Article

Factors hindering the implementation of urban planning tools in Central Africa: Case study of reference urban plan for Sarh Town (Chad)

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Abstract: The reference urban plan is an urban planning tool often used to orient the development of Chadian cities. However, expanding Chadian urban centers, such as Sarh, face challenges in implementing urban planning orientations of their urban plans within the set deadlines. The objective of this study is to identify the factors impeding the effective implementation of the reference urban plan for Sarh town. The methodology employed encompasses a literature review, individual interviews with urban planning experts, geographic information system (GIS) data, household surveys and statistical analysis. The results revealed that less than a quarter (19.72%) of the households surveyed were aware of the reference urban plan. The applied logistic regression model identified age, occupation and level of education as the main factors influencing public participation in the preparation of the reference urban plan. On average, 33.33% of the urban planning guidelines and 21.74% of the projected urban projects were implemented, with a difference of 1631.28 hectares (ha) between the projected plan and the actual plan for the town. Five factors were identified as contributing to the failure to implement the reference urban plan for Sarh town, including low funding, inadequate land management, a lack of political will, weak governance and poor communication. Consequently, participatory and inclusive planning approaches, effective financial mobilisation, strong governance, and the use of modern technologies such as GIS tools are recommended to enhance the implementation of urban planning tools.

Keywords: implementation challenges; infrastructure development; public participation; urban planning; urban policy; urbanisation

1. Introduction

Since the second half of the 20th century, urbanisation has been humanity's most significant and transformative phenomenon (Negeri et al., 2023). In 2021, 56% of the world's population lived in urban areas, a figure that is expected to increase to 68% by 2050 (UN-Habitat, 2022). Consequently, cities are confronted with a multitude of intricate challenges, including housing affordability, inequality, poor air quality, inefficient infrastructure and poor transport systems (Eldesoky and Abdeldayem, 2023; Zhu and Xu, 2023). In sub-Saharan Africa, the demographic and spatial explosion of cities has not been accompanied by matching urban infrastructure (Dandonougbo and Hetcheli, 2016). According to UN-Habitat (2018), the urbanisation of African cities is accompanied by growing poverty, which in turn leads to an increase in the number of urban slums. In the absence of an appropriate planning policy, this urbanisation can give rise to social, economic and ecological tensions (Weldegebriel

et al., 2023). To adequately address the mounting needs of urban communities and ensure sustainable urbanisation, numerous studies have underscored the necessity of implementing robust urban planning tools that consider the specific context of cities (Admasu and Jenberu, 2020; Maru et al., 2021; Watson, 2016). The development of any city is based on urban planning, and according to Enoguanbhor et al. (2019), informed land planning improves environmental sustainability and sustainable urban development. Danvidé (2015) emphasised that urban planning plays an important role in the provision of services and facilities, as well as in framing spatial occupation. Other studies have similarly emphasised the importance of urban planning in effectively managing urban expansion in the context of rapid urban growth (Guo et al., 2020; Nor et al., 2017). According to Colenbrander and Barau (2019), the proper implementation of master plans makes it possible to achieve sustainable development goals.

In recent decades, urban planning issues in developing countries have been constantly evolving due to rapid urbanisation and the complex challenges it poses (Mohamed et al., 2020). In sub-Saharan Africa, urban expansion is leading to the occupation of peripheral areas without respect for town planning regulations (Blakime et al., 2024), which represents a serious challenge for environmental and ecological management in urban areas (Das and Das, 2019). This situation calls for a continuous review of urban planning strategies, incorporating participatory methods adapted to local specificities and dynamics. Several researchers stress the importance of adopting flexible and inclusive planning approaches to meet the growing needs of populations while considering contextual realities. Aldegheishem (2023) revealed that, despite the many technical policy instruments developed in Saudi Arabia, urban development is not sustainable due to the low level of participation in the process of developing urban planning tools. A study by Negeri et al. (2023) highlighted the fact that the lack of active participation contributed significantly to the failure to implement the structural plan in the town of Nekemte (Ethiopia). Kleemann et al. (2017) reported that land-use planning in Ghana is unsuccessful because of insufficient involvement of local citizens in the planning process. In West Africa, Bolay (2015) reported that the urban planning practices used in Burkina Faso are closely modelled on a Western tradition, which is not aligned with the local and national context in terms of needs, priorities and the management of financial resources. The implementation of planning documents is a problem that stems not only from the approach to their preparation but also from financial and political constraints. For example, in East Africa, a study by Cirolia and Berrisford (2017) revealed that urban planning in Nairobi, Addis Ababa and Harare is a process characterised by diverse power relations and ongoing negotiations between various actors that influence the implementation of urban plans. Ahmed et al. (2023) reported that secondary cities in Africa are affected by a lack of institutional capacity, poverty and inequality, and a lack of investment in social services and infrastructure. In this work, a number of shortcomings were noted, particularly with respect to further studies on citizen participation in the urban planning process in developing countries. They did not sufficiently analyse the sociodemographic factors influencing public involvement. Furthermore, an assessment of the state of implementation of the urban plan guidelines, as well as the developments carried out, could help to identify the underlying reasons for these results, as well as the main influencing factors.

In Chad, urban issues in general and urban planning in particular have received very little attention among the priority projects of the public authorities. Most towns in Chad have developed for a long time without an appropriate strategic planning document (Allarané and Mahamat Hemchi, 2024). This urbanisation without urban planning tools has had numerous spatial, social and environmental impacts. The first urban plan in Chad was drawn up in 1947 for the town of N'Djamena, formerly Fort-Lamy (Tob-Ro, 2015). In terms of regulations, it was not until 2010 that the Chadian government established fundamental principles applicable to urban planning in Chad through Law no. 006/PR/2010 (Allarané and Mahamat Hemchi, 2024). According to this law, the urban planning system in Chad is composed of various tools, including the master plan for development and urban planning, the plan for development and urban planning, the reference urban plan and the detailed urban plan. The common objective of these urban planning tools is to guide the spatial development of Chad's urban centers. Currently, approximately 17.89%, or 17 of 95 urban centers of Chad, have tools to guide their spatial development. The city of N'Djaména has an unfinished and unapproved master development and town planning scheme. Additionally, 16 towns have reference urban plans. Development and town planning plans and detailed town planning plans have not yet been developed since the adoption of Law No. 006/PR/2010. The reference urban plan is an urban planning tool that involves rapidly exploring the existing situation, identifying the main problems and proposing solutions to resolve them (Allarané and Mahamat Hemchi, 2024). The majority of urban plans drawn up in Chad have been largely disregarded as a model, and the planning and urban development guidelines are failing to be respected (Mahamat Hemchi, 2015). Other urban centers, such as Sarh, are encountering difficulties in implementing their reference urban plans. The reference urban plan for Sarh town was established in 2010 for a maximum period of 15 years. However, most of the development and urban planning guidelines and projects outlined in the reference urban plan have not been effectively implemented on the ground. Owing to ineffective implementation, planned land uses such as the relocation of airport areas and the development of green spaces have not been implemented. In addition, the town of Sarh expanded beyond the limit defined when the reference urban plan was drawn up. In view of the challenges facing the town, a number of questions arise. How far has the reference urban plan for the town of Sarh been implemented? Was the approach to drawing up the reference urban plan participatory? What factors have affected the implementation of this plan?

The generation of scientific knowledge on the factors hindering the implementation of urban planning tools could represent a significant step toward improving their effectiveness in Chad and other developing countries. This will enable urban managers and other urban actors to define urban planning approaches that would facilitate citizen participation and inclusiveness (Aldegheishem, 2023; Wang et al., 2021). The knowledge and practices of inhabitants are frequently overlooked in urban planning approaches. For this reason, UCLGA (2018), in their report entitled "Transition to Sustainable Cities and Terories", highlighted the need for participatory and inclusive planning approaches in the transition to sustainable territories and cities in Africa. To the best of our knowledge, no study has explored the factors hindering the implementation of the reference urban plan in the study area. It is therefore

important to address the gaps in academic research in the field of urban planning in Chad and to make important contributions to the implementation of urban plans for African urban planners and other urban actors. As a result, the objective of this study is to identify the factors hindering the implementation of the reference urban plan for Sarh town. More specifically, this involves (i) evaluating the approach employed in the development of the reference urban plan for Sarh town; (ii) assessing the level of implementation of the planned urban planning guidelines and projects via geographic information system (GIS) tools; and (iii) identifying the main factors hindering the implementation of the planned urban planning guidelines and projects.

2. Materials and methods

2.1. Study area

The town of Sarh is the capital of the province of Moyen-Chari and the department of Barh-Kôh in Chad according to ordinance no. 001 of 11, February, 2019. It is located between 09°06' and 09°13' north latitude and 18°20' and 18°25' east longitude(Mbatbral, 2015). The town of Sarh is bounded to the north and east by the municipality of Hellibongo, to the south by the municipality of Banda, and to the west by the municipality of Balimba (see **Figure 1**). It is subdivided into 6 districts and 30 neighbourhoods, with a population of 97,224 in 2009 and an estimated total population of 109,509 in 2015 (Africapolis, 2020). The area of the town is 38.04 km², which represents 0.003% of the national territory (Africapolis, 2020). The initial plan for the town of Sarh was developed between 1932 and 1935 by the French colonial administration (Tchadinfos,2022). Following independence, a master plan for development and urban planning was drawn up by the architect Legrand between 1962 and 1965 for the town of Fort Archambault, which became Sarh in 1972 (Tchadinfos, 2022). The latest plan for Sarh town is the reference urban plan initiated in 2010 by the Ministry of Town and Country Planning, Housing and Urbanism (MTCPHU) through the coordination unit of the urban development support project.
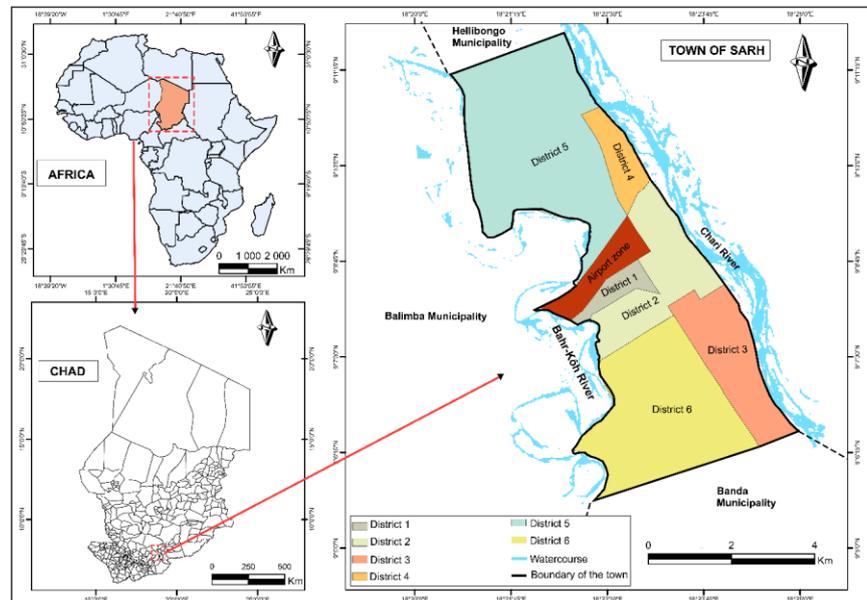

Figure 1. Location of the study area.

2.2. Data collection and sampling

2.2.1 Data collection

To conduct this research, a methodological approach based on a literature search, digitisation of existing official plans, focus group discussions, advice from experts in urban planning and development and a questionnaire survey were used to collect the necessary data.

The literature search reviewed work carried out in Sarh and similar studies in other countries. It was conducted online, where relevant articles were consulted, and at the Center for Study and Training for Development and in the libraries of the universities of Sarh and N'Djamena in Chad, where general works and periodical articles were read and analysed. Information pertaining to urban data was obtained from the Department of Urban Planning in Chad and the Sarh town municipality. The literature review provided a state of knowledge, references and perspectives on the factors influencing the implementation of urban plans in developing countries. It also identified gaps in existing research.

The digitisation of the existing official plans commenced with the importation of images of nondigitised official plans dating from 2010 into ArcGIS 10.8. Four control points were subsequently identified and selected, with due consideration given to their judicious distribution across the nongeoreferenced image. For each of these control points, precise geographic coordinates, including latitude and longitude, were recorded. Once the coordinates of the control points had been recorded, adjustments were made to obtain the optimal match between the official plan images and the reference layer. Finally, the final step was to define the spatial reference system. Updating the georeferencing procedure resulted in the generation of a georeferenced image, which was subsequently digitised. The digitisation of existing urban plans has made it possible to identify discrepancies between the land use planned when the reference urban plan for the town of Sarh was drawn up and the actual land use on the ground.

Group discussions were held with local stakeholders in each of the six districts of the town. In total, forty-six (46) local stakeholders participated in the focus groups. In each district, between six and nine participants took part in the focus groups. These discussions helped establish the level of implementation of the plan's directives and a participatory urban diagnosis for each district. The profile of the focus group participants in each borough is shown in **Table 1** below:

Table 1. Distribution of focus group participants by district.

District	Number of participants	Participant categories
District 1	7	4 neighbourhood leaders, 2 association representatives and 1 borough delegate.
District 2	8	6 neighbourhood chiefs, 1 association representative and 1 borough delegate.
District 3	9	2 neighbourhood leaders, 4 square managers and 3 members.
District 4	8	6 neighbourhood leaders and 2 internal members.
District 5	8	5 neighbourhood leaders and 3 youth representatives.
District 6	6	2 neighbourhood leaders, 2 square managers and 2 members.
Total	**46**	-----------

In addition, individual interview questionnaires were designed to collect expert knowledge and opinions on the factors hindering the implementation of the urban plan guidelines in the town of Sarh. This methodology was used by Negeri et al. (2023) to identify the factors affecting the implementation of the structure plan for the town of Nekemte (Ethiopia). As a result, individual interview questionnaires were administered to sixteen (16) officials in the target government departments, including the following: urban planning, urban development, environment, housing, sanitation and technical services in the Sarh Town Municipality. The interviews provided an opportunity to gather useful information and gain a better understanding of urban planning practices in Chad and the challenges facing the country, particularly in terms of implementing urban planning tools. **Table 2** below shows the profiles of the experts interviewed.

Table 2. Distribution of experts by government department.

Services	Number of experts interviewed
Urban planning	7
Urban development	3
Environment	2
Technical department of Sarh Town Municipality	2
Housing	1
Sanitation	1
Total	**16**

A survey of 425 households throughout Sarh town was conducted to gather sociodemographic data on the population. All the heads of households in the districts of Sarh town were considered samples. This approach was also used in a recent study carried out in Central Africa by Vanel and Coffi (2024). To obtain more detailed information on the approach to developing planning tools, the following specific criteria were defined for the population to be surveyed: to be a head of household, to be at least 30 years old and to have lived in the town for a minimum of 12 years. This criterion of the number of years of residence was established to ensure that the heads of household had sufficient knowledge of the various urban planning tools developed over this period.

The survey was based on a questionnaire containing closed and open questions. This method has been employed in studies conducted in East Africa (Admasu and Jenberu, 2020; Maru et al., 2021). The information collected from households is based on variables such as the following:

- Sociodemographic characteristics of the respondents (age, gender, occupation, level of education, and residence status in Sarh);
- Respondents' knowledge of the urban planning tools of Sarh (reference urban plan);
- Respondents' involvement in the development of the urban planning tool.

2.2.2. Sampling

The survey population was distributed across the six districts of Sarh. The sample size was determined using the Schwartz formula, as described by (Allarané et al., 2023), which allowed inferences to be made about the entire population of Sarh town.

The formula is as follows:

$$n_q = \frac{[(Za)^2 \, x \, P(1 - P)]}{d^2}$$

With Za: fixed deviation or reduced deviation at a risk of 5% (1.96), corresponding to a confidence interval of 95%; P: the proportion of the population of Sarh town relative to the population of the province; and d: the margin of error set at 2% in this study.

Households were allocated according to population density within the six districts of the town of Sarh. For example, the most densely populated districts, comprising mainly residential areas (districts 5 and 2), were allocated a larger sample size than the less popular districts, comprising mainly administrative and service areas (districts 4 and 1). To establish this distribution, the quota method based on population density was applied to ensure a spatial distribution of households that was proportional to the population density in the six districts. The proportional sample allocation technique was used by Admasu and Jenberu (2020) in a study of the town of Arba Minch (Ethiopia). This method makes it possible to guarantee valid and representative results concerning the evaluation of the level of participation of the populations in the process of development of the reference urban plan for Sarh town. **Table 3** presents the distribution of the households surveyed.

Table 3. Distribution of households surveyed.

Districts	Number of neighborhoods	Number of households	Percentage
District 1	5	49	11.53
District 2	5	89	20.91
District 3	2	66	15.53
District 4	7	48	11.30
District 5	8	113	26.60
District 6	3	60	14.13
Total	**30**	**425**	**100.00**

2.3. Data processing and analysis

Geographic information system (GIS) software, particularly QGIS 3.24 and ArcGIS 10.8, was used to process the cartographic data and design illustrative maps on the basis of geographic data (in shapefile format) retrieved from the Technical Department of Sarh Town Municipality. To process and analyse the sociodemographic data, the Office suite (Excel version 2019) was employed to organise and format the data collected from a digital form designed on the KoboToolbox platform. The maps were subsequently subjected to processing in Illustrator 2019. Furthermore, R-Studio 4.2.1 software was utilised in conjunction with specific packages to process the data in accordance with the specific objectives. Ch2 and Fisher statistical tests were used

to assess the significance of the differences observed between the variables. To identify the factors influencing participation, a binary logistic regression model was developed, incorporating the socioeconomic characteristics of the targeted individuals. This model was utilised to calculate odds ratios, with an odds ratio of 1 signifying no effect. An odds ratio much greater than 1 corresponds to an increase in the phenomenon studied, and an odds ratio much less than 1 corresponds to a decrease in the phenomenon studied.

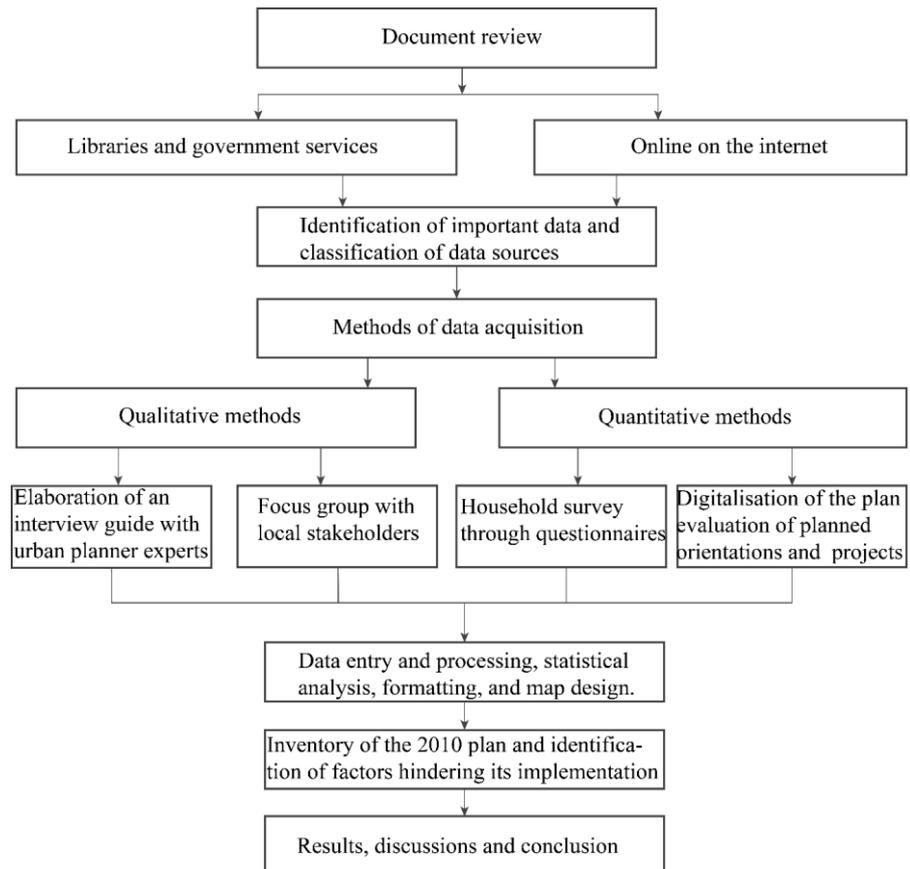The entire methodology is summarised in **Figure 2** below.

Figure 2. Summary of the methodology adopted by the authors.

3. Results

3.1. Evaluation of the approach employed in the development of the reference urban plan

3.1.1. Public perception of the development of the reference urban plan

Table 4 below shows the respondents' perceptions of their knowledge of the plan and the method used to draw it up. The household results show that 19.72% of the households surveyed were aware of the reference urban plan, of which only 5.63% recognised the participatory nature of its preparation. The chi2 test of independence reveals a probability $< 2.2\ e^{-16}$, which indicates that people's participation depends strongly on their knowledge of urban policy tools such as the reference urban plan.

Table 4. Perception of knowledge regarding the plan and the method of its development.

Development method (%)		
Knowledge of urban policy tool (reference urban plan)	Not associated	Associated
No knowledge	80.28	0.0
Knowledge	14.08	5.63

3.1.2. Analysis of factors influencing public participation

Figure 3 below highlights the factors affecting participation in the development of the reference urban plan for Sarh town. The results show that participants aged 60 and over, public employees and those with a higher level of education have the highest odds ratios (4.25, 2.94 and 2.89, respectively) in their category. These values, which are greater than 1, indicate that as age increases, people become more aware of the need to become involved in the development of urban planning tools. In addition, being a public official encourages participation in the development of urban planning tools. Similarly, the greater the level of education, the more likely people are to be involved in drawing up documents. As the coastal value for residents is less than 1 (0.36), being a resident has very little influence on participation in urban planning tools. A *p*-value less than 5% shows that resident status has a significantly low influence on participation in the preparation of urban planning tools, such as the reference urban plan.
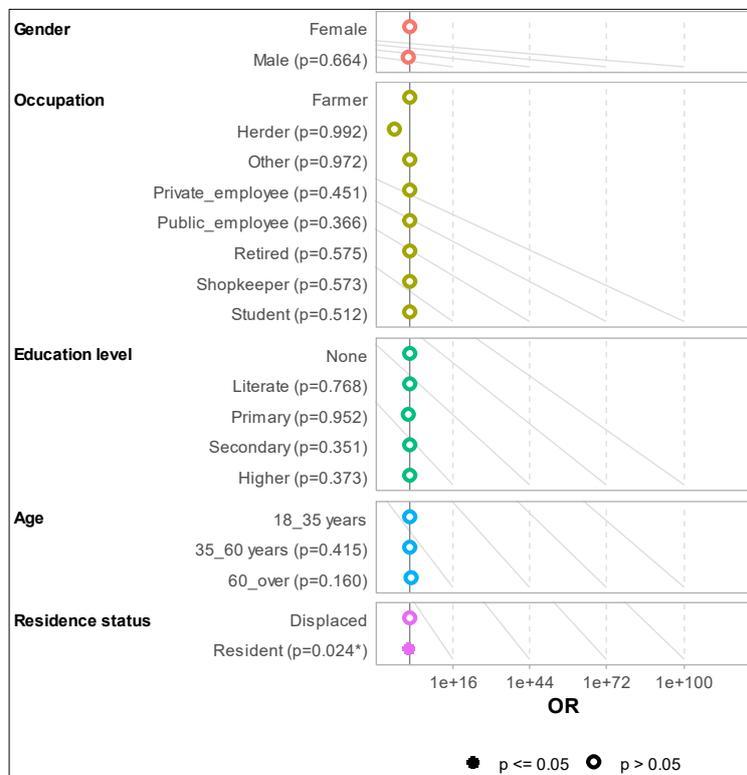

Figure 3. Factors influencing public participation in the preparation of the reference urban plan.

3.2. State of implementation of development guidelines and planned urban projects

3.2.1. Progress report on the implementation of development guidelines

Table 5 below shows the completion rates for the development and town planning guidelines. The table shows that only 11% of the development guidelines have been completed, 67% have not been completed, and 22% are partially completed, for an average completion rate of 33.33%. The chi2 test of independence shows a *p*-value of 0.096 with a degree of freedom of 2. The difference in the proportion of development and town planning guidelines completed is not significant, as the *p*-value is above the 0.05 threshold.

Table 5. Planned development and urban planning guidelines.

Planned operations	Achievement	Percentage (%)
Relocation of the Airport by 250 ha (in 5 years)	Not achieved	0
Relocation of military sites outside the town (within 5 years)	Not achieved	0
Restructuring the center of the town	Achieved	100
Densification of the equipment zone	Not achieved	0
Projection of an urban fringe along the Chari	Not achieved	0
Restructuring of 8 neighborhoods/24: Maroc, Kassai, Mbaimadja, Tatala, Kemkian, Jardin, Kissimi, Maigara 1 (within 5 years)	Partially achieved	50
Creation of a small trades zone in the Northeast	Not achieved	0
Creation of a university hub at the town's exit, on the main road towards Maro (within 5 years)	Partially achieved	65
Addressing of the town (within 5 years)	Not achieved	00
Development guidelines completely achieved		11
Development guidelines not achieved		67
Development guidelines partially achieved		22
Average completion rate		**33.33**

3.2.2. Allocation and land use provided for in the reference urban plan

The reference urban plan for Sarh town (see **Figure 4**) includes nine types of land use with different proportions. As shown in **Table 6**, the total area provided by the reference urban plan is 2173.18 ha. The largest proportion of land was allocated to the medium-density residential area, at 745.02 ha (34.28%), followed by the future extension area, the mixed zone and the low-density residential area, which accounted for 460.31 ha (21.18%), 244.80 ha (11.26%) and 197.86 ha (9.11%), respectively. The central zone and the industrial zone were ranked fifth and sixth, representing 156.96 ha (7.22%) and 116.846 ha (5.38%), respectively. The other land-use types of the town, namely, the high-density residential zone, the tourism zone and the natural zone around the town, were ranked seventh to ninth in terms of the proposed surface area, representing 100.77 ha (4.64%), 97.45 ha (4.48%) and 53.12 ha (2.44%), respectively.

Superimposing the projected plan and the actual plan of Sarh town using geographic information system software (see **Figure 4**) reveals a discrepancy both in terms of spatial planning and land use as initially planned. For example, the relocation of the airport (167.22 ha), planned to free up space for residential development (134.28

ha) and a natural area (32.94 ha), was not implemented. In addition, the current perimeter of Sarh town (3804.47 ha) greatly exceeded the initial perimeter defined (2173.18 ha) when the plan was drawn up.
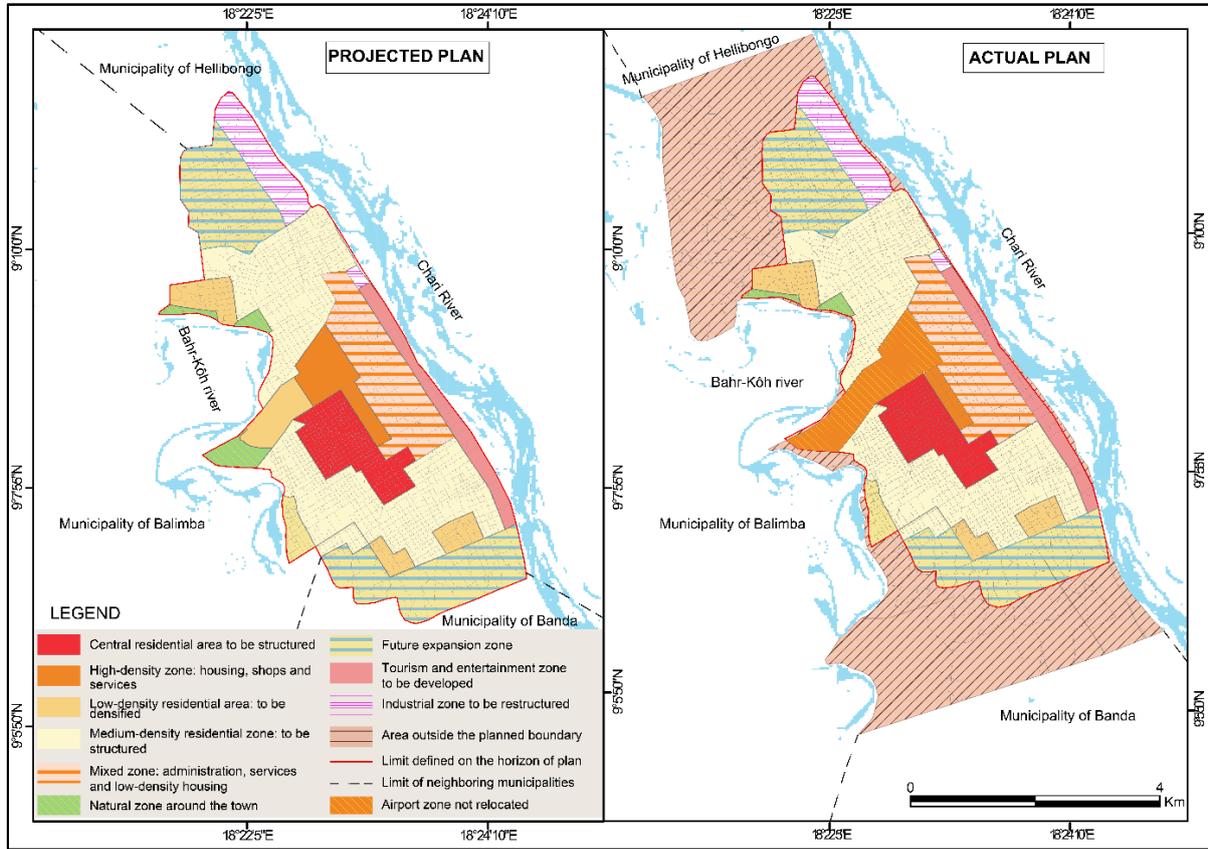

Figure 4. Comparison of the projected plan with the actual plan *(Sources: MTCPHU, Sarh Town Municipality).*

Table 6. Comparison of planned and actual land use on site.

Land use as specified in the reference urban plan	Planned area (ha)	Percentage (%)	Actual surface area (ha)	Percentage (%)	Difference (ha)
Central residential area to be structured	156.96	7.22	156.96	4.13	0
High-density zone: housing, shops and services	100.77	4.64	27.54	0.72	−73.22
Low-density residential area: to be densified	197.86	9.11	136.80	3.60	−61.06
Medium-density residential zone: to be structured	745.02	34.28	745.02	19.58	0
Mixed-zone: administration, services and low-density housing	244.80	11.26	244.80	6.43	0
Natural zone around the town	53.12	2.44	20.18	0.53	−32.93
Future expansion zone	460.31	21.18	2091.60	54.98	+1631.28
Tourism and entertainment zone to be restructured	97.45	4.48	97.45	2.56	0
Industrial zone to be restructured	116.84	5.38	116.84	3.07	0
Airport zone	0	0	167.22	4.40	+167,22
Total area of the planned town/real plan	**2173.18**	**100.00**	**3804.47**	**100.00**	**+1631.28**

3.2.3. Analysis of the reasons for discrepancies in planned land use

The expansion of the town beyond its planned boundaries is linked to a number of factors. The increase in population and its corollary, the demand for housing, which

can only be met through access to land, has not been dealt with effectively by public authorities, especially at a time when property development is still in its infancy. As a result, spontaneous occupation is increasing, reinforcing land speculation. Public players, characterised by their inadequacy and lack of skills and with limited means of intervention, are struggling to apply regulatory texts related to land and urban governance.

The decision to keep the airport area in its original location is mainly due to the challenges involved in implementing the guidelines of the Sarh reference urban plan, as well as the difficulty of mobilising significant financial resources. Maintaining the airport in its current location represents an obstacle to intraurban accessibility. In addition, the town is forced to expand to the north and south, exceeding the limit set by the reference urban plan.

3.2.4. Level of completion of planned urban projects

In terms of development projects, the inventory of infrastructure and social and community facilities revealed that only 19.99% of the infrastructure projects and 23.50% of the social and community facility projects planned in the reference urban plan had been completed. The total percentage of planned urban projects completed is presented in **Table 7**.

Table 7. Rate of completion of basic infrastructure and community facilities.

Type of infrastructure	Existing infrastructures (2010)	Projected infrastructures	Infrastructure built after 2010	Percentage of completion
Bituminous roads	1 km of bituminous roads	20 km of bituminous roads	11 km of bituminous roads	55.00
Drinking water supply	Drinking water supply in 7 out of 30 neighborhoods	Extend the water network to all neighborhoods	Drinking water supply in 15 out of 30 neighborhoods	50.00
Electricity supply	Electricity supply in 7 out of 30 neighborhoods	Extend the electricity network to all neighborhoods	Electricity supply in 13 out of 30 neighborhoods	43.33
Waste management (latrines and garbage bins)	1 waste disposal site	15 intermediate waste disposal sites	Waste disposal in 11 out of 30 neighborhoods	36.66
Percentage of basic infrastructure built				**19.99**
Type of equipment	Existing equipment (2010)	Projected equipment	Built equipment after 2010	Percentage of completion
Primary schools	31	36	02	40.00
Secondary equipment	15	23	01	12.50
Sanitary equipment	04	24	01	5.00
Commercial equipment	04	09	02	40.00
Cultural equipment	01	06	01	20.00
Percentage of sociocollective equipment built				**23.50**
Total percentage of planned urban projects completed				**21.74**

3.3. Analysis of the factors contributing to failure to implement the reference urban plan

The factors contributing to the failure to implement the reference urban plan were identified and are represented in **Figure 5** below. This figure shows that five factors contributed to the failure to implement the Sarh reference urban plan. Poor funding (37.5%) was the main factor in the failure to implement the Sarh reference urban plan, followed by the problems of governance, inadequate land management and lack of

will (18.8% for each factor). Poor communication was the fifth most common factor, accounting for 6.2% of the variance. Most households surveyed (80.28%) said they were not familiar with the reference urban plan for Sarh town. This lack of knowledge is linked to the lack of awareness and involvement of citizens in the urban planning process. Only 5.63% of respondents took part in drawing up the reference urban plan. This had an impact on the implementation of the reference urban plan.
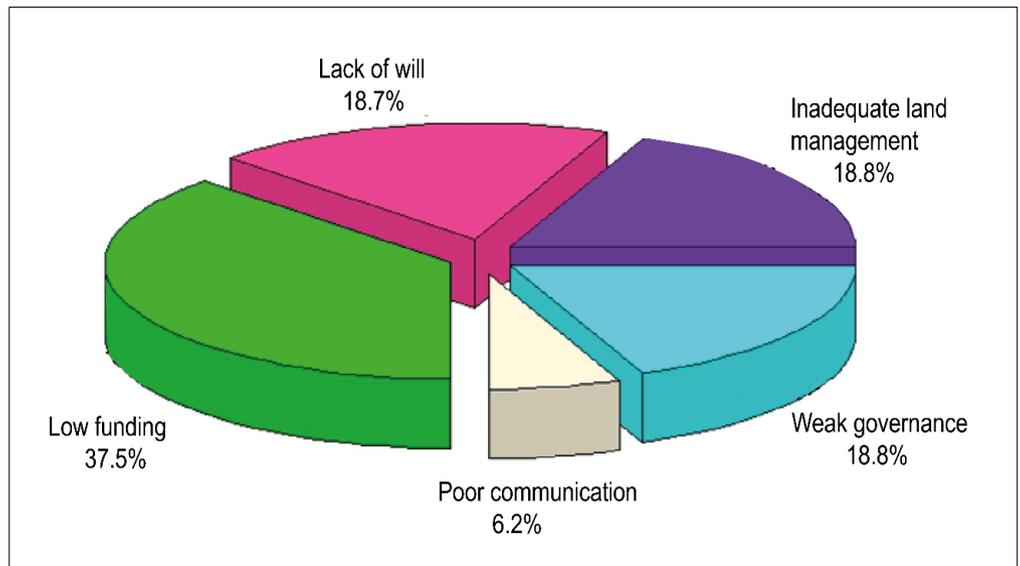

Figure 5. Factors contributing to the failure to implement the reference urban plan.

4. Discussion

African cities, particularly those in Central Africa, face enormous challenges in implementing urban planning tools within the set deadlines. The reference urban plan for Sarh town in Chad, although existing, has gaps in its applicability due to institutional challenges.

First, 19.72% of the 425 heads of household surveyed were aware of the reference urban plan for the town of Sarh, and 5.63% recognised the participatory nature of its preparation. Age, occupation and level of education were identified as the main factors influencing public participation in planning. These findings highlight the importance of citizen participation in drawing up urban plans and the crucial role of education and awareness-raising in encouraging greater integration of all citizens in the decision-making process. A similar study by Workineh (2021) revealed little involvement of residents in developing a rezoning plan for the town of Injibara in the Amhara region of Ethiopia due to a lack of knowledge and understanding of the process. Involving people in the planning process can influence local development (Kleemann et al., 2017; Negeri et al., 2023; Wilson et al., 2019). Similarly, Aldegheishem (2023) demonstrated that despite the numerous technical policy instruments developed in Saudi Arabia, urban development is not sustainable due to the low level of participation in the process of developing urban planning tools. The influence of occupation on the level of public participation in the process of developing the reference urban plan for Sarh town corroborates the findings of Wang et al. (2021), according to which most citizens working in the suburbs of Huilongguan in China are

concerned about their problems and are therefore motivated to participate in the planning process. However, Swapan (2016) noted that current models of participation do not accurately reflect the realities of developing countries, as only a small proportion of citizens are interested in participating in the planning process. The main difference between the results of this study and those of previous studies lies in the factors influencing public participation in the preparation of urban plans, particularly age and level of education.

Second, less than 50% of the planned planning guidelines and urban projects have been implemented, with a difference of 1,631.28 hectares (ha) between the planned land use and actual development of the town. These results provide important information for a critical debate on the role and effectiveness of urban planning tools for urban development, particularly in developing countries. The discrepancies between the forecast plan and the actual development of the Sarh town corroborate the results of Hailu et al. (2023), who identified a discrepancy between the 2017 land use plan and the actual land use in 2023 in Addis Ababa, Ethiopia. Similarly, using QGIS software and satellite imagery from 2005, 2010 and 2017, Omollo (2019) demonstrated that none of the approved development zones of Kisii town in Kenya have been respected by subsequent schemes, indicating noncompliance. Enoguanbhor et al. (2021), by overlaying and contrasting land use plans and land use maps, reported spatial inconsistencies between urban plans and associated urban land dynamics in the Abuja urban area of Nigeria. The low level of implementation of the socio-collectives infrastructure and facilities provided in the reference urban plan confirms Chirisa's (2014) hypothesis that a low level of plan implementation in developing countries results in physical infrastructure development lagging behind expectations, thereby producing undesirable outcomes. Dube (2013) demonstrated that the master plans prepared for the town of Arba Minch in Ethiopia have been implemented but have not fully achieved the intended objectives. Ryan and Gao (2019) also identified the challenges and complexities encountered during the implementation of the plan for Youngstown in the USA, a town in decline similar to Sarh town in Chad.

Third, five factors contributing to the failure to implement the Sarh reference urban plan effectively were identified: lack of funding, inadequate land management, lack of political will, weak governance and poor communication. The lack of funding was the most important factor influencing the implementation of the benchmark urban plan for Sarh town. This result corroborates the findings of (Laurian et al., 2004; Nallathiga, 2016; Negeri et al., 2023), who identified the financial challenge as a contributing factor to the implementation of urban plans in developing countries. The weak governance and a lack of politics confirm the findings of Nuhu (2019) and Cobbinah et al. (2023), who revealed that the Ministry's reluctance to share power with local authorities, compounded by contradictory laws and regulations, played an important role in the implementation of urban plans in Tanzania and Ghana. In addition, inadequate land management and poor communication have been identified as factors contributing to the failure to effectively implement the reference urban plan for Sarh town. Effective land management in the Sarh town is hampered by a lack of the necessary resources and the absence of IT tools to facilitate the effective management of land data. These results corroborate the findings of (Abubakari et al., 2023; Alem, 2021), who indicated that deficiencies in land governance are among the

factors hindering the effective implementation of urban plans in Nigeria and Ghana. Similarly, Admasu and Jenberu (2020) identified the lack of public participation as one of the main challenges in implementing urban plans in Arba Minch, Ethiopia. Nuhu (2019) also emphasised the importance of the participation of different stakeholders in the enactment of appropriate legal and institutional frameworks to regularise both formal and informal stakeholders and improve the governance of peri-urban land in the future.

5. Conclusion

This study examined the factors hindering the implementation of the reference urban plan for Sarh town in Chad, highlighting the complex dynamics that influence urban planning tools in developing countries. First, the results reveal that most households are unfamiliar with this planning tool, which represents a major challenge in terms of raising awareness and involving citizens in the urban planning process. Second, an analysis of the content of the reference urban plan revealed a low level of implementation of the planned development guidelines and urban projects, with a gap between the planned plan and the town's actual development. In addition, the results indicate that structural challenges, including insufficient financial resources, inadequate land management, weak governance, a lack of political will and poor communication/awareness-raising, are major obstacles to the effective implementation of the directives in the reference urban plan for Sarh town.

The results obtained could serve as a reference for other Chadian and sub-Saharan African cities facing similar challenges, thus helping to improve good urban planning practices in the subregion. Furthermore, the time and resources available are limited for a detailed analysis of the various factors hindering the implementation of the reference urban plan. Exploring citizen participation mechanisms in other urban contexts in Chad and sub-Saharan Africa to identify models of good practices adapted to each city would be relevant. A more in-depth analysis of the interactions between the various planning stakeholders could provide insights into urban governance. Finally, research into the impact of public policies and international funding on the implementation of urban plans would be useful in meeting the needs of developing cities.

References

Abubakari, M., Ibrahim, A.-S., Dosu, B., Mahama, M. (2023). Sustaining the urban commons in Ghana through decentralized planning. Heliyon, 9(5), e15895.https://doi.org/10.1016/j.heliyon.2023.e15895

Admasu, T. G., Jenberu, A. A. (2020). Urban Planning Implementation Challenges in Arba Minch Town, Southern Ethiopia. Urban Forum, 31(4), 549–572. https://doi.org/10.1007/s12132-020-09393-6

Africapolis. (2020). Rapport sur le Tchad. Available online: https://africapolis.org/en/country-report/Chad (accessed on 02 July 2024).

Ahmad, N., Anjum, G. A. (2012). Legal and institutional perplexities hampering the implementation of urban development plans in Pakistan. Cities, 29(4), 271–277. https://doi.org/10.1016/j.cities.2011.07.006

Ahmed, A., Asabere, S. B., Adams, E. A., Abubakari, Z. (2023). Patterns and determinants of multidimensional poverty in secondary cities: Implications for urban sustainability in African cities. Habitat International, 134, 102775. https://doi.org/10.1016/j.habitatint.2023.102775

Aldegheishem, A. (2023). Community participation in urban planning process in Saudi Arabia: An empirical assessment. Journal of Urban Management, 12(3), 221–230. https://doi.org/10.1016/j.jum.2023.04.003

Alem, G. (2021). Urban Plans and Conflicting Interests in Sustainable Cross-Boundary Land Governance, the Case of National Urban and Regional Plans in Ethiopia. Sustainability, 13(6), 3081. https://doi.org/10.3390/su13063081

Allarané, N., Mahamat Hemchi, H. (2024). Outils d'urbanisme comme instruments de fabrication de la ville de N'Djaména (1990 à 2023). Available online: https://revues.imist.ma/index.php/AMJAU/article/download/48673/26222/140033 (accessed on 04 May 2024).

Allarané, N., Azagoun, V. V. A., Atchadé, A. J., Hetcheli, F., et al. (2023). Urban Vulnerability and Adaptation Strategies against Recurrent Climate Risks in Central Africa: Evidence from N'Djaména City (Chad). Urban Science, 7(3), 97. https://doi.org/10.3390/urbansci7030097

Blakime, T.-H., Adjonou, K., Komi, K., et al. (2024). Dynamics of Built-Up Areas and Challenges of Planning and Development of Urban Zone of Greater Lomé in Togo, West Africa. Land, 13(1), 84. https://doi.org/10.3390/land13010084

Bolay, J.-C. (2015). Urban Planning in Africa: Which Alternative for Poor Cities? The Case of Koudougou in Burkina Faso. Current Urban Studies, 03(04), 413–431. https://doi.org/10.4236/cus.2015.34033

Chirisa. I. (2014). Link between time use and spatial plan implementation: What explains dysfunctional urban landscapes in Zimbabwe? 5(1), 49–60.

Cirolia, L. R., Berrisford, S. (2017). 'Negotiated planning': Diverse trajectories of implementation in Nairobi, Addis Ababa, and Harare. Habitat International, 59, 71–79. https://doi.org/10.1016/j.habitatint.2016.11.005

Cobbinah, P. B., Asibey, M. O., Azumah, A. D. (2023). Urban forest and the question of planning-sustainability inadequacy. Cities, 140, 104453. https://doi.org/10.1016/j.cities.2023.104453

Colenbrander, S., Barau, A. (2019). Planning and financing urban development in the context of the climate crisis. International Journal of Urban Sustainable Development, 11(3), 237–244. https://doi.org/10.1080/19463138.2019.1673529

Dandonougbo, I., Hetcheli, F. (2016). Problèmes de sous-équipement et stratégies d'assainissement à Notsé (Togo): Acteurs et enjeux de la gestion des services urbains. Cahiers du Centre Béninoise de la Recherche Scientifique et Technique (CBRST),78–100.

Danvidé, T.B. (2015). Gouvernance des politiques de planification urbaine et gestion des inondations à Cotonou [PhD thesis]. Université de Paris 8.

Das, M., Das, A. (2019). Dynamics of Urbanization and its impact on Urban Ecosystem Services (UESs): A study of a medium size town of West Bengal, Eastern India. Journal of Urban Management, 8(3), 420–434. https://doi.org/10.1016/j.jum.2019.03.002

Dube, E. E. (2013). Urban planning and land management challenges in emerging towns of Ethiopia: The case of Arba Minch. Journal of Urban and Environmental Engineering, 340–348. https://doi.org/10.4090/juee.2013.v7n2.340348

Eldesoky, A. H., Abdeldayem, W. S. (2023). Disentangling the Relationship between Urban Form and Urban Resilience: A

Systematic Literature Review. Urban Science, 7(3), 93. https://doi.org/10.3390/urbansci7030093

Enoguanbhor, E. C., Gollnow, F., Walker, B. B., et al. (2021). Key Challenges for Land Use Planning and Its Environmental Assessments in the Abuja City-Region, Nigeria. Land, 10(5), 443. https://doi.org/10.3390/land10050443

Enoguanbhor, E., Gollnow, F., Nielsen, J., et al. (2019). Land Cover Change in the Abuja City-Region, Nigeria: Integrating GIS and Remotely Sensed Data to Support Land Use Planning. Sustainability, 11(5), 1313. https://doi.org/10.3390/su11051313

Guo, Z., Hu, Y., Zheng, X. (2020). Evaluating the effectiveness of land use master plans in built-up land management: A case study of the Jinan Municipality, eastern China. Land Use Policy, 91, 104369. https://doi.org/10.1016/j.landusepol.2019.104369

Hailu, T., Assefa, E., Zeleke, T. (2023). Land use planning implementation and its effect on the ecosystem in Addis Ababa, Ethiopia. Environmental Challenges, 13, 100798. https://doi.org/10.1016/j.envc.2023.100798

Kleemann, J., Inkoom, J. N., Thiel, M., et al. (2017). Peri-urban land use pattern and its relation to land use planning in Ghana, West Africa. Landscape and Urban Planning, 165, 280–294. https://doi.org/10.1016/j.landurbplan.2017.02.004

Laurian, L., Day, M., Backhurst, M., et al. (2004). What drives plan implementation? Plans, planning agencies and developers. Journal of Environmental Planning and Management, 47(4), 555–577. https://doi.org/10.1080/0964056042000243230

Mahamat Hemchi, H. (2015). Mobilités urbaines et planification : Le cas de N'Djamèna [PhD thesis]. Université de Bordeaux Montaigne.

Maru, M., Worku, H., Birkmann, J. (2021). Factors affecting the spatial resilience of Ethiopia's secondary cities to urban uncertainties: A study of household perceptions of Kombolcha city. Heliyon, 7(12), e08472. https://doi.org/10.1016/j.heliyon.2021.e08472

Mbatbral, N. (2015). Gestion des déchets ménagers et catastrophes environnementales: Cas de la ville de Sarh (Moyen-Chari, Tchad). Available online: https://www.researchgate.net/publication/321226422. (accessed on 15 December 2024).

Mohamed, A., Worku, H., Lika, T. (2020). Urban and regional planning approaches for sustainable governance: The case of Addis Ababa and the surrounding area changing landscape. City and Environment Interactions, 8, 100050. https://doi.org/10.1016/j.cacint.2020.100050

Nallathiga, R. (2016). Assessing the Role of Master Plans in City Development: Reform Measures and Approaches. Nagarlok, XLVIII, 1-18.

Negeri, M. D., Guta, M. S., Erena, S. H. (2023). Determinant factors hinder urban structure plan implementation: The case of Nekemte Town, Ethiopia. Heliyon, 9(3), e13448. https://doi.org/10.1016/j.heliyon.2023.e13448

Nor, A. N. M., Corstanje, R., Harris, J. A., Brewer, T. (2017). Impact of rapid urban expansion on green space structure. Ecological Indicators, 81, 274–284. https://doi.org/10.1016/j.ecolind.2017.05.031

Nuhu, S. (2019). Peri-Urban Land Governance in Developing Countries: Understanding the Role, Interaction and Power Relation Among Actors in Tanzania. Urban Forum, 30(1), 1-16. https://doi.org/10.1007/s12132-018-9339-2

Omollo, W. O. (2019). Conformity assessment to development plan implementation as a tool for development control in Kisii Town, Kenya. South African Journal of Geomatics, 7(3), 331. https://doi.org/10.4314/sajg.v7i3.10

Ryan, B. D., Gao, S. (2019). Plan Implementation Challenges in a Shrinking City: A Conformance Evaluation of Youngstown's (OH) Comprehensive Plan with a Subsequent Zoning Code. Journal of the American Planning Association, 85(4), 424–444. https://doi.org/10.1080/01944363.2019.1637769

Swapan, M. S. H. (2016). Who participates and who doesn't? Adapting community participation model for developing countries. Cities, 53, 70–77. https://doi.org/10.1016/j.cities.2016.01.013

Tchadinfos. (2022). Sarh, la ville historique, est en décadence. Available online: https://tchadinfos.com/sarh-la-ville-historique-est-en-decadence/#google_vignette (accessed on 15 May 2024).

Tob-Ro, N. (2015). Gouvernance urbaine et aménagement au Tchad : Production et attribution des terrains à bâtir à N'Djamèna [PhD thesis]. Université de Ngaoundéré.

UCLGA. (2018). The transition to sustainable cities and territories: The role of African local authorities. Synthesis of sessions and recommendations. Available online: https://www.climate-chance.org/wp-content/uploads/2018/11/af8_synthese_des_sessions_fr_23_11_2018.pdf (accessed on 05 July 2023).

UN-Habitat. (2018). The state of African cities 2018, the geography of African investment. UN-Habitat.

UN-Habitat. (2022). World cities report: Envisioning the future of cities (p. 422). Available online: https://unhabitat.org/sites/default/files/2022/06/wcr_2022.pdf (accessed on 15 September 2023).

Vanel, A. R., Coffi, A. C. (2024). Public Perception and Resilience to Flooding: An Examination of Vulnerability in Brazzaville,

Congo During the 2019 Floods. International Journal of Design and Nature and Ecodynamics, 19(1), 211–219. https://doi.org/10.18280/ijdne.190123

Wang, X., Chen, Y., Han, Z., et al. (2021). Evaluation of mobile-based public participation in China's urban planning: Case study of the PinStreet platform. Cities, 109, 102993. https://doi.org/10.1016/j.cities.2020.102993

Watson, V. (2016). Locating planning in the New Urban Agenda of the urban sustainable development goal. Planning Theory, 15(4), 435–448. https://doi.org/10.1177/1473095216660786

Weldegebriel, A. T., Tekalign, M., Van Rompaey, A. (2023). Sociospatial analysis of regime shifts in Addis Ababa's urbanisation. Applied Geography, 154, 102918. https://doi.org/10.1016/j.apgeog.2023.102918

Wilson, A., Tewdwr-Jones, M., Comber, R. (2019). Urban planning, public participation and digital technology: App development as a method of generating citizen involvement in local planning processes. Environment and Planning B: Urban Analytics and City Science, 46(2), 286–302. https://doi.org/10.1177/2399808317712515

Workineh. N.A. (2021). Rezoning prior urban planning period for urban space development in Injibara Town, Amhara National Regional State, Ethiopia. 109, 105702. https://doi.org/10.1016/j.landusepol.2021.105702

Zhu, X., Xu, J. (2023). After the pandemic is before the pandemic: Rethinking urban priorities, assumptions and planning approaches. Heliyon, 9(10), e20763. https://doi.org/10.1016/j.heliyon.2023.e20763