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Killings of social movement leaders in Colombia: an estimation of the total population of victims - update 2018

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December 2019

The killing of social movement leaders in Colombia has been monitored and documented by many organizations over the years. Since the killings occur in many places and in many social sectors, it is difficult to know whether all of them are recorded. In this report, we use a statistical method known as *multiple systems estimation* (MSE) to estimate the total number of killings of social movement leaders in Colombia, including the documented killings and the undocumented killings. We estimate that in 2018, 284 social movement leaders were killed. We also estimate that there is a 0.79 probability that the increase of lethal violence against this population was 50% or greater between 2017 and 2018 and with certainty it was at least of 10%.

This analysis extends our earlier report *Asesinatos de líderes sociales en Colombia en 2016-2017: una estimación del universo*. In that report, we estimated that in 2016 lethal violence took the lives of 166 social movement leaders, while in 2017 the lives of 185 leaders were ended. We also estimated that the probability that the increase of lethal violence from 2016 to 2017 was 10 percent or greater was 0.6.

This report is divided into 5 sections. After this introduction, we describe the data and the documentation projects. In the third section we explore the documented killings and analyze the intersections among the projects. Then we present the estimates of the social movement leaders killed using multiple system estimation. In the fifth section we present our conclusions.

Data

We use data from six different organizations: Cumbre Agraria, Indepaz, Somos Defensores, Front Line Defenders, Ombudsman Office and the Office of the United Nations High Commissioner for Human Rights (OHCHR). This allows us to have data from national and international civil society organizations, as well as from the state and the United Nations.

The recorded homicides reported by each of the six organizations for each year are shown in Table 1. We note that there is no data for Indepaz for 2017 because it was not public

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Table 1. Record of social movement leaders according to each organization.

Year	Indepaz	Somos Defensores	Cumbre Agraria	Front Line Defenders	OHCHR	Ombudsman's Office
2016	114	80	92	86	61	133
2017	NA	106	106	89	84	126
2018	261	164	NA	125	115	177

and we did not get access to it, while for 2018 the cell for Cumbre Agraria is NA because it collaborated with Indepaz for reporting the data.

Each organization has its own data about social movement leaders murdered, and none of them agrees on the total number. For example, in 2016 the Ombudsman's Office reported the killing of 133 social movement leaders, while OHCHR registered 61. In 2017 these same organizations registered 126 and 84 homicides respectively, while in 2018 the differences persisted and these organizations recorded 177 and 115 killings.

Table 1 also shows that the report of killings has grown year after year for each organization (except for Ombudsman's Office between 2016 and 2017). In fact, three of the organizations, Indepaz, Cumbre Agraria and Somos Defensores, have more than doubled their recorded killings.

Although the differences in reported totals might seem contradictory, we note that documenting these murders is very difficult, and consequently, it is understandable that different documentation projects observe slightly different subsets of the total population of victims. In addition to the different sources of information each organization uses, difficulties in accessing places where murders occur, differing levels of trust with the affected communities, and slightly different definitions of who a social leader is contribute to different observed counts. However, the multiple, independent documentation efforts by different kinds of organizations provide a basis for statistical triangulation so that we can estimate how many killings remain undocumented.

Documented Killings

By linking the same victims recorded in different databases, we found that groups in combination reported the killing of 280 social leaders in 2018. This count is different from the one that would be obtained by adding the records of each organization at the individual level because we deduplicated the databases, linking all the victims reported by more than one organization so that we do not double-count any of the cases.

We can analyze Figure 1 in two steps. To begin with, the lower left corner of the figure with the horizontal bars shows the sample size by each organization. We can see that the reported killings vary being OHCHR the organization with the lowest record (115) and Indepaz and Cumbre Agraria the ones with the highest one (261). The right side of Figure 1 with the

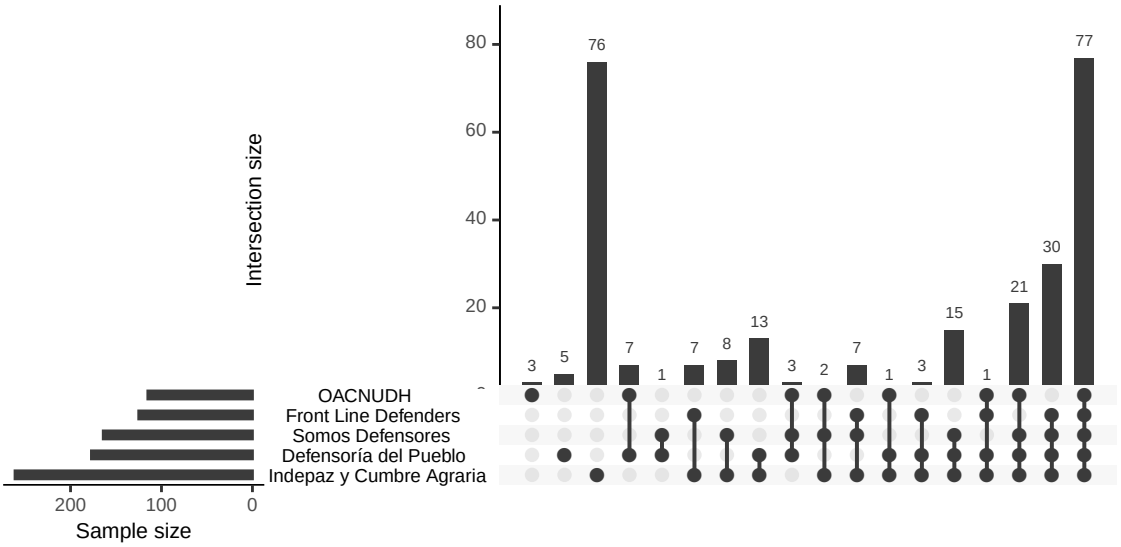


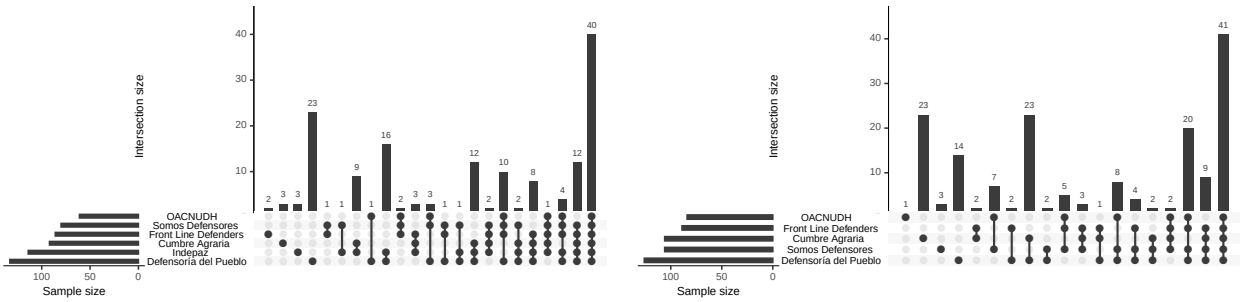
Figure 1. Intersections for 2018

vertical bars shows the coincedences in the killings reported by different organizations. The dots on the bottom and the bar heights show which organizations agree on how many deaths. Understanding how many records overlap is the first approach for analyzing the universe, since it allows us to make an initial assumption about its size. For 2018 we see that the highest bar is the rightmost one, that is, in which all the organizations coincide, followed by the count of killings documented by Cumbre Agraria and Indepaz.

When comparing 2018 with 2016 and 2017 (Figures 2 and 3), we find that the number of homicides registered by the organizations has increased year upon year. For these periods, 160 and 172 murders of social leaders were recorded respectively.

In addition, for all three years the figures show that the highest bar is the last one, that is, the one that contains the records in which all organizations coincide. The relatively high count on this bar means that organizations largely agree, and it is a first indication that in combination, the groups have documented nearly the entire universe of murdered social movement leaders.

Although the increase in the count of documented killings might imply that violence has worsened, the increase could be the result of changing documentation practices rather than a true increase in actual homicides. The observed increase could be due to a greater awareness of who is a social leader, greater funding available for documentation, an increase in the sources of information for the monitoring organizations, or other influences not related to an increase in the number of victims. To account for the unobserved killings, we will estimate the probable total number of killings.



2016 2017

Figures 2 and 3. Intersections for 2016 and 2017.

Estimation

In order to estimate the total population of murdered social movement leaders, and thereby to understand the underreporting, we use a technique called *multiple systems estimation* (MSE). This link provides a non-technical introduction to the method. For a slightly more mathematical explanation and a description of the method's applications in human rights, see Manrique-Vallier, Price, and Gohdes (2013). MSE requires a consolidated database linking all the murders reported by the organizations, as shown in Figures 1, 2 and 3.

To understand the estimation method, we use the following intuition:[1] imagine two dark rooms. We cannot see inside them, and the only tool we have to explore their size is a handful of small rubber balls. The balls do not make any sound when they hit the walls or ceilings, but they make a small sound – *click* – when they hit each other. We throw the balls into the first room, and listen: click, click, click. We gather the balls and throw them into the second room with equal force: click. Our intuition is that the second room is larger because the balls are able to spread out and therefore strike each other less frequently.

Using databases, in some sense we "throw" the databases into the "room" of social momvement leaders killed in Colombia each year. When the databases document the same person, it is as if the databases collided, making a click. We can use the number of people documented on more than one list and the total size of the databases to estimate the total number of victims, including those not on any of the lists.

This method is called "capture-recapture" or "multiple systems estimation," and it has been used to study wildlife and human populations for over one hundred years. A technical and historical introduction to this approach can be found in Bird and King (2017); discussions of the application of capture-recapture to human rights problems can be found in Lum, Price, and Banks (2013), Bales, Hesketh, and Silverman (2015), and Ball and Price (2019). The specific method we use here was developed by Manrique-Vallier (2016).[2]

[1] HRDAG uses this analogy in most of our reports that use MSE.

[2] The software used for the estimates is Bayesian Non-Parametric Latent-Class Capture-Recapture by Indiana University Statistics Professor Daniel Manrique-Vallier.

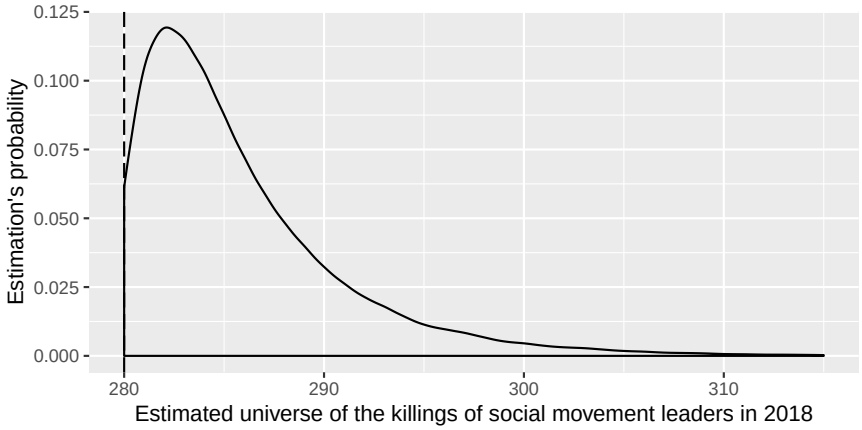
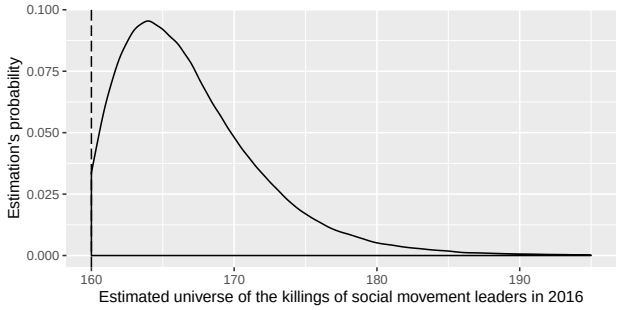
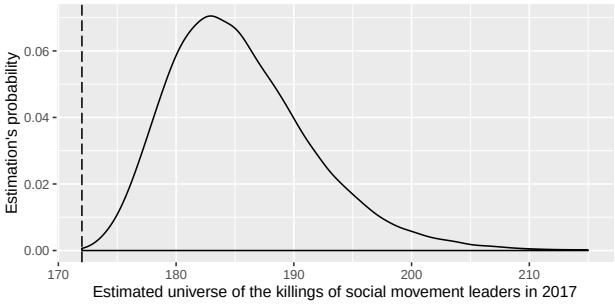


Figure 4. Killings of social movement leaders posterior distribution in 2018



2016



2017

Figures 5 and 6. Killings of social movement leaders posterior distribution in 2016 and 2017.

To make conclusions about the trend of the murder of social movement leaders, we compare the estimates of the total population of victims for each year. Figure 4 shows the posterior distribution[3] of the total population of leaders killed in 2018. Given these data and the LCMCR model, there is a 95% probability that the universe of assassinations of social leaders is between a credible interval of 280 to 300.

To compare the killings of social movement leaders in 2016 and 2017 with 2018, Figures 5 and 6 show the posterior distribution of the total population of leaders murdered in these years. We can see that the three distributions have their highest point very close to the observed killings, shown with the line, suggesting that in combination, the organizations record almost every murder.

When doing an estimation, there is always a trade-off between variance and bias. Researchers have to determine if they are going to choose models to have a smaller variance with a higher bias, or vice-versa. In our case, we use the LCMCR method, which minimizes bias and consequently increases the variance. Our uncertainty is greater on the right side of the

[3]Albert (2007): A posterior distribution represents the likelihood of future observations based on a fitted model.

distribution. While we know the minimum possible number of social movement leaders who have been killed — the true number cannot be less than the observed total — there is a wide range of possible totals on the right side of the posterior distribution.

Like other Bayesian estimators, LCMCR estimates a distribution of likely values, not an exact number of murdered social movement leaders. We present the median of the posterior distribution of estimated killings because, by definition, it is the point where there is a 50% probability that the true value is lower and a 50% chance that it is higher.

The estimates are summarized in Table 2 where we contrast the observed killings versus the estimates. Between 2016 and 2018 the observed number of killings grew 75%, while the estimated universe increased 71%. We can see that through the last three years, the organizations that monitor this topic have recorded almost every killing. We can also see that the only year for which the lowest value of the credible interval is higher than the number of observed killings is for 2017.

Table 2. Summary for every year.

Year	Observed	Lowest CI value	Highest CI value	Estimated	Underreported
2016	160	160	180	166	6
2017	172	176	200	185	13
2018	280	280	300	284	4

To address the hypothesis that the lethal violence against social leaders has increased between each time period, we estimate the probability of a 10% increase[4] between 2016 and 2017 and find a result of 0.6. For 2017 and 2018 this value is 1, which means that with certainty the murder of social leaders increased at least 10% between 2017 and 2018. To estimate if this increase was worse between 2017 and 2018 than in 2016-2017, we calculate the probability that killings of social movement leaders has increased at least 50% between each of these periods with a result of 0.79 for 2017-2018 and 0 for 2016-2017. It is very likely that lethal violence has worsened in the last year.

Conclusion

The debate about the killings of social movement leaders in Colombia is sometimes confused by different counts produced by different organizations. In this document, we show that by combining their reports, we can see the overall universe of victims. Indeed, the independent labor of all the organizations is crucial because each project covers a slightly different subpopulation of victims. This enables us to use a statistical model to estimate the total population of social movement leaders killed in Colombia.

[4]For calculating the probability that lethal violence has grown in at least 10%, we compare the difference between two years to 10% of the first year. The proportion of sampled elements for which the difference is true is the probability that the second year is at least 10% greater than the first year.

Using the information of six different organizations, we estimate that assassination of social movement leaders in Colombia has increased since 2016 and grew particularly between 2017 and 2018. Particularly, the estimated killings have grown in 71% between 2016 and 2018. This pattern is consistent with the hypothesis that after the Peace Agreement, lethal violence against local leaders has worsened, a theory that has been widely discussed in Colombia. This is related to the fact that some analysts believe that the violence is the consequence of readjustment and competition among local armed groups.

Even with the growing cases to be reported the organizations that monitor this phenomena have been able to cover almost all of the increase. We recommend that they keep working independently to document these killings. It is thanks to their independent efforts that statistical methods can be used to estimate the unobserved killings.

Finally, it is important to note that although this report is focused on data and estimates, this story is about more than numbers. Each of the leaders who got killed was part of a community and worked to improve the rights and life of that community. Our goal with this document is to help to focus the debate on the necessity of protecting their lives of these individuals instead of arguing about the accuracy of each organization that monitors this issue.

Acknowledgments

We want to thank Dr. Megan Price, Dr. Kristian Lum, Dr. Rodrigo Uprimny, and Tarak Shah for their clarifications and comments. This project was supported by funding from the Open Society Foundations, the Oak Foundation, an anonymous supporter, and the John D. and Catherine T. MacArthur Foundation. We thank the organizations that provided us with the information on the killings of social movement leaders, which was the fundamental input to develop this work.

About HRDAG

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The Human Rights Data Analysis Group is a non-profit, non-partisan organization that applies scientific methods to the analysis of human rights violations around the world. This work began in 1991 when Patrick Ball began developing databases for human rights groups in El Salvador. HRDAG grew at the American Association for the Advancement of Science from 1994–2003, and at the Benetech Initiative from 2003–2013. In February 2013, HRDAG became an independent organization based in San Francisco, California; contact details and more information is available on HRDAG's website, Twitter feed, and Facebook page.

HRDAG is staff by applied and mathematical statisticians, computer scientists, demographers, and social scientists. HRDAG supports the protections established in the Universal Declaration

of Human Rights, the International Covenant on Civil and Political Rights, and other international human rights treaties and instruments. HRDAG scientists provide unbiased, scientific results to human rights advocates to clarify human rights violence.

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Founded in 2005, Dejusticia is a Colombia-based research and advocacy organization dedicated to the strengthening of the rule of law and the promotion of social justice and human rights in Colombia and the Global South. We promote positive social change by producing rigorous studies and fact-based policy proposals; carrying out effective advocacy campaigns or litigating in the most impactful forums; and designing and delivering education and capacity-building programs.

At Dejusticia, we believe that academic work can be committed to social justice and can contribute to effect change, and we have an "amphibious" approach to our work: we take deep dives in academic and policy-design research and writing with a clear sense of how such work can and will have an impact on our direct action and advocacy.

Contact details and more information is available on Dejusticias's website, Twitter feed, and Facebook page.

Appendix

One of the elements that could attract the attention of 2018 compared to the previous years is the behavior of Figure 1 versus Figures 2 and 3 is the relatively large number of killings reported only by Indepaz and Cumbre Agraria — 76 —. Some people might believe that this implies that they are inflating the numbers. To test this hypothesis, we eliminated two killings reported only by Indepaz and Cumbre Agraria and estimated the total killings. For this excercise the credible interval changed from 280-300 to 278 and 298 with an estimated population of 282 instead of 284. The fact that the results changed by two means that in this context, our model is sensitive to the number of killings reported uniquely by these two organizations. We note first that we have no reason to believe that the organizations have inflated the results. To the contrary, the information is that our results depend on the veracity of the information provided by the organizations and since two organizations got together to report it's not surprising that their list includes more records. In this case, since the reports done by the organizations are very close to the universe, our results are sensitive to changes in data.

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