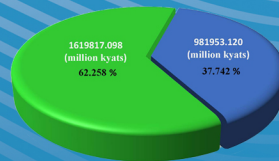


Month	Blue Group	Yellow Group
Jan	1	1
Feb	1	1
Mar	2	2
Apr	2	2
May	10	4
Jun	10	10
Jul	10	10
Aug	10	10
Sep	10	10
Oct	10	10
Nov	10	10
Dec	10	10
Total	142	99



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February, 2025

Abstract

This research paper examines the critical intersection of jade mining governance and waste dump management in the fragile region in Upper Myanmar, specifically focusing on the period from 2011 to 2020. Myanmar's gemstone sector, particularly jade from Hpakant, plays a significant role in the nation's economy generating billions annually. However, this vital industry faces significant governance, management, and regulation challenges, particularly in fragile region. While jade mining regulations have evolved over centuries, the transition to mechanized mining has led to new complexities and issues. This shift has resulted in substantial waste generation, including overburden, waste rock, tailings, processing residues, and wastewater. Improper waste disposal and the resulting increase in landslides have become a major consequence of jade mining operations. Between 2011 and 2020 alone, over 150 landslides occurred in the region, causing numerous injuries and fatalities, highlighting the need for improved management practices.

This paper analyzes the legal framework governing the jade mining industry, examining both the *de jure* (legal) and *de facto* (actual practice) aspects of mining waste dump management. It explores the evolution of jade mining regulations and their effectiveness in addressing the environmental and social impacts of the industry. This paper highlights deficiencies in the legal framework while also emphasizing the imbalance between the assigned workload and the number of the staff appointed, and the staff's lack of expertise in regulating jade mining and managing mine waste, identifying these as key findings under both *de jure* and *de facto* aspects.

The research aims to understand the challenges and opportunities for improved jade mining governance and waste dump management, to ensure that jade production contributes to sustainable economic development and the well-being of the nation rather than being perceived as a resource curse. The paper concludes with recommendations for regulatory improvements, addressing environmental concerns, and promoting the staff's capacities within the jade mining industry.

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Introduction

1. Background

(A) **The Significance of Natural Resources and Economic Development in a country:**

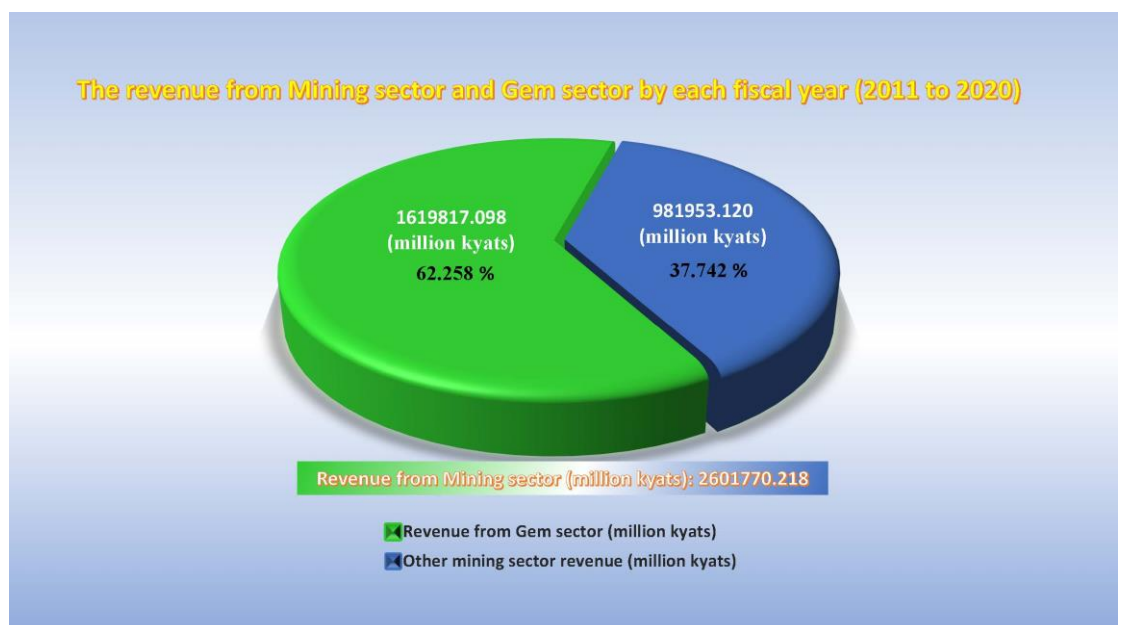
Natural resources are the backbone of a country's economy, driving its growth and prosperity. These resources, including minerals, forests, water, and fossil fuels, are crucial for keeping industries running, making money, and improving the lives of citizens. When we use them wisely, we can boost the economy, but if we don't, we can face conflicts, damage the environment, and slow things down. Countries rely on natural resources for a lot of money. In developing countries, these resources are often the starting point for building industries, creating jobs, and advancing technology in areas like manufacturing and construction. But natural resources are not just about money. They also provide essential services to our environment. Forests help regulate the climate and water cycles, while healthy soil and clean water are important for farming and making sure we have enough food. When we take care of our natural resources, we attract investment and tourism, which can make our country even stronger. But if we don't manage them well, we can end up with corruption, inequality, and conflicts. This is what's called the "**resource curse**." In conclusion, natural resources are essential for economic development and the well-being of our country. When we take care of them, we can build a stable economy and ensure a sustainable future.

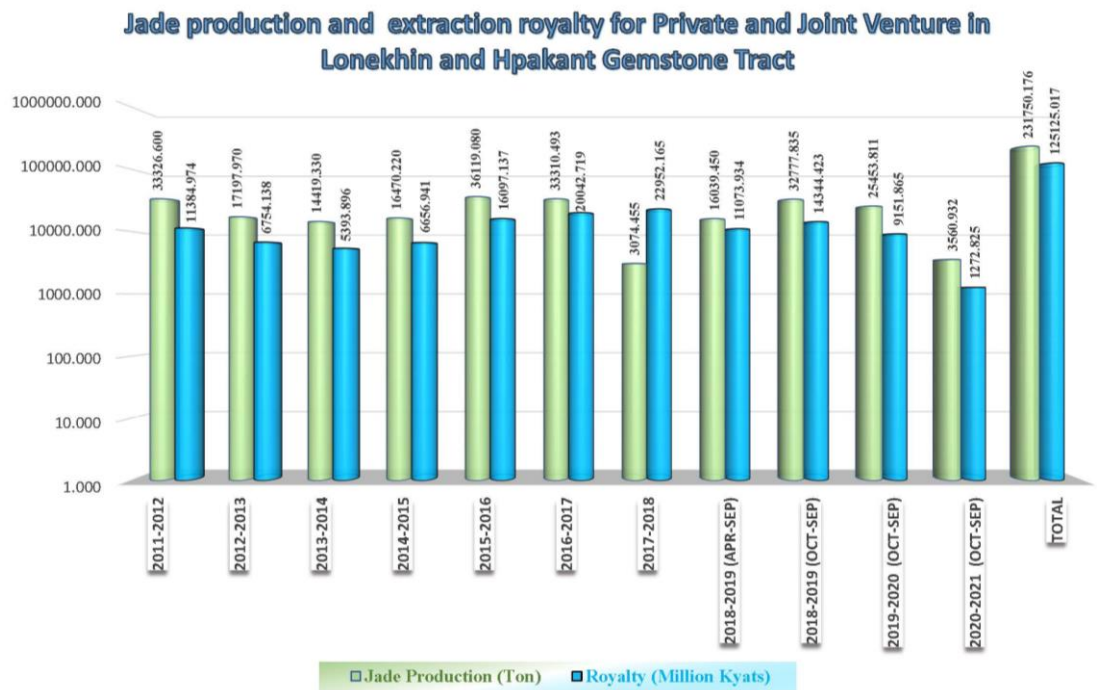
(B) **Vital role of rich gemstones in Myanmar:** Myanmar's gemstones, including jade, rubies, and sapphires, hold immense significance to the nation. Beyond their aesthetic value, these precious stones are integral to Myanmar's economic fabric, cultural heritage, and global reputation. The allure of Myanmar's imperial jades from Kachin State and its renowned "**pigeon-blood**" rubies from Mogok has garnered global acclaim. These gemstones not only instill pride in the nation but

also generate substantial revenue and employment opportunities. Notably, the gemstone industry stands as a substantial contributor to Myanmar's economic growth, with jade alone accounting for billions of dollars in annual revenue. China, a global jade enthusiast, is a major importer of Myanmar's gemstones. Myanmar's official gem emporiums showcase a diverse range of precious stones, while informal trading also exists, albeit often in violation of legal regulations. The gemstone industry has fostered employment across various sectors, from miners in the jade-rich Hpakant region to craftsmen and traders in Mandalay. This industry provides diverse livelihood options, particularly for individuals residing in remote areas. Throughout history, rubies and jade have been revered for their symbolic significance, embodying wealth, power, and protection. Myanmar's gemstones have garnered global recognition, further enhancing the nation's reputation for producing rare and extraordinary stones. However, the gemstone industry faces challenges that necessitate the implementation of improved regulations, environmental protection measures, and fair treatment practices. By addressing these challenges, Myanmar can harness the potential of its gemstones to stimulate economic growth and preserve the environment for future generations.

- (C) **Jade plays a proud role in economic significance for local communities and governments in Myanmar:** Myanmar Jade holds significant economic importance for Myanmar, providing substantial benefits to both the local population and the government. Myanmar is renowned for producing high-quality jadeite, particularly from the Hpakant region in Kachin State. The jade industry in Myanmar generates substantial revenue and constitutes a substantial portion of the country's economy. From 2011 to 2016, the revenue generated from the gem sector accounted for approximately 70% of the revenue generated from the mining sector. For the local community, jade mining serves as a viable means of livelihood. Small-scale miners, collectively known as "**Yaymasay**," engage in

cooperative activities and engage in trade of jade. Their endeavors often support entire families. While the jade industry provides employment opportunities, many workers face hazardous conditions. This underscores the imperative for the government to ensure that regulations are fair and safe for all stakeholders. For the government, jade represents a substantial source of revenue. The Myanmar Gems Enterprise (MGE) derives income from taxes, royalties, and fees. This revenue is utilized to construct essential infrastructure such as roads, hospitals, and schools. However, Myanmar possesses untapped potential in the jade industry if the government addresses issues such as corruption and illegal trade. Smuggling and unregulated operations divert funds from the government and hinder transparency in the industry. Given the global demand for jade, particularly in China, Myanmar has established itself as a prominent player in the jade market. This position facilitates increased revenue generation and fosters improved diplomatic relations with other nations. To maximize the benefits of jade, Myanmar must ensure that the government operates with fairness and that all stakeholders derive equitable advantages from the industry. By rectifying problems such as inadequate regulations and environmental degradation, the government can create a more inclusive and prosperous jade industry that benefits everyone involved.





- (D) **Overview of the Jade mining industry and Jade rich regions in Northern Myanmar:** Myanmar is famous for its jadeite, especially the imperial jades. The jade mining industry, mostly in northern Myanmar's Kachin State, is super important to the country's economy and culture. Hpakant and LoneKhin are two of the richest jade areas, where they dig up jade and show how the economy, government, and environment are all connected. Hpakant, often called the "**jade capital of the world,**" is the centre of Myanmar's jade mining. They make really good jadeite, especially the super rare and valuable "**imperial jade.**" It's clear and green, and it's worth a lot of money. Hpakant supports a huge jade industry that makes billions of dollars each year. They mostly mine jade in open pits and use machines, which gives them a lot of jade each year. Then, they sort and grade the jade based on how good it is, how clear it is, and how green it is. High-quality jade sells for a lot, but lower-quality jade is still used to make jewellery and other things. However jade mining in northern Myanmar has caused a lot of problems. Big mining operations have cut down a lot of trees, made the soil erode, and polluted the water, which is bad for the environment. There are also social problems, like poor working conditions, people being forced to leave their homes, and fights between the Kachin Independence Army (KIA) and the Myanmar Army over who gets to control the jade."

- (E) **Geographical, ecological, and social significances and Characteristics of Fragile Upper Region:** The upper region of Myanmar, particularly Kachin State, is a region of significant geographical, ecological, and social importance. Its rugged terrain, abundant natural resources, and diverse ecosystems create both opportunities and challenges. This region's natural wealth and strategic location position it as a potential catalyst for economic and cultural development. However, the fragility of its ecosystems and the socio-political challenges faced by its communities underscore the imperative for sustainable governance and inclusive development strategies to safeguard this invaluable region for future generations.
- (1) **Geographical Characteristics and Significance:** The upper region is characterized by mountainous landscapes and globally renowned jade-bearing deposits. Its remote and often inaccessible terrain has contributed to its isolation, presenting challenges for development efforts while preserving its natural beauty. Its proximity to China has established it as a pivotal trade corridor, particularly for the export of jade and other resources. However, this geographical positioning has also made it a focal point for geopolitical and economic competition, further complicating governance.
 - (2) **Ecological Importance:** The region's ecosystems provide essential services, including climate regulation, water purification, and soil fertility, benefiting both local and downstream communities. However, these ecosystems are under threat from deforestation, mining, and other extractive activities that degrade the environment and disrupt ecological balance. The vulnerability of the upper region to landslides, erosion, and water contamination due to these activities underscores the fragility of its natural systems.

- (3) **Social Characteristics and Challenges:** The upper region is home to a diverse array of ethnic groups, notably the Kachin people, who have a profound cultural connection to the land and its resources. However, the area grapples with poverty, limited access to education and healthcare, and ongoing conflict between the Kachin Independence Army (KIA) and the Myanmar Army. This conflict, fueled in part by competition over natural resources such as jade, has resulted in displacement, loss of livelihoods, and weakened social cohesion.

2. Problem Statement

- (A) **Unique challenges posed by high-altitude Environmental and Social effects caused by Jade mining activities:** Jade mining in Myanmar, particularly in the resource-rich Hpakant region of Kachin State, is a crucial economic activity. However, it encounters substantial governance, management, and regulatory challenges. These challenges stem from inadequate institutional structures, corruption, environmental degradation, and socioeconomic disparities, rendering it challenging to strike a balance between economic gains and sustainable development. The governance, management, and regulation of jade mining in Myanmar are beset by a myriad of interconnected challenges. Transparency gaps, corruption, and conflicts undermine governance, while inefficient extraction practices and environmental mismanagement hinder sustainable resource utilization. Regulatory frameworks remain fragmented and poorly enforced. Addressing these challenges necessitates comprehensive and inclusive strategies, encompassing robust legal frameworks. By addressing these issues, Myanmar can transform its jade industry into a catalyst for sustainable development and national unity, benefiting all stakeholders while safeguarding its natural wealth for future generations.

(B) **Governance Challenges:**

- (1) **Lack of Transparency:** The jade mining sector in Myanmar faces a persistent lack of transparency. Contracts, revenue flows, and production data are frequently withheld from public view. Despite Myanmar's participation in the Extractive Industries Transparency Initiative (EITI), only a limited number of mining companies disclose their payments and activities, resulting in substantial gaps in accountability. This lack of transparency erodes public trust and hinders equitable distribution of the sector's wealth.
- (2) **Conflict and Political Instability:** The jade-rich regions of Kachin State are sites of ongoing conflict between the Myanmar Army and the Kachin Independence Army (KIA), both of whom vie for control over jade resources. This competition exacerbates violence and instability in the region, complicating governance efforts. Furthermore, the absence of a well-defined and enforceable framework for resource sharing between ethnic groups and the central government perpetuates grievances and contributes to unrest.

- (C) **Management Challenges: Inefficient Resource Extraction Techniques:** Jade mining in Myanmar is characterized by inefficient extraction techniques that prioritize short-term profits over long-term sustainability. Large-scale mechanized mining often depletes deposits rapidly, leaving substantial quantities of lower-grade jade untapped and wasted.

(D) **Regulatory Challenges:**

- (1) **Inadequate Legal Frameworks:** The Myanmar Gemstone Law fails to address the intricate complexities of jade mining. The responsibilities and accountability for all relevant governmental organizations are overly burdensome and poorly defined.

- (2) **Ineffective Enforcement:** Regulatory bodies responsible for overseeing jade mining are severely constrained by limited resources, technical expertise, and institutional weaknesses. These deficiencies result in inadequate monitoring of mining activities, enabling violations such as illegal mining, underreporting of production, and environmental degradation to persist.
- (3) **Absence of Stakeholder Inclusion:** Local communities and artisanal miners, who are disproportionately affected by jade mining, are frequently excluded from regulatory decision-making processes. Formalizing artisanal miners and involving community representatives in policy discussions can bridge this gap and enhance regulatory outcomes.
- (4) **Increased Risks of Landslides:** The steep and unstable slopes of high-altitude areas make them prone to landslides. Jade mining operations exacerbate this risk by destabilizing the terrain through excavation and the accumulation of overburden and waste rock. Landslides pose a significant threat to miners and nearby villages.

(E) **Social Challenges in High-Altitude Regions**

- (1) **Health risks for workers and residents:** Mining operations in high-altitude regions pose significant health risks to both workers and nearby residents. These risks encompass respiratory problems, exposure to toxic chemicals, and psychological stress.
- (2) **Increased crime, drug addiction:** The economic potential of jade mining attracts a large, transient population of miners, traders, and opportunists. This influx often leads to social instability, including increased crime, drug addiction, and exploitation, creating an environment of insecurity for residents.

Objectives

3. This study aims to **assess the effectiveness of governance frameworks** in regulating jade mining operations, **examine the socio-economic impacts** of poor waste dump management and **propose policy recommendations and practical strategies** to improve governance and promote sustainable waste management in the jade mining sector.

Scope and Methodology

4. **Scoping:** The research paper titled “**Jade Mining Governance and Waste Dump Management in Fragile Regions of Upper Myanmar**” is focused on understanding the governance frameworks and waste dump management practices in the jade mining industry, particularly in the Upper Myanmar region from 2011 to 2020.

5. **Methodology:** The research uses a qualitative approach to analyze governance frameworks, social impacts, and socio-political dynamics in jade mining regions. It aims to provide a comprehensive understanding of the issues and identify actionable solutions.

Governance of Jade Mining (Discussion)

6. **Principles of Sustainable Governance in the Natural Resources and Mining Industry:** Sustainable governance in the natural resources and mining industry is super important for finding a balance between economic growth, environmental protection, and social well-being. Sustainable governance in this sector is based on transparency, inclusivity, environmental responsibility, social fairness, and long-term planning. By putting these principles into action, countries can use their resources wisely while also protecting the environment and making sure everyone benefits. Following basic governance principles makes sure that the benefits of resource extraction are shared fairly so ecosystems and communities don't suffer. Here are the key principles for sustainable governance in this sector:

- (A) **Transparency and Accountability:** Transparency in the mining industry entails the open disclosure of contracts, revenues, and operational data, thereby enabling stakeholders to access information regarding the management of resources. Accountability mechanisms, such as independent audits, public reporting, and anti-corruption measures, hold governments, companies, and regulatory bodies

accountable for their actions. Initiatives like the Extractive Industries Transparency Initiative (EITI) play a pivotal role in promoting transparency and accountability globally.

- (B) **Inclusive Governance and Stakeholder Engagement:** Sustainable governance necessitates the inclusive participation of all stakeholders, encompassing governments, local communities, civil society organizations, and mining companies. Engaging indigenous populations and marginalized groups in decision-making processes ensures the recognition and protection of their rights and interests. Mechanisms such as community consultations and grievance redress systems foster trust and mitigate conflicts among stakeholders.
- (C) **Environmental Stewardship:** Governance frameworks must prioritize environmental protection by enforcing stringent regulations on waste management, pollution control, and land restoration. Environmental impact assessments (EIAs) and monitoring programs should be mandatory to minimize ecological damage. Sustainable practices, such as rehabilitating mined lands and promoting biodiversity conservation, are essential for mitigating long-term environmental risks.
- (D) **Social and Economic Equity:** Natural resource governance must address the equitable distribution of benefits derived from mining activities. This entails allocating revenues to support local development projects, such as infrastructure, healthcare, and education, particularly in regions affected by mining. Additionally, ensuring fair labor practices and providing compensation for displaced communities are essential components of achieving social equity.

7. **Legal framework, national law, International Agreements and Guidelines:** They promote ethical practices, environmental sustainability, and equitable benefit-sharing. These frameworks prevent the exploitation of resources, corruption, and conflict while encouraging responsible practices. They regulate the sector, enhance transparency, and address social and environmental impacts. Modern governance emphasizes community rights and participation.

legal frameworks regulate licensing, taxation, environmental compliance, and labour practices. Myanmar's Gemstone Law governs jade and gemstone mining and outlines licensing processes and taxation.

- (A) **Law and Regulations:** Myanmar Gemstone Law: The Myanmar Gemstone Law, first enacted in 1995 and later amended in 2003, 2016, and 2019, serves as the primary legal framework for the gemstone sector. It outlines rules for licensing, taxation, and operations in jade mining. However, the law is widely regarded as insufficient to address the sector's governance challenges. Key issues include Limited Environmental and social Protection and Labor Protections.
- (B) **International Agreements and Guidelines:** Extractive Industries Transparency Initiative (EITI): Promotes transparency in the mining sector, including gemstones. It requires member countries to disclose revenues, licensing processes, and beneficial ownership.

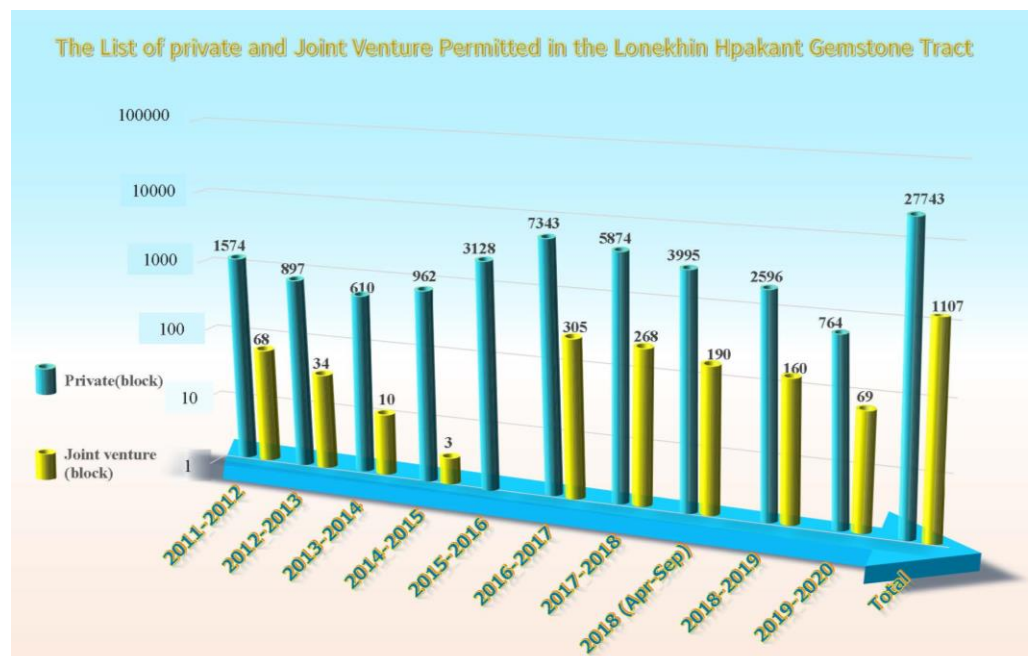
8. **Challenges for Governance in Myanmar Jade Mining:** Myanmar's jade mining industry is fraught with governance challenges. These challenges stem from a combination of political conflict, weak enforcement of regulations

- (A) **Conflicts between the Myanmar Army and the Kachin Independence Army (KIA):** The ongoing conflict between the Myanmar Army (Tatmadaw) and the Kachin Independence Army (KIA) over control of jade-rich territories poses a significant impediment to effective governance in the jade mining sector. Jade mining revenues serve as a substantial source of funding for both parties involved in the conflict. The KIA imposes unofficial taxes and exercises control over certain mining operations within its influence, utilizing these funds to finance its struggle for enhanced autonomy and rights for the Kachin people. Conversely, the Tatmadaw collaborates with military-linked companies and private firms to dominate the formal jade trade, establishing parallel governance structures that compete for control. This ongoing power struggle destabilises the region, rendering it virtually impossible to implement a unified governance framework.

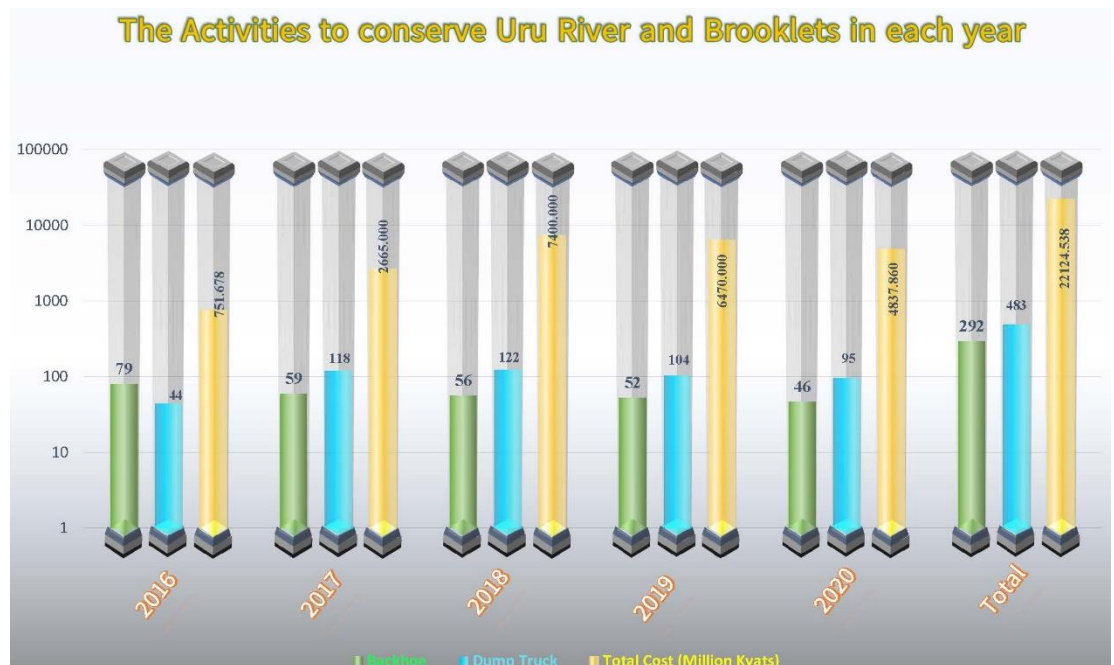
Corruption and illicit practices flourish in this environment, with substantial quantities of jade being smuggled out of Myanmar, depriving the government and local communities of valuable revenue. Furthermore, the militarization of jade mining sites exacerbates insecurity, displacing local populations and fostering lawlessness in mining regions. In areas controlled by the Tatmadaw, licensing processes are frequently opaque, favouring influential elites and companies with military connections. In KIA-controlled zones, informal systems of taxation and trade circumvent the official regulatory framework, further fragmenting governance efforts.

(B) **Weak Enforcement of Laws:** Despite the existence of legal frameworks such as the Myanmar Gemstone Law, enforcement of mining regulations remains weak, undermining governance efforts.

(1) **Lack of Institutional Capacity:** Regulatory bodies, such as the Myanmar Gems Enterprise (MGE), lack the resources, technical expertise, and assigned a small number of staff to monitor mining activities effectively. Many mining companies operate over 7000 jade blocks (permitted in 2016) with minimal oversight, often ignoring environmental and labor standards.



- (2) **Environmental Non-Compliance:** Many mining operations disregard mandatory Environmental Impact Assessments (EIAs) and fail to implement waste management practices. This negligence leads to widespread deforestation, water contamination, and hazardous waste dumps, which remain unaddressed due to lax enforcement.
- (3) **Loss of Livelihoods:** Traditional livelihoods such as farming and fishing are disrupted by large-scale mining operations, which degrade the environment and monopolize local resources. Many displaced individuals are forced to engage in informal mining under dangerous conditions, earning minimal income while being exposed to health and safety risks.
- (c) **Addressing Governance Challenges:** The governance of jade mining in Myanmar faces significant challenges due to conflict, weak law enforcement, and the marginalization of local communities. The legal framework governing jade mining in Myanmar has evolved over centuries. Starting from the monarchical era to colonial regulations and modern laws, significant changes have shaped mining practices. The first regulation was issued in 1940. Called it 1940 jade mining regulation. First Myanmar Gems Law was able to be enacted in 1995. First amendment of it 2002 and Second is in 2016. New Myanmar Gems Law was issued in 2019. Since the 1995 law enacted. Jade mining technique from traditional mining to mechanized mining. Traditional jade mining employed labor-intensive methods with minimal environmental impact. However, mechanized mining, utilizing heavy machinery, has resulted in extensive waste generation. But the strange thing is any provisions regarding how to dump mine waste in all of laws already issued. Addressing these challenges requires a coordinated effort to foster peace, strengthen institutions, and prioritize the needs of affected communities, ensuring that the jade industry contributes to sustainable development and national unity. To overcome these challenges, Myanmar's jade mining sector requires comprehensive governance reforms:



- (1) **Conflict Resolution:** Establishing resource-sharing agreements between the central government and ethnic groups, including the KIA, is essential for reducing conflict and creating a unified regulatory framework.
- (2) **Strengthening Enforcement:** Building institutional capacity, increasing transparency, and implementing stringent anti-corruption measures can improve compliance with laws and regulations.
- (3) **Community Involvement:** Empowering local communities through consultation, equitable revenue-sharing mechanisms, and formal recognition of artisanal mining activities can promote inclusivity and reduce tensions.

Waste Dump Management (Discussion)

9. **Environmental and Social impacts of Mining:** Gemstone mining significantly impacts the environment, both immediately and long-term. Understanding these impacts is crucial for developing sustainable mining practices that minimize environmental damage.

- (A) **Environmental impacts of Mining:** Gemstone mining causes direct environmental damage, including habitat destruction, soil erosion, water pollution, and waste generation. These impacts disrupt ecosystems, threaten biodiversity, and pose risks to human health and the environment. And it causes indirect environmental

damage, deforestation, land degradation, and water pollution, leading to climate change and disrupting ecosystem services. These impacts, including the spread of invasive species and long-term environmental degradation, pose significant risks to both wildlife and human communities.

- (B) **Social impacts of Mining:** Jade mining, particularly in Myanmar's Hpakant area, significantly impacts local communities, both directly and indirectly. While it provides employment opportunities, these often come with poor wages, unsafe working conditions, and health risks. The mining industry's profits are concentrated among elites, leading to socio-economic inequality, exploitation, and the breakdown of traditional social structures.

10. **Mining Waste Generate and Factors contributing to waste generation in jade mining:**

Jade mining generates various waste, including overburden, waste rock, tailings, processing waste, wastewater, and residual waste. Sustainable waste management practices can reduce environmental impact and ensure efficient resource use.

11. **Factors Contributing to Waste Generation in Jade Mining:** Several factors influence the volume and nature of waste generated in jade mining, including:

- (A) **Mining Method:** The chosen mining approach, such as open-pit, underground, or alluvial mining, affects waste production.
- (B) **Geological Conditions:** Variations in host rock composition and the distribution of jade deposits can lead to increased waste, particularly when jade is mixed with low-grade or barren rock.
- (C) **Equipment and Infrastructure:** Heavy machinery and infrastructure used in mining operations can generate waste through maintenance, wear-and-tear, and eventual decommissioning.
- (D) **Regulatory Requirements:** Compliance with environmental standards and waste management regulations may affect how waste is generated, handled, and disposed of, influencing the overall waste profile.

12. **What is waste dump management?** : Waste dump management refers to the process of handling, organizing, and managing the disposal of waste materials in a manner that minimizes environmental impact, ensures public health and safety, and complies with regulations. Effective waste dump management reduces the negative environmental impact of waste, conserves resources, and promotes sustainable living practices.

13. **Waste dump management strategies:** It requires a strategic approach to ensure environmental protection, safety, and regulatory compliance. Here's a step-by-step guide:

(A) **Assessment and Planning:**

- (1) **Site Analysis:** Conduct geological and environmental surveys to identify suitable locations for waste dumps, considering factors like topography, drainage patterns, and proximity to water bodies or communities.
- (2) **Waste Characterization:** Analyze the types of waste generated (e.g., overburden, tailings, and waste rock) to understand their physical and chemical properties, including potential environmental risks like acid rock drainage (ARD).

(B) **Design of Waste Dump:**

- (1) **Location Selection:** Choose a site with minimal environmental and social impact. Avoid areas prone to landslides, flooding, or ecological sensitivity.
- (2) **Engineering Design:** Create a stable and sustainable waste dump structure with proper slope gradients, terraces, and drainage systems to prevent erosion and collapse.
- (3) **Capacity Planning:** Estimate the volume of waste to ensure the dump site can handle the projected quantity throughout the mining operation.

(C) **Implementation:**

- (1) **Waste Segregation:** Separate potentially hazardous materials from inert waste for specialized handling.
- (2) **Dump Construction:** Begin with compacted layers of waste to ensure stability. Use geotextiles or liners if necessary to prevent leachate contamination.

- (3) **Drainage Systems:** Install channels, silt traps, and retention ponds to manage surface runoff and prevent water pollution.

(D) **Monitoring and Maintenance:**

- (1) **Regular Inspections:** Conduct routine checks for structural integrity, erosion, and water quality near the dump site.
- (2) **Environmental Monitoring:** Track the impact on soil, water, and air quality to ensure compliance with environmental standards.
- (3) **Rehabilitation Plans:** Develop a closure and reclamation strategy for when the dump reaches its capacity, including recontouring, replanting, and transforming the site into a usable landscape.

(E) **Regulatory Compliance:**

- (1) **Permits and Approvals:** Obtain necessary permissions from local authorities and ensure the plan aligns with mining and environmental regulations.
- (2) **Community Engagement:** Involve local communities in decision-making processes and address their concerns to foster trust and cooperation.

14. **Landslides:** Landslides occur several times a year around Hpakant's jade mines. In July 2020, at least 162 people died in a landslide in the same area, and 113 were killed in a November 2015 one. Most victims are independent miners who settle near mounds of discarded earth excavated by heavy machinery used by mining companies. Landslides at mining waste dumps occur due to a combination of geological, environmental, and operational factors. Waste dumps, composed of overburden, tailings, and other mining byproducts, are inherently unstable, and poor management exacerbates the risks. Below are the primary reasons for landslides in mining waste dumps:

(A) **Geological Factors:**

- (1) **Unstable Terrain:** Mining waste dumps are often located on sloped or uneven terrain, which reduces their stability.

- (2) **Weak Foundation Materials:** The ground beneath the waste dumps may be composed of loose soil, clay, or fractured rock, which is unable to support the heavy loads.
- (3) **Seismic Activity:** In regions prone to earthquakes, vibrations can destabilize waste dumps and trigger landslides.

(B) **Design and Construction Deficiencies:**

- (1) **Improper Dumping Practices:** Waste material is often deposited haphazardly without compaction, leading to weak and unstable structures.
- (2) **Excessive Height and Overloading:** Building excessively tall dumps without engineering controls increases the risk of collapse.
- (3) **Poor Drainage Systems:** The lack of proper drainage allows water to accumulate within the waste pile, reducing shear strength and increasing instability.

(C) **Environmental Factors:**

- (1) **Heavy Rainfall:** Rainwater infiltrates the waste dump, saturating the materials and reducing their cohesion, leading to slope failure.
- (2) **Weathering and Erosion:** Exposure to weather elements weakens the structural integrity of the waste pile over time, increasing susceptibility to landslides.

15. **Effective management of mining waste dumps:** It is crucial to prevent landslides. This comprehensive approach integrates engineering excellence, environmental stewardship, effective governance, and community participation. Effective mine waste management is not only a technical necessity but also an ethical responsibility. Based on past experiences, it is essential to develop and implement best strategies.

- (A) **Site Analysis:** which is the foundation of effective waste management. Site analysis must be conducted by selecting a suitable dumping site and conducting thorough geological and environmental surveys. Based on what has been done

on the ground, companies choose locations close to their operations by cost-benefit when applying for waste dump sites under the first amended law. When conducting on-site inspections of applications, they primarily check the accuracy of land ownership. Indeed, The priority should be to choose a location with minimal environmental and social impact, avoiding areas prone to landslides, flooding, or ecological sensitivity.

- (B) **Engineering Design:** Next is the Engineering Design of the dump site. A stable structure must be developed, with appropriate slope gradients, terraces, and drainage systems to ensure durability and safety. Capacity planning is also critical at this stage, as it helps estimate the volume of waste that the site can hold, avoiding overloading and structural failures. Also, when approving companies' applications, methods for disposing and accumulating mine waste, drainage systems, the volume of waste that could be accumulated, and the forms of action to be taken to prevent landslides were not specified.
- (C) **Implementation:** According to waste dump management theory, topsoil must be removed separately. When accumulating soil from jade mining, it should be compacted layer by layer with machinery to prevent water infiltration and ensure compactness. The top layer should be covered with the separately removed topsoil, and trees should be replanted. Retaining walls should be built. It is understood that landslides occur because of water infiltration.¹ In actual practice, they do not prevent water infiltration, nor do they ensure compactness. Because the topsoil is not removed separately, replanting trees on the waste soil piles is unsuccessful and does not thrive.
- (D) **Monitoring and Maintenance:** Regular inspections should be conducted to ensure the structural integrity of the dump, monitor erosion, and assess water quality in the surrounding area. But the number of staff assigned is not good enough to monitor. The ratio of the number of staff and permitted blocks is 1: 500. Permit-holding companies prioritize cost-effectiveness over responsibility in maintaining waste dump.

Key Findings

16. De jure and de facto waste dump management Aspects

(A) De jure Aspects:

- (1) De jure waste dump management outlines the legal framework, while de facto waste dump management reflects the actual practices on the ground. Effective waste management requires a strong de jure system with robust enforcement to ensure that de facto practices align with environmental regulations and protect public health.
- (2) De jure Waste Dump Management refers to Legal Framework which means the official, legal laws, rules and regulations governing Permits and licenses, Land use zoning, waste disposal and landfill.

(B) De Facto Aspects: De facto Waste Dump Management refers to actual practice for how waste disposal actually happens on the ground, regardless of the legal framework.

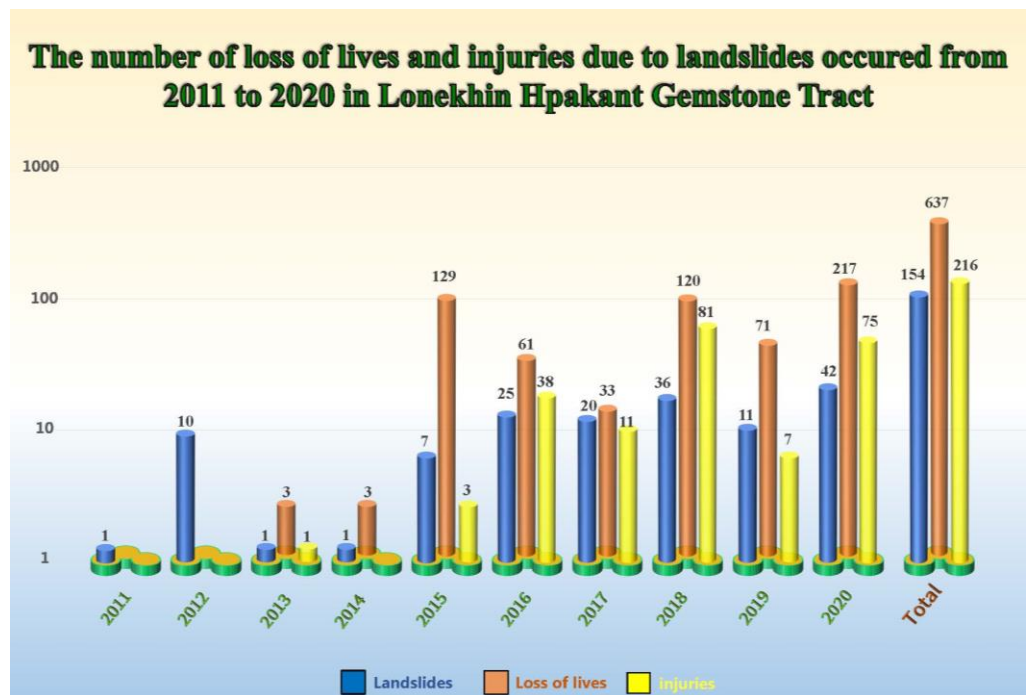
(C) De jure and de facto waste dump management:

- (1) **De jure waste dump management:** The governance of jade mining and waste dump management in Myanmar's Hpakant region presents a complex interplay between official regulations (de jure) and on-the-ground practices (de facto). While formal laws exist to regulate mining activities, the actual implementation often diverges significantly, leading to environmental degradation and human rights concerns. Addressing these challenges requires a concerted effort to bridge the gap between de jure regulations and de facto practices. Strengthening regulatory frameworks, ensuring their enforcement, and promoting transparency in the jade mining sector are crucial steps toward sustainable development and the protection of human rights in Myanmar's Hpakant region. De Jure

Waste Dump Management: Myanmar has established legal frameworks intended to oversee mining operations and manage waste effectively. These regulations are designed to ensure environmental protection and the safety of local communities. For instance, the Myanmar Mines Law outlines provisions for responsible mining practices, including waste management protocols. However, the enforcement of these laws is often weak, and oversight mechanisms are limited. Reports indicate that the government's failure to regulate jade mining companies adequately has contributed to fatal incidents, such as the collapse of tailings dams in Hpakant. Addressing these challenges requires a concerted effort to bridge the gap between de jure regulations and de facto practices. Strengthening regulatory frameworks, ensuring their enforcement, and promoting transparency in the jade mining sector are crucial steps toward sustainable development and the protection of human rights in Myanmar's Hpakant region.

- (2) **De Facto Waste Dump Management;** In practice, the management of mining waste in Hpakant often deviates from official regulations. Mining companies frequently engage in illicit large-scale operations without adhering to environmental safeguards. The accumulation of mining debris and waste has led to numerous landslides, resulting in significant loss of life and property. For example, a landslide in January 2025 caused by the collapse of a waste pond buried approximately 50 houses, leading to at least a dozen fatalities. After the 2015 landslide that killed more than 100 people, the head office designated 12 sites for dumping mine waste. Directives were issued to companies to dump mine waste at designated

waste sites, to inspect waste sites, and to maintain waste sites to prevent landslides. But Monitoring was not sustainably maintained by the staff.



17. Myanmar's mining laws lack enforcement, allowing companies to operate with minimal accountability and exacerbating environmental and safety issues. Improper waste dump management leads to deadly landslides, while the lucrative jade industry fuels conflicts and exploitation. Human rights abuses, including unsafe working conditions and adverse impacts on communities, result from ineffective governance. Waste management exacerbates these issues, causing loss of life and livelihoods.

Recommendations

18. To achieve a more sustainable and responsible jade mining industry, several key reforms must be implemented. The following recommendations are proposed:

- (A) **Policy reforms:** There are essential to ensure stricter enforcement of regulations. Existing laws must be strengthened to include clear provisions for waste disposal, environmental protection, and corporate responsibility. Regulatory bodies must have the authority and resources to enforce these policies effectively, ensuring that mining operations adhere to environmental and social standards.

- (B) **Investment in staff training:** It is another crucial step. Many governance challenges in the jade mining sector stem from a lack of expertise in waste management and regulatory oversight. Providing specialized training programs for government officials, inspectors, and mining company personnel will enhance their ability to implement and monitor sustainable practices. This will ensure that waste dump management follows best practices, reducing the risks of environmental degradation and landslides.
- (C) **Developing sustainable waste dump management systems:** Additionally, these systems should be a priority. This includes requiring mining companies to conduct proper site analysis, implement engineering designs that ensure waste stability, and rehabilitate mining sites after operations cease. Government agencies must work closely with the private sector to enforce these standards and provide technical guidance on sustainable waste disposal methods.
- (D) **Improved monitoring systems:** That must also be established to track compliance and detect violations early. Regular inspections, remote sensing technology, and third-party audits should be utilized to ensure mining companies are following regulations. Transparency measures, such as publicly available environmental impact reports, will also help hold companies accountable for their actions.
- (E) **Balancing economic growth with environmental responsibility:** That is critical for the long-term success of the jade industry. While jade mining contributes significantly to Myanmar's economy, failure to manage its negative impacts can lead to long-term environmental destruction and social unrest, reinforcing the resource curse. By promoting responsible mining practices, ensuring strict enforcement of waste management regulations, and fostering industry-wide accountability, Myanmar can transform its jade sector into a model of sustainable resource management.

Conclusion

19. This study highlights significant weaknesses in the governance of Myanmar's jade mining sector, particularly in waste management. Key challenges include staff shortages, excessive workloads, and a lack of expertise among regulatory authorities, all of which contribute to ineffective oversight and enforcement. Without proper governance structures, mining operations continue to generate vast amounts of waste, leading to environmental degradation, frequent landslides, and social instability.

- (A) **Strengthening regulations:** To address these issues, strengthening regulations is essential. Existing laws and policies must be revised to include clear guidelines for waste disposal, rehabilitation plans, and corporate accountability. A well-defined legal framework will provide the foundation for improved governance, ensuring that mining activities align with environmental and social responsibilities.
- (B) **Enhancing capacity building:** It is another critical step. Government agencies must invest in training programs to equip regulatory staff with the necessary skills to oversee mining operations effectively. This includes educating personnel on best practices for sustainable waste management, site inspections, and risk mitigation strategies. By building a knowledgeable workforce, authorities will be better prepared to enforce mining regulations and hold companies accountable for their environmental impact.
- (C) **Effective monitoring and enforcement mechanisms:** Additionally, they must be established. Regular site inspections, advanced tracking technologies, and third-party audits will help detect violations and ensure compliance with waste management policies. Transparent reporting and public accountability will further strengthen governance by discouraging illegal dumping and irresponsible mining practices.

20. In conclusion, improving governance in the jade mining sector requires a multi-faceted approach that includes regulatory reforms, capacity building, and enhanced monitoring systems. By addressing these fundamental weaknesses, Myanmar can develop a more responsible and sustainable jade industry that supports economic growth while safeguarding the environment and the well-being of local communities.

References

1. Myanmar Extractive Industries Transparency Initiative (MEITI) reports,
2. Governing the gemstone sector: considerations for Myanmar by Paul Shortell (2017),
3. Outcomes of Workshops for the Development of the Myanmar Gemstones Policy,
4. Facts and figures from Myanma Gems Enterprise,
5. Internet Sources,
6. Annexes

Annexes

The revenue from mining sector and Gem sector by each fiscal year

Sr.	fiscal Year	Revenue From Mining Sector (Million Kyats)	Revenue From Gem sector (Million Kyats)	Percentage of Mining Sector Revenue (%)	Remark
1	2011-2012	86860.692	64260.928	73.982	
2	2012-2013	284364.18	221126.731	77.761	
3	2013-2014	366259.288	304501.981	83.138	
4	2014-2015	373372.751	258195.631	69.152	
5	2015-2016	319434.657	206640.441	64.975	
6	2016-2017	219145.643	123011.366	56.132	
7	2017-2018	232928.000	176257.173	75.670	
8	2018 (Apr to Sep)	106717.451	56570.013	53.009	
9	2018-2019	275530.051	94828.026	34.417	
10	2019-2020	337157.505	111593.588	33.098	
	Total	2601770.218	1619817.098	62.258	

**Jade productoin and extraction royalty for Private and Joint Venture
in Lonekhin Hpakant Gemstone Tract**

Sr.	Year	Jade Production (Ton)	Royalty (Million Kyats)
1	2011-2012	33326.600	11384.974
2	2012-2013	17197.970	6754.138
3	2013-2014	14419.330	5393.896
4	2014-2015	16470.220	6656.941
5	2015-2016	36119.080	16097.137
6	2016-2017	33310.493	20042.719
7	2017-2018	30724.455	22952.165
8	2018 (Apr to Sep)	16039.450	11073.934
9	2018-2019 (Oct to Sep)	32777.835	14344.423
10	2019-2020 (Oct to Sep)	25453.811	9151.865
11	2020-2021 (Oct to Sep)	3560.932	1272.825

**The List of Private and Joint Venture permitted
in Lonekhin Hpakant Gemstone tract**

Sr.	Year	Private (Block)	Joint Venture (Block)	Remark
1	2011-2012	1574	68	
2	2012-2013	897	34	
3	2013-2014	610	10	
4	2014-2015	962	3	
5	2015-2016	3128	-	
6	2016-2017	7343	305	
7	2017-2018	5874	268	
8	2018 (Apr to Sep)	3995	190	
9	2018-2019	2596	160	
10	2019-2020	764	69	

The activities to conserve Uyu River and Brooklets in each year

Sr.	Year	Machine Used		Total Cost (Million Kyats)	Remark
		Backhoe	Dump Track		
1	2016	79	44	751.678	
2	2017	59	118	2665.000	
3	2018	56	122	7400.000	
4	2019	52	104	6470.000	
5	2020	46	95	4837.860	
	Total	292	483	22124.538	

The List of common waste dumps designated in Lonekhin Hpakant gemstone tract

Sr.	Location	Designated Area (Acre)	Hmaw	Remark
1	Nam Maw	30	Nan Maw	
2	Nan Jan	30	Wa Jae, San Kahtan, Nan Jan, Ngo Pin	
3	Mar Sar	90	Maw Sisar, Gaday, Ngo Pin	
4	Namaphyt	80	Maw Sisar	
5	Maw Mong Bwam	150	Maw Mong Bwam, Balakha, Maw Won Gyi	
6	Kalar Maw	80	Kalar Maw, Sharong Kha, Mana	
7	Upper Metlinchaung	150	Mana, Sai Kyar Bwan, Metlin Chaung, Phar Pyin	
8	Whay Khar	150	Whay Khar	
9	Yay Aye Chaung(New)	150	Mamon, Metlin Chaung, Sapot, Kayin Chaung	
10	Seik Mu Ywar Haung	120	Bazan Chauk, Mamon, Phar Pyin,Sabyiwa	
11	San Kahtan	80	War Jae	
12	Kan Khan Bwan (Yay Aye Chaung)	300	Kayin Chaung, Sapot, Mamon, Metlin Chaung	

**The number of loss of lives and injuries due to landslides occurred from 2011 to 2020
in Lonekhin Hpakant Gemstone Tract**

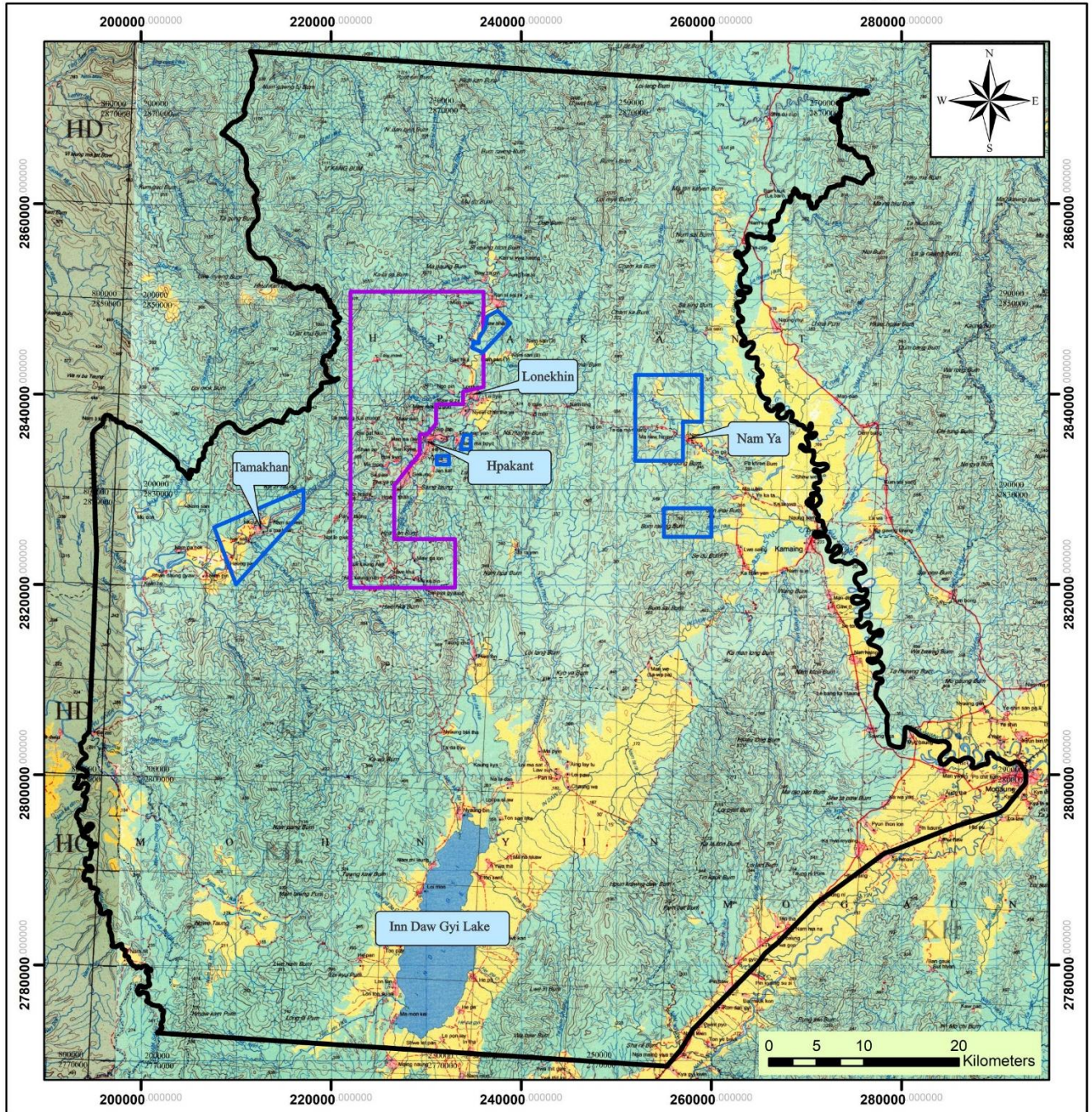
Sr.	Year	Landslides	Loss of Lives	Injuries	Remark
1	2011	1	-	-	
2	2012	10	-	-	
3	2013	1	3	1	
4	2014	1	3	-	
5	2015	7	129	3	
6	2016	25	61	38	
7	2017	20	33	11	
8	2018	36	120	81	
9	2019	11	71	7	
10	2020	42	217	75	
	Total	154	637	216	

Maps

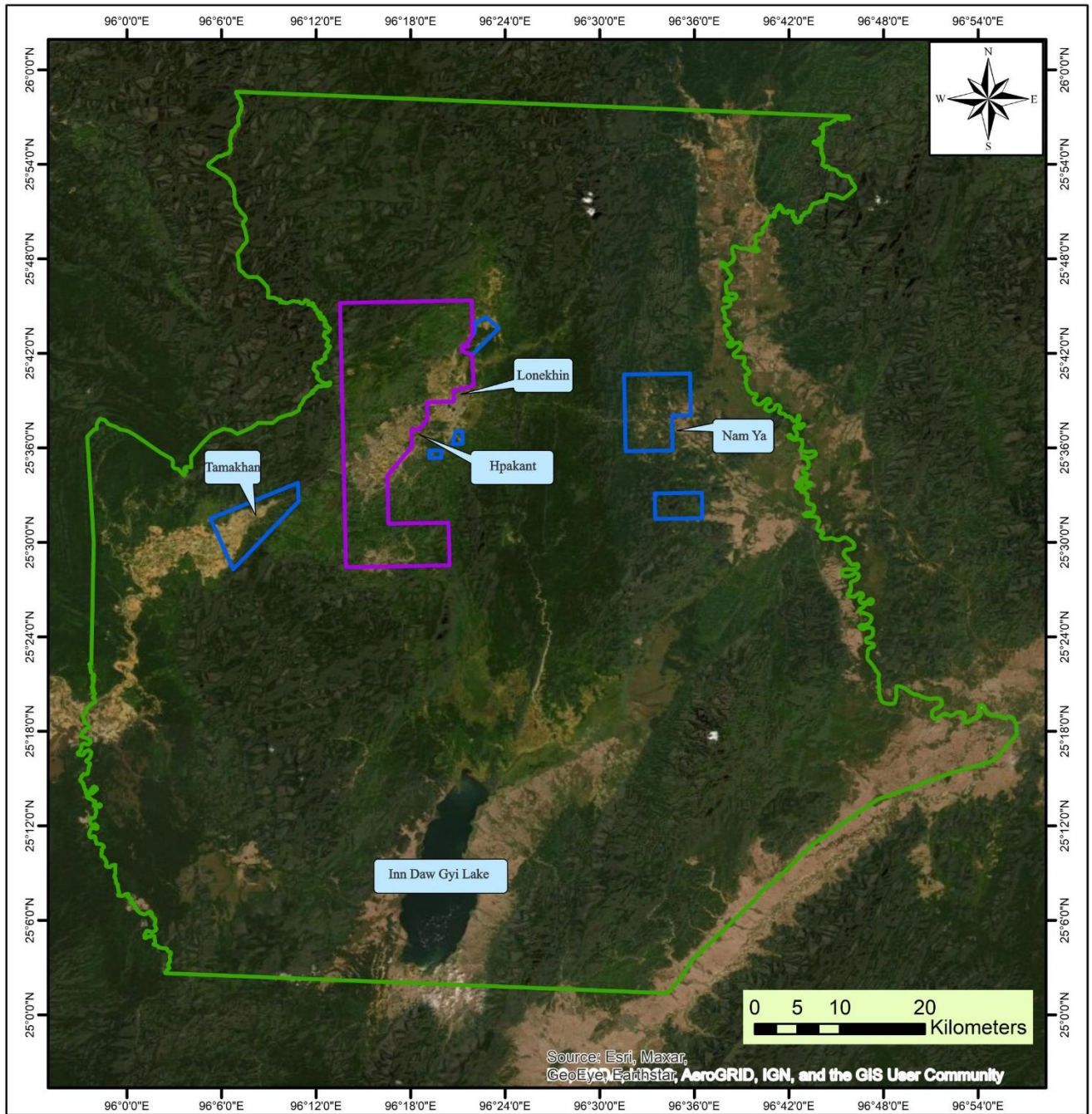
Lonekhin Hpakant Gemstone Tract

(UTM Map)

Part of Map Sheet No - UTM 2595 / 2596



Lonekhin Hpakant Gemstone Tract (Google Map)



Photos

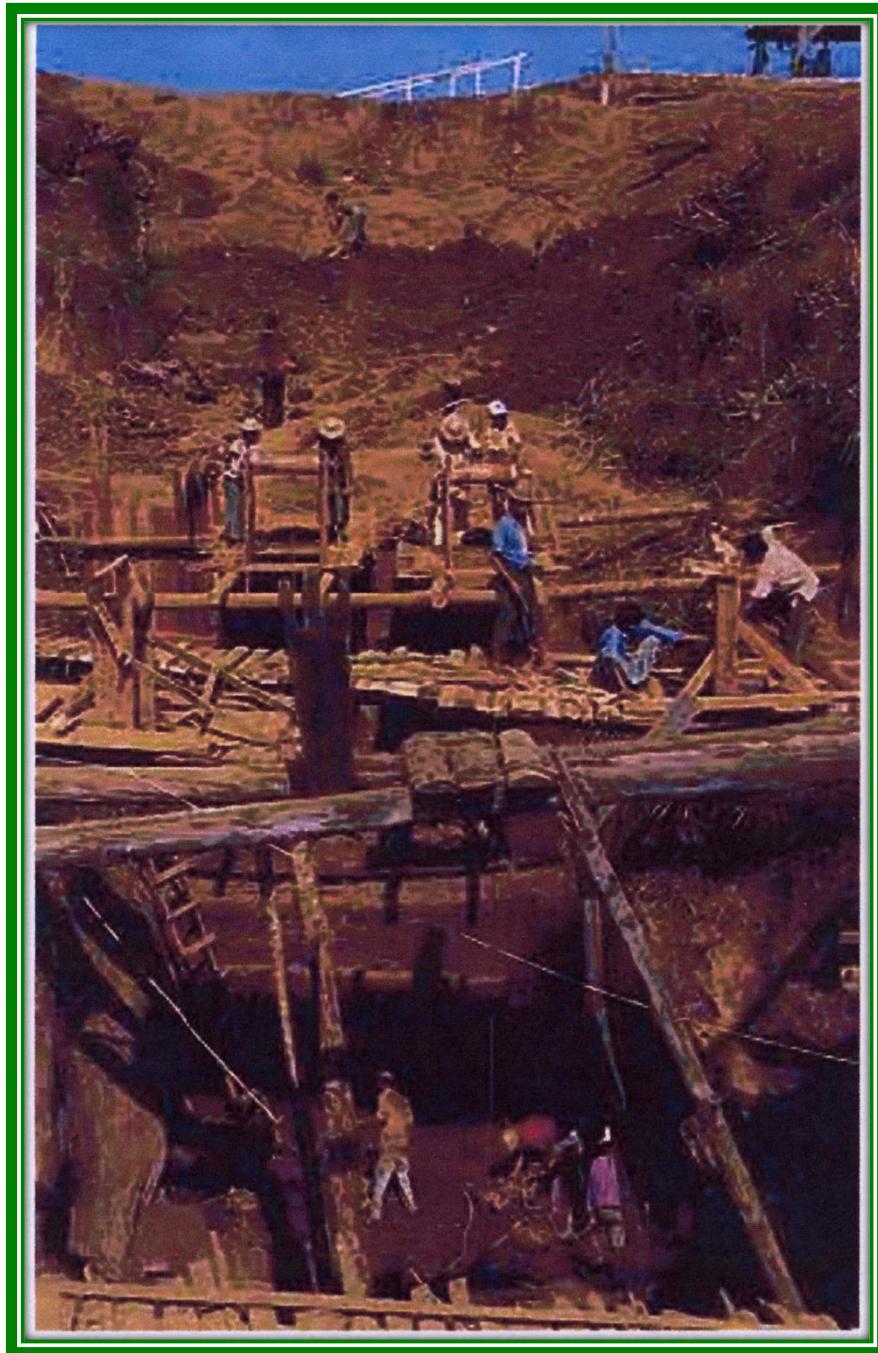
**Jade mining by labours (1930) (Lat-Kyin Method)
(Pann Tin Mhaw)**



**Jade mining by labours (1930) (Lat-Kyin Method)
(Whay Khar Mhaw)**



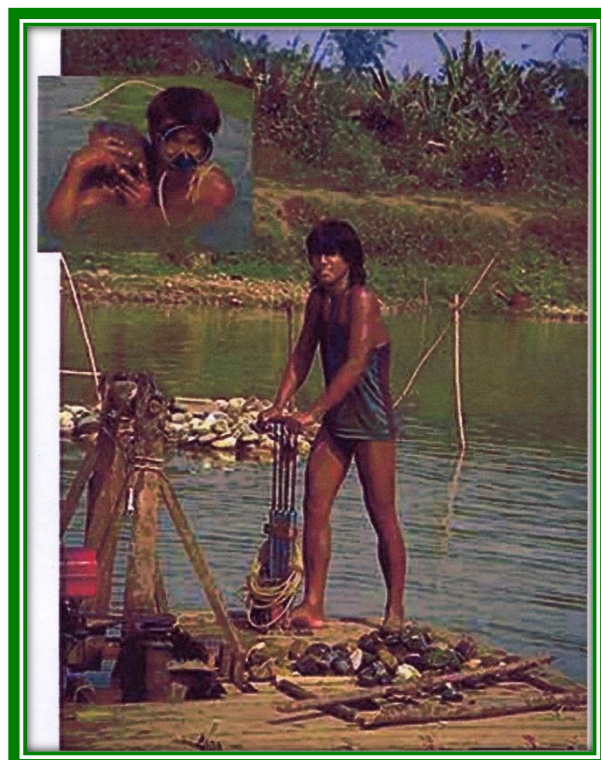
**Jade mining by labours (1982) (Lat-Kyin Method)
(Taw Maw)**



**Jade mining by labours (1984) (Lat-Kyin Method)
(Taw Maw)**



**Jade mining by labours (1990) (Yay-Ngote-Kyin Method)
(Uru River)**



Jade mining by Labours (1996) (Khauk-Sar Method)
(Hparkant Gyi Mhaw)



Jade mining, Carrying wasted soil by Handcart (1996)
(Maw Wan Gyi Mhaw)



Jade mining, Underground Mining Method (2004)
(Nan Mhaw)



Jade mining, by Machineries (2004)



Jade mining, by Machineries (2006)



Jade mining, dumping mine waste (2006)



Jade mining, by Machineries (2009)



Jade mining, by Machineries (2010)



Jade mining, by Machinerics (2013)



Jade mining, by Machinerics (2014)



Jade mining, by Machineries (2015)



Jade mining, by Machineries (2016)



Jade mining, by Machineries (2017)



Jade mining, by Machineries (2018)



Jade mining, dumping mine waste (2018)



