

PHYSICAL PLANNING TOOLS TO ENHANCE SUSTAINABLE PERI-URBAN DEVELOPMENT

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ABSTRACT

This paper seeks to examine physical planning tools used to enhance and planned development of peri-urban communities of Jos metropolis through an inquiry into whether development is controlled or monitored and assessing the spatial planning tools/agencies that policymakers and planning agencies can adopt in promoting inclusive policies for sustainability in Jos metropolis. Both qualitative and quantitative approaches were adopted for data acquisition. Four peri-urban areas were selected systematically; questionnaires were randomly administered. ArcGIS10.5 software, GPS device, and camera were used for qualitative data acquisition. The findings of the study shows that development is controlled or monitored but some areas are unplanned due to the absence of a layout plan but efforts were made to serve the residents with a notice to ensure building permits and development control. Jos Metropolitan Development Board (JMDB) is the primary agency saddle with the responsibilities of controlling development and the approval of building plans but due to the cumbersome and unending nature of the process majority of the buildings are without a building plan and no approval as well as the neighbourhood development plan (layout) which is vital to improving physical planning. Based on the results obtained, conclusions were drawn that usage of spatial planning tools in the development of peri-urban areas are ineffective as spatial governance is expressed in the unplanned and chaotic nature of development. Recommendations were made to assist policy makers, practitioners and the academia, as the growth of urban areas beyond planned spatial limits into peri-urban areas with chaotic nature of development shows signs of ineffective spatial governance.

KEYWORDS: *Enhance; Peri-Urban; Physical Planning; Sustainable Development; Sustainable Cities and Communities; Tools*

1. INTRODUCTION

The quest for housing to accommodate increasing urban populations owing to expanding world population, Araya and Cabral (2010) alleged, is reflected in the tremendous growth of urban areas in recent decades and is beyond planned urban spatial limits with haphazard development (UN-Habitat, 2020) as it encroached transitional zone between urban and rural areas (peri-urban) resulting from absence, poor or ineffective spatial governance. Butsch and Heinkel (2020) define peri-urban areas as interface zones between rural-urban landscapes located in the fringes of urban, regional, and rural areas. These rural-urban interfaces are of prime importance lately due to the hasty nature of unguided developments that are unplanned, chaotic and organic, which Ravetz *et al.*, (2013) report is the dominant urban form and spatial planning challenge currently. Further said, in older industrial or post-industrial countries, peri-urban areas are zones of socio-economic change and spatial restructuring. In comparison, newer industrializing countries, and most of the developing world, are zones of chaotic development leading to sprawl, characterized by scattered houses growing organically, high dependence on transport for commuting, and are often referred to as commuting or bedroom communities, and lack spatial governance.

The organic nature of development is seen as a growing trend world over by Charles *et al.*, (2021), and the process is occurring rapidly, especially in developing countries. A feature common to peri-urban zones in advanced countries, where spatial governance is effective is low/moderate density areas, regular layout pattern (showing planned normal roads and compliance with set-back rules), provision of public (green spaces) within or in the vicinity of residential areas, generally larger building sizes, (Kuffer and Barros, 2011). The ineffectiveness of spatial management in peri-urban areas of developing countries has made developers flood peri-urban areas.

Buildings are built without planning blueprints or measures to make development an orderly, functional, efficient, and aesthetically pleasing physical environment for living, working circulation, and recreation (Lewis, 1969 in Olaitan, 2019). Chigudu (2021) frowns at the ineffectiveness of spatial planning tools (spatial/land use planning, neighbourhood development plan, zoning, building permit, monitoring and development control) in enhancing the physical form of peri-urban areas, leading to spatial disorganization owing to uncontrolled rapid physical transformations of the regions.

Achieving sustainable physically planned peri-urban areas, which Grochowska and Małeczka (2020) adjudge to guarantees conflicting land uses are not situated next to each other and establish setbacks and criteria for safety and stability is hinged on land use planning and development control, backed by well-informed-policies-based-on-sustainable-development-principles of building sustainable and cities. This can help address organic development challenges of infrastructural provisions (Azi *et al.*, 2021) and exposure to land, air, and water-based pollution, jeopardizing health and economic productivity (Abayomi, 2013). Further outlines requisite physical planning tools used by planners to ensure or enhanced planned physical development, including master plans, models, laws, zoning, upgrading, renewal, and development control, described as an indispensable tool of planning by Abu (2015), if effectively utilized, these physical planning tools will monitor peri-urban development and achieve sustainable, equitable and efficient development outcomes in respect to the principles of building

sustainable cities and communities. Silva *et al.*, (2020) submit that the government used these tools to govern land use development to enforce local and national planning guidelines. However, land use plans, zoning, monitoring and development control measures are sustainable tools for controlling land use changes in urban areas that are unsustainable, predominantly to guarantee ordered and logical development of land and established habitable settlements (Surajit and Negi, 2016). Airey and Doughty (2020) argued that development control ensures that developments occur at a legitimate site and time in a way commensurate with a recommended set of policies and standards. This will invariably lead to sustainable physical development. This made the Commonwealth of Australia (2017) rightly mention development control as a regulatory effort, primarily undertaken by specified land use or development certification process, whereby applicants submit requests for their proposed development plans to be determined by the approval authority (for building permit) and are not to stop growth but to ensure the orderly and rational development of land to create sustainable human settlements, (Thomas, 2001).

In achieving orderly physical development in any given area, Enermark (2012) concludes that land use planning has proven to be the best approach as it helps in creating a functionally efficient and aesthetically pleasing physical environment for living, working, circulation and recreation (Lewis, 1969 in Olaitan, 2019). Land use planning is a tool used to determine how land ought to and ought not to be used by evaluating the land and alternative patterns of land use, systematically choosing the use that meets the specified goals and then outlining policies and programs for the benefit of the land, (Simon, 1990). Land use planning groups different uses, evaluates each land use and then defines zones for all land uses.

Nel (2016) described zoning as the demarcation of urban areas using town planning ordinances and regulations to govern the use of zoned land. To buttress the importance of zoning, Berliner *et al.*, (2020) advanced that zoning lays down the statutory framework that defines permissible land uses and establishes a distinction between various forms of land use. In the words of Daniels (1999) in Masina (2003), land use planning could be a vital tool to control peri-urban development by a municipality, stipulating growth boundaries (demarcates the area which the city cannot expand beyond in a given period) and phased developments, this makes zoning indispensable. Further advanced, this can be achieved by providing bulk infrastructure like sewers up to the growth boundary and not beyond it. Willing developers beyond the limit are frustrated by the lack of infrastructure.

The responsibilities of urban municipalities involved in land use planning and development control should span the area adjacent to the urban boundary. A passionate approach to controlling peri-urban development can only work in places with very strong urban governance such as developed countries where there are solid and stringent urban and regional development and planning policies with well-organized spatial planning governance. In replicating this approach in developing countries, significant adaptations would have to be made focused on improving and strengthening the institutional framework guiding development in peri-urban areas. Charles *et al.*, (2021) point out that urban development plans were not mindful of demands, and neither did they address local challenges, leading to poor execution of proposed developments in peri-urban areas. Further said, urban planning strategies have not been successful, as critical tools for managing and directing urban development, and have not been adequately enforced. It can therefore be argued that land-use reform that transcends urban areas

and spatial restructuring of peri-urban areas are necessary because of inadequate planning tools or ineffective institutional structures to manage their transformational processes and spatial stability in developing countries coupled with poor spatial planning governance. Thus, it is essential to drive chaotic unguided growth and mixed characteristics of peri-urban land use change and spatial transformation. Peri-urban areas of Jos metropolis are no exception to the challenge posed by the absence of a blueprint, ineffective spatial planning and governance, and development control agencies aimed at a planned peri-urban development. Visibly, peri-urban developments around Jos metropolis are mainly organic, informal, and not state-managed. Lamba (2005) expressed that it results in poor living conditions and threatens the development of sustainable communities.

This trend, if not controlled and managed, will develop neighbourhoods that lack spatial organization, are chaotic, and unfit for human habitation because UN-Habitat (2020) brochures show that, the world's urban population had soared to 50% from merely ten per cent (10%) at the beginning of the 20th century. The population increase comes with a demand for spatial extension of urban land usually acquired through land use conversions of rural agricultural land (Osumanu and Akomgbangre, 2020). To Adzende *et al.*, (2015), the rapid rate of urbanization experienced had created severe environmental problems noticeable along the urban fringe of Jos metropolis, and difficulties in infrastructural provisions (Azi *et al.*, 2021); this is connected to the chaotic and ungoverned nature of development.

This has brought the desire to control or manage this chaotic development using physical planning tools which include; spatial/land use planning, neighbourhood development plan, zoning, building permit, monitoring and development control) to enhance the development of sustainable peri-urban communities. This made it pertinent to write this paper which is aimed at improving and sustainable physically planned peri-urban community in Jos metropolis through inquiry into whether development in peri-urban areas is controlled or monitored and assess the spatial planning tools/agencies used guiding peri-urban development.

2. MATERIALS AND METHODS

2.1.1 Sampling Techniques and Data Collection

This study defined its target peri-urban areas as all Dung-Gwom (2008) enumerated eighteen peri-urban regions of Jos North and seventeen in Jos South Local Government Area (LGA). A systematic sampling technique was employed to select peri-urban neighbourhoods and respondents randomly to make up the required sampled peri-urban neighbourhoods and respondents from 124,645 estimated household heads which served as the population for this study. Four (4) sample peri-urban areas were selected systematically after they were arranged alphabetically. The fourth neighbourhood and eight from the two sampled LGA were chosen; these were Dong, Gura-Top, Kabong, and Mun-Gyel. The Questionnaire used for this purpose was prepared by the researchers and vetted by the Department of Urban and Regional Planning, at the University of Jos. The questionnaires were administered to household heads, and participation was voluntary. Two hundred and forty-seven (247) questionnaires were administered, representing 0.2% of the 124,645 estimated household population, with 231 retrieved (Table 1). Tools applied in mapping, geo-referencing, and taking of photographs were ArcGIS 10.5 software, GPS device, and camera.

Table 1: The selected peri-urban areas

Selected Peri-urban areas	Population	Questionnaire administered	Retrieved
Gura-Top	18,438	36	36
Mun-Gyel	12,497	24	24
Kabong	72,159	144	128
Dong	21,551	43	43
Total	124,465	247	231

2.1.2 Study Area

Jos metropolis is located between latitude $9^{\circ} 82' - 9^{\circ} 90'$ North and longitude $9^{\circ} 86' - 9^{\circ} 90'$ East, Figure 1. It is situated almost at the geographical centre of Nigeria and about 179 kilometres from Abuja, the Federal Capital of Nigeria (Lekwot *et al.*, 2015). The transformation of Jos into a city came with a massive deficit in housing. The housing deficit saw a considerable movement from the city into the peri-urban areas where land and cost of accommodation are relatively cheap because of ineffective spatial governance that will build a sustainable and livable environment.

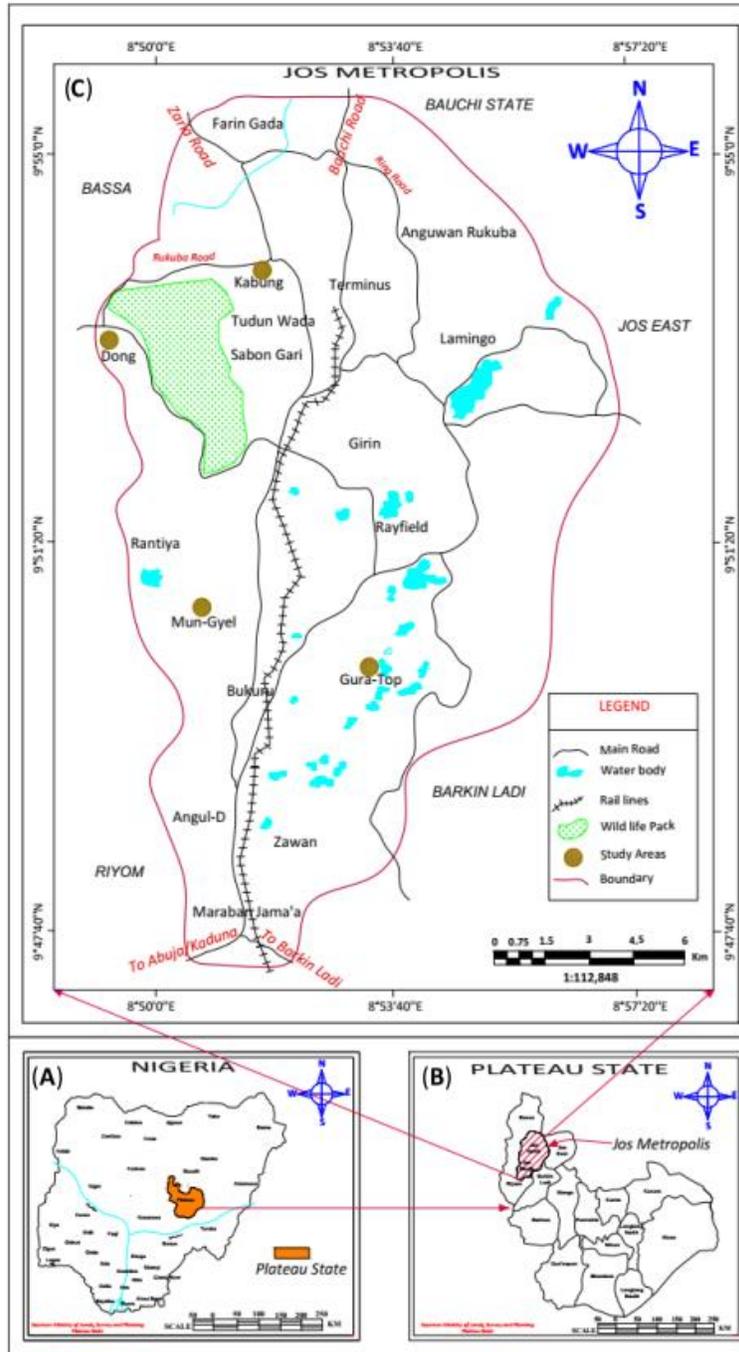


Figure 1: Plateau state in Nigeria showing Jos Metropolis and Selected Peri-urban Areas

3. RESULT AND DISCUSSIONS

3.1.1 Controlling/monitoring development in peri-urban areas

This section focuses on whether development is monitored or controlled. Since not controlling or monitoring the physical growth of peri-urban areas makes peri-urban areas degenerate into slums, thus, hampering the attainment of the vision of building sustainable communities. Findings of the study, as presented in Figure 2, reveal development in peri-urban neighbourhoods are controlled as 58% of the respondents said development control officers usually marked buildings X signifying stoppage of work, as seen in Figure 3a when the building commenced without permission. In comparison, 42% said the development was not monitored or controlled. Despite being claimed by the majority that development is being controlled and monitored, it is not following any predetermined sets of plans/layouts, and standards as development control officers only asked for building permits. This explains why development is still organic as if Jos metropolis doesn't have any development control agency that its services span into the peri-urban areas. The development can be said to debunk the physical planning strategies and physical development tools of Nigerian Urban and Regional Planning Decree 88 of 1992 (NURP Decree 88, 1992), which seeks to use physical planning tools to control development and to ensure that all development conforms to a predetermined set of standards and plans. Buildings are allowed in areas reserved as green areas, country parks, and conservation corridors by the two master plans, Figure a and 3b.

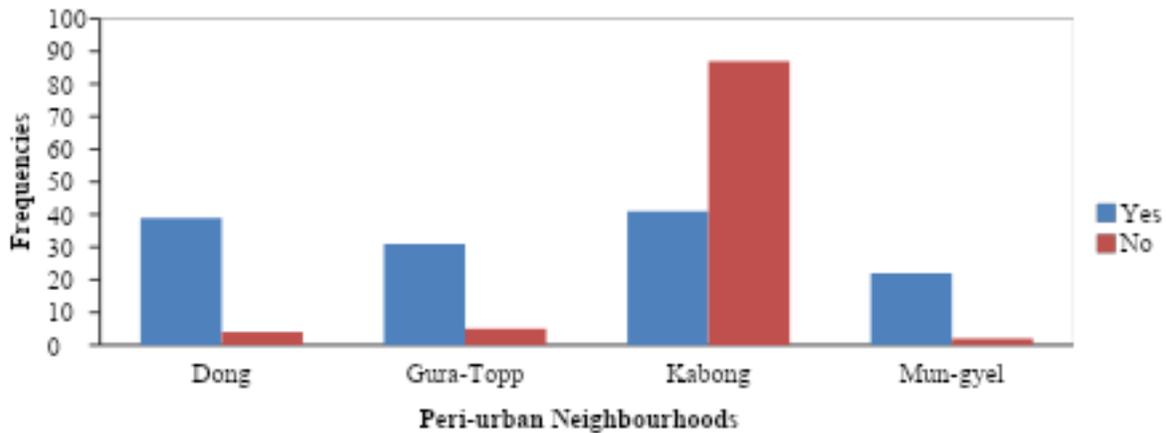


Figure 2: Control or Monitoring Development



Figure 3a: Building Marked by Development Control Agency



Figure 3b: Organic or Unplanned Developments in Kabong

3.1.2 Nature of peri-urban neighbourhood development

Monitoring and control of development should translate into planned developed peri-urban areas. The finding of the study shows peri-urban neighborhoods are unplanned, as revealed by the majority (65%) of the respondents in Figure 4 with Figure 5a-d depicting the physical nature of development; despite claims that development is monitored and controlled, growth is haphazard without government intervention aimed at initiating physical planning for sustainability, consequently having irregular shapes, irregular exterior space dimensions, and meandering circulation as revealed by Marpaung (2017) with most areas inaccessible. Thirty (30%) said it is semi-planned; these are respondents located in locations where customary land is prepared to help appreciate the cost of their property, while 5% said it is planned, the majority of whom reside in Gura-top close to the seat of government in the state. One will not be wrong in saying, the unplanned nature of peri-urban development in Jos metropolis is the result of rapid, unchecked spatial expansion due to the absence of peri-urban spatial development plans, ineffective spatial governance and management, monitoring of development, high development pressure and insufficient supply mechanism of plots in a planned layout that are affordable, a system of land grabbing and racketeering.

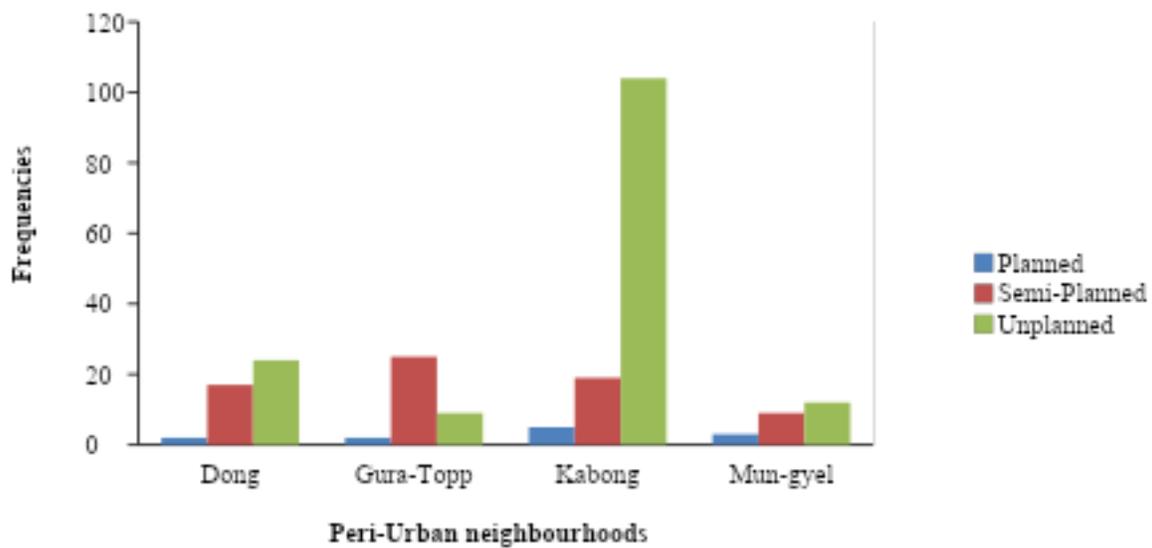


Figure 4: Nature of neighborhood development

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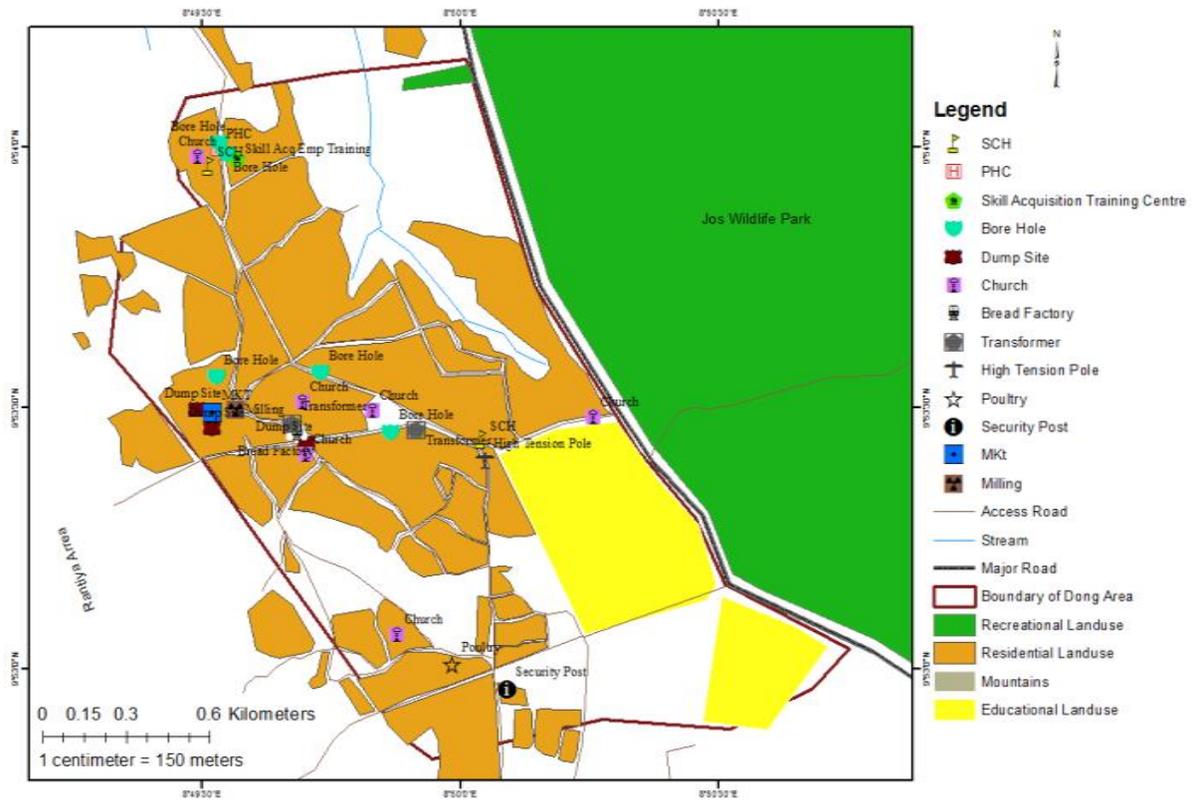


Figure 5a: The nature of peri-urban development in Dong

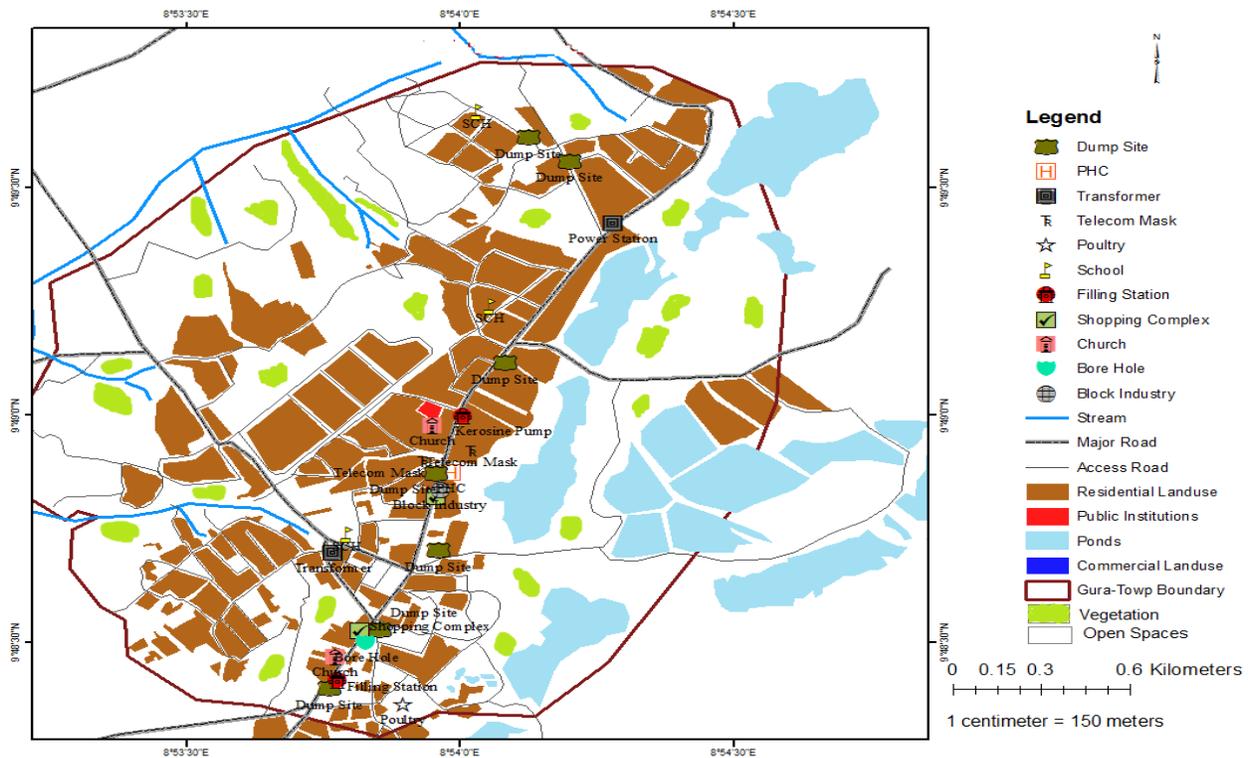


Figure 5b: The nature of peri-urban development in Gura-Top

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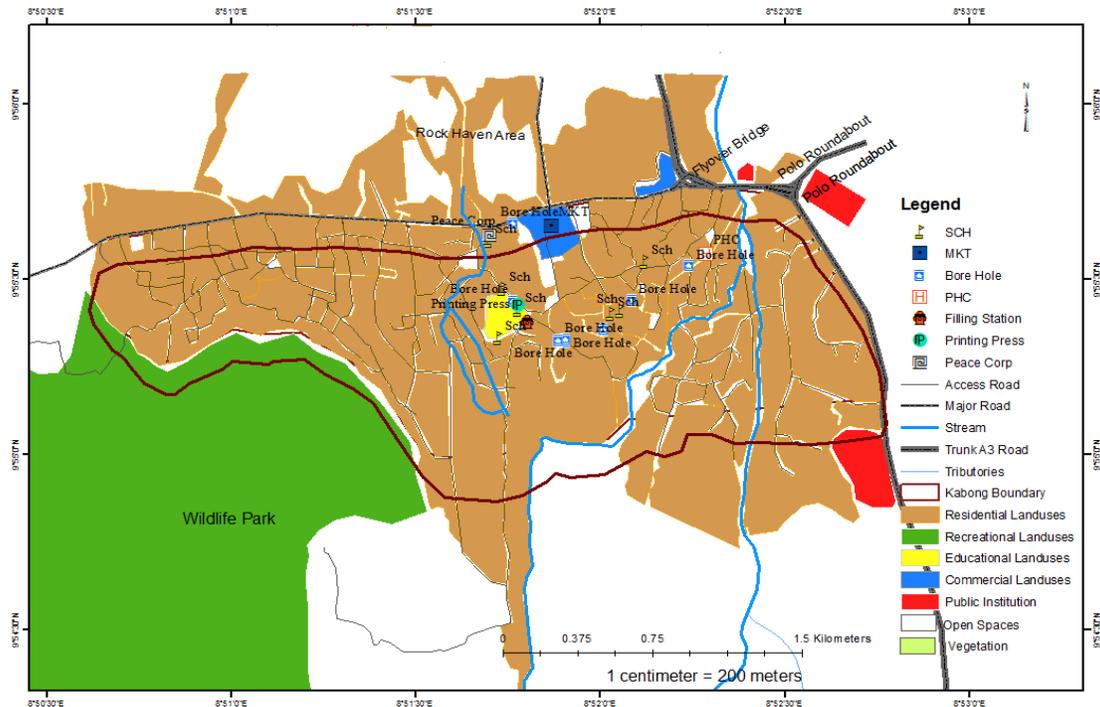


Figure 5c: The nature of peri-urban development in kabong

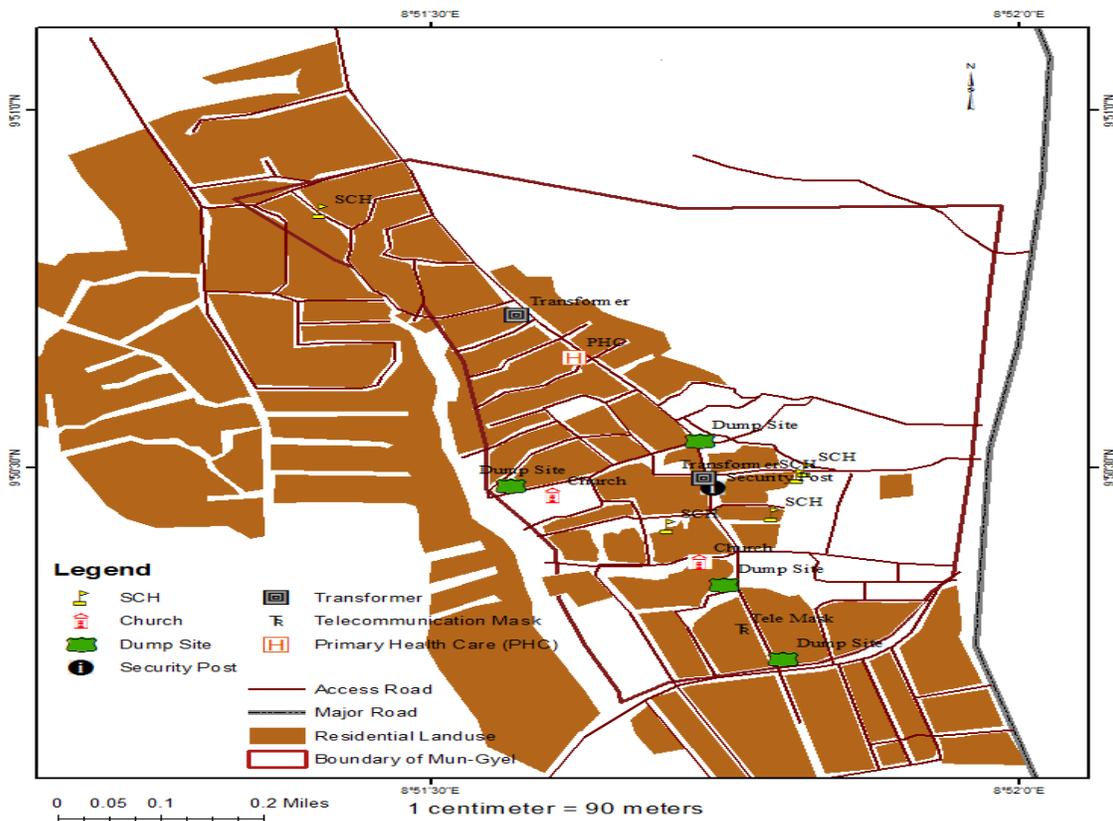


Figure 5d: The nature of peri-urban development in Mun-Gyel

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3.1.3 Reasons for the nature of development

The reasons for the nature of existing development in peri-urban neighbourhoods are presented in Figure 6. The absence of a layout plan for guiding development is the primary reason for the nature of existing development in peri-urban areas as attested by the majority (72.8%) of the respondents, corruption on the part of development control officials was reported by 15.1% while ineffective development control was attested to by 12.1%. These findings are inconsistent with Oduwaye (2009), who identified inadequate human resources, development, human capacity development, and insufficient sustainable land use planning and management, among others, as reasons for the nature of development. The study cites development control/monitoring as tools for developing sustainable peri-urban communities.

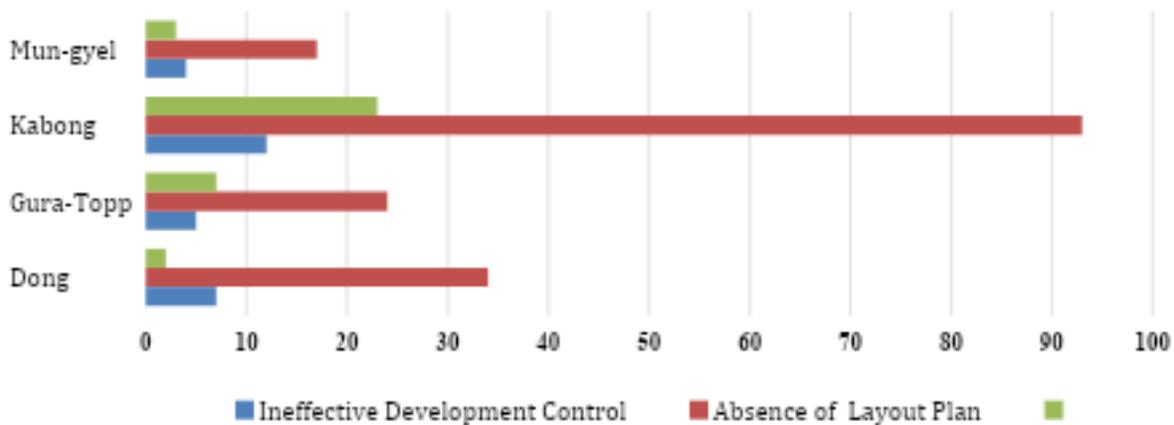


Figure 6: Reasons for the Nature of Development

3.1.4 Enforcement notice of development control

The study also sought to know whether residents of peri-urban areas were served with a notice regarding development control during their development process, this is presented in Figure 7. An overwhelming majority of the respondents (69.7%) said no, while 30.3% said yes. Those that said yes further said they were given notice of stop work to show their building permits or register their development with the ministry or board, not in respect of lack of adherence to a blueprint used to control development aimed at ordering land use for sustainability. Despite the enforcement of development control concerned itself with spatial organization and development in an orderly manner, Ibrahim and Emmanuel (2014) reported that it controls the excesses of people concerning development in the environment generally as non-compliance leads to the development of an unhealthy environment, inadequate provision of access and parking space, loss of children playground, etc. with Wapwera *et al.* (2015) reporting that urban centres in developing countries have shown development and distribution of new settlements to be haphazard and making it very difficult for the development authorities to govern and manage such settlements as a result of varying factors.

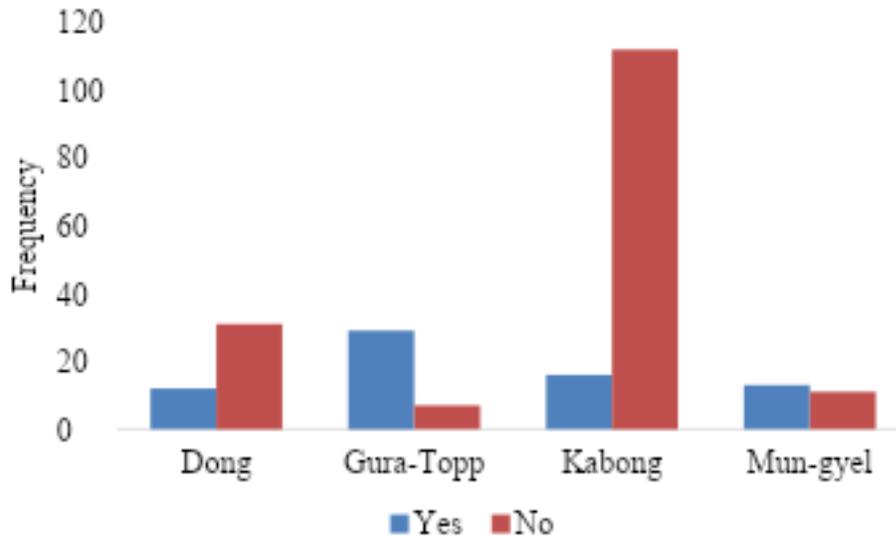


Figure 7: Enforcement notice of development control

of such is the development control policies in developing countries that Lipton, (1977) viewed to be urban biased; this is so because the urban areas are the seat of government; they get developed faster, and this affects their economic efficiency, formation, sizes and quality of life compare to peri-urban areas which accommodate the spilt over development of the urban areas. Failure of the development control policies to order development in peri-urban areas, Charles *et al.*, (2021) report that peri-urban areas are experiencing intensive and continuous physical growth in an uncontrolled manner, with Liman (2020) believing that lack of regular enforcement has led to decay of towns and development of slums and shanty settlements at the periphery of the city.

3.1.5 Agencies controlling or monitoring development

The study sought to find out agencies saddled with the responsibilities of controlling development in the peri-urban areas of Jos metropolis. From the result (Figure 8), an overwhelming majority (97%) of the respondents reveal that Jos Metropolitan Development Board (JMDB) is the primary agency saddle with monitoring and control of development in peri-urban areas; 3% said both JMDB and the Ministry of Lands, Survey and Town Planning (MLSTP) are saddle with monitoring and control of developments in their neighbourhoods while none of the respondents said Ministry of Physical Planning and Urban Development (MPPUD) monitor or control development in their peri-urban communities. In Jos metropolis, despite the existence of these agencies that should have control development, their concern is on the registration of properties and granting building permits, which is the reason why haphazard development without coordination is experienced in the peri-urban areas; this confirms the assertion of Kio-Lawson *et al.*, (2016)) in which they said despite the availability of these physical development agencies commissioned to check and regulate physical development, cities are still showing traces of disorderliness to a large extent in their growth. Thus, expressing that none of the agencies is functioning effectively as put forward by Abayomi (2013).

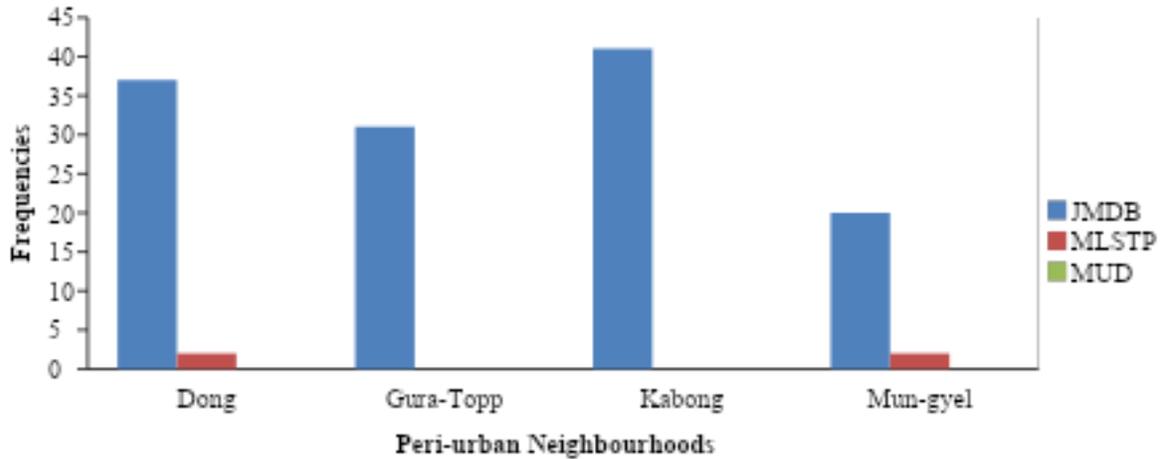


Figure 8: Agencies controlling or monitoring development

Note: JMDB connotes Jos Metropolitan Development Board; MLSTP - Ministry of Lands, Survey and Town Planning, MPPUD - Ministry of Physical Planning and Urban Development.

3.1.6 Possession of building plan

Since local planning authorities are mainly concerned about the approval of building plans and registration of buildings than ensuring the proposed building conforms to all development control regulations and details of a blueprint or preparing a layout plan. Explains why this sought to determine whether residents' owners have building plans. From the result in Figure 9 majority (61%) don't have a building plan, while 39% of the respondents have their building plan, with some being photocopied from others or a sketch of the floor plan. This reveals that many of the buildings in peri-urban areas were not approved before construction commenced as the majority did not submit the building plan to planning authorities for approval even among the majority that had a building plan. This made Abayomi (2013) posit that the approval processes and development control through the use of approval and monitoring are faulty, as most people have approval but use the building for different use they built at their discretion. This explains why the nature of development is more organic. Possession of a building planning is not a criterion for orderly development as developers are expected to apply for building permits from the planning authority.

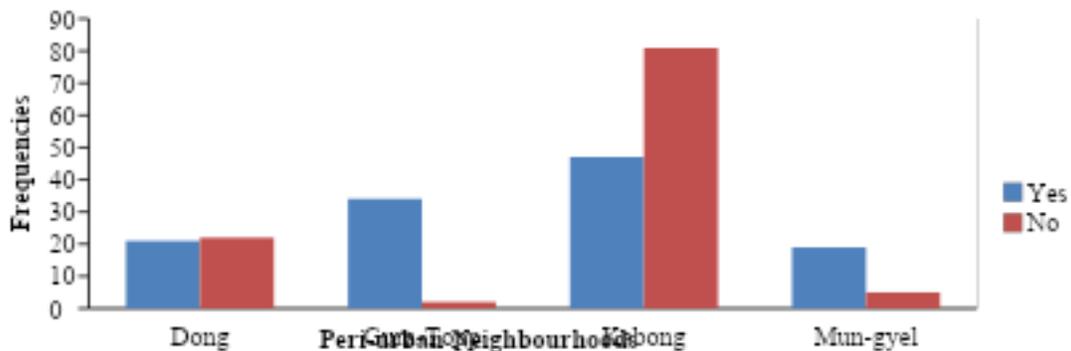


Figure 9: Possession of building plan

3.1.7 Approval of building plans

Building approval to prospective developers to build structures in approved locations within an established time frame and within the preview of the layout plan is expected to help develop planned peri-urban areas. This explains why the study sought to determine whether the buildings in peri-urban areas had their plans approved. Findings presented in Figure 10 shows a great majority of the buildings were not approved before they were built, as expressed by 88.7% of the respondents, while 11.3% of the respondents said their building plans were approved before they commenced their buildings. This shows a high level of the ineffectiveness of development control agencies' poor monitoring and the absence of layout plans to guide development or enforce development control. This explains why Abayomi (2013) posits that the approval process and development control through approval and monitoring are faulty.

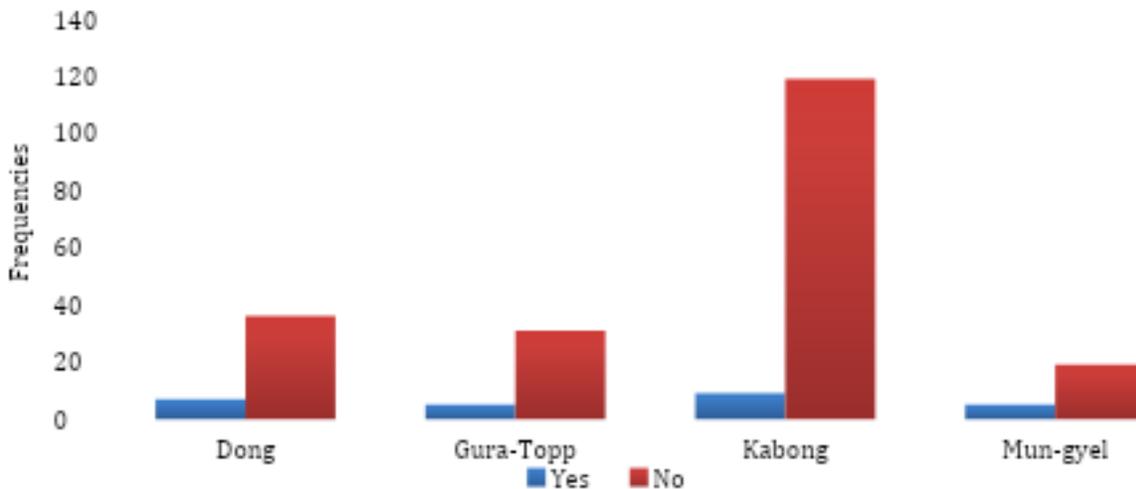


Figure 10: Approval of building plans

3.1.8 Ways to improve physical planning

Spatial orderliness, the highest degree of efficiency, the functionality of a place, and aesthetics are a function of physical planning as it contains sets of actions aimed at improving the physical, social and economic welfare of a place and its dwellers and with the current view of planning with the people explains why this study sought to find out the views of the respondents on the ways of improving physical planning in the study area. Table 2 reveals that the majority, i.e. about 67% of the respondents, said having a neighbourhood development plan (layout plan) is vital to improving the physical planning of the peri-urban neighbourhoods. About 17% said having a viable development control agency will help in enhancing physical planning through the monitoring and control of development, about 14% said community monitoring of development would help in improving physical planning of the neighbourhood, 2% said availability of non-corruptible development control officers would help in initiating physical planning in the peri-urban areas while less than 1% responding that, monitoring and control of development will help in improving the development of the peri-urban areas. Success in achieving coordinated development in peri-urban areas is a function of available neighbourhood plans and viable development control agencies, lacking in all the peri-urban areas.

Table. 2: Ways of improving physical planning

Variables	Peri-urban areas				Total	Percentage (%)
	Dong	Gura-Topp	Kabong	Mungyel		
Having a neighbourhood plan	28	23	91	12	154	66.7
Development control agency	13	4	15	7	39	16.9
Monitoring and control	1	0	0	0	1	0.4
Community monitoring	1	7	21	3	32	13.8
Uncorrupt development control officers	0	2	1	2	5	2.2

This supports the views of Abayomi (2013); where he outlines the master plan, models, laws, zoning, upgrading, renewal, and development control as the fundamental and indispensable physical planning tools used by planners to ensure or enhanced planned physical development with Silva *et al.*, (2020) revealing that, the government uses these tools to govern land use development to enforce local and national planning guidelines.

3.1.9 Benefits of physical planning

The benefits of physical planning are spatial orderliness, coordinated development, proper circulation, and provision of infrastructures, achieving the highest degree of efficiency, functionality, and aesthetics. This explains why this study sought to find out the benefit of physical planning. Table. 3 shows that the significant benefits are said to ensure orderly development as revealed by 70%, 15% said it would provide the aesthetic of the built environment, ensure building conducive living environment was attested by 10%, while about 6% said it ensures the availability of physical infrastructures, despite the inherent benefits of physical planning. As expressed by respondents, chaotic development forms are the characteristics of all peri-urban areas in Jos metropolis; this supports the views of NITP (2009) on planning which focused on restricting the urban space to thematic areas, zones/ sub-zones and layouts and the production of plans and maps to guide development along a determined framework and goal.

Table 3: Benefits of Physical Planning

Variables	Peri-urban areas				Total	Percentage
	Dong	Gura-Top	Kabong	Mungyel		
Aesthetic	4	9	18	3	34	15
Orderly Development	29	21	96	15	161	69
Availability of Infrastructures	3	5	2	3	13	6
Conducive Environment	7	1	12	3	23	10

4. CONCLUSION

Increased demand for housing due to a surge in urban population has led to chaotic development beyond urban spatial limits. The study evaluated the physical development of peri-urban areas of Jos metropolis in efforts to enhance the planned development of communities through an inquiry

into whether development is controlled or monitored and an assessment of the spatial planning tools/agencies used to attain the planned peri-urban development for sustainability. Quantitative and qualitative approaches adopted were viable for this study. Findings show that development is controlled which should have translated into planned peri-urban communities yet, unplanned as certified by the majority. The absence of layout plans for peri-urban neighbourhoods was the reason for the unplanned nature of existing development. Notice of building permit served was not in respect of development control as development proceeded in an uncoordinated manner. To ensure planned peri-urban development, having a neighbourhood development plan (layout) was reported vital to improving physical planning, with the benefit being orderly development. The issuing of building permits to developers in areas that have no layout compounded the planning problems and people misconstrued it for development control. The absence of a neighbourhood development plan and ineffective spatial governance is expressed in the unplanned and chaotic nature of development, with neighbourhoods degenerating into slums with time. Developing a planned peri-urban neighbourhood hinges on the goals of sustainable development that the world is striving to achieve through various international commitments. Thus, strategies toward making peri-urban neighbourhoods inclusive, safe, resilient, and sustainable for the present and future generations should be pursued. This study is helpful to policymakers, and Jos metropolitan development agencies, in adopting and promoting inclusive policies for sustainable development of peri-urban areas. It also adds to the body of knowledge globally by providing information for further studies including issuing of building permits and development control.

5. RECOMMENDATIONS

Given the findings of the present study, the following recommendations were made;

Peri-urban areas should be incorporated into urban planning to provide a blueprint to guide physical development by control agencies to build sustainable communities. Community participation should be taken with seriousness since there is a shift from planning for the people to planning with the people. This enables the residents to understand the dynamics of physical development and appreciate the reasons and activities of development control agencies.

The preparation of neighbourhood/layout plans should be the priority of the planning and development control agencies to guide the monitoring and control of development. There should be a synergy between the Jos Metropolitan Development Board and Plateau Geographic Information Services, Plateau State Ministry of Lands, Survey and Town Planning, Ministry of Physical Planning and urban development, and Local Government Planning Board in coordinating development around the peri-urban areas of the metropolis.

Agencies concerned with spatial governance should be effective and proactive in ensuring that development is monitored and controlled. This involves training and equipping the staff with the necessary tools needed for building planned peri-urban communities for sustainability.

Customary land owners should be made to register with the regulatory bodies and ensure layout plans are prepared before parcels or lots are sold to intending developers. This will ensure development in neighbourhoods that have prepared layout plans to develop planned peri-urban areas in the Jos metropolis.

Issuing of building permits to developers in areas that have no layout should be discouraged with strict sanctions imposed on defaulters developing in areas without layout plans as these compound the physical planning problems.

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