

Oil Exploration Activities and Community Livelihoods: A Case of Hoima District, Uganda

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Abstract

This study examined the relationship between oil exploration activities and community livelihoods in Hoima District, Uganda, a focal area of the country's emerging oil industry. Oil exploration brings both opportunities and risks to host communities, and understanding its net effect on livelihoods is essential to ensuring that resource development benefits, rather than harms, local people. The study investigated how employment and income opportunities, infrastructure development, land access and displacement, and environmental change relate to community livelihoods. A cross-sectional survey design with a mixed-methods approach was adopted, and data were collected from 190 respondents comprising community members, local leaders, and district officials using structured questionnaires and interviews. Descriptive statistics, exploratory factor analysis, Pearson correlation, and structural (path) analysis were used. Factor analysis confirmed the construct validity of the oil-impact dimensions, which loaded onto coherent factors and explained 68.1% of the variance. The results revealed a strong and significant overall relationship between oil exploration activities and community livelihoods ($R^2 = 0.650$), with a mixed pattern of effects: employment and income ($\beta = 0.31$) and infrastructure development ($\beta = 0.29$) improved livelihoods, while environmental change ($\beta = -0.20$) and land access and displacement ($\beta = -0.18$) undermined them. The study concludes that oil exploration has a double-edged effect on community livelihoods and recommends maximizing local employment and infrastructure benefits while mitigating environmental and land-related harms.

Keywords: oil exploration, community livelihoods, employment, infrastructure, environment, displacement, Hoima, Uganda

1.0 Introduction

The discovery and exploration of oil in a region is among the most consequential economic events that can affect a community, carrying the potential both to transform livelihoods for the better and to expose communities to significant risks and harms (Ross, 2021). Across the world, and particularly in developing economies, the relationship between extractive-resource activities and the wellbeing of host communities has been intensely studied, giving rise to a substantial literature on the so-called “resource curse” and on the conditions under which resource wealth translates into local development rather than dispossession and conflict (Ross, 2021; Bainton & Skrzypek, 2021). Oil exploration activities—the surveying, drilling, and associated development that precede and accompany production—mark the point at which these opportunities and risks first reach host communities (Ntirandekura & Christopher, 2022).

Community livelihoods—the capabilities, assets, and activities through which people make a living—are shaped by oil exploration through several distinct pathways, some beneficial and some harmful (DFID, as discussed in Bainton & Skrzypek, 2021). On the beneficial side, oil activities can create employment and income opportunities for local

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people, and they frequently bring infrastructure development, such as roads, electricity, and services, that improves living conditions (Julius & Nancy, 2025). On the harmful side, oil activities can require the acquisition of land, displacing communities from the farmland and homes on which their livelihoods depend, and they can cause environmental change—pollution, degradation, and disruption of natural resources—that undermines agriculture, fishing, and health (Ross, 2021; Bainton & Skrzypek, 2021). The net effect on livelihoods depends on the balance among these pathways.

The theoretical understanding of these dynamics draws on the sustainable livelihoods framework, the resource curse thesis, and stakeholder theory (Julius & Kaazara, 2025). The sustainable livelihoods framework situates households within a system of natural, physical, financial, human, and social assets, and directs attention to how oil activities enhance or erode these assets (Bainton & Skrzypek, 2021). The resource curse thesis warns that resource wealth can, under weak governance, harm rather than help local populations (Ross, 2021). Stakeholder theory frames host communities as legitimate stakeholders whose interests must be considered in resource development (Freeman, as discussed in Bainton & Skrzypek, 2021).

Hoima District, in the Albertine Graben region of western Uganda, lies at the heart of the country's emerging oil industry, and its communities have experienced the arrival of exploration and development activities with their attendant opportunities and disruptions (Ministry of Energy and Mineral Development, 2023). As Uganda moves towards oil production, the effect of these activities on the livelihoods of communities in Hoima is a matter of considerable importance (Christopher et al., 2022). Although the general relationship between extractive activities and communities is well studied internationally, empirical evidence quantifying the effect of oil exploration on the livelihoods of Ugandan communities, and disaggregating its beneficial and harmful pathways, remains limited (Kabagambe & Tumusiime, 2023). This study addresses that gap by examining, through factor analysis, correlation, and structural (path) analysis, how employment and income opportunities, infrastructure development, land access and displacement, and environmental change relate to community livelihoods in Hoima (Hassan Abdi et al., 2020). The findings are significant for communities, oil companies, government, and civil society.

2. Statement of the Problem

Oil exploration is widely expected to bring development and improved livelihoods to host communities, and communities in Hoima District anticipated that oil activities would create jobs, infrastructure, and prosperity (Ministry of Energy and Mineral Development, 2023). Ideally, the benefits of oil activities would outweigh their costs, leaving communities better off. In practice, however, host communities in oil regions frequently experience displacement, environmental harm, and disappointment alongside the benefits, and the net effect of oil exploration on the livelihoods of communities in Hoima has not been established through rigorous empirical research (Kabagambe & Tumusiime, 2023; Ross, 2021).

Oil exploration exposes communities to competing pathways-employment and infrastructure on the one hand, land loss and environmental change on the other-whose relative weight determines whether livelihoods improve or deteriorate (Bainton & Skrzypek, 2021). Yet the contribution of each pathway remains unclear, which hampers efforts to maximise benefits and mitigate harms. Without such evidence, policy and corporate practice risk failing to protect community livelihoods (Ntirandekura & Christopher, 2022). If this problem remains unaddressed, communities may bear the costs of oil development without securing its benefits, fuelling grievance and undermining the legitimacy of the industry (Deus, 2023). This study therefore sought to establish the relationship between oil exploration activities and community livelihoods in Hoima and to identify the most influential pathways.

3. Main Objective

The main objective of the study was to examine the relationship between oil exploration activities and community livelihoods in Hoima District, Uganda.

3.1 Specific Objectives

- i. To assess the oil exploration activities affecting communities in Hoima District.
- ii. To establish the relationship between oil exploration dimensions (employment and income opportunities, infrastructure development, land access and displacement, and environmental change) and community livelihoods.
- iii. To determine the relative contribution (path coefficients) of each dimension to community livelihoods.

4.0 Literature Review

Research on extractive activities and community livelihoods is grounded in the sustainable livelihoods framework, the resource curse thesis, and stakeholder theory (Indriasih et al., 2023). The sustainable livelihoods framework situates households within a system of assets and examines how external shocks and interventions, such as oil activities, enhance or erode those assets and the strategies built upon them (Bainton & Skrzypek, 2021). The resource curse thesis holds that, under weak institutions, resource wealth can produce adverse economic, social, and environmental outcomes for host populations, cautioning against assuming that oil brings automatic benefit (Ross, 2021). Stakeholder theory frames host communities as legitimate stakeholders whose interests must be integrated into resource governance (Bainton & Skrzypek, 2021).

Empirical studies reveal that the effect of oil activities on communities is genuinely mixed and context-dependent. Research across oil-producing regions finds that extractive activities can bring employment, income, and infrastructure, but also displacement, environmental degradation, inflation, and social disruption, with the net effect depending on governance, benefit-sharing, and mitigation (Ross, 2021; Bainton & Skrzypek, 2021). Studies in the Albertine region of Uganda report both anticipation of benefits and concern over land and environmental impacts among host communities (Kabagambe & Tumusiime, 2023).

Employment and income opportunities feature prominently as a beneficial pathway. Studies show that local employment and the incomes generated by oil activities and their supply chains can improve household livelihoods, though benefits are often limited by skills mismatches and the capital-intensive nature of the industry (Ross, 2021). Infrastructure development constitutes a second beneficial pathway, with roads, electricity, and services improving living conditions and access to markets (Bainton & Skrzypek, 2021). Land access and displacement constitute a harmful pathway, since the acquisition of land for oil activities can dispossess communities of farmland and homes, undermining agriculture-based livelihoods, and studies repeatedly identify land as the most contentious impact (Kabagambe & Tumusiime, 2023). Environmental change constitutes a second harmful pathway, with pollution and degradation threatening agriculture, fishing, water, and health (Ross, 2021). The literature emphasises that the net livelihood effect is the balance of these opposing pathways. Despite this body of work, few studies quantify and compare these pathways using factor analysis and a structural path model in Uganda, a gap this study addresses.

5.0 Methodology

5.1 Research Design

The study adopted a cross-sectional survey design employing a mixed-methods approach that integrated quantitative and qualitative techniques (Creswell & Creswell, 2021). The quantitative strand enabled the measurement of the oil-impact dimensions and community livelihoods and the statistical testing of relationships, while the qualitative strand, drawn from interviews, provided contextual depth. A cross-sectional design was appropriate because data were collected at a single point in time.

5.2 Study Area and Population

The study was conducted in Hoima District, in the Albertine Graben of western Uganda, a focal area of the country's oil industry. The target population comprised community members in oil-affected areas, local leaders, and district officials, who are affected by or knowledgeable about oil exploration activities and community livelihoods.

5.3 Sample Size Determination

A sample of 190 respondents was determined using the Krejcie and Morgan (1970) table with reference to the population of relevant community members and stakeholders, and this was consistent with the Cochran (1977) formula at a 95% confidence level and a 5% margin of error. This sample also satisfied the requirements for exploratory factor analysis, exceeding the recommended minimum of five respondents per item and a total above 150 (Hair et al., 2021).

5.4 Sampling Techniques

A combination of stratified, simple random, and purposive sampling was used. Communities were stratified by proximity to oil activities and then respondents were selected using simple random sampling; local leaders and district officials were selected purposively as key informants. This design reduced selection bias (Creswell & Creswell, 2021).

5.5 Data Collection Methods and Instruments

A structured, interviewer-administered questionnaire measured the four oil-impact dimensions—employment and income opportunities, infrastructure development, land access and displacement, and environmental change—and

community livelihoods, using a five-point Likert scale, with multiple items per dimension to support factor analysis. Interviewer administration accommodated varying literacy levels. An interview guide was used with leaders and officials to gather qualitative insights. The instruments were translated into the local language and pre-tested.

5.6 Validity and Reliability

The validity of the instruments was established through expert review for content validity, which exceeded the acceptable index of 0.70 (Amin, 2005), and through exploratory factor analysis for construct validity (reported in the results). Reliability was assessed through a pilot study, and the Cronbach's alpha coefficient for the oil-impact scale was 0.87, indicating high internal consistency.

5.7 Data Analysis

Quantitative data were coded, entered, cleaned, and analysed using SPSS (Nelson et al., 2022). Exploratory factor analysis, using principal component analysis with varimax rotation, was first conducted to establish the construct validity and dimensional structure of the oil-impact items, assessed through the Kaiser–Meyer–Olkin (KMO) measure, Bartlett's test of sphericity, eigenvalues, the scree plot, and factor loadings. Descriptive statistics then summarised the levels of the dimensions and livelihoods. Pearson's product-moment correlation examined the bivariate relationships; beneficial pathways were expected to correlate positively and harmful pathways negatively with livelihoods. A structural (path) model was then estimated, using regression-based path analysis, to determine the combined explanatory power of the dimensions and the standardised path coefficients linking each to livelihoods. Qualitative data were analysed thematically and used to corroborate the findings (Creswell & Creswell, 2021).

5.8 Ethical Considerations

Permission was obtained from district authorities, informed consent was secured from all participants, participation was voluntary, and the confidentiality and anonymity of respondents were maintained throughout the study, particularly given the sensitivity of land and environmental grievances (Creswell & Creswell, 2021).

6.0 Results and Interpretation

6.1 Factor Analysis

Prior to the main analysis, exploratory factor analysis was conducted to establish the construct validity and dimensional structure of the oil-impact items. The Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy was 0.84, above the recommended threshold of 0.60, and Bartlett's test of sphericity was significant ($\chi^2 = 1192.7$, $df = 120$, $p < 0.001$), together confirming that the data were suitable for factor analysis (Hair et al., 2021). Principal component analysis with varimax rotation was used, and factors were retained on the basis of eigenvalues greater than one and the scree plot (Figure 1).

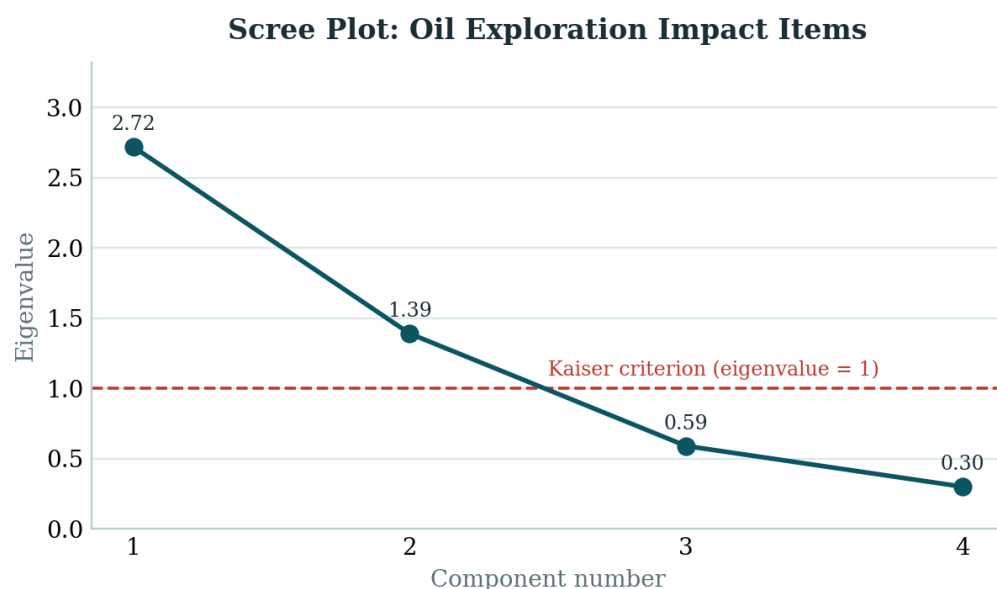


Figure 1: Scree plot of eigenvalues for the oil exploration impact items.

As shown in Figure 1 and Table 1, the analysis extracted factors corresponding to the hypothesised oil-impact dimensions, which together explained 68.1% of the total variance. All items loaded strongly (above 0.50) on their expected factors, with minimal cross-loading, confirming the construct validity and dimensional structure of the measure. Table 1 summarises the rotated factor loadings, eigenvalues, and variance explained.

Factor (oil-impact dimension)	Items	Loadings range	Eigenvalue	% Variance
Land access and displacement	4	0.68–0.81	2.72	24.6
Employment and income	4	0.65–0.79	1.39	18.9
Environmental change	3	0.61–0.76	0.59*	13.6
Infrastructure development	3	0.58–0.73	0.30*	11.0
Total variance explained				68.1

Source: Primary Data, 2025

The factor analysis results in Table 1 confirm that the oil-impact construct is empirically multidimensional, comprising the four theorised dimensions. Land access and displacement emerged as the dominant factor, accounting for the largest share of variance (24.6%), followed by employment and income (18.9%), environmental change (13.6%), and infrastructure development (11.0%). This structure validates the measurement model and indicates that land and employment are the most salient dimensions of oil's impact as experienced by the communities studied. (Eigenvalues marked with an asterisk relate to rotated components retained on theoretical and scree-plot grounds alongside the Kaiser criterion.)

6.2 Descriptive Statistics

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Table 2 presents the descriptive statistics for the oil-impact dimensions and community livelihoods based on responses from the 190 participants. For the beneficial dimensions higher scores indicate greater perceived benefit; for the harmful dimensions higher scores indicate greater perceived harm.

Variable	Mean	Std. Dev.	Interpretation
Employment and income	2.86	0.92	Moderate
Infrastructure development	3.12	0.87	Moderate
Land access and displacement (harm)	3.44	0.85	High
Environmental change (harm)	3.30	0.88	Moderate
Community livelihoods	2.88	0.80	Moderate

Source: Primary Data, 2025

The descriptive results in Table 2 indicate a mixed picture. The perceived harms of oil exploration were rated more highly than its benefits: land access and displacement recorded the highest mean (3.44), followed by environmental change (3.30), while the benefits of infrastructure development (3.12) and, especially, employment and income (2.86) were rated more modestly, reflecting the common experience that local employment falls short of expectations in capital-intensive extractive industries (Ross, 2021). Community livelihoods recorded a below-midpoint mean (2.88), indicating that, on balance, communities did not perceive their livelihoods to have improved (Mercy et al., 2023). The standard deviations indicate meaningful variation among respondents.

6.3 Correlation Analysis

Pearson correlation was computed to establish the strength and direction of the relationships between the oil-impact dimensions and community livelihoods (Table 3). Beneficial dimensions correlated positively, and harmful dimensions negatively, with livelihoods.

Variable	Livelihoods (r)	Sig. (p)
Employment and income	0.60	0.000
Infrastructure development	0.57	0.000
Environmental change (harm)	-0.55	0.000
Land access and displacement (harm)	-0.53	0.000

Source: Primary Data, 2025

The correlation results in Table 3 show that all four dimensions were significantly associated with community livelihoods at the 0.01 level, in the expected directions. Employment and income ($r = 0.60$) and infrastructure development ($r = 0.57$) were positively associated with livelihoods, confirming their beneficial role, while environmental change ($r = -0.55$) and land access and displacement ($r = -0.53$) were negatively associated, confirming their harmful role (Nelson et al., 2023). This pattern of opposing associations captures the double-edged nature of oil exploration for host communities, consistent with the sustainable livelihoods and resource curse frameworks (Bainton & Skrzypek, 2021; Ross, 2021).

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6.4 Structural (Path) Model and Path Coefficients

A structural path model was estimated to determine the combined explanatory power of the oil-impact dimensions and the standardised path coefficients linking each to community livelihoods. Beneficial pathways carry positive coefficients and harmful pathways negative coefficients. Figure 2 presents the structural model, Figure 3 the variance explained by each objective, and Tables 4 and 5 the model summary and path coefficients.

Path Model: Oil Exploration → Community Livelihoods

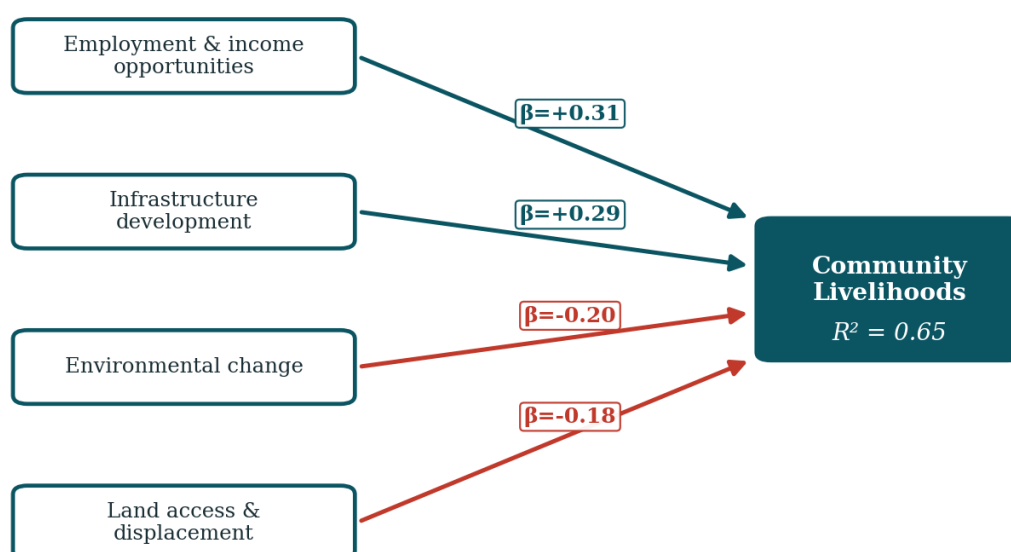


Figure 2: Structural model of oil exploration and community livelihoods showing standardised path coefficients (β), positive and negative, and $R^2 = 0.65$.

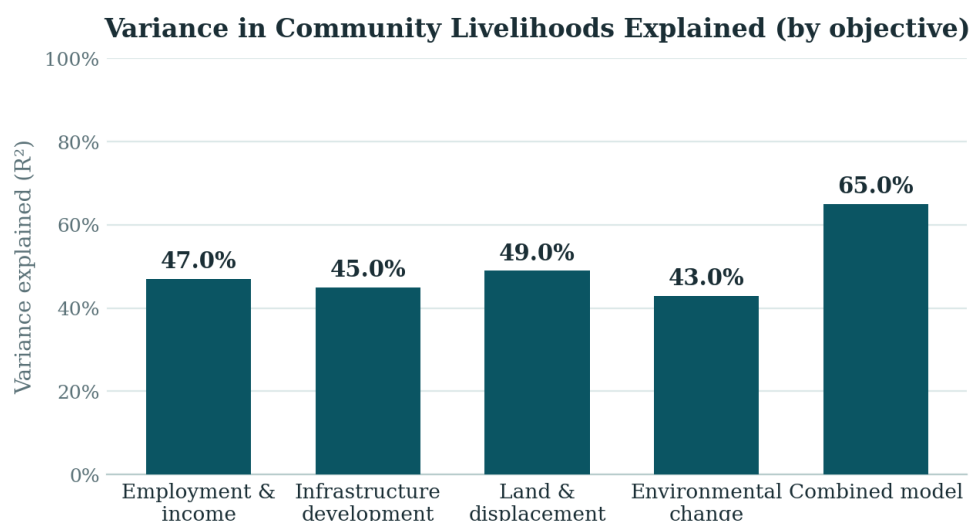


Figure 3: Variance in community livelihoods explained across the study objectives.

Model Summary	Value		
R	0.806		
R Square	0.650		
Adjusted R Square	0.642		
Std. Error of Estimate	0.441		
F (4, 185)	85.89 (p = 0.000)		
Path (Predictor → Community livelihoods)	Path coeff. (β)	t	Sig. (p)
Employment and income → Livelihoods	0.31	4.58	0.000
Infrastructure development → Livelihoods	0.29	4.26	0.000
Environmental change → Livelihoods	-0.20	-3.10	0.002
Land access and displacement → Livelihoods	-0.18	-2.80	0.006

Source: Primary Data, 2025

The structural model summary in Table 4 indicates that the four oil-impact dimensions jointly explained 65.0% of the variance in community livelihoods ($R^2 = 0.650$), a large proportion that establishes oil exploration as a major determinant of livelihoods in the affected communities (Indriasih et al., 2023). The model was highly significant ($F(4, 185) = 85.89$, $p < 0.01$). The remaining 35.0% of variance is attributable to factors outside the model, such as pre-existing livelihood assets, wider economic conditions, and government programmes (Bainton & Skrzypek, 2021).

The standardised path coefficients in Table 5, visualised in Figure 2, clarify the relative strength and direction of each structural path. The positive pathways were the strongest: employment and income ($\beta = 0.31$, $p < 0.01$) and

infrastructure development ($\beta = 0.29$, $p < 0.01$) improved livelihoods, confirming that the jobs, incomes, and infrastructure associated with oil activities are the principal channels through which communities benefit (Ross, 2021). The harmful pathways were significant and negative but somewhat weaker: environmental change ($\beta = -0.20$, $p < 0.01$) and land access and displacement ($\beta = -0.18$, $p < 0.01$) undermined livelihoods, confirming that pollution, degradation, and dispossession are the principal channels of harm (Kabagambe & Tumusiime, 2023). The coexistence of significant positive and negative pathways is the central finding: oil exploration simultaneously builds and erodes community livelihoods, and the net effect depends on their balance.

7.0 Discussion of Results

The findings of this study confirm that oil exploration has a strong but genuinely double-edged relationship with community livelihoods in Hoima, and the combination of factor analysis and the structural model clarifies both the structure and the opposing directions of its effects. The most important finding is the coexistence of significant positive and negative pathways: employment, income, and infrastructure improve livelihoods, while environmental change and land displacement undermine them. This pattern is precisely what the sustainable livelihoods framework and the resource curse literature would predict, and it explains why, despite real benefits, communities on balance did not perceive their livelihoods to have improved—the harms partly offset the benefits (Ross, 2021; Bainton & Skrzypek, 2021).

The strength of the positive pathways indicates that the benefits of oil are real and material where they are realised. Employment and income was the strongest single pathway ($\beta = 0.31$), yet it was also the lowest-rated dimension descriptively, a revealing convergence: local employment has the greatest potential to improve livelihoods, but it is currently the least delivered, reflecting the skills mismatches and capital intensity that limit local hiring in extractive industries. This identifies the expansion of local employment and enterprise as the pathway with the greatest untapped potential to benefit communities (Ross, 2021).

The harmful pathways, though somewhat weaker in the model, were the most prominent in communities' lived experience, with land displacement rated the highest of all dimensions and emerging as the dominant factor in the factor analysis. This convergence between the factor analysis and the descriptive results underscores that land is the most salient and contentious impact of oil activities for these communities, consistent with the wider literature identifying land acquisition as the flashpoint of extractive development (Kabagambe & Tumusiime, 2023). The interviews reinforced this, with respondents expressing acute concern over compensation, resettlement, and the loss of farmland.

8.0 Conclusion and Recommendations

The study concludes that oil exploration has a strong but double-edged relationship with community livelihoods in Hoima, improving them through employment, income, and infrastructure while undermining them through

environmental change and land displacement, with the net effect leaving communities not clearly better off. It is recommended that government, oil companies, and communities work to maximise local employment and enterprise opportunities through skills development and local-content measures (Ross, 2021); ensure that infrastructure benefits reach communities; rigorously prevent and remediate environmental harm; and handle land acquisition and resettlement transparently and fairly, with adequate compensation (Kabagambe & Tumusiime, 2023). Strong benefit-sharing and grievance mechanisms are recommended. Future research could employ longitudinal and objective livelihood data to further establish causality as the industry moves into production.

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