

# BRIEFER

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## Climate Change and Vietnamese Fisheries: Opportunities for Conflict Prevention

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### Introduction

The fishing sector is vital to Vietnamese prosperity and important to all nations bordering the South China Sea. China, Thailand and Vietnam, accounted for 80 percent of world fishery production in 2008 and 50 percent of fishery export value.<sup>i</sup> In 2009, Vietnamese fisheries accounted for 6 percent of gross domestic profit. In 2010, 7.4 percent of economically active people were engaged in fishing, the second highest percentage worldwide after Fiji.<sup>ii</sup> Vietnam rose to the position of the fifth largest exporter of fish and related products between 1998 and 2008 when the catch was valued at nearly US \$5 billion. A flourishing aquaculture industry rather than increases in offshore capture fisheries explains much of its rise. In 2007, aquaculture production surpassed capture fisheries.<sup>iii</sup> Pangasius, a catfish species and marine and freshwater prawns comprise the majority of exports in this sector.<sup>iv</sup>

Vietnam's capture fishing grounds are vast. The UN Convention on the Law of the Sea (UNCLOS) grants nations the right to declare an Exclusive Economic Zone (EEZ) of 200 nautical miles from an established coastal baseline over which it has exploitation rights to all natural resources.<sup>v</sup> Vietnam's EEZ encompasses more than 1 million square miles, including 3,000 islands and 2000 species of fish: one hundred and thirty have high economic value.<sup>vi</sup>

Eighty percent of the world's fish stocks are overfished or at maximum capacity.<sup>vii</sup> This situation is especially evident in the South China Sea where coastal fishing grounds have been depleted to 5-30 percent of their unexploited stocks.<sup>viii</sup> Consistent with this trend, unsustainable fishing practices have been confirmed in local areas within the Vietnamese EEZ. A large amount of the over withdrawal can be attributed to the incursion of foreign fishing vessels. Declining yields have been exacerbated by environmental destruction of

many kinds including that associated with tsunamis and cyclones.<sup>ix</sup> These stressors limit Vietnam's options for maintaining food security and could increase the likelihood of international clashes over fishing rights.

### **Climate Change: Physical Impacts**

Vietnam is one of the developing countries most exposed to climate change by nature of its geography. Twenty four percent of Vietnam's population lives in coastal districts.<sup>x</sup> Storms and related damage from floods and tidal surges are among the most significant impacts.<sup>xi</sup> Coastal mangroves, salt marshes and coral reefs – critical to breeding marine life – are all endangered. Warming ocean temperatures associated with climate change will also change migratory patterns of fish in the open sea.<sup>xii</sup> Fish stock scarcity caused by altered migration patterns is compounded by over-fishing.

Worldwide, climate change-driven changes in the distribution of sea life are expected in every marine ecosystem but the exact magnitude and extent of effects are largely unknown due to the immaturity of scientific analytical approaches.<sup>xiii</sup> However, evidence from a meta-analysis of studies on range shifts of aquatic species published in 2011 in the *Journal Science* by I. Ching et al., has significant implications for Vietnam. Northern migration of fish stocks into waters claimed by China is the most concerning trend.<sup>xiv</sup> It finds that as ocean temperatures near the equator rise, species in the South China Sea are migrating to colder waters in higher latitudes at a rate of approximately 17 kilometers per decade.<sup>xv</sup> A newer study from the journal *Nature* confirms these results.<sup>xvi</sup> More than 89% of 29,000 observational data series from 75 studies demonstrate the consistency of worldwide migratory patterns toward the north or south poles in response to warming temperatures.<sup>xvii</sup>

Worldwide, climate change-driven changes in the distribution of sea life are expected in every marine ecosystem.<sup>xviii</sup> New scientific analytical approaches are improving our understanding of the magnitude and extent of these effects. A meta-analysis of studies on range shifts of ocean aquatic species in the *Journal Science* by I. Ching et al finds that more than 89% of 29,000 observational data series from 75 studies demonstrate the consistency of worldwide fish migratory patterns toward the north or south poles in response to warming temperatures.<sup>xix</sup> A 2013 study from the journal *Nature* confirms these results.<sup>xx</sup> New research in the journal *Science* in June 2015, amplifies these findings by demonstrating that lower oxygen caused by warming is putting too much physiological strain on marine animals living closest to the equator also driving species toward the poles from tropical ocean waters. As temperatures rise, fish metabolisms speed up increasing the demand for the scarce oxygen.<sup>xxi</sup> Species in the South China Sea are migrating to colder waters in higher latitudes at a rate of approximately 17 kilometers per decade.<sup>xxii</sup> All of these findings have significant negative implications for Vietnam. Northern migration of economically vital fish stocks into waters claimed by China is an emerging security concern.<sup>xxiii</sup> Climate change will also deplete aquaculture yields. Global aquaculture is concentrated in the world's tropical and subtropical regions, with Asia's inland freshwaters accounting for 65 percent of total production. In Vietnam, freshwater, coastal and offshore open water are all suitable environments for aquaculture. However, aquaculture production is concentrated in the Mekong River Delta where sea-level rise and associated surges are causing harmful saline intrusion into brackish and freshwater hatcheries.<sup>xxiv</sup> Extreme weather events such as floods damage aquaculture farms by displacing

water, spreading disease, and destroying infrastructure.

**Major physical effects of climate change on Vietnamese Fisheries**

<b>Cyclones, Typhoons</b>	Based on a range of models, it is <i>likely</i> that future tropical cyclones (typhoons and hurricanes) will become more intense, with larger peak wind speeds and heavier precipitation associated with increases of tropical sea-surface temperatures.
<b>Flooding</b>	Coastal areas, including the heavily-populated Mekong megadelta region, will be at greatest risk due to tidal surges and sea level rise.
<b>Ocean Acidification</b>	Progressive acidification of ocean waters destroys corals and their dependent species. Vietnam has a limited reef system but fish species migrate northward from the fragile Coral Triangle reef system.
<b>Rising Temperatures</b>	Shifts in ranges and changes in algal, plankton and fish abundance are associated with rising water temperatures, as well as related changes in salinity, oxygen levels and circulation.

Sources: IPCC (2014) (2007), T. Daw, et al. (2009), I-Ching Chen, et al. (2011)

**Climate Change: Socioeconomic Impacts**

While peer-reviewed physical science identifies likely fish stock migration in the South China Sea, the socioeconomic implications of these changes have not been examined. The Notre Dame Global Adaptation index (ND-GAIN) compares a country’s level of vulnerability to climate change to its readiness to deal with these impacts. As the 77th most vulnerable country and the 63rd least ready of 177 countries in the index, Vietnam faces significant challenges but

there is also room for optimism that Vietnam can increase its readiness.<sup>xxv</sup> Vietnam has moderate capacity to adapt to climate change given its status of economic development, relatively good governance a part of which is some climate change adaptation planning in the federal level.<sup>xxvi</sup> However continued reliance on declining fisheries may reduce Vietnam’s moderate adaptive capacity with serious negative implications for economic development and food security.

It is hard to overstate Vietnamese reliance on fisheries. A comprehensive study by Malone et al. of the importance of fisheries to national economic and food security ranks Vietnam as the most sensitive country in the World.<sup>xxvii</sup> This study ranks Vietnam as 24<sup>th</sup> in the world in terms of relative national economic vulnerability specifically to climate change-driven impacts on capture fisheries.<sup>xxviii</sup><sup>xxix</sup>

These findings alone should send a resounding warning to Vietnamese policymakers about the need to rapidly develop adaptive measures to maintain the viability of fisheries. However, fishers who already live in conditions of poverty are facing an evolving political system where economic reform is removing social safety nets associated with the formerly centrally-planned economy. This economic adjustment suggests that conditions will likely worsen for the rural poor including subsistence-level farmers and fishers before they get better.<sup>xxx</sup>

It is reasonable to conclude that shifts in the distribution of species associated with warming of the oceans will have the greatest impact on the food security of poor (or artisanal) fishermen. These fishermen use boats, often without motors or navigational technology, which have a range of only a few miles offshore. The waters closer to the Vietnamese coastline are warming at a higher rate so that fish stocks are moving further out to sea, possibly beyond

the range of artisanal fishermen. Another concern is that every major typhoon destroys an increasing number of small fishing boats and homes faster than they can be replaced.

Depletion of the fisheries and resulting economic damage may be a “push-factor” for migration. For Vietnamese people, expected income differentials and the anticipation of better public services are contributing factors to inter-provincial migration from rural to urban areas.<sup>xxxii</sup> For example, poor fishers in Ca Mau Province are reacting to loss of income resulting from a decline in off-shore fisheries by migrating to other provinces.<sup>xxxiii</sup> The proportion of overall migration to urban centers is quite large. Population concentrations in urban areas are more susceptible to natural disasters such as Typhoons. Vietnamese migration policies and practices such as credit and lending policies that favor members of the Kinh ethnic majority over other ethnic minority groups have created tensions that could lead to internal conflict.<sup>xxxiii</sup>

As noted, aquaculture has become an increasingly important source of livelihood for ethnic minorities, particularly the Thai, Tay, and Sedang, three of the 54 distinct ethnic groups recognized by the Vietnamese government. Households belonging to ethnic minorities are generally poorer than those of ethnic majorities.<sup>xxxiv</sup> A 2011 survey found that reliance on aquaculture was a significant factor in Vietnamese minorities’ vulnerability to poverty.<sup>xxxv</sup>

### Potential for Conflict

The Southeast Asian region’s open sea fisheries are located amidst a complex security architecture featuring several overlapping maritime territorial claims. Vietnamese fishing vessels following the northward fish migration or reacting to fisheries depletion within the EEZ are likely to be intercepted by Chinese patrol

vessels, fanning the flames of existing maritime territorial disputes. A handful of disputes such as that surrounding the Spratly Islands cause Vietnam to be in conflict with neighboring states but China is the most strategically significant. The map below illustrates each littoral country of the South China Seas claim to an EEZ under UNCLOS relative to China’s claim.

Vietnam’s relationship with China is arguably the most complicated and conflict-prone in the region. China is a former colonial power and the last all-out war between the nations was only 35 years ago in 1979. Since that time Vietnamese-Chinese bilateral security relations, while cordial in some respects, have been dominated by three challenging territorial issues: demarcation of the mutual land boundary; delineation of the Gulf of Tonkin, and overlapping sovereignty claims in the South China Sea.<sup>xxxvi</sup> Vietnam’s economic dependence on China complicates the existing security relationship: China is Vietnam’s largest trade partner and the latter runs a significant trade deficit with the former.

### Chinese territorial claims relative to UNCLOS EEZs



Source: BBC News <http://www.bbc.co.uk/news/world-asia-pacific-11152948>

In 2004, China and Vietnam ratified the Agreement on Fishing Cooperation in the Gulf of Tonkin located between Hainan Island and the Vietnamese mainland (see map). The agreement delineated exclusive and common fishing areas, in an attempt to reduce the potential for conflict. However, China instituted a ban on fishing during peak fishing (spawning) season from May to June below the agreed upon Chinese area of control. Incursions into this zone by Vietnamese trawlers have been met with violence, seizures of vessels and heavy fines. The most deadly incident took place in January 2005 when Chinese patrol boats opened fire on Vietnamese fishing trawlers, killing nine crewmen. China has accused Vietnamese fishermen of attacking their trawlers in the Gulf of Tonkin.<sup>xxxvii</sup> Elsewhere, in March 2013, a Chinese patrol craft fired warning flares that set fire to a Vietnamese fishing boat near the disputed Paracel Islands.<sup>xxxviii</sup>

Violent incidents are more common further south in the disputed Spratly Archipelago. In April 2007, China patrols detained four Vietnamese fishing boats for an extended period and later that year rammed a Vietnamese vessel resulting in one death. While a formal declaration of war over fishing stocks is unlikely, there is precedent for small confrontations involving fishing vessels to escalate into wider international conflicts. The Cod War of 1975 between Britain and Iceland and the Turbot War of 1995 between Canada and Spain were very limited in scale. However, they illustrate that disputes over natural resources can quickly spiral out of control even among member of security alliances such as NATO.

Volatile socioeconomic conditions on the Vietnamese mainland have already been noted. Climate change impacts such as flooding and typhoons can cause significant population displacement. Confrontations between existing landowners and displaced people have the potential to exacerbate existing tensions between

majority and minority ethnic groups. Land disputes are prevalent in Vietnam. Over one million complaints concerning land were estimated to have been lodged between 2009 and 2014 and some have led to violent outcomes.<sup>xxxix</sup>

Thomas Homer-Dixon, a leading scholar, identifies three conditions where environmental scarcity can be a driver for violent conflict. They can be summarized as 1.) A decrease in supply of a controllable resource leads to simple scarcity conflict 2.) Environmental scarcity causes economic deprivation which in turn disrupts key social institutions causing civil strife and 3.) Large population movements caused by environmental stress exacerbate group identity conflicts.<sup>xl</sup> This research suggests these climate change's impacts on Vietnam may trigger these conditions.

### **U.S. Strategic Interests and Opportunities for Engagement**

Maintaining an advantageous balance of power in the South China Sea is a primary U.S. strategic goal. In February 2014, the U.S. officially rejected China's maritime claims—including those adjacent to Vietnamese waters—on the basis that they are contrary to international law. The horseshoe shaped territorial lines demarking the Chinese EEZ were not drawn based on land features as required by the UNCLOS, a treaty the U.S. has not signed but observes at least in this case.<sup>xli</sup>

Vietnam is a natural ally in the region because its ability to project power acts as a check against Chinese hegemony in the South China Seas and cooperation between the countries is growing on several levels. However, it is essential that the United States avoid a situation where conflict such as a minor maritime dispute evolves into a larger conflagration where Vietnam is at a profound disadvantage and may request U.S. military assistance. Confrontation

on any level based on depleted natural resources sets a dangerous precedent in the region. It is therefore in the interest of the U.S. to take active measures and develop plans for conflict prevention.

Open sea capture fisheries management is an opportunity for the U.S. Coast Guard (USCG), the organization with primary responsibility for maritime law enforcement, to engage with Vietnam and possibly China. Sporadic U.S.-Vietnamese cooperation already exists. In 2009, the USCG conducted a joint course on maritime boarding techniques. This was followed by more action in 2012, where the USS *Waesche*, one of the USCG's three "National Security Cutters" capable of global deployment, conducted a 161 day mission to Southeast Asia and the Pacific region. This mission also included tactical training and fisheries restoration management.<sup>xiii</sup>

Coast Guard capacity building around enforcement is important because the Association of Southeast Asian Nations (ASEAN) has developed an international regime to regulate fishing in the South China Sea. However, much like the Tonkin Agreement between China and Vietnam, it lacks an effective enforcement mechanism partially due to lack of capacity. An increased USCG presence could help build this capacity and minimize the potential for conflict. In March 2013, China announced plans to merge five agencies with law enforcement power over waters that China claims into a unified Coast Guard called the State Oceanic Administration.<sup>xliii</sup> The existence of this unified organization could facilitate cooperation with the U.S. and Vietnam and lead to a more coherent Chinese posture.

Reduction in societal resilience exacerbated by climate change impacts and natural disasters will increase the demand signal for U.S.

humanitarian operations and disaster relief and recovery efforts. The U.S. military, led by the Navy, has a record of responding to every regional disaster at some level. For example, despite frosty relations, U.S. forces provided assistance to Myanmar after tropical cyclone Nargis in 2009, although the bulk of this assistance was refused.<sup>xliv</sup>

The U.S. military is cooperating with regional military organizations on risk reduction activities to prepare for and adapt to the worst effects of climate change. Military-to-military cooperation is facilitated by epistemic factors. These include common characteristics such as terminologies, strategic planning cultures and common capabilities including rapid deployment and heavy lift capacity. Trust built by cooperation around these issues can carry over into discussions over other more intractable issues. For example, cooperation between the U.S. and South East Asian nations on counter-narcotics have been problematic but maritime cooperation in other areas could form the basis of more productive discussions.

Disaster risk reduction and emergency response preparation arguably fits more clearly into the mission set of a civilian agency. The U.S. Federal Emergency Management Agency (FEMA) has established bilateral agreements with some countries in the region. Currently, these activities are limited to technical exchanges because FEMA lacks the authority to actually conduct ground operations overseas. Expanding these authorities would be a step in the right direction.

## **Conclusion**

The physical and economic impacts of climate change on Vietnam's fisheries are significant and consequential. These impacts may have second-order implications for conflict at the international and local levels.

It is in the strategic interest of the U.S. to forestall such conflict and build resilience of this key regional ally. Accordingly, under a broad strategy, U.S. military presence in South East Asia should be complemented by financial support for current and prospective allies. In 2009 the U.S. committed to mobilize US \$100 billion by 2020 along with private-sector partners. Less than half of this funding, referred to as “climate finance” is obligated for climate

adaptation and risk reduction activities, as opposed to mitigation projects. U.S. emphasis on adaptation and risk reduction in the Asia-Pacific could stimulate greater financial commitments from other donor countries and leverage existing Vietnamese funding. In partnership with Vietnamese authorities, the U.S. has several means at its disposal to successfully address the impacts of climate change on capture and aquaculture fisheries.

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<sup>v</sup> United Nations Convention on the Law of the Sea: Agreement Relating to the Implementation of Part XI of the Convention, available at [http://www.un.org/Depts/los/convention\\_agreements/texts/unclos/closindx.htm](http://www.un.org/Depts/los/convention_agreements/texts/unclos/closindx.htm).

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<sup>x</sup> Tran Duc Thanh et al. “Regimes of human and climate impacts on coastal changes in Vietnam,” *Regional Environmental Change*, Volume 4, Issue 1, (2004)

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<sup>xiv</sup> I-Ching, Chen, et al. “Rapid Shifts of Species Associated with High levels of Climate Warming” *Science*, Vol 333 (2011).

<sup>xv</sup> Ibid

<sup>xvi</sup> William L. Cheung et al. “Signature of Ocean Warming in Global Fisheries Catch,” *Nature* 497, (2013)

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