

Overmortality in Congo (DRC) during the 1998-2004 Conflicts: an Estimate of Excess Deaths scientifically based on Demographic Methods

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1 Introduction: About Wars, Elections and Deaths

When referring to the Democratic Republic of Congo (DRC), a figure of "four million deaths" – sometimes even quite higher – is frequently mentioned as a consequence of the political crises in recent years. An NGO, International Rescue Committee (IRC) contributed in spreading such information, quoted without verification by several personalities, organizations and even government officials.

The four million deaths, allegedly caused by the Second Congo War between 1998 and 2004, refer to the number of deaths due to conflicts and their consequences. Incidentally, since then, the toll surprisingly goes on inflating. As far as we are concerned, this exercise was only meant to assess the validity of the figure initially put forward; we hereby show that it was grossly overestimated.

A First Congo War took place in 1996 when the Alliance of Democratic Forces for the Liberation of Congo (French acronym; AFDL), strongly supported by Rwandan servicemen, marched through the Congo from East to West until President Mobutu fled and President Laurent Désiré Kabila seized power. According to a general consensus, this operation was much like a "military walkover" characterized by the hurried flight (or surrender) of troops loyal to Field Marshal Mobutu before rebel fighters headed by the future President. Of course, some deaths were recorded due to a few skirmishes, executions or other abuses: however, it is generally agreed that the First Congo War led to very few direct deaths and had only very limited consequences on the disorganization of the country. Anyway, the recurrent "four million deaths" do not refer to this First War.

The Second Congo War, from 1998 to 2004, opposed President Kabila's troops – backed by foreign contingents (Zimbabwean, Angolan....) – to the rebels in Eastern DRC, backed by Rwanda and Uganda. During this eventful war, there was a "collateral conflict", when Rwanda and Uganda became divided and then opposed, while both armies fought each other in Kisangani and in the region.

Afterwards, a voters' registration (enrolment) took place in 2005-2006; the targeted population was the adult people of Congolese nationality, aiming at creating voters' files. This operation allowed getting distributions of voters by age and sex, and by the smallest administrative unit.

At the request of the European Commission, three experts, including the two authors of this paper, assessed the registration procedures, which they found satisfactory from a statistical point of view.

¹ This translation largely uses a preliminary translation by a WHO office; be the anonymous translator thanked!

The experts also carried out a dynamic reconstitution of the population distributed by sex and age first since 1984, year of the last population census, and then since 1956. Such reconstruction looks exactly like a classical demographic projection ("prospective"), but for the fact that it applied on the past.

Given the sensitive nature of the exercise, the Commission requested an embargo on the release of data relating to population size estimated for 2005. We totally agree with the rationale behind this embargo and will thus not provide herein data on population size. The only absolute figures provided will be the estimated numbers of deaths. Otherwise, only population percentages or vital statistics indicators (e.g. life expectancy) will be produced. But, for the calculations needed for preparing this paper, we constantly used the actual data regarding the population distributed by sex, age, province and district of the DRC; they include 2005 data (voters' registration), as well as the row of data computed from 1956 to 2005 (dynamic reconstruction).

The reconstruction exercise, indeed, enabled us to estimate precisely the country's population according to sex and age since 1956 and according to region (that is, for each province and, within each of them, for districts) since 1984². Consequently, it was easy to estimate the number of deaths occurring in DRC during the period of unrest and to question the relevance of the claims that the wars and their consequences left four million people dead.

It is clear that not all the deaths during the period were caused by the conflicts. It is also clear that the "four million deaths" under discussion always include not only those who died in the fighting (be they regular soldiers or not) but also all other victims – who were many more than the "fighters" – as a result of disruption in hospitals, distribution networks, farm work, etc.

Questioning an assertion like "four million deaths in the DRC" may seem irrelevant or even improper. In fact, we intend to fight against any kind of revisionism – both that which deny humanitarian disasters and that which get hold of disasters; for good reasons (mobilize aid ; but possibly to the detriment of other crises?) or bad ones (incitement to hatred between nations and/or ethnic groups). But let us be clear here: although, according to our estimates, the conflicts in the DRC caused much less deaths than the alleged four million, their number is anyway an excess!

In the next paragraphs, we will present first the results of the voters' registration and then the outcome of our population reconstruction exercise.

Afterwards, we will demonstrate the perfect fit between the reconstructed population and the registered people. Such similitude will lend credibility not only to the size of the population computed for 2005 but also to the hypothesized parameters of mortality and fertility that underpinned them. Such knowledge of vital trends, especially those related to mortality levels, will enable us to dismiss out of hand the belief that there were four million deaths.

² The administrative set-up of the Belgian Congo in 1956 and the degree of disaggregation of data did not make possible to go further backwards into the past, while keeping a reference to the current administrative structure of the country.

2 Voters' registration

We worked on the voters' enrolment for the 2005 and 2006 election schedule (constitutional referendum, presidential and parliamentary elections; local elections were later scheduled). The operation was carried out between July 2005 and February 2006, using a highly decentralized mechanism covering the entire national territory with some 9,000 fully computerized offices or "Registration Centres". In concrete terms, there were five successive "rounds" covering first Kinshasa and then two or three provinces at a time (the administrative map in force at that time comprised eleven provinces, including Kinshasa); these arrangements were made for optimizing logistics and had only a very limited impact on the results, especially as far as we are concerned. It should be emphasized that enrolment is legally mandatory for all Congolese aged eighteen and above; its legally binding aspect is obviously not very relevant given that there is no legal device actually enforcing such obligation. However, it was everywhere observed that citizens actually were highly mobilized and motivated to register, due to two major factors: the people's desire to have elections, and the additional advantage offered by the electoral law by which a voter's card serves as an identity card. Some influential politicians attempted to sabotage the electoral process by calling on voters to boycott registration; nevertheless, the analysis of the number of registered voters showed that the call had no massive impact.

Let us stress that, trying to highlight population deficits between observed (voters' registration) and expected data (prospective simulations), we may take the various gaps to mean excess mortality. In this case, we may observe some underenumeration (i.e. people missing from the electoral head count); since we think the operation was reasonably close to exhaustiveness, "evaders" like boycotters are not counted (by definition!) and may thus be mistakenly confused with excess deaths. We can however dread an opposite effect, "rigging" by people not supposed to appear on voters' lists, like foreigners and people under 18. Detailed analysis show that such "rigging" had just a limited effect and that young people "promoted" to adults are clearly identifiable. Moreover, all monitoring and analysis elements show that these excess youths can easily be isolated; the phenomenon, common throughout the country, did not however constitute a genuine rigging attempt but simply an "early" massive registration to ensure ownership of an identity card: nobody would guess if – nor when – another registration (or even a mere update) would take place.

The technical validation of the enrolment involved complex analytical procedures based on the specific characteristics of data flows in the global enrolment process, briefly outline hereafter:

Individual data, as appearing on voters' cards (names of the voter and his parents, sex, date and place of birth, current residence and elementary biometric data [photograph and one fingerprint]), are stored on computer hard disk drives, complemented with automatic unique identifiers, not accessible to operators. From this moment, the information follows two distinct channels which will remain completely independent from the start to the end of the process:

- Individual data are systematically consolidated and saved on CD-ROMs daily; weekly and at the close of a registration office. At least a copy of the completed CD-ROMs had be sent by Registration Centres through a hierarchical pyramid of local and regional offices

up to the National Treatment Centre (CNT³) set up within the premises of the Independent Electoral Commission (CEI) in Kinshasa and managed with UN technical assistance.

- Everyday, or "as often as possible" where field conditions are more constrained, heads of Registration Centres communicate the number of cases treated during the day (or since the previous call) in their centres to the local offices; such aggregate information is usually communicated immaterially (by phone) following the same hierarchy as above, right to the National Technical Secretariat (STN), also located within the premises of the CEI and under the direct responsibility of the Congolese technical officials.
- It is relevant to note that at no point was aggregate information used to check the figures carried by the CD-ROMs – neither were the CD-ROMs used, even roughly, to confirm or invalidate aggregate figures. Although such information split undermined the efficiency of the operation, it was particularly welcome for our technical works, as it guaranteed the independence of each of the sources; aggregate information was indeed communicated under the form of a declaration of daily activities and could of course not be considered as “contaminated” by an eventual further examination of the final CD-ROM – which was anyway not technically available to heads of Registration Centres). The presence of “two independent sources” is a classical great opportunity for any data validation.

Details of the experts' work aiming at the final data validation are of course under embargo; we however have the right to state that a thorough multi-step data processing managed to resolve nearly every error identified by a first analysis of the files coming up from the field (several millions of errors due to incorrectly sorted or codified data, to mistakenly routed ones, as well as to incorrect consolidations and to hardware breakdown and software failures in the field). On the other hand, it was possible to dismiss the fear of “rigging” with multiple registrations of many voters: extremely heavy technological methods for detecting double fingerprints (only partially applied) and more basic but always efficient methods (coupling of individual characteristics) both converged to show that the cases of fraudulent registrations were negligible – a few thousands out of the over 25 000 000 voters.

The above described approach constituted an “internal data criticism” which only takes into account the contents of data and their collection and transmission processes. Briefly speaking, this criticism leads to the conclusion that, generally, electoral rolls were drawn up in a serious and transparent manner, with little doubts about the honesty of a vast majority of the people registered. Admittedly; pure demographic analysis (examination of the breakdowns by sex and age) reveals significant imperfections; but they are on the whole not worse than those of a so-called “scientific population census”: in summary, people answered as they could, and those who did not know their age gave only approximate information, strictly within the standards for that kind of population. It can also be rightly concluded that there were no clear cases of “rigging”: the only way for getting a fake but acceptable age structure would be to have in the field a coordinated army of competent demographers capable of real-time invention of individuals constituting a demographically correct population... Other indicators like the comparison between the place of birth and place of registration did not reveal either any "pocket" of abnormalities which could point to fictitious registrations.

3 Population Reconstruction

A population reconstitution resembles a prospective (or forecast) exercise focused on the past: in practice, it starts from a population distributed according to sex and age at a given moment

³ Acronyms hold for the official names of these institutions (in French).

in the past; for each simulated year, are applied constant or variable sex- and age-specific rates and/or probabilities of mortality, fertility and migration; the purpose is to produce for a given final year an estimate of the population disaggregated by age and sex, which will be the closest possible to the real population in that year.

In the specific case of our "prospective of the past" of DRC, we first of all focused on the detailed distributions by age and sex of the 1984 census (the last census conducted in the country). Mortality and fertility estimates for the period between 1984 and 2005 are those published by the United Nations (most of them were carried out by Congolese demographers). External migration balance (net difference between flows of in- and out-migrants) is manifestly low and has not been taken into account.

With regard to the exercise aiming to assess the completeness of voters' registration and their distribution by age and sex, we were interested only in people of Congolese nationality. In 1984, they represented about 95% of the total population of each age group, at the national level: there are however large regional differences, taken into account by the exercise for each province.

To correctly carry out this reconstruction exercise, we proceeded as follows:

- Firstly, we converted the 1984-2005 overall estimates for mortality (life expectancy) and fertility (number of children per woman) into detailed figures by age slices of one year (and by sex; for mortality data). It is well known that mortality and fertility estimates are generally quite robust, even when carried out in countries with incomplete statistics: demographers use several auditing techniques applied to the partial available observation, together with a wide set of "model life tables" designed for various sub-regions in the world (for example: tropical Africa does not have the same mortality rates as Sahelian Africa). Demographers thus transform these overall estimates into probabilities and rates per sex and age. That was done and we produced a first reconstruction for the period 1984 -2005.
- However, some doubt remained: could the distribution by age and sex produced by the 1984 census be accepted as such? In other words, how accurate was this census? Facing an undecided answer to this question, we then decided to broaden the bounds of the reconstruction exercise by starting it as far back as possible – in 1956, reference year of the first major population survey in the Congo, conducted by A. Romaniuk. Some would object that, already in 1956, the quality of the survey left much to be desired. However, there is a general consensus among demographers as to the global quality of that survey. But be that as it may, beginning with 1956 we produced for 2005 a population 91% of whom were born after 1956. So, the possible population errors of 1956 had no major impact in 2005. On top of that, we have to consider that reconstruction year by year follows a path passing close to some "landmark", particularly the size AND distribution by age and sex produced by the 1970 administrative census and the 1984 general census; we are then sure the reconstruction quite well reflects the past demographic dynamics of the Congolese population.

Finally, the reconstitution exercise starts in 1956 and crosses between this date and 2005 the following "landmarks":

- A. Romaniuk's demographic survey centred on 1956 from which he published his thesis ("La fécondité des populations congolaises", Mouton, Paris/The Hague, 1967).

- Koni Botoke Bongoma's PhD thesis , further analysing 1956 data ("Population trends in Zaire and their implications 1885 – 2005", Australian National University, Canberra, 1979)
- The 1970 administrative census.
- Data from the EDOZa survey, centred on 1976 ("La synthèse des Etudes Démographiques de l'Ouest du Zaïre 1974-1977", Louvain-la-Neuve, 1978).
- The 1984 census.
- UN 1984 – 2002 estimates
- ADRASS estimates of the Congolese population in 2005, based on the 1984 census.

4 Convergence between population size estimated through the reconstruction and from voter registration

At the end of the first reconstruction exercise (from 1984 to 2005), age pyramids were drawn for 2005 and checked against those of registered voters. Figures 1 (by age) and 2 (by age group) show, for the whole country, differences between the populations reconstructed in a "prospective" way and observed through voters' registration.

Figures 1 and 2 show that both approaches produce very similar results except around the age of 18 years. This discrepancy is mainly due to persons below 18 years, registering as voters, by declaring an age of 18 or 19, in order to become voters or, most likely, just to receive an identity document. It should indeed be recalled that for decades in the DRC, there is no or no longer any civil registration system, nor population files or registers; and, for most people, it is very often useful or necessary to hold at least one piece of paper that serves as an administrative document. Figure 1 presents the differences per year of age between the registered and reconstructed populations. Figure 2 presents the same results after grouping in 5 year age groups, in order to enhance the legibility by eliminating the "noise" caused by age declaration errors. Of course, the number of voters is usually lower than the corresponding number of people because not everybody registered (underregistration).

The convergence presented in figures 1 and 2 was checked for each of the provinces and almost all the districts of the country (except for a few urban districts like the cities of Bukavu and Zongo where migration – unknown but measurable through reconstruction – prevents the obtainment of an immediate convergence).

Figure 2 clearly shows that voter registration "errors" are only sizeable among youngsters up to 20. We may mischievously notice that young women more easily lie about their age than young men, probably because the presence of an offspring makes them to be seen as "respectable mothers" and therefore as adults.

The very close convergence between both exercises – the reconstruction based on 1984 data and the 2005 enrolment – constitutes a reliable cross-validation of their quality. It is indeed unthinkable that such convergence is coincidental for the following two reasons explained before:

- Registration data were collated from two different administrative procedures, leading to strong internal control. The reconstruction exercise is under constraints from the 1984 population distribution by age and sex and the later "landmarks".

Figure 1: Differences between age structures of the reconstructed population and the registered voters, by age⁴

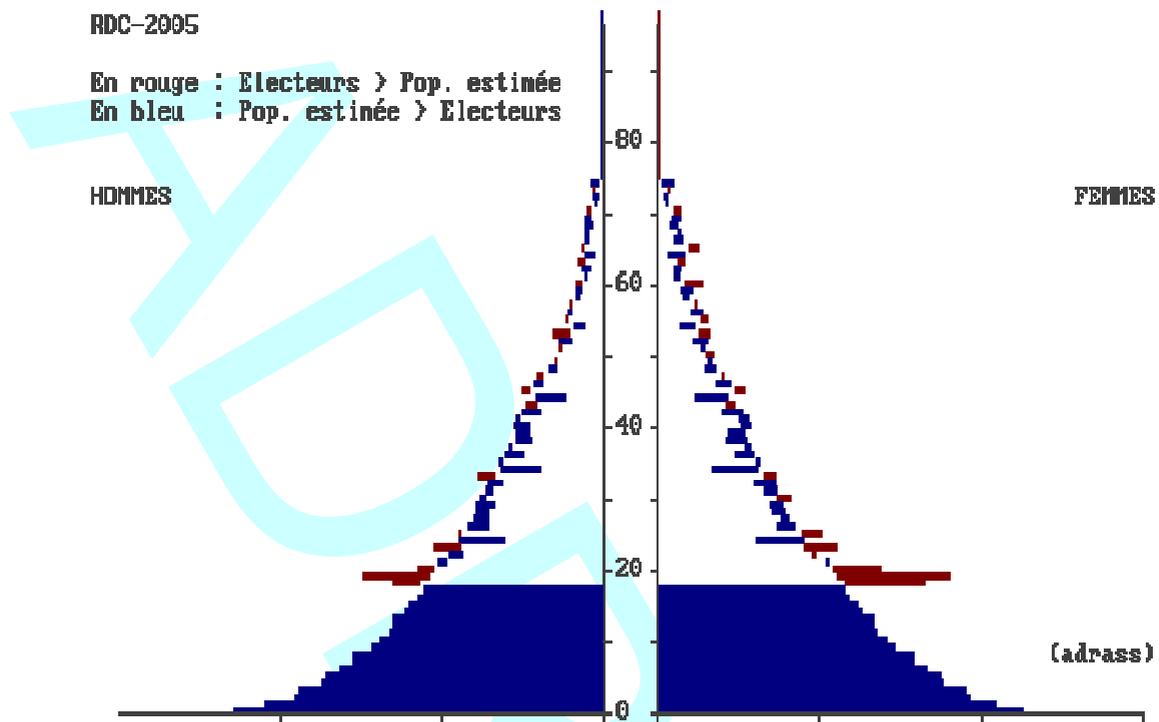
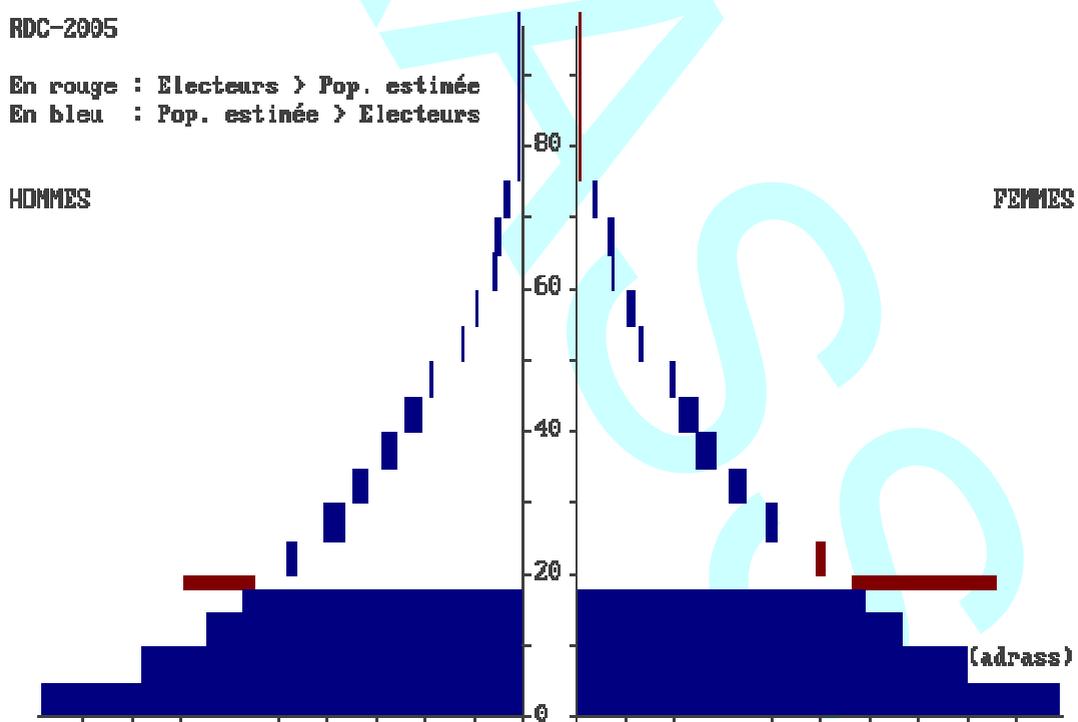


Figure 2: Differences between age structures of the reconstructed population and the registered voters, by 5 year age groups

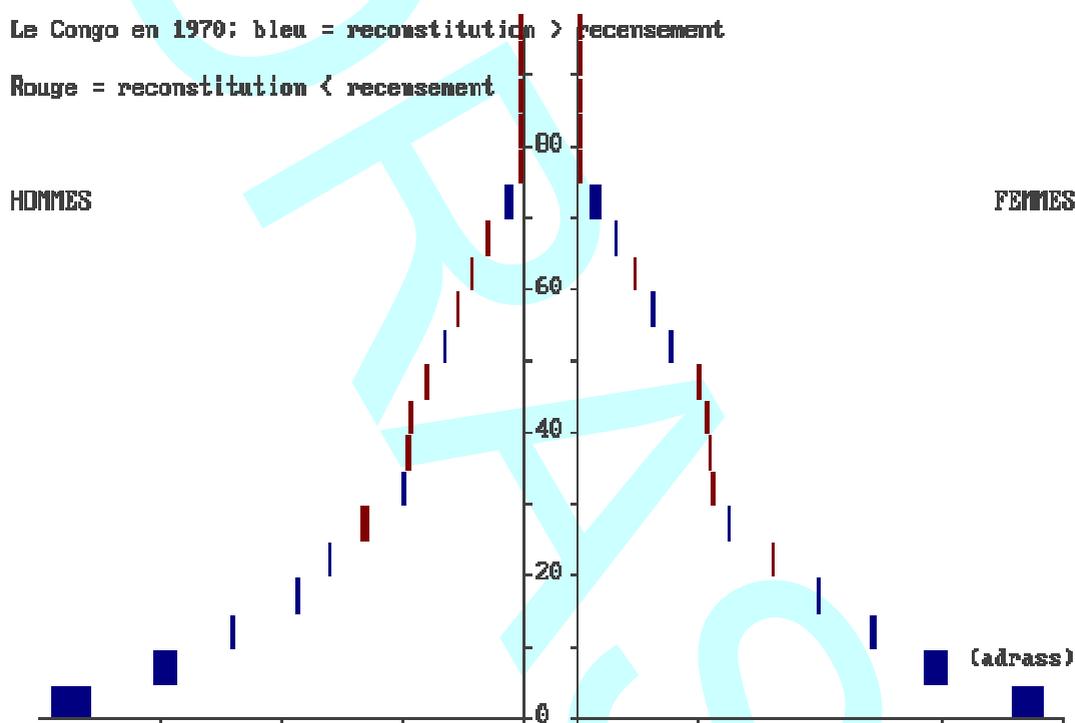


⁴ The "differential pyramids" display only differences between two compared pyramids; when the compared population (here, voters) exceeds the reference population (here, the simulated demographic population), the excess appears in red; conversely, when the compared population is exceeded by the reference one, the gap appears in blue.

Just to be on the safe side in terms of reliability, we still had to check the quality of the 1984 census data, as mentioned earlier, by running a reconstruction starting from 1956 onwards.

Figures 3 and 4 compare the population structures as reconstructed for 1970 and 1984 with the census results of those years. The pyramids are "differential pyramids", as explained in note 4, p.7, and, for the sake of legibility, we show only pyramids by 5-year age groups.

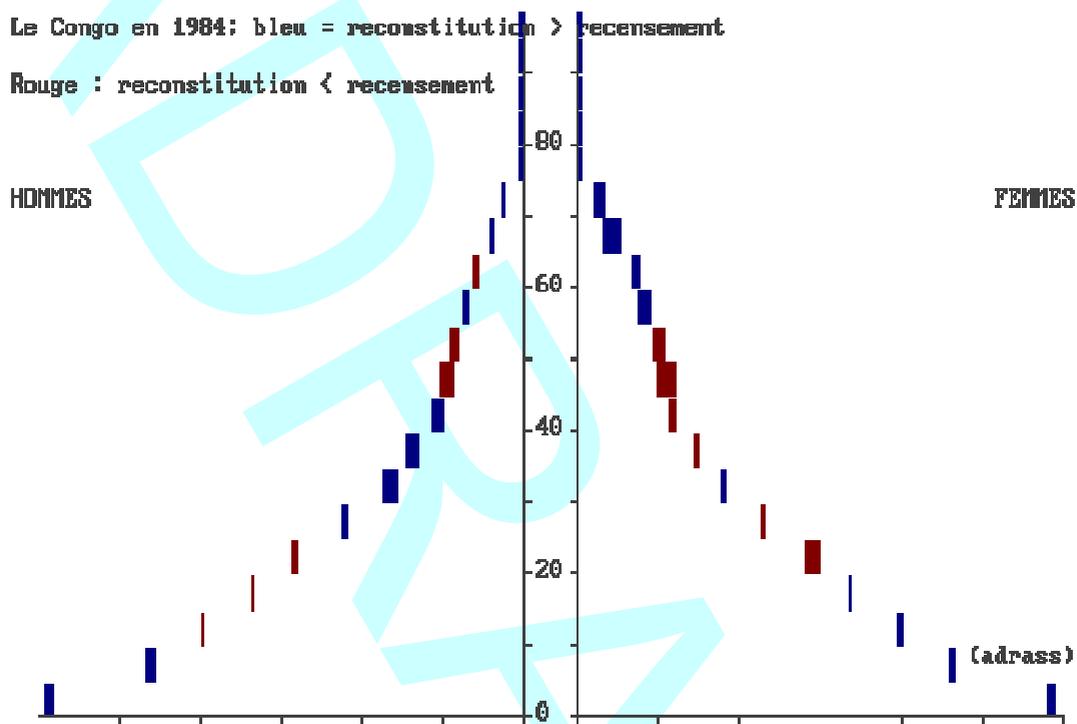
Figure 3: Differences between age structures of the reconstructed population (from 1956) and the enumerated population at the 1970 administrative census, by 5 year age groups.



For argument's sake, let us consider in Figure 4 the differences observed in 1984 between the 1984 census and the reconstruction exercise carried out on the basis of 1956 data. There is near-perfect equivalence! And yet, in 1984, people born after 1956 already constitute 70% of the total population. This percentage is obtained by the yearly calculation (between 1956 and 1984) of detailed data (per single year of age), derived from applying rates and probabilities, which are themselves the translation of overall mortality and fertility parameters estimated by Congolese demographers and their colleagues from United Nations at some moments during the analysed period. Thanks to the total independence of both these convergent sources, we are therefore able to:

- Validate the sex and age distribution of the 1984 census. Accept the mortality and fertility levels and trends estimated by UN and/or Congolese demographers between 1956 and 1984.

Figure 4: Differences between age structures of the reconstructed population (from 1956) and the enumerated population at the 1984 "scientific" census, by 5 year age groups.

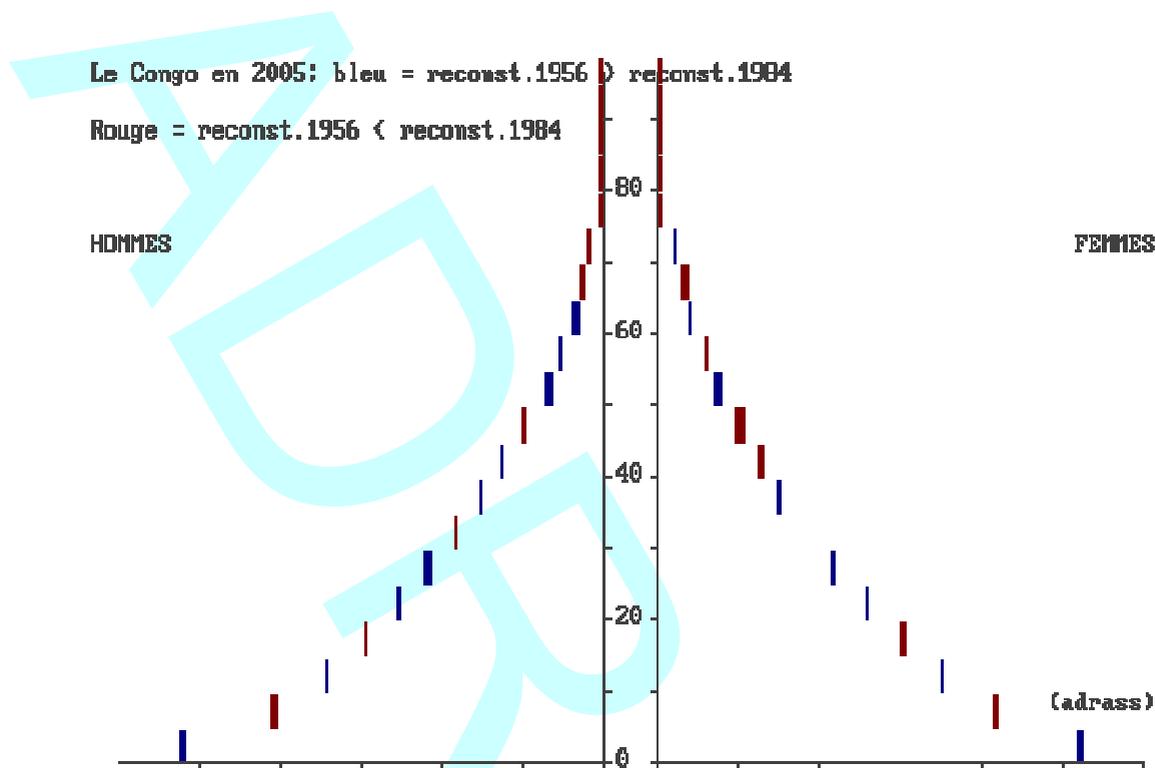


Finally, Figure 5 (page 10) shows the minute differences between both reconstructions; from 1956 and from 1984. It definitively dispels any doubt about the reliability of the 1984 census and the truthfulness of the convergence between reconstituted populations (be it from 1956 or 1984 is no longer relevant) and enrolled voters.

By way of conclusion,

- from the close similarity in 2005 between the "long" (since 1956) and the "short" (since 1984) reconstructions, and from the near-superimposed populations in 2005 (reconstruction and voters' enrolment), not only can one definitively validate the three exercises (the two reconstructions and the registration), **but also can one validate the whole "machinery" used for the reconstruction, especially mortality and fertility trends between 1956 and 2005.**

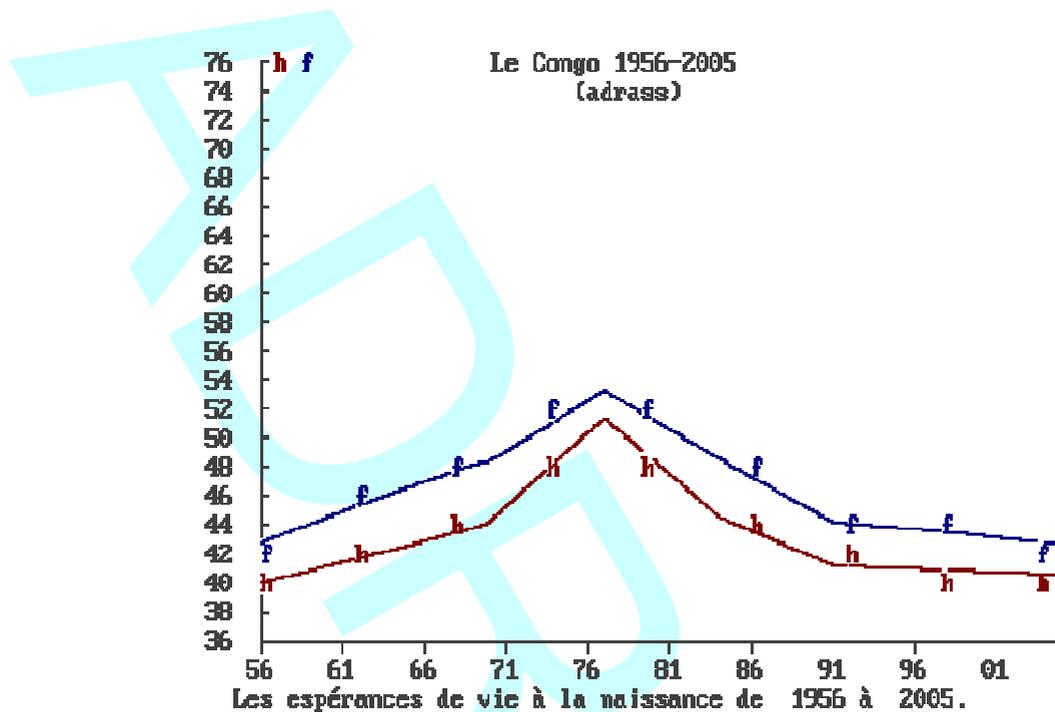
Figure 5: Differences between age structures in 2005 of the reconstructed population from 1956 and the reconstructed population from 1984, by 5 year age groups.



We can therefore reliably examine the evolution of life expectancy at birth by sex in the DRC since 1956. That year, these parameters amounted to 40 years for men and 43 for women. As shown in Figure 6 (page 11), life expectancy steadily grew at a moderate pace until 1971 and then faster, but unfortunately only for a few years: by the late 1970s; life expectancy declined as fast as it rose, probably due to the combined effects of the fast-growing HIV/AIDS incidence and the incipient decline of the Mobutu regime. Finally, from the early 1990s, the deterioration continued slowly, so that life expectancies reached in 2005 levels as low as around the time of Independence (1960).

We must bear these mortality curves in mind and place them back in their days. Indeed, an argument used by proponents of the "Four million deaths" statement for justifying these high estimates is: deaths "due to war" mostly resulted from non-military causes, not directly related to the armed conflict; they would rather be consequences of social disorganization, halt of farming, disappearance of health facilities, etc, as a direct result of war. However, the mortality analysis shows that life expectancies started declining sharply twenty years before the conflicts and, moreover, had almost stopped dropping – while not recovering – well before the start of the conflicts. We willingly share the hypothesis of deterioration in the health and nutrition conditions; however, its chronology suggests that it should first be attributed to the deterioration of development caused by the gradual collapse of the regime, both far before the war and more consequential than the conflicts. It is thus out of the question to impute all this evolution to the wars.

Figure 6: Trends in life expectancy in Congo from 1956 to 2005 (from the simulation tool used for the reconstructions)



In the next paragraphs, we will give no round figures for the number of deaths, in order to keep the greatest possible transparency in our calculations. But it should be clear that we do not claim to produce estimates of the death toll with such accuracy! Besides, we will use round figures for our conclusions.

It must be emphasized that the scenarios produced below are all worked out by sex and one-year age group, and simulated by periods of one year. However, in order to simplify the text – and to abide by the embargo –, we will only release mortality figures (numbers of deaths, life expectancies) with data for both sexes merged.

5 An indisputable rebuttal of the four million deaths estimate

Since the reconstruction on the past has been validated, we may also admit that the number of deaths produced by the reconstruction between 1998 and 2004 is acceptable. This number – which includes all deaths – stands at 7,679,821!

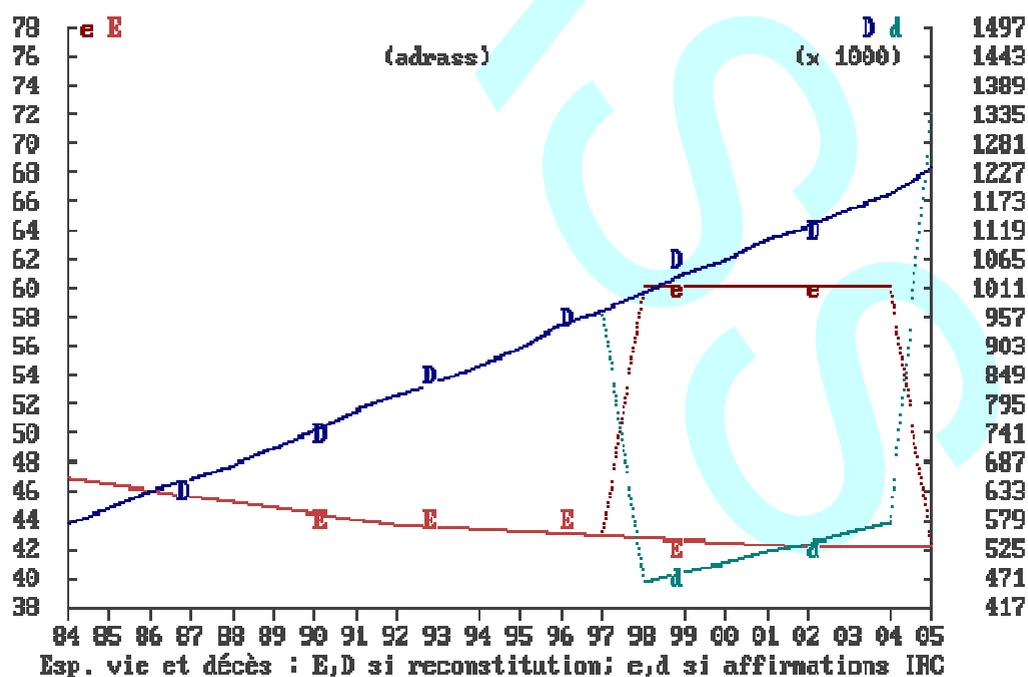
Let us follow the reasoning of advocates of the “Four million deaths” hypothesis: if there had been no unrest, there would have been four million deaths less than the reconstructed number. We therefore tested various levels of life expectancy (and their associated probabilities of death) able to produce only about 3,680,000 deaths (i.e. 7,679,821 – 4,000,000 deaths). This result may be obtained using life tables with an e_0 (life expectancy at birth) of 60 years between 1998 and 2004; although this parameter stagnated around 42 years before and after these dates. It is obviously ludicrous from data in Table 1 and Figure 7 (page 12).

(continued on page 13)

Table 1: Life expectancies and annual deaths in the Congo (DRC) following the validated reconstruction and following the no-conflict hypothesis (ADRASS calculations)

Year	Reference figures		"no conflict" (see text)	
	e	D	e	D
1984	46.69	573 484	46.69	573 484
1985	46.30	601 834	46.30	601 834
1986	45.90	634 877	45.90	634 877
1987	45.50	655 429	45.50	655 429
1988	45.10	682 035	45.10	682 035
1989	44.71	714 431	44.71	714 431
1990	44.31	746 063	44.31	746 063
1991	43.91	783 685	43.91	783 685
1992	43.51	813 479	43.51	813 479
1993	43.36	836 733	43.36	836 733
1994	43.21	867 194	43.21	867 194
1995	43.06	899 799	43.06	899 799
1996	42.91	944 313	42.91	944 313
1997	42.76	970 081	42.76	970 081
1998	42.61	1 003 199	59.99	463 667
1999	42.47	1 038 639	59.99	484 303
2000	42.32	1 064 297	59.99	500 440
2001	42.17	1 102 670	59.99	521 760
2002	42.02	1 125 880	59.99	535 475
2003	42.02	1 159 307	59.99	557 060
2004	42.02	1 185 829	59.99	575 620
2005	42.02	1 234 933	42.02	1 349 920

Figure 7: Life expectancies and annual deaths in the Congo (DRC) following the validated reconstruction and following the no-conflict hypothesis (ADRASS calculations)



(note: see below, page 13)

Note: the left-hand scale is used for life expectancies (E and e); the right-hand scale for deaths (D and d). The results of the base reconstruction are in upper case (E and D) and the « no-conflict » hypothesis in lower case (e and d). Before and after 1998-2004, curves “ E ” and “ e ” are identical, as are curves “ D ” and “ d ” before 1998; in 2005 however, the mortality calculated for the reconstruction applies again, but to the increased population survivors from the conflict period.

(continued from page 11)

A plausible objection may be formulated: even if the overall death toll between 1984 and 2005 is accepted, maybe were there fewer deaths before 1998 and thus more afterwards. But then life expectancy outside the period 1998-2004 would have been higher, and it would remain the need for a dramatic jump upwards of life expectancy during the period, in order to "absorb" the four million deaths. This “calendar based” objection is in fact unacceptable.

The pointlessness of the assertion that there were four million deaths in the DRC is so glaring that we could stop there, and let its proponents continue in their fantasies ...or profitable lies.

However, we will go a step further and attempt a sensible estimate of the number of conflict-related deaths during these years.

6 A reasonable – yet overestimated – assessment of overmortality due to conflicts between 1998 and 2004

We think the slow erosion of life expectancy (the « E » curve in Figure 7) is the most plausible trend. It also incorporates accepted mortality estimates centred on 1982, 1992 and 2002. Then, in order to find an undisputed death toll due to unrest, we built a scenario where life expectancy decrease after 1984 only continued until 1992; afterwards, mortality became constant. All you have to do to estimate overmortality is to compare the size of the population during the reconstruction with this scenario of life expectancy decline ceasing in 1992. Doing so, we put the case for the believers in the « four million deaths » theory since we are considering the entire period (1992 – 2004) and not only the unrest period (from 1998).

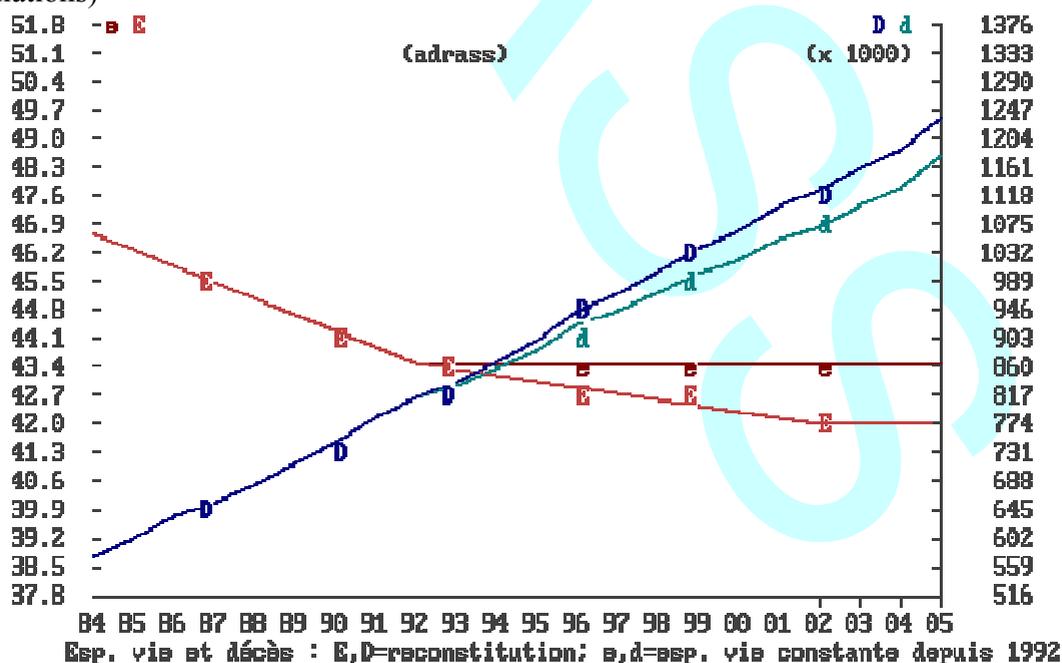
The results are presented in Table 2 and Figure 8 (page 14). The difference between the number of deaths since 1992 is equal to 13,011,420 – 12,605,661, that is **405,759 deaths**. The total population however increases by 446,696 persons in 2005; i.e. the 405,759 spared lives plus additional children born to these survivors.

(continued on page 15)

Table 2: Life expectancies and annual deaths in the Congo (DRC) following the validated reconstruction and following the scenario of a mortality decline ceasing in 1992 (ADRASS calculations)

	Reconstruction			
	Reference figures		mortality decline ceasing in 1992	
1984	46.69	573,484	46.69	573,484
1985	46.30	601,834	46.30	601,834
1986	45.90	634,877	45.90	634,877
1987	45.50	655,429	45.50	655,429
1988	45.10	682,035	45.10	682,035
1989	44.71	714,431	44.71	714,431
1990	44.31	746,063	44.31	746,063
1991	43.91	783,685	43.91	783,685
1992	43.51	813,479	43.51	813,479
1993	43.36	836,733	43.51	831,935
1994	43.21	867,194	43.51	857,490
1995	43.06	899,799	43.51	885,098
1996	42.91	944,313	43.51	924,166
1997	42.76	970,081	43.51	944,511
1998	42.61	1,003,199	43.51	971,813
1999	42.47	1,038,639	43.51	1,001,111
2000	42.32	1,064,297	43.51	1,020,949
2001	42.17	1,102,670	43.51	1,052,789
2002	42.02	1,125,880	43.51	1,069,957
2003	42.02	1,159,307	43.51	1,102,992
2004	42.02	1,185,829	43.51	1,129,371
2005	42.02	1,234,933	43.51	1,177,399

Figure 8: Life expectancies and annual deaths in the Congo (DRC) following the validated reconstruction and following the scenario of a mortality decline ceasing in 1992 (ADRASS calculations)



(note: see below, page 15)

Note: the left-hand scale is used for life expectancies (*E* and *e*); the right-hand scale for deaths (*D* and *d*). The results of the base reconstruction are in upper case (*E* and *D*) and the « no mortality decline after 1992 » scenario in lower case (*e* and *d*). Before 1992, curves “*D*” and “*d*” as well as curves “*E*” and “*e*” are identical by assumption.

(continued from page 13)

Up to now, we calculated as accurately as possible a reconstruction by sex and age of the population of Congolese nationals, between 1984 and 2005. As shown above, this reconstruction and voter registration are cross-validated. By comparison with a plausible though conservative estimate of mortality without unrest, we find excess of 405,759 deaths. This number should however be adjusted in two ways:

- Firstly, this death toll is clearly overestimated, since the whole country – thus the whole population – was not involved in the conflicts during the 1998-2004 period; one can therefore not blame wars for the deaths in other regions, rather due to the gradual collapse of a dictatorship on the wane. We may agree that Kinshasa, and the Lower Congo and Bandundu provinces were unaffected by unrest, while the whole of north-eastern provinces – North Kivu, South Kivu, Maniema and Eastern Province – were entirely hit (although this is grossly actually exaggerated), and that half of the population of Kasai, Equator and Katanga provinces were affected ; it means that conflicts struck a part of the territory corresponding to 45% of the Congolese population. Proportionately, conflict-related deaths should thus be estimated to 45 percent of the excess death toll, i.e. **182,592** persons.
- Secondly, all calculations were made on the population of Congolese nationals. Foreigners represented 5% of the population in 1984, but they increased in number over the last two decades, almost exclusively because of immigration in the eastern provinces. Let us then admit some « hard-line » hypotheses: foreigners would now account for 10% of the population (a really maximal proportion) and they would be exclusively concentrated in unrest areas. From mere arithmetic, the 10 percent of foreigners in the total population amount to 22 percent of the 45% share of the population living in conflict areas. Based on the above hard-line hypotheses, the maximum number of deaths would therefore be increased by a factor of 1.22 and stand at a total of **222,762** deaths. Considering however that our calculations start in 1992, and not in 1998, we may consider that conflict-related deaths stand at a rounded **TWO HUNDRED THOUSAND** persons.

Of course one may just agree with the initial estimate of four hundred thousand deaths for the whole country, but refuse to accept their relatively even distribution over the territory, rather considering they are concentrated in the eastern part of the country, hit by unrest ; therefore, the weight of 45% would no more be supported. This objection would neglect that life expectancies were decreasing in every province; this trend is validated by the correlation between reconstruction and voters' registration in each province.

On the contrary, one should rather consider that the declining life expectancies into the provinces outside the troubled areas support the idea that deaths in the whole Congo – thus even in the east of the country – are more the result of a decaying Mobutu regime than of the war in the east and its consequences. A conflict-related death toll under two hundred thousand would therefore be possible! We do however not want to weaken our analysis with such considerations that are difficult to quantify.

As a first conclusion: a sound understanding of the dynamics of population evolution in the Congo allows to use only pure quantitative (mathematical) methods backed by robustly validated observation data ; this approach makes possible to completely reject the wild assertion that the unrest in the Congo have caused four million or more deaths – unfortunately, a worldwide repeated assertion.

Indisputably, there is an absolute human tragedy in the DRC, but it is only very partly due to the wars of 1998-2004 as we have just demonstrated. In fact, the Congolese are suffering mostly from consequences of the calamitous management of the country by Marshal Mobutu's regime. One might wonder why, in the past, the international community did not express a stronger revulsion at the deteriorating standards of living by most of the Congolese people. Perhaps was it more necessary to support a « friend » in the Cold War context prevailing at that time?

Moreover, one might wonder whether the « four million dead in the DRC » assertion is the result of a simple – but glaring – misjudgement or whether it serves the interest of countries, organizations or other hidden forces.

Finally, we must strongly emphasize that our work is not meant to trivialize the abject conditions in which the Congolese people are living. However, it was deemed necessary to provide scientifically defensible estimates, to fight against the tendency to exaggerate the number of victims. Our work does not deny the abysmal living conditions of the Congolese people but indicates that the obvious quagmire in which stays the country is not primarily due to foreign interventions – of course to be blamed. Moreover, we came to consider that this situation is unfortunately not unique: it may even appear there were more deaths in Somalia or in Darfur, given the population « at risk »: the most basic senses of justice and compassion should not be diverted from these people because of distortions in the appraisal of tragedies.

Appendix: Reappraisal of the non-existence of four (or six?) million of war casualties in DRC, 1998-2004: some more evidence (April 2009)

In the document, we have indisputably shown the demographic impossibility of a death toll as high as several million people only due to the direct and indirect consequences of unrest during the 1998-2004 period. Our analysis used comparisons between the reconstructed actual population of the country and an hypothetic reconstruction of the same population, but where mortality did no more increase (as it actually did), considering that the excess number of deaths between both reconstructions would be imputed to unrest, at least in the affected provinces. We even took a chance to overestimate this mortality, by beginning in 1992 – instead of 1998 – the hypothetic period of steady mortality. As a result, the correct death toll is around 200,000 victims attributable to wars (calculated from a robust estimate of 400,000 excess deaths amongst the Congolese population of the whole country).

After several productive discussions with experts in demography or in epidemiology, we got from Mrs Prof. D. G. Sapir (Research Centre in Epidemiology of Disasters, Catholic University of Louvain) the idea to test two additional hypotheses. The results shown below strongly suggest that DRC probably lost millions of people during the last two decades of the century. But these deaths should primarily be imputed to the long decay of the global situation of Zaire during most of the Marshal Mobutu's regime and not much to the invasion of DRC by Rwandan and Ugandan troops – there are enough other good reasons to blame it.

Let us remind that we reconstructed the yearly evolution of the Congolese population from 1956, making it totally compatible with the censuses of 1970 and 1984 and with voter's enrolment in 2005; the laws of mathematical demography indicates that the fine tuning of such a reconstruction, using detailed fertility, mortality and migration indicators (also accepted by most of experts in population of DRC), leads to a cross-validation of both structure and movement estimates, including population size. Consequently, we have to admit that life expectancies were at their highest near the end of the '70s (most likely around 1977). As soon as 1984, mortality indicators had risen back to their estimated level around 1970. Both additional simulations below test the hypothesis of a complete freeze of mortality evolution, either in its better year (1977) or in the last year with an indisputable structure (1984), so showing the impact of decaying conditions after the year of freezing the evolution until 2005 (see table on page 18).

For people eager to make international comparisons, let us stress that maintaining the 1977 life expectancy, i.e. 52.0 year, would have placed the country ahead of at least twenty-one other countries from Sub-Saharan Africa in 2005!

Table: Comparison between mortality estimates (life expectancies): validated reconstruction of DRC's population vs hypothetical evolutions without mortality decline after 1977 or after 1984; total number of deaths estimated when applying each mortality set.

	Validated life expectancies	Life expectancies with mortality frozen in 1977	Life expectancies with mortality frozen in 1984
1956	41.6	41.6	41.6
1963	44.1	44.1	44.1
1970	46.5	46.5	46.5
1977	52.0	52.0	52.0
1984	46.7	52.0	46.8
1991	43.9	52.0	46.8
1998	42.6	52.0	46.8
2005	42.0	52.0	46.8
Total deaths 1977-2005 (reconstruction)	Total deaths 1984-2005 (reconstruction)	Total deaths 1977-2005 (mortality staying at its 1977 level)	Total deaths 1984-2005 (mortality staying at its 1984 level)
23,751,824	20,210,120	17,647,528	17,783,312
7 Excess deaths: validated 8 reconstruction vs frozen hypotheses		6,104,296	2,426,808

From figures above, one can immediately see that the dreadful death toll inflicted to Congolese people – sometimes estimated up to 6 million and over – can indeed be accounted for by "**unrest**". But we should understand under this term « more than two decades of mismanagement initiated by the predatory practices of the past regime », and NOT limit its meaning to « the mere episode of the 1998-2004 wars ».