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The Effect of Anywaa, Nuer, and Highlanders Ethnic Concentrations in Gambella City Spatial Space

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Abstract

The research delves into the influence of ethnic concentration on the development of Gambella City, Ethiopia. Qualitative and quantitative approaches were all utilized for data collection. Anywaa, Nuer, and Highlanders' clustering in the area has significant implications for the city's infrastructure, sociospatial advancement, economy, and ecology. These groupings have hindered the city's overall progress, leading to low infrastructure, unemployment and poverty rates, inadequate healthcare and education, environmental pollution, and social exclusion of the underprivileged. A comprehensive plan that prioritizes social inclusion, infrastructure development, healthcare access, top-notch education, the health environment, and nursing local resources to economic development is necessary to tackle these challenges through affordable housing programs, job training and skill development programs, and cultural exchange initiatives that celebrate diversity and help create a harmonious and inclusive society.

Keywords

Gambella City, Ethnic concentration, Urban growth, Ethiopia

INTRODUCTION

Gambella City is the capital of the Gambella regional state in Ethiopia according to the Ethiopian Federal Democratic Republic Government Constitution of 1995 (FDRE, 1995). The city has a rich history of being a center of trade between Ethiopia and Sudan, with people from diverse ethnic backgrounds from both countries establishing permanent settlements. This has resulted in a dynamic blend of native and non-native residents, enriching the social fabric of Gambella. From the establishment, the northern part of the enclave is home to a charming native village that adds a rural touch to the city's landscape. Prior to the 1984 central statistics, there was no proper data gathering as the settlement was underutilized by both governments, Sudan and Ethiopia (Bell St., 1988). However, Ethiopia recognized Gambella residents as part of their country, giving them proper recognition as natives and nationals. The Gambella enclave has the potential to bring together people of different Ethiopian and non-Ethiopian backgrounds to reside. However, over time, the original function of the city changed, and it became an ethnic-based settlement. The concentration of residents based on ethnicity is the most defined form of settlement pattern in Gambella City. The Anywaa, Nuer, and Highlanders (non-indigenous) concentrated in settlement areas that defined their distinctions and identities (Fiyessa, 2014)). This level of ethnic concentration has led to several challenges such as smuggling, disparity, pollution, fragmentation, and hatred, defining the city as an ethnic enclave (Wal S. et al., 2023). To address the lack of data on the implications of Anywaa, Nuer, and Highlanders concentrations on Gambella City's development, a study was conducted. This study investigated the role of Anywaa, Nuer, and Highlanders enclaves in Gambella City development, considering variables such as socio-

economic factors, environment, and infrastructure. The aim was to define the level of ethnic concentration in the city using the structural equation model.

LITERATURE REVIEW

Ethnic enclave settlement refers to the concentration of a specific ethnic group within a specific geographic area (Kim J., 2018). Such settlements can have significant implications for sociospatial, economic, environmental, and infrastructure development. On the positive side, these settlements can foster vibrant cultural communities, promote social cohesion, and preserve cultural traditions. They can also serve as economic hubs, catering to the specific needs and preferences of the community. However, these settlements may face challenges such as limited access to resources and services outside their jurisdiction. Therefore, understanding the settlement patterns of residents is crucial. It allows for targeted urban planning and infrastructure development that support the unique needs and preferences of the community. This approach can create inclusive and sustainable cities that celebrate diversity while addressing potential challenges faced by ethnic enclaves. It is important to note that ethnic enclaves can be rewarding or discouraging, depending on the settlement pattern. While they can foster a strong sense of community and cultural pride, they can also lead to isolation and limited opportunities for interaction with diverse groups. Enclaves are often formed due to historical migration patterns or cultural preferences, providing a sense of familiarity and support for individuals within the community (Perkins, H. et al., 2011). However, it is crucial to strike a balance between cultural preservation and integration into a broader society to prevent enclaves from becoming isolated or exclusionary. Overall, understanding the implications of ethnic enclave settlement is critical for urban planners and policymakers to ensure that communities are inclusive, sustainable, and provide equal opportunities for all. Enclaves are spaces where people with shared cultural backgrounds and experiences come together, either voluntarily or involuntarily. Enclaves can be beneficial in preserving cultural traditions, creating vibrant ethnic neighborhoods, and establishing support networks (Espinoza-kulick M. et al., 2021). However, they can also result from systemic inequalities or forced migration, leading to social and economic challenges for residents (Shin J., 2017). It is important to strike a balance between preserving cultural identity and promoting integration into a larger society. This requires implementing policies that encourage interaction and exchange between different ethnic groups, fostering mutual understanding and cooperation for the overall development of the city. Living in an ethnic enclave can lead to strong social networks and support systems, positively impacting entrepreneurship and economic growth (Maani, 2016). However, it is crucial to avoid perpetuating segregation or hindering integration efforts, as this can lead to social divisions and exclusionary practices. These enclaves should not become isolated or exclusive but rather serve as vibrant hubs that actively engage with the larger society, promoting inclusivity and fostering a sense of belonging. In summary, ethnic enclave settlements can contribute to the preservation of cultural heritage and provide a sense of community for residents. It is essential to ensure that these enclaves do not perpetuate systemic inequalities or isolation but rather serve as inclusive and diverse spaces that promote cultural diversity and social cohesion. Ethnic enclaves can provide immigrants with a sense of familiarity and support, helping them to navigate the challenges of starting a new life in a foreign country (Gonzalez, J., 2017). These enclaves also promote a strong sense of community and cultural preservation, allowing immigrants to maintain their identity while adapting to their new surroundings. However, it is important to strike a balance between utilizing resources within these enclaves and actively engaging with the broader society to promote cultural exchange and mutual understanding. Protected ethnic jobs and markets may impede social integration, especially for lower-skilled immigrants who do not gain language proficiency (Maani, 2016). Without language proficiency, immigrants may face difficulties in accessing education and healthcare services, which can hinder their overall integration into the new society (Ischak, M., 2018).

Therefore, it is advisable for immigrants to actively seek opportunities to learn the local language and participate in language acquisition programs to enhance their chances of upward mobility and social integration. According to social network theories, immigrants with strong social connections and contacts within their new community are more likely to find job opportunities outside traditional ethnic enclaves, providing a wider range of employment options and potentially increasing their chances of finding higher-paying jobs. Ethnic enclaves have an advantage in civic participation, providing a supportive environment where immigrants can engage in collective decision-making processes and advocate for their rights (Izha et al., 2023). However, it is crucial to avoid relying solely on ethnic enclaves for support and engagement as this may lead to a lack of exposure to diverse perspectives and experiences, potentially limiting the overall growth and integration of immigrants into a larger society. Additionally, environmental contamination is pervasive in Sub-Saharan African communities, where many people reside in enclaves and unplanned settlement zones (Dos Santos et al., 2017). Contamination can be a severe health hazard for residents living in areas exposed to pollutants such as toxic chemicals and hazardous waste. Addressing environmental concerns in these communities should prioritize improving living conditions within enclaves and developing sustainable infrastructure in unplanned settlement areas. Communities in enclaves often lack access to basic services such as sanitary facilities, landfills, and clean water, leading to increased environmental degradation (Barrington et al., 2023).

Developing sustainable infrastructure in unplanned settlement areas can help to mitigate the negative impacts of pollution and waste on both the environment and the communities living in these areas. Improving access to fundamental utilities such as adequate water, better waste disposal, access to power, public transportation, and open spaces can improve the quality of life for residents in unplanned settlement areas while also reducing the strain on the environment. Addressing the issue of unclear land titles and providing legal recognition to these settlements can enable better planning

and implementation of sustainable infrastructure projects, further aiding in environmental conservation efforts. Cities with residents from different backgrounds often face issues of land speculation, exclusion, and displacement (Murray, 2015a). Policymakers must prioritize regularizing informal settlements and ensure that all residents have secure land tenure rights to promote social cohesion and reduce poverty. In developing countries, environmental risks disproportionately affect urban residents living under the poverty line in areas with poor infrastructure development (Bolay, 2020). Informal settlements often lack access to basic services such as clean water, sanitation, and electricity, making residents more vulnerable to environmental hazards (Sahiledengle et al., 2018). Investing in infrastructure remains crucial for fostering economic growth and enhancing the quality of life in developing nations. Nearly one in ten people globally face water shortages, which hinders basic human needs and impedes economic activities such as agriculture and manufacturing (Akomolafe and Adesua, 2016). Water access, availability, and affordability are major concerns for residents in developing countries, including Gambella City, Addis Ababa, and Ethiopia. The average waiting time for accessing water from public taps leads to significant time and productivity losses for residents, increasing the risk of waterborne diseases, and hampering their ability to engage in economic activities that rely on water for production. The absence of essential facilities such as clean water and sanitation in informal settlements perpetuates poverty and inequality. In some cities, ethnic enclaves face obstacles in accessing electricity and related infrastructure, making living conditions worse (Akomolafe and Adesua, 2016). Access to electricity is crucial for basic needs like lighting, cooking, and powering appliances. The enclave nature of each ethnic group in Gambella City intensifies the demand for electricity, creating multiple sources of power. Without reliable electricity, potable water supply, roads networks businesses struggle to operate efficiently, hindering economic growth and development. Most enclaves, particularly those in emerging areas, face a shortage of physical and social infrastructures connections, which affects daily life, essential services like healthcare and education, and limits innovation and entrepreneurship opportunities. The lack of electricity also poses a significant challenge for businesses, limiting productivity and the ability to meet customer demands. The unreliable electricity supply hampers the region's economic growth and development potential, making it difficult to attract investments and create job opportunities for the local population. Access to reliable power supplies in Ethiopian cities, such as Gambella City, is limited due to inadequate budget allocation and institutional issues, hindered by expansion of ethnic concentration as highlighted by (Beyene, 2018, Wal S.et al., 2023). This lack of electricity affects daily life, businesses and hinders the adoption of modern technologies. Furthermore, inadequate sewerage and drainage systems exacerbate these challenges, posing health risks and hindering the city's development. Additionally, improper waste disposal contributes to the spread of diseases and contamination of water sources. Ethnic enclave settlements, which are predominantly diverse, have both positive and negative implications for city development (Wal S. Et al., 2023). These settlements are characterized by high residential density and a concentrated ethnic community, benefiting from ethnic businesses serving the needs of its inhabitants. However, such settlements can also result in various developments in the city. Living in an ethnic enclave has more advantages for the economy than disadvantages. For instance, Asian Americans benefit from capital exchanges and facilitate the economic integration of new immigrants through social networks and economic resources. However, protected ethnic jobs and markets may impede social integration and trap lower-skilled immigrants in low-paid jobs. Overall, understanding the complexities of urban settlements and their impact on sociospatial, economic, environmental, and infrastructure development is crucial for addressing the aforementioned challenges.

MATERIALS AND METHODS

Descriptive of the Study Area

According to Article 52 (2(b)) of the Federal Constitution (1995), each regional state in Ethiopia is required to establish its own constitution and administrative organization to manage and govern its unique characteristics such as cultural diversity, economic activities, and geographical features. The Gambella regional state, with its capital in Gambella, has established various administrative structures to cater to the specific needs and challenges in the region. The Gambella City Administration, created in 2006, plays a critical role in coordinating and implementing policies and initiatives that directly benefit the urban population. It collaborates with the regional government departments to tackle issues including urban planning, social services, and infrastructure development. The city is divided into five administrative units, each with its own elected council, working closely with the Gambella City Administration to address the specific needs and concerns of its residents. This decentralized approach allows for more effective governance and ensures that local voices are heard and represented in decision-making processes. The Gambella City has a diverse population, with the Nuer ethnic group being the largest at 33.8%, followed by Anywaa at 26.1%, Oromo at 14%, Amhara at 7.4%, Tigrian at 6.5%, Kambata at 4.3%, and other ethnic groups at 4.9%. The Gambella Land Inventory, conducted in 2016-2017 with support from the Ministry of Urban Development, Housing, and Construction, analyzed the land use inventory data.

The land use inventory showed an imbalanced ethnic concentration in the city, with a Nuer majority in Kebele 01, followed by Highlanders and Anywaa. Highlanders played a significant role in Kebele 02, 03, 04, and 05, while Anywaa comprised 44% of residency in Kebele 04, 24% in Kebele 03, and 20% in Kebele 05. In the following sections, we amplified each kebele distributions in every kebele. This imbalance in residency distribution highlights the need for inclusive urban planning and development strategies that address the specific needs and concerns of different ethnic groups in Gambella. The concentration of residents in certain areas may lead to social and economic disparities between

different ethnic groups, as well as potential tensions and conflicts. Therefore, urban planners must promote policies that encourage social cohesion, integration, and equal access to resources for all residents in Gambella.

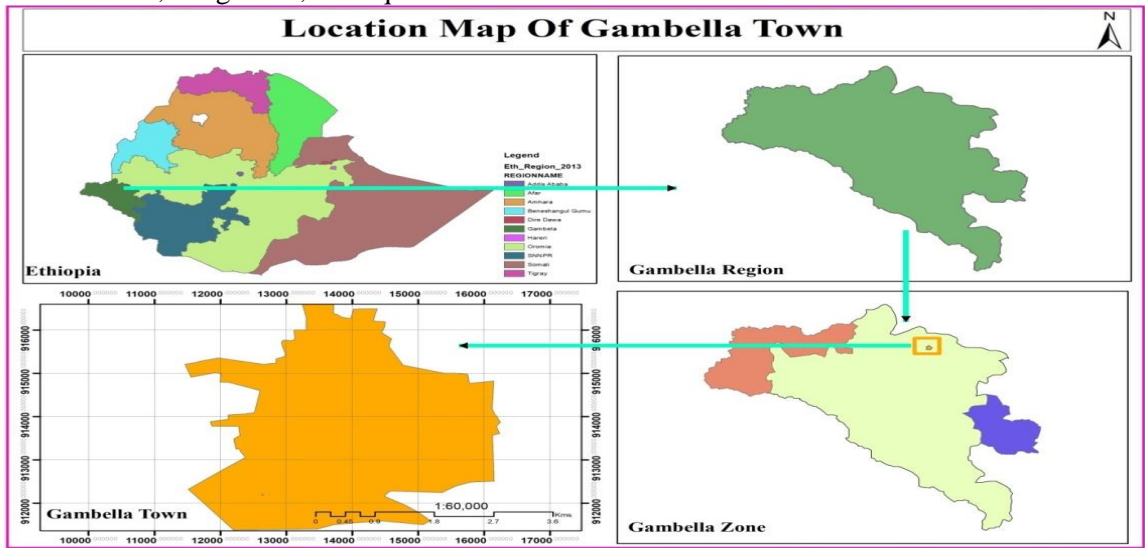


Figure 1 Map of Gambella City in Gambella National Regional State (*Source:* Own survey 2023)

Data collection and analysis

The study utilized both qualitative and non-qualitative data collection methods to gain a comprehensive understanding of the subject matter. Qualitative methods involved conducting interviews and focus groups to gather in-depth insights, while non-qualitative methods included analyzing numerical data and statistics from surveys and questionnaires. The use of multiple data collection methods enhanced the validity and reliability of the findings by triangulating different sources of information. The study involved 500 residents from 500 households, which is 3.1% of the total household population of 16,129. Key informants (KII), individuals with specialized knowledge or expertise, were considered in interviews and focus group discussions to gain a more comprehensive understanding of the topic. RStudio and GIS were used for analysis, enhancing the accuracy and reliability of the findings. The results were presented thematically, visually, and in tables and figures using Confirmatory Factor Analysis (CFA). Statistical software packages such as SPSS and Excel were used to validate the results and conduct additional tests, ensuring the robustness of the analysis.

RESULTS

Gambella City Population distribution and Concentration by ethnicity in Kebele based Land inventory

Kebele 01 population distribution

Kebele 01 is a settlement located in the eastern part of the city. Often referred to as "New Land," it is home to a diverse population and a vibrant community. The area comprises of residential, commercial, and industrial zones the Gambella University, with the majority of the residents being Nuer 85%, highlanders 13%, and the Anywaa ethnic group with 2%. The rich cultural tapestry of the area includes various languages and traditions. The Baro River's proximity offers recreational activities and scenic beauty for the residents. The Nuer, highlanders, and Anywaa ethnic groups have their own distinct neighborhoods within the locality, which helps preserve their unique cultural identities. Despite living in separate areas, residents rarely often come together for cultural event, which fosters disunity and misunderstanding among the diverse population. Their spatial spaces fragmentaion make them different from one another as enclave ranged.

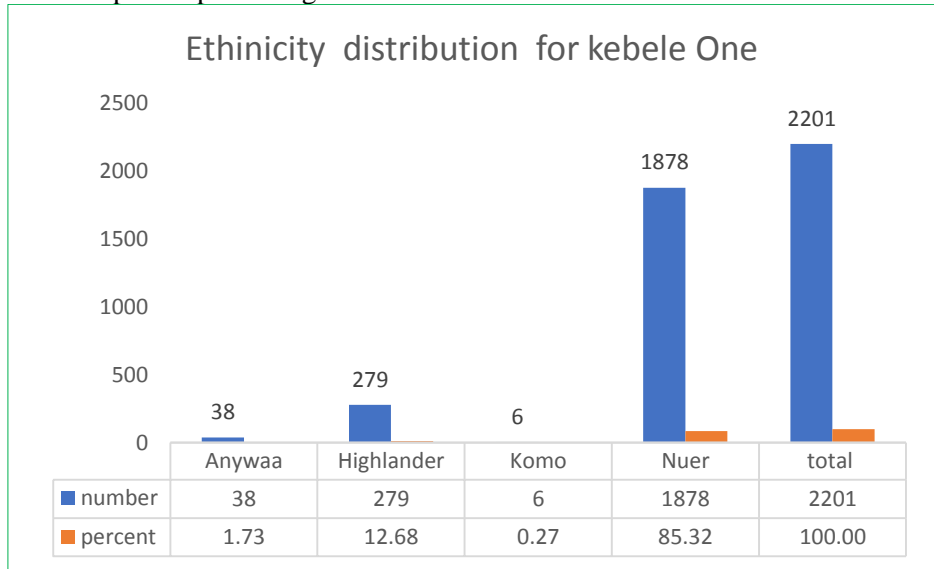


Figure 2 Kebele 01 ethnic group distributions (*Source:* Own survey refr. LUI, 2016)

Kebele 02 spatial space population distributions

Kebele 02 is a lively and bustling neighborhood located in the heart of the city. The area is well known for its diverse population and unique sense of community. It is also home to the Ethiopian Customs Administration, making it an important part of the city since its establishment. The neighborhood is a popular destination for both locals and visitors interested in experiencing cultural diversity and a lively atmosphere. The majority of residents are Highlanders, followed by Anywaa and Nuer. The ethnic diversity of the neighborhood is further enriched by the presence of various other ethnic groups. The residents take great pride in their heritage and actively work to preserve and promote their respective cultures. The neighborhood has a total of 465 households with 72% Highlanders, 19% Anywaa, and 8% Nuer residents. The strong sense of community is evident through various cultural events and festivals that showcase the vibrant tapestry of traditions within the neighborhood. However, their concentrations in enclave make the different.

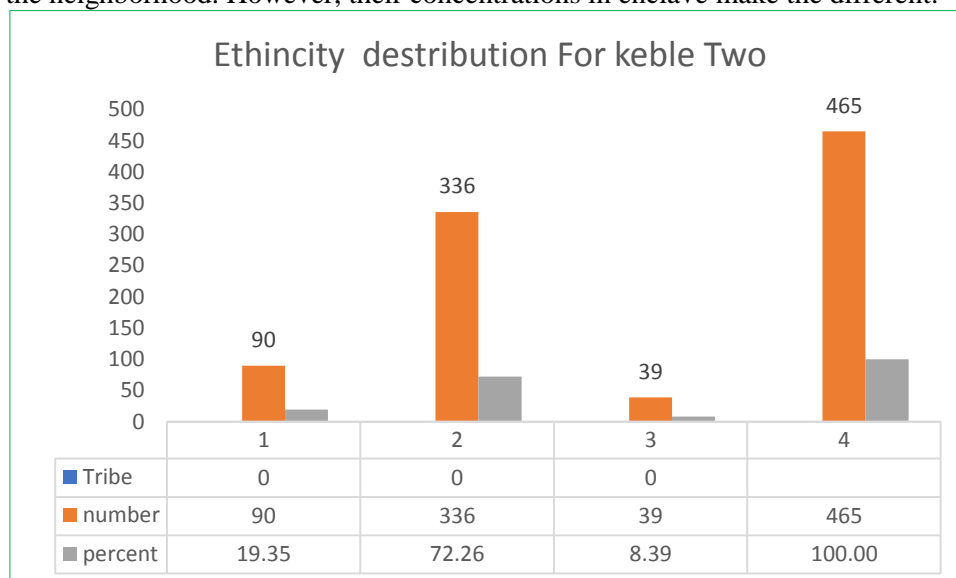


Figure 3 Kebele 02 ethnic group distributions

Kebele 03 spatial space population distributions

Kebele 03, also known as "Gebeya Sefer," is a bustling market area that serves as a hub for economic activities and a cultural melting pot. The kebele is located in the northeastern part of the city, making it easily accessible for both locals and tourists. It is a popular marketplace due to its strategic location. The area is inhabited by 1,441 residents, with 75% being highlanders and 25% from the Anywaa ethnic group. Highlanders are known for their strong work ethic and close-knit community bonds. On the other hand, Anywaa residents bring a unique cultural perspective, making the community more diverse and inclusive. Together, these ethnicities create a dynamic atmosphere in the kebele that is welcoming to all.

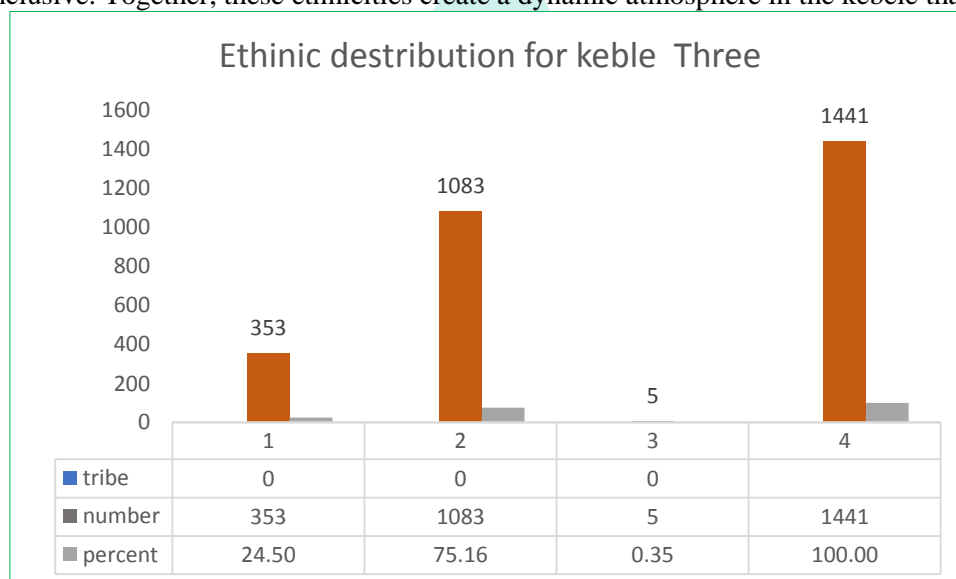


Figure 4 Kebele 03 ethnic group distributions

Kebele 04 spatial space population distributions

The Kebele is a settlement located in the western part of the city. It is known for its vibrant community and diverse population found separation, consisting of Highlanders (55%), Anywaa (44%), and other ethnicities (1%). The community is a melting pot of traditions and beliefs, with various cultural and religious institutions. The Kebele's proximity to the river offers scenic views and recreational opportunities. The Highlanders bring their rich cultural heritage and traditions, while the Anywaa community contributes to the diversity of beliefs and practices. The remaining 1%,

including highlander ethnicities like Amhara and Tigray, bring their unique customs and cultural practices, enriching the community's diversity and fostering interconnectedness among individuals from different backgrounds. However, their concentration make the impartiality as the same ethnic group found in certain spatial space with a lot of consequences to residents.

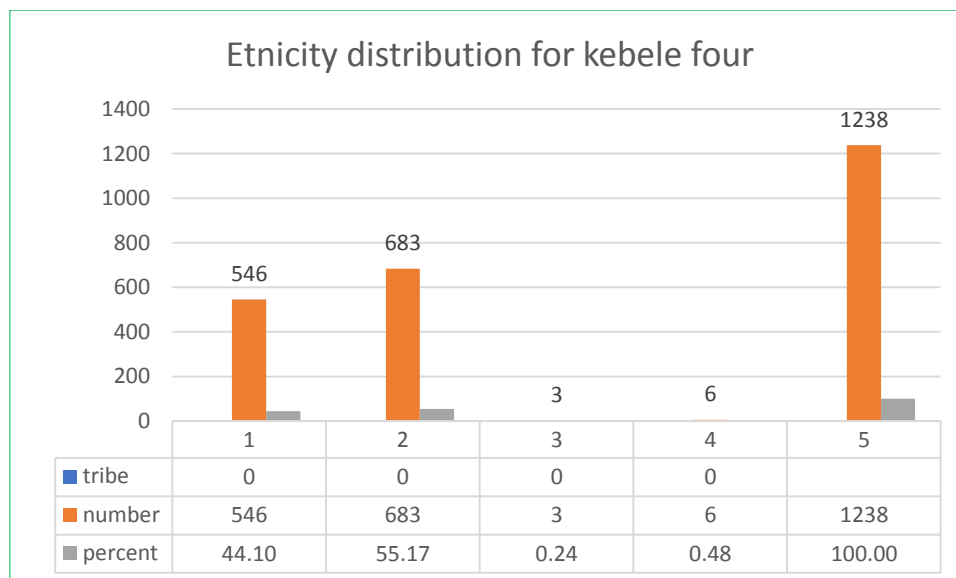


Figure 5 Kebele 04 ethnic group distributions

Kebele 05 spatial space population distributions

Kebele 05, also known as "Baro Mado," is a bustling and developing neighborhood in Gambella. It is home to a diverse mix of ethnic groups, including Highlanders, Anywaa, and Komo, which contributes to the area's rich cultural fabric. However, residents in this kebele fragment in space as each group found in concentration in the City.

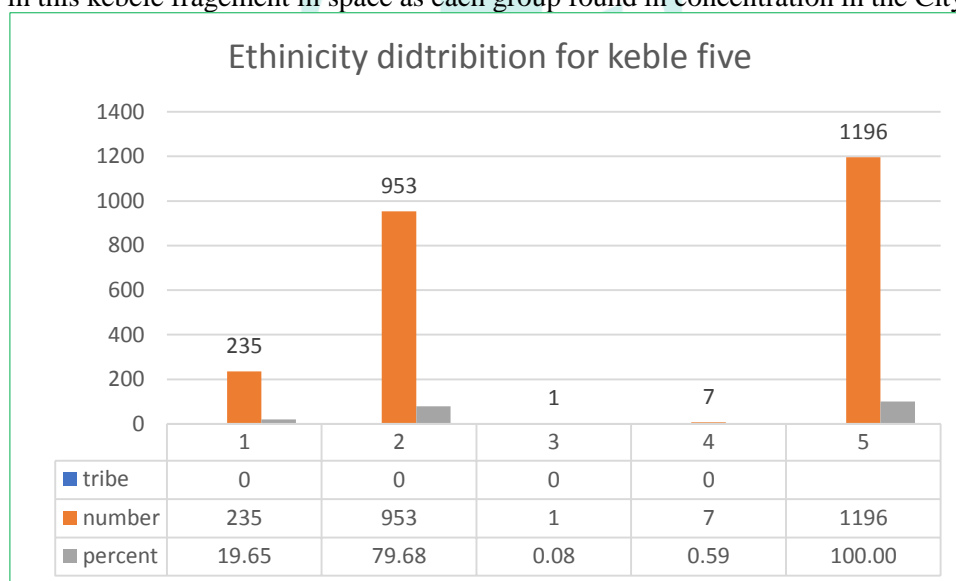


Figure 6 Kebele 05 ethnic group distributions

To sum up, the above Land inventory data (2016-2017) magnified that the concentration of different ethnic groups in specific areas of Gambella city can be attributed to historical factors, migration patterns, socio-economic conditions, and access to resources. For example, Kebele 01 is mostly inhabited by the Nuer ethnic group, possibly due to historical ties and the availability of resources and socio-economic opportunities. On the other hand, Kebele 02, 03, 04, and 05 have a majority of highlanders, with Anywaa people present in Kebele 04 and 05. Despite their small population size, the Anywaa community remains vocal and assertive in claiming their rights to land ownership, particularly regarding their ancestral lands. The settlement patterns of these ethnic groups in Gambella can be traced back to historical migrations from highland regions and the availability of specific resources or job opportunities. All in all, each ethnic group concentration magnified in figure 7 below that show how concentrations is revealed among residents with a lot of consequences to sociospatial, economic, environmental and Infrastructure development in Gambella city as discussed.

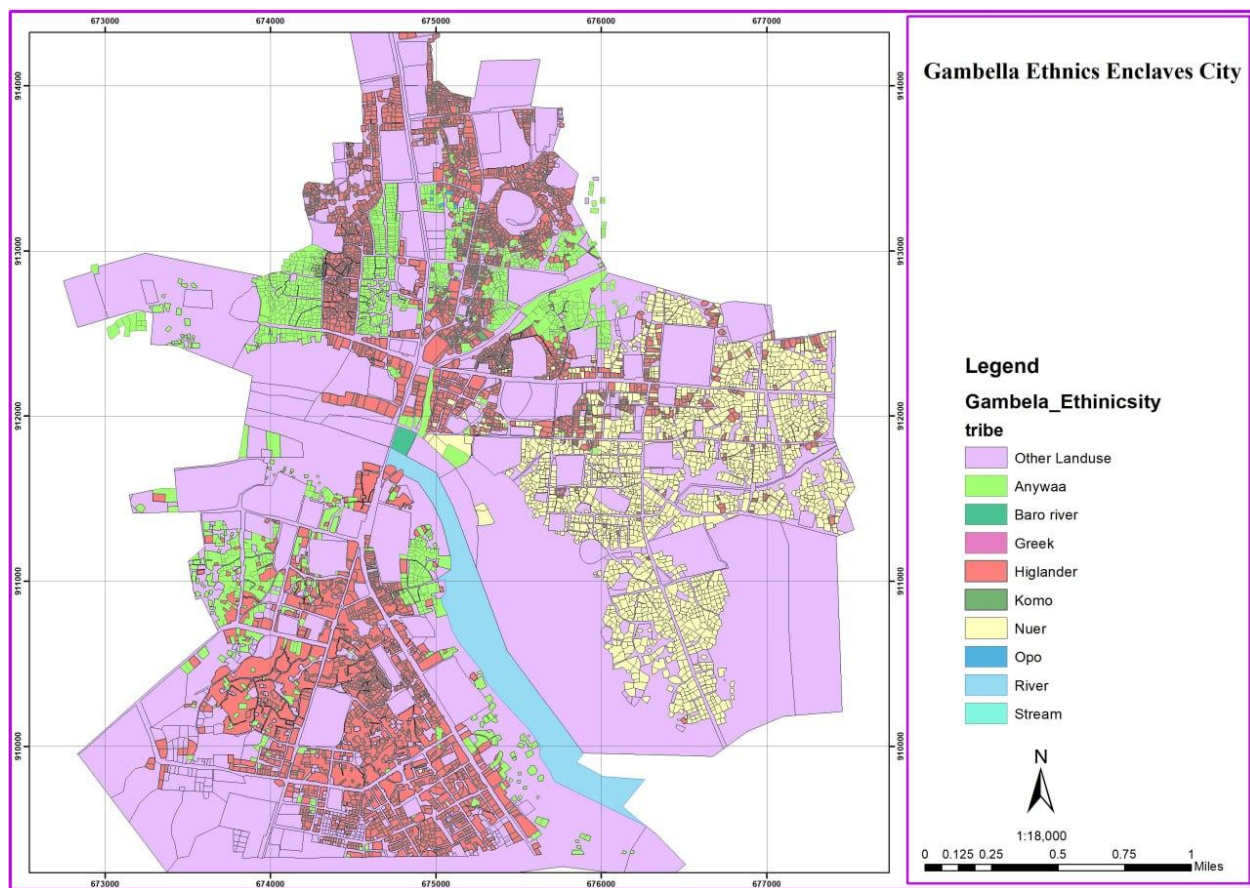


Figure 7 Gambella city ethnic distribution by kebeles (LIN, 2016) (*Source: Own survey 2023*)

Descriptive of SEM results of Anywaa, Nuer and Highlander ethnic concentration on the Sociospatial, Economic, Environment, and Infrastructure in Gambella City development

Interpretation of Structural Equation Model (SEM): Covariant and Variant Outcomes

The Anywaa people are a unique linguistic group from Ethiopia and South Sudan, and they are a significant presence in Gambella City (Feyissa, 2021, 2014). Although they are primarily found in Kebele 03 and 04, they have recently moved to Kebele 05 in the southwestern part of the city. Despite being the smallest ethnic group in the city, they have a strong voice and are considered an important contributor to the city's development in terms of sociospatial (SOSP) dynamics, economy (ECO), environment (ENV), and infrastructure (INF). Their unique grammar, vocabulary, and phonetics set them apart from other language families in the region. The Anywaa concentration in Gambella City has a significant impact on the sociospatial aspects of the city, such as social interactions and spatial organization. However, their influence on and infrastructure development is relatively limited. As weak investment in infrastructure in their concentrated area much observed, this highlights the need for further investigation to better understand the dynamics of city development and ensure inclusive growth for all communities. According to land inventory (LIN, 2016), the Anywaa ethnic group is mostly concentrated in Kebele 03 and 04, but conflicts in the City is now relocating them to Kebele 05 towards the western part of the city near Gambella teacher and Health Science colleges.

The Covariance results for Anywaa settlement area

Covariance is an essential concept in understanding the impact of economic activities on a region's social, spatial, and environmental aspects. It helps analyze how economic development influences these factors and their influence on city growth. The survey revealed that the sociospatial (0.007%) impact played a significant role in shaping the Anywaa enclave's contribution to the city's overall development. Although the enclave had a limited contribution to the economic, environmental, and infrastructure sectors, its influence on the sociospatial dynamics of the city was substantial. This implies that the concentration of the Anywaa ethnic group in the enclave affects the social and spatial well-being of residents in Gambella City. Therefore, it is crucial to increase collaboration and integration between the Anywaa community and other residents to foster overall development. The covariance interpretation reveals the interdependence between these factors and their impact on the development of the economy, ensuring a safe environment and improving infrastructure. The presence of the Anywaa ethnic enclave in Gambella City has a positive effect on the existing city's urban and spatial trajectory, contributing to the weak growth and diversification of the local economy. The existence of the Anywaa enclave in Gambella City poses challenges such as limited access to economic opportunities, environmental degradation, and inadequate infrastructure which hinder progress in these areas. The Anywaa ethnic group's concentration in the enclave further hinders their ability to contribute to economic growth and environmental sustainability due to the lack of communication and integration with the rest of the city. The absence of proper infrastructure limits opportunities for overall development and connectivity with other parts of the city as this group is in isolation.

Variance output Results

The effect of ethnic concentration is how much the covariates strayed away from the norm. We trace the role of this concept in the analysis to how far economic activities, socio-spatial trajectories, environmental pollutions, provision of necessary infrastructure, and ethnic enclave settlement variations strayed from the criterion of a perfect fit. The sociospatial effect of the Anywaa concentration in Gambella City is characterized by the potential disruption of social cohesion and spatial organization disparity with the 96.3%. The concentration of the Anywaa ethnic group in one area may lead to the formation of isolated pockets within the city, limiting intergroup interactions and integration. The analysis of the Anywaa enclave's impact on the current state of Gambella City provides valuable insights into the specific areas where the enclave has had the most significant impact, such as economic development, social dynamics, environmental quality, and infrastructure provision. The settlement patterns of the Anywaa enclave have significantly impacted the city's socio-spatial, economic, social, and environmental conditions, as well as the demographic composition and community interactions. The enclave has led to the development of distinct cultural practices and traditions within certain spatial spaces, affecting economic activities. The presence of the Anywaa ethnic group has also led to significant changes in the environmental landscape, accounting for 17% of the observed variation. The Anywaa ethnic population has also significantly influenced infrastructure development, contributing to a 17% difference in infrastructure functions. The Anywaa ethnic enclave produced major variances in environmental and infrastructure development, highlighting the significant influence of the Anywaa ethnic enclave on Gambella City's overall development. However, further investigation is needed to understand the reasons behind the negative impact on economic, environmental and infrastructure development in order to address and mitigate these issues effectively.

Table 1 the Anywaa ethnic concentration model

lavaan 0.6-9 ended normally after 64 iterations

Estimator	ML
Optimization method	NLMINB
Number of model parameters	41
Number of observations	496
Model Test User Model:	
Test statistic	396.250
Degrees of freedom	94
P-value (Chi-square)	0.000
Parameter Estimates:	
Standard errors	Standard
Information	Expected
Information saturated (h1) model	Structured

REGRESSIONS:						
COVARIANCES:						
	ESTIMATE	STD.ERR	Z-VALUE	P(> Z)	STD.LV	STD.ALL
.ECON ~~						
.ANY	-0.020	0.014	-1.498	0.134	-0.020	-0.070
.SOCIOP ~~						
.ANY	0.007	0.020	0.353	0.724	0.007	0.017
.ENVI ~~						
.ANY	-0.028	0.008	-3.524	0.000	-0.028	-0.163
.INFRUS ~~						
.ANY	-0.008	0.008	-0.993	0.321	-0.008	-0.047
INTERCEPTS:						
	ESTIMATE	STD.ERR	Z-VALUE	P(> Z)	STD.LV	STD.ALL
.ECON	0.357	0.092	3.887	0.000	0.357	0.161
.SOCIOP	0.717	0.092	7.801	0.000	0.717	0.299
.ENVI	0.759	0.038	20.001	0.000	0.759	0.368
.INFRUS	0.180	0.148	1.213	0.225	0.180	0.154
.ANY	0.444	0.077	5.803	0.000	0.444	0.973
VARIANCES:						
	ESTIMATE	STD.ERR	Z-VALUE	P(> Z)	STD.LV	STD.ALL
.ECON	0.490	0.031	15.748	0.000	0.490	0.099
.SOCIOP	0.963	0.061	15.748	0.000	0.963	0.167
.ENVI	0.170	0.011	15.748	0.000	0.170	0.040
.INFRUS	0.167	0.011	15.748	0.000	0.167	0.122
.ANY	0.170	0.011	15.727	0.000	0.170	0.814

Source: RStudio's Analysis from the 2021 Survey Data

The Anywaa ethnic enclave's presence in Gambella City has a significant impact on the city's socio-spatial and economic dynamics. However, there is still room for improvement in terms of environmental and infrastructure development within the concentration. Further research could explore potential strategies to address these limitations and promote more balanced growth and development in the city. The concentration of Anywaa ethnic-based settlements in Gambella City has led to unequal social and spatial benefits, harming the town's growth (KII1, & 2). The lack of integration and interaction with other communities has been exacerbated by a high shortage of safe water and environmental degradation. In addition, the unequal distribution of infrastructure in these settlements has limited access to basic amenities and services, further hindering their socio-economic progress. The city has a weak capacity to provide access to municipal services due to low capital for infrastructure investment, mainly because most indigenous residents have weak economic capacity (KII3). Furthermore, the economic sector in the city is dominated by those who prefer highland Ethiopia, further exacerbating inequality and limiting development opportunities for the local population. The ethnic-based distribution of settlements has created challenges for effective policing and maintaining law and order (FGD 1&2). The city police force is finding it difficult to implement a cohesive strategy due to the fragmented nature of the population. This situation highlights the need for a comprehensive approach that addresses both economic disparities and ethnic divisions within the city to improve access to municipal services and promote social cohesion. The police in Gambella City face challenges in managing and enforcing law and order due to ethnic divisions. Residents are reluctant to report wrongdoing within their communities, especially in areas like Kebele 01,04, 03 &05 where the Anywaa, Nuer and Highlanders ethnic group is the majority (FGD 1&2). This highlights the need for effective policing in areas where residents share a common background and are reluctant to report criminal activities. Building trust and fostering cooperation between different ethnic groups is crucial for successful law enforcement efforts. Collaborating with local community leaders and organizations is also essential to address these issues and ensure the safety of all residents. Additionally, bringing criminals into prison while in their enclave is difficult due to the lack of investment and preference for highland Ethiopia as an economic hub. The Gambella regional police's alignment with ethnic affiliations can potentially exacerbate tensions and fuel ethnic conflicts in the city. Therefore, prioritizing impartiality and avoiding ethnic biases is crucial for promoting peace and harmony among different communities.

Nuer enclave settlement effect on sociospatial, economic, environment, and infrastructure development

The Nuer people belong to the Nilo family and are primarily found in the eastern part of Gambella City, historically, they are found in both in Ethiopia and South Sudan as the majority (Fiyessa, 2011). They have a rich cultural heritage that includes unique traditions, customs, and rituals, which have been passed down through generations. They are pastoralists, relying primarily on cattle herding as their main source of livelihood. The Nuer people play a significant role in the socio-spatial (SOSP), economic (ECO), environmental (ENV), and infrastructure (INF) functions of the city. Their presence in Kebele 01 and the monument "New Land" highlights their historical and cultural significance in the region. Despite facing challenges such as displacement and conflict, the Nuer community in Gambella City continues to preserve and celebrate their cultural identity. They have also created a contentious border area with the Anywaa community in Kebele 04.

Covariance results for Nuer concentration in space

Covariance is an essential concept in understanding the impact of economic activities on a region's social, spatial, and environmental aspects. It helps analyze how ethnic concentrations influence these factors and their influence on city growth. By considering independent variables and their relationships with variables strongly correlated with the establishment of the Nuer concentration in one place, we can better understand the dynamics of the Nuer community's. Covariate estimation helps assess the overall impact of the Nuer ethnic concentration on Gambella Town's development and well-being. It also helps identify potential confounding variables that may influence the relationship between settlement-based ethnicity and various activities. This analysis examines the effect of settlement-based ethnicity on the expansion of economic, socio-spatial, environmental, and infrastructural activities in Gambella Town. Understanding these associations helps policymakers make informed decisions regarding resource allocation and urban planning. This research provides valuable insights into the dynamics of ethnic enclaves and their role in shaping the town's growth and development. The concentration of the Nuer ethnic group in certain spatial spaces in Gambella City has a significant positive relationship with economic, infrastructure, and environmental functions. This suggests that the presence of the Nuer ethnic group contributes to the overall development and functionality of the urban space. However, the Nuer ethnic concentration has a negative value of 0.09% in the sociospatial space of Gambella City, which magnifies the sociospatial space trajectory are from the weak ties of the Nuer ethnic group concentration.

The development of Gambella City is not solely dependent on the concentration of the Nuer ethnic group or the expansion of economic and infrastructural activities. The expansion of economic and infrastructural activities does not significantly correlate with the ethnic base settlement in the town. Instead, other factors like governance, social cohesion, and cultural diversity may play a crucial role in shaping the city's development trajectory. Therefore, a comprehensive approach to urban planning and development that considers various aspects is necessary to ensure inclusive growth and sustainable progress for all communities in Gambella City. Although ethnic settlement patterns may influence social interactions and environmental dynamics, they do not significantly impact the town's economic and infrastructural development, as access to safe water, roads network, electricity and related social and physical infrastructure still lagging.

The sociospatial issues observed in Gambella City are primarily attributed to the social and spatial separation of residents, which is further exacerbated by the influence of ethnicity on the functioning of the police force (KII, 1&2). To promote integration and equal access to resources and services across all ethnic groups in the city, inclusive policies and initiatives are also necessary. The Nuer ethnic group concentrations has a significant impact of 1% on the city's economy, society, space, environment, and infrastructure (see table 2). The concentration of the Nuer ethnic group has led to a unique cultural and social dynamic, resulting in the development of weak economic activities and the need for tailored infrastructure. The Nuer ethnic enclave plays a dominant role in shaping the social and spatial dynamics of Gambella City, contributing to a 97.2% variation in socio-spatial trajectories and a 49% difference in economic activity. However, it has minor variances in environmental and infrastructure expansion by 17, indicating a need for further research to explore the reasons behind these minor variations. The Nuer ethnic concentration in one space make the socio-spatial and economic challenges, resulting in disparities in access to basic services like healthcare, education, and clean water. The concentration of the Nuer ethnic group has also hindered social integration and cohesion with other communities. Moreover, the sudden emergence of violent acts in the city raises concerns about the town's potential destabilization and calls for immediate action to address the underlying causes and ensure the safety of all residents. The influx of South Sudanese refugees after the 2013 conflict has also led to a wave of violence in Gambella, causing fear and uncertainty among residents (KII2, FGD, 1 &2). This influx has led to the increase of violent practices among the younger generation, which were not previously part of Gambellian culture. This attributed to historical conflicts between the Nuer and the Anywaa (Feyissa, 2014) and has been magnified by city and regional police officers. To address these issues, authorities must implement measures to prevent further escalation of criminal activities within the region. Therefore, authorities must take measures to prevent further escalation of criminal activities within the region.

Table 2 the Nuer enclave model

lavaan 0.6-9 ended normally after 70 iterations

Estimator	ML
Optimization method	NLMINB
Number of model parameters	41
Number of observations	496

Model Test User Model:	
Test statistic	347.921
Degrees of freedom	94
P-value (Chi-square)	0.000

Parameter Estimates:	
Standard errors	Standard
Information	Expected
Information saturated (h1) model	Structured

REGRESSIONS:						
COVARIANCES:						
	ESTIMATE	STD.ERR	Z-VALUE	P(> Z)	STD.LV	STD.ALL
.ECON ~~						
.NUE	0.038	0.012	3.096	0.002	0.038	0.143
.SOCIOP ~~						
.NUE	-0.099	0.019	-5.215	0.000	-0.099	-0.261
.ENVI ~~						
.NUE	0.016	0.007	2.283	0.022	0.016	0.101
.INFRUS ~~						
.NUE	0.001	0.007	0.121	0.904	0.001	0.006
INTERCEPTS:						
	ESTIMATE	STD.ERR	Z-VALUE	P(> Z)	STD.LV	STD.ALL
.ECON	0.393	0.091	4.293	0.000	0.393	0.177
.SOCIOP	0.708	0.092	7.688	0.000	0.708	0.295
.ENVI	0.758	0.038	19.977	0.000	0.758	0.367
.INFRUS	0.162	0.148	1.094	0.274	0.162	0.139
.NUE	0.551	0.070	7.914	0.000	0.551	1.378
VARIANCES:						
	ESTIMATE	STD.ERR	Z-VALUE	P(> Z)	STD.LV	STD.ALL
.ECON	0.490	0.031	15.748	0.000	0.490	0.099
.SOCIOP	0.972	0.062	15.748	0.000	0.972	0.169
.ENVI	0.170	0.011	15.748	0.000	0.170	0.040
.INFRUS	0.167	0.011	15.748	0.000	0.167	0.122
.NUE	0.147	0.009	15.532	0.000	0.147	0.920

Source: RStudio's Analysis from the 2021 Survey Data

Highlanders' enclave effects on sociospatial, economic, environmental, and infrastructure development

Highlanders, who are non-native to Gambella City, are an integral part of Gambella City's social structure and economic development. Highlander with special naming Known as "Buny," Nuer and Anywaa nicknamed them "Gala", they bring their own traditions and customs, adding to the city's vibrant atmosphere. Their presence has increased economic opportunities, as they bring skills and expertise that benefit the local economy. Other non-native Gambellian nations, such as Oromo, Amhara, Tigrian, Keffa, Kambata, and other Southern nations and nationalities, also contribute to the city's culture. The focus of Highlanders on trade and commerce has allowed them to thrive economically and contribute to the region's development. Their cultural diversity enriches the community and the social structure of Gambella. Since the establishment of the enclave, their primary responsibility has been to work in the commercial sector, controlling the central or level one land use of the city on the main highway. They are found in enclaves throughout the city. The Highlanders enclave in Gambella City is a significant area with a strong focus on trade and commerce, controlling central land use along the main highway. The enclave is spread across the city, showcasing its influence and presence. The concept of covariance for highlanders' concentration is used to analyze the connections between the economic (ECO), socio-spatial (SOSP), environmental (ENV), and infrastructural factors (INF), or vice versa. This analysis helps understand how the Highlanders ethnic concentration influences the development or is influenced by various aspects of the city's socio-spatial, environmental, and infrastructural factors. The structural equation model (SEM) estimates help understand how settlement-based ethnicity in Gambella City affects the economic, socio-spatial, environmental, and infrastructural activities in the town. The presence of a Highlander ethnic enclave in Gambella City had a significant impact on the town's economic activities, with businesses owned by Highlanders experiencing higher levels of growth and profitability compared to those outside the enclave. This information is crucial for policymakers and urban planners seeking to address the unique needs and challenges faced by this specific ethnic group in Gambella City. The increase in Highlander ethnic enclave settlements in Gambella City has a significant positive relationship with socio-spatial, environmental, and infrastructure activities. This suggests that the presence of these settlements contributes to the overall development and growth of the city, but also puts pressure on its economic, environmental resources and infrastructure development. Policymakers must address these issues to ensure sustainable growth and development. The expansion of economic activities does not have a significant correlation with the sociospatial function in the town. This suggests that the presence of the Highlander enclave primarily affects the social and physical aspects of the town rather than its economic development. The concentration of resources and opportunities within specific communities exacerbates socio-spatial segregation, leading to limited interaction and integration between different ethnic groups, hindering social cohesion and potentially leading to conflicts (fiyessa, 2011, 2014, Wal S. Et al., 2023). The environmental deterioration caused by the influx of settlers puts a strain on natural resources and contributes to ecological imbalances, particularly in the Baro and JabJabe rivers, which are being dried up by the mismanagement of residents nearby. The presence of a distinct ethnic group concentrated in one area can lead to the marginalization of other communities and hinder inclusive development efforts. The interpretation of SEM variance outcomes allows for a better assessment of the overall impact of the Highlanders settlement on various aspects of Gambella City's economic, socio-spatial, environmental, and infrastructure functions (see table 3). By analyzing how much these covariates deviate from the norm, insights into the effectiveness of infrastructure provision and the impact of Highlander ethnic enclave settlements on Gambella City's overall development can be gained. The study reveals that Highlander ethnic concentration in one place in Gambella Town significantly impact economic, socio-spatial, environmental, and infrastructure activities. These settlements result in a 96.4% variation in socio-spatial trajectories, a 49% difference in economic activity, and a 17% variation in environmental conditions. The presence also significantly affects infrastructure development, with a 17% difference attributed to the Highlander ethnic enclave. That makes the minor variances in environmental and infrastructure expansion as highlanders concentrated. The study emphasizes the need for further research to understand the specific impacts of these settlements on the town's economic and socio-spatial aspects.

Table 3 the highlander enclave model

lavaan 0.6-9 ended normally after 65 iterations	
Estimator	ML
Optimization method	NLMINB
Number of model parameters	41
Number of observations	496
Model Test User Model:	
Test statistic	420.227
Degrees of freedom	94
P-value (Chi-square)	0.000
Parameter Estimates:	
Standard errors	Standard
Information	Expected
Information saturated (h1) model	Structured

REGRESSIONS:						
COVARIANCES:						
	ESTIMATE	STD. ERR	Z-VALUE	P(> Z)	STD. LV	STD. ALL
.ECON ~~						
.H_LAN	-0.025	0.014	-1.797	0.072	-0.025	-0.084
.SOCIOP ~~						
.H_LAN	0.073	0.021	3.500	0.000	0.073	0.174
.ENVI ~~						
.H_LAN	0.007	0.008	0.854	0.393	0.007	0.038
.INFRUS ~~						
.H_LAN	0.008	0.008	0.942	0.346	0.008	0.045
INTERCEPTS:						
	ESTIMATE	STD. ERR	Z-VALUE	P(> Z)	STD. LV	STD. ALL
.ECON	0.411	0.092	4.475	0.000	0.411	0.185
.SOCIOP	0.722	0.092	7.855	0.000	0.722	0.300
.ENVI	0.757	0.038	19.964	0.000	0.757	0.367
.INFRUS	0.173	0.148	1.164	0.245	0.173	0.148
.H_LAN	-0.080	0.079	-1.010	0.313	-0.080	-0.160
VARIANCES:						
	ESTIMATE	STD. ERR	Z-VALUE	P(> Z)	STD. LV	STD. ALL
.ECON	0.490	0.031	15.748	0.000	0.490	0.099
.SOCIOP	0.964	0.061	15.748	0.000	0.964	0.167
.ENVI	0.170	0.011	15.748	0.000	0.170	0.040
.INFRUS	0.167	0.011	15.748	0.000	0.167	0.122
.H_LAN	0.181	0.012	15.624	0.000	0.181	0.732

Source: RStudio's Analysis from the 2021 Survey Data

DISCUSSION

Gambella City is a settlement located in western Ethiopia, inhabited by three different ethnic groups: Anywaa, Nuer, and Highlanders (CSA, 1994). The presence of both indigenous and non-indigenous residents creates a multicultural environment. These enclaves play a vital role in the city's economics, sociospatial dynamics, environmental and infrastructure development. Their diversity also influences the city's cuisine, arts and traditions, making it a vibrant and culturally rich place to live. However, absent of proper handling of the same ethnic concentration produced a lot of implications on the city development. The focus of this topic is looking on the contribution of Anywaa, Nuer, and Highlanders ethnic group settlements to sociospatial, economic, environmental and infrastructure development in Gambella City. Ethnic enclaves in Gambella City are critical for shaping the city's cultural fabric and social wellbeing. These settlements bring together people with shared traditions, languages, and customs. The concentration of residents from these enclaves has led to the development of unique businesses and services catering to their communities' needs.

Structural equation model results show that an increase in Anywaa interest in the enclave leads to significant consequences in the city's sociospatial dynamics, such as decreased in social cohesion and cultural diversity. The presence of the Anywaa enclave settlement also affects economic activities in the city, both positively and negatively. While it has influenced the development of unique businesses, it has also contributed to weak economic activities among residents. The increase in Anywaa interest in the enclave has led to changes in the local environment, such as increased pressure on natural resources and potential conflicts over land use. However, the existing infrastructure may not be adequately equipped to accommodate the growing needs of the Anywaa settlement, resulting in strain on services such as transportation and utilities. The weak economic sector development in Gambella City is more influenced by the Anywaa ethnic group's weak business practices, as they work in primitive ways instead of modernizing them. This lack of access to resources and training hinders the development of a robust economic sector in the city. The concentration of ethnic groups such as Anywaa in Gambella City has also led to a backward trading system and informal business practices. This has resulted in limited access to formal markets, reduced opportunities for innovation and growth, and a lack of investment in infrastructure and technology. These factors have perpetuated socioeconomic inequalities within the city, primarily benefiting a select few with access to resources and connections within the enclave. The lack of modernization and adherence to traditional business practices by the Anywaa ethnic group have hindered the city's progress and limited its potential for growth. Interventions and support are necessary to encourage the adoption of more efficient and modern business practices to stimulate economic development in Gambella City.

The spatial concentration of the Nuer ethnicity has also hindered city growth due to limited opportunities for economic diversification and innovation. The concentration of the Nuer and Anywaa ethnic groups in specific areas may have hindered their integration into the larger city economy, leading to further economic disparities. The lack of proper infrastructure and limited access to education has further exacerbated the economic disparities in Gambella. The Nuer ethnic group primarily engages in weak economic activities in their settlement areas, which have hindered the overall progress and prosperity of both enclaves. The lack of formal business practices and illegal activities has further perpetuated poverty and limited opportunities for growth in Gambella. The lack of sustainable business practices in Gambella has hindered local industries' growth and limited job opportunities. The absence of revenue taxes has led to a

lack of funds for infrastructure development and public services. The reliance on informal door-to-door sales may limit access to larger markets and growth opportunities for ethnic groups. The Nuer ethnic group's concentration in one area contributed to increased segregation as well as a lack of diversity, integration, social cohesiveness, and cultural interchange. Planning and regulation must be done correctly to handle these problems and guarantee the city's growth.

The presence of the highlanders' enclave in Gambella City has the potential to contribute to the city's economic and sociospatial development. However, their presence may lead to a wealth disparity, creating social tensions and inequalities among different ethnic groups. The concentration of highlanders in the city's spatial space has resulted in limited opportunities for other ethnic groups to participate in the economic sector and an unequal distribution of resources. The highlanders' presence also contributes to a lack of economic opportunities for other ethnic groups, creating a breeding ground for criminal activities such as theft and smuggling. These socioeconomic disparities and resulting social issues need to be addressed to foster inclusivity and harmony within the city. The exclusion of highlanders from the administrative system further exacerbates these sociospatial differences, leading to a lack of representation and access to resources for these highlanders. This situation creates tension and animosity between indigenous and non-indigenous residents, perpetuating a divide in the community. Addressing this disparity and promoting inclusivity in economic activities is crucial for the overall development and prosperity of Gambella City. The concentration of Anywaa, Nuer, and Highlander ethnic groups in the city's spatial spaces contributes to weak economic, sociospatial, environmental, and infrastructure development. There is a lack of representation and inclusion of these ethnic groups in decision-making processes, resulting in an inadequately safe environment and the allocation of resources for infrastructure development and environmental safety measures. In conclusion, the concentration of Anywaa, Nuer, and Highlander ethnic groups significantly impacts the sociospatial and economic functions of Gambella City. City authorities should address these issues and prioritize infrastructure development to improve living conditions for all residents. Promoting inclusivity and fostering a sense of community among different ethnic groups can help mitigate tensions and promote overall development in the city.

CONCLUSION

The presence of Anywaa, Nuer, and Highlanders in Gambella City has a significant impact on its development across several key areas - sociospatial, economic, environmental, and infrastructure. A structural equation model (SEM) has revealed that the influence of these ethnic groups is considerable, leading to challenges that have weakened the city's economic growth. These include limited access to education and healthcare, inadequate infrastructure, high levels of poverty and unemployment, urban pollution, and social exclusion of marginalized communities. Addressing these challenges requires a comprehensive approach focused on improving access to quality education and healthcare, investing in infrastructure development, promoting environmental sustainability and economic opportunities, and fostering social inclusion and equality. To achieve this, initiatives that promote dialogue, understanding, and collaboration among diverse groups are essential, as well as addressing social inequalities and promoting equal opportunities for all residents. Moreover, affordable housing programs, job training and skill development programs, and cultural exchange initiatives celebrate diversity and help create a harmonious and inclusive society.

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REFERENCES

1. Akomolafe, C. O., & Adesua, V. O. (2016). The Impact of Physical Facilities on Students' Level of Motivation and Academic Performance in Senior Secondary Schools in South West Nigeria. *Journal of Education and Practice*, 7(4), 38-42.
2. Bolay, J. C. (2020). *Urban Planning Against Poverty: how to think and do better cities in the global south* (p. 214). Springer Nature.
3. Brown, J., Acey, C. S., Anthonj, C., Barrington, D. J., Beal, C. D., Capone, D., & Winkler, I. T. (2023). The effects of racism, social exclusion, and discrimination on achieving universal safe water and sanitation in high-income countries. *The Lancet Global Health*, 11(4), e606-e614.
4. Census 2007 Tables: Gambela Region Archived November 14, 2010, at the Wayback Machine, Tables 2.1, 2.4, 2.5, and 3.4.
5. Choi, I. C., Shin, H. J., Nguyen, T. T., & Tenhunen, J. (2017). Water policy reforms in South Korea: A historical review and ongoing challenges for sustainable water governance and management. *Water*, 9(9), 717.
6. Dos Santos, S., Adams, E. A., Neville, G., Wada, Y., De Sherbinin, A., Bernhardt, E. M., & Adamo, S. B. (2017). Urban growth and water access in sub-Saharan Africa: Progress, challenges, and emerging research directions. *Science of the Total Environment*, 607, 497-508.

7. Espinoza-Kulick, M. A. V., Fennelly, M., Beck, K., & Castañeda, E. (2021). *Ethnic enclaves*. Oxford University Press.
8. Feyissa, D. (2011). *Playing Different Games: the paradox of Anywaa and Nuer identification strategies in the Gambella region, Ethiopia* (Vol. 4). Berghahn Books.
9. Feyissa, D. (2014). The pure, the real, and the chosen: the encounter between the Anywaa, the Nuer, and the Highlanders in Gambella. *elf an*, 171.
10. Gambella municipality (2016). Land use inventory in Gambella City administration(2016-2017).
11. González, J. D. (2017). *Beyond the enclave: Success strategies of immigrant entrepreneurs* (Doctoral dissertation, Walden University).
12. Izhar, A. I., Choong, W. W., & Wee, S. C. (2023). Key determinants enhancing local community acceptance of migrant labour settlements in Seberang Perai, Penang, Malaysia. *City, Culture and Society*, 34, 100533.
13. Ischak, M., Setioko, B., & Nurgandarum, D. (2018). Spatial Typo-morphology of Residential House in Supporting to the Resilience of the Indigenous Settlement in the Sub-urban Area, Case: Enclave Settlement in the New Town of Gading Serpong. *International journal of Rural Development, Environment and Health Research (IJREH)*, 2.
14. Kim, J. (2018). Manhattan's Koreatown as a transclave: The emergence of a new ethnic enclave in a global city. *City & Community*, 17(1), 276-295.
15. Maani, K. (2016). *Multi-stakeholder decision making for complex problems: a systems thinking approach with cases*. World Scientific.
16. Murray, M. J. (2015). Waterfall City (Johannesburg): privatized urbanism in extremis. *Environment and Planning A*, 47(3), 503-520.
17. Sahiledengle, B., Alemseged, F., & Belachew, T. (2018). Sanitation practice and associated factors among slum dwellers residing in urban slums of Addis Ababa, Ethiopia: a community based cross-sectional study. *Journal of Public Health and Epidemiology*, 10(10), 370-379.
18. Stephen Bell (1988). The Gameblla enclave; Anglo-Ethiopian Society study.
19. Vallance, S., Perkins, H. C., & Dixon, J. E. (2011). What is social sustainability? A clarification of concepts. *Geoforum*, 42(3), 342-348.
20. Wal, S. M., Asseffa, T., & Belachew, S. K. (2023). The Relationship between Ethnic Enclave Settlements with Development Spectrum in Gambella City Ethiopia. *American Journal of Multidisciplinary Research and Innovation*, 2(1), 83-98.
21. The Population and Housing Census of Ethiopia(1994). Results for Gambela Region, vol.1 Archived November 19, 2008, at the Wayback Machine, Table 2.17.