How do rural industrial sites impact migrant motives and the socio-economic conditions of local and migrant populations?

Itohan-Osa Abu [a,*], Michael Thiel [a], Clement Nyamekye [b], Yaw Mensah Asare [c], Emmanuel Agyapong [b], Benjamin Agbemor [d], Ebenezer N.K. Boateng [e,f], Chibuike Ibebuchi [d], Tobias Ullmann [a], Jürgen Rauh [g], Hannes Taubenböck [a,h]

[a] Department of Remote Sensing, Institute of Geography and Geology, University of Würzburg, John-Skilton-Straße 4a, 97074 Würzburg, Germany
[b] Department of Civil Engineering, Koforidua Technical University, Koforidua, Ghana
[c] Department of Geomatic Engineering, Kwame Nkrumah University of Science and Technology, Kumasi, Ghana
[d] Department of Geography, Kent State University, Kent, OH, USA
[e] Department of Geography and Regional Planning, University of Cape Coast, Cape Coast, Ghana
[f] Knowledge Exchange for Resilience, School of Geographical Sciences and Urban Planning, Arizona State University, Tempe, AZ, USA
[g] Social Geography, Institute of Geology and Geography, University of Würzburg, Am Hubland, 97074 Würzburg, Germany
[h] German Aerospace Center (DLR), German Remote Sensing Data Center (DFD), Münchnerstrasse 20, 82234 Weßling, Germany

ARTICLE INFO

ABSTRACT

Understanding the impact of rural industrialization on migration motives and the socio-economic well-being of local and migrant populations is critical for developing policies that aim at improving living standards and ensuring inclusive economic growth. Previous studies have emphasized rural-to-urban migration in Ghana, this study investigates the socio-economic impacts of rural industrial sites on local and migrant populations, drawing on a comprehensive survey conducted across various villages in Ghana, West Africa. We examine the pull effects of rural industrial sites as sources of economic growth and social transformation. Through a detailed questionnaire survey leveraging mobile technology, the research captures responses from 1,102 respondents, comprising both Indigenous people and migrants, to understand the complex socio-economic dynamics at play. Our findings show that among other factors, migration patterns are principally influenced by socio-economic motives, with significant gender differences in both motivations and outcomes. The logistic regression analysis indicates that men are more likely to migrate for socio-economic reasons compared to women, with an odds ratio (OR) of 1.50, which is statistically significant at a 95 % confidence level. On the other hand, women are more likely to migrate for family reunification. Furthermore, individuals with earnings above the minimum wage prior to migrating were significantly more likely to migrate, with a statistically significant OR of 2.82, suggesting that higher initial earnings might ease the migration process, and it is not always not the poorest people that migrate. Additionally, migrants citing socio-economic reasons for moving to the rural industrial sites are significantly more likely to achieve satisfactory outcomes, with a statistically significant OR of 5.12. Our results show that though migrant experiences may vary, industrial sites in rural communities boost local employment and economic activities. These findings emphasize the critical role of economic success, information access, and

---

* Corresponding author.
E-mail address: Itohan-osa.abu@stud-mail.uni-wuerzburg.de (I.-O. Abu).

demographic factors in shaping migration experiences and outcomes, offering valuable insights for cross-national labour migration and policy development.

Introduction

The expansion of industrial sites in rural areas has significantly reshaped the socioeconomic landscape of these regions. In many developing countries, rural industrialization does not simply follow a uniform trajectory; it is deeply influenced by existing governance structures, infrastructure, population densities, and resource endowments [1]. For example, China's in-situ urbanization-where rural industries develop under robust government programs, quality infrastructure, and dense rural populations – has led to industrial agglomerations and a relatively seamless transformation from rurality to semi-urban industrial enclaves [2–4]. In contrast, rural industries in Ghana frequently center on the extraction and processing of local resources, such as solid minerals and agricultural produce, rather than manufacturing clusters integrated tightly with existing urban centers [5–7]. As a result, the patterns of industrial growth, migration, and socio-economic change in Ghana's rural areas differ markedly from those observed in other regions such as rural China.

According to Lee's push-pull model of migration [8], individuals are often attracted to regions offering better economic prospects, such as industrial zones, where employment opportunities and improved living conditions serve as key pull factors [9–11]. The nature of these economic opportunities and the ensuing migration streams depends on local conditions. In Ghana, rural industrial sites may generate employment that does not necessarily match the wage structures found in urban areas [12–14]. This dynamic can limit long-distance migration inflows, as wages often reflect local rural standards consequently stimulating local or internal migration rather than attracting workers from higher-income areas or urban areas [15,16]. Migration is also influenced by a range of other factors, including social, demographic, environmental, and political conditions [17–20]. While rural industrialization presents opportunities for economic development, job creation, and infrastructure improvement, it also introduces significant challenges for both local communities and migrants [21–23]. These challenges often include disruptions to traditional livelihoods, alterations in social structures, environmental degradation [24,25], among others.

Rural industrialization in Ghana's resource-rich areas must therefore be understood within the specific economic base and growth trajectory of each village, as well as its relationship to existing urban areas [26–29]. In instances where industrial activities hinge on local mineral extraction or agriculture-based processing, the inclusive or exclusive nature of production can shape socio-economic benefits and determine the extent to which local populations are integrated into new economic activities [30–32]. Industries reliant on local labor and value chains may enhance community resilience and capacity-building if they incorporate local labor and value chains, while externally controlled, capital-intensive operations may yield more exclusive benefits, limiting broader community gains and potentially undermining local well-being [33,34]. Given that migration is a pressing societal issue [17,35–37], the blend of benefits and drawbacks from expanding rural industrial zones has become a focal point for policymakers, researchers, and the international community [38]. Understanding the socio-economic impacts of industrial sites is crucial for developing balanced policies that foster economic growth while protecting the well-being of both local and migrant populations [39].

Research has shown that industrialization in rural areas often attracts populations from impoverished regions seeking better employment and living conditions [40]. Such migration reshapes the demographic, economic, and social fabric of rural communities (push regions) and destination areas (pull regions), necessitating an in-depth analysis of the motives behind migration and its subsequent outcomes [19,41,42]. Migration movements to rural industrial areas will only occur if prospective migrants perceive tangible improvements in income and livelihood conditions compared to their places of origin [43–45]. One critical area of inquiry is the differential impact of gender on migration motives and outcomes. Men and women often experience and respond to the opportunities and challenges posed by rural industrialization in distinct ways [46–48]. Furthermore, assessing the well-being of migrants through indicators such as self-reported happiness and changes in earnings provides key insights into the socioeconomic dynamics at play [49, 50].

Extensive research has documented the global transformative effects of industrialization on rural economies and societies [51,52]. However, existing literature reveals a significant gap in understanding how industrialization impacts on local and migrant populations in rural settings [53–56]. Most studies tend to focus on economic growth metrics, often neglecting the diverse experiences of individuals and communities affected by rural industrial sites [57–59]. While migration related to industrialization is a well-documented phenomenon, there is a need for more differentiated analyses of migration motives, particularly in terms of gender differences and their effects on the well-being and socio-economic status of migrants.

This research is guided by several key theories in rural development and migration. The dualistic development thesis posits that industrialization in rural areas leads to a dichotomy of economic development and social transformation [60–64]. Lee's push-pull theory further informs our analysis of migration motives [8], suggesting that individuals are driven from their homes by adverse conditions and attracted to destinations by better opportunities [11,65–68]. This theory serves as the foundation of our investigation into how rural industrial sites in Ghana act as magnets for migration and the socio-economic dynamics that emerge as a result.

To enhance the push-pull framework, this study also incorporates concepts from network theory and social capital. Network theory posits that migration is significantly influenced by the social networks migrants belong to, which include family, friends, and broader community ties. These networks provide crucial information and resources that facilitate migration decisions, influencing both the choice of destination and the strategies migrants employ during the process [69–71]. Social capital, similarly, emphasizes the value of social relations and the reciprocal support systems within migrant communities [72–74]. Social capital manifests in various ways, including emotional support, information sharing about job opportunities, and assistance with housing, all of which are vital for the

socioeconomic integration and well-being of migrants [75–77]. By examining these social structures and their impacts, this study aims to provide a deeper understanding of the social dimensions of migration and how they directly influence migrants' adaptation and livelihoods in new environments in Ghana [35,78].

In Ghana, the establishment of rural industrial sites, particularly in solid mineral mining, has driven significant economic growth and social change in local communities [79–82]. The Ghanaian case highlights the need for policies that balance the economic benefits of industrialization with environmental sustainability and social inclusion, aligning with the goals of the United Nations Sustainable Development Agenda [31,83,84]. These policies that are designed often lag behind the realities on the ground, required approaches to environmental stability, wage standardization, educational investment, and skill-building for local communities [85,86]. Given the gaps in the existing literature, this study aims to address the following key questions within our theoretical framework: 1. What are the socio-economic impacts of rural industrial sites on local populations, and how do these impacts influence the environment into which migrants arrive?

2. What motivates individuals to migrate to rural areas with industrial sites and how do migrants shape the impacts of rural industrialization on the local population?

3. How does migration to rural industrial areas affect the well-being of migrants?

This research aims to inform policy decisions related to rural development, industrialization, and migration [40,87]. By examining the socio-economic impacts of rural industrial sites, the results of this study can help policymakers develop strategies that maximize the benefits of industrialization while mitigating its negative effects on local and migrant populations. For instance, the results may inform policies that strengthen local labor training programs, ensure fair wage standards, foster environmentally sustainable extraction practices, and encourage inclusive value-chain development that benefits rural communities [88,89]. Moreover, the study contributes to the global discourse on sustainable development, particularly in relation to achieving the United Nations Sustainable Development Goals focused on poverty reduction, gender equality, decent work and economic growth, and sustainable cities and communities [90]
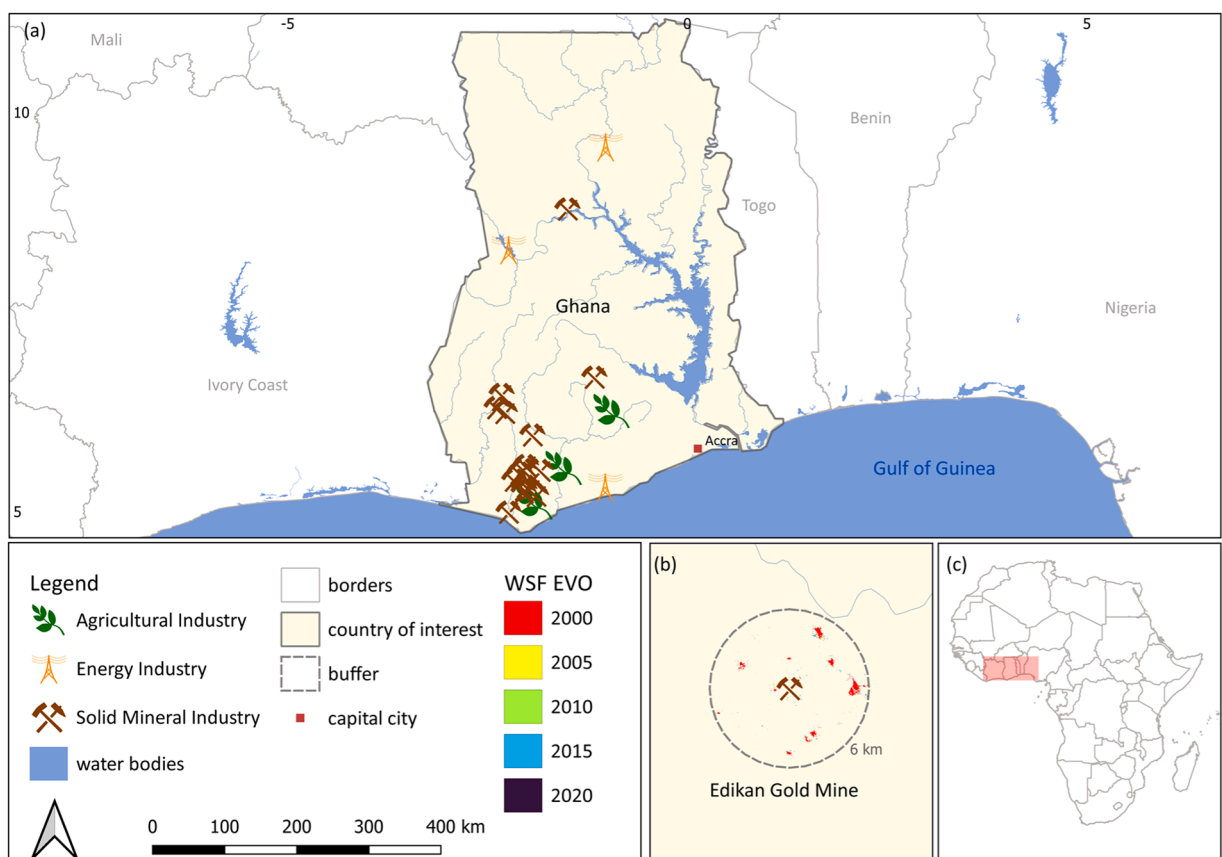
Fig. 1. (a) Study areas in Ghana, showing locations of different types of industries; (b) example of the systematic selection of the villages within the 6 km buffer showing the World Settlement Footprint Evolution (WSF-EVO), which enabled precise identification of settlements, (c) Location of the region of interest within Africa.

Data and methodology

The dataset for this study was collected through a field survey conducted in Ghana from November to December 2023. Utilizing mobile phones and the Kobo Toolbox app (Kobo Collect), the project team gathered data across selected villages with industries in Ghana (Fig. 1).

The surveys were conducted in English, Pidgin English, and Twi to ensure inclusivity and comprehension among diverse participants. The selected survey locations include Akyempim, Akoti, Asempanaye, Ayanfuri, Baifikrom, Benso, Benso, Bogoso B-line, Damang, Dumasi, Effasu, Gyedi, Jama, Kwae, Kwame Niampa, New Atuabo, Nsuta Zongo, Patriensa, Prestea-Krutown, Salman, Twifo Kwenyako, Wassa Agona, Wuba, and Yepala (see Table A1). These locations are host communities to extractive and agricultural industries. The proximity of these sites to roads, social infrastructure /amenities, and urban areas influences the availability of external inputs, technology, and labor. Villages closer to urban hubs often experience more diversified industrial activities and may attract non-local migrants due to perceived income advantages [91,92]. In contrast, more isolated villages depend on local resources, labor, and traditional techniques, limiting the scale and scope of industrialization [93–95]. This selection was informed by their proximity to industrial sites within a 6 km radius, which was determined by using the OpenStreetMap (OSM) plugin in QGIS (Fig. 1). The 6 km buffer was chosen as a compromise to capture the direct and moderate range impacts of industrial sites on surrounding areas, balancing the need for inclusivity without diluting specific effects, unlike the narrower 1 km or 5 km or the overly inclusive 10 km buffers [96]. This strategic selection aimed to encompass a broad spectrum of socio-economic environments, providing insights into the varied impacts of rural industrialization.

Sampling strategy

Respondents within each village were selected through a stratified sampling method, focusing solely on individuals to accurately capture the experiences and perceptions of both groups, i.e., of Indigenous people and migrants affected by nearby industrial sites. Villages were chosen based on their proximity to industrial sites within a 6 km buffer, ensuring a mix of varying levels of exposure. Within each selected village, individuals were randomly selected, considering factors such as age, gender, and occupation, to ensure balanced representation. This approach ensured a balanced representation of the population by targeting up to 50 respondents in each site, reflecting the diverse socio-economic dynamics within these communities. The survey team approached individuals in public areas and community centers, ensuring voluntary participation and obtaining informed consent. The response rate across all sites was meeting the target, as 50 individuals were surveyed at each site.

Table 1
Demographic Characteristics of Respondents.

Variable	Category	Frequency	Percentage
Gender	Women	616	55.9 %
	Men	486	44.1 %
Total		1102	100 %
Age	Under 18 i.e., 16 & 17	30	2.7 %
	18–24	270	24.5 %
	25–34	405	36.8 %
	35–44	193	17.5 %
	45–54	107	9.7 %
	55–64	50	4.5 %
	65 or older	47	4.3 %
Total		1102	100 %
Education Level	No formal education	171	15.5 %
	Primary education	100	9.1 %
	Junior Secondary education	448	40.7 %
	Senior Secondary education	311	28.2 %
	Tertiary education	72	6.5 %
Total		1102	100 %
Employment Status	Self-employed	548	49.7 %
	Unemployed	310	28.1 %
	Employed	244	22.1 %
Total		1102	100 %
Marital Status	Married	507	46.0 %
	Single	535	48.5 %
	Widowed	31	2.8 %
	Divorced	16	1.5 %
	Separated	13	1.2 %
Total		1102	100 %
Migration Status	Indigene	658	59.7 %
	Migrant	444	40.3 %
Total		1102	100 %

Survey implementation

The survey, designed in the Kobo Toolbox, considered parameters such as migration motives, employment changes, income variations, and perceptions of well-being, with a particular focus on examining gender-specific impacts. This allowed for an understanding of how rural industrialization affects men and women differently, shedding light on each group's unique challenges and opportunities. Table A4 shows the different questions asked in the survey.

Data collection

In total, 1102 respondents, comprising 658 indigenous individuals and 444 migrants, participated in the survey. Please see Table 1 for details in the appendix. We surveyed 1102 respondents and at least 50 individuals per site to allow for uniformity. The emphasis was on surveying individuals rather than households to gain a more granular understanding of the socio-economic conditions influenced by rural industrialization. This approach provided a comprehensive perspective on industrial sites' direct and indirect effects on local and migrant populations.

Analytical approach

We utilized descriptive statistical methods to summarize demographic and socio-economic patterns among the survey participants. The frequencies and percentages were calculated for categorical variables and means with standard deviations for continuous variables. Table 1 provides an overview of the sample composition, including key variables such as gender, age, education level, marital status, employment status, and migration status. This allows for a detailed understanding of the diverse characteristics of the population surveyed, which includes 658 indigenous individuals (59.7 %) and 444 migrants (40.3 %). The sample includes nearly equal representation of males and females (44.1 % and 55.9 %, respectively) and spans a range of age groups, education levels, and employment statuses, ensuring that the analysis captures diverse socio-economic dynamics. This comprehensive summary of the data distribution provided preliminary insights into patterns and trends relevant to our study objectives. To assess the relationships between variables in Table 1, intercorrelation analysis was conducted. This method evaluates the strength and direction of linear relationships among pairs of variables, allowing identification of potential interactions or redundancies [97]. Additionally, Variance Inflation Factors (VIFs) were calculated to measure multicollinearity among predictors. Low VIF values (<5) indicate minimal collinearity, ensuring stable regression estimates and valid inference. These steps are critical in preparing the data for inferential analysis and validating the suitability of predictors for inclusion in the multinomial logistic regression model [98,99]. Table A2 shows the correlations between the independent variables and the VIFs, the correlations are within the range of $0 - 0.13$ indicating weak correlations. Additionally, the VIF values are within the range of -0.006 to 0.03 and so are all <5 further supporting that the independent variables are not redundant (see Table A3).

Subsequent analysis employed multi-variable logistic regression to examine the likelihood of experiencing specific socio-economic outcomes [100,101]. Considering that our analysis of the survey data aims to determine the relationship between various factors (independent variables) and specific outcomes (dependent variables), multi-variable logistic regression was adopted for such analyses, also given that the outcomes of interest are categorical (e.g., yes/no). Another reason multi-variable logistic regression was selected for our analysis is because of the multiple predictors used in the study. This regression model allows for examining the effect of various factors on the likelihood of experiencing certain outcomes. Moreover, the logistic regression model is designed to work with non-linear relationships between the independent variables and the log odds of the dependent variable, making it ideal for situations where the effect of predictors on the outcome is non-linear.

Sixteen independent variables were selected for analysis, including demographic factors such as Gender, Age, Marital status, Current Educational Level, Cost of living since the industry was established, Income change since the rural industrial site was established, Consideration of leaving the area since the rural industrial site was established, Noticed changes in the environment since the rural industrial site was established, Family members left the community since the industry was established, Employment at the industrial site, Age at the time of migration, How did you migrate, Old Earnings, Migrants' reason for migrating, Earnings improvement since moving, and Awareness of job opportunities available here. The coding schemes for all independent variables are detailed in Table A5, accommodating various data types, including binary (e.g., Male, Female) and categorical variables (e.g., No, Yes, Not sure). For inferential analysis, we utilized multi-variable logistic regression, which enabled us to explore the adjusted effects of the independent variables on the likelihood of the standard of living of the local population, migration due to socio-economic motives, and migrants' self-reported happiness. Migrants' motives for relocation were grouped into six categories: conflicts/acts of terrorism referred to as R1; family reasons referred to as R3); socio-economic reasons referred to as R4; relocation to acquire education or vocation skill referred to as R5; to be independent referred to as R6; and other reasons not captured in the questionnaire referred to as R2. These categories allowed for a clearer analysis of the predominant drivers of migration in the region.

The logistic regression results are presented as odds ratios (ORs). To minimize Type I errors, the ORs are tested for statistical significance at a 95 % confidence level using Wald's Z-test. The Z-test assesses whether the regression coefficients (log-odds) of the predictor variables differ significantly from zero, which would indicate an effect on the outcome variable. P-values were calculated for each predictor, and those with values below 0.05 were considered statistically significant, suggesting a meaningful association between the predictor and the binary outcome. The selection of reference categories for categorical variables was a critical step in our analysis, aimed at enhancing the interpretability of the logistic regression outcomes. For instance, in assessing the impact of gender (i.e., independent variable) on socio-economic migration motive (i.e., the outcome), "female" was designated as the reference category.

Consequently, an OR for "male" exceeding 1.5 would indicate a higher likelihood for males, relative to females, to migrate for socio-economic reasons. An OR greater than 1.5 implies that while holding other variables in that category constant, the independent (or predictor) variable is associated with an increased likelihood of the outcome. The stronger the OR, the stronger the association between the dependent and independent variables.

Ethical considerations and limitations

This study ensured informed consent from all participants, guaranteeing anonymity and confidentiality to uphold the integrity of the research process. While the methodology employed provides robust insights into the socio-economic effects of rural industrialization, it acknowledges potential limitations such as non-response bias and the challenge of fully capturing long-term impacts.

Results

Socio-economic impact of rural industrial sites on local populations

To assess the socio-economic impacts of rural industrial sites on local populations, we aimed to capture a comprehensive picture of how the establishment of industries in rural communities influences local communities in terms of employment, environmental perceptions, migration patterns, and socio-economic well-being.

Descriptive statistics (see Fig. 2) show that 28.12 % of locals report either direct employment or employment of a family member at the industrial sites. Further analysis in Table A6 uses logistic regression to identify factors affecting employment among locals. Notably, individuals connected to someone who has worked at these sites have a 1.36 times higher likelihood of employment (p-value=0.09). Additionally, the employment survey data highlight that 61.85 % of the local population is employed, indicating that industrial sites boost employment opportunities in these rural areas, with many benefiting directly or indirectly (Fig. 2). The analysis extends to examining the broader socio-economic effects. Table A6 reveals significant changes in the income levels of locals since establishing these sites. Those employed have seen a notable increase in income (OR=2.37, p-value<0.05) compared to other employed Indigenous people whose incomes have decreased. However, this economic benefit is tempered by an increase in the cost of living, with those experiencing higher costs having an odds ratio of 1.40 (p-value<0.05) compared to those facing moderate cost changes.

Fig. 2 shows that a substantial majority (65.96 %) of the respondents have noticed environmental changes since the establishment of the industrial site. A small fraction (7.75 %) of respondents uncertain about environmental changes demonstrates the community's overall concern about industrial effects on their natural surroundings. Furthermore, 50.5 % of the locals who had not considered leaving the community were likely to report employment opportunities (OR of 1.62, p-value <0.05) compared to those who were unsure of leaving.

Benefits in socio-economic well-being, as indicated by changes in income, can be documented by our analysis in Fig. 2. 22.49 % of the local respondents experiencing an increase in income since the establishment of the industrial site were 2.37 times more likely to report employment opportunities with an OR of 2.37 ($p < 0.05$) compared to locals whose income has decreased.

The logistic regression analysis also reveals the influence of socio-demographic factors such as education level and age on the employment opportunities in the communities. For instance, individuals with at least Junior Secondary education are more likely to report employment opportunities (OR = 2.09, $p = 0.0063$) than those without formal education.
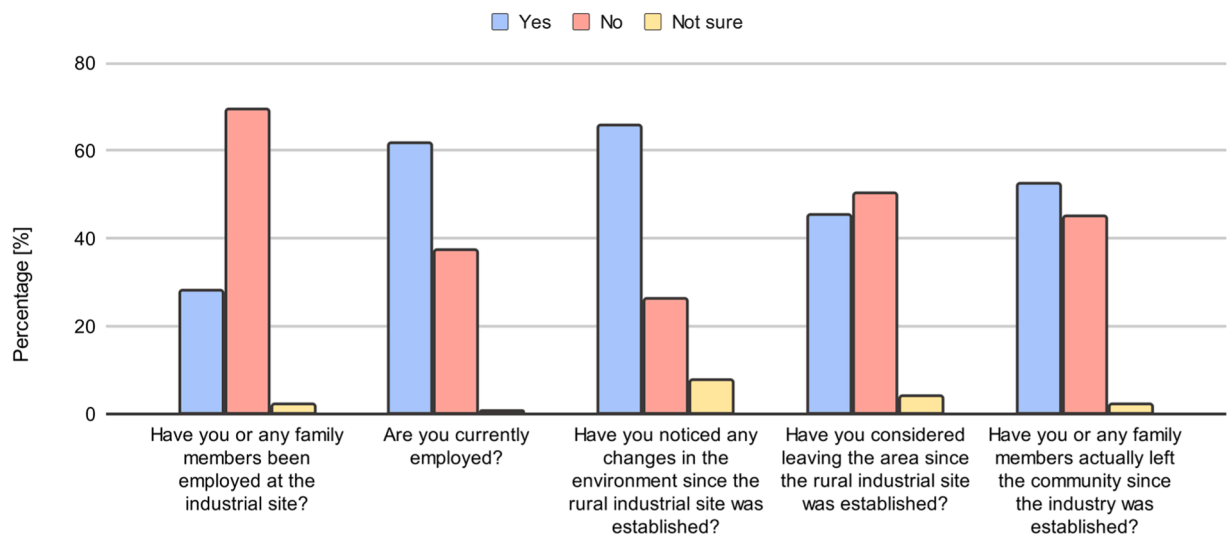

Fig. 2. Descriptive statistics on the socio-economic impact of rural industrial sites on local populations.

Migration motives in rural areas with industrial sites

This section aims to delve into the question, "*What motivates individuals to migrate to rural areas with industrial sites, and how do these motives differ by gender?*" This inquiry is pivotal in understanding the multifaceted drivers behind migration patterns, particularly in the context of rural industrialization. Fig. 3 shows the descriptive statistics of the migration motives.

Socio-economic reasons (R4) emerge prominently, with 20.7 % of males and 16 % of females attributing their migration to such reasons (Fig. 3). This significant proportion highlights the role of economic considerations in the migration decision-making process, highlighting the allure of industrial sites for potential employment and better living conditions.

Family-related reasons (R3) follow closely, especially for females, for whom it constitutes the reason for 17.5 % of migrations (Fig. 3). This factor is also significant for males, although to a lesser extent, highlighting the gendered differences in migration motivations related to family dynamics.

The desire to acquire academic or vocational skills (R5) is a migration motive that appears to resonate more with females, with around 5 % moving for this purpose (Fig. 3).

Conversely, the pursuit of independence (R6) is less frequently cited as a primary motive, with a minimal percentage from both genders citing it as their main reason for migrating (Fig. 3). This observation implies that while the aspiration for autonomy is present, it commonly intersects with other migration motives. This complex matrix of motives, with socio-economic reasons at taking the lead, followed by family ties, education, and independence, paints a detailed picture of the factors influencing migration decisions in rural areas with industrial sites.

Amidst these varied motivations in Fig. 3, the logistic regression findings offer a deeper insight into the socio-economic dimensions shaping these migration patterns outlined in Table 2.

From Table 2, men were found to have an increased likelihood of migrating for socio-economic reasons compared to women, with an OR of 1.50 (p-value = 0.042). This supports the notion that economic incentives are a significant migration motive for men in the context of rural industrialization.

Young adults aged 18–24 showed a significant propensity to migrate, with an OR of 1.62 (p-value = 0.015), indicating a strong tendency towards seeking employment opportunities compared to those below 18 years (i.e., 16 & 17 years).

Furthermore, the effect of prior earnings on migration decisions further delineates the economic factors contributing to migration motives. Individuals earning below the minimum wage were less inclined to migrate, as evidenced by an odds ratio (OR) of 0.60 (p-value = 0.017) compared to those earning at the minimum wage level, possibly due to financial constraints. Conversely, individuals with earnings above the minimum wage before migrating were significantly more likely to do so, with an OR of 2.82 (p-value < 0.001) compared to those at the minimum wage level, suggesting that higher initial earnings might facilitate the migration process.

Moreover, the role of social networks in facilitating migration is highlighted by the significant association with migrating with friends, which presents an OR of 2.56 (p-value = 0.046) compared to migrating alone.

Impact of migration on migrants

In this section, we dissect the impacts of migration by focusing on migrants' self-reported happiness, changes in their economic
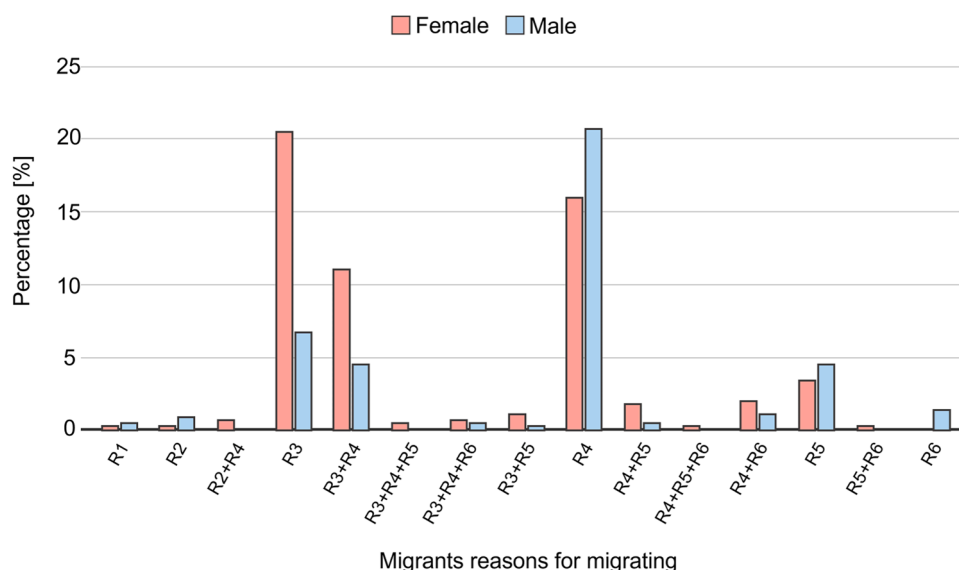
Fig. 3. Group bar chart of the migration motives. Rx + Ry represents the combination of motives chosen by the respondents. R1 Conflicts / Acts of Terrorism; R2 Other reasons; R3 Relocation because of family reasons; R4 Socio-Economic Reasons; R5 To acquire an academic or vocational skill; R6 To be Independent.

Table 2

Results of the logistic regression on the determinants of the socio-economic motives for migrants living in rural communities with industries.

| Variable	OR	P-Value
Gender		
Female	Ref	
Male	1.50	0.04
Age at the time of migration		
Under 18	Ref	
18–24	1.62	0.02
25–34	1.26	0.29
35–44	1.71	0.21
45–54	1.68	0.39
Current Educational Level		
Junior Secondary education	Ref	
No formal education	1.31	0.35
Primary education	1.05	0.90
Senior Secondary education	0.81	0.34
Tertiary education	1.27	0.48
How did you migrate?		
Alone	Ref	
With family	0.81	0.28
With friends	2.56	0.05
Marital status		
single	Ref	
divorced	1.33	0.74
married	0.97	0.89
separated	1.33	0.74
widowed	1.16	0.81
Old Earnings		
Minimum wage	Ref	
Greater than minimum wage	2.82	0.00
Less than minimum wage	0.60	0.02

OR = Odds Ratio. P-Values < 0.05 are considered statistically significant. N = 444** observations (migrants only) were included in the analysis.

status, and their awareness of job opportunities prior to relocation. A portrait of migrant welfare emerges from our analysis, revealing that 38.29 % of female respondents and 26.13 % of males report feeling happy in their new environments (Fig. 4). However, a significant segment remains ambivalent, with 13.06 % of females and 9.23 % of males unsure about their happiness, suggesting a period of adjustment (Fig. 4). This gender disparity further highlights the differentiated experiences and coping mechanisms among migrants.

Economically, migration presents both opportunities and challenges. Our survey data indicates that a larger proportion of females (35.59 %) than males (27.93 %) experienced an improvement in earnings post-migration (Fig. 4). Yet, 20.27 % of females and 12.61 % of males saw no change in their economic situation, pointing to the diverse outcomes of migration endeavors (Fig. 4).

Awareness of employment opportunities before migration is also critical, influencing both the decision to migrate and the ease of integration into the new setting. According to our findings, 32.66 % of females and 27.48 % of males were informed about job opportunities before moving (Fig. 4). However, many embarked on their migration journey without such knowledge, highlighting a significant information gap.

The logistic regression analysis provides more insights into the factors influencing migrants' happiness. Table 3 shows that
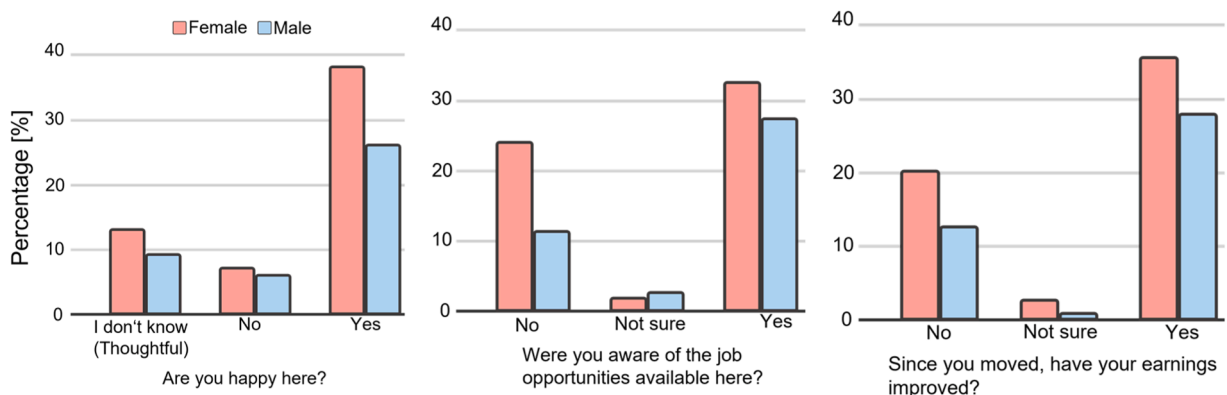
Fig. 4. Descriptive statistics on self-reported happiness, changes in earnings, and awareness of employment opportunities since relocating.

Table 3

Results of the logistic regression on the determinants of the self-reported happiness for migrants living in rural communities with industries.

Variable	OR	P-Value
Gender		
Female	Ref	
Male	1.26	0.35
Age		
Under 18	Ref	
18–24	0.39	0.0002
25–34	1.30	0.24
35–44	4.41	0.005
45–54	3.85	0.027
55–64	0.58	0.43
65 or older	1.09	0.90
Are you happy here?		
I don't know (Thoughtful)	Ref	
No	0.52	0.03
Yes	1.22	0.41
Current Educational Level		
No formal education	Ref	
Junior Secondary education	0.92	0.72
Primary education	0.73	0.44
Senior Secondary education	0.78	0.34
Tertiary education	2.62	0.074
Marital status		
divorced	Ref	
married	2.27	0.0012
separated	1.47	0.98
single	0.44	0.000698
widowed	0.66	0.55
Migrants reason for migrating		
Conflicts / Acts of Terrorism	Ref	
Other**	0.75	0.72
Relocation because of family reasons	0.97	0.90
Socio-Economic Reasons	5.12	2.98E-10
To acquire an academic or vocational skill	0.16	2.69E-09
To be Independent	2.08	0.24
Since you moved, have your earnings improved?		
Not sure	Ref	
No	0.13	2.22E-14
Yes	6.27	2.22E-12
Were you aware of the job opportunities available here?		
No	Ref	
Not sure	1.44	0.57
Yes	1.38	0.18

OR = Odds Ratio. P-Values < 0.05 are considered statistically significant. N = 444** observations (migrants only) were included in the analysis.

migrants who reported an increase in earnings post-relocation were notably more likely to express satisfaction with their migration experience, with an OR of 6.27 (p-value < 0.05) compared to those who were unsure. Conversely, those without earnings improvement demonstrated a significantly reduced likelihood of positive migration outcomes (OR = 0.13; p-value < 0.05) compared to those who were unsure.

Socio-economic motivations for migration also played a critical role, with migrants citing such reasons significantly more likely to achieve satisfactory outcomes (OR = 5.12; p-value < 0.05) compared to reasons in the domains of Conflicts/ Acts of Terrorism. Additionally, age emerges as a pivotal determinant, particularly affecting younger migrants (aged 18–24), who report less favorable migration outcomes (OR = 0.39; p-value = 0.001) than those under 18 years. This suggests that younger migrants face unique challenges, including employment and social integration hurdles, underscoring the need for targeted support and interventions.

Discussion

Studies have reported that rural industrial sites impact migration motives and socioeconomic conditions in rural areas [102,103]. However, the impact is multi-dimensional, involving employment, environmental, social, political, and migratory dynamics that interplay to shape the well-being of local and migrant populations [104]. In the regional context of Ghana, this study aimed to unravel this complexity by juxtaposing the socio-economic benefits against the realities of migration within the overarching theme of how these elements influence individual happiness, social cohesion, and community resilience.

Our results showed that creating employment opportunities stands out as a significant benefit of rural industrialization, with 28.12

% of locals finding direct or familial employment. Moreover, 61.85 % of the local respondents are employed, highlighting the significant impact of rural industrial sites on employment levels, which is closely aligned with the national employment rate of 61.5 % as reported by the International Labour Organization (ILO) Data Explorer in 2022 ([105], 2024). This similarity suggests that the employment level in the area mirrors the national average, highlighting the impact of rural industrial sites on local employment. This rate of employment is further supported by an odds ratio of 1.36, indicating that individuals connected (for example, through family relatives) to the industrial sites are more likely to be employed than those with no such connections. These statistics emphasize the substantial role that rural industrialization plays in bolstering local economies. It enhances direct employment opportunities and likely contributes to increased consumer spending, stimulates local businesses, and attracts complementary industries, thereby broadening its economic impact on the community. This is in line with the findings of [106]. Our results also resonate with studies in other regions that rural industrialization boots economic activities in these more peripheral areas [107–111]. For example, Boiko et al. [112] argued that rural development can be stimulated by boosting agro-tourism activities in rural areas. Yeh et al., [113] demonstrated how rural industrialization in China has been instrumental in transforming the economic landscape by providing jobs, increasing incomes, and reducing poverty. However, this economic upliftment is not uniformly experienced, reflecting broader socio-economic disparities that can exacerbate existing inequalities, such as increased cost of living [114,115,116]. The scenario calls for targeted interventions to ensure that the fruits of industrialization are equitably shared, enhancing collective happiness and socio-economic stability.

The environmental dimension introduces a sobering counterpoint to economic gains and also shapes migration dynamics. 65.96 % of the respondents reported noticeable environmental changes, highlighting significant concerns about pollution, habitat destruction, and land-use changes. However, these environmental impacts are not uniformly experienced and are perceived differently by locals and migrants. Nonetheless, the same respondents also reported increased employment opportunities. This may reflect that the presence of industrial sites, despite their environmental impacts, is associated with increased job creation, possibly due to the expansion of the site or related industries [117à119]. Notably, environmental degradation acts as a "push factor", with 45.4 % of locals considering leaving the area – this is the environmental cost of industrialization, highlighting the conflicting dynamics at play- economic benefits often attract individuals, while environmental concerns compel others to contemplate relocation. The logistic regression analysis indicated that these individuals are 0.92 times more likely to report employment opportunities, highlighting a complex situation. Therefore, despite available jobs, environmental worries may drive the contemplation to move. This collective environmental consciousness among the populace speaks to the tangible degradation of natural habitats and hints at the potential for diminished community happiness, as environmental quality is closely linked to quality of life [120]. Our study emphasizes the role of environmental sustainability in promoting social cohesion and reducing migratory pressures. For instance, addressing industrial pollution could enhance community well-being and discourage outward migration caused by environmental push factors. Consistent with our study, several studies have reported that increasing industrialization is related to environmental deterioration [121–123]. Environmental degradation in rural areas often manifests as land use changes [124,125] and an increase in (water, land, and air) pollution [126–128], among others [129]. Rahman et al., [130] reported that industrial pollution from increased industrialization hurts human health and increases death rates. Indeed, minimizing the environmental impacts of rural industrialization involves a multifaceted approach, integrating sustainable practices, technological innovation, policy interventions, and community engagement. These approaches not only prevent environmental degradation but also promote a more balanced and sustainable migration dynamic.

Consistent with Lee's [8] push-pull model, our results confirm that migrants are primarily drawn to industrial sites due to the economic opportunities they offer. Pull factors such as employment prospects and improved living conditions align with the model's assertion that individuals are attracted to areas with perceived advantages [131,132]. While socio-economic motives dominate (Fig. 3), our findings reinforce the notion that rural industrial zones act as significant magnets for migration, offering enhanced economic prospects [133], thereby validating the core principles of Lee's framework. Moreover, the dominance of socio-economic motives is intertwined with a significant gendered divergence in migration motivations [134,135]. The decision to migrate is often driven by the pursuit of a better life, whether through improved earnings [136], family reunification [137], or educational opportunities [138]. However, this journey is not without uncertainties, as evidenced by the mixed responses regarding relocation outcomes. The varied migration experiences—highlighted by the contrast between those reporting improved earnings (OR = 6.27) and others facing stagnant incomes highlight the precarious balance between opportunity and risk that migrants must navigate. Thus, migration patterns in response to rural industrialization reveal a complex interplay of advantages and challenges.

Additionally, our results show that outcomes of migration to rural industrial sites vary across industrial types. For example, among migrants, the Energy sector accounts for the highest proportion of respondents that reported employment (33 %), followed by the Agricultural sector (26 %), and the Solid Mineral/Mining sector (22 %), with the lowest in Oil and Gas (19 %). Positive community impacts are most prominent in the Energy sector (86 %), compared to Agricultural (21 %), Solid Mineral/Mining (18 %), and Oil and Gas (10 %). Migrants report income increases almost exclusively in the Agricultural sector (38 %). Environmental changes are most observed in the mining sector (68 %), followed by the Agricultural sector (36 %), while the Solid Mineral and energy sectors reported relatively minimal changes.

Finally, integrating happiness into the discourse on rural industrialization necessitates a holistic approach that also considers the intangible elements of environmental integrity and individual well-being. The findings point to a reality where industrial development offers economic opportunities and poses environmental and social challenges. Achieving a harmonious balance requires policies that foster economic inclusivity, protect environmental resources, and support migrants in their journeys toward happiness and fulfillment (Table 3).

Given the constraints of time, cost, and the need for uniformity across multiple industrial sites, a sample size of 50 per site was deemed appropriate for this study. While this size facilitated manageable data collection and analysis within the given limitations, it also poses potential challenges regarding the breadth and depth of the insights generated. The methodological approach of this study,

while robust in its capacity to deliver timely results, inevitably encompasses limitations that must be acknowledged. The accuracy of participant responses, potentially influenced by the compact nature of the study and its sample size, may not fully represent the wider community's experiences. Incorporating additional qualitative methods such as focus groups or detailed interviews could complement the existing data, offering a richer, more comprehensive view of the socio-economic impacts and enhancing the study's overall validity [139,140].

Furthermore, we must also consider the relevance of commuting distances in the context of our study. While specific data on maximum commuting distances in rural Ghana was not directly available, the use of a 6 km buffer for surveying around industrial sites was informed by global commuting patterns where individuals typically travel between 5 km and 10 km for work [96]. This approximation helps justify the chosen survey radius and highlights the need for future studies to obtain more precise local data to validate or adjust this parameter. Such an examination would provide additional insights into rural Ghana commuting behaviors, potentially influencing policy and planning decisions related to rural industrial development.

Conclusion

This study addressed the socio-economic impacts of rural industrial sites, the motivations behind migration to these areas, and how such migration affects migrants. The findings reveal that industrial sites in rural communities boost local employment, have positive effects on the indigenes of rural communities, and raise environmental concerns, necessitating sustainable development approaches. Migration to these rural areas with industrial sites is primarily driven by economic opportunities for males and a combination of economic, family, and educational motives for females. The experiences of migrants vary; while some benefit from improved earnings and happiness, others face uncertainties.

This study contributes to the existing literature by contextualizing migration patterns within Ghana's specific socio-economic and environmental landscape. Unlike studies focused on urban migration or industrialization in developed countries, this research highlights the dual role of rural industrialization as both a driver of economic opportunities for the migrant and local population and a source of environmental and social challenges. Generally, the findings reveal that the local populations can benefit from rural industrialization through employment and the increased rural industrialization has the potential to be a pull factor for migrants who primarily migrate for socioeconomic reasons. On the other hand, increased urban-rural migration impacts the cost of living in rural areas and for some industrial types such as mining, has negative consequences on the ecosystem, exacerbating environmental degradation. The findings equally reveal gendered migration dynamics and their policy implications, offering a more granular understanding of how industrialization shapes migration in rural Ghana. By highlighting these unique dynamics, the study bridges gaps in the current literature and provides a Ghana-specific lens to labor migration discussions.

Policy recommendations include investing in education and vocational training to enhance local labor capacities, standardizing wages to attract and retain skilled workers, and ensuring gender-inclusive policies to support female migrants [14]. Environmental sustainability should be prioritized through strict regulations and greener technologies, while improved rural infrastructure and social amenities can enhance the quality of life and attract sustainable investments [29]. Policy interventions must also address the balance between economic benefits and environmental costs, ensuring that development is equitable and does not disproportionately burden vulnerable groups. Finally, fostering collaboration between industries, governments, and communities can ensure equitable and transparent development outcomes [141–143].

Further research opportunities could include comparative studies across different countries and industries, an in-depth study of migrant well-being, investigating how gendered migration dynamics evolve over time, and exploring policy interventions that can promote more inclusive forms of rural industrialization. These future inquiries would strengthen the understanding of the complex interplay between industrialization and migration but also provide evidence-based guidance for more inclusive and sustainable policymaking.

Funding

CRediT authorship contribution statement

Itohan-Osa Abu: Writing – original draft, Writing – review & editing, Data curation, Methodology, Formal analysis, Investigation. **Michael Thiel:** Conceptualization, Funding acquisition, Methodology, Writing – original draft, Formal analysis, Writing – review & editing, Investigation, Supervision. **Clement Nyamekye:** Writing – review & editing. **Yaw Mensah Asare:** Writing – review & editing. **Emmanuel Agyapong:** Writing – review & editing. **Benjamin Agbemor:** Writing – review & editing. **Ebenezer N.K. Boateng:** Writing – review & editing. **Chibuike Ibebuchi:** Writing – review & editing. **Tobias Ullmann:** Writing – review & editing. **Jürgen Rauh:** Writing – review & editing. **Hannes Taubenböck:** Conceptualization, Methodology, Writing – original draft, Formal analysis, Writing – review & editing, Investigation, Supervision.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to

influence the work reported in this paper.

Data availability statement

The datasets used in this study are available upon request.

Appendix

Table A1
List of industries and villages surveyed.

Industries	Name	Names of villages	Region
Solid Mineral Industry	Awaso Bauxite Mine	Asempanaye	
Solid Mineral Industry	Benso Gold Mine	Benso	Western
Solid Mineral Industry	Bibiani Gold Mine	Gyedi	Ashanti
Solid Mineral Industry	Bogoso North Gold Mine	Bogoso B-line	Western
Energy Industry	Bontanga Dam	Wuba	Northern
Agricultural Industry	BOPP - Benso Palm Oil Mill	Benso	Western
Solid Mineral Industry	Buesichem Gold Mine	Kwame Niampa	Western
Energy Industry	Bui Dam	Jama	Savannah
Solid Mineral Industry	Chirano Gold Mine	Akoti	Western
Solid Mineral Industry	Chujah Dumasi Gold Mine	Dumasi	Western
Solid Mineral Industry	Damang Gold Mine	Damang	Western
Solid Mineral Industry	Edikan Gold Mine	Ayanfuri	Western
Agricultural Industry	GOPDC - Kwae Palm Oil Mill	Kwae	Eastern
Solid Mineral Industry	Iduapriem Gold Mine	Wassa Agona	Western
Energy Industry	Mankessim Dam	Baifikrom	Central
Solid Mineral Industry	Nsuta Manganese Mine	Nsuta Zongo	Western
Solid Mineral Industry	Nzema Gold Mine	Salman	Western
Oil & Gas Industry	Osagyefo Barge Gas Power Plant	Effasu	Western
Solid Mineral Industry	Owere Gold Mine	Patriensa	Ashanti
Solid Mineral Industry	Prestea South Gold Mine	Prestea-Krutown	Western
Solid Mineral Industry	Savacem - Buipe Cement Grinding Mill	Yepala	Savannah
Solid Mineral Industry	Tarkwa Gold Mine	New Atuabo	Western
Solid Mineral Industry	Teberebie Gold Mine	Akyempim	Western
Agricultural Industry	TOPP - Twifo Ntafrewaso Palm Oil Mill	Twifo Kwenyako	Central

Table A2
Correlation table between the independent variables.

	Sex	Age	Current Educational Level	Employment status
Sex	0.0	0.02	0.13*	−0.09*
Age	0.02	0.0	−0.13*	0.00
Current Educational Level	0.13*	−0.13*	0.0	−0.04
Employment status	−0.09*	0.00	−0.04	0.0

Table A3
Variance Inflation Factor (VIF) table.

Variable	VIF
Sex	−0.093
Age	0.029
Current Educational Level	−0.036
Employment status	−0.006

Table A4
Survey Questions and Data Entries.

Section	Question	Key
Demographics	What is your community's name?	Community_name
	What is your marital status?	Marital_status
	What is your employment status?	Employment_status
	What is your age at the time of migration?	Age_at_migration
	What is the size of your family at the time of migration?	Family_size_at_migration
	What is your gender?	Gender
	What is your age category?	Age_category
Migration Details	What is your migration status?	Migration_Status

Table A4 (*continued*)

Section	Question	Key
	What is your reason for migrating/relocation?	Reason_for_migrating
	What is your age at the time of migration?	Age_at_migration_2
	What is the location of your place of origin?	Place_of_origin
	What is the size of your family at the time of migration?	Family_size_at_migration_2
Community Interaction	How is the industry engaging with local communities to address their concerns?	Industry_engagement
Industrial Operation Status	Is the industrial site still in operation?	Industrial_site_operation
Economic Impact	What are the economic benefits of the industrial site?	Economic_benefits
	What are the economic drawbacks of the industrial site?	Economic_drawbacks
	What is the impact of the industrial site on local employment opportunities?	Employment_impact
	What changes have occurred in local economic activities since the industrial site began operation?	Economic_changes
Happiness	Overall, how happy are you with your community and living conditions?	Happiness_level

Table A5
Measurement of independent variables.

S/N	Variable	Coding
1	Gender	0 = Female
		1 = Male
2	Age	0 = Age Under 18
		1 = 18–24
		2 = 25–34
		3 = 35–44
		4 = 45–54
		5 = 55–64
		6 = 65 or older
3	Marital status?	1 = separated
		2 = divorced
		3 = married
		4 = single
		5 = widowed
4	Current Educational Level	1 = Primary education
		2 = Junior Secondary education
		3 = No formal education
		4 = Senior Secondary education
		5 = Tertiary education
5	What has been the cost of living since the industry was established?	1 = Low
		2 = Moderate
		3 = High
6	Has your income increased or decreased since the rural industrial site was established?	1 = Increased
		2 = Decreased
		3 = No change
7	Have you considered leaving the area since the rural industrial site was established?	1 = No
		2 = Not sure
		3 = Yes
8	Have you noticed any changes in the environment since the rural industrial site was established?	1 = No
		2 = Not sure
		3 = Yes
9	Have you or any family members actually left the community since the industry was established?	1 = Not sure
		2 = No
		3 = Yes
10	Have you or any family members been employed at the industrial site	1 = Not sure
		2 = No
		3 = Yes
11	Age at the time of migration_18–24	1 = Under 18
		2 = 18–24
		3 = 25–34
		4 = 35–44
		5 = 45–54
12	How did you migrate?	1 = Alone
		2 = With family
		3 = With friends
13	Old Earnings	1 = Minimum wage
		2 = Greater than minimum wage
		3 = Less than minimum wage
14	Migrants reason for migrating	1 = Conflicts / Acts of Terrorism
		2 = Other**
		3 = Relocation because of family reasons
		4 = Socio-Economic Reasons
		5 = To acquire an academic or vocational skill

Table A5 (*continued*)

S/N	Variable	Coding
		6 = To be Independent
15	Since you moved, have your earnings improved?	1 = Not sure
		2 = No
		3 = Yes
16	Were you aware of the job opportunities available here?	1 = No
		2 = Not sure
		3 = Yes

Other** mostly represents Environmental factors.

Table A6

Logistic Regression Analysis of Factors Determining Employment Status Among Indigenous People in Rural Industrial Areas

This table presents a logistic regression analysis exploring various factors that influence whether indigenous respondents in rural industrial communities are currently employed.

Variable	OR	P Value
Age		
18–24	Ref	
Under 18	0.07	0.001
25–34	1.32	0.11
35–44	1.83	0.01
45–54	1.44	0.20
55–64	1.30	0.45
65 or older	0.64	0.23
Gender		
Female	Ref	
Male	0.80	0.16
Marital status?		
Separated	Ref	
Divorced	0.92	0.90
Married	1.16	0.36
Single	0.72	0.04
Widowed	3.60	0.04
Current Educational Level		
No formal education	Ref	
Junior Secondary education	2.09	0.00002
Primary education	0.83	0.48
Senior Secondary education	0.94	0.73
Tertiary education	1.39	0.42
Has your income increased or decreased since the rural industrial site was established?		
Decreased	Ref	
Increased	2.37	0.0001
No change	0.60	0.002
Have you considered leaving the area since the rural industrial site was established?		
Not sure		
Yes	1.08	0.62
No	1.62	0.0003
Have you noticed any changes in the environment since the rural industrial site was established?		
No	Ref	
Not sure	1.04	0.89
Yes	1.17	0.35
Have you or any family members actually left the community since the industry was established?		
No	Ref	
Yes	0.62	0003
Not sure	1.03	0.96
Have you or any family members been employed at the industrial site?		
No	Ref	
Not sure	0.79	0.64
Yes	1.36	0.09
What has been the cost of living since the industry was established?		
Moderate	Ref	
High	1.40	0.08
Low	0.35	0.01

References

[1] Szirmai, A. (2012). *Proximate, intermediate and ultimate causality: theories and experiences of growth and development.* http://collections.unu.edu/view/UNU:43.

[2] Y. Zhu, In situ urbanization in rural China: case studies from Fujian province, Dev. Change 31 (2000) 413–434, https://doi.org/10.1111/1467-7660.00160.

[3] Y. Zhu, In situ urbanization in China: processes, contributing factors, and policy implications, China Popul. Dev. Stud. 1 (1) (2017) 45–66, https://doi.org/10.1007/BF03500917.

[4] Y. Zhu, M. Lin, L. Lin, J. Chen, The extent of in situ urbanisation in China's county areas. The case of Fujian province, China Perspectives 2013 (2013/3) (2013) 43–52.

[5] L. Acheampong, D. Antwi, Perceived livelihood of palm kernel processors at Abura in the cape coast metropolis of Ghana, Afr. J. Rural Dev. (AFJRD) 2 (4) (2017) 535–547.

[6] G. Hilson, Creating' rural informality: the case of artisanal gold mining in Sub-Saharan Africa, SAIS Review of International Affairs 33 (1) (2013) 51–64.

[7] A. Ntiamoah, G. Afrane, Environmental impacts of cocoa production and processing in Ghana: life cycle assessment approach, J. Clean. Prod. 16 (16) (2008) 1735–1740.

[8] E.S. Lee, A theory of migration, Demography 3 (1) (1966) 47–57, https://doi.org/10.2307/2060063.

[9] F. Castelli, Drivers of migration: why do people move? J. Travel. Med. 25 (1) (2018) tay040.

[10] K.S. Sridhar, A.V. Reddy, P. Srinath, Is it push or pull? Recent evidence from migration in India, South Asia Netw. Econ. Res. Inst 10 (2010) 1–17.

[11] N. Van Hear, O. Bakewell, K. Long, Push-pull plus: reconsidering the drivers of migration, J. Ethn. Migr. Stud. 44 (6) (2018) 927–944.

[12] Ackah, C., Adjasi, C., & Turkson, F. (2014). *Scoping study on the evolution of industry in Ghana.* WIDER Working Paper. https://www.econstor.eu/handle/10419/97115.

[13] S.E. Edusah, E. Antoa, The socio-economic contribution of rural small-scale industries in Ghana, Journal of Economics and Sustainable Development 5 (2) (2014) 161–172.

[14] M. Honorati, S.J. De Silva, Expanding Job Opportunities in Ghana, World Bank Publications, 2016. https://books.google.com/books?hl=en&lr=&id=NpuCDQAAQBAJ&oi=fnd&pg=PT14&dq=Expanding+Job+Opportunities+in+Ghana&ots=2mATFLzhW6&sig=-FlYkBjzPIwx7GZghj9FPHu1m1w.

[15] M. Filipski, H.L. Lee, A. Hein, U. Nischan, Emigration and Rising Wages in Myanmar: evidence from Mon State, J. Dev. Stud. 56 (5) (2020) 946–963, https://doi.org/10.1080/00220388.2019.1626834.

[16] M.I. Khan, Consequences of Labour Migration on Wages and Employment: evidence from India, The Indian Journal of Labour Economics 64 (1) (2021) 23–47, https://doi.org/10.1007/s41027-020-00294-7.

[17] R. Black, W.N. Adger, N.W. Arnell, S. Dercon, A. Geddes, D. Thomas, The effect of environmental change on human migration, Global Environmental Change 21 (2011) S3–S11.

[18] M. Borderon, P. Sakdapolrak, R. Muttarak, E. Kebede, R. Pagogna, E. Sporer, Migration influenced by environmental change in Africa, Demogr. Res. 41 (2019) 491–544.

[19] L.M. Hunter, J.K. Luna, R.M. Norton, Environmental Dimensions of Migration, Annu Rev. Sociol. 41 (1) (2015) 377–397, https://doi.org/10.1146/annurev-soc-073014-112223.

[20] R. Obokata, L. Veronis, R. McLeman, Empirical research on international environmental migration: a systematic review, Popul. Environ. 36 (1) (2014) 111–135, https://doi.org/10.1007/s11111-014-0210-7.

[21] M.G. Bastos Lima, U.M Persson, Commodity-centric landscape governance as a double-edged sword: the case of soy and the Cerrado Working Group in Brazil, Front. For. Glob. Change 3 (2020) 27.

[22] R.E. Galt, The Moral Economy Is a Double-edged Sword: explaining Farmers' Earnings and Self-exploitation in Community-Supported Agriculture, Econ. Geogr. 89 (4) (2013) 341–365, https://doi.org/10.1111/ecge.12015.

[23] L.W. Munnich, G. Schrock, Rural knowledge clusters: the challenge of rural economic prosperity. The American Midwest, Routledge, 2016, pp. 159–176. https://www.taylorfrancis.com/chapters/edit/10.4324/9781315498416-11/rural-knowledge-clusters-lee-munnich-greg-schrock.

[24] N. Andrews, N.J. Bennett, P. Le Billon, S.J. Green, A.M. Cisneros-Montemayor, S. Amongin, N.J. Gray, U.R. Sumaila, Oil, fisheries and coastal communities: a review of impacts on the environment, livelihoods, space and governance, Energy Res. Soc. Sci. 75 (2021) 102009.

[25] P. Hota, B. Behera, Opencast coal mining and sustainable local livelihoods in Odisha, India, Mineral Economics 29 (1) (2016) 1–13, https://doi.org/10.1007/s13563-016-0082-7.

[26] F. Dapilah, J.Ø. Nielsen, J.N. Akongbangre, Peri-urban transformation and shared natural resources: the case of shea trees depletion and livelihood in Wa municipality, Northwestern Ghana, African Geographical Review 38 (4) (2019) 374–389, https://doi.org/10.1080/19376812.2018.1480395.

[27] X. Diao, E. Magalhaes, J. Silver, Cities and rural transformation: a spatial analysis of rural livelihoods in Ghana, World Dev. 121 (2019) 141–157.

[28] J.T. Mensah, E. Botchway, Ghana's salt industry: a neglected sector for economic development? Resour. Policy. 38 (3) (2013) 288–294, https://doi.org/10.1016/j.resourpol.2013.06.002.

[29] A.N. Somanje, G. Mohan, J. Lopes, A. Mensah, C. Gordon, X. Zhou, M. Moinuddin, O. Saito, K. Takeuchi, Challenges and Potential Solutions for Sustainable Urban-Rural Linkages in a Ghanaian Context, Sustainability. 12 (2) (2020), https://doi.org/10.3390/su12020507. Article 2.

[30] G. Hilson, Farming, small-scale mining and rural livelihoods in Sub-Saharan Africa: a critical overview, Extr. Ind. Soc. 3 (2) (2016) 547–563.

[31] G. Hilson, R. Maconachie, Artisanal and small-scale mining and the Sustainable Development Goals: opportunities and new directions for sub-Saharan Africa, Geoforum. 111 (2020) 125–141.

[32] L. Weng, A.K. Boedhihartono, P.H. Dirks, J. Dixon, M.I. Lubis, J.A. Sayer, Mineral industries, growth corridors and agricultural development in Africa, Glob. Food Sec. 2 (3) (2013) 195–202.

[33] E. Baglioni, L. Campling, Natural resource industries as global value chains: frontiers, fetishism, labour and the state, Environ. Plann. A Econ. Space 49 (11) (2017) 2437–2456, https://doi.org/10.1177/0308518X17728517.

[34] K. Lowitt, G.M. Hickey, W. Ganpat, L. Phillip, Linking Communities of Practice with Value Chain Development in Smallholder Farming Systems, World Dev. 74 (2015) 363–373, https://doi.org/10.1016/j.worlddev.2015.05.014.

[35] S. Castles, Understanding Global Migration: a Social Transformation Perspective, J. Ethn. Migr. Stud. 36 (10) (2010) 1565–1586, https://doi.org/10.1080/1369183X.2010.489381.

[36] R.E. Park, Human Migration and the Marginal Man, American Journal of Sociology 33 (6) (1928) 881–893, https://doi.org/10.1086/214592.

[37] L.A. Sjaastad, The Costs and Returns of Human Migration, Journal of Political Economy 70 (5, Part 2) (1962) 80–93, https://doi.org/10.1086/258726.

[38] N. Sackeyfio, Energy Politics and Rural Development in Sub-Saharan Africa, Springer International Publishing, 2018, https://doi.org/10.1007/978-3-319-60122-9.

[39] T. Dax, M. Fischer, An alternative policy approach to rural development in regions facing population decline, Eur. Plan. Stud. 26 (2) (2018) 297–315, https://doi.org/10.1080/09654313.2017.1361596.

[40] L. Ryser, G. Halseth, Rural economic development: a review of the literature from industrialized economies, Geogr. Compass. 4 (6) (2010) 510–531, https://doi.org/10.1111/j.1749-8198.2010.00321.x.

[41] Clark, W.A. (2020). *Human migration.* https://researchrepository.wvu.edu/rri-web-book/15/.

[42] S. Paquette, G. Domon, Changing ruralities, changing landscapes: exploring social recomposition using a multi-scale approach, J. Rural. Stud. 19 (4) (2003) 425–444.

[43] R. Jedwab, L. Christiaensen, M. Gindelsky, Rural push, Urban Pull and... Urban push? New historical Evidence from Developing Countries, Institute for International Economic Policy, Washington, DC, USA, 2014. https://www2.gwu.edu/~iiep/assets/docs/papers/Jedwab_IIEPWP_2014-4.pdf.

[44] S.K. Meher, Impact of distress seasonal migration from a socio-economic perspective: a case study of Nuapada District in Kalahandi Balangir Koraput Region of Odisha, Ind. J. Labour Econ. 62 (4) (2019) 763–782.

[45] N.P. Singh, R.P. Singh, R. Kumar, R.N. Padaria, A. Singh, N. Varghese, Determinants and farm-level impacts of labour outmigration in the indo-Gangetic Plains of India, Indian J. Agric. Econ. 66 (1) (2011). https://ageconsearch.umn.edu/record/204740/files/13-N.P%20singh.pdf.

[46] P. Boyle, K. Halfacree, Migration and Gender in the Developed World, Routledge, London, 1999. https://api.taylorfrancis.com/content/books/mono/download?identifierName=doi&identifierValue=10.4324/9780203448878&type=googlepdf.

[47] J.E. Dugbazah, Gender, Migration and Rural Livelihoods in Ghana: A case of the Ho District, University of Birmingham, 2008. PhD Thesis, https://etheses.bham.ac.uk/id/eprint/209/.

[48] N. Piper, Gender and migration, Policy Analysis and Research Programme of the Global Commission on International Migration 7 (2005). https://www.incedes.org.gt/Master/pipersesentacuatro.pdf.

[49] D. Ballas, What makes a 'happy city'? Cities. 32 (2013) S39–S50.

[50] D. Coates, P. Anand, and M. Norris, Housing, happiness and capabilities: a summary of the international evidence and models, Open Discussion Papers in Economics (2015). https://www.econstor.eu/handle/10419/147532.

[51] T. Reardon, C.P. Timmer, Transformation of markets for agricultural output in developing countries since 1950: how has thinking changed? Handbook of Agricultural Economics 3 (2007) 2807–2855.

[52] P.N. Stearns, The Industrial Revolution in World History, Routledge, 2020. https://www.taylorfrancis.com/books/mono/10.4324/9781003050186/industrial-revolution-world-history-peter-stearns.

[53] S. Chen, Z. Liu, What determines the settlement intention of rural migrants in China? Economic incentives versus sociocultural conditions, Habitat. Int. 58 (2016) 42–50.

[54] J. Domac, K. Richards, S. Risovic, Socio-economic drivers in implementing bioenergy projects, Biomass and Bioenergy 28 (2) (2005) 97–106.

[55] A.G. Papadopoulos, L.-M. Fratsea, Migrant and refugee impact on well-being in rural areas: reframing rural development challenges in Greece, Front. Sociol. 6 (2021) 592750.

[56] B. Surya, H. Hadijah, S. Suriani, B. Baharuddin, A.T. Fitriyah, F. Menne, E.S. Rasyidi, Spatial transformation of a new city in 2006–2020: perspectives on the spatial dynamics, environmental quality degradation, and socio—Economic sustainability of local communities in Makassar City, Indonesia, Land. (Basel) 9 (9) (2020) 324.

[57] D. Acemoglu, S. Johnson, J.A. Robinson, Institutions as a fundamental cause of long-run growth, Handbook Econ. Growth 1 (2005) 385–472.

[58] W.C. Gartner, A perspective on rural tourism development, J. Region. Anal. Policy 35 (1) (2005). https://ageconsearch.umn.edu/record/132301/files/05-1-3.pdf.

[59] A. Stockdale, Rural Out-Migration: community Consequences and Individual Migrant Experiences, Sociol. Ruralis. 44 (2) (2004). https://www.researchgate.net/profile/Aileen-Stockdale/publication/229550287_Rural_Out-Migration_Community_Consequences_and_Individual_Migrant_Experiences/links/6058c60792851cd8ce5e39fc/Rural-Out-Migration-Community-Consequences-and-Individual-Migrant-Experiences.pdf.

[60] Campfens, H. (1997). Community development around the world: practice, theory, research, training. https://books.google.com/books?hl=en&lr=&id=I8qCyqen10C&oi=fnd&pg=PR17&dq=Drawing+on+theories+of+rural+development+and+migration,+this+research+is+guided+by+the+dualistic+development+thesis,+which+posits+that+industrialization+in+rural+areas+leads+to+a+dichotomy+of+economic+development+and+social+transformation&ots=TPwTtzb_Zh&sig=C4JarexnMNJ_QjLT2VxrS_rmMD4.

[61] H. De Haas, A theory of migration: the aspirations-capabilities framework, Comp. Migr. Stud. 9 (1) (2021) 1–35.

[62] J.D. Kasarda, E.M. Crenshaw, Third World Urbanization: dimensions, Theories, and Determinants, Annu Rev. Sociol. 17 (1) (1991) 467–501, https://doi.org/10.1146/annurev.so.17.080191.002343.

[63] M. Kühn, Peripheralization: theoretical Concepts Explaining Socio-Spatial Inequalities, Eur. Plan. Stud. 23 (2) (2015) 367–378, https://doi.org/10.1080/09654313.2013.862518.

[64] Mackay, M.D., Perkins, H.C., & Espiner, S.R. (2009). The study of rural change from a social scientific perspective: a literature review and annotated bibliography. https://researcharchive.lincoln.ac.nz/handle/10182/1132.

[65] D.A. Abolga, Migration and settlement: Exploring what Drives Rural-Urban Displacement in Kumasi, Ghana, Norwegian University of Life Sciences, 2022 [Master's ThesisÅs], https://nmbu.brage.unit.no/nmbu-xmlui/handle/11250/3042298.

[66] F.M. Asiimwe, D. Musinguzi, Analysis of push and pull factors influencing the migration of Ugandan domestic workers to Saudi Arabia, Interdiscip. J. Soc. Stud. 4 (2024) 1–19.

[67] C. Gbollie, S. Gong, Emerging destination mobility: exploring African and Asian international students' push-pull factors and motivations to study in China, Int. J. Educ. Manage. 34 (1) (2020) 18–34.

[68] N.T. Zaman, Md.S. Sohel, Md. Obaidullah, Md.S. Hossen, Md.T. Rahman, Md.K. Sifullah, Md.F.H. Sarker, Factors shaping Bangladeshi students' migration decision using push–pull theory: a focus group study, SN. Soc. Sci. 4 (1) (2023) 4, https://doi.org/10.1007/s43545-023-00797-2.

[69] J.E. Blumenstock, G. Chi, X. Tan, Migration and the value of social networks, Review of Economic Studies (2023) rdad113.

[70] S. Haug, Migration Networks and Migration Decision-Making, J. Ethn. Migr. Stud. 34 (4) (2008) 585–605, https://doi.org/10.1080/13691830801961605.

[71] K. Munshi, Social Networks and Migration, Annu Rev. Econom. 12 (1) (2020) 503–524, https://doi.org/10.1146/annurev-economics-082019-031419.

[72] C.L. Bankston III, Immigrant Networks and Social Capital, John Wiley & Sons, 2014, in: https://books.google.com/books?hl=en&lr=&id=t7wBBAAAQBAJ&oi=fnd&pg=PT6&dq=Social+capital,+similarly,+emphasizes+the+value+of+social+relations+and+the+reciprocal+support+systems+within+migrant+communities&ots=b_HrhmONJ-&sig=2T56Q1ppq26TP4CdQOFIRxu6FrQ.

[73] A. Portes, P. Landolt, Social capital: promise and pitfalls of its role in development, J. Lat. Am. Stud. 32 (2) (2000) 529–547.

[74] R.D. Putnam, Bowling alone: the collapse and revival of American community, Simon Schuster (2000). https://books.google.com/books?hl=en&lr=&id=rd2ibodep7UC&oi=fnd&pg=PA13&dq=Putnam,+R.+D.+(2000).+Bowling+alone++The+collapse+and+revival+of+American+community.+New+York++Simon+%26+Schuster.&ots=G7Ffs1qoT0&sig=lyXxnKzxpZi9RvVs8LeFM1F0zBI.

[75] M. De Jesus, B. Warnock, Z. Moumni, Z.H. Sougui, L. Pourtau, The impact of social capital and social environmental factors on mental health and flourishing: the experiences of asylum-seekers in France, Confl. Health 17 (1) (2023) 18, https://doi.org/10.1186/s13031-023-00517-w.

[76] A.B. Strang, N. Quinn, Integration or isolation? Refugees' social connections and wellbeing, J. Refug. Stud. 34 (1) (2021) 328–353.

[77] J. Zhou, J. Zhou, H. Zhang, J. Zhang, Social integration as mediator and age as moderator in social capital affecting mental health of internal migrant workers: a multi-group structural equation modeling approach, Front. Public Health 10 (2022) 865061, https://doi.org/10.3389/fpubh.2022.865061.

[78] J. Thompson, I. Scoones, Addressing the dynamics of agri-food systems: an emerging agenda for social science research, Environ. Sci. Policy. 12 (4) (2009) 386–397.

[79] J.A. Akudugu, Organising and Implementing Local Economic Development Initiatives At the District Level in Ghana, Universitäts-und Landesbibliothek Bonn, 2013 [PhD Thesis], https://bonndoc.ulb.uni-bonn.de/xmlui/handle/20.500.11811/5595.

[80] K. Amponsah-Tawiah, K. Dartey-Baah, Corporate social responsibility in Ghana, Int. J. Business Social Sci. 2 (17) (2011) 107–112.

[81] Y. Bangura, Economic Restructuring, Coping Strategies and Social Change: implications for Institutional Development in Africa, Dev. Change 25 (4) (1994) 785–827, https://doi.org/10.1111/j.1467-7660.1994.tb00536.x.

[82] G.C. Schoneveld, L.A. German, E. Nutakor, Land-based investments for rural development? A grounded analysis of the local impacts of biofuel feedstock plantations in Ghana, Ecology and Society 16 (4) (2011). https://www.jstor.org/stable/26268963?casa_token=0w7-xB0eA7sAAAAA:A7ptyY4qB0gEqvsMTpUKfnUUBLkYq7RxcH_l9XUiZTHBZEqKNQpOHpLfnUpx6PeCEyRvcrIMOql1_bZvbFLWw8sWMtGBvT3R31IRWFJlkPWFBnKE7lsU.

[83] J. Mensah, Sustainable development: meaning, history, principles, pillars, and implications for human action: literature review, Cogent. Soc. Sci. 5 (1) (2019) 1653531.

[84] V. Mensah, The Role of Corporate Social Responsibility On sustainabledevelopment: A case Study of the Mining Community in the Obuasi municipality, Universitetet i Agder, University of Agder, 2009 [Master's Thesis, https://uia.brage.unit.no/uia-xmlui/bitstream/handle/11250/135139/Victoria_Thesis%20last%20version.pdf?sequence=1.

[85] R. Barua, Government of India Endeavors for Vocational Education, Training and Skill Development, Anveshana 7 (1) (2017) 43–56.

[86] P. Zhang, Skill formation, environmental pollution, and wage inequality, Ann. Reg. Sci. 62 (2) (2019) 405–424.
[87] H. Long, J. Zou, Y. Liu, Differentiation of rural development driven by industrialization and urbanization in eastern coastal China, Habitat. Int. 33 (4) (2009) 454–462.
[88] E.-M. Meemken, J. Sellare, C.N. Kouame, M. Qaim, Effects of Fairtrade on the livelihoods of poor rural workers, Nat. Sustain. 2 (7) (2019) 635–642.
[89] C. Oya, F. Schaefer, D. Skalidou, The effectiveness of agricultural certification in developing countries: a systematic review, World Dev. 112 (2018) 282–312.
[90] Altenburg, T. (2011). *Industrial policy in developing countries: overview and lessons from seven country cases*. Discussion paper. https://www.econstor.eu/handle/10419/199359.
[91] Y. Shamdasani, Rural road infrastructure & agricultural production: evidence from India, J. Dev. Econ. 152 (2021) 102686.
[92] A. Sharma, Urban proximity and spatial pattern of land use and development in rural India, J. Dev. Stud. 52 (11) (2016) 1593–1611, https://doi.org/10.1080/00220388.2016.1166207.
[93] Cuambe, C.C. (2004). *State-community partnership as an option for sustainable management of an Androstachys johnsonii dominated woodland in Mabote District, Mozambique* [PhD Thesis, Stellenbosch: stellenbosch University]. https://scholar.sun.ac.za/items/1d495aef-302c-4c52-ad63-d5cb179fa469.
[94] Y. Juanwen, W. Quanxin, L. Jinlong, Understanding indigenous knowledge in sustainable management of natural resources in China: taking two villages from Guizhou Province as a case, For. Policy. Econ. 22 (2012) 47–52.
[95] S. Tangjang, Traditional slash and burn agriculture as a historic land use practice: a case study from the ethnic noctes in Arunachal Pradesh, India, World Journal of Agricultural Sciences 5 (1) (2009) 70–73.
[96] A. Manning, B. Petrongolo, How Local Are Labor Markets? Evidence from a Spatial Job Search Model, American Economic Review 107 (10) (2017) 2877–2907, https://doi.org/10.1257/aer.20131026.
[97] J.H. Kim, Multicollinearity and misleading statistical results, Korean J. Anesthesiol. 72 (6) (2019) 558–569.
[98] K.M. Marcoulides, T. Raykov, Evaluation of Variance Inflation Factors in Regression Models Using Latent Variable Modeling Methods, Educ. Psychol. Meas. 79 (5) (2019) 874–882, https://doi.org/10.1177/0013164418817803.
[99] C.G. Thompson, R.S. Kim, A.M. Aloe, B.J. Becker, Extracting the variance inflation factor and other multicollinearity diagnostics from typical regression Results, Basic Appl. Soc. Psych. 39 (2) (2017) 81–90, https://doi.org/10.1080/01973533.2016.1277529.
[100] Z. Shi, Returned migrants, family capital and entrepreneurship in rural China, China Popul. Dev. Stud. 1 (2) (2017) 49–70, https://doi.org/10.1007/BF03500924.
[101] Y. Zhu, W.W. Wang, L. Lin, J. Shen, Q. Ren, Return migration and in situ urbanization of migrant sending areas: insights from a survey of seven provinces in China, Cities 115 (2021) 103242, https://doi.org/10.1016/j.cities.2021.103242.
[102] W. Qi, Y. Deng, B. Fu, Rural attraction: the spatial pattern and driving factors of China's rural in-migration, J. Rural. Stud. 93 (2022) 461–470.
[103] A. Vuin, D.A. Carson, D.B. Carson, J. Garrett, The role of heritage tourism in attracting "active" in-migrants to "low amenity" rural areas, Rural Society 25 (2) (2016) 134–153, https://doi.org/10.1080/10371656.2016.1194324.
[104] S. Mercandalli, B. Losch, M.N. Belebema, J.-F. Bélières, R. Bourgeois, M.F. Dinbabo, S. Freguin-Gresh, C. Mensah, C.C. Nshimbi, Rural Migration in Sub-Saharan Africa: Patterns, Drivers and Relation to Structural Transformation, FAO, 2019. https://agritrop.cirad.fr/595727/1/2019_FAO_RuralMigration_WorkingPaper_EN.pdf.
[105] ILOSTAT Data Explorer. (n.d.). Retrieved 12 October 2024, from https://rshiny.ilo.org/dataexplorer0/.
[106] D. Assamah, S. Yuan, Greenfield investment and job creation in Ghana: a sectorial analysis and geopolitical implications of Chinese investments, Human. Soc. Sci. Commun. 11 (1) (2024) 1–11, https://doi.org/10.1057/s41599-024-02789-w.
[107] A.L. Bertrand, H.W. Osborne, The impact of industrialization on a rural community, Journal of Farm Economics 41 (5) (1959) 1127–1134.
[108] Decentralized Industrialization and Rural Development: Evidence from Taiwan. (1979). *Economic Development and Cultural Change*, 28(1), 77–96. https://doi.org/10.1086/451154.
[109] X. Ma, T. Huang, China's Rural Industrialization and Agricultural Mechanization, China & World Economy 31 (3) (2023) 27–58, https://doi.org/10.1111/cwe.12470.
[110] D. North, Rural industrialization. The Geography of Rural Change, Routledge, 2014, pp. 161–188. https://api.taylorfrancis.com/content/chapters/edit/download?identifierName=doi&identifierValue=10.4324/9781315842608-11&type=chapterpdf.
[111] UNESCO, B.C. (2016). *Education and training for rural transformation. Skills, jobs, food and green future to combat poverty*.
[112] Boiko, V., Romanenko, Y., Shevchuk, S., Barabanova, V., & Karpinska, N. (2020). *Rural development by stimulating agro-tourism activities*. http://dspace.ksaeu.kherson.ua/handle/123456789/4733.
[113] A.G. Yeh, J. Xu, K. Liu, China's Post-Reform urbanization: Retrospect, Policies and Trends, 5, IIED, 2011. https://books.google.com/books?hl=en&lr=&id=X68svHs9nMkC&oi=fnd&pg=PA1&dq=Yeh,+A.G.O.,+%26+Xu,+J.+(2008).+China%27s+Post-Reform+Urbanization:+Retrospect,+Policies+and+Trends.+Urban+Studies+Research,+Vol.+2008,+Article+ID+789132.&ots=2UFyO3vDy6&sig=umGreZwgE9I7oL6hb90-hirLaKs.
[114] N. Bandelj, M.C. Mahutga, How socio-economic change shapes income inequality in post-socialist Europe, Social Forces 88 (5) (2010) 2133–2161.
[115] Birkmann, J., Liwenga, E., Pandey, R., Boyd, E., Djalante, R., Gemenne, F., Leal Filho, W., Pinho, P., Stringer, L., & Wrathall, D. (2022). *Poverty, livelihoods and sustainable development*. https://orbi.uliege.be/bitstream/2268/299648/1/IPCC_AR6_WGII_Chapter08.pdf.
[116] M. Lawrie, M. Tonts, P. Plummer, Boomtowns, Resource Dependence and Socio-economic Well-being, Australian Geographer 42 (2) (2011) 139–164, https://doi.org/10.1080/00049182.2011.569985.
[117] D. D`amato, M. Rekola, M. Wan, D. Cai, A Toppinen, Effects of industrial plantations on ecosystem services and livelihoods: perspectives of rural communities in China, Land. use policy. 63 (2017) 266–278.
[118] L. Leonard, Mining and/or tourism development for job creation and sustainability in Dullstroom, Mpumalanga, Local Economy: The Journal of the Local Economy Policy Unit 31 (1–2) (2016) 249–263, https://doi.org/10.1177/0269094215621875.
[119] S. Martinat, P. Dvorak, B. Frantal, P. Klusacek, J. Kunc, J. Navratil, R. Osman, K. Tureckova, M. Reed, Sustainable urban development in a city affected by heavy industry and mining? Case study of brownfields in Karvina, Czech Republic, J. Clean. Prod. 118 (2016) 78–87.
[120] J.M. Fischer, A. Amekudzi, Quality of Life, Sustainable Civil Infrastructure, and Sustainable Development: strategically Expanding Choice, J. Urban. Plan. Dev. 137 (1) (2011) 39–48, https://doi.org/10.1061/(ASCE)UP.1943-5444.0000039.
[121] M.A. Destek, Deindustrialization, reindustrialization and environmental degradation: evidence from ecological footprint of Turkey, J. Clean. Prod. 296 (2021) 126612.
[122] B. Kahouli, K. Miled, Z. Aloui, Do energy consumption, urbanization, and industrialization play a role in environmental degradation in the case of Saudi Arabia? Energy Strategy Reviews 40 (2022) 100814.
[123] A. Zafar, S. Ullah, M.T. Majeed, R. Yasmeen, Environmental pollution in Asian economies: does the industrialisation matter? OPEC Energy Review 44 (3) (2020) 227–248, https://doi.org/10.1111/opec.12181.
[124] T.V. Ha, M. Tuohy, M. Irwin, P.V. Tuan, Monitoring and mapping rural urbanization and land use changes using Landsat data in the northeast subtropical region of Vietnam, Egypt. J. Remote Sens. Space Sci. 23 (1) (2020) 11–19.
[125] J. Yin, X. Zhao, W. Zhang, P. Wang, Rural land use change driven by informal industrialization: evidence from Fengzhuang Village in China, Land. (Basel) 9 (6) (2020) 190.
[126] I. Bradbury, R. Kirkby, S. Guanbao, Development and environment: the case of rural industrialization and small-town growth in China, Ambio (1996) 204–209.
[127] A. Ebenstein, The consequences of industrialization: evidence from water pollution and digestive cancers in China, Review of Economics and Statistics 94 (1) (2012) 186–201.
[128] Y. Zhang, H. Long, Y. Li, S. Tu, T. Jiang, Non-point source pollution in response to rural transformation development: a comprehensive analysis of China's traditional farming area, J. Rural. Stud. 83 (2021) 165–176.
[129] F.-C. Mihai, S. Gündoğdu, L.A. Markley, A. Olivelli, F.R. Khan, C. Gwinnett, J. Gutberlet, N. Reyna-Bensusan, P. Llanquileo-Melgarejo, C. Meidiana, Plastic pollution, waste management issues, and circular economy opportunities in rural communities, Sustainability. 14 (1) (2021) 20.

[130] M.M. Rahman, K. Alam, E. Velayutham, Is industrial pollution detrimental to public health? Evidence from the world's most industrialised countries, BMC. Public Health 21 (1) (2021) 1175, https://doi.org/10.1186/s12889-021-11217-6.

[131] M. Uysal, C. Jurowski, Testing the push and pull factors, Ann. Tour. Res. 21 (4) (1994) 844–846.

[132] M. Uysal, X. Li, E. Sirakaya-Turk, Push–pull dynamics in travel decisions. Handbook of Hospitality Marketing Management, Routledge, 2009, pp. 412–439. https://www.taylorfrancis.com/chapters/edit/10.4324/9780080569437-19/push%E2%80%93pull-dynamics-travel-decisions-muzaffer-uysal-xiangping-li-ercan-sirakaya-turk.

[133] B. Khalid, M. Urbański, Approaches to understanding migration: a mult-country analysis of the push and pull migration trend, Economics & Sociology 14 (4) (2021) 242–267.

[134] F. Arthur-Holmes, K.A. Busia, Women, North-South migration and artisanal and small-scale mining in Ghana: motivations, drivers and socio-economic implications, Extr. Ind. Soc. 10 (2022) 101076.

[135] F.K. Donkor, R.K. Mazumder, S. Hosseinzadeh, S. Roy, A user-centric design approach to understand international education in the contemporary world: motivations and gender preferences for studying in Europe, J. Res. Int. Educ. 19 (1) (2020) 54–68, https://doi.org/10.1177/1475240920916046.

[136] B. Bhardwaj, D. Sharma, Migration of skilled professionals across the border: brain drain or brain gain? European Management Journal 41 (6) (2023) 1021–1033.

[137] E. Kofman, F. Buhr, M.L. Fonseca, Family migration. Introduction to Migration Studies.–IMISCOE Research Series, Springer, Cham, 2022, pp. 137–149.

[138] M. Tani, M. Piracha, Migration and Education, in: K.F. Zimmermann (Ed.), Handbook of Labor, Human Resources and Population Economics, Springer International Publishing, 2022, pp. 1–22, https://doi.org/10.1007/978-3-319-57365-6_101-1.

[139] M.Q. Patton, Qualitative Research & Evaluation Methods, sage, 2002. https://books.google.com/books?hl=en&lr=&id=FjBw2oi8El4C&oi=fnd&pg=PR21&dq=Qualitative+Research+and+Evaluation+Methods&ots=bym2hDLArL&sig=xkvaYHfNBIdwvvaSaLilsDWAF9g.

[140] M.Q. Patton, Qualitative Research & Evaluation methods: Integrating theory and Practice, Sage publications, 2023. https://books.google.com/books?hl=en&lr=&id=HXitEAAAQBAJ&oi=fnd&pg=PT8&dq=Qualitative+Research+and+Evaluation+Methods&ots=SJ3JvUzHzv&sig=oqfUJofPLrs2oY_NIpzQHosjEs8.

[141] E.A. Coleman, B. Schultz, A.R. Parker, J. Manyindo, E.M. Mukuru, How Communities Benefit from Collaborative Governance: experimental Evidence in Ugandan Oil and Gas, Journal of Public Administration Research and Theory 33 (4) (2023) 616–632.

[142] F. Mantino, F. Vanni, Policy mixes as a strategy to provide more effective social and environmental benefits: evidence from six rural areas in Europe, Sustainability. 11 (23) (2019) 6632.

[143] M. Sommerville, J.P. Jones, M. Rahajaharison, E.J. Milner-Gulland, The role of fairness and benefit distribution in community-based Payment for Environmental Services interventions: a case study from Menabe, Madagascar, Ecological Economics 69 (6) (2010) 1262–1271.