

Death and survival during the 1994 genocide in Rwanda

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This paper reports a quantitative study of the genocide in the prefecture of Kibuye in western Rwanda in 1994. It uses a database produced from a house-to-house survey of victims by the organization of genocide survivors, Ibuka. For a total of 59,050 victims of the genocide, data were collected on age, sex, occupation, commune of residence before the genocide, and place and date of death. An analysis conducted for one commune (Mabanza), showed that the chance of surviving the genocide was higher in those sectors of the commune where the Tutsi population did not congregate at a football stadium in Kibuye. Those who went to a mountainous area and defended themselves were almost the only Tutsi still alive in the prefecture after the month of April 1994. Other determinants of survival included age, sex, and occupation. The number of deaths each day while the killing lasted is estimated for the whole of the prefecture.

Keywords: genocide; massacre; mortality; survival; Africa; Rwanda

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Introduction

In 1994 Rwanda witnessed a genocide that swiftly took the lives of some 800,000 Rwandans. In just 3 months, more than 10 per cent of the general population and approximately 75 per cent of the Tutsi ethnic minority population were killed.

The ethnic composition of the population has been a major element in Rwandan politics since the era of colonization. At first, Belgian colonizers had favoured the Tutsi ruling class, but in the 1950s the ruling Tutsi began to lay claim to an independent Rwanda. In response, Belgium provided military and political aid to the Hutu, enabling a new elite of Hutu leaders to overturn the privileged position of the ruling Tutsi, and replace it with the leadership of *Parmehutu*, a party committed to the emancipation of the Hutu. The new rulers, at the national as well as local level, consolidated their control of the country by removing all Tutsi from positions of power. A number of books provide detailed treatment of the history of Rwanda, including those written by G. Prunier, C. Newbury, F. Reyntjens, and J. P. Chrétien.

In 1972–73 a group of army officers became frustrated with the monopolization of power by the group around the President. They organized a *coup d'état* and installed a new President, Habyarimana. He established the *Mouvement Révolutionnaire pour le Développement* (MRND), a single political

party of which every Rwandan was declared to be a member by birth. Habyarimana's rhetoric was one of peace and reconciliation between the ethnic groups and, partly owing to high coffee prices in the late 1970s and generous donor support, his regime seemed attractive to a large section of the population. However, public activity was now tightly controlled. Movement in and out of the communes was closely monitored and registered and every adult was required to participate in weekly communal labour, *umuganda*. The President forbade officers and soldiers to marry Tutsi wives, and required everyone to participate in weekly meetings in his honour.

In October 1990, a group of Tutsi refugees attacked Rwanda from Uganda. A civil war followed between the Rwandan armed forces and a rebel army of Tutsi, during which the civilian population in the north of Rwanda were the main victims. During this war, in the period 1990–93, a total of 2,000 Tutsi were killed in local massacres. These massacres were not spontaneous outbursts of violence on the part of a poor peasant population but were organized by the national power elite (Association Rwandaise pour la Défense des Droits de la Personne et des Libertés Publiques 1993; Fédération International des Droits de l'Homme 1993; United Nations 1993; US Department of State 1993). Then on 6 April 1994, a plane in which Habyarimana was flying was shot down. Rwanda descended into genocide.

Aim and method of the study

Aim

This paper presents a statistical analysis of data on the genocide in the Kibuye Prefecture of Rwanda. The main purpose of the study was to document the scale, geography, and pace of the genocide. The next section describes the data-set used for the study and provides a general overview of population figures. This is followed first by an analysis of survival chances for one commune, and next by estimates of deaths over time. In order to make the narrative easier to follow, numerous computations are placed in the Appendices. We present estimates of the distribution of deaths over time throughout the 3 months of the genocide for Kibuye in general and for Bisesero, a mountainous area in Gishyita commune, in particular. The focus on Bisesero is important because there the local Tutsi population resisted the genocide, making it possible to analyse the effect of their resistance on the mortality pattern.

According to the non-governmental organization African Rights, the genocide in Kibuye Prefecture was the most complete genocide of all the prefectures in Rwanda (African Rights 1995, p. 394). Locked in

(see Figure 1) between the prefectures of Gisenyi in the north, Gitarama in the east, Cyangugu in the south, and Lake Kivu in the west, the Tutsi from Kibuye had nowhere to flee. Knowing that they had to rely solely on themselves, a large number of them—estimated in this paper at almost one quarter of all the Tutsi killed in the prefecture—mounted a strong resistance against their attackers in Bisesero. They succeeded in defending themselves for more than a month after the start of the genocide, and their fate differed from that of other Tutsi in the prefecture. As I document later in the paper, 75 per cent of the Tutsi from Kibuye were killed before the end of April 1994, with the Tutsi of Bisesero being the main exceptions.

Data collection

The data-set used for the study reported in this paper is a register of individuals who were victims of the genocide in Kibuye Prefecture. The register was compiled by Ibuka, an organization of survivors of the genocide, and published in 1999. As well as the name of the victim, Ibuka representatives registered, whenever possible, the victim's age, occupation, place

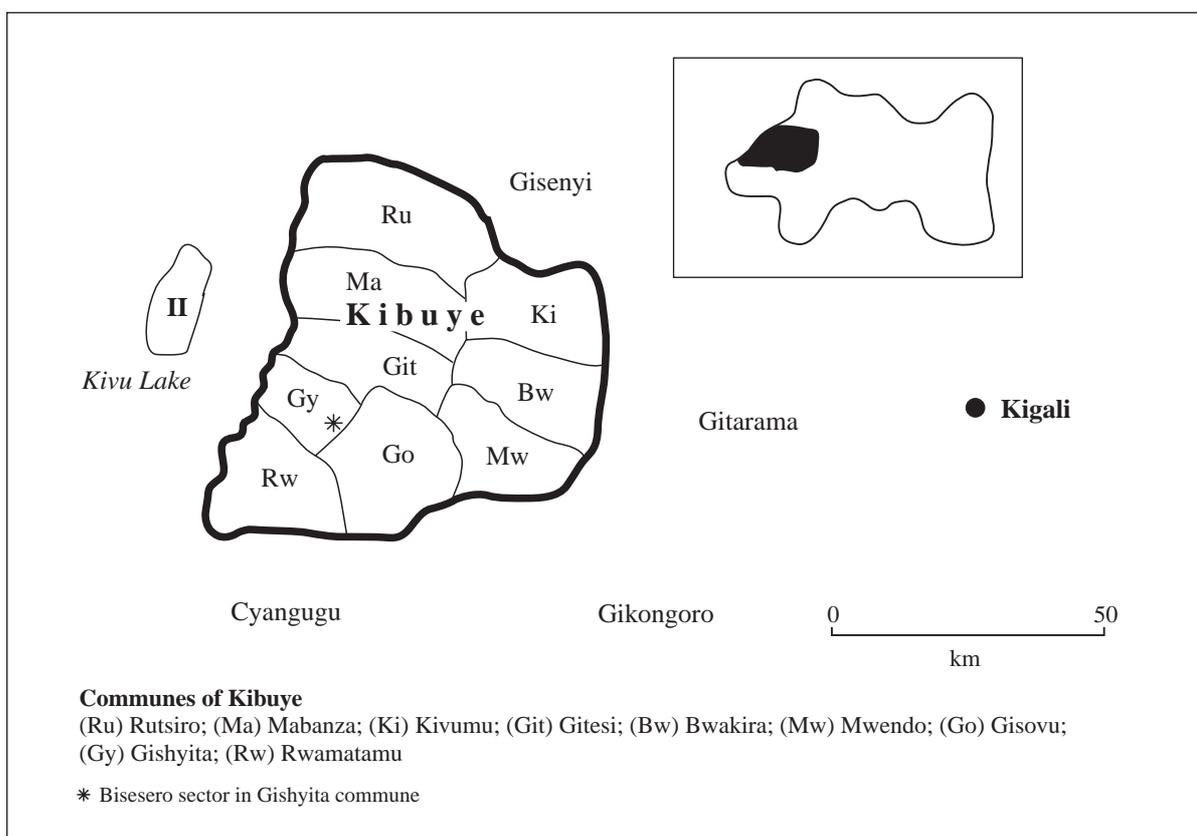


Figure 1 Map of Kibuye Prefecture, Rwanda

of death, and the weapon used. The register contains the names and other details of almost 60,000 victims.

The registration procedure was based on the administrative organization of Rwanda. A prefecture is divided into nine communes, each with 50,000 inhabitants on average. Each commune is subdivided into several sectors, and each of these into several cells. Commune by commune, sector by sector, and cell by cell, Ibuka representatives visited the families of Tutsi survivors and of those Hutu who had not participated in the genocide, to discover the names and other details of the murdered Tutsi. The majority of the enumerators had secondary-school education and had come from, or were familiar with, the commune in which they were conducting the survey of victims. There was at least one enumerator per sector, and one supervisor for each commune who monitored the work of about 20 enumerators.

Neither enumerators nor supervisors received any training in statistics or interviewing, and the completeness of data collection differed substantially between communes and sectors. According to the accounts of individuals I interviewed, most of the information supplied for the register came from Hutu (most Tutsi having died), who presumably had no incentive to inflate victim figures, indeed might have been more likely to do the opposite. It was also my impression that Hutu who did not participate in the genocide were keen to provide accurate information as a way of emphasizing their innocence.

The published register contains details of the victims of the genocide, but the original books in which the data were recorded also contain information on the surviving members of each household, information similar to that recorded for the victims—

age, sex, occupation, and area of residence. As with the data on the victims, the completeness of data on survivors differs substantially between communes and sectors. As Table 1 shows, the completeness of data collection was poor for the communes of Gitesi, Gisovu, and Rutsiro. Funding limitations meant that only for one complete commune (Mabanza) could the data-set be computerized, and thus made suitable for a detailed analysis. For this commune, a data-set of victims *and* survivors was created from the original enumeration records.

Descriptive statistics

The Ibuka project succeeded in identifying 59,050 victims of genocide in Kibuye Prefecture—12 per cent (59,050 of 500,000) of the population of that prefecture. Table 2 presents the overall figures. The figure of 59,050 is an underestimate since not all Tutsi victims were registered. An undetermined number of Hutu, either allied with Tutsi by marriage or opposed to the Habyarimana regime, were also killed but these deaths were not registered by Ibuka. According to the 1991 census and the Ibuka register, 12.4 per cent of the population of Kibuye Prefecture were killed in the genocide—approximately 83 per cent of its Tutsi population. Between 15 and 20 per cent of Tutsi (between 10,000 and 15,000 persons) survived. Table 3 presents information on the scale of the genocide in each of the communes of the prefecture. Since data on ethnic affiliation of population at commune level were not available for 1991, it is not possible to determine how many Tutsi survived the genocide in each of the communes.

Table 1 Author's assessment of completeness of data by commune on victims of 1994 genocide in Kibuye, Rwanda

Commune	Age	Date of death	Place of death	Data on survivors	Whether recoding of data from enumerators' records worthwhile
Bwakira	+	–	+/-	+	Yes
Gishyita	+	+	+	+	Yes
Gisovu	+	+	–	–	No
Gitesi	+	–	–	–	Partly
Kivumu	+	+	+/-	+/-	Partly
Mabanza	+	+/-	+	+	Yes
Mwendo	+	+/-	+/-	+	Yes
Rutsiro	+	–	–	–	No
Rwamatamu	+	+	+	+	Yes

+ = data collected on the item for most victims; – = data missing; +/- = data for some victims collected but not others.
Source: Ibuka (1999).

Table 2 Summary statistics for genocide in Kibuye Prefecture

	Number ¹	Per cent
Total population of the prefecture in 1991	473,920	100
Population registered as Hutu	399,470	84.3
Population registered as Tutsi	71,225	15.0
Population registered as Twa	1,490	0.3
Foreign, other, or undetermined	1,735	0.3
Murdered population identified by Ibuka	59,050	12.4
	Number	Per cent ²
Tutsi population registered as murdered	59,050	82.9
Tutsi population not registered as murdered	12,175	17.1

¹No figures are available for population size in March 1994. Total population in the prefecture probably reached 500,000 ($\cong 473,920 * (1.03)^2$) by March 1994.

²Taking into account population growth, the figures would be 78 per cent registered as murdered and 22 per cent not registered.

Sources: Ibuka (1999); National Population Census (1991).

Table 3 Victims of 1994 genocide in Kibuye Prefecture by commune

Commune	Number of inhabitants 1991 ¹	Number of victims shown in Ibuka register	Percentage of population killed ²
Bwakira	53,555	4,674	8.7
Gishyita	43,090	11,273	26.1
Gisovu	39,365	3,003	7.6
Gitesi	61,341	11,118	18.1
Kivumu	55,361	3,934	7.1
Mabanza	63,460	8,782	13.8
Mwendo	43,632	4,472	10.2
Rutsiro	56,768	941	1.6
Rwamatamu	54,494	10,853	20.0
Total	471,066	59,050	12.5

¹1991 census data on ethnic affiliation by commune were not available.

²0.5 per cent less when population growth between 1991 and 1994 is taken into account.

Sources: As for Table 2.

Analysis of survival chances

Mabanza commune and Kibuye's football stadium

According to the Ibuka register and details of another 500 victims identified after its publication, there were 9,257 Tutsi victims of the genocide in Mabanza commune, which means that 86 per cent of Tutsi in the commune were killed (Table 4). There were 1,477 survivors.

Table 5 shows where in the commune the Tutsi residents were killed. About 20 per cent (and 25 per

Table 4 Death and survival in Mabanza commune

Total inhabitants registered in the 1991 census	63,460
Total inhabitants in 1994 (1991 figure * (1.03) ²)	67,325
Total of Tutsi residents in computerized database	10,785
Total number of victims	9,257
Total number of survivors	1,477
Number registered by name only	51
Number killed as percentage of 1994 inhabitants	13.7
Percentage of Tutsi killed	86.2
Percentage of Tutsi who survived	13.8

Source: Ibuka (1999) and enumerators' original records.

Table 5 Places where Tutsi residents of Mabanza were killed in the 1994 genocide

Place of victim's death	Number of victims	Per cent
In the cell of residence	1,905	20.5
In another cell within the sector	836	9
In another sector within the commune	329	3.5
In the Gatwaro Football Stadium	3,359	36.2
In Nyamagumba ¹	677	7.3
In Biseseero ²	300	3.2
In the Kivu Lake	18	0.2
Any another place	645	10.0
Place unknown	1,188	12.8
Total	9,257	100
Place unknown	8,069	87.1

¹Name given by the perpetrators of genocide to a hill in Kibingo sector. The name is the same as that of a hill in Ruhengeri Prefecture where Tutsi were killed in 1963–64. Tutsi from the northern sectors (Kibingo and neighbouring sectors) of Mabanza commune did not gather at the community office, but took refuge at 'Nyamagumba' and there resisted the Interahamwe and units of the army from 9 to 12 April 1994.

²'Biseseero' means the hills of Biseseero.

Source: As for Table 4.

cent of those for whom cell of residence is known) were killed in their cell of residence. More than one in three (36.2 per cent) were killed in the Gatwaro Football Stadium, which is situated in the centre of the town of Kibuye, some 10–15 km away from Mabanza. The evidence from the register that the majority of Tutsi killed in Kibuye town centre came from Mabanza commune is supported by accounts obtained from interviews with survivors and the eyewitness account of a German expatriate doctor, Dr W. Blam, who stayed in Kibuye town until his evacuation in mid-May. He recalls survivors telling him that several thousand Tutsi gathered at the commune office in Mabanza. There the mayor told them repeatedly over 2 days not to leave the compound. Subsequently Tutsi from other Kibuye communes arrived, and the mayor then said he had received an order to send everybody to Kibuye town. On Wednesday 13 April, they were forced to march to the Gatwaro Football Stadium in Kibuye town centre, some 15 km away (African Rights 1995).

According to Blam (1994, p. 108), who was working for the German Development Cooperation, in the few days following 11 and 12 April:

waves of refugees, most of them from Mabanza, arrived and by Friday 15 April, more than 10,000 were concentrated in the town of Kibuye. More than 5,000 were in the Gatwaro Football Stadium next to the hospital [where he resided], several thousand were in the grounds of the Catholic parish church, and an undetermined number were with friends or parents on the islands close to the Kivu Lake.

Blam writes (p. 108) that these refugees were telling stories of terrible massacres of groups of refugees in Rutsiro commune. The figures of (at least) 10,000 refugees overall and 5,000 in the Gatwaro Stadium are similar to those reported by French army officers. African Rights (1995, pp. 416, 424) quotes two French officers who conducted on-site investigations some time after their arrival:

Colonel Patrick Sartre told Reuters that at least 4,500 Tutsi, including women and children, were slaughtered in the Kibuye Stadium on 16 and 17 April. He calculated that about 12,000 Tutsi had been murdered in those two days, at the church, in the stadium, and in the surrounding countryside. Lt. Colonel Eric de Stabenrath told Keith Richburg of *The Washington Post* that he found 4,300 bodies piled on top of each other in Kibuye's church and 7,000 to 9,000 more bodies in a sports stadium. From his investigations, he established that Tutsi refugees who had sought shelter at the stadium had been attacked by soldiers and militia who had continued shooting until they had run out of ammunition. He concluded that between 80 and 95 per cent of the Tutsi population had been massacred in this area.

It is impossible to say precisely how many Tutsi were killed in the Gatwaro Stadium. Blam says he saw more than 5,000 refugees before the massacre. Colonel Patrick told Reuters that 4,500 people were slaughtered in the stadium, while Lt. Col. Stabenrath counted 7,000–9,000 bodies. According to the Ibuka register, the stadium was the place of death of 4,179 victims, of whom 3,359 came from Mabanza. The latter figure is certainly an underestimate since the place of death was not recorded in many cases.

In Figure 2, we observe between-sector variation in Mabanza commune. Tutsi were most likely to survive if they resided in Gacaca or Kibirira sectors, where 24.5 and 30 per cent, respectively, of the Tutsi population survived. The place with the highest percentage of survivors in Mabanza, 58 per cent, was a cell in Kibingo sector that had a relatively high number of Tutsi. Further analysis of data on variation between sectors reveals a systematic component: it is the sectors whose Tutsi inhabitants did not march to the Gatwaro Stadium that had higher overall percentages of survivors.

The sectors can be divided into two groups by whether the number who died in the Gatwaro Stadium was more or less than 50 per cent of the total number of victims. Group 1 (less than 50 per cent) comprises: Buhinga, Gacaca, Gihara, Gitwa, Kigeyo, and Rubengera. Group 2 (more than 50 per cent) comprises: Kibirira, Kibingo, Mushubati, Nyaragatovu, Nyarugenge, and Rukaragara. On average, 20.9 per cent of the victims in the first group died in the

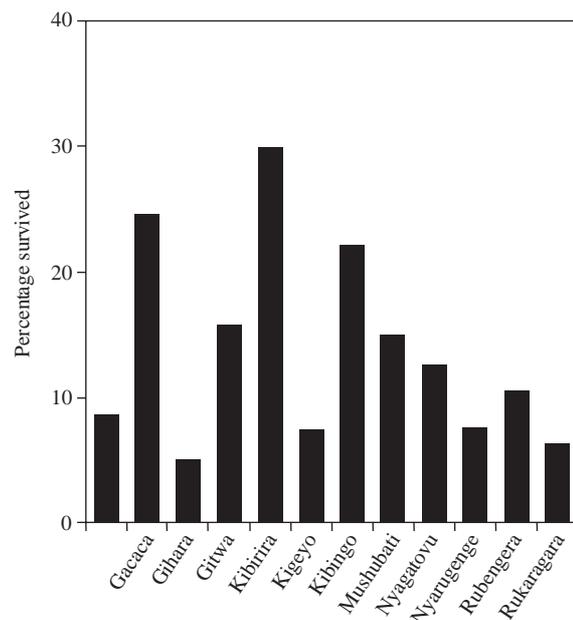


Figure 2 Probability of surviving the genocide in the Mabanza commune by sector
 Source: As for Table 2

Table 6 Chance of surviving the genocide in two different groups of sectors in Mabanza commune

		Per cent victims killed in Gatwaro Stadium		
		<50 per cent Group 1	>50 per cent Group 2	Total
Killed in or survived the genocide?				
Killed	Number	4,609	4,590	9,199
	Per cent	83.1	89.6	86.2
Survived	Number	939	530	1,469
	Per cent	16.9	10.4	13.8
Total	Number	5,548	5,120	10,668
	Per cent	100	100	
Chi-square tests of the difference in chance of survival				
		Value	df	<i>p</i> (two-sided)
Pearson chi-square		96.898	1	0.001
Number of valid cases		10,668		

Source: As for Table 4.

Gatwaro Stadium, and 63.3 per cent in the second group.

Tests of the significance of the difference in survival chances between each group are shown in Table 6. Tutsi from sectors with relatively few victims killed in the Gatwaro Stadium had a significantly higher overall chance of survival. In the first group of sectors, 16.9 per cent survived the genocide, compared with only 10.4 per cent in the second group. In contrast, we do not find a higher percentage of survivors in the sectors whose population sought refuge in Nyamagumba and fought the Interahamwe there. (The Interahamwe—‘those who fight together’—were the civilian death squads who, with State encouragement and support, carried out the massacres.

A total of 677 Tutsi fled to Nyamagumba, and this destination was especially popular among refugees from the sectors of Kibingo and Rukaragara. While both belong to group 2, the proportion surviving was much higher in Kibingo (22.3 per cent) than in Rukaragara (6.5 per cent). Although few Tutsi from these two sectors went to the Gatwaro Stadium, it does not follow that fighting the Interahamwe increased refugees’ survival chances. It seems that only escaping to Zaire or going into hiding really improved their chances.

In total, there were 3,566 people in Mabanza whose date of death is known. Almost half of all Tutsi from Mabanza commune with known dates of death died either on 13 April, when Nyamagumba was attacked, or on 17 April, which was the date of the massacres in the grounds of the Catholic parish church of Kibuye and the Gatwaro Football Stadium. However, more of the dates of death of the victims who died in these major massacres are known than

those of victims who were killed in their houses, in the woods, or in the hills—50 per cent compared with 30 per cent.

Determinants of survival

Logistic regression (Liao 1994) was used to model the determinants of survival, with age, sex, occupation, and sector of residence as explanatory variables. Ninety per cent of Tutsi adults in Mabanza were farmers. The population of non-farmers was higher there than in other rural areas because it had a concentration of schools and small-scale trade. The number of people included in the regression is 8,289 (the number for whom complete information was available).

Table 7 shows the results. All the variables, except sex and four of the sector dummies, are significant at the 5 per cent level. The effects of the age variable are quadratic. The probability of surviving the genocide increases with age to a maximum at age 20 (0.0442/(2 * 0.0011)) and decreases again at older ages. Except for older women, women’s chances of survival were no higher than those of men. Tutsi with non-farming occupations had a better chance of surviving than did farmers and schoolchildren. This may have been because they were better informed than farmers and chose to flee earlier, or because they were physically better able to flee, or because they had more cash with which to pay off the Interahamwe. Probably all these reasons applied to some extent. Compared with Buhinga sector, the sectors whose Tutsi population did not go to the Gatwaro Football Stadium had higher survival proportions.

Table 7 Determinants of survival in Mabanza commune: results of logistic regression, with survival as dependent variable. $N = 8,928$

Explanatory variables	Coefficient	SE
<i>Individual characteristics</i>		
Age	0.0442*	0.0096
Age ²	-0.0011*	0.0001
Sex	0.2312	0.1447
Age * Sex	0.0110*	0.0051
Off-farm	0.6589*	0.1391
<i>Sector dummies</i>		
Gacaca	1.2155*	0.1675
Gihara	-0.3640	0.2211
Gitwa	0.8141*	0.1847
Kibirira	1.6166*	0.1517
Kigeyo	-0.1128	0.1743
Kibingo	1.2329*	0.1462
Mushubati	0.7198*	0.1559
Nyagatovu	0.5897*	0.1590
Nyarugenge	-0.0324	0.2207
Rubengera	0.4016*	0.1956
Rukaragata	-0.0456	0.2334
Constant	-2.9649*	0.1924

Effects are robust for other specifications of the logistic regression.

*Significant at the 5 per cent level.

Source: As for Table 4.

The spatial and temporal distribution of genocide

Dealing with missing data

Of the 59,050 registered victims, date of death is not recorded in 25,716 cases. Since the number of dates of death known for each commune varies, it is likely that the raw data present a biased distribution of murders over time. To produce an estimate of the actual distribution, we therefore have to adopt a procedure that compensates for the poverty of data for some of the communes. For the communes of Bwakira, Kivumu, Mabanza, Mwendu, Rutsiro, and Rwamatamu, we assume that the distribution of the dates of the murders for which the date is known is representative of all victims residing in that commune.

For the communes of Gishyita and Gisovu a slightly different procedure was used. There are three reasons for this. First, the victims taking refuge in the hills of Bisesero died later than the victims killed elsewhere. (By 'Bisesero', I mean the hills in Bisesero sector where the Tutsi of Gishyita, Gisovu, Gitesi, and Rwamatamu took refuge and defended them-

selves against the genocide.) Second, especially in Gishyita commune, where many Tutsi lived, the number of cases for which the date of death is known is greater for the victims who did *not* die in Bisesero. Thus if we applied the same weight for the whole commune of Gishyita, the estimate for the victims in Bisesero would be biased. Third, since it is important to know how many people died in Bisesero and when they died, we undertake a separate estimation for Bisesero. For these reasons, the dates of death of victims from Gishyita and Gisovu communes are weighted up according to whether or not they died in Bisesero.

For the commune of Gitesi, for more than 50 per cent of the victims, the place of residence is missing from the register as well as the date of death. Even when it is registered, the place is often entered as 'in the mountains'. Thus for this commune, the Ibuka register is unreliable and another weighting procedure had to be used. Further details of the treatment of data for this commune are given in Appendix A and in Verwimp 2001 and 2003.

Estimates of deaths each day for Kibuye Prefecture

Using the Ibuka data and the computerized data-set for Mabanza, and applying a number of assumptions specified in the Appendices, I estimated the number of Tutsi who died in Bisesero at 13,000, of whom 6,800 were from Gishyita, 1,333 from Gisovu, 3,700 from Gitesi, 700 from Rwamatamu, and 400 from Mabanza.

With the assumptions specified in the Appendices, it is possible to estimate the distribution of killing over time in Kibuye Prefecture. The method assumes that those victims in Bisesero whose dates of death were recorded are a representative sample of all the victims of Bisesero. Their dates of death are important because the Tutsi at Bisesero, on average, died later than the other Tutsi. Since we have dates for only the 2,500 victims who died in the hills of Bisesero, these victims are given a weighting factor of 5.2 to yield the estimate of 13,000.

According to the Ibuka data, 340 people died before 6 April 1994. While it is known from other sources that several people were killed in the first months of 1994 in different attacks, the figure of 340 in the first 5 days of April is surprisingly high. Given that the number of people registered as killed in the first week of May seems implausibly low, a possible explanation of the figure for deaths before 6 April is that the dates for early May were incorrectly

Table 8 Estimated number of victims of genocide in Kibuye Prefecture (including Bisesero) each day from 1 April 1994 onwards

Date	Number of Tutsi killed for whom date of death known	Estimated number of Tutsi killed ¹	Per cent	Cumulative per cent
April 1	134	134	0.2	0.6
April 2	7	7	0.0	0.7
April 3	7	7	0.0	0.7
April 4	175	175	0.3	1.1
April 5	17	17	0.0	1.2
April 6	11	20	0.0	1.2
April 7	63	160	0.3	1.5
April 8	193	445	0.8	2.2
April 9	379	1,133	1.9	4.2
April 10	655	1,503	2.5	6.7
April 11	952	2,135	3.5	10.1
April 12	2,398	4,238	7.1	17.2
April 13	3,683	6,408	10.8	28.1
April 14	3,492	6,206	10.5	38.6
April 15	2,468	4,416	7.4	46.0
April 16	2,525	4,839	8.2	54.2
April 17	1,629	5,296	9.0	63.2
April 18	1,194	3,488	5.9	69.1
April 19	312	1,392	2.3	71.4
April 20	681	1,506	2.5	73.9
April 21	146	300	0.5	74.4
April 22	100	208	0.4	74.8
April 23	84	163	0.3	75.1
April 24	203	772	1.2	76.3
April 25	207	501	0.9	77.2
April 26	76	142	0.2	77.4
April 27	43	93	0.2	77.6
April 28	870	1,099	1.9	79.5
April 29	59	101	0.2	79.7
April 30	81	179	0.3	80.0
May 1	67	212	0.4	80.4
May 2	136	547	0.9	81.3
May 3	39	146	0.3	81.6
May 4	32	86	0.1	81.7
May 5	51	173	0.3	82.0
May 6	22	62	0.1	82.1
May 7	9	37	0.1	82.1
May 8	36	157	0.3	82.4
May 9	28	66	0.1	82.5
May 10	103	342	0.6	83.1
May 11	37	100	0.2	83.3
May 12	57	205	0.4	83.7
May 13	782	3,654	6.2	89.9
May 14	227	1,029	1.7	91.6
May 15	203	902	1.6	93.2
May 16	69	231	0.4	93.6
May 17	24	111	0.2	93.8
May 18	53	209	0.4	94.2
May 19	20	54	0.1	94.2
May 20	97	361	0.6	94.8
May 21	26	93	0.2	95.0
May 22	14	40	0.1	95.1
May 23	14	52	0.1	95.2
May 24	13	44	0.1	95.3
May 25	71	291	0.5	95.8

Table 8 Estimated number of victims of genocide in Kibuye Prefecture (including Bisesero) each day from 1 April 1994 onwards (Continued)

Date	Number of Tutsi killed for whom date of death known	Estimated number of Tutsi killed ¹	Per cent	Cumulative per cent
May 26	21	69	0.1	95.9
May 27	0	0	0	95.9
May 28	33	93	0.2	96.1
May 29	15	46	0.1	96.2
May 30	34	131	0.2	96.4
May 31	13	65	0.1	96.5
All of June and later	771	2,120	3.5	100.0
Total	25,716	59,050		100

¹Number derived by applying estimation procedure.

Source: Ibuka (1999).

recorded as having occurred in early April. Adding the figures for 1 April to the figures for 1 May (and for those of 2–5 April to those of 2–5 May) is likely to yield more accurate figures for the murders in the first week of May.

Measured in numbers of people killed per day, the genocide in Kibuye reached its peak in the middle of April. Seventy-five per cent of Kibuye's Tutsi killed during the genocide were killed in the first few weeks. After 50 days (by the end of May), the genocide had been almost completed in Kibuye, leaving 59,050 dead. This represents a daily average of 1,200 Tutsi killed. During the first few weeks, however, many more people were killed per day. Between 7 and 21 April, Tutsi were killed at a rate of 3,000 per day (75 per cent of 59,050 divided by 15 days) on average. Numbers peaked on 13 and 14 April when an estimated 6,408 (10.8 per cent of 59,050) and 6,206 Tutsi were killed (see Table 8).

Most Tutsi were killed in the first 2 weeks of the genocide, with losses being especially heavy in the communes of Rutsiro, Mabanza, Rwamatamu, and Gishyita. Two of the lower peaks in Figure 3 are for 28 and 29 April, which is when massacres occurred at Kiziga Hill in Rwamatamu commune. Among survivors, 13 May is known as the date on which Interahamwe from Kibuye, Cyangugu, and Gisenyi assembled in Bisesero to kill the Tutsi there. They had succeeded in staying alive there until then by making good use of the steep hills and throwing stones at their attackers. They could not, however, withstand the overwhelming firepower of the assembled Interahamwe, and the course of the subsequent massacre is shown in Table 8.

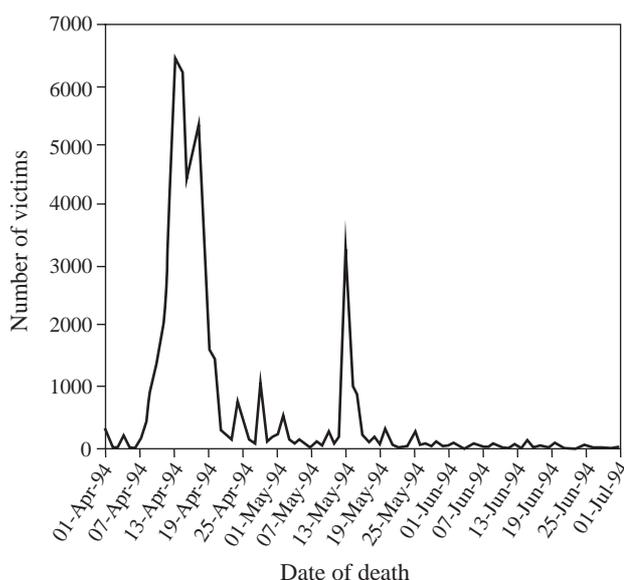


Figure 3 Estimated number murdered each day in Kibuye Prefecture (including Bisesero) from 1 April to 1 July 1994. $N = 59,050$

Source: Ibuka (1999)

Population statistics

Owing to the speed of the genocide in Kibuye Prefecture, it was virtually impossible for the Prefect of Kibuye, Clément Kayishema, to make a day-by-day head count of all the victims in the prefecture. However, as Alison Des Forges (1999, p. 239) writes:

Administration officials very carefully recorded changes in the population before the genocide, noting births, deaths,

and movement into and out of the commune on a monthly as well as a quarterly basis. With these data, officials knew how many Tutsi, whether male or female, adult or child, lived in each administrative unit, information useful in any attempt to eliminate them. Prefect Kayishema was so concerned about the accuracy of these data that he took time in early May to review census data submitted by mayors for the last quarter of 1993. He found errors in at least two of the reports, that of Mabanza, which recorded the increase in female Tutsi as 52 instead of 53, and that of Rwamatamu where an error of 7 was made in accounting for the male Tutsi population and an error of 6 was made in recording that of female Tutsi.

It is clear that population statistics in Kibuye Prefecture, and especially the accurate reporting system of demographic changes that existed in Rwanda before the genocide, became a deadly tool in the hands of the prefect. Des Forges writes that during the genocide, administrators gave orders that all details of all displaced persons should be immediately registered (p. 240). She also refers to documents in which the mayor of Bwakira commune asked councillors to submit a list of heads of household who had died, the number of people in the household killed, and the number who had fled (pp. 240–1). The use of statistics in the pursuit of genocide is not unique to Rwanda. Dealing with a European example, Seltzer (1998) reveals the intricate ways in which statistics and statistical systems were involved in the planning and advancement of the genocide against the Jews in Nazi Germany, Poland, France, the Netherlands, and Norway. A highly disturbing feature of the Rwandan case is the fact that the international community did not take action against the registration of ethnicity on the identity cards of Rwandans when this could have saved thousands of lives. According to Des Forges (p. 17), influential donors overlooked the systematic discrimination against Tutsi before the genocide and did not insist on the elimination of ethnic affiliation on the cards that served as death warrants for many Tutsi in 1994. The identity cards helped the Interahamwe to discover who were Tutsi among a crowd of people.

In documents related to the massacres, the prefect used euphemistic language to refer to them. In one such document (a letter), he writes that ‘calm’ gradually returned from 25 April onwards—meaning that most Tutsi from Kibuye had been killed by then (Kayishema 1994). From the end of April, the prefect tried to restore ‘normality’ in the prefecture. Children were expected to go back to school and adults back to work as if nothing had happened.

Referring to the Tutsi who had defended themselves in Bisesero and were among the few still alive,

the prefect describes Bisesero in the letter mentioned above as a ‘small area of insecurity’. Survivors of the massacres there told African Rights researchers that they had seen the prefect there several times. He was considered one of the leading organizers of the genocide (African Rights 1998, pp. 18, 28). The prefect, together with Obed Ruzindana (a wealthy businessman), Alfred Musema (Director of the tea factory in Gisovu), and the mayors of Gisovu and Gishyita had used their cars and the trucks of the tea factory to deliver Interahamwe and soldiers to the massacre sites.

Conclusions

This paper has presented a statistical analysis of the genocide in Kibuye Prefecture, Rwanda. It uses the register produced by Ibuka, on the assumption that its data are sufficiently reliable. For one commune, Mabanza, the data in the enumerators’ original records, on victims and survivors, were converted into a computerized database to allow statistical analysis. This analysis showed that the likelihood of surviving was better for young adults than for children, the middle aged, and the elderly, especially for those who did not join the crowd at the Gatwaro Football Stadium. The likelihood of survival also depended on the sector of residence. This is because the Tutsi population in half the sectors of Mabanza commune went to the football stadium, but Tutsis in the other half either did not, or were less likely to do so.

In order to estimate the distribution of deaths over time, it was first necessary to estimate the number of people killed in the hills of Bisesero. This necessarily entailed making some assumptions to deal with the problems of missing data, especially for the commune of Gitesi. The result is an estimate of 13,000 as the number of Tutsi killed in the hills of Bisesero. This estimate was used in a calculation of the number of Tutsi killed every day in the entire prefecture. The calculation confirmed that genocide had proceeded at a very rapid pace. Seventy-five per cent of the Tutsi of Kibuye had been killed by 22 April—an average of 3,000 murders per day for the first 2 weeks of the genocide in the prefecture.

As Minna Schrag, a former prosecutor with the International War Crimes Tribunal for Yugoslavia, observed at a 1997 conference on the use of quantitative data and analysis ‘data can help us tell the story of the crime’ (quoted in Seltzer 1998, p. 543). The analysis presented here supplements narrative accounts of the genocide in Kibuye with details of its scale, geography, and pace.

Appendix A: Death and survival in Gitesi commune

Gitesi commune, which is Kibuye's 'urban' commune, had a large Tutsi population before the genocide. Unfortunately, there were many gaps in the data collected there for the Ibuka register. The data for half the sectors were used to create a computerized database, which was analysed to produce the results shown in Table B2. The data for the other sectors are too incomplete to be used. The following facts were established by enquiries made during a visit to the commune in October 2000.

- (i) From 6 to 11 April, the great majority of the Gitesi Tutsi stayed in their homes rather than gather by the thousand in front of the community office like the Tutsi from Mabanza. That is why, after 11 April, the Tutsi of Gitesi, unlike those of Mabanza, were killed at numerous places throughout the entire commune.
- (ii) The dispersion also explains why fewer dates of death were recorded. Members of the same household fled in different directions and did not know the fate of other household members.
- (iii) Apparently the mayor did not actively support the genocide, nor did he oppose it. He behaved more like a bystander. This may be an additional explanation of the dispersion of the Tutsi from Gitesi, at least in the first few days of the genocide.
- (iv) A number of Tutsi from elsewhere in Gitesi came to Kibuye town centre from 12 April onwards; however, many of them were killed in other places throughout the commune.

Appendix B: Estimation of deaths over time

Gishyita and Gisovu communes

For Gishyita commune, it is possible to identify 5,800 residents (out of 11,273) who died in the hills of

Bisesero, because the place of death is mentioned in the Ibuka register. This figure is the 'certain' estimate for Gishyita. It also proved possible to trace 4,000 residents of the commune who did not die in the hills of Bisesero, which left about 1,473 Tutsi from Gishyita whose place of death remained unknown or unclear. Since many people died in the hills of Bisesero, where the exact location was more likely to be unknown, I assume that 1,000 of these 1,473 (two thirds) were also killed in the hills of Bisesero. This suggests that 6,800 Tutsi from Gishyita, that is, three out of five Tutsi from Gishyita, were killed at Bisesero.

For Gisovu commune, 1,000 people (of 3,003) died in Bisesero (the location is indicated in the register) and 1,500 died in other places. As in the case of Gishyita, I assume that 333 of the remaining 503 (two thirds) also died in the hills of Bisesero. Thus an estimated total of 1,333 Tutsi from Gisovu, 44 per cent of its Tutsi population, were killed in Bisesero (Table B1).

Gitesi and Mabanza communes

From interviews in the commune, we know that a considerable number of Tutsi from Gitesi commune managed to take refuge in Bisesero. According to African Rights, Tutsi who had survived several massacres in Kibuye and Gitesi arrived in Bisesero. The Tutsi from Gitesi commune more specifically had survived or escaped massacres at the Gatwaro Stadium, the grounds of the Catholic parish church of Kibuye, and a priest's residence in the grounds. According to the Ibuka file, however, the majority of Tutsi who were killed in these places were residents of Mabanza commune. The figures for Mabanza and Gitesi commune are shown in Table B2.

In contrast to the Tutsi from Mabanza commune, many Tutsi from Gitesi commune were not trapped in the town centre. This does not mean that *all* the Gitesi refugees reached Bisesero. Gitesi is adjacent to Gishyita, but the Bisesero sector in Gishyita commune borders Gisovu commune rather than

Table B1 Tutsi from Gishyita and Gisovu communes killed in Bisesero

Commune	Total number of Tutsi killed	Not killed in Bisesero		Killed in Bisesero		Per cent
		Certain	Assumed	Certain	Assumed	
Gishyita	11,272	4,000	4,473	5,800	6,800	60
Gisovu	3,003	1,500	1,668	1,000	1,335	44

Source: Ibuka (1999).

Table B2 Place of death for Tutsi from Mabanza and Gitesi communes

Place of death	Mabanza	Gitesi ¹
Gatwaro Football Stadium	3,359	718
In Bisesero	300	360
In the mountains	177	3,182
Other specified places	4,233	4,158
Unknown	1,188	2,432
Total number of victims	9,257	10,850

¹See text for discussion of the data problems for the commune of Gitesi. In the Ibuka records for Gitesi commune, cases of unknown place of death were added to the category 'in the mountains', but were assigned differently when the data were recoded for the computer analysis. The figures for Gitesi commune are extrapolations from data recoded for six sectors.

Source: Ibuka (1999).

Gitesi commune. Moreover, a large number of Tutsi were killed on the roads, in their houses, and while hiding with friends. The analysis of half the sectors in Gitesi (see Table B2 and Appendix A) reveals that, extrapolating to the whole commune, one in three Tutsi from Gitesi were killed either in Bisesero (3.3 per cent) or 'in the mountains' (29.3 per cent), while 8.1 per cent were killed in Karongi and for 22.4 per cent the location is unknown. For want of reliable data, we make two arbitrary assumptions: that two thirds of those who died 'in the mountains' went to Bisesero and that half of those whose place of death is unknown also went there. These figures yield a value of 34 per cent (i.e., $3.3 + 19.5 + 11.2$) as the percentage of the 10,850 Gitesi victims who were killed in Bisesero, or 3,700 persons.

The estimated distribution over time of the remaining 7,150 victims of Gitesi commune is also based on the analysis of the data for half the sectors in the commune and observations from eyewitnesses. Of the 948 Gitesi victims for whom the date of death is known, 642 (67 per cent) were killed between 15 and 19 April, with 400 (62 per cent of 642) on 17 April, the day of the massacre in the grounds of the Catholic parish church of Kibuye. With this limited evidence, together with interview data (African Rights, Doctor Blam, and author's interviews in Gitesi), we make the following assumptions. Since the major massacres in that commune took place from 15 to 19 April, we assume that 4,300 (60 per cent of 7,150) died during these days, especially on 16, 17, and 18 April 1994. In the absence of relevant data, these 4,300 victims are assigned to dates as follows: 250 on Friday 15 April, 250 on Saturday 16, 2,000 on Sunday 17, 1,000 on Monday 18, and 800 on Tuesday

19. We also assume that the distribution of deaths over time of the remaining 2,850 (i.e., $10,850 - 3,700 - 4,300$) Tutsi from Gitesi commune was the same as that of the entire prefecture. This is plausible given the evidence that Tutsis who were hiding in the hills were hunted down throughout the territory of the entire prefecture and throughout the 3 months of the genocide. All weighting factors for each of the dates are thus augmented in proportion to the number of people who died on that date, to account for these remaining 2,850 victims. The database also shows that a small number of Tutsi from Mabanza died in Bisesero. Because Mabanza commune does not border Bisesero sector in Gishyita commune, we estimate that only a very small percentage of the 'unknown' in the Mabanza records reached Bisesero.

In the case of Rwamatamu commune, most Tutsi were killed in the commune itself and early in the genocide. Few managed to escape to Bisesero. The register shows that about 9,000 Tutsi victims from Rwamatamu were not killed at Bisesero, which leaves about 1,000 refugees who could have gone there. The presence of Tutsi from Rwamatamu at Bisesero is corroborated by interviews with survivors (see Table B3).

Since the data available for computer analysis were restricted to the data for the commune of Mabanza and half the commune of Gitesi, the overall figure of 59,050 victims found by Ibuka was retained as a baseline for the estimation over time, which meant ignoring the small differences found between the numbers of victims shown in the register for these communes and the numbers revealed by the computer analysis using enumerators' records.

The figure of 13,000 is the estimate of the number of victims killed at Bisesero. Changing the assumptions made to produce this figure would not make a

Table B3 Minimum, maximum, and most plausible estimates of number of Tutsi killed in Bisesero by commune of residence

Commune of residence	Minimum or 'certain' estimate	Most plausible estimate	Maximum estimate
Gishyita	5,800	6,800	7,300
Gisovu	1,000	1,333	1,500
Gitesi	600	3,700	4,000
Rwamatamu	400	700	1,000
Mabanza	300	400	800
Total number	8,100	12,933	14,600

Source: Ibuka (1999)

big difference. The minimum estimate is the 8,100 victims in the Ibuka records whose place of death is stated as Bisesero, which is surely lower than the real number. The most plausible maximum estimate is 14,600. If future research shows that in fact most Tutsi from Gitesi did not die 'in the mountains', as indicated in the Ibuka register, but were killed in other major massacres in Gitesi commune, the figure of 13,000 Tutsi killed in Bisesero will have to be revised downward and the figure for those killed in the grounds of the Catholic parish church revised upward. On the other hand, if future research shows that more than 3,700 Tutsi from Gitesi commune reached Bisesero, the estimate for Bisesero will have to be revised upward.

The estimate of 13,000 is lower than that given in other publications. According to African Rights, 50,000 people were killed in Bisesero. This must be an overestimate because the total number of victims in Kibuye Prefecture registered by Ibuka is 59,050. The Ibuka figure may be an underestimate and it includes only Tutsi living in Kibuye before the genocide, but the African Rights figure of 50,000 for Bisesero alone seems implausibly high. If it were accurate, it would mean either that 10 per cent of the population of the entire prefecture (or two thirds of all the Tutsi from Kibuye) had gathered at Bisesero or that a large number of Tutsi from Gitarama, Gisenyi, Gikongoro, or Cyangugu prefectures had gone to Bisesero. Neither occurrence seems very plausible.

Notes

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References

- African Rights. 1995. *Rwanda: Death, Despair and Defiance*. London: African Rights.
- African Rights. 1998. *Rwanda: Resisting Genocide. Bisesero, April–June 1994*. London: African Rights.
- Association Rwandaise pour la Défense des Droits de la Personne et des Libertés Publiques (ADL). 1993. *Rapport sur les Violations des Droits de l'Homme au Rwanda 1990–1993*. Kigali: ADL.
- Blam, W. 1994. Völkermord als 'modernes' Politikinstrument, in Hildegard Schürings (ed.), *Ein Volk verlässt sein Land—Krieg und Völkermord in Rwanda*. Cologne: ISP.
- Des Forges, A. L. 1999. *Leave None to Tell the Story. Genocide in Rwanda*. New York: Human Rights Watch.
- Fédération International des Droits de l'Homme (FIDH). 1993. *Report of the International Commission of Investigation on Human Rights Violations in Rwanda since October 1, 1990*. Paris: FIDH.
- Ibuka. 1999. Data file Kibuye Dictionary Project. Kigali, Rwanda: Ibuka.
- Kayishema, Clément. 1994. Letter of the Préfet to all the Mayors concerning the self-defence programme of the population, on 30 April, 1994. Copy of the letter available from P. Verwimp or Human Rights Watch.
- Liao, T. F. 1994. *Interpreting Probability Models: Logit, Probit and Other Generalized Models*. Sage University Papers. Quantitative Applications in the Social Sciences Series. Thousand Oaks, CA: Sage.
- Seltzer, W. 1998. Population statistics, the Holocaust and the Nuremberg trials, *Population and Development Review* 24(3): 511–552.
- United Nations. 1993. *Report by Mr. B. W. Ndiaye, Special Rapporteur, on his Mission to Rwanda from 8–17 April 1993*. New York: United Nations. Available: <http://www.preventgenocide.org/prevent/UNdocs/ndiaye1993.htm>
- US Department of State. 1991 and 1993. *Human Rights Conditions in Rwanda*. Washington, DC: US Department of State.
- Verwimp, Ph. 2001. *A Quantitative Study of Genocide in Kibuye Prefecture, Rwanda*. Discussion Paper, Centre for Economic Studies, Leuven.
- Verwimp, Ph. 2003. Development and genocide in Rwanda: a political economy analysis of peasants and power under the Habyarimana Regime. Doctoral dissertation, Economics Department, University of Leuven.