

Infrastructure at the Frontier: Development Outcomes in Western Province, Papua New Guinea

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Abstract. Western Province in Papua New Guinea (PNG) is a resource-rich but under-developed frontier region facing unique infrastructure and development challenges. This paper examines three major infrastructure initiatives in the province, the Ok Tedi mine, the PNG Sustainable Development Program (PNGSDP), and the recent introduction of Starlink satellite internet, to evaluate their development outcomes. Drawing on development studies and empirical data, the analysis finds that large-scale resource extraction and related infrastructure have produced mixed benefits for local communities. The Ok Tedi mine generated significant revenue and some local improvements but also severe environmental and social disruptions that constrained broad-based development. PNGSDP, a trust fund created from mining profits, has funded important projects in Western Province, yet its impact has been undermined by political disputes and governance issues. The arrival of Starlink satellite internet offers new opportunities for connectivity in remote areas, potentially improving education and health services, although regulatory hurdles and sustainability concerns remain. These case studies reveal something critical; that frontier infrastructure investments alone do not guarantee equitable development outcomes. Effective governance, community engagement, and long-term planning are crucial to translate infrastructure into inclusive and sustainable development at the frontier. This paper contributes to understanding the complex relationship between infrastructure and development in remote regions of PNG and similar contexts.

Keywords: Frontier development, Infrastructure, Papua New Guinea, Post colonial development, Inclusive development

1. Introduction

Frontier regions rich in natural resources often experience paradoxical development outcomes: enormous wealth is generated, yet local communities remain under-developed [1]. Western Province, PNG's largest and most remote province, exemplifies this paradox extremely well. The region boasts abundant natural resources (notably the Ok Tedi copper and gold mine) and has been the focus of high-profile development interventions from both domestic and international agents. However, it consistently ranks low on key development indicators such as health, education, and income levels [2]. Basic infrastructure in the province is limited: communities are scattered across difficult terrain with few roads, unreliable electricity, and minimal communications networks [3].

Western Province is often described as PNG's "last frontier," not only for its geographic isolation but also for the frontier-like dynamics of state absence, corporate presence, and contested development visions [4].

This paper investigates how infrastructure projects at this frontier have shaped development outcomes in Western Province. It focuses on three case studies that span different eras and types of infrastructure: the Ok Tedi mine (an extractive industry infrastructure established in the 1980s), the PNG Sustainable Development Program (PNGSDP) (an institutional infrastructure for development financing begun in 2002), and Starlink satellite internet (a digital infrastructure newly introduced in the 2020s). Each represents a distinct approach to fostering development in a peripheral region, through mining-led growth, through a sovereign wealth fund and service delivery programs, and through leapfrogging communication technology. By examining these cases, the paper asks: to what extent have these infrastructure initiatives delivered broad-based social and economic development in Western Province? What common challenges emerge in translating frontier infrastructure investments into positive local outcomes?

As such, this research significantly advances the broader academic understanding of infrastructure-led development in frontier regions, especially in postcolonial contexts like Papua New Guinea. The Western Province case yields critical insights into the governance, equity, and sustainability of infrastructure interventions in remote, resource-rich settings. The findings carry value for both development theory and practice. Theoretically, the study fills a gap in the literature on state-building and inclusive development at the periphery, while practically it offers actionable insights for policymakers and practitioners on ensuring that infrastructure investments in similar regions are managed accountably, equitably, and with long-term sustainability in mind.

2. Literature review

Frontier regions pose particular challenges for development theory and practice. They are often characterized by rich natural resources and weak state presence, leading to what some scholars call "enclave" development patterns where external actors extract resources with limited local spillovers [5]. Classic resource curse literature argues that resource-dependent economies can suffer from stagnant growth and poor governance outcomes [6]. In contexts like PNG, these dynamics are pronounced in remote provinces: large mining or logging projects create enclaves of modern infrastructure amid a broader landscape of underdevelopment [7]. As Harvey [8] and others note, infrastructure in such regions often serves extractive industries rather than local populations, reinforcing spatial inequalities.

The concept of the "frontier" in development studies is not merely geographic but also political-economic, frontiers are zones where state authority is contested or minimal, and where corporate or non-state actors play outsized roles in provision of services and infrastructure [9]. Western Province can be understood through this lens: the Ok Tedi mine, for example, effectively created a private infrastructure network (roads, airstrips, telecommunications) for resource extraction, operating semi-autonomously from central government oversight [10].

Scholars have examined how infrastructure investments can facilitate development in remote settings, emphasizing the importance of connective infrastructure (roads, communications) for market access and service delivery [11]. Improved transport and communication networks are often linked to better health and education outcomes by integrating isolated communities into broader economic and information systems [12]. However, the literature also cautions that without complementary social investments and inclusive institutions, infrastructure alone may not yield inclusive development [13]. Citing cases from Melanesia and elsewhere, World Bank [14] observes

that externally driven projects can bypass local needs and capacities, sometimes exacerbating local inequalities. The experiences in PNG's resource-rich areas underscore this point: Banks [15] found that mining-led development in PNG tends to benefit a narrow group (employees, business elites, government revenues) while risks and environmental costs are borne by local communities.

Another strand of literature focuses on benefit-sharing mechanisms and development funds in resource regions. In theory, trusts like PNGSDP can capture resource revenues and reinvest them for long-term local development, buffering against boom-bust cycles [16]. International experience (for example, Norway's oil fund or Alaska's permanent fund) suggests that well-governed sovereign funds can provide sustained benefits, but transparency and insulation from political interference are key [17]. In PNG, several studies have highlighted governance challenges that impede such mechanisms: political intervention, lack of community voice in fund management, and difficulties in delivering projects on the ground have limited their effectiveness [18].

Finally, emerging literature on digital infrastructure and development suggests that new technologies (e.g., satellite internet) could help leapfrog traditional barriers in remote regions [19]. Connectivity initiatives are potential game-changers for isolated communities by enabling access to information, online education, telemedicine, and e-commerce [20]. Yet researchers caution that technology is not a panacea; factors such as affordability, digital literacy, and local content are critical for meaningful impact [21]. This review of literature informs the analysis of Western Province's experience: it highlights the need to assess not just the physical presence of infrastructure but also governance, inclusion, and sustainability in evaluating development outcomes at the frontier.

3. Analysis

3.1. Ok Tedi mine: resource infrastructure and local outcomes

The Ok Tedi mine, which began operations in 1984, is one of the world's largest copper and gold mines and has been central to Western Province's economy for decades [22]. As a piece of infrastructure, the mine brought roads, an airport, power generation, and a dense concentration of economic activity to the remote Star Mountains region. It also generated substantial revenue, by the 1990s, Ok Tedi accounted for a significant share of PNG's export earnings and fiscal revenues [23]. Some of these revenues were returned to the province through royalties, equity dividends to local and provincial government entities, and compensation payments to communities affected by mining [24]. In theory, this influx of funds and infrastructure should have catalyzed broader development in Western Province. Indeed, there have been localized benefits: the mine has provided employment, business opportunities for some landowners, and funded community projects in its immediate vicinity [25]. For example, villages nearest to the mine have received investments in schools, health clinics, and agriculture programs funded by community mine continuation agreements [26].

However, the Ok Tedi case also exemplifies the dark side of enclave infrastructure development. The mine's operations caused severe environmental damage, particularly due to the discharge of mine waste into the Ok Tedi and Fly rivers when a tailings dam was not built as originally planned [27]. The resulting ecological harm, widespread forest dieback, river sedimentation, and reduced fish populations, undermined subsistence livelihoods for tens of thousands of downstream residents [28]. This environmental devastation had direct human development costs: food insecurity and health problems rose in many river communities [29]. The company (Ok Tedi Mining Limited) and the PNG government eventually faced lawsuits and international pressure, leading to substantial compensation payments and mitigation programs, but much of the damage is irreversible [30].

Crucially, the broader development outcomes for Western Province remain disappointing relative to the wealth extracted. Outside the enclave of Tabubil (the town servicing the mine), infrastructure across the province is sparse and under-maintained [31]. The provincial capital, Daru, and other district centers like Kiunga lag far behind in basic services despite the mine's presence. Scholars have noted that the Ok Tedi mine functioned as a "two-speed" economy: a pocket of modern facilities surrounded by underdevelopment [32]. Revenue management has been part of the problem. Despite earmarking funds for provincial development, weak governance and capacity constraints hindered the effective implementation of many planned projects [33]. Corruption and mismanagement at various levels of government further diluted the potential benefits of mining income for the wider population [34].

By the early 2000s, acknowledging these gaps, the mine's majority owner BHP Billiton and the PNG government took steps to ensure more sustainable benefits. This led to the creation of PNGSDP when BHP exited the project in 2002, as discussed in the next section. In sum, Ok Tedi's legacy in Western Province is ambivalent: it delivered significant infrastructure and economic output, yet failed to translate into broad-based, long-term development for most of the province's communities [31]. The situation shows that new infrastructure linked to mining can lead to isolated development unless there are strong efforts to share benefits and reduce negative impacts.

3.2. PNG sustainable development program: trust funds and governance

The PNG Sustainable Development Program (PNGSDP) was established in 2002 as an independent not-for-profit entity to manage the dividends from BHP's 52% share in Ok Tedi after BHP's withdrawal from the mine [35]. PNGSDP's mandate was to invest these mining revenues in development projects, with a focus on sustainable benefits for Western Province and PNG as a whole, particularly to prepare for the mine's eventual closure. Legally domiciled in Singapore to insulate it from PNG's domestic politics, the fund built up a substantial Long Term Fund (over US\$1 billion by the early 2010s) while also spending on development programs in Western Province through an Annual Development Budget [36]. PNGSDP represented a novel form of infrastructure in a governance sense: a financial and institutional mechanism intended to convert resource wealth into broad development outcomes over the long term [37]. In its first decade, PNGSDP financed a range of projects in Western Province, including rural health services, education scholarships, agricultural programs, and critical infrastructure like water supply and electricity in small communities [38]. For instance, PNGSDP partnered to roll out telecommunications towers in remote areas of the province, greatly expanding mobile network coverage by late 2010s [39]. These investments were starting to bridge gaps in service delivery, aligning with development plans and community needs [39].

Despite these efforts, PNGSDP's impact has been hindered by political interference and disputes over control of the fund. In 2013, the PNG government under Prime Minister Peter O'Neill expropriated BHP's remaining shares in Ok Tedi and attempted to control PNGSDP's assets, arguing that the fund had not adequately improved local conditions [40]. This sparked a protracted legal battle in international courts, as PNGSDP resisted, citing its independent governance structure. The Singapore High Court in 2014 ultimately ruled in favor of PNGSDP's autonomy, keeping the funds under the program's control [41]. However, during these years of legal uncertainty, much of PNGSDP's development programming was scaled back or frozen, delaying projects that communities were awaiting [42]. The confrontation highlighted issues of trust and accountability: the national government questioned PNGSDP's transparency and wanted direct access to its finances, whereas PNGSDP's managers (led by former PNG Prime Minister Mekere Morauta)

insisted on arms-length management to prevent political misuse of the funds [43]. This tussle reflects a broader governance challenge in frontier development, ensuring that large development funds are both protected from politics and responsive to local expectations.

Although PNGSDP survived the legal challenge, the episode revealed limits in its ability to single-handedly drive development. Critics pointed out that while the fund had accumulated savings, many basic needs in Western Province remained unmet [44]. For example, the province still had among the lowest rates of access to clean water and highest maternal mortality in PNG during the 2010s, indicating that mining-derived wealth had not yet translated into improved human development metrics [45]. There were some success stories, PNGSDP's investment in connectivity with Digicel led to 4G mobile coverage reaching even remote villages by 2018, facilitating digital access for schools and health clinics [46]. Yet, other planned large-scale projects (such as a proposed hydroelectric dam and extensive road upgrades) either progressed slowly or were shelved due to the political impasse and implementation difficulties [47]. PNGSDP's mixed record demonstrates that even well-funded infrastructure and development programs require stable governance partnerships and community involvement to be effective. Without coordination with government agencies and local stakeholders, a trust fund alone could not overcome systemic service delivery problems in Western Province. In essence, PNGSDP provided a necessary but not sufficient institutional infrastructure for development, it highlighted how governance context can enable or constrain the translation of resource wealth into public goods [48].

3.3. Starlink satellite internet: digital infrastructure at the frontier

In the mid-2020s, Western Province has entered a new experiment in frontier infrastructure with the introduction of Starlink satellite internet services. Traditional internet connectivity in the province has been limited; only a few urban centers have had reliable (but costly) broadband via terrestrial or satellite links, and vast rural areas remained effectively offline [49]. In 2024, PNG's government granted Starlink (SpaceX's low-earth orbit satellite internet provider) a license to operate, aiming to dramatically expand internet access in remote regions like Western Province [50]. Almost immediately, pilot deployments of Starlink receivers began in the province. It is reported that by early 2025, a handful of isolated communities, including villages in the North Fly district, were connected to high-speed internet through Starlink kits, some facilitated by NGOs and the provincial government [51]. This digital infrastructure has the potential to be a "leapfrog" technology for Western Province: instead of waiting for fiber optic cables or microwave towers to extend into every remote corner (a prohibitively expensive and slow process), satellite broadband can deliver connectivity directly from the sky [19].

The developmental implications of such connectivity are significant. For instance, schools in Starlink-connected villages can access online educational materials and remote teaching resources, improving the quality of education for children who previously had almost no access to up-to-date learning content [52]. Health clinics can consult with doctors in urban hospitals via telemedicine applications, potentially saving lives in medical emergencies [52]. Small businesses and farmers might use the internet connections to obtain market information, weather forecasts, or to engage in e-commerce on a limited scale, thereby integrating locals into the wider economy [52]. In short, Starlink's arrival brings hope of bridging the longstanding digital divide that has contributed to Western Province's marginalization. The early reports from pilot sites are encouraging: community members have embraced the newfound connectivity, with youths in some villages reportedly taking online courses and entrepreneurs exploring mobile banking and trade facilitated by the internet [53].

These initial outcomes align with development literature that touts connectivity as a catalyst for social and economic inclusion.

However, significant challenges temper the optimism around Starlink as a frontier infrastructure solution. One concern is sustainability and cost: while Starlink technology can deliver service, the equipment and subscription fees are high by local standards [50]. During the pilot phase, external donors or the provincial government have often subsidized these costs, but scaling up to all communities would require substantial funding or a viable business model. Ensuring that connectivity remains affordable for ordinary villagers is crucial; otherwise, the service might only benefit local elites or specific institutions. Another challenge is the regulatory and logistical framework. Until Starlink received its license, many individuals who imported Starlink kits were technically using them illegally, leading to warnings from the national regulator (NICTA) about unlicensed terminals [54]. Now that it is licensed, there needs to be clear policy on how remote communities can acquire and use the technology lawfully, as well as how to monitor its usage (the government expressed security concerns, wanting to track devices to prevent misuse). This indicates the state's desire to maintain oversight even as it embraces the new technology, reflecting a cautious approach to frontier connectivity. Furthermore, to turn internet access into real development gains, complementary investments are needed in digital literacy and maintenance. Many rural residents of Western Province have limited experience with online services, so training programs are necessary to help them make full use of connectivity for education, business, and civic engagement [55]. There are also practical challenges such as providing reliable electricity for the Starlink terminals and devices, some villages lack power grids and must rely on solar panels or generators to run the equipment. Without consistent power and technical support, the internet service could be intermittent or fall into disuse. Early evidence from the Starlink rollout shows that where communities have local champions or tech-savvy individuals (often teachers or health workers), the uptake is much more effective, underlining the role of human capacity alongside the hardware [56]. In summary, Starlink's introduction in Western Province is a groundbreaking development, offering a new kind of infrastructure that bypasses physical isolation. It has begun to yield positive impacts in connected communities, but its long-term success in promoting inclusive development will depend on addressing issues of cost, capacity, and coordination with broader development efforts.

4. Discussion

The three frontier infrastructure cases reveal contrasting outcomes and governance dynamics, yielding vital policy lessons for equitable development. The Ok Tedi mine exemplifies how a large extractive project can generate immense national wealth yet fail to translate local benefits. Western Province's copper and gold boom contributed up to 15–25% of PNG's GDP since 1985, but this resource wealth did not lead to inclusive growth or improved human development indicators. Instead, weak regulatory oversight allowed serious environmental harm – Ok Tedi became one of PNG's most polluting enterprises, devastating riverine systems and local livelihoods. This underscores that without strong governance and community inclusion, infrastructure wealth alone cannot ensure broad-based or sustainable outcomes.

The PNG Sustainable Development Program (PNGSDP) was a direct response to Ok Tedi's shortcomings, innovating a governance model to safeguard mining dividends for development. PNGSDP invested in health, education, and agriculture in Western Province, and grew into PNG's second-largest development financier after AusAID. Its independent trust structure – designed to insulate funds from domestic political risks – highlights how governance arrangements can enhance long-term planning. However, the 2013 state expropriation of Ok Tedi and PNGSDP showed the

fragility of such arrangements, attracting criticism as “poor public policy” and a setback to development goals. This episode illustrates the need for alignment between corporate, state, and local interests: development funds must be transparent, accountable, and integrated with government strategies to endure.

By contrast, Starlink’s satellite internet initiative offers a novel approach, addressing geographic isolation through global technology. Starlink can leapfrog traditional infrastructure by providing high-speed connectivity to remote communities with minimal local facilities. Its early introduction in PNG promises new opportunities for education, commerce, and service delivery in previously disconnected areas. Yet, this case underlines that technology alone is not a panacea. Ensuring equitable access to Starlink’s benefits will require supportive public policy (such as regulatory facilitation and subsidies) and community engagement to build digital literacy. The Starlink example thus reinforces a common lesson: innovation must be coupled with inclusion.

In relation to policy-relevant lessons, across all three cases, robust governance and stakeholder collaboration emerge as decisive factors for success. For governments, the mandate is to enforce stringent safeguards – environmental regulations, revenue management frameworks, and inclusive planning – so that frontier investments do not bypass local development. Donors and development partners should bolster capacity and oversight mechanisms (as PNGSDP attempted), while respecting local ownership to avoid political backlash. Corporate actors must commit to corporate social responsibility and community partnerships, learning from Ok Tedi’s early failures by mitigating harm and sharing benefits. Civil society’s role is equally pivotal: community groups and NGOs can hold projects accountable and ensure local voices shape infrastructure planning. In frontier regions like Western Province, infrastructure-led development will only yield sustainable, equitable outcomes when these stakeholders work in concert. The cases of Ok Tedi, PNGSDP, and Starlink collectively suggest that blending hard infrastructure with “soft” infrastructure – transparent institutions, inclusive governance, and human capacity – is essential. Future initiatives should integrate economic growth with social and environmental well-being, ensuring that remote populations are not just passive beneficiaries but active partners in defining their development path.

5. Conclusion

In conclusion, infrastructure at the frontier is most effective when embedded in a holistic development approach. Western Province’s mixed outcomes teach us that mines can fuel development only if their proceeds are justly shared and environmental costs addressed; development funds can drive progress only if insulated from corrosive politics and aligned with local needs; and cutting-edge technology can uplift communities only if affordability and user capabilities are ensured. Future policy in PNG’s frontier regions should thus prioritize inclusive governance mechanisms for any major infrastructure project. This includes involving local communities in decision-making, maintaining transparency in benefit distribution, and planning for long-term sustainability beyond the project’s initial lifespan. By learning from past challenges and successes in Western Province, PNG and similar developing regions can better harness infrastructure investments, old and new, to achieve equitable and lasting development outcomes on the frontier. The experiences of Western Province with the Ok Tedi mine, PNGSDP, and Starlink internet illustrate the complex interplay between infrastructure and development on PNG’s frontier. These case studies demonstrate that infrastructure projects, whether physical, financial, or digital, are not inherently transformative; their contribution to development depends on governance arrangements, community involvement, and mitigation of negative externalities.

References

- [1] Auty, R. (1993). *Sustaining Development in Mineral Economies: The Resource Curse Thesis*. London: Routledge.
- [2] UNDP (2020). *Papua New Guinea Human Development Report*. United Nations Development Programme.
- [3] National Statistics Office PNG (2011). *Western Province District Profiles*. Port Moresby: NSO. 7.
- [4] Australian High Commission. (2022). *PNG–Australia Western Province Strategy 2022–2030*.
- [5] Ferguson, J. (2005). Seeing like an oil company: space, security, and global capital in neoliberal Africa. *American Anthropologist*, 107(3), 377–382.
- [6] Ross, M. (2012). *The Oil Curse: How Petroleum Wealth Shapes the Development of Nations*. Princeton University Press.
- [7] Church, W. (2022). Factional competition, legal conflict and emerging organisational stratification around a prospective mine in Papua New Guinea. In N. Bainton, D. Filer, & C. McPherson (Eds.), *Capital and Inequality in Rural Papua New Guinea* (pp. 87–112). ANU Press.
- [8] Harvey, D. (2005). *The New Imperialism*. Oxford University Press.
- [9] Tsing, A. (2005). *Friction: An Ethnography of Global Connection*. Princeton University Press.
- [10] Filer, C. (1990). The Bougainville rebellion, the mining industry, and the process of social disintegration in Papua New Guinea. *Contemporary Pacific*, 3(2), 345–367.
- [11] Asher, S. & Novosad, P. (2020). Rural roads and local economic development. *American Economic Review*, 110(3), 797–823.
- [12] Francisco, K., & Helble, M. (2017). The Impact of Improved Transport Connectivity on Income, Education, and Health: The Case of the Roll-On/Roll-Off System in the Philippines. *Asian Development Bank*.
- [13] Bourke, R.M. & Harwood, T. (2009). *Food and Agriculture in Papua New Guinea*. ANU Press (Chapter 1).
- [14] World Bank. (2021). *Macro Poverty Outlook: Solomon Islands*. Washington, DC: World Bank. <https://thedocs.worldbank.org/en/doc/c6aceb75bed03729ef4ff9404dd7f125-0500012021/related/mpo-slb.pdf>
- [15] Banks, G. (2005). Globalization, poverty, and hyperdevelopment in Papua New Guinea's mining sector. *Fijian Studies*, 3(2), 77–90.
- [16] Segal, P. (2011). Resource funds, redistribution and investment policies: an analytical framework. *Journal of Development Economics*, 96(2), 156–167.
- [17] Weber, E. (2018). Lessons from Norway: state management of petroleum resource wealth. *Resources Policy*, 57, 38–45.
- [18] Flower, S. (2015). *Political Governance and Service Delivery in Papua New Guinea: A Strategic Review of Current and Alternative Governance Systems to Improve Service Delivery*. National Research Institute. Retrieved from <https://www.researchgate.net/publication/270794493>
- [19] Fong, M. W. L. (2009). Technology leapfrogging for developing countries. In M. Khosrow-Pour (Ed.), *Encyclopedia of Information Science and Technology* (2nd ed., pp. 3707–3713). IGI Global. <https://doi.org/10.4018/978-1-60566-026-4.ch591>
- [20] Curtain, R. et al. (2016). *Pacific Possible: Long-term Economic Opportunities and Challenges for PNG*. World Bank. (Chapter on ICT)
- [21] World Economic Forum. (2024, September). *Entering the Intelligent Age without a digital divide*.
- [22] Kirsch, S. (2014). *Mining Capitalism: The Relationship between Corporations and Their Critics*. Berkeley: University of California Press.
- [23] Imbun, B. (2007). Cannot manage without the 'significant other': mining, corporate social responsibility and local communities in PNG. *Journal of Business Ethics*, 73(2), 177–192.
- [24] Ok Tedi Mining Limited. (2024, December 13). *Ok Tedi Mining to generate K40 Billion over next 26 years*. PNG Business News.
- [25] Bainton, N. (2010). *The Lihir Destiny: Cultural Responses to Mining in Melanesia*. Canberra: ANU Press. (Comparative insights, Ch. 5 on Ok Tedi)
- [26] Ketan, J. (2013). The Ok Tedi community mine continuation agreements: a case of community consultation? *PNG Journal of Social Issues*, 10(1), 21–36.
- [27] Hanson, L. et al. (2001). *Papua New Guinea Rural Development Handbook*. Canberra: ANU. (Section on Ok Tedi environmental impact)
- [28] Swales, S., Storey, A. W., & Bakowa, K. A. (2000). Temporal and spatial variations in fish catches in the Fly River system in Papua New Guinea and the possible effects of the Ok Tedi copper mine. *Environmental Biology of Fishes*, 57(1), 75–95.
- [29] Business & Human Rights Resource Centre. (2024, June 7). *Papua New Guinea: Large-scale mining operations allegedly caused adverse impacts on environment and healths of about 30, 000 residents in southern site of Ok Tedi*

and Fly Rivers.

- [30] Mirou, N. (2013). Commission of Inquiry into the Special Agriculture and Business Leases (SABL). Final Report, PNG Government. (Case study on failed road project in WP)
- [31] Ok Tedi Development Foundation. (n.d.). Western Province. <https://otdfpng.org/western-province/>
- [32] Zorn, S. (2018). Despite our best intentions: Papua New Guinea's Ok Tedi mine and the limits of expert advice. *Mineral Economics*, 31(1), 13–21. <https://doi.org/10.1007/s13563-017-0111-1>
- [33] Johnson, P. (2012). Lode Shedding: A Case Study of Papua New Guinea's Mining Boom. Lowy Institute Paper 34. (Chapter 3 on revenue management)
- [34] Transparency International Australia. (2019). Corruption Risks in Mining Awards: Papua New Guinea Country Report. Retrieved from <https://transparency.org.au/wp-content/uploads/2019/10/PNG-report.pdf>
- [35] BHP Billiton. (2002, February 8). BHP Billiton withdraws from Ok Tedi copper mine and establishes development fund for benefit of Papua New Guinea people.
- [36] PNG Sustainable Development Program Ltd. (2012). Annual Report 2012. Port Moresby: PNGSDP.
- [37] Port Jackson Partners (2019). Independent Review PNG Sustainable Development Program. Retrieved from <https://www.pngsdp.org/uploads/2019-SDP-Review.pdf>
- [38] PNG Sustainable Development Program Limited. (2020, August). SDP Overview. Retrieved from <https://www.pngsdp.org/wp-content/uploads/2020/11/SDP-Overview-August-2020-WEB.pdf>
- [39] Barton, J. (2018). Digicel and PNG Sustainable Development Programme tackling digital divide. *Developing Telecoms*, 13 Sept 2018.
- [40] ABC News. (2013, September 19). PNG government takes control of Ok Tedi mine. Retrieved from <https://www.abc.net.au/news/2013-09-19/png-government-takes-control-of-png-ok-tedi-mine/4967004>
- [41] Independent State of Papua New Guinea v PNG Sustainable Development Program Ltd [2019] SGHC 68. Retrieved from https://www.elitigation.sg/gd/s/2019_SGHC_68
- [42] Morauta, M. (2017, June 14). Ok Tedi Mining Ltd damaged by O'Neill. Retrieved from <https://www.mekeremorauta.net/single-post/2017/06/14/Ok-Tedi-Mining-Ltd-damaged-by-ONeill>
- [43] Morauta, M. (2016, April 25). Morauta brushes aside PM O'Neill's claims. *PNG Facts*. Retrieved from <https://news.pngfacts.com/2016/04/morauta-brush-aside-pm-oneills-claims.html>
- [44] McLeod, S. (2019, April 24). A billion reasons: the future of PNG's Sustainable Development Fund. Lowy Institute. Retrieved from <https://www.lowyinstitute.org/the-interpreter/billion-reasons-future-png-s-sustainable-development-fund>
- [45] UNICEF Papua New Guinea. (n.d.). Water, Sanitation and Hygiene. Retrieved June 11, 2025, from <https://www.unicef.org/png/what-we-do/water-sanitation-and-hygiene>
- [46] PNG Sustainable Development Program Ltd. (2018). Annual Report 2018. Retrieved from <https://pngsdp.org/uploads/2018-Annual-Report.pdf>
- [47] Lawrence, C. (2017). Infrastructure Challenges for Papua New Guinea's Future. Lowy Institute. Retrieved from https://interactives.lowyinstitute.org/archive/png-in-2017/downloads/Lawrence_Infrastructure.pdf
- [48] PNG Sustainable Development Program Ltd. (2011). Independent Review of the PNG Sustainable Development Program. Retrieved from <https://pngsdp.org/uploads/2011-pngsdp-review.pdf>
- [49] Masiu, T. (2024). Speech: Launch of Starlink Services in PNG. Ministry of Information and Communication, 3 Jan 2024.
- [50] Australia Papua New Guinea Business Council. (2024, January 8). Starlink licence to revolutionise Papua New Guinea's internet landscape. Retrieved from <https://apngbc.org.au/news/starlink-license-to-revolutionise-papua-new-guineas-internet-landscape/>
- [51] Collective Empowerment Foundation. (n.d.). Development Initiatives. Retrieved from <https://collectiveempowermentfoundation.org/development-initiatives/>
- [52] Starlink. (n.d.). Connecting The Unconnected. Retrieved June 11, 2025, from <https://www.starlink.com/connecting-the-unconnected>
- [53] Yasaro, J. (2025, January 20). Starlink in Papua New Guinea: Opportunities and Challenges. *Journey Within*. Retrieved from <https://journeywithin.wordpress.com/2025/01/20/starlink-in-papua-new-guinea-opportunities-and-challenges/>
- [54] Tech In Pacific. (2023, January 4). PNG Outlaws Unlicensed StarLink Terminals. Retrieved from <https://www.techinpacific.com/png-outlaws-unlicensed-starlink-terminals/>
- [55] Post-Courier. (2025, May 15). Digital literacy in PNG: Why it's more important than ever. Retrieved from <https://www.postcourier.com.pg/digital-literacy-in-png-why-its-more-important-than-ever/>
- [56] Burton, J. (1997). The Ok Tedi settlement: issues, outcomes and implications. In C. Filer (Ed.), *Dilemmas of Development*, pp. 173–224. Canberra: ANU.