Resource Scarcity and Violent Conflict:

On the Material Origins, Nature, and Conditions of Modern Terrorism

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A Thesis presented to the Graduate Faculty of the University of Virginia in

Candidacy for the Degree of Master of Arts

Middle Eastern and South Asian Languages and Cultures

University of Virginia

May 2019

Abstract

The continued spread and escalation of terrorism worldwide suggests that the general approach of the War on Terror is inappropriate and the conventional understanding of the phenomenon, which has provided the strategic basis for the war, is erroneous. In contrast to the conventional view that terrorism is only a subjective political phenomenon which emanates from extreme emotions, viewpoints, and beliefs, this work suggests that it is an objective phenomenon which arises from basic material concerns. From this alternative perspective a fundamental-level scientific theory of modern terrorism is developed and is tested using relevant data. This theory offers an explanation for the origin, nature, and characteristic conditions of terrorism and provides a markedly different conception of the phenomenon compared with the prevailing view. It suggests that terrorism's origin lies in primal material concerns, namely basic survival and wellbeing, its nature is mainly economic and environmental and involves violent conflict related to essential resources, and its defining condition is resource scarcity. The main thesis examined is the possible connection between terrorism and the scarcity of essential natural resources. Scarcity is defined in a relative sense and identified through two different comparisons (temporal and geographic) using detailed data related to essential renewable resources. The data indicate that conditions of greater resource scarcity are associated with higher levels of terrorist activity. A global scale temporal analysis reveals that resource scarcity and the number of terrorist incidents are both increasing with time and at comparable rates. A national-level geographic analysis shows that countries having greater relative resource scarcity tend to experience higher levels of terrorist incidents compared to countries with relative resource abundance. While most countries experience only low levels of terrorist incidents, those countries that experience significant terrorism have greater levels of resource scarcity. This behavior supports the theory proposed here that terrorism has its origin in fundamental material concerns and is brought about, at least partially, by the scarcity of vital natural resources. These findings imply that resource scarcity currently developing across the world may be partially responsible for the recent increase in terrorist activity and could be conducive to even higher levels in the future. Based upon these findings an alternative and substantially different approach to terrorism is suggested.

Introduction

After the attacks of September 11, terrorism became widely recognized as a significant threat to modern civilization, potentially on par with other global scale issues like climate change, resource depletion, species extinction, and population growth. This concern is apparent in the U.S.'s National Strategy for Combating Terrorism, developed shortly after the attacks, which describes terrorism as ***'a clash between civilization and those who would destroy it'*** (Bush, 2003: 29). The issue has received a great deal of attention since the U.S. led War on Terror was launched in 2001 and enormous amounts of resources have been devoted to military operations, research, and other measures to understand and address it. It is estimated that the financial costs to the U.S. associated with the War on Terror exceeded $5.6 trillion by the end of fiscal year 2018 (Crawford, 2017: 1). The efforts, however, appear to have had little success at actually achieving the desired goals of eliminating, reducing, or even containing overall terrorism despite nearly twenty years of extensive, costly counterterrorism operations. There has been a recent decline in terrorist activity, but on the global-scale it steadily increased to historically high levels during this period in terms of the number of terrorist incidents occurring annually, countries experiencing incidents, and resulting deaths, and the long-term trend is clearly upward (see GTD data Fig. 2; Global Terrorism Index, 2017: 4). The ineffectiveness of these efforts calls into question the conventional assessment of the issue on many levels from the fundamental understanding of terrorism to the countermeasures that have been undertaken to address it. At this point, no

meaningful explanation has been provided for the failure of these efforts or the continued increase in terrorist activity despite significant attempts to bring it under control. Some argue that the U.S.'s basic approach and the general characterization of the problem have been reactive, vague, counterproductive, and lacking a historical perspective, and they assert that a more complete understanding of the phenomenon is needed to properly address it (Duyvesteyn, 2004; Shrivastava and Mitroff, 2005; Cronin, 2006). This work suggests that the efforts of the War on Terror have been ineffective because the conventional understanding of modern terrorism, which has guided the development of the overall strategy of the operation, is fundamentally inaccurate and has resulted in misguided countermeasures. Additionally, the phenomenon is growing and spreading due to large-scale, primal factors which are not accounted for in the conventional understanding. This work seeks to develop a comprehensive, fundamental-level scientific theory of terrorism from basic principles and with it determine a more effective means for addressing the problem.

Terrorism is conventionally classified as a political phenomenon and is defined as the strategic use of extreme violence by non-state entities against a target, often civilian, to achieve a political objective (Crenshaw, 1981; Bush, 2003: 1; Tilley, 2004; Young and Findley, 2011; Enders and Sandler, 2012: 4-7). Often cited objectives include matters such as autonomy, changes in government policy, expulsion of foreign influences, and revenge or redress for human rights violations (Crenshaw, 1981; Maleckova, 2003; Tilley, 2004; Li, 2005; Chenoweth, 2010; Krueger and Young and Findley, 2011). Although they are considered

extremists, the general consensus is that terrorists are rational, sane individuals who are driven by political issues (Crenshaw, 1981; Enders and Sandler, 2012: 13; Shapiro, 2013: 18-21). Enders and Sandler note that there has been a transformation in the general ethos of terrorist groups during the modern era of terrorism, starting sometime in the 1960s, with interests shifting from secular ethno-nationalist and left-wing ideologies to religious fundamentalism (2012: 55). However, they are still viewed as rational actors and extremists that are driven by political concerns.

The prevailing conception of terrorism seems reasonable and believable on the surface, but it actually has significant flaws. Among other things, I suggest that it misclassifies the phenomenon and misinterprets the objectives of terrorists, in particular, what they actually are and the motives behind them. Furthermore, it seems that the analysis beyond this basic level has been rather limited and little consideration has been given to factors outside of the political sphere that may be important. It is generally taken as a given that for some reason (revenge, desire for power, fanaticism, etc.) terrorism emerges, terrorist organizations form, and individuals join these organizations. However, no meaningful theory has been offered which explains how arbitrary matters, such as ideological or religious views, lead to terrorism or why people who have coexisted peacefully for long periods suddenly become arch enemies. The conventional characterization of terrorism seems to be based more upon assumptions and assertions than the results of any rigorous, objective analysis, thus it offers no real understanding or predictive capabilities. Since its

ramifications are significant and far-reaching, it is worthwhile to briefly reflect upon its meaning and implications. Broadly speaking, politics is concerned with the organization and operation of society, and involves deciding upon matters such as the form of government, economic system, role of religion, etc. These are certainly important considerations, but they are actually arbitrary issues about which there can be many viewpoints and much debate. They are not non-negotiable, essential matters, such as satisfying basic needs. This view, therefore, assumes that terrorists are not concerned with objective, practical necessities, but are mainly interested in abstract, subjective matters that are non-essential and negotiable. An important implication of this characterization is that they have various options before them and can be persuaded to behave differently if properly encouraged. Another implication is that science has limited ability to study the phenomenon since it is appropriate, strictly speaking, for matters that are objective, not subjective and arbitrary. Therefore, useful scientific techniques may not be applicable and the study of terrorism is reduced largely to unverifiable speculation.

While the stated objectives and actions of terrorists can rightly be described as political, we must realize that the phenomenon of terrorism itself may originate from something entirely different. As Huxley (1977: 48) argues, it is impossible to understand the political activity in many countries from a purely political perspective because forces outside of that sphere actually drive events. In the case of terrorism, the means utilized to achieve the objective may not reveal anything about the origin or nature of the phenomenon itself. Certainly, it

is important to consider the obvious symptoms of a malady, but they do not provide any real understanding of it in the end. Over analysis of superficial symptoms does not lead to an accurate diagnosis of a problem or to effective solutions, so we should not become fixated on them. I suggest that extreme ideological or religious views are not causes of terrorism, as is conventionally thought, but are actually the results of it. They are merely characteristic forms or symptoms that appear after the phenomenon has developed, thus suppression of them will do little to eliminate the underlying problem. The inability of conventional counterterrorism measures to alter the behavior of terrorists suggests that this is the case and that the interpretation of terrorism as a primarily political phenomenon is inaccurate.

Considering the escalating threat posed by terrorism, it is an opportune time to take a different approach and explore dimensions of the issue which have received little attention in the past. Some suggest that it would be helpful to take a more fundamental approach and develop a broader understanding of the issue. Certainly, it would be valuable to better understand the origin of terrorism in the greater context of human affairs, more accurately describe its nature, and identify certain conditions that are associated with its appearance. Along these lines, Crenshaw (1981) and Lugovskyy (2015) both point out that it is important to consider the circumstances in which terrorism occurs and determine if broad political, social, and economic conditions make terrorism more likely. Much of the research on the topic, however, has been concerned with identifying particular politically-oriented causes or triggers of terrorism (why a given

organization formed, why a certain individual became involved, etc.), and these tend to be varied, numerous, and case-specific. Comparatively little effort has been directed at developing a broader, fundamental-level understanding of terrorism as a basic phenomenon which considers the general conditions in which people live, but this may prove to be a more fruitful approach to the issue than simply searching for isolated causes.

Theoretical Background

The Origin of Terrorism: the Human Condition

A fundamental-level, generalized theory of terrorism which captures its most important dimensions is clearly needed and such a theory is developed in this work from basic concepts. The intent is to provide a more comprehensive, universal scientific theory of the phenomenon that explains why it exists in the world, what it is really about, and what characteristic conditions are associated with its emergence. The conventional conception of terrorism as a political matter concerned with the form and functioning of society is not very convincing and is actually inconsistent with the rational actor model. It has been well established that terrorists are rational, sane individuals and this implies that whatever motivates them to persistently take such extreme action must be something vital, necessary, and of great importance, as Enders and Sandler suggest (2012: 59). However, fighting to the death over arbitrary and non-essential political matters, which are varied and constantly changing, seems both irrational and improbable. In reality, political motives can potentially be overcome with sufficient inducement since they are not actually concerned with necessities, and this has been a fundamental strategic assumption of the War on Terror. The continued spread of terrorism and the dogged persistence of its agents, however, casts doubt on the validity of this assumption and the general assessment of the situation.

To comprehend terrorism more fully and identify its origin we must first place it in the proper context as a phenomenon that persistently appears in the

world for some reason despite determined efforts to eradicate it. The National Strategy for Combating Terrorism suggests that political violence may be endemic to the human condition, thus is simply an inherent part of life in the world (Bush, 2003: 29). However, the human condition itself does not actually include politics or violence, these are merely some of our reactions to it. While I disagree with Bush's claim, it admittedly makes an insightful connection between terrorism and the basic situation in which human beings exist in the world. It is a valuable insight and points to a natural place to begin this analysis. The human condition is a topic that has been thoroughly examined from a multitude of perspectives over the ages, but it could be described simply as the basic situations, concerns, events, and needs that characterize the human experience. Arendt (1958: 7-11) offers a salient and modern description of the situation, and in her view humans are simply living beings coexisting on Earth with others of their kind in a world largely of their own creation. Consequently, basic material issues of biology, namely survival and wellbeing, are typically their first and most pressing concerns. She also asserts that more sophisticated, abstract matters, like political or social issues, are actually secondary considerations that arise only after the more pressing material concerns related to the necessities of life have been addressed and satisfied (1958: 37). Huxley (1978: 237-239) provides a similar account of the human condition and concludes that our basic material needs must be satisfied before anything on a higher level can be pursued. He also suggests (1978: 48) that the political situation in many countries today cannot even be understood from a purely political viewpoint because the issues

are actually driven by primal biological concerns, namely the struggle to survive. These are rather unsurprising and obvious conclusions, but they highlight that our most pressing concerns are basic, non-negotiable, materialistic matters stemming from biology, something that is generally overlooked in the conventional understanding of terrorism. The origin of terrorism, I suggest, lies here in the primal struggle to survive, a biological concern that flows directly from the basic human condition.

The Nature of Terrorism: Economy, Environment, and Conflict

Clearly, humans must address the basic needs of life before they can do anything else and since there is no option in the matter they will persistently take whatever action is required to satisfy them. While much of civilization is directed toward this concern in some manner, Arendt (1958: 28-37) and Durant (1954: 6-9) explain that the role of satisfying these vital needs is played mainly by economy. This role is evident from the origin of the term '***economy'*** in ancient Greek which refers to the mundane, but essential, tasks related to '***household management'*** or acquiring the basic necessities for survival. According to the Greek philosopher Aristotle, the family, village, and state all originate from our basic material needs and exist primarily for the sake of enabling a good life. That is, to satisfy basic economic needs and enable people to pursue higher matters than just mere survival, like philosophy and politics (Lekachman, 1959: 8). Our most pressing and essential concerns, which are primal matters of biology, are addressed through economy, but it is certainly not an isolated, stand-alone

system. It functions in concert with the political, social, cultural, and other spheres of society to satisfy our various material needs. Since the different spheres of society are overlapping and integrated we should be aware that various other means, such as political or social avenues, can be used to achieve economic ends and *vice versa*. Considering this, we should not confuse the external characteristics or forms of the means with the underlying, true concern. In the case of terrorism, perhaps means which are typically viewed as political are merely techniques used to achieve basic economic ends.

While economy is an important factor examined in this work, it is admittedly considered only on a very rudimentary level. It is simply viewed as a means by which inputs from the natural environment are processed to produce the goods, services, and other outputs that will eventually be consumed by a population to satisfy its material needs. In this way, environment is introduced as a critical factor in this analysis, one which is closely associated with economy. Later in this work, consumption levels of basic natural resources are examined and are taken as a general economic measure. This admittedly does not provide a complete or detailed understanding of the entire economic situation, but it serves as a useful indicator of an economy's capacity to satisfy a society's basic material needs. Presumably, the higher the consumption levels, the more likely it is that a population's basic needs are being satisfied. Also, the replenishment rates of these resources in the environment are examined and are an important corresponding quantity for comparison with consumption levels.

It is clear that the natural environment and economy are critical elements

in the effort to survive, but is there any theoretical basis or evidence to suggest that they have any connection with violent conflict, in particular, terrorism? Violent conflict has been a regular part of human history and it has various causes, ranging from materialistic concerns to more abstract, idealistic matters. This work is scientific, thus it is concerned with the influence of basic material factors, things which can be objectively observed and measured. Arendt (1958: 31) explains that the ancient Greeks viewed violence as a legitimate means to acquire the necessities of life (i.e., for basic economy), but it was not appropriate for the political realm where rhetoric was preferable. Violence was considered to be a pre-political means for addressing more basic, but essential, economic concerns. Likewise, Durant (1954: 22) remarks that '***societies are ruled by two powers: in peace by the word, in crisis by the sword; force is used only when indoctrination fails.***' When it comes to the necessities of life there are really no options to consider, they must be acquired to survive. If they are not available then a crisis situation arises, some turn to violence and no amount of persuasion will change their view on the matter. In the political realm, however, there are options available and they are somewhat arbitrary, so there is no true need for violence and persuasion is preferable. From a historical and practical perspective, it seems that violence is an accepted and natural feature of the economic sphere but not necessarily of the political realm. This suggests that the violence associated with terrorism can be characterized more accurately as economic and environmental rather than political. The phenomenon unfolds in a convoluted tangle of forms, but its true essence may be about satisfying basic

material needs not settling subjective matters.

The Conditions of Terrorism: Resource Scarcity

There is an established and understandable connection between survival and violence, but outbreaks of extreme, sustained violence, as seen with terrorism, are fairly uncommon. This suggests that there may be certain unusual or characteristic conditions that can be associated with these outbreaks. In his work related to the division of labor, Durkheim describes how the population, environment, and economy can influence outbreaks of violent conflict, and it seems plausible that the same process could be at work with terrorism. Drawing from the work of Charles Darwin, he suggests that conflict between humans, as with all living organisms, over vital resources is a natural consequence of the primal biological quest to survive. If populations grow and become more concentrated, resource scarcity can arise and lead to conflict between competitors as the struggle intensifies. Durkheim describes the process as follows (Giddens, 1972: 153-154):

> *If work becomes progressively divided as societies become more voluminous and dense, it is not because external circumstances are more varied, but because the struggle for existence is more acute…. So long as they have more resources than they need, they can still live side by side, but if their number increases to such proportions that their needs can no longer all be adequately satisfied, war breaks out, and it is the more violent the more marked this scarcity; that is to say, as the number of participants increase.*

Many factors are involved in the outbreak of violence described by this

theory, so the process cannot be understood or explained simply by focusing on a single one of them. The number of participants, or the population, is a critical factor which drives the entire process on a fundamental level and is something that is under human control. It is a demographic or biological matter and it determines the demand for resources. The amount of resources that are available is another important factor and it is clearly an environmental issue. This is something that is largely out of human control, but overconsumption of them can have an effect and may lead to resource depletion. Another critical factor is the ability of a society to satisfy its material needs, something that is typically considered an issue of economy. When all of these factors, or variables, are below threshold levels there is peace, but when they exceed certain levels there is an imbalance and violence erupts. The outbreak of violence is dependent on a complex interaction between multiple factors and occurs when certain conditions arise in the system. Those conditions, i.e., the scarcity of resources, understandably make daily life far more difficult, and it may be the intensifying struggle to survive that leads to the extreme violence that is characteristic of terrorism, not emotions, ideological views, or religious beliefs as is commonly thought. That is, the phenomenon of violence is caused by factors that are objective, material, and quantifiable, not factors that are subjective, arbitrary, and intangible. The theory does not differentiate among the various forms of violent conflict (rioting, terrorism, international war, etc.), but these categories are rather arbitrary and there is no reason why it should be relevant to only one of them. Since this study concerns terrorism the theory will be explored

in that context, but it could certainly be applied to other forms of violent conflict.

History shows that many diverse groups of people, including competitors, can coexist peacefully so long as they have sufficient resources, as Durkheim suggests, and this is probably the norm. However, the effort to acquire and control essential resources for economic reasons has periodically been a source of conflict since ancient times (Lekachman, 1959: 7, Klare, 2001: 25), so it is important to understand how conditions of scarcity arise on a planet that is abundant in so many natural resources. According to Bedogne (2009: 14) and Durant (1954: 19-20), economy was important in the distant past, but it was not the dominant feature of life because essential resources were typically plentiful and easy to acquire from the environment when humans lived sparsely and in small numbers. However, once permanent settlements developed and human populations grew larger, resources in that location would eventually become depleted and would need to be acquired from further away. The cultural change to concentrated urban living in large numbers introduced the notion of resource scarcity into the daily lives of humans and elevated economics to a critical concern of society (Giddens, 1972: 153-154; Bedogne, 2009: 14), one which would occasionally lead to conflict. Later in this paper, measured data is examined to determine if this process, i.e., violence due to increasing resource scarcity, is actually occurring in the world today and has any possible connection with terrorism.

As long as the economy readily satisfies the basic material needs of a population these matters are of little concern, but if it fails to do so they become

serious problems and may lead to outbreaks of violence. This type of scarcity-related violence sometimes occurs in the modern world and it may also influence terrorism. For example, in 2008 a sudden shortage of basic necessities quickly led to global food riots with widespread violence erupting among the general population (United Nations Report, 2011: 61; Brinkman, 2011: 5-8). Of course, this was an acute and brief outbreak, but the same forces could certainly influence sustained, long-term violence. Klare (2001: 15-23) points out that the current global demand for resources is growing at an unsustainable rate and is driven by dramatic increases in both the human population and economic activity. This situation, he suggests, will inevitably result in greater competition and conflict between nations, but it most likely will not be confined to the state level. The drive to acquire vital resources may also result in greater non-state competition and conflict, like terrorism (Klare, 2001: 222). He argues that conflicts of the past have often been over political and ideological issues, but in the future they will be increasingly about vital economic matters, in particular, the basic resources needed to survive (2001: 213). Since the human population is becoming more concentrated in dense urban areas and is projected to continue growing throughout the 21st century this is undoubtedly an important matter to consider.

This analysis has produced a theory that offers a plausible explanation of terrorism, and it provides a markedly different understanding of the issue compared to the prevailing view. According to this theory, terrorism's origin is simply the primal struggle to survive, a materialistic biological concern emerging

directly from the basic human condition. Its general nature is violence connected to economic and environmental concerns, not abstract political, social, or religious matters. In particular, it is characterized by violence that erupts from escalating competition over essential resources, where violence is a pre-political means for acquiring necessities. The specific conditions which are associated with this violence are resource scarcity. Those who become involved in terrorism, either as active terrorists or supporters, probably have no knowledge of the situation with resources, but simply realize that basic living conditions are deteriorating. They may perceive a threat to their own survival and wellbeing and feel that their involvement could help improve their situation in life. Rational thinkers also realize that their own fortunes rise and fall with those of their close associates, so the involvement may be an effort to benefit both themselves and their particular community. This theory helps explain their persistence and zeal in the face of powerful, determined opposition and why they are willing to resort to violence so readily. Like others engaged in violent conflict, terrorists may use violence simply as a means to procure necessities that are difficult to acquire through conventional economic means and to eliminate others that are competing for them. Their objectives, therefore, are basic material matters that emanate from objective needs, not subjective, arbitrary matters that are driven by emotions as is conventionally thought.

Related Work in the Literature

It seems plausible that conditions in the natural environment and economy

could have an influence on terrorism, but the relationship is essentially unexplored at this time. Economy has been given a fair amount of consideration by researchers, but it has largely been dismissed as a meaningful causal factor, and the natural environment has been almost entirely ignored. One goal of this work is to explore this relationship more carefully and determine if certain large-scale material conditions in the natural environment and economy have any connection with terrorist activity. In comparison to political factors, there has been little detailed examination of these matters, but some researchers have touched on them.

On the topic of environment, Shrivastava and Mitroff (2005) note that little consideration has been given to the more primal concerns that motivate typical human beings, such as their basic living conditions and general wellbeing, which could potentially encourage them to support or actively engage in terrorist activity. They suggest that the poor living conditions created by the scarcity, unequal distribution, and lack of control of resources drive some people to terrorism. They assert that most work on the topic has focused mainly on the conventional economic, social, and political aspects, but has failed to consider the ecological roots of the problem. Consequently, the primary countermeasures undertaken in the War on Terror have been narrow military responses which often destroy the environment and the natural resources that it contains. This may actually exacerbate the problem in the long-term, instead of solving it, by increasing resource scarcity and further degrading living conditions. At this point, Shrivastava and Mitroff have not presented any original research to support their

assertions.

Dreher and Kreibaum (2016) also consider the influence of environment and examine the effect of natural resources on terrorism and insurgency. They note that the availability of natural resources is well-known to have an impact on the stability and peace of a region, but point out that this issue has received little attention as a potential cause of terrorism. They suspected that the presence of natural resources could be an important factor that influences the extent of terrorism, but found in their study that resource availability actually has little apparent effect on terrorist activity. However, they examine the impact of petroleum being available not the scarcity of essential natural resources, which is an important point. An interpretation I take of their findings is that terrorists are not driven so much by the greed factor (i.e., to become rich or powerful), but are more concerned with the basic material necessities. Otherwise, the literature is rather limited on the possible relation between environment and terrorism.

Sandler (2014) provides an informative review of research regarding the relationship between economic factors and terrorism, and he notes that there is a spectrum of contradictory findings with no consensus despite a substantial body of work. Citing a study by Ender and Hoover (2012) which examines the relationship between poverty and terrorism, he suggests that those living in wealthy countries have fewer grievances to fuel terrorism. In contrast, those living in poor countries are focused more on day-to-day survival and, presumably, have no time or resources to become involved in terrorist activity. This is a plausible proposition, but it seems that difficult economic circumstances

could also make some more receptive to influences that would have little appeal under better conditions and more likely to use violence to satisfy their basic needs. In any case, it is rather unrealistic that these desperate individuals would be very interested in the fine points of abstract politics, social issues, and religion as the conventional view supposes.

A critical shortcoming of most of these economic studies is that their analyses give no consideration to the natural environment and are based mainly on abstract conventional metrics, such as GDP, which may not be very meaningful for the areas (i.e., developing countries) in which most terrorism actually occurs. Such metrics are merely aggregate, post-hoc indicators that describe levels and quantities (i.e., numbers of transactions, total sales proceeds, etc.), but they do not actually explain what happens or why. They can be fairly informative for countries with modern, developed economies, but such metrics are far less meaningful for developing countries which typically have more basic activities that occur outside of the formal economy. In developing countries, the people often have a much closer relationship with the natural environment and acquire many of their basic necessities directly from the local surroundings without any formal transactions. Therefore, a more comprehensive and appropriate economic analysis should consider the actual availability and consumption of basic resources which are used to satisfy material needs (essential and non-essential), not just abstracted conventional economic metrics like GDP.

Data: Natural Resources and Terrorism

Production, Consumption, and Scarcity of Resources

A primary interest of this work is the possible connection between terrorism and the scarcity of essential natural resources, a topic which is largely unexplored at the moment. Two critical issues to determine at the outset, therefore, are exactly what scarcity means and whether resources actually are scarce. In a simple sense, this a matter of what is available in the environment and what is needed by a society. Are resources abundant and readily available to fill a population's needs or are they scarce and difficult to acquire? Unfortunately, there is no universal definition of scarcity and it is not specified by any absolute standards, so it is defined in this work in a relative sense and is identified through two different comparisons using detailed data related to basic renewable ecological resources. The analysis actually indicates whether resources are *more scarce* compared to some reference point, not scarce in an absolute sense. One comparison is used to determine how total resource levels change in the environment over time on the global scale and another comparison is used to determine how resource consumption levels (via economic activity) vary from one geographic location to another at a given time. They can be viewed as two different means for assessing resource levels and scarcity: one considers actual conditions in the environment and the other considers the experience of humans in their own lives. I refer to these two different measures as environmental scarcity and experienced scarcity. Each quantity provides valuable information about the availability of resources, and, in either case,

decreasing levels of resources (i.e., in the total amount in the environment or in their consumption) are interpreted as an indication that resources are becoming more scarce. The resources considered in this study are renewable, i.e., they are naturally replenished, not non-renewable or fossil resources. Since fossil resources are not replenished it is a matter of fact that any consumption makes them more scarce.

As far as most people are concerned, resource scarcity is a perception based upon their actual experience and this is probably the most important thing to them. It is an impression of whether there are sufficient resources available to satisfy one's material needs and is naturally associated with consumption levels since consumption is explicit evidence that resources actually exist and are available to use. With higher levels of consumption resources are likely to be perceived as abundant and material needs are more likely to be met, while with low consumption levels resources are likely perceived as more scarce. However, the perception of human beings may not reflect actual conditions in the environment. It is possible that resources are abundant in the environment, but their consumption by the population is comparatively low for some reason. Conversely, it is also possible that resources are scarce in the environment, but the population somehow manages to consume them at high levels, for example, by liquidating reserves or importing them. In any case, consumption levels are ultimately constrained by the amount of resources that are available in the environment, so both of these factors should be considered to fully understand the phenomenon in the long term.

In this study, the production (or replenishment) and consumption of resources are the principal factors that influence any change in their overall availability in the environment (i.e., in the total amount). These factors are expressed here by the bio-capacity and Ecological Footprint, which are well-known measures related to renewable ecological resources. Their values are provided by the Global Footprint Network National Footprint Accounts 2016 Edition, a database which includes various environmental, economic, and demographic data on national and global levels. The Ecological Footprint measures the amount of ecological assets that a population of a region needs to produce the renewable natural resources (plant-based food, livestock and fish products, forest products, plant fiber, etc.) that it consumes and to absorb its waste, and the bio-capacity measures the productivity of a region's ecological assets. Each quantity is calculated on a national basis and is expressed in units of global hectares (gha) which indicates the amount of ecological resources that are available on a standardized hectare of land having average productivity levels (Global Footprint Network website). In basic terms, the bio-capacity and Ecological Footprint are measures of the natural environment's rate of production of resources and a population's rate of consumption of them through economic activity, respectively. The Ecological Footprint shows the impact of a society on the environment and the capacity of an economy to satisfy the society's material needs, i.e., higher consumption levels suggest that material needs (both necessities and non-essentials) are more likely to be met.

$$\textit{resource imbalance} = \textit{Ecological Footprint} - \textit{bio-capacity} \qquad (1)$$

The difference between the Ecological Footprint and bio-capacity is defined here as the resource imbalance (shown by equation 1), an important quantity in this analysis. It reveals whether the total amount of resources in the environment are being accumulated or depleted and is used as an indicator of environmental scarcity. If the Ecological Footprint is less than the bio-capacity, the resource imbalance is negative and resources in the environment are accumulating or becoming more abundant. Conversely, if the Footprint is greater than the bio-capacity, the resource imbalance is positive and resources are being depleted or are becoming more scarce. Note that this analysis does not determine the total amount of resource reserves that are stored in the environment, but indicates a change in the amount of resources, i.e., whether it is increasing or decreasing with time.

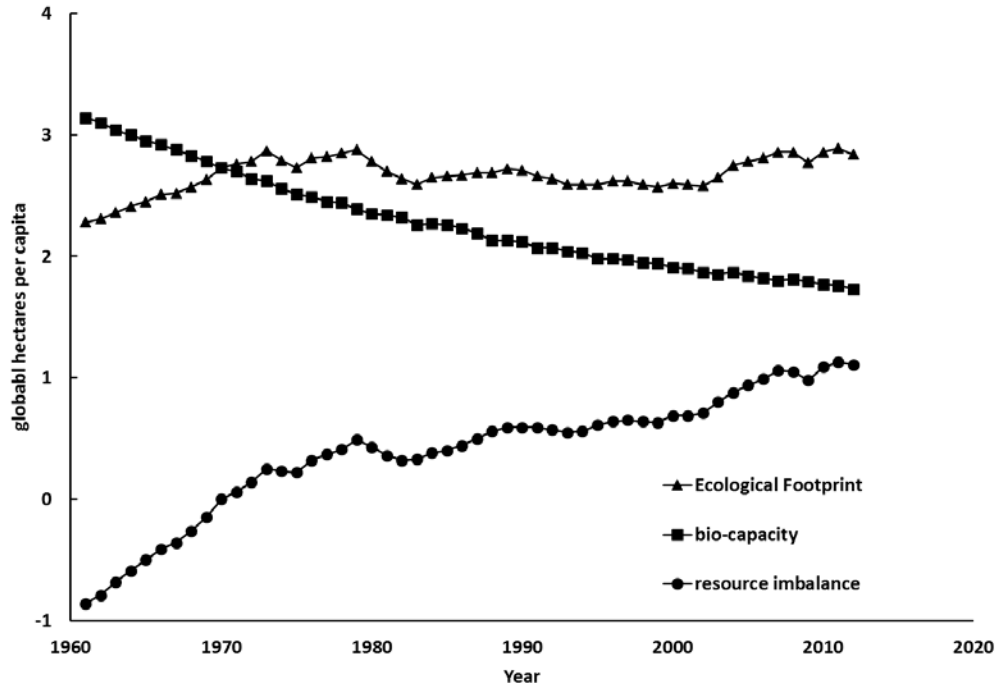

Figure 1. Bio-capacity of Earth, total human Ecological Footprint, and global resource imbalance (all on a per capita basis). Around the year 1970 humanity's combined use of the ecological resources considered exceeded the planet's ability to produce them in a sustainable manner, thus these resources in the environment started to become more scarce at this time. A positive resource imbalance indicates that environmental scarcity is increasing. (Data from the Global Footprint Network National Footprint Accounts 2016 Edition).

Data for the global scale bio-capacity, Ecological Footprint, and resource imbalance, all on a per capita basis, between the years 1961 and 2012 are shown in Figure 1. The average consumption level (shown by the footprint) has increased slightly during this period, but the change is modest at about 22%. The per capita bio-capacity, however, has diminished significantly and has been reduced by roughly half. This reduction in bio-capacity is primarily due to population growth, which divides the amount of resources available to each person, not to a decrease in the overall replenishment rate. The data show that

until about 1970 the average Ecological Footprint was less than the bio-capacity of the planet, thus the resource imbalance was negative. This means that the total amount of renewable resources available in the environment, at least those being considered, was increasing (i.e., becoming less scarce) or held at constant levels. After 1970, however, the global resource imbalance became positive and the world overall has been in a period of increasing environmental scarcity with a shrinking total amount of resources. Not only are the resources in question becoming more scarce with time, but the rate at which they are becoming scarce is also increasing. This is due to both rising consumption levels and population growth. Similar behavior is seen in the national-level data for essentially every country in the world. An interesting point is that average consumption levels were rising during this period even though resources started to become more scarce in the environment after 1970. That is, experienced scarcity actually decreased for the average person even though environmental scarcity grew. In the next section, the relationship between the bio-capacity, Ecological Footprint and terrorist activity is examined.

Resource Scarcity and Terrorism

In this analysis, resource scarcity is indicated by a comparatively smaller Ecological Footprint (a spatial comparison showing experienced scarcity) and by a positive resource imbalance (a temporal comparison showing environmental scarcity). If scarcity of basic natural resources is a fundamental driver of terrorism, as the theory developed in this work suggests, then we should observe

increasing terrorist activity as these resources become more scarce. To test this hypothesis data for terrorist activity, the bio-capacity, the Ecological Footprint, and the resource imbalance are examined in this section. Terrorism data is taken from the Global Terrorism database (GTD) provided by the National Consortium for the Study of Terrorism and Responses to Terrorism which includes information related to terrorist incidents on national and global levels. The number of reported terrorist incidents is taken as the measure of terrorist activity and greater numbers of incidents are interpreted to indicate higher levels of terrorism. For the sake of simplicity, in this initial work no differentiation is made between the various categories of terrorism (domestic, international, etc.) and only the total number of incidents is considered.

Environmental Scarcity and Terrorism

The global scale data plotted in Figure 2 shows the conditions for both natural resources and terrorism progressing in time over roughly the last half century. The figure shows the global resource imbalance on an annual basis from 1970 to 2012 (y-axis right scale) and the annual number of terrorist incidents (y-axis left scale) on a worldwide basis from 1970 to 2017, both normalized by the world population at the year of measurement. The annual number of terrorist incidents begins at comparatively low levels in the early 1970s, increases from the late 1970s through the early 1990s, has a temporary decline from about 1993 to 2003, and then has a steep increase through the remainder of the time period. The behavior shown in the data is not smooth, but

the long-term trend is clearly increasing. Likewise, the resource imbalance begins at about zero in 1970, then has an overall increasing trend with several brief periods of small decline, which indicates generally growing environmental scarcity. Both quantities on average are increasing with time and at comparable rates as the trend lines indicate.

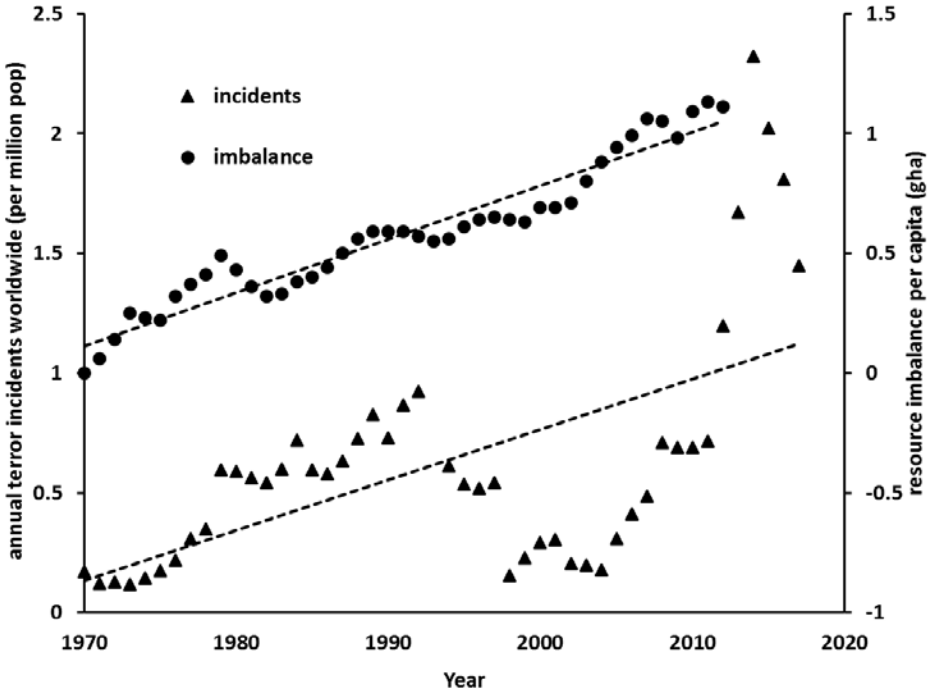

Figure 2. Per capita global resource imbalance from 1970 to 2012 and the average annual total number of terrorist incidents worldwide per million in population from 1970 to 2017. Both the resource imbalance and annual number of terrorist incidents show an upward trend during this time period, which indicates growing resource scarcity and increasing terrorist activity. (Data from the Global Footprint Network National Footprint Accounts 2016 Edition and the Global Terrorism Database).

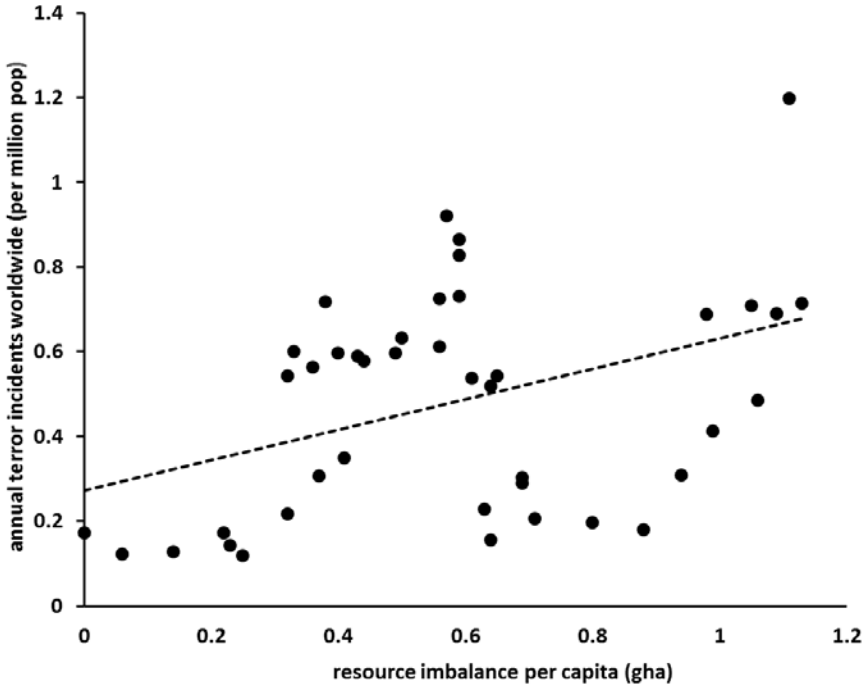

Figure 3. Per capita global resource imbalance plotted against the total number of terrorist incidents worldwide per million in population from 1970 to 2012. An increase in the size of the resource imbalance (i.e., environmental scarcity) corresponds to an increase in the number of terrorist incidents.

Figure 3 shows a scatter plot of the global resource imbalance and total number of terrorist incidents occurring worldwide each year from 1970 to 2012. The relationship is not smooth, but there is clearly an increase in the number of terrorist incidents as the resource imbalance increases to higher levels. That is, as the rate at which environmental scarcity grows so does the level of terrorist activity. The level of terrorism would likely continue to increase with time even for a constant positive value of the resource imbalance, since resources are still becoming more scarce in this situation, but a growing resource imbalance probably exacerbates the situation. Statistical analysis yields a correlation

coefficient of 0.41, which suggests a moderate level of correlation for a linear relationship between the resource imbalance and terrorist incidents.

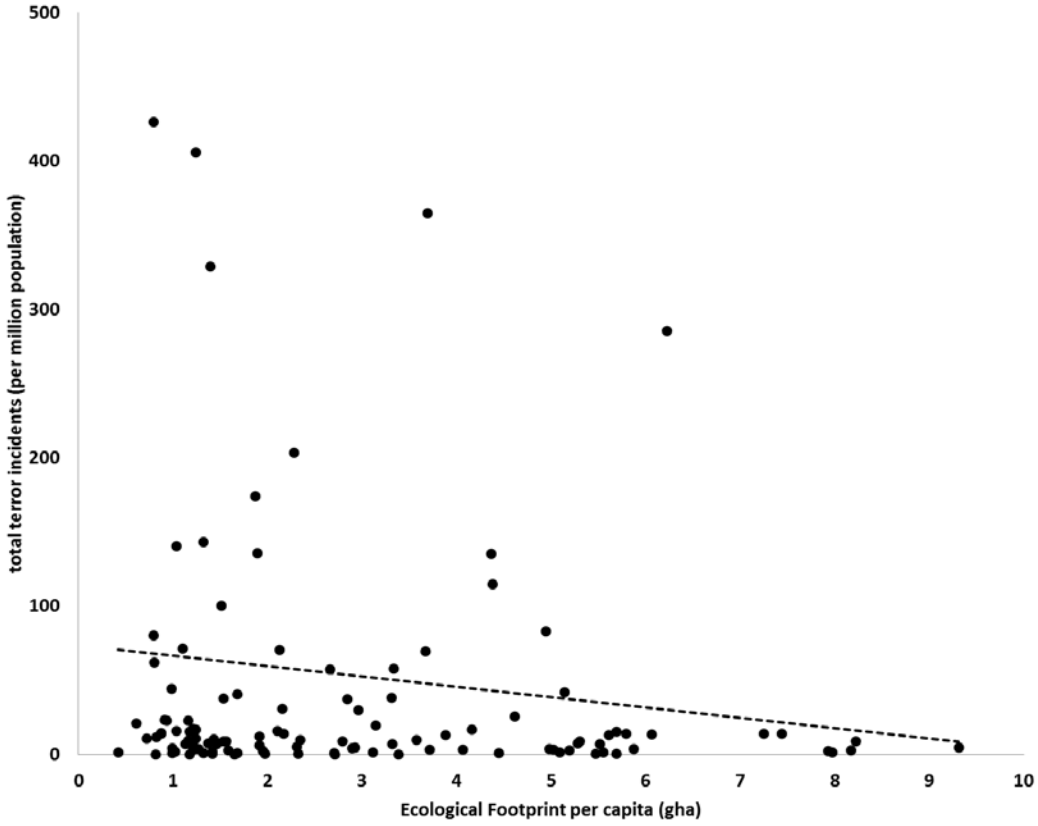

Figure 4. National level per capita Ecological Footprint in 2012 compared to total number of terrorist incidents occurring in a given country from 1970 to 2017. As the Ecological Footprint increases consumption of resources grows, thus experienced scarcity decreases, and terrorist activity on average decreases. Note that some data are off the y-scale on the chart.

Experienced Scarcity and Terrorism

The data in Figure 1 show that on the global scale resources in the environment are becoming more scarce with time and this trend will likely continue into the future. At the current time, however, there is a sizeable amount of geographic variation in the Ecological Footprint and it can provide some

valuable insight into the nature of terrorism. If scarcity of essential natural resources is an important driving factor of terrorism, then we should see higher levels of terrorist incidents in countries having a comparatively lower Ecological Footprint or a greater level of experienced scarcity.

Figure 4 shows a scatter plot for individual countries which compares the per capita Ecological Footprint measured in 2012 with the total number of terrorist incidents occurring in that country between 1970 and 2017. While the Ecological Footprint has changed in the various locations during this period, the average change has only been modest, as Figure 1 shows, and in almost all cases it has been an increase. Therefore, the value for the footprint from 2012 is taken to be representative for the entire time period. Only countries with a population greater than 5 million are considered since smaller countries may not have sufficient scale in the population, economy, or environment to exhibit representative behavior. The data indicate that countries having relatively smaller Ecological Footprints (i.e., lower consumption levels and greater experienced scarcity) experience higher levels of terrorist activity on average compared to countries having relatively larger footprints. While most countries have only low levels of terrorist incidents regardless of their footprint, those countries that do experience high levels of terrorism have greater levels of experienced scarcity, as the trend line shows. Note that several data points (occurring at low footprint values) are off the y-scale of Figure 4. The range in the figure shows most of the data points and is selected so that the general behavior is apparent.

A Regional Focus: Resource Scarcity and Terrorism in South Asia

Due to its increasing political, demographic, and economic importance, South Asia is a vital region to consider in the study of global terrorism. The region is especially relevant to this work because it is an area with significant terrorist activity and because it likely experiences scarcity of essential natural resources due to its high population density. According to the Global Terrorism Database, roughly 32 percent of all terrorist incidents worldwide between 2012 and 2017 occurred in South Asia. Since only about 20 percent of the world's total population lives in this area, the level of terrorism is considerably higher than the global average. Perhaps the higher than average levels of terrorism are due to scarcity of resources.

In terms of resources, all of the countries in the region currently show a positive resource imbalance (i.e., the footprint is greater than the bio-capacity) and the level of imbalance is growing with time. Each country exhibits essentially the same type of behavior in the bio-capacity and Ecological Footprint as the world average (shown in Figure 1), but the measured values for these quantities are significantly lower due to the high population density. The bar graph in Figure 5 shows the per capita bio-capacity, ecological footprint, and resource imbalance in the year 2012 for the world and the large countries of South Asia. From left to right the bars show data for the world, Bangladesh, India, Pakistan, Sri Lanka, and Nepal. Compared to the world average, the bio-capacity and Ecological Footprint values are much smaller for the countries of South Asia, but the resource imbalance is comparable. The data reveals that the population of

this region has fewer resources available on a per capita basis and uses less of them compared to the world average. According to the analysis of this work, resources are comparatively scarce in South Asia, in both the environmental and experienced senses. That is, the total amount of resources available in the environment is decreasing with time and the consumption level of these resources by the population is comparatively lower than the world average.

With respect to terrorism in South Asia, the national and global trends are generally similar, but there is a fair amount of variation in the levels of terrorist activity among the different countries. Figures 6-8 show the number of terrorist incidents occurring on an annual basis from 1970 to 2017 for the world, India, Pakistan, Bangladesh, Nepal, and Sri Lanka. As in Figure 2, the number of terrorist incidents in a country for a given year is normalized by the population of that country at the year of measurement and is expressed in incidents per million in population. India and Bangladesh show levels of terrorism that are comparable to the world average, while Pakistan and Nepal show levels that are considerably higher than the world average. Sri Lanka exhibits markedly different behavior from the other countries with very high levels of terrorist incidents between about 1985 and 2010, then much lower levels that are currently comparable to the world average. In Figure 9, the Ecological Footprint is plotted against the total number of terrorist incidents occurring between 1970 and 2017 for various countries, and the countries of South Asia are identified. All of them appear on the low end of the footprint scale which means that they show larger experienced resource scarcity compared to other countries on the graph.

The data for the countries of this region support the theory proposed in this work that terrorism is connected to the scarcity of essential natural resources. All of the countries of South Asia show meaningful resource scarcity compared to other countries of the world and on average experience significantly more terrorism than the world average.

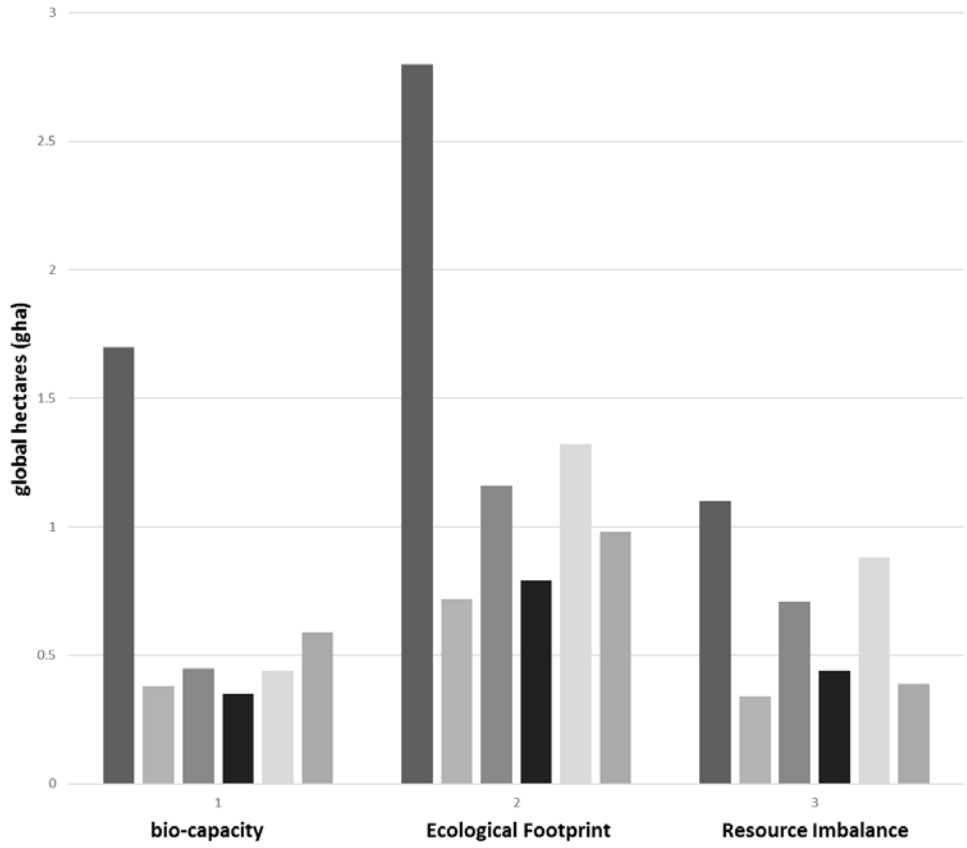

Figure 5. The per capita bio-capacity, Ecological Footprint, and resource imbalance in the year 2012 for the world and large countries of South Asia. From left to right the bars show data for the world, Bangladesh, India, Pakistan, Sri Lanka, and Nepal. (Data from the Global Footprint Network National Footprint Accounts 2016 Edition).

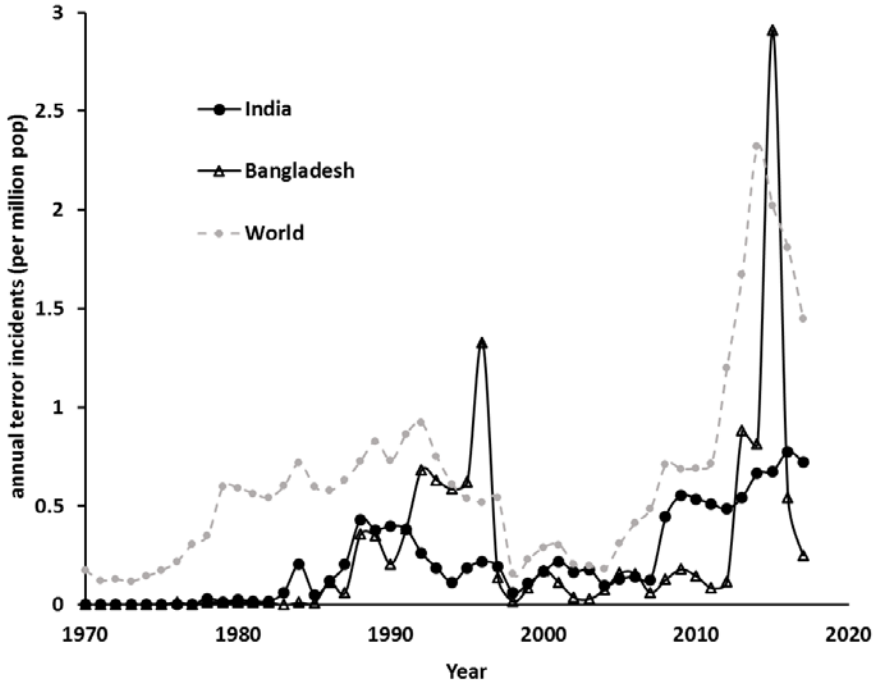

Figure 6. The number of terrorist incidents in India, Bangladesh, and the world per million in population from 1970 to 2017. The levels of terrorist activity in these countries are comparable to the global average (Data from the Global Terrorism Database).

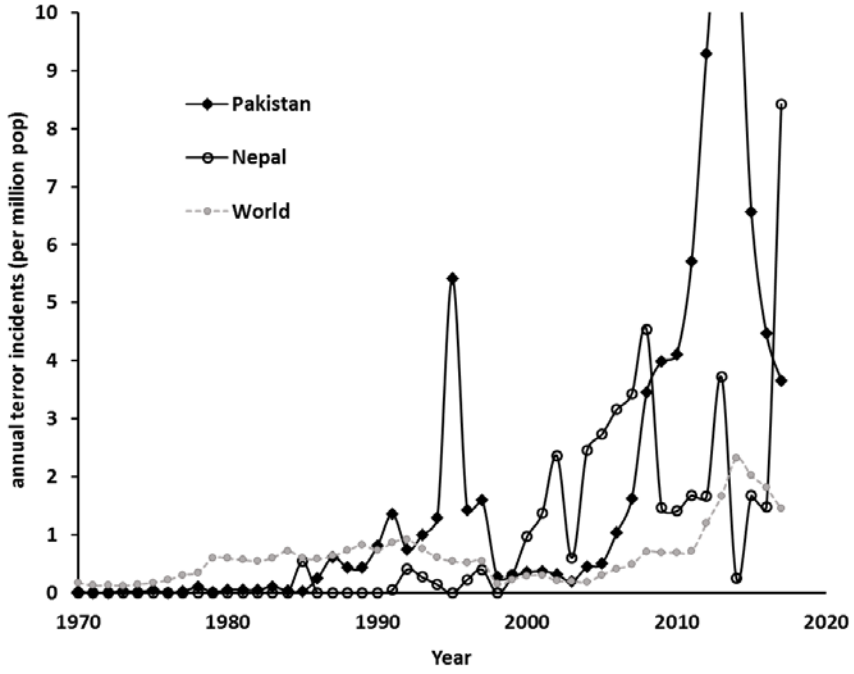

Figure 7. The number of terrorist incidents in Pakistan, Nepal, and the world per million in population from 1970 to 2017. The levels of terrorist activity in these countries are considerably higher than the global average (Data from the Global Terrorism Database).

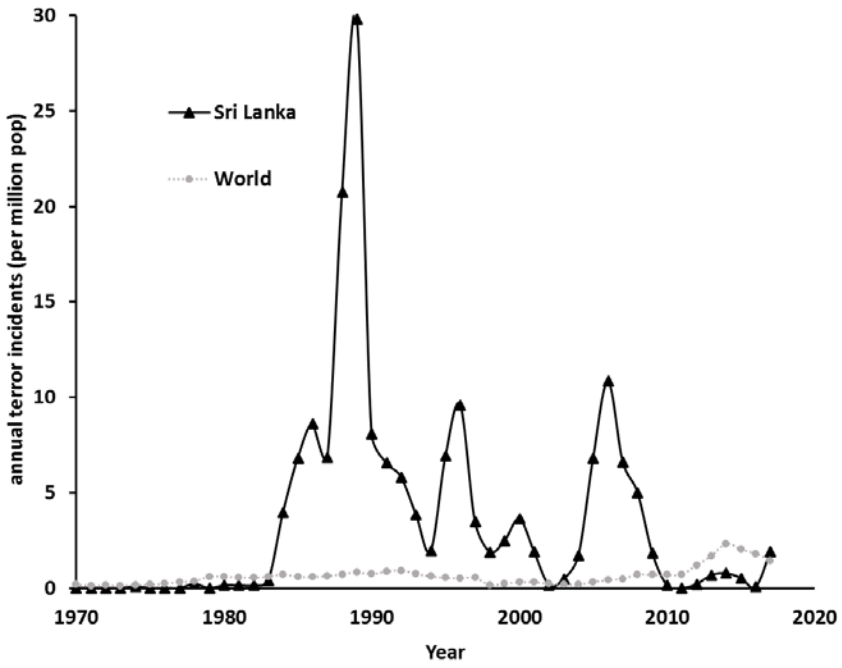

Figure 8. The number of terrorist incidents in Sri Lanka and the world per million in population from 1970 to 2017. The level of terrorist activity in Sri Lanka was significantly higher than the global average between about 1985 and 2010, but it has recently become comparable (Data from the Global Terrorism Database).

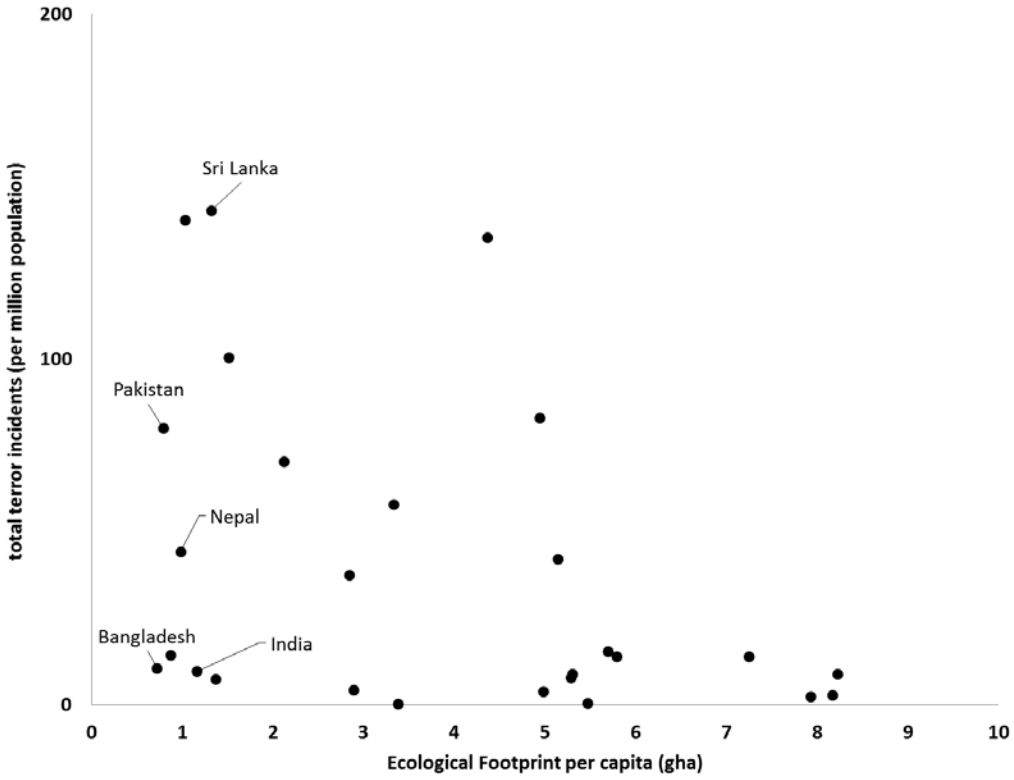

Figure 9. The national level per capita Ecological Footprint in 2012 compared with the total number of terrorist incidents in various countries per million in population from 1970 to 2017. The countries of South Asia are identified and all appear on the low end of the footprint scale.

Analysis and Discussion

The data reveal that higher levels of terrorist activity are generally associated with conditions of greater resource scarcity, and this is the case for both environmental and experienced scarcity. A global scale temporal analysis shows that environmental scarcity and the number of terrorist incidents are both increasing with time and at comparable rates (see Figs. 2 and 3). Presumably, as essential natural resources become more scarce in the environment over time, due to a growing population and increasing consumption levels, competition for these resources intensifies. This competition can potentially escalate into violent conflict if the basic needs of some are not satisfied, as Durkheim suggests, and it may occur as terrorism in some situations.

A national-level geographic analysis shows that countries having greater relative experienced scarcity (indicated by lower consumption levels) tend to have higher levels of terrorist incidents compared to countries with relative resource abundance (see Figure 4). Most countries have only low levels of terrorist incidents, but those countries that do have high levels of terrorism show conditions of greater experienced scarcity. This is similar to the behavior Ender and Hoover (2012) observed with respect to national GDP and terrorist incidents (shown in their Figure 1). Since a country's level of resource consumption often scales with GDP this similarity is understandable. As Sandler (2014) suggests, those living in wealthy countries probably have fewer complaints because their consumption levels are comparatively high and their material needs are more likely to be satisfied, thus they are less likely to become involved in terrorism.

Also, these countries have more resources available to allocate to counterterrorism measures which helps to further inhibit terrorist activity.

While there is considerable spread in the data there is a general correspondence observed between resource levels and terrorist activity. This behavior supports the theory proposed here that terrorism is brought about by an intensification in the struggle to survive which is due, at least partially, to the scarcity of essential natural resources. Most people are probably unaware of the changing situation with resources, but they may generally sense a growing difficulty in daily life. These conditions may encourage some to engage in terrorist activity, either as direct perpetrators or as supporters in the general population, because it is viewed as a means to improve a difficult situation in life. In a broad sense, rational actors realize that their personal wellbeing is closely tied to that of their own particular community, so their involvement in extremism may be an effort to help both themselves and their community. The correlation between the variables is only moderate, but these are long-term, large-scale data which reflect a multitude of real world events and conditions, so this is expected to a certain degree. Also, it is important to recognize that this study only considers terrorism. There are numerous other types of violent conflict that could be associated with resource scarcity, such as war, insurgency, or general rioting, which are not taken into account, and the grouping into these categories is rather artificial and arbitrary.

The findings of this work suggest that the increasing levels of resource scarcity currently developing across the world provide favorable conditions for

higher levels of terrorist activity in the future. Although these conditions create a conducive environment there are certainly many other factors that determine whether terrorism actually emerges. Scarcity itself does not guarantee its appearance, just as cigarette smoking does not guarantee the development of lung cancer, but is well-known to increase its likelihood. When terrorism does erupt, conventional counterterrorism measures will likely remain ineffective since they are merely reactive responses which only address the symptoms of the problem. In reality, they may even exacerbate the situation, as Shrivastava and Mitroff suggest, because they often employ operations that degrade the environment, destroy infrastructure, and restrict the flow of resources, thus they can further intensify resource scarcity and reinforce the conditions that favor terrorism. An alternative and perhaps more effective countermeasure is simply to ensure that conditions of resource scarcity are not prevalent or long-lasting in at-risk regions, thus circumstances will be generally less conducive to terrorism. Indeed, this is effectively what many conventional economic development programs attempt to achieve and it may be a viable solution for the short-term. Enhancements in production might be accomplished through various conventional means that are appropriate for the situation, such as environmental recovery, general efficiency and sustainability improvements, infrastructure development, etc. However, these would only be temporary, stopgap measures, not permanent solutions since the overall amount of resources in the environment would continue to be depleted and eventually exhausted. In most cases, this is not a sustainable option since the majority of the world's countries

are currently experiencing environmental resource scarcity and are trending toward even higher levels in the future, as Figure 1 shows. The basic natural resources needed to drive both economic development and routine activity are becoming more scarce with time and they may not be plentiful enough for conventional development schemes. In most countries, the consumption of essential natural resources currently exceeds the capacity of the environment to replenish them, and in the future it appears that the situation will likely intensify as the average consumption levels and population both continue to grow.

Conclusion

After nearly twenty years of extensive military operations, massive financial expenditures, and incredible amounts of destruction the War on Terror has not eliminated or even contained terrorism. Current data reveal that this violent phenomenon is spreading across the globe and is trending toward even higher levels in the future. At this point, no meaningful explanation has been offered for the failure of these efforts or the continued increase in terrorist activity, but this work attempts to provide some insight into the situation. It is suggested that the efforts of the War on Terror have been ineffective largely because the conventional understanding of modern terrorism, which has provided the strategic basis for the operation, is fundamentally inaccurate and has resulted in misguided countermeasures. Also, terrorism is growing and spreading due to large-scale, fundamental factors that are not accounted for in the prevailing conception, but they are considered carefully in this work.

A primary goal of this work is to develop a fundamental-level, scientific theory of modern terrorism which offers a concise explanation of the phenomenon's origin, nature, and characteristic conditions. This theory suggests that terrorism's origin lies in the primal struggle to survive, a material concern that stems directly from biology. Its general nature is most accurately described as economic and environmental, rather than political as conventionally thought, and involves the outbreak of violence due to escalating competition over essential resources that are needed to survive. This violence is mainly concerned with basic necessities, thus is considered pre-political in nature. The characteristic

conditions associated with the phenomenon are resource scarcity. Those who become involved in terrorism, either as active extremists or supporters, may do so because they perceive a threat to their own survival and see some benefit in their involvement. This helps explain their persistence and fanaticism in the face of powerful, determined opposition and why they are so willing to readily engage in extreme violence even to the point of suicide.

The primary issue examined in this work is the possible connection between terrorism and the scarcity of essential natural resources, a topic which is largely unexplored at the moment. Scarcity is defined in a relative sense and is identified through two different comparisons using detailed data related to essential renewable resources. In either case, decreasing levels of resources are considered to indicate that resources are becoming more scarce. The data indicate that conditions of greater resource scarcity, both temporally and geographically, are generally associated with higher levels of terrorist activity. A global scale temporal analysis reveals that environmental resource scarcity and the number of terrorist incidents are both increasing with time and at comparable rates. As essential natural resources become more scarce in the environment with time, due to a growing population and increasing consumption levels, basic survival becomes more difficult for some and this pressure can lead to violent conflict, which may be terrorism in some situations. A national scale geographic analysis shows that countries having greater experienced scarcity of resources tend to have higher levels of terrorist incidents compared to countries with relative experienced abundance. While most countries have only low levels of

terrorist incidents, those countries that experience significant terrorism tend to have greater levels of experienced resource scarcity. It is thought that populations which consume greater amounts of resources tend to be generally more content and are less likely to become involved with terrorism since their material needs are largely satisfied.

There is considerable spread in the data, but there is a general correspondence between resource levels and terrorist activity. This behavior supports the theory proposed here that terrorism originates in the primal quest to survive and is brought about by the scarcity of vital natural resources. The correlation between the variables is only moderate, but this is to be expected to a certain degree since there are complex, large-scale processes involved and many other factors besides the availability of resources could influence terrorist activity. Also, it is important to recognize that this study only considers terrorism and there are numerous other types of violent conflict that could erupt due to resource scarcity, such as international war, insurgency, or general rioting, which are not taken into account.

These findings suggest that the general increase in resource scarcity which is currently developing across the world may be responsible for the recent growth in terrorist activity and could encourage even higher levels in the future unless some meaningful actions are taken. Although these conditions create a conducive environment there are certainly many other factors that determine whether terrorism actually emerges, so scarcity itself does not guarantee outbreaks of violence. Conventional counterterrorism measures, such as military

action, will likely remain ineffective and may even exacerbate the situation since they often destroy resources and infrastructure, thus promote the conditions that are conducive to terrorism. An alternative and potentially more effective approach, at least for the short-term, is simply to ensure that conditions of resource scarcity are not prevalent or long-lasting in at-risk regions. This could be readily achieved through appropriate conventional means, such as environmental recovery, efficiency and sustainability measures, infrastructure development, etc., but it would only be a temporary, stopgap measure not a long-term solution. The unfortunate reality is that resources in the environment would continue to be drawn down and eventually exhausted. In the long-term, far more meaningful and fundamental changes must be made to our societies to effectively address terrorism and other types of resource-related violent conflict.

In the beginning of this paper, it was noted that the U.S.'s National Strategy for Combating Terrorism (2003: 29) asserts terrorists aim to destroy civilization, but that may not actually be the case. Collateral damage often occurs when a struggle becomes desperate and perhaps the destruction is merely incidental. The overall predicament is summed up rather well, in my view, by a salient passage in Will Durant's *Story of Civilization*. Durant says (1954: 7):

'In the last analysis civilization is based upon the food supply. The cathedral and the capitol, the museum and the concert chamber, the library and the university are the facade; in the rear are the shambles.'

The shambles, of course, are where the gritty, unglamorous, and sometimes violent struggle to survive originates and takes place. Here in the shambles we

can see terrorism's true nature on display: a bitter struggle brought about by deteriorating living conditions due to diminishing resources. The difficult circumstances provide favorable conditions for terrorism and when it emerges it naturally takes on characteristic forms, such as extreme religious beliefs, radical ideological views, ethnic tensions, oppressive regimes, etc. The conflict often spills over into the abstract, sophisticated realms of the facade (the political, religious, etc.) and takes on some of their forms, but they are merely superficial, temporary symptoms of the phenomenon, not its cause, so we should not let them be a distraction.

At this point in the battle against terrorism perhaps it is time to turn our attention from the more elegant and attractive façade to the less appealing shambles since this is where the phenomenon originates and unfolds. This work reveals that terrorism is a systemic issue which is intimately connected with a number of other serious challenges currently facing humanity that impact resource availability, like climate change, population growth, poverty, and species extinction. In reality, terrorism is not an arbitrary or isolated problem that can be dealt with in a piecemeal fashion, as has been attempted in the past, but is a fundamental-level, systemic issue of our civilization that must be addressed with thoughtful, comprehensive, long-term measures. It is not a momentary foe that can simply be destroyed by force after it has emerged, but is a persistent, ethereal threat that must be preempted by ensuring that conditions are unfavorable for its appearance in the first place. Terrorism is a problem that can simply be avoided, like many others, if the appropriate precautions are taken.

Future work on the topic could include a more comprehensive analysis of the relationship between natural resources and violent conflict in general, not just terrorism. Also, a detailed analysis of resource availability and consumption among subpopulations within a given country would be valuable.

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