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URBAN INFORMAL
FOOD DESERTS IN
WINDHOEK, NAMIBIA

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Abstract

Informal settlements in rapidly-growing African cities are urban and peri-urban spaces with high rates of formal unemployment, poverty, poor health outcomes, limited service provision and chronic food insecurity. Traditional concepts of food deserts developed to describe North American and European cities do not accurately capture the realities of food inaccessibility in Africa's urban informal food deserts. This paper focuses on a case study of informal settlements in the Namibian capital, Windhoek, to shed further light on the relationship between informality and food deserts in African cities. The data for the paper was collected in 2016 and involved a survey of a sub-sample of households living in shack housing in three informal settlements in the city. Using various standard measures, the paper reveals that the informal settlements are spaces of extremely high food insecurity. They are not, however, food deprived. The proximity of supermarkets and open markets, and a vibrant informal food sector, all make food available. The problem is accessibility. Households are unable to access food in sufficient quantity, quality, variety, and with sufficient regularity. Urban policy can no longer be silent on food insecurity in Africa's urban informal food deserts and needs to address the growing crisis of urban food security.

Keywords

food security, food deserts, informal settlements, food access

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Introduction

With the rapid growth of Africa's urban population, has come an explosion of informal settlements on the fringes of most cities – what Doug Saunders optimistically refers to as “transitional spaces” or “arrival cities” and UN Habitat more pessimistically designates as “slums” (Saunders 2010, UN-Habitat 2016). These impoverished residential areas of cities have been seen as the product of “dis-jointed modernization” in which urban population growth outpaces urban economic and institutional development as well as government failures to pro-actively manage urbanization (Fox 2014). In sub-Saharan Africa as a whole, nearly 60% of the total urban population now lives in informal settlements. However, there is considerable inter-country variation (UN-Habitat 2016). At one extreme there are countries such as Sudan and Central African Republic with over 90% of the urban population living in informal settlements. In Southern Africa, Mozambique has the highest proportion of its urban population in informal settlements, at 80% (Jachnow et al 2017). South Africa, with a long history of informal settlement demolition in the apartheid era, is one of the lowest at 23% (Huchzermeyer and Karam 2006). The country of Namibia, which was controlled by South Africa until independence in 1991 and had a similar history of draconian controls on urbanization, now has 39% of its urban population residing in informal settlements (Idongo 2015, Weber and Mendelsohn 2017).

Informal settlements in African cities are urban and peri-urban spaces with high rates of formal unemployment, grinding poverty, heavy reliance on the informal economy, poor health outcomes, very limited basic services provision, and heightened vulnerability to climate change (Ezeh et al 2017, Gulyani and Talukdar 2010, Medina et al 2017, Myers 2005, Okurut et al 2015, Satterthwaite et al 2018, Scovronick et al 2015, Sverdluk 2011). They are also areas with high levels of individual, household and community food insecurity (Crush and Frayne 2014, Frayne et al 2018, Ruel et al 2017, Tacoli 2017). One study of 12 African countries, for example, found that at least 40% of the urban

population was energy deficient (Smith et al 2006). The prevalence of hunger was highest in Ethiopia, at 90%. Another study of 6,453 low-income households in 11 African cities by the African Food Security Urban Network (AFSUN) found that 57% were severely food insecure and only 17% were completely food secure (Frayne et al 2014). In some cities, over 70% of households were severely food insecure. Studies of informal settlements in particular cities have also found extremely high rates of food insecurity. In two large Nairobi informal settlements, for example, only 16% of households were food secure (Faye et al 2011, Mohamed et al 2016). In Maputo's informal settlements in Mozambique, just 5% of households were completely food secure (Raimundo et al 2014, 2016).

Recent studies of food insecurity in African cities have suggested that low-income residential areas, and informal settlements in particular, can be viewed as “urban food deserts” (Battersby and Crush 2016, Crush and Battersby 2016). Food deserts are conventionally defined as “urban areas where residents do not have access to an affordable and healthy diet” (Cummins and Macintyre 2002), which is certainly an apt description of informal settlements in African cities. In much of the literature on food deserts in European and North American cities, however, it is the absence and inaccessibility of supermarkets that is the primary determinant of whether a residential neighbourhood is considered a food desert or not (Shannon 2013). While few, if any, informal settlements in African cities have supermarkets within their borders, this conceptualization is inappropriate for Africa for at least three reasons.

First, residents of informal settlements rely on a variety of informal market and non-market sources of food both within and outside their residential areas. Supermarkets are far from being the only, or even the main, source of food in African cities (Battersby 2012). Where they do exist they tend to be located in more affluent parts of cities (Peyton et al 2015, Battersby and Peyton 2016). Second, despite their distant geographical location, upwards of 90% of the residents of poor areas of Southern African cities buy food at supermarkets (Crush and

Frayne 2011). The typical purchasing pattern is to travel to more distant supermarkets to purchase staples in bulk (especially cereals such as maize flour and rice) once per month. In other words, supermarket patronage meets a basic daily staple food need but does not necessarily lead to a more diverse or nutritious diet. Third, the association of food deserts with the absence of supermarkets ignores the fact that most African cities have vibrant local informal food sectors (Kroll 2016, Skinner 2019). Households in informal settlements tend to rely on informal food vendors for most of their immediate food needs. As a result of these conceptual deficiencies, African urban food deserts have recently been redefined as “poor, often informal, urban neighbourhoods characterized by high food insecurity and low dietary diversity, with multiple market and non-market food sources but variable household access to food” (Battersby and Crush 2016).

While the informal food sector is extremely complex with many different types of mobile and fixed enterprise, one of the features of many African cities is the clustering of food vendors in marketplaces. Some of these marketplaces have grown spontaneously, often at major transportation hubs, and are generally informal in nature. Others are in spaces designated by the municipal authorities. However, beyond paying a fee for the use of a stall or stand, the majority of food vendors in the markets are also informal. These marketplaces are an important element of the food system in many cities and play an important role in improving access to nutritious foods by the urban poor. They also provide informal employment opportunities for owners and employees (often other family members) and therefore improve the income stream for some households. Understanding food markets is of critical importance to urban food systems, urban nutrition and food security.

This paper focuses on a case study of food deserts in the informal settlements of the African city of Windhoek, the capital and largest city in Namibia. In this paper we analyze data from a 2016 household survey of Windhoek to examine the current state of the city’s urban food deserts, with a particular focus on the food purchasing behaviour of

households in the city’s informal settlements. The first section describes the growth and location of informal settlements in Windhoek, as well as the demography and socio-economic status of the residents of the settlements. The second section presents the survey methodology and describes the sub-sample of informal housing households used in the analysis. The ensuing sections present the results of the survey. The first looks at levels of food security and shows that, like many informal settlements in African cities, the residents survive in a situation of extreme vulnerability to food insecurity. The second shows that these food insecure households in the informal settlements actually have high rates of supermarket patronage. The apparent contradiction is because they are largely target shoppers, only patronizing supermarkets to buy staple cereals in bulk at monthly intervals. The final section addresses the role of the informal food sector in the informal settlements, arguing that although it improves accessibility to more nutritious foods, households remain mired in the city’s food deserts.

Windhoek’s Informal Settlements

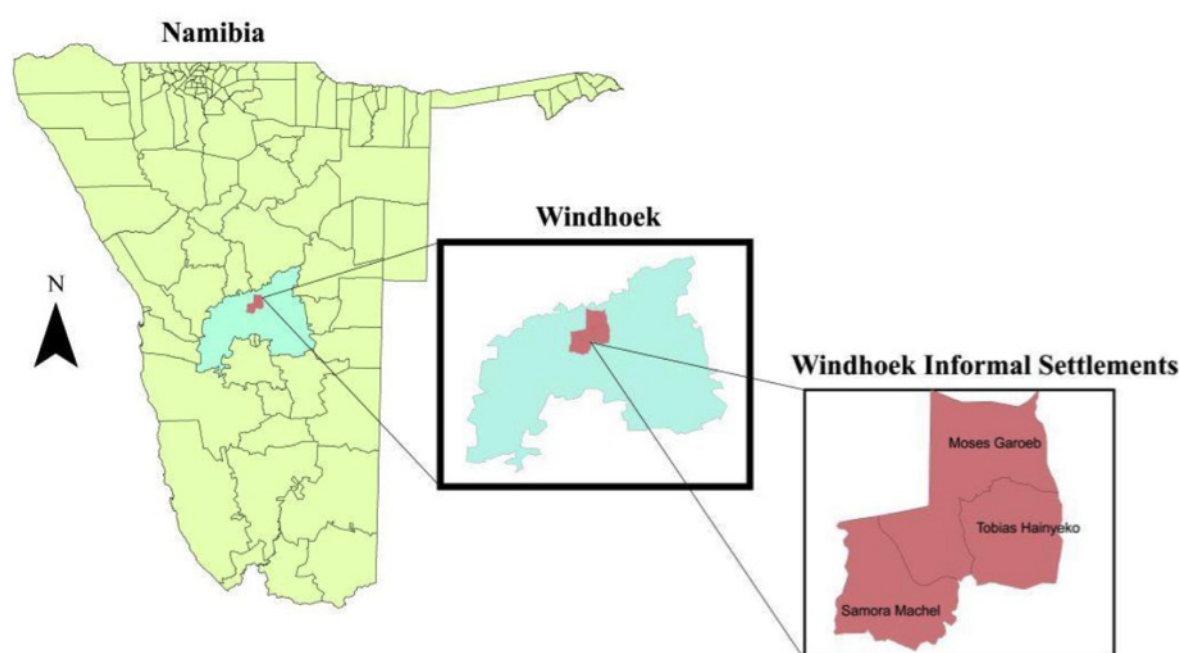
Urbanization in Namibia is taking place rapidly and outpacing formal housing delivery (Idongo 2015). Informal settlements are growing quickly in all urban centres (Weber and Mendelsohn 2017). At the time of the 2011 Census, Windhoek had a total population of 322,500, a 36% increase from the previous census in 2001. Shack housing made of corrugated iron predominates in virtually all of the informal settlements. Nationally, in 2011 there were approximately 80,000 urban households in shacks, a number projected to grow to over 530,000 by 2031 (Weber and Mendelsohn 2017). One-third (or 27,000) of all residential units in Windhoek were shacks, a 90% increase from 2001. Windhoek’s informal settlements are located in the four north-western constituencies of Tobias Hainyeko, Moses Garoëb, Samora Machel and parts of Khomasdal North (Figure 1). Between 2001 and 2011, the population increase was as high as 77% in Moses Garoëb and 69% in Samora Machel, primarily as

a result of in-migration from rural areas (Nickanor et al 2016).

Table 1 provides basic information on demography and service provision in the three main areas of informal settlement. The total number of households was nearly 40,000, with 143,000 household members. Nearly 30% of the population were children under the age of 15 while over two-thirds were working-age adults. In the informal

settlements, the proportion of households in shacks varied from 37% in Samora Machel to 71% in Tobias Hainyeko. The informal settlements continue to grow through spatial expansion and densification (Figure 2) (Ishimael 2016). Between 2012 and 2016, an additional 15,000 shacks were built, i.e. around 3,500 new structures per year (Weber 2017). While most households have access to public piped water, accessibility to electricity, private toilets and garbage removal is much more limited.

FIGURE 1: Location of Major Informal Settlements in Windhoek



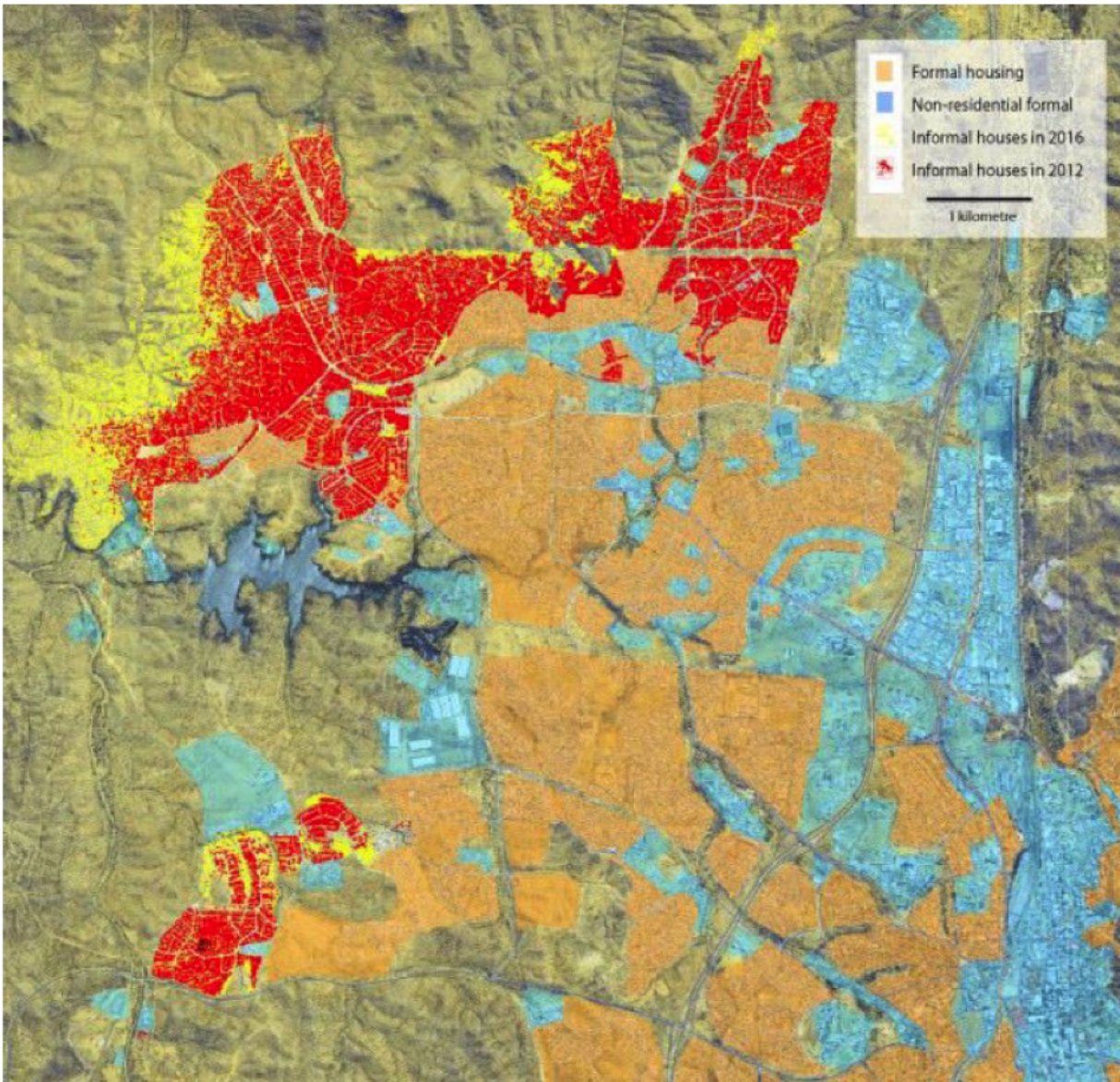
Source: Weber and Mendelsohn 2017

TABLE 1: Characteristics of Constituencies with Informal Settlements, 2011

	Moses Garoëb	Samora Machel	Tobias Hainyeko
No. of households	13,800	13,200	12,600
Population	45,500	49,700	45,800
Age 0-14 (%)	25	29	27
Age 15-59 (%)	72	68	70
Age 60+ (%)	1	1	1
Employed (%)	62	63	62
Unemployed (%)	38	37	38
Public piped water (% of households)	99	99	98
Private toilet (% of households)	44	77	33
Electric lighting (% of households)	28	69	20
Regular garbage collection (% of households)	28	69	20
Shacks (%)	64	37	71
Brick houses (%)	36	63	29

Source: Nickanor 2013

FIGURE 2: Growth of Informal Settlements, 2011-2016



Source: Weber and Mendelsohn 2017

Poverty is very visible in Windhoek's overcrowded informal settlements with makeshift shacks stretching to the horizon. Most shacks consist of one or two rooms made of corrugated iron sheets, which become very hot in summer and bitterly cold in winter (Figure 3). Most of the land is owned by the municipality but many shacks are erected by "slumlords" who exact high rents from tenants. The lack of formal legal title creates a sense of extreme vulnerability and little incentive to invest in improvement (Karuaihe and Wandschneider 2018). While formalized land tenure is a pre-condition for households to access municipal

services privately, most households do not own land (Karuaihe and Wandschneider 2018). There is a serious lack of basic services such as water, ablution facilities, roads, street lights, schools, clinics and other infrastructure. Shack dwellers have no flush toilets or electricity and access water and sanitation through communal facilities. Many resort to using riverbeds and bushes because pit latrines are often poorly serviced (Newaya 2010).

Formal unemployment in all three areas was close to 40% in 2011. Levels of unemployment were highest for women and poverty is most severe for

female-headed households (Nickanor 2013). Men have higher rates of formal employment than women, but work primarily as manual labourers in sectors like construction (Newaya 2010). Jobs in the formal sector are sparse for women, so many turn to the informal sector to earn income. Previous studies of the quality of life in the informal settlements indicate that levels of absolute and lived poverty are extremely high and that this, in turn, is related to poor health outcomes (including child stunting and underweight) and high incidence of food insecurity including a diet deficient in both quantity and quality (Nickanor 2013, Mbongo 2017, Nickanor and Kazembe 2016). A survey in 2007–8, for example, found that three-quarters of households in the city’s low-income areas were severely food insecure and only 6% were food secure (Raimundo et al 2014). Dietary diversity was also very low with foods eaten from an average of less than 5 of 12 possible food groups in the 24 hours prior to the survey. A more recent survey of

a sample of over 400 households in various informal settlements found that two-thirds were food insecure (Mbongo 2017).

Windhoek’s burgeoning informal settlements certainly qualify as urban food deserts in terms of the revised definition provided above: i.e. they are “poor, often informal, urban neighbourhoods characterized by high food insecurity and low dietary diversity.” What is less clear is whether or not they have multiple market and non-market food sources. In terms of the main food sources, previous studies suggest that low-income households in Windhoek purchase most of their food from a combination of formal and informal retail outlets – including supermarkets, informal markets, street vendors and tuck shops (Nickanor 2013, Mbongo 2017, Pendleton et al 2012). With urban agriculture almost non-existent, the primary non-market sources of food are rural–urban food transfers (Nickanor 2013, Frayne 2007).



Informal Housing in Moses Garoëb, Windhoek

Research Methods

The data for this study comes from a city-wide household survey of the City of Windhoek conducted by the authors in August 2016 over a two-week period as part of the ongoing research program of AFSUN and HCP. The survey instrument was developed by AFSUN and HCP and mounted on tablets through a modified computer-assisted personal interviewing open data toolkit (ODK). The city-wide survey interviewed a total of 863 households, drawn from all 10 constituencies, using a two-stage cluster sampling design. First, a total of 35 primary sampling units (PSUs) were randomly selected with probability proportional to size (PPS). The PSUs were selected from a master frame developed and demarcated for the 2011 Population and Housing Census. The second stage involved systematic sampling of 25 households in each of the selected PSUs. In each household, the head or their representative was interviewed after informed consent. For the purposes of this paper, a sub-sample of 431 households in informal settlements was extracted from the overall sample. All of these households were resident in informal (shack) housing in the relevant constituencies.

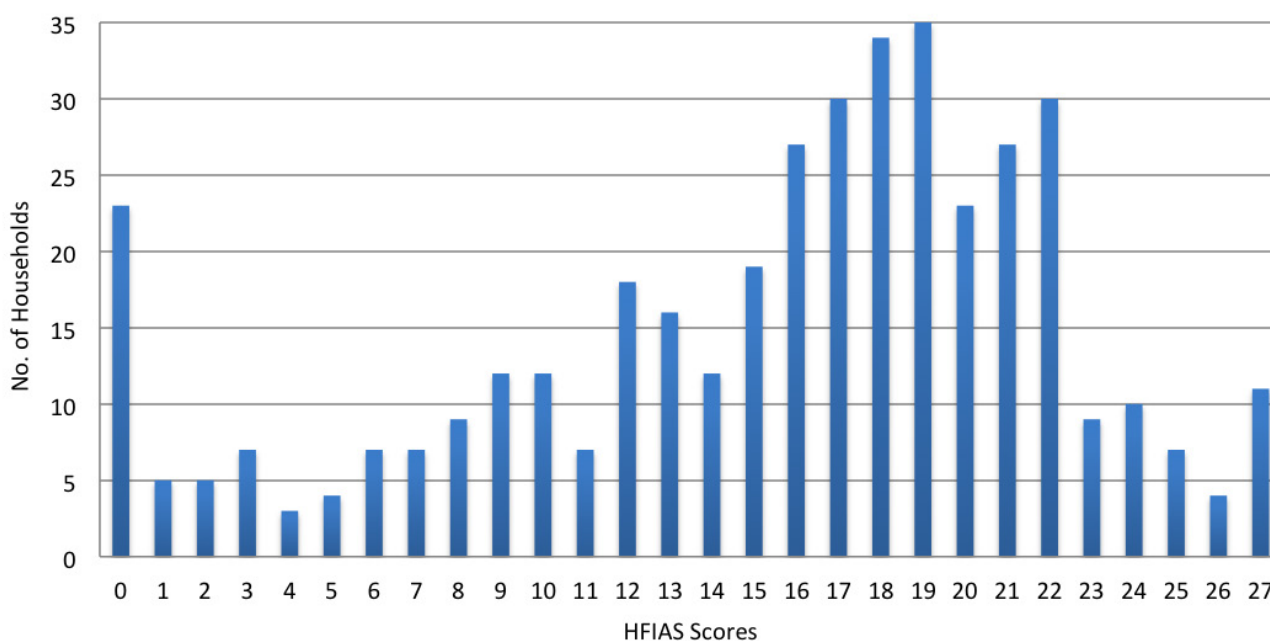
The survey covered a broad range of issues including household demography and economics, levels of food security, the type and location of food sources, and the purchasing strategies of households. To assess the prevalence and levels of household food insecurity, the survey used the indicators developed by the Food and Nutrition Technical Assistance (FANTA) project (Coates 2013). These include the Household Food Insecurity Access Score (HFIAS), the Household Food Insecurity Access Prevalence (HFIAP) measure, the Household Dietary Diversity Score (HDDS) and the Months of Adequate Household Food Provisioning (MAHFP) indicator (Coates et al. 2007). Household food purchase patterns were identified using the Hungry Cities Food Purchases Matrix (HCFPM), which captures how many households purchase a range of common food items, the source and frequency of purchase, and the geographical location of that source (Crush and McCordic 2017).

Food Insecurity in Windhoek's Food Deserts

The survey results reveal extremely high rates of food insecurity among households living in shack housing in Windhoek's informal settlements. The mean household HFIAS score was 15.4, which is very high by most standards. Two-thirds of the households have an HFIAS of 15 or greater, and one-quarter have an HFIAS of 20 or greater (Figure 4). The high HFIAS scores translate into very high prevalence of food insecurity on the HFIAP. Only 6% of households classify as completely food secure while 84% are severely food insecure. The remainder are moderately or mildly food insecure.

Of the four basic types of household structure, nuclear households were the most food insecure with an HFIAS=16.9, followed by female-centred households (HFIAS=15.6), extended households (HFIAS=14.9) and male-centred households (HFIAS=13.9) (Table 2). Nuclear households are the most food insecure because they tend to be larger in size with more young dependants. However, while there are variations in the prevalence of food security by household type, the overall picture is of ubiquitous food insecurity with well over 80% of households severely food insecure in each category. As many as 77% of household heads said that they worry about not having sufficient food and 60% that in the previous month there were times when there was no food in the house due to a lack resources to buy it. Nearly half had experienced going to bed hungry because there was no food in the house and 40% had gone a whole day and night without eating. Food shortages led to eating fewer meals (71%) and eating smaller meals (70%).

In addition to lack of access to sufficient amounts of food, the quality of diet in the informal settlements is very poor. In the HDDS methodology, households are asked which of 12 food groups they had consumed in the previous 24 hours. The mean HDDS for all households in the informal housing sub-sample was 2.6, meaning that on average households had eaten food from less than 3 food groups. A total of 63% of the households had an HDDS of 2

FIGURE 3: Distribution of Household HFIAS Scores

TABLE 2: Levels of Household Food Insecurity by Household Type

	Households		HFIAS	HFIAP				HDDS
	No.	%	Mean	Food secure (%)	Mildly food insecure (%)	Moderately food insecure (%)	Severely food insecure (%)	Mean
Female-centred (no husband/male partner, may include relatives, children, friends)	114	28.2	15.6	5.1	0.8	7.6	86.5	2.5
Male-centred (no wife/female partner, may include relatives, children, friends)	100	24.8	13.9	9.9	2.0	6.9	81.2	2.6
Nuclear (husband/male partner and wife/female partner with or without children)	105	26.0	16.9	4.0	0.0	7.6	88.4	2.3
Extended (husband/male partner and wife/female partner and children and other relatives)	85	21.0	14.9	4.7	2.4	11.8	81.1	3.0
Total	404	100.0	15.4	6.2	1.2	8.4	84.2	2.6

or less and 97% had an HDDS of 5 or less (Table 3). An HDDS of 5 is generally considered the absolute minimum for a nutritionally adequate diet. While there was some variation by household structure, from a low of 2.5 for female-centred households to 3.0 for extended households, the values for all groups indicate extremely limited dietary diversity.

Table 4 shows which food groups had actually been accessed by the households in the previous 24 hours. The overwhelming majority (95%) had consumed one of the staple cereals that are core to the daily diet – maize meal, rice, pearl millet, pasta or wheat (in the form of bread). Around one-third were able to supplement the staple with meat (beef, chicken

or offal) and nearly one-third had eaten some fish. Around 22% had been able to consume some vegetables, but apart from non-nutritious commodities such as sugar, tea/coffee and food made with oil, little else had been consumed by many households. Dairy had only been consumed in 8% of households and fruit in only 2%.

Food insecurity in Windhoek's informal settlements is not a function of the unavailability of food since, as the next section shows, there are numerous formal and informal food outlets both within and nearby the settlements. Rather, the high levels of food insecurity are due to the inability of the

majority of households to secure sufficient income to meet their basic needs and to purchase food in sufficient quantity and of sufficient diversity to ensure a balanced and nutritious diet for all household members. In some African cities, poor households are able to mitigate food insecurity through non-market mechanisms such as urban agriculture, urban livestock, rural-urban food remittances and food sharing.

Participation rates in urban agriculture tend to be limited in Windhoek's informal settlements due to land shortages, the arid climate, and lack of access inputs including water (Dima and Ogunmokun

TABLE 3: Distribution of HDDS Scores

No. of food groups	No. of households	% of households	Cumulative % of households
0	11	2.6	2.6
1	33	7.9	10.5
2	220	52.5	63.0
3	68	16.2	79.2
4	43	10.3	89.5
5	24	5.7	95.2
6	8	2.9	98.1
7	4	1.0	99.1
8	3	0.7	99.8
9	1	0.2	100.0
10	0	0.0	
11	0	0.0	
12	0	0.0	
Total	411	100.0	

TABLE 4: Food Groups Consumed

Food groups	No. of households	% of households
Cereals and food made from grains	398	95.0
Meat including beef, chicken, offal	141	33.7
Fresh or dried fish	121	28.9
Foods made with oil, fat or butter	101	24.1
Vegetables	93	22.2
Sugar or honey	89	21.2
Other foods such as condiments, coffee, tea	57	13.6
Dairy products including milk and cheese	33	7.9
Foods made from beans, peas, lentils or nuts	19	4.5
Potatoes and other tubers	11	2.6
Eggs	10	2.4
Fruit	5	1.2

Note: Multiple-response question

2004). In this survey, less than 10% of households grew any of their own food or kept livestock for food in the city. A few grew some food in rural areas (around 9%). However, only 11% received food from relatives in rural areas, a figure significantly lower than previously identified for Windhoek and a practice that has been critical to survival among low-income households in the city in the past (Frayne 2007). While there is some food sharing in the informal settlements, the number of beneficiaries is small (less than 10%). This may not be because households are unwilling to share but that they barely have enough for their own survival.

Supermarkets and Food Deserts

The household diet in the food deserts of Windhoek is monotonous and dominated by a few commodities – maize meal, pearl millet flour, rice and bread – supplemented, when possible, by meat, fish and vegetables. A classic global north city food deserts argument would implicate the absence of supermarkets as a key culprit in the limited and nutritionally-poor diet of such households (Cummins and Macintyre 2002). However, Windhoek

has undergone a supermarket revolution in the last two decades and there are now over 30 supermarkets scattered throughout the city (Figure 4) (Nickanor et al 2017). The majority are owned by South African companies with one long-established local chain, Woermann Brock. While most supermarkets are located in higher-income areas in the centre and south of the city, there are a number of budget outlets towards the north. What unites them is their spatial location in proximity to the informal settlements and the underlying corporate strategy to explicitly target low-income consumers.

Table 5 shows that the vast majority of households in informal shack housing purchase food at supermarkets (at 93%, far more than any other type of formal or informal outlet). The importance of spatial proximity in encouraging patronage is confirmed by the fact that the most popular supermarkets are virtually all located in the northern part of the city (Table 6). The question is how to reconcile this level of supermarket access and patronage with the extremely high levels of food insecurity in the informal settlements detailed earlier. The answer is to be found in how often households patronize supermarkets and what products they purchase.

TABLE 5: Food Outlets Patronized by Residents of Informal Settlements

	No. of households	% of households	At least five days per week	At least once per week	At least once per month	Less frequently
Formal						
Supermarkets	389	93.1	1.0	10.0	72.8	16.2
Small shops	64	15.3	7.8	59.4	21.9	11.9
Fast food/ takeaways	17	4.1	0.0	11.8	88.2	0.0
Purchase at commercial farm	4	1.0	0.0	25.0	75.0	0.0
Restaurant	2	0.5	0.0	50.0	50.0	0.0
Informal						
Open markets	243	58.1	14.9	46.3	16.9	21.9
Street vendors	113	27.0	62.2	21.6	8.1	8.1
Tuck shops	60	14.4	47.5	35.6	16.9	0.0
Note: Multiple-response question						

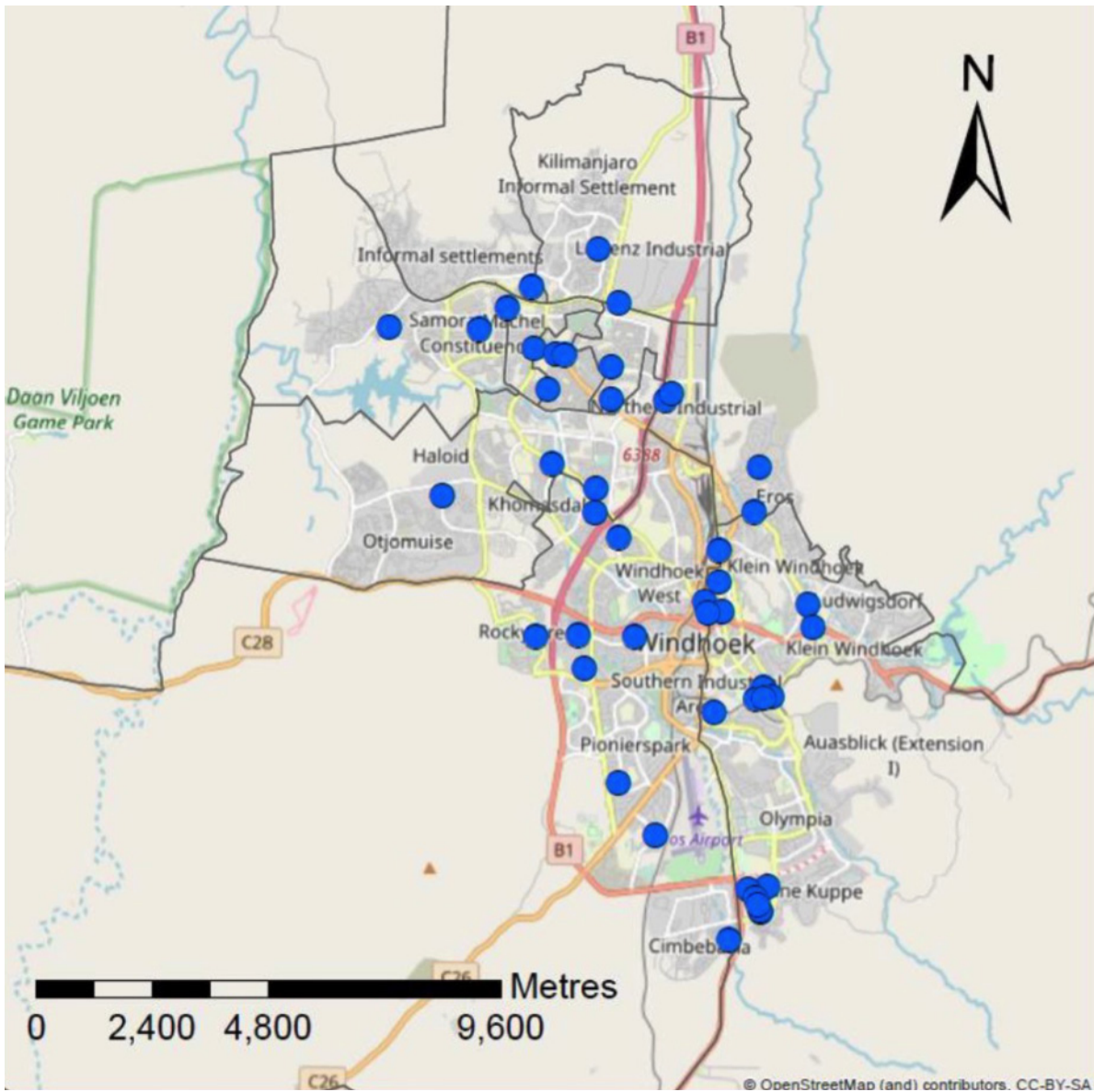
TABLE 6: Supermarkets Patronized by Informal Settlement Residents

	No. of households	%
Shoprite Monte Christo	81	21.0
Woermann Brock Goreagab	56	14.5
Shoprite Katutura	45	11.7
Woermann Brock Ombili	43	11.1
Namica Supermarket	41	10.6
Woermann Brock Otjomuise	26	6.7
Shoprite USave Olyeeta	22	5.7
Woermann Hyper Monte Christo	15	3.9
Woermann Hyper Soweto	5	1.3
Pick n Pay Wernhil	4	1.0
Shoprite USave Soweto Market	4	1.0
Woermann Brock Oshakati Service	4	1.0
Pick n Pay Soweto	3	0.8
Cash n Carry Northern Industrial Area	3	0.8
Metro Cash n Carry Northern Industrial Area	2	0.5
Pick n Pay City Centre	2	0.5
Checkers Klein Kuppe	1	0.3
OK Foods Government Office Park	1	0.3
Shoprite CBD	1	0.3
Olyeeta Supermarket	1	0.3
Fruit & Veg City CBD	1	0.3
Others	25	6.5
Total	386	100.0

Table 5 indicates that most households do not patronize supermarkets with any frequency: nearly 80% of the households purchasing food at supermarkets do so monthly or less frequently. Only 10% of households shop at supermarkets with any regularity (weekly or more frequently). This, in turn, raises the question of what foodstuffs these food insecure households are buying when they go to supermarkets. As noted above, one of the main attractions of supermarkets is the possibility of

buying in bulk. The HCFPM provides a product-by-product analysis which shows exactly what bulk buying is taking place (Table 7). The table shows the top 10 food products (purchased by the greatest number of households in the month prior to the survey). What stand out is that over 90% of households purchase their staple cereals – including mealie meal, rice and pasta – at supermarkets. The supermarkets, in turn, have entire aisles devoted to these products packaged in bulk.

FIGURE 4: Location of Supermarkets in Windhoek



Katutura USave Supermarket

TABLE 7: Household Patronage of Different Food Retail Outlets

	No. of households	% of households	Formal outlets			Informal outlets		
			Super-market	Small shop	Butchery	Open market	Tuck shop	Street seller
Mealie meal	347	80.5	92.5	2.3		1.2	1.2	0.3
Bread	342	79.3	39.7	19.0		2.7	31.5	1.1
Fish	172	41.1	20.9	5.2		24.4	2.9	42.4
Rice	163	37.8	98.8			1.2		
Pasta	151	35.0	98.6			0.7		
Meat	150	34.8	34.7	4.7	16.7	33.3	0.7	10.0
Vegetables	78	18.1	56.4	6.4		26.9	3.8	6.4
Mahangu	70	16.2	92.1	3.9		1.3	2.6	1.3
Offal	52	12.1	20.4	1.9	7.4		44.0	22.2
Fruit	29	6.7	75.9			17.2		6.9



Staple Cereals in Bulk, Shoprite Katatura

Informal Food in the Deserts

The informal food sector has been identified in many African cities as playing a key role in delivering affordable food to low-income households (Nickanor et al 2016). In Windhoek, informal retail has expanded in volume and complexity with the rapid growth of the city. The sector is characterized by several different types of enterprise, including: (a) tuck shops, which are small informal shops in

fixed structures located primarily in informal settlements; (b) mobile vendors selling door to door or from the back of small trucks; (c) street vendors on pavements, at transport hubs and outside supermarkets (clusters of street vendors in various areas are known as informal markets); and (d) open markets, which are formally established and approved by the city authorities. The municipality is responsible for fee collection from vendors who rent market stands, security, cleaning, sanitation facilities and maintenance.



Tuck Shop in Informal Settlement



Mobile Vendor in Informal Settlement



Street Vendors



Informal Market



Tukondjeni Open Market

Of these various sources, open markets were patronized by almost 60% of households in the month prior to the survey, street sellers (including informal market vendors) by just over one-quarter and tuck shops by 14%. The city's nine open markets therefore play a key role in the food provisioning of the informal settlements. The most important is Tukondjeni in the Tobias Hanyeko constituency, the preferred market for 46% of the informal households. Other well-patronized markets include Single Quarter (preferred by 25% of households), Okahandja (also in Tobias Hanyeko) (by 8%), and Soweto (by 10%) (Table 8). Patronage of open markets is not as consistent as with supermarkets but almost half of those who shop at open markets do so on a weekly basis and another 15% almost daily (Table 5). The main products bought at the open markets are meat, fish and vegetables (Table 7). They therefore do play an important role

in making more nutritious foods available for those households that can afford the products.

Street sellers and tuck shops are patronized much more frequently than either supermarkets or open markets; almost daily in many cases (Table 5). This is mainly because they make food available within walking distance in the informal settlements themselves, break bulk to sell in small and affordable quantities and offer food on credit to trusted customers. Tuck shops meet the local demand for bread and for offal, while street sellers provide fish, meat and offal. Both informal retailers therefore play a role in making a greater range of food available and accessible within the informal settlements. However, their presence is insufficient to mitigate chronic food insecurity as households are only able to patronize these outlets when they have sufficient income to do so.

TABLE 8: Preferred Open Markets of Informal Settlement Households

	No.	%
Tukondjeni Market	145	42.0
Single Quarter Market	85	24.6
Soweto Open Market	34	9.9
Okahandja Park Market	29	8.4
Hakahana Open Market	25	7.2
Wanahenda Bus Stop Open Market	13	3.8
Khomasdal Open Market	8	2.3
Green Well Open Market	5	1.4
Eliaser Tuhadeleni Market	1	0.3

Conclusion

Urban food deserts are growing rapidly in many African cities and represent a major development and governance challenge. While low-income areas of most cities qualify as food deserts, in terms of the Africa-appropriate definition used in this paper, informal settlements are particularly intense and chronic sites of food deprivation. Much of the literature on informality in African cities focuses on housing, sanitation and infrastructure. The place of food in informal settlements receives much less attention. For example, UN-Habitat's list of key urban challenges does not even mention food security as a concern goal (UN-Habitat 2018). Similarly, while Sustainable Development Goal (SDG) 11 provides a list of targets for the achievement of sustainable cities by 2030, food security is notably absent (Battersby 2017). The reasons for the neglect of urban food deserts in the international food security agenda relates to the pervasive anti-urban bias in official and non-governmental thinking (Crush and Riley 2018).

By contrast, the residents of Africa's informal settlements identify putting daily food on the table as one of their most significant challenges. Using the case study of Windhoek, Namibia, this paper argues that this is not because there is insufficient food in the city. On the contrary, the growing presence of supermarkets targeting lower-income areas of the city, officially-sanctioned marketplaces, and a vibrant informal food sector all ensure that

food is available and spatially accessible. It is simply not accessible in sufficient quantity, of sufficient variety, and with sufficient regularity. Urban food deserts in Windhoek evidence extraordinarily high levels of food insecurity as households struggle to do much more than eat a diet of cooked maize meal or rice supplemented, when possible, with meat or fish. Urban agriculture is unviable, leaving households reliant on occasional transfers of food from the rural north to diversify their diet. The visibility of food may be partially responsible for official perceptions that there is no crisis and, indeed, no food deserts. Like most African cities, Windhoek does not have a holistic and systematic food security policy plan that would help address the problem of informal food deserts. If it were to develop such an urgently-needed plan, it could serve as a model for other urban areas on the continent.

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