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New Leadership Approaches for Climate Change and Environmental Security

William F. Lyons Jr., Tara Kulkarni, and Mallory Dutil

Abstract: Climate change has become a threat multiplier in every corner of the globe, substantially impacting human security, especially in the developing world. Drought, desertification, sea level rise, and coastal floods have resulted in climate migration to urban centers, increasing demands for water and food, with governmental and societal resources overwhelming already strained assets. Under these conditions, civil order breaks down, and crime and victimization of vulnerable populations becomes endemic. Human security becomes compromised. With civil war a possibility, regional and national security interests come to center stage. This nexus between climate change and conflict requires new approaches to address environmental security systematically and holistically. The authors recommend three important steps to develop this new domain of national security. First, issues associated with environmental security need to be elevated to the same level of importance as traditional domains of military operations, such as air, land, sea, space, and cyber. Second, addressing environmental security needs to be fully integrated into the national security strategy of the United States, with a strong emphasis on a whole of government and whole of society approach. This approach should include the elevation of development to be an instrument of national power as a co-equal with diplomacy, information, military, and economic instruments. Finally, and perhaps most importantly, a future generation of military and civilian leaders must be educated and trained to be intellectually invested in the environmental security domain. This paper explores these issues and presents recommendations to achieve these critical first steps to advance a more resilient and sustainable future.

Keywords: Environmental Security; Military Domain; Development; Instruments of Power; Leadership.

Introduction and Background

The role of climate change as a threat multiplier across multiple domains is well documented. The term “threat multiplier” in the context of environmental security was first coined by the Center for Climate and Security in 2007. It was later identified in the 2014 Quadrennial Defense Review published by the U.S. Department of Defense. It has since been validated in a comprehensive study of the relationship between climate change and political instability across Middle East and North African (MENA) countries, and considered in a prominent way in NATO’s engagements, policy frameworks, and operations. Overall, it aptly captures the snowballing effects driven by climate change. The changing climate has exacerbated environmental degradation related to deforestation, desertification, droughts, floods, and wildfires, impacting human access to safe and sufficient amounts of food, water, and other natural resources. This relationship is illustrated in Figure 1.
Figure 1. Snowballing Effects of Climate Change

For military and defense establishments around the world, understanding the role that climate change—and more broadly a degraded environment—plays in national and global security considerations is paramount to deter avoidable wars and ensure sustainable global development with peace as the central tenet. The emerging domain of environmental security, a term that encompasses climate security where environmental degradation as well as conflict and security challenges are juxtaposed for both recognizing problems and analyzing them to implement actionable solutions, offers a pathway to do just that.

From “a measure of the threats to our values” to “a pursuit to curtail challenges to the interdependent human-biome ecosystem,” environmental security definitions have evolved over time. In the twenty-first century, as the current generation grapples with its existential crises of a changing climate and pandemics that have underscored the need to reimagine previous versions of access, rights, and human identities, a narrower definition of environmental security is helpful. Two definitions are offered for consideration: Zurlini and Müller’s take as “environmental security is one in which social systems interact with ecological systems in sustainable ways, all individuals have fair and reasonable access to environmental goods, and mechanisms exist to address environmental crises and conflicts,” and Belluck et. al’s: “Environmental security involves actions that guard against environmental degradation in order to preserve or protect human, material, and natural resources, at scales, ranging from global to local.”

Moreover, Salako (2017) notes that environmental security is one of seven key components of human security. In fact, military experts and several political leaders not only think deeply about the interconnectedness of human security with environmental security...
degradation, resource scarcity and conflict, but have attempted to develop policies, strategies, and implement actions to address this intersection. The National Intelligence Council (NIC) has noted several 2030 trends related to food, water and energy stresses and fragile states that are especially vulnerable to resource scarcity that can serve as precursors to conflict. Water scarcity, while also pervasive, is a result of an “imbalance between the demand and supply of water, in a geographical area.”

Peter Gleick’s “Water Conflict Chronology,” maintained by the Pacific Institute, is a repository of water conflicts over the ages. For example, in the early 2000s in Israel, the withholding of resources to build a water treatment plant in a neighboring country was used as leverage to diminish their already scarce water resources and prevail in their ongoing conflict with the Palestinians.

As essential resources like food and water continue to be threatened by the changing environment, these security threats will likely only become larger. This also includes the potential for terrorist groups to target these valuable resources as scarcity increases. Water infrastructure could be targeted, as most is government owned, therefore potentially serving as a symbolic and political target for physical disruption, bioterrorism/chemical contamination, and cyber-attack.

The environmental conditions that result in this cycle of conflict and human insecurity will only become more prevalent as impacts from climate change accelerate and then further strain our ability to respond to crises. This intersection between climate change and conflict requires new approaches to address environmental security systematically and holistically.

**Approach**

This research used a mix of peer reviewed literature, and governmental and nongovernmental reports and publications to support our research for new approaches to address the relationship between climate change and conflict or environmental security. To prepare for this new domain of national security, three important steps must be taken. As a first step, the issues associated with environmental security need to be elevated to the same level of importance as the traditional domains of military operations, such as air, land, sea, space, and cyber. Once this domain has been elevated to its proper status, addressing environmental security needs to be fully integrated into our national security strategy. This approach should include the elevation of development to be an instrument of national power as a co-equal with the diplomacy, information, military, and economic instruments. Development as an instrument of national power should be reflected in a substantially elevated profile within the State Department to coordinate the development activities of the U.S. Agency for International Development (USAID), the Millennium Challenge Corporation, the U.S. Department of Defense, Non-Governmental Organizations, and partner nation capabilities.

The confirmation in April 2021 of Samantha Power (a former U.S. ambassador to the United Nations) as the administrator of USAID, and her elevation to membership on the National Security Council, is a tremendous step forward. While coordination at this level will present many challenges, not the least of which will be the civil-military dynamic in
conflict areas, delivering a coordinated and comprehensive development plan is the key to ensuring the sustainable development of the world’s population centers.

Finally, a new strategy to educate the future leaders of our world to lead us into an era of climate action is necessary. A new educational curriculum spanning undergraduate and graduate studies is essential to the goal of mitigating climate change-induced security issues. Current offerings in higher education were examined to make recommendations for improvement and expansion of environmental security curricula.

The three steps described above are illustrated in Figure 2.

![Figure 2. Three Steps to Prepare](image)

**The Climate Change and Human Security Nexus**

The nexus between climate change and human security is intuitive, and simultaneously not well understood. Stability in emerging and developing regions is largely dependent on conditions that promote human security and economic opportunity. Nations that cannot provide human security and economic opportunity often culminate in fragile or failing states. As a consequence of the role that the United States and its allies play in global governance, addressing fragile and failing states frequently becomes a matter of national security interest, as evidenced by the protracted involvement of the United States in Yemen and Somalia.

Globally, one of the primary contributors to human insecurity is climate change, which manifests itself through a variety of challenges, such as desertification, extreme flooding, food insecurity, water scarcity, climate migration, and rapid urbanization. A changing climate has contributed to ozone layer depletion and loss of biodiversity, and also served as a precursor of the global spread of diseases. Climate change has created a dynamic
international security environment for the United States, significantly increasing the risk of future conflict. To respond to these changing conditions, the U.S. should consider a policy of climate action as a means of strategic deterrence and conflict prevention. Conflict prevention—in the context of climate change—suggests the use of a whole of government and a whole of society approach to the nation’s overall national security strategy.

Taken individually or in the aggregate, climate change-induced conditions create instability in nations where insufficient governance and/or natural resources exist to manage the shock of these events. Left unchecked, this cycle of climate change-induced insecurity in the developing world has the potential to create conditions of human insecurity, civil unrest, local conflict, and the potential for regional or international conflict. Accordingly, it is in the national security interest of the United States and its allies to use the full range of their national instruments of power, including diplomacy, information, military, and economic policies, to mitigate the potential for these destabilizing events by investing in a comprehensive and coordinated climate action plan. This paper argues that development must be elevated to be a co-equal instrument of national power, as development activities have the greatest potential to affect climate action and a more sustainable environment in the most unstable regions of the world. While climate action requires a commitment to a long-term campaign, without a concerted and focused effort, there is no prospect of addressing the underlying climate change-induced causes of conflict that plague the developing world. It is a national security—and arguably a moral—imperative to deter conflict by aggressively pursuing climate action. In a national security context, conflict prevention is far less costly in lives lost and in national treasure than conflict resolution.

The Link Between Climate Crises and International Security

Humanitarian interventions in the developing world by military forces of western countries during the 1990s gave rise to a new understanding of how individual security and national security were interrelated. Perhaps the most well-known example is the 1993 intervention of the United States to bring humanitarian relief to the famine-stricken citizens of Somalia. Although the U.S. military intervention did lead to famine relief, it also led to a violent confrontation between the United States and forces loyal to Mohammed Farah Aided, a Somali warlord, known as the Battle of Mogadishu.

Such military interventions led to a rethinking of how human security affects regional and national security. A more contemporary example of the link between climate change, human security, and national security is the current situation in South Sudan. The links between climate change, migration, and conflict in South Sudan are well established. The most pronounced Indian Ocean Dipole (also known as the East African El Nino) in generations has caused historic flooding on a scale not seen in 60 years. The increasingly unpredictable flood seasons have caused food insecurity on an unprecedented scale. According to USAID, there are 5.5 million people in South Sudan requiring food assistance, with 1.7 million climate refugees. This level of degraded human security has been seriously exacerbated by violence
between tribes and political parties, with activities from cattle rustling to extrajudicial killings seizing the spotlight as most people simply try to survive. The link between climate change, extreme flooding, and fighting is obvious to all who are paying attention in this struggling country. As a result of these challenges, South Sudan is on track to be one of the largest recipients in the world of both USAID and World Food Programme (WFP) aid in 2021. Figure 3 illustrates the relationship between climate change and food security.

Figure 3. Climate Change and Food Security

The depth and complexity of these climate change-induced humanitarian catastrophes suggests that a new approach to solving these problems is required. Simple cause and effect analysis is no longer sufficient to address the wicked problems of climate change-induced insecurity. A new framework to address these multifactorial and multidimensional problem sets and train a new generation of military and civilian leaders to develop and apply these new concepts must be developed.

The Evolution of Development as an Instrument of National Power

Research at the U.S. Army War College has explored the concept of development as an instrument of American power. The conclusion of that research was to suggest that the United States invest more heavily in international development activities as a means of preventing conflict, rather than the recurring pattern of unsustainable spending on conflict resolution and subsequent reconstruction. The conclusion also suggested that this approach is ever more important in a world that is globalizing and urbanizing at a dizzying rate. This research suggested that sustainable international development activities would
result in greater international security, manifested through improved human security in the urban areas of developing countries.24

Another study conducted for the U.S. Army’s Strategic Studies Institute (SSI) reached a similar conclusion. This study established the necessity of linking development with security in Africa as an imperative for the national security of the United States. The SSI study documented the impact of mass migration on African security in the context of terrorism and political violence. This study specifically linked instability in all its forms, including crime, political stability, civil war, and transnational conflict, with decreased economic development. It also specifically articulated a vision for conflict prevention versus conflict resolution.25

As strategic military thought has evolved over the last thirty years, the idea of preventing conflict though international development rather than resolving it through military intervention has become mainstream.26 Robert M. Gates, former U.S. Secretary of Defense and former Director of Central Intelligence, in a speech delivered in 2008, remarked that “the overall posture and thinking of the United States armed forces has shifted—away from solely focusing on direct American military action, and toward new capabilities to shape the security environment in ways that obviate the need for military intervention in the future.”27 The new capabilities that Secretary Gates described were international development capabilities, which are uniquely positioned to address climate change-induced challenges. This is strong evidence that the role that climate change is an important consideration in the creation of national security policy.

The fundamental relationship between international development and national security is outlined in the National Security Strategy of the United States.28 While there are detractors from this approach,29 who argue that development should not be a matter of national security for former colonial powers, the concept of linking development activities with national security interests have been an integral part of the national security strategy of the United States for generations. Perhaps the most prominent example of linking international development and national security was the Marshall Plan for the recovery of Europe after World War II.30

The civilian and military leaders of today’s U.S. Armed Forces have a growing understanding of the complexities of environmental contexts and national security interests. In a report entitled “Megacities and the United States Army,” the U.S. Army Strategic Studies Group (SSG) documented the relationship between challenges to the provision of basic services, especially infrastructure, and the propensity for increased conflict. Unfortunately, the SSG focused more on kinetic solutions (conflict resolution solution sets) in these complex environments, rather than development solutions (conflict prevention solution sets). However, there were some interesting observations about the threats posed by the conditions in the informal settlements of the emerging megacities.31
The report identified that the megacities would generate the preponderance of the friction in the developing world, a term used by the armed forces to describe nascent forms of conflict. They identified that instability will be focused on the urban environment, with slums posing a particular challenge to stability, with the urban environment becoming the strategic key terrain of future military intervention. Using a systems theory approach, the SSG identified the informal settlements of Rio de Janeiro and Sao Paulo, Brazil; Lagos, Nigeria; and Dhaka, Bangladesh, as particularly vexing environments in which the military will need to be prepared to operate, specifically due to the security threats these environments present. Implicit in these studies is the basic understanding that each of these locations is subject to significant climate change-induced national security threats. See Figure 4 for a map of some of the areas most impacted by climate change-induced impacts.

**Figure 4. Climate Change-induced Security Threats**

However, the U.S. Army does understand the criticality of development as a means of reducing the likelihood of conflict. Ongoing military operations in Africa are oriented to “the three Ds”—diplomacy, development, and defense. In operations described in Army Magazine, U.S. Army African Command is focusing its engagement strategy on development activities in the Lake Chad basin, which includes the nations of Nigeria, Niger, Chad, and Cameroon (see Figure 4). As Lake Chad reduces in size, threats to local and regional stability have emerged. Those threats include less food for local economies, a rapidly growing population, limited employment opportunities, and local and regional ethnic and religious tensions. These threats have resulted in growing internal displacement and migration, as well as extremist groups and criminal enterprises that are exploiting these conditions. These challenges affect political stability not only in Africa, but also in Europe due to stress placed on the immigration system.
Further, research conducted at the University of Cambridge explored the links between sustainable urban design and human security as a means of reducing the propensity of conflict. The aim of that research was to improve the development of urban design strategies for conflict prevention and to identify the best practices for urban design in the global megacities of the developing world, as well as to identify urban design approaches that have been successfully implemented in the world’s most challenging urban environments. Identifying these techniques provides a roadmap for the rest of the developing world to follow as global urbanization trends continue and climate change threatens the sustainability of these growth patterns.

Sustainability is increasingly considered a matter of national security. The U.S. Army thinks about sustainability as a national security issue in a wide ranging of contexts, from...
the business case to considerations on the use of military force. Army and Navy installations are suffering the effects of climate change, fossil fuel dependence, and resource scarcity like all other business-like organizations in the world. In addition, the prospects for military conflict in a world where depleting resources and climate change affect everything from regional stability to intrastate conflict require that military strategies consider sustainability as a consideration in reducing the likelihood of conflict.37

Wicked Problems, Systems Thinking, and a New Approach to Climate Change-Induced Insecurity

One approach to examining the relationship between climate change and national security is to use systems thinking. The use of systems thinking is a critical concept in examining the environment in a sustainability context.38 A causal loop diagram is a useful way to envision the inter-relationship between climate change and national security. A causal loop diagram describing the systems approach to the relationship between climate change-induced issues and international security is illustrated in Figure 6.39

![Figure 6: Illustrative Causal Loop Diagram - Climate Change and International Security](image-url)
A wicked problem is a set of problems that are difficult or impossible to solve because of incomplete, contradictory, and changing requirements that are often difficult to recognize. There is no definitive formulation of a wicked problem. In trying to solve for wicked problems, solutions are “better or worse,” not complete resolutions, and there is no way to comprehensively test a solution. Specific aspects of the wicked problem may be susceptible to testing solutions, but each test risks further impacts. Because wicked problems can be symptoms of some other problem, care must be taken to avoid worse impacts, as well intentioned as the proposed solution might be.

Systems thinking presents an opportunity to explore a more comprehensive picture of cause and effect, layering societal issues that were once considered unrelated or marginally related into one problem set. Systems thinking creates an environment where individual contributions using multidisciplinary teams can make connections that others might not readily identify and develop discrete solutions for individual problems, and then consider those solutions in the broader context of the wicked problem. By adopting this approach, a whole of government/whole of society approach to solving wicked problems emerges, with a greater understanding of how interrelated problems can be addressed more holistically. The process of using these approaches should begin now with these techniques systematically integrated into curricula across undergraduate and graduate learning environments.

**Climate Action**

Despite the challenges presented by a lack of political consensus on the causes of climate change, there are hopeful signs that climate action can improve human security. Physical infrastructure constructed through development and direct investment is essential to economic and social sustainability. Floods of increasing intensity and frequency will render large areas of arable land unusable, precious water resources are squandered or sullied, food aid cannot get to those most in need, crops raised in one part of a country cannot get to market to relieve hunger, and the cycle of poverty continues. Likewise, development aid targeted toward more sustainable agricultural practices, sustainable management of water and other natural resources, and sustainable economic models can reduce or mitigate the ill effects of climate change. Every effort to thwart the negative impacts of climate change in the developing world is one small step toward reducing the likelihood of human insecurity and conflict.

There is general agreement that sustainable development is essential to reducing the negative impacts of climate change. Providing infrastructure development to informal settlements is widely recognized as a key step toward a more sustainable environment. Providing fresh water, sanitary sewer systems, electricity, transport, and solid waste management is a critical step on the path to sustainability.40
Educating a New Generation of Leaders

Finally, and perhaps most importantly, educating and training a future generation of military and civilian leaders who are intellectually invested in the environmental security domain, and who will rise to the challenges of climate change in the near and mid-term, will be critical. The environmental security domain is equally important as the traditional domains of conflict, including air, land, sea, space, and cyber. For the environmental security domain to be effective, investments in educating future military and civilian leaders who are fluent in the issues of environmental security must match investments in more traditional domains. To that end, there are few programs offered in traditional higher education to accomplish that goal.

A thorough review of current offerings in this field reveals the programs in Figure 7.

<table>
<thead>
<tr>
<th>NAME</th>
<th>MAIN TOPICS</th>
<th>OFFERED THROUGH</th>
<th>LEVEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learning Pathway: Environmental Security</td>
<td>Aims to explore multiple ways in which environmental features play a role in security concerns. Includes 7 recommended courses.</td>
<td>University of Kansas</td>
<td>undergraduate</td>
</tr>
<tr>
<td>Course: Environmental Security/Conflict</td>
<td>Addresses some of the conceptual and contemporary issues relating to the impacts and effects of the environment on international, regional and national security, and the potential for social and political conflict in the Middle East and beyond. Topics include resource wars and energy security, food security, climate change and migration.</td>
<td>Georgetown University</td>
<td>graduate, undergraduate</td>
</tr>
<tr>
<td>Master of Arts in Environment, Development, and Peace: Specialization in Environmental Security and Governance</td>
<td>Gain insights into different theoretical frameworks, institutional tools and practical techniques related to water, food, and climate change, among others. Courses taken: Climate Change Governance; Water Security or Food Security; Environment, Conflicts and Sustainability.</td>
<td>University of Peace (Costa Rica)</td>
<td>graduate</td>
</tr>
<tr>
<td>Master of Science in Threat Response and Management: Environmental Security Concentration</td>
<td>Designed for those who want to address the challenges of climate change across the public sector, federal agency level, and sustainability and social responsibility in the private sector.</td>
<td>University of Chicago</td>
<td>graduate</td>
</tr>
<tr>
<td>Course: Environmental Security and Sustaining Peace</td>
<td>How natural resources and the environment impact conflict. How conflict harms natural resources and the environment. How natural resources and the environment support peacebuilding. How you can assess and address the relationship between natural resources and conflict.</td>
<td>SDG Academy/edX</td>
<td>offered to anyone</td>
</tr>
</tbody>
</table>

Figure 7: Climate Security Courses and Programs
The multidisciplinary nature of environmental security as a field of study makes it challenging to develop a rigorous curriculum at the undergraduate level without compromising core studies to support the fundamentals. However, this research argues that a well-designed curriculum for environmental security as a major or concentration can be achieved by interweaving essential coursework in hard sciences, political science, international relations, and conflict studies. A curriculum based on these fundamentals will allow for the development of new graduates with a bachelor of science degree (or equivalent) with the intellectual rigor needed to master the emerging field of environmental security.

At the graduate level, there is ample opportunity to develop programs tailored to meet the needs of tomorrow’s environmental security professionals. Certificate programs, master’s programs, and doctorate programs should all be developed to support the professional needs of environmental security professionals as well as create an ecosystem of research and dialogue regarding this critical discipline. Post baccalaureate study and research is essential to setting the conditions for future success in the field of environmental security.

Conclusion

The growing field of environmental security presents many opportunities and challenges for our society. To meet the challenges, a multidisciplinary approach focused on placing significant emphasis on the three critical issues is required. First, environmental security must be considered as a new domain of military and civilian operations. Placing environmental security on par with the traditional domains of operations (air, land, sea, space, and cyber) will be a forcing function to ensure that strategic planning considers the environmental security equities of global operations and creates the foundation for rigorous professional development and education in the military services as well as civilian agencies.

Second, our national security strategy must be updated to fully reflect the challenges posed by climate change, climate migration, and other environmental security threats to stability. Reflecting this priority in the national security strategy sets the stage for a strong emphasis on a whole of government and whole of society approach when considering strategic actions in the pursuit of national interests. Emphasizing environmental security as a significant factor in our national security strategy requires the elevation of development to be an instrument of national power as a co-equal with the diplomacy, information, military, and economic instruments. The government agencies tasked with addressing climate change, development, and environmental security must be task-organized to bring the full capabilities of our government to bear on addressing the complex and wicked problems posed by climate change.

Finally, in conclusion, educational curricula in environmental security, at the undergraduate and graduate level, are essential to developing a next generation of professionals committed to this complex and emerging field of study. Undergraduate
programs will establish a baseline for future environmental security professionals, much as tailored programs did for cybersecurity. Likewise, graduate programs will create an ecosystem of research and professional development needed to sustain these professionals as they are tasked to address the challenges of climate change and environmental security. Combined, an educational framework focused on a whole of government and whole of society approach to the challenges of our time will pay long-term dividends as the world grapples with climate change and its many impacts.

Environmental security is poised to become one of the defining professions of this century. As a nation and as a society, tackling the issues associated with climate change and environmental security head-on is an imperative that cannot be ignored. Our future depends on it.

William F. Lyons, PE, Esq., has more than 30 years of professional experience providing consulting services for infrastructure and real estate projects. As a planner, civil engineer, and attorney, his experience includes projects on five continents and throughout the U.S., Lyons holds a juris doctor from Suffolk University Law School, a master’s degree in strategic studies from the United States Army War College, a master’s degree in studies in sustainability leadership from the University of Cambridge, a master’s degree in transportation and urban systems from North Dakota State University, and a bachelor of science degree in electrical engineering from Norwich University. Lyons holds adjunct faculty appointments with Wentworth Institute of Technology, University of Massachusetts-Amherst, and Norwich University, where he serves as a senior fellow at the Center for Global Resilience and Security (CGRS). Lyons retired from the U.S. Army Reserve as a colonel, after 31 years of service in military intelligence, logistics and engineering.

Tara Kulkarni, PE, Ph.D., is an associate professor in civil and environmental engineering, and director of the CGRS at Norwich University. She has a Ph.D. in civil engineering from Florida State University and is a licensed professional engineer. She has over fifteen years of experience, across state government, management consulting, and academia. Her teaching and research focuses on addressing climate change impacts through community resilience using engineering and non-engineering solutions. She is also investigating the intersections of the water-food-energy nexus to build environmental security. She has won numerous awards for teaching and research, has co-authored a book on water resources, and published multiple book and report chapters, peer reviewed journal articles and conference papers. As director of the CGRS, Kulkarni has launched and leads multiple funded projects related to the Dog River Conservancy, energy resilience, environmental security, the Resilient Vermont Network, and the Norwich Humanities Initiative.
Mallory Dutil is a student at Norwich University working on her master’s degree in civil engineering with a focus on environmental and water resources engineering. She holds degrees from Norwich in environmental science, chemistry, and general engineering. She was a student fellow at the CGRS at Norwich for her last two years of undergraduate work and has continued her work as a fellow for the past year. She has been deeply involved in Norwich’s Undergraduate Research Fellow programs working on environmental reconstruction research from the last Ice Age using sediment cores and macrofossils from Pecks Pond in Barre, Vermont, and examining Israel’s water resource management and technology in relation to water scarcity and political unrest in the area. She also worked as a research apprentice for the Vermont Genetics Network examining targeted chemotherapy drug development, specifically using Taxol and tamoxifen derivatives for breast cancer.

Endnotes


14. Ibid.


23. Ibid.

25. Ibid.


32. Ibid.


35. Ibid.


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SPELLING AND STYLE: Note that we conform to Webster’s Collegiate Dictionary and The Chicago Manual of Style in matters of spelling, abbreviation, punctuation, etc. On first use of an acronym or abbreviation in the manuscript, please spell it out in full.

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Books: Feldman, Lily Gardner, Germany’s Foreign Policy of Reconciliation: From Enmity to Amity (Lanham, MD: Rowman and Littlefield Publishers, 2012), 20-33


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CONTENTS

Introduction to the Extended Reality-based LVCG Military Training System for Small Units at Korea Military Academy
Kyuyong Shin, Hochan Lee, and Junhyuk Oh

Educating 21st Century Thinkers: A Case for Renewed Emphasis on Liberal Arts and Humanities in Officer Education
Jamie McGrath

An Approach for a Character Development Strategy for the Center for University Studies
Lirim Bllaca, Alisa Ramadani, Ali Haxhimustafa, and Premtim Shaqiri

Leadership Undefined: The Paradoxes of Future Military Leadership
Martijn W. van Eetveldt, Richard G. Oppelaar, and Peter Olsthoorn

Catalysts and Accelerants: Untangling the Linkages between Climate Change and Mass Atrocities
John Riley and Will Atkins

New Leadership Approaches for Climate Change and Environmental Security
William F. Lyons Jr., Tara Kulkarni, and Mallory Dutil

Navigating Through a VUCA World by Using an Educational Compass
C. J. M. Annink and N. N. M. van Mook

We Need to Rethink Reality: The War Nexus and Complexity
André Simonyi

Authority and Military Command: Reflection on the Challenges Military Academies Face in Today’s Profound Social and Cultural Changes
Danic Parenteau

New Directions in Intelligence Education
Robert J. VandenBerg, Mark W. Perry, and Aleia F. Manning

Reappraisal of the Korean Military’s Core Competences in the Age of the Phono Sapiens
Dong-ha Seo and Jung-yoon Chang

Squaring the Circle: The Evolution of NATO’s Strategic Communication Since the 1990s
Linda Risso

Intercultural Competence Training at a US Service Academy: Pilot Study
Kelly Lemmons

Studies on Leadership: Research, Development, and Practice, based on evidence at Agulhas Negras Brazilian Military Academy
Atílio Sozzi Nogueira, George Hamilton de Souza Pinto, and Marcos Aguiar de Souza

Increase of Officer Cadets’ Competences by Internationalization
Harald Gell

Peter James Leavy, Shevahn Telfser, and Jeffrey Howard

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