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USING SYSTEM DYNAMICS TO ANALYZE THE SRI LANKA NAVY'S EFFORTS TO DISRUPT NARCOTERRORISM IN THE EEZ OF SRI LANKA AND INDIAN OCEAN REGION

by

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March 2023

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13. ABSTRACT (maximum 200 words)

The Indian Ocean Region (IOR) significantly influences the world's economy and balance of power, and maintaining the IOR's maritime security is foremost the responsibility of the islands and coastal nations in the region. Sri Lanka, as the second-largest island nation in the IOR, also has a large Exclusive Economic Zone (EEZ) threatened by drug trafficking, a problem also faced by other coastal and island nations in the region. The Sri Lanka Navy aims to counter maritime security challenges in the nation's EEZ and to support such efforts throughout the IOR. Little research has been done to explain how small nations might benefit from maritime security and trade engagement with great power nations. This thesis analyzes case studies of Seychelles, Mexico, and Thailand to determine which variables (such as material and monetary resources, institutions, and regional partnerships) most contribute to maritime security capabilities. System dynamics modeling then demonstrates potential behavioral outcomes for Sri Lanka's maritime security system to determine which approaches could effectively disrupt drug trafficking. This thesis documents that achieving enhanced maritime security by disrupting drug trafficking in Sri Lanka's EEZ and IOR is difficult without expanded capabilities and resources such as additional platforms, intelligence sharing, technology, and regional and international agreements.

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ABSTRACT

The Indian Ocean Region (IOR) significantly influences the world's economy and balance of power, and maintaining the IOR's maritime security is foremost the responsibility of the islands and coastal nations in the region. Sri Lanka, as the second-largest island nation in the IOR, also has a large Exclusive Economic Zone (EEZ) threatened by drug trafficking, a problem also faced by other coastal and island nations in the region. The Sri Lanka Navy aims to counter maritime security challenges in the nation's EEZ and to support such efforts throughout the IOR. Little research has been done to explain how small nations might benefit from maritime security and trade engagement with great power nations. This thesis analyzes case studies of Seychelles, Mexico, and Thailand to determine which variables (such as material and monetary resources, institutions, and regional partnerships) most contribute to maritime security capabilities. System dynamics modeling then demonstrates potential behavioral outcomes for Sri Lanka's maritime security system to determine which approaches could effectively disrupt drug trafficking. This thesis documents that achieving enhanced maritime security by disrupting drug trafficking in Sri Lanka's EEZ and IOR is difficult without expanded capabilities and resources such as additional platforms, intelligence sharing, technology, and regional and international agreements.

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LIST OF ACRONYMS AND ABBREVIATIONS

AIS	Automatic Identification System
AOPV	Advanced Offshore Patrol Vessel
AMO	Air and Marine Operations
ANB	Anti-Narcotic Bureau
ANCORS	Australian National Center for Ocean Resources and Security
APSC	ASEAN Political-Security Community
ASEAN	Association of Southeast Asian Nations
CBP	Customs and Border Protection
CMF	Combined Maritime Force
CPV	Coastal Patrol Vessel
CTF	Combined Task Force
DCoC	Djibouti Code of Conduct
DEA	Drug Enforcement Agency
EEZ	Exclusive Economic Zone
FAC	Fast Attack Craft
FGB	Fast Gun Boats
GDP	Gross Domestic Product
GMCP	Global Maritime Cooperation Program
GPC	Global Power Competition
GPS	Global Positioning System
IDSA	Institute for Defense Studies and Analysis
INL	International Narcotics and Law Enforcement Affairs
IOFMC	Indian Ocean Forum on Maritime Crime
IOR	Indian Ocean Region
IORA	Indian Ocean Rim Association
IUUF	Illegal Unreported Unregulated Fishing
JIATF	Joint Interagency Task Force

LTTE	Liberation Tigers of Tamil Elam
MDA	Maritime Domain Awareness
MDSL	Maritime Doctrine Sri Lanka
MILAN	Multilateral Naval Exercises
NDEA	National Drug Enforcement Agency
ONCB	Office of Narcotic Control Board
OPV	Offshore Patrol Vessel
PPNSU	Provincial Police Narcotics Suppression Unit
ReCAAP	Regional Cooperation Agreement on Combating Piracy and Armed Robbery against Ships in Asia
SAARC	South Asian Association of Regional Cooperation
SCG	Seychelles Coast Guard
SD	System Dynamics
SLN	Sri Lanka Navy
SLOC	Sea Line of Communication
SRP	Southern Route Partnership
UAE	United Arab Emirates
UNODC	United Nations Office of Drugs and Crime
UNCLOS	United Nations Convention of Law of the Sea
U.S.	United States
WHTZ	Western Hemisphere Transit Zone
WIO	Western Indian Ocean

EXECUTIVE SUMMARY

The Indian Ocean Region (IOR) significantly influences the world's economy and balance of power, and maintaining maritime security in this region is foremost the responsibility of the IOR islands and coastal nations. India, Pakistan, Bangladesh, and Myanmar are the major coastal nations in the IOR, while Sri Lanka, Seychelles, Mauritius, Madagascar, Comoros, Reunion, Andaman Nicobar, and the Maldives comprise the island nations. These coastal and island nations face enormous challenges from emerging traditional and non-traditional maritime security threats. As the second-largest island nation in the IOR, Sri Lanka has a large Exclusive Economic Zone (EEZ).[1] Being an island nation, Sri Lanka also faces traditional and non-traditional maritime security challenges prevalent in the IOR. Among these challenges, drug trafficking in its EEZ poses a significant threat to Sri Lanka and other coastal and island nations in the region. It is the mission of the Sri Lanka Navy (SLN) to address maritime security challenges in the nation's EEZ and to support such efforts throughout the IOR.[2]

Researchers and scholars have identified narcoterrorism as a significant threat in the IOR. Many have also cited cooperation among nations and the sharing of intelligence as key factors in the enhancement of maritime security.[3] Yet, there is a paucity of material that addresses how regional coordination and cooperation and the implementation of sustainable mechanisms among regional powers and small nations contribute to countering narcoterrorism and other non-traditional maritime security threats. Further, little research has been done to explain how small nations might benefit from maritime security and trade engagement with great power nations. Engagement with the United States, China, and India may provide an opportunity to achieve more effective maritime security.

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[1] Sri Lanka Navy Headquarters, *Maritime Doctrine of Sri Lanka (MDSL)*, SLN BR 1 (Colombo, Sri Lanka: Navy Headquarters, 2020), 166, https://www.navy.lk/assets/images/english/Doctrine/br_01/mobile/index.html#p=1.

[2] Sri Lanka Navy Headquarters, 60–61.

[3] Jamal Barnes and Daniel Baldino, "A Network Maritime Security Approach to Intelligence Sharing in the IOR," *Journal of the Indian Ocean Region* 14, no. 3 (2018): 315–30, https://doi.org/10.1080/19480881.2018.1519298.

The Sri Lanka Navy has adopted a maritime surveillance patrol system based on intelligence and has deployed its available naval assets to disrupt narcoterrorism. Sri Lanka's geographical position and its available naval assets contribute to maritime security in the IOR, but greater cooperation with great power nations may be needed to enhance the capacities and capabilities of smaller nations such as Sri Lanka.[4] This thesis addresses gaps in existing maritime security cooperation research and offers recommendations for actions and policies to more effectively meet Sri Lanka's maritime security objectives. This requires a review of existing maritime security agreements and a better awareness of the threat dynamics in the region.

Therefore, this thesis uses a qualitative exploratory research methodology to address potential approaches for the Sri Lanka Navy (SLN) to counter, deter, or reduce the threat from narcoterrorism. Following the identified methodology, this thesis includes a literature review as well as three case study analyses of Seychelles, Mexico, and Thailand to determine which variables (such as material and monetary resources, institutions, and regional partnerships) contribute most to maritime security capabilities. System dynamics modeling is then used to analyze non-linear feedback mechanisms within Sri Lanka's maritime security system to evaluate potential behavioral outcomes resulting from proposed policies and approaches to disrupt drug trafficking and non-traditional threats in Sri Lanka's EEZ and within the IOR.

The SLN and Regional Drug Countermeasures Model developed in this thesis shows that counter maritime security incidents, counter-drug patrols/operations, and partner counter-drug patrol numbers can be changed through the user interface. This can enable users to understand the behaviors of outcomes that are important to decision makers. Based on the contribution of four SLN naval units, supplemented by patrols by two units from partner-nation navies, and factoring in 18 months of delay to gain partner nations' support, the model provided a result of three incidents. Further, when the number of Sri Lankan patrols was increased along with the number of partner-nation contributed patrols in the model, the resulting number of maritime security incidents decreased from

[4] Cody T. Smith, "Century of the Seas: Unlocking Indian Maritime Strategy in the 21st Century" (master's thesis, Naval Postgraduate School, 2017), 75–78, http://hdl.handle.net/10945/56178.

five to one per month. These results are important and helpful for SLN decision makers to understand and plan future maritime security operations, enhance diplomatic relations, and build up regional agreements to ascertain partner support.

As just mentioned, maritime security incidents, counter-drug patrols/operations, and partner counter-drug patrol numbers can be changed through the user interface. Therefore, the user interface is important for better understanding the behaviors of the model. Perhaps the most challenging factor is the delay needed to gain partner support for counter-drug operations. Delaying agreements and diplomatic negotiations to ascertain partner support could change the outcomes of the model. If a delay of 30 months is required to gain partner support, for example, the number of maritime security incidents remains at three per month.

This thesis documents how achieving enhanced maritime security by disrupting drug trafficking in Sri Lanka's EEZ and IOR is difficult without expanded capabilities and resources such as platforms, intelligence sharing, technology, and regional and international agreements. Consequently, the thesis also offers sustainable and achievable recommendations for actions and policies to meet this objective. These recommendations are based on the findings of this thesis which show how different countries have initiated successful maritime security cooperation programs and strengthened legal entities through regional and international cooperation with nations and international actors.

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I. INTRODUCTION

A. BACKGROUND

The economy and balance of power of the world are significantly influenced by the Indian Ocean. Today, responsibility for maintaining the security of the area's maritime domain rests primarily with the islands and coastal nations in the Indian Ocean region (IOR). However, coastal and island nations face enormous challenges from emerging traditional and non-traditional maritime security challenges in this region. Sri Lanka, the second-largest island nation in the IOR, has 1,340 kilometers of coastline, 65,610 square kilometers of land area, and 510,000 square kilometers of an Exclusive Economic Zone (EEZ).[1]

Being an island nation, Sri Lanka faces the traditional and non-traditional maritime security challenges prevalent in the IOR. In particular,drug trafficking menaces Sri Lanka's EEZ and poses a significant threat to Sri Lanka and other coastal and island nations in the region. It is the mission of the Sri Lanka Navy (SLN) to prevent maritime security incidents in the nation's EEZ and to support such efforts throughout the IOR.[2] India, Pakistan, Bangladesh, and Myanmar are major coastal nations, and Sri Lanka, Seychelles, Mauritius, Madagascar, Comoros, Reunion, Andaman Nicobar, and the Maldives are the main island nations in the region.

The SLN has adopted a maritime surveillance patrol system based on intelligence and deployed its available naval assets to disrupt narcoterrorism in the EEZ and IOR.[3] Yet, achieving enhanced maritime security in the region is difficult without expanded capabilities and resources. To help the Sri Lanka and its partner nations identify what resources are needed to meet their maritime security objectives, this thesis addresses gaps in existing maritime security cooperation research and offers recommendations for

[1] Sri Lanka Navy Headquarters, *Maritime Doctrine of Sri Lanka (MDSL)*, SLN BR 1 (Colombo, Sri Lanka: Navy Headquarters, 2020), 166, https://www.navy.lk/assets/images/english/Doctrine/br_01/mobile/index.html#p=1.

[2] Sri Lanka Navy Headquarters, 60–61.

[3] Sri Lanka Navy Headquarters.

actions and policies to combat drug trafficking in the IOR. Over the last five years, the Sri Lanka Navy has struggled to apprehend drug traffickers and seize different types of drugs smuggled in varying quantities, as indicated by the SLN drug seizure operations data presented in Table 1.

Table 1. SLN Drug Seizure Operations Data.[4]

Year	Heroin # of incidents	Hashish # of incidents	Methamphetamine # of incidents	Ketamine # of incidents	Cannabis # of incidents
2016	01	-	-	-	08
2017	-	-	-	-	07
2018	01	-	-	-	08
2019	07	02	01	-	16
2020	06	-	06	01	27
2021	07	01	03	-	27
May 2022	04	-	03	-	05
Total incidents	**26**	**03**	**13**	**01**	**98**
Total Weight	**3791.692**	**88.141**	**940.946**	**581.034**	**11996.68**

Weights in Kilograms

The South Asian Association of Regional Cooperation (SAARC) and the United Nations Office on Drugs and Crimes (UNODC) are the leading international organizations intended to address concerns about regional maritime security.[5] Regional cooperation programs and training programs are available to counter non-traditional threats in the IOR, but there has been little research to determine which reforms are most effective. Therefore, this thesis analyzes the drug-trafficking problem and determines effective countermeasures and reforms to combat the drug-trafficking problem.

[4] Adapted from Sri Lanka Navy, *Compendium of Drug Seizures at Sea by Sri Lanka Navy* (Colombo, Sri Lanka: Navy Headquarters, 2021) with updated information provided by the office of the Director of Intelligence, Sri Lanka Navy.

[5] "UNODC Conducts Exercise to Counter Maritime Crime in Sri Lanka," United Nations Office on Drugs and Crime, January 7, 2020, //www.unodc.org/unodc/en/frontpage/2020/January/unodc-conducts-exercise-to-counter-maritime-crime-in-sri-lanka.html.

B. RESEARCH QUESTION

The research question explored by this thesis is, how can the SLN's counter drug-trafficking operations be improved to disrupt drug trafficking in Sri Lanka's EEZ and in the IOR to ensure better maritime security?

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II. LITERATURE REVIEW

> Whoever controls the Indian Ocean dominates Asia. This ocean is the key to the seven seas in the twenty-first century, the destiny of the world will be decided in these waters.
>
> —Alfred Thayer Mahan[6]

The Indian Ocean is significant to global trade and the balance of power. The Indian Ocean covers 20 percent of the Earth's surface, and its position connecting the Pacific and the Atlantic Oceans, along with their associated Sea Lines of Communication (SLOC), has transformed the Indian Ocean into a significant region for global trade and energy transfer, as well as maritime security concerns.[7] Indian maritime security studies specialist Priyanjoli Ghosh emphasizes the geostrategic importance of the IOR for global maritime commerce and the power balance of the region in his 2020 journal article "India's Indian Ocean Region Strategy."[8] Geopolitics and foreign affairs author Robert D. Kaplan asserts that the Indian Ocean and Asian regional dynamics are of great concern for strategic competition in the 21st century.[9] Kaplan further emphasizes that this dynamic area (which includes India, Bangladesh, Tanzania, Burma, Oman, Pakistan, China, Indonesia, and Sri Lanka) has become crucial to U.S. power. This region is now a vital aspect of the world's economic future and the Global Power Competition (GPC).[10]

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[6] P. K. Ghosh, "Maritime Security Challenges in South Asia and the Indian Ocean: Response Strategies," in *American-Pacific Sealanes Security Institute Conference on Maritime Security in Asia* (Honolulu, HI: Center for Strategic and International Studies, 2004), 1, https://www.navedu.navy.mi.th/stg/databasestory/data/lawabout/law-aboutsea/Maritime%20Security%20Laws%20&%20Frameworks/Maritime%20Security%20in%20SEA.pdf.

[7] Sandy Gordon, *Security and Security Building in the Indian Ocean Region* (Canberra : Strategic and Defence Studies Centre, Research School of Pacific and Asian Studies, Australian National University, 1996), 18–28, https://openresearch-repository.anu.edu.au/handle/1885/216566.

[8] Priyanjoli Ghosh, "India's Indian Ocean Region Strategy," *Journal of Indo-Pacific Affairs* 3, no. 3 (Fall 2020): 146–50, https://media.defense.gov/2020/Aug/31/2002488089/-1/-1/1/GHOSH.PDF.

[9] Robert D. Kaplan, *Monsoon: The Indian Ocean and the Future of American Power* (New York: Random House, 2010), 5–17.

[10] Kaplan, 10–20.

Maritime security in the IOR must tackle the emergence of non-traditional and traditional threats. Maritime security studies specialist Priyanjoli Ghosh further addresses existing maritime security challenges that include rising narcoterrorism in the region.[11] Sri Lanka and other coastal and island nations in the IOR are also directly and indirectly vulnerable to narcoterrorism. Drugs are increasingly a threat to Sri Lanka, Seychelles, Maldives, and Mauritius. Therefore, the disruption of drug trafficking and narcoterrorism is important both to secure ocean commerce and to prevent terrorism.

Maritime security researchers of the Australian National Centre for Ocean Resources and Security (ANCORS), Sam Bateman and Anthony Bergin assert that many of the coastal and island nations in the IOR face enormous challenges from a variety of emerging maritime security threats such as Illegal Unreported Unregulated Fishing (IUUF), encroachment on sovereign economic exclusion zones (EEZ), terrorism, migration, narcotics trafficking, maritime piracy, and natural disasters.[12]

As the second-largest island nation in the IOR, with 1,340 kilometers of coastline and 65,610 square kilometers of a land area, Sri Lanka has an EEZ of 510,000 square kilometers that is eight times larger than the nation's land area.[13] Further, Sri Lanka's geographical position makes it highly vulnerable to transnational organized crime (TOC) and drug transit and implies a great responsibility to secure major global SLOCs that pass nearby.

According to the Maritime Strategy of Sri Lanka, to protect its own EEZ, Sri Lanka must largely contribute to ensuring several aspects of regional maritime security. "The Sri Lanka Navy's Maritime Strategy 2025, its roadmap for achieving this aim, was released in November 2016 in Colombo. The SLN's lack of resources, especially bigger ships, has resulted in weak security in the maritime domain of Sri Lanka."[14] While a

[11] Ghosh, "Maritime Security Challenges."

[12] Sam Bateman and Anthony Bergin, "New Challenges for Maritime Security in the Indian Ocean – an Australian Perspective," *Journal of the Indian Ocean Region* 7, no. 1 (July 2011): 117–25, https://doi.org/10.1080/19480881.2011.587335.

[13] Sri Lanka Navy Headquarters, *Maritime Doctrine of Sri Lanka (MDSL)*, 166.

[14] "Sri Lanka Navy Maritime Strategy 2025," Global Security, accessed February 15, 2022, https://www.globalsecurity.org/military/world/sri-lanka/navy-strategy.htm.

variety of maritime security challenges prevail in the IOR, drug trafficking is among the most significant and particularly affecting to the Ocean's global commerce and the security of regional nations.

At the same time, it is important to consider the geopolitical implications associated with regional maritime security concerns. For instance, Ghosh asserts that being a regional power, "In the wake of the COVID-19 pandemic, when the world order is expected to witness a geostrategic shift, India will aim at further strengthening its presence in the IOR. In this dynamic, India will look forward to building up the gambit with Indian Ocean littorals such as Sri Lanka, Maldives, Mauritius, and Seychelles to scrutinize the rise of China."[15] It is important to understand how India's posture will affect IOR maritime security concerns and partnerships.

Professor Aparajita Biswas's article, "Small Arms and Drug Trafficking in the Indian Ocean Region," states that Afghanistan, Iran, and Pakistan, known as the Golden Crescent, comprise the most significant for opium poppy cultivating region in the world and the Golden Triangle of Southeast Asia, which includes Burma, Thailand, and Laos, is located close to the IOR.[16] Pushpita Das, Associate Fellow at the Institute for Defense Studies and Analyses (IDSA), also explains in her book, *Drug Trafficking in India: A Case for Border Security*, that "both the east and west coasts of India have been major staging points for the smuggling of drugs. In the mid-1990s, the Tamil Nadu-Sri Lanka sector emerged as an important exit route for heroin smuggled in from Afghanistan and the [Makran coast of] Pakistan."[17]

From another perspective, Biswas discusses the link between narcoterrorism and arms trafficking in the IOR by the Liberation Tigers of Tamil Elam (LTTE) during the three decades (1983–2009) of separatist conflict. The LTTE engaged in drugs and arms trafficking to generate funds for purchasing sophisticated weapons, equipment (GPS,

[15] Ghosh, "India's Indian Ocean Region Strategy," 150.

[16] Aparajita Biswas, "Small Arms and Drug Trafficking in the Indian Ocean Region" (working paper, Centre for African Studies, 2008), https://archive.mu.ac.in/arts/social_science/african_studies/biswaswp.pdf.

[17] Pushpita Das, *Drug Trafficking in India: A Case for Border Security* (New Delhi: Institute for Defence Studies and Analyses, 2012), 34–35.

communication sets), and training facilities in Sri Lanka and abroad.[18] In 2009 the LTTE was defeated militarily by the Sri Lankan armed forces, ending three decades of internal conflict. However, drug trafficking and narcoterrorism remain a national and regional threat to security.[19] Further, Biswas explains that "the transnational narco-networks, now backed by armed insurgents, make anti narco-production or narco-trafficking drives immensely difficult."[20] Therefore, military and law enforcement measures by individual states without partner supports would not be an effective way to counter transnational narco-networks.[21]

According to the Maritime Doctrine of Sri Lanka (MDSL), the SLN has continued its efforts to address all types of maritime security challenges in Sri Lanka's EEZ and the adjacent areas of the IOR. That includes counter-narcotics trafficking in the EEZ and the region to help secure maritime commerce and to ensure better regional maritime security with the resources available in the SLN.[22]

Further, the MDSL discusses the IOR's vulnerability to arms and drug trafficking in the Bay of Bengal and Arabian Sea, which are extensively used by traffickers.[23] It has been noted that while annual consumption of heroin within Sri Lanka is minimal, the number of apprehensions involving the drug made each year at seaports, airports, and on fishing vessels is significant and alarming.[24] The SLN reportedly apprehended 3791.692 Kg of heroin, 940.946 Kg of crystal methamphetamine (ICE), 581.034 Kg of ketamine, 88.141 Kg of hashish and Cannabis 11996.68 Kg from January 2016 to May 2022 in the EEZ of Sri Lanka.[25] Iranian, Pakistani, and Sri Lankan drug traffickers were also

[18] Biswas, "Small Arms and Drug Trafficking."

[19] Mitchell Sutton and Serge DeSilva Ranasinghe, *Transnational Crime in Sri Lanka: Future Considerations for International Cooperation* (Barton ACT, Australia: Australian Strategic Policy Institute, 2016), 7–11, https://www.aspi.org.au/report/transnational-crime-sri-lanka-future-considerations-international-cooperation.

[20] Biswas, "Small Arms and Drug Trafficking."

[21] Biswas.

[22] Sri Lanka Navy Headquarters, *Maritime Doctrine of Sri Lanka (MDSL)*, 48–65.

[23] Sri Lanka Navy Headquarters, 60.

[24] Sri Lanka Navy Headquarters, 60–61.

[25] Sri Lanka Navy, *Compendium of Drug Seizures at Sea*.

apprehended during those operations, along with the fishing trawlers they used to conceal their illicit trade within the general fishing community at sea. These statistical data highlight the existing drug trafficking threat to the country.

According to the study *Transnational Crime in Sri Lanka*, by Australia-based maritime security experts, Mitchell Sutton and Serge De Silva-Ranasinghe, "at the regional and global levels, Sri Lanka has engaged in a number of initiatives to counter drug trafficking, people smuggling, money laundering, and maritime crime. Most of its law enforcement cooperation efforts at the coordination level have been with the South Asian Association for Regional Cooperation (SAARC)."[26] As Sutton and De Silva-Ranasinghe note, Sri Lanka and regional countries in the IOR have used the SAARC to cooperate on law enforcement efforts. Further, the authors mention that the SAARC selected Sri Lanka as the center to establish the SAARC Convention on Narcotic Drugs and Psychotropic Substances (1990), the Colombo-based SAARC Drug Offences Monitoring Desk (1992), the SAARC Conference on Cooperation in Police Matters (first held in Colombo in 1996), and the SAARC Coordination Group of Drug Law Enforcement Agencies.[27]

According to Article 108 of the 1982 "United Nations Convention of Law of the Sea" (UNCLOS), "All States shall cooperate in the suppression of illicit traffic in narcotic drugs and psychotropic substances engaged in by ships on the high seas contrary to international convention."[28] Sri Lanka ratified UNCLOS on July 19, 1994. Therefore, Sri Lanka and other coastal nations should find ways to ensure safer SLOCs by disrupting non-traditional threats, including drug trafficking, and bolster maritime security in the IOR.[29]

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[26] Sutton and Ranasinghe, *Transnational Crime in Sri Lanka*, 15.

[27] Sutton and Ranasinghe, 15–16.

[28] United Nations, *United Nations Convention on the Law of the Sea* (New York: Nova Science Publishers, 2008), 56, ProQuest.

[29] Buddhika Liyanagamage, "Future Maritime Security Concerns of the Sri Lanka Navy: Challenges versus Solutions" (master's thesis, Naval Postgraduate School, 2018), 1–3, http://hdl.handle.net/10945/61216.

Retired Indian naval officer Manoj Gupta, in his case study *Indian Ocean Region: Maritime Regimes for Regional Cooperation* asserted that "the Indian Ocean is arguably the world's least understood region in international relations."[30] Furthermore, Indian Ocean littorals have ignored maritime security threats for too long. Larger regional powers such as India and Pakistan, therefore, could assist with maritime security aspects in the IOR.[31]

Annual maritime security symposia, such as the "Galle Dialogue" maritime conference, and professional international training programs offered by UNODC to counter maritime security threats have enabled the SLN to become a key partner in the IOR maritime domain.[32]

A. GAPS IN THE LITERATURE

Researchers and scholars have identified narcoterrorism as a great threat in the IOR. Many have also cited cooperation among nations and the sharing of intelligence as key factors in the enhancement of maritime security.[33] However, there is a paucity of material that addresses how regional powers and small nations can best counter narcoterrorism and other non-traditional maritime security threats through regional coordination and cooperation and the implementation of sustainable mechanisms. As a first step, such an approach requires a review of existing agreements and a better awareness of the threat dynamics in the region in order to improve maritime law enforcement and security in the IOR.

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[30] Manoj Gupta, "Indian Ocean Region," in *Indian Ocean Region: Maritime Regimes for Regional Cooperation*, by Manoj Gupta (New York: Springer, 2010), 49–68, https://doi.org/10.1007/978-1-4419-5989-8_3.

[31] Manoj Gupta, "The New Regime for Ocean Governance," in *Indian Ocean Region: Maritime Regimes for Regional Cooperation*, by Manoj Gupta (New York: Springer, 2010), 17–47, https://doi.org/10.1007/978-1-4419-5989-8_2.

[32] "Galle Dialogue 2021: International Maritime Conference - Sri Lanka," Galle Dialogue 2021, accessed November 4, 2021, http://galledialogue.lk/; "UNODC Conducts Exercise to Counter Maritime Crime in Sri Lanka."

[33] Jamal Barnes and Daniel Baldino, "A Network Maritime Security Approach to Intelligence Sharing in the IOR," *Journal of the Indian Ocean Region* 14, no. 3 (2018): 315–30, https://doi.org/10.1080/19480881.2018.1519298.

Commodore (retired) Kazi Emdadul, founding member of Bangladesh Institute of Maritime Research and Development, asserts that maritime security has remained a low priority in the region. He opines that "non-traditional threat (NTS) is real and moving fast towards a cataclysmic situation, yet the regional forums' initiative seems like a pantomime and inadequate."[34]

Further, little research has been done to explain how small nations might benefit from maritime security and trade engagement with great power nations. The United States, China, and India may provide an opportunity for smaller nations to pursue more effective maritime security cooperation. The geographical position of Sri Lanka and its available naval assets have helped contribute to maritime security in the IOR, but expanded cooperation with these great power nations may be needed to enhance the capacities and capabilities of smaller nations like Sri Lanka in meeting this security objective.[35]

[34] Kazi Emdadul, "Maritime Security Challenges – Indian Ocean Region (IOR): Shared Concerns and Opportunities Way Ahead," *South Asia Journal*, March 18, 2021, http://southasiajournal.net/maritime-security-challenges-indian-ocean-region-ior-shared-concerns-and-opportunities-way-ahead/.

[35] Cody T. Smith, "Century of the Seas: Unlocking Indian Maritime Strategy in the 21st Century," (master's thesis, Naval Postgraduate School, 2017), 75–78, http://hdl.handle.net/10945/56178.

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III. METHODOLOGY

This thesis uses a qualitative exploratory research methodology to address potential approaches the Sri Lanka Navy can employ to counter, deter, or reduce the threat from narcoterrorism. This methodology includes a Literature Review (presented in Chapter II), case studies from related research, and qualitative and quantitative data for systems analysis and system dynamics modeling intended to explore possible approaches to disrupting drug trafficking and narcoterrorism in the EEZ of Sri Lanka to improve maritime security in the IOR. The exploratory research in this thesis is intended to help national security decision makers and the SLN. System dynamics modeling is used to analyze non-linear feedback mechanisms within Sri Lanka's maritime security system and to evaluate potential behavioral outcomes resulting from proposed policies to disrupt drug trafficking and non-traditional maritime threats in the EEZ of Sri Lanka and the IOR.

System dynamics models are calculus-based mathematical representations of an endogenous system that is generating problematic behavior. In this case, that problem is the scarcity of resources to counter narcotic trafficking in the proximity of Sri Lanka. These models consist of stocks (i.e., the accumulation or integration of measurable units), in-flows and out-flows (i.e., the rate, or differentiation, of accumulation), and converters that provide mathematic inputs to the flow equations or for analysis.[36]

Professor Norman Porter asserts in "The Value of System Dynamics (SD) Modeling in Policy Analytics and Planning" that "an efficacious planning and policy analysis process must be focused on enhancing the ability of decision-makers to make sense of an uncertain and complex environment."[37] System dynamics modeling may enhance the decision makers' understanding of systemic behaviors impacted by the

[36] Norman Wayne Porter, "The Value of System Dynamics Modeling in Policy Analytics and Planning," in *Policy Analytics, Modelling, and Informatics: Innovative Tools for Solving Complex Social Problems*, ed. J. Ramon Gil-Garcia, Theresa A. Pardo, and Luis F. Luna-Reyes (Cham, Switzerland: Springer International Publishing, 2018), 124, https://doi.org/10.1007/978-3-319-61762-6_6.

[37] Porter, 124.

capabilities of drug traffickers, the successes of the SLN's counter-drug operations, the effectiveness of partner nations' support for counter-drug operations, and the intelligence capabilities of the SLN and regional partners.[38]

[38] Porter, 124.

IV. CASE STUDIES ANALYSIS

This research uses cases studies to provide context for the existing narcoterrorism threat in Sri Lanka's EEZ and the IOR. Statistical data related to drugs apprehended within the EEZ by the SLN during the last five years (January 2016 to May 2022) will be used to illustrate the significance of this threat and the efforts made by the SLN to counter it.

A. BACKGROUND

At present, the SLN is conducting counter-drug operations by deploying existing resources to disrupt drug trafficking in Sri Lanka's EEZ and adjacent areas in the IOR. Sri Lanka claims an EEZ up to eight times larger than the nation's land area, as shown in as the map in Figure 1. This chapter is focused on three case studies to analyze the approaches taken by other nations to address their own drug trafficking problem in the IOR and elsewhere. Seychelles, Thailand, and Mexico are used as case studies to realize the dynamics of the drug-trafficking in these countries and the approaches they have taken to conduct counter-drug trafficking operations.

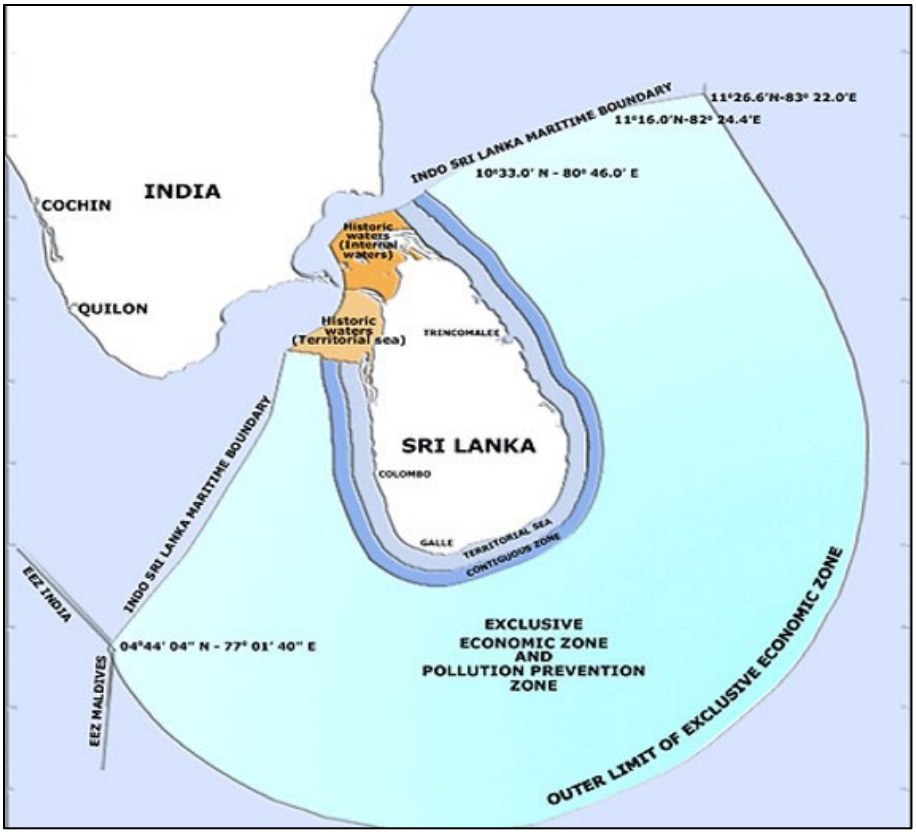

Figure 1. Map of Sri Lanka's EEZ[39]

The SLN's fleet units, which include Advanced Offshore Patrol Vessels (AOPV) and Offshore Patrol Vessels (OPV), are being deployed for counter-drug operations on the high seas while Fast Gun Boats (FGB), Coastal Patrol Vessels (CPV), Fast Attack Craft (FAC), and other classes of ships and craft are conducting other forms of counter-drug operations in the Sri Lankan littorals to ensure maritime security in coastal areas and the EEZ.[40] This effort is intended to suppress the influx of drugs and psychotropic substances into the country.

The SLN has identified a number of narcotics-trafficking routes, as well as the operating methods of trafficking vessels and smuggling vessels operating in the EEZ.[41]

[39] Source: Sri Lanka Navy Headquarters, *Maritime Doctrine of Sri Lanka (MDSL)*, 125.

[40] Sri Lanka Navy Headquarters.

[41] Sri Lanka Navy Headquarters.

Further, new strategies are being considered to enhance the SLN's success in counter-drug operations. Intelligence gathering and sharing are recognized as critical to the success of the SLN's counter-drug operations. However, existing regional mechanisms and resources need to be improved to achieve successful counter-drug operations in the EEZ of Sri Lanka and adjacent areas of the IOR.

B. SEYCHELLES'S COUNTER DRUG-TRAFFICKING EFFORTS

Seychelles is an archipelagic island nation in the Western Indian Ocean (WIO), comprising 115 islands and fewer than 100,000 permanent residents. Mahe, the main island of Seychelles, encompasses 451 square kilometers of landmass.[42] The island nation has an EEZ of 1.3 million square kilometers, making it the state with "the second largest EEZ bordering or within the Western Indian Ocean region."[43] The key routes of heroin flowing through the Western Indian Ocean and impacting Seychelles are depicted in Figure 2.

[42] James A. Malcolm and Linganaden Murday, "Small Islands' Understanding of Maritime Security: The Cases of Mauritius and Seychelles," *Journal of the Indian Ocean Region* 13, no. 2 (2017): 235–36, https://doi.org/10.1080/19480881.2017.1328018.

[43] Christian Bueger and Jan Stockbruegger, "Pirates, Drugs and Navies: Why the Western Indian Ocean Needs a New Security Architecture," *RUSI Journal* 161, no. 5 (2016): 47–48, https://doi.org/10.1080/03071847.2016.1253375.

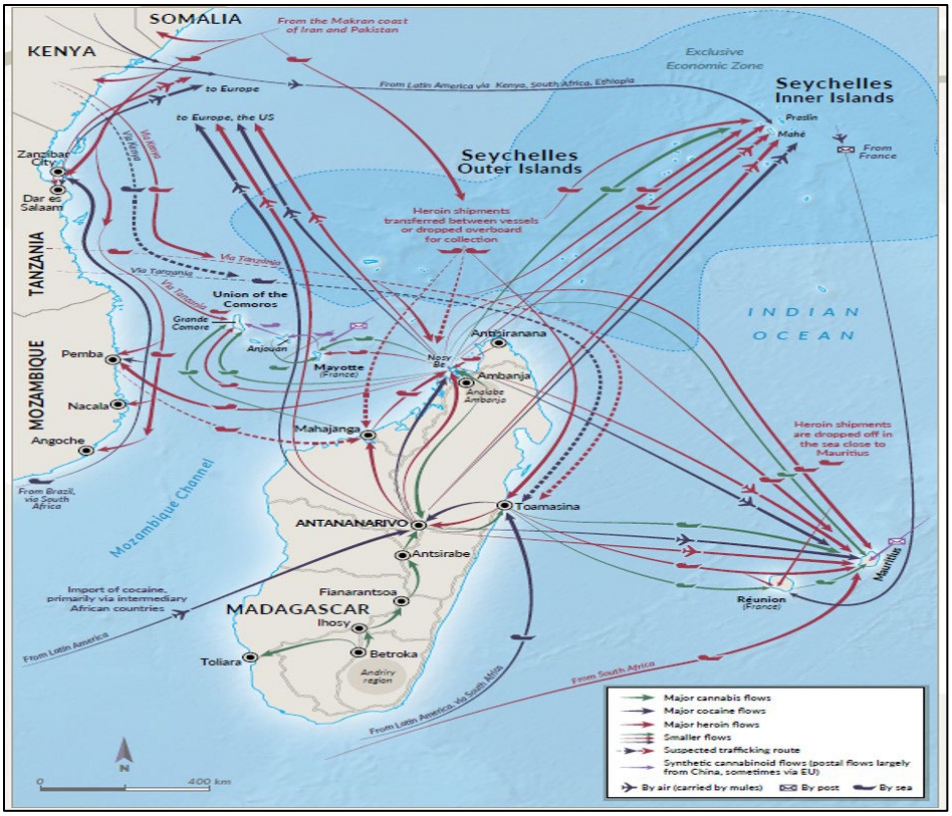

Figure 2. Key Heroin Flowing through the Western Indian Ocean[44]

Although Seychelles's EEZ is significantly greater than its land-based territories, its naval force is small, having only a limited number of ships for patrol.[45] Seychelles has a 600 kilometer long combined coastline and an oceanic shelf totaling 43,000 square kilometers.[46] Due to the size of its EEZ, Seychelles is confronted with the maritime security challenges that are prevalent in the IOR, such as illegal narcotics-trafficking, piracy, and IUU fishing.[47] These threats are particularly concerning as tourism and

[44] Source: Lucia Bird et al., *Changing Tides: The Evolving Illicit Drug Trade in the Western Indian Ocean* (Geneva: Global Initiative against Transnational Organized Crime, 2021), 8, https://globalinitiative.net/wp-content/uploads/2021/05/GITOC-Changing-Tides-The-evolving-illicit-drug-trade-in-the-western-Indian-Ocean.pdf.

[45] Bueger and Stockbruegger, "Pirates, Drugs and Navies."

[46] Alvine Marie and Christian Bueger, "Seychelles: Island Solutions and Capacity Building Successes," in *Capacity Building for Maritime Security: The Western Indian Ocean Experience*, ed. Christian Bueger, Timothy Edmunds, and Robert McCabe (Cham, Switzerland: Palgrave Macmillian, 2021), 201, https://doi.org/10.1007/978-3-030-50064-1_1.

[47] Bueger and Stockbruegger, "Pirates, Drugs and Navies," 48.

fisheries are the primary industries that contribute to the nation's gross domestic product (GDP).[48]

As a result of a shift in Afghan heroin being trafficked through the Southern Route, Seychelles waters have become a major drug trafficking route with that nation being seen increasingly as a target market. Opioids are transported via the Southern Route from Afghanistan to destinations in Africa, Europe, and Asia through Iran or Pakistan via the Indian Ocean.[49] The exploitation of the country both as a drug target market and drug-trafficking route has resulted in an enormous influx of heroin into the nation.[50] President Danny Faure, in his 2017 State of the Nation address, declared that "the country needed to wage two wars—one to reduce the quantity of drugs entering the country and one to reduce the demand for drug consumption in the country."[51] Increasing domestic support for drug trafficking and a subsequent increase in demand have resulted in well-funded businessmen moving into the illicit drug market. Both high and low-level drug dealers are enjoying a certain degree of protection from law enforcement entities in order to maintain drug businesses in Seychelles.[52]

Based on Automatic Identification System (AIS) data, more than 140, 000 vessels transit the Indian Ocean annually.[53] However, large numbers of small vessels, which are exempt from carrying AIS, also transit the Indian Ocean. According to Ghosh, "the Indian Ocean will remain one of the world's most strategic locations, with more than 75 percent of the world's maritime trade and 50 percent of daily global oil transfers passing

48 Marie and Bueger, "Seychelles," 201.

49 UN Office on Crime and Drugs, *World Drug Report 2016* (Vienna: UN Office on Crime and Drugs, 2016), https://www.unodc.org/doc/wdr2016/WORLD_DRUG_REPORT_2016_web.pdf.

50 Marie and Bueger, "Seychelles," 209.

51 Danny Faure, "State of the Nation Address 2017 - 14 February 2017 by President Danny Faure," State House: Office of the President of the Republic of the Seychelles, February 14, 2017, https://www.statehouse.gov.sc/speeches/3300/state-of-the-nation-address-2017-14-february-2017-by-president-danny-faure.

52 Bird et al., *Changing Tides*.

53 Bird et al., 47.

through the region."[54] Uncounted amounts of narcotics are the main illegal cargo moving through the Western Indian Ocean in huge quantities.

This volume of traffic has prompted international efforts, agreements, joint ventures, and treaties related to maritime security cooperation, but the island country's capacity for maritime surveillance continues to be inadequate. Regional islands in the Indian Ocean mainly depend on assistance from the long-standing interest of foreign powers operating in the region. Further, international security infrastructure in this region mainly involves France, India, the UK, the United States, China, and Japan.[55]

According to the Seychelles' blue economy strategy, while reducing its environmental risks and impacts, the country focuses on marine-based economic development to enhance well-being and social equity.[56] Therefore, to reap the country's blue economy benefits, maritime security is significant for Seychelles.[57] The Blue Economy Department of Seychelles, the National Maritime Domain Awareness Center, the Marine Spatial Planning effort, and a maritime security strategy are responsible for organizing and governing maritime security of the country.[58]

Lucia Bird et al. found that Seychelles is some of the highest heroin-consuming countries in the world. Around five percent of the population has been reported as heroin consumers, and a recent survey conducted by the government of Seychelles revealed drug consumption is continuing to rise.[59] This country is one of the main destinations of cannabis, heroin, and cocaine in the WIO.[60] Drug marketing dynamics in Seychelles are

[54] Ghosh, "India's Indian Ocean Region Strategy," 150.

[55] Bird et al., *Changing Tides*.

[56] Marie-Therese Purvis, "Seychelles Blue Economy Strategy," *Island Studies*, no. 3 (2015): 14–19, https://unisey.ac.sc/wp-content/uploads/Island-Studies-Issue-3.pdf.

[57] Purvis, 50–57.

[58] Marie and Bueger, "Seychelles."

[59] Bird et al., *Changing Tides*, 3.

[60] Bird et al., 3.

dominated by the control of a limited number of drug importers. Distribution is conducted by domestic networks and intermediaries.[61]

Counter narcotics operations in Seychelles were managed by the National Drug Enforcement Agency (NDEA) until 2018 and thereafter by the Anti-Narcotics Bureau (ANB). The Visible Policing and Specialized Operation division of the Seychelles Police Department amalgamated the ANB, which was created by the NDEA.[62] Maximizing resources and providing oversight for the Commissioner of Police were the main goals of the newly created organization. By 2019, the ANB received four fast Yamaha jet skis from the United Arab Emirates (UAE) to enhance its maritime patrol capabilities.[63]

NDEA operations, such as searching of dhow boats transiting through Seychelles EEZ, are frequently supported by Seychelles Coast Guard (SCG) patrols on the outlying islands. The NDEA operates in ports as well. According to NDEA capabilities, the agency can operate up to 50 nm from shore, but they must depend on the SCG for support. NDEA argued that this can be problematic, which may be due to intelligence breaches.[64] The NDEA also cooperates with international actors such as the Combined Maritime Forces (CMF) under U.S. command[65] and the Southern Route Partnership (SRP) established by UNODC.[66] However, according to Joanna Wright, "as the deployment of naval vessels to CMF is voluntary and is secondary national tasking and commitments of member states, the allocation of naval assets to CMF have not synchronized well with the high dhow activity periods for drug trafficking."[67]This

[61] Bird et al., 3.

[62] "Transforming Year for Drug Enforcement in Seychelles," Seychelles Nation, December 29, 2017, https://www.nation.sc/archive/257141/transforming-year-for-drug-enforcement-in-seychelles.

[63] Marie and Bueger, "Seychelles," 211.

[64] Marie and Bueger, 211.

[65] "Combined Maritime Forces (CMF): A 34-Nation Naval Partnership," Combined Maritime Forces (CMF), accessed September 8, 2022, https://combinedmaritimeforces.com/.

[66] Marie and Bueger, "Seychelles," 211.

[67] Joanna Wright, "Drug Trafficking on the Southern Route and Impact on Coastal States" (High Level Meeting of Interior Ministers of the Indian Ocean Region, Colombo, Sri Lanka, 2016), 11, http://www.southernroute.org/download/Drug%20Trafficking%20on%20the%20Southern%20Route.pdf.

highlights the requirement of deploying assets at the correct time for counter-drug operations.[68]

According to India's regional maritime security strategy, Seychelles has been granted two offshore patrol vessels, maritime reconnaissance aircraft, and a Dornier aircraft. Further, India has provided five million USD as a defense grant for infrastructure and a coastal radar surveillance system to enhance maritime surveillance capabilities. The UAE has also donated two coast guard vessels and 15 million USD for the construction of coast guard facilities.[69] In addition, the coalition navies Combined Task Force (CTF) 150 is the leading international maritime force operating in the WIO region to combat narcotics trafficking.[70]

With its headquarters in Mauritius, the Indian Ocean Rim Association (IORA) was established in 1997 to enhance multilateral regional cooperation for the maintenance IOR maritime security and safety.[71] Seychelles is an active member country of the IORA. Further, the IORA has begun to discuss a maritime security strategy for capacity building to strengthen regional maritime security.[72] However, a huge effort would be required to make the IORA an effective platform for maritime security policy formation in the IOR.[73]

According to Christian Bueger and Jan Stockbruegger, many of the IOR international actors are in charge of maritime security tasks. Those tasks include multilateral agreements to combat piracy, "the Djibouti Code of conduct (DCoC), the European Union's program to maintain the Eastern and South Africa-Indian Ocean Region (MASE) regional maritime security, and the Indian Ocean Forum on Maritime

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[68] Wright, 11.

[69] Marie and Bueger, "Seychelles," 216.

[70] Combined Maritime Forces, "CTF 150: Maritime Security," Combined Maritime Forces (CMF), September 17, 2010, https://combinedmaritimeforces.com/ctf-150-maritime-security/.

[71] Bueger and Stockbruegger, "Pirates, Drugs and Navies."

[72] "About IORA," Indian Ocean Rim Association, accessed August 25, 2022, https://www.iora.int/en/about/about-iora.

[73] Bueger and Stockbruegger, "Pirates, Drugs and Navies."

Crime (IOFMC) organized by the UNODC."[74] These multilateral maritime security mechanisms are intended to address maritime security concerns in the IOR. Nevertheless, these projects often compete to serve as the key coordination mechanism center for enhancing regional capacity.[75]

As noted on the UNODC website, the IOW staff from the UNODC Global Maritime Crime Program (GMCP) Regional Office for East Africa is headquartered in Nairobi. This program is active in the following East African nations: Kenya, Angola, Mauritius, Comoros, Namibia, Seychelles, Pakistan, Tanzania, and Madagascar. It has vast experience and knowledge in aiding regional states in their battle against maritime offences. As part of its mandate, the IOW team is devoted to assisting the member states in enhancing regional and international collaboration and strengthening their capacities to apply the legislation to combat serious organized crime in the maritime sector.[76]

Further, according to the UNODC, through full-time mentorship and training programs that are tailored to the individual requirements of the participating agencies, the IOW assists in increasing the capacity of maritime law enforcement agencies. Additionally, it oversees the SRP, a program for national drug enforcement and international partners to coordinate and recognize priority locations to bolster the response from the region. Additionally, the initiative supports information exchange through the development of the capacity of Maritime Domain Awareness (MDA), which includes the creation of land-based technology to enhance the MDA's imaging as well as the ability to identify dark vessels for behavioral analysis.[77]

In 2020, UNODC's GMCP held three maritime law enforcement Visit Board Search and Seizure (VBSS) training sessions in Seychelles, supported by the U.S. Bureau

[74] Bueger and Stockbruegger.

[75] Bueger and Stockbruegger.

[76] United Nations Office on Drugs and Crime, "Indian Ocean West," accessed August 11, 2022, https://www.unodc.org/unodc/en/piracy/Indian-Ocean.html.

[77] UN Office on Drugs and Crime.

of Oceans and International Environmental and Scientific Affairs.[78] These courses were designed to improve Seychelles' ability to combat crimes onboard fishing vessels. The Seychelles Coast Guard, Marine Police Unit, and Anti-Narcotics Bureau, Fishing Authority, and Seychelles Customs joined for the first time during these VBSS courses.[79]

To summarize, Seychelles is an archipelagic island and claims an EEZ spanning 1.3 million square kilometers. Due to its large EEZ, Seychelles is confronted with many of the non-traditional and traditional maritime threats that prevail in the IOR. According to the blue economy strategy of the country, maritime security is vital if Seychelles is to meet its economic and security objectives.

The IOR will continue as one of the most strategically significant maritime areas in the world, hosting more than 75 percent of global trade and 50 percent of the daily global oil transit.[80] However, the western Indian Ocean is also used to transport an unaccounted amount of illicit cargo, with narcotics being the most prevalent form. As heroin from Afghanistan is being trafficked via the Southern Route, the Seychelles waterways have become the main conduit for drug trafficking and the island nation is seen as a target drug market. The volume of traffic has prompted initiatives for international maritime security cooperation, collaboration, treaties, joint ventures, and partnerships, yet this country continues to face difficulties due to the inadequate maritime surveillance capacity of the island nations.

One of the countries with the highest heroin consumption rates worldwide, relative to its population, is Seychelles. Counter narcotics operations in Seychelles are managed by the NDEA, ANB, and the Seychelles Coast Guard. These agencies cooperate with the U.S.-led CMF and Southern Route Partnership developed by the UNODC. Also, to enhance capacity and capabilities, international partners' support is critically important

78 UN Office on Drugs and Crime, "UNODC GMCP Seychelles Hosts First Maritime Law Enforcement Courses Aimed at Combating Crimes on Board Fishing Vessels," United Nations Office on Drugs and Crime, September 4, 2020, https://www.unodc.org/unodc/frontpage/2020/September/unodc-gmcp-seychelles-hosts-first-maritime-law-enforcement-courses-aimed-at-combatting-crimes-on-board-fishing-vessels.html.

79 UN Office on Drugs and Crime.

80 Ghosh, "India's Indian Ocean Region Strategy," 150.

to Seychelles, since the country has a limited number of platforms and resources for addressing its maritime security challenges, particularly narcotics trafficking.

International partner support is a critical need for the small developing nations in the IOR. Therefore, many of the IOR maritime security and intelligence-sharing measures are under the control of international actors. Those measures include Multilateral Counter-Piracy agreements, the Djibouti Code of Conduct European Union Program, MASE, and the IOFMC organized by the UNODC.[81] These multilateral maritime security mechanisms are intended to address maritime security concerns in the IOR. Yet, these projects often compete as the central coordination mechanism for regional capacity building. Therefore, coordination of these agencies is the key to implementing a better maritime security strategy for the region, as identified from the literature.[82]

India and the UAE are the primary countries that have supported Seychelle's counter-drug operations by providing platforms, funds, and other resources. The CTF 150 is the most prominent maritime multinational maritime force conducting operations to counter narcotics trafficking in the WIO region. Additionally, the IORA and the UNODC have begun to discuss a maritime security strategy and how to enhance regional capacity building, respectively. Most of the aforementioned initiatives represent important contributions for developing countries in the IOR to enhance their capacities to counter maritime security challenges in the region. Nonetheless, an effective objective-centric roadmap has yet to be developed by nations in the WIO region. This is crucial to manage resources effectively and to obtain benefits from international actors, agencies, and interested parties in the IOR to meet the nations' maritime security interests.

C. THAILAND'S COUNTER DRUG-TRAFFICKING EFFORTS

Thailand is a Southeast-Asian country located in the Indochinese peninsula. Its land area totals about 513,120 square kilometers. The country is bordered by Cambodia,

[81] Bueger and Stockbruegger, "Pirates, Drugs and Navies," 50.

[82] Bueger and Stockbruegger.

Laos, Myanmar, Malaysia, the Gulf of Thailand, and the Andaman Sea, as depicted in the Map of Thailand in Figure 3.

Figure 3. Map of Thailand[83]

Thailand's maritime borders are shared with Vietnam to the southeast and India and Indonesia to the southwest. The Gulf of Thailand covers a total area of 320,000 square kilometers and has a length of about 800 kilometers and a width of 560 kilometers. At its deepest point, the Gulf is 85 meters, and 58 meters at its average depth.[84]

[83] Source: Diptarka Ghosh, "Gulf of Thailand," WorldAtlas, March 24, 2021, https://www.worldatlas.com/gulfs/gulf-of-thailand.html.

[84] Ghosh.

Thailand is one of the countries that belongs to the "Golden Triangle" where major heroin, opium, and other illicit drug production takes place in the Southeast Asian region. Laos and Myanmar are the other two countries that comprise the "Golden Triangle," one of the world's predominant regions for the production of narcotic drugs.[85] The first and third largest opium poppy cultivators in the Golden Triangle are Myanmar and Laos; these poppies are later transformed into heroin.[86] Thailand has become a major transit hub of narcotics and also has a significant level of consumers due to its proximity to these two nations.

Illicit drug distribution networks have made the Golden Triangle significant as part of the illicit drug trafficking route, enabling the transport of refined heroin and amphetamine through Thailand, making drug trafficking the most significant threat encountered by the Association of Southeast Asian Nations (ASEAN) member countries.[87] According to Ralf Emmers, "Myanmar, Thailand, and Laos are major producers of narcotics and transit points for drugs sent to North America, Europe and other parts of Asia."[88]

According to the 2022 UNODC annual report, a population survey in 2019 revealed that 0.7 percent had used crystalline methamphetamine in the past year, while 1.3 percent had used methamphetamine pills ("Yaba"), altogether representing approximately one million people.[89] Meanwhile, Thailand's Office of Narcotic Control Board (ONCB), the Royal Thai Navy, the Thai Coast Guard, Police, and Marine Police departments continue operations to fight against illicit drugs in Thailand and across their

[85] Ralf Emmers, *The Threat of Transnational Crime in Southeast Asia: Drug Trafficking, Human Smuggling and Trafficking, and Sea Piracy* (Singapore: Institute of Defence and Strategic Studies, 2003), 3–4, https://www.redalyc.org/pdf/767/76711296006.pdf.

[86] Emmers, 4.

[87] Ralf Emmers, *The Securitization of Transnational Crime in ASEAN* (Singapore: Institute of Defence and Strategic Studies, 2002), 6, https://hdl.handle.net/10356/91080.

[88] Emmers, 6.

[89] UN Office on Drugs and Crime, *World Drug Report 2022* (Vienna: UN Office on Crime and Drugs, 2022), 61, https://www.unodc.org/res/wdr2022/MS/WDR22_Booklet_4.pdf.

borders and maritime domain.[90] According to UNODC's 2022 annual report, in 2019 and 2020, huge quantities of methamphetamine were seized in Thailand.[91]

Regional cooperation is recognized as being vitally important for countering non-traditional security challenges. To that end, the Bali Concord II has encouraged strong cooperation among ASEAN member states. Maritime security is included within the ASEAN Political-Security Community (APSC) pillar, and in 2004, Thailand's maritime strategy began including regional maritime security cooperation. Further, according to Bradford and Herrmann, "In 2004, Thailand was a founding member of the Japanese-initiated Regional Cooperation Agreement on Combating Piracy and Armed Robbery against Ships in Asia (ReCAAP) and in 2008 the kingdom became the fourth partner in the counterpiracy Malacca Strait Patrols (MSP)."[92] The Royal Thailand Navy (RTN) and RTN Riverine Patrol Regiment are responsible for countering non-traditional security threats, such as drug smuggling, in collaboration with other counter-drug operations agencies, at sea and on Thailand's main rivers.[93]

Cooperation of regional and extra-regional agencies contributes to counter drug operations in Thailand. The Joint Thai–U.S. task unit is one of the agencies that battles counter-drug trafficking operations in Thailand. Typically, the United States has extended cooperation by providing resources and services to partner nations. In 2020, the United States donated electronic equipment to the Royal Thai Government as part of a law enforcement partnership between the United States and Thailand. Thirty cameras were included in that equipment consignment for counter-drug operations in Thailand.[94]

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[90] Chiang Mai, "U.S. Government Supports Royal Thai Government to Fight Drug Trafficking," U.S. Embassy and Consulate in Thailand, February 12, 2020, https://th.usembassy.gov/u-s-government-supports-royal-thai-government-to-fight-drug-trafficking/.

[91] UN Office on Drugs and Crime, *World Drug Report 2022*.

[92] John F. Bradford and Wilfried A. Herrmann, "Thailand's Maritime Strategy: National Resilience and Regional Cooperation," *Journal of Indo-Pacific Affairs* 4, no. 9 (Winter 2021): 37, https://media.defense.gov/2021/Dec/12/2002907685/-1/-1/1/JIPA%20-%20BRADFORD%20&%20HERRMANN.PDF.

[93] Bradford and Herrmann, 32.

[94] Mai, "U.S. Government Supports Royal Thai Government."

The Chiang Mai Sensitive Investigative Unit (SIU) of the U.S. Drug Enforcement Administration (DEA) is comprised of investigators from the Office of Narcotic Control Board (ONCB), the Provincial Police Narcotics Suppression Unit (PPNSU), and the Royal Thai Police Narcotics Suppression Bureau (NSB).[95] The DEA has established offices in Bangkok, Udorn, and Chiang Mai to support DEA and the Thailand government's counter-narcotics operations targeting drug trafficking organizations responsible for drug supply to the United States and international market.[96] The SIU is comprised of embedded DEA agents and their intelligence analysts who provide assistance as advisors in investigation support, intelligence sharing, operational funding, and technical assistance to Thailand.[97]

According to the U.S. Embassy and Consulate in Thailand, in 2020 that embassy donated investigation tools to the Royal Thai Government as part of a law enforcement partnership between the United States and Thailand to counter transnational crime and drug trafficking.[98] The U.S. State Department's Bureau of International Narcotics and Law Enforcement Affairs (INL) provided the donation.[99] The INL has funded activities in Thailand to fight terrorism, illicit drugs, and crimes and provided material assistance to counter-drug and law enforcement activities for over 40 years, helping protect families and communities in Thailand from transnational crime and drug trafficking.[100]

As part of the United States and Thailand strategic partnership, the expansion and reinforcement of law enforcement cooperation could enhance Thailand's counter drug

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[95] Mai.

[96] "Drug Enforcement Administration (DEA)," U.S. Embassy and Consulate in Thailand, accessed October 4, 2022, https://th.usembassy.gov/embassy-consulate/bangkok/us-agencies/drug-enforcement-administration-dea/.

[97] Mai, "U.S. Government Supports Royal Thai Government."

[98] U.S. Embassy and Consulate in Thailand, "U.S. Government Commits to Countering Transnational Crime with Royal Thai Government," U.S. Embassy and Consulate in Thailand, accessed October 9, 2022, https://th.usembassy.gov/u-s-government-commits-to-countering-transnational-crime-with-royal-thai-government/#:~:text=On%20June%2024%2C%20the%20United,U.S.%2DThai%20law%20enforcement%20partnership.

[99] U.S. Embassy and Consulate in Thailand.

[100] U.S. Embassy and Consulate in Thailand.

operations by strengthening its agencies and law enforcement.[101] The Bangkok-based International Law Enforcement Academy (ILEA) is already fully utilized by the U.S. and Thai governments as part of their strategic alliance to improve coordination among law enforcement officers and build networks in the region.[102]

Meanwhile, the Royal Thai Marine Police (RTMP) and Thailand maritime law enforcement agencies work together with assistance from the UNODC for Thailand coastal drug operations.[103] Further, the UNODC's Global Maritime Crime Program extends training and technological assistance for these counter-drug operations. This program includes transferring high-endurance drones with high-resolution infrared cameras to enhance the day and night surveillance capabilities of units patrolling along the Mekong River, where Thai intelligence has revealed drug traffickers attempting to move their drug shipments.[104]

The Maritime Crime Coordination Office of UNODC in Southeast Asia and the Pacific also works with the agency on Maritime Trafficking Routes-Southeast Asia (MTR-SEA).[105] This includes maritime law enforcement and drug enforcement agencies at regional and national levels that study emerging maritime trafficking routes and report drug-trafficking incidents at sea by creating a list of Vessels of Interest (VOI).[106] Further, the Southeast Asia and the Pacific regional program has been designed from 2022 to 2026 under the patronage of UNODC. The response to Transnational Organized Crimes and illicit drug-trafficking are some of the program's key areas of focus. The

[101] Antony J. Blinken and Don Pramudwinai, "United States-Thailand Communiqué on Strategic Alliance and Partnership," Department of State Press Releases, July 10, 2022, https://www.state.gov/united-states-thailand-communique-on-strategic-alliance-and-partnership/.

[102] Blinken and Pramudwinai.

[103] "UNODC Provides a Technological Edge to Address Drug Trafficking on the Mekong River," UNODC Regional Office for Southeast Asia and the Pacific, September 23, 2021, https://www.unodc.org/roseap/en/2021/09/drug-trafficking-mekong-river/story.html.

[104] UN Office on Drugs and Crime.

[105] UN Office on Drugs and Crime.

[106] UN Office on Drugs and Crime.

program is part of UNODC's promise to fight existing crime and security challenges in the region.[107]

More than 70 years of bilateral relations and political exchange between India and Thailand paved the way for economic and security partnerships in the Andaman Sea, merging India's Look East policy and Thailand's Look West policy.[108] Further, the Indian navy and Thai navy have cooperated in the annual Indo-Thai Joint Working Group conferences since 2003. India and Thailand began bilateral navy-to-navy staff talks in 2008, to enhance maritime domain security cooperation. Additionally, bi-annual Coordinated Patrols (CORPAT) have been launched since 2005 to enhance interoperability and capabilities of both navies.[109] According to Mark Shawn Cogan and Vivek Mishra, "India's Andaman and Nicobar Command (ANC) has been a host to the CORPAT exercise since its inception, rotating alternately between India and Thailand."[110] This kind of joint exercise and cooperative patrols help to strengthen Thailand's counter-drug operation capabilities in the region.

Further, moving ahead from the bilateral framework to the multilateral, the Royal Thai Navy and the Indian Navy coordinate with several fora for maritime security cooperation, including taking part in the Multilateral Naval Exercises (MILAN) organized by the Indian Navy every two years under the patronage of the ANC.[111] Thailand is one of the few countries that took part in the 1995 inaugural MILAN. Like CORPAT, the MILAN is also a platform for maritime security cooperation in regions important to India, Thailand, and some other countries in Southeast and South Asia.

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[107] "A New Regional Programme for Southeast Asia and the Pacific Takes Form for 2022–2026," United Nations Office on Drugs and Crime, March 30, 2022, https://www.unodc.org/unodc/en/frontpage/2022/March/a-new-regional-programme-for-southeast-asia-and-the-pacific-takes-form-for-20222026.html.

[108] Mark Shawn Cogan and Vivek Mishra, "India–Thailand Security Cooperation: Strengthening the Indo-Pacific Resolve," *Journal of Asian Security and International Affairs* 7, no. 1 (2020): 36–56, https://doi.org/10.1177/2347797020906651.

[109] Cogan and Mishra.

[110] Cogan and Mishra, 45.

[111] Cogan and Mishra, 46.

The Indian Ocean Naval Symposium (IONS) is another maritime security initiative involving India and Thailand. The IONS is a dialogue for the regional maritime security concept launched in 2008 by the Indian Navy.[112] The IONS, a common platform for India and Thailand, comprises 32 countries of four littoral groups with Thailand in Southeast Asia and the Australian Littorals category.[113] These maritime security initiatives are very important for Thailand and other regional countries to enhance their capacities to counter regional maritime security threats.

The Bay of Bengal Initiative for Multi-Sectorial Technical and Economic Cooperation (BIMSTEC) is a major counterterrorism program initiated in 1997 by countries in the Bay of Bengal, including India, Thailand, Nepal, Sri Lanka, Bhutan, Myanmar, and Bangladesh.[114] The BIMSTEC became more focused on counterterrorism after the July 2004 Summit Declaration in Bangkok.[115] According to the Summit Declaration, BIMSTEC countries would cooperate with one another and the international community to fight terrorism through information sharing and facilitation. In 2008, Combating Transnational Organized Crime, Illicit Drug Trafficking, and International Terrorism were incorporated into the BIMSTEC Convention by member states.[116]

To summarize, although the ONCB, Thai military, and law enforcement agencies are engaged in counter-drug operations. Thailand has aligned with various domestic, regional, and international initiatives to battle illegal drug threat in the country and the region. Additionally, ASEAN cooperation with regional states to counter drug trafficking and related crimes is important for regional maritime security. Further, the United States and Thai joint task unit, BIMSTEC, ReCAAP, and UNODC programs also contribute to counter-drug operations in Thailand and Southeast Asia.

International partner support is critical in the Southeast Asia region, particularly for countering illicit drug operations in the Golden Triangle. The United States DEA SIU

[112] Cogan and Mishra, "India–Thailand Security Cooperation."

[113] Cogan and Mishra, 47.

[114] Cogan and Mishra.

[115] Cogan and Mishra.

[116] Cogan and Mishra, 41.

is one such partnership, providing technical assistance, operational funding, and intelligence sharing to Thailand. Further, this mission is focused on enhancing the ability of investigate, target, detect, and dismantle complex international drug trafficking organizations.[117]

Another source of international support comes from the UNODC GMCP, which provides training assistance and technological assistance for these counter-drug operations. The RTMP and Thailand maritime law enforcement agencies work together with assistance from UNODC to counter drug trafficking on Thailand's coast.

Further, India's and Thailand's CORPAT, MILAN, and IONS as well as ReCAAP are also important cooperative efforts to enhance Thailand's counter-drug operations and maritime security. Thailand is one of the countries that benefits from regional and extra-regional actors and organizations in terms of assets, intelligence sharing, technology, and interoperability capabilities with multinational agencies. This is essential in the Southeast Asian region if Thailand is to meet the nation's maritime security objective.

D. MEXICO'S COUNTER DRUG-TRAFFICKING EFFORTS

Unlike the previous cases, Mexico is a North American country bordered by the Caribbean Sea and the Gulf of Mexico to the East, the United States to the North, and the Pacific Ocean to the West, as depicted the map of Mexico in Figure 4. Mexico's land area covers 761,610 square miles (1,972,550 square kilometers).[118] In addition the Mexico–United States border extends 1,932 miles (3,110 kilometers).[119]

[117] Mai, "U.S. Government Supports Royal Thai Government."

[118] WorldAtlas, "Mexico Maps & Facts," WorldAtlas, February 25, 2021, https://www.worldatlas.com/maps/mexico.

[119] Jason Shvili, "Mexico–United States Border," WorldAtlas, September 13, 2021, https://www.worldatlas.com/places/mexico-united-states-border.html.

Figure 4. Map of Mexico[120]

Mexico has been fighting a long and deadly conflict with illicit drug dealers. However, Mexican authorities have been unable to gain appreciable success in disrupting drug cartels. Taken as hostages, thousands of Mexicans die every year during efforts to combat narco-trafficking and other drug-related crimes.[121] After becoming the president of Mexico, Felipe Calderón declared war on the cartels from 2006 to 2012 and increased the number of troops dedicated to the war on drugs during his six-year term.[122]

Mexican drug cartels largely influence the U.S. drug market and remain a problem for the United States. Production of heroin and methamphetamine production in

[120] Source: "Mexico Maps & Facts."

[121] Council on Foreign Relations, "Mexico's Long War: Drugs, Crime, and the Cartels," Council on Foreign Relations, September 7, 2022, https://www.cfr.org/backgrounder/mexicos-long-war-drugs-crime-and-cartels.

[122] Council on Foreign Relations.

Mexico is mainly carried out by domestic drug suppliers. Further, Mexican criminal organizations engage in transporting Colombian-produced cocaine to the United States. Typically, drug-trafficking organizations in Mexico produce and transport foreign-sourced drugs to the United States along the Southwest border. Nonetheless, given that drugs such as marijuana, cocaine, methamphetamine, heroin, and fentanyl are smuggled into the country through a variety of methods of entry, "the exact quantity of illicit narcotics entering the United States is unknown."[123]

In March 2007 former Mexican President Felipe Calderon requested assistance from the United States to battle the drug problem and halt cross-border smuggling activities. In response, under the Merida Initiative the United States offered a package of counter-drug assistance and rule-of-law assistance to Mexico. To fund the Merida Initiative, U.S. Congress authorized $1.5 billion from 2008 to 2010, and another $420.7 million in foreign military funding to purchase aircraft, helicopters, and other equipment to support Mexico's security forces.[124] Further, U.S. intelligence supported Mexico's strategy of arresting kingpins from major drug trafficking organizations. The United States has assisted its neighbor closely by providing billions of dollars to develop and improve security forces and restructure the Mexican judicial system to counter this drug threat.

Further, it is known that Mexico and China are the leading sources of fentanyl, which is a synthetic opioid up to 50 times stronger than heroin. Despite the fact that Mexican authorities were able to seize huge quantities of fentanyl between the years 2019 and 2020,[125] the number of drug overdose deaths in the United States

[123] Kristin Finklea, *Illicit Drug Smuggling between Ports of Entry and Border Barriers*, CRS Report No. R46218 (Washington, DC: Congressional Research Service, 2020), 6, https://crsreports.congress.gov/product/pdf/R/R46218.

[124] Clare Ribando Seelke, *U.S.-Mexico Security Cooperation: From the Mérida Initiative to the Bicentennial Framework*, CRS Report No. IF10578 (Washington, DC: Congressional Research Service, 2022), 1, https://sgp.fas.org/crs/row/IF10578.pdf.

[125] Council on Foreign Relations, "Mexico's Long War."

increased by 30 percent during that period.[126] The magnitude of the fentanyl and synthetic drug threat to the United States from 2019 to 2021 is reflected in the data on drug overdose deaths presented in Figure 5.

According to the Centers for Disease Control and Prevention (CDC), the U.S. death toll from illicit drug overdoses and poisoning reached 107,375 during the last 12 months ending in January 2022.[127] Further, synthetic opioids like fentanyl were involved in 67 percent of those deaths.[128]

[126] Mbabazi Kariisa et al., "Vital Signs: Drug Overdose Deaths, by Selected Sociodemographic and Social Determinants of Health Characteristics – 25 States and the District of Columbia, 2019–2020," *Morbidity and Mortality Weekly Report* 71, no. 29 (July 22, 2022): 940, https://doi.org/10.15585/mmwr.mm7129e2.

[127] "DEA Recognizes First Ever National Fentanyl Awareness Day," DEA United States Drug Enforcement Administration, May 9, 2022, https://admin.dea.gov/press-releases/2022/05/09/dea-recognizes-first-ever-national-fentanyl-awareness-day.

[128] "Fentanyl Awareness," DEA Unites States Drug Enforcement Administration, accessed November 22, 2022, https://www.dea.gov/fentanylawareness.

Table. Characteristics of Adolescent Overdose Deaths, 2010, 2019, 2020, and 2021[a]

Characteristics	2010 Deaths, No.	2010 Rate	2019 Deaths, No.	2019 Rate	2020 Deaths, No.	2020 Rate	2020 Change, %	2021[b] Deaths, No.	2021[b] Rate	2021[b] Change, %
Total among overall population	38 329	12.41	70 630	21.52	91 799	27.86	29.48	101 954	31.06	11.48
Total among adolescents	518	2.40	492	2.36	954	4.57	94.03	1146	5.49	20.05
Substance										
Benzodiazepines	83	0.38	71	0.34	142	0.68	100.13	152	0.73	6.97
Cocaine	22	0.10	53	0.25	84	0.40	58.59	84	0.40	−0.07
Heroin	52	0.24	37	0.18	40	0.19	8.18	26	0.12	−35.04
Illicit fentanyls and synthetics	38	0.18	253	1.21	680	3.26	168.95	884	4.23	29.91
Methamphetamine	38	0.18	80	0.38	104	0.50	30.09	112	0.54	7.62
Prescription opioids	159	0.74	52	0.25	74	0.35	42.40	66	0.32	−10.87
Race and ethnicity[c]										
American Indian or Alaska Native, non-Hispanic	11	4.86	14	6.88	16	7.87	14.37	24	11.79	49.89
Black or African American, non-Hispanic	24	0.70	46	1.49	114	3.69	148.22	96	3.10	−15.92
Latinx	62	1.38	136	2.68	276	5.35	99.44	354	6.98	30.51
White, non-Hispanic	412	3.32	281	2.50	521	4.67	87.02	604	5.36	14.93

[a] Drug overdose deaths among high school-aged adolescents (14-18 years), shown as counts, and rates per 100 000 population for 2010, 2019, 2020, and 2021, compared with values for the all-age US population. Data for adolescents are also stratified by substance involved and race and ethnicity. Year-to-year percentage increases are shown for 2020 (relative to 2019) and 2021 (relative to 2020).

[b] 2021 refers to January to June 2021, and rates and counts have been annualized.

[c] Race and ethnicity were assessed in this study, as categorized in the underlying records, because recent data have suggested that racial and ethnic inequalities in overdose are increasing among the general population and may also be a concern among the adolescent population assessed herein.[5] Trends among Asian individuals were not included because of differences between the representation of this group in the preliminary and final databases used.

Figure 5. Drug Overdose Deaths in the United States, 2019 to 2021[129]

U.S. Customs and Border Protection (CBP) is an important entity in disrupting illicit trafficking from Mexico and other regional neighboring countries to the United States. According to the U.S. CBP, "with more than 60,000 employees, U.S. Customs and Border Protection, CBP, is one of the world's largest law enforcement organizations and is charged with keeping terrorists and their weapons out of the U.S. while facilitating lawful international travel and trade."[130] Enhancement of the nation's security through intelligence, innovation, trust, and collaboration is CBP's vision, and its mission consists of protecting the American people, enhancing economic prosperity, and safeguarding U.S. borders.[131]The Map of U.S.-Mexico Border is depicted in Figure 6.

[129] Source: Joseph Friedman, Morgan Godvin, and Chelsea L. Shover, "Trends in Drug Overdose Deaths among U.S. Adolescents, January 2010 to June 2021," *JAMA* 327, no. 14 (April 12, 2022): 1398, https://doi.org/10.1001/jama.2022.2847.

[130] U.S. U.S. Customs and Border Protection, "About CBP," U.S. Customs and Border Protection, accessed November 22, 2022, https://www.cbp.gov/about.

[131] U.S. U.S. Customs and Border Protection.

Figure 6. Map of U.S.-Mexico Border[132]

According to the CBP, during the Fiscal Year 2020, the U.S. CBP Air and Marine Operations (AMO) enforcement actions and initiatives apprehended 278,492 pounds of marijuana, 194,220 pounds of cocaine, and 15,985 pounds of methamphetamine; they also apprehended cash, weapons, and suspects during those operations.[133] The AMO confronts security threats at the country's border and beyond, with 1,800 federal agents, 300 vessels, and 240 aircraft, deployed throughout Puerto Rico, the U.S. Virgin Islands, and the United States.[134]

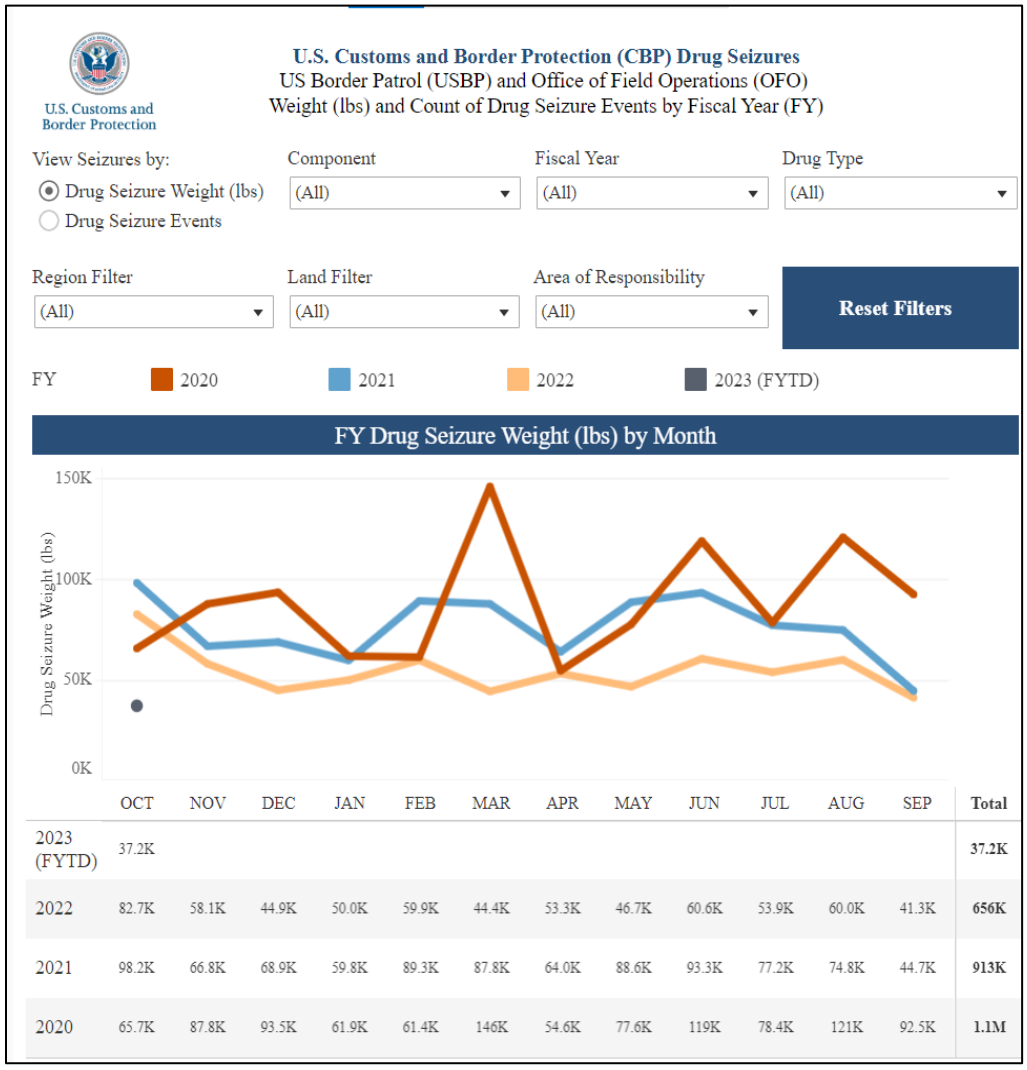
The U.S. CBP and Office of Field Operations (OFO) officers play a pivotal role in disrupting illegal drug trafficking to the United States. Most recently, in October 2022, they apprehended a huge quantity of hard narcotic substances, methamphetamines and cocaine worth over $6,100,000, during two separate

[132] Source: Shvili, "Mexico–United States Border."

[133] U.S. Customs and Border Protection, "CBP Air and Marine Operations and Partners Seize Nearly Two Tons of Cocaine Worth Over $58 Million," U.S. Customs and Border Protection, March 1, 2021, https://www.cbp.gov/newsroom/national-media-release/cbp-air-and-marine-operations-and-partners-seize-nearly-two-tons.

[134] U.S. Customs and Border Protection.

operations at the Americas Bridge and World Trade Bridge.[135] Figure 7 illustrates the CBP drug seizure statistics for Fiscal Years (FY) 2020 to 2023, and Figure 8 illustrates the statistics by drug type for FY 2022 and FY 2023.



	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	Total
2023 (FYTD)	37.2K												37.2K
2022	82.7K	58.1K	44.9K	50.0K	59.9K	44.4K	53.3K	46.7K	60.6K	53.9K	60.0K	41.3K	656K
2021	98.2K	66.8K	68.9K	59.8K	89.3K	87.8K	64.0K	88.6K	93.3K	77.2K	74.8K	44.7K	913K
2020	65.7K	87.8K	93.5K	61.9K	61.4K	146K	54.6K	77.6K	119K	78.4K	121K	92.5K	1.1M

Figure 7. CBP Drug Seizure Statistics, FY 2020 to FY 2023[136]

[135] U.S. Customs and Border Protection, "CBP Officers Seize $6.1 Million in Hard Narcotics at Laredo Port of Entry," U.S. Customs and Border Protection, November 1, 2022, https://www.cbp.gov/newsroom/local-media-release/cbp-officers-seize-61-million-hard-narcotics-laredo-port-entry.

[136] Source: "Drug Seizure Statistics FY2023," Drug Seizure Statistics, January 18, 2023, https://www.cbp.gov/newsroom/stats/drug-seizure-statistics.

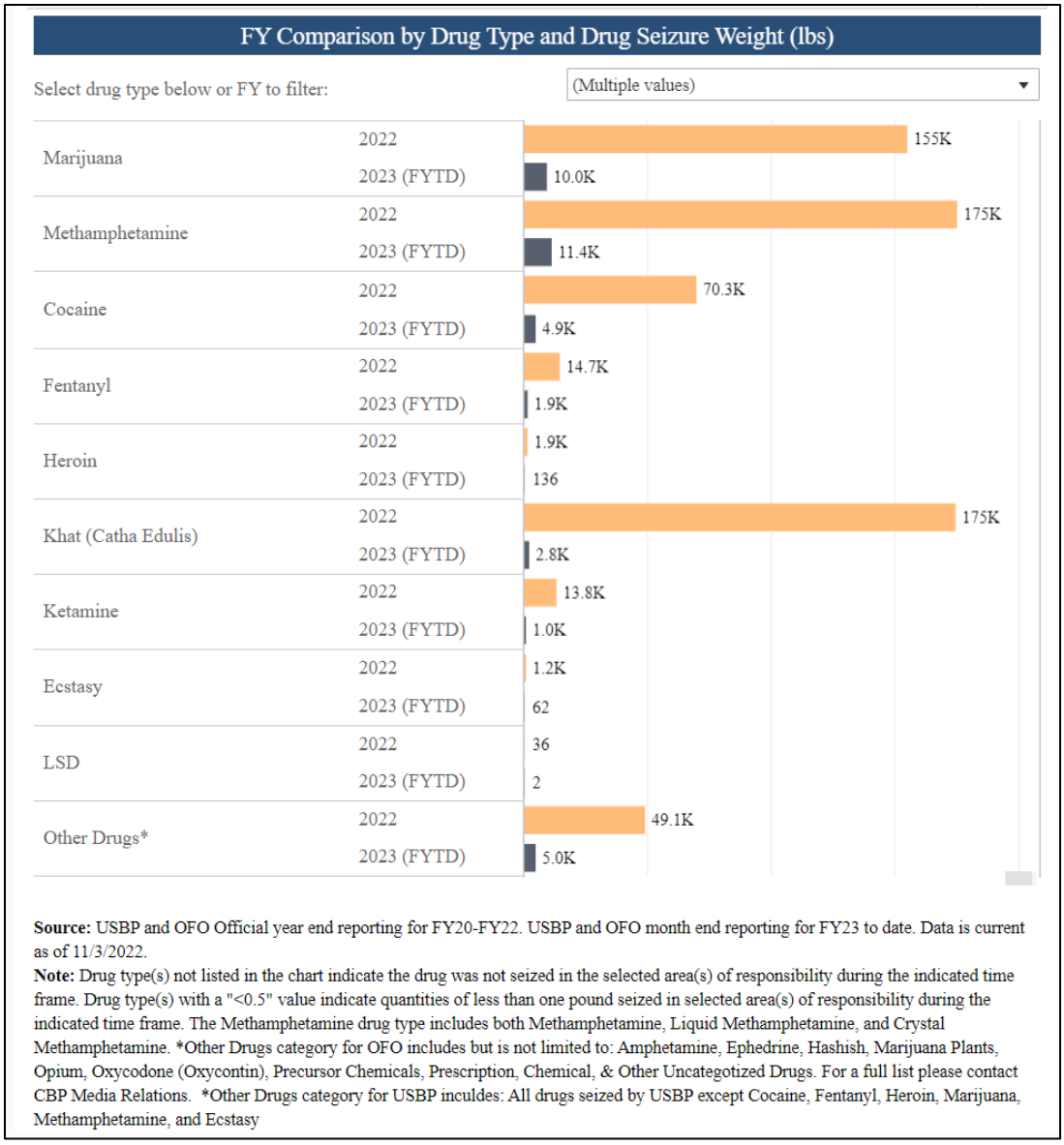


Figure 8. CBP Drug Seizures by Drug Type, FY 2022 and FY 2023[137]

Further, Figure 9 and Figure 10, show the breakdown of southwest land border encounters by the U.S. Border Patrol (USBP) Sector and OFO Field Office and depict the apprehension volume of illegal border entries.[138]

[137] Source: U.S. Customs and Border Protection.

[138] U.S. U.S. Customs and Border Protection, "CBP Officers Seize $6.1 Million in Hard Narcotics."

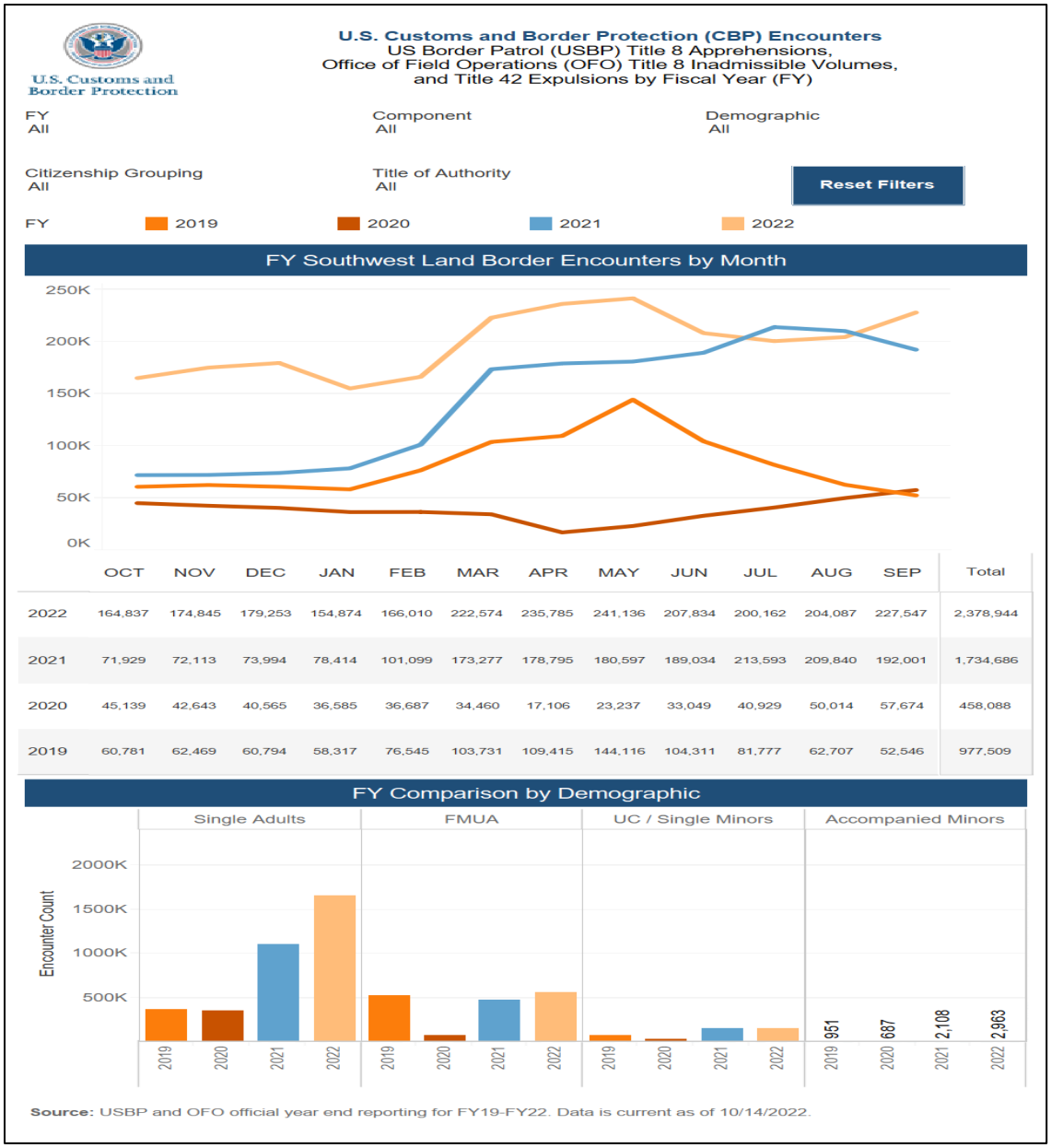
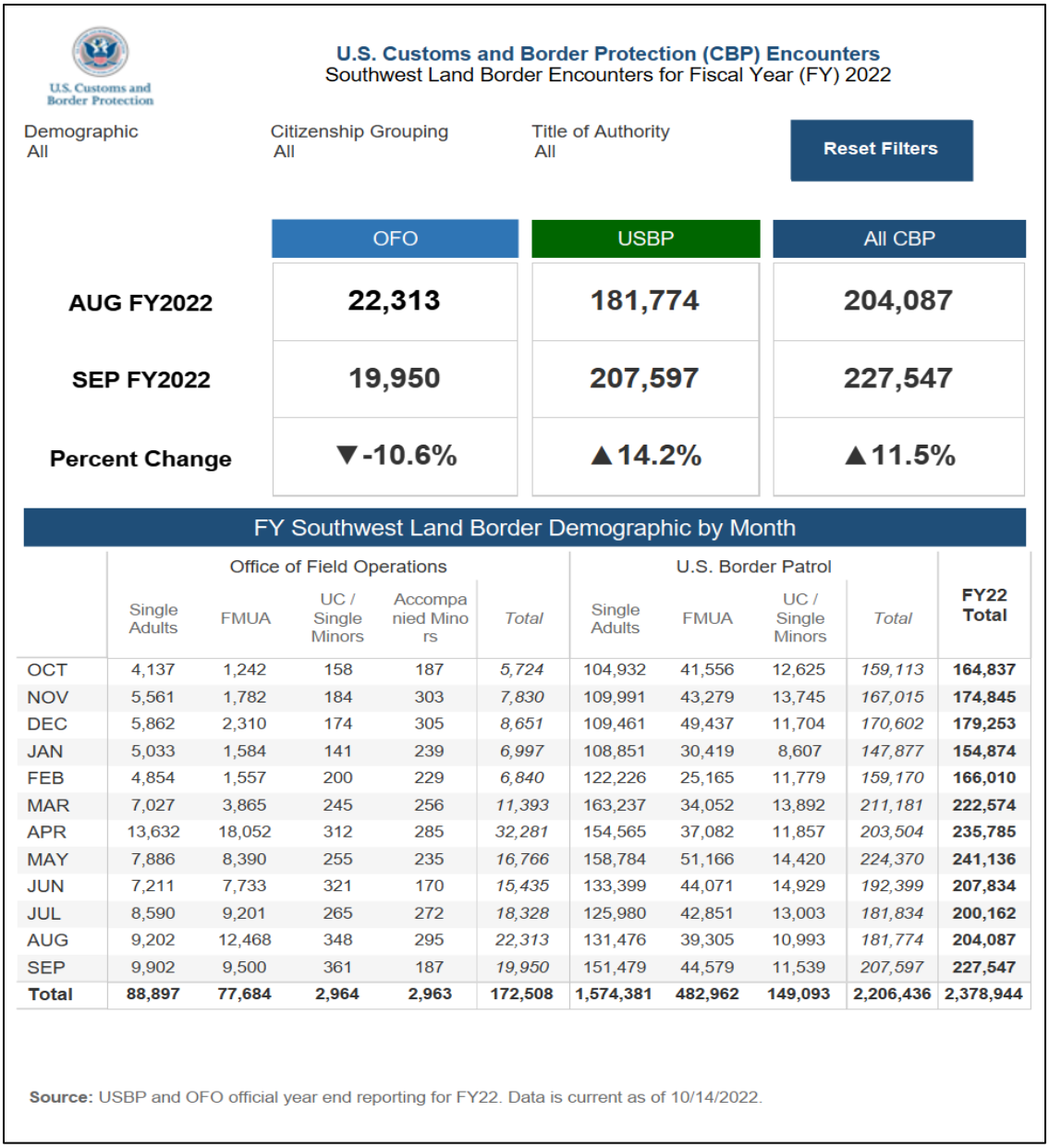


Figure 9. Breakdown of Southwest Land Border Encounters by the U.S. Border Patrol (USBP) Sector and OFO Field Office[139]

[139] Source: U.S. Customs and Border Protection, "Southwest Land Border Encounters," U.S. Customs and Border Protection Newsroom, January 17, 2023, https://www.cbp.gov/newsroom/stats/southwest-land-border-encounters.



U.S. Customs and Border Protection

U.S. Customs and Border Protection (CBP) Encounters
Southwest Land Border Encounters for Fiscal Year (FY) 2022

Demographic: All | Citizenship Grouping: All | Title of Authority: All | Reset Filters

	OFO	USBP	All CBP
AUG FY2022	22,313	181,774	204,087
SEP FY2022	19,950	207,597	227,547
Percent Change	▼-10.6%	▲14.2%	▲11.5%

FY Southwest Land Border Demographic by Month

	Office of Field Operations					U.S. Border Patrol				
	Single Adults	FMUA	UC / Single Minors	Accompanied Minors	*Total*	Single Adults	FMUA	UC / Single Minors	*Total*	**FY22 Total**
OCT	4,137	1,242	158	187	*5,724*	104,932	41,556	12,625	*159,113*	**164,837**
NOV	5,561	1,782	184	303	*7,830*	109,991	43,279	13,745	*167,015*	**174,845**
DEC	5,862	2,310	174	305	*8,651*	109,461	49,437	11,704	*170,602*	**179,253**
JAN	5,033	1,584	141	239	*6,997*	108,851	30,419	8,607	*147,877*	**154,874**
FEB	4,854	1,557	200	229	*6,840*	122,226	25,165	11,779	*159,170*	**166,010**
MAR	7,027	3,865	245	256	*11,393*	163,237	34,052	13,892	*211,181*	**222,574**
APR	13,632	18,052	312	285	*32,281*	154,565	37,082	11,857	*203,504*	**235,785**
MAY	7,886	8,390	255	235	*16,766*	158,784	51,166	14,420	*224,370*	**241,136**
JUN	7,211	7,733	321	170	*15,435*	133,399	44,071	14,929	*192,399*	**207,834**
JUL	8,590	9,201	265	272	*18,328*	125,980	42,851	13,003	*181,834*	**200,162**
AUG	9,202	12,468	348	295	*22,313*	131,476	39,305	10,993	*181,774*	**204,087**
SEP	9,902	9,500	361	187	*19,950*	151,479	44,579	11,539	*207,597*	**227,547**
Total	**88,897**	**77,684**	**2,964**	**2,963**	**172,508**	**1,574,381**	**482,962**	**149,093**	**2,206,436**	**2,378,944**

Source: USBP and OFO official year end reporting for FY22. Data is current as of 10/14/2022.

Figure 10. Breakdown of Southwest Land Border Encounters by the U.S. Border Patrol (USBP) Sector and OFO Field Office[140]

The U.S. administrative authorities have taken different initiatives and measures to secure the southern border to safeguard national security. According to information from Council on Foreign Relations, "the George W. Bush administration deployed

[140] Source: U.S. Customs and Border Protection.

roughly 6,000 National Guard troops to the border, and the Barack Obama administration sent about 1,200 before trimming down the force" along the border.[141]

Subsequently, the Trump administration repeatedly emphasized border enforcement as a high national security priority.[142] President Trump's "Zero Tolerance immigration enforcement policy" and Executive Order (EO) 13767 (January 2017) on border security directed the deployment of all lawful means to prevent further illegal immigration into the United States and secure the country's southern border.[143] Further, executive branch agencies and departments were directed to repatriate illegal immigrants humanely, swiftly, and consistently.

As part of the U.S. and Mexico cooperation, U.S. President Biden and Mexican President Lopez Obrador have focused attention on migration issues and economic issues related to both countries. On October 8, 2021, Mexico hosted the initial U.S.-Mexico High-Level security dialogue. Meanwhile, President Biden's administration revoked some initiatives of President Trump's Executive Order 13767 entitled "Border Security and Immigration Enforcement Improvements" and terminated building the wall at the southern border, and soon after the U.S. experienced largest influx of illegal and undocumented aliens.[144]

According to CBP and OFO data, southwest border encounters (illegal immigrants) increased significantly in FY 2021 and FY 2022, as shown in Figure 9, while drug seizures have decreased, as presented in Figure 7. Further, drug overdose deaths topped 100,000 in FY 2021, as shown in Figure 5**.** Ceasing many of the border security

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[141] Amelia Cheatham, Claire Klobucista, and Diana Roy, "How the U.S. Patrols Its Borders," Council on Foreign Relations, April 5, 2022, https://www.cfr.org/backgrounder/how-us-patrols-its-borders.

[142] Cheatham, Klobucista, and Roy.

[143] William A. Kandel, *The Trump Administration's "Zero Tolerance" Immigration Enforcement Policy*, CRS Report No. R45266 (Washington, DC: Congressional Research Service, 2018), 13, https://trac.syr.edu/immigration/library/P14693.pdf.

[144] Joseph R. Biden, Jr., "Proclamation on the Termination of Emergency with Respect to the Southern Border of the United States and Redirection of Funds Diverted to Border Wall Construction," The White House, January 20, 2021, https://www.whitehouse.gov/briefing-room/presidential-actions/2021/01/20/proclamation-termination-of-emergency-with-respect-to-southern-border-of-united-states-and-redirection-of-funds-diverted-to-border-wall-construction/.

measures taken during the President Trump administration and reinstituting the previous policy of "catch and release" has had a negative impact on the enforcement of border security, and Mexico's drug cartels greatly increased their illegal drug trafficking providing them millions of dollars in illegal revenue to sustain their various criminal activities.[145]

Elsewhere, drug smuggling has evolved with new transport methods with the design and building of narco-torpedoes, narco-submarines, semi-submersible craft, and low-profile platforms during the last 20 years. The new technology has become an essential tool enabling undetectable, fast-moving drug trafficking vessels with advanced operational capabilities.[146] Therefore, counter-drug enforcement operations are more complex in this challenging environment.

At the same time, according to Byron Ramirez and Robert Bunker, "The United States Southern Command (SOUTHCOM) has invested in the use of intelligence, surveillance, and reconnaissance tools as well as non-traditional organizations like the Joint Interagency Task Force South that share information throughout the U.S. government."[147] Operation Martillo is one of the Southern Command's key tools that involve U.S., Central American, Canadian, and European joint anti-illicit trafficking operations for fighting this problem in the region with the support of partner nations.[148] Since the inception of Operation Martillo on January 15, 2012, this operation helped to confiscate 693 metric tons of cocaine and $25 million in currency, and resulted in apprehending 1,863 offenders and seizing 581 aircraft and vessels.[149] However, due to their complexity, counter-drug operations are only possible and successful with

[145] "America Last: The Biden Administration's First 100 Days Key Immigration-Related Actions," Federation for American Immigration Reform, April 30, 2021, https://www.fairus.org/legislation/presidential-administration/america-last-biden-administrations-first-100-days-key.

[146] Byron Ramirez and Robert J. Bunker, eds., *Narco-Submarines: Specially Fabricated Vessels Used for Drug Smuggling Purposes* (Fort Leavenworth, KS: U.S. Army Foreign Military Studies Office, 2015), https://core.ac.uk/download/pdf/70984437.pdf.

[147] Ramirez and Bunker.

[148] Ramirez and Bunker, 27–28.

[149] "Operation Martillo Still Hammering Away at Illicit Trafficking," DOD News, March 30, 2016, https://www.defense.gov/News/News-Stories/Article/Article/708314/operation-martillo-still-hammering-away-at-illicit-trafficking/.

international cooperation and the support of partner nations.[150] Therefore, SOUTHCOM and NORTHCOM work closely in monitoring a key region of the narcotics transit zone between Guatemala, Mexico's southern border, and Belize (Tri-border area).[151]

Further, interagency counter-drug operations are organized and led by the Joint Interagency Task Force (JIATF) South. Also, the agency oversees monitoring and detecting of drug traffickers operating in the maritime domain and air routes in the Gulf of Mexico, Eastern Pacific, and Caribbean Sea. Another responsibility of JIATF-South is to collect, process, and disseminate information for interagency counter-drug operations.[152]

According to the Department of Homeland Security, "in the [Western Hemisphere Transit Zone] WHTZ, the Coast Guard is the major maritime interdiction asset provider to U.S. Southern Command through the Joint Interagency Task Force – South (JIATF-South)."[153] These essential counter-drug trafficking efforts and active support are more important to Mexico and Latin American countries to battle against the regional drug problem. Further, the U.S. Coast Guard effectively works and relies on its partnerships with different agencies and entities; this effort continues especially with international allies and partners with respect to counter-drug operations in the WHTZ.[154]

U.S. Coast Guard, U.S. Navy, and ships belonging to partners, such as the French, British, Dutch, Colombians, and Canadians, are patrolling in the Eastern Pacific and the Gulf of Mexico on a year-round basis. Further, the law enforcement detachment of the U.S. Coast Guard takes the lead through these operations to seize illegal drugs and board

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150 Ramirez and Bunker, *Narco-Submarines*.

151 "Counter Transnational Criminal Organizations," Counter Threats, accessed October 27, 2022, https://www.southcom.mil/Commanders-Priorities/Counter-Threats/Countering-Transnational-Organized-Crime/.

152 Kathleen J. McInnis and Brendan W. McGarry, *United States Southern Command (SOUTHCOM)*, CRS Report No. IF11464 (Washington, DC: Congressional Research Service, 2022), https://apps.dtic.mil/sti/pdfs/AD1166541.pdf.

153 U.S. U.S. Department of Homeland Security, *Counter Drug Operations: Fiscal Year 2020 Report to Congress* (Washington, DC: Department of Homeland Security, 2020), 2, https://www.dhs.gov/sites/default/files/publications/uscg_-_counter-drug_operations.pdf.

154 U.S. U.S. Department of Homeland Security, 6.

suspected vessels. Further, these naval forces closely operate with the allies and partner nations to execute effective counter-drug operations within the partner nations' territorial waters.[155]

Among international organizations, UNODC helps to tackle Transnational Organized Crimes (TOC) in states. This process includes identifying the country's specific priorities to fight TOCs. On April 27, 2022, the Government of Mexico and UNODC initiated a pilot project to bring together the private sector, academia, and government representatives to review United Nations Convention against Transnational Organized Crimes (UNTOC). The UNTOC and its review mechanism will enable to exchange ideas about different processes involved in combating crimes, including counter-drug operations.[156]

As part of the UNODC Global Synthetic Monitoring: Analyses, Reporting, and Trends (SMART) program, Mexico has been granted two on-site drug testing devices to better identify synthetic drugs to help counter-drug operations in Caribbean and Latin American countries.[157] This type of capacity-building program could support the nations' ability to identify synthetic drug substances and bolster counter-drug operations in the region.

Further, the Canadian government has provided funds for the Caribbean and Latin America SMART program through the Anti- Crime Capacity Building Program (ACCBP) and the Bureau of International Narcotics and Law Enforcement Affairs (INL) of the U.S. Department of State.[158] Therefore, partner support for capacity building and resource enhancement is very essential for counter-drug operations.

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155 U.S. Southern Command, "Counter Transnational Criminal Organizations."

156 "UNODC Supported Pilot Initiative for Mexico UNTOC Review Process Begins Its Activities," United Nations Office on Drugs and Crime, May 12, 2022, //www.unodc.org/unodc/en/frontpage/2022/May/unodc-supported-pilot-initiative-for-mexico-untoc-review-process-begins-its-activities.html.

157 "UNODC Donates Drug Identification Technology to Mexico to Help Combat the Global Threat of Synthetic Drugs in the Region," United Nations Office on Drugs and Crime, November 18, 2019, https://www.unodc.org/unodc/en/frontpage/2019/November/unodc-donates-drug-identification-technology-to-mexico-to-help-combat-the-global-threat-of-synthetic-drugs-in-the-region.html.

158 UN Office on Drugs and Crime.

U.S. INL supports in Mexico have increased the range of bilateral relations between U.S. and Mexican judicial, law enforcement, and civil authorities. Sharing information to disrupt drug trafficking and take legal actions against criminals is initiated through INL supports in Mexico. Further, INL support has made a model for the United States, Mexico, and partner nations' security cooperation in the region. As part of the INL program, canines have been provided to detect and seize drugs, arms, and money while improved information sharing has enhanced coordinated operations against transnational crime.[159]

To summarize, Mexico has been fighting a deadly battle against drug dealers for a long time, but Mexican authorities have been unable to gain any appreciable success so far. Therefore, various initiatives have been taken by political and security authorities to enhance efforts for countering drug problems and organized crime in the country. The United States has been working closely with Mexico, providing that country with funds and development assistance, and in assisting in the improvement of Mexico's security agencies and restructuring of the judicial system to counter this drug threat.

Further, as previously mentioned, counter-drug trafficking efforts are very challenging at sea due to the development of narco-submarines and narco-torpedoes during the last 20 years. Narco-submarines and narco-torpedoes are a prevailing threat in the Central Americas and Caribbean region. Therefore, extra efforts and resources are needed to detect drug trafficking vessels during counter-drug operations.

With the launch of several counter-drug operations initiatives, Mexican President Felipe Calderon requested more assistance and cooperation from the United States to battle the cross-border trafficking and drug war. One such initiative, the Merida Initiative, is basically focused on counter-drug operations and gaining U.S. assistance for strengthening the rule of law in Mexico. Coordination and information sharing to disrupt drug trafficking and to take legal action against criminals have developed through U.S. INL

159 "Bureau of International Narcotics and Law Enforcement Affairs: Mexico Summary," Bureau of International Narcotics and Law Enforcement Affairs – Work by Country, accessed October 27, 2022, https://www.state.gov/bureau-of-international-narcotics-and-law-enforcement-affairs-work-by-country/mexico-summary/.

support in Mexico. Further, INL support has become a model for U.S., Mexico, and partner nations' security cooperation in the region.

The United States SOUTHCOM and the JIATF-South are also among the responsible entities in the drug war. Cooperation among partner nations is a key consideration in counter-drug and non-traditional threat operations. Operation Martillo is one of SOUTHCOM's key tools in fighting drug trafficking with the partner nations. Further, the U.S. Coast Guard effectively works and relies on its partnerships with different agencies and entities. This effort continues especially with international allies and partners with respect to counter-drug operations in the Western Hemisphere Transit Zone (WHTZ). The role of international organizations is also important to maintain effective counter-drug operations in Mexico. UNODC helps to tackle TOC in states worldwide by providing on-site drug testing devices which can help countries such as Mexico to better identify synthetic drugs during their counter-drug operations.

Illegal immigrants have become a problem for countries with large borders and have a greater impact on the effectiveness of those countries' counter-drug trafficking operations. In the United States, drug overdose deaths have become another great threat, and without effective control of illegal immigrants and disruption of drug trafficking, it will be difficult to reduce drug overdose death rates and drug-related crimes in the country. Effective national security and border protection policies and mechanisms are critical for effective counter-drug operations. Also, international cooperation through resourcing, knowledge sharing, and joint operations can further improve counter-drug operations in Mexico and other regions as well.

V. SYSTEM DYNAMICS MODELING AND ANALYSIS

Chapter IV provided case studies to serve as examples of how counter-drug operations are shaped by their various collaborative approaches to addressing a specific narcotics threat. Resource limitations and the lack of effective cooperation mechanisms are common challenges in the fight against illegal drug trafficking discussed in each case study. Hence, this research identified that partner-nation support, the assistance of international organizations, intelligence sharing among nations and agencies, and operational capability enhancements were all key factors that have effectively contributed to improving counter-drug operations in the Seychelles, Thailand, and Mexico. The lack of resources and regional cooperation is a major challenge to countering the drug trafficking threat and ensuring better maritime security in Sri Lanka's EEZ. Therefore, system dynamics modeling may help to understand the inter-related nature of the drug trafficking and countermeasures, including the advantages of intelligence (for both traffickers and the SLN), and partner-nation contributions to counter-narcotics efforts.

System dynamics (SD) modeling is used in this research to better understand the inter-related nature of drug trafficking and countermeasures in Sri Lanka's EEZ and IOR. This includes the advantages of intelligence (for both traffickers and the SLN), and partner-nation contributions to counter-narcotics efforts. The components of drug trafficking and state, regional, and international systems employed to counter drug trafficking are modeled. A user interface is included in the model as a decision support tool to analyze the impact changes in various policies and parameters might have on the system over an extended time horizon.

As noted, system dynamics modeling is used to help address the question: How can the SLN's counter-drug trafficking operations be improved to disrupt drug-trafficking in Sri Lanka's EEZ and in the adjacent IOR to ensure better maritime security? Additional questions considered are shown in Table 2.

Table 2. System Dynamics Questions.

Problem	Case	System Dynamics Question
Countering drug trafficking in Sri Lanka's Exclusive Economic Zone and adjacent Indian Ocean Region	The significant increase in drug trafficking in Sri Lanka's EEZ and the IOR is a threat to the country's national security objectives, economy, and ocean commerce in the IOR. Therefore, the Sri Lankan Navy's counter-drug trafficking operations need to be improved to disrupt drug-trafficking in Sri Lanka's EEZ and in the adjacent IOR to ensure better maritime security.	**A**. What are the potential approaches to countering, deterring, or reducing the threat of narcoterrorism? **B.** How could qualitative and quantitative data for systems analysis and system dynamics modeling provide possible approaches to disrupt drug trafficking and narcoterrorism with the support of partner nations in the region EEZ to improve maritime security in Sri Lanka's EEZ and the IOR? **C.** How could SD modeling help national security decision-makers and the Sri Lanka Navy by analyzing potential behavioral outcomes resulting from non-linear feedback mechanisms within the system being modeled to test potential methods and policies intended to disrupt drug trafficking and non-traditional threats in the EEZ of Sri Lanka and to the IOR?

The statistical data in Table 3 is a summary of the SLN drug seizures from January 2016 to May 2022. Using the numbers of SLN drug operations from Figure 11 and the types of drugs seized by the SLN as shown in Figure 12 and Table 3 summarize the number of incidents recorded, as well as the quantity and type of narcotics seized by the SLN, in Sri Lanka's EEZ.

Table 3. SLN Drug Seizure Summary, January 2016–May 2022.[160]

Year	Heroin # of incidents	Hashish # of incidents	Methamphetamine (ICE) # of incidents	Ketamine # of incidents	Cannabis # of incidents
2016	01	-	-	-	08
2017	-	-	-	-	07
2018	01	-	-	-	08
2019	07	02	01	-	16
2020	06	-	06	01	27
2021	07	01	03	-	27
May 2022	04	-	03	-	05
Total incidents	**26**	**03**	**13**	**01**	**98**
Total weight	**3791.692**	**88.141**	**940.946**	**581.034**	**11996.680**

Weights in kilograms

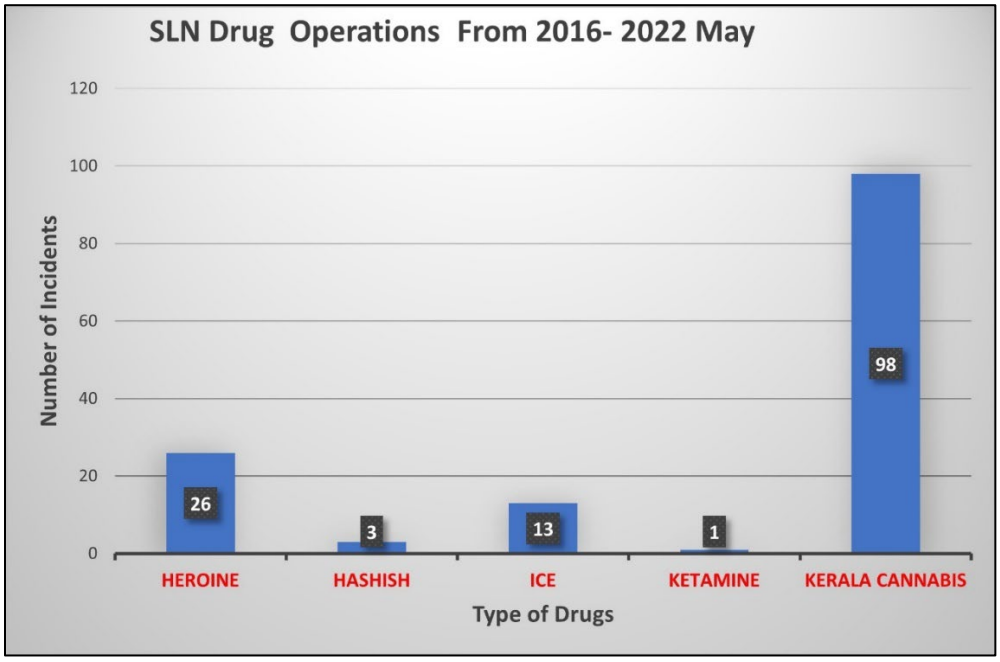


Figure 11. Numbers of SLN Drug Operations, January 2016–May 2022[161]

[160] Adapted from Sri Lanka Navy, *Compendium of Drug Seizures at Sea*, 2, and additional data provided by the Office of the Director of Intelligence, Sri Lanka Navy.

[161] Adapted from Sri Lanka Navy, 2, and additional data provided by the Office of the Director of Intelligence, Sri Lanka Navy.

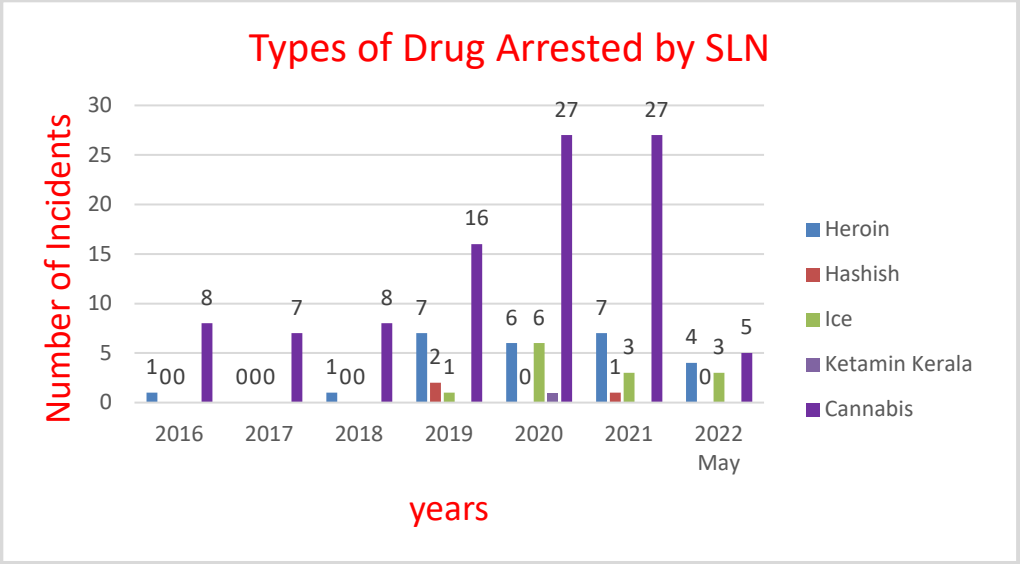


Figure 12. Types of Drugs Seized by SLN, January 2016–May 2022[162]

The drug seizure summaries in Table 3, Figure 11, and Figure 12 are evidence of the drug threat in the EEZ of Sri Lanka and the results of existing counter-drug operations by the Sri Lanka Navy (141 major counter-drug operations over 65 months).

The initial step used statistical data related to illicit drugs seized by the SLN during the last 65 months (January 2016 to May 2022) within Sri Lanka's EEZ. That data included types and amounts of drugs seized. This primary data is publicly available in the SLN's "Compendium of Drug Seizures at Sea by Sri Lanka Navy 2021" and through Sri Lanka Navy's official website www.navy.lk.

The second step was to review the international agencies and mechanisms available in the region to fight narcoterrorism in the IOR and to explore how SD modeling may help to identify underlying sources of problematic outcomes. The components of drug trafficking and the individual, state, and international systems employed to counter drug trafficking represent the exogenous and endogenous variables in the bounded systems to be modeled. These variables contribute to non-linear relationships, feedback mechanisms, and delays that currently result in narcoterrorism.

[162] Adapted from Sri Lanka Navy, 2, and additional data provided by the Office of the Director of Intelligence, Sri Lanka Navy.

The third step was to provide a user interface to analyze the impacts that changes in various policies and parameters intended to improve counter-narcotics operations might have on system behavior over an extended time horizon.

A. DRUG TRAFFICKING AND COUNTERMEASURES AS A SYSTEM

Drug trafficking and countermeasures were analyzed within the context of the Causal Loop Diagram (CLD) shown in Figure 13. The CLD was created using ISEE Systems' Stella Software. The objective was to identify cause-and-effect relationships among key variables that represent feedback loops that impact the system behavior.

1. Structure and Feedback Loops

The CLD created identifies 16 variables and three feedback loops in the drug trafficking and counter-drug operations as shown in Figure 13. Polarities are noted for each link from independent to dependent variables. Positive polarity represents a reinforcing causal relationship between variables, and negative polarity represents a balancing causal relationship between variables. Delays between variables are depicted as double slashes on the link.

2. Causal Loop Diagram—Drug Trafficking and Counter Measures in Sri Lankan EEZ

In Figure 13, the polarity of each causal link in the CLD indicates whether the feedback is positive or negative between variables.[163] Positive polarity indicates that as the independent variable increases or decreases, the linked dependent variable will increase or decrease in kind beyond what it otherwise would have been (reinforcing behavior). Negative polarity indicates that as the independent variable increase or decreases, the linked dependent variable will decrease or increase beyond what it otherwise would have been (balancing behavior). If the causal loop has an even number or zero negative polarity links, the loop exhibits reinforcing behavior (albeit "vicious" or "virtuous"). If there is an odd number of negative polarity links in the loop, the loop will

[163] Information links are depicted with dashed lines, material links are depicted by solid lines.

display balancing (goal-seeking) behavior. Reinforcing loops are labeled with the loop identifier "R." Balancing loops are labeled with the loop identifier, "B."[164]

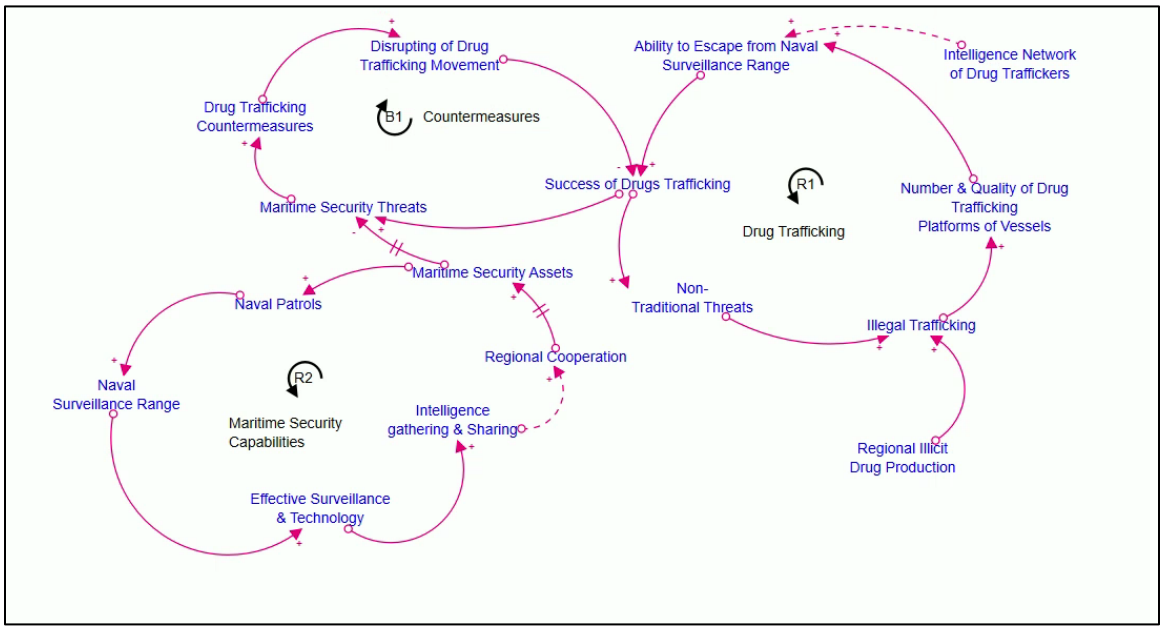


Figure 13. Drug Trafficking and Countermeasures Causal Loop Diagram for Sri Lanka[165]

There are three feedback loops in the CLD depicted in Figure 13: Drug Trafficking (Reinforcing Loop R1), Maritime Security Capabilities (Reinforcing Loop R2), and Countermeasures (Balancing Loop B1).

3. Drug Trafficking Feedback Loop

The first feedback loop, Drug Trafficking, is the "Reinforcing" loop. The Drug Trafficking Feedback Loop depicted in Figure 14.

[164] Porter, "The Value of System Dynamics Modeling," 124.

[165] Adapted from ISEE Systems, Stella Software.

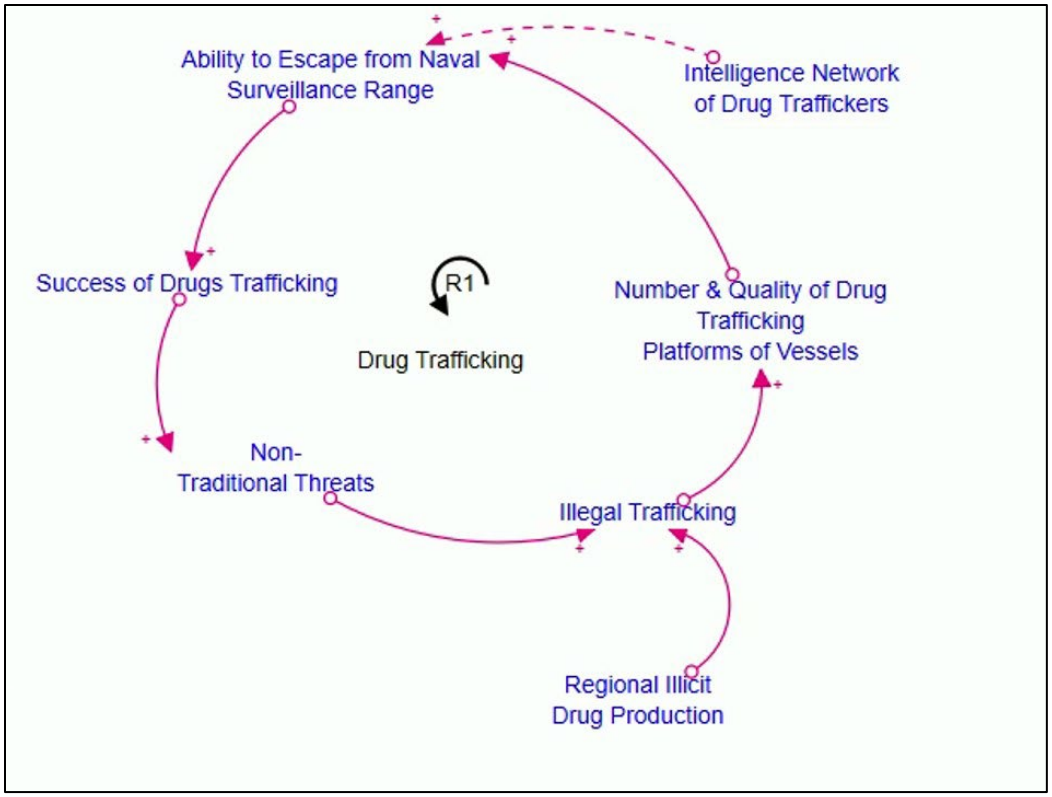


Figure 14. Drug Trafficking Feedback Loop[166]

As Regional Illicit Drug Production increases/decreases, the Illegal Trafficking increases or decreases beyond what it otherwise would have been in response. This is meant to represent the effect of drug-producing countries, such as Pakistan, Afghanistan, Iran (Golden Crescent countries), and Thailand, Myanmar, and Laos (Golden Triangle countries), that have a huge impact on drug production and trafficking in the IOR. As Illegal Trafficking increases/decreases, the Number and Quality of Drug Trafficking Platform of Vessels increases/decreases beyond what its response otherwise would have been. As the Number and Quality of Drug Trafficking Platform of Vessels increases/ decreases, the Ability to Escape from Naval Surveillance Range increases/decreases beyond what it otherwise would have been in response. This is meant to represent the effect of high endurance platforms equipped with radar, AIS, and satellite communication. In addition, as the Intelligence Network of Drug Traffickers increases/

[166] Adapted from ISEE Systems, Stella Software.

decreases, the Ability to Escape from Naval Surveillance Range increases/decreases beyond what it otherwise would have been in response, as depicted by the dashed information connecter in the CLD. As the Ability to Escape from Naval Surveillance Range increases/decreases, the Success of Drug Trafficking increases/decreases beyond what it otherwise would have been in response. As the Success of Drug Trafficking increases/decreases, the Non-Traditional Threats increase/decrease beyond what the response otherwise would have been in the IOR.

4. Maritime Security Capabilities Feedback Loop

The second feedback loop, Maritime Security Capabilities, is the "Reinforcing Loop." The Maritime Security Capabilities Feedback Loop depicted in Figure 15.

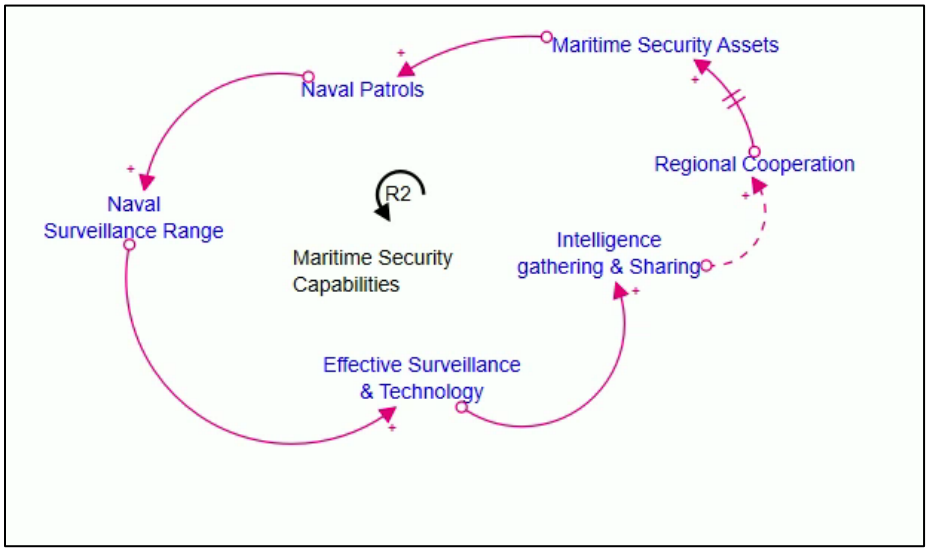


Figure 15. Maritime Security Capabilities Feedback Loop[167]

As Maritime Security Assets increase/decrease, the number of Naval Patrols increases/decreases beyond what it otherwise would have been in response. This is meant to represent SLN surveillance capabilities and assistance from partner nations' maritime surveillance capabilities that will enhance the maritime surveillance capacity of the SLN.

[167] Adapted from ISEE Systems, Stella Software.

As the number of Naval Patrols increases/decreases, the Naval Surveillance Range increases/decreases beyond what it otherwise would have been in response. As the Naval Surveillance Range increases/decreases, the Effective Surveillance & Technology rate increases/decreases beyond what it otherwise would have been in response. This is meant to represent the effect of high-endurance naval platforms equipped with long-range radar, AIS, VMS, satellite communication, maritime air assets, and drones onboard. As the Effective Surveillance & Technology rate increases/decreases, the Intelligence Gathering & Sharing capability increases/decreases beyond what it otherwise would have been in response. This is meant to represent the introduction of the latest technology, AI, and reliable intelligence sharing. As the Intelligence Gathering & Sharing capability increases/decreases, the Regional Cooperation increases/decreases beyond what it otherwise would have been in response, as depicted by the dashed information connector in the CLD. As the Regional Cooperation rate increases/decreases, the number of Maritime Assets increases/decreases beyond what it otherwise would have been in response, as depicted by the dashed delay connecter marked by the crosses in the CLD. This is meant to represent delay time to gain agreement for regional cooperation through bilateral and multilateral agreements, joint patrols, maritime assets sharing, and intelligence sharing among the partner nations to counter maritime security threats.

5. Countermeasures Feedback Loop

The third feedback loop, Countermeasures, is the "Balancing" loop. Countermeasures are depicted in Figure 16.

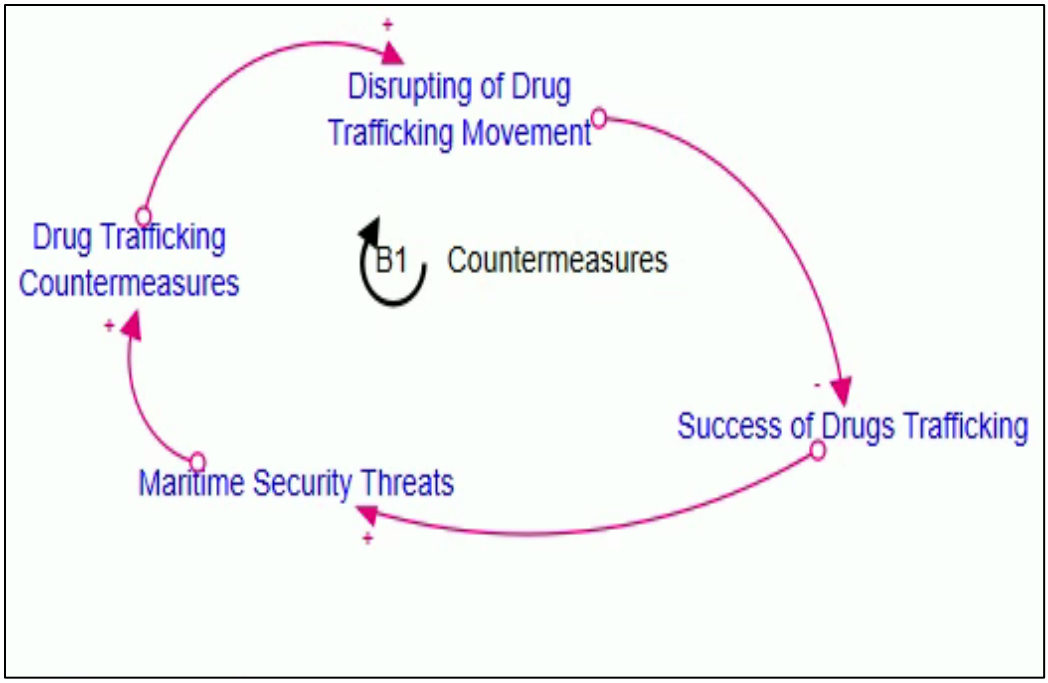


Figure 16. Countermeasures[168]

As the Drug Trafficking Countermeasures increase/decrease, the Disrupting of Drug Trafficking Movement increases/decreases beyond what it otherwise would have been in response. This is meant to represent the effect of enhanced capacity and capabilities on counter-drug operations. As the Disrupting of Drug Trafficking Movement increases/decreases, the Success of Drug Trafficking increases/decreases beyond what it otherwise would have been in response. As the Success of Drug Trafficking increases/decreases, the Maritime Security Threats increases/decreases beyond what it otherwise would have been in response. As the number of Maritime Security Threats increases/decreases, the number of Drug Trafficking Countermeasures increases/decreases beyond what it otherwise would have been in response.

Causal Loop Diagrams are useful for identifying the polarity of links between variables and the resultant balancing or reinforcing behavior of closed loops. It should be noted, however, that the strength of individual links and the subsequent dominance of the loops in the behavior of the system cannot be measured without data and mathematically

[168] Adapted from ISEE Systems, Stella Software.

determining the mechanisms at play within the system. To do this requires the development of stock and flow modeling and simulation.

B. SLN AND REGIONAL DRUG COUNTERMEASURES MODEL

In the SLN and Regional Drug Countermeasures Model, shown in Figure 17, there are six stocks: Maritime Security Incidents, Total Maritime Security Incidents, Counter-Drug Patrols/Ops, Total Counter-Drug Patrols/Ops, Partner Counter-Drug Patrols/Ops, and Total Partner Counter-Drug Patrols/Ops.

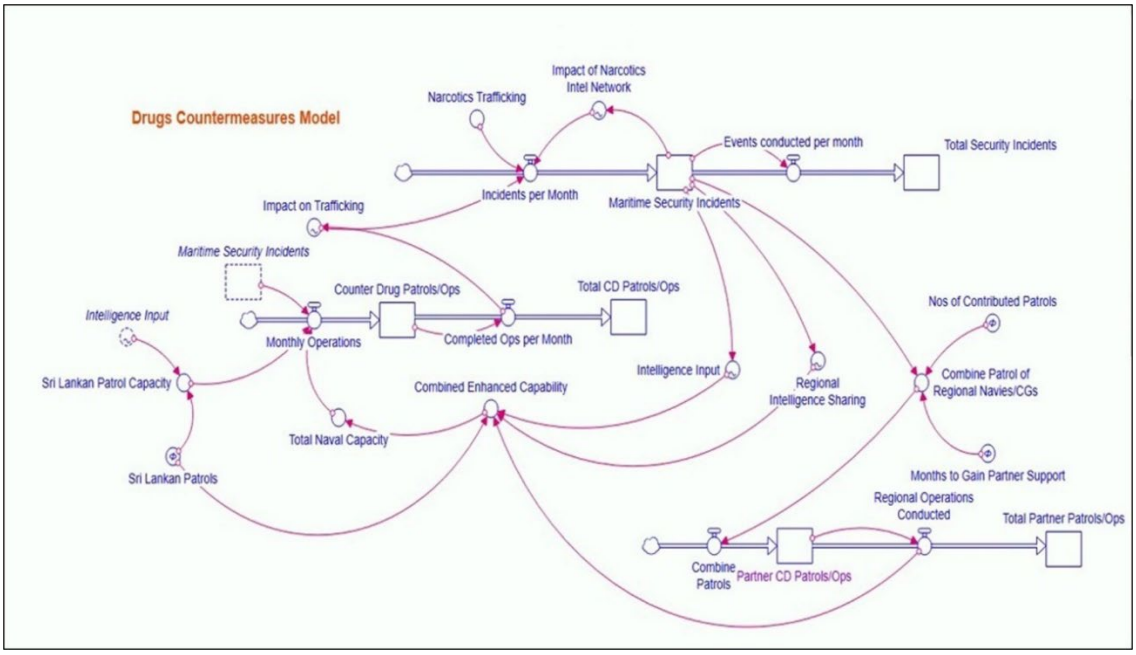


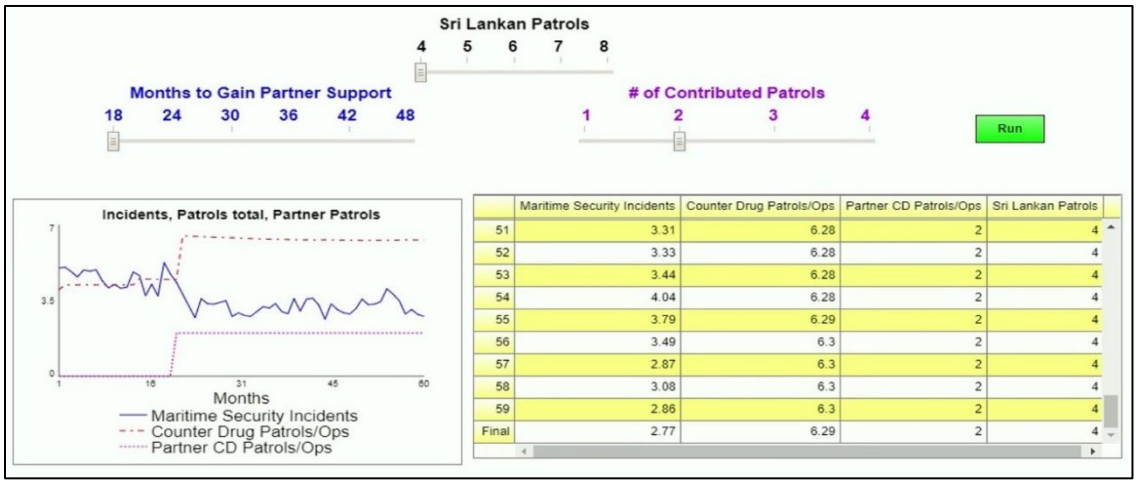
Figure 17. SLN and Regional Drug Countermeasures Model[169]

This model simulates the SLN's abilities to conduct counter-drug operations, partner nations' contribution to counter-drug operations, and maritime security incidents (related to drug trafficking) in Sri Lanka's EEZ over five years (60 time steps). Elements and their relationships used in the SLN and Regional Drug Countermeasures Model are described in detail in the Appendix.

[169] Adapted from ISEE Systems, Stella Software.

C. USER INTERFACE

Maritime Security Incidents, Counter-Drug Patrols/Operations, and Partner Counter-Drug Patrols numbers can be changed with the user interface. This can enable users to understand the behaviors of outcomes that are important to decision makers. With the contribution of four SLN naval units, two patrols units from partner navies, and 18 months of delay to gain partner support, the outcomes shown in Figure 18 are achieved.

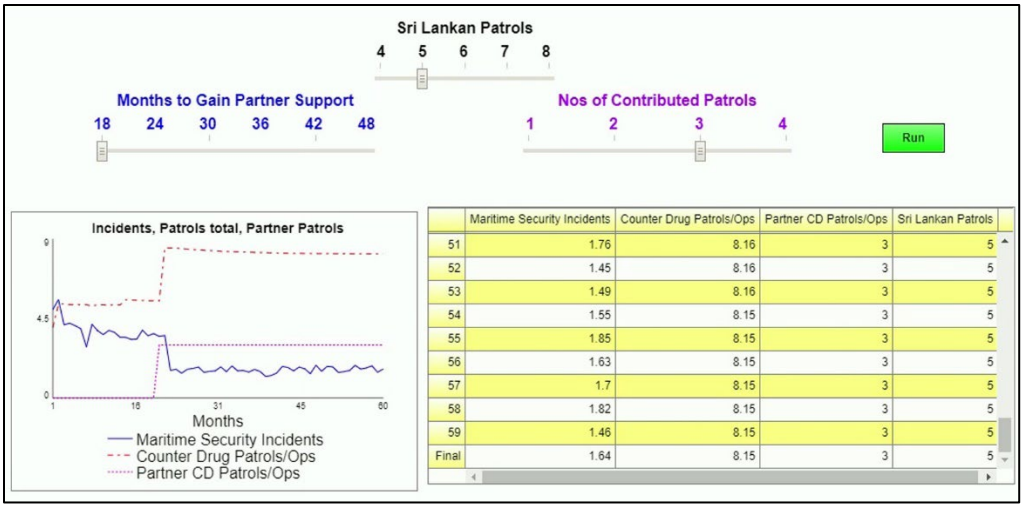


	Maritime Security Incidents	Counter Drug Patrols/Ops	Partner CD Patrols/Ops	Sri Lankan Patrols
51	3.31	6.28	2	4
52	3.33	6.28	2	4
53	3.44	6.28	2	4
54	4.04	6.28	2	4
55	3.79	6.29	2	4
56	3.49	6.3	2	4
57	2.87	6.3	2	4
58	3.08	6.3	2	4
59	2.86	6.3	2	4
Final	2.77	6.29	2	4

Figure 18. Counter-Maritime Security Incidents with 18 Months Delay to Gain Partner Supports[170]

Further, the increasing number of Sri Lankan patrols and the number of contributed patrols in the model decreased the number of maritime security incidents from five to one per month, as shown in Figure 19. These outcomes are more important and helpful for SLN decision makers to understand and plan future maritime security operations, enhance diplomatic relations, and build up regional agreements to ascertain partner support.

[170] Adapted from ISEE Systems, Stella Software.

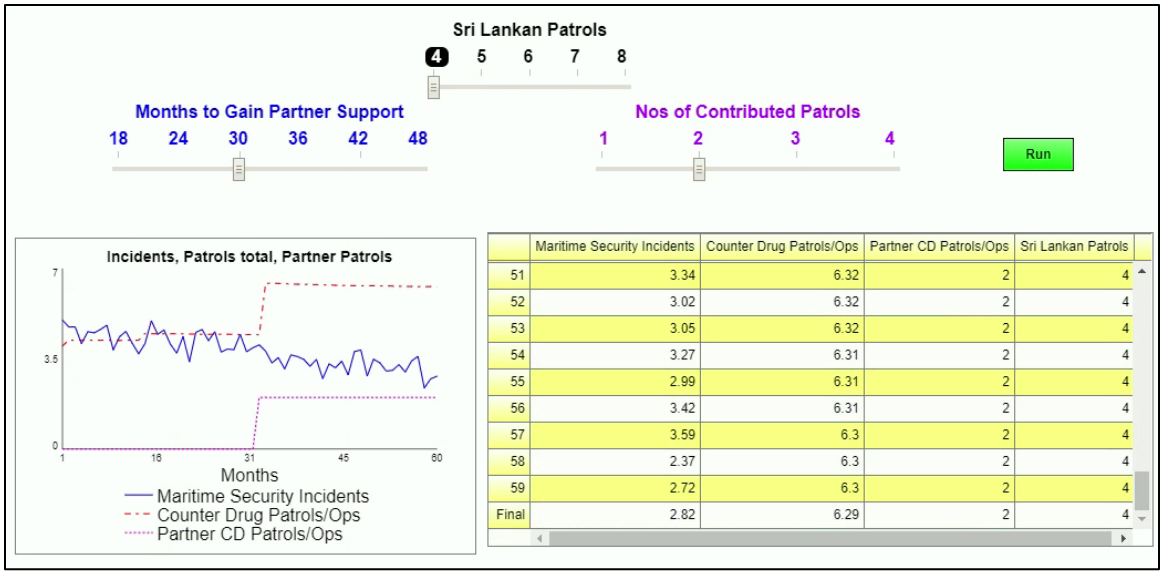


	Maritime Security Incidents	Counter Drug Patrols/Ops	Partner CD Patrols/Ops	Sri Lankan Patrols
51	1.76	8.16	3	5
52	1.45	8.16	3	5
53	1.49	8.16	3	5
54	1.55	8.15	3	5
55	1.85	8.15	3	5
56	1.63	8.15	3	5
57	1.7	8.15	3	5
58	1.82	8.15	3	5
59	1.46	8.15	3	5
Final	1.64	8.15	3	5

Figure 19. Increasing Number of Sri Lankan Patrols and Number of Contributed Patrols[171]

Therefore, the user interface is important for better understanding the behaviors of the model. Further, the most challenging factor is the delay to gain partner support for the counter-drug operations. Delaying agreements and diplomatic negotiations to ascertain partner support could change the outcomes of the model as shown in Figure 20. If the time to gain partner support is delayed by 30 months, maritime security incidents remain at three incidents per month.

[171] Adapted from ISEE Systems, Stella Software.



	Maritime Security Incidents	Counter Drug Patrols/Ops	Partner CD Patrols/Ops	Sri Lankan Patrols
51	3.34	6.32	2	4
52	3.02	6.32	2	4
53	3.05	6.32	2	4
54	3.27	6.31	2	4
55	2.99	6.31	2	4
56	3.42	6.31	2	4
57	3.59	6.3	2	4
58	2.37	6.3	2	4
59	2.72	6.3	2	4
Final	2.82	6.29	2	4

Figure 20. Counter-Maritime Security Incidents with 30 Months Delay to Gain Partner Support[172]

[172] Adapted from ISEE Systems, Stella Software.

VI. FINDINGS, CONCLUSION, AND RECOMMENDATIONS

The findings of this research are based on case studies that qualitatively analyze each country significantly affected by drug problems, and on system dynamics modeling that used the statistical data quantifying the SLN's counter-drug operations and apprehensions in the last five years. Further, findings and observations are made by the author about the drug threat, drug countermeasures, and successes and failures of counter-drug operations according to the case studies and modeling. It has been observed that Seychelles, Thailand, and Mexico have been supported by partner nations, regional countries, and international actors to enhance the effectiveness of their counter-drug operations through Memorandums of Understanding, agreements, legal mechanisms, capabilities, and resource enhancements including financial assistance. Those are the identified key factors that resulted in effective outcomes of counter-drug operations in the states studied.

A. CASE STUDIES REVIEW

The Seychelles, Thailand, and Mexico case studies to serve as examples of how counter-drug operations are shaped by various collaborative approaches to addressing a specific narcotics threat. Resource limitations and the lack of effective cooperation mechanisms are common challenges in the fight against illegal drug trafficking discussed in each case study.

1. Seychelles

Being an archipelagic island, and due to its large Exclusive Economic Zone, Seychelles is confronted with traditional and non-traditional threats. Among those threats, drug trafficking is perhaps the most significant, as it is to other island nations in the IOR. Seychelles is in a strategic maritime area in the WIO. Heroin transiting from Afghanistan via the southern route poses a significant threat to Seychelles.

Seychelles employs a marine-based economic strategy, and maritime security is vital to implementing that strategy and accomplishing that the country's economic goals.

Counter-narcotics operations are a high priority for the country, and national agencies such as the NDEA, ANB, and Seychelles Coast Guard play pivotal roles in these operations. However, limited assets and a lack of strong regional cooperation mechanisms have challenged the Seychelles' ability to achieve its maritime security objectives.

To achieve their security goals, the Seychelles' National Drug Enforcement Agency, Anti-Narcotics Bureau, and the Seychelles Coast Guard partner with the U.S.-led Combined Maritime Force and UNODC's Southern Route Partnership. Further, the Djibouti code of conduct, MASE, and Indian Ocean Forum on Maritime Crime, organized by the UNODC, are important tools used to meet maritime security and intelligence-sharing tasks, since international partner support is a critical need for small developing nations in the IOR.

As key partners in the IOR, India and the United Arab Emirates are the primary countries that support Seychelles' counter-drug operations by providing platforms, funds, and other resources. Additionally, the U.S.-led CTF150 is the most prominent multinational force that conducts maritime security operations to support countries in the WIO region. The Indian Ocean Rim Association (IORA) and the UNODC, respectively, have also begun to develop a regional strategy for capacity building.

2. Thailand

Thailand is a Southeast Asian country located in the Indochinese peninsula, bordered by the sea and several countries. Thailand is also one of the countries belonging to the Golden Triangle, one of the world's predominant areas for the production of illicit drugs. Yet, illicit drug trafficking is the most significant threat encountered by ASEAN member states.[173] According to Emmers, "Myanmar, Thailand, and Laos are major producers of narcotics and transit points for drugs sent to North America, Europe and other parts of Asia."[174]

[173] Emmers, *The Securitization of Transnational Crime in ASEAN*, 6.

[174] Emmers, 6.

The Thailand Office of Narcotic Control Board, the Royal Thai Navy, the Thai Coastguard, the Police, and the Marine Police Department are engaged in counter-drug operations in Thailand and across its borders. The Thai military and domestic law enforcement agencies are engaged in counter-drug operations throughout Thailand's territory.

Regional cooperation is recognized as being vital for countering maritime security challenges in the region. ASEAN cooperation with regional states to counter drug-trafficking and crime is also important for regional maritime security. The U.S. and Thai joint task units, BIMSTEC, ReCAAP, and UNODC are key state and non-state partners for counter-drug operations in Thailand and Southeast Asian countries.

As international partner support is critical in the Southeast Asia region's counter-drug operations, the U.S. DEA's SIU provides additional support. Operational funding, intelligence sharing, and technical support are key elements of counter-narcotic operations in Thailand. Meanwhile, India's and Thailand's cooperative efforts through coordinated patrols, MILAN, and the Indian Ocean Naval Symposium are effective initiatives for counter-drug operations. The author found that Thailand is one of the counties that benefits from regional and extra-regional actors and international organizations in terms of assets, intelligence sharing, technology, and enhancement of interoperability with multinational agencies.

3. Mexico

Mexico is a large North American country**,** bordered by the United States, Guatemala, Belize, the Caribbean Sea, and the Pacific Ocean, and it has a large coastline. Mexico has been engaged in a war on drugs for a long time, but Mexican authorities have been unable to achieve much success in disrupting the cartels. Illegal immigration also poses a significant threat on the Mexico border. Tens of thousands of military personnel were employed in the war on drug cartels from 2006 to 2012 by former president Felipe Calderón. These drug cartels also largely contribute to the U.S. illegal drug market and remain a threat to the United States. Drug-related deaths, particularly from fentanyl, have significantly increased in the United States in the absence of effective control of illegal

immigration and disruption of drug cartels. The United States provides Mexico with billions of dollars to develop and improve its security forces and for restructuring the judicial system to counter this drug threat. In response to Mexican President Felipe's request for more assistance and cooperation from the United State, the Merida Initiative was launched as an important mechanism focused on counter-drug and rule of law assistance. Further, assistance from the U.S. State Department's Bureau of International Narcotics and Law Enforcement Affairs has increased bilateral relations with Mexico by sharing information and working with law enforcement, judicial, and civil authorities. The U.S. CBP is also a vital agency for countering illegal border crossings and drug trafficking.

Drug trafficking tactics, types of vessels, and capabilities are critically important for drug traffickers to conduct their operations successfully. The introduction of narco-submarines and narco-torpedoes has created a challenging environment for counter-drug operations in Central America and the Caribbean region.

The United States SOUTHCOM and JITF-South are actively engaged in the war on drugs in the region. Elsewhere, Operation Martillo is one of the key tools for fighting drug trafficking in Mexico and Central America.[175] The United States and international allies and partners are also critical for maintaining the security of the Western Hemisphere Transit Zone. International actors such as UNODC also support Mexico by providing resources for the identification of synthetic drugs during counter-drug operations. Specifically, international cooperation through resourcing, knowledge sharing, and joint operations can further improve counter-drug operations in Mexico and other regions as well.

As a part of the cooperation between Mexico and the United States, U.S. President Biden and Mexican President Lopez Obrador have focused attention on economic issues related to migration that affect both countries. However, President Biden's administration revoked many initiatives introduced by President Trump's Executive Order (EO) 13767 entitled, "Border Security and Immigration Enforcement

[175] Ramirez and Bunker, *Narco-Submarines*, 27–28.

Improvements," and terminated construction of the southern border wall, which has contributed to the largest influx of illegal and undocumented aliens into the United States in history. As a result, drug trafficking has also significantly increased across the Mexico/ U.S. border, contributing to a drug-related death toll that exceeded 100,000 in the United States during FY 2021.

Each case study clearly demonstrates the strengths of coordinated counter-drug operations, intelligence sharing, and resource exchange for counter-drug operations in their respective regions of the world. Resource and intelligence sharing among regional powers and international actors are vital tools for counter-drug operations conducted by small nations. Regional and bilateral agreements and international organization mandates for operations and legal assistance are other important elements of successful counter-drug operations.

B. THE SLN AND REGIONAL DRUG COUNTERMEASURES MODEL

The SLN has made great efforts to counter the existing drug-trafficking in Sri Lanka's EEZ and adjacent areas of the IOR. Significant numbers of drug seizures have been made since 2016. While counter-drug operations of the SLN have mainly been intelligence-based, random surveillance patrolling has also contributed significantly to the success of these missions. As discussed in Chapters I to III and enumerated in Table 1, the SLN has been able to seize large quantities of drugs and apprehend trafficking suspects. However, the SLN's lack of adequate resources and regional cooperation is a major challenge for countering the drug trafficking threat in the region.

In the SLN and Regional Drug Countermeasures Model shown in Figure 17 of Chapter V, there are six stocks such as Maritime Security Incidents, Total Maritime Security Incidents, Counter-Drug Patrols/Ops, Total Counter-Drug Patrols/Ops, Partner Counter-Drug Patrols/Ops, and Total Partner Counter-Drug Patrols/Ops. This model simulates the SLN's ability to counter drug operations, the level of partner nations' intelligence and security patrol contributions to counter-drug operations, and the number of maritime security incidents (related to drug trafficking) in Sri Lanka's EEZ over a

five-year (60 time steps) time horizon. Elements used by the SLN and their relationships, and the Regional Drug Countermeasures Model are described in detail in the Appendix.

The SLN and Regional Drug Countermeasures Model is intended to help maritime security decision makers better understand the dynamics of drug trafficking in the Sri Lankan Area of Responsibility (AOR), the dynamics of the SLN's counter-drug operations, the impact of intelligence capabilities (for the SLN as well as for the drug trafficking network) and of regional intelligence sharing (among the SLN and international partners), and the impact of partner nations' maritime patrols in augmenting SLN patrols. Knowledge and awareness of these essential elements of the counter-drug operation system would help to improve the SLN's counter-drug trafficking operations to disrupt narcoterrorism in Sri Lanka's EEZ and in the IOR to ensure better maritime security.

The system's behavior is observed when variables are associated with maritime security incidents and counter drug operations as depicted in Figure 21. Further, the success of this model is evidenced by the decrease in the monthly average number of maritime security incidents from five to two over 60 time steps, as depicted in Figure 21 to Figure 25.

The SLN's contribution to counter-drug operations starts with four naval units per month, along with the SLN intelligence. However, with a time delay of 18 months to obtain partner nation support for counter-drug operations and intelligence sharing, the number of maritime security incidents remained at five per month, as shown in Figure 21. Finally, from the 20th months onward, partner nations' contribution increased by two naval/coast guard units per month for time steps 16 to 31, as depicted in Figure 22 and for time steps 31 to 46 in Figure 23. On completion of 60 months of time steps, the number of maritime security incidents decreased from five to two, as depicted in Figure 24 and Figure 25.

This model gives a clear picture for SLN decision makers to understand the necessity of securing more platforms from and agreements with partner nations, as well

as the importance of local and regional intelligence sharing for effective counter-drug operations in Sri Lanka's EEZ and the IOR.

	Maritime Security Incidents	Counter Drug Patrols/Ops	Completed Ops per Month	Partner CD Patrols/Ops
1	5	4	4	0
2	4.94	4.22	4.22	0
3	4.93	4.22	4.22	0
4	4.42	4.22	4.22	0
5	4.31	4.22	4.22	0
6	4.38	4.22	4.22	0
7	4.7	4.22	4.22	0
8	4.27	4.22	4.22	0
9	4.62	4.22	4.22	0
10	4.42	4.22	4.22	0
11	4.58	4.22	4.22	0
12	5	4.22	4.22	0
13	4.4	4.22	4.22	0
14	4.8	4.5	4.5	0
15	4.48	4.49	4.49	0
16	4.57	4.5	4.5	0

Figure 21. Maritime Security Incidents and Counter Drug Operations, Model Behavior Time Steps 1 to 16.[176]

[176] Adapted from ISEE Systems, Stella Software.

	Maritime Security Incidents	Counter Drug Patrols/Ops	Completed Ops per Month	Partner CD Patrols/Ops
16	4.26	4.49	4.49	0
17	3.71	4.48	4.48	0
18	5.25	4.48	4.48	0
19	4.73	4.47	4.47	0
20	4.33	4.48	4.48	2
21	3.79	6.48	6.48	2
22	3.25	6.48	6.48	2
23	2.7	6.47	6.47	2
24	3.58	6.45	6.45	2
25	3.35	6.43	6.43	2
26	3.33	6.42	6.42	2
27	3.41	6.41	6.41	2
28	3.49	6.4	6.4	2
29	2.76	6.39	6.39	2
30	2.93	6.39	6.39	2
31	2.8	6.37	6.37	2

Figure 22. Partner Nations' Contribution Increased by Two Naval/Coast Guard Units per Month, Model Behavior Time Steps 16 to 31[177]

	Maritime Security Incidents	Counter Drug Patrols/Ops	Completed Ops per Month	Partner CD Patrols/Ops
31	2.8	6.37	6.37	2
32	2.77	6.36	6.36	2
33	2.99	6.35	6.35	2
34	3.21	6.34	6.34	2
35	3.15	6.33	6.33	2
36	3.36	6.32	6.32	2
37	2.99	6.32	6.32	2
38	2.88	6.32	6.32	2
39	3.58	6.31	6.31	2
40	3.01	6.3	6.3	2
41	3.56	6.3	6.3	2
42	3.61	6.3	6.3	2
43	3.29	6.3	6.3	2
44	2.64	6.3	6.3	2
45	3.35	6.3	6.3	2
46	3.08	6.29	6.29	2

Figure 23. Partner Nations' Contribution Increased by Two Naval/Coast Guard Units per Month, Model Behavior Time Steps 31 to 46[178]

[177] Adapted from ISEE Systems, Stella Software.

[178] Adapted from ISEE Systems, Stella Software.

	Maritime Security Incidents	Counter Drug Patrols/Ops	Completed Ops per Month	Partner CD Patrols/Ops
45	3.35	6.3	6.3	2
46	3.08	6.29	6.29	2
47	2.93	6.29	6.29	2
48	2.87	6.29	6.29	2
49	3.13	6.28	6.28	2
50	3.57	6.28	6.28	2
51	3.31	6.28	6.28	2
52	3.33	6.28	6.28	2
53	3.44	6.28	6.28	2
54	4.04	6.28	6.28	2
55	3.79	6.29	6.29	2
56	3.49	6.3	6.3	2
57	2.87	6.3	6.3	2
58	3.08	6.3	6.3	2
59	2.86	6.3	6.3	2
Final	2.77	6.29	6.29	2

Figure 24. Maritime Security Incidents Model Behavior after 60 Time Steps[179]

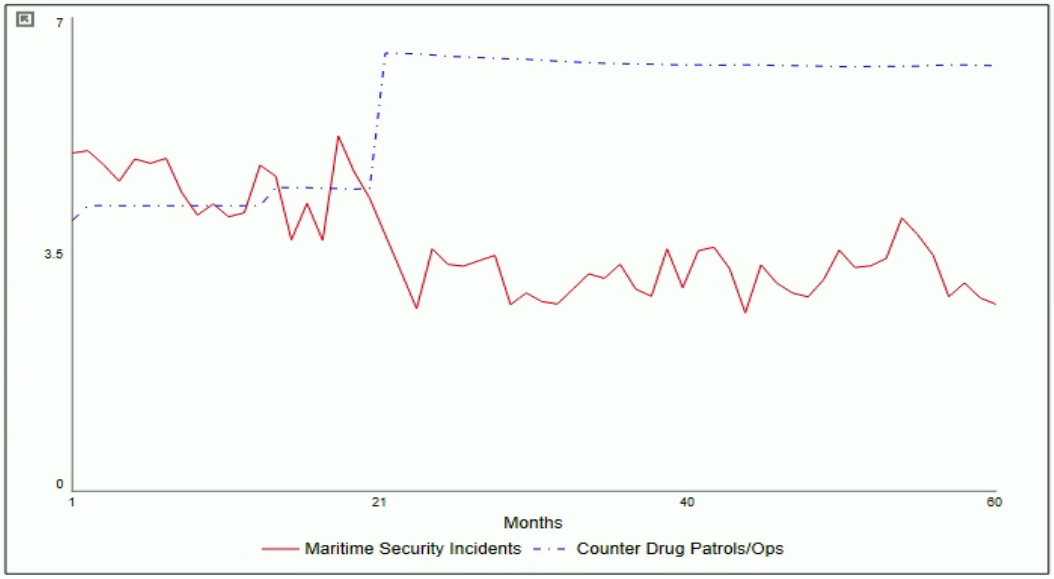


Figure 25. Graph of Maritime Security Incidents Model Behavior from1 to 60 Time Steps[180]

[179] Adapted from ISEE Systems, Stella Software.

[180] Adapted from ISEE Systems, Stella Software.

C. CONCLUSION

The case studies and the SLN and Regional Drug Countermeasures Model provide SLN decision makers with a decision support tool for recognizing the potential impact of having more platforms and agreements with partner nations as well as local and regional intelligence sharing for counter-drug operations, which can lead to the reduction of maritime security incidents in the EEZ of Sri Lanka and the IOR. This could further help maritime security decision makers to understand threat dynamics in a particular region to plan deployment of maritme security assets without wasted resources.

D. RECOMMENDATIONS FOR SRI LANKA AND THE IOR

This thesis has documented that achieving enhanced maritime security to disrupt drug trafficking in Sri Lanka's EEZ and IOR is difficult without expanded capabilities and resources such as additional and advanced platforms, intelligence sharing, technology, and regional and international agreements. Therefore, it is necessary to offer sustainable and achievable recommendations for actions and policies to meet this objective. According to the findings of this thesis, different countries have initiated successful maritime security cooperation programs and strengthened their legal entities through regional and international cooperation with other nations and international actors.

Just as Thailand strengthened its national security capabilities through membership in the Association of Southeast Asian Nations and other regional organizations so can Sri Lanka achieve success in maritime security initiatives through participation in the South Asian Association for Regional Cooperation (SAARC), a major regional organization in South Asia. SAARC can lead regional dialogue on maritime security concerns and regional intelligence sharing in the IOR to counter drug trafficking and non-traditional threats in the IOR. Such dialogue could help regional navies from India, Pakistan, and Bangladesh address maritime security threats in the IOR by jointly employing resources and capabilities and would, in turn, assist Sri Lanka's counter-drug trafficking operations by increasing the number of maritime patrols to ensure better maritime security in the region. That said, it is necessary to determine how effective the

SAARC is and what reforms are needed to enhance its effectiveness to address the drug problem in the IOR.

The SLN and Regional Drug Countermeasures Model with its user interface and Causal Loop Diagram might help to answer system dynamics questions formulated at the beginning of this research and will also be important as a decision support tool for SLN decision makers in shaping and restructuring the SLN counter-drug operations. This would eventually be accomplished with the assistance of regional partners and international actors through negotiations with regional powers to mitigate the negative impacts of delays in obtaining maritime security agreements and would facilitate the prompt sharing of intelligence and the commitment of additional maritime patrol assets.

The Naval Air Wing is an important element to enhance the maritime surveillance range and capabilities of the Sri Lanka Navy. As an initial step, acquisition of maritime patrol helicopters would enhance the maritime surveillance capacity of the SLN. Therefore, financial support and asset acquisition should be initiated through navy-to-navy staff talks and defense dialogues with regional navies and major powers like the United States. So far, Sri Lanka has been granted three offshore patrol vessels by the United States, an offshore patrol vessel each from China and India, and two Bay Class patrol vessels from Australia. Most of these platforms and some of the SLN platforms are also capable to carry helicopters onboard.

As the research explained, UNODC is a key counter-drug operations entity of the United Nations offering training and asset sharing in different countries, including Seychelles, Thailand, Mexico, and Sri Lanka. Therefore, increasing engagement with this organization could help the SLN and other counter-drug enforcement agencies to build capacity through enhanced training and acquisition of additional resources.

Maintaining a non-aligned foreign policy to achieve partner support from India, the United States, and China could be the best option to enhance the maritime security capability of Sri Lanka in conducting counter-drug operations. This objective can be achieved through maritime exercises, training and assets exchange, goodwill port calls, and navy-to-navy staff talks.

Further, maritime cooperation dialogues such as the annual Galle Dialogue maritime conference in Sri Lanka and Goa Maritime Symposium in India, the Indian Ocean Naval Symposium, and the International Sea Power Symposium in the United States are effective fora to increase maritime domain awareness and to address capability gaps and requirements for small nations to counter maritime security threats.

Better coordination of drug and maritime law enforcement agencies is an essential element for counter-drug operations as well. The study identified drug and maritime law enforcement entities in Seychelles, Thailand, Mexico, and the United States that achieved significant success in developing their inter-agency coordination to achieve success in future operations. Therefore, Sri Lanka can use this model to achieve better coordination and cooperation among Sri Lanka's Navy, Coast Guard, Police Narcotics Bureau, and National Dangerous Drug Control Board to achieve success in future counter-drug operations.

Further, maritime surveillance through new technology and intelligence sharing is an essential aspect of maritime security operations. Regional intelligence sharing between IOR regional countries and cooperation with international intelligence agencies could be greatly improved for counter-drug operations in the IOR. Local and international intelligence sharing could also have a significant impact on the counter-drug operation as shown in the model developed for this thesis, as presented Figure 17. Therefore, the Directorate of Naval Intelligence and State Intelligence Service of Sri Lanka should enhance its intelligence network within the region and beyond to achieve more success in counter-drug operations.

E. RECOMMENDATIONS FOR FUTURE RESEARCH

Based on maritime security threat dynamics in different regions of the world, maritime security decision makers could benefit from exploring a variety of modeling and simulation methods such as system dynamics, agent-based modeling, wargaming, and Delphi Groups to better understand the behavior of non-traditional maritime security threats and more effective resources, policies, and strategies to address these. Such analytic methods and tools may help decision makers deploy assets in a more cost-

effective manner to counter maritime security threats and ensure better maritime security in particular region.

Developing more refined Systems Dynamics (SD) models and populating them with relevant data could prove useful in analyzing a variety of policies, legal constructs, resources, and collaborative efforts to counter maritime security threats unique to specific regions.

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APPENDIX. DESCRIPTION OF THE DEVELOPED MODEL'S ELEMENTS

Elements	Description	Formula
Converter, Narcotics Trafficking	Calculated to normal distribution monthly incidents, five incidents per month	NORMAL(5, .5)
Inflow, Incidents per Month	Calculated considering Impact of Narcotics Intel Network, Narcotics Trafficking, and Impact on Trafficking	IF ((1+ Impact_of_Narcotics_Intel_Network) * Narcotics_Trafficking - (Impact_on_Trafficking*Narcotics_Trafficking)) > 0 THEN ((1+Impact_of_Narcotics_Intel_Network)*Narcotics_Trafficking - (Impact_on_Trafficking*Narcotics_Trafficking)) ELSE 1
Converter, Impact of Narcotics Intel Network	Calculated graph extrapolated	Maritime Security Incidents 0–10 "X" axis and Impact of Intel network 0–0.45 "Y" axis
Stock, Maritime Security Incidents	Considering data available in SLN average incidents per month: 5	Average incidents per month 5
Outflow, Maritime security events conducted per month	Considered output from Maritime Security Incidents Stock	HISTORY(Maritime_Security_Incidents, TIME)
Stock, Total Security Incidents	Considered input as maritime security events conducted per month	Initial value "0"
Converter,	Calculated	Maritime Security Incidents 0–10 "X" axis and SLN

Elements	Description	Formula
SLN Intelligence Input	graph continuous	Intelligence input 0–0.6 "Y" axis
Converter, Regional Intelligence Sharing	Calculated graph continuous	Maritime Security Incidents 0–10 "X" axis and Regional Intelligence input 0–0.6 "Y" axis
Converter, No. of Contributed Patrols	Contributed patrols from regional navies	Initial value 2 units per month
Converter, Months to Gain Partner Support	Considered Delays will occur to get partner support	Delay time 18 months
Converter, Combine Patrol of Regional Navies/ Coast Guards	Calculated considering months to gain partner support, maritime Security Incidents, and No. of Contributed Patrols	IF TIME > Months_to_Gain_Partner_Support AND Maritime_Security_Incidents > 1 THEN Nos_of_Contributed_Patrols ELSE 0

Element	Description	Formula
Inflow, Combined Patrols	Consider Combined Patrols of Regional Navies/Coast Guards	IF "Combine_Patrol_of_Regional_Navies/CGs" > 0 THEN PULSE("Combine_Patrol_of_Regional_Navies/CGs," 0, 1) ELSE 0
Stock, Partner Counter Drug Patrols	Initially, no partner counter-drug patrols, and after 18 months will gain partner contribution for counter-drug operations of SLN	Initial value "0"
Stock, Total Partner Patrols/Ops	Initially, no partner counter-drug patrols	Initial value "0"
Converter, Combined Enhanced Capability	Calculated with SLN Patrols, SLN Intelligence, Intelligence Sharing, and Regional Operations Conducted	SMTH1(Sri_Lankan_Patrols * (1 + Intelligence_Input+Regional_Intelligence_Sharing), 12)+ Regional_Operations_Conducted
Outflow,Regional Operations Conducted	Calculated considering Partner Counter-Drug Patrols/Ops over Time	HISTORY("Partner_CD_Patrols/Ops," TIME)
Converter, Total Naval Capacity	Considered inputs from Combined_Enhanced_Capability	Inputs from the Combined_Enhanced_Capability converter
Converter, Sri Lankan Patrols	SLN is contributing 4 units per month for counter-drug operations in the EEZ and the region	The initial number of SLN units 4
Converter, Sri Lankan Patrol Capacity	SLN patrols and SLN Intelligence inputs considered	Sri_Lankan_Patrols * (1+ Intelligence_Input)
Inflow, Monthly Operations	Calculated with the input from Maritime Security Incidents, Total Naval Capacity, and Sri Lankan Patrol Capacity	IF TIME > 12 AND Maritime_Security_Incidents > 1 THEN Total_Naval_Capacity ELSE Sri_Lankan_Patrol_Capacity
Stock, Counter Drug Patrols/Ops	Initial Patrols/Ops are considered as 4 and inputs received from the Monthly Operations	Initial value 4
Outflow, Completed Ops per	Inputs are getting from Counter-Drug Patrols/Ops and contributing to Impact	HISTORY("Counter_Drug_Patrols/Ops," TIME)

Element	Description	Formula
Month	on Trafficking and Total Counter Drug Patrols/Ops	
Stock, Total CD Patrols/ Ops	Getting inflow from Completed Ops per Month	Initial Value “0”

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