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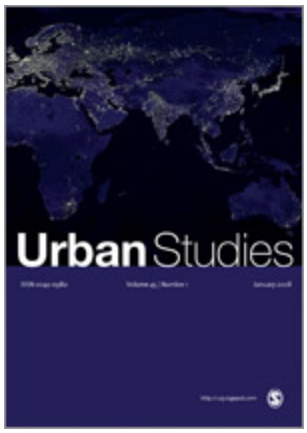

CEMENTING AFRICA: CEMENT FLOWS AND CITY-MAKING ALONG THE WEST AFRICAN COASTAL CORRIDOR (GHANA, TOGO, BENIN, NIGERIA)

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Cementing Africa: Cement flows and city-making along the West African corridor (Accra, Lomé, Cotonou, Lagos)

Abstract

This paper analyses the production, circulation and consumption of cement along the West African coastal corridor, a 500-kilometer conurbation that stretches between Accra, Lomé, Cotonou and Lagos – the largest urban metropolis still in progress in Africa. By focusing on the "cement chain," this research contributes to ongoing explorations of how urban phenomena are produced in Africa. As a binding material, cement is at the nexus of a range of issues at stake in contemporary African cities, such as urban policies, economic trends, dweller practices, environmental issues and capitalist accumulation. Based on empirical long-term fieldwork, the paper adopts a "follow-the-thing," multi-scale approach, retracing the itinerary of cement bags from the plant to the plot and observing all the actors involved in the cement chain, from major companies to bricklayers. Cement, the paper concludes, epitomises the emerging "Made in Africa" metropolitan condition, therefore including issues regarding the environment and sustainability into current debates on the growth of the cement city.

Keywords: Built environment, Urbanisation, Agglomeration, Governance, Housing, Environment, Sustainability, Construction sector, Dwellers practices

Introduction

On the over 500-kilometre road linking Accra, Lomé, Cotonou, Porto-Novo, and Lagos, a coastal corridor set to become Africa's largest urbanised zone, over 30 million people live, travel, consume and build (Moriconi-Ebrard *et al.*, 2016).[1] The landscape of this permanent construction site is dominated by a greyish cement colour, with cranes erecting towers in city centres while in the rural outskirts cement mixers drop abundant flows of 'grey gold'.

'A tonne of cement' was the gift one of my colleagues, an eminent professor at the National University of Abomey Calavi (Cotonou-Benin), received as a retirement present in order to kick-start his house-building project. Owning a house made of concrete, it is thought,

[1] Accra (5 millions inhabitants), Lomé (1 million), Cotonou (1.5 million), Porto-Novo (500,000), and Lagos (18 millions). See the database Africapolis to visualize this large urban corridor in progress: http://africapolis.org.

will make him respectable. In the same vein, a major telecommunications company sponsored a competition – advertised prominently in Cotonou's main streets in preparation for the 2018 New Year – whose first prize was twelve parcels and 150 tonnes of cement (Fig. 1).

These two anecdotes highlight the importance of cement in West Africa. Cement is so much more than a banal and inert building material; it is omnipresent. The coastal corridor is littered with cement depots and hardware stores selling gravel, sand, concrete iron and sheet metal as well as cement. Cement also serves as a key indicator of economic growth and development. On hardware shop doors the cost of a tonne of cement is noted in chalk every day (Fig. 4). Like the stock market, cement's value fluctuates with the fortunes of the local economy. Moreover, cement embodies a symbolic marker of success in Africa: one's position in society can be measured by the cubic metres one has poured. As such, cement is a thing with 'a social life' (Appadurai, 1986). In its various dimensions and scales and in its material and immaterial characteristics, cement symbolises African urban life and transmits key modes of a wider cultural imaginary.

Cement is a binder: concretely, it binds sand, water and clinker. In Africa it also, metaphorically, binds urban politics, environment, economy and the quotidian practices of urban dwellers. Cement is therefore a useful entry point into the material life of African urban inhabitants. Through the lens of cement and its derivatives (cement bags, bricks, concrete blocks), this article tries to contribute to the scholarship on the production of urban space in contemporary Africa. Even though cement is the leading material produced in the world, it remains understudied in urban studies. Besides economic studies highlighting the crucial importance of the cement value chain in Africa (White, 2015; World Bank, 2016; Byiers et al., 2017), the only studies of direct relevance concern cement in other areas (Fry, 2013) or some pioneering work on the construction materials industry (Myers, 1999). Yet in African cities characterised by a massive 'construction boom' (Author, forthcoming), 'makeshift' urbanisation (Pieterse and Simone, 2017), fluidity of exchange, and ultra-connected and mobile people who can be considered as infrastructure (Simone, 2004), it seems worthwhile to focus on the city's 'concrete' foundations. Given the difficulty of understanding *who makes up a city* in Africa's contemporary urban revolution (Parnell and Pieterse, 2014), this paper aims to shed light on *what concretely makes up a city*.

Inspired by material studies (Clark et al., 2008), I propose a 'follow the thing' approach (Marcus, 1995) to analyse the production, circulation and consumption of cement.

The cement chain will be explored, tracing the pathways of cement bags from the quarry to delivery, from the plant to the plot (horizontal approach). My methodology also requires a multi-scale (vertical) approach to understanding the links between actors at every part of this chain, from chief managers of major cement companies, transnational real estate developers, and government agencies (de)regulating the cement market as well as informal retailers, land owners and bricklayers.

This multiscale and multidimensional research is based on long-term fieldwork carried out in West Africa. Settled in Cotonou, the economic centre of the Republic of Benin, from July 2016, I have regularly travelled along the long urban corridor from Accra to Lagos and thus have developed my observations while on the move, just like bags of cement transported from one site to another. Data have been collected along the corridor and in the major metropolises but also around the main cement plants and cement storage places near harbour in order to underline the unexpected and inconspicuous linkages between all these places and actors. In different suburbs of Cotonou, Ibadan and Lomé, I have seen worksites pop up, followed their progress and discussed with their supervisors. Finally, through interviews and surveys, I have talked to the main players in the cement market (global companies, cement workers, developers, politicians, wholesalers, informal retailers).

Adopting an urban geographical point of view, this paper attempts to highlight the spatial and social impacts of the 'cementification' process in West Africa. In the first part, I show how cement has become, in the span of a century, the most important and valuable symbol of urban production and accumulation in this part of Africa. This questions the 'planetary urbanisation' process announced by Lefebvre in 1970 and the concrete forms, recently evoked by T. Brenner and C. Schmidt (2015), that are unfolding. The second and third section build up the distinction proposed by Tim Ingold (2013) between building and dwelling perspectives. The second section examines the built environment and technical aspects, adopting the point of view of dominant stakeholders (companies, technicians, architects, planners) (Parnell et al., 2009). The third section takes an opposing tack by focussing on the everyday practices and narratives of city dwellers (Robinson, 2006; Simone, 2010; De Boeck and Baloji, 2016), Finally, cement tells us about the 'metropolitan condition' being manufactured in contemporary Africa.

[Insert Figure 1 here]

1. The production of the Urban in Africa through the lens of Cement

A binder to analyse city making in Africa

The complexity of contemporary city-making in African can be better understood by considering cement's embedded scales and actors. The cement chain highlights the links between land use, urbanisation and capitalism. Cement can be considered a source of accumulation, materialising Marxist ideas of the 'spatial fix' (Harvey, 2001). It adds considerable value to a plot: the simple act of mixing cement transforms a mundane nude parcel of land into a capitalist building site and, as such, is the first step towards the financialisation of urban production (Halbert and Attuyer, 2016).

Witnessing this capitalistic alchemy, development partners and donors have begun to openly promote cement as a lever for economic growth and 'unlocking Africa's potential' (World Bank, 2016). As an object of accumulation, commodification and domination, cement is considered tangible proof of Africa's emergence. Per capita cement consumption is frequently used (in comparison to GDP) as an indicator of a country's development. West Africa's average annual per capita cement consumption of 115 kilograms is far below the global average of 513 kilograms (White, 2015), which means that there are significant possibilities for market expansion. The dominance of the Indian, Chinese, and Lebanese diasporas in building materials business remind how construction is a high-profit business and how urban Africa is involved in globalization (Choplin and Pliez, 2018). Rising cement consumption is supposed to be linked to an emerging urban middle class (Mercer, 2014; Page and Sujo, 2017) and the growing importance of the 'base of the pyramid' (Prahalad and Hammond, 2002). Indeed, along the African urban coastal corridor, millions of poor people dream of a four concrete-walled house with sheet metal as a roof. Several other million inhabitants from the middle class wish to benefit from affordable housing programs. Finally, in Accra and Lagos, thousands of wealthy people clamour for luxurious gated communities and shopping malls (in Lagos alone there are over 12,000 millionaires).

Cement is often presented as a source of substantial profits not only for large Western cement-manufacturing companies but for all the actors involved in the construction sector, including the households themselves. But the 'trickle down' effect of redistribution is often limited for both formal and informal housing. Many studies on the socio-economics of construction since the 1960s have shown that dwellers develop private construction sites, acquire certain skills and know-how, and take on the roles of foremen and building

entrepreneurs (Turner, 1977; Canel et al., 1990). Households have developed strategies to create patrimonies and speculate through land and buildings, which are converted into financial windfalls (Denis, 2016). Nowadays, if the strategies employed are quite similar to the ones from the past, they are much more intense, numerous and generalized, crossing a number of social classes. Whereas neo-urban migrants used to invest in their place of origin, many today prefer to build in urban areas. Building in concrete has become the main way to make a profit and to shoulder the high cost of living (it is useful to remember that Nigerian landlords usually ask for one year's rent to be paid in advance). In the 'new urban worlds' (Pieterse and Simone, 2017) that are cemented worlds, building sites are the new places of domination where owners, bricklayers and apprentices appear as the emblematic figures of the oppressed worker.

Lust for cement in Africa: from colonisation to local (re)appropriation

Every day in Red Star Square in downtown Cotonou, hundreds of trucks bearing the logo Dangote block traffic. These trucks belong to Nigerian businessman Aliko Dangote. By producing and selling cement, Dangote has become, in a decade, the wealthiest individual in Africa and the only African in Bloomberg's list of the 'fifty most influential people' in the world.[2] Ever since Nigeria became self-sufficient and Africa's leader in cement, Dangote has sought to export Nigerian cement throughout the region. The 1,000 trucks he bought from Chinese manufacturer Sinotruck travel the 450 kilometres between Ilaro Nigerian cement plants to Dangote's logistics platform in Tema, the port of Accra (Fig. 2). From there, Dangote cement is distributed throughout Ghana and in neighbouring countries like Burkina Faso and Mali, where cement commands a higher retail price. Even if cement is not a new product in Africa, Dangote shows that its production, circulation and consumption are much more intense today due to an enormous emerging urban market.

Dangote has profoundly transformed the image of cement in Africa, which was first linked to the figure of the white European colonial who constructed out of cement and clinker while locals lived in wooden huts. Dangote epitomizes the reappropriation, or Africanisation, of this colonial material (unlike oil or gas, sources of a resource curse and Western

[2] Dangote, founded in 1981, is a Nigerian conglomerate based in Lagos. After having worked in flour and sugar trading, the firm entered the cement industry in 2000. Dangote opened Africa's largest African cement plant (Obajana Cement Plant) in 2003, and it has since opened other cement plants in Nigeria and the rest of Africa.

dependence). Cement's history, especially compared to other colonial products like alcohol (Nyuur and Sobiesuo, 2016), or gas and crude oil (Yates, 2012; Ariweriokuma, 2008), remains understudied. The first colonial cement plant was the Société des Chaux et Ciments du Sénégal, founded in 1928 in the suburbs of Dakar. The first integrated cement plant in Nigeria (NIGERCEM) opened in 1957, while Benin's SCB-Société des Ciments du Bénin opened in 1978. Cement production is divided into three main stages with two type of cement plants (integrated and grinding): (1) limestone is extracted and mixed with clay (80% limestone, 20% clay); (2) this 'raw metal' (85% cement) is heated to 1500°C to make clinker; (3) the latter is crushed and mixed with gypsum to make cement. The first cement grinding plants in Africa tended to be located either near harbours (where imported clinker arrives) or close to major markets. Integrated cement plants, which are more recent and less numerous and used for clinker production (stages 1 and 2), tend to be located near limestone mines, which are quite rare in the region and far from areas of consumption. The difficulties associated with sourcing limestone explain why the region mainly imported cement and clinker (the major component of cement), but also petcoke (mostly from Venezuela) or carbon (from Russia or South-Africa) for the kiln and gypsum (from Spain or Turkey) for the crushing, creating a heavy external dependence. Moreover, since the kiln has to be heated to a very high temperature, the lack of access to energy and the high cost of electricity have slowed down the construction of integrated cement plants in the region. These constraints explain why, until recently, cement companies preferred to develop only grinding plants and importing cheaper clinker, usually from East Asia. But faced with higher demand, the major players now prefer to produce clinker directly in Africa and build integrated cement plant.

Although cement is emblematic of colonial domination and its process of extraversion (Bayart, 2000), it is being reclaimed by local cultures. Cement is now perceived to be a local material, produced in Africa, as well as a source of enrichment for African people, with Dangote as the best example. Consuming locally-produced is considered patriotic, as this picture promoting Togolese cement – 'le ciment du pays'- demonstrates (Fig. 3).

[Insert Figure 2 here]

[Insert Figure 3 here]

Cementification and 'extended urbanization'

Grappling with the 'planetary urbanisation' process first described by Henri Lefebvre (1970, 1974), Neil Brenner and Christian Schmid (2014) argue that today we are witnessing a double phenomenon of concentration of individuals and activities in cities ('concentrated urbanisation') and, at another level, the diffusion of urbanisation at the fringes ('extended urbanisation'). The West African urban corridor appears as a good case for testing this promising theory notably the articulations of both extended and concentrated urbanisation. It provides compelling analytical keys to recognise the creation of new scales of urbanisation. Cement depots and hardware stores are ones of this obvious markers: the sales teams of cement companies, but also informal retailors, supporting the urban sprawl process, buzz around the urban outskirts, searching for housing developments and construction sites (Fig. 4). A representative of SCB Bouclier Cement, one of the major companies in Benin, puts it this way: 'We set up our containers so we are easily spotted and we move them in the edge of the city according to demand. We're very flexible' (interview 05.02.2018, Cotonou). Another marker of this extended urbanisation is the pervasive 'spider web' – the name given to the illegal wiring of the electricity network, a necessity in suburban fringes where the legal network has not yet arrived (Jaglin, 2014). As the inhabitants pull the wires to make a connection, they are also pulling the city towards them. Quite often these spaces still mapped as rural are lacking in public infrastructure, especially access to water, electricity and education. But, at the same time, numerous private schools are a sign of 'extended urbanization', as are evangelical churches often located in remote and poor areas. The evangelic front aligns with urbanisation, globalisation and commodification. In these greyish urbanising spaces, thousands of poor people, at the bottom of the pyramid, enter the marketplace. In between the cement depots and evangelical churches, containers act as vending points and bank counters run by the main mobile telephone operators. These mobile phone operators have become mobile banks in these last few years, allowing customers to send and receive money or make mobile payments. These dematerialised and flexible commercial transactions facilitate the acquisition of a plot and materials, mainly cement, and the payment of a bricklayer. Finally, motels and discreet hotels are cropping up at the edges of the rural world, where the absence of an electricity network allows for darkness and intimate night-time visits. As such, all of the traces of urban production are present (concrete buildings, density, networks, transport) without the identifying marks of a city (off-grid networks, private infrastructure).

Unbounded urbanisation spreads while the memory of rural places is cemented over with concrete slabs. 'The city has caught us up', observed one of the village chiefs in the suburbs of Cotonou (interview 23.10.2017, Togbin/Abomey-Calavi, Benin). One could rather say that this "city-less urbanisation" has caught up with them. This raises important questions about the management of spaces that are totally absent from masterplans and official city maps.

2. Seeing like a cement company: urbanisation, market and politics

The value chain and politics of cement can be better understood by adopting the point of view of political stakeholders, economic operators, giant cement companies and international donors – in short, 'seeing like' a cement company, to borrow a line from J. Scott (1998) and later J. Ferguson (2005).

African cities, the last frontier of capitalism and… cement

'When the building stands firm, everything stands firm'. This proverb is particularly appropriate for the current African construction boom. Demographic and economic growth and infrastructure investments have created a high demand for cement. African cities can be considered the last frontier of capitalism (Watson, 2014), and for cement in particular (White, 2015). Africa has the world's fastest-growing cement market (African Union for Housing Finance, 2015). The World Bank, as well as the French and German aid agencies, directly support sub-Saharan Africa's cement industry (Byiers et al., 2017). For the World Bank, cement production is seen as an 'effective tool for boosting productivity, innovation and inclusive growth', which is why it supports increasing cement production so that the cost per bag is reduced and the product becomes more widely accessible. Simultaneously, major companies have developed a narrative (Fry, 2013) of how they contribute to local development and economic growth. This narrative holds that a more efficient cement value chain promotes an inclusive city and boosts the welfare of less well-off households. For example, in Austral Africa, LafargeHolcim supports affordable housing programmes using subsidised materials and financed by micro-credits. The DuraBric® product made in Malawi by LafargeHolcim, targeting 'suburban and rural poor inhabitants', provides 'low carbon, affordable and environmentally friendly bricks of earth and cement … in the process saving

up to 14 trees per house'. A consensus is emerging on the benefits of cement: this tangible asset offers employment and creates houses for the needy population.

The combined effect of a demographic boom and urbanisation have led to a rising demand for cement. The major cement companies – Heidelberg, Lafarge-Holcim, and, more recently, Dangote – understand the immense African market. Along the West African urban corridor, they engage in predatory competition. No less than ten integrated plants have been opened in the last decade in western Africa. In 2013, a few kilometres from the main cement plant SCB-Lafarge (in Benin), the New Cement Plant of Benin, owned by NOCIBE-Sahel Cement, opened with governmental support. One hundred kilometres away in Nigeria, Dangote and Larfarge have their own cement plants. Heidelberg opened in 2013 a fully-integrated plant in Tabligbo in Togo (80 kms from Lomé) (Fig. 2). Whereas in 2016 the World Bank bemoaned that 'cement prices in Africa are above world prices', in this part of the continent, the price has nearly halved in less than ten years. For instance, in Benin, with the opening of the NOCIBE plant in 2013, which benefited from tax exemptions, the price per tonne went down from to 110,000 FCFA to 66,000 FCFA.[3] The three other major cement manufactures in Benin (Lafarge, Heidelberg and SCB Bouclier) complained about this unfair competition, with the Commercial Director of Bouclier asking for 'the return of the State to regulate the market, as our margins are very slim. The financial balance is fragile' (Interview 05.02.2018, Cotonou). The new director of NOCIBE responded, 'The competitors gorged on high cement prices during decades. It was time to decrease the prices and help the consumers' (Interview with CEO of Nocibe; 23.11.2018, Massé, Bénin). The opening of these new cement plants has induced price decline, and thus the diminution of illegal cross-border cement trafficking. Just like basic necessities like bread or rice, the production and commercialisation of cement justify state policy interventions.

Dangote's competitors point to favourable commercial agreements that skew the market. The Togolese government has accused Dangote of cutting prices, with the firm selling cement by the tonne for 65,000 FCFA, much below the fixed state price of 80,00 FCFA. In October 2016 a number of deputies in the National Assembly accused the government of refusing to certify Dangote because its cement was much cheaper than the state price. In Benin, though, Dangote has no incentive to price-dump cement since it is a 43% shareholder (with shares acquired from the Nigerian state) of SCB Lafarge. 'If things go

[3] By comparison, in December 2017, the tonne was at 85,000 CFA (130€) in the Ivory Coast, 80,000 CFA (122€) in Togo and 60,000 CFA (91€) in Nigeria.

well for SCB Lafarge, it is Dangote interest" (Interview with CEO of SCB Lafarge, 08.11.2018, Cotonou). It is more profitable to compete in Ghana, a country with a high rate of economic growth where Dangote has favourable commercial agreements and from where it re-exports to neighbouring countries like Burkina Faso and the Ivory Coast.

These different cases shed light on the enmeshed nature of politics and private business, very strong in this part of Africa (Bayart, 1999; Fourchard, 2011). It is widely known that Akilo Dangote was close to Olusegun Obasanjo, the former President of Nigeria (1999-2007), and is close to the current president, Muhammadu Buhari. The guest list for Dangote's daughter's wedding in Lagos in March 2018 included the president of Ghana and the former president of Benin, as well as Bill Gates. Aliko Dangote is often praised for his role in advancing Nigerian interests: President Buhari personally congratulated him for having transformed Nigeria into a major cement exporter.

Cement bags on West African roads: policies and politics

The example of Dangote clearly illustrates the interplay of regional and national policies and the collusion between political and economic actors and interests. His strategy of cutting down Western cement imports and creating better distribution networks in the sub-region (Dangote Cement, 2016) was made possible by the economic crisis afflicting Nigeria since July 2016, which led to the devaluation of the currency (Naira). With Dangote operating at over-capacity and thus looking for new sales opportunities, the economic crisis represented a chance to re-deploy concrete throughout the sub-region.

At the same time, both the African Union and ECOWAS support the construction sector, and indirectly cement production and consumption, in order to boost regional integration and reduce external dependence (Byiers et al., 2017).[4] Dangote benefits from the support of the Nigerian state and ECOWAS, exploiting the liberalisation of regional trade and national regulatory frameworks. This help explains why the firm's 1,000 trucks can easily cross the borders of Nigeria, Niger, and Ghana. The financial benefit to the countries traversed, including Togo and Benin, are relatively minor. For each convoy of 400 trucks, Dangote makes its tax payment beforehand, at the national level, skipping the tax formalities at customs and escaping the minor daily corruption frequent in the cross-border region (Walther, 2015; Lihoussou, 2017). Dangote also benefits from Nigeria's ban on cement

[4] The ECOWAS Trade Liberalisation Scheme (ETLS) supports duty-free access for goods among member states.

imports, which violates the ETLS (Byiers et al., 2017), and has privileged access to limestone deposits (World Bank, 2016). This is why competitors complain of unfair trading practices resulting from the collusion of politics and economics.

But Dangote's trucks are not the only vehicles circulating along this giant metropolis being constructed on the coastal corridor. There are 700 *Buffle* trucks, so-called due to the buffalo logo of Heidelberg. These trucks belong to the wealthy Nigerien businessman Illiassou Moumouni, otherwise known as 'Alomaro', who concluded a deal with Heidelberg to distribute the clinker produced in his factory (near Lomé) to his company's other cement plants (in Benin, Niger and Burkina Faso). Since the unloaded clinker is immediately replaced by cement, his trucks are never empty. Like Dangote, Alomaro, who is originally from Malanville (Niger), enjoys special customs control agreements due to his interpersonal relationships (Walther, 2015). He is personally linked to the main distributor of cement in Niger, Aboubacar Charfo, who holds the monopoly on Dangote cement distribution and is originally from the Tahoua region, 'such as all the Nigerien involved in the building material business' as a nigerien wholesaler explained us (Interview 05.09.2018, Niamey). Alomaro recently fell into disgrace with the current president, while Charfo remains favoured.

Cement manufacturers are undoubtedly close to local politicians and governments searching for ways to carry out infrastructure projects, and vice-versa. They insist on their crucial role on local and national development, especially when they face local protestors pointing out the environmental consequences of nearby cement works or extraction sites (cracks in the buildings, high dust levels). At the framework of corporate, social and environmental policies, the cement industry touts the schools, health centres, or community buildings in cement that it helps construct. Cement companies also, to quote the head of external relations at Heidelberg CIMBENIN, undertake 'charming actions to be well considered by the local population' (Interview 02.02.2018, Cotonou). In Togo, Heidelberg's foundation pays school fees for underprivileged children and in Benin repairs roads and roundabouts in areas affected by flooding (Interview with CEO of CIMTOGO, 07.06.2018, Lomé).

A profitable cement value chain

If the cement value chain is relatively easy to describe, it is difficult to measure the benefits for each actor and go-between link in it. The cement manufacturers and the main wholesalers interviewed were reluctant to give elements on the economic aspects.

The Nocibe Company (Ciments du Sahel Property) is a good example to see this value chain: the newest integrated cement plant has been erected with Beninese political and financial support, with Chinese companies building them in record time (18 months). The technologies and material come from Europe. For the most important contracts, the company have agreements with wholesalers. Most of them have been operating for a long time, some of them since the end of the colonial period. This is the case for several transnational Lebanese families who have developed monopolies on building materials distribution in Benin, Nigeria and Togo. The Chagoury family, for example, owns the large 'La Roche' stores in Lomé, Lagos and Cotonou. Retail distribution is undertaken by private vendors without any official connection to the cement company. For Nocibe and the other companies, retailers purchase their goods from wholesalers, and a cement depot can be opened anywhere to meet the rising demand for cement in the rural-urban corridor. At the bottom of the pyramid are bricklayers and small building craftsmen, who operate informally, purchasing cement from wherever it is sold. As construction workers state, most of the time this is 'just around the corner' (interview, 6 June 2018, Cotonou). Some companies (Dangote, Nocibe) operate their own truck fleet, while others (Lafarge, Heidelberg) outsource transportation and delivery to private companies. The CEO of CIMTOGO is blunt about this part of the value chain: 'transport is not our core business' (interview, 7 June 2018, Lomé). The profit margins for cement companies are small on each cement bag, as the CEO of Nocibe details: 'Our cement plant produces one million tonnes per year. But we can go up to 1,6 million tonnes. We need to be careful and find a fragile equilibrium: we need to sell a lot (at an affordable price) because we profit only on huge quantities, but we need to avoid overproduction. (interview with CEO of Nocibe, 23 November 2018, Massé, Bénin)

While cement production and circulation are regulated, they are also determined by market conditions of supply and demand. Obviously, political and economic stakeholders jointly advocate the spread and ubiquity of the cement block, presented as the new gold bullion for the poor.

3. The social life of cement and the African Metropolitan condition

This section looks at the perspective of dwellers, considering their expertise and practices. Following the progress of private construction sites (Canel et al., 1990) and talking with builder-citizens make clear the value placed on blocks of cement as assembling pieces of

cities, lives and futures. This social approach leads to a better understanding of what the 'metropolitan condition', defined by Walter Benjamin (1999, 2003**)** means in contemporary West Africa.

Building the incremental city brick-by-brick

The city 'made in Africa' is first and foremost a 'makeshift' and 'incremental city' (Simone and Pieterse, 2017), built day by day, brick by brick, sometimes via state megaprojects that satisfy elite interests, but, most of all, through self-built housing projects. For poor people who have difficulty accessing a bank or do not trust bank credits, buying cement bags and building bit by bit according to their means is a way to hoard resources or invest. Indeed, as cement is a pervasive element in the city, it is possible to buy a few materials at a time and build one step at a time. This is marked out in the urban landscape, as plots are prepared, materials piled up, and handmade metal signs announce the name, job and phone number of the owner. Many Africans from the diaspora invest their money in their country of origin via real estate (Mercer, 2014). For the diaspora as well as for locals, the most challenging task is setting up a construction site. Depending on the fluctuation of the owner's income, this can take several years. On top of cement, the owner needs to also acquire reinforced steel bars, corrugated steel panels for the roof, windowpanes and windows. It is also necessary to find a trustworthy bricklayer and the site must be regularly visited to oversee the work. Since they cannot be physically present for the entirety of the building process, the diaspora mobilises a whole service network to do this in their stead. Thanks to global trade websites like Alibaba or Jumia, cement bags can be bought online and delivered to the plot; real estate agencies can take care of legal matters and drones can supervise construction sites. Of the tens of construction sites surveyed between 2016 and 2018, owners recounted at length their conflicts with bricklayers, neighbours, heirs, and other buyers who wished to purchase the same plot. Construction sites 'take up too much brain space. It is the story of my entire life" says Norbert, a Beninese owner of a plot under construction (Interview 08.11.2017, Cotonou).

[Insert Figure 4 here]

A right to the city through the plot and the block

Once it is poured and mixed, cement holds important virtues and social values. When turned into concrete, individuals can attain the coveted status of owner. Building – "Construire son chez" as Beninese and Togolese people say- is part of many urban dwellers aspirations. Indeed it is an instrument measuring social success and access adulthood. It can be considered one of the 'modes of accumulation and attributes of African success' (Warnier, 1999), like the four-wheel drive, air conditioning, or international travel. The strength and endurance of concrete are strongly linked to masculinity. However, in this part of Africa, it is quite common to see women build, maintain a construction site, negotiate the price of construction materials and bring them back to the sites they own. Construction, especially for single or widowed women, is a means of achieving a level of independence: 'It has been hard but now that I have built my house, I don't need to rely on anyone else', explains Elinor (06.09.2018, Cotonou).

Cement is also in demand because of its long-term toughness and sustainability, and for that reason is preferred to traditional local materials. A well-known Beninese architect explains: 'When I suggest wood or straw to my clients, they refuse; they say "it sounds like the kind of material used in villages. Wood is for the bush, not the city"' (22.05.2017, Cotonou). These traditional building materials, associated with settlements along the riverbank and the lagoon, have a very negative connotation in the urban coastal corridor. Lacustrine groups living on wood stilts along the riverbank of Cotonou and Lagos (with the example of Makoko area) are marginalised socially and institutionally (the authorities consider them illegal occupiers). Traditional stilt homes, once typical of the Gulf of Guinea lagoon, are being progressively replaced by houses made of concrete. 'Bricks don't rot!' goes the Ivory Coast proverb, indeed bricks, unlike bamboo and earth brick houses, don't need to be re-built after each rainy season. For its part, though, cement is not very well-adapted to the humid tropical climate. 'Houses made of clay are naturally cool and maintain the same temperature indoors, but people prefer cement because it lasts longer; you do not have to rebuild your house after each rainy season. It's a house that will last' explains François, who has been building his little house in the distant suburbs of Cotonou for over ten years (15.01.2017, Cotonou).

There is a strong social significance associated with acquiring a plot, buying cement bags, and building a house brick-by-brick out of concrete (and not shoddy or cheap materials like bamboo or sheet metal): this is a way to break free from the vicious circle of precarity

and insecurity. These building symbolises existing and having the right to stay put. In the context of eviction campaigns, cement can be a material expression of a right to the city, especially for newly arrived migrants from the countryside who face discourses on autochtony and discrimination based on their rural origins. Building in cement can be interpreted as a first step towards claiming a 'right to the city', in its Lefebvrian acceptation, even though it is not quite worded as such.

Modernity and Cement: Walter Benjamin in Lagos?

Lagos, Accra, Lomé or Cotonou can be seen as laboratories of modernity, concentrations of great changes (massive urbanisation, intensified exchanges, strong demographic pressures, and the spread of new technologies) processed by the new perceptions and experiences of metropolitan citizens. Anonymity, complexity, crowds: the metropolis made in Africa is first and foremost a dizziness, an upheaval of the human sensorium. Lagos and its 18 million inhabitants produce an emotional shock. To understand this new metropolitan experience (and its link to cement), it is helpful to turn to the great theorist of modernity, Walter Benjamin (Benjamin, 1999, 2003; Simay, 2006; Füzesséry and Simay, 2008). While the contemporary African context is very different from the European one Benjamin wrote about, it is possible to draw out comparative elements and processes. Jennifer Robinson (2013) has shed light on the tensions between modernity and tradition in African towns and shown how Benjamin's approach could be used to explore the urban 'now' and 'new' urban developments. Using the turn-of-the-century Paris and Berlin theorised by Benjamin as a point of comparison to contemporary Accra, Lagos, or Lomé allows us to better reflect on this new metropolitan condition and its various forms of modernity.

In the Arcades Project, Benjamin notes that a key moment in European cities was being played out as metropolitan consumers were being integrated into global markets. The Passages are a metaphor for the entry into capitalism, with cushions, curtains and glass as objects used by the bourgeoisie to absorb this external social shock. In this new African metropolitan, we can draw a parallel with Benjamin's analysis of modernity by thinking about techniques, materials or construction techniques. In contemporary Africa, cement embodies an avatar of modernity, like glass in the Berlin of Benjamin's childhood. As P. Simay notes: 'glass has the supreme and paradoxical quality of making opaque, but also to make legible the relationship between the interior and the exterior, the family structure and individuality, love and sexual repression, the exploited and the exploiters' (2006: 15). These

remarks could be transposed for the wall of cement, whose thickness, granularity, and hardness say something about dominant social relationships, poverty and marginality. The resistance of the brick, its quality, is based on the quantity of sand and cement used, and by extension, the social status and financial means of the person who ordered the construction is revealed.

Moreover, cement is reassuring when faced with this unprecedented metropolitan experience. To apply one of G. Simmel's phrases, the grey building material might offer a certain form of 'protection of the subjective life against the violence of the large city' (Simmel, 2005). Behind concrete walls, the citizen can be protected from the anonymous crowd or the city itself, from a complexity that is not totally known and a city circumscribed neither by its forms nor in its extensions and functioning. These recent changes sketch the relevance of cement for Africa's urban future.

Conclusion: Towards sustainable alternatives to the cemented city?

Cement is a valuable tool for reading current processes of urban production in contemporary Africa. In this part of the world, city-making is the business of everyone: heads of state launch large-scale projects, global cement companies look to invest in promising markets, and average citizens become foremen on their personal construction sites. As a binder, cement enables us to read the landscape of a construction site, economic tendencies, dweller practices, environmental issues, power relationships between policy makers and citizens, globalisation and new forms of international dependence. Subscribing to the alchemy of capitalism and neoliberalism, cement transforms a raw material into a real estate good: by the simple act of mixing and hardening, cement can multiply the cost of a plot as well as the prestige of its owner. Cement highlights inequalities, a source of impoverishment for the poorest who try to stack up cement blocks after strenuous and hard efforts, and a source of immediate profit for the wealthiest who pour tonnes of cement in every available interstice. A culture of cement is establishing itself with large firms, international donors and political stakeholders jointly supporting the market and inhabitants re-appropriating the material as a symbol of success.

Yet the future of the cemented city can be questioned. In the context of diminishing resources (earth, water, sand) and redefined UN sustainable development goals (2015), the extraction, production and transportation of cement raise crucial environmental questions.

The cement industry is energy and water intensive and one of the largest emitters of carbon dioxide and greenhouse gases in the world (7% of global emissions) (Rubenstein, 2012). So while cement is a durable material, it is not ecologically friendly (Fry, 2013). These questions are crucial for the coastal West African urban corridor, a narrow slice of fragile land that is over-urbanized and squeezed between the sea and the lagoon.

In this context, cement companies are trying to take part in local development and reduce their emissions. They all say that they respect international laws and act to protect the environment (for instance by substituting fuel made from organic waste for fossil fuel) (Dangote Cement, 2016: 42). They play on the double meaning of the terms sustainability/durability, in particular the polysemous French term 'durable'. They value different 'sustainable' projects, issue reports on 'sustainability'.

This new context raises questions about possible alternatives to cementification. High-quality durable materials, like clay bricks, straw roofs and bamboo, are only accessible to a slim elite who can afford to pursue their quest for authenticity. For a sustainable future for African cities, it is important to rediscover local vernacular architecture, which has been relegated to a lower status for too long. A sustainable future requires revaluing African knowledge and thinking about a viable economic model that will allow for the mass production of long-lasting materials that can compete with cement. In the meantime, production of the urban in Africa for the next few decades will assuredly be linked to cement.

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Figure 1. 12 Plots and 150 tonnes of cement to win - advertising billboards

© A. Choplin, Cotonou, January 2018

1422x1066mm (72 x 72 DPI)

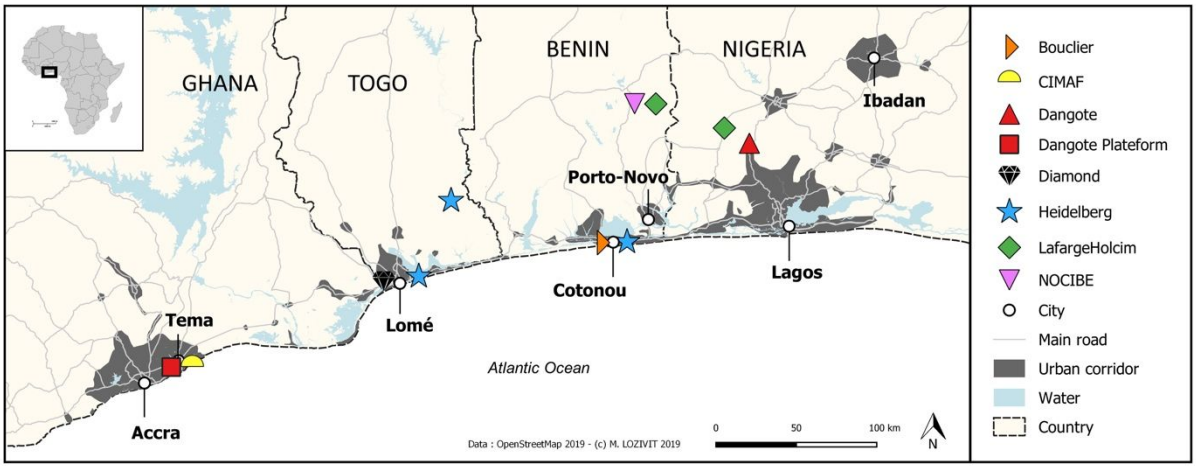

Figure 2. Cement plants along the West African corridor

@ M. Lozivit, A. Choplin, 2019

Figure 3. Building the city with locally produced cement - Advertising billboard for CIMTOGO (Heidelberg Company) in a street of Lomé, Togo - © M. Lozivit, January 2019
333x379mm (72 x 72 DPI)

Figure 4. A cement depot opened 24 hours a day, with the cost of a tonne of cement witten in chalk in front of the door. Porto-Novo, Benin - © A. Choplin, November 2018

333x379mm (72 x 72 DPI)