2023 Chuuk State Chemical Profile

Chuuk Environmental Protection Agency

FSM Department of Environment, Climate Change and Emergency Management
Waste Management and Pollution Control Unit
Federated States of Micronesia

Supported by the United Nations Environment Programme

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Federated States of Micronesia
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Acronyms

CIF	Cost, Insurance, and Freight
COM	College of Micronesia
DDT	Dichlorodiphenyltrichloroethane
DECEM	Department of Environment, Climate Change and Emergency Management
DFA	Department of Finance & Administration
DHS	Department of Health
DOE	Department of Education
DTI	Department of Transportation and Infrastructure
EPA	Environmental Protection Agency
FSM	Federated States of Micronesia
FSMCT	FSM Customs & Tax
FSMNG	Federated States of Micronesia National Government
GDP	Gross Domestic Product
HCB	Hexachlorobenzene
HCDCS	Harmonized Commodity Description & Coding System
HS	Harmonized Commodities System
Km	Kilometers
Mi	Miles
NCP	National Chemical Profile
NM	Nautical Miles
OCT	Office of Customs & Tax
PCB	Polychlorinated
POP	Persistent Organic Pollutants
RAC	Refrigerants and Air Conditioning
SCP	State Chemical Profile
UNDP	United Nations Development Program
UNEP	United Nations Environment Program
USD	United States Dollar
Vital	FSM Petroleum Corporation
WCO	World Customs Organization

Authors' Note

The State Chemical Profile (SCP) is a desktop study that lists and summarizes relevant laws, policies, governmental institutions, and other relevant mechanisms of the State of Chuuk for managing and implementing chemical management in Chuuk State. The SCP is part of the FSM's National Chemical Profile (NCP) and includes data and information about the chemicals entering the State. Furthermore, data and information were collected to evaluate the management of chemicals and hazardous waste in the State. The SCP analyzed vital policy and legislative items: environmental, chemical control, customs and taxation, chemical management regulations and policies, and health. This report will inform discussion for further policy and legislative development in the FSM and the four States to support the implementation of proper chemical and hazardous waste management across the FSM.

Every effort was taken to ensure that the information written in this report is accurate. This report is provided for informational and educational purposes only. It is intended, but not promised or guaranteed, to be current and complete as of the date of its publication. This analysis should not be used as a legal document, and organizations should consult with lawyers to provide legal advice on implementing chemical and waste management in the FSM.

The contents of this report, including any errors or omissions, are solely the responsibility of the authors at OCEA, Inc. The authors invite corrections and additions.

Executive Summary

Understanding the critical nature of efficient chemical and hazardous waste management, the FSM has been fervently involved in global collaboration, aligning its strategies with international frameworks and treaties. Embracing global conventions and accords, like the Basel Convention, marks a noteworthy advancement for the FSM. Similarly, the nation's engagement in actualizing the Stockholm Convention is pivotal in curbing and eradicating persistent organic pollutants (POPs).

Between 1997 and 2006, the FSM participated proactively in the Persistent Organic Pollutants in Pacific Island Countries (POP in PICs) initiative, underscoring its resolve to combat chemical contamination and its steadfastness in confronting the ecological threats presented by POPs.

The FSM has initiated measures to tackle chemical handling and safety nationally via specific laws and programs. The Department of Environment, Climate Change and Emergency Management (DECEM) defines baseline standards and creates the legislative framework concerning chemical management. However, each State within the FSM is responsible for establishing legislation, regulations, and policies at the State level. Furthermore, each state is responsible for executing and implementing chemical and hazardous waste management initiatives within its jurisdiction.

Chuuk has taken proactive steps by passing laws and formulating various resource management strategies to meet its obligations regarding the stewardship, safeguarding, and preservation of the environment and its natural resources. Chuuk has developed regulations that address the handling and removal of chemical and hazardous waste as it pertains to development projects only. The use, storage, and disposal of chemical products are highlighted in the Chuuk State Marine and Fresh Water Standard Regulation and the Solid Waste Regulations, which fall under the mandate of Chuuk EPA to enforce.

However, Chuuk is encumbered by several challenges:

- A comprehensive list of chemicals that enter the State;
- Having appropriate legislation, regulations, and policies that address the importation, handling, and disposal of chemical and hazardous waste;
- Identifying the major importers of chemicals and hazardous materials into the FSM;
- Knowing which agencies are responsible for managing the proper disposal and management of chemicals and hazardous waste.

The "*Strengthening Institutional Capacity of Chemical Management in the FSM*" project is designed to assist Chuuk in creating an extensive State Chemical Profile. This involves pinpointing the varieties and quantities of chemicals arriving in the State, understanding their usage and management, identifying the sectors engaged in chemical importation, and evaluating the existing laws and enforcement.

The analysis required data collection from various sources, documentation of existing chemical storage sites, and stakeholder engagement to discuss policy recommendations and legislative reforms on chemical management. The consultant carried out the following

activities:

- Collecting import statistics from the State Customs office for Chapters 28-40 of the 2018 Harmonized Commodities System (HS) to assess chemical imports, their sources, and their intended use.
- Provide import statistics for the island state, including data on the types and amounts of chemicals imported, their sources, and their intended use.
- Capture photographs of chemical storage sites across the island state to assess compliance with storage and handling requirements and identify potential risks or hazards.
- Inspect the domestic market to assess the availability and use of chemicals and identify any potential risks or hazards associated with their use.
- Facilitate stakeholder engagement workshops to collect feedback and provide policy recommendations on chemical management. The workshop will bring together key stakeholders, including government agencies, industry representatives, and civil society groups, to discuss the situational analysis findings and identify policy improvement opportunities.

The analysis aims to identify the current status of the legal, institutional, administrative, and technical infrastructure for chemicals management in the State of Chuuk, FSM. The result of such analysis aims to help implement environmental and chemical management priorities and inform necessary legislative reforms to improve chemical management at the state and national levels in the FSM.

1. The Profile of the State of Chuuk

1.1 Geographic Context

1.1.1 Location & Terrain

Chuuk State has a total landmass of approximately 127 km^2, characterized by a unique geographical feature consisting of some of the largest lagoons in Micronesia, low-lying atolls and three single islands.[1] The capital of Chuuk state is Weno, located on Weno Island which is part of Chuuk Lagoon and includes seven major volcanic island groups within 93 km^2 of lagoon enclosed by a string of islets on a barrier reef. Weno is the largest city in the FSM. The state includes also a group of 14 inhabited outlying atolls and low islands located outside Chuuk Lagoon. Geographically, Chuuk is divided into five regions: Northern Namoneas, Southern Namoneas, Faichuk, Mortlocks and Northwest islands. The highest elevation in Chuuk is Mt. Uinipot on Tol Island at 443 m. Chuuk has the smallest land area among all the FSM states and is the most populated.[2]

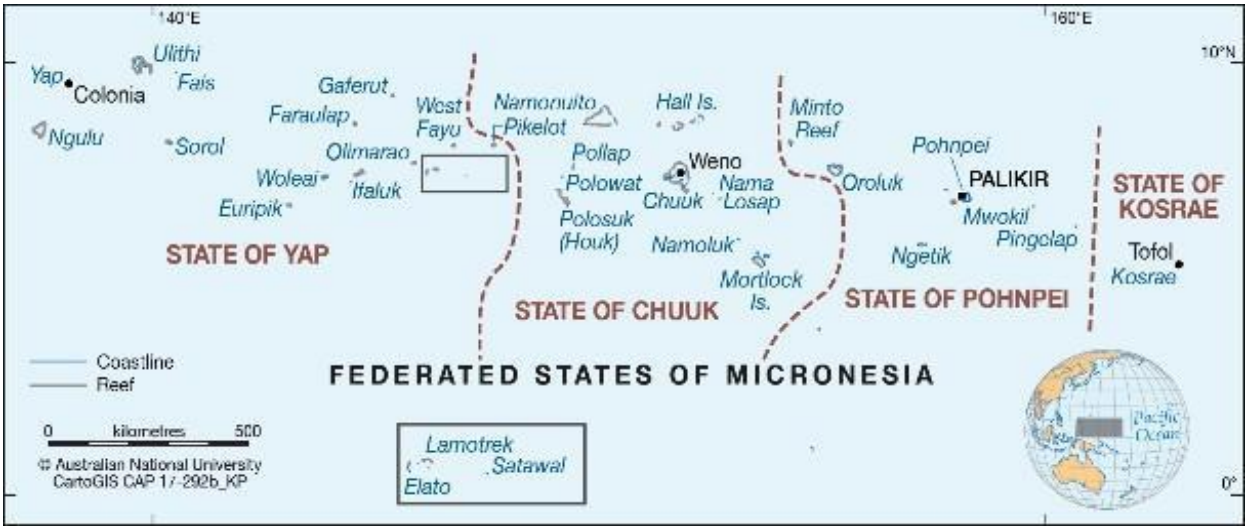


Image 1: *Map of FSM (**Federated States of Micronesia - CartoGIS Services Maps Online - ANU**)*

Much of the upland native forest in Chuuk was cleared during WWII, and these areas were converted into agroforest. Invasive vegetation is a significant problem and has taken a foothold in many areas of Chuuk islands. The islands in Chuuk lagoon have the highest cover of agroforest across the four FSM's states, while the numerous inhabited outer islands of Chuuk state have designated areas, or islands, developed only for agriculture purposes.[3]

It is estimated that almost 60% of land in Chuuk is forested. Of this, upland forest covers 28% of forested land, palm forest covers 1.3%, and agroforest covers 71%. Chuuk State, due to the islands' limited land and estuarine areas, has only small and isolated areas of mangroves; however, they are present throughout the state, estimated to be 2% of the land

[1] The Federated States of Micronesia State of the Environment (SOE), 2019. https://fsm-data.sprep.org/resource/fsm-soe-2018

[2] Chuuk State Strategic Development Plan FY2018-FY2023. https://www.spc.int/CoastalFisheries/CFM/Document/ShowDocument/7aca5721-a9db-4610-8726-03b607e985ab

[3] The Federated States of Micronesia State of the Environment (SOE), 2019. https://fsm-data.sprep.org/resource/fsm-soe-2018

within the state.[4]

Chuuk Lagoon is home to a number of marine habitats and high levels of biodiversity, which is heavily relied upon by the population. Chuuk islands are surrounded by a coral reef in most cases a barrier reef, which is interrupted at intervals by deep water passes. Distinctive shallow water-fringing reef systems are associated with the larger volcanic and continental islands located in Chuuk State. Chuuk coral reefs include barrier reefs, fringing reefs, atolls, and submerged reefs. Common reef habitats include lagoon reefs (pinnacle, patch), passes, channels, shallow reef flats, terraces, submerged reefs, slopes, reef holes, embayment, quasi estuaries, seagrass beds, mangroves, mud and sand flats. Chuuk Lagoon is a major shipwreck site for WWII and includes at least 50 wrecks resting in its waters, with some creating major concerns for potential oil spills and pollution.

1.1.2 Climate Overview

Table 1: *Overview of climate trends in Chuuk State*

Climate feature	Climate trends
Air Temperature	In Chuuk annual mean air temperatures have increased at a rate of +0.23°F (0.13˚C) per decade since 1951.
Rainfall	Chuuk is affected by the West Pacific Monsoon climatic pattern. This brings in storms and typhoons which causes additional rain during the wet season. Interannual rainfall variability, associated with ENSO events, has been observed in Chuuk since the 1950s. Annual rainfall shows a declining trend of -0.7 inches (17.4mm) per decade since 1950. In a typical El Niño, dryness and drought are common.
Sea Level	Chuuk experiences the highest monthly mean sea levels around March and its lowest around November and December. Extreme sea levels and high tides in Chuuk are associated with changes in water levels due to El Niño Southern-Oscillation. These events are typically observed during la Niña. Records from tide gauges from 1963 to 1999 indicate that of the 10 highest water levels recorded in Chuuk, seven occurred during La Niña conditions. Coastal flooding is already affecting the state, the most recent event, which took place in December 2021, occurred due to strong winds and extreme tides in combination with raised sea levels and flooded houses and infrastructure in Chuuk state.
Storm patterns	The Micronesia Region is the most active tropical cyclone basin in the world. The tropical storms and typhoons that occur annually especially affect Chuuk and Yap. The most recent damaging typhoons that hit Chuuk State were typhoon Maysak (2015) and Wutip (2019) both events caused fatalities and millions of dollars in damage. Chuuk out-lying islands (Lukunor, Mortlocks Region and Northwest Region, Houk and Pollowat) were particularly affected by Typhoon Wutip, with residents facing water and food shortages.
Sea Surface Temperature	Natural variability (i.e., year-to-year variability) still plays a large role in determining the sea-surface temperature in Chuuk. Historical changes are consistent with the broad-scale sea-surface temperature trends for the wider Pacific region, indicating increased SST warming.
Ocean	Ocean acidification is projected to continue, with consistent decline in aragonite

[4] Falanruw, M. 2001. Terrestrial Biodiversity of the FSM. FSM Government publication, 35pp & Cole, T. G., Ewel, K. C., and Devoe, N. N. 1999. Structure of mangrove trees and forests of Micronesia. Forest Ecology and Management 117: 95-109.

Acidification saturation.

Sources: *Pacific Climate change data portal, Data portal, NOAA National Centers for Environmental Information (NCEI), Australian Bureau of Meteorology and CSIRO-2014.*

1.2 Demographic Structure

1.2.1 Demographics

Chuuk's population, as per the 2010 census, stands at 48,703, representing the largest population in the FSM. The majority of households are male-headed (81%),[5] and higher poverty incidence is in female-headed households (about 56%).[6] Notably, there is a decline in Chuuk's population due to outward migration and declining fertility.[7]

1.2.2 Education

A 2022 report highlighted that Chuuk states has the lowest enrollment rates of all states across all levels of education, showing a constant decline since 2018.[8] Although Chuuk has the highest number of schools in the country (75 schools, of which 51 in Chuuk lagoon and 24 in the outer islands), it has the lowest number of students graduating from primary and secondary grades.[9] Indeed, Chuuk state leads the country with most dropouts for most primary grades, with data showing that the state has the most out of school children at all levels of education.[10]

1.2.3 Resources and Economy

Chuuk's geographical isolation and poorly developed infrastructure impede long-term growth. Over the years, fishing and farming have primarily supported livelihoods, acting as a safety net for Chuukese families. A United Nations Development Program (UNDP) 2008 Report stated that poverty is a concern, and based on a 2008 poverty assessment, 11% of the FSM population suffered from food poverty, while 29.9% of the population suffered from basic needs poverty.[11] The public sector plays a central economic role and depends on development funding. About 65% of national government revenue and 75% of states' revenues come from US aid and compact funding. Chuuk state has the highest proportion of people below the food poverty line (16%) and basic-needs poverty is accentuated and most severe as is the deprivation in access to electricity, water sources, schools and general assets.

Chuuk's Gross Domestic Product (GDP) experienced recession for the next 5 years since COFA II began. In 2003 Chuuk's GDP was $83 million and by 2008 Chuuk's GDP declined

[5] FSM Integrated Agriculture Census, 2016.
[6] FSM and WorldBank, 2017. Poverty Profile of the Federated States of Micronesia, based on the 2013/1204 household income and expenditure survey.
[7] Summary Analysis of Key Indicators from the FSM 2010 Census of the Population and Housing. Palikir, Pohnpei: FSM Office of Statistics, Budget, Overseas Development Assistance and Compact Management; see: http://prism.spc.int/images/census_reports/FSM_2010_Census_Indicators_Final.pdf
[8] FSM NDOE Education Statistics Digest 2022. https://www.national.doe.fm/wp-content/uploads/2023/04/FSM-NDOE-Education-Statistics-Digest-2022.pdf
[9] FSM NDOE Education Statistics Digest 2022. https://www.national.doe.fm/wp-content/uploads/2023/04/FSM-NDOE-Education-Statistics-Digest-2022.pdf
[10] FSM NDOE Education Statistics Digest 2022. https://www.national.doe.fm/wp-content/uploads/2023/04/FSM-NDOE-Education-Statistics-Digest-2022.pdf
[11] Moving the Pacific Forward. UNDP Annual Report. 2008. https://www.undp.org/sites/g/files/zskgke326/files/migration/pacific/UNDP_MCO_AR_2008.pdf

to $67 million. In 2010, Chuuk experienced 3% growth in its GDP due to an increased spending in public and private sectors, but in subsequent years Chuuk experienced very little growth.[12] In 2013, Chuuk's per capita income was $1,455, compared with the FSM average of $2,300, ranking the lowest GDP per capita the in the FSM.[13] Whilst economic activity has continually declined along with COFA funding, the response following the Maysak Cyclone in 2015 has injected funds into the Chuuk State economy.[14]

Chuuk population is highly dependent on marine and terrestrial resources for subsistence. The subsistence economy is based on small-scale horticulture and fishing. These two activities are not mutually exclusive, as most farmers are also fishermen. Some have livestock for food production. This traditional subsistence economy is still vital for the population, where men, women, and youth are actively engaged.

1.3 Political Structure

1.3.1 Government Structure

The state of Chuuk has four branches of government established by the Constitution: legislative, executive, judicial, and municipal. Furthermore, the Constitution recognizes and protects tradition and customs' profound role in society. It provides that existing Chuukese custom and tradition must be respected, and that the Legislature may prescribe, by statute, for their [custom and tradition] protection. If challenged as violative of other constitutional rights, the protection of Chuukese custom and tradition must be considered a compelling social purpose warranting such governmental action. Each inhabited island in Chuuk has a traditional leader known as "Soupwun' who comes from a clan that ruled the island supposedly from the beginning of its settlement. These Soupwuns are equivalent to a chief. Chuuk State has a council of traditional leaders comprised of 42 active Soupwuns. This council is the strong hold of customs and traditions with great influence in the political process.[15]

1.3.2 Legislative

Chuuk State is the only state in the FSM that has a bicameral legislature (The Senate &The House of Representative). The Chuuk State Legislature consists of two houses: the Senate (ten members led by the body's president) and the House of Representatives (28 members led by the body's Speaker). The Legislature's power "extends to all rightful subjects of legislation not inconsistent with" the constitutions of Chuuk or the FSM. The Chuuk Constitution charges the Legislature with providing, by law, for the development and enforcement of standards of environmental quality.

1.3.3 Executive

Chuuk's Executive Branch is led by the governor and lieutenant governor, who are jointly elected for a four-year term on a single ticket.

[12] Chuuk State Strategic Development Plan, 2018-2023
[13] Chuuk State Infrastructure Development Plan, 2016-2025.
[14] Chuuk Joint State Action Plan On Disaster Risk Management And Climate Change, 2017.
[15] Chuuk State Strategic Development Plan, 2018-2023

1.3.4 Judicial

The judicial branch in Chuuk State consists of the State Supreme Court, inferior state courts established by statute, and municipal courts.

The State Supreme Court has concurrent original jurisdiction over land cases and disputes over waters in the State of Chuuk. Chuuk's Constitution contains a judicial guidance clause providing that court decisions must be consistent with the State Constitution, local traditions and customs, and Chuuk's social and geographical configuration.

1.3.5 Municipal

The Chuuk Constitution recognizes the existence and importance of the 39 municipalities in Chuuk State. Each municipality is required to adopt its own democratic constitution within limits prescribed by the State Constitution and by general law, and the municipal constitution may be traditional. The powers and functions of a municipality with respect to its local affairs and government are superior to statutory law. Each municipality has an elected mayor who acts as the executive body. The legislative side is with the municipal council. The judiciary branch is with the municipal court, which usually has one or two presiding judges.[16]

Restructuring of state government departments has reduced the number to 8 major departments: Administrative Services, Agriculture, Marine Resources, Health Services, Education, Public Safety, Attorney General Office, and Transportation.[17] Table 2 is a list of the governor's cabinet, which are composed of the heads of state departments. As of the writing of this draft, we are still trying to acquire correct and working websites for the departments listed in Table 2.

Table 2. *Executive Departments of the State of Chuuk*

Department	Website
Administrative Services	
Department of Education (DOE)	https://chuuk.doe.fm/
Department of Marine Resources	None
Department of Transportation	None
Department of Health Services	None
Department of Agriculture	None
Department of Public Safety	None
Attorney General Office	None
Chuuk EPA	Facebook page only

The Chuuk Environmental Protection Agency (EPA), Department of Health Services (DHS), and Chuuk Supply Office, which is a division within the Department of Administrative Services (DAS), are relevant for managing chemicals, biohazards, and other hazardous materials. Table 3 lists the departments and Offices and summarizes their mandates.

Table 3: Chuuk State Departments responsible for chemicals, biohazards, and other hazardous materials

Department	Mandate
Chuuk EPA	Mandated to enforce the Chuuk State Marine and Fresh Water Standard Regulation as well as the Solid Waste Regulations, which regulate use, storage and disposal of chemical products.

[16] Chuuk State Strategic Development Plan, 2018-2023
[17] Chuuk State Strategic Development Plan, 2018-2023

Department of Health Services (Procurement Officer, Office of Sanitation, Quality Assurance Officer, Laboratory, Mortuary)	The Chuuk Department of Health Services has responsibilities pertaining to chemical management to ensure the safety of healthcare facilities, patients, staff and the general public. This is inclusive of the procurement of chemical products and the safe handling, storage and disposal of chemical products utilized at the Chuuk State Hospital.
Department of Administrative Services (Chuuk Supply Office)	The Chuuk Supply Office is responsible for processing of purchase requisitions from state government agencies and ensuring the release of all purchased items adhere to Chuuk State financial management regulations. This responsibility is inclusive of chemical products purchased through Chuuk State "sector" and "local" funds.
Chuuk Public Utility Corporation CPUC	The Chuuk Public Utilities Corporation (CPUC) has mandates for chemical management to ensure the safe and efficient operation of its utilities, such as electricity, water treatment and sanitation facilities.
Vital Petro-Corp	FSM Vital Petrocorp's mandates include compliance with relevant regulations and standards, safety protocols and training, risk assessment and mitigation, protecting the environment by implementing measures to minimize environmental impact, developing emergency response plans, stakeholder communication and monitoring and evaluation of chemical management practices.
Chuuk Chamber of Commerce (RAC)	The Chuuk Chamber of Commerce primarily plays a supportive role in promoting responsible chemical management within the business community in Chuuk. Some mandates include the provision of resources and information such as chemical management best practices, advocacy for policies and regulations and facilitating networking and collaboration amongst businesses and the government.
Department of Transportation (Division of Public Works)	The Division of Public Works has mandates that focus on ensuring the safe and responsible handling, storage and disposal of chemicals used in various public works activities. Mandates include, but are not limited to, regulatory compliance, establishing and implementing safety protocols, hazard communication and awareness and risk assessment and management. The Division of Public Works is likewise responsible for the management of the Chuuk State dump site(s).

2 Insights on Chemical Consumption and Imports in Chuuk

2.1 Data Collection

The FSM Office of Customs & Tax (OCT), functioning under the Department of Finance & Administration (DFA), plays a pivotal role in managing and overseeing imports, which is essential for grasping the dynamics of the country's trade in goods and services. To monitor imports coming into each of the states, OCT has satellite offices in each state ports. In 1983, the international Harmonized Commodity Description and Coding System (HCDCS), also known as the Harmonized System (HS), was implemented. Created by the World Customs Organization (WCO), the HS provides a global standard for categorizing traded goods. This universal system simplifies the description of commodities, allowing nations to align their customs and trade processes.

The Oceania Customs Organization (OCO) serves as a critical regional intergovernmental entity established to foster collaboration and enhance the capabilities of customs administration across the Pacific. Its primary objectives include advancing trade facilitation, increasing revenue collection, and strengthening border security among its member states. HS is pivotal to the OCO's operations in this framework as it aligns its customs classifications

with global norms. This standardization through the HS codes brings uniformity in customs practices across the Pacific, facilitating smoother trade among the member countries.

2.2 Data Assessment & Methodology

Within the scope of the consultancy focused on gathering customs data for chemical imports under chapters 28 through 40 of the 2017 HS code, the process involved meticulous collection, compilation, refinement, storage, and analysis of chemical import data. OCT plays a key role in this process. It targets the import data relevant to the designated HS chapters and year (HS2017) for t thorough analysis.

The import data utilized by OCT is sourced from various points of entry within the nation. This dataset encompasses a range of critical information about the imported chemicals including their specific classification and description as per the HS code, the quantity of the imports, their Cost, Insurance and Freight (CIF) value, the year of import, the state within the FSM that received the goods, and the country of origin. These parameters serve as filters to isolate statical information focusing on the 13 chapters within the HS code pertaining to chemicals and related products.

2.2.1 Top-down Analysis of Chemical Imports

The top-down approach in assessing chemical imports offers a broad view of national and sometimes regional import trends. It identifies key patterns, high-volume or high-risk substances, evaluates policy impacts, and helps set regulatory and strategic priorities.

2.2.2 Bottom-up Analysis of Chemical Imports

This approach focused on gathering granular data on chemicals directly from the source, i.e., laboratories throughout FSM. By distributing a chemical inventory survey, specific data about chemical names, quantities, storage methods, usage patterns, and more can be collected. A chemical inventory survey was distributed to all known laboratories through the FSM to collect the following data:

- **Chemical Abstract Service (CAS) Number:** Unique identifier for chemical substances.
- **Chemical Name:** The standardized name of the chemical.
- **Location - Building:** Specific building where the chemical is stored or used.
- **Location - Room Name or Number:** Specific room or area within the building.
- **Physical State:** Solid, liquid, gas, etc.
- **Description of Hazards:** Specific risks associated with the chemical.
- **Disposal Method:** Recommended ways to discard the chemical safely.
- **Safety Precautions:** Guidelines for safe handling, transport, storage, etc.
- **Amount:** Quantity of the chemical in possession.
- **Units:** Measurement units (from the approved list) for the quantity.

A bottom-up approach through a chemical inventory survey provided the granularity and specificity needed to understand the on-ground reality of chemical usage in FSM's laboratories. When used in conjunction with a top-down import analysis, it paints a comprehensive picture of the chemical landscape, from import to end-use, guiding informed policy decisions and safety protocols.

2.3 Chemical Import Statistics

The statistics for chemical imports from 2019 to 2021 were obtained from the DCT division's PC trade system, utilizing the 2017 HS codes version. A quick examination of the datasets, encompassing the targeted 13 chapters, revealed notable deficiencies in the "Quantity" and "Unit" columns, with only 7.5% (356 out of 4735 records) containing data for these fields.

Concerns were raised regarding the chemical import statistics for baseline years, particularly the value, measured in CIF, of imports recorded under tariff codes labeled as "Others". The codes provide no specific information about the items imported. It is speculated that importers might not be fully knowledgeable or motivated to accurately declare their imports due to the complexity and time required to find appropriate HS codes and tariff number descriptions. Consequently, to save time, importers often default to using "Others" tariff codes instead of identifying the most accurate code for their chemical imports. Additionally, Customs offices lack expertise in recording precise monetary values and detailed descriptions of imports.

2.3.1 General Observations

All chemical and chemical-related products originate outside of Kosrae. The island needs the means to produce chemicals or develop industrial products. Imports within Chapters 28-40 of the HS codes displayed consistent trends, with no notable fluctuations or deviations from the average during the baseline years. Approximately two-thirds of all chemicals and related product imports into the FSM were concentrated in three chapters: Chapter 39 (Plastics and Articles Thereof), Chapter 30 (Pharmaceutical Products), and Chapter 34 (Soaps, Surface Washing Agents, Candles, etc.).

2.4 Chemical Inventory Survey Results

2.4.1 Chemical Import Statistics 2019-2021

There were several notable trends assessed in the baseline years. Chapter 39, *Imports of Plastics and Articles Thereof*, accounted for the most significant amount of chemical or chemical-related imports (36%) in the three baseline years. Nearly 93% of the total chemical imports fall within eight chapters. Plastics, pharmaceutical products, soaps, and washing agents accounted for 65.5% of all imports within the baseline period. Imports of Soaps and Cleaning Agents were probably slightly inflated due to the demands for preparation and response to the SARS-CoV-19 outbreak.

2.4.2 Chuuk Chemical Import Analysis: Baseline Year 2019-2021

Across the baseline years of 2019-2021, Chuuk imported approximately $32.9 million worth of chemicals and chemical-related products. Chuuk State had the highest chemical imports, probably due to the fact that Chuuk has the largest population within the FSM. Table 4 provides information on the cumulative value of chemical imports into Chuuk from 2019 to 2021.

***Table 4**: Chuuk Chemical Import Overview*

Year	Dollar Value (USD)
2019	11,176,492
2020	9,448,126
2021	12,345,292
Total:	32,969,910

2.4.3 Chuuk Chemical Import Analysis: Baseline Year 2019-2021

For the baseline years, all Chapters showed fluctuations in imports. Chapter 39 - Plastics and Articles Thereof – did account for nearly 36% of all chemical or chemical-related imports from 2019-2021 and ranked the highest in CIF value in Chuuk. Whereas Chapter 37 – Photographic or Cinematographic Goods – ranked the lowest in CIF value and accounted for only .0063% of the total import value over three years. Interestingly, also Chapter 31- Fertilizer- ranked among the lowest CIF values, accounting for only .0091% of the total import value for the baseline years. Table 5 shows the CIF value of chemicals or chemical-related imports from 2019-2021 by HS Chapter.

Table 5: *Summary of the chemical import analysis for Chuuk. Cost, Insurance, and Freight (CIF) values are reported in US dollars.*

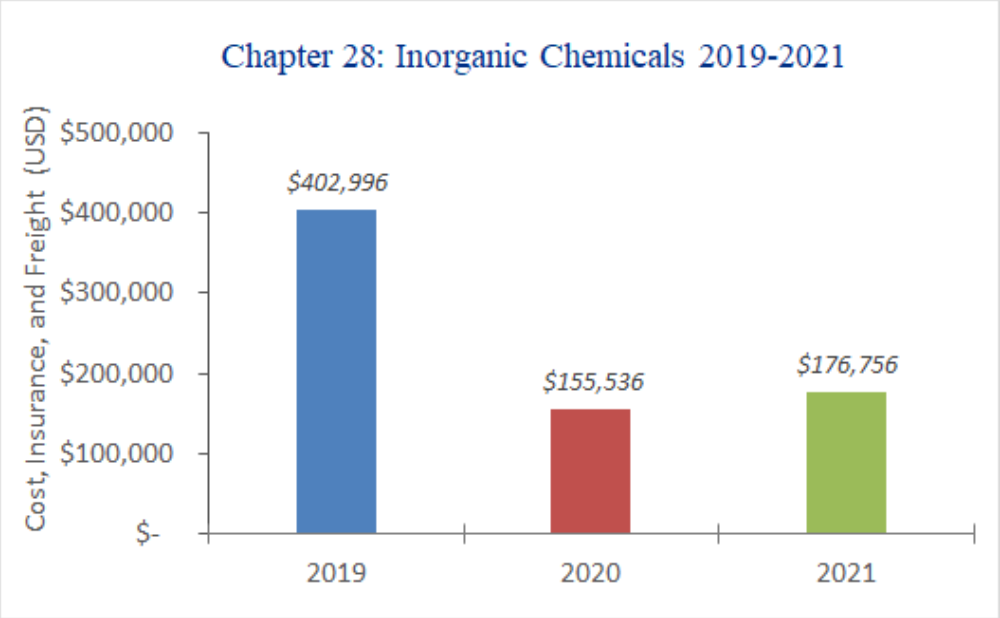
Chapter	2019	2020	2021	Grand Total
28	$402,998	$155,536	$176,758	$735,292
29	$104,364	$283,760	$105,874	$493,998
30	$2,017,406	$1,013,344	$1,731,852	$4,762,602
31	$4,954	$11,538	$13,426	$29,918
32	$1,289,904	$778,888	$1,065,326	$3,134,118
33	$674,240	$784,958	$998,390	$2,457,588
34	$1,499,902	$1,720,930	$1,876,222	$5,097,054
35	$98,450	$76,488	$111,460	$286,398
36	$15,586	$153,074	$115,988	$284,648
37	$3,120	$4,768	$12,938	$20,826
38	$659,738	$758,982	$678,458	$2,097,178
39	$3,806,340	$3,229,790	$4,702,984	$11,739,114
40	$599,490	$476,070	$755,616	$1,831,176
Grand Total	$11,176,492	$9,448,126	$12,345,292	$32,969,910

2.5 Chemical & Allied Industries (Chapters 28-40)

Chapters 28 to 40 of the HS code fall under the "Chemical & Allied Industries" section (Section 6). This section includes a wide range of chemical products and related materials, including inorganic chemicals, organic chemicals, pharmaceutical products, fertilizers, plastics, and rubber articles. Section 2.3 will report the trends for Chapters 28-40 of the HS Code, measuring CIF for Chuuk in baseline years. The chapters are reviewed in ascending order with an overview of the absolute trade values of imports for each chapter across the baseline year.

2.5.1 Chapter 28: Inorganic Chemicals; Organic or Inorganic Compounds of Precious Metals; Isotopes

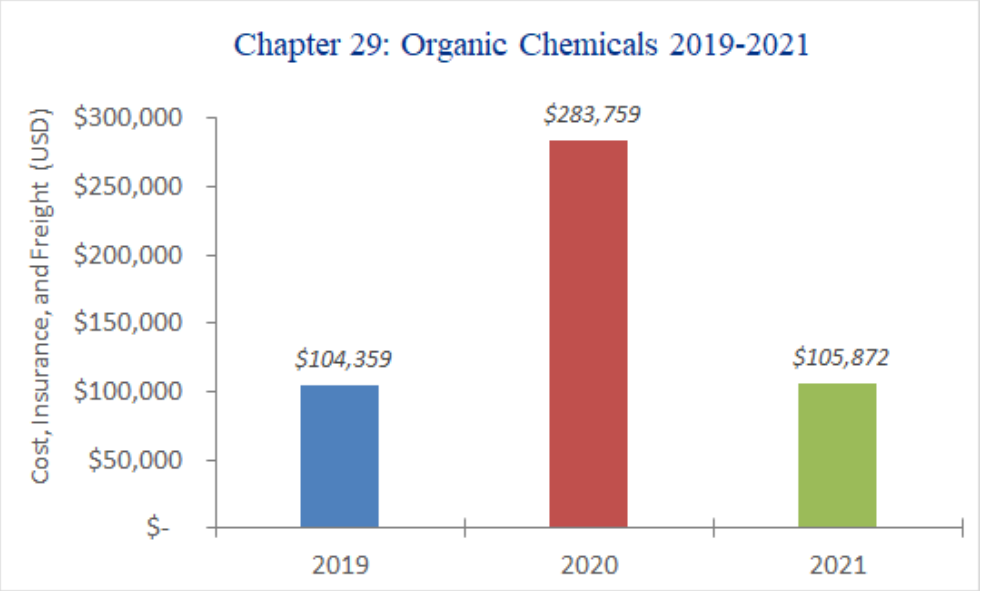
Chuuk saw a noticeable decline in Inorganic Chemicals CIF value in 2020 and 2021.



Graph 1: *CIF Value of Inorganic chemicals imported in Chuuk State over the period 2019-2021. CIF values are reported in USD.*

2.5.2 Chapter 29: Organic Chemicals

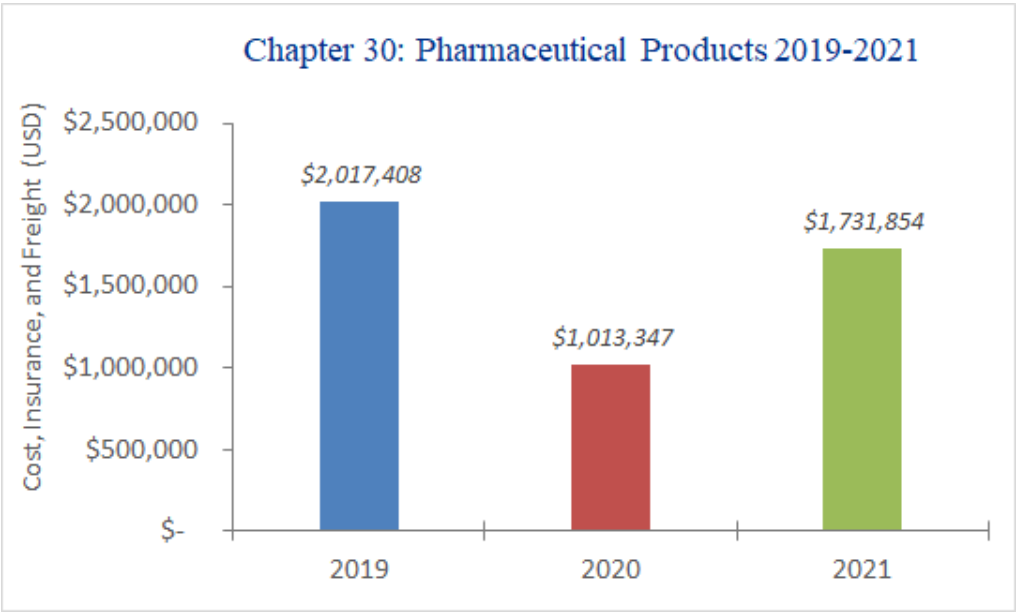
In 2020, Chuuk saw an increase in Organic Chemical CIF values. The import in 2021 saw a decline in the import value for Chuuk by 62.7% to $105,874, which brought Chuuk's import value almost back to its 2019 level. The imports under Chapter 29 are primarily composed of various chemical products, starting with a category labeled as 'Other,' which encompasses a range of chemical products not specified in the list. Acetone, a volatile and flammable solvent, is a significant import. This is followed by malaria diagnostic test kits, crucial for detecting and managing malaria. Next is 'Other Organic Compounds,' a broad category with multiple organic chemicals not listed separately. Another major import includes medications containing penicillin, streptomycin, or their derivatives, which are essential antibiotics but can cause allergic reactions in some individuals. Additionally, there is a category of 'Other, Including Natural Concentrates,' comprising various natural and concentrated substances. Propanol and propanol, which are types of alcohol used as solvents and antiseptics, are also imported in significant quantities. These alcohols are flammable and can be irritating to the skin and eyes. The list also includes chemically pure sugars, other than common sugars like sucrose and glucose, and their derivatives used in various industrial processes. Other hazardous imports are alcohol peroxides, ether peroxides, ketone peroxides, and their derivatives, which are highly reactive and can be explosive. Lastly, antisera and other blood fractions are imported, essential for medical treatments. Overall, the list includes a range of essential chemicals, some of which are hazardous and require careful management.



Graph 2: *CIF Value of Organic chemicals imported in Chuuk State over the period 2019-2021. CIF values are reported in USD.*

2.5.3 Chapter 30: Pharmaceutical Products

In 2019, Chuuk had the highest import value of Pharmaceutical Products across the four FSM states, amounting to $2,017,406. In 2020 the import values dropped by 49.1% to then showing a significant rebound in the import value in 2021, which increased by 70.9% to $1,731,852.



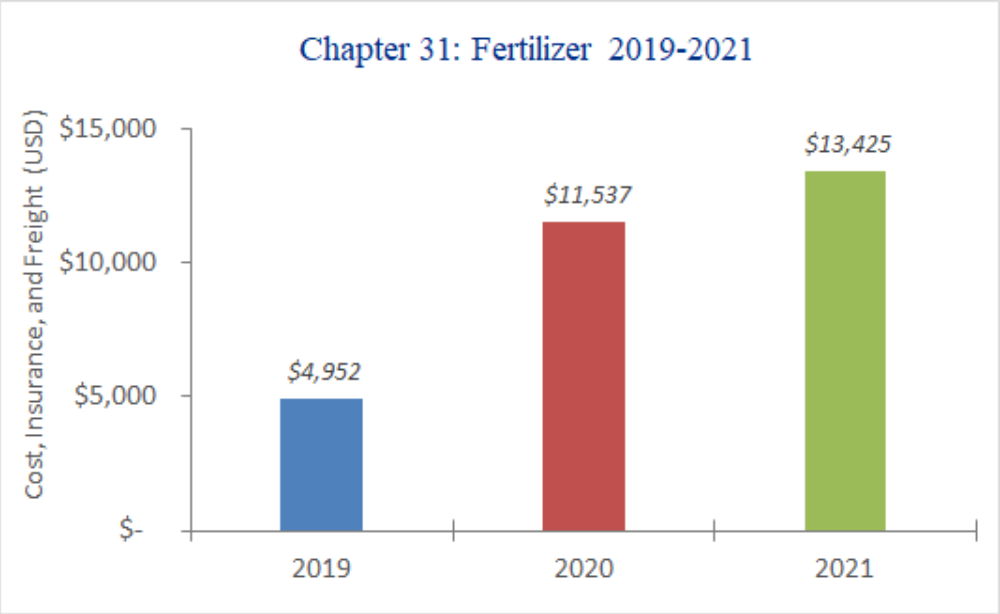
Graph 3: *CIF Value Pharmaceutical Products imported in Chuuk State over the period 2019-2021. CIF values are reported in USD.*

Chemical imports under Chapter 30 encompassed various medical and healthcare-related products, such as:

- Adhesive dressings and other articles with adhesive layer.
- Vaccines for human medicine

- First-aid boxes and kits
- Opacifying preparations for X-ray examinations and diagnostic reagents
- Products containing penicillin, streptomycin, or their derivatives,
- Dental cements, other dental fillings, and bone reconstruction cements
- Products containing antibiotics.
- Sterile surgical catgut, similar sterile suture materials, and sterile tissue adhesives
- Sterile laminaria and sterile laminaria tents
- Gel preparations are used as lubricants during surgical operations, physical examinations, or coupling agents between the body and medical instruments.

2.5.4 Chapter 31: Fertilizers



Graph 4: *CIF Value for Fertilizers imported in Chuuk State over the period 2019-2021. CIF values are reported in USD.*

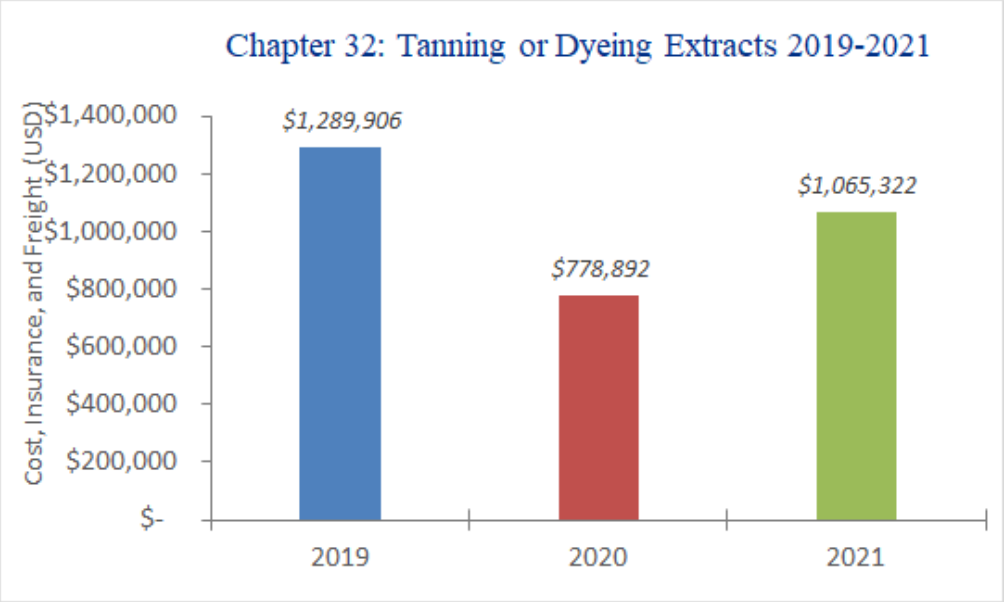
In 2020, Chuuk experienced a significant increase in its import values by 132.9%, reaching $11,538. In 2021, the import values for Chuuk increased by 16.4% to $13,426. The data indicate that Chuuk experienced a steady increase in its import value over the baseline years 2019-2021. The main chemical imports under Chapter 31 in the Chuuk encompass various fertilizers and associated products, ranked in ascending order based on their CIF value. The spectrum of these products extends from unspecified mixtures to mineral or chemical fertilizers enriched with essential nutrients like nitrogen, phosphorus, and potassium. Additionally, synthetic organic substances used in tanning and compounds comprising 35% or more of Di phosphorus pentoxide (P_2O_5) were part of the key chemical imports.

2.5.5 Chapter 32: Tanning or Dyeing Extracts; Tannins and Derivatives; Dyes, Pigments, and Other Colorants

There was a 39.6% decrease from 2019 to 2020 in CIF value for Chapter 32 in Chuuk, followed by an increase of about 36.7% in 2021.

The top 10 imports under Chapter 32 include various products related to tanning, dyeing, pigments, and paints. These range from unspecified items categorized as 'Other', to 'Stamping foils', commonly used in printing and packaging industries. 'Automotive Paints', used for

coating vehicles, and 'Prepared driers', substances used to accelerate the drying of paints and varnishes, are also included. Essential oils 'Of peppermint (Mentha piperita)', 'Of lemon', and 'Of orange' are part of the list, highlighting the demand for natural products used in various industries such as food, cosmetics, and pharmaceuticals. 'Other paints and varnishes', which include enamels, lacquers, distempers, and prepared water pigments used for finishing leather, indicate the broad spectrum of paint-related products imported. 'Marine paints', used for coating ships and other marine structures, and products 'Based on acrylic or vinyl polymers', which include a wide range of paints, varnishes, and coatings, round out the list of top 10 imports under Chapter 32.

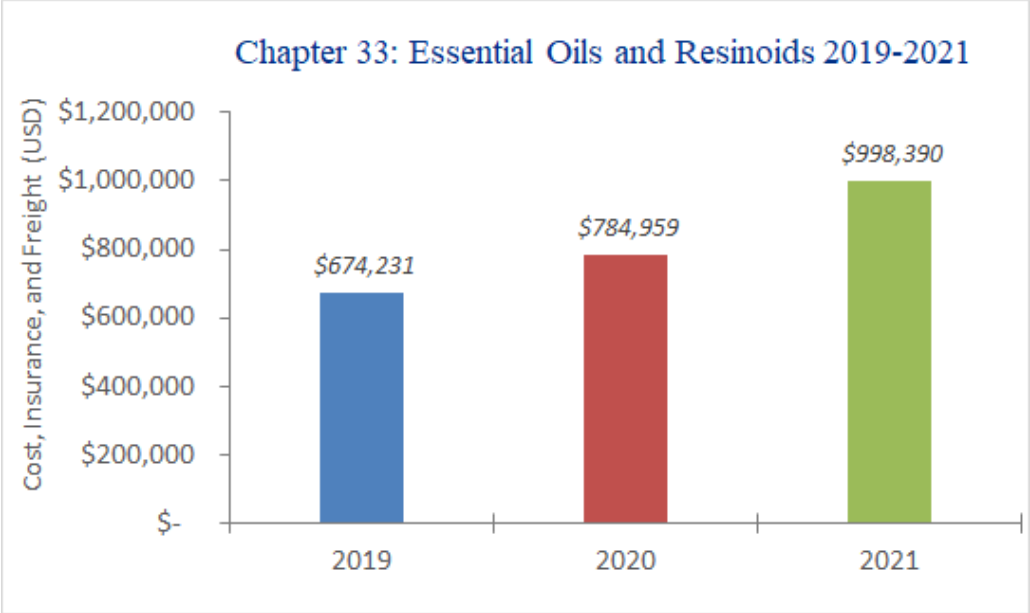


Graph 5: *CIF Value for products imported in Chuuk State under the HS's Chapter 32 over the period 2019-2021. CIF values are reported in USD.*

2.5.6 Chapter 33: Essential Oils and Resinoids; Cosmetic or Toilet Preparations

Chapter 33 data imports revealed a steady increase in the importation of essential oils, perfumery, or cosmetic preparations in Chuuk over the baseline years 2019-2021. Chuuk experienced an increase in 2020 by 16.4% and saw a further increase by 27.2% 2021.

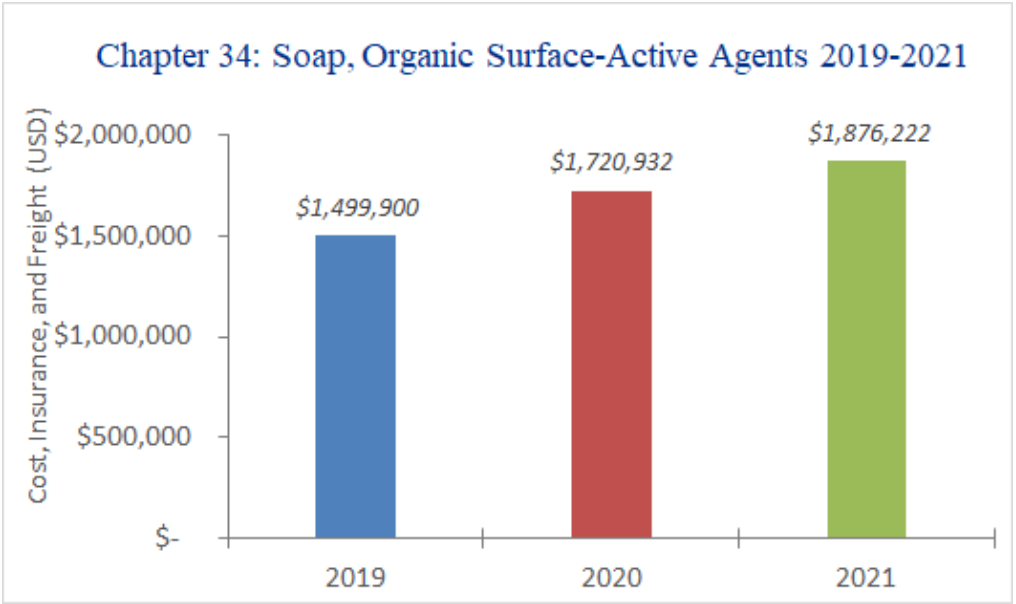
The top 10 chemical imports under Chapter 33, "Essential Oils, Perfumery, or Cosmetic Preparations," encompass various personal care and hygiene products. Hair dye, chemical preparations used to change hair color, is at the top of the list, followed by pre-shave, shaving, or aftershave preparations.



Graph 6: *CIF Value for Essential Oils, Resinoids, Perfumery, Cosmetic, or Toilet Preparations products imported in Chuuk State over the period 2019-2021. CIF values are reported in USD.*

2.5.7 Chapter 34: Soap, Organic Surface-Active Agents, Washing Preparations, Lubricating Preparations, Artificial Waxes, Prepared Waxes

The data shows a general upward trend in imports for Chuuk, which may indicate different consumer behaviors or market demands. Chuuk's chemical imports under Chapter 34 increased by approximately 14.7% in 2020 to reach $1,720,930 and further increased by about 9% in 2021 to $1,876,222.



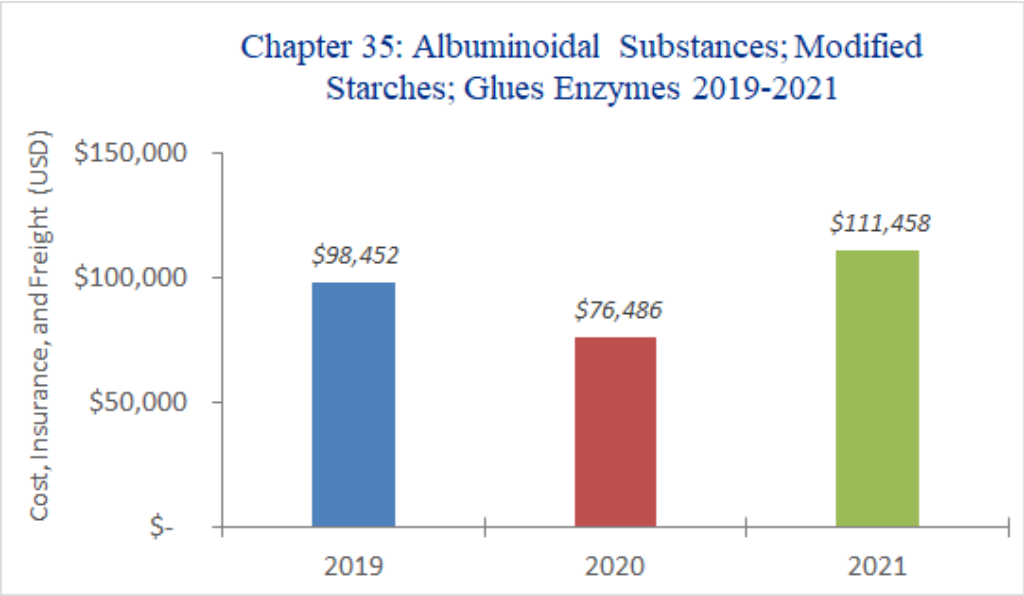
Graph 7: *CIF Value for Soap, Organic Surface-Active Agents, Washing Preparations, Lubricating Preparations, Artificial Waxes and Prepared Waxes products imported in Chuuk State over the period 2019-2021. CIF values are reported in USD.*

The primary chemical imports under Chapter 34 encompass various preparations and products. These include preparations for treating textile materials, leather, fur skins, or other

materials, which are essential for maintaining and enhancing the quality and longevity of these materials. Another significant import includes organic surface-active products and preparations for washing the skin, available in liquid or cream form and packaged for retail sale, with or without soap. The list also includes cationic, nonionic, and anionic surface-active agents, essential components in detergents, and cleaning products. Additionally, soap in various forms, including poly(oxyethylene) (polyethylene glycol), and other soaps, including bathing soaps, are key imports to the island.

2.5.8 Chapter 35: Albuminoidal Substances; Modified Starches; Glues Enzymes

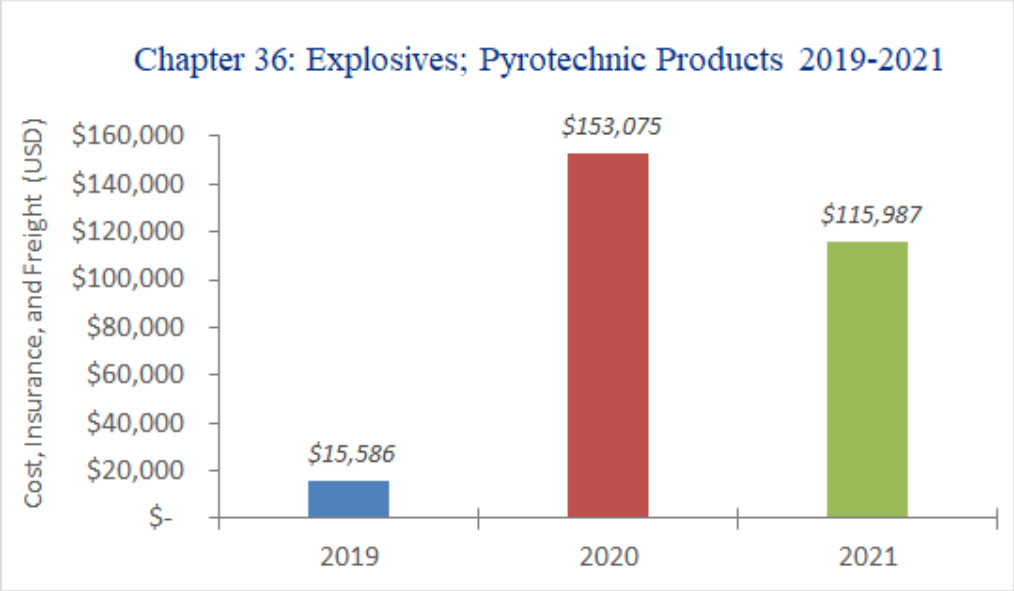
Between 2019 and 2020, Chuuk's import value under Chapter 35 decreased by about 22.3% to $76,488. In the following year, 2021, Chuuk's imports increased by 45.7% to $111,460.



Graph 8: *CIF Values for products imported in Chuuk State under the HS's Chapter 35 over the period 2019-2021. CIF values are reported in USD.*

2.5.9 Chapter 36: Explosives; Pyrotechnic Products; Matches; Pyrophoric Alloys; Certain Combustible Preparations

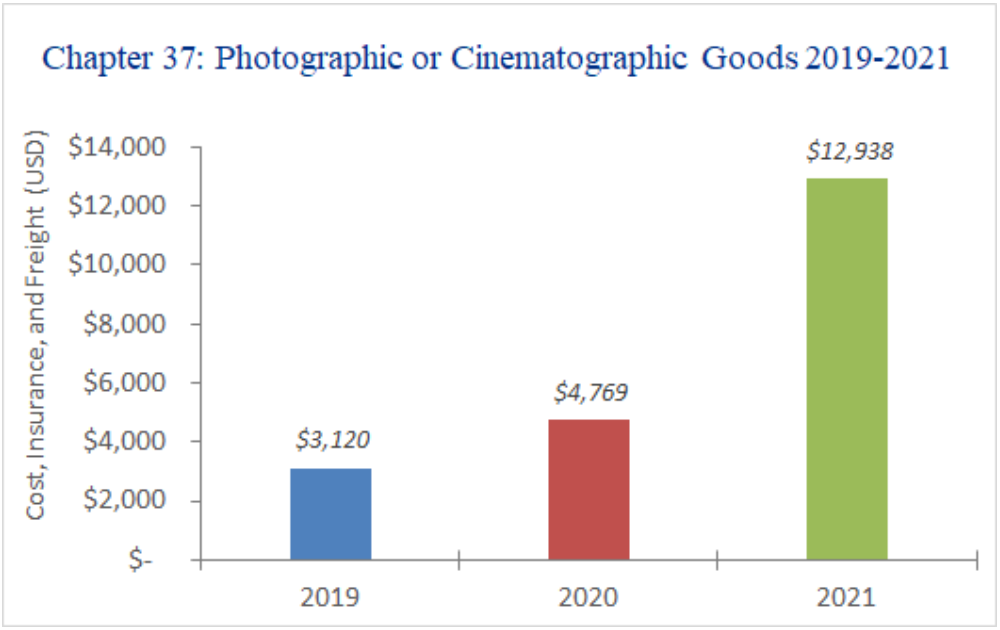
In 2020, Chuuk's imports under Chapter 36 skyrocketed by 881% ($153,074) to then decline by 24.2% (115,988) in 2021.



Graph 9: *CIF Values for products imported in Chuuk State under the HS's Chapter 36 over the period 2019-2021. CIF values are reported in USD.*

2.5.10 Chapter 37: Photographic or Cinematographic Goods

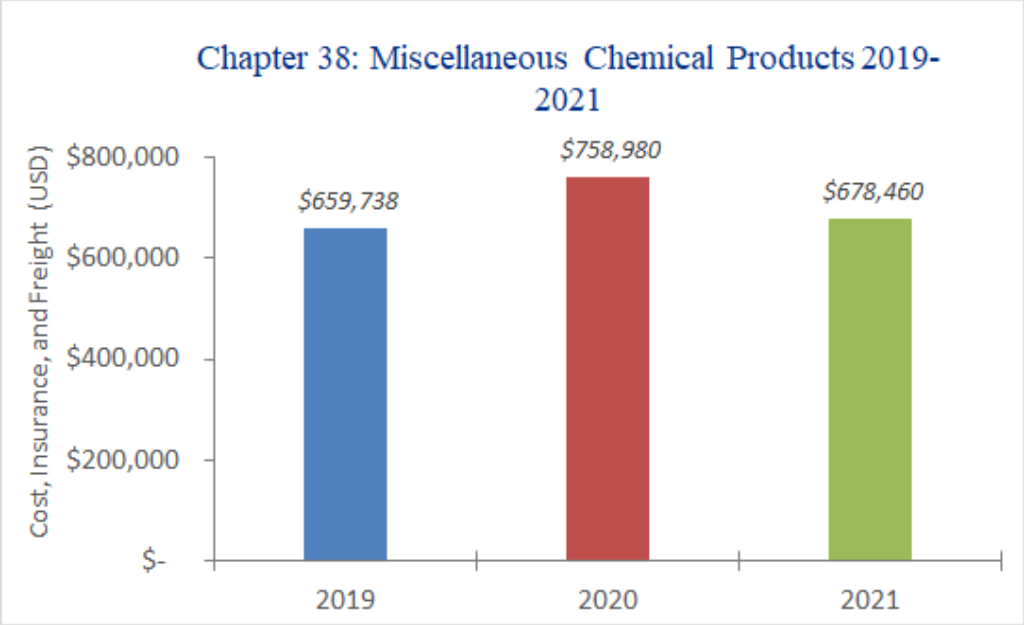
The data shows a upward trend in the importation of photographic or cinematographic goods in Chuuk over the baseline years 2019-2021, which saw a significant increase by 171.5% in 2021.



Graph 10: *CIF Value for Photographic or Cinematographic goods imported in Chuuk State over the period 2019-2021. CIF values are reported in USD.*

2.5.11 Chapter 38: Miscellaneous Chemical Products

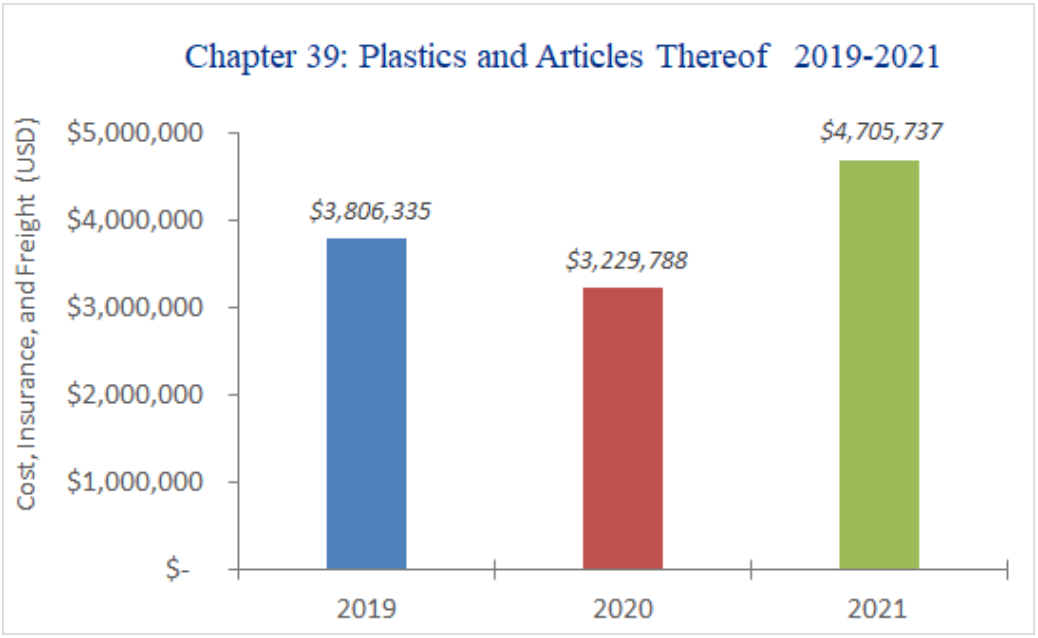
In 2019, Chuuk recorded import value of pesticides and related chemicals, amounting to $659,738. The following year, 2020, witnessed a 15.1% surge in Chuuk's imports to $758,982, to then showing a decline in 2021 by 10.6%.



Graph 11: *CIF Value for Pesticides and Related Chemicals imported in Chuuk State over the period 2019-2021. CIF values are reported in USD.*

2.5.12 Chapter 39: Plastics and Articles Thereof

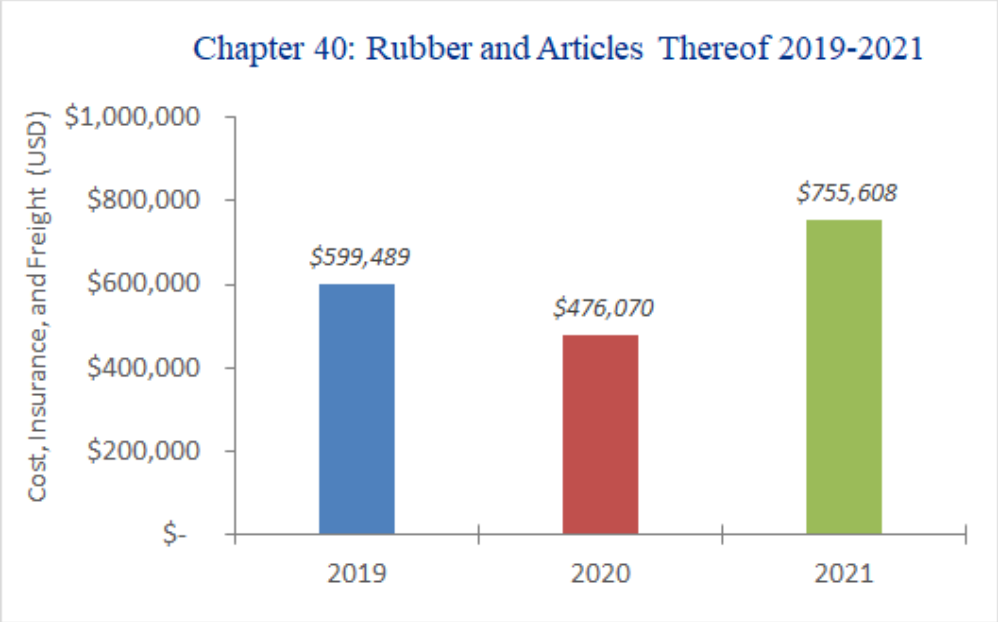
Between the years 2019-2020, the import value for Plastics and Articles Thereof in Chuuk showed a decline of 15.2% in Chuuk's imports to $3,229,790. Chuuk's import value rebounded by 45.7% in 2021, showing a considerable rise.



Graph 12: *CIF Value for Plastics and Articles Thereof imported in Chuuk State over the period 2019-2021. CIF values are reported in USD.*

2.5.13 Chapter 40: Rubber and Articles Thereof

In 2020, the data show a decline of 20.6% in Chuuk's import value for Rubber and Articles Thereof to then rose by 58.6% to $755,616 in 2021.



Graph 13: *CIF Value for Rubber and Articles Thereof imported in Chuuk State over the period 2019-2021. CIF values are reported in USD.*

3 Current Chemical Management Practices

The institutional capacity for managing Chuuk's chemicals, hazardous substances, and waste is yet to develop fully. As FSM is a signatory to the Basel and Stockholm conventions, managing chemicals per obligations under these conventions requires institutional capacity in the FSM to be developed. Sound management, including chemical usage, storage, and disposal, is vital to minimizing health and safety risks and environmental impacts.

Chuuk State implements management actions in alignment with international conventions such as the Basel and Stockholm conventions, as well as FSM National regulations. In 2007 Chuuk EPA acted to pass legislation pertaining to the management of persistent organic pollutants, but the bill was never passed through the legislative process. To date Chuuk does not have specific POPs regulations but defers to the FSM National Government Environmental Protection Act of 2012 and Title 25 of the FSM Code for management of POPS at the state level. "Chuuk EPA has a requirement as part of their job role to ensure that any chemicals or hazardous wastes are stored correctly, or if there are any chemicals/hazardous wastes found that they are taken from where they were found using all the necessary safety equipment and store in such a manner that they are no longer a threat to the environment."[18]

There needs to be more chemical handling, storage, and disposal policy guidelines in place for Chuuk. Public and private sector entities that import and use chemicals in Chuuk should have procedures to handle, store, and dispose of chemicals. With the need for more guidelines, chemical expertise, and practitioners in Chuuk, ensuring best management practices for using, storing, and disposing of these chemicals is challenging.

With no legal mandate to regulate imports, including various types of chemicals, into the ports, the state governments rely significantly on the FSM National Government (FSMNG) to provide data on the types and amounts of chemicals entering the ports. The FSMNG, particularly the FSM Customs Office, is mandated to carry out Customs clearance of vessels and aircraft arriving at FSM ports. In addition, this office is responsible for cargo inspection at sea and air freight stations, including inspections of chemicals and hazardous substances entering the ports.

3.1 Major Public and Private Sector Entities Involved in the Import and Use of Chemicals

3.1a Pharmaceuticals

Pharmaceuticals are imported into Chuuk primarily by the Chuuk State Department of Health Services, MedPharm Clinic, Sefin Clinic, Family Clinic, and the Chuuk Community Health Center (CCHC). The clinics are owned and operated privately. The CCHC is an independent nonprofit organization working with the Chuuk Department of Health Services (CDHS).

The Department of Health Services currently employs a Procurement Officer who is responsible for processing purchase requisitions for all department products, including chemicals. The majority of their pharmaceutical and chemical products are purchased through

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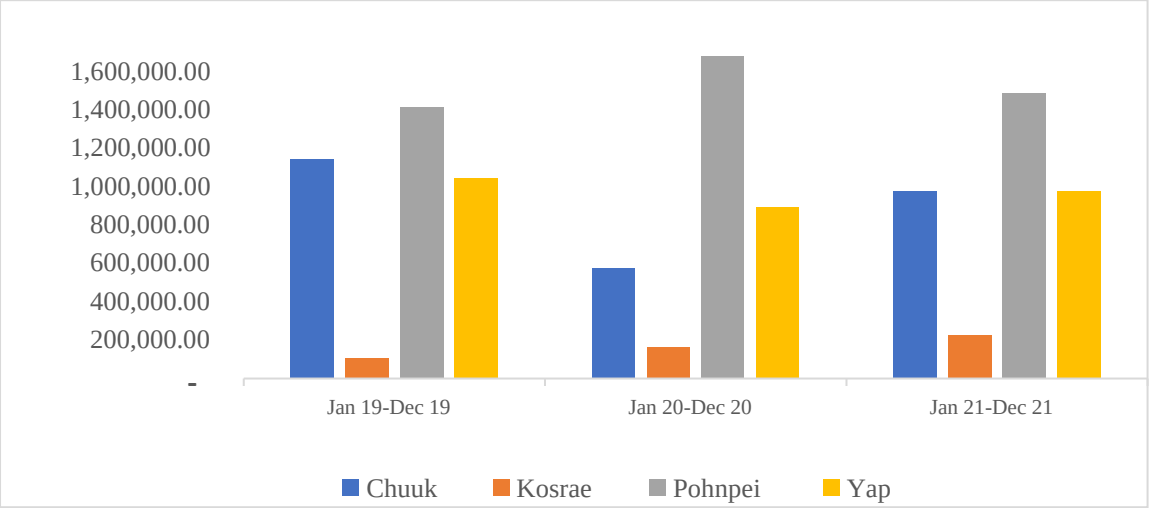
third-party vendors who compete for the right to be the sole provider of these products to the Department.
Data from the FSM Customs & Tax (FSMCT) office shows a variable and fluctuating cost, insurance, and freight (CIF) value for pharmaceutical imports to Chuuk from 2019 to 2021. Graph 14 shows that pharmaceutical costs declined between 2019 and 2020 and then increased again in 2021. The drivers for the decline in costs in 2020 need to be clarified. It could mean that data on pharmaceutical products imported in 2020 declined due to import challenges and other factors.

Compared to the other states in the FSM, Chuuk showed a sharp decline on CIF for pharmaceutical products for the year 2020. The data for the state of Yap shows a similar fluctuation in CIF value, as shown in Graph 14.



Graph 14: *CIF Value for Pharmaceuticals in Chuuk and other states in different years*

3.1b Refrigerants

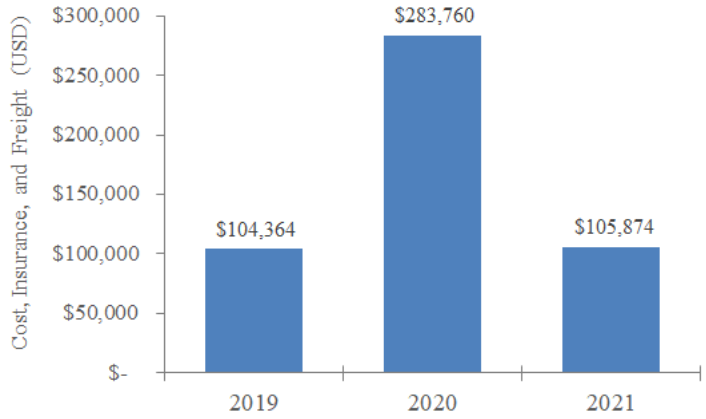
The import of certain refrigerants is controlled through a permitting through the FSM National Government. Refrigerants imported into the state are inspected and cleared upon arrival by FSM Customs agents. Chuuk State EPA also conduct their own inspection visits of private sector entities and are aware of vendors that are licensed to import and sell refrigerants. The type of refrigerant products that are imported are also strictly controlled, and some are illegal to be brought into the FSM.

3.1c Fuel and Petrochemicals

The only fuel company that operates in Chuuk and throughout the FSM is the Vital FSM

Petroleum Corporation (Vital). Vital imports and sells petroleum products to its customers in the FSM. Petrochemical products, however, are standard; anyone can import them into the FSM anytime. Petrochemical products such as plastics, fertilizers, detergents, and tires are readily available on shelves everywhere.

Petroleum and petrochemical products are organic chemicals. FSMCT data shows that between 2019 and 2021, the cost of importing organic chemicals into Chuuk increased significantly from a little over 100K CIF value in 2019 to almost 300K in 2020, then returned close to the CIF value of 2019 in 2021.



Graph 15: *CIF Value for Organic Chemicals in different years*

3.1d Laboratories

Only three entities are known to have laboratories operating within Chuuk State. The education sector, namely the College of Micronesia (COM) and Caroline College & Pastoral Institute (CCPI), has laboratories, but they are primarily used for natural science and, therefore, do not import, store, or use chemical products.
Chuuk EPA likewise has a laboratory that is only used for water quality testing. The Chuuk State Hospital also has an operational laboratory that tests biological samples and handles chemical products.

3.1e Chuuk State Hospital Laboratory

The hospital lab had a separate storage cabinet within the lab that was strictly for the chemicals they were currently using, as well as another storage room, but did stress that they needed more well-contained storage areas, both inside and outside of the lab to ensure that their chemicals were safely stored and separated from all other equipment and supplies. Air conditioning was also highlighted as a need, to ensure that certain chemicals were stored at a controlled temperature. Only the lab technician had access to their chemical storage cabinet within the hospital lab as he would be the one responsible for mixing chemicals within the lab. The lab also had a separate room where chemicals were handled by the lab technician and his assistant so that the handling of chemicals within the lab would be done separately from all other work. Lab technicians were also HAZMAT trained and certified in 2019 and also trained in the use of "spill buckets" (absorbents) which are used in the event that chemicals are spilled inside the lab. Hospital lab employees also receive training through the Biosafety Office at the FSM National Government and can also refer to Material Safety Data Sheets (MSDS) that are available for all chemicals that are used in the lab.

The hospital lab also highlighted the need for more training in handling, storing, and disposing of chemicals. Safety equipment such as gloves, masks, PPE, and HAZMAT suits were also requested as the current gear did not meet proper safety standards or was insufficient to meet their needs.

Image 2: *Chemicals at the Chuuk State Hospital*

During the project, the consultants could not obtain chemical and pharmaceutical inventory from the Chuuk State Hospital.

Hospital Mortuary

The Chuuk State Hospital Mortuary handled chemicals such as embalming fluid and other chemical products in the hospital maintenance storage area. A separate storage area is needed to ensure the chemicals are stored safely to prevent exposure to untrained hospital staff and contain potential contamination. They handled chemicals such as embalming fluid, which was stored in one cabinet area within the mortuary room. Discarded embalming fluid was not properly stored, with cases of old embalming fluid were discarded in an open room within the hospital maintenance area haphazardly. Discarded chemicals were not properly disposed of and were left scattered in their current storage area. Seepage from discarded embalming fluid into the nearby environment was sighted. Staff could benefit from additional training on handling, storage, and disposal of chemical waste within the mortuary. Additional safety gear that meets proper standards for handling chemicals is also a necessity.

Image 3: *Chuuk State Hospital Mortuary discarded chemicals*

3.1f Medical Waste

Chemical and biological waste at the Chuuk State Hospital is collected daily in biobags and taken to the incinerator for disposal. Improvements in waste segregation should be made to

limit general waste being deposited into biobags for chemical and medical waste. All chemical and biological waste is taken to the incinerator located behind the hospital for burning. The location of the incinerator is not ideal as it is located next to public residential areas, the tuberculosis ward, and the patient ward. Hospital management has recommended that an incinerator be situated in a safe, controlled area off-site. Waste from the incinerator should be safely disposed of on a regular basis. Inspection of the incinerator noted a large pile of waste from the incinerator that was overgrown by weeds, which could mean the waste pile had not been disposed of for a while. Segments of the incinerator smoke stack have also not been attached which limits the height of the chimney which may prevent disbursement of ash away from residential neighborhoods located near hospital.

Image 4: *Chuuk State Hospital Medical Waste Incinerator*

3.1g Fertilizer

No information was available during the time of the assessment.

3.1h Pesticides

No information was available during the time of the assessment.

3.1i Market Review/ Inspection of Chemical Products Available Locally

Private sector entities import and sell numerous chemical products such as paints, paint neutralizers and thinners, chemical sprays, acids, batteries, refrigerants, and many other products with chemical properties. Each business is expected to adhere to Chuuk State regulations on the proper handling, storage, and disposal of chemicals and are subject to fines if Chuuk EPA inspections determine that they are not in compliance.

Private sector vendors handled all aspects of handling, storage, and disposal of chemicals within their store grounds. ACE Hardware staff were frequently involved in training opportunities conducted through Chuuk EPA and were familiar with protocols for the safe handling of chemicals on their premises. All chemicals were clearly labeled, with the exception of their acid, which were stored in large 5-gallon containers. Chemicals were segregated from all other store products within the store and the warehouse. The ACE Hardware manager did feel that his staff could benefit further from more training on proper handling, storage and disposal of chemical products. The second hardware store that was inspected was the AWM Hardware store. According to their manager, all chemicals they had on stock were in the hardware store and no chemicals were being stored in their larger warehouse. Some paint products (paint, paint neutralizer, etc..) were not labeled, and their acids also did not have any labeling. Hardware staff had not been involved in previous

chemical management trainings and were thus unfamiliar with safety protocols for safe handling, storage and disposal of chemical products. AWM also had refrigerants on stock which, according to EPA staff, they were not permitted to import/sell. The store manager was informed of the procedures for importing refrigerants and was also invited to participate in future chemical management trainings for private sector vendors.

Image 5: *Chemicals at Chuuk Hardware Store*

Used oil products are a common chemical waste throughout Chuuk State for private and government sectors. Used oil is often stored on-site for each respective entity, but protocols are in place for collection through Chuuk EPA for storage. The current storage area for used oil is at the government warehouse located at the Transco dock. An auto-repair shop was inspected to determine what chemicals were available on their grounds. Upon completion of the inspection, it was determined that the only chemicals they had on stock was used oil, which they had already requested assistance from EPA for removal. The manager was informed of EPA guidelines for the disposal of used oil and invited to participate in future training provided through EPA.

Image 6*: Oil and used oil at an auto-repair shop in Chuuk state.*

The capacity level to safely handle and store chemical products varies greatly from business to business. Overall, the need to adequately train local business on safe handling, transport, storage and disposal of chemical products should be prioritized. Enforcement agencies tasked with monitoring local businesses must likewise be capacitated and properly equipped to ensure safety of the general public and local environment. Knowledge regarding the proper disposal of chemical waste could be greatly improved. Collaboration between local

businesses and enforcement agencies in terms of training and awareness should be highlighted to increase compliance and ensure proper safeguards are adhered to.

4 Legislation and Regulations

4.1 Legislation and regulations

The Chuuk Environmental Protection Agency (C-EPA) is responsible for safeguarding the management of potentially hazardous chemicals at the Chuuk State level.
The Chuuk State Marine and Fresh Water Standard Regulations and the Chuuk State Solid Waste Regulations, pursuant to Public Law 2-94-01, cover standards for regulation and enforcement.

Some other relevant legislation for chemical management in Chuuk is listed below:

- CSL Public Law 02-94-01
- Littering Law CSL- 191-33
- Recycling Law *(aluminum cans) -not signed yet*
- Title 7, Chapter 9 (Municipal Taxing Power)
- Title 21, Chapter 13 (Sanitation)
- Title 22, Chapter 1 (Chuuk Environmental Protection Act)
- Title 22, Chapter 3 (Littering)
- Title 24, Chapter 11 (Public Lands and Condemnation)
- Title 29, Chapter 5 (Environmental Improvement Tax)

4.1a Marine & Fresh Water Standard Regulations

The Chuuk State Marine & Fresh Water Standards Regulations aims to "identify the uses for which the various waters of Chuuk State shall be maintained and protected, to specify the water quality standards required to maintain the designated uses, and to prescribe regulations necessary for implementing, achieving and maintaining the specified water quality". Water quality standards are covered under Part 6 of the regulations, under "radioactive materials", "oil petroleum products" and "toxic substances".

Table 6: *List of toxic substances identified by the Marine and Fresh Water Standard Regulations*

MARINE			CLASS 1 (FRESH WATER)		CLASS 2 (FRESH WATER)	
Substance	Limit	Factor	Limit	Factor	Limit	Factor
Unionized Ammonia NH 3	0.01 mg/l	0.1	0.02 mg/l	0.05	0.02 mg/l	0.05
Arsenic	0.01 mg/l	0.01	0.050 mg/l			
Barium	0.5 mg/l	1.0	1.0 mg/l			
Berllium	0.1 mg/l	0.01	6.8 mg/l			
Boron	5.0 mg/l	0.1				
Cadium	5.0 g/l	0.01	0.66 g/l		0.66 g/l	
Chlorine Producing Oxidants	7.5 g/l	0.1	10 g/l		10 g/l	
Chromium	50.0 g/l	0.01	11.0 g/l		11.0 g/l	
Copper	3.0 mg/l	0.1	6.0 g/l	0.1		0.1
Cyanide	1.0 g/l	0.1	5.0 g/l	0.05	5.0 g/l	0.05
Iron	0.05 mg/l		0.3 mg/l		1.0 mg/l	
Lead	5.6 g/l	0.01	0.3 mg/l		1.0 mg/l	
Manganese	0.02 mg/l	0.02	50 mg/l			
Mercury	0.02 mg/l		0.012 g/l		0.012 g/l	
Nickel	0.025 g/l	0.01	56.0 g/l	0.01		
Aldrin	0.002 g/l	0.01	0.002 g/l	0.01	0.002 g/l	0.01
Dieldrin	0.002 g/l	0.01	0.002 g/l	0.01	0.002 g/l	0.01

Chlordane	0.004 g/l	0.01	0.004 g/l		0.004 g/l	
Malathion	0.1 g/l	0.01	0.01 g/l		0.1 g/l	
Methoxychlor	0.03 g/l	0.01	0.03 g/l		0.03 g/l	
Mirex	0.001 g/l		0.001 g/l		0.001 g/l	
Parathion	0.04 g/l	0.01	0.04 g/l		0.04 g/l	
Toxaphene	0.005 g/l	0.01	0.005 g/l		0.005 g/l	
Phenol	1.0 g/l	0.01	1.0 g/l	0.05	1.0 g/l	0.05
Elemental Phosphorus	0.1 g/l	0.01	0.1 g/l		0.1 g/l	
Phthalate Esters	3.4 g/l	0.01	3.0 g/l		3.0 g/l	
PCB	0.001 g/l	0.01	0.001 g/l		0.001 g/l	
2, 4, D		0.01	100.0 g/l			
2, 4, 5-TD		0.01	100.0 g/l			
DDT	0.001 g/l	0.01	0.001 g/l		0.001 g/l	
Demeton	0.1 g/l	0.01	0.1 g/l		0.1 g/l	
Endosulfan	0.001 g/l	0.01	0.003 g/l		0.003 g/l	
Endrin	0.004 g/l	0.01	0.004 g/l		0.004 g/l	
Guthion	0.01 g/l	0.01	0.01 g/l		0.01 g/l	
Heptachlor	0.001 g/l	0.01	0.001 g/l		0.001 g/l	
Lindane	0.004 g/l	0.01	0.01 g/l		0.01 g/l	
Selenium	0.005 g/l	0.01	10 g/l	0.01	10.0 g/l	0.01
Silver	1.0 g/l	0.01	1.0 g/l	0.01	1.0 g/l	0.01
Hydrogen Sulfide (undissociated)	2.0 g/l		2 g/l		2 g/l	
Zinc	58.0 g/l	0.01	47.0 g/l	0.01	47.0 g/l	0.01

4.1b Solid Waste Regulations

Chuuk State Solid Waste Regulation establishes "minimum standards governing the design, construction, installation, operation, and maintenance of solid waste storage, collection and disposal system. Such standards are intended to:

a) Prevent pollution of the drinking water or waters of Chuuk State;
b) Prevent air and land pollution;
c) Prevent the spread of disease and the creation of nuisance;
d) Protect the public health and safety;
e) Conserve natural resources; and
f) Preserve and enhance the beauty and quality of the environment."

This regulation covers parameters for the storage, collection, management/permitting, and disposal of waste, with a specific focus on hazardous and chemical waste under Section 8 to ensure that "such standards and revisions shall include procedures designed to prevent damage to human health or living organisms."

Chuuk currently does not have a priority list of hazardous substances that are banned from being possessed, sold, bought, used, applied, stored, transported, discarded, or otherwise discharged in Chuuk State, deferring to the FSM National Government list of hazardous substances. Chuuk EPA has also made official requests to the US EPA to guide the development of a list of banned substances for Chuuk.

The Chuuks POPs Regulation was promulgated in 2014 and established the effective date of the ban for substances on the priority list and defined unlawful activities pertaining to substances on the priority list after the ban's effective date. As of today, no specific legislation establishes requirements for transporting, storing, and managing other hazardous

chemicals besides POPs in Chuuk.

5 Area For Improvement - Recommendations

1) Database/Information Sharing

a) Increase collaboration between Chuuk EPA, FSM Customs, FSM Biosafety, and other enforcement entities in all areas of chemical management.
b) Database of chemicals imported into Chuuk logged and periodic monitoring and evaluation of chemicals within Chuuk State implemented.
c) Standard Operating Procedures (SOP) were drafted to clearly delineate the roles and responsibilities of stakeholders involved in chemical management.
d) Raise the level of awareness among all entities involved in the management of chemical products on proper management and safety protocols, policies and regulations, and resources available to receive technical assistance.
e) Awareness activities are conducted for private sector entities and the general public on proper chemical management practices.

2) Enforcement

a) Capacitate enforcement agencies at the National, State, and Municipal levels through the provision of proper training, gear, and funding to enable them to enforce chemical management regulations.
b) Draft standard operating procedures for enforcement entities that clearly define roles and responsibilities.
c) A review of current policies and regulations regarding chemical management is needed to highlight potential gaps for strengthening.
d) Stronger measures need to be taken at the Municipal Government level to ensure enforcement of chemical regulations.
e) Strengthen the permitting process for importing and using certain potentially hazardous chemicals.
f) Need stronger control measures for the import and control of chemical products that are imported into the state.
g) Ideally, products brought into the state would need to be inspected and approved by Chuuk-EPA, who would determine their ISPN number to determine if they are US-EPA approved.

3) Chemical Identification

a) Training provided in the private and government sector on chemical identification, including safety measures key for management.
b) Ensure effective collaboration between enforcement agencies and importers to determine whether chemicals imported adhere to EPA standards.

4) Storage

a) Chemicals must be stored in isolated, well-contained storage facilities.
b) Entities involved with the storage of chemicals need to be adequately trained and equipped with proper safety gear.
c) Standard safety procedures should be developed for the safe storage of chemicals.

5) Transport

a) Entities involved with the transport and handling of chemicals need to be properly trained and equipped.

6) Labeling

a) Ensure that all chemical products are clearly labeled.
b) Clear signage must be placed where potentially hazardous chemicals are stored, handled, or disposed of.
c) Safety protocols need to be posted in areas where potentially hazardous chemicals are stored, handled, or disposed of.

7) Disposal/Destruction

a) Place another incinerator located off-site from the hospital for medical/chemical waste.
b) More effective segregation practices for chemical and general waste at the hospital.
c) More training for disposal of chemicals for all entities.
d) All persons involved in the disposal of chemicals are adequately trained.
e) Standard operating procedures are developed for the disposal of chemicals.
f) Adequate funding resources are allocated to the proper disposal of chemical products.

8) Monitoring and evaluation of Chemical Management Practices

a) Inspection of private and government sector entities for chemicals needs to be undertaken on a consistent basis.
b) State and Municipal level enforcement entities are properly trained and capacitated.

6 Conclusion

The current management of chemicals within Chuuk State specifically, and the Federated States of Micronesia in general, is multi-sectoral, therefore necessitating collaboration at all levels of government to ensure effective management measures. The inspection of the current use, transport, handling, storage, and disposal of chemicals within the government and private sectors was conducted to create a chemical management profile for Chuuk State to provide a clearer understanding of current practices on the ground. It would likewise help to identify the current roles and responsibilities of stakeholders as well as determine gaps within the chemical management process that need to be addressed. For the purpose of this project, specific focus was granted to the health, education, and private sector entities to ascertain what chemicals they were currently using, how they were managed, and what was needed to ensure that chemicals did not pose a threat to the people and natural environment of Chuuk State.

FSM as a country needs to be proactive about building its institutional and human capacities to ensure that we can comply with our obligation under international conventions, including the Basel and Stockholm conventions, to which FSM is a signatory. An enhanced institution and human capacity for Kosrae and FSM would also mean that we could ensure such chemicals entering our islands are used to minimize significant adverse impacts on the environment and human health.

Appendix I: Hazard ID, Health Effects, and Laboratory Purposes

CAS Number[19]	Chemical Name	Hazard ID	Health Effects	Purpose and Potential Use
1310-73-2	Sodium Hydroxide	Corrosive, causes server skin burns, and eye damage	May cause respiratory irritation if inhaled, and harmful if swallowed.	Used in soap making, oven cleaners, and chemical manufacturing.
67-64-1	Acetone	Highly flammable, can cause eye irritation.	Prolonged inhalation can cause respiratory irritation, dizziness, or headaches.	Common solvent, nail polish remover, and laboratory reagent.
1309-48-4	Magnesium Oxide	May cause irritation to the respiratory tract if inhaled in power form.	Generally considered safe with low toxicity; excessive ingestion can cause laxative effects.	Dietary supplement, antacid, and in the production of ceramics and cement.
112926-00-8	Silica Gel	May cause eye and skin irritation; considered a desiccant.	Generally non-toxic; inhalation of dust should be avoided.	Humidity control in packaging and used in cat litter.
110-54-3	Hexanes Optima	Highly flammable, an aspiration hazard if swallowed and enters the airways.	Inhalation can cause dizziness, nausea; long-term exposure may damage the nervous system.	Solvent in industrial applications, glue, and varnish removers.
1336-21-6 & 7732-18-5	Ammonium hydroxide	Causes severe skin burns and eye damage	Inhalation can cause respiratory irritation or burns.	Used in cleaning agents, and furniture darkening.
7664-93-9	Sulfuric Acid	Corrosive, cause severe skin burns and eye damage.	Inhalation can cause respiratory irritation. Ingestion can cause internal burns, permanent injury, or death.	In car batteries, fertilizer manufacturing, and chemical synthesis.
7647-01-0	Hydrochloric Acid	Corrosive, causes severe skin burns, and eye damage.	Inhalation can cause coughing, hoarseness, inflammation, and ulceration of the respiratory tract.	Used to regulate the pH level in a wide range of manufacturing and treatment processes, including the production of steel, PVC

[19] The Chemical Abstracts Service (CAS) numbers refer to the pure substances, not necessarily the solutions or mixtures; solutions or mixtures can vary in composition.

				plastic, and food products.
64-19-7	Acetic Acid	Corrosive at high concentrations, causing skin burns, and eye damage.	Inhalation can cause coughing or lung irritation; ingestion can cause throat burns.	Vinegar (in dilute form), production of synthetic fibers, and polymers.
1336-21-6	Ammonium hydroxide			
144-55-8	Sodium Bicarbonate	Generally safe; may cause eye irritation.	Ingestion in large amounts can disrupt electrolyte balance.	Water softener, glass manufacturing, in detergents, and chemical manufacturing.
7647-01-0	Hydrochloric Acid			
497-19-8	Sodium Carbonate	May cause skin and eye irritation; harmful if swallowed.	Can cause serious eye damage or skin irritation.	Water softener, glass manufacturing, in detergents, and chemical manufacturing.
7647-14-5	Sodium Chloride	Generally considered safe; excessive inhalation of dust can irritate respiratory tract.	High ingestion can lead to hypertension and heart conditions.	Table salt, de-icing, and in various industries for manufacturing and food preservation.
7758-98-7	Cupric Sulfate	Harmful if swallowed; causes skin and serious eye irritation.	Ingestion can cause gastrointestinal distress, intravascular hemolysis, or kidney and liver damage.	Fungicide, herbicide, pesticide, and analytical reagent.
	Alkaline Tartrate Solution[20]	Generally considered safe; specifics depend on the exact composition.	Usually low toxicity; and avoid ingestion or inhalation of mists.	Likely used in chemical reactions or analysis, specifics depending on composition.
76-59-5	Bromothymol Blue	May cause eye, skin, and respiratory tract irritation.	Generally safe in small quantities; avoid excessive exposure.	pH indicator in chemical reactions and titrations.
7722-64-7	Potassium Permanganate	Oxidizer; may cause fire; harmful if swallowed; causes serious eye damage.	Can cause irritation or burns upon contact with skin and mucous membranes.	Water treatment, antiseptic, and in chemical reactions.
7778-50-9	Potassium Dichromate	Carcinogen; causes skin and eye	Can cause allergic skin	Used in labs, wood staining,

[20] This is a solution rather than a specific chemical, and its components would have separate CAS numbers. For example, tartaric acid has the CAS number 87-69-4, and an alkaline like sodium hydroxide has the CAS number 1310-73-2

		irritation; harmful if swallowed.	reaction, asthma symptoms, or lung cancer.	photography.
1336-21-6	Ammonium Solution	Likely refers to Ammonium Hydroxide; corrosive, causes burns.	Respiratory and eye irritant.	Cleaning, pH adjustment, and in fertilizers.
477-73-6	Safranin O	Considered safe, though may cause slight irritation.	Minimal in small quantities; avoid ingestion and contact with eyes.	Biological stain for highlighting structures in cell biology and microbiology.
6381-59-5	Fehling Solution	Irritant; harmful when inhaled or ingested.	Can cause skin and eye irritation.	Chemical test to differentiate between water-soluble carbohydrate and ketone functional groups.
7664-41-7	Ammonia	Toxic if inhaled; causes skin burns and serious eye damage.	Respiratory irritant; high exposure can lead to pulmonary edema.	Fertilizer production, cleaning agent, and in the manufacture of plastics, textiles, and pesticides.
547-58-0	Methyl Orange	May cause eye and skin irritation potential respiratory irritant.	Generally low toxicity; avoid ingestion and inhalation.	pH indicator in titrations and chemical reactions.
77-09-8	Phenolphthalein	Suspected carcinogen; may cause eye, skin, and respiratory tract irritation.	Ingestion can cause gastrointestinal discomfort.	pH indicator in acid-base titrations.
1336-21-6	Ammonia Solution[21]			
67-56-1	Methanol	Highly flammable; toxic if ingested, inhaled, or absorbed through skin.	Can cause blindness, organ damage, or death if ingested.	Solvent, antifreeze, fuel, and denaturant for ethanol.
56-81-5	Glycerin Solution	Generally safe; pure glycerin can cause eye irritation.	Large quantities can cause gastrointestinal discomfort and laxative effects.	In pharmaceuticals, food, and personal care products for moisture retention.
10035-04-8	Calcium Chloride, Dihydrate, Powder[22]	May cause eye and skin irritation.	Ingestion can lead to hypercalcemia.	De-icing, dust control, and in food.
7783-20-2	Ammonium Sulfate,	May cause irritation to eyes and	Generally low toxicity; high	Fertilizer, water treatment,

[21] It is not specified if this is referring to ammonium hydroxide, the common name for the solution of ammonia in water.

[22] It is not clear if this is referring to the hydrated form, which is a powder; anhydrous calcium chloride has a different CAS number.

	Granular	respiratory system.	doses can cause nausea, diarrhea.	food additive.
7558-79-4, 7732-18-5	Buffer Solution pH 7 4120-G20	Typically safe, though constituents may cause irritation.	Low risk but avoid ingestion of direct contact with skin and eyes.	Maintaining pH in experiments, calibrating pH meters.
30-1483	Ascorbic Acid, Fine Powder	Generally safe; excessive amounts can cause irritation.	High doses can lead to stomach upset and kidney stones.	Vitamin C supplement, antioxidant in food.
50-81-7	Ascorbic Acid			
7757-79-1	Potassium nitrate, crystal	Oxidizing agent; may intensify fire; harmful if swallowed.	Ingestion can lead to gastrointestinal irritation, dizziness, or shortness of breath.	In fertilizers, food preservation, fireworks, and gunpowder.

Appendix II: Hazard ID, Health Effects, and Laboratory Purposes –Laboratory

CAS Number	Chemical Name	Hazard ID	Health Effects	Purpose & Potential Use
67-64-1	Acetone	Highly flammable, irritant to eyes and respiratory system.	Inhalation can cause dizziness, headaches; long-term exposure may affect the central nervous system.	Solvent, nail polish remover, laboratory reagent.
	Carbol Fuchsin[23]	Potentially carcinogenic, may cause eye and skin irritation.	Long-term exposure may lead to serious health conditions.	Staining bacteria in Gram staining, Ziehl-Neelsen stain.
477-73-6	Safranin	Mildly toxic, irritant to skin and eyes.	Can cause irritation; potential long-term effects are not well documented.	Biological stain, especially in Gram's method.
	Grams Decolorizer Solution[24]	Composition varies, typically includes acetone and alcohol, so it's flammable and is an irritant.	Can cause respiratory and eye irritation.	Used in Gram staining to differentiate bacterial species.
	Crystal Violet Solution[25]	Carcinogenic, irritating to eyes, skin, and respiratory system.	Possible mutagen, long-term exposure can be harmful.	Used in Gram staining, also in the medial field as a topical antiseptic.
64-17-5	Ethanol	Highly flammable, can be irritating to eyes and respiratory system.	Inhalation can cause dizziness; ingestion can be harmful or fatal.	Solvent, disinfectant, fuel, and recreational beverage.
50-00-0	Formaldehyde	Carcinogenic; highly irritating to eyes, skin, and respiratory system.	Can cause respiratory issues and cancer upon prolonged exposure.	Preservative in medical laboratories, embalming agent, and industrial applications.

[23] There is no specific CAS number for Carbol Fuchsin because it's a mixture of compounds, but its main component, Basic Fuchsin has the CAS number 632-99-5.
[24] This is typically a mixture of acetone and ethanol and does not have a CAS number as a mixture.
[25] The main compound – Crystal Violet – has the CAS number 548-62-9.

7647-01-0	Hydrochloric Acid (HCL)	Highly corrosive, can cause severe burns and eye damage.	Inhalation can cause coughing, choking, and inflammation of the respiratory tract.	pH adjuster, used in various industrial processes, cleaning agent.
	70% Isopropyl Alcohol[26]	Flammable, irritant to eyes and respiratory system.	Inhalation can cause dizziness, headaches; ingestion can be toxic.	Disinfectant, solvent, used in medical rubs and wipes.
61-73-4	Methylene Blue	Can be irritating to eyes and skin, potential respiratory irritant.	High doses can cause nausea, vomiting, and diarrhea.	Medication for methemoglobinemia, biological stain, aquarium treatment for fungal infections.
	10% Neutral Buffered Formalin[27]	Contain formaldehyde, so it's carcinogenic, corrosive, and a sensitizer.	Can cause skin, eye, and respiratory irritation; long-term exposure is linked to cancer.	Tissue preservative, embalming agent, disinfectant.
108-95-2	Phenol Crystalized	Corrosive; can cause burns, toxic if absorbed through skin.	Can affect central nervous system, liver, kidneys; can be fatal in high doses.	Antiseptic, disinfectant, used in synthesis of chemicals and drugs.
7553-56-2	Iodine Solution	Can be irritating to eyes and skin, toxic of ingested in large quantities.	High concentrations can cause thyroid issues, skin irritation.	Antiseptic; used in medical diagnostics, and water purification.
67-56-1	Methanol	Highly flammable, toxic if ingested, inhaled, or absorbed through skin.	Can cause blindness, organ damage, or death if ingested.	Solvent, antifreeze, fuel, and denaturant for ethanol.
	Eosin Y Solution[28]	Irritant; can be harmful in ingested, in haled, or absorbed through skin.	Can cause blindness, organ damage, or death if ingested.	Staining biological tissues, used in microscopy and for dyeing fabrics.

[26] This is a solution of Isopropyl Alcohol in water. Pure Isopropyl Alcohol has the CAS number 67-63-0.
[27] This is a solution typically consisting of formaldehyde, water, and typically a buffer. Formaldehyde CAS number is 50-00-0.
[28] The active ingredient – Eosin Y – has the CAS number 17372-87-1.