

**Engineering Innovations
and Effects to
Standard of Living and Quality of Living**

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Standard of Living

- Refers to the level of wealth, comfort, material goods, and necessities available to a person or community.
- Often measured by factors such as income, employment, class disparity, poverty rate, housing affordability, and hours of work required to purchase necessities.
- Also includes factors like environmental quality, physical and mental health, education, recreation, and social belonging.

Factors Affecting Standard of Living:

1. Income and Employment:

- Income level:
- Employment opportunities

2. Health:

3. Education

4. Housing

5. Economic Stability

6. Environmental Quality

7. Social Services and Infrastructure:

Effects on Standard of Living:

- **Improved standard of living** usually leads to better overall health, longer life expectancy, higher productivity, and social mobility.
- **Economic crises** or **high inflation** can decrease the standard of living by reducing people's purchasing power, leading to unemployment and poverty.
- **Climate change** and **environmental degradation** can lower the standard of living by harming people's health and livelihood.

In summary, the standard of living is a complex measure influenced by a variety of social, economic, and environmental factors. Improving the standard of living involves improving access to education, healthcare, fair wages, stable economies, and clean environments.

Quality of Life:

- Refers to the general well-being of individuals and societies, outlining both positive and negative aspects of life.
- This goes beyond material wealth and encompasses the overall well-being of individuals and societies.
- Includes not only economic factors but also environmental, physical, and mental health, education, recreation, and leisure time, and social belonging which contribute to people's happiness, health, and satisfaction.
- While **Standard Of Living** typically focuses on economic measures like income and material wealth, **Quality Of Life** is a broader concept that includes:
 - Physical and mental health , Personal safety and security, Social relationships and support, Work-life balance, Freedom and personal rights, Environmental quality: *Clean air, water, and a pleasant natural environment*, & Access to education and cultural opportunities:

While engineering innovations can indeed improve the standard of living by providing better infrastructure, more efficient transportation, advanced medical technologies, and more, they can sometimes inadvertently affect the quality of life.

For example:

1. **Industrialization** can create jobs and wealth, it can also lead to pollution, noise, stress, and the erosion of community cohesion.
2. **Technological advancements** can improve efficiency, reduce costs, and create more goods, increasing the standard of living. But these can also lead to:
 - **Job displacement** as machines or automation replace human labor, reducing social connection or creating stress.
 - **Environmental degradation** through industrial processes or overconsumption, affecting public health.
 - **Social isolation** caused by excessive reliance on technology, reducing face-to-face interactions.

3. Urbanization (a result of engineering innovations in construction and transportation) may boost the standard of living by offering better housing and jobs, *but it can strain infrastructure, cause pollution, and reduce green spaces, which impacts the quality of living.*

How to Overcome These Problems:

- **Holistic Innovation:** When developing new technologies or engineering solutions, a more holistic approach should be taken. This means considering not just the material benefits (SoL) but also the long-term effects on people's lives (QoL).
 - For example, sustainable technologies that balance economic growth with environmental preservation.
 - Developing innovations that foster work-life balance and prevent excessive job automation, creating new roles instead.

- **Policy and Regulation:** Governments can play a significant role by implementing regulations that protect **QoL** while promoting **SoL**. This might include:
 - **Environmental regulations** to ensure technological progress does not harm the planet (e.g., green building standards, renewable energy, mining regulations).
 - **Social safety nets** for displaced workers due to technological advancements (e.g., job retraining programs, universal basic income).
 - **Urban planning policies** that prioritize green spaces, mental health, and community-building in cities.

- **Community-Centered Design:** Engineering projects should be designed with community well-being at their core. This means considering the social and environmental impacts alongside the economic ones.
 - **Community-driven innovations** can help ensure that technological advancements don't prioritize profits over people.
 - Involving communities in the planning process, especially regarding infrastructure or urban development, can reduce the risk of alienating people from the benefits of innovation.

➤ **Sustainable and Inclusive Development:** Any engineering innovation that enhances the *Standard of Living* should aim for sustainability. It's vital that these advancements are inclusive, providing benefits across all segments of society without leading to greater inequality.

- Ensuring that all people have access to the same level of progress can help maintain or improve the *Quality of Living* for everyone.

Related UN SDGs

Goal 3 - Ensure healthy lives and promote well-being for all at all ages

Goal 9 - Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation

Goal 11 - Make cities and human settlements inclusive, safe, resilient and sustainable

Case Example : Hpakant Jade Mining & Environmental Regulations in Myanmar

Environmental Conservation Legislations in Myanmar

1990 : National Commission for Environmental Conservation

2011 : Establishment of Ministry of Forestry & Environmental Conservation (combined with Ministry of Mines in 2016)

2012 : Environmental Conservation Law

2014 : Environmental Conservation Rules

2015 : Environmental Impact Assessment Procedure

2015 : National Environmental Quality (Emission) Guidelines

2017 : Transitional Registration of Consultants

2023 : Licensing of EIA Consultants

Mining Concessions to Private Companies

- Started at 1994-1995
- One Acre Plots
- Three years concession period, can extend for one more time & needed to compete with other investors after that.

Hydraulic Excavator Landscape



- | | | | | |
|--------------------------|--------------------------|---------------------------|-----------------------------|---------------------|
| • 13/15Ton | • 20/22Ton | • 30Ton | • 36/49Ton | • 74/95Ton |
| • 313D/315D | • 320D/320D2/320 | • 329D/324D/326D2/326 | • 330D/336D/336/340/349/352 | • 374/395 |
| • Bucket (0.6 – 0.8 CUM) | • Bucket (0.9 – 1.2 CUM) | • Bucket(1.45 – 1.54 CUM) | • Bucket(1.67 – 2.8 CUM) | • Bucket(4 – 6 CUM) |

Hydraulic Mining Shovel

6015

- 150Ton
- 6015Backhoe/Front Shovel
- Bucket- 8 CUM



6020B

- 200Ton
- 6020B
- Bucket- 12 CUM

Medium Size Mining Trucks



10 Ton Truck



25 Ton Truck



30 Ton Articulated Truck



40 Ton Articulated Truck

Off Highway Dump Trucks

772

45 ton / 41 t



773

60 ton / 54 t



775

70 ton / 63.5 t



777

100 ton / 91 t



Pass Match

6015

772

45 ton / 41 t

**773**

60 ton / 54 t

**775**

70 ton / 63.5 t

**777**

100 ton / 91 t



3

4

5

6

-

7



- 150Ton
- 6015Bachhoe/Front Shovel
- Bucket- 8 CUM

Pass Match

6020B

773

60 ton / 54 t



775

70 ton / 63.5 t



777

100 ton / 91 t



785

150 ton / 136 t



3

3

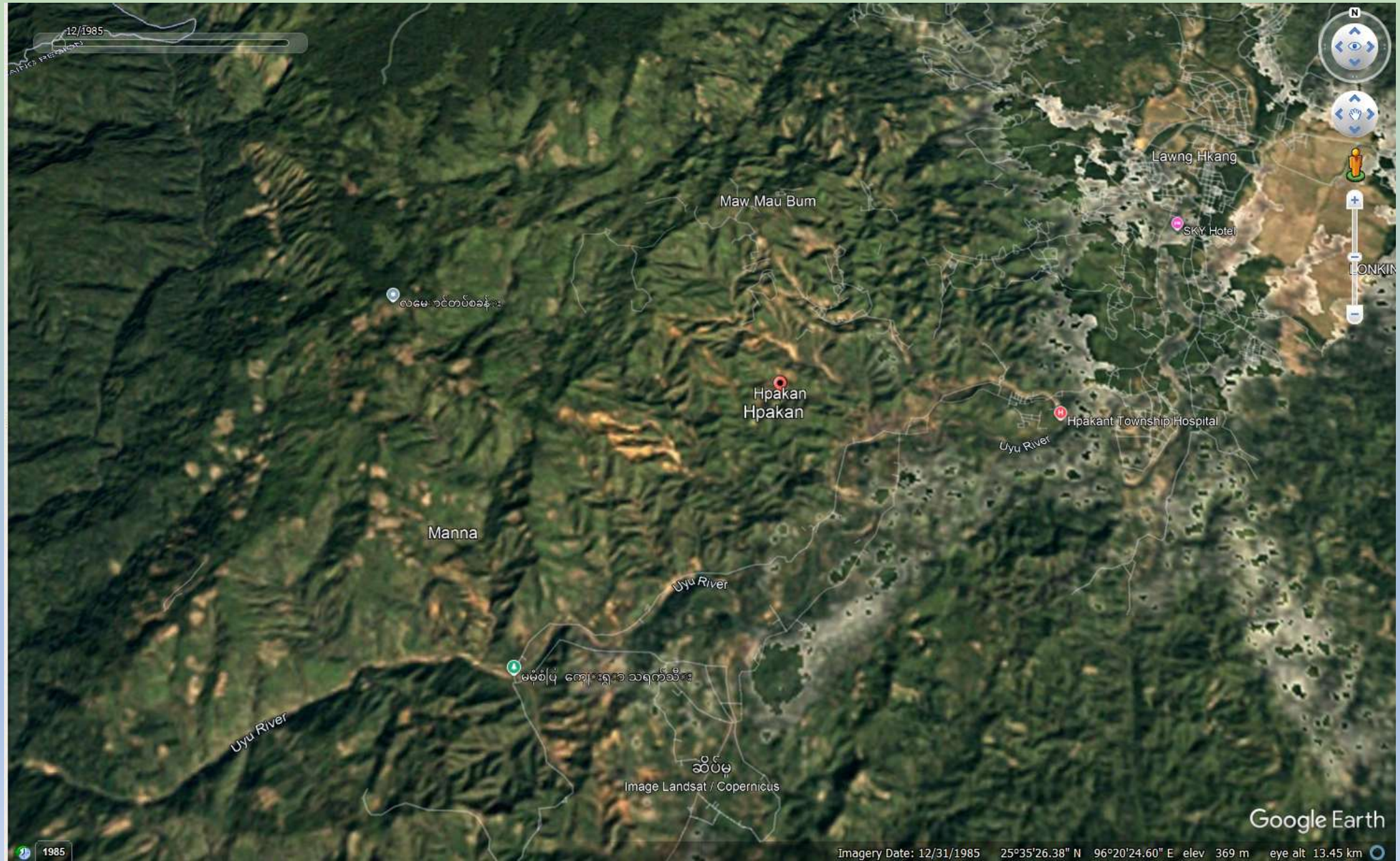
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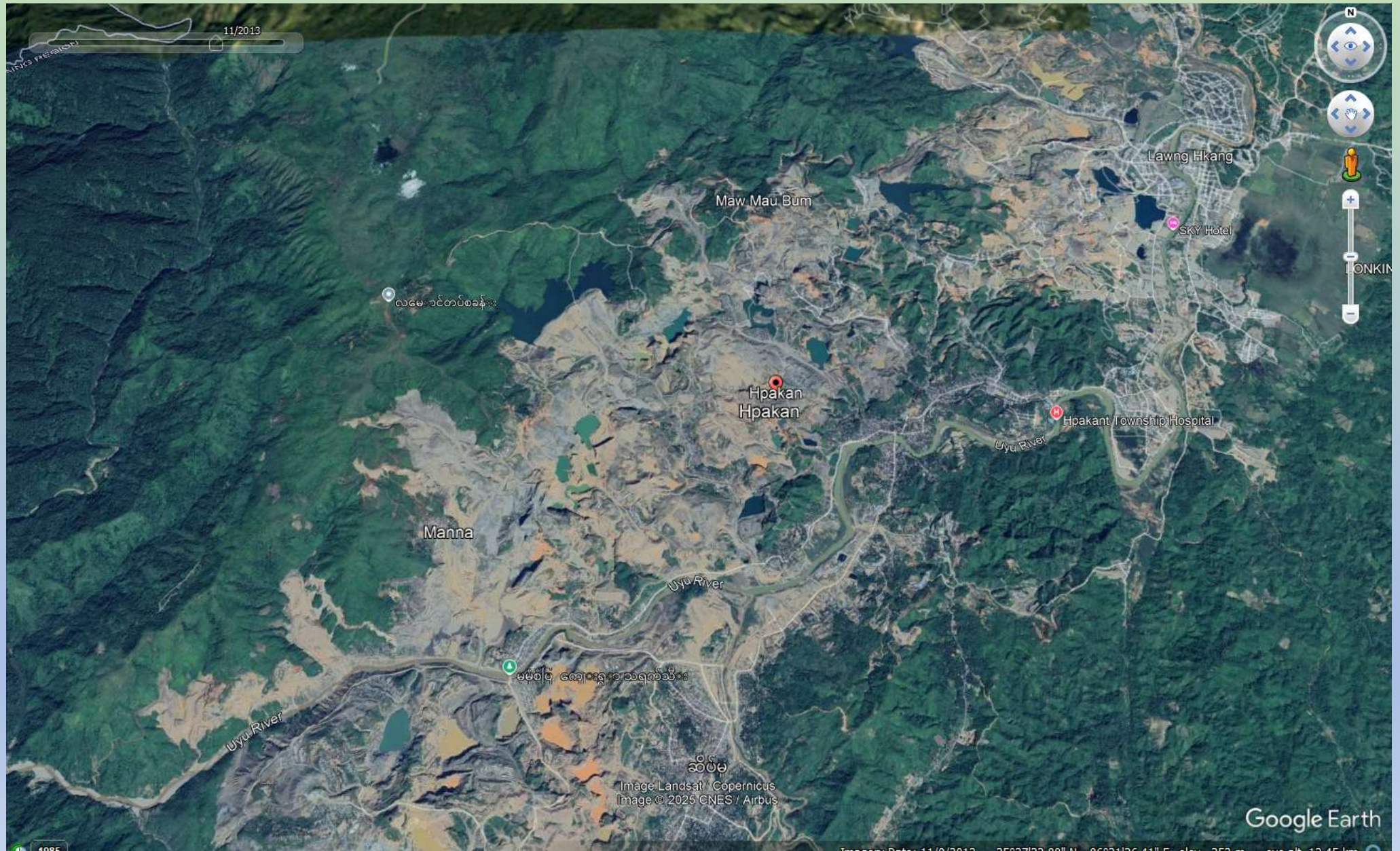


- 200Ton
- 6020B
- Bucket- 12 CUM

Hpakant_Jade Land, Kachin State December 1985



Hpakant_Jade Land, Kachin State November 2013



Hpakant_Jade Land, Kachin State February 2016



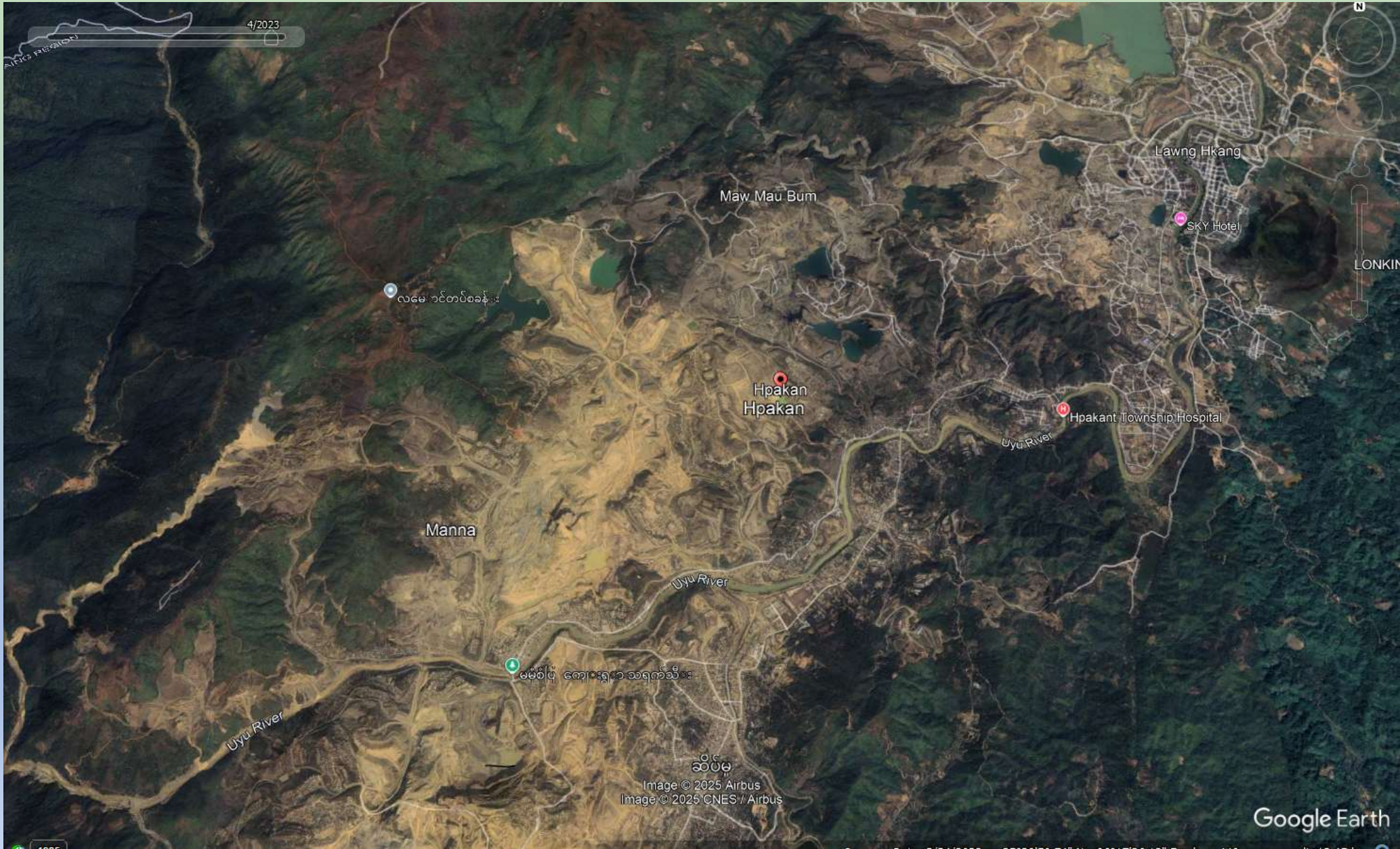
Hpakant_Jade Land, Kachin State December 2018



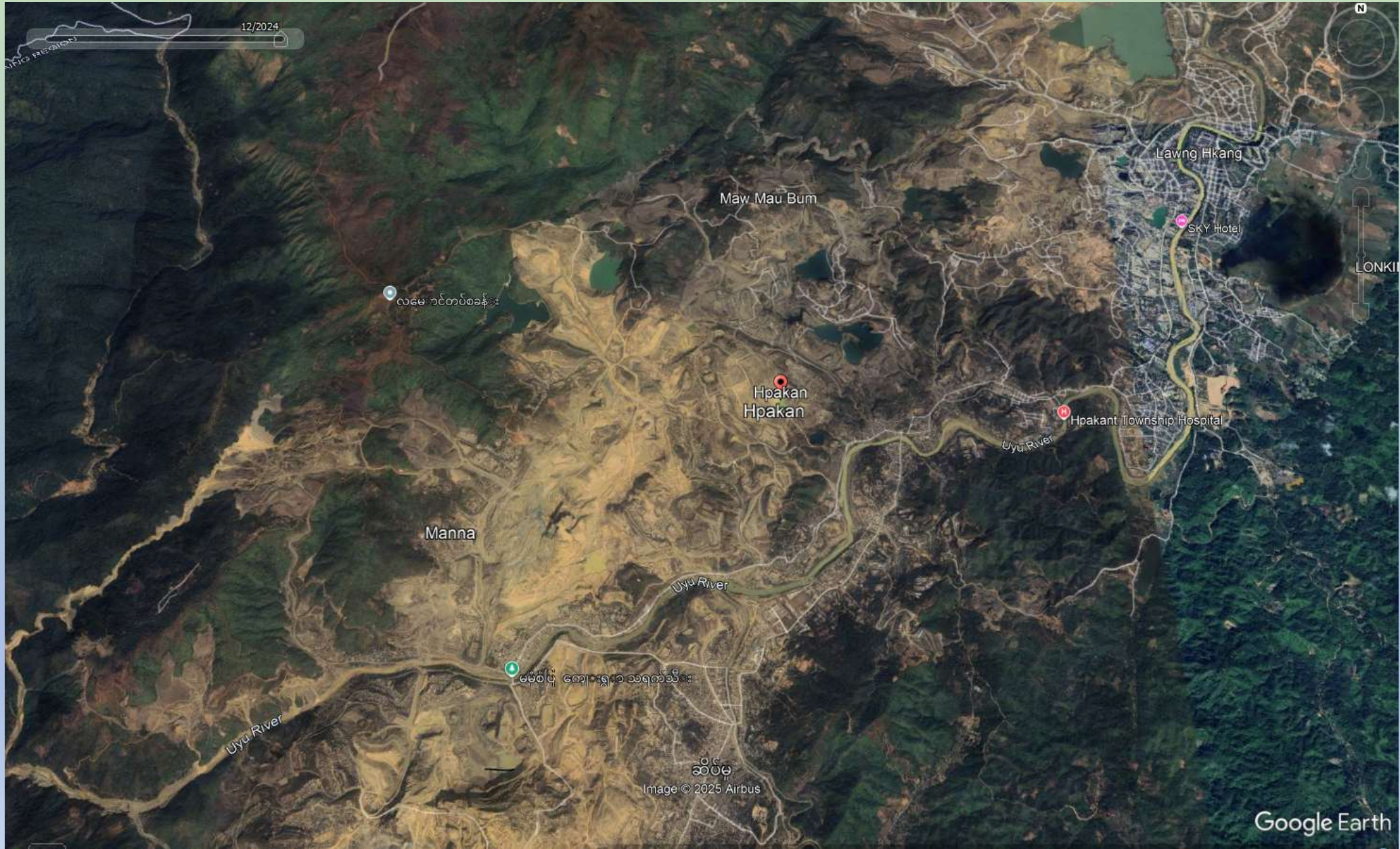
Hpakant_Jade Land, Kachin State November 2020



Hpakant_Jade Land, Kachin State April 2023



Hpakant_Jade Land, Kachin State December 2024



Jade Mining Sites at Hpakant



Relief works after disaster



Scavengers living nearby sites



Conclusion

- To overcome the potential negative effects of engineering innovations on the quality of living while improving the standard of living, we need a balanced approach.
- This requires :-
 - prioritizing both material and intangible well-being,
 - creating sustainable policies,
 - designing technologies with humanity in mind, and
 - fostering social and environmental responsibility.

Thank you