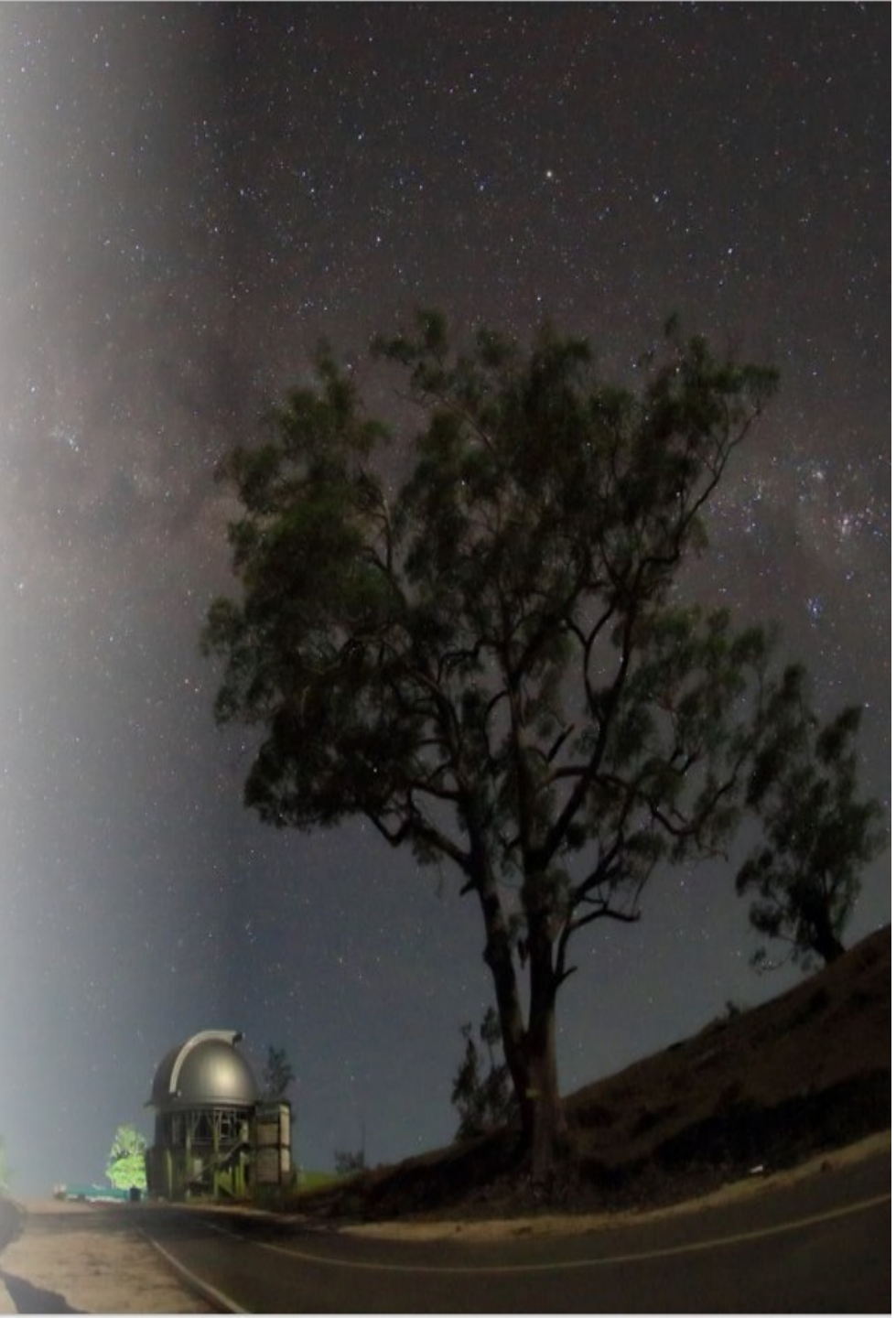

The Threat of Satellite Constellations to Developing Countries: Indonesia's Experiences

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cultural astronomy, interdisciplinary literature

Threats of Satellite Constellations: Indonesian Context

- The Timau Observatory is still in the preparatory stage before it becomes operational, but satellite streaking has the potential to significantly reduce the quality of data obtained from this new facility. Poor data quality is a major problem for Indonesia because of its limited budget for building large modern astronomical facilities.

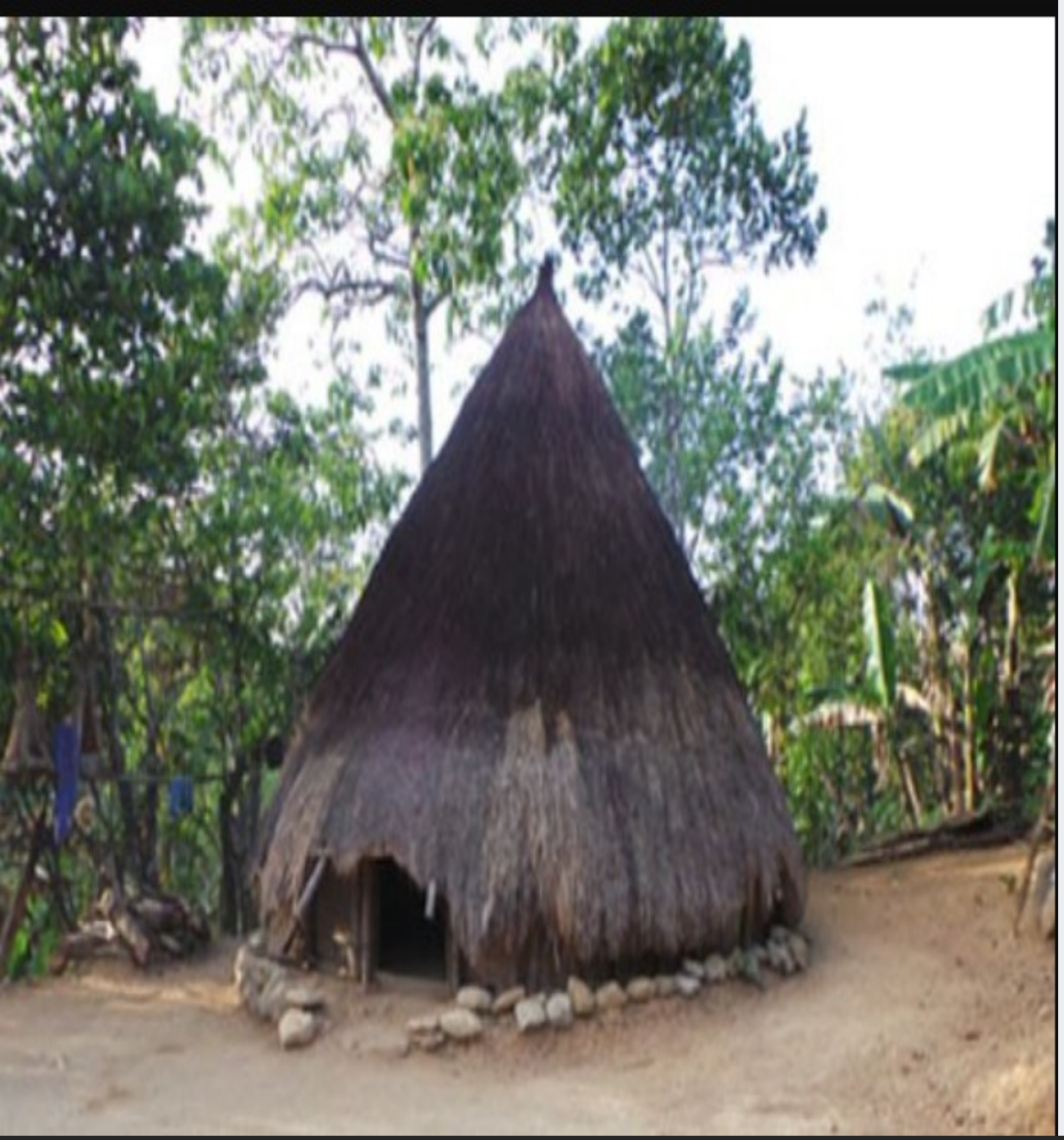
- Indigenous communities around Timau's observatory have their local astronomical knowledge, and the existence of the satellite constellations has the potential to block the indigenous communities' sky observation. It also violates their rights as the indigenous people (UN Declaration on the Rights of Indigenous Peoples, article 13.1).

Best Practices from Other Countries

- In the case of the Bawaka Country, the relationships and ties between indigenous peoples of Bawaka Country and their ancestors and kin, whose souls migrate to Sky Country, are also altered by interaction with outer space through the launching and development of satellite constellations. This demonstrates how the likelihood of satellite constellations significantly influences not only indigenous traditions based on astronomical information or the transfer of indigenous knowledge and heritage, but also indigenous peoples' spiritual rituals and relationships to their ancestors.

- Kaibab Paiute Indian Reservation encompasses five tribal villages alongside the non-indigenous community of Moccasin. Furthermore, the designation Thunder Mountain Pootseev Nightsky itself formally acknowledges the Kaibab Paiute's status as a sovereign nation, underscores the cultural significance of Thunder Mountain and the night sky to their people, and recognizes their unique Southern Paiute language.

- Around the Timau observatory, there is an urgent need to document and transmit the knowledge to younger generations before it is permanently lost. The experience of the Kaibab Paiute offers a valuable model for such cultural preservation. At the Pipe Spring National Monument, knowledge transmission is facilitated through a variety of public programs, including ranger-guided hikes during the full moon, star parties, workshops on planting native gardens using traditional methods, educational talks on light pollution, and other outreach activities coordinated with the national park. However, due to the existence of satellite constellations, sky-related knowledge transmission is impossible because the elders cannot show the celestial objects to the youngsters with their naked eyes.



The traditional houses of the Amfoang people, who are indigenous to the area around the Timau Observatory, are called round houses (*ume bubu*). These houses are designed to be closed with no ventilation, so even if a fire is lit inside, no light will be visible from outside the round house. In addition, free-roaming livestock are still allowed because there is no potential for light pollution. This condition shows that the local culture of the community is in line with the conditions of minimal artificial light, which is a major requirement for observing the sky with the naked eye. In addition, the shape of these houses does not disturb the habitat of endemic animals around the observatory. However, this house still cannot block the strike of the satellite constellations that disturb the ability to observe the sky with the naked eye, so the elders cannot transfer their knowledge while showing the beauty of the sky.

Recommendations

- National Level:

A. All stakeholders, including the central government—represented by the research institution responsible for the observatory—policy makers, local governments, and the indigenous communities, collaborate to preserve the astronomy-related knowledge through conducting interdisciplinary research to support the policy formulation to preserve areas around the Timau Observatory as a dark sky park.

B. Developing teaching and outreach materials from the interdisciplinary research results.

C. Involving indigenous people in every activity, from research, drafting teaching materials and policy documents, to including indigenous people as co-authors in scientific publications.

- International Level: Based on Indonesia's experience in developing the observatory on a tight budget, yet threatened by the existence of mega-satellite constellations before the observatory is fully operational, it is important to create an international agreement regulating developed countries and private companies actively deploying satellites in orbit to provide compensation to developing countries that are scientifically disadvantaged. Compensation can be free data or other astronomical facilities.