



Natural Resources and Livelihood Diversification: A Case Study of Chromite Extraction in Heroshah-Malakand, Pakistan

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ABSTRACT

Background: Natural resources can promote rural development and livelihood diversification when managed through inclusive institutions. However, unequal governance often concentrates benefits among a few actors, leaving resource-rich communities economically marginalized. Chromite mining in Heroshah, District Malakand, Khyber Pakhtunkhwa (KPK), Pakistan, represents a localized resource-curse scenario where substantial mineral wealth has generated limited benefits for local residents.

Objective: To assess the impact of chromite extraction on livelihood diversification, income generation, resource distribution, and local livelihoods in Heroshah-Malakand.

Methods: A cross-sectional household survey was conducted among 150 randomly selected households in Union Council Heroshah. Data were collected using a structured questionnaire and analyzed through descriptive statistics and thematic analysis.

Results: Annual chromite production was estimated at approximately 400 tonnes, valued at PKR 11.09 million (≈ USD 90,000). However, only about PKR 148,500 (1.3%) reached local households, while most revenues remained with two private contractors. Most households earned PKR 20,000–30,000 monthly and depended on agriculture, trade, and public-sector employment rather than mining. Respondents reported land degradation, water contamination, and biodiversity loss.

Conclusion: Findings indicate an institutionally driven resource curse caused by exclusionary governance. Strengthening community rights, inclusive management, sustainable extraction practices, and local value-added processing could improve socioeconomic and environmental outcomes.

INTRODUCTION

Natural Resource Management encompasses actions taken to maintain both renewable and non-renewable resources for the benefit of current and future generations, as well as the broader relationship between people and their natural environment (Hussen, 2004). Healthy and productive ecosystems underpin rural livelihoods; for the rural poor, access to and management of such ecosystems are therefore key to improving welfare (Ellis & Allison, 2004). In the absence of enabling conditions adequate infrastructure, functional public services, sound institutions, equitable access rights, and meaningful stakeholder engagement few rural populations are able to escape poverty, regardless of resource endowment (Ellis & Allison, 2004; Gupta & Dasgupta, 2013).

Pakistan, and Khyber Pakhtunkhwa (KPK) in particular, is abundantly endowed with natural resources. The Khyber Pakhtunkhwa Oil and Gas Company Limited (KPOGCL) estimates that KPK contributes approximately 55 per cent of national natural-resource output, encompassing crude oil, liquefied petroleum gas, natural gas, and minerals including coal, copper, gold, lead, zinc, chromite, rock phosphate, gypsum, rock salt, and silica. The non-renewable mineral chromite occurs in the Qila rocks of District Malakand within the

Heroshah Mountains of the Sakhakot Qila complex. Of the eight identified mines, five were active with an estimated output of ten tonnes of ore per day: three remained unexploited due to waterlogging and land degradation (Ahmad et al., 2013).

Yet this endowment has not translated into local prosperity. Prolonged disputes among community shareholders over extraction rights led the government to award extraction contracts to private contractors without resolving the underlying governance failures. Contractors remit a nominal share to community landowners while retaining most of the resource value. Resolving these conflicts and redirecting resource benefits towards local households are therefore prerequisites for sustainable resource stewardship and livelihood improvement.

The present paper addresses a well-documented gap in the Pakistani literature: while national commentaries highlight Pakistan's poor management of abundant resources (Laghari, 2011; Subhani, 2018), there is very limited fine-grained, household-level evidence on distributional patterns within individual mining communities, or on the institutional mechanisms that shape those patterns. The discourse is predominantly macro-level and journalistic rather than survey based. This study fills that void by providing primary household-level evidence on chromite extraction in Heroshah-



Malakand and situating it explicitly within the international resource-governance literature.

The study pursues five objectives: (i) to assess the availability and ownership structure of chromite in Heroshah-Malakand; (ii) to quantify the distribution of extraction revenue between private contractors and local households; (iii) to characterise the current occupational and income profiles of local households and the resource's contribution (or lack thereof) to livelihood diversification; (iv) to document the extraction techniques employed and their environmental implications; and (v) to identify institutional arrangements that residents perceive as capable of improving livelihood outcomes.

The paper makes three principal contributions. First, it provides bounded, primary household-survey evidence on mineral-rent distribution in Pakistani mining community evidence that is largely absent from the national debate. Second, it connects a Pakistani case to the CBNRM and resource-governance literature, demonstrating that the mechanisms documented elsewhere are operative in KPK. Third, it generates locally grounded policy directions on property-rights allocation, community or state stewardship, sustainable extraction, and local processing all linked to livelihood diversification (Ellis & Allison, 2004).

The paper proceeds as follows. Section 2 presents the theoretical and conceptual framework. Section 3 describes the materials and methods. Section 4 reports results. Section 5 discusses findings in light of theory and prior literature. Section 6 derives policy implications. Section 7 notes limitations and directions for future research. Section 8 concludes.

The growing body of literature on natural resources and development economics identifies a recurring paradox: resource-rich countries and communities frequently exhibit high poverty rates the so-called resource curse (Auty, 2003). In Tanzania, despite approximately 44 million hectares of arable land and diverse mineral, forest, water, and wildlife resources, Mkonda and He (2017) show that half the population remains in poverty. They attribute this to poor governance, policy failure, political interference, insufficient technological development, and corruption, each of which channels resource wealth to a minority rather than the population at large. This outcome is consistent with Auty's (2003) resource-curse thesis and with Frieden and Lake's (1995) political-economy perspective, in which the distribution of resource wealth reflects power rather than economic efficiency alone.

Livelihood diversification has been identified as a key pathway out of rural poverty. Ellis and Allison (2004) argue that diversification broadening income sources and reducing dependence on any single asset improves resilience to food insecurity and creates the foundation for asset accumulation. Critically, access to natural resources must be treated as a livelihood asset whose availability is shaped by local governance and policy. Korankye (2014) concludes that equitable resource allocation reduces poverty, whereas inequitable access concentrates wealth and perpetuates vulnerability. Moseley (2003) similarly emphasises that resource endowments become livelihood assets only when mediated through functional institutions.

Institutions the rules governing access, use, and decision-making over a resource thus occupy a central explanatory role. Gupta and Dasgupta (2013) advocate multi-stakeholder analysis to ensure that governance provides an inclusive platform for sustainable use. Rugebreg et al. (2016) find that when governments fail to extend legal resource rights to local communities, communities lose both benefits and incentives for conservation, fuelling conflict. Local participation is therefore not merely desirable but functionally necessary: where communities are involved in governance design, benefit-sharing tends to be more equitable and local support for sustainable management tends to be higher.

Community-Based Natural Resource Management (CBNRM) operationalises these principles by devolving resource rights and

management responsibilities to local communities. Ayoo (2007) argues that centralised government ownership of natural resources fosters inequitable provision and widens the rich–poor gap, as communities lack both economic incentives to protect resources and the capacity to diversify incomes. By contrast, CBNRM creates incentives aligned with conservation. Long (2004) documents how the Wildlife Integration for Livelihood Diversification (WILD) programme in Namibia not only rehabilitated wildlife over approximately a decade but generated an estimated N\$14.5 million in tourism revenues by 2003, of which roughly half reached households as wages. Lepper and Goebel (2010) report similarly transformative effects in Ngamiland, northern Botswana, where CBNRM-based ecotourism converted negligible natural-resource income into a meaningful community cash income.

Pakistan literature corroborates the governance-gap narrative. Laghari (2011) observes that despite abundant water, minerals, natural gas, and oil, Pakistan cannot solve its resource crises due to management inefficiency compounded by corruption, skills shortages, weak political will, and inter-communal conflict. Subhani (2018) reaches a similar conclusion: Pakistan's resources are theoretically sufficient for development but require sustained state action on management. Ahmad et al. (2013) document the specific context of the Heroshah chromite mines within the Sakhakot Qila complex, characterising the extraction method (blasting) and its adverse impacts on land, water, and biota.

Theoretical and Conceptual Framework

This study is grounded in institutional resource economics, which treats institutions the rules governing access, use, and decision-making over a resource endowment as the mechanism through which geographical endowment is translated into livelihood outcomes (Hussen, 2004; Korankye, 2014). The central premise is that the same physical endowment can produce markedly different distributional and environmental consequences depending on the institutional system applied; institutions, rather than geology per se, are the principal determinants of outcomes (Ellis & Allison, 2004; Auty, 2003).

Two ideal-typical regimes bracket the possibility space. Under an exclusionary regime, rights are held by a small group of actors here, private contractors who capture most of the resource rent, bear no accountability to the host community, and consequently have weak incentives to reduce environmental impact; expected outcomes are rent capture, community exclusion, and resource degradation (Ayoo, 2007; Rugebreg et al., 2016; Mkonda & He, 2017). Under an inclusive regime whether state stewardship oriented towards public welfare or CBNRM with secure community property rights — benefits are broadly distributed, participants have conservation incentives, and the resource becomes an asset on which households can diversify; the resource is predicted to be used more sustainably (Ayoo, 2007; Long, 2004; Lepper & Goebel, 2010; Gupta & Dasgupta, 2013).

Three institutional features distinguish the regimes: the allocation of property rights, the quality and inclusiveness of governance, and the degree of stakeholder participation (Gupta & Dasgupta, 2013; Cobbinah, 2015). A parallel pathway operates through extraction technology and environmental practice: technique conditions both resource wastage and ecological impact (Ahmad et al., 2013). Figure 1 summarises these relationships. The framework guides the empirical analysis by positioning the Heroshah case along the exclusionary–inclusive continuum and tracing its implications for income, occupational diversification, and environmental sustainability.

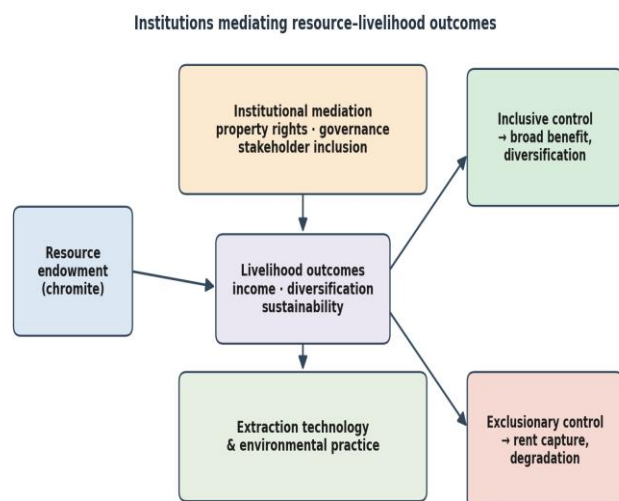


Figure 1. Conceptual framework: institutions mediating the link between resource endowment and livelihood outcomes. Source: Authors, synthesising Ayoo (2007), Ellis and Allison (2004), Gupta, and Dasgupta (2013), and Rugebreg et al. (2016).

METHODOLOGY

Research Design

This study adopts a cross-sectional, primary-survey design within a single-community case-study framework. The bounded, context-specific focus necessitates a descriptive case-study approach. The design integrates both closed (quantitative) and open-ended (qualitative) items, enabling quantification of income, occupation, and resource shares alongside in-depth accounts of ownership, extraction strategies, and preferred governance arrangements.

Study Area

The study was conducted in Union Council Heroshah, District Malakand, KPK, Pakistan. Malakand occupies a strategic position at the gateway to Bajaur (north), Lower Dir (west), Swat (east), and Buner (south-east), with Charsadda to the south-west and Mardan to the south-east. Covering 952 km², the district draws 4.5% of its irrigated area from the Swat River and hosts hydroelectric generation at Jabban and Malakand. Administratively, Malakand comprises 28 union councils and two tehsils (Dargai and Batkhela). The district has a complex administrative history incorporated into the NWFP (now KPK) in the early 1900s, then administered as a Federally Administered Tribal Area (FATA) until 1969 and thereafter governed as a Provincially Administered Tribal Area (PATA). The chromite deposits under investigation are located in the Heroshah Mountains within the Sakhakot Qila complex.

Sampling Frame and Procedure

The target population consisted of all households within Union Council Heroshah with any interest in or exposure to chromite extraction. The sampling frame was constructed from the union council household registry. A sample of 150 households was drawn using simple random sampling without replacement to minimise selection bias and to support descriptive generalisation within the union council. The use of simple random sampling within a clearly bounded frame is standard practice in household surveys of this type and is the basis for the inferences drawn about the population. All selected households were approached; those that declined or could not be contacted were replaced by randomly selected alternates from the same frame, yielding a final achieved sample of $n = 150$ with a response rate of approximately 90%.

Data Collection Instrument

Data were collected using a structured questionnaire comprising 14 items 6 closed and 8 open-ended. Closed items covered: family size;

monthly household income range; primary income source; whether the household holds a chromite share and its approximate value; income from resource extraction; and whether own-source income exceeds resource income. Open-ended items elicited descriptions of the extraction method, perceptions of resource extractability and over-extraction, environmental effects, and preferred governance arrangements. The instrument was pre-tested on five households outside the study frame and refined accordingly. Face and content validity were established through expert review by two academic specialists in natural resource economics prior to deployment. Figure 2 summarises the study design and sampling parameters.

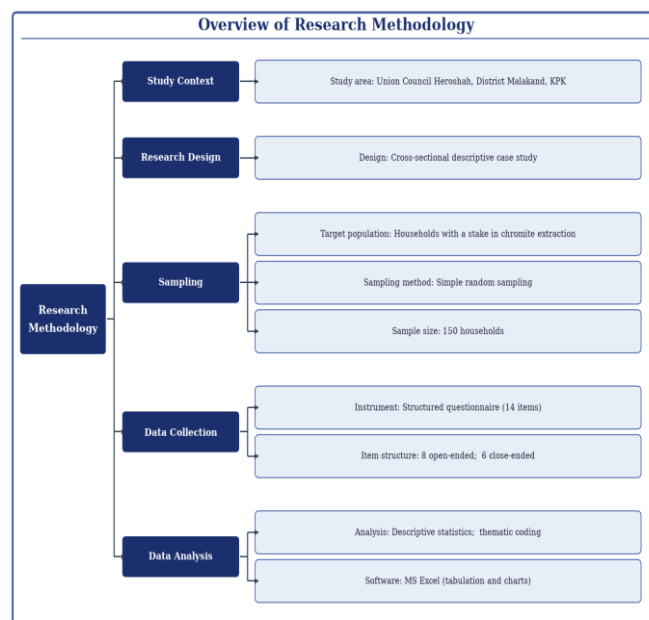


Figure 2. Overview of the study design, sampling, data collection, and analysis procedures.

Figure 2. Summary of study design and sampling parameters.

Variables

The outcome constructs of interest are monthly household income (income band), primary occupation, and the household's share of resource income. The explanatory constructs relate to the institutional and technical regime: ownership and control of the resource, extraction method, and respondents' perceptions of extraction efficiency and over-extraction. Contextual variables include family size and primary source of household income. This operationalisation maps directly onto the conceptual framework in Section 2, in which institutional attributes and extraction practice jointly drive livelihood outcomes.

Data Analysis

Closed-ended responses were analysed using descriptive statistics (frequencies and percentages) and displayed as pie charts and bar graphs generated in Microsoft Excel. Open-ended responses were subjected to thematic analysis: responses were read, coded inductively, and grouped into recurring themes relating to ownership structures, extraction methods, and preferred governance forms. Revenue estimates reported in Section 4.4 were derived by multiplying total reported output by the prevailing market price per tonne and then comparing community-allocated amounts with the inferred total; these figures are best interpreted as reasonable approximations rather than audited values (see Section 7 for caveats). Validity was strengthened through the use of simple random sampling within a defined frame, and through triangulation of respondents' accounts of extraction technique and environmental effects against independent geological and economic data for the same mines. Informed consent was obtained from all participants, who were assured of anonymity and the exclusive research use of their data.

RESULTS

Household Income Distribution

The distribution of monthly household income is illustrated in Figures 3 and 4. The modal income band is PKR 20,000–30,000, encompassing 42% of sampled households. The second-largest group (31%) reports income of at least PKR 40,000, while 17% fall in the PKR 30,000–40,000 band. The lower bands are thinly represented: 9% in PKR 10,000–20,000 and 1% below PKR 10,000. Despite residing in a mineralogically endowed area, the majority of sampled households are concentrated in the lower-middle segment of the income distribution a finding that is directly relevant to the resource-curse framing of Section 2.

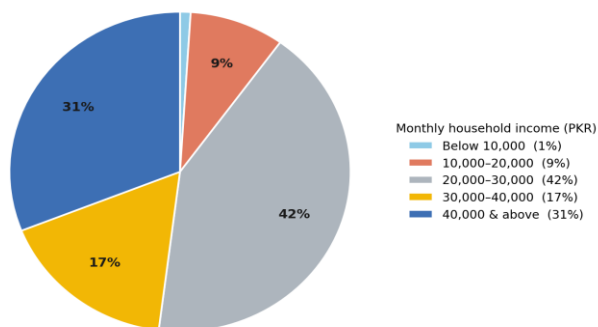


Figure 3. Distribution of monthly household income among sampled households ($n = 150$). The modal band (PKR 20,000–30,000, 42%) and the concentration of households in lower-income brackets contrast with the substantial estimated value of local chromite extraction, underscoring the disconnect between resource endowment and community welfare. Source: Authors' field survey.

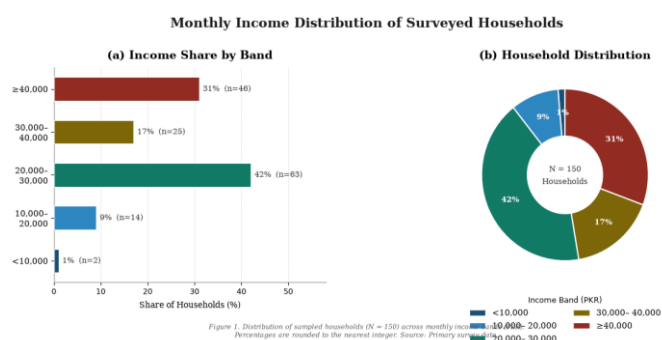


Figure 4. Monthly household income distribution by category bar chart representation ($n = 150$). The bar chart confirms the pie-chart pattern, with the PKR 20,000–30,000 category dominating and only 31% of households reaching the PKR 40,000+ band. Source: Authors' field survey.

Occupational Structure

The occupational profile of sampled households is presented in Figures 5 and 6. Government service employees constitute the largest single group (24%), followed by business owners (19%), farmers (17%), labourers (15%), shopkeepers (13%), drivers (9%), and private employees (3%). Notably, chromite extraction does not emerge as a primary occupation for any significant share of households a striking finding given the community's proximity to active mines. This low representation of mining in the local livelihood portfolio is a first-order indicator that the resource endowment has not translated into occupational diversification for the local population.

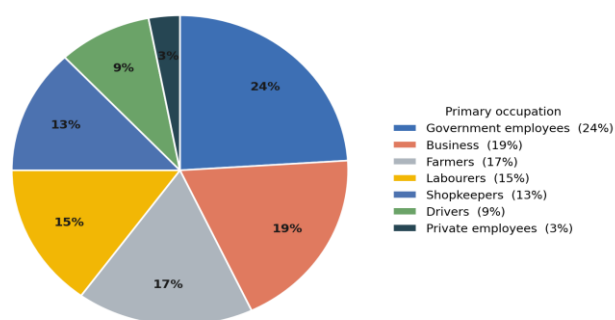


Figure 5. Primary occupation of sampled households ($n = 150$). Government service (24%) and business (19%) dominate local livelihoods, while chromite mining is absent as a primary occupation, indicating that the resource has not been integrated into the local livelihood portfolio. Source: Authors' field survey.

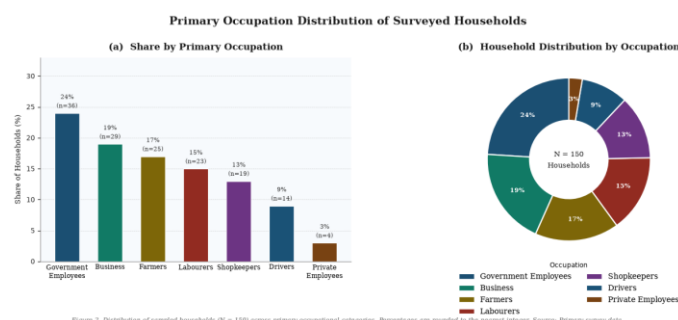


Figure 6. Primary occupation of sampled households bar chart representation ($n = 150$). The bar chart highlights the diversity of non-resource occupations and confirms that extraction does not figure as a meaningful livelihood category despite the community's proximity to active chromite mines.

Ownership and Control of the Resource

Control over chromite extraction was consistently reported by respondents to be vested in two private contractors. Protracted disputes among local shareholders over extraction rights had persisted long enough for the government to award extraction contracts to outside contractors as a conflict-resolution measure without resolving the underlying property-rights question or establishing a durable management system. Community landowners receive a distributed share from the contractor, but decision-making rights and the residual value of the resource remain outside community control. This ownership structure firmly places the Heroshah case at the exclusionary end of the conceptual continuum outlined in Section 2.

Revenue Generation and Distribution

Figures 7 and 8 present the distributional core of the study. Annual production is estimated at approximately 400 tonnes of chromite. At an estimated market price of USD 225 per tonne, total annual production value is approximately USD 90,000 ($\approx$ PKR 11.09 million). Of this estimated total, only approximately PKR 148,500 per year (1.3%) is allocated to the community, with individual household shares ranging from PKR 3,000 to PKR 9,000 per year. The two private contractors collectively retain approximately PKR 10.94 million (98.7%) of estimated annual extraction value. These revenue figures are derived from respondents' self-reported output and price estimates and are best understood as indicative approximations rather than audited accounts (see Section 7). The central empirical finding is not any precise monetary figure but the order of magnitude of the gap: a resource generating millions of rupees annually delivers less than 2% of that value to the community it physically displaces.

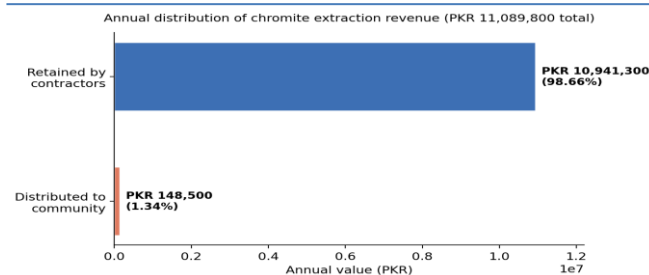


Figure 7. Annual distribution of estimated chromite extraction revenue between contractors and the community. The pie chart illustrates the extreme concentration of resource rent: private contractors retain an estimated 98.7% of total extraction value, while the host community receives approximately 1.3%.

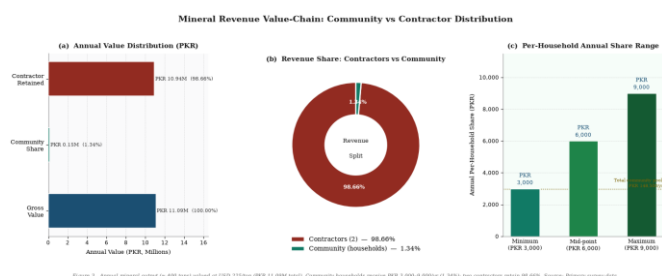


Figure 8. Estimated annual value of chromite extraction and its distribution bar chart representation. The bar chart depicts the absolute magnitude of the disparity between contractor and community shares in monetary terms (PKR), making the scale of rent capture visible.

Extraction Techniques and Environmental Effects

Blasting is the sole extraction method employed. Respondents characterised this approach as wasteful and environmentally harmful, linking it to resource loss and damage to land, water sources, and local biota. These accounts align with independent geological evidence that blasting at the Heroshah mines generates waste across wide areas and causes significant ecological harm to land, water, and biodiversity. The technical regime therefore compounds the distributional inequity: the community bears the environmental costs of extraction while receiving virtually none of its economic benefits.

Perceived Governance Preferences

When asked how the situation could be improved, respondents consistently expressed a preference for a fundamental shift in resource control. Recommendations centred on four themes: transferring management to government or community bodies with accountability mechanisms to ensure revenues are channelled into community welfare; securing community property rights to curb over-extraction; guaranteeing community revenue shares; and processing ore locally rather than exporting it unprocessed to Karachi. These preferences align clearly with the inclusive end of the conceptual continuum and provide community-level validation for the policy directions elaborated in Section.

DISCUSSION

The findings collectively depict a localised resource curse. As in Mkonda and He's (2017) analysis of Tanzania a country rich in land, minerals, and wildlife yet plagued by poverty Heroshah hosts a substantial mineral endowment, yet households cluster in lower-income brackets while resource value accrues to a small minority. Auty's (2003) framing is instructive here: the outcome is not a product of the resource itself but of the governance and institutional model through which it is extracted. The documented contractor concentration of 98.7% of estimated revenue exemplifies precisely the inequitable resource allocation and wealth uncertainty that Korankye (2014) identifies as drivers of persistent poverty. More recent scholarship reinforces this diagnosis. Bebbington and

Bury (2013) demonstrate that mining governance failures in the Andes produced analogous patterns of community exclusion and environmental harm, even as national GDP grew, highlighting the need to distinguish macro-level resource revenues from community-level distributional outcomes. Similarly, Arsel et al. (2016) show that the resource curse is not an automatic consequence of resource abundance but emerges through specific political-economic processes in Heroshah's case, the assignment of extraction rights to private contractors without community consent or accountability. Hilson and Maconachie (2017) further argue that artisanal and small-scale mining communities in the Global South are disproportionately exposed to governance failures that redirect rents away from local beneficiaries, a pattern directly mirrored in the present findings.

The institutional mechanism is central to the explanation. The unresolved community conflict over extraction rights precipitated the transfer of those rights to private contractors rather than to community or accountable state management. This is the pattern identified by Ayoo (2007): governance arrangements that exclude local communities eliminate economic incentives for income diversification and environmental protection. It is also consistent with Rugebreg et al. (2016), who find that such exclusion not only marginalises communities economically but also fosters community-state conflict. Gupta and Dasgupta (2013) and Cobbinah (2015) both emphasise that inclusiveness in governance is the mechanism through which equitable benefit-sharing and local support for sustainable resource management are secured conditions entirely absent in Heroshah.

The absence of stakeholder participation has additional consequences highlighted by recent literature. demonstrate, in the context of Himalayan community forest management, that exclusion of local stakeholders from governance decisions systematically undermines both livelihood outcomes and biodiversity conservation a dual failure also visible in Heroshah. Asiyambi and Lund (2020) similarly show that governance arrangements that sideline community interests in forest and mining settings tend to produce short-run rent extraction rather than long-run sustainable management, reinforcing the need for inclusive institutional design. These findings contrast sharply with CBNRM successes. Community-based management in Namibia redistributed approximately half of tourism revenues as household wages and catalysed wildlife recovery (Long, 2004); ecotourism partnerships in northern Botswana produced measurable gains in community income and poverty reduction (Lepper & Goebel, 2010). In Heroshah, by contrast, the community holds no decision rights and receives a negligible share of resource value. The resource has not become a livelihood asset enabling households to escape poverty livelihoods remain anchored in public employment, trade, and agriculture, entirely consistent with Ellis and Allison's (2004) framework. Onyekwere et al. (2022) reach analogous conclusions in Nigerian artisanal gold-mining communities, where the absence of community governance institutions perpetuated a cycle of environmental degradation and income inequality a dynamic strikingly parallel to Heroshah.

The resource-curse literature has been refined to distinguish national-level from sub-national manifestations. Van der Ploeg (2011) shows that localised resource curses can emerge even when aggregate national indicators are positive, because the distributional effects of extraction are geographically and institutionally mediated. This sub-national framing is particularly apt for Heroshah, where KPK's overall mineral output figures obscure severe community-level deprivation. Recent empirical work by Loayza and Rigolini (2016) on Peruvian mining districts confirms that proximity to extraction sites does not automatically translate into local welfare gains unless governance institutions channel rents appropriately a finding with direct implications for the Heroshah case.

Finally, the environmental dimension must be linked to the distributional one. The blasting technique criticised by respondents and confirmed by geological evidence to cause harm to land, water, and biota (Ahmad et al., 2013), imposes costs on people who receive

virtually none of the extraction benefits. This is the joint distributional–environmental failure predicted by the governance literature when resources are managed through exclusionary institutions (Ayoo, 2007; Rugebreg et al., 2016). document comparable blast-induced land and water degradation in KPK mining communities, confirming that this is a systemic rather than idiosyncratic feature of the regional extraction regime. Pact (2015) and subsequent CBNRM pilot projects in Pakistan suggest that introducing community environmental monitoring alongside resource-governance reform could simultaneously address both the distributional and ecological dimensions an integrated intervention logic that the Heroshah evidence strongly supports.

Policy Implications

The analysis identifies four mutually reinforcing policy directions grounded in both the empirical findings and the broader literature. Transition to inclusive governance. Replacing private contractor management with accountable state stewardship or community-based management would align extraction incentives with local welfare and conservation goals (Ayoo, 2007; Long, 2004; Lepper & Goebel, 2010). Respondents themselves identified government or community control as their preferred governance arrangement, providing bottom-up validation for this direction.

Secure community property rights. Establishing clear, legally enforceable property rights over chromite for the host community would address both distributional and environmental failures simultaneously, reduce incentives for over-extraction, and give the community a legitimate stake in the resource's value (Korankye, 2014; Rugebreg et al., 2016). Resolving the underlying ownership disputes rather than circumventing them through contractor assignments is a prerequisite for durable governance reform.

Multi-stakeholder participation. Institutionalising multi-stakeholder decision-making processes over extraction terms, revenue allocation, and environmental management would improve benefit-sharing and build local support for long-run sustainable management (Gupta & Dasgupta, 2013; Cobbinah, 2015). Community representation in licensing and royalty negotiations should be formalised.

Local processing and sustainable extraction. Establishing local ore-processing capacity would generate jobs and diversify livelihoods rather than exporting unprocessed ore to distant refineries, while replacing blasting with lower-impact extraction methods would reduce waste and ecological harm (Ahmad et al., 2013; Ellis & Allison, 2004). Directing a fixed proportion of extraction revenues into community public goods health, education, infrastructure would further convert the endowment into a development asset. Together, these measures would shift the Heroshah case from the exclusionary to the inclusive end of the conceptual continuum, improving equity, diversification, and sustainability as an integrated package rather than as discrete interventions.

Limitations and Future Research

These limitations define a productive research agenda. Longitudinal studies should track changes in rent distribution and livelihood outcomes across governance transitions. Comparative, multi-site designs across mineral-producing communities in Khyber Pakhtunkhwa could test the external validity of the resource-governance and resource-curse interpretation (Mkonda & He, 2017; Ayoo, 2007). Mixed-methods approaches combining household surveys with mine-level production records or independent production audits could improve the accuracy of revenue estimates. Econometric analysis exploiting variation in governance arrangements across sites or over time could enable more rigorous causal inference about the relationship between institutional arrangements and livelihood outcomes (Ellis & Allison, 2004). Dedicated environmental assessments of mining and blasting practices should also quantify potential effects on air quality, noise, vibration, land degradation, and community health. Finally, formal stakeholder mapping and participatory assessment could help

evaluate community participation, power relations, and institutional readiness for community-based natural-resource management (Ayoo, 2007; Cobbinah, 2015).

CONCLUSION

This study investigated the availability, ownership, and livelihood implications of chromite extraction in Heroshah-Malakand through a household survey of 150 randomly selected households. The findings are unambiguous: an estimated PKR 11.09 million of annual extraction value produces only approximately PKR 148,500 (1.3%) in community-level income, with the remainder captured by two private contractors who obtained extraction rights following unresolved community disputes. Residents earn predominantly in lower-middle income bands; livelihoods are anchored in public employment, trade, and agriculture rather than the resource itself; extraction employs an environmentally damaging blasting method; and residents prefer government or community control with equitable benefit-sharing and local processing.

The case is interpreted as an institutionally driven, localised resource curse rooted in exclusionary property-rights allocation rather than resource scarcity. The study contributes to the Pakistani literature by providing primary household-level evidence on mineral-rent distribution within a PATA mining community, and to the international literature by demonstrating the operation of resource-governance mechanisms documented elsewhere in Africa, Latin America, and Asia in a KPK context. The central implication is also the central source of optimism: because the curse is institutional rather than geological, it is remediable. Shifting control towards the community or an accountable state, establishing enforceable property rights, embedding stakeholder participation, and building local processing capacity could transform a resource that currently deepens inequality into a genuine foundation for equitable and sustainable livelihood diversification.

Ethical Considerations

The study was conducted in accordance with ethical guidelines, with informed consent obtained from all participants and confidentiality strictly maintained.

Data Availability

Available from corresponding author on request.

Author Contributions

Karishma Zaman: conceptualisation, data collection, formal analysis, writing original draft. Wajiha Bilal: literature review, writing review and editing. Muhammad Junaid Khan: methodology, data curation, writing review, and editing. Naji Ullah: conceptualisation, supervision, writing review, and editing. Muhammad Hussam ul Haq: data collection, visualisation.

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Conflict of Interest

The authors declare no conflict of interest.

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Declaration of Use of Artificial Intelligence

Gemini AI tool was used for grammar and language correction.

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