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Analysing Mismatches in the Demand and Supply of Classrooms in the Basic and Secondary Education Sectors in Cameroon

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Abstract

The present work analyzed the contribution of Cameroon's public contracts and territorial planning policies toward the reduction of classroom disparities across the country. Many localities in Cameroon suffer due to misallocation of classrooms on one hand and inefficient public contracting-execution system on the other hand. This paper uses a hypothetico-deductive method to understand the nexus of public contracting-territorial planning within the educational sector in Cameroon. To do this we made use of existing infrastructural data collected from various Ministerial Departments and public contracts data from 2016 to 2022. Findings show that there is a great disparity of existing classrooms, injustice in the allocation of classrooms and bad governance practices in the award and execution of allocated classrooms that directly contribute to this uneven repartition. At the national scale, the Centre and Littoral regions seem to be saturated with about 20,574 and 10,436 classrooms respectively, the Far North which is part of the Priority Education Zone is in dying need of about 11,293 classrooms while on the local or regional scale these two saturated regions show some degree of insufficiency in term of available classrooms. Therefore, much needs to be done by the Cameroonian authorities in order to ensure inclusive, equitable quality education and promote lifelong learning opportunities for all as stipulated by the Sustainable Development Goal 4.

Keywords

Public Contracts, Territorial Planning, Territorial Disparities, Governance, Classroom, Cameroon

1. Introduction

Cameroon's territorial planning and public contracts system has generated a series of uneven landmark developmental issues which vary from one region to another and within the same region. Given that territorial planning and public contracts remain one of those complex and vital public policies that shape the present and future of a given territory or area, these policies influence the spatial allocation of infrastructures, facilities, the distribution of the population and land use of the area in question. Territorial planning across the world in general and Cameroon, in particular, is based or founded on four major objectives which range from economic, social, and political to environmental/ecological objectives. This work will focus on the demand and supply of classrooms which is one aspect out of the many that make up the social objective.

Improving the quality of education in general and educational infrastructure, in particular, has been one of the major priorities of the Cameroonian policy-makers. Recently, this has been visible from the Poverty Reduction Strategy Paper to the Growth and Employment Strategy Paper and presently in the National Development Strategy 2030. However, these efforts have not been felt by the local population due to the fact majority of these classrooms are allocated to saturated areas rather than to the priority educational zone.

Even though classrooms remain the immediate surroundings for conducive learning, many research works have focused on pupil/student classroom ratio, teacher/pupil-student ratio, and spatial distribution of schools but have neglected classroom disparities based on its carrying capacity.

This research uses a multi-scale approach to analyse the contribution of public contracts governance towards the reduction of classrooms disparities based on pupil/student classroom ratio, classrooms allocations, award and execution. That is, confronting the social objective of territorial planning with the provision of classrooms within the basic and secondary education sectors at both national and regional scales.

2. Debate in Literature

Over-crowding and uneven repartition of classrooms have been major educational problems in many parts of the world, especially in less developed and developing countries with scarce resources. In Africa, disparities between regions date back to the colonial or even the pre-colonial era and in spite of efforts to expand the school system and redress the regional balance made by post-independence governments, these disparities have not diminished that much [1]. However, public contracting remains a strategic public policy used by governments across the world to acquire goods and services and execute public works for the benefit of their citizens. Therefore, Barrett, Treves [2] stress the need that when public or borrowed money is used to fund capital investment in school infrastructure projects, there is a strong need to account for how the funds are invested and for actually delivering the promised benefits to the society. They fur-

ther establish that 22 percent of pupils are in over-crowded classrooms and 34 percent are in under-utilised spaces in Romania. Other researchers like Kana [3] focused on the mismatches between demand and supply of basic infrastructure in the Logone and Chari division in Cameroon while at the same time lamented overcrowded classrooms and insufficient teachers within this area. A similar report produced by the Cameroon Ministry of Basic Education MINEDUB [4], it confirms that classes are over-crowded and the size of classrooms depends on the location with 72 and 58 pupils/classrooms ratio in urban and rural areas respectively. Nevertheless, there have been contradictory results on the use of numbers for measuring spatial disparities in schooling on one hand and allocating school infrastructure by numbers on the other hand [5]. Therefore, there is a need to associate sophisticated tools that englobe multiple indicators and spatial aspects that guarantee geo-governance within the national and local levels.

Even though public contracting is not fully responsible for classrooms disparities, there are proofs of lapses in data collection, analysis and modeling as well as the technique or tools that facilitate decision making in Cameroon. Significant modelling challenge that depends on collecting and analysing population data together with geospatial data using assumptions to devise plans that can predict or project the number and types of school places needed in the future [2] is lacking. This is because most decision makers across Cameroon go in for cosmetic instead of sustainable solutions in the allocation of classrooms in particular and the territorial planning in general. Moreso, a spatial look at pupils-students/classroom ratio and the allocations, awards and executions of classrooms in the last seven years, portray some degree of social injustice that can only be fuelled by political interference as partly analysed by [6] [7]. However, the management of public contracts still faces multiple challenges in the central and local levels across the country which could have been resolved by simply applying the findings of Yemmafouo and Lebga [8], where they show how Geographic Information System contributes to different steps of public contracts management in order to make it more accountable and productive for the whole community.

3. Fieldwork Approach

3.1. Presentation of the Study Area

Cameroon is a country located in the Gulf of Guinea, in Africa South of the Sahara. The country is located between latitudes 2˚ to 13˚ north of the equator and longitudes 8˚ to 16˚ east of the Greenwich Meridian. Cameroon is bordered to the North by Lake Chad, West by Nigeria and the Atlantic Ocean, South by Equatorial Guinea, Gabon and the Democratic Republic of Congo and East by the Central African Republic. It has a surface area of 475,442 km^2 and an estimated population of 24,348,251 as projected by the Central Bureau of Census and Population Studies "Bureau Central de Recensement et d'Etude de la Popu-

lation" [9] and with a population density of approximately 51 people per kilometre square. The country is considered the "Economic Bread Basket" of the Central African Economic and Monetary Community (CEMAC) zone even though with a greater proportion of its citizens living below the poverty line of US$1.90 per day [10]. From 2010 to 2017, Cameroon has scored an annual Gross Domestic Product (GDP) of 4.5%.

3.2. Data Collection

This work made used of both secondary and primary data collected across many sectors within the country. Varying and diverse secondary data like official statistics, reports official database produced by many stakeholders; Ministry of Basic Education [4], Ministry of Secondary Education (MINESEC), Ministry of Economy, Planning and Regional Development [11], Ministry of Public Contracts (MINMAP), Public Contracts Regulatory Agency (PCRA) and other government structures were used. Secondary cartographic data was gotten from the National Institute of Cartography in the form of ESRI shape file. After data collection, a process known as pre-processing which include geo-referencing, spatial joining (joining tabular data with shape-file) and other pre-processing functions were carried out thereby making it possible for geo-visualisation. The advantages of using several types of data (multiple official reports, statistics, project logbook, data collected from the field through direct observation, interviews…) is that the collected data can be cross-checked across multiple sources, which will go a long way to increase the robustness of our findings.

These secondary data sources were evaluated based on their authenticity, credibility, representativeness and meaning as proposed by Scott [12]. Primary data was collected using in-depth interviews, semi-structured interviews, group discussions and direct observation to confront what was gotten from the secondary data.

3.3. Data Processing and Analysis

Data processing and analysis englobed processing and analysing qualitative data gotten from the various interviews conducted on the field, quantitative data gotten both from statistics produced by public institutions and interviews. Spatial analysis was facilitated by Quantum GIS and ArcMap in the treatment, processing and representation of our results which are displayed on table forms, bar charts, graphs and spatial data presented on maps. Our unit of analysis in this research work varies from national, regional to local administrative units in Cameroon depending on the availability of data and its importance. Moreso, both descriptive and inferential statistical analysis like regression was carried out to demonstrate our findings.

4. Fieldwork Approach

Findings demonstrate the contribution of public contracts governance towards the reduction of classroom disparities across the country passing through tho-

rough need analysis and propose three main scenarios that can close classrooms disparities gap between one to thirty-six years.

4.1. Thorough Need Analysis of Classrooms

In order to solve the problem in question, a pupils-students/classrooms ratio and a thorough need analysis of existing and recently constructed classrooms within the last five year is necessary both at national and local levels. Thorough need analysis shows that Cameroon had 28,146 and 30,936 surplus classrooms in 2016 and 2020 respectively. That is based on the pupils-students/classrooms ratio, a total of 156,499 classrooms were required which is less than the total number of classrooms which stand at 187,435. Even though this finding shows a relatively good result, a spatial look across the regions requires about 30,936 classrooms to close the disparities gap (Table 1 and Figure 1).

4.2. Evaluating the Contribution of Public Contracts Governance to Confront Classrooms Disparities at the National Scale

One of the main strategic axes of the National Strategic Document on education and training (2013-2020) was to ensure access and equity in the educational sector by reducing all sort of disparities but today the educational sector is still characterised by great disparities. Therefore, much efforts and resources are needed to bring about equity in the domain of education.

With about 31,122 schools, total enrolment of pupils/students of 6,263,996 and 184,645 classrooms unevenly distributed across the national triangle giving a national ratio of 38[1] pupils/students in a classroom[2], this pupils/students classrooms

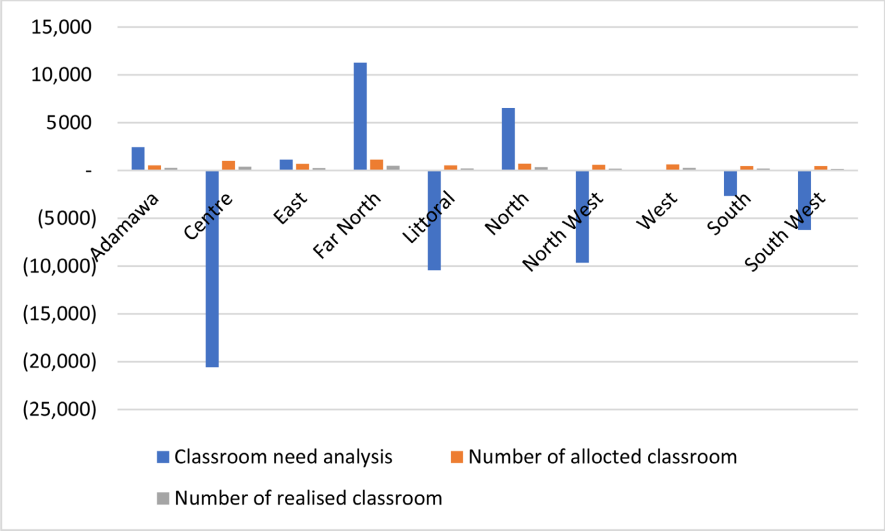
Table 1. Overview of regional classrooms need analysis.

Region	Existing	Ratio	Required	Need analysis
Adamawa	6989	61	9450	2461
Centre	53,569	28	32,995	−20,574
East	8641	51	9784	1143
Far North	16,947	75	28,240	11,293
Littoral	34,605	31	24,169	−10,436
North	11,719	70	18,248	6529
North West	11,358	7	1722	−9636
West	22,016	45	21,956	−60
South	8542	31	5887	−2655
South West	10,259	18	4046	−6213
Total	**184,645**	**38**	**156,499**	−28,146

Source: Data base of MINEDUB 2020, MINESEC 2020, MINEPAT 2016-2020.

[1]This national ratio of 38 pupils/students in a classroom is far below 48 mentioned in the National Strategic Document on education and training (2013-2020).

[2]Extract of Statistical Yearbook of MINEDUB and MINESEC 2019/2020.



Source: Data base of MINEDUB 2020, MINESEC 2020, MINEPAT 2016-2020.

Figure 1. Mismatches in the demand and supply of classrooms.

ratio varies from one region to another. Five out of the ten regions have a pupils/students classrooms ratio less than the national ratio and the remaining five register 38 and above. Among these regions with pupils/student's classrooms ratio greater than the national ratio, we have the West region with 45, the East and Adamawa between 51 - 61 and the North and Far North registering more than 70 pupils/student's classrooms ratio (**Figure 3**). Contrary to these regions with pupils/student's classrooms ratio greater than the national rate, are regions with pupils/student's classrooms ratio less than 38 pupils/students per classroom (Littoral, Centre, North West, South West and South) including the West region that has excess classrooms ranging from 60 - 28,000 (**Table 1**). However, the case of the two Anglophone regions that have recently been characterised by low school enrolment is due to massive school boycott, internally displaced and many seeking refuge in Nigeria because of the bloody conflict that started six years ago.

From 2016-2020, a total number of 6772 classrooms were budgeted and allocated in Cameroon. Nonetheless, looking at the spatial allocation of these classrooms across the ten regions of the country; the Far North region with about 75 pupils/student's classrooms ratio received the lion shares of 17.7% of the total number of classrooms, closely followed by the Centre region with 28 pupils/student's classrooms ratio receiving 15.1%, the North region with 70 pupils/student per classrooms received 10.7%, the East region with 51 received 10.3% and Adamawa region with 46 managed to get 8.2% and the remaining 38% went to the other regions.

Looking at the regional spatial allocation of classrooms from 2016-2020 in Cameroon (**Table 2**), it is very clear that the allocation of these classrooms does not respect the social objective of territorial planning at the national scale which calls for social justice in the distribution of social infrastructures in order to cor-

rect intra and inter spatial disparities in development. Therefore, in order to do away with biased classrooms allocations across Cameroon, it derived a mathematical formula that guarantees equitable classroom allocations that is proportionate to the needs of the areas in question.

$$i \in \{1, \cdots, N\}, \quad A_i = \begin{cases} 0 & \text{if } x_i < 0 \\ x_i * \dfrac{T}{\sum_{i=1}^{M} x_i} & \text{Else} \end{cases}$$

where:

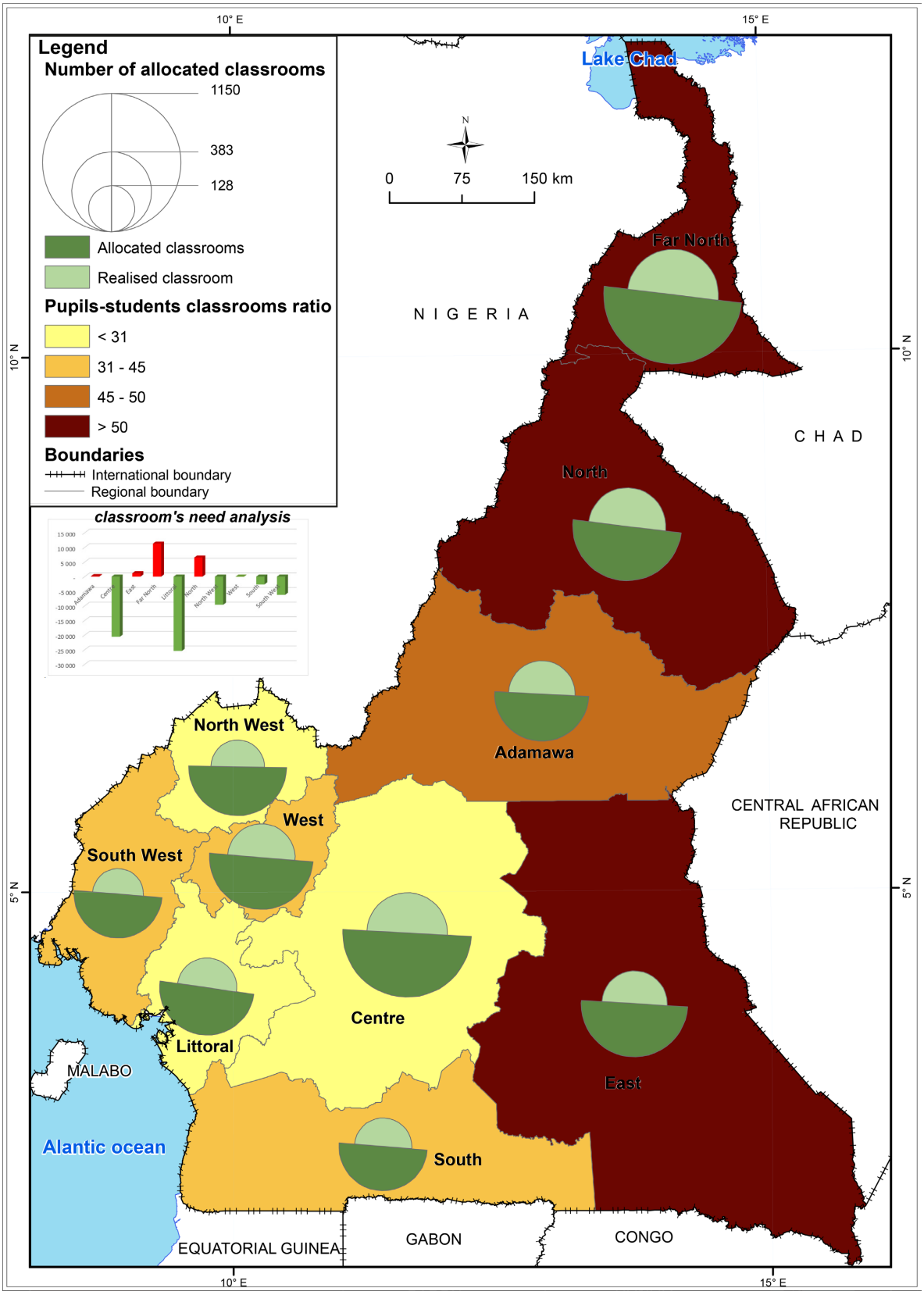
- N the number of regions;
- M ($M \leq N$) the number of regions having a positive need;
- $x_i, i = 1, \cdots, M$ those positives needs for the M regions;
- $A_i, i = 1, \cdots, N$ the allocation for the region i.
- T the total allocation.

Table 2 shows an overview of equitable vs biased classrooms allocations, whereby the formula above has been used to derive regional equitable classroom allocations across four regions in dying need of classrooms.

On the other hand, highlighting territorial planning issues on the domain of educational infrastructures (classroom) through the governance of public contracts shows that from 2016-2020 only 41% of allocated or programmed classrooms were realised. These realisations vary from one region to another with the Far North having the highest 7.35% of realised classrooms, closely followed by the Centre region with 5.79%. The North and the West regions registered 5.32% and 4.06% of realised classrooms respectively. Meanwhile, the South West and North West regions occupied the bottom positions with 2.30% and 2.55% respectively (Figure 2).

Table 2. Overview of equitable vs biased classrooms allocations

Region	Existing	Ratio	Required	Need analysis	Equitable allocation	Hazard allocation	Number of realised classrooms
Adamawa	6989	61	9450	2461	778	535	268
Centre	53,569	28	32,995	−20,574	0	992	392
East	8641	51	9784	1143	361	684	257
Far North	16,947	75	28,240	11,293	3569	1150	498
Littoral	34,605	31	24,169	−10,436	0	540	213
North	11,719	70	18,248	6529	2064	711	360
North West	11,358	7	1722	−9636	0	575	173
West	22,016	45	21,956	−60	0	647	275
South	8542	31	5887	−2655	0	471	198
South West	10,259	18	4046	−6213	0	467	156
Total	**184,645**	**38**	**156,499**	−28,146	**6772**	**6772**	**2790**



Source of data: MINEDUB 2018-2019, MINESEC 2018-2019 and MINEPAT 2016-2020.

Figure 2. Analysing national disparities and public contracts governance in the domain of classrooms.

4.3. Evaluating the Contribution of Public Contracts Governance to Confront Classrooms Disparities at the Regional Scale

The recent move towards accelerating the process of decentralisation which saw the putting in place of Regional Councils across the ten regions of Cameroon and transfer of certain competences from the central government to Decentralised Local Authorities cannot be attained without appropriate knowledge of the situation on the ground. Even though, analysis on the national scale reveals certain disparities of existing classrooms from one region to another, there is a great disparity and disequilibrium within each region from one municipality to another. A general look at the 360 municipalities that make up the country shows 192 municipalities with pupils/student's classrooms ratio below the national ratio and 229 municipalities with pupils/student's classrooms ratio of less than 45 pupils/students per classroom. Moreso, there are 86 municipalities between 45 - 75 pupils/students per classroom, 40 municipalities between 75 - 100 pupils/students per classroom, and 5 municipalities between 110 - 286 pupils/student's classrooms ratio. However, from 2016-2020, a total of 6772 classrooms were budgeted and allocated over the national territory which was supposed to reduce these existing pupils/student classroom disparities. Unfortunately, municipalities with the highest pupils/student's classroom ratio were allocated only 17% of the total classrooms, 22% went to the 185 municipalities with about 35 - 97 pupils/students per classroom and the remaining 16% to those with less than 34 pupils/students per classroom. Coupled with this, a general municipal view of classrooms execution with the exception of Yaoundé II municipality with zero allocation from 2016-2020 in terms of classrooms shows that 14 municipalities had an average classrooms execution of less than 25%, 32 municipalities between 25% - 50%, 90 municipalities between 50% - 75% and 223 municipalities with 75% and above (**Figure 3**). The paragraphs below give detail municipal analysis of educational infrastructures within each region by highlighting territorial planning issues through the governance of public contracts using pupils/student's classrooms ratio, municipal allocation and execution of classrooms from 2016-2020.

The Adamawa region with a pupils/student enrolment of 321,689, with 1401 schools, 6989 existing classrooms, a total number of 535 classrooms allocated and 268 executed from 2016-2020 across the 21 municipalities that make up this region. However, this region still requires more than six thousand classrooms. Although, this region has an average of 46 pupils/students per classroom which is far above the national ratio, 2 municipalities lead from both extremes Kontcha and Meiganga with 31 and 82 pupils/students per classroom respectively. Only 2, (Kontcha and Mayo-Baléo) out of the 21 municipalities registered a 31 and 34 pupils/students per classroom respectively. This is less than the national pupils-students/classrooms ratio. Ngaoundal registered 44. Meanwhile 16 municipalities have 50 - 75 pupils-students per classroom and 2 municipalities (Ngaoundéré I and Meiganga) with 79 and 82 pupils-students/classrooms ratio as shown on of **Figure 3(a)**). More so, a spatial view on the municipal reparti-

tion of classrooms within the Adamawa region from 2016-2020 shows that 78% of total number of classrooms were allocated to municipalities with more than 50 pupils/students per classroom even though Meiganga with the highest pupils/student's classroom ratio within Adamawa received 35 classrooms less than Bankim with 55 pupils/students per classrooms that was allocated 38 classrooms. However, 5 municipalities (Mbé, Ngaoundéré II, Ngaoundal, Kontcha and Bankim) in the Adamawa region registered an average classrooms execution rate between 92% - 95% and the rest of the municipalities registered 100% from 2016-2020. The issue in the Adamawa region seems to be tilted toward poor classrooms need analysis and little allocations rather than on public procurement governance because 98% of the total volume of classrooms allocated within this region were effectively executed as shown on of **Figure 3(a)**).

The Centre region which is the region with one of the best pupils/student's classroom ratios (28) after the Littoral region with the exception of the two anglophone regions, has the highest number of schools 8161, total enrolment 1 484,796, existing classrooms 53,569 and received one of the highest classrooms allocations (992) after the Far North region unevenly distributed across the 70 municipalities that make up this region. Although, the national needs analysis demonstrates that the Centre region has a surplus of 20,574 classrooms, just like other regions, there's a great disparity within this region which varies from one municipality to another. For instance, 53 out of the 70 municipalities have a pupils/student's classroom ratio less than the national ratio while 65 municipalities have less than 45 pupils/students per classroom. Nevertheless, 5 municipalities (Mbandjock, Ngambé-Tikar, Evodoula, Ayos and Nkoteng) have a pupils/student's classroom ratio between 45 - 60 pupils-students per classroom. The spatial repartition of classrooms from 2016-2020 put Yaoundé IV municipality at the top with 30 classrooms and Yaoundé II at the bottom with zero classroom. Notwithstanding the fact that almost all municipalities within the Centre region have surplus classrooms with the exception of the Mbandjock, Nkoteng, Evodoula, Ngambé-Tikar and Ayos municipalities, even though in needs were only allocated 11% of the total classrooms in the Centre region from 2016-2020 (**Figure 3(a)**). More so, about 79% of the total classrooms allocated within the Centre region were executed. A detailed spatial repartition of executed classrooms in the Centre region shows that 3 municipalities (Edzendoum with 0%, Olanguina 21% and Bibey 25%) registered an average classroom execution rate of less than 25%, 6 municipalities with an average execution rate between 25% - 50%, 16 municipalities between 50% - 75% and 44 municipalities with an average classrooms execution rate of 75% and above **Figure 3(b)**).

The East which is the largest region in terms of surface area in Cameroon is one of the regions with the highest pupils/student's classroom ratio after the Far North and North regions with 51 pupils/students per classroom. In the East region, 16 out of the 33 municipalities have surplus classrooms with the Doumé municipalities at the top with 132 surplus classrooms. Moreover, 11 municipali-

ties have a pupils/student's classroom ratio less than the national ratio, 16 municipalities with pupils-students/classrooms of less than 45 pupils-students per classrooms. Furthermore, 12 municipalities have between 45 - 75 pupils/students per classroom and 5 municipalities have between 79 - 94 pupils/students per classroom. Even though, 38% of classrooms within the East region from 2016-2020 was allocated to municipalities with the highest pupils/student's classroom ratio, Messaména municipality with an average of 30 pupils/students per classroom and about 93 surplus classrooms benefited a total of 36 classrooms from 2016-2020. This can be clearly seen on **Figure 3(c)**). Out of the 684 classrooms allocated in the East region from 2016-2020, only 514 (75%) of these classrooms were realised. The Lomié municipality registered the lowest rate of classroom execution with 20%, closely followed by 6 municipalities with an average classroom execution rate between 25% - 50% and 10 municipalities registered an average execution rate between 50% - 75% as well as 16 municipalities with an average classroom execution rate > 75% see **Figure 3(c)**).

The North region has the second highest pupils/student's classroom ratio after the Far North with an average of 70 pupils/students per classroom, even though this region received 707 classrooms from 2016-2020 which is far below the total number of classrooms allocated to the Centre and Far North regions with 998 and 1167 respectively. Lagdo, Garoua I and Figuil municipalities are the only municipalities with a pupils/student's classroom ratio less than 60 pupils/students per classroom which almost double the national pupils/student's classroom ratio. Bardanké and Touboro municipalities have the highest pupils/student's classroom ratio of 97 and 126 respectively. The social objective of territorial planning which is based on achieving equity seems not to be respected within the North region, for instance as Lagdo municipality was allocated 55 classrooms from 2016-2020 which double the total number of classrooms allocated to the Touboro municipality with an average of 126 pupils/students in a classroom. Apart from Rey-Bouba, Poli and Tcheboa municipalities within this region which registered an average classroom execution rate between 80-96%, the other municipalities registered 100% execution rate **Figure 3(d)**). Thus, the issues within this region are linked to insufficient classrooms and the misallocation of available scarce resources to areas not necessarily in pressing needs.

The Far North region is the region with the highest pupils/student's classroom ratio in the country with an average of 75 pupils/students per classroom. A total of 1167 classroom were allocated to this region from 2016-2020. Looking at the spatial repartition, 16 municipalities have a pupils/student's classroom ratio less than 73 pupils/students per classroom, 23 municipalities between 75-100 pupils/students per classroom and 24 municipalities with a pupils/student's classroom ratio above 75. Although, this region has the highest pupils/student's classroom ratio and was allocated the highest number of classrooms, 43% of the total classrooms allocated to the Far North region went to municipalities with the lowest pupils/student's classroom ratio (<70). Thus, even though social jus-

tice was respected at the national scale by allocating the highest number of classrooms to this region, regrettably this was not respected at the regional scale and the fact that only 86.61% of these classrooms were effectively executed. For instance, the Waza municipality registered zero classroom execution rate, 3 municipalities with an average classroom execution rate between 33% - 50%, closely followed by 5 municipalities with an average execution rate between 50% - 75% and 38 municipalities with 75% and above among which 16 scored an execution rate of 100% of **Figure 3(d)**).

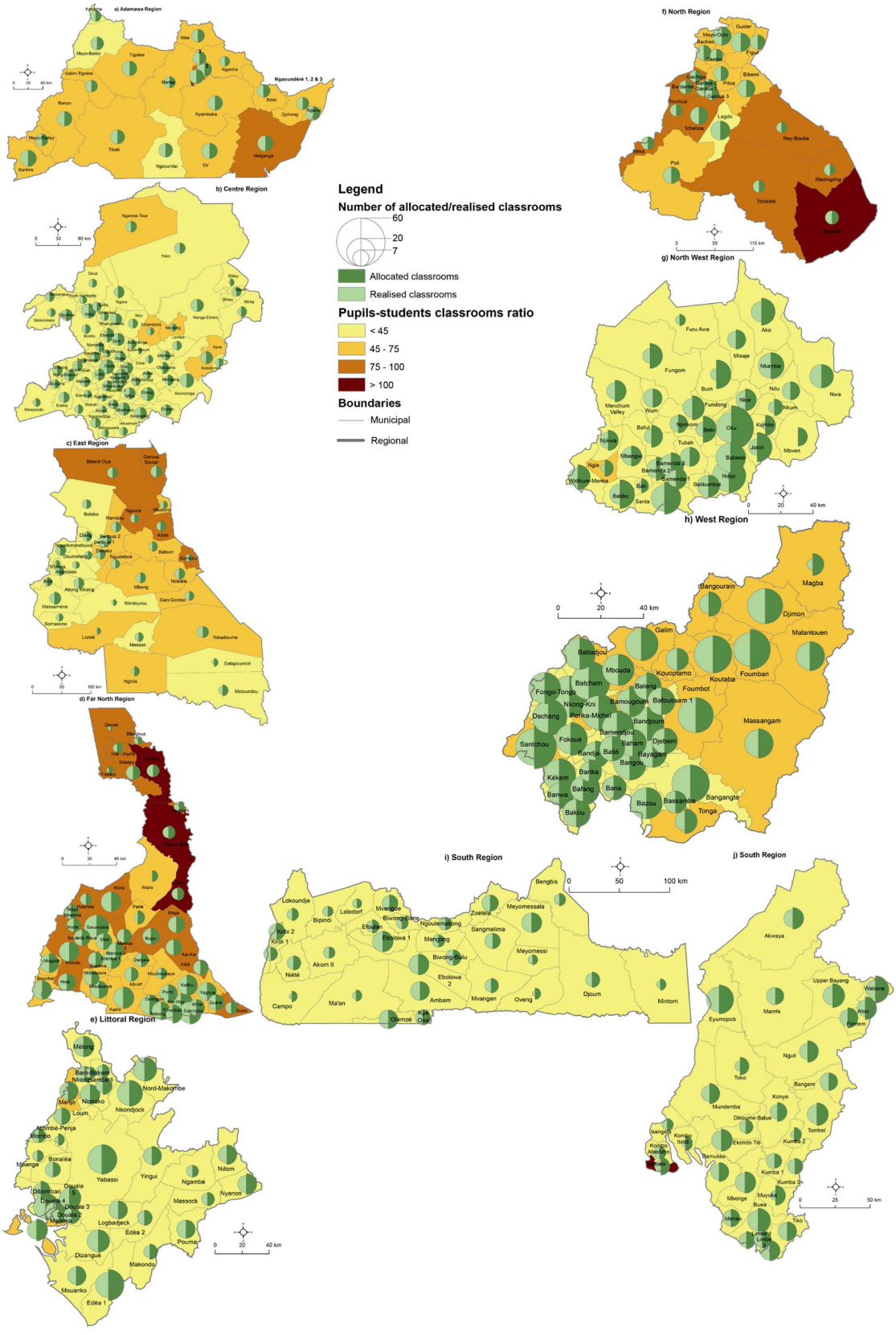
The Littoral region has the second highest number of schools (5438) after the Centre region and the region with the highest number of surplus classrooms. Here, 21 municipalities have a pupils/student's classroom ratio less than the national ratio, 11 municipalities between 34 - 44 pupils/students per classroom and 2 municipalities; Manjo and Manoka with a pupils/student's classroom ratio of 47 and 57 respectively. All municipalities in this region with the exception of Manjo and Manoka have surplus classrooms. However, a spatial view on the regional allocation of classrooms within this region from 2016-2020 shows that 64% of the total number of classrooms allocated within this region went to municipalities with a pupils/student's classroom ratio of less than 34 pupils/students per classroom, 29% to municipalities with a pupils/student's classroom ratio between 34 - 44 and the rest to Manjo and Manoka municipalities. Coupled with this misallocation of classrooms within the Littoral region, only 79% of these classrooms were realised with Njombé-Penja having the lowest rate of execution (33%) coming after 16 municipalities with an average execution rate between 55 - 75 and the rest scoring an average classroom execution rate of 80% and above **Figure 3(e)**).

The North West just like the South West region has been hit by the bloody crisis in the last six years. This crisis has completely disrupted the educational sector throughout the two anglophone regions especially in the rural areas. About 18 and 13 municipalities in the North West and South West respectively have less than 5 pupils/students per classroom. Although, the Ngie municipality in the North West region with the highest pupils/student's classroom ratio of 51 pupils/students per classroom was allocated 8 classrooms which is far below that of Oku municipality with less than 5 pupils/students per classroom, meanwhile Idabato municipality with an average of 286 pupils/student per classroom got only 3% of the total classrooms allocated to the South West region. The social objective of territorial planning seems not to be respected in these two regions due to unequal repartition and execution of classrooms. For instance, Idabato with a total pupils/student's enrolment of 3430 has only 12 existing classrooms and has been allocated 12 classrooms from 2016-2020. Generally, the North West region registered an average classrooms execution rate of 60% with 3 municipalities (Balikumbat, Nwa and Wum) scoring a 100% classroom execution rate while the Mbven municipality leads from the bottom with zero percent. Specifically, 4 municipalities scored less than 25% classrooms executions rate, 9 municipalities between 30% - 50%, 10 municipalities between 57% - 73% and 11

municipalities with an average classrooms execution rate of 78% and above. However, the South West region which is one of the crises hit region registered an average execution rate of 67% with Kombo Itindi and Kumba II having an average classroom execution rate of 25%, 5 municipalities with execution rate between 27% - 50%, 15 municipalities between 56% - 75% and 9 municipalities between 80% - 100% among which 4 municipalities scored 100% classrooms execution rate (**Figure 3(g)** & **Figure 3(j)**).

The West region has the highest number of schools (3 474) after the Centre and Littoral regions. Equally, with about 988,022 pupils/students' enrolment which is the third in the country coming after the Centre and Far North regions, a total of 22,016 classrooms were allocated to this region from 2016-2020. Although, the pupils/student's classroom ratio in the West region stands at 45 pupils/students per classroom, 15 municipalities have a pupils/student's classroom ratio less than the national ratio, 24 municipalities between 25 - 45 pupils/students per classroom and 16 municipalities with pupils/student's classroom ratio between 45 and 69. Nevertheless, more than half of the municipalities within this region have surplus classrooms and were allocated closed to 36% of the total number of classrooms within the West region while those with pupils/student's classroom ratio above 54 only got 14%. Nevertheless, the average execution rate of classrooms in the West region from 2016-2020 stands at 85% which varies from one municipality to another. Apart from the Magba Municipality which registered 25% of classrooms execution, the rest of the municipalities registered an average execution rate of 56% and above. That is 11 with an average execution rate between 56% - 73% and 28 municipalities with an average classrooms execution of 78% and above among which 15 municipalities registered 100% classrooms execution rate as shown on **Figure 3(h)**).

The South region has an average pupils/student's classroom ratio of 31 which is slightly below the national ratio. A spatial view of classroom needs analysis across the South region shows that almost all municipalities in this region have surplus classrooms except Kribi II. About 25 municipalities have a pupils-student's classroom ratio less than 38 pupils/students per classroom and 4 municipalities have between 38 - 46 pupils-students per classroom with Kribi II having 46 pupils/students per classroom which is the highest within this region. Just like the other regions, the spatial allocations of classrooms from 2016-2020 were not allocated to municipalities in real needs, for instance, Meyomessala with an average of 34 pupils/students per classroom and about 233 surplus classrooms were allocated 30 classrooms while municipalities like Kribi I and Niété only got 14 and 16 classrooms respectively. Coupled with this misallocation of classroom within the South region is the problem of effective realisation of the allocated classrooms. From 2016-2020, this region registered an average classrooms execution rate of 84% with 10 out of the 29 municipalities which makes up this region scoring 100% classrooms execution rate. More so, Oveng and Campo municipalities registered the lowest rate of classrooms execution of 20 and 22%



Source: Data base of MINEDUB 2020, MINESEC 2020, MINEPAT 2016-2020.

Figure 3. Analysing regional disparities and public contracts governance in the domain of classrooms.

respectively, Ma'an and Mintom municipalities each registered 40% of execution rate, 7 municipalities registered an average execution rate between 67% - 75% and 18 with an average execution between 76 (**Figure 3(i)**).

4.4. Simulation of Three Scenarios to Close Classrooms Disparities Gap

The country counts 30,936 surplus classrooms unevenly distributed across the ten regions of the country with the Centre and Littoral regions alone having 68 and 34 percent of surplus classrooms respectively. However, about 20,044 classrooms are required to close classrooms disparities gap across the county. **Table 3** presents three scenarios;

- First these classrooms correspond to amount 361 billion FCFA which is 51 percent of the total amount of the public investment projects in the last five years (2016-2020).
- Secondly, the number of allocated classrooms per year stood at 1354 which amount to about 24 billion FCFA and fifteen years to close the gap in question in term of classrooms allocation and 17 percent of amount needed over the average amount PIP per year in the last five year.
- Lastly, the average number of realised classrooms per year stood at 558 which is about 10 billion FCFA requiring thirty-six years to close the disparities gap, and corresponding to 7 percent of amount needed over the average amount PIP per year in the last five years.

Therefore, these three scenarios demonstrate three major ways to deal with the problem in question; Sacrificing 51 percent of the total amount of PIP that is, close to 361 billion FCFA to close this gap in a year or using fifteen years to close it with an average of 1354 classrooms allocated each year or better still taking thirty-six years with an average of 10 billion FCFA per year. These three scenarios cannot work without an efficient, transparent public procurement system and effective realisations of awarded classrooms.

5. Discussion

This paper made use of data on existing infrastructures on the field, data on public contracts allocations, awards and executions from 2016-2020 and made

Table 3. Three scenario to close classrooms disparities gap.

Classrooms required-Average number of allocated and realised classrooms	Total/average number of classrooms	Amount needed (FCFA)	Estimated number of years	% amount needed /the total amount PIP	% amount needed /the average amount PIP per year
Classrooms required	20,044	360,793,200,000	/	51	/
Average number of allocated classrooms per year	1354	24,379,200,000	15	3	17
Average number of realised classrooms per year	558	10,044,000,000	36	1	7

use of multiple methods to analyse the mismatches in the demand and supply of classrooms within the basic and secondary education sectors. However, it integrates the methodology of assessing disparities and aspects regarding socio-economic indicators used in approaching territorial disparities [13] [14]. Even though education planning is just one out of the many sectors that make up territorial or regional planning, Carron and Châu [1] analysis the role of educational planning in the reduction of regional disparities.

Due to the mismatches between demand and supply of basic infrastructures across the country, Kana [3] in his paper titled "*L'inadéquation entre l'offre et la demande d'éducation au Nord Cameroun: le cas du Département du Logone-et-Chari*", where the aim is to make up for the infrastructural deficit that was previously considered to be the major cause of low school enrolment rates observed throughout the country, particularly in the Northern part. He however, argued that even though classrooms within the Logone et Chari division are overcrowded (>the national pupils/students classroom ratio) which vary from one sub-division to another, this is also due to the fact that there are insufficient teachers within the area.

Our findings present a North-South and East-West disparities in the allocations, awards and execution of classrooms across the country. This was confirmed by the World Bank Group [15] reports which revealed that public education spending is unevenly allocated across the country, with the lowest levels of per student spending observed in the areas with the greatest need designated Priority Education Zones "*Zones d'Éducation Prioritaires*, *ZEPs*", which include the North, Far North, East, and Adamawa regions, than in other regions, particularly the Centre, Littoral, and South. For instance, students in the impoverished North Region receive 2.2 times less than students in the wealthier Littoral region.

Moreso, the Cameroon public contracts code has made provision for special procedures like direct labour, contracts awarded through mutual agreement and others which can be applied where competitive bidding fails. However, Cabras [16] highlights the ability of competitive tendering systems to achieve cash savings and reduce wastage; but the question is whether the adoption of such systems in the public sector produces positive economic effects on the local supply chain in peripheral and remote areas.

6. Conclusions

The objective of this paper was to analyse the contribution of Cameroon's public contracts and territorial planning policies toward the reduction of classroom disparities across the country. To do this we made use of existing infrastructural data collected from various Ministerial Departments and public contracts data from 2016 to 2022.

Moreover, analysis at the level of the social objectives shows that the social objective of territorial planning is not respected in Cameroon based on biased or

haphazard classroom allocations and execution in the primary and secondary education sectors. In order to do away with biased classroom allocations across Cameroon, we derived a mathematical formula that guarantees equitable classroom allocations that is proportionate to the needs of the areas in question. A linear regression analysis reveals that realised classrooms with a β of 0.962 and a significant value of 0.001 (p-value < 0.05) shows the significance of the model and further confirm its positive influence on pupils/student classroom ratio. Given that one classroom contains 45 pupils/students; the construction of a classroom (0.001) will create space for close to 45 pupils/students.

The recent tense political climate across the country is fuelled by the high rate of centralisation of decision-making within the central administration and slow rate of decentralisation. Even though the radical Islamic sect Boko haram is based in the northern part of the country, the socio-political crisis in the two Anglophone regions and the Séléka that disturb the East and the Adamawa regions originated from diverse causes, the fact that they have stayed for so long is because they have found a common ground characterised by inequality in the allocation and execution of public contracts in general and educational infrastructures in particular. This is partly because most youths especially in the Priority Education Zones and crisis hit Northwest and southwest regions have become vulnerable to being used by non-state armed groups due to social injustice.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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