



The Spread of Terror: A Geospatial Analysis of Civilian Attacks in Afghanistan, 2001 to 2015

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The Spread of Terror:
A Geospatial Analysis of Civilian Attacks in Afghanistan, 2001 to 2015

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A Thesis in the Field of International Relations
for the Degree of Master of Liberal Arts in Extension Studies

Harvard University

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Abstract

Afghanistan has suffered a tragically violent history. Since 1839, the territory has borne the scars of more than 80 armed conflicts, marking it one of the most volatile places on the planet. In the past thirty years of great power involvement, millions have been killed and displaced, often as a result of non-state violence. However, not all provinces of Afghanistan have been affected equally by this nearly constant strife, especially during the NATO-led invasion and occupation, which began in 2001.

This project analyzes data from the Global Terrorism Database describing the volatile state of modern Afghanistan to identify patterns of violence. Through exploratory spatial analysis analyzing distinct provincial characteristics and demographics, this study reveals several significant factors in creating a model of civilian attacks. Examining a variety of traditional and non-traditionally advocated development goals such as literacy, children's health, income equality, employment, and distance from foreign powers, this project finds a province's likelihood of suffering an attack is a factor of its population, the percentage of land dedicated to illicit drug production, and the portion of the public occupying the lowest quintile of wealth.

Dedication

To my parents, who put their growing family above all else. And to Haley,
forever my favorite Widener companion.

Acknowledgements

I wish to express my profound gratitude to the numerous professors, mentors and colleagues who developed, shaped and ultimately enabled the delivery of this work. Professors Don Ostrowski, Asher Orkaby, and Doug Bond of the Harvard Extension School, Professor Scott Bell and Mr. David Strohschein of the Harvard GIS Institute, and Lt Col (Ret.) Jeff Montgomery of the 315 TRS gave selflessly to the success of this project.

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Chapter I.

Introduction

Afghanistan has suffered a tragically violent history. Since 1839, the territory has born the scars of more than 80 armed conflicts, marking it as one of the most volatile places on the planet. In the past thirty years of great power involvement, millions have been killed and forced to flee their homes. However, not all provinces of Afghanistan were affected equally by this nearly constant strife, especially during the NATO-led invasion and occupation.

This project analyzes data describing the volatile state of recent Afghanistan to identify patterns of violence that foil its stability. Through exploratory spatial analysis analyzing distinct provincial characteristics and demographics, this study seeks to answer: Are there underlying characteristics that correlate to this phenomenon? How have traditionally advocated methods of developing state stability fared in Afghanistan? And are these qualities exportable or able to be emulated elsewhere?

The exercise aims to contribute to the academic understanding of regional conflict, particularly within southwest Asia. It identifies characteristics that correlate to a decrease in civilian attacks, and may thus provide the conditions for the development of a stable security environment. Ultimately, this exercise seeks to save lives of Afghans and inhabitants of vulnerable states throughout the world.

Background

This study elects the province as the unit of analysis in Afghanistan, using terror attacks per district as the dependent variable to measure stability. As the United Nations’ “Afghanistan Human Development Report 2007” writes: “Security is a prerequisite for the rule of law that, in turn, creates an environment conducive to human development.”¹ Therefore, we begin by developing a working definition of stability, and then address how to identify instability.



Figure 1. Provincial map of Afghanistan

International relations scholars typically define stability in terms centering on inter-state relations, espousing ideas on hegemonic behaviors, bipolarity, control of

¹ “Afghanistan Human Development Report 2007,” Kabul, Afghanistan: Center for Policy and Human Development, Kabul University, 2007. Available from: <<http://hdr.undp.org/sites/default/files/nhdr2007.pdf>> Retrieved March 24, 2017.

borders, organized economic activity and functions usually reserved for the modern notion of a Westphalian sovereign state. This definition is too broad, as data for this exercise deal with an intra-state conflict.

A more nuanced definition is available in party conflict analyses research. J.C. Harsanyi describes stability as “the balance of power among the various social groups pressing for the arrangements most favorable to their own interests,” while Niou et al. posit that system stability has a preference for “greater resources to less, unless greater resources leads, ultimately, to an outcome in which resources are reduced to zero... where survival is preferred to elimination.”² Unfortunately, Afghanistan is better classified as a failed or, more diplomatically, “recovering” state, rather than a functioning entity.

In analyzing intra-state stability, it is necessary to find a more applicable definition to these less traditional nation-states. For this analysis, we draw upon Markus Fischer’s work, which relates sub-state actors’ stability behaviors to that of Feudal Europe’s communes, duchies, and principalities, rather than to an entire state.³ In exploring the effectiveness of various stability-enhancing initiatives at the provincial level, we turn to more localized concepts proposed by Barry Posen, who provides a theoretical framework for groups of people who find themselves “newly responsible for

² J. C. Harsanyi, “Essays on Ethics, Social Behaviour, and Scientific Explanation,” Springer Science & Business Media, 2012; Emerson M. S. Niou, Peter C. Ordeshook, and Gregory F. Rose, *The Balance of Power: Stability in International Systems* (Cambridge: Cambridge University Press, 2007).

³ Markus Fischer, “Feudal Europe, 800-1300: Communal Discourse and Conflictual Practices,” *International Organization* 46, no. 2 (1992): 427–66.

their own security.”⁴ This understanding is more applicable to studies of Afghanistan, as local leaders frequently usurp direction from Kabul.

Synthesizing these sources, we define stability as a measurement of physical safety: a lack of violence against civilians. In turn, large numbers of terrorist attacks within a region indicate an absence of stability. This study uses the number of civilian attacks as the dependent variable while working to identify its explanatory variables. These variables include proximity to foreign power centers, the prevalence of poppy cultivation, levels of child health care access, educational attainment, wealth distribution, and employment status.

Methods

This thesis leverages a variety of analytical tools to create and test its model. The crux of this study rests upon the geospatial analysis tool ArcGIS to visually reveal relationships between geographic location and civilian attacks within Afghanistan, as compared to those variables selected for analysis. This application provides the capability to create high fidelity choropleth, dot density, and graduated symbol maps, revealing patterns within the data set that might otherwise go unnoticed. The study uses these maps throughout the text and in Appendix I to visualize the relationship between civilian attacks and selected variables.

Next, statistical analysis allows us to test identified patterns empirically. Each variable is examined individually and checked against the five measurements of civilian attacks defined in the following section. Lastly, through stepwise regression we develop a

⁴ Barry Posen, “The Security Dilemma and Ethnic Conflict,” *Survival* 35, no. 1 (1993): 27-47.

model consisting of those variables with significant impact on the level of civilian attacks within a province.

Scholars, researchers, and politicians throughout the past century have provided ample prescriptions for bolstering state stability, peace, and economic growth. Under the guise of various initiatives such as the United Nations' 2020 Development Goals, American nation-building policies and a Global War on Terror, a plethora of solutions to building functioning states has been proposed and implemented. In analyzing the effect of these enterprises upon that most basic of state requirements, stability, this study reveals where future efforts might focus on Afghanistan, and perhaps throughout the world. This report identifies those characteristics that show a significant correlation to that fundamental building block for the rule of law. One hopes that these findings contribute to our understanding and promotion of the advancement of human development within Afghanistan.

Chapter II.

The Global Terrorism Database

The Global Terrorism Database (GTD) incident tracking system is the primary source of data for this study. Created by the National Consortium for the Study of Terrorism and Responses to Terrorism at the University of Maryland, this open-source database tracks “information on terrorist events around the world from 1970 through 2016.”⁵ As of 2017, the database contained more than 170,000 curated entries. Before inclusion, each proposed event undergoes several stringent levels of review.

First, the GTD vets each candidate incident against the definition of a terrorist event: a “threatened or actual use of illegal force and violence by a non-state actor to attain a political, economic, religious, or social goal through fear, coercion, or intimidation.”⁶ Next, the potential record must satisfy three key attributes:

1. The incident must be intentional – the result of a conscious calculation on the part of a perpetrator.
2. The incident must entail some level of violence or immediate threat of violence, including property violence, as well as violence against people.
3. The perpetrators of the incidents must be sub-national actors. The database does not include acts of state terrorism.

Finally, the incident must exhibit at least two of the following three criteria:

⁵ National Consortium for the Study of Terrorism and Responses to Terrorism, “Global Terrorism Database.” Available from: <<https://www.start.umd.edu/gtd/>>. Retrieved March 4, 2017.

⁶ Ibid.

1. The act must be aimed at attaining a political, economic, religious, or social goal.
2. There must be evidence of an intention to coerce, intimidate, or convey some other message to a larger audience (or audiences) than the immediate victims.
3. The action must be outside the context of legitimate warfare activities.⁷

After meeting the above requirements, each entry within the GTD includes 114 distinct data fields. These categories detail aspects such as location, target type, weapons used, perpetrating group, casualties, and nationalities involved. While all 170,000 entries do not fill every field, each incident is assigned an independent event ID, matched with latitude/longitude coordinates, and linked to primary reporting source data to provide amplifying information. As Afghanistan is a notoriously difficult environment from which to gain reliable data, the inclusion of this additional non-uniform information is indispensable. Even the United Nations struggles to collect uniform data on all portions of the country, as in 2007 when its researchers were barred entrance to Paktika.⁸

Additional research throughout this project allowed independent verification of entries within the GTD. Atrocities captured in headlines such as “17 Beheaded at Party in

⁷ National Consortium for the Study of Terrorism and Responses to Terrorism, “Global Terrorism Database Codebook: Inclusion and Variables.” Available from: <<http://www.start.umd.edu/gtd/downloads/Codebook.pdf>>. Retrieved March 4, 2017. The Codebook provides additional explanation for each criterion, as well as a description of the “doubt terrorism” variable for each entry. Considering the difficulties of event verification within the target region, for this study all entries that have met the GTD attributes and criteria for inclusion are treated as valid.

⁸ Tamim Ansary, *Games without Rules: The Often-Interrupted History of Afghanistan* (New York: Public Affairs, 1994), 321.

Bloody Afghan Day” from a 2012 AFP news article are easily cross-referenced.⁹ GTD entry number 201208260001 describes this incident, where two women and 15 men were gruesomely beheaded for listening to music during a party. I thus verified the inclusion of large-scale attacks as well more obscure events. For instance, a report in *Games without Rules* claiming, “In mid-December 2005, [the Taliban] killed a teacher at the gates of his school in Hilmand Province,” is incident number 200512150003, indicating the third recorded event on 15 December 2005, which describes an armed assault against an educational facility in Zargun Village of Hilmand Province carried out by the Taliban.¹⁰ The victim, a teacher/professor, was “shot dead in front of his students.”¹¹ Several additional verifications proved the Global Terrorism Dataset a gruesome, yet accurate, repository.

Filtering the Global Terrorism Database by country, Afghanistan, and date range, 2001 to 2015, yields 9474 entries with which to begin this analysis. A green dot depicts each of the 9474 entries in the chart below. This chart is known as a point density map, where each point is placed to convey the intensity of a given attribute across space and illustrate the spatial dispersion of the raw data set.¹²

⁹ Mamoon Durrani, “17 Beheaded at Party in Bloody Afghan Day,” *AFP News*, August 27, 2012. Available from: <<https://sg.news.yahoo.com/17-civilians-beheaded-afghanistan-officials-053748986.html>>. Retrieved August 15, 2017.

¹⁰ Ansary, *Games without Rules*, 318.

¹¹ National Consortium for the Study of Terrorism and Responses to Terrorism, “Global Terrorism Database.”

¹² Esri Support GIS Dictionary. “Dot Density Maps.” ESRI. Available from: <<https://support.esri.com/en/other-resources/gis-dictionary/term/dot%20density%20map>>. Retrieved November 30, 2017.

Terror Attacks Across Afghanistan, 2001-2015

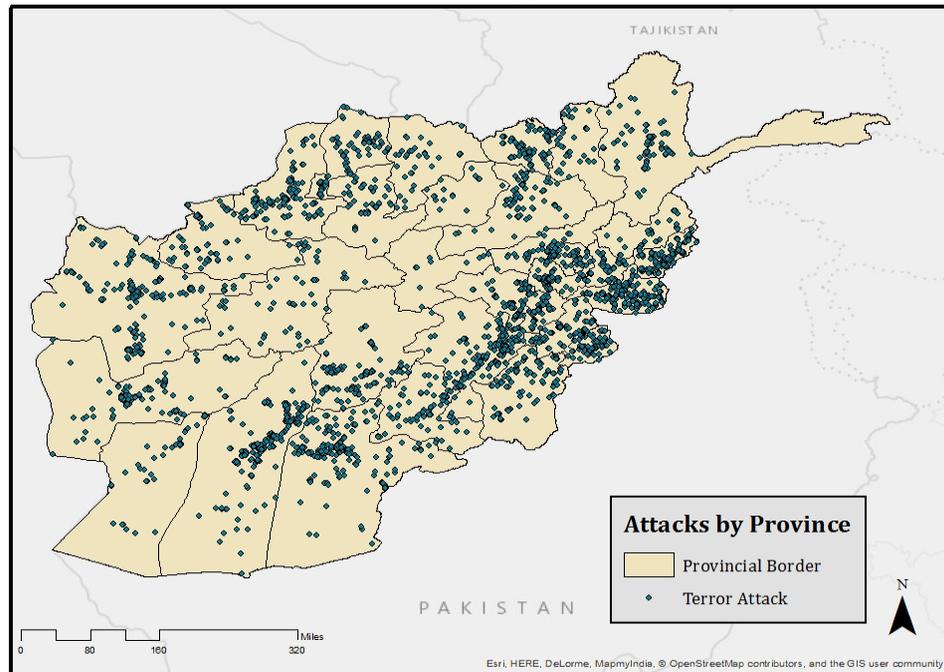
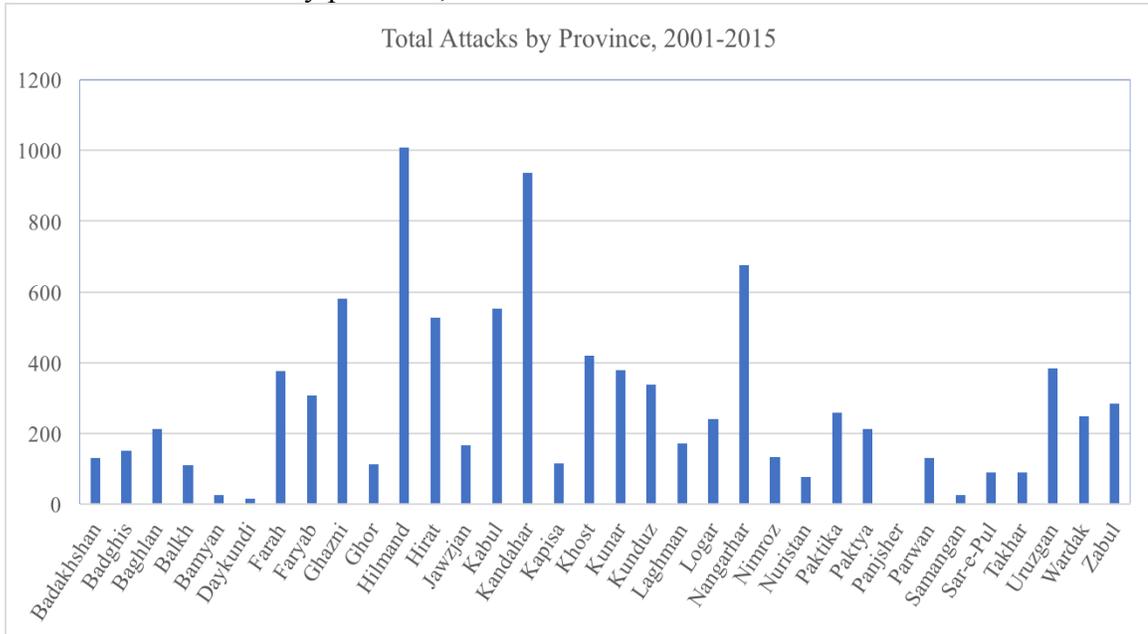


Figure 2. Terror attacks across Afghanistan, 2001 to 2015

As the map above illustrates, none of the 34 Afghan provinces was immune to civilian attacks from 2001 to 2015. However, not all regions were affected equally; there is an apparent clustering along the eastern border with Pakistan, as well as a ring around the entire country. The chart below bins the attacks by province.

Table 1. Total attacks by province, 2001 to 2015.¹³



Using these data, one can see that the provinces of Hilmand, Kandahar, Nangarhar, and Kunduz stand out as particularly prone to terror. These four provinces combined for 3240 attacks over the period, or over 34% of the total attacks. This intense concentration of terror attacks requires further investigation, which is why this project endeavors to uncover what might play a contributing factor to these findings. One primary variable to explore is population, as depicted below.

¹³ National Consortium for the Study of Terrorism and Responses to Terrorism, “Global Terrorism Database.”

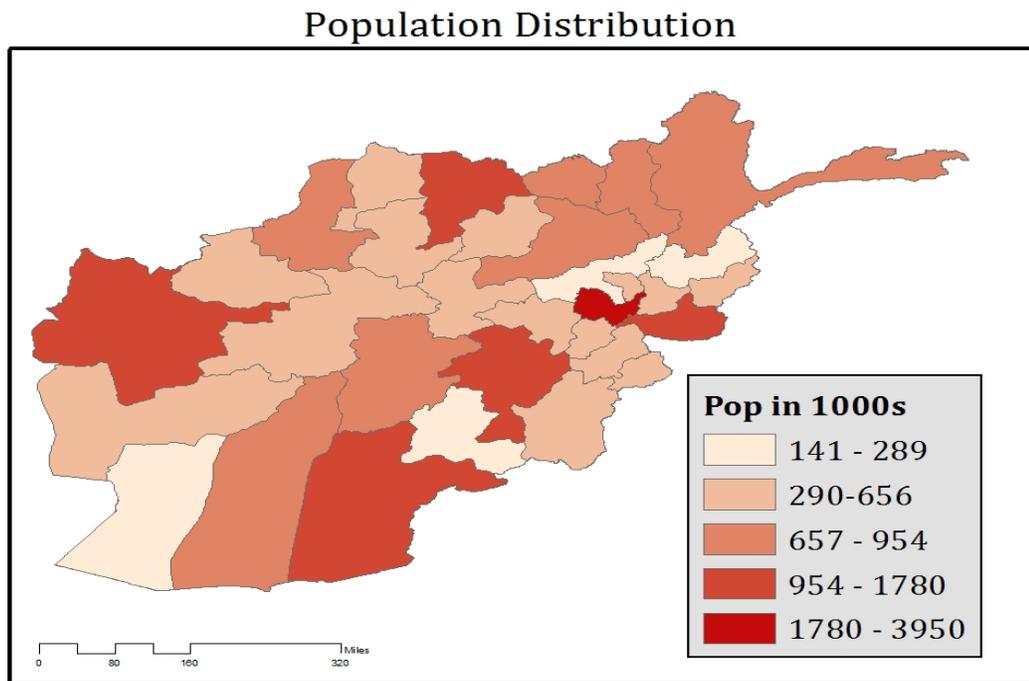


Figure 3. Afghanistan population distribution by province (1000s)

As anticipated, densely populated regions such as Kabul experienced a higher instance of attacks. But this does not fully explain the variation. Regression analysis finds that population explains only 21% of the variance across the country, where each additional 100,000 residents accounted for .1676 more attacks experienced from 2001 to 2015. When attacks suffered by province varies from 3 in Panjshir to 1009 in Hilmand, this finding is not particularly impactful.

While choropleth maps such as that displayed above afford categorization by province to facilitate statistical analysis, it is useful to apply additional manipulation of the point density map. Leveraging the geographic coordinates provided in each GTD entry to reveal precise location, the variable concentration of attacks becomes more apparent.

In the chart below, we manipulate the point density map presented previously using the Spatial Analysis Toolbox within ArcGIS to create a magnitude-per-unit area from point features that fall within a neighborhood around each cell.¹⁴ We create a floating-point raster value for each underlying pixel in Afghanistan by calculating the proximity of each attack to all others in its immediate vicinity, or neighborhood. Higher raster values reflect a concentration of attacks, whose intensity is measured by a graduated color scheme from green to red. Areas experiencing fewer than 100 attacks are not highlighted in this depiction.

This map more drastically reflects the geospatial spread of attacks. It reveals high concentrations of incidents in Hilmand, Kandahar, Kabul, Nangarhar, Khost, and Ghazni provinces, aligning with the standout provinces identified in the previous bar chart. Considering these data are not normalized by population, it is notable that Herat Province in the west, the second most populated province with an estimated 1.8 million residents, appears to have experienced a lower concentration of attacks than even Kunar, the twenty-third most populated province, with an estimated 428,000 residents. These geospatially apparent disparities raise the question: which provincial-level independent variables correlate to the distribution of terror attacks in Afghanistan from 2001 to 2015?

¹⁴ Esri Support GIS Dictionary, "Dot Density Maps." ESRI. Available from: <<https://support.esri.com/en/other-resources/gis-dictionary/term/dot%20density%20map>>. Retrieved November 30, 2017.

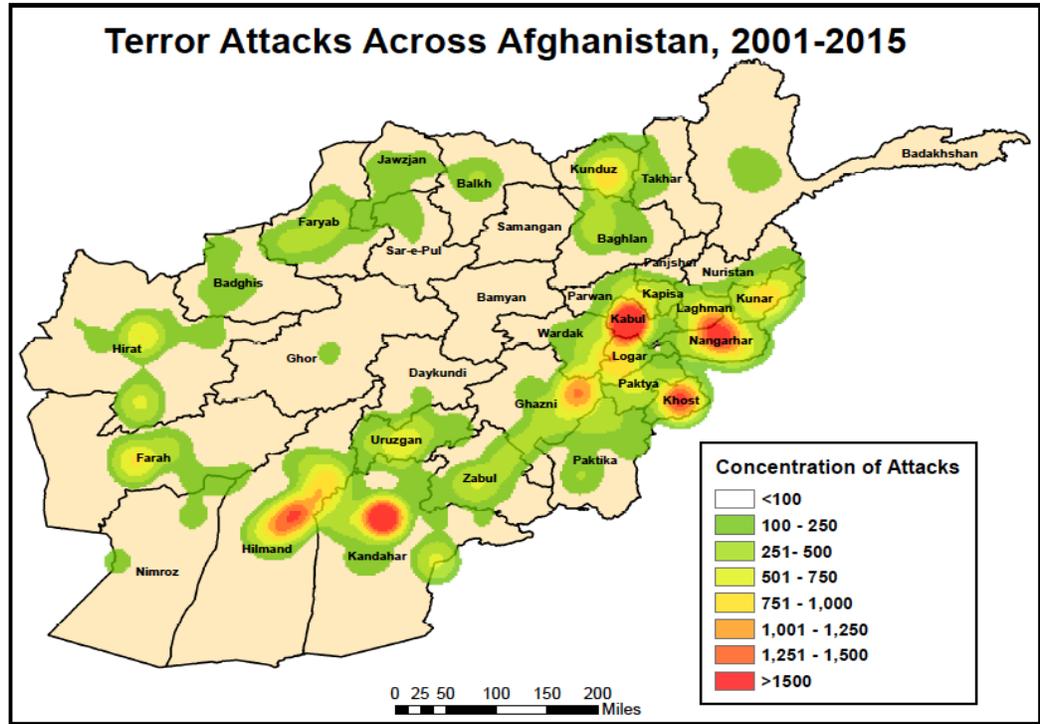


Figure 4. Terror attacks across Afghanistan, 2001 to 2015 (heat map)

We create five central measurements describing terror attacks by province to test the independent variables introduced in subsequent sections of this project. These five normalized measures of attacks are:

1. Total Attacks (AttacksTot): the absolute number of individual attacks a province suffered from 2001 to 2015 (best reflected in the point density chart above)
2. Average Attacks (AttacksAVG): the average number of attacks a province suffered each year from 2001 to 2015. Essentially, the total divided by 15
3. Attacks by Population (AttacksTotPer100k): the total number of attacks a province suffered normalized by the population
4. Attacks by Population per Year (AttacksYrPer100k): the total number of attacks a province suffered normalized by population, divided by 15

5. Attacks in 2015 (Attacks2015): the total number of attacks a province experienced in 2015, the last complete year GTD and additional source data are available

With these five main variables describing attacks identified, this project progresses to examine potential explanatory variables in turn.

Chapter III.

Proximity to Foreign Powers

As a land-locked central Asian country, Afghanistan is significantly affected by the nations with which it shares a border. Moving clockwise from the west, Kabul must simultaneously facilitate relationships with Iran, Turkmenistan, Uzbekistan, Tajikistan, China, and Pakistan. These nations, in turn, affect realities within Afghanistan. Taking into account the foundational geographic premise coined by W. R. Tobler in 1970, that “everything is related to everything else, but near things are more related than distant things,” this portion of the project endeavors to test whether the distance from these power centers affected terror attacks.¹⁵ Most notably, we test whether proximity to Iran has a statistically significant effect on terror attacks experienced by province.

In conducting research on Iranian geopolitical influence, much favor is paid to Iran’s covert actions within its western neighbor, Iraq, as seen in works such as “Democracy, Islam and Insurgency in Iraq” by Muntazra Nazir, “Iranian Influence in Iraqi Shi'a Groups” by James N. Watts and “Iranian Proxies Step Up Their Role in Iraq” by Phillip Smyth.¹⁶ Meanwhile, Iranian influence within its eastern neighbor is often less understood or studied. But this oversight is not due to a lack of Iranian interest. According

¹⁵ Waldo Tobler, “A Computer Movie Simulating Urban Growth in the Detroit Region,” *Economic Geography* 46 (June 1970): 236.

¹⁶ Muntazra Nazir, “Democracy, Islam and Insurgency in Iraq,” *Pakistan Horizon* 59, no. 3 (2006): 47–65; James Watts, “Iranian Influence in Iraqi Shi’a Groups,” Naval Postgraduate School, 2012. Available from: <http://www.dtic.mil/dtic/tr/fulltext/u2/a563454.pdf>. Retrieved February 2, 2017; Phillip Smyth, “Iranian Proxies Step Up Their Role in Iraq,” Washington Institute, 2014. Available from: <http://www.washingtoninstitute.org/policy-analysis/view/iranian-proxies-step-up-their-role-in-iraq>. Retrieved February 22, 2017.

to internal documents, by 2000, the Islamic Republican Guard Corps (IRGC) had established the al-Ansar Command Center of its Fourth Corps with the explicit intent to project “Iranian influence in Afghanistan and Central Asia.”¹⁷ Following this train of logic, this analysis attempts to determine whether western and northern Afghanistan are markedly more or less volatile than other regions, and what factors might influence this phenomenon. Proximity to potentially disruptive foreign influences, notably from Iran as described in Felter and Fishman, provides a spatial variable to measure against in assessing their impact.

Data

Identifying physical distance from provinces to borders required locating the geographically central point within each province and measuring its distance to Iran, Pakistan, and Uzbekistan. The Measure tool in ArcGIS calculated these distances, assigning a distance of 0 to bordering provinces. Total results of this method are displayed in the table below.

¹⁷ Joseph H. Felter and Brian Fishman, “Iranian Strategy in Iraq,” Combating Terrorism Center at West Point. 18. Available from: <<https://ctc.usma.edu/posts/iranian-strategy-in-iraq-politics-and-other-means>>. Retrieved on August 14, 2017.

Table 2. Provincial distances from Iran, Pakistan and Uzbekistan (miles).

Province	DistIran	DistPak	DistUzbek
Badakhshan	608	0	199
Badghis	150	366	243
Baghlan	436	151	143
Balkh	330	235	0
Bamyan	380	222	185
Daykundi	313	211	245
Farah	0	405	427
Faryab	196	389	165
Ghazni	418	142	265
Ghor	220	306	272
Hilmand	131	0	449
Hirat	0	328	361
Jawzjan	270	298	0
Kabul	449	48	224
Kandahar	234	0	428
Kapisa	518	66	186
Khost	524	0	288
Kunar	556	0	261
Kunduz	424	145	66
Laghman	517	51	236
Logar	459	60	240
Nangarhar	552	0	270
Nimroz	0	0	516
Nuristan	535	0	229
Paktika	460	0	332
Paktya	497	0	272
Panjshir	522	76	173
Parwan	450	100	162
Samangan	403	183	86
Sar-e-Pul	283	291	126
Takhar	476	99	111
Uruzgan	299	161	271
Wardak	420	98	199
Zabul	316	0	341

Results

Ultimately, a province's distance from Iran and Pakistan is not statistically significant when tested against the five measurements of attacks mentioned previously.

Therefore, the results are inconclusive in assessing the impact of Iranian policy in Afghan

affairs as measured by the geographic distribution of terror attacks across the study period. This lack of conclusion may be due to a multitude of reasons, not the least of which is a lack of clear understanding of Iranian intent in the region. Regardless, the effect of Iranian influence in Afghanistan is a topic due more consideration from academic and governmental researchers.

Despite the lack of results regarding distance from Iran, a province's distance from Uzbekistan, originally included merely as a control variable, did prove statistically significant at the 99% confidence level. According to this simple regression test, each mile further a province is located from Uzbekistan correlated to 1.07 more total attacks, explaining roughly 29% of the variation among provinces. Therefore, Khost, located 288 miles from the Uzbek border, could expect 310 more attacks over the 2001 to 2015 period than Balkh, which borders Uzbekistan. In this instance, the calculation is nearly perfect: Khost experienced 419 total attacks while Balkh fell victim to only 110. The choropleth map below represents the distance of each province from Uzbekistan.

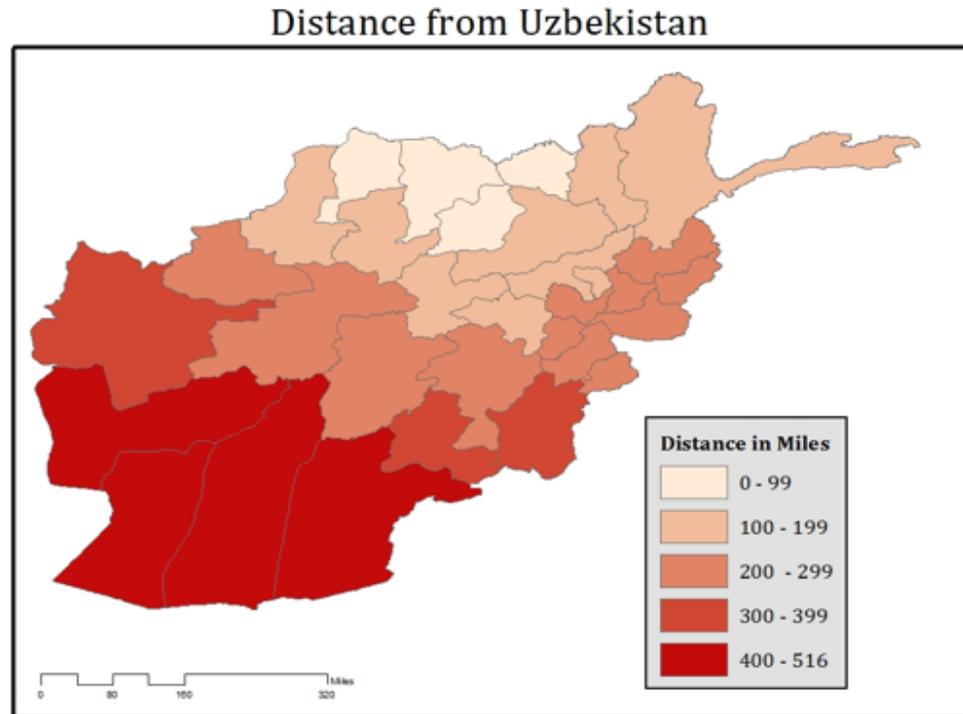


Figure 5. Provincial distance from Uzbekistan (miles)

This result is not entirely surprising. Examining the point density maps introduced earlier, it is apparent the majority of attacks occurred in southern provinces, particularly in Hilmand, Kandahar, and Nangarhar provinces. But this trend is not uniform: Kunduz Province, a mere 66 miles from the Uzbek border and the seventh most populated province with nearly 1 million people, was also a markedly volatile area. Therefore, the DistUzbek variable will be included in later multiple regression analysis tests, but with noted caution.

Chapter IV.

Poppy Production

The negative correlation between illegal drug production and state stability is a common theme throughout international relations literature. While research does not link illicit drug production as a contributing factor to the onset of hostilities, academics conclude that “conflict duration is increased by the presence of narcotics.”¹⁸ Scholarship suggesting a crime-rebellion linkage has emerged to explain this phenomenon.

The Crime-Rebellion theory posits that as governmental control dwindles in geographic areas and rebel coffers begin to deplete during protracted conflicts, even previously narcotics-averse groups will succumb to the potential of organized crime to provide a new financial base.¹⁹ There are three benefits to this new funding stream: first, it allows rebel groups to recruit and pay more fighters. Next, the group acquires increasingly more lethal weapons, which are in turn used to solidify a monopoly of violence and territorial control. Finally, a group will use its increased wealth to establish legitimacy with local populations through the reintroduction of public services.²⁰ Examples from across the world abound as rebels with the Revolutionary Armed Forces of Colombia (FARC) to the Liberation Tigers of Tamil Eelam (LTTE or Tamil Tigers) in

¹⁸ Svante E. Cornell, “The Interaction of Narcotics and Conflict,” *Journal of Peace Research* 42, no. 6 (November 1, 2005): 753.

¹⁹ Ibid.

²⁰ Mara Revkin and William McCants, “Experts Weigh In: Is ISIS Good at Governing?” Brookings, November 30, 2001; Aaron Zelin, “The Islamic State of Iraq and Syria Has a Consumer Protection Office,” *Atlantic*, June 13, 2014.

Sri Lanka provide two well-known examples of such groups becoming entrenched in international drug production and trafficking in support of their protracted cause.

A more recent example of this behavior was seen in Islamic State in Iraq and Syria (ISIS)-controlled territories in Iraq. As the insurgency continued, the previously drug and alcohol-averse group began pursuit of alternative revenue sources.²¹ ISIS quickly moved to tax and facilitate the opium trade from Afghanistan through its territory on to global markets.²² Following the Crime-Rebellion model, in 2014 militants in Mosul provided security and stability for the city while “fixing potholes, busing people between territories, rehabilitating blighted medians to make roads more aesthetically pleasing, and operating a post office.”²³ The income stream provided by the illicit drug trade enables rebel groups to fuel continued attacks, subsequently prolonging conflict across the region.

With estimates ranging from \$500 billion to over \$1 trillion in annual market activity, the eradication of the drug trade is a global initiative routinely at the forefront of policy agendas.²⁴ President Richard Nixon’s iconic declaration of a War on Drugs in 1971 launched the American initiative, marking the beginning of four decades of Washington’s engagement in interdiction efforts.²⁵ This substantial undertaking has

²¹ Graeme Wood, “What ISIS Really Wants,” *Atlantic*, March 2015.

²² John Robert Flores, “Funding Terror: An Analysis of Financing Methods for Terror Groups Based in the Middle East,” *Liberty University*, June 10, 2015.

²³ Aaron Zelin, “The Islamic State of Iraq and Syria Has a Consumer Protection Office,” *Atlantic*, June 13, 2014.

²⁴ Matthew Jenner, “International Drug Trafficking: A Global Problem with a Domestic Solution,” *Indiana Journal of Global Legal Studies* 18, no. 2 (2011): 901–927.

²⁵ Richard Nixon, “Special Message to the Congress on Drug Abuse Prevention and Control,” *The American Presidency Project*. Available from: <<http://www.presidency.ucsb.edu/ws/?pid=3048>>. Retrieved August 20, 2017.

yielded limited efficacy, as even in North America tens of thousands of deaths over the past decade are directly attributed to drug abuse and its associated violence.²⁶ But the United States is not alone in its attempts: efforts to curb the drug trade trudge along on every continent as governments, academics, and the general population grapple with the negative externalities attributed to the industry.

Poppy production is the illicit crop of choice in central Asia. Numerous environmental and social factors contribute to its dominance, where it was estimated in 2007 to account for more than half the country's Gross Domestic Product, or about \$1.5 billion.²⁷ First, poppy plants are drought resistant, mitigating unpredictable precipitation patterns in South Asia. Next, its sap has a shelf life of several years and is relatively light and easily transportable.²⁸ Therefore, unlike perishable goods, the risk of value drop through market gluts can be allayed through storage. Finally, throughout 2001 to 2015, opium sap fetched higher prices than Afghanistan's more traditional crops of wheat and grapes, and on smaller plots of land. This price differential was on the order of several magnitudes: while an acre of wheat in 2007 yielded around \$33 per acre, an acre of poppies would fetch between \$500 and \$700.²⁹ In this climate of more potential profit achievable using less land, poppy cultivation is the logical choice. But there is one final, tragic reason poppy farming appeals to so many in Afghanistan.

²⁶ "Who Is behind Mexico's Drug-Related Violence?" BBC News, February 10, 2014. Available from: <<http://www.bbc.com/news/world-latin-america-10681249>>. Retrieved August 3, 2017.

²⁷ Jon Lee Anderson, "The Taliban's Opium War," *New Yorker*, July 2, 2007.

²⁸ Ansary, *Games without Rules*, 299.

²⁹ Anderson, "The Taliban's Opium War," July 2, 2007.

Afghanistan's recent history compounds the need to farm on small plots: several decades of shifting battle lines have left much of the region's formerly arable land sown with landmines. These relatively low-cost, entry-denial bombs are ubiquitous and costly, leading a *British Medical Journal* study concluded the removal of landmines could increase agricultural production in Afghanistan from 88% to 200%. Because of these landmines, locals surveyed cited walking "to the fields and between or around villages" as one of their highest risk activities.³⁰ Considering the factors presented, poppies appear the reasonable, safe, and economically sound agricultural choice.

Therefore, poppy sap has seeped into the daily lives of many Afghans, with some even using extract as a means of exchange. According to Tamim Ansary, opium has quite literally turned into money: people are using it as currency.³¹ A seemingly bizarre notion, this development is logical as opium satisfies the four monetary criteria established by Aristotle: it holds intrinsic value, is portable, divisible, and durable.³² The use of agricultural goods as currency is not without precedent, as even ancient Mesoamericans were known to trade cacao beans as payment for taxes and wages.³³ But its use in Afghanistan has gone even further, as opium is used to buy "even trivial consumer goods

³⁰ Neil Andersson, Cesar Palha Da Sousa, and Sergio Paredes, "Social Cost Of Land Mines In Four Countries: Afghanistan, Bosnia, Cambodia, And Mozambique," *BMJ: British Medical Journal* 311, no. 7007 (1995): 718–21. The BMJ estimates that while landmines cost about \$3 to produce and deploy, removal costs range from \$300 to \$800 apiece.

³¹ Ansary, *Games without Rules*, 321.

³² Shahzavar Karimzadi, *Money and Its Origins* (London: Routledge, 2016), 206.

³³ Sophie D. Coe, *The True History of Chocolate* (New York: Thames and Hudson, 1996), 98-99; Alexander Del Mar, *The History of Money in America from the Earliest Times to the Establishment of the Constitution* (Cambridge: Cambridge Encyclopedia Company, 1899), 45; and Maricel E. Presilla, *The New Taste of Chocolate: A Cultural and Natural History of Cacao with Recipes*. 1st rev. ed. (Berkeley: Ten Speed Press, 2009), 17.

such as clothes and groceries.”³⁴ The eradication of such a socially pervasive element and its numerous secondary effects has proven incredibly difficult.

Data

As with most illicit activities, an accurate measurement of poppy production within Afghanistan is difficult to assemble using non-governmental resources. The “Afghanistan Opium Survey 2016,” produced annually by the United Nations Office on Drugs and Crime, provides the most robust starting point. This report estimates 201,000 hectares (776 sq miles) of active cultivation across the country.³⁵ Representing an almost 10% increase from the previous year and an explosion from estimated Taliban and the Soviet Union volumes, this growing acreage count has drawn criticism from world leaders. At a 2010 Asia security summit, Russian Deputy Prime Minister Sergei Ivanov offered criticism of the North Atlantic Treaty Organization-led effort to combat the problem, saying, “The whole international community and, first of all, those who took responsibility for ensuring peace and stability in Afghanistan, namely the International Security Assistance Force, should make a strong commitment to fight this drug threat.”³⁶ This criticism is not misplaced, as the United States promised to do just that. In an April 2002 speech at the Virginia Military Institute, President George W. Bush outlined his baseline objective as the United States working “to help Afghanistan to develop an

³⁴ Ansary, *Games without Rules*, 321.

³⁵ United Nations Office on Crime and Drugs, “Afghan Opium Survey 2016: Cultivation and Production,” 2016. Available from: <https://www.unodc.org/documents/crop-monitoring/Afghanistan/Afghanistan_opium_survey_2016_cultivation_production.pdf>. Retrieved August 3, 2017.

³⁶ “Russia Says Afghan Drug Trade Threatens World Peace,” *Asia News Monitor*. 2010. Available from: <<https://www.voanews.com/a/russia-says-afghan-drug-trade-threatens-world-peace-95719289/118905.html>>. Retrieved August 8, 2017.

economy that can feed its people without feeding the world's demand for drugs.”³⁷ The NATO mission through 2015 fell short of that ideal.

The *Afghanistan Opium Survey* concludes that significant levels of opium poppy cultivation and illicit trafficking of opiates have created multiple challenges for Afghanistan. On a macro scale, poppy production has fueled instability, insurgency, and terrorist groups, while the continued rise in local drug consumption further stresses limited or non-existent local services.

This portion of the project aims to test the impact of illicit drug production on provincial terror attacks. I seek to answer two central questions:

1. Does a correlation between poppy production per province and number of civilian attacks exist?
2. Does mapping the two variables contribute to our understanding of their interplay?

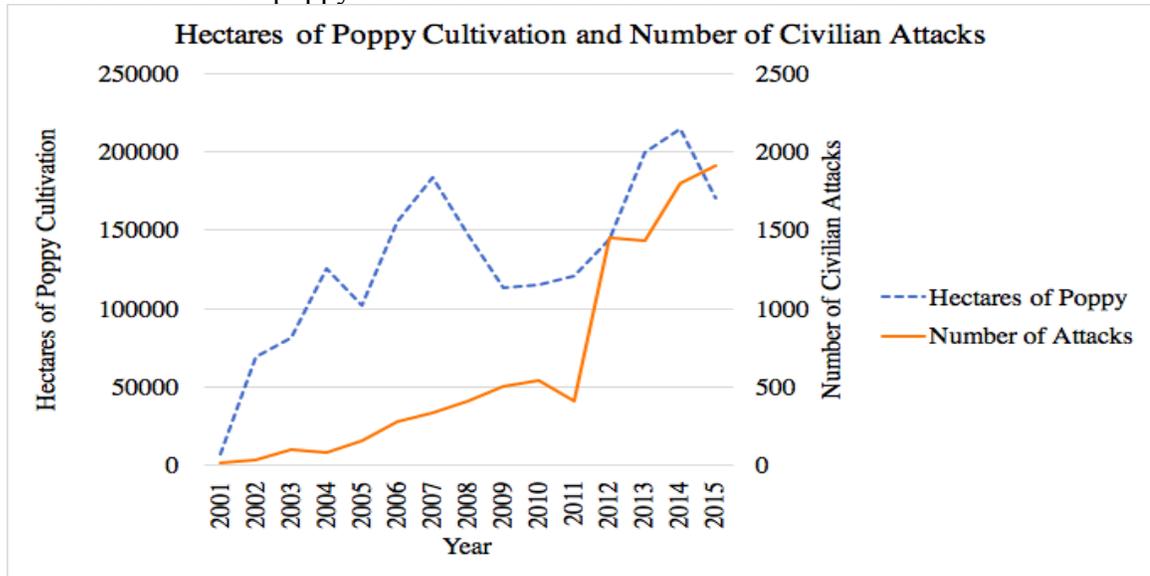
Results

The chart below provides a launching point from which to begin the examination, illustrating a trend between hectares of poppy production across Afghanistan as compared to civilian attacks, each recorded per annum. The left axis reveals a strongly increasing acreage of poppy production while the right axis demonstrates a similar upward trend of attacks over time. The decline in civilian attacks in 2007 may correlate to a decrease in poppy cultivation beginning that same year. STATA testing identifies this

³⁷ George W. Bush, “President Bush Speaks at VMI, Addresses Middle East Conflict,” April 17, 2002. Available from: <<http://transcripts.cnn.com/TRANSCRIPTS/0204/17/se.02.html>>. Retrieved August 28, 2017.

correlation as statistically significant at the 95% level, where each additional 1% of poppy cultivation correlates to 556 more recorded attacks over the 15-year period.

Table 3. Hectares of poppy cultivation and number of civilian attacks.



In examining the correlation between poppy production and civilian attacks at the provincial level, this project again turns to the geospatial analysis tools available through ArcGIS. First, terror attacks and hectares of active cultivation were captured by province, by year, and aligned with existing Afghanistan shape data through a spatial join. With one map per year, this process results in four series of 15 choropleth and graduated symbol maps, one for each year from 2001 to 2015. Visualizations of these data were tested in four combinations with each variable depicted as “simple” or “normalized”:

1. Simple Comparison: Number of Hectares vs. Number of Attacks
2. Normalized Cultivation Comparison: Number of Hectares normalized by percentage of total land vs. Number of Attacks
3. Normalized Attacks Comparison: Number of Hectares vs. Number of Attacks normalized by the total population of a province

4. Combination Normalized Comparison: Number of Hectares normalized by percentage of total land vs. Number of Attacks normalized by the total population of a province

Appendix I, “Poppy Cultivation and Civilian Attacks,” is one of the four map series created through this process. These 15 maps demonstrate the correlation noted above by displaying the simple comparison outlined in the first description. Note that graduated symbols represent each variable as a percentage of the total number of civilian attacks and poppy cultivation rates appear as increasingly deeper shades of green.

By creating this multivariable series of maps comparing the two events across Afghanistan’s 34 provinces and their change over time from 2001 to 2015, we begin to visualize the evolving pattern of terror attacks and poppy cultivation. Most notably, poppy cultivation increasingly concentrates in the southwest and Badakhshan in the northeast.

Additionally, Kandahar and Hilmand Provinces are both highly active in poppy cultivation as compared to the rest of the country, and extremely volatile. The provinces accounted for 61 percent of total production acreage over the study period as well as 20 percent of overall attacks, raising the possibility of outliers within this data set. However, with only 34 degrees of freedom and the overall criticality of each entry, these data are not discarded. Furthermore, other provinces experienced the opposite trend.

Badakhshan in the northeast, routinely among the top six poppy cultivating provinces, experienced some of the lowest numbers of civilian attacks: it ranked 21st in total attacks, or 26th in attacks normalized by population. Additionally, Kabul, home to the capital city of the same name, hosted virtually no poppy production yet experienced

among the most civilian attacks year over year. We expect to see this high number of attacks at the seat of government and most populated province. But even normalized by total population, Kabul continues to stand out for this unenviable characteristic. Overall, these instances bolster the claim propagated by the body of work dedicated to the Crime-Rebellion theory and the United Nations’ *Afghanistan Opium Survey 2016* that, “The significant levels of opium poppy cultivation and illicit trafficking of opiates have created multiple challenges for Afghanistan, as it has fueled instability, insurgency, and terrorist groups, as well as drug consumption.”³⁸

The final poppy-terror correlation test involved determining the average number of attacks per province per year and comparing this to the average percentage of land used for cultivation. These variables were named *AttacksTot* and *PoppyPercentLand*, respectively. In this regression test, the positive correlation became clearer: at the 95% confidence level, R-squared at .38 and low F value, these data reveal that a 1% increase in land used for poppy cultivation correlated with 566.42 more attacks over that 15-year period.

Table 4. Total attacks and percentage of land in poppy cultivation regression analysis.

. regress AttacksTot PoppyPercentLand						
Source	SS	df	MS	Number of obs	=	34
Model	767878.429	1	767878.429	F(1, 32)	=	20.04
Residual	1226211.69	32	38319.1153	Prob > F	=	0.0001
				R-squared	=	0.3851
				Adj R-squared	=	0.3659
Total	1994090.12	33	60426.9733	Root MSE	=	195.75

AttacksTot	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
PoppyPercentLand	566.4184	126.5315	4.48	0.000	308.682	824.1547
_cons	199.2578	37.98006	5.25	0.000	121.8949	276.6206

³⁸ United Nations Office on Crime and Drugs, “Afghan Opium Survey 2016: Cultivation and Production.”

The graph below provides a visualization of these data and the regression line of best fit. The three data points separated from the cluster, moving clockwise, represent Kandahar, Hilmand, and Nangarhar, respectively. While no potential outliers exist within the AttacksTot variable, Hilmand and Nangarhar do lie outside of the traditional measure of three standard deviations of the mean PoppyPercentLand (.269), at 1.07 and 1.23 percentage of their land devoted to poppy production. However, this study elects not to drop these observations from the dataset as they represent a significant portion of the Afghan population and suffered a combined 1,685 separate terror attacks from 2001 to 2015. To disregard these atrocities would be inappropriate considering the implications of the dependent variable in this project.

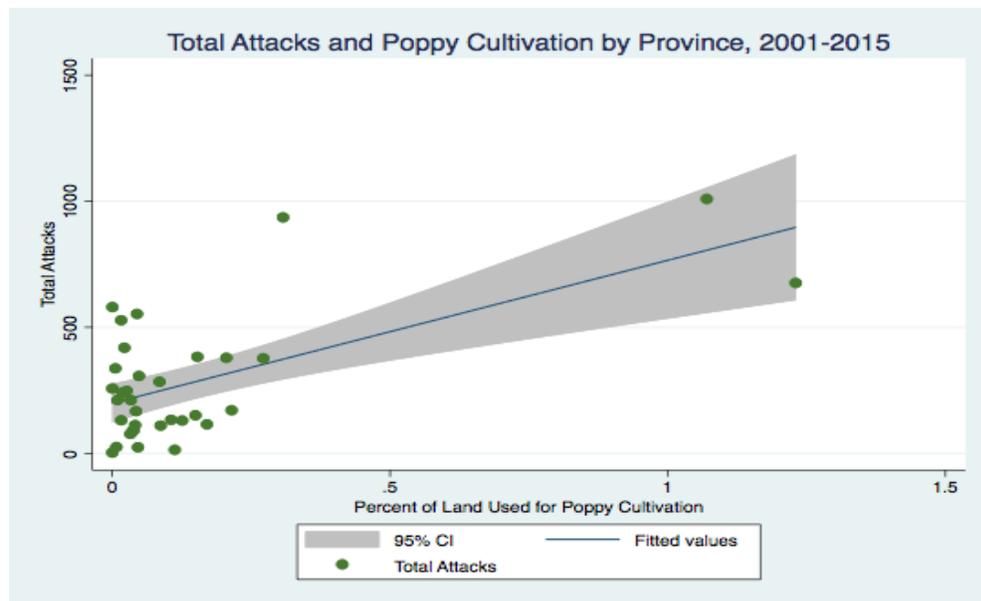


Figure 6. Total attacks and percentage of land in poppy cultivation line of best fit

Having established that the amount of area dedicated to poppy cultivation explains 38% of the variation in terror attacks across Afghanistan’s provinces, we move to more demographic explanations to improve our model.

Chapter V.

Health Demographics

Access to quality healthcare is touted as a bellwether to societal stability. In describing development within Afghanistan in particular, Stuart Gordon highlights the spillover effects of investments in public health, positing that their provision “in fragile environments has broader consequences than simply satisfying the human needs of the beneficiary population.”³⁹ The mantle of improved health as defined from access clean drinking water to prenatal care creates a large variety of indicators from which to “score” a country’s success. Various academic studies from across the globe attempt to quantify this measurement in depth.

An issue of the journal *Disasters* focuses on restoring stability within fragile states through numerous prescriptive solutions like those outlined by Gordon. Case studies advocating the need for healthcare support in fragile states supplement overarching essays on the history of stability-focused aid and its implications on education, wealth, and health. Fledgling societies including Sri Lanka (Jonathan Goodhand), Somalia (Ken Menkhaus), Colombia (Samir Elhawary), Pakistan (Andrew Wilder), Timor (Elisabeth Lothe and Goron Peake), and Haiti (Robert Muggah), are examined in depth, highlighting the critical role public health plays in their recovery.⁴⁰

³⁹ Stuart Gordon, “The United Kingdom’s Stabilisation Model and Afghanistan: The Impact on Humanitarian Actors,” *Disasters* 34 (October 1, 2010): S369.

⁴⁰ Jonathan Goodhand, “Stabilising a Victor’s Peace? Humanitarian Action and Reconstruction in Eastern Sri Lanka,” *Disasters* 34 (October 1, 2010): S342–67; Ken Menkhaus, “Stabilisation and Humanitarian Access in a Collapsed State: The Somali Case,” *Disasters* 34 (October 1, 2010): S320–41;

Each of these studies advocates for a holistic approach to aid provision, especially in the healthcare domain, where primary indicators include childhood mortality, access to vaccinations, clean drinking water, and general education.

In “Poverty, Vulnerability, and Provision of Healthcare in Afghanistan,” Jean-Francois Trani, et al., provide a 2010 review of the Basic Package of Health Services, as introduced by the Afghan government in Kabul in 2002.⁴¹ This study highlights the “significant challenges” for healthcare access in fragile states, where health needs are of “particular importance.”⁴² Predictably, this analysis concludes with a call for increased aid and decreased overhead costs, because, in a country where 82 percent of its residents live in districts where non-governmental organizations (NGOs) provide the majority of primary care services, ineffective methods are unaffordable.

In a more narrowly focused 2008 study, “Effect of Security Threats on Primary Care Access,” Masahiro J. Morikawa asks whether the outset of conflict affects patient access to healthcare as measured by the number of clinical visits across Logar Province throughout 2004.⁴³ The author finds that while urban visit numbers increased during this conflict, those in more isolated rural areas experienced a decline. Comparable war-torn

Samir Elhawary, “Security for Whom? Stabilisation and Civilian Protection in Colombia,” *Disasters* 34 (October 1, 2010): S388–405; Andrew Wilder, “Aid and Stability in Pakistan: Lessons from the 2005 Earthquake Response,” *Disasters* 34 (October 1, 2010): S406–26; Elisabeth Lothe and Gordon Peake, “Addressing Symptoms but Not Causes: Stabilisation and Humanitarian Action in Timor-Leste,” *Disasters* 34 (October 1, 2010): S427–43; Robert Muggah, “The Effects of Stabilisation on Humanitarian Action in Haiti,” *Disasters* 34 (October 1, 2010): S444–63.

⁴¹ Jean-Francois Trani, Parul Bakhshi, Ayan A. Noor, Dominique Lopez, and Ashraf Mashkoor, “Poverty, Vulnerability, and Provision of Healthcare in Afghanistan,” *Social Science & Medicine* 70, no. 11 (June 2010): 1745–55.

⁴² Trani, et al., “Poverty, Vulnerability, and Provision of Healthcare in Afghanistan,” 1746.

⁴³ Masahiro Morikawa, “Effects of Security Threats on Primary Care Access in Logar Province, Afghanistan,” *Medicine, Conflict and Survival* 24, no. 1 (2008): 59–64.

regions such as Ethiopia, Uganda, and Kosovo replicate this a pattern.⁴⁴ The study concludes there are serious access issues during a conflict, but does not question whether this lack of healthcare access affects the conflict itself.

Most pertinent to this study, Stuart cites healthcare first in his prescription for state stability in “The United Kingdom's Stabilisation Model and Afghanistan: The Impact on Humanitarian Actors.” He writes:

“Health services, alongside education and infrastructure development, are portrayed as key instruments in strengthening the state ... that serve to reduce the chances of the state slipping back into violence. Hence, service delivery strategies, particularly in areas such as education, healthcare, rural infrastructure and water/sanitation, are ... critical building blocks in developing the state’s performance legitimacy in ways that are sufficient for the fragile state’s immediate survival and for its longer-term growth.”⁴⁵

Within Afghanistan, leaders began to view the provision of primary health care, in addition to being a valiant aim in its own right, as “generating influence and intelligence opportunities” where local populations are encouraged to share information, ultimately “changing underlying attitudes towards the military force and the Afghan Government.”⁴⁶ The more holistic “hearts and minds” approach employed by the occupying forces of Afghanistan thus added healthcare promotion to their laundry list of prescriptive solutions.

Finally, Annabelle Mark and Mike Jones argue in “Thinking through Health Capacity Development in Fragile States” for the need to provide thoughtful aid in supporting healthcare practices in target states as healthcare is a critical element “in

⁴⁴ Morikawa, “Effects of Security Threats on Primary Care Access in Logar Province, Afghanistan,” 63.

⁴⁵ Gordon, “The United Kingdom’s Stabilisation Model and Afghanistan,” S369.

⁴⁶ Gordon, “The United Kingdom’s Stabilisation Model and Afghanistan,” S378.

securing civil and political stability.”⁴⁷ As these authors vociferously agree, health care plays a significant role in overall state stability. In Afghanistan, we have the data to test these claims.

Data

The United Nations produces extensive healthcare metrics describing Afghanistan through numerous publications, particularly the “Afghanistan Demographic and Health Survey 2015.” Created through a partnership between the Central Statistics Organization and the Ministry of Public Health in Kabul, the “Demographic and Health Survey” provides primary source data for healthcare access in this portion of this project.⁴⁸ This survey compiles the most recent information on a multitude of health indicators by province including fertility levels; fertility preferences; marriage; awareness and use of family planning methods; child feeding practices; nutrition; adult and infant mortality; awareness and attitudes regarding HIV/AIDS; women’s empowerment; and domestic violence. It aims to “assist policymakers and program managers in evaluating and designing programs and strategies for improving the health of the country’s population.”⁴⁹ This study will draw from many elements within this report to test for

⁴⁷ Annabelle Mark and Mike Jones, “Thinking through Health Capacity Development for Fragile States,” *International Journal of Health Planning and Management* 28, no. 3 (July 1, 2013): 269–89.

⁴⁸ Central Statistics Organization, and Ministry of Public Health, Afghanistan, “Afghanistan Demographic and Health Survey 2015,” 2017. Available from: <<https://dhsprogram.com/pubs/pdf/FR323/FR323.pdf>>. Retrieved June 22, 2017.

⁴⁹ *Ibid.*, 35. It is important to note that data from Zabul Province in south-central Afghanistan are not included in this portion of the study due to “extreme security concerns” for United Nations workers at the time of collection. This omission is reflected in data tables as well as choropleth maps produced.

correlations between selected variables and the five main terror statistics introduced in earlier sections.

Health Indicators and Results

We now turn to specific measurements of health access, focusing on children's wellbeing to include mortality rates and access to vaccinations. These indicators, whose promotion is universally accepted as a sacrosanct aim, provide insight into the disparate results across the Afghan provinces. These disparities, in turn, offer the opportunity to test potential correlation with civilian attacks.

Infant Mortality

Chief among its proponents, the United Nations' Millennium Development Goals lists reduced childhood mortality as one of its most important aims. This study selected two different measurements of childhood health by which to test potential correlation with civilian attacks: infant mortality and vaccination rates. Infant mortality, a fairly common measurement of healthcare development across the world, is chosen as the most understandable independent variable of those available, with its purported direct correlation to state stability. According to the "Afghanistan Demographic and Health Survey 2015," "infant and child mortality is relevant to a demographic assessment of a country's population and is an important indicator of the country's socioeconomic development and quality of life."⁵⁰

⁵⁰ Central Statistics Organization, and Ministry of Public Health, Afghanistan, "Afghanistan Demographic and Health Survey 2015," 2017. 127.

Advocates for increased access and quality in childhood healthcare span the academic and policy worlds. In a reverse correlation, Mosley and Chen cite rising political stability as chief among their indicators associated with decreased infant mortality in developing states.⁵¹ In its prescriptive 2008 report “Reforms for Stability and Sustainable Growth,” the Organization for Economic Co-operation and Development affords considerable attention to health outcomes in Hungary, identifying mortality and morbidity as key indicators for its measurement.⁵² And for its part, the United States incorporated healthcare investment into its platform for rebuilding Iraq and Afghanistan.

The United States’ involvement in Afghanistan experienced a shift in operational paradigm to a more holistic and controversial approach deemed “Counterinsurgency,” or COIN. This newly rebranded strategy, which switched attention from the capture and killing of terrorists to a more grass-roots “hearts and minds” campaign, has met critiques ranging from vociferous skepticism to tepid approval.⁵³ Burnett et al. write that following this strategy transition, American aims in the region expanded to include the “circle of development by working with the governments to ... invest in health care.”⁵⁴ With such

⁵¹ W. Henry Mosley and Lincoln C. Chen, “An Analytical Framework for the Study of Child Survival in Developing Countries,” *Population and Development Review* 10 (1984): 38.

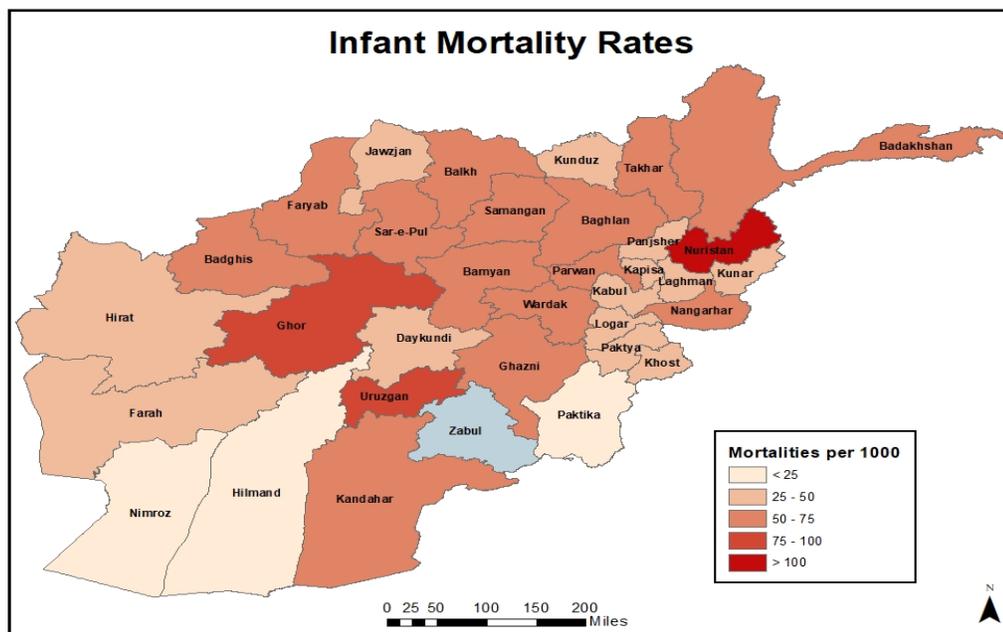
⁵² Organization for Economic Co-Operation and Development, “Reforms for Stability and Sustainable Growth,” OECD, April 15, 2008. 18.

⁵³ Metra Mehran and Abdul Waheed Ahmad, “The Problem with Afghanistan’s Counterinsurgency,” *The Diplomat*, July 28, 2016. Available from: <<https://thediplomat.com/2016/07/the-problem-with-afghanistans-counterinsurgency/>>. Retrieved October 28, 2017; and Christopher Paul and Colin P. Clarke, “Counterinsurgency Scorecard Update,” RAND Corporation. 2016. While the former declares Afghanistan has a poor record on maintaining security, the latter creates a historical “scorecard,” which gives the current conflict a narrowly positive, or successful, score.

⁵⁴ Mark W. Burnett, Philip C. Spinella, Kenneth S. Azarow, and Charles W. Callahan, “Pediatric Care as Part of the US Army Medical Mission in the Global War on Terrorism in Afghanistan and Iraq, December 2001 to December 2004,” 2008. 261. Available from: <<http://pediatrics.aappublications.org/content/121/2/261>>. Retrieved December 28, 2017.

attention paid to the issue of childhood health outcomes in Afghanistan, this study offers the unique opportunity to potentially quantify its impact and review the RAND corporation’s “scorecard” regarding the effectiveness of COIN across the country. And, if decreased infant mortality can be shown to correlate with increased stability as measured by a lower frequency of terror attacks, conversely, higher infant mortality rates could potentially be anticipated in less stable areas.

Data. Rates of infant mortality, defined as the probability of dying between birth and the first birthday, vary significantly across Afghanistan. Nuristan, located along the Pakistani border along the slopes of the Hindu Kush mountains, suffers 123 infant mortalities per 1000 live births. On the opposite extreme, Hilmand suffers 3. The mean infant mortality rate for the 33 provinces included in this study is 49.75 deaths per 1000. The choropleth map below reflects the distribution of these rates for all provinces.



Source: Afghanistan Demographic and Health Survey 2015

Figure 7. Infant mortality rates by province

Results. This study reveals no statistically significant correlation between the number of civilian attacks and infant mortality rate across the provinces. Testing against all five normalized and non-normalized variables identified earlier in this project for measuring attacks yielded no difference in the outcome. Having read the previous chapters' description of the volatility of Hilmand (infant mortality rate of 3) and the relative calm of Nuristan (infant mortality rate of 123), this conclusion is surprising. But this observation does lead to another question: why and how is infant mortality *so* low in Hilmand, this otherwise volatile region full of poppy cultivation?

This trend holds in comparing additional measurements of early childhood health outcomes available in the 2015 survey. For neonatal mortality (the likelihood of dying within the first month of life), postneonatal mortality (the likelihood of dying between the first month of life and first birthday, computed as the difference between infant and neonatal mortality), child mortality (the likelihood of dying between the first and the fifth birthday), and under-5 mortality (the likelihood of dying between birth and the fifth birthday), Hilmand ranks number one across the board.⁵⁵

Perhaps maternal medical care statistics can provide insight. Only 30.7 percent of women in Hilmand receive antenatal care from a skilled provider, which includes a doctor, nurse, midwife, or auxiliary nurse/midwife.⁵⁶ This measurement places Hilmand at number 29 on the list, or fourth from last of 33 provinces considered. Accordingly,

⁵⁵ Central Statistics Organization, and Ministry of Public Health, Afghanistan, "Afghanistan Demographic and Health Survey 2015," 131.

⁵⁶ Central Statistics Organization, and Ministry of Public Health, Afghanistan, "Afghanistan Demographic and Health Survey 2015, 144.

only 25.9 percent of women gave birth in a healthcare facility, and 15.9 percent received a postnatal check-up within the first two months after delivery. A full 93.8 percent of women in the province reported problems (lack of permission, money, or sheer travel distance required) in accessing any treatment.⁵⁷ These results appear irreconcilable. Women are receiving less health care during and immediately following pregnancy, but children are surviving at much higher rates than one would expect to see. Clearly, additional research is needed. Because infant mortality and prenatal care are not the only indicators of healthcare access and efficacy advocated by the COIN methodology and prescribed by development experts and Nobel laureates, we turn to children's health access for clarification.

Vaccination Rates

Moving to post-birth measurements of childhood health access, we next analyze the rate of children receiving all basic vaccinations and those receiving none. Since 1978, immunization programs in Afghanistan have provided millions of doses of vaccines to children under 23 months.⁵⁸ Such initiatives prevent over 15.6 million measles deaths worldwide each year.⁵⁹ Three reasons drove the selection of these two measurements.

⁵⁷ Central Statistics Organization, and Ministry of Public Health, Afghanistan, "Afghanistan Demographic and Health Survey 2015, 150-56.

⁵⁸ Raveesha Mugali, et al., "Improving Immunization in Afghanistan: Results from a Cross-Sectional Community-Based Survey to Assess Routine Immunization Coverage," *BMC Public Health*, 2017, 2.

⁵⁹ Mugali, et al., "Improving Immunization in Afghanistan," 2.

First, abundant time and resources aim to enhance the health outcomes of Afghan children, who are identified as the “most vulnerable group” in Afghanistan.⁶⁰ Second, investments in childhood vaccinations have a potentially high future payoff – namely, ensuring recipients do not contract life-threatening ailments. Additionally, this measurement offers a specific time boundary as, by definition, children must have received these immunizations within the past few years, or they would no longer be considered part of that demographic. And finally, these variables present a binary option, i.e., you are either fully vaccinated or not. There is no question of subjectivity in survey responses such as that received from a line of questioning like, “how easily can you access healthcare?” Such a binary option aids in the simplification of outcome interpretation.

Data. Within vaccination statistics, the variables chosen for analysis are the percentage of children with all basic vaccinations, denoted AllVaccinations, and percentage of children with no immunizations, or NoVaccinations.

Children with all basic vaccinations are aged 12-23 months and have received:

1. One dose of BCG vaccine, which protects against tuberculosis
2. Three doses of pentavalent, which protects against diphtheria, pertussis (whooping cough), tetanus, hepatitis B, and Hib
3. Three doses of polio vaccine
4. One dose of measles vaccine⁶¹

⁶⁰ Trani, et al., “Poverty, Vulnerability, and Provision of Healthcare in Afghanistan,” 1746.

⁶¹ Central Statistics Organization, and Ministry of Public Health, Afghanistan, “Afghanistan Demographic and Health Survey 2015,” 160.

Children with no vaccinations (NoVaccinations) are those who have received zero inoculations since birth.

Across Afghanistan, 46% of children seen during the survey had received all baseline vaccinations. Within individual provinces, this variable ranged from .7% in Nuristan to 74.5% in Ghazni, with an average of 39.86%. For those aged 23 months or less receiving no vaccinations, the average within the provinces was 13%. Observations ranged from a low of .8% in Badghis to a high of 73.9%, again in Nuristan. Nuristan expectedly exhibited the lowest percentage of children receiving all essential vaccinations and the highest rate of those receiving zero vaccinations.⁶² Mothers polled in Nuristan on whether a child with a developing fever should receive medical attention were also least likely to respond in the affirmative.⁶³ Childhood health conditions in Nuristan Province as indicated by the United Nations report study are tragically poor.

⁶² Central Statistics Organization, and Ministry of Public Health, Afghanistan, “Afghanistan Demographic and Health Survey 2015,” 160.

⁶³ Central Statistics Organization, and Ministry of Public Health, Afghanistan, “Afghanistan Demographic and Health Survey 2015,” 183.

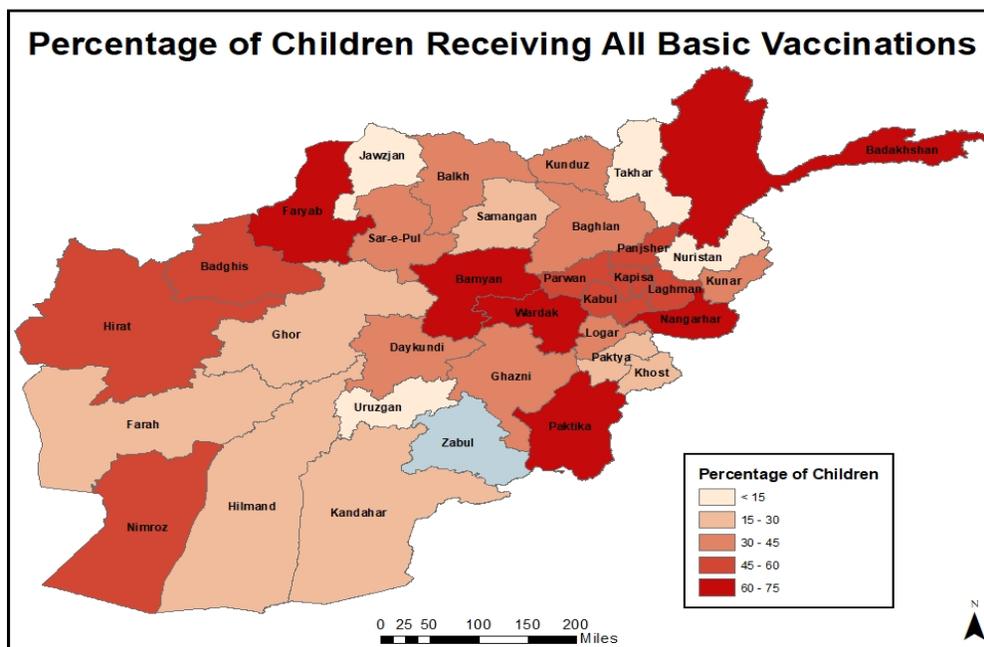


Figure 8. Percentage of children receiving all basic vaccinations by province

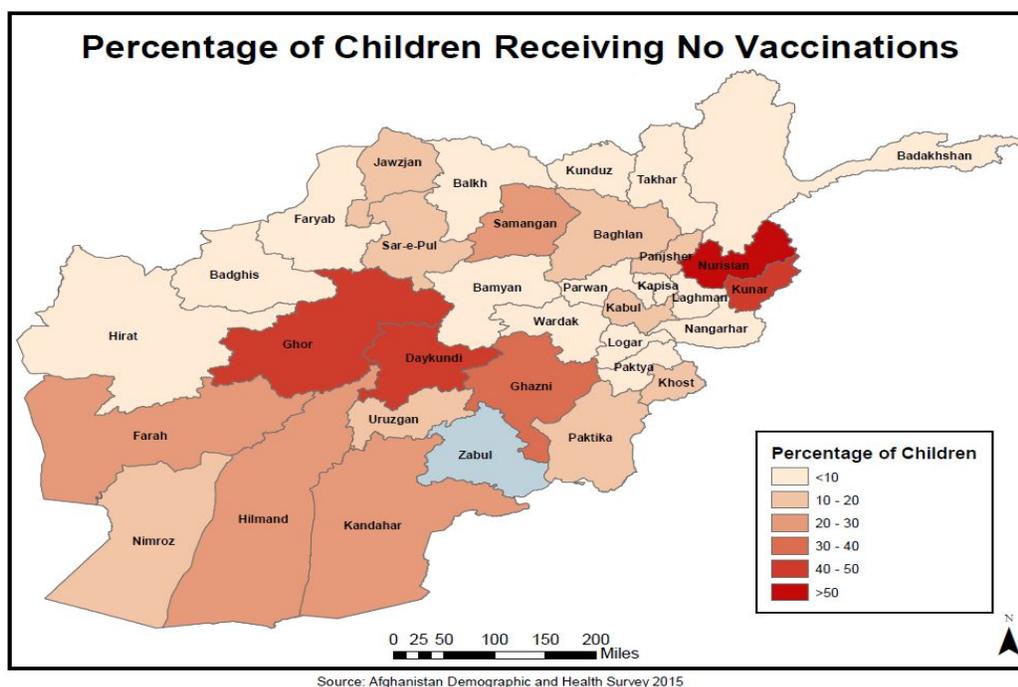


Figure 9. Percentage of children receiving no vaccinations, by province.

It is important to note that vaccination rates provided in the *Demographic and Health Survey* are not without challenge. A 2017 study focused on Afghan immunization

access funded by UNICEF and published by BioMed Central, an open-access medical research foundation, found “large discrepancies between the reported administrative coverage, individual survey results, and WHO/UNICEF estimates.”⁶⁴ While this smaller-scale study is worthy of note, it better serves as a reminder of the difficulty of achieving certain results in the extraordinarily challenging Afghan security environment.

Results. Tested against the five measures of civilian attacks, the percentage of children receiving all basic vaccinations and those receiving no inoculations revealed no significant correlation. While the continued encouragement of and support for decreased childhood mortality and access to essential vaccinations will and should remain a noble goal for all developing nations, its correlation with stability as defined by this study is unestablished.

⁶⁴ Raveesha Mugali, et al., “Improving Immunization in Afghanistan: Results From a Cross-Sectional Community-Based Survey to Assess Routine Immunization Coverage.” 2.

Chapter VI.

Educational Attainment

Our next several demographic variables are closely related population characteristics, beginning with educational attainment. The argument for education to combat terrorism has been voiced for decades by world leaders and Nobel laureates abound. Elie Wiesel wrote that “education is the way to eliminate terrorism,” while the Dalai Lama philosophically mused in 2001 that “education can narrow the gap between appearance and reality,” and thus reduce the inner drive for violence.⁶⁵ In March 2002, President George W. Bush explained to the United Nations Financing for Development Conference in Monterrey, Mexico his government’s position to “challenge the ... lack of education and failed governments that too often allow conditions that terrorists can seize.”⁶⁶ His Secretary of State echoed these remarks, declaring, “I fully believe that the root cause of terrorism does come from situations ... where there is ignorance, where people see no hope in their lives.”⁶⁷ This theme continued within government circles for years.

⁶⁵ Janet J. Jal, “Getting at the Roots of Terrorism,” *Christian Science Monitor* (Boston), December 10, 2001.

⁶⁶ George W. Bush, “President Outlines U.S. Plan to Help World’s Poor,” Presented at the United Nations Financing for Development Conference, Monterrey, Mexico, March 22, 2002. Available from: <<https://2001-2009.state.gov/e/eeb/rls/rm/2002/8891.htm>>. Retrieved November 20, 2017.

⁶⁷ Colin L. Powell and Gideon Yago. Be Heard: An MTV Global Discussion with Colin Powell. Television, February 14, 2002. Available from: <<https://2001-2009.state.gov/secretary/former/powell/remarks/2002/8038.htm>>. Retrieved January 25, 2018.

In opening remarks at a 2005 Congressional hearing explicitly focused on fighting terrorism through education, Senator Richard Lugar took to the floor to outline the direct correlation, saying:

“Outdated and poorly funded education systems in many Near Eastern and South Asian countries have led to an education deficit. This gap has contributed to the rise of extremist ideologies that have provided fertile ground for terrorist recruitment during the last decade.”⁶⁸

Numerous testimonies at this hearing by government and private industry experts followed, espousing the need to increase funding for public education within the region.

Academics also cite the positive returns on investment in education. John F. Kennedy School of Government lecturer Jessica Stern writes that we have an urgent need to improve access to education in Middle Eastern countries, or else “new Osamas will continue to arise.”⁶⁹ John O. McGinnis of Northwestern University oddly personifies ignorance as one of the “greatest friends of terrorism.” Coupled with poverty, McGinnis views the pair as fuel for instability whose reduction is paramount to the fight against Osama bin Laden and his co-conspirators.⁷⁰ Early twenty-first-century scholars were understandably heavy-handed in language describing solutions to the Al-Qaeda threat, while a bit light on tangible proof.

⁶⁸ Combating Terrorism through Education: The Near East and South Asian Experience, Pub. L. No. Y 4.F 76/2:S.HRG.109-155, § Committee on Foreign Relations, 80 (2005). Available from: <<https://www.gpo.gov/fdsys/pkg/CHRG-109shrg24020/html/CHRG-109shrg24020.htm>>. Retrieved January 24, 2018.

⁶⁹ Jessica Stern. “Talking about Terrorism,” *Harvard Magazine*, November 1, 2001. Available from: <<https://harvardmagazine.com/2001/11/talking-about-terrorism.html>>. Retrieved January 20, 2018.

⁷⁰ John O. McGinnis “Expanding Trade: A Powerful Weapon against Terrorism,” *The Federalist Society*, December 1, 2003. Available from: <<https://fedsoc.org/commentary/publications/expanding-trade-a-powerful-weapon-against-terrorism>>. Accessed January 25, 2018.

Empirical evidence in support of education as a means to reduce terrorism is less conclusive than sources cited above indicates. Scott Alan finds that terrorists are “as educated as surrounding populations,” meaning they represent a cross-section of the society.⁷¹ In a study of 118 countries from the period 1984 to 2007, researchers at the University of Paderborn find that education “neither fosters nor retards” terrorism.⁷² In a nebulous conclusion, these authors advocate a country-specific nuanced approach where education may or may not have a positive effect on fomenting peace.

Some research even finds a positive correlation between education and terror. After researching the backgrounds of international suicide bombers across 16 Middle Eastern countries, Malečková and Stanisić conclude: “The share of highly educated people... is significantly correlated with the number of international terrorist acts carried out by individuals or groups from that country.”⁷³ While their study does not speak directly to domestic terrorism, it provides an antithesis to the conventional political wisdom advanced above. The authors ultimately conclude that the number of highly educated people in a society is significantly correlated to the number of attacks originating in that country. A 2% rise in the portion of residents with a tertiary education leads to a doubling of terrorists.⁷⁴

⁷¹ Scott Atran, “Genesis of Suicide Terrorism,” *Science* (New York), 299, no. 5612 (2003): 1534.

⁷² Sarah Brockhoff, Tim Krieger, and Daniel Meierrieks, “Ties That Do Not Bind (Directly): The Education-Terrorism Nexus Revisited,” IDEAS Working Paper Series from RePEc; St. Louis, 2010. Available from: <<http://ideas.repec.org/p/pdn/ciepap/26.html>>. Retrieved January 24, 2018.

⁷³ Jitka Malečková and Dragana Stanišić, “Does Higher Education Decrease Support for Terrorism?” *Peace Economics, Peace Science and Public Policy* 19, no. 3 (2013): 343.

⁷⁴ Malečková and Stanišić, “Does Higher Education Decrease Support for Terrorism?” 334-49.

In another study, this time teamed up with Alan B. Krueger, Malečková finds that neither education level nor technical job skills affect violence levels within a society.⁷⁵ In a case study of Hezbollah in Palestine, the authors find a 30 percent increase in secondary school enrollment to be “associated with an 8 percent increase in Hezbollah participation.”⁷⁶ Along the same vein, Ralph Hudson finds in a 1999 report that “terrorists, in general, have more than average education.”⁷⁷ Once again, data from the “Afghanistan Demographic and Health Survey” compared to the Global Terrorism Database provide an excellent opportunity to contribute to this body of research.

Data

Data within the “Afghanistan Demographic and Health Survey” regarding education levels across provinces are extensive. Participants’ highest level of schooling is broken down into six categories: no education, some primary, completed primary (6th grade), some secondary, completed secondary (12th grade) and more than secondary. The question was posed to 29,461 women and 10,760 men from all provinces except Zabul, where workers could not safely obtain data. The chart below displays total results by schooling level, where the disparity between men’s and women’s educational attainment is apparent.

⁷⁵ Alan B. Krueger and Jitka Malečková. “Education, Poverty and Terrorism: Is There a Causal Connection?” *Journal of Economic Perspectives* 17, no. 4 (December 2003): 119–44.

⁷⁶ Krueger and Malečková, “Education, Poverty and Terrorism: Is There a Causal Connection?” 135.

⁷⁷ Ralph Hudson. “The Sociology and Psychology of Terrorism: Who Becomes a Terrorist and Why?” Federal Research Division, Library of Congress, September 1999. 48. Available from: <https://www.loc.gov/rr/frd/pdf-files/Soc_Psych_of_Terrorism.pdf>. Retrieved January 24, 2018.

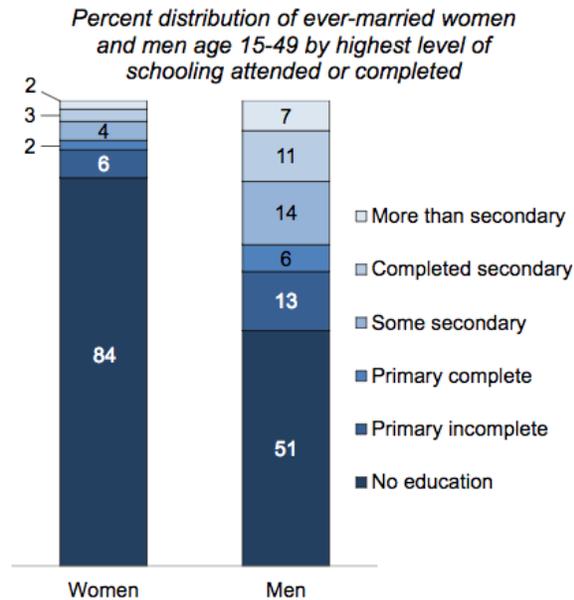


Figure 9. Percent distribution of highest level of schooling completed by gender⁷⁸

Women’s access to education in Afghanistan is notoriously dismal. As the brutal legacy of subjugation under Taliban rule continues, this survey finds that nation-wide, 83.5% of women receive no education at all while fewer than 2% move on to post-secondary studies. Individual province totals range from a staggering 98.7% of women with no schooling in Paktika to 65.7% in relatively urban Kabul. For secondary education, Kabul again leads with a paltry 6.5%, while not one of the 851 women interviewed in Khost had accomplished the same feat. This lack of education leads to an overall literacy rate among women of 14.8%, which produces a litany of problems of its own such as the poor childhood health statistics seen earlier in this report. The maps below display provincial totals for females with no education and secondary education.

⁷⁸ Central Statistics Organization, Afghanistan, and Ministry of Public Health, Afghanistan. “Afghanistan Demographic and Health Survey 2015,” 32.

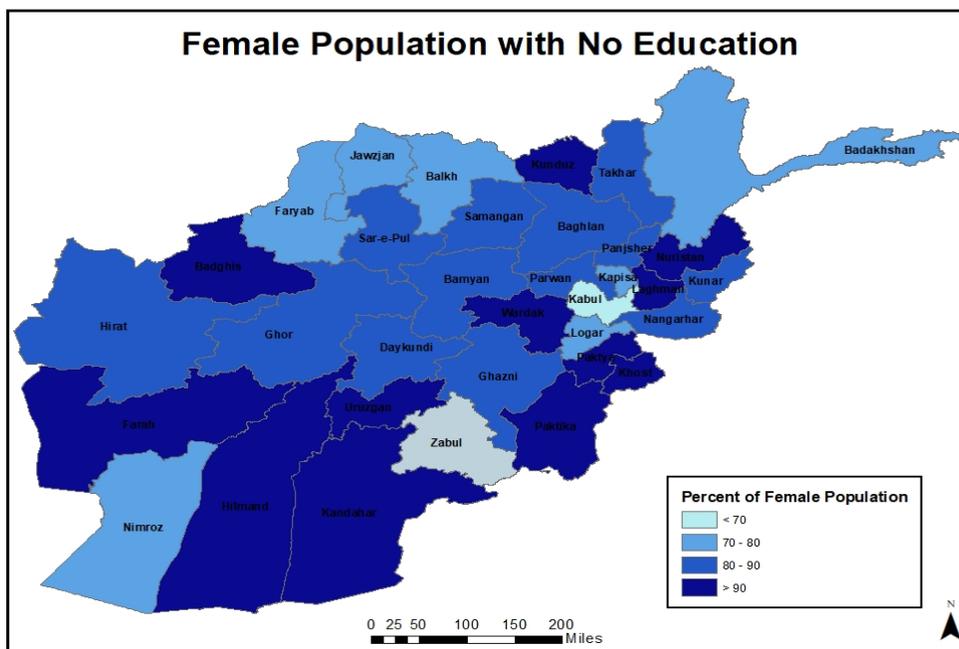


Figure 10. Percentage of female population with no education

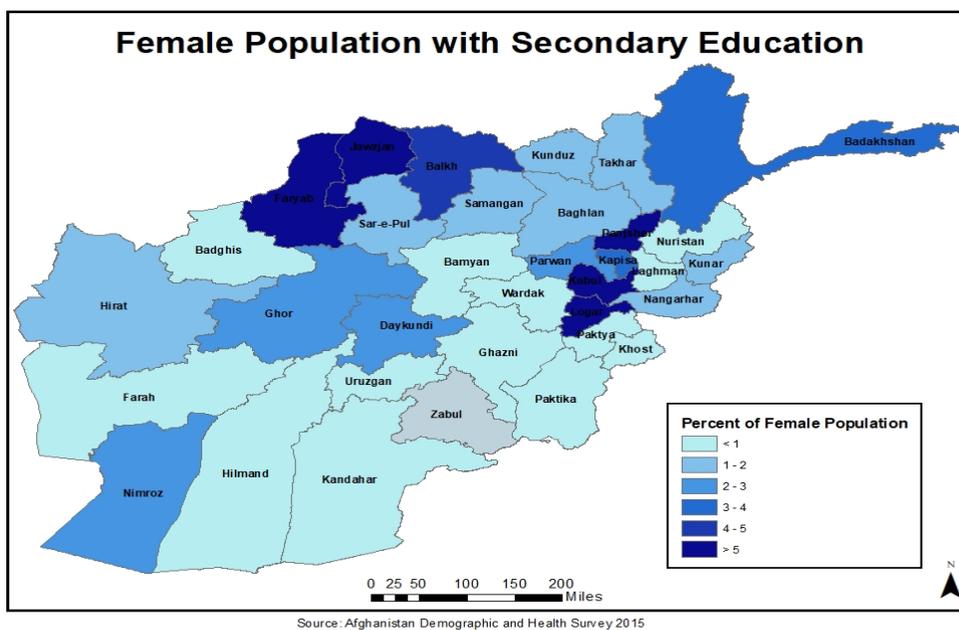


Figure 11. Percentage of female population with secondary education completed

Male academic results in Afghanistan are significantly higher than their female counterparts. Over 18% of men complete secondary studies while one-third of those move on to higher pursuits, leaving only about half the population receiving zero formal schooling. Kapisa hosts the lowest portion of males with no education (26.7%) and a surprisingly high 27.6 percent of Panjshir males complete secondary education.⁷⁹ While Kabul again ranks among the lowest numbers of no education and highest for secondary completion, the educational landscape is more diffuse for males than females.

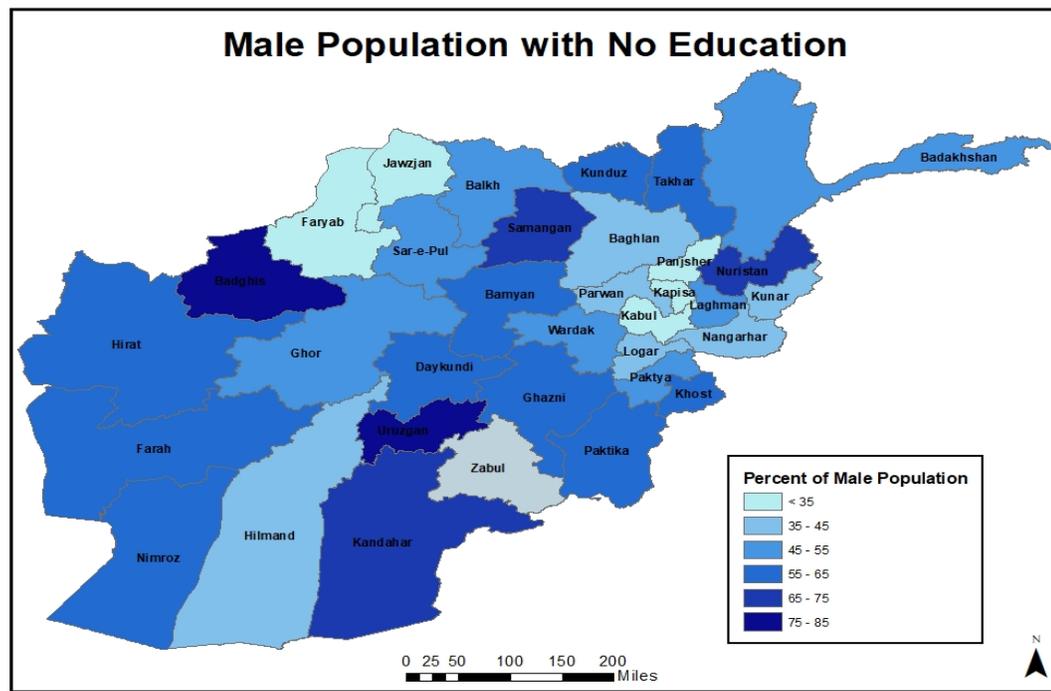


Figure 12. Percentage of male population with no education

⁷⁹ Central Statistics Organization, and Ministry of Public Health, Afghanistan, “Afghanistan Demographic and Health Survey 2015,” 2017. 41. Concerning the last statistic describing the percentage of males completing secondary education in Panjshir province, it is important to note that only 18 males were surveyed. This sample size is by far the smallest among this data set, by order of magnitude of three. The next highest level of secondary completion was Jawzjan Province, where a more believable 21.7% of the 218 males interviewed had accomplished the same level of education.

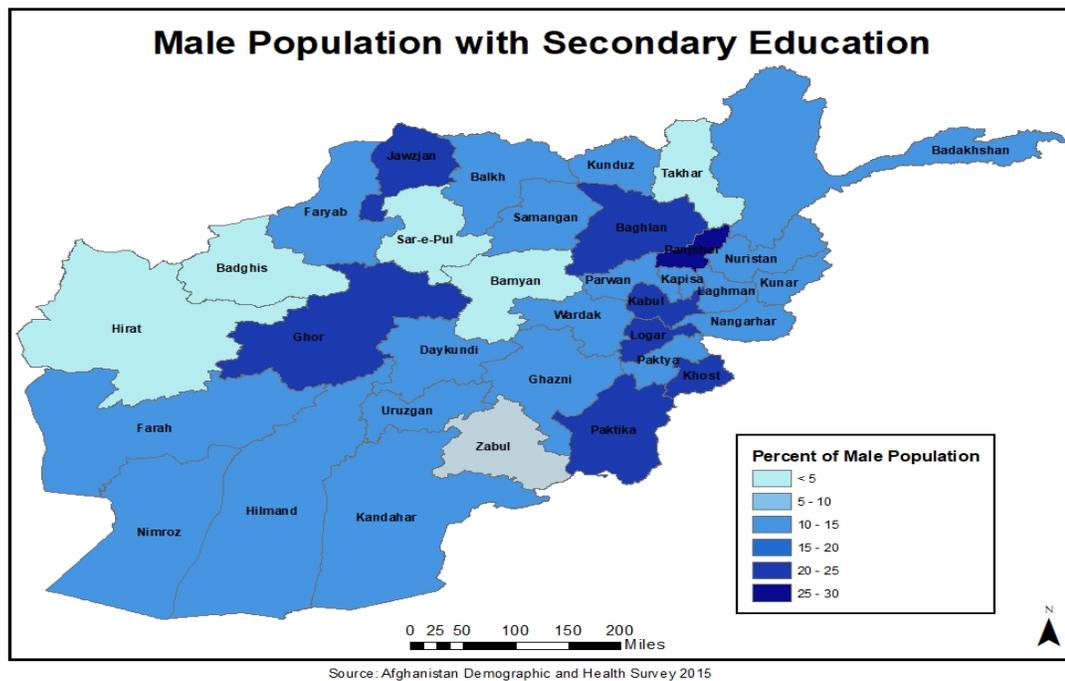


Figure 13. Percentage of male population with secondary education completed

Comparing these maps to those introduced in Chapter 3 does not immediately reveal important patterns beyond a seemingly urban-rural divide amongst the people. As seen throughout much of the world, those in more urban settings typically enjoy greater access to educational opportunities. The “Afghanistan Human Development Report” includes education in its multitude of factors contributing to human security and state stability, whose attainment it sees as key to “creating a robust, free and just state.”⁸⁰ We next move to test whether education is indeed fostering this robust, free and just state.

Results

⁸⁰ “Afghanistan Human Development Report 2007,” Kabul, Afghanistan: Center for Policy and Human Development, Kabul University, 2007. 37.

Unfortunately, the results of this experiment reinforce the gulf between idyllic political rhetoric and real-world proof of concept. This study finds no correlation between the educational attainment of male and female Afghans and the relative security levels experienced in their home provinces. Testing against all five attack indicators yielded equally inconclusive results. Considering a similar outcome in his 2007 study of Palestinian terrorists, an undeterred Claude Berrebi writes: “The importance of the use of education or economic growth to fight terror is not invalidated, in spite of these findings.”⁸¹ While these results show that improved educational attainment may not be a demonstrated means of directly fighting terrorism, its promotion continues to be a noble aim. In line with Berrebi, this study advocates the eradication of ignorance and illiteracy remain a top priority in any societal advancement model.

⁸¹ Claude Berrebi, “Evidence about the Link Between Education, Poverty and Terrorism among Palestinians,” *Peace Economics, Peace Science and Public Policy* 13, no. 1 (2007): 28.

Chapter VII.

Wealth Distribution

Development leaders and veterans of nation-building universally denounce wealth inequality for its capacity to spur unrest. Kim Dae-jung, the former president of South Korea often credited with facilitating his country's economic rise in the late 1990s, stated bluntly: "At the bottom of terrorism is poverty. That is the main cause."⁸² Desmond Tutu echoed these sentiments, saying "external circumstances such as poverty" play a critical role in turning people into terrorists. More cautiously, Jody Williams, 1997 Nobel Laureate, assessed that poverty is but one of the contributing factors to terrorism.⁸³ In an attempt to quantify these platitudes, a body of academic studies has yielded less clear-cut results.

Conflict researchers take a keen interest in studying inequality as a precursor to intrastate violence. Building on the 1964 seminal work in the field, "Inequality and Instability" by Bruce Russett, which established a high correlation between violent deaths and the Gini index, researchers have produced scores of studies both in support and contrary to the proposed inequality-conflict nexus.⁸⁴ This theory, which states that as inequality grows more pronounced, the potential for violence within the state rises, is the subject of constant debate.

⁸² Desmond Tutu, quoted in Jal, "Getting at the Roots of Terrorism," 1.

⁸³ Jody Williams, quoted in Jal, "Getting at the Roots of Terrorism," 1.

⁸⁴ Bruce M. Russett, "Inequality and Instability: The Relation of Land Tenure to Politics," *World Politics* 16, no. 3 (1964): 449.

In a 2010 study focused on violence in Columbia, A. Cotte Poveda finds the effective control of violence negatively correlates with unemployment rates, internal displacement rates, the GINI index, and hectares of coca cultivated. As previous chapters have explored the Afghan corollary to coca, poppy, Poveda's principal claim that "economic development is a key factor to decrease violence" presents the opportunity to test his findings within Afghanistan. The author declares a positive feedback loop, where increased economic equality leads to lower levels of violence (measured by homicide rate per 100), which in turn leads to enhanced economic investment.⁸⁵ Again focusing on a Latin America population, a 1996 study by Ramiro Martinez of the University of Delaware determines that economic inequality, rather than poverty itself, has a substantial effect on the Latino homicide rate in urban centers. Considering the numerous ethnic populations present in Afghanistan, we can see that it is helpful for application to our study that Martinez concludes inter-race income disparities do not play a pronounced role in the findings.⁸⁶

In his study of the economic roots of uprisings, Carles Boix posits that violence is most likely to occur in "countries that are highly unequal and where wealth is mostly immobile."⁸⁷ Violence becomes attractive to the impoverished when the wealthy own a sizable fraction of the economy. Boix refines this hypothesis further, declaring, "violence

⁸⁵ A. Cotte Poveda, "Estimating Effectiveness of the Control of Violence and Socioeconomic Development in Colombia: An Application of Dynamic Data Envelopment Analysis and Data Panel Approach," *Social Indicators Research* 105 (February 2012): 363.

⁸⁶ Ramiro Martinez, "Latinos and Lethal Violence: The Impact of Poverty and Inequality," *Social Problems* 43, no. 2 (May 1, 1996): 142.

⁸⁷ Carles Boix, "Economic Roots of Civil Wars and Revolutions in the Contemporary World," *World Politics* 60, no. 3 (September 10, 2008): 392.

will not take place under both low and medium levels of inequality.” Rather, in these wealth distribution situations, violence will be scarce while democracy will take root.⁸⁸

Scholars less convinced of the role inequality plays in conflict include Paul Collier and Anke Hoeffler, whose attempt to create a predictive model of potential for conflict outbreak dismisses most proxies for grievance, including inequality, as insignificant.⁸⁹ They are joined by James Fearon and David Laitin, who find that in a post-Cold War world, “after controlling for per capita income, more ethnically or religiously diverse countries have been no more likely to experience significant civil violence.”⁹⁰

Finally, Henrikas Bartusevicius, in a global survey of 77 popular rebellions, finds that inequality significantly increases the likelihood of armed violence, especially when using the Gini index as a proxy for inequality rather than absolute GDP.⁹¹ This portion of the study adds findings from the recent conflict in Afghanistan to the growing list of case studies, where effective democracy is absent. To that end, as a baseline for investigative purposes, this section will attempt to quantify the claim from the “Afghanistan Human Development Report 2007” itself that inequalities “can breed economic, social and political instability and conflict.”⁹²

⁸⁸ Boix, “Economic Roots of Civil Wars and Revolutions in the Contemporary World,” 397.

⁸⁹ Paul Collier and Anke Hoeffler, “Greed and Grievance in Civil War,” *Oxford Economic Papers* 56, no. 4 (October 1, 2004): 563–95.

⁹⁰ James D. Fearon and David D. Laitin, “Ethnicity, Insurgency, and Civil War,” *American Political Science Review* 97, no. 1 (February 2003): 75–90.

⁹¹ Henrikas Bartusevičius. “The Inequality–Conflict Nexus Re-Examined: Income, Education and Popular Rebellions,” *Journal of Peace Research* 51, no. 1 (January 1, 2014): 35.

⁹² “Afghanistan Human Development Report 2007,” Kabul, Afghanistan: Center for Policy and Human Development, Kabul University, 2007, 51.

Data

Data for this section are again provided by the “Afghanistan Human Development Report 2015.” Included primarily as a background characteristic variable, wealth in this survey is determined as follows:

“Households are given scores based on the number and kinds of consumer goods they own, ranging from a television to a bicycle or car, in addition to housing characteristics such as source of drinking water, toilet facilities, and flooring material. . . . National wealth quintiles are compiled by assigning the household score to each usual (de jure) household member, ranking each person in the household population by his or her score, and then dividing the distribution into five equal categories, each comprising 20% of the population.”⁹³

This portion of the project considers what effect the proportion of residents in the lowest quintile (bottom 20%), the highest quintile (top 20%) and the Gini coefficient of each province might have on our measurements of susceptibility to civilian attacks.

The Gini coefficient is a statistical measure of inequality where a “value of 0 for the Gini coefficient denotes complete equality, and a value of 1 maximal inequality, i.e., all income is received by a single individual.”⁹⁴ This standard measure of wealth distribution may also be represented graphically by the Lorenz curve diagram. Named for Max O. Lorenz, an American economist known for his work on railroad rate disparities, the chart below shows equality as a line with a slope of 1. Anything below that line shows at least some unequal wealth distribution.

According to the World Bank estimates from 2008, Afghanistan as a whole has a 27.82 Gini coefficient. This score places Afghanistan between Iceland and Romania,

⁹³ Central Statistics Organization, Afghanistan, and Ministry of Public Health, Afghanistan, “Afghanistan Demographic and Health Survey 2015,” 2017, 9.

⁹⁴ John Black, Nigar Hashimzade, and Gareth Myles, “Gini Coefficient,” *Dictionary of Economics* (Oxford: Oxford University Press, 2013). <<http://www.oxfordreference.com/view/10.1093/acref/9780199696321.001.0001/acref-9780199696321-e-1355>>.

relatively equal societies, as the 136th most unequal society. For comparison, the United States ranks as 40th most unequal with a Gini coefficient of 45.0.⁹⁵

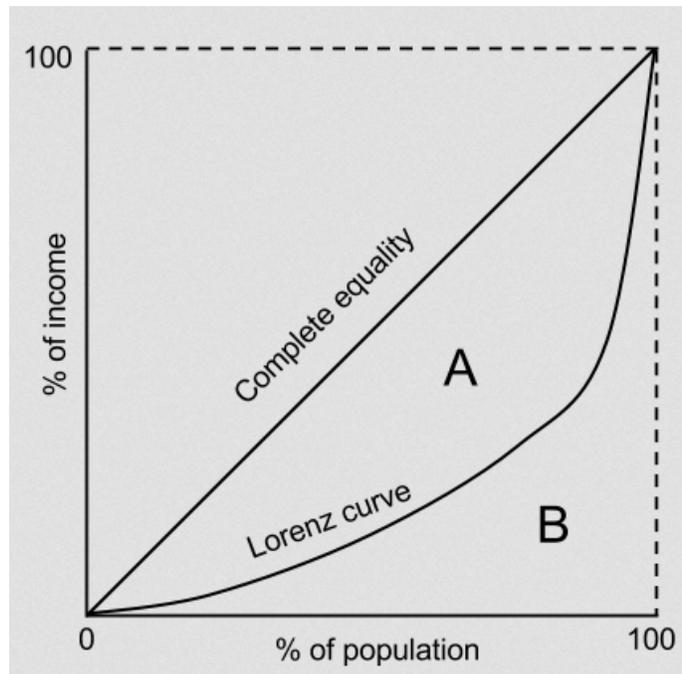


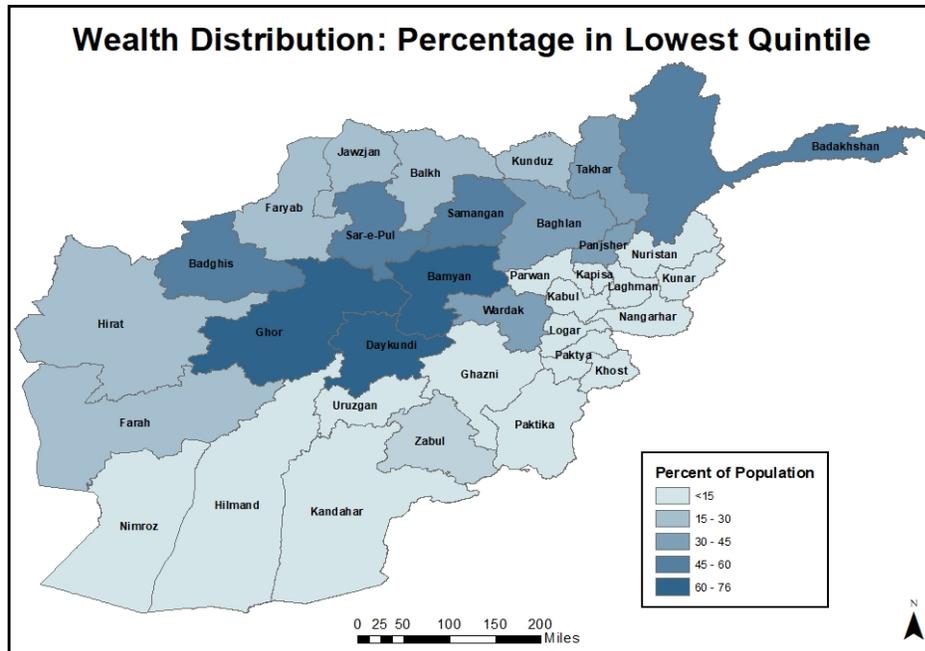
Figure 14. The Lorenz Curve of income inequality⁹⁶

Provincial characteristics provided by the “Afghanistan Demographic and Health Survey” reveal vast discrepancies in wealth distribution between urban and rural provinces. While Kabul counts only .3% of its population in the bottom quintile, Bamyan is home to over 68%. Kabul is again home to the highest proportion of residents in the highest quintile of earners, while Daykundi barely registers with just .1%. This urban-rural divide is less evident in provincial Gini coefficients where Kapisa identifies as the most equal with a .11 score (closely followed by Kabul at .15) and Badghis and Balkh

⁹⁵ World Bank. “Afghanistan Development Indicators.” World Development Indicators, May 6, 2014. Available from: <<https://web.archive.org/web/20140506153448/http://data.worldbank.org/country/afghanistan>>. Retrieved January 14, 2018.

⁹⁶ “Equity in the Distribution of Income,” *The IB Economist* (blog). Available from: <<http://ibeconomist.com/revision/2-3-macroeconomic-objectives-equity-in-the-distribution-of-income/>>. Retrieved January 16, 2018.

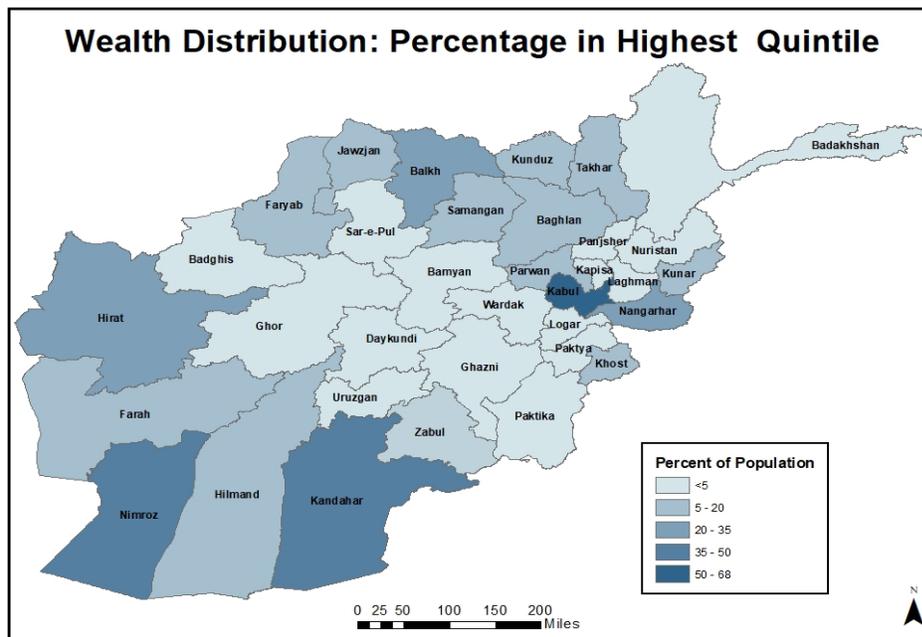
identify as most unequal with .33 scores each.⁹⁷ The pair of choropleth maps below reflect these data.



Source: Afghanistan Demographic and Health Survey 2015

Figure 15. Percentage of provincial population within the lowest quintile of wealth

⁹⁷ Central Statistics Organization, Afghanistan, and Ministry of Public Health, Afghanistan. “Afghanistan Demographic and Health Survey 2015,” 2017. 19.

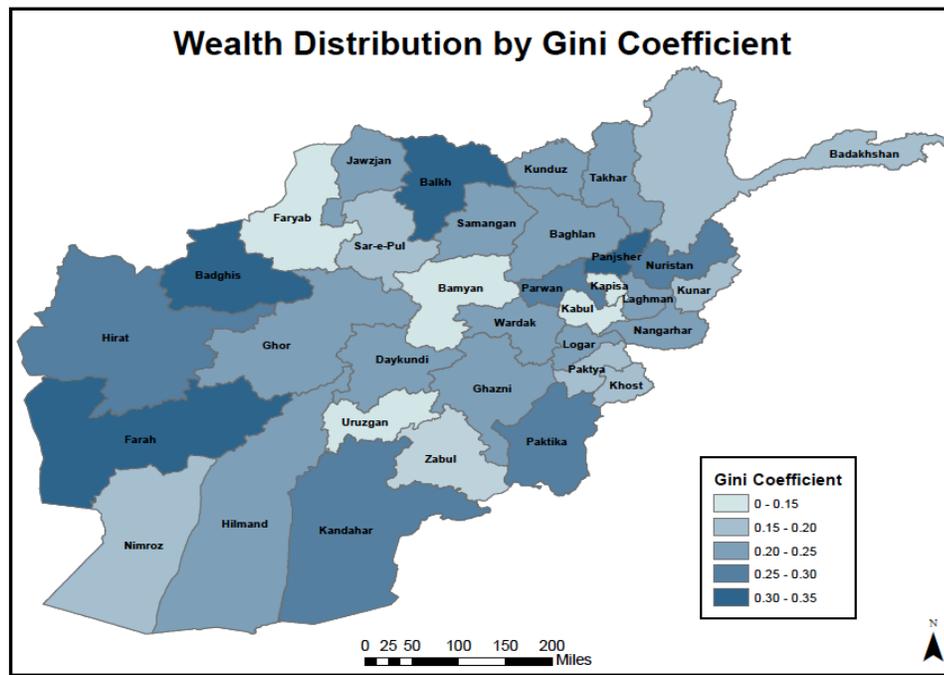


Source: Afghanistan Demographic and Health Survey 2015

Figure 16. Percentage of provincial population within the highest quintile of wealth

Results

Testing against our five measurements of civilian attacks over the target period, the Gini coefficient of each province yielded no correlation. As evidenced in the choropleth map below, this measurement is not readily visually related to the various maps depicting civilian attacks seen earlier in this report, and the regression tests confirm this observation.



Source: Afghanistan Demographic and Health Survey 2015

Figure 17. Gini coefficient by province

While this study finds no correlation for the Gini coefficient, testing against both the percentage of residents in the lowest quintile of earners and the highest quintile yielded significant correlations. The percentage of the population in the lowest quintile of earners proved significant against all five measurements of civilian attacks. At a 99% confidence level, each percentage of the population in the lowest quintile of wealth explained about 29% of the variance between provinces with a coefficient of -5.9.

Highest quintile tests were less conclusive, as it was not significant against the two measurements normalized by population (AttacksTotPer100k and AttacksYrPer100k). However, against total attacks, the percentage of the population in this segment was significant at the 99% level, explaining 22% of the variation with a coefficient of 8.28. Therefore, the greater the portion of a province in the highest wealth quintile, the more likely it was to experience civilian attacks from 2001 to 2015. The

inverse holds true, as those provinces with larger portions of the population in the lowest quintile of wealth were less likely to experience attacks. These two measurements are carried forward to build the model in final section of this project.

Chapter VIII.

Employment Status

Our final demographic variable focuses on the current employment status of men across Afghanistan and their tendency to participate in terror attacks. An extensively researched theory stemming from Gary Becker's seminal 1968 work "Crime and Punishment," highlights the economic motivations for participation in crime in general.⁹⁸ This theory states that as the economic cost (risk) of participating in non-sanctioned actions such as crime decreases, more participants are likely to take part. Stated succinctly, Henrik Urdal offers, "Unemployment is believed to cause grievances."⁹⁹

Braungart identifies a "climate of radicalism" arising from unemployment, which "weakens the political system's legitimacy and stability."¹⁰⁰ Carles Boix more recently summarized the hypothesis with, "Actors will engage in violence when they have both the motive and opportunity, as well when the benefits of engaging in such activity outweigh the potential costs."¹⁰¹ By extension, a body of modern scholarship postulates that as more significant portions of the population find themselves unemployed, the

⁹⁸ Gary S. Becker, "Crime and Punishment: An Economic Approach," *Journal of Political Economy* 76, no. 2 (1968): 169–217.

⁹⁹ Henrik Urdal, "The Devil in the Demographics: How Neo-Malthusian Population Pressure and Youth Bulges Influence the Risk of Domestic Armed Conflict." University of Oslo, 2002. 38. Available from: <<http://hdl.handle.net/10852/14004>>. Retrieved January 30, 2018.

¹⁰⁰ Richard Braungart, "Historical and Generational Patterns of Youth Movements: A Global Perspective," *Comparative Social Research* 7 (1984): 16.

¹⁰¹ Carles Boix, "Economic Roots of Civil Wars and Revolutions in the Contemporary World," *World Politics* 60, no. 3 (September 10, 2008): 391.

likelihood of their raising arms against the state increases in parallel. We saw this phenomenon play out under the Crime-Rebellion theory introduced in the chapter treating opium cultivation.

Case studies attempt to quantify the economic motives behind terror groups at length. Caruso and Gavrilova identify a “youth-bulge” in Palestine familiar to developing countries where an abundance of young males, in particular, are susceptible to the trappings of violence as their unemployment rates are often “three to five times as high as adult rates.”¹⁰² These authors find the growth rates of unemployment to be “positively and significantly associated with both emergence and brutality of Palestinian political violence.”¹⁰³ The unemployed or underemployed are often swept up into militant ethnic and political movements, finding common cause and that elusive paycheck by joining local insurgencies. Moving west to the FARC, Collier finds that rebel groups are more likely to succeed when they have access to large groups of unemployed potential members.¹⁰⁴

Presenting the opposing view, Claude Berrebi, introduced earlier in the section examining education, finds in his study of 142 Palestinian terrorists that 94% held employment.¹⁰⁵ Additionally, in writing for the World Bank, Christopher Cramer finds

¹⁰² Raul Caruso and Evelina Gavrilova, “Youth Unemployment, Terrorism and Political Violence, Evidence from the Israeli/Palestinian Conflict,” *Peace Economics, Peace Science and Public Policy* 18, no. 2 (2012). 44.

¹⁰³ Caruso and Gavrilova, “Youth Unemployment, Terrorism and Political Violence,” 21.

¹⁰⁴ Paul Collier, “Economic Causes of Civil Conflict and Their Implications for Policy,” Department of Economics, Oxford University, April 2006. 1. Available from: <<http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.460.9440&rep=rep1&type=pdf>>. Retrieved January 28, 2018.

¹⁰⁵ Claude Berrebi, “Evidence about the Link Between Education, Poverty and Terrorism among Palestinians,” *Peace Economics, Peace Science and Public Policy* 13, no. 1 (2007): 18.

there are “no grounds empirically for the commonly made claims that there is a strong, automatic causal connection from unemployment, underemployment, or low productivity employment to violence and war.”¹⁰⁶ And a final empirical study from Georgetown University finds, at best, a modest, “contemporaneous” relationship between labor participation rates and terrorism.¹⁰⁷ With these opposing philosophical and empirical viewpoints, we turn our attention to Afghan employment statistics.

Data

Akin to many of the demographic variables mentioned earlier, employment status across Afghanistan varies significantly by province. With a total current employment rate for men (those reporting employment for all seven days before the survey date) of 91.4%, the country overall has a relatively high portion of the population working in spite of the internal strife. The individual provincial rates range from 71.4 in rural and mountainous Samangan to 97.8% in tragedy-ridden Kandahar, where over 41% are engaged in agricultural work. It is unclear whether this agrarian labor includes illicit crop cultivation. The choropleth map below reflects these data.

¹⁰⁶ Christopher Cramer, “Unemployment and Participation in Violence,” School of Oriental and African Studies, London, November 16, 2010. 2. Available from: <<http://web.worldbank.org/archive/website01306/web/pdf/wdr%20background%20paper%20-%20cramer.pdf>> Retrieved January 28, 2018.

¹⁰⁷ Shannon C. Flowers, “The Relationship between Youth Unemployment and Terrorism,” M.P.P., Georgetown University, 2014. Available from: <<https://search-proquest-com.ezp-prod1.hul.harvard.edu/docview/1529425108/abstract/F11AC588F4524B9BPQ/1>> Retrieved January 27, 2018.

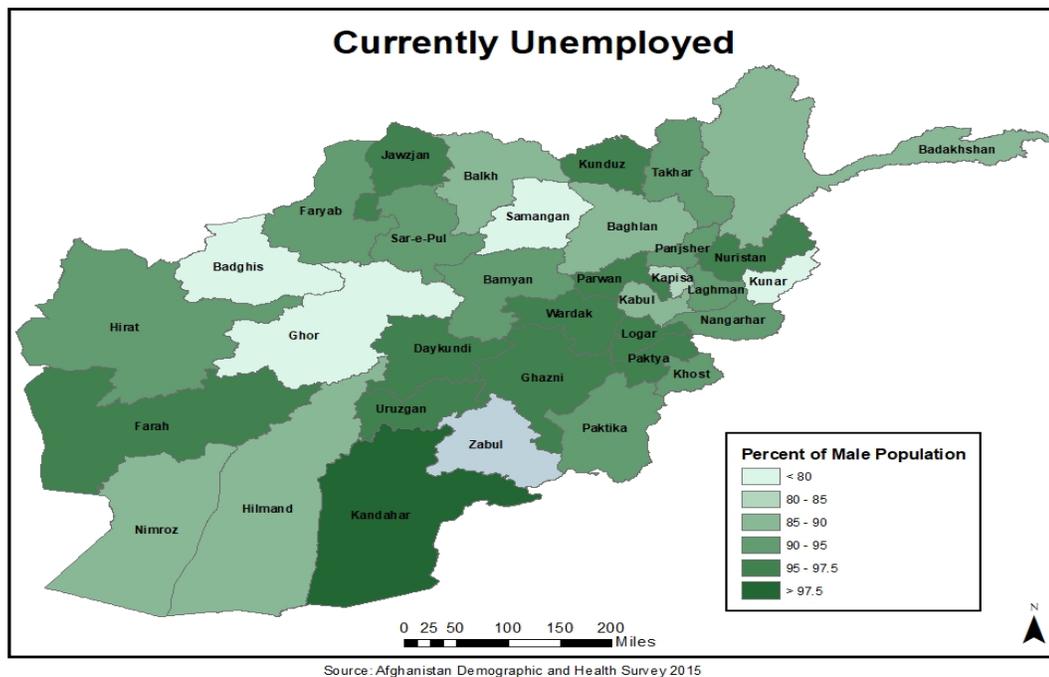


Figure 18. Percentage of male population currently unemployed

The second variable under examination in this section involves the rate of long-term unemployment. As scholarship examined earlier predicts that this group would be most likely to engage in criminal activities as their economic cost decreased, we might expect a stronger incidence of terror involvement among those places with the idlest hands. Long-term unemployed are those not employed in the 12 months preceding the survey.

For Afghanistan as a whole, only 3.1% of the male population falls into the long-term unemployed demographic. Sar-E-Pul reports the lowest long-term unemployment at .1% (1 respondent of the 195 surveyed), while Kunarha along the Pakistani border reported a staggering 19.8%. A trend of higher long-term unemployment along this eastern frontier becomes evident in the choropleth map provided below.

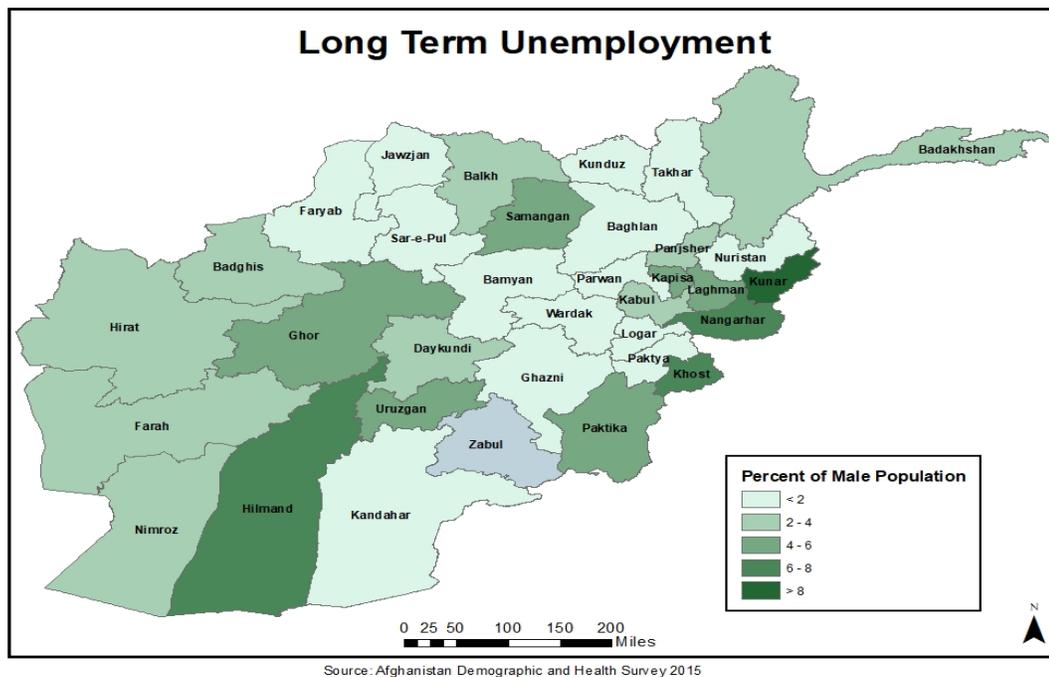


Figure 19. Percentage of male population experiencing long-term unemployment

Results

Testing produces no significant correlation between employment levels and civilian attacks. Treating each of the five variables for measuring terror in turn against both current and long-term unemployment yields this same result. Although this snapshot is not conclusive, it places this study on the Berrebi-Cramer side of the debate over whether employment status has a bearing on public safety conditions. While promoting jobs and focused labor in productive capacities will encourage overall economic development, boosting employment as a direct means of fighting terror across Afghanistan is unverified by this study.

Chapter IX.

Conclusion

Examining instances of civilian attacks across the war-torn society of Afghanistan from 2001 to 2015 is a sobering endeavor. In an optimistic attempt to understand and make sense of the pattern of violence throughout its 34 provinces, this project identifies a set of variables with potential correlation to total civilian attacks per province. Scholarly debate and political rhetoric, especially from American officials, greatly influenced selection of the characteristics for study.

I leveraged three primary data sets in designing this project. The Global Terrorism Database, from the University of Maryland, provided civilian attack event, geographic and severity data as groundwork for the dependent variable. The “Afghan Opium Survey 2016” and the “Afghanistan Human Development Report 2015” provided measurements on poppy production and demographic characteristics, respectively. These characteristics were then mapped using mixed cartographic methods within ArcGIS, at times revealing geographic patterns to their distribution. Next, empirical testing of the variables selected yielded some surprising results, as displayed in the table below.

Table 5. Correlation results.

Significantly Correlated
Provincial Distance from Uzbekistan
Average Square Mile of Poppy Cultivation
Hectares of Poppy Cultivation in 2015
Percent of Land Used for Poppy Cultivation in 2015
Percentage of Land Used for Poppy Cultivation on Average
Proportion of Population in Lowest Quintile of Wealth
Proportion of Population in Highest Quintile of Wealth
Not Significantly Correlated
Provincial Distance from Pakistan
Provincial Distance from Iran
Infant Mortality Rate
Proportion of Children Receiving All Essential Vaccinations
Proportion of Children Receiving No Essential Vaccinations
Proportion of Males with No Education
Proportion of Males Completing Secondary Education
Proportion of Females with No Education
Proportion of Females Completing Secondary Education
Provincial Gini Coefficient
Male Long-Term Unemployment
Male Current Unemployment

Constructing a model from the identified correlating variables reveals a cogent formula. Using STATA to perform stepwise regression analysis on these variables identified above yields a model explaining over 64% of the variation in total provincial civilian attacks. Nearly two-thirds of the variation in total civilian attacks among Afghanistan's 34 provinces can be explained through differences in population, the proportion of land devoted to poppy cultivation, and the portion of the population occupying the lowest quintile of wealth. While increases in population and percentage of land dedicated to poppy cultivation lead to an increased instance of attack, the portion of

that population in the least wealthy fifth revealed the opposite effect. The table below displays these findings.

Table 6. Stepwise regression.

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. regress AttacksTot Population PoppyPercentLand LQWealth

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Source	SS	df	MS	Number of obs	=	33
Model	1289909.18	3	429969.726	F(3, 29)	=	17.71
Residual	704152.701	29	24281.1276	Prob > F	=	0.0000
				R-squared	=	0.6469
				Adj R-squared	=	0.6103
Total	1994061.88	32	62314.4337	Root MSE	=	155.82

AttacksTot	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
Population	.0001261	.0000406	3.11	0.004	.0000432 .0002091
PoppyPercent~d	431.3749	104.8349	4.11	0.000	216.9634 645.7864
LQWealth	-3.883084	1.266073	-3.07	0.005	-6.472494 -1.293673
_cons	215.829	57.07537	3.78	0.001	99.09675 332.5612

While these three variables ultimately survived the stepwise regression test to reveal significant correlations, this study is not intended to discourage the advocacy of other morally sound efforts presented and tested throughout this paper. Proponents of children’s health care, women’s literacy, and income equality need not abandon their lofty ideals to improve Afghan society overall. Instead, for the civil stability-minded readers, this project elevates specific target areas upon which to focus effort.

We encourage further and modified examinations of these data sets, especially testing the correlations discovered here against fragile states in similar circumstances. Additional robust data sources, including classified reports, may provide greater and potentially more accurate insight and results in repeated testing. The centuries-long anguish of the Afghan people deserves more than convenient political rhetoric and the continued advocacy of unproven techniques to address the violence and instability rampant across the country. Future policy drafters, scholars, and program implementers

should build upon those factors identified here to develop more accurate models and back-tested data. One hopes this research will reveal more insights into the patterns of violence in Afghanistan and around the world, and discover more insightful and impactful means to address it.

Appendix I.

Poppy Cultivation and Civilian Attacks, by Year

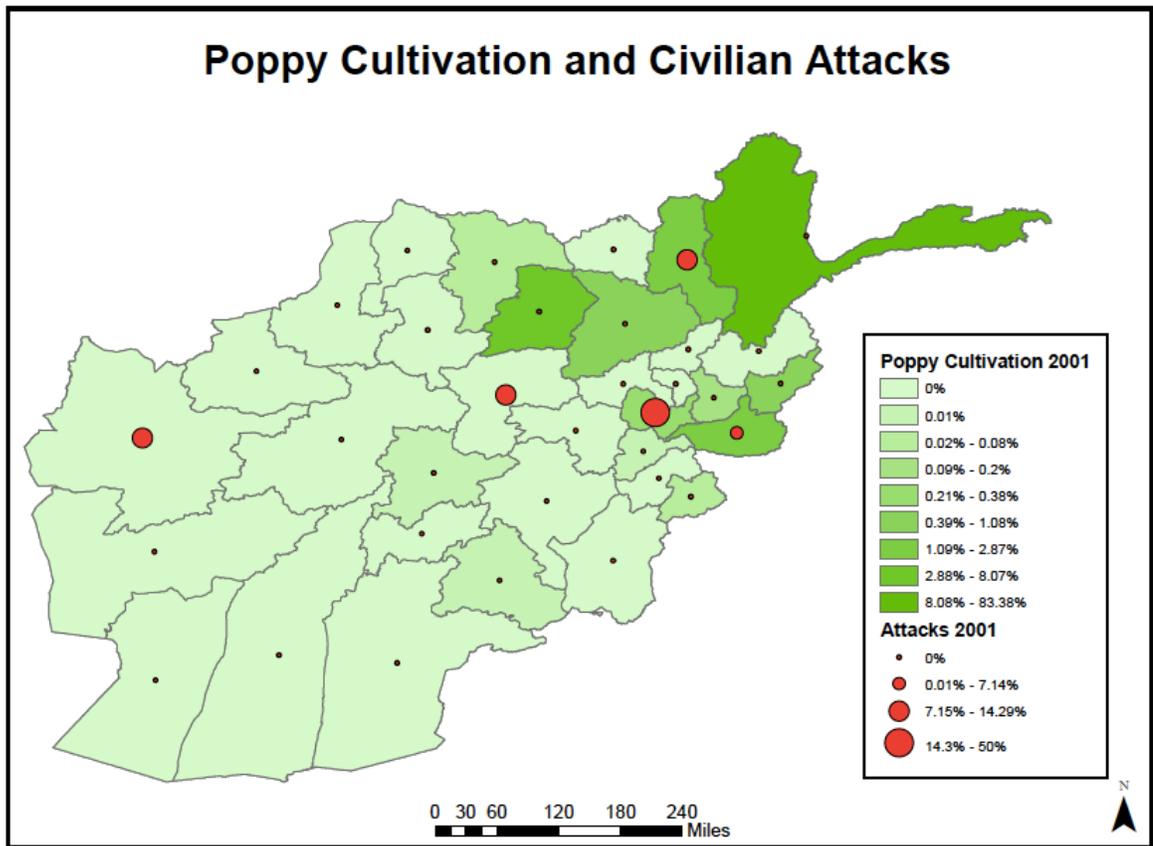
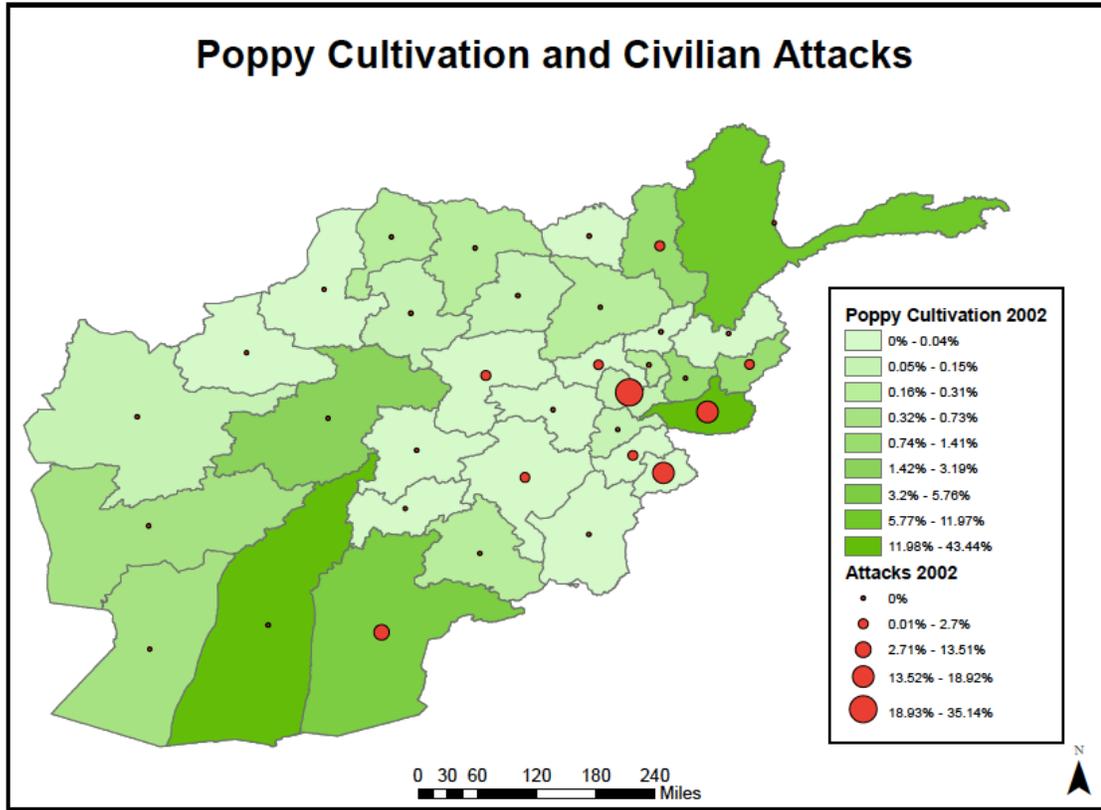


Figure 20. Poppy cultivation and civilian attacks, 2001

This map series depicts the percentage of land dedicated to poppy cultivation by province as well as the percentage of total attacks occurring in that Province. Here, in the first year of our study, no real pattern of violence is yet discernable.



Source: Global Terrorism Database & United Nations Office on Crime and Drugs

Figure 21. Poppy cultivation and civilian attacks, 2002

Poppy cultivation begins to emerge in Hilmand Province in the Southwest. Kabul continues to be the focus of most civilian attacks.

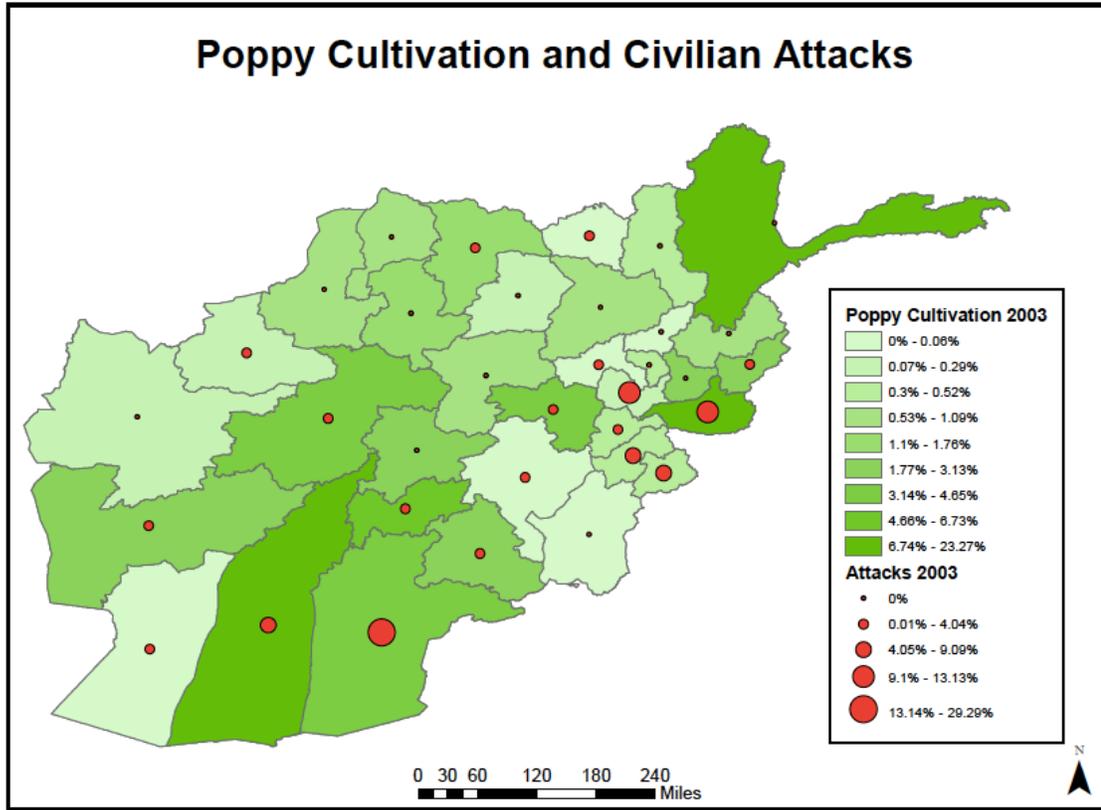


Figure 22. Poppy cultivation and civilian attacks, 2003

Poppy cultivation in the Southwest continues to grow, along with its share of civilian attacks, as seen here in Hilmand and Kandahar Provinces.

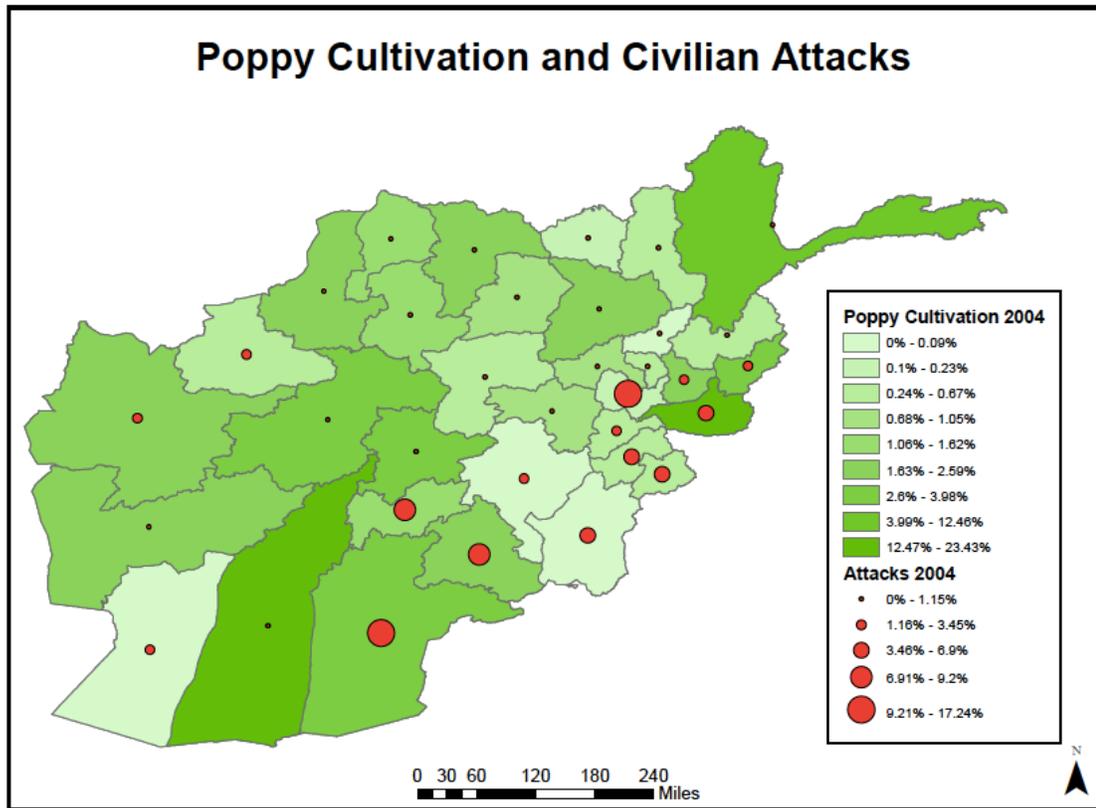
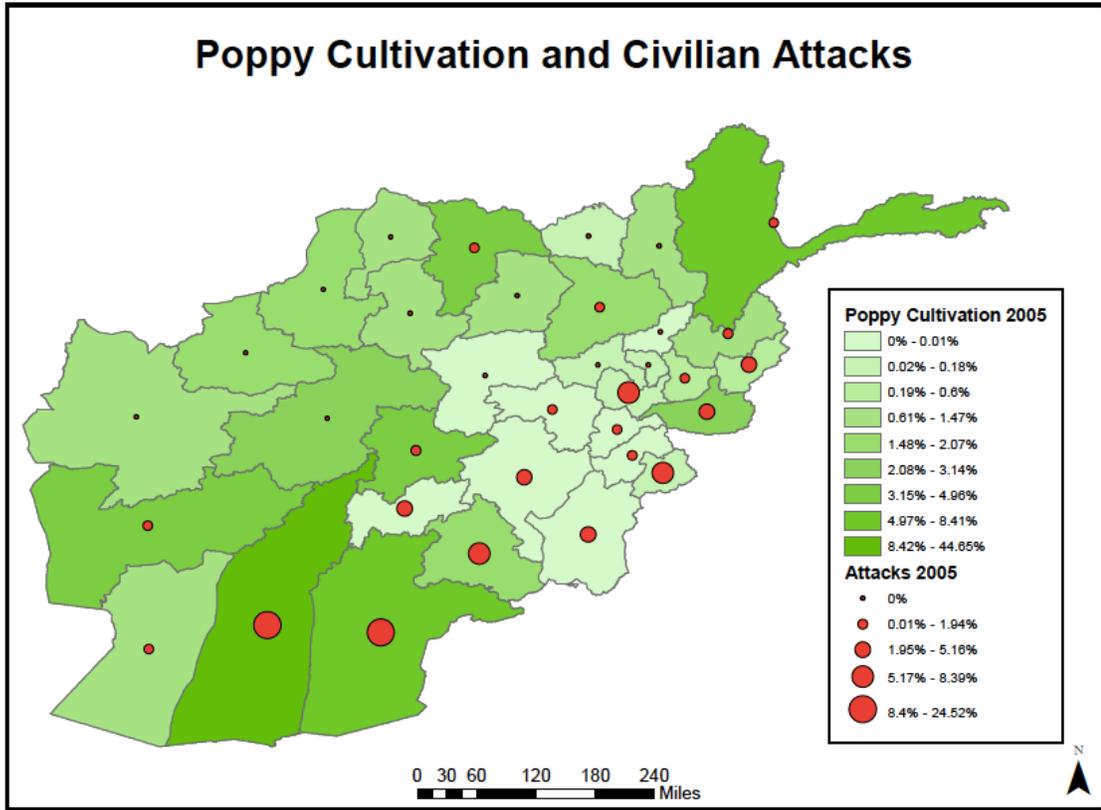


Figure 23. Poppy cultivation and civilian attacks, 2004

Hilmand Province experiences a brief reprieve from attacks while poppy cultivation spreads throughout the country.



Source: Global Terrorism Database & United Nations Office on Crime and Drugs

Figure 24. Poppy cultivation and civilian attacks, 2005

A clear clustering of attacks along the Pakistani border to the east and southeast becomes evident, while Hilmand and Kandahar continue to produce the majority of poppy.

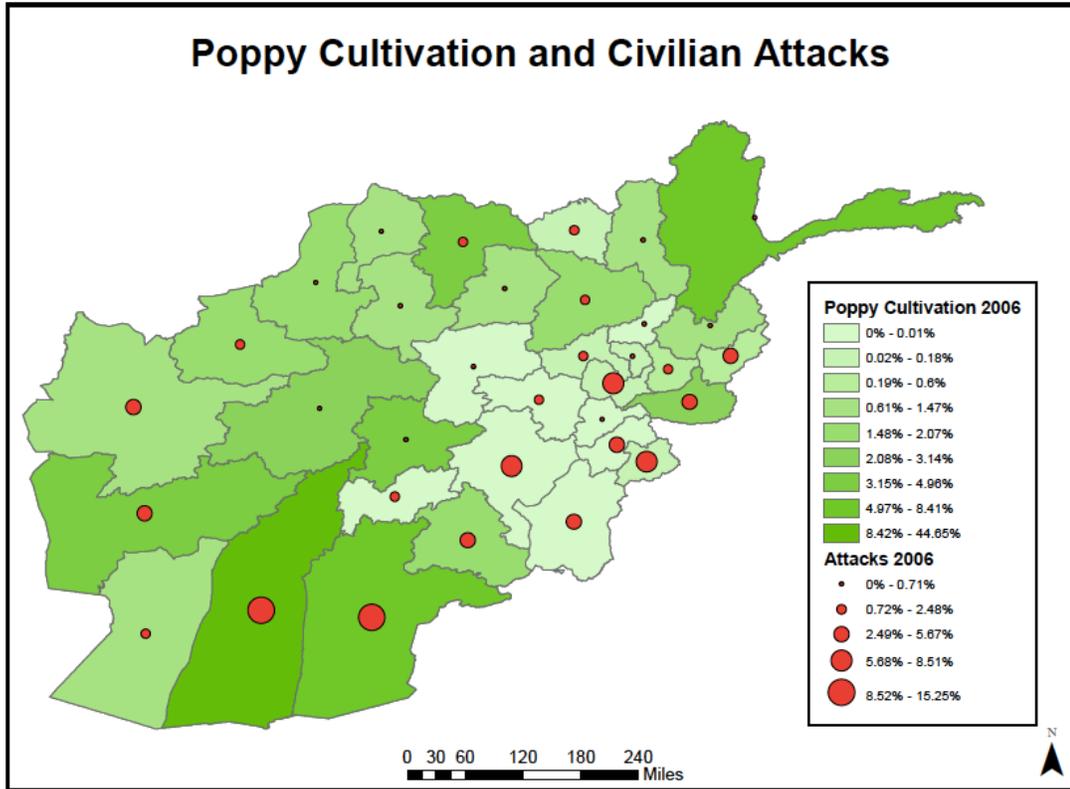


Figure 25. Poppy cultivation and civilian attacks, 2006

Largely a continuation of the pattern seen from the previous year, poppy cultivation edges westward.

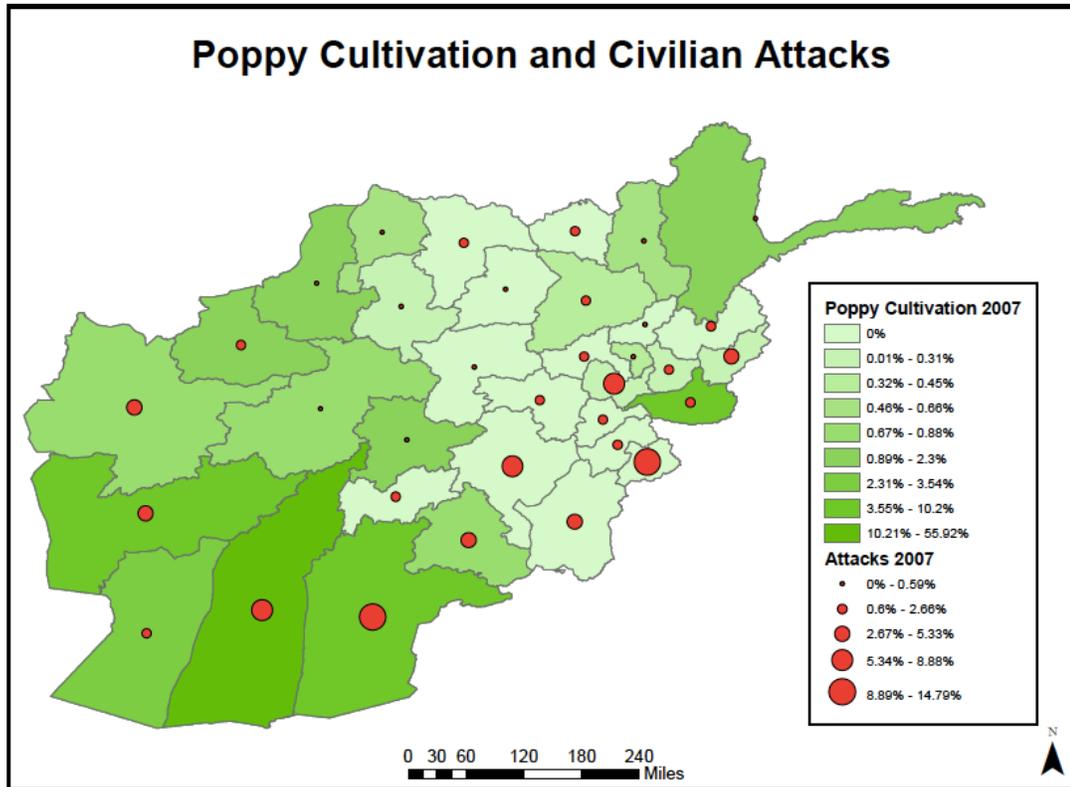


Figure 26. Poppy cultivation and civilian attacks, 2007

A western swing of poppy cultivation activity takes clearer shape as attacks continue unabated along the Pakistani border.

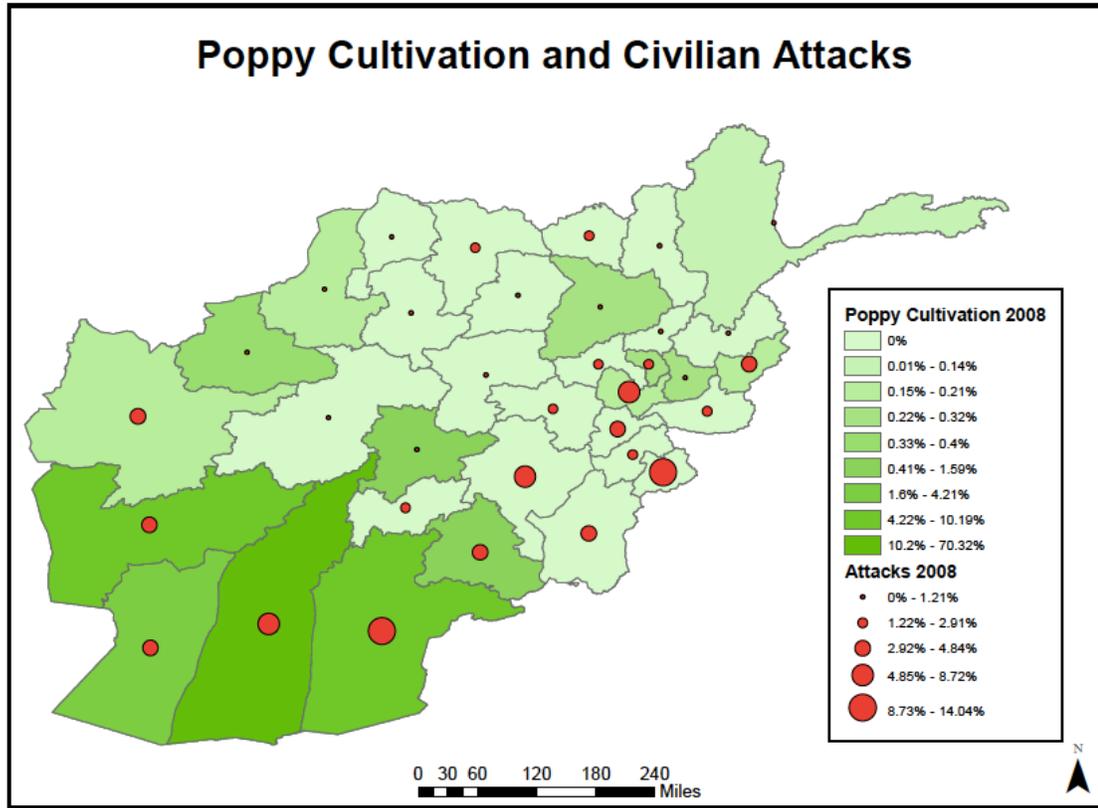
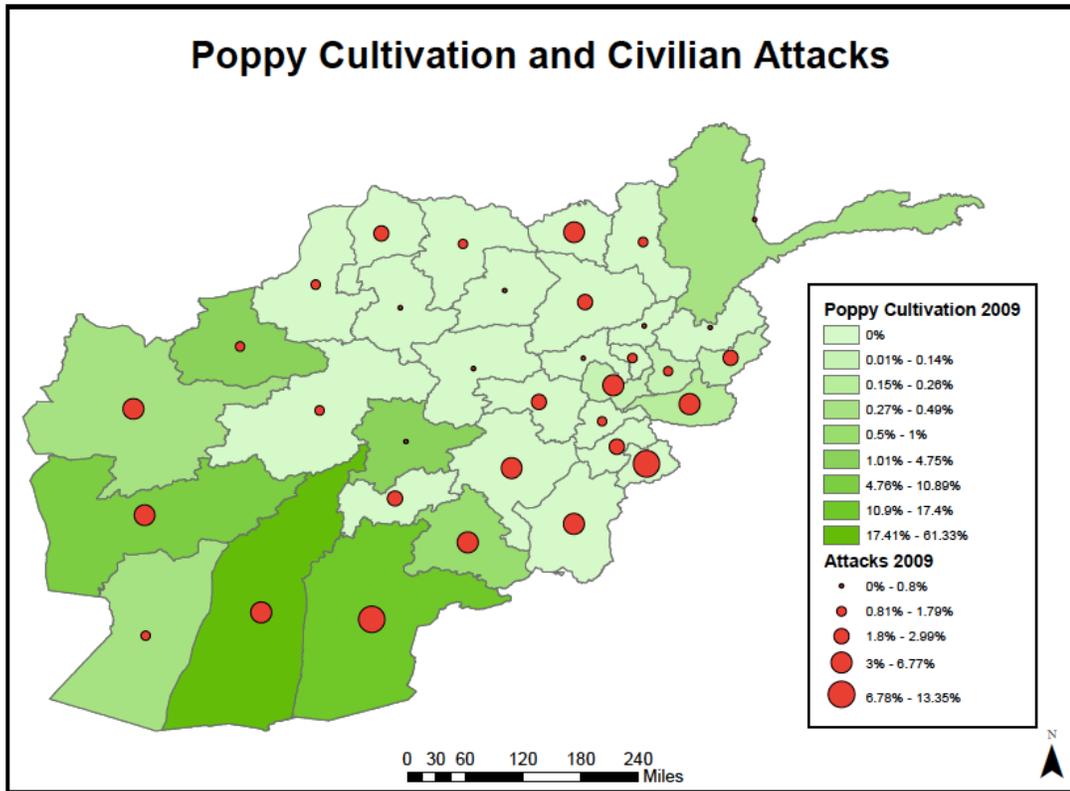


Figure 27. Poppy cultivation and civilian attacks, 2008

Counterclockwise from left, Farah, Nimroz, Hilmand and Kandahar provinces clearly lead the poppy cultivation market, with each experiencing a substantial portion of the nation's civilian attacks.



Source: Global Terrorism Database & United Nations Office on Crime and Drugs

Figure 28. Poppy cultivation and civilian attacks, 2009

Poppy cultivation in the southwest continues its dominance, while attacks remain concentrated in those areas and the Pakistani border.

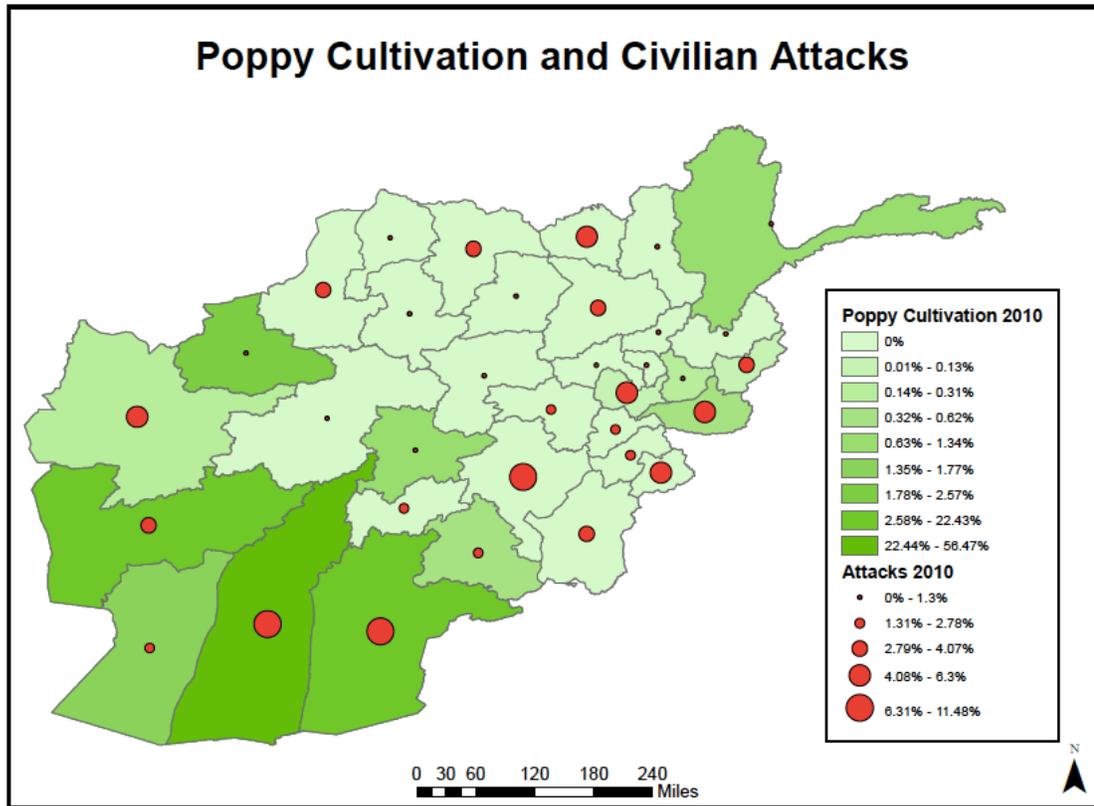


Figure 29. Poppy cultivation and civilian attacks, 2010

Hilmand and Kandahar continue to host both high production levels and civilian attacks.

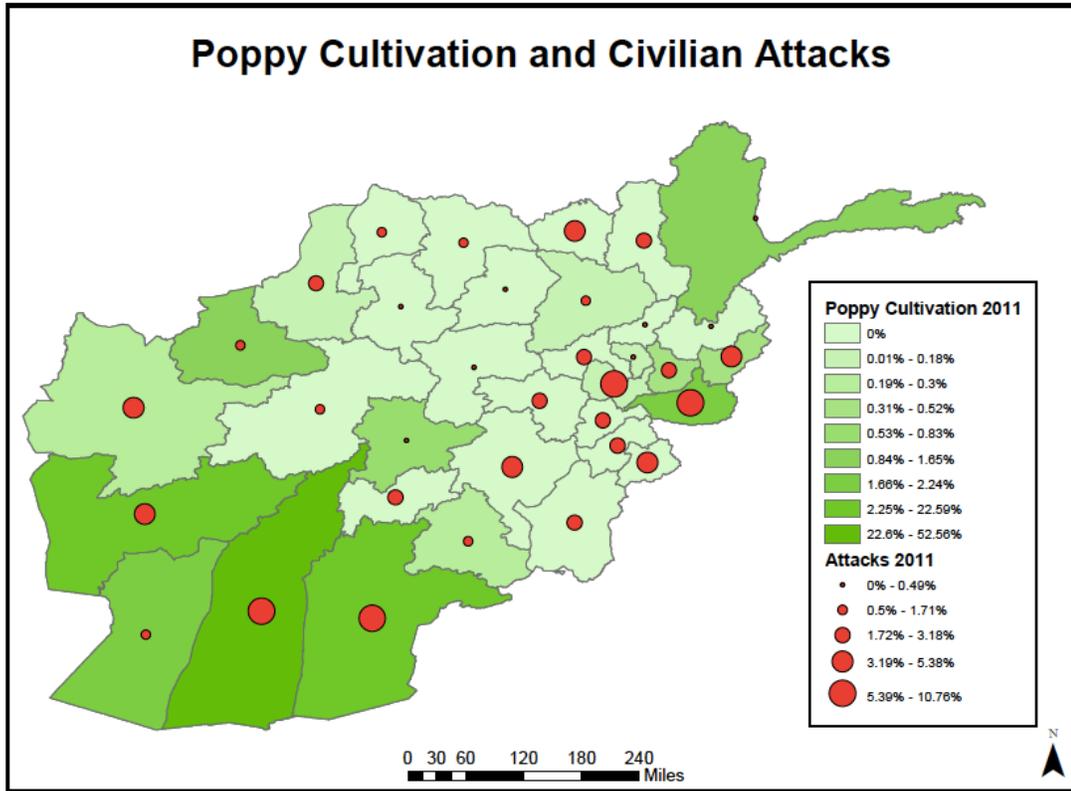


Figure 30. Poppy cultivation and civilian attacks, 2011

Production levels reach new highs in Kandahar and Hilmand, as attacks spike accordingly.

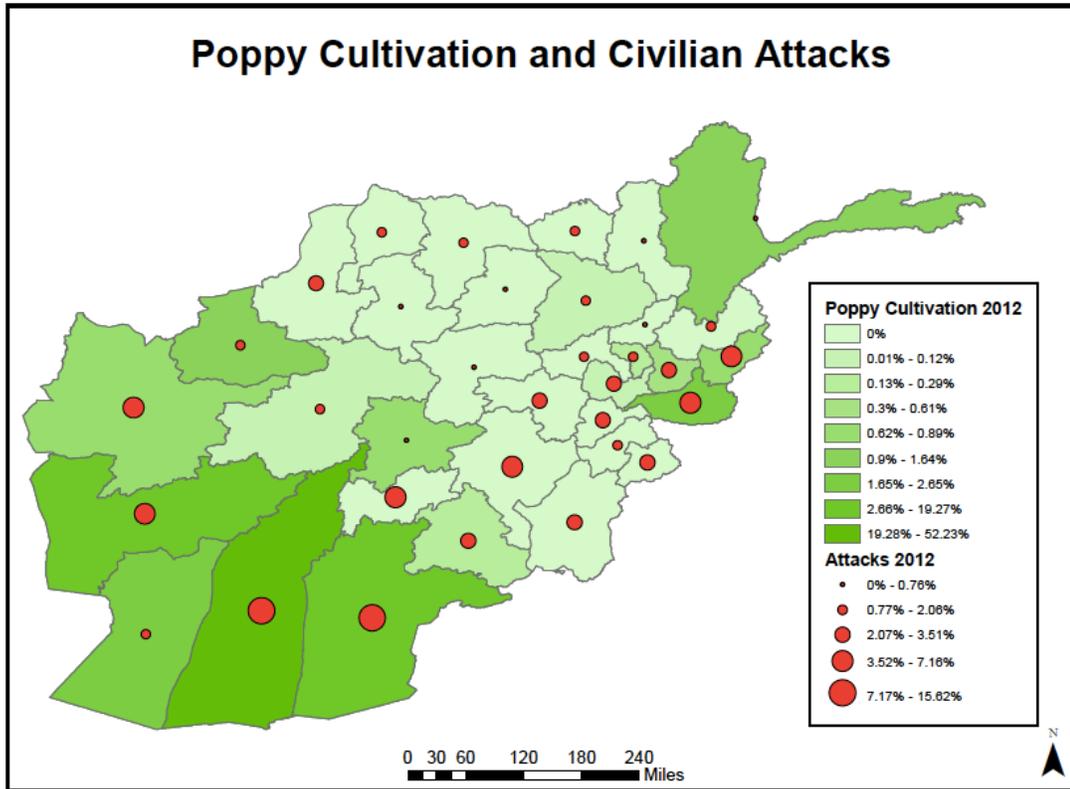


Figure 31. Poppy cultivation and civilian attacks, 2012

All provinces bordering Iran become involved in poppy cultivation. Sparsely populated Nimroz escapes much of the violence of its neighbors.

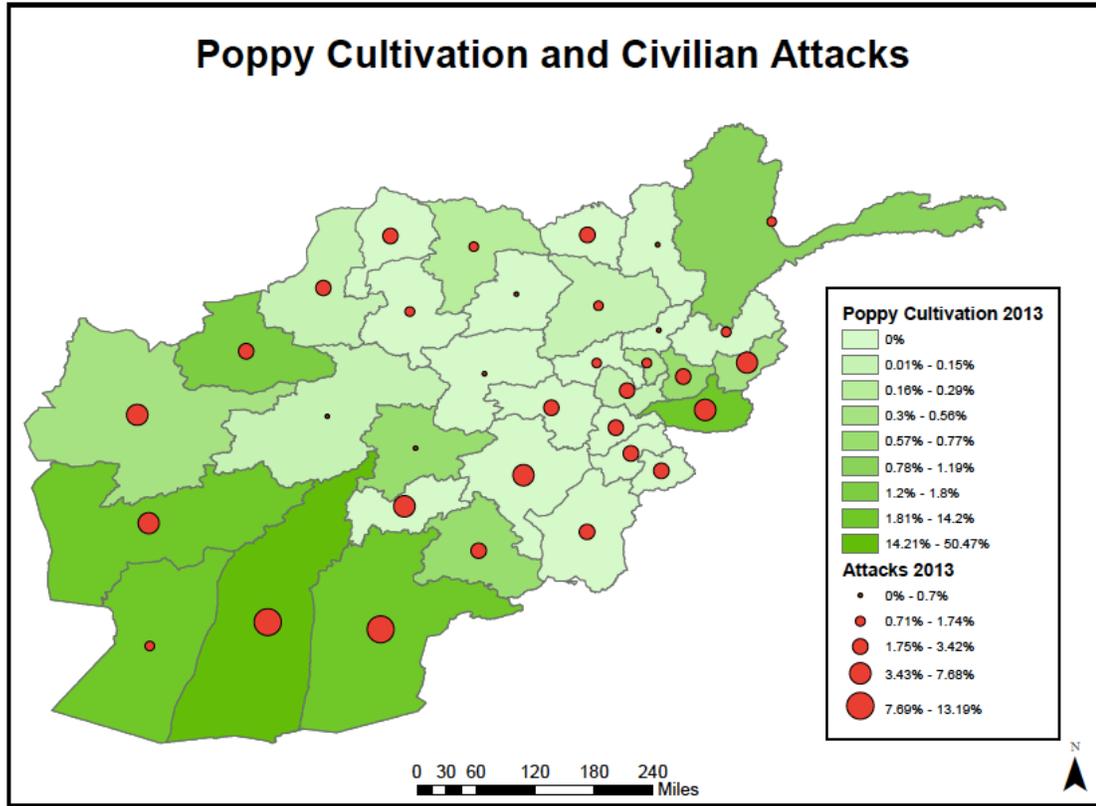
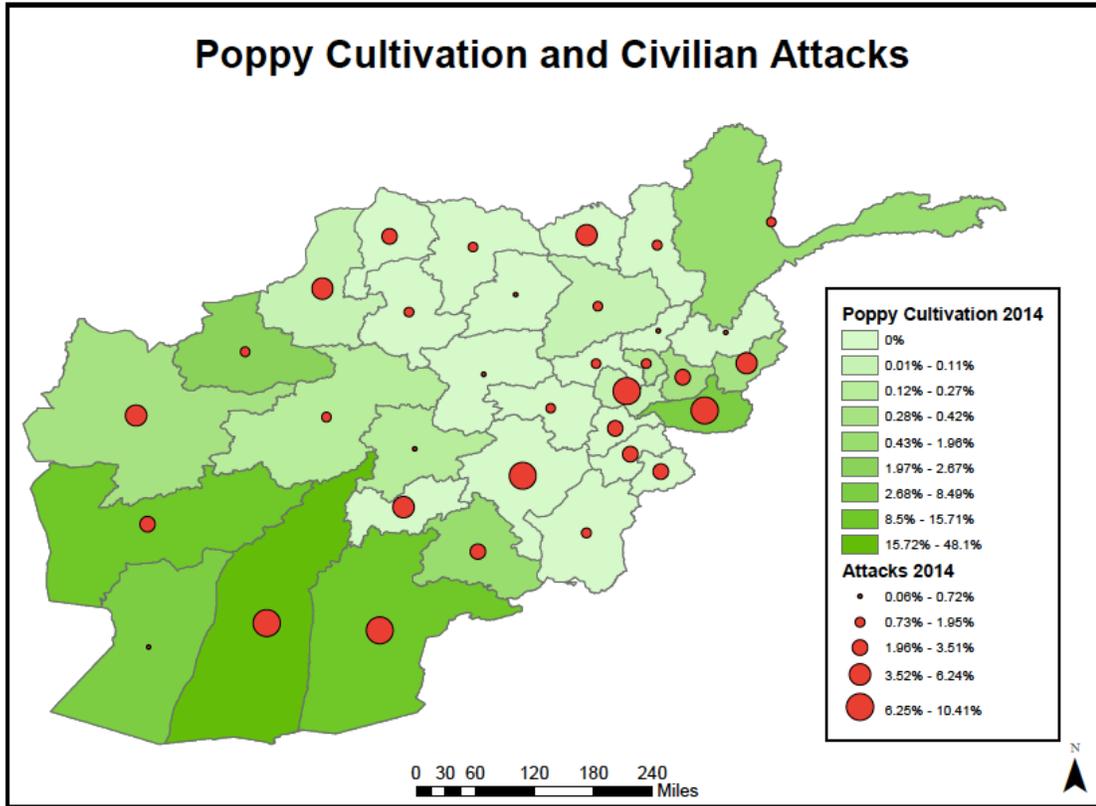


Figure 32. Poppy cultivation and civilian attacks, 2013

Continued domination of the west in cultivation. Attacks continue to concentrate there as well.



Source: Global Terrorism Database & United Nations Office on Crime and Drugs

Figure 33. Poppy cultivation and civilian attacks, 2014

Nimroz province continues to escape large scale attacks as Kabul and the Pakistani border provinces absorb much of the violence.

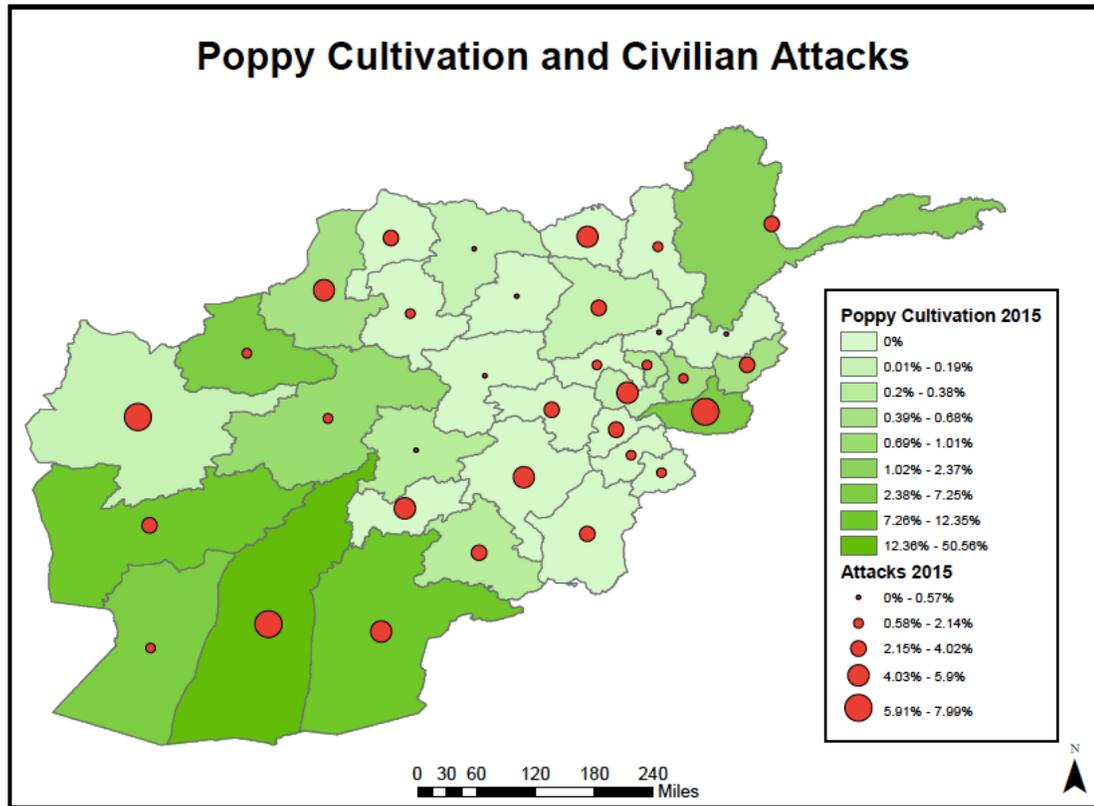


Figure 34. Poppy cultivation and civilian attacks, 2015

Our final year of observation, the pattern of violence coupled with poppy growth largely holds. Nangarhar province in eastern Afghanistan joins Hilmand and Kandahar as large

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