2023 Kosrae State Chemical Profile

Kosrae Island Resources Management Authority

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

Kosrae, FSM

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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
EEZ	Exclusive Economic Zone
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
KCHC	Kosrae Community Health Center
KDHS	Kosrae Department of Health Services
KIRMA	Kosrae Island Resource Management Authority
Km	Kilometers
KSDHS	Kosrae State Department of Health Services
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 Kosrae for managing and implementing chemical management in the Kosrae. 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 actively participated in the Persistent Organic Pollutants in Pacific Island Countries (POPs 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 at the national level 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.

Kosrae 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. Kosrae has developed regulations that address the handling and removal of chemical and hazardous waste as it pertains to development projects only. It has established an ACT related to POPs and maintains a registry of prohibited chemicals. It also has legislation that requires proper labeling of all chemicals and hazardous materials.

However, Kosrae is encumbered by a number of 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.
- Continued importation with instructions in different languages and not converted to English.
- Limited technical capacity for properly transporting, handling, and disposal.
- Don't have a Material Safety data sheet for medical imports – from non-English countries, mostly from Asia.

The project titled "Strengthening Institutional Capacity of Chemical Management in the FSM" is designed to assist Kosrae 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 involved in chemical importation, and evaluating the existing laws and enforcement.

The analysis will require 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 will carry 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 Kosrae, FSM. The result of such analysis will 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 Kosrae

1.1 Geographic Context

1.1.1 Location & Terrain

In the east, Kosrae is geologically the youngest, high volcanic island with a steep topography, a total landmass of approximately 111 km2 (43 sq mi), and an Exclusive Economic Zone (EEZ) extending for 200 nm. Coral reefs surround the island and has around 10.3 km^2 (4 sq mi) of land suitable for agriculture and 64.5 km^2 (25 sq mi) of forested land located on the steep mountains (Fig. 1). The majority of the island's coastline is experiencing chronic erosion. The highest elevation in Kosrae is Mt. Finkol at 635 m (2,083 ft). Kosrae is the only FSM state without outer islands (Image 1).[1] Kosrae has a population of 6,616 people (2010 census), or approximately 6% of the FSM's population.

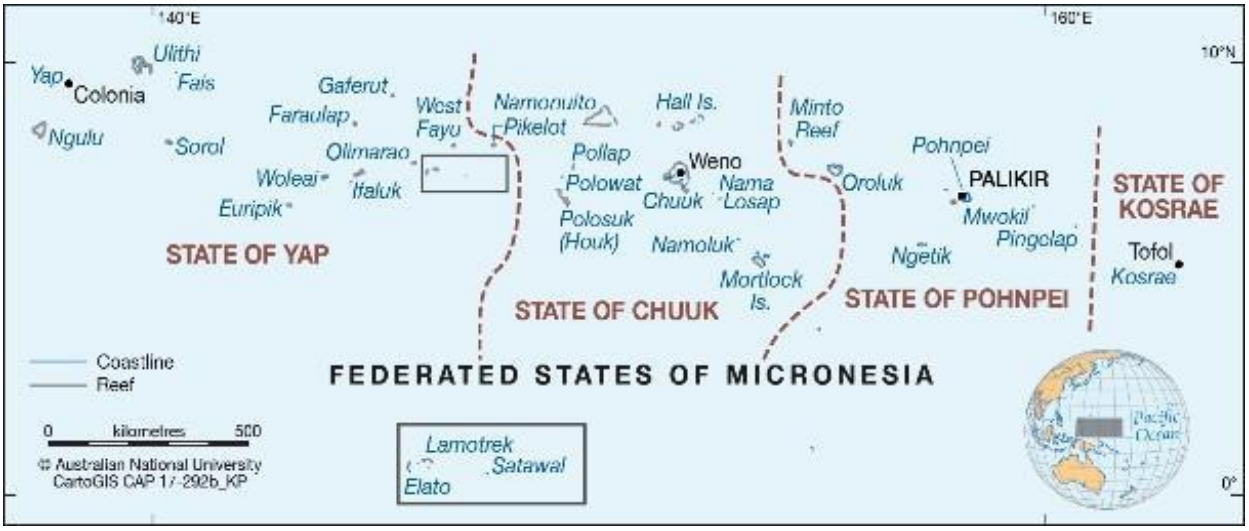

Image 1: *Map of FSM (**Federated States of Micronesia - CartoGIS Services Maps Online - ANU**)*

Approximately 14% of Kosrae is vegetated by mangrove swamps.[2] Other vegetation types include upland forests, swamp forests, mangroves, cloud forests, secondary forests, agroforests, marsh, and savanna grassland. The island is fertile, though much of it is steep and inaccessible. The watersheds are steep and heavily vegetated, and the catchments in the mid to upper ranges are relatively natural. However, where clearing or deforestation has occurred in sloping areas, intense rainfall quickly denudes exposed soil. Invasive vegetation is a significant problem and has taken a foothold in many of the lower parts of many of the catchments.

A fringing reef, mangroves, and coastal strand forests surround Kosrae. The fringing reef is narrow and covered with boulders of coral heads removed from the fore reef during occasional cyclone events. Kosrae's fringing reef is broken only by four natural harbors: Lelu in the east, Utwe in the south, Okat in the northwest, and Yela in the west. Kosrae has

[1] Government of the Federated States of Micronesia (2016). Kosrae Joint State Action Plan for Disaster Risk Management and Climate Change. SPC's Suva Regional Office, Fiji.

[2] US Forest Service and FSM (2010)) *Federated States of Micronesia State-Wide Assessment and Resource Strategy 2010–2015+*.

jurisdiction over water within 12 miles of its engulfing fringing reef.[3]

1.1.2 Climate Overview

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

Climate feature	Climate trends
Air Temperature	Kosrae experiences little seasonal variation in mean air temperatures across the year (less than 1.5°C/ 2.7°F between the average hottest and coolest months), which is driven mainly by sea surface temperatures. In general, across the island groups, the mean annual temperature averages 27.1°C (80.8°F) over the period 1901–2019, but annual mean air temperatures have increased (~0.5 - 1˚C) across the FSM since 1951.
Rainfall	Average annual rainfall in Kosrae is of 197 inches (500cm), with April tending to be the wettest month. Heaviest rainfall tends to occur between July and October, particularly when El Niño conditions are developing. In a typical El Niño, Kosrae can experience dryness and drought between October and December and significantly reduced rainfall between January and March in the following year.
Sea Level	The north-east trade winds tend to increase tide levels between November and April. Higher than normal high tides occur particularly between December and February, while much higher-than-normal high tides (known in Kosrae as King Tides) can occur during La Niña.
Storm patterns	Many of the typhoons that affect western Micronesia Region often originate around Kosrae as tropical depressions or storms developing into full typhoons to the west and north of the island. Typhoons, tropical depressions and storms that track close to Kosrae cause heavy rainfall. In 2015 Tropical storm Dolphin caused wave swells and flooding.
Sea Surface Temperature	Natural variability (i.e., year-to-year) still plays a significant role in determining the sea-surface temperature in Kosrae. Historical changes are consistent with the broad-scale sea-surface temperature trends for the wider Pacific region, indicating increased SST warming.
Ocean Acidification	Ocean acidification is projected to continue, with consistent decline in aragonite 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

Kosrae's population, as per the 2010 census, stands at 6,616, with nearly half (50.7%) being under the age of 20.[4] The census also recorded 3,352 males making up 50.7% of the populace, and 3,264 females, constituting 49.3%. Most residents, 4,456 or 67.4%, live in the island's rural regions, while urban locales are home to 2,160 individuals, representing 32.6% of the population. Notably, there is a decline in Kosrae's population, experiencing an average

[3] Kosrae State Strategic Development Plan FY2020-FY2023. Updated July 2019, Kosrae Department of Resources and Economic Affairs. https://fsm-data.sprep.org/system/files/Kosrae%20SDP%20%282019%29.pdf

[4] 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

annual reduction of 1.50%.[5]

1.2.2 Education

A 2008 report highlighted a notable decrease in Kosrae Education System's total enrollment, with around 200 fewer students.[6] While speculative consensus suggests this downturn might be attributable to outmigration. However, the absence of hard data necessitates further evidence to substantiate this theory. Nevertheless, population forecasts from the FSM Office of Statistics potentially lend credence to these assertions, indicating that outmigration could be a persistent trend over time.

1.2.3 Resources and Economy

Kosrae's geographical isolation and poorly developed infrastructure impede long-term growth. Over the years, fishing and farming have diminished, primarily supporting livelihoods, and acting as a safety net for Kosraeans. Inequality of income and the incidence of families with incomes below the poverty line are among the highest in the Pacific region. 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.[7] 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.

Kosrae's Gross Domestic Product (GDP) in 2015 was estimated at $14.6 million (USD) (or $1963 (USD) per person). While some in Kosrae still depend on fishing and farming for their livelihoods, nonfarm activities contribute significantly to income. Major economic sectors in Kosrae are marine resources, tourism, agriculture, and small-scale businesses. The State Government owns and operates all infrastructure facilities, health facilities, most education services, small enterprises, and extensive commercial activity in the fishery. The private sector employs retail outlets, restaurants, resorts, farming, and service businesses.

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 Kosraeans, where men, women, and youth are actively engaged. On average, Households headed by women earn 9% less than male-headed households.[8]

1.3 Political Structure

[5] 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

[6] Kosrae State Department of Education, Strategic Plan 2008-2012. Developed by the Kosrae Department of Education with Support of the Pacific Regional Initiatives for the Deliver of Basic Education(PRIDE). March 2008. See: http://www.paddle.usp.ac.fj/collect/paddle/index/assoc/fsm011.dir/doc.pdf

[7] Moving the Pacific Forward. UNDP Annual Report. 2008. https://www.undp.org/sites/g/files/zskgke326/files/migration/pacific/UNDP_MCO_AR_2008.pdf

[8] FSM HIES 2013/14l: Main Analysis Report.

1.3.1 Government Structure

The state of Kosrae 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.

1.3.2 Legislative

The Kosrae State Legislature is a unicameral body of 14 senators elected from 4 electoral districts for four years.[9] The Legislature's power extends to "all rightful subjects of legislation not inconsistent with" the Kosrae Constitution.[10] Each Senator serves a four-year term.[11]

1.3.3 Executive

Kosrae's executive branch is led by the governor and lieutenant governor, elected jointly by a majority of votes.[12] The Governor and lieutenant governor serve a four-year term.[13] "The Governor is responsible for the faithful execution of the laws."[14]

1.3.4 Judicial

The judicial branch in Kosrae State consists of the State Court and such inferior courts as may be created by law.[15] The decisions of the highest division of the State Court are appealable to the appellate division of the FSM Supreme Court.[16] Kosrae's Constitution contains a judicial guidance clause providing that court decisions shall be consistent with the Constitution, State traditions and customs, and the social and geographical configuration of the State.[17]

1.3.5 Municipal

Kosrae's Constitution recognizes the existence and limited powers of the four municipalities in Kosrae State.[18] By state statute, a municipal government may not adopt an ordinance regarding or regulate or control an activity or subject that state law regulates or controls.[19] Kosrae's Constitution requires the state government to protect the State's traditions "as may be required by the public interest."[20]

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[9] Kosrae const. art. IV § 2.
[10] Kosrae const. art. IV § 1.
[11] Kosrae const. art. IV § 4.
[12] Kosrae const. art. V § 2.
[13] Kosrae const. art. V § 3.
[14] Kosrae const. art. V § 9.
[15] Kosrae const. art. VI § 2.
[16] Kosrae const. art. VI § 2.
[17] Kosrae const. art. VI § 9.
[18] Kosrae const. art. VII § 2.
[19] Kosrae const. art. VII § 2.
[20] Kosrae const. art. II § 2.

The Kosrae Constitution recognizes a right to a healthful, clean, and stable environment, and the state, by law, must protect its environment, ecology, and natural resources from impairment in the public interest.[21]

There are eight executive departments in the Kosrae government, established by statute. 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 Kosrae*[22]

Department	Website
Department of Education (DOE)	None
Kosrae Island Resource Management Authority (KIRMA)	None
Department of Finance	None
Department of Health	None
Department of Agriculture	None
State Attorney General	None
Department of Resources & Development	None
Department of Transportation & Infrastructure (DTI)	None

[21] Kosrae const. art. XI § 1. The waters, land, and other natural resources within the marine space of the state are public property, the use of which the state government is required to regulate by law in the public interest. *Id.* § 4.

[22] State departments did not have active websites at the time of this assessment.

2. Insights on Chemical Consumption and Imports in Kosrae

2.1 Data Collection

The Office of Customs & Tax (CTA), functioning under the Department of Finance & Administration (DF&A), 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 (38.8%) in the three baseline years. Nearly 95% of the total chemical imports fall within the seven chapters. Plastics, pharmaceutical products, soaps, and

washing agents accounted for 66% of all imports within the baseline period. Imports of Pharmaceuticals, Plastics and Articles Thereof, and Soaps and Cleaning Agents were slightly inflated due to the demands for preparation and response to the SARS-CoV-19 outbreak.

In the customs statistics for the baseline years of 2019 to 2021, a significant 92.5% lacked "Quantity" and "Units" data. Only Chapters 31 (Fertilizers), Chapter 40 (Rubbers), and another unspecified chapter had obtained quantities and units in their tariffs. The absence of "Quantity" and "Unites" data in more than 92.5% of the customs statistics meant that the CIF column became the sole significant quantitative measure for evaluating chemical trade flows and volumes into Kosrae.

2.4.2 Kosrae Chemical Import Analysis: Baseline Year 2019-2021

Across the baseline years of 2019-2021, Kosrae imported approximately US$7.29 million worth of chemical and chemical-related products. Table 4 provides information on the cumulative value of chemical imports into Kosrae from 2019 to 2021.

***Table 4**: Kosrae chemical important overview*

Year	Dollar Value (USD)
2019	$ 2,533,796
2020	$ 2,381,328
2021	$ 2,380,062
Total	$ 7,295,186

2.4.3 Kosrae Chemical Import Analysis: Baseline Year 2019-2021

For the baseline years, Chapter 39 – Plastics and Articles Thereof – had minor fluctuations in imports. It did, however, account for nearly 67% of all chemical or chemical-related imports from 2019-2021 and ranked the highest in CIF value in Kosrae. Whereas Chapter 36 – Pyrotechnic Products; Matches; Pyrophoric Alloys; Certain Combustible Preparations – ranked the lowest in CIF value and accounted for only .0086% of the total import value over three years.

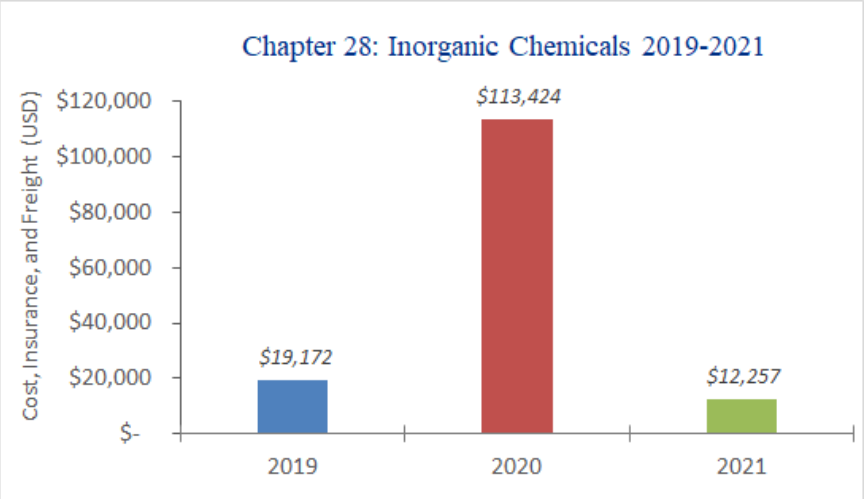
Table 5: Summary of the chemical import analysis for Kosrae. Cost, Insurance, and Freight (CIF) values are reported in US dollars.

Chapter	2019	2020	2021	Grand Total
28	19,172	113,424	12,257	144,853
29	21,803	45,649	71,698	139,150
30	92,495	144,618	200,196	437,309
31	2,208	7,950	220	10,378
32	87,518	40,661	123,172	251,351
33	103,482	132,735	63,110	299,327
34	130,985	111,638	101,591	344,214
35	2,733	10,761	163	13,657
36	423	208	0	631
37	6,374	1,369	0	7,743
38	115,534	59,285	69,178	243,997
39	1,611,734	1,632,071	1,628,570	4,872,375
40	185,601	80,955	263,644	530,200
Grand Total	2,380,062	2,381,324	2,533,799	7,295,185

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 Kosrae 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



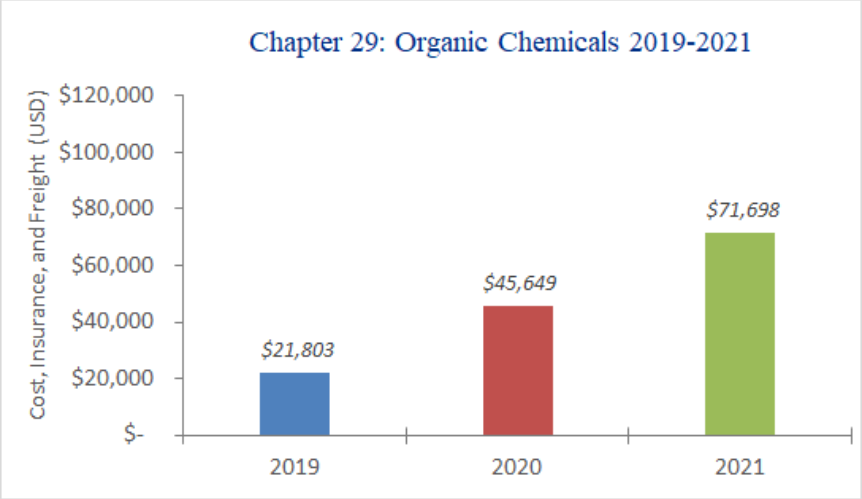
Graph 1: *CIF Value of Inorganic chemicals imported in Kosrae State over the period 2019-2021. CIF values are reported in USD.*

Kosrae saw a noticeable spike in Inorganic Chemicals CIF value in 2020. The key chemical imports for Chapter 28, listed from most minor to most significant in terms of CIF value, include a variety of inorganic chemicals such as sodium hydrogen carbonate (sodium bicarbonate), oxygen, compounds of magnesium, phosphorus, soda lye or liquid soda in aqueous solution, chemically pure sugars other than common types like sucrose, lactose, maltose, glucose, and fructose, commercial calcium hypochlorite and other calcium hypochlorite, disodium sulfate, and argon.

2.5.2 Chapter 29: Organic Chemicals

In 2021, Kosrae saw an increase in Organic Chemical CIF values. 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. Propan1ol and propan2ol, 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.

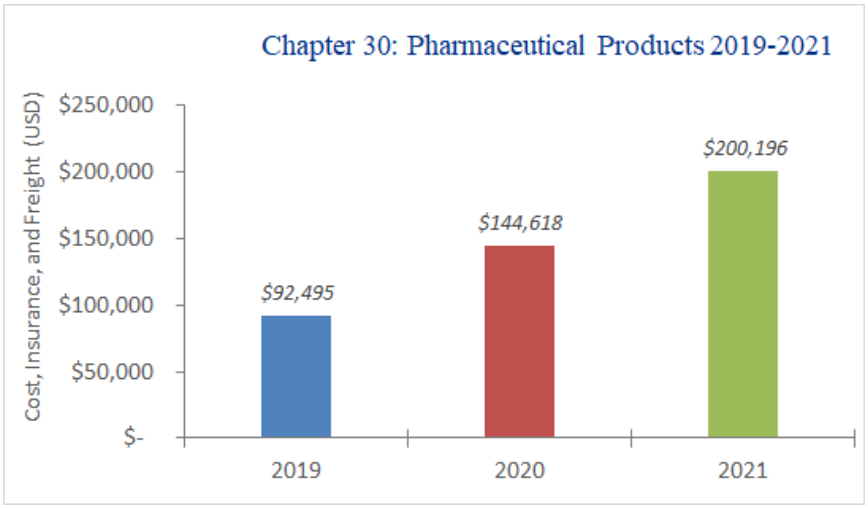


Graph 2: *CIF Value of Organic chemicals imported in Kosrae State over the period 2019-2021. CIF values are reported in USD.*

2.5.3 Chapter 30: Pharmaceutical Products

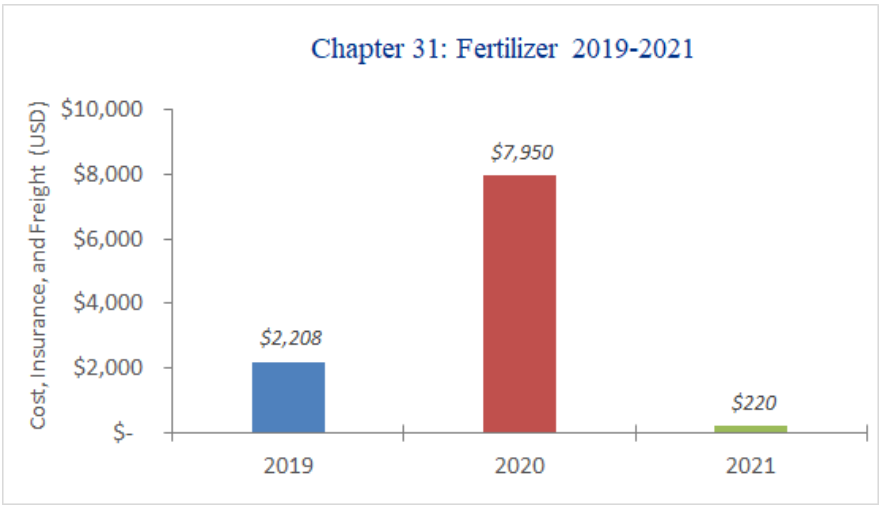
Chemical imports under Chapter 30 encompassed various medical and healthcare-related products, such as:

- 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.



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

2.5.4 Chapter 31: Fertilizers



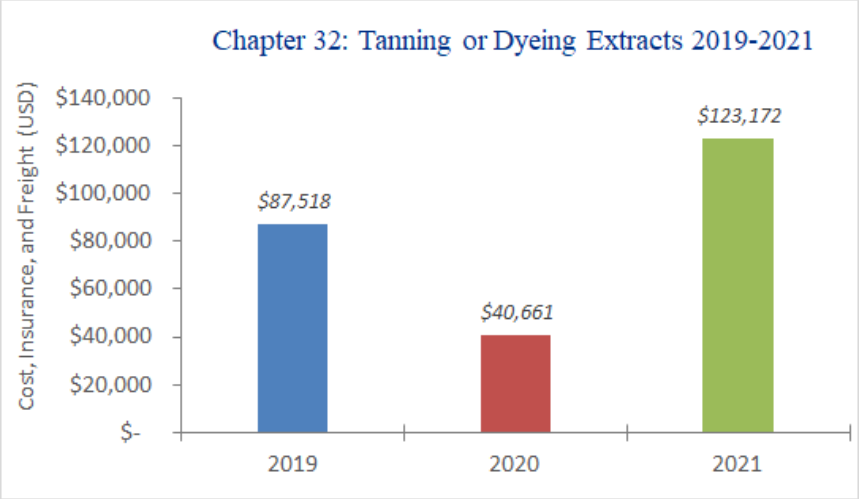
Graph 4: *CIF Value for Fertilizers imported in Kosrae State over the period 2019-2021. CIF values are reported in USD.*

The main chemical imports under Chapter 31 in the Kosrae 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 (P2O5) 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 53.5% decrease from 2019 to 2020 in CIF value for Chapter 32 in Kosrae. However, in 2021, the CIF value in the same chapter saw a 202.7% spike. 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.

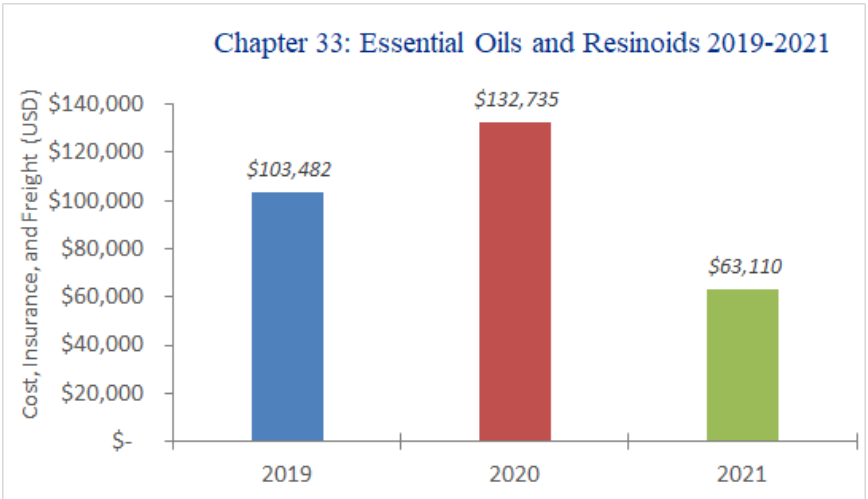


Graph 5: *CIF Value for products imported in Kosrae State under the HS's Chapter 32 over the period 2019-2021. CIF values are reported in USD.*

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

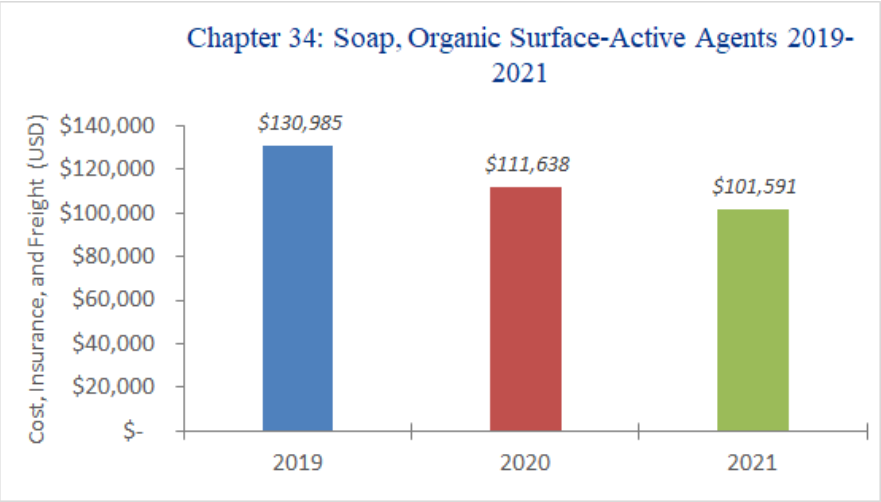
Chapter 33 data imports revealed fluctuating trends in the importation of essential oils, perfumery, or cosmetic preparations in Kosrae over the three-year period. Kosrae experienced an increase in 2020 but saw a significant decline in 2021.

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 Kosrae State over the period 2019-2021. CIF values are reported in USD.*

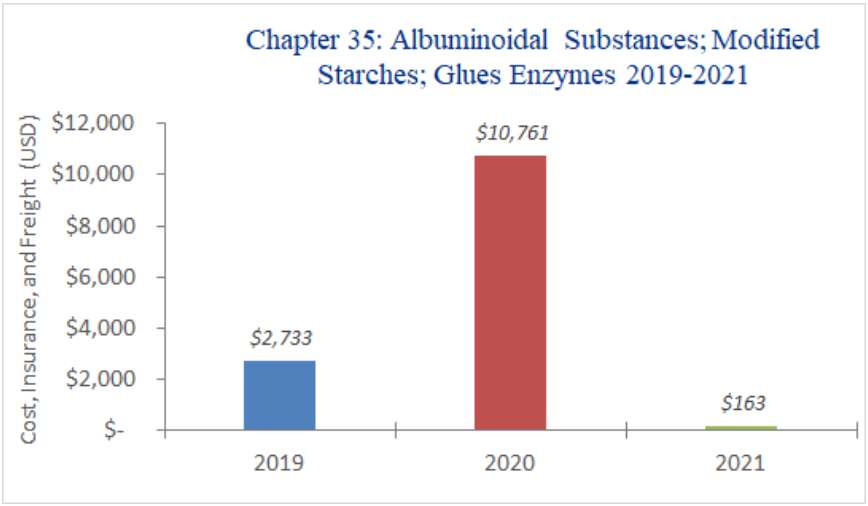
2.5.7 Chapter 34: Soap, Organic Surface-Active Agents, Washing Preparations, Lubricating Preparations, Artificial Waxes, Prepared Waxes



Graph 7: *CIF Value for Soap, Organic Surface-Active Agents, Washing Preparations, Lubricating Preparations, Artificial Waxes and Prepared Waxes products imported in Kosrae 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

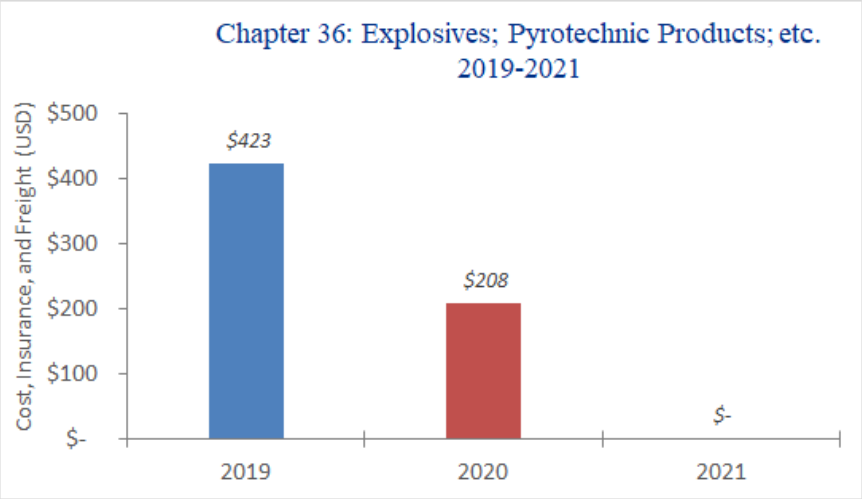


Graph 8: *CIF Values for products imported in Kosrae State under the HS's Chapter 35 over the period 2019-2021. CIF values are reported in USD.*

Kosrae's imports increased almost fourfold to $10,761 in 2020; however, in 2021 imports plummeted to just $162, a 98.5% decrease from the previous year.

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

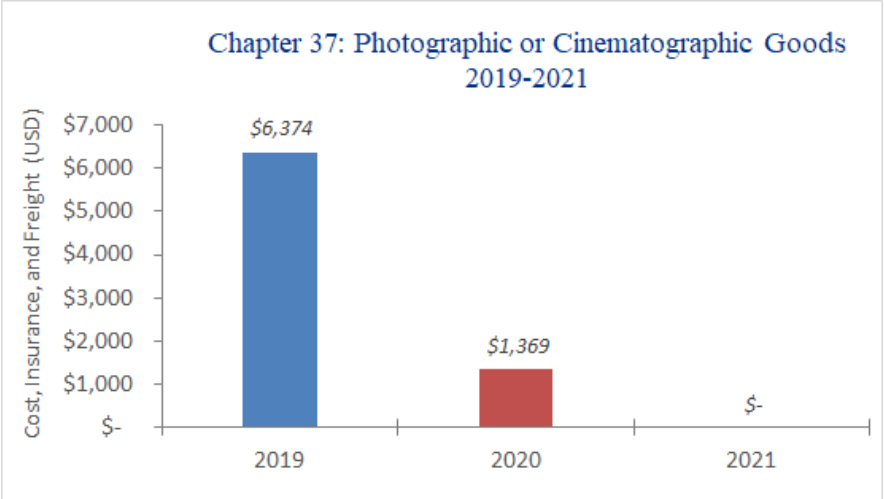
Kosrae showed a consistent, steady decline within the evaluation period. In 2019, import values were just about $400; in 2020, it decreased by nearly half; in 2021, Kosrae had zero import data for this category.



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

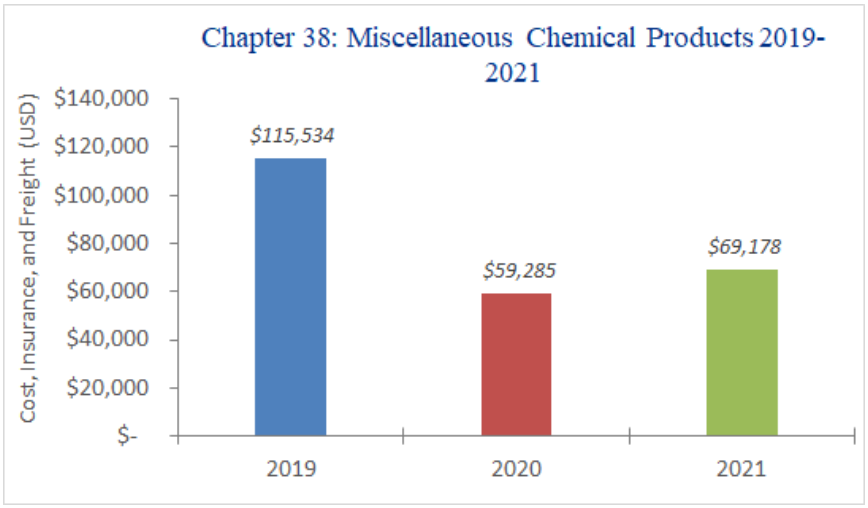
2.5.10 Chapter 37: Photographic or Cinematographic Goods

The data shows a downward trend in the importation of photographic or cinematographic goods in Kosrae over the three-year period, which saw a significant decrease in 2020, and no data available for 2021.



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

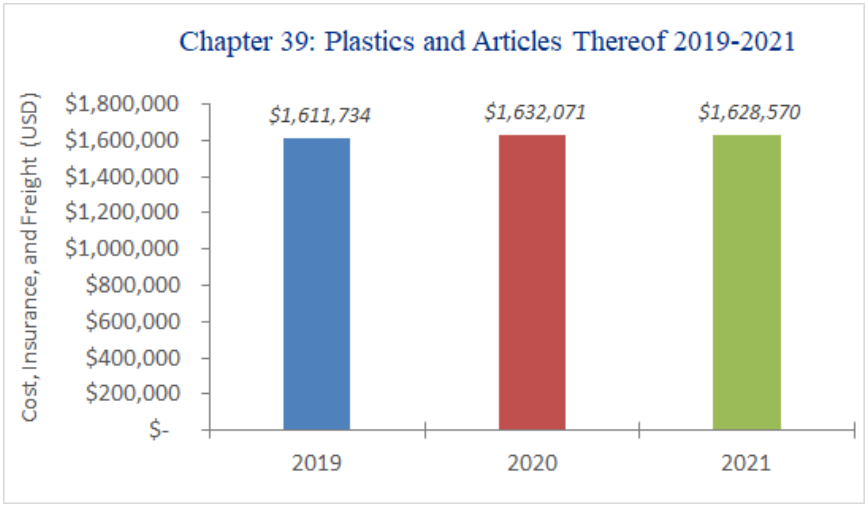
2.5.11 Chapter 38: Miscellaneous Chemical Products



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

The data shows some volatility in Kosrae's pesticide and related chemical imports over three years. In 2019, Kosrae purchased nearly $120,000 in pesticides and related chemicals. Then, in 2020, import data shows the imports for such goods dropping just below $60,000. In 202, imports increased by $10,000 but did not reach the same levels as 2019.

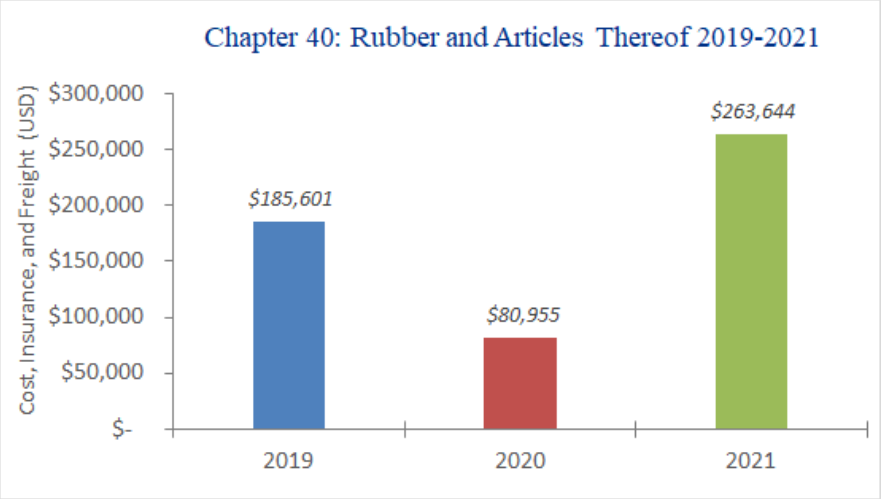
2.5.12 Chapter 39: Plastics and Articles Thereof



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

Imports of Plastics show a slight increase over the period 2019-2021, reaching CIF value of US$ 1,628570 in 2021.

2.5.13 Chapter 40: Rubber and Articles Thereof



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

Imports of Rubber and Articles Thereof show a considerable increase in 2021.

3. Current Chemical Management Practices

The institutional capacity for managing Kosrae'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.

Managing the Persistent Organic Pollutants (POPs) and enforcing the Persistent Organic Pollutants Acts of 2009 and its associated POPs regulation are in progress. Although specific to POPs, chemical management is occurring to some extent. The list of POPs and banned hazardous substances is published in the Kosrae state code section 19.509. The use of all other hazardous chemicals not on the list of banned hazardous substances is subject to review and approval of Kosrae Island Resource Management Authority (KIRMA) through the Development Permit Review process. That said, it is evident that the capacity for effective chemical management is limited and remains a significant concern for Kosrae.

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

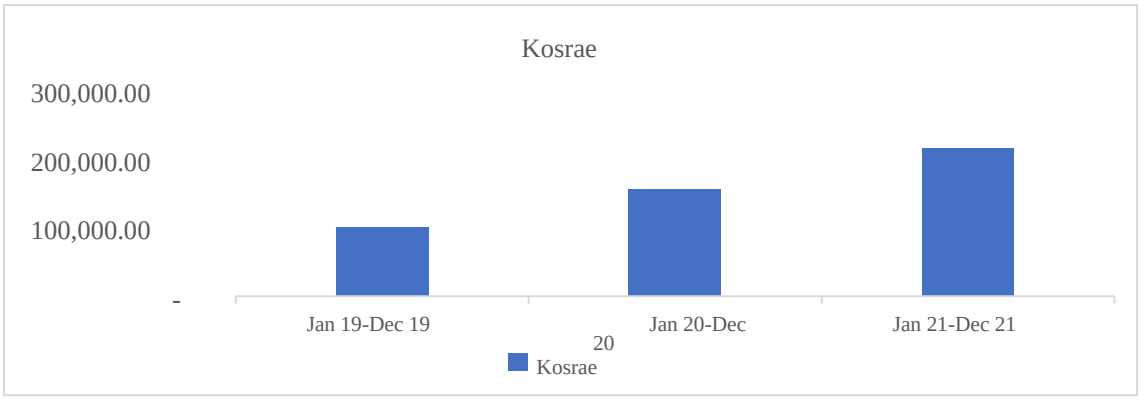
With no legal mandate to regulate imports, including various types of chemicals, into the ports, the state governments rely significantly on the FSM National Government (FSMNG) to provide data on the types and amounts of chemicals entering the ports. The FSMNG, particularly the FSM Customs Office, is 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

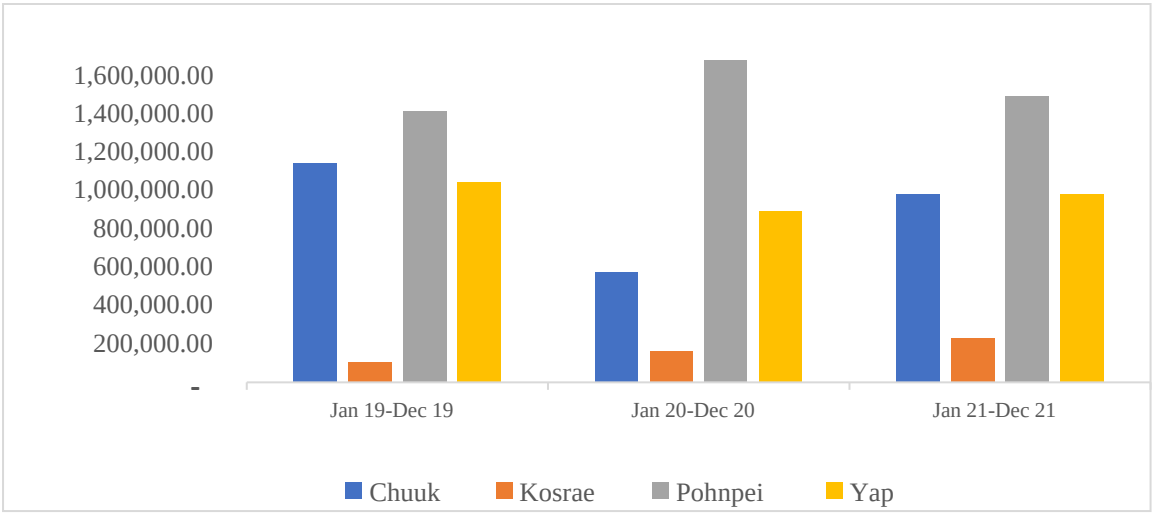
Pharmaceuticals are imported into Kosrae primarily by the Kosrae State Department of Health Services (KSDHS), Kosrae Drug Store, and the Kosrae Community Health Center (KCHC). The Kosrae Drug Store is owned and operated privately. The KCHC is an independent nonprofit organization working with the Kosrae Department of Health Services (KDHS). It currently runs three service delivery sites. Two of the sites have pharmacies.

Data from the FSM Customs & Tax (FSMCT) office shows a gradual and steady increase in cost, insurance, and freight (CIF) value for pharmaceutical imports to Kosrae from 2019 to 2021. Graph 1 shows the pharmaceutical costs increase from 2019, 2020, and 2021. The drivers for the increase in costs need to be clarified. It could mean increased pharmaceutical products imported each year or the cost of delivering the product to Kosrae increased due to other factors such as fuel prices.



Graph 14: *CIF Value of Pharmaceuticals for Kosrae state in different years*

Compared to the other states in the FSM, Kosrae spent less on CIF for pharmaceutical products for those three years. The data for the other three states shows fluctuations in CIF value, as shown in Graph 2.



Graph 15: *CIF Value for Pharmaceuticals in different years across the four FSM's states.*

3.1b Refrigerants

Both private and public sectors import and widely use refrigerants in Kosrae. Kosrae has a team of certified refrigeration and air-conditioning (RAC) handlers. The team comprises staff from the Department of Transportation and Infrastructure (DTI), Department of Education (DOE), Department of Health Services (DHS), Kosrae Island Resource Management Authority[23] (KIRMA), and others from the private sector. These certified individuals are responsible for working on RAC equipment and appliances in Kosrae.

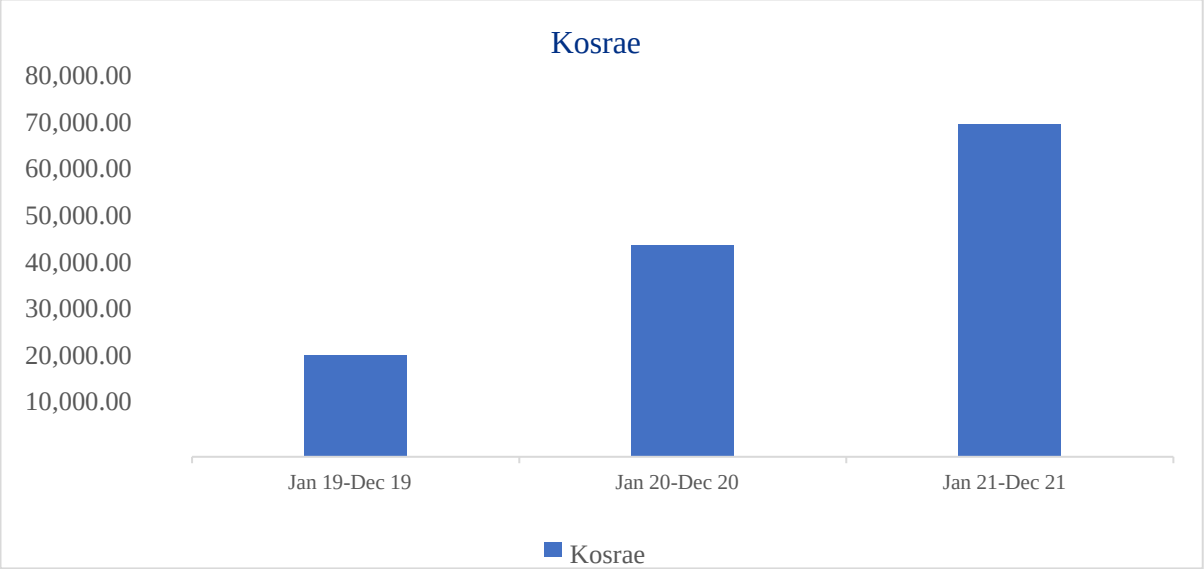
Ongoing RAC training are held as part of the efforts to keep building local capacity in proper refrigerant handling and use due to its toxicity, flammability, and contribution to ozone depletion and climate change.

[23] Kosrae Island Resource Management Authority (KIRMA) is the equivalent to the Environmental Protection Agencies in the other three FSM states.

3.1c Fuel and Petrochemicals

The only fuel company that operates in Kosrae 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 Kosrae increased significantly from a little over 20K CIF value in 2019 to over 70K in 2021.



Graph 16: *CIF Value for Organic Chemicals in different years*

3.1d Laboratories

Our assessment noted that the KIRMA does not have a laboratory. The same goes for all the public schools in Kosrae. Not a single elementary or high school has an operational school laboratory. The College of Micronesia (COM) – Kosrae Campus does have a laboratory. Still, according to the acting Dean of the Kosrae Campus, the lab has not been operational or used since 2017 due to a lack of lab instructors. The acting Dean of the Kosrae campus provided the following data (**Table 5**). (For more information on hazard identification, health impacts, and purpose and/or potential use, see Appendix I.)

Table 6: *Chemical Inventory for COM-FSM Kosrae Campus*

CAS Number[24]	Chemical Name	Amount	Quantity Available
1310-73-2	Sodium Hydroxide	500 grams	7
67-64-1	Acetone	1 liter	5
1309-48-4	Magnesium Oxide	500 grams	1
112926-00-8	Silica Gel	1 kilogram	2

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

110-54-3	Hexanes Optima	1 liter	6
1336-21-6 &7732-18-5	Ammonium hydroxide	500 milliliters	1
7664-93-9	Sulfuric Acid	500 milliliters	1
7647-01-0	Hydrochloric Acid	1 liter	2
64-19-7	Acetic Acid	100 milliliters	1
1336-21-6	Ammonium hydroxide	100 milliliters	1
144-55-8	Sodium Bicarbonate		1
7647-01-0	Hydrochloric Acid	100 milliliters	1
497-19-8	Sodium carbonate	200 milliliters	1
7647-14-5	Sodium chloride	1 kilogram	1
7758-98-7	Cupric sulfate	100milliliters	1
	Alkaline tartrate solution[25]	1 quart	1
76-59-5	Bromothymol Blue	500 milliliters	1
7722-64-7	potassium permanganate	1.1 pounds	1
7778-50-9	Potassium dichromate	1.1 pounds	1
67-64-1	Acetone	500 milliliters	10
1336-21-6	Ammonium solution	500 milliliters	1
7664-93-9	Sulfuric Acid	2.4 liters	1
7647-01-0	Hydrochloric Acid	2.5 liters	1
477-73-6	Safranin O	25 grams	1
6381-59-5	Fehling Solution	1000 milliliters	1
7664-41-7	Ammonia	32 ounces	1
547-58-0	Methyl Orange	1 liter	1
1310-73-2	Sodium Hydroxide	750 grams	1
77-09-8	Phenolphthalein	500 milliliters	1
1336-21-6	Ammonia solution[26]	750 milliliters	1
64-19-7	Acetic Acid	2.5 liters	1
67-56-1	Methanol	1 gallon	1
56-81-5	Glycerin solution	500 milliliters	1
10035-04-8	Calcium Chloride, Dihydrate, Powder[27]	500 grams	7
7783-20-2	Ammonium Sulfate, Granular	500 grams	1
7558-79-4, 7732-18-5	Buffer solution ph. 7 4120-G20	475 milliliters	14
30-1483	Ascorbic Acid, fine powder	1 kilogram	3
50-81-7	Ascorbic Acid	500 grams	1
7757-79-1	Potassium nitrate, crystal	2.5 kilograms	3

[25] 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

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

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

Image 2: *Chemicals at the COM-FSM Kosrae Campus*

3.1e Kosrae Hospital Laboratory

The assessment of chemicals at the Kosrae Hospital Clinical Laboratory identified more chemicals are being used for lab testing, analysis, and sterilization of medical instruments. Most chemicals on location and in storage at the medical laboratory are disinfectant chemicals and fixatives or preservative agents. These chemicals are stored in safety cabinets. All waste chemicals are disposed of through the hospital's electric incinerator. The following table shows the chemical inventory for the Kosrae Hospital Clinical Laboratory. (For more information on hazard identification, health impacts, and purpose and/or potential use, see Appendix II.)

Table 7: *Chemical Inventory for Kosrae Hospital Laboratory*[28]

CAS Number	Chemical Name	Amount	Quantity Available
67-64-1	Acetone		
	Carbol Fuchsin[29]		
477-73-6	Safranin		
	Grams Decolorizer Solution[30]		
	Crystal Violet Solution[31]		
64-17-5	Ethanol		
50-00-0	Formaldehyde		
7647-01-0	Hydrochloric Acid (HCL)		
	70% Isopropyl Alcohol[32]		
61-73-4	Methylene Blue		
	10% Neutral Buffered Formalin[33]		
108-95-2	Phenol Crystalized		
7553-56-2	Iodine Solution		
67-56-1	Methanol		

[28] The hospital was unable to provide the consultants with exact amounts as some of the products were opened and used.

[29] 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.

[30] This is typically a mixture of acetone and ethanol and does not have a CAS number as a mixture.

[31] The main compound – Crystal Violet – has the CAS number 548-62-9.

[32] This is a solution of Isopropyl Alcohol in water. Pure Isopropyl Alcohol has the CAS number 67-63-0.

[33] This is a solution typically consisting of formaldehyde, water, and typically a buffer. Formaldehyde CAS number is 50-00-0.

	Eosin Y Solution[34]		

3.1f Medical Waste

Medical wastes are produced largely by the Kosrae State Hospital and the Community Health Centers. All medical wastes are transferred, burned, and destroyed at the Kosrae State Hospital's incinerator. The incinerator is operated by the Department of Health (DOH) staff.

Image 3: *Kosrae State Hospital Medical Waste Incinerator*

3.1g Fertilizer

Fertilizers are imported into Kosrae primarily through local vendors, village-based farmer associations, and the Department of Resources and Economic Affairs (DREA). Triple 16 fertilizer is the most imported fertilizer by local shops and at DREA. Local farmers and gardeners widely use this fertilizer in the villages for vegetables and fruit gardens. It contains 16% Nitrogen, 16% Phosphorus, and 16% Potassium by weight. It was noted during the assessment that DREA is currently seeking alternatives to Triple 16 and is in the process of managing and reducing the use of commercial fertilizers (all inorganic fertilizers and pesticides used on the island) and promoting organic fertilizers that are available locally.

Fertilizers at the DREA office are stored in an old cargo container (see **Figure 4**). In the prior days, the fertilizers were hoarded in the former Agriculture building; however, due to the condition of the building, the fertilizers were damaged. With limited storage, DREA encourages citizens to use organic compost fertilizers rather than relying on inorganic fertilizers. Using imported inorganic fertilizer can cause the soil to dry out and lose mineral substances. Some of the suggested alternatives shared by DREA included compost and bat dung.

[34] T 87-1.

3.1h Pesticides

DREA utilizes an imported pesticide product called “neem oil.” The neem oil is an organic pesticide imported from Israel. It operates as a pesticide that exterminates white flies. Other than that, there is no other pesticide used within the state. As of today, the Division of Agriculture has no plan to import other inorganic pesticides to Kosrae.

The Kosrae State Hospital brings in pesticides for vector control through the CDC and WHO for training purposes and for applicators. KIRMA and DREA are now able to import them directly. These pesticides are mainly water and oil based. These items are not currently being used but are available for use in the future.

3.1i Market Review/ Inspection of Chemical Products Available Locally

As part of the consultancy, market reviews and field inspections were completed at two locations/stores: a drug store (pharmacy) and a hardware store. The inspection identified that the only drug store in Kosrae carries common over-the-counter pharmaceuticals such as Acetaminophen, Ibuprofen, Tylenol, Pepto Bismol, and others. These products are arranged methodically on shelves, with product labels in English clearly shown. The room is air-conditioned and tidy, as shown in Figure 5.

Image 5: *Over-the-counter drugs at Kosrae Drug Store*

A similar observation was recorded for the hardware store. Common household chemical and petrochemical products such as bleach, liquid laundry detergents, toilet cleaners, paints, glues, oil, and fertilizers were observed in the hardware store. These legible product labels were placed on shelves, as shown in Figure 7.

The observation was completed in one day. Although the observation occurred at only two locations, the result shows that private businesses in Kosrae generally sell common household chemical products, which are safe if used properly.

Image 6*: Household & Petrochemicals at a hardware store*

4. Legislation and Regulations

4.1 Legislation and regulations

Kosrae has enacted legislation and developed a range of resource management plans to give effect to its responsibilities in relation to the management, protection, and conservation of the environment and natural resources. Principally, Kosrae Island Resource Management Authority (KIRMA) implements these responsibilities. KIRMA is a semi-autonomous government agency mandated to:

> *"protect the environment, human health, welfare, and safety and to abate, control and prevent pollution or contamination of air, land, and water by balancing the needs of economic and social development with those of environmental quality and adopting regulations and pursuing policies which, to the maximum extent possible, ensure that economic and social development is environmentally sustainable."*
> *(Kosrae State Code, Section 19.101).*

4.1a Title 19 Kosrae State Code and Regulations Development Projects

Under Title 19 of the Kosrae State Code and the Regulations for Development Projects, KIRMA has responsibilities and powers to administer a development permit system. Development review permits are required for the following activities:

- Projects involving earthmoving activities;
- Projects located within a "coastal development risk area";
- Projects that cost over $5,000 (USD);
- Projects that are incompatible with surrounding land uses;
- Projects involving the disposal or removal of dredged materials, including all sand-mining operations;
- The use, handling, disposal of toxic or hazardous chemicals, pesticides, petroleum, oil, and lubrication; and
- Projects involving commercial harvesting of aquatic, marine, or timber resources (Regulation 3.1).

4.1b Title 19, Chapter 5, Subchapter C – POPS Act of 2009

Title 19, Chapter 5, Subchapter C of the Kosrae State code, also known as the Persistent Organic Pollutants Act of 2009, was enacted to protect the environment and the health of persons in Kosrae and with the specific purposes of:

1) Implementing the provisions of the Stockholm Convention;
2) Reducing and eventually eliminating the introduction of certain hazardous substances into Kosrae's environment and
3) Monitoring the use and discharge of certain hazardous substances currently within the jurisdiction of Kosrae

A priority list of hazardous substances banned from being possessed, sold, bought, used, applied, stored, transported, discarded, or otherwise discharged in Kosrae except as authorized by regulation is listed in subchapter C. These substances (Table 7) are listed in the table below.

Table 8: *List of Hazardous substances*

A Priority List of hazardous substances declared by KIRMA in accordance with Section 19.509 of the Kosrae State Code
1. Aldrin
2. Chlordane
3. Dichlorodiphenyltrichloroethane (DDT)
4. Dieldrin
5. Dioxins
6. Endrin
7. Furans
8. Heptachlor
9. Hexachlorobenzene (HCB)
10. Murex
11. Polychlorinated Biphenyls (PCBs)
12. Toxaphene

The POPs Regulation was promulgated in 2014 and established the effective date of 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 the transport, storage, and management of other hazardous chemicals besides POPs in the state of Kosrae.

4.1c Labeling Requirements

According to Section 19.512 of the Kosrae State Code, proper labeling is required for chemicals and hazardous substances in Kosrae. These requirements include:

1) No product containing substances identified on the priority list shall be used, distributed, received, or sold within the State of Kosrae, with or without the permit, unless it bears a label in English providing the following information:

    a. name, brand, or trademark under which the product is sold or distributed;
    b. ingredient statement containing both active and inactive or inert ingredients;
    c. directions for use and disposal which, if complied with, will adequately protect health and environment;
    d. warning or caution statements as may be required by regulations;
    e. weight or measure of active and inactive or inert ingredients.

2) It shall be a violation of this chapter to detach, alter, deface, or destroy, in whole or in part, any label unless such action is taken pursuant to the regulation issued under this chapter.
3) It shall be a violation of this chapter to possess, sell, buy, use, apply, store, transport, discard, or otherwise discharge a misbranded product.

5. Area For Improvement - Recommendations

1) Database/Information Sharing

a) A chemical Inventory System should be created and managed by the Kosrae state;

b) Inventories must be maintained for all hazardous chemicals entering Kosrae's port.

c) Chemicals should be inventoried at least annually, and inventory of excess stocks should be shared with other departments/labs to minimize waste.

d) A "Chemical & Hazardous Substance Management law" should be enacted to require chemical importers, laboratories, offices, pharmacies, industrial companies, etc., to maintain, share, and regularly update relevant environmental agency(ies) regarding the inventory of hazardous chemicals in their stocks, including pharmaceuticals, refrigerants, used oil, medical waste, and petrochemicals.

e) The inventory system should have standard operating procedures and protocols (SOPs) for handling chemicals.

2) Enforcement

a) Training and capacity development for KIRMA and other state enforcement officers to enforce state and national laws and regulations relating to chemical management, including the labeling law/requirement.

b) The national law mandating the FSMCT to carry out customs clearance of vessels and cargo inspection at sea and air freight stations should be amended to include relevant state environmental agencies and should empower the states to enforce national laws (precedence exists with maritime laws).

3) Chemical Identification

a) The "new" state law should also require the inclusion of CAS Registry Numbers in all chemical inventory lists.

4) Storage

a) Chemical Storage Guidelines should be developed and enforced.

b) All unused and outdated chemicals shall be appropriately disposed of with the government's support.

c) Storage facilities should be in place in each of FSM's states to contain chemical wastes and substances confiscated by the FSM Customs & Tax office.

d) Instructions for storing dangerous goods must be unambiguous to avoid harmful or destructive circumstances.

e) Developing local capacity to become expert chemical practitioners should be a priority of the state of Kosrae.

5) Transport

a) Chemical importers must inform relevant state and national government offices about chemical transport, usage, storage, and disposal.

b) Chemical transport procedures should be clearly defined from one container to another or from one facility to another.

6) Labeling

a) Amend the provisions on labeling requirements in the Persistent Organic Pollutants Act of 2009 to require proper labeling of all hazardous chemicals entering the port of entry.

7) Disposal/Destruction

a) FSM government should export all highly hazardous chemical wastes and confiscated chemicals out of the country for proper disposal.

b) Regulations should be developed to regulate the disposal of all other hazardous chemicals that can be appropriately disposed of in Kosrae.

c) For used oil, prepare treatment procedure for O&M of waste oil combustion facility; and - Raise awareness for and business sectors to commence waste oil treatment.

d) To have separate drainage for waste and chemicals – medical waste/ sluice

e) To autoclave – 5 for the hospital

f) Update incinerators at the hospital

g) Importers should be responsible for disposal – importers pay

8) Monitoring and evaluation of Chemical Management Practices

a) The government should develop mechanisms for stakeholder engagement to build awareness and strengthen the cooperation and compliance of stakeholders.

b) Develop an M&E plan.

c) Build the capacity of local environmental agencies to implement the M&E plan.

d) Produce periodic reports on results of M&E

e) Each agency handling chemicals and hazardous materials should create SOPs

9) Legislation POPs list amended

a) KIRMA mandate expanded to look at enforcement of other chemicals beyond POPs

b) DHS was consulted under subsection 3, 19.510, regarding the ID of substances to be included in the FSM's chemical and hazardous substances legislation. DHS should update its recommendations and work closely with the Waste Management and Pollution Control Unit at DECEM to coordinate its efforts in all areas pertaining to chemical management, legislative and policy updates, and capacity building.

c) DHS should monitor the private sector

4. Conclusion

Kosrae state has state legislation that bans the importation of certain hazardous POPs chemicals, establishes a review process to ensure the safe use of other dangerous chemicals, and imposes proper labeling requirements for such hazardous chemicals. There is still a great need for the state to build local capacity to achieve sound chemical management in Kosrae.[35] A country's priority should be Strengthening national and state capacities to effectively use, store, and dispose of chemicals and respond to chemical emergencies. Building local capacity to understand and perform simple chemical analyses is essential for achieving sound

[35] https://cwm.unitar.org/publications/publications/cw/tw/tws_5_report_final.pdf

chemical management.

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 – COM FSM Kosrae Campus

CAS Number[36]	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

[36] 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[37]	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,

[37] 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[38]			
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[39]	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,

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

[39] 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 – Kosrae Hospital Clinical 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[40]	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[41]	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[42]	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.

[40] 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.
[41] This is typically a mixture of acetone and ethanol and does not have a CAS number as a mixture.
[42] 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[43]	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[44]	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[45]	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.

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