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On: 10 September 2013, At: 09:44

Publisher: Routledge

Informa Ltd Registered in England and Wales Registered Number: 1072954 Registered office: Mortimer House, 37-41 Mortimer Street, London W1T 3JH, UK



Geopolitics

Publication details, including instructions for authors and subscription information:

<http://www.tandfonline.com/loi/fgeo20>

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Published online: 30 May 2008.

To cite this article: Christopher Jasparro & Jonathan Taylor (2008) Climate Change and Regional Vulnerability to Transnational Security Threats in Southeast Asia, *Geopolitics*, 13:2, 232-256, DOI: [10.1080/14650040801991480](https://doi.org/10.1080/14650040801991480)

To link to this article: <http://dx.doi.org/10.1080/14650040801991480>

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Climate Change and Regional Vulnerability to Transnational Security Threats in Southeast Asia

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Transnational and non-state threats including international organized crime, terrorism, illicit trafficking (in drugs, wildlife, humans, arms, etc.), piracy, infectious disease, and illegal migration flows are major concerns in Southeast Asia. This paper examines IPCC projections for climate change to the region and discusses possible impacts of these changes upon transnational security. Overall, climate change could increase potential vulnerability to various transnational security threats. Southeast Asian livelihood and social systems will be pressured, while state and civil society capacity will be strained. This will intensify existing vulnerabilities to non-state security threats and raise the overall level of vulnerability and risk to both human and state security. Predicted climate change impacts are also likely to strengthen or help revive sub-state networks that have traditionally responded to environmental change and pressure via violence, crime, smuggling, banditry, trafficking, terrorism, and other such activities. This will contribute to the evolution, expansion, and growth of “new” war fighting groups while raising overall vulnerability to non-state threats from local to global scales.

The opinions and ideas expressed in this paper are those of the authors alone and do not represent those of the US Marine Corps, Department of Defense, or US Government.

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CONCEPTUAL BACKGROUND: TRANSNATIONAL THREATS IN SOUTHEAST ASIA

In this paper we examine how climate change may affect the vulnerability of Southeast Asia to transnational security threats. Transnational security (also commonly referred to as non-traditional, 'gray area', or irregular) threats are "non-military ones that cross borders and either threaten the political and social integrity of a state or the health and quality of life of its inhabitants".¹ As such they operate at the intersection of often competing notions of human security and traditional understandings of state/national security. Among the phenomena commonly cited as examples are international organised crime, terrorism, illicit trafficking (in drugs, wildlife, humans, arms, etc.), piracy, infectious disease and pandemics, and illegal migration flows.² Most of these phenomena have distinct cultural and political ecologies that when combined with effects of globalisation and environmental change have the potential to rapidly mutate, intensify, or expand.

Although these issues have attracted increasing attention in the decade following the Cold War's end, they are hardly new. However, the realities of the current global context (e.g., globalisation, the passing of the Cold War, increased urbanisation, advances in communications technology, etc.) are facilitating the growth, occurrence, and intensity of these threats.³ Within this context, threats often flow amongst the same diffusion pathways and merge or converge. For example, there is a well-documented nexus between trafficking in women as sex workers, intravenous drug use, and the spread of HIV/AIDS; while transnational criminal groups engage in disparate activities, such as antiquities and human trafficking, or environmental crimes simultaneously with drug trafficking.⁴

In this paper we take a modified political ecology approach – modified because political ecology is generally used to analyse incidences of environmental change and/or environmental conflict, while here we use it for an analysis of regional vulnerability to transnational threats. Political ecology is best defined as a research approach which integrates historical, institutional, political, and economic factors with the environmental conditions of an area, at multiple scales of analysis, in order to determine the conditions which produce environmental change or environmental conflict.⁵ The basic idea is that local people affect the land, but their actions are influenced, caused, or constrained by a variety of larger forces, including local, regional, national and global forces, policies, and pressures.

However, because of the multiplicity of scales and factors which need to be considered, political ecology provides little in the way of methodological or conceptual orthodoxy.⁶ Reacting to this, some human geographers have attempted to link political ecology with Marxian, feminist, and post-structuralist approaches.⁷ Viewing political ecology's pluralism as a strength, we prefer the more traditional approach of simply looking at as many different

types of factors as one can, at multiple scales, in order to explain and perhaps predict environmental outcomes in the most comprehensive fashion possible. Research on environmental problems in developing countries has come to the similar conclusion that no single variable or short-term explanation suffices in explaining the complex web of incidents and influences which lead to environmental degradation.⁸ Social, economic, cultural, political and physical factors must be taken into consideration in both analyses of environmental degradation or vulnerabilities to the sorts of threats we discuss here.

Recent works which combine the political ecology approach with a focus on vulnerability to disasters are thus referred to as studies in the political ecology of disaster.⁹ They start from the premise that natural disasters always have a social, political, and economic component, and that moreover, vulnerability cannot be reduced to a simple socioeconomic category such as “poverty.”¹⁰ Instead, vulnerability should include the mechanism whereby general social conditions, such as poverty, are manifested in specific situations of increased risk to natural disasters. In the case of transnational threats and the predicted effects of global warming, vulnerability is multifaceted since the transnational threats posed are various and in some cases unconnected. Nonetheless, a useful model for analysing vulnerability in both cases is the Pressure and Release model (PAR) explained by Wisner et al. as follows:

The basis for the PAR idea is that a disaster is the intersection of two opposing forces: those processes generating vulnerability on one side, and the natural hazard event (or sometimes a slowly unfolding natural process) on the other. The image resembles a nutcracker, with increasing pressure on people arising from either side . . . to relieve the pressure, vulnerability has to be reduced.¹¹

Of course, it is also important to note humans adopt coping mechanisms to deal with vulnerabilities and can demonstrate significant resilience.¹²

In recent years, climate change has become part of the international security discourse. In the words of John Ashton, the United Kingdom (UK) Foreign Secretary’s Special Representative for Climate Change, “There is every reason to believe that as the 21st century unfolds, the security story will be bound together with climate change.”¹³ Even the US Department of Defense’s Office of Net Assessment produced a report in 2003 to “imagine the unthinkable” and examine what the national security implications of abrupt climate change related to a rapid collapse of thermohaline conveyance in the North Atlantic might be.¹⁴ Climate change experts are increasingly being drawn into government-sponsored climate-security discussions.

Within this emerging discourse climate change has begun to be discussed in PAR-like terms – human insecurities and/or state vulnerabilities

could be exacerbated by the impacts of climate change which may generate pressures that will elicit response from publics, states, and non-state actors alike. This line of reasoning takes two forms.

First, climate change will reduce state capacities and human security thereby creating failing/failed states and/or environments conducive to the production of non-state threats and conflict. For example, according to Peter Walker, Irwin Rosenberg Professor of Nutrition and Human Security at Tufts University, over the next generation climate change will be the *key factor* in determining human security.¹⁵ A high profile 2007 study by the Center for Naval Analysis argued that projected climate change poses a serious threat to US national security and that it will

act as a threat multiplier for instability in some of the most volatile regions of the world. Projected climate change will seriously exacerbate already marginal living standards in many Asian, African, and Middle Eastern nations, causing widespread political instability and the likelihood of failed states. Weakened and failing governments, with an already thin margin for survival, foster the conditions for internal conflicts, extremism, and movement toward increased authoritarianism and radical ideologies.¹⁶

Smith similarly argues that in Southeast Asia climate change “will increasingly have effects in the realm of counter-terrorism” where, in some countries, “increased poverty and reduced state capacity related to predicted climate change may contribute to the creation or sustenance of functional space which may allow terrorist groups to flourish.”¹⁷

Liotta and Miskel use the analogy of the pattern revealed by composites of satellite imagery to describe the world as divided between areas “in the light” and those within shadows where threats such as, “anarchy, government collapse, ethnic rivalry, cultural grievances, environmental degradation, natural resource depletion, competition for economic resources, drug trafficking, terrorists . . . and the spread of infectious diseases” gestate.¹⁸ Coping with such threats will require taking into account population, rapid spread of infectious diseases, urbanisation, and the impacts of climate change.¹⁹

Climate change may intensify what Naim likewise describes as the growing opposition between these geopolitical “black holes” and “bright spots.” Schwartz and Randall warn that under conditions of abrupt climate change, “the United States and Australia are likely to build defensive fortresses around their countries because they have the resources to achieve self-sufficiency.”²⁰ Thus as governments and societies weaken, the divide between “bright spots” and “black holes” will increase and contribute to what Naim refers to as an emerging paradox: the more fortified and successful the bright spots are at defending themselves, the more lucrative it is

for networks (i.e., non-state criminal threats) operating in black holes to find ways to deliver their products and services inside them.²¹

Without comparable modern examples, it is difficult to assess what global climate change portends for the stability of present state and societal structures. However, this line of reasoning does echo arguments made by scholars who have studied the impact of climatic and environmental changes on past societies and civilisations. Authors as diverse as Mike Davis, Jared Diamond, Brian Fagan, Clive Ponting, and Eugene Linden, for instance, contend that climatic changes and related shifts (such as ENSO events) can negatively impact and undermine the legitimacy and effectiveness of political leaders and societal institutions, and be implicit in grave humanitarian crises, if appropriate responses are not developed.²²

Second, climatic factors are appearing in discussions of the evolution of warfare. This 'new' warfare is sometimes referred to as "irregular warfare", "4th Generation", "Hybrid war", and "war amongst the people". Many of these 'new' types of war-fighting groups contain traditional or pre-state/pre-modern elements²³ and are organised around social networks rather than hierarchal bureaucracies. Such groups may resort to violence, warfare, and raiding under environmental and climatic pressures, as scarcity and uncertainty have particularly profound influence on the intensity and frequency of (such) conflict.²⁴ Some anthropologists have argued that primitive war, i.e., organised conflict between members of stateless societies, has served several functions including regulating demographic variables and economic inequalities.²⁵ A contemporary example can be seen in the endemic warfare amongst Somali pastoralists that has been attributed in part to "desert living conditions, lack of resources, and continual droughts."²⁶ Sea-based raiding and piracy by non-state tribal and ethnic groups has similarly been attributed to the convergence of physical geography, environmental conditions, resource issues, tribal culture, and political-economy.²⁷

Concern over climate and stability and "new" warfare threats has the potential to produce significant and even counterintuitive geopolitical responses. For example, "Phase 0", or conflict prevention and capacity building, has been singled out as especially important in the current National Security Strategy of the United States (NSS) and is becoming an integral part of regional Theater Security Cooperation (TSC) activities and planning.²⁸ The next NSS, currently under development, is likely to specify Phase 0 as a major element of US grand strategy. This represents a significant shift in thinking, often underappreciated outside security circles, in which diplomacy, cooperation, development, and human security are gaining traction versus hard-power national security approaches. If climate change impacts do indeed (or are perceived to) produce instability or "new" warfare threats they will provide additional impetus to Phase 0 type thinking.

That said, much of the emerging climate-security discourse contains elements of early environmental security research which many critics have found to be problematic. Deudney, for example, argues that viewing environmental issues as security concerns tends to emphasise worst-case scenarios as a basis for planning; applies zero-sum “us versus them thinking” to environmental matters; and discounts the roles military activity and warfare play in causing environmental degradation.²⁹ Dalby further argues that securitising environmental issues helps provide justification for “the global managerialist ambitions of some northern planners.”³⁰

Much of the recent discourse on climate change and security has, in fact, occurred at the global level that “produce[s] the truth of a global environment under threat [by] rescaling the debate upward to erase specificity and difference.”³¹ Threat-centred thinking and rhetoric, about dangers emanating from the “dark” can lead to policies that emphasise managing or avoiding chaos. This, by extension, requires fixing places outside the “light,” driving discourse along simplistic neo-Malthusian lines which, in turn, can rationalise interventionist and neo-imperial approaches. Robert Kaplan, for instance, advocates that “Phase 0” type efforts be undertaken along what amount to be nineteenth-century British lines.³² In his influential book, *The Pentagon’s New Map*, Thomas Barnett argued that the US needs to help “integrate the gap” (e.g., “dark spots”) through an imperial-like combination of traditional military force and the development and employment of a “system administration force.”³³

On the other hand Liotta and Miskell caution that such logic should not be used to justify intervention, but rather wider multi-actor, cooperative approaches that address both threat-based and vulnerability-based challenges.³⁴ Similarly, Naim emphasises that the relationship between “bright spots” and “black holes” is two-way. Diamond, in his study of past environment-societal collapses, also reminds us that there are always other contributing factors of which climate change can be one, and that it is not just environmental and demographic pressures that matter, but political and societal responses as well.³⁵ The climate-security debate should not just be dismissed as environmental determinism or an excuse for neo-imperial interventions, and we advocate neither approach.³⁶ Better conceptual tools are needed if this debate and ensuing policies are going to significantly mature in sophistication.

Since the PAR approach focuses on the interplay between pressures, responses, vulnerabilities, and scale, it enables climate-security linkages to be looked at from multiple perspectives and scales rather than via generalised and unidirectional processes. Threats and vulnerabilities, external and internal factors, and societal choices can all be considered. The application of a PAR informed approach to climate-security analyses may thus help avoid some of the problems that mar the environmental security literature.

In this paper, we look at how predicted climate impacts could influence vulnerability to non-state security threats at the regional (and in some cases national or local) scale as a ‘next step’ in the emerging climate-security debate. The paper considers how pressures generated by largely outside activities (e.g., carbon emissions that drive climate change) intersect with regional and local factors in order to produce or increase vulnerability. Extrapolating from regional climate scenarios to predict future security outcomes is nevertheless problematic because of the complexity of interactions involved, contextual differences, the imprecision of climate predictions, and the effects of scale. Given these caveats, we still hope to help advance the climate-security debate beyond global-scale generalisation and to, hopefully, point out avenues for extending research to other scales of analysis.

Southeast Asia is an ideal case study for this approach. The region has a high level of non-state transnational security vulnerability and activity.³⁷ Non-state threats in the region emanate from complex political-ecological contexts in which responses to environmental pressures play a part. These threats have “tangled causes”³⁸ and “environmental factors play a significant – albeit complex – role in shaping . . . regional security.”³⁹ Many groups engaged in illicit transnational activities also fit the mold of ‘new’ irregular war-fighting organisations. Consequently, there is an existing context and a set of interacting variables that climate change can be examined against. By looking at predicted regional vulnerabilities to climate change, it is possible to identify likely pathways by which climate change may impact regional vulnerability to non-state and transnational threats.

NON-STATE SECURITY THREATS AND CLIMATE CHANGE VULNERABILITY IN SOUTHEAST ASIA

Southeast Asia is particularly vulnerable to non-state transnational threats for a number of reasons: crossroads location for trade, transport, and finance; rapid economic growth coupled with intense poverty and inequalities; severe environmental degradation; the historic importance and occurrence of low-intensity conflict, organised crime and piracy; ethnic diversity; and its location along major natural hazard belts. Furthermore, these threats are clearly increasing and intensifying in potential and scope and have intruded onto national and regional policy agendas.⁴⁰ Security analysts from Southeast Asia surveyed by the East-West Center in 2007 cited vulnerability to natural disasters, disease pandemics, serious economic downturns, and social instability as their top “non-traditional” security concerns and identified “competition for scarce [natural] resources” as the top short and long-term regional security threat.⁴¹ Terrorism and violent extremism comprised two of the other top five short and long term concerns.⁴²

Climate change is likely to create both immediate and transitional conditions in Southeast Asia that will increase the potential for transnational security threats. The 2007 IPCC report expresses “high confidence that multiple stresses in Asia will be compounded further due to climate change.”⁴³ The IPCC also identifies several Southeast Asian Megadeltas as climate change vulnerability hotspots: Mekong (extreme), Chao Phraya and Mahakam (medium). The previous IPCC report also predicts that

agricultural productivity in Asia is likely to suffer severe losses because of high temperature, severe drought, flood conditions, and soil degradation; food security of many developing countries in the region would be under tremendous threat. There are likely to be large-scale changes in productivity of warm water and cool water fish in many countries in Asia. Sea-level rise would cause large-scale inundation along the vast Asian coastline and recession of flat sandy beaches. The ecological security of mangroves and coral reefs around Asia would be put at risk. The monsoons in tropical Asia could become more variable if El Niño–Southern Oscillation (ENSO) events become stronger and more frequent in a warmer atmosphere. Countries in temperate and tropical Asia are likely to have increased exposure to extreme events, including forest die-back and increased fire risk, typhoons and tropical storms, floods and landslide, and severe vector-borne diseases.⁴⁴

Part of the problem in predicting the effects of climate changes in Southeast Asia is that by running different coupled climate models with different emissions scenarios, the results for Southeast Asia vary.⁴⁵ This is because some scenarios include higher emissions of aerosols whose cooling effect partially moderates the effects of greenhouse warming. In most of the model simulations, warming effects over Southeast Asia are less than in most other regions of the world, although under all simulations warming does occur. The range of change varies between models from a minimum of 1.05 K increases by the 2040s to a maximum of 4.12 K increase by the 2080s. Nonetheless, the variance between different prediction scenarios for precipitation is generally less than for many other world regions. Under all emissions scenarios, summer precipitation increases in Southeast Asia, though this effect is slightly lessened in some scenarios and dramatically increased by the 2080s under others. In all models, winter precipitation totals are forecast to decline more than any other world region, but in some models, these decreases are lessened. Overall, the projections suggest increased warming and an enhanced monsoonal effect, with more summer precipitation but significantly less winter precipitation.

Given these predictions, past changes in precipitation regimes due to ENSO events provide glimpses of how climate change may impact Southeast Asian economies and societies. The economic costs of droughts to Indonesia and the Philippines related to the 1982–1983 El Niño are

estimated to have been \$500 million and \$450 million respectively.⁴⁶ The effects of the 1998 El Nino also demonstrate the range of impacts that climatic shifts can produce. In 1998, for instance, water supplies in Manila decreased by 60%, cocoa production was reduced in Malaysia by 12%, rice production was cut in Indonesia leading to higher food prices and famine in some areas,⁴⁷ and there were billions in economic losses. The combined impacts of El Nino effects and the 1997 Asian economic crisis on Indonesia led to a devaluation of the rupiah by 84%, pushed nearly 60 million people into poverty and led to high food prices that triggered riots and mass demonstrations,⁴⁸ and helped bring down the Suharto government.

If the pressures of climate change cannot be met by states, favourable conditions for non-state social networks may be produced. Collaborative networks often develop in response to complex problems that are too big to be handled by single organisations.⁴⁹ Recent studies suggest that adaptive strategies to climatic risks by local-level social networks are already increasing in Vietnamese coastal areas and may become more prevalent amongst marginalised communities.⁵⁰ Although in this case the networks are not engaged in illicit activities, it does suggest that climate change in Southeast Asia could precipitate or accelerate network formation of all kinds, including ones typical of the emerging 'new' warfare threats discussed earlier.

The relationship between climate change and transnational security threats in Southeast Asia is not unidirectional and there is the potential that existing transnational threats could distract governments from taking adequate measures to confront climate change, potentially setting off negative feedback cycles. The 2007 IPCC report warns that countries facing other serious issues such as domestic unrest, disease epidemics, terrorism, etc. may be distracted from dealing with the dangers of climate change and the need to implement adaptation measures.⁵¹

In the remainder of the paper we examine potential transnational-climate vulnerabilities in more detail by looking at three particular threat areas: human trafficking, transnational terrorism, and infectious disease.

Human Trafficking

Southeast Asia is a regional hub, source, and destination area for trafficking in persons. The scale of the traffic is unknown, estimates vary from 200,000 to 500,000 persons trafficked across national borders each year. Human trafficking in the region occurs through sub-state and transnational networks within a political-ecological and demographic context that climate change may affect profoundly. The trade is both bottom ("dark") and top ("light") driven as socioeconomic "pushes" in marginalised areas converge with the "pulls" of economic opportunity and demand for cheap labour and sexual services in developed countries and

areas. Because human trafficking is “deeply entrenched and interwoven with the world’s ever more complex migration flows”⁵² the nature of climate change impacts will depend on the relationship between regional impacts and general patterns of migration and mobility. Asia has witnessed an explosion in population mobility over the last two decades⁵³ and according to a joint UN and International Labour Organization Study (ILO), “the majority of migrants in the Greater Mekong Subregion (Thailand, Laos, Cambodia, Vietnam, Burma) are irregular in the sense that they may have entered a country illegally or, if they have entered legally, have chosen to stay on after the expiration of their visas.”⁵⁴ Most population movement in the region is rural to urban and rooted in the region’s uneven pattern of development.⁵⁵ This migration context is conducive to both trafficking in persons and the spread of HIV/AIDS. Hugo identifies seven factors related to HIV/AIDS diffusion, which also demonstrate how the context of migration in the region is favourable to human trafficking for the sex trade:⁵⁶

- Migrant workers are drawn mainly from adult males
- Many are separated from spouses/parents for up to two years
- They are particularly directed to places where the commercial sex industry is well established
- Migrants can earn relatively large amounts of cash
- They are often far removed from traditional behavioural constraints
- Many commercial sex workers are themselves circular migrants
- Women migrant workers are generally in vulnerable situations
- Commercial sex workers are often disempowered

Regional mobility in Southeast Asia “is overwhelmingly controlled by close friendship and kin networks that evolve and intensify over time.”⁵⁷ This general pattern is replicated in the conduct of human trafficking which occurs through local social networks in which people from the equivalent of Naim’s “black holes” (e.g., rural areas) are moved towards “bright spots” (e.g., urban centres). A regional process by which non-state “dark” networks form in response to socioeconomic-ecological pressures and opportunities thus already exists. In Laos, for example, “much of the [human trafficking] trade consists of informal networks, often family members, friends or fellow villagers who have gone abroad to work before and have maintained connections.”⁵⁸ After crossing the Thai border, trafficked persons are then passed on to more structured and well-organised criminal networks.⁵⁹

Climate change is likely to intensify the existing socioeconomic and ecological pressures that are feeding regional mobility and human trafficking. Vulnerability will increase directly as populations are displaced, and indirectly by undermining human security in the source areas of migrants.

Vulnerability will further increase as sub-state networks attempt to respond to both the direct and indirect impacts of climate change.

The IPCC predicts that, "Climate related disruptions of human populations and consequent migrations can be expected over the coming decades . . . circular migration patterns, such as those punctuated by shocks of migrants following extreme weather events could be expected."⁶⁰ According to the IPCC, coastal areas in Southeast Asia are already vulnerable to sea-level rise from both geological processes and anthropogenic manipulation. However, global warming is projected to produce an increase in sea level of three to four times over present rates. Estimates of the regional impacts of climate change generally rank Southeast Asia as being near the top of the list of regions most threatened by flooding due to sea-level rise.⁶¹ The potential impacts of this accelerated sea-level rise include inundation of low-lying coastal areas, shoreline retreat, water table changes, soil salinisation and acidification. In addition, flooding from high storm surges would reach further inland.⁶²

In Southeast Asia, the Irrawaddy, Chao Phraya, Mekong, and Song Hong are among the key low-lying river deltas "that are most vulnerable to sea-level rise."⁶³ A 1-m rise in sea level could lead to land loss in Indonesia, Malaysia, and Vietnam of nearly 34,000 km², 7,000 km², and 40,000 km² respectively, affecting over 19 million people.⁶⁴ Without adequate adaptation and mitigation, sea-level rise is likely to have a severe adverse economic impact on agriculture through the mechanisms of the direct loss of crop land, as well as soil salinisation, drought, and flooding; and would also affect infrastructure and tourism.

Natural disasters produced and exacerbated by climate change will increase vulnerability by physically displacing people and by creating disorder that traffickers and criminals can exploit. Events following the Indonesian tsunami provide a glimpse of how climate and disaster-related shocks can exacerbate existing vulnerabilities. The vulnerability of women and children from Aceh to trafficking reflects wider national and regional vulnerability patterns, particularly in poor, politically and economically marginal areas. According to the Center for Indonesian Migrant Workers, most of Indonesia's female sex trafficking victims come from poor communities in Java, West Nusa Tenggara, Sulawesi, and Sumatra.⁶⁵ In 2003 the Indonesian government estimated that around a million of the country's women and children had been trafficked. The lure of cash and educational opportunities in developed countries also acts as a "pull" factor that entices women or their families into human trafficking chains.⁶⁶ In many respects these factors were compounded in Aceh due to the ongoing conflict. Prior to the tsunami, Aceh Province was known as one of Indonesia's main trafficking nodes where women and girls affected by the conflict and/or poverty were forced into prostitution and trafficked to brothels in Banda Aceh and Mualaboh.⁶⁷ Neighbouring North Sumatra Province is also a known sending,

transit and receiving area for trafficking in sex and domestic workers, child labour, and illegal adoption.⁶⁸

In the tsunami's early aftermath officials estimated 35,000 children in Aceh were orphaned, and within days reports surfaced of human trafficking rings attempting to prey upon the thousands of orphaned and unregistered children. UNICEF confirmed its first case of child trafficking by 7 January.⁶⁹ According to National Police General Suyitno Landung, trafficking rings were using three scams: posing as NGO representatives, claiming to be family members, and pretending to be foster parents.⁷⁰

Fortunately, in this case an effective and rapid international and Indonesian government response was able to curtail opportunistic trafficking. However, the Asian tsunami was exceptional in terms of media attention, donations of foreign aid, and cooperation. Such responses cannot be expected for all disasters and particularly for the more slowly and subtly produced pressures predicted from climate change.

Piracy

Southeast Asia is well known as a global piracy hotspot. The region's narrow sea-lanes and marine geography have historically provided an opportunity for piracy that continues today, as, according to Lloyds of London, 70,000 vessels carrying a third of global crude oil shipments and a fifth of all waterborne trade pass through the region's sea lanes each year.⁷¹ Climate change is likely to increase regional vulnerability to piracy in two ways. First, negative impacts on coastal fisheries will have an adverse impact on seafaring groups that have traditionally resorted to piracy under conditions of duress. Second, adverse economic impacts may increase the pool of potential pirate recruits while simultaneously weakening state capacity to conduct anti-piracy operations.

Piracy in Southeast Asia also has long had a distinct cultural and political ecology in which indigenous war-fighting traditions, sub-state networks, and environmental changes have intersected. Piracy in the region has provided a venue in which indigenous networks can connect into wider regional and global social, economic, and criminal networks. From at least the nineteenth century, pirates in Southeast Asia have been, "dependent upon support of local population, receivers, moneylenders and people in the 'upper world' . . . support has to be spread out over an extended area . . . ethnicity often forms the glue with which to cement the contacts over this range together."⁷²

Analysts generally recognise three types of pirates: small criminals, organised criminals, and militant/separatists.⁷³ "Small-timers" often resort to piracy in response to economic or environmental pressures (e.g., poor fish catches). Indeed, the majority of pirate attacks in the region involve impoverished fishermen boarding vessels to steal money and other valuables.⁷⁴ Research by

Vagg, for instance, demonstrated that a 1990–1992 piracy outbreak in the Riau Archipelago was produced by the combination of existing traditions and new patterns of raiding, opportunity, and dislocation caused by economic growth which propelled both locals and migrants into piracy. Similarly most of the Indonesian pirates interviewed for a recent *National Geographic* article were poor fishermen or unemployed labour migrants.⁷⁵

Piracy and smuggling have traditionally provided alternative means of income generation to fishing. They have, in effect, served as a response to environmental and economic pressures upon fisheries. Piracy has been both directed against fishermen and committed by them – with “traders and fishermen . . . not averse to robbing their colleagues” as the opportunity presented.⁷⁶ “Around Malaysia and Indonesia, for example there is a long history of raiding, robbing, smuggling, and extortion based around fishing communities in the area.”⁷⁷ This pattern has persisted into modern times. Piracy surged in the 1950s off the coast of Malaysia when fishermen suffered from a temporary decline in fish catches.⁷⁸ Into the late 1980s in the southern Philippines, traditional fishing communities still played both victim and prey.⁷⁹ Small-arms trafficking provides an additional option for struggling fishermen, who, in Southeast Asian waters, can earn around US\$1,000 for an illegal arms run.⁸⁰ For example in May, 2001, Thai police seized an arms shipment from Burmese insurgent groups to Achenese rebels via Thai fishing boats plying Indonesia waters in search of better fish catches.⁸¹ As Southeast Asian fisheries decline, it is no coincidence that “opportunistic fishermen”⁸² are among the key groups participating in piracy and sea robbery. In Indonesia, for instance, damage to around 80% of the country’s coral reefs and pressure from commercial trawlers and foreign poachers has reduced fish stocks, forcing fishermen and sailors into piracy.⁸³

In Southeast Asia the lines between piracy, militancy and organised criminality are not always clear. These are all “phenomena [that] only occur in weak or failed states”⁸⁴ which are likely to suffer further reductions in capacity under climate change. Perhaps the most vivid example of the convergence of traditional networks, “new” warfare, piracy, weak states, and insurgency is found in the southern Philippines with the criminal and Islamist extremist Abu Sayaf Group (ASG). The ASG has engaged in terrorism, piracy, kidnapping, and banditry and has established linkages with other terrorist groups in Southeast Asia such as Al-Qaeda and Jemaah Islamiya (JI).⁸⁵ Most ASG members and supporters belong to Muslim families adhering to centuries-old seafaring traditions.⁸⁶ In particular, the Tausug minority figure prominently among ASG membership.⁸⁷ The Tausug are an ethnolinguistic group of subsistence farmers and fishermen centred upon the Sulu Sea who have a history of piracy predating the Spanish conquest.⁸⁸

Should climate change contribute to overall declines in Southeast Asian fish stocks, there is a strong probability that incidences of piracy will increase. This is still an open question given that some studies indicate that

some shallow-water fisheries in Southeast Asia may experience increased productivity even as deeper water fisheries decline.⁸⁹ Nonetheless, while definitive statements on the specific impacts of climate change on Southeast Asian fisheries cannot be made, given the current situation and trends towards overexploitation, indicators suggest future impacts will be adverse. The ultimate impact (positive or negative) of global warming on the region's fisheries will depend upon how complex marine food chains are impacted by the deterioration of key ecosystems such as mangroves and coral reefs as well as other factors such as sea-level rise, changes in water temperature and mixing layers, and shifts in ocean currents. For example, increasing frequency of El Niño events (likely in a warmer atmosphere) could lead to measurable declines in plankton biomass and fish larvae abundance in Southeast Asian coastal waters, disrupting lower levels of the food chain with subsequent negative impacts on fisheries in Asia.⁹⁰ Predicted increases in sea-surface temperatures for climate models for the region suggest that coral reefs in Indonesia may be ultimately threatened,⁹¹ greatly affecting fishing stocks in coastal waters. In addition, predicted droughts or changes in ENSO cycles may cause more extreme wildfire events such as the one which occurred in 1997, which has been partially implicated in coral reef asphyxiation.⁹²

If climate change takes a toll on regional economies and state capacities decrease, current trends and historic patterns suggest that incentives, opportunity, and vulnerability to piracy will increase. An increase in under- or unemployed males will increase the pool of potential pirates. Recent drops in pirate activity have been attributed to increased patrolling and some legal reforms,⁹³ but little has been done to address piracy's underlying socioeconomic drivers which may worsen under predicted climate change scenarios.

Current anti-piracy efforts are already under-resourced.⁹⁴ The Indonesian navy, for instance, can only keep about one fourth of its vessels at sea and needs about three times as many vessels to adequately cover areas vulnerable to piracy, human trafficking, and smuggling⁹⁵ and it is uncertain whether regional states have the funding to sustain current anti-piracy operations.⁹⁶ Economic losses incurred by climate change therefore could further constrain both local resources and international aid for anti-piracy operations.

Anti-piracy capacity could further be undermined by potential climate change mitigation measures. International actions, such as carbon taxes, designed to prevent further climate change or mitigate its effects could contribute to rising fuel prices. This in turn could limit anti-piracy/trafficking enforcement measures. Rising fuel costs have already caused Indonesia and the Philippines to cut back patrols. Thailand has declined to join air patrols in the Malacca Straits because, as Thai General Ruengroj Mahasaranond explained, "It is not worth sending our ships and planes there because the cost will be extraordinary."⁹⁷

Terrorism

Most non-state terrorism in Southeast Asia today is associated with ethnic, separatist, and other internal conflicts, many of which have been exacerbated by an interrelated cycle of uneven development, population pressure, environmental degradation, and unsustainable and inequitable resource extraction.⁹⁸ Although internal conflict and terrorism are not new to Southeast Asia, ethnic, religious and communal conflicts have resurged or intensified.⁹⁹ Meanwhile, transnational groups such as Al-Qaeda and JI have been able to infiltrate and/or cooperate with separatist and insurgent movements in Mindanao, Indonesia, and Southern Thailand, to varying and fluctuating degrees. Climate change has the potential to act as an “overarching destabilizing element that fosters the enabling environment for non-state actor terrorist groups” by contributing to reduced state capacity, state failure, economic troubles, and other problems.¹⁰⁰

According to an extensive World Bank study, failure of economic development is a key contributing cause of “civil wars” (e.g., internal conflicts)¹⁰¹ such as the ones in Southeast Asia that spawn incidents of terrorism. The four categories of highest risk are: middle-income countries facing sudden economic downturns, declining or stagnating low-income countries, countries currently with conflicts, and countries in the first ten years after a conflict.¹⁰² In addition to terrorism, such conflicts have produced other transnational spillovers including increased incidence of malaria, refugee and migrant movements, and drug trafficking.¹⁰³ With the exception of Singapore, every country in Southeast Asia fits or will fit into one of these World Bank categories for the next several decades as the economic effects of climate change exert themselves. Consequently, climatic changes could prolong or deepen the economic drivers and impacts of internal conflicts in the region along with related terrorism and other transnational spillover effects.

Indonesia is already considered a weak state, for a variety of social, economic and political reasons, and climate change has the potential to further weaken and destabilise the country.¹⁰⁴ Its experiences in the late 1990s provide insights into how state weakness, climate, and terrorism can intersect. Existing socioeconomic disparities were intensified by the 1998 financial crisis and helped make Southeast Asia fertile ground for the spread of extremist Islamist ideologies and groups such as al-Qaeda and JI.¹⁰⁵ The impacts of the financial crisis were themselves intensified by the effects of drought related to the 1998 ENSO event.

A poor crop led to rice price increases of 300% by March 1998¹⁰⁶ while fires set by plantation companies raged out of control in abnormally dry conditions, producing between \$2 and \$3.2 billion in economic damage.¹⁰⁷ High food and fuel prices plus cuts in subsidies triggered violent riots throughout the country and ultimately helped precipitate President Soeharto's resignation. This created a power vacuum in which extremists such

Abdullah Sungkar and Abu Bakar Ba'asyir, leaders of Jemaah Islamiyah were able to return from exile and revamp their organisation's growth and operations in the peripheries of the region.¹⁰⁸

The Philippines is similarly vulnerable to the predicted effects of climate change. Mindanao, the Philippine's poorest region and the centre of the Moro insurgency and JI and ASG operations, is particularly vulnerable to climatic fluctuations. ENSO conditions in 1998 and 1999, for instance caused an 8–10% drop in agricultural exports.¹⁰⁹ Manila, however, has staked its long-term hopes for defeating insurgency and terrorism in the south on an economic development strategy¹¹⁰ which could very well be slowed or reversed due to climate change. Communist insurgents such as the New People's Army may also gain from economic dislocation produced or intensified by climate change.¹¹¹

Disaster relief and response has become a field for ideological competition between transnational terrorist groups and their opponents. Thus in addition to contributing to social and economic pressures, climate-related disasters are likely to create additional operational spaces for terrorist groups. On the other hand, media interviews with earthquake survivors in parts of Pakistan suggest that American and western assistance may be improving local images of the US and other Western countries,¹¹² as it did following the tsunami in Indonesia. However, al-Qaeda and like-minded groups seem determined not to let the US and the international community get a leg up on them again. After the 2005 Pakistan-India earthquake, charities associated with militant groups responded to the disaster much as they had earlier in Indonesia. Furthermore, unlike the case of the tsunami, unfulfilled international aid pledges have meant that relief operations are still largely under-funded¹¹³ thus enabling militants to better compete for influence against the international community. This may be the result of donor fatigue which would be likely to be considerably greater in scenarios where climate change leads to some of the more dire predictions offered by the IPCC.

If future disasters or environmental threats are proven or perceived to be related to climate change this could also increase resentment against developed countries for their role in producing GHG emissions. The US is especially vulnerable in this respect due to its intransigence on Kyoto (which has been used in terrorist propaganda), and the ineffectiveness of its public diplomacy. According to Larry Wilkerson, former US State Department Chief of Staff,

If you're unilaterally declaring Kyoto dead, if you're declaring the Geneva Convention is not operative, if you're doing a host of things that the world doesn't agree with you . . . then you've got to pay the consequences, and the consequences are your public diplomacy people have a really tough job.¹¹⁴

Indeed this is something not lost on Osama Bin Ladin who remarked in his 2002 letter to the American people,

You have destroyed nature with your industrial waste and gases more than any other nation in history. Despite this, you refuse to sign the Kyoto agreement so that you can secure the profit of your greedy companies and industries.¹¹⁵

In his 2007 address to the American people, Bin Ladin expanded upon this theme:

In fact, the life of all mankind is in danger because of the global warming, which is largely due to emissions of the factories of the major companies; nonetheless, the representatives of those companies in the White House insist on not observing the Kyoto Accord, notwithstanding . . . the death and displacement of millions of people as a result.¹¹⁶

The impacts of climate change can thus be expected to increase regional vulnerability to terrorism by contributing to local and national instability and disenchantments that help produce terrorism, as well as by creating both real physical (post-disaster) and rhetorical spaces of competition between transnational terrorists groups and states.

Infectious Disease

Amongst all transnational threats, the potential for a nexus between infectious disease and climate change is the most studied and predicted. There is also a well-developed literature on infectious disease as an emerging non-state and transnational security threat.¹¹⁷ Three types of relationships generally appear in this literature. First, disease burdens may erode the effectiveness of military and security forces. Second, the impacts of disease can destabilise political and socioeconomic systems through the corrosive effects of lost labour, broken families, costs of care, disruption of trade, and, most dramatically, by producing large-scale casualties (such as a virulent pandemic would produce). Third, diseases, such as HIV/AIDS can compound or intersect with other problems such as drug and human trafficking.

It is well established that climatic and related ecological factors influence the distribution of anthropod transmitted diseases as well as other infectious disease hazards.¹¹⁸ Presently, climatic changes are “improving the environment for some diseases and disease vectors.”¹¹⁹ For example, climate influences malaria both directly and indirectly as it affects the distribution and reproduction of mosquito species (e.g., through vegetation, breeding sites, precipitation, temperature, etc.).

Southeast Asia is already highly vulnerable to infectious disease threats. The prevalence of infectious diseases in Southeast Asia is almost as high as in Sub-Saharan Africa and the health care delivery system is vulnerable to economic downturns.¹²⁰ In 1998, for example, there were 19.5 million new malaria infections in the wider Asia and Pacific region, many of them drug-resistant, and 100,000 related deaths. Southeast Asia is a hotspot for emerging infectious disease with several originating from the region during the past ten years including “avian flu (H5N1) in Hong-Kong (1997), Nipah virus encephalitis in Malaysia (1998) and the SARS outbreak from Southern China (2002).”¹²¹

Despite the region’s rapid economic growth and development, water-related diseases remain a persistent problem in Southeast Asia. Diarrhoeal diseases still contribute heavily to mortality and morbidity in all age groups in poorer parts of the region, and in Indonesia, diarrhea is the third leading cause of death overall and the main cause of infant mortality.¹²² Access to high-quality health care also varies, ranging from less than 40 percent of the population in Burma and Cambodia to 50 to 70 percent in Thailand, Malaysia, and the Philippines.¹²³

Regional vulnerability is likely to grow under predicted climate change scenarios. In Southeast Asia new evidence shows that the frequency and occurrence of climate-related diseases have already increased with rising temperatures and increased rainfall variability.¹²⁴ Furthermore, Global Circulation Models (GCMs) used to estimate potential malaria distribution under various climate-change scenarios for Southeast Asia indicate that malaria may expand into new areas such as parts of Sumatra and Irian Jaya (West Papua). Increases in seasonal malaria are also likely to produce epidemics, with high initial fatality rates in unprepared or non-immune populations.¹²⁵ An increase of 3–4°C in average temperature, as is forecast by 2080 in many projections, may also double the reproduction rate of the dengue virus.¹²⁶ One Indonesian model indicates that incidences of dengue in the country may increase threefold.¹²⁷

Water-related infectious diseases, which already account for the majority of epidemic emergencies in Southeast Asia are expected to increase as higher temperatures and humidity combine with projected increases in population, urbanisation, and declining water quality.¹²⁸ Warmer sea-surface temperatures along the coastlines of South and South-east Asia may support higher phytoplankton blooms creating habitats for infectious bacteria such as cholera.¹²⁹ Waterborne diseases, such as cholera and various diarrhoeal diseases due to *Giardia*, *Salmonella*, and *Cryptosporidium* might also become more common through contaminated water supplies.¹³⁰

Increases in the regional disease burden will stress economies and basic human security. The IPCC reports that increased incidence of malaria associated with climate change may cause significant economic impacts through lost labour and the costs of drugs and treatments.¹³¹

Recent regional disease events, such as the SARS outbreak, hint at the potential economic impact that future infectious disease outbreaks could have. In the wake of the SARS outbreak, international travel to affected areas fell by 50–70% and hotel occupancy by more than 60%. Some businesses and large factories had to halt operations once cases appeared among workers.¹³² Extrapolating from the SARS experience, an Asia Development Bank team examined the potential economic consequences of various flu pandemic scenarios for Asia and concluded that even a mild outbreak would “likely slow or halt economic growth in Asia and lead to a significant reduction in trade, particularly of services. In the long run, potential economic growth will be lower and poverty will increase.”¹³³ This in turn could exacerbate the conditions which help drive other transnational threats.

CONCLUSION

At the regional scale, climate change is likely to produce effects that increase Southeast Asia’s vulnerability to non-state and transnational security threats in two primary ways. First, climate change is likely to pressure Southeast Asian livelihood and social systems while straining state and civil society capacity and exacerbating “bright spot/dark hole” divides locally and globally, while widening the enabling environment in which non-state security threats gestate and thrive. This in turn will intensify existing vulnerabilities to non-state security threats; produce new or additional incentives and opportunities for criminals, terrorists, and diseases; and raise the overall level of vulnerability and risk to both human and state security.

Second, predicted climate change impacts are likely to strengthen or help revive the propensity of sub-state networks that have traditionally responded to environmental change and pressure via violence, crime, smuggling, banditry, trafficking, terrorism, and other such activities. This will contribute to the evolution, expansion, and growth of “new” war-fighting groups while raising overall vulnerability to non-state threats from local to global scales.

These conclusions however must be caveated by the recognition that regional scale threat and vulnerability assessments generally do not consider the effects of resilience at lower levels of scale. A rise in general vulnerability also does not mean that all actors will respond in the same way. Thus specific positive responses and adaptations may be missed or underestimated by regional scale assessments.

As the impacts of climate change manifest themselves and perceptions of *transnational* vulnerability and threat increase, climate change will grow in importance in security discourse and policy making at the global,

regional, national, and local scales. In broad geopolitical terms, this could affect Southeast Asia in a number of ways:

1. As pressure mounts on state, economic, and social systems, limited resources will be captured by national core areas further increasing the marginalisation and vulnerability of peripheral areas. Since peripheral regions (isolated island and coastal areas, highlands, etc.) are already key source areas of drug crops, pirates, insurgents (and in some cases related terrorist organisations), illegal migrants and trafficked persons in South-east Asia they may then be perceived as even greater “*threats*”. This could then lead to threat-centric responses such as attempts to isolate perceived “dark spots” or “fix” them through military intervention by central governments or outside powers.
2. The *vulnerability* of peripheral areas comes to be seen as a potential problem for states as a whole (or even the region or international community) thus spurring “soft” measures aimed at vulnerability reduction and mitigation in marginalised areas.

How governments, international organisations, and societies respond to the security dimensions of climate change will be in large part a function of intellectual and policy discourse. As mentioned in the introduction, the outlines of this discourse are already emerging. Whether this emerging debate helps produce conventional state-oriented, hard-power, and threat-centric responses; or cooperative, soft-power, and vulnerability-centric ones remains unclear. More detailed and deeper analysis is needed if simplistic neo-Malthusian explanations and equally simplistic chaos management or pre-emption policies are to be avoided in lieu of more nuanced and sophisticated ones. This is an area where geographers have the potential to make significant contributions.

More work is needed to bridge the gap between traditional political-ecology research and the discourse of transnational security/irregular warfare. This can be done by applying geographic and political-ecology approaches already used for the study of phenomena such as human trafficking, migration, drug crop production, and infectious disease. However this must be applied specifically to and within contexts of predicted climate change and transnational security.

The rich tradition in political-ecology and geography of conducting research at multiple scales (especially local and sub-national) must also be applied to climate-transnational security analysis. The richness and granularity of multi-scalar analysis both presumes and reveals context and nuance, highlighting rather than erasing specificity and difference. The political ecology literature clearly demonstrates that the complexities of the global economy must be factored into local vulnerabilities and that care is needed to ensure that local specifics are appropriately considered.¹³⁴

Because political-ecologists and geographers are concerned with the relationships between political economy and mechanisms of access, resources, and struggle,¹³⁵ they are able to bring a more inclusive perspective to climate-security issues than international relations specialists. It is essential to recognise that regional and local vulnerabilities to climate change are largely produced by external consumption and resource use patterns. As both Naim and Dalby point out, it is the relationships between different parts of the world that ultimately matter, not whether they are in the “light” or “dark.”¹³⁶ Unless this type of thinking is factored into climate-security analysis, it becomes all too easy to blame the vulnerable and pursue one-sided policy equations. Injecting specificity, difference, texture, and nuance into climate-security discourse is needed to open the door for richer, more sophisticated, and inclusive policy debates and responses.

ACKNOWLEDGEMENTS

The authors wish to thank Phuong Kim Pham for research assistance, and two anonymous reviewers for their comments.

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