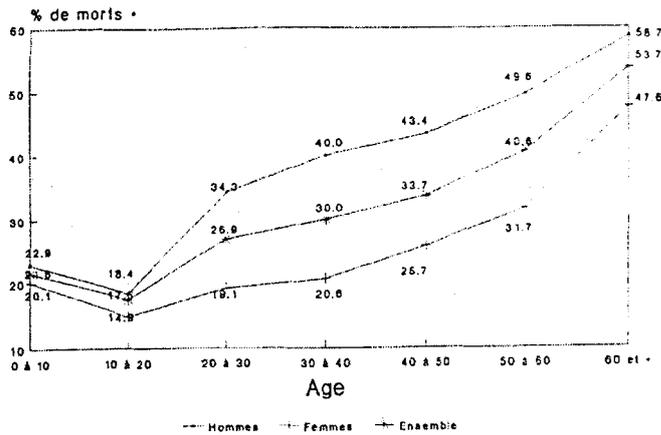


Figure 10. Causes of Mortality during Khmer Rouge Regime, 1975-1979 (p. 56)
(Assassines = Assassinations; Famine = Starvation; Disparus = Missing; Guerre = War)

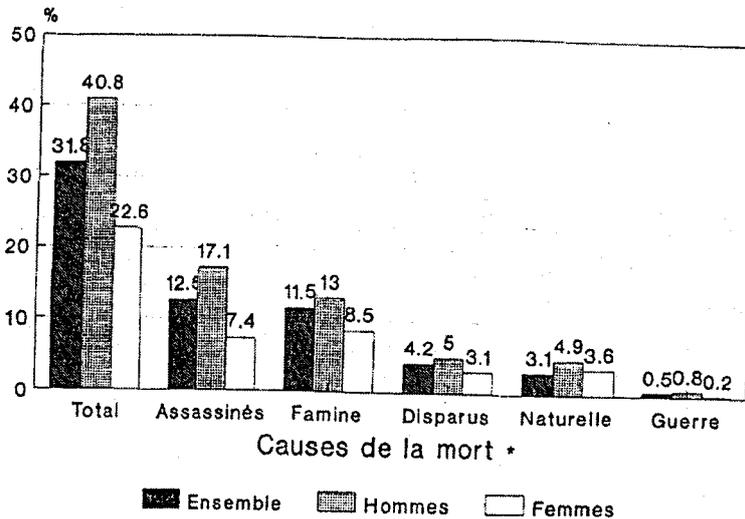
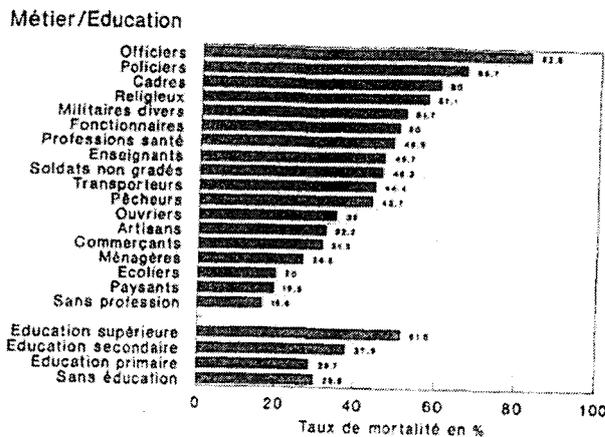


Figure 12 Mortality Rates By Profession and Education Level, 1975 – 1979 (p. 62)
(Officiers – Officers; Policiers – Policemen; Professions Santé – Medical Staff; Pecheurs – Fishermen; Ouvriers – Blue Collars; Ecoliers – Teachers; Paysants – Peasants)



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Figure 17. Mortality Rates of National Minorities, 1975 – 1979 (p. 77)

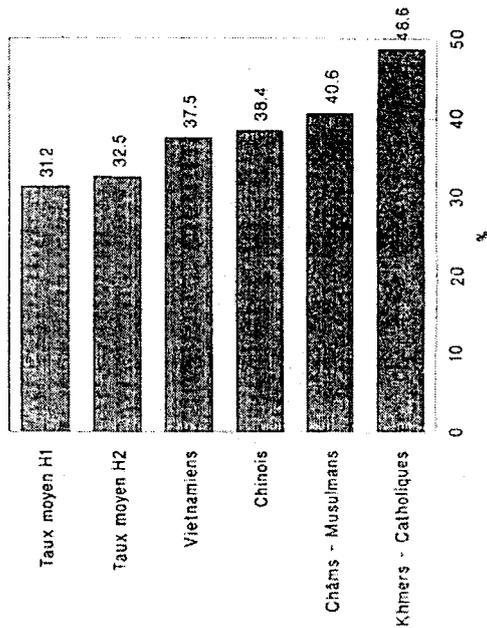
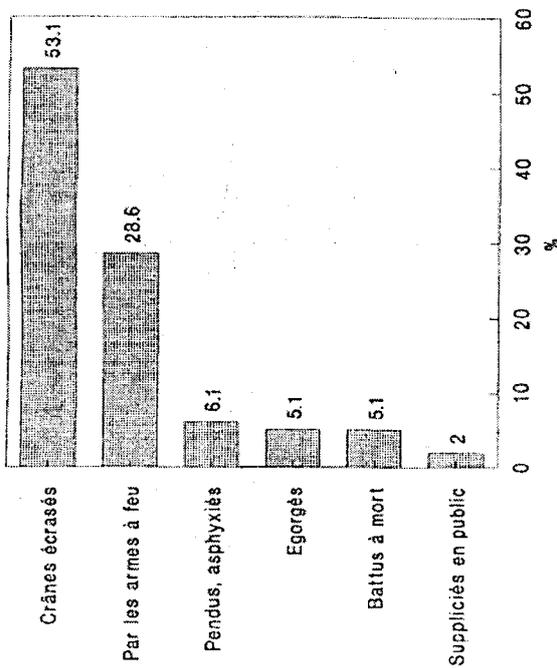


Figure 18. Methods of Extermination during Khmer Rouge Regime, 1975 – 1979 (p. 78)
 (Crânes Ecrasés – Skulls Crashed; Par Les Armes De Feu – Fire Weapon; Pendus, Asphyxiés – Hanged, Suffocated; Egorés – Throat Cut, Battus A Mort – Beaten To Death, Suppliciés En Public – Tortured Publicly)



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Figure 20. Methods of Extermination during Khmer Rouge Regime, 1975-1979. By Year (p. 84)
(Par Armes A Feu – Fire Weapon; Manuelle, Torture – Killed by Hand, Tortured To Death)

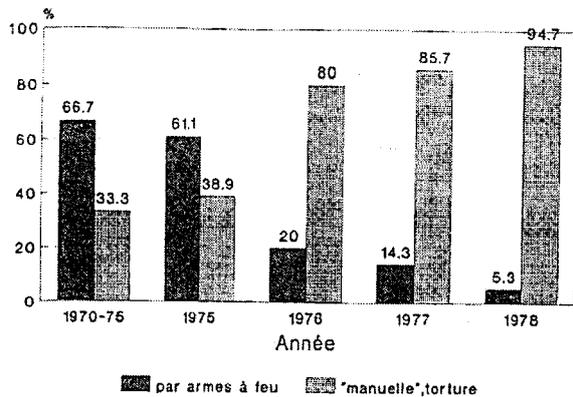
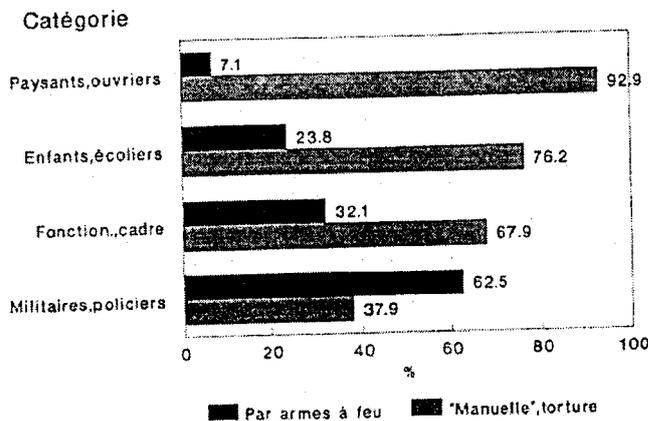


Figure 21. Methods of Extermination By Socio-Economic Status. (p. 85)
(Paysants – Peasants; Ouvriers – Blue Collars; Enfants – Children; Ecoliers – Teachers; Fonction, Cadre - Functionaries; Policiers – Policemen)



According to Table 13, the increase in rural population was positively correlated with the mortality caused by starvation in the South of Cambodia ($r=0,732$) and negatively in the North ($r=-0,564$).

Table 13. Relation between the Increase in Rural Population and Percentage of Deaths Caused By Starvation. (Population In 1975 = 100%) (p. 90)

Provinces du sud			Provinces du nord		
% Accroissement (+) % Diminution (-)	% morts famine		% Accroissement (+) % Diminution (-)	% morts famine	
Phone Penh	-94.3	0.7	Svay Rieng	-24.6	6.4
Kg Som	-6.7	5.7	Preah Vith.	+14.7	3.3
Randal	+2.3	6.2	Oddar Méan Chhey	+16.2	1.1
Kg Speu	+11.6	11.5	Siem Reap	+21.1	4.6
Kg Chhnang	+17.1	11.6	Prey Veng	+37.9	5.0
Battambang	+20.6	6.3	Kg Cham	+68.9	5.0
Kampot	+41.2	1.8	Kg Thom	+109.7	2.1
Takeo	+47.7	3.8	Kratie	+164.2	1.5
Pursat	+169.1	19.1			
Corrélation	$r = 0.732$			$r = -0.564$	

~~CONFIDENTIAL~~ *DH/1/1***Main Contribution/Failure of the Paper:**

To some extent the criticism of small surveys remains valid here as well (see the next author Kiernan). Nevertheless this survey is exceptional:

- It is relatively big, carefully prepared, preceded by a pilot, selected from three different populations of survivors, at three different moments of time etc.
- Its representativeness of the entire country cannot be assessed but most certainly it can be seen as a broad and solid case study.
- Its scope is extensive; not only Khmer Rouge revolution is covered but as well the civil war of 1970-75; comparisons of the two are possible.
- It explores areas of victimization that are of utmost interest to a court of law, such as causes of death, timing of casualties, targeting of ethnic and professional groups, and of urban versus rural populations etc.

The extrapolation of survey results is careful; a majority of the results are reported as percentages and can be applied to any population size. The author provides his best estimates of the Cambodia population in April 1975 (H1 and H2); thus obtaining absolute numbers is possible using his population statistics on the first place. Uncertainty of his population estimates is expressed by presenting two different variants (H1 and H2) which, however, are quite convergent when it comes to the overall number of excess deaths during the Khmer Rouge period.

A large number of very detailed results are available on various aspects of the victimization process during the Khmer Rouge regime in 1975-1979. These results are extremely valuable from the point of view of legal proceedings. The results can be seen as a large and well documented case study on the victims of Khmer Rouge.

All the above makes this study a worthwhile candidate for recommending its results for use in court. A separate chapter in this report discusses portions of the survey related to the civil war.

~~CONFIDENTIAL~~ESTIMATES BY BEN KIERNAN, 1996⁹⁶ and 2003⁹⁷

Reported Excess Deaths	(a) 1.671 mln (b) 1.855 mln																																																																				
Reported Direct Excess Deaths	Not reported																																																																				
Time Period Covered	April 1975 to January 1979																																																																				
Total Number of Months	45; from April 1975 to January 1979 (January not counted)																																																																				
Causes of Death	Not reported for the entire country; several surveys referred to for reporting the percent of <i>murdered</i> people																																																																				
Affected Ethnic Groups	<p>All main ethnic and religious groups discussed (see table below); Chams in great detail: 77,000 killed during Khmer Rouge out of 250,000 initial population of Chams in 1975, plus 10,000 missing newborn babies born (as estimated by Kiernan) in 1975-79. The overall number of killed and missing Chams is thus about 90,000 in 1975-79 (exactly 87,000).</p> <table border="1"> <thead> <tr> <th>Social Group</th> <th>1975 Population</th> <th>Number Who</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td colspan="4">NEW PEOPLE</td> </tr> <tr> <td>urban Khmer</td> <td>2,000,000</td> <td>500,000</td> <td>25</td> </tr> <tr> <td>rural Khmer</td> <td>600,000</td> <td>150,000</td> <td>25</td> </tr> <tr> <td>Chinese (all urban)</td> <td>430,000</td> <td>215,000</td> <td>50</td> </tr> <tr> <td>Vietnamese (urban)</td> <td>10,000</td> <td>10,000</td> <td>100</td> </tr> <tr> <td>Lao (rural)</td> <td>10,000</td> <td>4,000</td> <td>40</td> </tr> <tr> <td>Total New People</td> <td>3,050,000</td> <td>879,000</td> <td>29</td> </tr> <tr> <td colspan="4">BASE PEOPLE</td> </tr> <tr> <td>rural Khmer</td> <td>4,500,000</td> <td>675,000</td> <td>15</td> </tr> <tr> <td>[Khmer Kron]*</td> <td>5,000</td> <td>2,000</td> <td>40</td> </tr> <tr> <td>Cham (all rural)</td> <td>250,000</td> <td>90,000</td> <td>36</td> </tr> <tr> <td>Vietnamese (rural)</td> <td>10,000</td> <td>10,000</td> <td>100</td> </tr> <tr> <td>Thai (rural)</td> <td>20,000</td> <td>8,000</td> <td>40</td> </tr> <tr> <td>upland minorities</td> <td>60,000</td> <td>9,000</td> <td>15</td> </tr> <tr> <td>Total Base People</td> <td>4,840,000</td> <td>792,000</td> <td>16</td> </tr> <tr> <td>Total Cambodia</td> <td>7,890,000</td> <td>1,671,000</td> <td>21</td> </tr> </tbody> </table> <p><i>Note: * not included in Cambodia total</i></p>	Social Group	1975 Population	Number Who	Percentage	NEW PEOPLE				urban Khmer	2,000,000	500,000	25	rural Khmer	600,000	150,000	25	Chinese (all urban)	430,000	215,000	50	Vietnamese (urban)	10,000	10,000	100	Lao (rural)	10,000	4,000	40	Total New People	3,050,000	879,000	29	BASE PEOPLE				rural Khmer	4,500,000	675,000	15	[Khmer Kron]*	5,000	2,000	40	Cham (all rural)	250,000	90,000	36	Vietnamese (rural)	10,000	10,000	100	Thai (rural)	20,000	8,000	40	upland minorities	60,000	9,000	15	Total Base People	4,840,000	792,000	16	Total Cambodia	7,890,000	1,671,000	21
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Data Sources	A number of small scale surveys (listed under this table) were used for drawing or supporting his results. Additional sources on the population size in April 1975 and January 1979: Migozzi (1980), Sampson (1977), Banister and Johnson (1993), Sliwinski (1995), Heuveline (1998), as well as UN (mid-1974; unrevised), and DK estimates.																																																																				
Methods for the Overall Number of Victims	For (a), 1.671 mln, no reconstruction was made; (pre 1980 uncorrected) UN projections were used for April 1975, i.e. 7.890 mln, and his own informed guesses for the population size of Base and New People as well as of Phnom Penh and other cities (see above). A typically historical qualitative approach was used. First, he reviewed a number of small surveys, some of which were anthropological and related to single villages. Then, the																																																																				

⁹⁶ Ben Kiernan, 1996: *The Pol Pot Regime: Race, Power and Genocide in Cambodia under the Khmer Rouge, 1975-79*. (2008 - Third Edition). Yale University Press. New Haven, London (First edition: 1996). Chpt 11. *The End of Pol Pot Regime (The Toll)*.

⁹⁷ Ben Kiernan, 2003: "The Demography of Genocide in Southeast Asia: The Death Tolls in Cambodia, 1975-79, and East Timor, 1975-80". Research note, *Critical Asian Studies* 35:4 (2003), pp. 585-597.

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	<p>results from this review were extrapolated over the entire population by applying estimated rates of those who perished (i.e. were killed, died of indirect war-related causes or went missing); all was done by social group. The rates were generally taken from the reviewed surveys or were produced as his own informed guesses. Kiernan also came up with separate estimates of victims among ethnic groups (Chinese, Vietnamese, Cham, Thai, Lao and “upland minorities”).</p> <p>For (b), 1.855 mln, the general accounting approach was applied, by comparison of the <u>expected</u> and <u>actual</u> population size in 1979 (in January). Components:</p> <ul style="list-style-type: none"> • Expected population January 1979: 8.215 mln (produced as 1% annual growth of 7.89 mln April 1975 population (his own estimate), minus 150,000 repatriated Vietnamese; 1% growth covers only the actual natural change; NOT excess deaths) • Actual population January 1979: 6.36 mln (after Bannister and Johnson, 1993) • Repatriation to Vietnam, 1975-79: 150,000 (already subtracted from “expected”) • Residual: “1979 expected” – “1979 actual” (no refugees): about 1.855 mln of excess deaths
Methods for Cause of Death Distribution	NA
Affected Population Included in Estimate: mid-year 1970 (or around)	7.363 mln (Migozzi, 1973)
Affected Population Included in Estimate: April 1975 (or around)	7.890 mln (Kiernan’s own)
Affected Population Included in Estimate: January 1979 (or around)	6.360 mln (Banister and Johnson, 1993)
Absolute Decline in Population Size between April 1975 to January 1979 (or around)	1.530 mln
Motivation for this Report	Writing the history of Cambodia, 1975-79

Main Surveys Referred to by Kiernan:

Ben Kiernan, 1980: A survey of 500 respondents of whom 100 interviewed in France in 1979 and 400 inside Cambodia in 1980. In: Ben Kiernan and Chanthou Bua, 1982: Peasants and Politics in Kampuchea, 1942-1981. London Zed Books.

Milton Osborn, 1980: A survey of 100 Khmers among the refugees in camps at the Thai-Cambodian border. In: M. Osborn, 1980: Pol Pot’s Terrifying Legacy. FEER, 6 June 1982, pp.20-22. (Quoted after Kiernan, p. 456).

~~From: DUC/LA~~

- Stephen Heder, 1981: A survey of 1,500 refugees on the Thai-Cambodian border in 1980-81 (field data on 15,000 individuals - members of respondents' immediate families). Specific source not available. (Quoted after Kiernan, p. 456)
- May Ebihara, 1993: Anthropological survey of a Khmer village of 158 inhabitants in Cambodia (Kandal province, south of Phnom Penh). In: M. Ebihara, A Cambodian Village under the Khmer Rouge, in Kiernan, 1993: Genocide and Democracy in Cambodia, chpt. 2 (Quoted after Kiernan, p. 459)
- Katuiti Honda, 1981: Two surveys in two Khmer villages (one of 168 people and one of 728 people). Journey to Cambodia: Investigation into Massacre by Pol Pot Regime. Tokyo, 1981. (Quoted after Kiernan, p. 459)

Main Contribution/Failure of the Paper:

Using small surveys and extrapolation of their results over the entire populations not always can be seen as a reliable measurement method of conflict or violent regime victims. Among the most important reasons the following can be mentioned:

- No sampling mechanism exists that would ensure the sample being representative of all victims; in particular, the random sampling designed as a representation of the exposed population must fail; this is because conflicts and revolutions are not random events; they develop through planned objectives and targeting of certain groups more than the rest of the population.
- Also convenience sampling is unreliable unless many samples are integrated by cross-referencing, merging and duplicate elimination.
- Families who suffered relatively higher losses, and especially the families killed or disappeared in whole, will always be underrepresented in any sampling scheme as they are underrepresented among the survivors from whom respondents are drawn.
- Some sampling schemes can as well produce overrepresentation of clustered deaths if they are designed to be taken from clustered victims' representations.
- There exists recall error which increases with time.

Despite of the above, historical estimates based on extrapolation of sample results and integrated with other multiple sources of information are useful indications of the victimization level. Kiernan never stops in exploring new avenues for estimating the Khmer Rouge victims. His early estimate of 1.5 mln victims of Khmer Rouge in 1975-78 (not discussed here), was followed by two next ones, 1.671 mln and 1.855 mln, each obtained from a different approach. He also integrates his own numbers with estimates of others, and so in his final conclusion the death toll of Khmer Rouge regime in 1975-79 is claimed to be between 1.671 to 1.871 mln (the latter after Sliwinski). This desire to present the reader with the best available data is remarkable. The enormous experience Kiernan has as a historian makes his estimates worthwhile.

The general accounting equation he used in his latest estimate (Kiernan, 2003) is not optimal as an estimation method of victims. His earlier approach (Kiernan 1996, 2008) in which he integrated the results of several sources (sample surveys, qualitative interviews with survivors, research results, monitoring reports, personal communications with knowledgeable persons etc.) and applied the estimates rates of those perished to his April 1976 population divided into meaningful social groups is much more convincing.

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ESTIMATE BY PATRICK HEUVELINE, 1998⁹⁸

Reported Excess Deaths	2.2 mln (most likely of possible 700,000 to 3.2 mln) or 1.5 to 2 mln (based on subjective assessment)
Reported Direct Excess Deaths	1.1 mln (most likely of possible 600,000 to 2 mln)
Time Period Covered	1975-1979 (whole years); the famine of 1979-80 might have caused 500,000 to 650,000 deaths according to various authors; part of these deaths is included in Heuveline's estimate of 2.2 mln excess deaths in 1975-79.
Total Number of Months	60; 5 whole years 1975-79 instead 45 months from April 1975 to December 1978
Causes of Death	Direct and indirect causes distinguished
Affected Ethnic Groups	Not distinguished
Data Sources	Key Sources: 1962 Population Census, 1992 electoral rolls of the United Nations Transitional Authority in Cambodia (UNTAC) Auxiliary Sources: Large number of sources were used for formulating assumptions for the population reconstruction and large number for assessment of violent and overall excess deaths in 1970-79, 1970-75 and 1975-79 (see "Details of the Method" under this table...")
Methods for the Overall Number of Victims	Excess deaths are obtained as a residual category from comparing two sets of separately made population projections: forward 1962-1979, and backward 1992-1980. A well established demographic standard - the intercensal cohort component method was used. The forward projection was based on the 1962 Census and the backward one on the 1992 UNTAC voters register. Assumptions used for fertility, mortality and migration balance resembled the actual trends in 1962-1969 and in 1980-1992. For the period 1970-1979 the trends observed in the 1960s were extrapolated expressing the scenario "what if the 1960s trends continued throughout the 1970s". This approach allows for estimating the population size in Cambodia at the end of the decade 1970-1979, i.e. on 1 January 1980, in the absence of conflict/turmoil. Natural mortality is part of this projection and is accounted for. Parallel, the second projection, from 1992 backwards to 1980, allows estimating the actual population size in Cambodia on 1 January 1980 too. A considerable difference must be (and was) obtained between the population size from the forward and backward modeling; the difference represented the excess deaths in 1970-1979.
Methods for Cause of Death	The overall excess deaths were initially estimated for

⁹⁸ Patrick Heuveline, 1998: "Between One and Three Million: Towards the Demographic Reconstruction of a Decade of Cambodian History (1970-79)". Population Studies No. 52, pp. 49-65. Or: Patrick Heuveline, 1998: "L'insoutenable incertitude du nombre. Estimations des décès de la période Khmer Rouge", Population, N°6 (Nov-Dec 1998), pp.1103-1117.

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Distribution	<p>1970-79. Then, a general cause of death distribution was obtained by applying selected model life tables (West model of Coal and Demeny for "Minimum" and Preston, McDaniel and Grushka (1993) high-mortality model for "Medium" and "High")⁹⁹ to distinguish between non-violent increases in mortality from violent deaths. The result of this step is the distribution of the 1970-79 excess deaths according to two major causes: "violence" and "remaining excess". Both types of deaths are available by age.</p> <p>The estimated <i>violent</i> deaths in 1970-79 are further split into the (pre-Khmer Rouge) 1970-75 and (Khmer Rouge) 1975-79 violent deaths based on a review of the work of others. 300,000 violent deaths were assumed for the civil war, 1970-75 (300,000 are the most likely variant out of 150,000 to 500,000 possible). The following authors were consulted: Sihanouk, 1986; Ea, 1987; Kiljunen, 1984; Hood and Albin, 1987; Banister and Johnson, 1995; Sliwinski, 1995; Hirschman et al., 1995; Barbieri, 1995. Some victims of the 1979-80 famine should be further subtracted from 1975-79 estimates. The overall number (1979-80) might have been up to 500,000-600,000 deaths. For 1979 only a part of it should be taken (e.g. 50%).</p>
Affected Population Included in Estimate: mid-year 1970 (or around)	7.662 mln (January 1970) ¹⁰⁰
Affected Population Included in Estimate: April 1975 (or around)	Not reported
Affected Population Included in Estimate: January 1979 (or around)	6.437 mln (January 1980)
Absolute Decline in Population Size between April 1975 to January 1979 (or around)	Not Reported
Motivation for this Report	Scientific article in a renowned international demographic journal.

Details of the Method

To address the uncertainty, in each model three variants were made: high, medium and low, which resembled the standard practice in official statistics. The high and low variants were made the most

⁹⁹ All reference can be found in the 1998 article of Heuveline: "Between One and Three Million: Towards the Demographic Reconstruction of a Decade of Cambodian History (1970-79)". Population Studies No. 52, pp. 49-65. The article is the source for this table.

¹⁰⁰ Population size in 1970 and 1980 is explicitly reported (Tab 5-I, p. 122) in: Patrick Heuveline, 2001: "The Demographic Analysis of Mortality Crises: The Case of Cambodia, 1970-1979". Chapter in: Holly Reid (ed.): "Forced Migration and Mortality". National Academic Press, USA.

~~Personnel/1/1/1~~

extreme possible, in order to address the range of all possible values of the excess deaths. The extreme maximum and extreme minimum excess variants are highly unlikely and the range of 0.7 to 3.2 mln strongly overestimated. The author suggests a far more realistic is the interval of 1.5 to 2 million.

Assumptions Regarding Mortality

Based on data from a number of demographic surveys in Cambodia and literate reviews.

Pre-1970 period: Demographic surveys for Cambodia, 1958-59; United Nations, 1971, 1984, 1995a; Siampos, 1970.

Post-1979 period: Murray and Chen, 1996; Banister and Johnson, 1993; 1982 demographic survey for Cambodia; Huguet, 1991; 1989 Census in Vietnam; Banister, 1993; Barbierie et al., 1995; Martin, 1989.

Assumptions Regarding Fertility

Based on data from demographic surveys in Cambodia and literate reviews. The main challenge was in the period before 1970, and not after 1979. Siampos, 1970; Martin, 1989; United Nations, 1995a.

Assumptions Regarding Migration

Migration is the main source of uncertainty in the population projections for Cambodia in 1970-79.

What is needed are two numbers:

- of migrants that left Cambodia after 1962 and did not return until 1992,
- of non-returnees who entered Cambodia after 1962 and were able to register in 1992 elections.

If these two components are erroneously identified (or not identified) they would inflate the residual of the 1962- and 1992-based projections, which represents the excess deaths. An assessment of the above-mentioned components is done by an analysis of two types of migration; each based on literature reviews:

Non-Khmer (and Khmer) migration to and from Vietnam: Migozzi, 1973; Ea, 1987; Banister and Johnson, 1993

Migration to and from Thailand: Migozzi, 1973; Ea, 1987; Banister and Johnson, 1993; Hood and Albin, 1987

Major Contribution/Failure of this Paper:

A transparent well formulated quantitative approach is presented to obtain reliable figures on excess and violent deaths in the 1970s and in 1975-79 in particular. A formal model is applied with well justified assumptions. The model represents the most up-to-date demographic standard in population projections. The level of subjectivism is relatively low compared with other authors. The author builds up on the work of others but is critical and selective of their results. The separation of violent deaths and their distribution into pre-Khmer Rouge and Khmer Rouge period is certainly convincing. Interpretation of the results could be more focused on the most likely variant as the range of all possible values of the number of victims in 1970s is extremely unrealistically large. Heuveline's estimate needs to be improved by:

- including births since 1970 and their mortality
- separation of victims of starvation in 1979 from the estimated excess in 1975-79
- narrowing down the estimated range of victims in 1970s to make it more realistic.

~~11/07/11 - 11/07/11~~**HEUVELINE AND POCH BUNNAK, 2007¹⁰¹**

Reported Excess Deaths	1.5-2 mln, i.e. about 25% of the 1975 population Estimates related to the Khmer Rouge period were obtained from MIPopLab survey (see "Details of the Method" under this table) <ul style="list-style-type: none"> - excess mortality claimed 30% of the 1975 male population - excess mortality claimed 20% of the 1975 female population - 45% of parental unions were disrupted by death of at least one spouse - Shortage of men estimated at 1 man for every 2 women age 15 and more years
Reported Direct Excess Deaths	50% (0.75-1 mln)
Time Period Covered	Target period: April 1975 to January 1979; survey statistics cover 1976-78 and 1979-80
Total Number of Months	45; Target period: April 1975-January 1979 (January not counted)
Causes of Death	Violent and indirect deaths (fifty-fifty distribution)
Affected Ethnic Groups	Not discussed
Data Sources	Heuveline (1998), Kiernan (1996), Sliwinski (1995) In addition to the above: <ul style="list-style-type: none"> - Mekong Island Population Laboratory (MIPopLab)
Methods for the Overall Number of Victims	Extrapolation of MIPopLab estimates over the 1975 population of Cambodia.
Methods for Cause of Death Distribution	Not discussed
Affected Population Included in Estimate: mid-year 1970 (or around)	Not presented in this paper
Affected Population Included in Estimate: April 1975 (or around)	Not presented in this paper
Affected Population Included in Estimate: January 1979 (or around)	Not presented in this paper
Absolute Decline in Population Size between April 1975 to January 1979 (or around)	Not presented in this paper
Motivation for this Report	Scientific article in a renowned international demographic journal

¹⁰¹ Patrick Heuveline and Poch Bunnak, 2007: "The Phoenix Population: Demographic Crises and Rebound in Cambodia". *Demography*, Vol. 44, No. 2, p. 405-426.

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Details of the Method

This article should be seen as a continuation of Heuveline's work from 1998, this time using a micro approach, i.e. data from the Mekong Island Population Laboratory (MIPopLab). MIPopLab builds up on some pilot surveys in Cambodia supported by initial grants from the University of Pennsylvania and University of Chicago, the United States of America. Heuveline established the MIPopLab in collaboration with Cambodian researchers, mostly from the Royal University of Phnom Penh. MIPopLab activities were eventually consolidated under the National Institutes of Health (NIH) grant #R03HD41537, "Demographic Reconstruction in Post-Khmer-Rouge Cambodia." Also today NIH is the source of funding for MIPopLab.¹⁰²

MIPopLab is an on-going demographic surveillance system launched in December 2000 in a rural district of Kandal province (located nearby Phnom Penh). The population of this district is about 10,000 persons and is questioned systematically once per year¹⁰³ regarding their basic demographics. A special module was designed in the MIPopLab survey to explore demographic consequences of Khmer Rouge regime, including excess mortality, disruptions in marriage formation and reproductive behavior. The module includes births and marriage histories of all women aged 15 to 75 years (2,843 histories were obtained). Data on parental survivorship were collected from all respondents of the Kandal district. Using this data, several important results were obtained not only on excess mortality but as well on declines in fertility and marriage formation during Khmer Rouge period.

Heuveline notes that regarding demographics, Kandal district cannot be seen as representative of the entire Cambodia population and not as extreme. He places Kandal somewhere between the Old and New people; likely closer to the Phnom Penh population than the areas populated by Base people.

Major results for the Khmer Rouge regime:¹⁰⁴

- Crude fertility rates (CFR) in 1976-1978 fell to about two-thirds of their pre-war levels
- CFRs rebound was immediate and striking in 1979-80; from 3.7 births per woman in 1976-78 to 7.1 births per woman in 1979-80¹⁰⁵
- Crude marriage rates (CMR) of females aged 15 to 34 years fell to 35% of their pre-war level during 1976-78
- CMRs rebounded as early as in 1979-80 and became 86% higher than the pre-war level, mainly thanks to a significant contribution of remarriages in this period

The overall decline in fertility during Khmer Rouge was caused by a general drop in fertility of married women in reproductive ages and as well by the decline in marriage formation and high proportion of widowed women in the population (20% widows among the female survivors of Khmer Rouge).

Major Contribution/Failure of this Paper:

The micro approach of MIPopLab is a worthwhile extension of earlier studies of Heuveline on Khmer Rouge victims. It broadens and deepens his analysis. It is an important confirmation of earlier results.

¹⁰² For MIPopLab details see Heuveline: The Mekong Island Population Laboratory (MIPopLab): Project Description, and Heuveline: MIPopLab Questionnaire. (Parts of the original grant application submitted in to NIH in around 2000). Personal communication of Ewa Tabeau with Heuveline, 26 June 2009.

¹⁰³ In the beginning they were questioned twice a year but at present only one time (personal communication of Ewa Tabeau with Patrick Heuveline and Poch Bunnak, 26 June 2009).

¹⁰⁴ Period rates are shown for five-year periods from 1961-65 to 1996-2000, except of the Khmer Rouge period which is divided into two shorter intervals: 1976-78 and 1979-80.

¹⁰⁵ For the recent two decades Heuveline shows that TFRs for Kandal province remain consistently lower by about 21 to 23% than the national estimates.

~~PROVIN: DATED/1/1~~NEUPERT AND VIRAK, 2005¹⁰⁶

Reported Excess Deaths	1.4 mln (out of 2 mln in 1970s); specifically 1.425 mln if 275,000 excess deaths in 1970-75 and 300,000 famine in 1979
Reported Direct Excess Deaths	Not available
Time Period Covered	January 1975 to January 1980
Total Number of Months	60; 5 whole years 1975-79 instead 45 months from April 1975 to December 1978
Causes of Death	Not available
Affected Ethnic Groups	Not discussed
Data Sources	1962 General Population Census (GPS-1962) 1998 General Population Census (GPS-1998) 2000 Demographic and Health Survey of Cambodia (DHS-2000)
Methods for the Overall Number of Victims	Excess deaths estimated as the 1980 residual change in the Cambodia population size as projected from two different ends: <ul style="list-style-type: none"> - Forward projection from 1962 Census up until 1970 using the actual change scenario (Siampos, 1970) and continued until 1980 under “normal mortality, actual reduced fertility and actual net migration”¹⁰⁷ scenario - Backward projection from 1998 Census until 1980 using assumptions derived from the DHS-2000
Methods for Cause of Death Distribution	Not available
Affected Population Included in Estimate: mid-year 1970 (or around)	7.4 mln
Affected Population Included in Estimate: April 1975 (or around)	Not available
Affected Population Included in Estimate: January 1979 (or around)	6.8 mln (around January 1980)
Absolute Decline in Population Size between April 1975 to January 1979 (or around)	600,000 in 1970-79; The overall population loss between 1970 and 1980 adds up, however, to about 3.3 mln: ¹⁰⁸ <ul style="list-style-type: none"> - Birth deficit in 1970-79: 700,000 (about 200,000 in 1970-75 and 500,000 in 1975-79) - Excess deaths in 1970-79: 2 mln - Out-migration in 1970-79: 570,000 The resulting “no-war” population in 1980 would have

¹⁰⁶ RICARDO NEUPERT and VIRAK PRUM, 2005: “Cambodia: Reconstructing the Demographic Stab of the Past and Forecasting the Demographic Scar of the Future”. European Journal of Population No. 21, pp.217-246.

¹⁰⁷ Net migration (-567,000 in 1970-79) was taken by Neupert and Virak from Banister and Johnson (1993).

¹⁰⁸ The calculation of the population losses is by the authors of this report based on figures on birth deficit, excess deaths and net migration from Neupert and Virak (2205).

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	been about 10.7 million. The loss in 1975-79 is about 2.3 mln (500,000 births deficit+1.4 mln excess deaths+408,000 out-migration).
Motivation for this Report	Scientific article published in a (Springer) book on war demographics

Major Contribution/Failure of this Paper:

The article is based on solid data sources and sound methodology. As a matter of fact, the population projection methodology is the same as that of Heuveline (1998). The resulting number of excess deaths in 1970s obtained by Neupert and Virak is, however, considerably different than that of Heuveline (it is lower: 2 mln vs. 2.5 mln in 1970-79, and 1.4 mln versus 2.2 in 1975-79). The authors explain this difference as follows:

- smaller volume of net migration in Heuveline (1998)
- lower normal mortality for the 1970s in Heuveline (1998)
- the 1970 population was larger in Heuveline (1998); 7.662 mln in Heuveline (1998) and 7.4 mln in Neupert and Virak (2005)

In addition to the above, it can be said the 1980 population obtained from the backwards approach (6.8 mln) is rather high compared with the 1980 population from the Cambodia administrative count (6.6). Hugué (1997) had also run a backwards projection from the 1998 Census until 1980 and produced 6.6 mln population for mid-1980. Heuveline's projection for January 1980 was 6.4 mln. Thus, yet another factor behind the difference with Heuveline's number of excess deaths is the smaller 1980 population.

All in all, it seems Neupert and Virak produced a relatively low estimate of excess deaths (1.4 mln in 1975-78; 1.4 mln does not include the estimated 300,000 famine deaths in 1979 and not estimated 300,000 excess deaths in 1970-75), whereas Heuveline's estimate of 1.9 mln excess deaths in 1975-78 belongs to higher ones (1.9 mln does not include about 300,000 famine deaths in 1979 and not 300,000 during the civil war).¹⁰⁹

A number of similar explanations were provided about differences with other studies (e.g. Banister and Johnson, 1993). The main source of these differences is seen in the estimated 1970 population and assumptions used by various authors.

¹⁰⁹ Calculations discussed in this paragraph are all produced by the authors of this report. Some 300,000 excess deaths were assumed in these calculations for the civil war and another 300,000 for the 1979 famine deaths. Subtracting these two components from the excess deaths estimated for 1970-79 makes it possible for us to directly compare figures for exclusively 1975-78. Note that the same assumptions were used for both authors as this was the most straightforward way of comparing these two different numbers.

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ESTIMATE BY CRAIG ETCHESON, 2005¹¹⁰

Reported Excess Deaths	2.2 mln
Reported Direct Excess Deaths	1.1 mln
Time Period Covered	April 1975 to January 1979
Total Number of Months	45; April 1975-January 1979 (January not counted)
Causes of Death	Violent and indirect deaths (fifty-fifty distribution)
Affected Ethnic Groups	Not discussed
Data Sources	Data collected in the DC-Cam mass grave mapping project
Methods for the Overall Number of Victims	<p>Excess deaths of Khmer Rouge, 1975-78, (2.2 mln) are composed of two parts:</p> <ul style="list-style-type: none"> - The first component is the number of individuals represented by human remains in the mass graves mapped so far in Cambodia: 1,1 mln. - A second component of Etcheson's estimate are indirect excess deaths (1.1 mln.), whose number remains about the same as the number of individuals in the mass graves. <p>The proportion between the two components (i.e. direct and indirect excess deaths) equals 50:50 and is assumed after Heuveline (1998). Other proportions available from literature (and based mainly on small sample estimations) are not seen as appropriate. (Mainly not applicable to the entire population).</p>
Methods for Cause of Death Distribution	Not studied other than by applying the assumption of the "fifty-fifty" distribution. It is assumed, however, that all (or a majority of) victims in the mass graves are from executions rather than from mixed direct and indirect causes of death.
Affected Population Included in Estimate: mid-year 1970 (or around)	NA
Affected Population Included in Estimate: April 1975 (or around)	NA
Affected Population Included in Estimate: January 1979 (or around)	NA
Absolute Decline in Population Size between April 1975 to January 1979 (or around)	NA
Motivation for this Report	Scientific interest that resulted in a book and articles.

¹¹⁰ Craig Etcheson, 2005: "After the Killing Fields: Lessons from the Cambodian Genocide", pages 107-127 and the DC-Cam mapping project.

~~SECRET~~ *D. H. C. / 1 / 1***Main Contribution/Failure of this Paper:**

It is unquestionable that the data from the DC-Cam mass grave mapping are an essential source on victims of the Khmer Rouge regime in Cambodia. Thus, using this data as the basis for an estimate of victims not only makes a lot of sense but is important and needs to be done. While it is unquestionable that a majority of victims in the mass graves are Khmer Rouge victims (violent or non-violent), the assumption that *all* victims found in the mass graves were killed in executions or died as result of Khmer Rouge actions and policies, is not justified and might be difficult to prove. A reason for this is that the usual burial practices were forbidden by Khmer Rouge and thus not commonly exercised during this period. Thus, some “natural” deaths might be found in the mass graves too, especially in smaller graves located in a distance from detention and security centers.

Another aspect of the massive death process during the Khmer Rouge period is that many bodies were abandoned and left on the surface exposed to the devastating and quickly progressing atmospheric influences in this region of the world; thus, a large number of bodies were never buried in mass graves but decomposed on the surface. Many other bodies were dropped into rivers, wells, single pits and whatever other (often small) places which were equally strongly exposed to the hot and humid natural environment as the unburied bodies. It is therefore highly probable that the mass grave victims identified today are just a sample of all excess deaths.

The identified graves should be seen as a “burial-place-sample” of all people that died as war victims during that time. After 30 years from the end of the Khmer Rouge era the sample still contains about 1.1 million remains as estimated by the DC-Cam grave mapping project. It is fully possible that the mass graves identified so far comprise about 50% of all buried and unburied individuals. It is possible that the bodies in the graves represent both executed and indirect Khmer Rouge victims; the proportion between them will likely vary between the different graves. In any case, it is a large and important sample and must be further studied for unfolding information about how many, how and when these persons died.

For the above reasons, we consider Etcheson’s estimate of 2.2 million excess deaths plausible and in line with the most serious attempts of estimating the excess deaths in Cambodia. A worthwhile direction of validating this estimate would be an attempt to reconstruct the number of excess deaths from a randomly selected area using statistical methods (e.g. modeling and projections) and further compare it with the relevant data from the mass grave mapping.

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RENAKSE ESTIMATE, 1983¹¹¹

Reported Excess Deaths	3,314,768 excess death
Reported Direct Excess Deaths	Not discussed; the number of bodies in the grave pits and in the forest (568,000) are distinguished from the remaining 2.75 mln deaths
Time Period Covered	April 1975 to January 1979
Total Number of Months	45; April 1975-January 1979 (January not counted)
Causes of Death	Not generalized; torture and other forms of violent deaths systematically discussed
Affected Ethnic Groups	Not generalized
Data Sources	<i>Renakse</i> petitions collected by the National Front for the Defense, Restoration, and Solidarity of Kampuchea between 1980 and 1983 (hereafter: the Front)
Methods for the Overall Number of Victims	Nation-wide action of the Front; the number of petitioners is estimated at 1,166,307
Methods for Cause of Death Distribution	Narratives of the petitioners
Affected Population Included in Estimate: mid-year 1970 (or around)	NA
Affected Population Included in Estimate: April 1975 (or around)	NA
Affected Population Included in Estimate: January 1979 (or around)	NA
Absolute Decline in Population Size between April 1975 to January 1979 (or around)	NA
Motivation for this Report	To some extent political; petitioners made claims that the Khmer Rouge representatives had to be removed from the UN General Assembly and representative of the new Vietnam-supported government should take their place.

Main Contribution/Failure of this Paper:

In the *Renakse* survey, no preparations in statistical sense were made at all; no standardized questionnaires were used, no trained interviewers were taking statements, no professional personnel was involved in the exhumations. Collecting evidence was a spontaneous effort of the respondents and of actions taken at the initiative of every Research Committee in the country. With regard to the results, no pressure was exercised over the respondents; not over individuals and not over groups, and no instructions were given as to the outcomes of the survey. The country-level statistics in the *Renakse* Summary Report from 25 July 1983 are biased, however. *Renakse* final statistics contain duplicates (around 50% according to DC-Cam) and are incomplete at the same time.

¹¹¹ *RENAKSE*, 1983: Summary Report of the Research Committee on Pol Pot's Genocidal Regime - "*Renakse* Summary" and related.

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ANNEX 4. Selected Population Projections for Cambodia: NIS and UN Population Prospects of 2008

Table A4.1 Population of Cambodia: 1962, 1970, 1981-1998 (Millions): Observed and Projected

Year	NIS 2000	Annual Growth (%)	Source
1962	5.700		1962 Census
1963			
1964			
1965			
1966			
1967			
1968			
1969			
1970	6.800		unclear
1971			
1972			
1973			
1974			
1975			
1976			
1977			
1978			
1979			
1980	6.590		1980 Population Count
1981	6.700	2.8	
1982	6.900	2.8	
1983	7.100	2.8	
1984	7.300	2.8	
1985	7.500	2.8	
1986	7.700	2.8	
1987	7.900	2.8	
1988	8.100	2.4	
1989	8.300	2.5	
1990	8.600	3.6	
1991	8.800	2.3	
1992	9.000	2.3	
1993	9.300	3.3	NIS Provincial reports
1994	9.869	6.1	
1995	10.200		
1996	10.340		SESC96
1997	10.368		CSES97
1998	11.437	2.5	1998 Census

Source: NIS, 2000: Cambodia Statistical Yearbook 2000

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Table A4.2 Cambodia, Demographic Profile, Medium Variant, 1950-2015

Indicator	1950	1955	1960	1965	1970	1975	1980	1985	1990	1995	2000	2005	2010	2015
Population (thousands)	4 346	4 840	5 433	6 141	6 938	7 098	6 748	8 099	9 690	11 380	12 760	13 866	15 053	16 357
Male population (thousands)	2 173	2 420	2 717	3 072	3 473	3 552	3 124	3 815	4 615	5 475	6 181	6 754	7 374	8 052
Female population (thousands)	2 173	2 420	2 716	3 069	3 465	3 545	3 623	4 284	5 075	5 905	6 579	7 112	7 679	8 305
Population sex ratio (males per 100 females)	100	100	100	100.1	100.2	100.2	86.2	89.1	90.9	92.7	93.9	95	96	97
Percentage aged 0-4 (%)	16.7	16.7	16.9	17.1	17.2	15.5	14.4	20.6	18.5	17	13.7	11.3	11.1	11.1
Percentage aged 5-14 (%)	25.5	25.6	25.6	25.7	26	26.8	26.8	22.6	26.1	29.3	28.2	25.7	21.5	19.4
Percentage aged 15-24 (%)	19.4	19.4	19.2	19.1	18.9	19.5	21.3	20.2	18.4	16.1	19.6	23.6	23.5	21.4
Percentage aged 60 or over (%)	4.5	4.5	4.5	4.6	4.6	4.7	4.8	4.5	4.4	4.5	4.6	5.2	5.9	6.6
Percentage aged 65 or over (%)	2.7	2.7	2.7	2.7	2.8	2.8	2.8	2.9	2.7	2.8	3	3.1	3.6	4.1
Percentage aged 80 or over (%)	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.4	0.4
Percentage of women aged 15-49 (%)	47.4	47.4	47.1	46.8	46.4	47.3	50.5	48.5	46.9	44.7	48	51.5	54.4	54.9
Median age (years)	18.7	18.7	18.6	18.5	18.3	18.7	18.8	18.1	17.9	17.3	18.3	20.3	22.3	24.2
Population density (population per sq. km)	24	27	30	34	38	39	37	45	54	63	70	77	83	90

Indicator	1950-1955	1955-1960	1960-1965	1965-1970	1970-1975	1975-1980	1980-1985	1985-1990	1990-1995	1995-2000	2000-2005	2005-2010	2010-2015	2015-2020
Population change per year (thousands)	99	119	142	159	32	-70	270	318	338	276	221	237	261	270
Births per year, both sexes combined (thousands)	208	232	260	287	280	232	388	406	432	386	344	360	385	397
Deaths per year, both sexes combined (thousands)	109	113	118	127	158	277	118	118	124	126	125	121	123	125
Population growth rate (%)	2.15	2.31	2.45	2.44	0.46	-1.01	3.65	3.59	3.22	2.29	1.66	1.64	1.66	1.59
Crude birth rate (births per 1,000 population)	45.4	45.2	44.9	43.9	39.9	33.4	52.2	45.7	41	32	25.8	24.9	24.5	23.3
Crude death rate (deaths per 1,000 population)	23.8	22.1	20.4	19.4	22.5	40	15.8	13.3	11.7	10.4	9.4	8.4	7.8	7.3
Total fertility (children per woman)	6.29	6.29	6.29	6.22	5.54	4.7	6.6	6	5.55	4.45	3.41	2.96	2.7	2.53
Net reproduction rate (daughters per woman)	1.85	1.93	2.01	2.08	1.68	0.96	2.4	2.3	2.18	1.77	1.4	1.26	1.18	1.13
Infant mortality rate (infant deaths per 1,000 live birth)	165.1	152	139.5	130	180.9	263.2	116.4	97.9	89.8	83	72.4	62.3	52.8	43.9
Life expectancy at birth, both sexes combined (years)	39.4	41.4	43.4	45.4	40.3	31.2	50.7	53.9	55.6	56.4	58.1	60.9	63.3	65.6
Life expectancy at birth, males (years)	38.1	40	42	44	39	30	48.9	52.1	53.7	54.3	55.8	59	61.3	63.5
Life expectancy at birth, females (years)	40.8	42.8	44.9	46.9	41.7	32.5	52.3	55.5	57.2	58.3	60	62.6	65.1	67.5

Source: Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, *World Population Prospects: The 2008 Revision*, <http://esa.un.org/unpp>, Friday, July 24, 2009; 11:19:46 AM.

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Table A4.3 Cambodia, Population (thousands), All Variants, 1950-2020

Year	Medium variant	High variant	Low variant	Constant-fertility variant
1950	4 346	4 346	4 346	4 346
1955	4 840	4 840	4 840	4 840
1960	5 433	5 433	5 433	5 433
1965	6 141	6 141	6 141	6 141
1970	6 938	6 938	6 938	6 938
1975	7 098	7 098	7 098	7 098
1980	6 748	6 748	6 748	6 748
1985	8 099	8 099	8 099	8 099
1990	9 690	9 690	9 690	9 690
1995	11 380	11 380	11 380	11 380
2000	12 760	12 760	12 760	12 760
2005	13 866	13 866	13 866	13 866
2010	15 053	15 053	15 053	15 053
2015	16 357	16 525	16 190	16 516
2020	17 707	18 170	17 243	18 158
2025	18 973	19 819	18 128	19 848
2030	20 100	21 331	18 871	21 519
2035	21 121	22 782	19 479	23 215
2040	22 086	24 292	19 955	25 024
2045	22 997	25 886	20 288	26 991
2050	23 795	27 474	20 448	29 092

Source: Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, *World Population Prospects: The 2008 Revision*, <http://esa.un.org/unpp>, Friday, July 24, 2009; 11:19:46 AM.