

Article

## Exploring Sustainable Urban Food Provisioning: The Case of Eggs in Dar es Salaam

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**Abstract:** Global food supply is dominated by transnational corporations, which have great power and are widely critiqued for the negative environmental and social impacts of their operations. Many argue that this industrial food system is unsustainable, yet its expansion seems inevitable and alternatives are seen as incapable of feeding the world's growing and increasingly urban population. Since much of the world's future population growth is going to happen in the cities of the developing world, they have become the frontline for the expansion of the industrial food system, raising the serious challenge of ensuring food security for residents. This paper, based on a qualitative study of patterns of egg provisioning in Dar es Salaam, explores whether existing patterns of food supply in this rapidly growing city, of over four million people, provide workable alternatives. Eggs are an important source of nutrition and patterns of egg supply offer a lens through which to explore the sustainability of different modes of provisioning. A range of non-corporate provisioning patterns, based on small-scale enterprises, are found to have social, economic and environmental advantages, challenging assumptions that corporate food chains are necessary, or desirable, to feed cities sustainably.

**Keywords:** right to food; food networks; eggs; sustainable development; Dar es Salaam; food chains; supermarkets; bicycles; micro-enterprises

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## 1. Introduction

The main question this paper contributes to addressing is whether there are sustainable alternatives to the industrial food system, which is increasingly dominated by transnational corporations and widely critiqued for its negative environmental and social impacts. Many argue that this industrial food system is unsustainable, noting that, among other things this system involves an increasing concentration of power and profit in fewer and fewer hands; depends on fossil fuels; emits enormous amounts of carbon and methane that are driving climate change; destroys biodiversity and sucks up scarce fresh water resources; contributes to breaking down the social fabric of communities; leaves close to 900 million people hungry; and delivers highly processed foods that are contributing to the plague of obesity [1–4]. Despite all these drawbacks the expansion of this pattern of food supply often seems inevitable and some argue that it is essential to feed the world's growing population.

Van der Ploeg in his book *The New Peasantries* argues that “it is the rise of Empire as an ordering principle that increasingly governs the production, processing, distribution and consumption of food, and in so doing contributes to the advance of what seems like an inevitable agrarian crisis”, and concludes the book with a chapter on the peasant principle arguing for “repeasantization as a way out of the global agrarian crisis” [5] (p. 11). Like others, Weis, in *The Global Food Economy*, paints a bleak picture of the current situation, but also claims that neither the expansion of the industrial food system “nor its social fallout is inevitable or stable” [2] (p. 25).

In Tanzania, as in many developing countries, most of the food is produced by peasants, or what many prefer to call small-scale or family farmers, not by corporate food chains. This raises the question as to whether this mode of food provisioning, which exists to a large extent outside corporate control and yet feeds large cities, could offer sustainable alternatives for other parts of the world.

The challenges involved in ensuring that people can feed themselves is nowhere more strongly evident than in the rapidly growing urban centers of the developing world, where much of the world's population growth over the next decades will occur, and where the people live mostly in slums and poverty [2,6]. Any alternative to the industrial food system is going to have to meet these challenges, and maximize the opportunities involved in sustainably providing food for the expanding mass of urban dwellers [3,6,7].

In this paper, therefore, I look at sustainability as including a mode of food provisioning that is independent of corporate control, delivering food that is needed for large and fast growing cities. This notion of sustainability is well captured in the commonly used definition found in *Our Common Future*, frequently referred to as the “Brundtland Report” of 1987 [8] (p. 37), which reads as follows:

*Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It contains within it two key concepts:*

- *the concept of **needs**, in particular the essential needs of the world's poor, to which overriding priority should be given; and*
- *the idea of **limitations** imposed by the state of technology and social organization on the environment's ability to meet present and future needs.*

There is a wide agreement that issues relating to environment, economy and community all need to be considered when assessing sustainability [9]. The World Bank identifies essentially the same three elements saying there is a need to “balance social, economic, and environmental objectives or needs” [10].

Eggs are an important source of nutrition [11,12] and the case of egg provisioning in the large and growing city of Dar es Salaam offers a useful lens through which to look at the sustainability of patterns of food provisioning and to explore the alternatives to the corporate food system. Research for this paper involved assessing the extent to which the various food provisioning systems that supply eggs contribute to, or detract from, people’s ability to get adequate food, and the impact of these systems on the environment, economy and community. Within this, I also emphasize how the system is meeting the needs of people who live in poverty for whom the struggle to sustain access to adequate food and nutrition is greater.

## 2. Methodology

This is an exploratory and descriptive study that is also applied research with possible policy and urban planning implications [13]. A qualitative ethnographic approach was deemed most suitable especially as describing and understanding how the patterns of provisioning work and their social, cultural as well as economic ramifications is central to the study [14]. The research carried out at different times from end November 2011 to October 2013 combined observation, accompaniment and semi-structured and informal interviews with key participants involved in egg provisioning as well as a range of eaters in Dar es Salaam [15]. I use the term “eaters” because my research takes an interest in people and how and what they eat. I attempt to view their situations without preconceptions. In Dar es Salaam, concepts such as “consumer” and “household” run into definitional and practical challenges. Many research subjects live and eat within complex and fast-changing sets of social and familial relations. Further, many are not “consumers” in the sense that they are eating food they did not buy—they have many other means of acquiring food, and they often lack the sense of choice implied in the concept of a consumer (The concept of eaters is being developed further in a forthcoming paper on eaters in Dar es Salaam by the author). Thus, this paper draws on findings about the situation of eaters to consider what would constitute a sustainable food system or, more specifically in this case, a sustainable supply of eggs that would meet their needs. The paper forms part of a wider study of food provisioning in Dar es Salaam from which it is hoped more findings will be shared in forthcoming papers.

I intentionally start with and give more attention to the situation and interests of urban eaters. This runs counter to the more common approach, in what many see as “value chain” studies, which usually start with the producers. I suggest that eaters’ perspectives are both under researched and increasingly important to understand in our urbanizing world.

I chose a street (hereafter referred to as The Street—see Figure 1 for map) in the mixed-income area of Msasani about 7 km from Dar es Salaam’s city center as a starting point for looking at and comparing the sources of eggs available to eaters. I selected the site partly due to ease of access—I live in The Street and could, therefore, take advantage of being to some extent part of the culture [13,15]. The Street hosts a population from mixed-class and ethnic backgrounds, a variety of egg outlets and

proximity to one of the city's few supermarkets. Surveys of other areas in the city reveal that the types of food outlets present in The Street are similar to those elsewhere.

To map egg provisioning in The Street, I started with the retail outlets, the nearest supermarket and nearest “people’s market”. In this paper, I use the term “people’s market” to refer to what is called a “wet market” or “wetmarket” in some literature ([16], p. 2; [17] p. 1143). In Dar es Salaam, these are usually areas designated by the municipality for traders. The markets have central covered areas under which traders—around a 100 upwards—rent small stalls. Sections of the markets are set aside for different foods—vegetables, meat, fish, *etc.*—and small shops surround the central trading area. The term ‘people’s market’ better signifies the relationship and significance of these public market spaces to the wide number of people who use them. The term also points to these being spaces that are structured more around the mobilization of people, as compared to supermarkets which tend to be structured more around the mobilization of capital. The operation of these egg outlets, the eggs themselves, and their means of supply, were observed and analyzed, taking into account environmental, economic, and social implications.

**Figure 1.** Map of Dar es Salaam showing The Street and key egg suppliers.



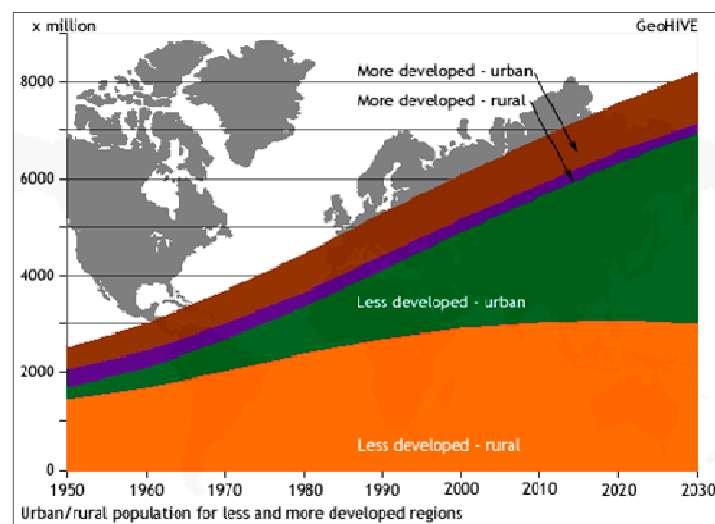
A wider circle of egg outlets in the neighboring streets and elsewhere in the city were surveyed to establish if the prices, eggs and their sources were similar. Observation over time in a number of areas of Dar es Salaam informed my broader perspective on the egg sector in the city. I gave particular attention to getting more information on one of the more significant forms of egg supply in the city, namely bicycle deliveries from peri-urban areas [18,19]. For this, I undertook participatory

observation, cycling with different egg suppliers to the egg farmers they procure from and back to their homes. Monitoring some of the delivery routes and brief interviews with a wider range of cyclists provided a sense of the scale and other insights into this mode of egg provisioning.

### 3. The Context

Dar es Salaam in Tanzania is one of the fastest growing cities in sub-Saharan Africa and the ninth fastest growing in the world [20]. With a population of just under 2.5 million in 2002 the city accommodated over 4.3 million by 2012 [21], and is expected to have around 10 million occupants by 2020. This illustrates the situation of many urban centers in the developing world where this urbanization is happening without the industrialization that has accompanied the rapid urbanization of Europe over the last centuries [6]. Almost all the population growth projected for the coming decades will occur in the cities of the less developed world (Figure 2), like Dar es Salaam, and the people living in such cities will face new struggles for survival and a better life [2,3,6,22].

**Figure 2.** Population growth projections by urban, rural and developed, less-developed countries [22].



Agriculture is still Tanzania's largest economic sector. Around 80% of the population depend on agriculture and related activities for their livelihoods, and on small-scale peasant or pastoral production systems producing enough to make the country marginally food secure [23,24]. It has been shown that urban agriculture also contributes to urban food security and poverty reduction, particularly by providing opportunities for women [25–27].

The agricultural sector is, however, under pressure, with a rate of growth that is below expectations [28]. Tanzania is directly experiencing what Lang refers to as the “new fundamentals”, including having felt the effects of the global food-price crisis of 2007–2008 and experiencing increasingly erratic weather conditions linked to climate change [29–34].

Economic liberalization from the mid-1980s onwards has contributed to economic growth rates of over 7% in Tanzania. Along with other international investors, supermarket chains have begun to establish themselves in the country [35,36]. However, this growth has also created greater inequalities

and had a limited impact on poverty levels leaving more people feeling worse off [37,38]. A third of the population remains undernourished and close to 40% of five year olds (26% in urban areas) are stunted due to poor nutrition [30] (p. 45), [39] (p. 4).

In many ways the situation of the majority of residents of Dar es Salaam fits with the desperate conditions described by Davis in *Planet of Slums* as well as in the UN Habitat report *The Challenge of Slums* [6,40]. The conditions that have led to the situation of Dar es Salaam are also consistent with Davis's analysis; indeed Davis makes a number of references to Dar es Salaam as an example of how liberalization, failing public services, push factors from rural areas, along with failed urban industrialization initiatives, have combined to create enormous slums and desperate living conditions for many residents [6].

To contextualize the prices and price changes referred to in this paper, the exchange rate between the Tanzanian shilling (TSh) and the United States (US) dollar remained around TSh1550 to \$1 during the course of this study. In January 2012, headline inflation in Tanzania was 19.7% with non-beverage food inflation at 27.8% [41]. By September 2013, non-beverage food inflation had dropped to 6.5% [42].

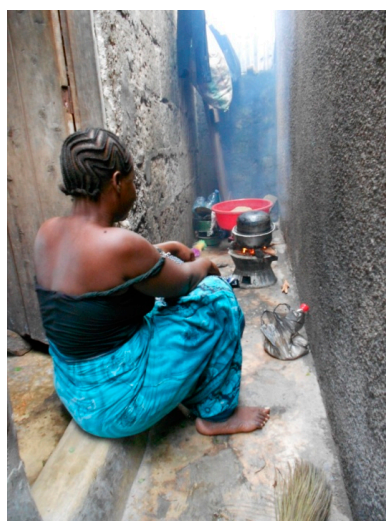
#### 4. Eaters

In this section, I sketch the situation of some eaters and draw on key statistics to give a sense of the circumstances within which many residents of Dar es Salaam live. Of course, these circumstances impact on their eating and food supplies, including eggs, acquisition needs and abilities and are a key consideration for sustainability from the perspective of the eater.

##### 4.1. Husna

Husna (Names are changed for individuals referred to in this paper) (aged 24) lives in one room of a two-roomed house with her one-year old child, her mother and her younger brother aged 23. The room is about three meters by two-and-a-half meters in size. Husna cooks on a small charcoal stove in the narrow space between her house and that of her neighbors (Figure 3).

**Figure 3.** Husna cooks on a charcoal stove in the tiny space between her house and her neighbors' wall.





The short corridor separating the two rooms of her house forms the main social, living and eating space (Figure 4). In this corridor Husna's child and visitors sit on the floor, or on low stools borrowed from the neighbors, share food and talk.

**Figure 4.** Sitting on the floor and eating in the corridor of Husna's house.



The house was built by Husna's mother when she had a job. Now, due to a stroke, she cannot work. They rent out the second room for a little income. Husna's younger brother has no job, but goes out each day trying to find employment, working as a temporary security guard or chopping and selling firewood to earn a few shillings. Husna does not know how her brother gets money for food, she simply says "he has his going around, around (*zungusha, zungusha*), this and that which he does (*shughuli, shughuli*)". Many days Husna has no money to buy food and waits for her brother to come home, hoping he will bring some maize meal and perhaps a few green vegetables, or sometimes as a treat an egg or two, to make a meal for the day. Her child seems to lack energy when I visit and has had a series of illnesses. Visits to the doctor do not seem to help. Sometimes Husna borrows food from neighbors or buys on credit from the shop, but she cannot do this for long if she cannot pay them back. There is no money or space for cupboards or a fridge in her home. They buy what food they can when they can and they use it straight away.

#### 4.2. Tabu

Tabu (aged 30) lives in a room in a half-built house. The owner who does not live there has let her stay rent free after she had to leave other places. Her older child has been taken in by relatives and she does not see him anymore, her younger child died in 2012. She is HIV positive and has been struggling with TB for some time. Previous business efforts that she started failed when medical expenses, for her child and later herself, absorbed her money, and her poor health made work difficult.

Tabu has a sister who lives nearby, but her sister's husband does not want Tabu to stay with them as he is worried that she will pass on her infection to the family. Her previous landlord evicted her for the

same reason. Where Tabu stays now has no electricity and more importantly no doors or windows. In August 2013, her mattress and cooking equipment were stolen.

Tabu is not employed and has no regular business activity to earn an income. She lives a precarious existence, relying on assistance from neighbors and relatives. Sometimes she does odd jobs like clearing a neighbor's yard. Due to her HIV status she is advised by doctors to eat nutritious food and says, "I try to eat a lot of eggs, also drink milk; they add strength to my body". When she can she buys the eggs "two, two, from the *duka*" (*duka* is Swahili for a small local shop). Inevitably, under the circumstances, I was asked by Tabu for assistance with money for food, which from time to time I did provide.

#### 4.3. Hassan

Hassan (aged 26) lives with his grandmother and younger sister who have no income and depend on him for food and other support. His parents passed away years ago. Hassan used to buy and sell fish for some income. Now pays a weekly rent to his friend who owns a motorbike, and transports passengers on the bike in what is an increasingly popular form of taxi service in Dar es Salaam.

Most days Hassan eats with a group of about ten young men on the street corner; they pool their limited resources and cook together on the side of the road. He mostly eats a thick maize-based porridge known as *ugali*. Sometimes they have rice, usually with beans and or some additional item like green vegetables or small fish. Hassan eats eggs about once a week, saying "I like eggs, not every time, but I like eggs...I buy at the *duka* because it is easy, I buy two, not more than two." He eats eggs with bread for breakfast or with *ugali*; and sometimes, not often as he sees it as expensive, he eats chips and eggs.

#### 4.4. Statistics

Key statistics, all from Tanzania's National Bureau of Statistics and Ministry of Livestock Development [12,21,43] confirm that a large number of people live in conditions such as those described above:

- 10.1% of mainland urban (Dar es Salaam is by far the largest mainland urban area) households have motorized transport (motorbikes, cars or trucks).
- 40.8% of mainland urban households have only one room for sleeping,
- 25.9% of mainland urban households have two or fewer members, the remaining 74.1% have three or more members.
- 20.9% of the mainland urban population has water piped to their yard or house.
- 45.4% of mainland urban population has electricity.
- 64.6% of the mainland urban population cooks on charcoal and 23.6% on wood.
- 23% of mainland urban population has a refrigerator.
- 27.3% of mainland urban households sometimes or often had a problem satisfying food needs in 2012.
- 16.4% of the Dar es Salaam population lives below the basic needs poverty line.
- Eggs are an important source of nutrients, proteins, vitamins, and have been found to contain "substances with biological functions beyond basic nutrition" [11] (p. 8421). In Tanzania in



2002, total egg consumption was around 31,000 tons, which while significantly less than beef consumption was more than 75% of the combined sheep and goat consumption, and more than double pork consumption [44] (p. 8).

- Between 2002 and 2006/07, egg production increased from 790 million a year to 2.2 billion [18] (p. 7). In the same period, per-person consumption of eggs doubled from 23 to 50 per year [45] (p. 11).

It is clear that many residents of Dar es Salaam live in crowded conditions with little or no secure storage space for food. Very few have access to fridges or private motorized transport and this has a major impact on what they can buy and where. Many survive not only on low incomes, but on irregular and unreliable incomes, and often have to resort to borrowing to get them through days when they have no income. A supply of food close to their places of residence, which can be bought in whatever minimum quantities residents can afford, is therefore extremely important. Eggs are easily accessible and are available from the full spectrum of retail outlets including street traders, small shops, and supermarkets [18]. This makes them an interesting entry point for looking at the relative merits and sustainability of various modes of food supply.

## 5. Egg Sellers to The Street

The Street I focused on when looking at egg supplies is about 200 m long, with 25 houses. The road itself is a bumpy dirt surface that changes with the rains and the ad-hoc efforts of residents to patch up holes, dump rubble from building projects, and create speed bumps to slow down the passing cars. It is a family neighborhood, but the families differ dramatically. On one corner, a three-storey mansion fills almost an entire plot, is surrounded by high walls, and you will rarely see anyone come or go through the gate. Around another corner, where a number of young men sleep in the street, is the *swahilini* (informal settlement) area of Bondeni, with crowded living conditions, floods in the rainy season, no running water and pit toilets. Between the extremes of mansions with many rooms and satellite dishes and people sleeping in the street, are single storey homes, usually consisting of four or so rooms, often accommodating extended families. Several of these households rent out one or more of the rooms or backyard shacks for around TSh30,000 (approx. \$20) a month. Cooking is often done in the yards on small charcoal stoves. Boys play soccer in the street in the evenings and girls are sent to the shops to buy things their mothers or nannies need. There are some wealthy residents and some who regularly go to the doors of their richer neighbors seeking food or money for medical bills, school fees and other such needs.

### 5.1. *Mangi's Duka*

Three houses from the western end is the main egg supplier and the only shop on The Street; *Mangi's Duka* (*Mangi* is the Chagga word for chief, and is widely used to refer to shopkeepers who are often thought to be Chagga speaking. *Duka* is Swahili for shop. *Mangi* in this report refers to the particular shopkeeper—actually twins—in The Street, and *Mangi's Duka* refers to their shop. The word *duka* is used to refer to other similar small local shops). It is typical of thousands of other small general dealer stores throughout Dar es Salaam. Open from around 7 am to about 10 pm every day, *Mangi's Duka* is made of wood with a zinc roof, and stands under the shade of a tree in the front yard

of a house (Figure 5). People buy over a counter that opens onto the street. Mangi sells a wide range of items including staple dry foods like maize flour, rice, beans, cooking oil and tinned foods, as well as general goods such as brooms, flip flops, school exercise books and of course sodas (e.g., Coca Cola and Pepsi) and eggs.

The eggs are arranged in reused trays, holding 30 eggs each, stacked on top of each other on the counter. While the eggs are transported and stored at the *duka* in trays, and some customers bring their own containers, Mangi does give many customers plastic bags in which to carry their eggs and other items. Mangi keeps up to seven trays at a time, and sells about 14 trays a week with prices during the study period varying between TSh250 (\$0.16) and TSh300 (\$0.19) per egg. In 2011 and early 2012 these eggs were supplied every two or three days by the same cyclist, Samuel, who rides with the eggs from the village of Kipunguni 22 km away. Towards the end of 2012 and through 2013 Mangi continued to buy from Samuel, but also at times bought eggs from a friend of his who is an egg wholesaler in another part of town, fetching them on his motorbike.

Mangi sells eggs one by one, and in any quantity that customers request. Most customers buy a small number of eggs. Typical examples include a man with a child on his arm buying half a kilo of maize meal and two eggs, a woman taking three eggs, and even a man taking one egg on credit at 10 pm.

Regular customers at Mangi's Duka can and do get food on credit. This is always interest free and the time period for repayment varies but seldom extends beyond month-end. Often a person may take items one day and pay the next, some pay weekly. Many times the woman who works in my house, cleaning and assisting with my children, has gone to the shop to get an item she needs for the house and I have paid Mangi when I got home in the evening from work.

**Figure 5.** Mangi's Duka in The Street.



The area of road in front of Mangi's Duka is a space where people meet and share news and ideas. I often meet my neighbors there. This is a social space that this form of egg sales makes a contribution to supporting. Even if a customer talks to no one else they have to speak to Mangi to ask for what they need. During the day some people return several times to buy different items and others stop to chat

even if they are not buying anything. Mangi is known to people in The Street and he knows them. He is there every day from morning until evening. When the daughter of a family who live in The Street got married I attended the wedding and found Mangi there among the other guests. Children often play outside the shop and children as young as five or six come to the Duka on their own. In the evening mostly young men are often to be found standing or sitting around the Duka drinking soda and talking. I have seen people leave their luggage, keys for their houses, and messages for neighbors at Mangi's Duka and I have done the same. An old man with no work or other income, Mzee Steven, often sat next to the Duka. It was where he chatted to people, drank coffee, and received the small gifts that he lived on. It was from Mangi that I heard Mzee Steven had passed away.

There are five other *dukas* within a few minutes' walk from Mangi's Duka selling a similar range of products including eggs. These, like Mangi's, ranged in price from TSh250 (\$0.16) to TSh300 (\$0.19) per egg during the research period and were brought to the shops by different cyclists.

### 5.2. Selling From Home

On the other side of The Street about 100 m from Mangi's Duka is a house with a handwritten sign outside advertising eggs for sale: In February 2012, they were priced at TSh7500 (\$4.84) per tray or TSh250 (\$0.16) each and by October 2013 after various fluctuations they were selling for TSh8000 (\$5.16) a tray or TSh300 (\$0.19) each. A young woman, Hadija, sells the eggs. Her sales varied over the period of research normally between one and two trays a day. In February 2012, she was buying them from a shop in Ilala for TSh6500 (\$4.19) per tray, so her gross profit per tray was TSh1000 (\$0.65).

Initially Hadija would buy 20 trays of eggs at a time and transport them by bus from Ilala to Msasani (The buses referred to in this paper are known in Swahili as *daladalas* and they provide most of the public transport in Dar es Salaam. Small to medium sized buses, they have 25–30 seats although many more passengers often squeeze inside. The buses run set routes and fares are government regulated, but there are no set schedules for their operation), where she then got a *bajaji* (a three-wheel motorized scooter used as a taxi) from the bus stop to her house. I took the same journey as Hadija and found the egg shop near the bus stop on a busy road. The young man running the shop sells eggs only. He goes out to buy them from farmers around Kitunda. In early 2012 he was selling trays for up to TSh7500 (\$4.84) each, but would reduce his price for bulk buyers like Hadija.

In early 2013, Hadija switched to buying eggs from a bicycle-based egg trader as she found this was more convenient than going to buy her eggs in Ilala and the pricing was competitive.

Hadija's home sales are convenient for customers who live on or near The Street and at times are cheaper than Mangi's Duka, especially if people can buy per tray. Buying from her is not as convenient as buying from the Duka though as one has to knock on the door and wait. I have not seen customers going there early in the morning or late in the evening.

### 5.3. Chip Seller

In the next street is the nearest chip seller (*muuzaji chipsi* in Swahili) with a typical large wok-like dish full of boiling oil on a charcoal stove made from an old truck wheel. Next to this is a small grill used for cooking *mishikaki* (meat on a stick) and the popular dish of chips and eggs cooked into a type

of omelet (*chipsi mayai*). They start cooking the chips before lunch and carry on into the evening. On average, they cook three trays of eggs a day. The eggs are mostly sourced from various cyclists, although at times they are bought from Hadija or from a *duka* nearby.

Some customers collect the food to take away, but a table, some chairs and a bench are arranged under a rough zinc roof to accommodate customers who want to eat there. There are always people sitting at the table, whether eating or not, and people walking and cycling past often stop to chat. In the mornings a woman sells tea and chapattis alongside the chip seller; there is a vegetable stall on the same site and just next to them a *duka*. Customers buying chips often buy a soda from the *duka* at the same time.

The chips and eggs are cooked with two eggs and sell for TSh2000 (\$1.29); this price remained unchanged during the research period. Plain chips were sold in 2013 for TSh1200 (\$0.77), an increase on the TSh1000 (\$0.65) charged in 2012. From this we can consider each egg, when cooked, to be sold for TSh400 (\$0.26) and it seems that the chip seller is squeezing his profit on the eggs by keeping the price down. This is a competitive market with many chip sellers, all selling chips and eggs. In 2012 a new one opened only about 100 m down the road from the chip seller described here.

#### 5.4. Egg Delivery Door to Door

Marriam is from Gongo La Mboto, a village beyond Julius Nyerere International Airport on the road to Kisarawe. Her husband passed away some years ago and she supports herself and her child by selling eggs, knocking on gates in different streets. She carries 10 to 15 trays of eggs each day wrapped in a cloth balanced on her head or slung over her shoulder when there are not so many left (Figure 6). She buys eggs from local small farmers in the peri-urban area of Gongo La Mboto and travels to Msasani on the bus with its government-regulated fare—TSh400 (\$0.26) in 2011 and TSh600 (\$0.39) in 2013—for the approximately 25 km journey across town. She has usually sold her eggs by about 10 am and then heads home. Marriam sells only whole trays of 30 eggs. In 2013 she was buying eggs from the small farmers at TSh6500 (\$4.19) and selling them at TSh7500 (\$4.84). TSHI was not monitoring her prices before 2013.

In August 2013 Marriam called and asked to see me. Her child had been sick and there had been a funeral in the family. To meet these and other demands she had used up the capital base for her egg business. While in theory state-provided health care for her child should have been free, this is not the case in practice—there are costs of transport and almost always some other charges such as opening a file and purchasing medicines. Sickness in a child can also lead to the need to buy different and more expensive foods or additional items such as nappies and sachets of rehydrate.

I lent Marriam TSh100,000 (\$64.52) to buy stock and get back into business. By the end of October 2013 she had not repaid the loan, but her business seemed to be doing well. She has a regular set of customers that she delivers to. If I had not assisted her she may or may not have been able to find other assistance, but she had managed to find her original startup capital without me. While showing the vulnerability of such traders, this experience also reveals the low financial entry barriers to business for her. Around \$65 enabled her to restart a business from which she supports herself and her family.

**Figure 6.** Marriam selling eggs from door to door.

### 5.5. The Supermarket

Shoppers Supermarket in Mikocheni is one of the largest in Dar es Salaam. It is also the closest supermarket to The Street, being about 20 minutes' walk away. Surrounded by car parks, it is located within a small shopping complex called Shoppers Plaza (Figure 7). The air-conditioned interior has shelves packed with different products similar to supermarkets in other parts of the world. If the main electricity supply is cut, a large diesel generator kicks in to continue running the equipment. The eggs are kept in a fridge in one corner near the vegetable section. At the end of November 2011 five different brands of eggs were available in packs of six or 30. Three brands were Tanzanian, all Dar es Salaam based companies; the two imported brands were from France and the United Arab Emirates. Prices ranged from TSh1950 (\$1.26) for six Tanzanian eggs up to TSh19,900 (\$12.84) for six eggs imported from France. A price check done on the same day showed that Shrijees and Shoprite (Shrijees is another supermarket group with four stores in Dar es Salaam. Shoprite is a South African based multi-national company) stocked only the same brands of Tanzanian eggs as Shoppers, but at slightly higher prices.

Over the following two years Shoppers stocked different selections of eggs, often only one brand at a time, and rarely had imported eggs. Eggs were always available in the trays of six, and sometimes in other larger quantities as well. At times they stocked “local eggs” (These “local eggs” are from traditional village chickens (*kuku ya kinyezi*) as opposed to the commercially bred chickens See more on these in Section 5.8) at higher prices or other more expensive eggs claiming that they had yellow yolks or were organic. According to the store's purchasing manager, the imported eggs sold too slowly so they will not stock them again. They prefer, he said, to buy from local suppliers and they choose those who are reliable. Imported eggs have however appeared again in the Shoppers' fridges a few times, although not for long.

Prices of the cheaper eggs in Shoppers crept up over the study period and never fell. In October 2013 they were TSh2800 (\$1.81) for six eggs. While this is substantially more than six eggs from Mangi's Duka (which cost TSh1800 at that time), Shoppers egg prices were consistently lower than the competing supermarket groups. By October 2013 Shoprite and Shrijees were selling trays of six eggs for TSh3000 (\$1.94) and TSh3400 (\$2.19) respectively.

**Figure 7.** Shoppers Plaza where Shoppers Supermarket is found.



### 5.6. Shoprite

Shoprite Holdings Ltd., which proclaims itself to be “Africa’s largest food retailer” [46], had a store in Mikocheni, close to The Street, but this closed in 2008, leaving two other Shoprite stores in Dar es Salaam, neither of which is close to the study site (see [35,36]). Thus, Shoprite was not really seen as a supplier to The Street, but due to their prominence in the city and debates on Supermarkets in Africa they could not be ignored in this study. Efforts to get an interview with the company or answers to questions were unsuccessful, with follow-up emails eliciting only a threatening response. Tracking of Shoprite’s egg prices and quality showed them to be very uncompetitive. For suppliers like Viola (see Section 6.4), Shoprite’s slow payments were also a problem.

There are documented examples of small-farmers who have tried to supply Shoprite, such as that of farmers from Luangeni in Zambia who felt they could not compete with the Shoprite branch in Chipata and, therefore, went into a supply partnership with them [47]. This partnership in Zambia, like others, later collapsed [47]. Many producers and suppliers in Tanzania seem to prefer supplying other outlets. Late in 2013 the news emerged that Shoprite is selling its three branches in Tanzania to Nakumat, a Kenyan retail group, thus ending Shoprite’s efforts to penetrate the Tanzanian market [48,49].

### 5.7. Around the People’s Market

Mikoroshini is within about 15 minutes walk of The Street and is the nearest “people’s market”. Municipal records show that 90 traders rent space in the market where they sell fruit, vegetables and, in another section, meat. Surrounding the central market area are a range of small shops, street traders and eating places with rough benches where tea and food are served. Mama Hamisi has an egg shop in a simple concrete structure close to the main market area. In early 2012 she was selling around



200 trays of 30 eggs a week at TSh6500 (\$4.19) a tray or TSh250 (\$0.16) per egg to small businesses and individuals in the area. The eggs were bought for TSh6000 (\$3.87) from a man who hires a truck to bring them to Dar es Salaam from Kibaha village about 50 kilometers away. They were from one of the largest egg farms in Tanzania, known as Mkuza—see Msami [18].

At times Mama Hamisi was selling trays of eggs at between TSh7000 (\$4.52) and TSh7500 (\$4.84) with single eggs still at TSh250 (\$0.16). By October 2013 she had reduced prices again selling a tray of large eggs for TSh7000 (\$4.52) and smaller eggs available at TSh6500 (\$4.19). She was buying from a range of different suppliers. According to Mama Hamisi, her previous supplier had first shifted to supply eggs to Mtwara, a city in the south of the country and had then stopped supplying eggs entirely saying there was too much competition. Mama Hamisi complained that her business was struggling, but she was not forthcoming about her actual sales quantities or profit margins. She said there was too much competition with a lot of people getting into the business, such as a new egg shop that had opened in a nearby street.

Whenever I have been to Mama Hamisi's shop there are a number of people sitting around and she is talking with them and other shop owners and stallholders nearby. There are few vehicles on the narrow track between the shops and stalls, but many people walk by and interact with Mama Hamisi and other shop owners.

### 5.8. The Egg as Remedy

Just a few meters from Mama Hamisi's shop, down a small alley and under the main market roof is a *duka la dawa asilia* (traditional medicine shop) selling "local eggs" for TSh600 (\$0.39) per egg. The eggs are sold for their health benefits alongside other traditional remedies for a range of ailments and items such as beads. Such "local eggs" do not sell in large volumes, but as mentioned, are also sometimes stocked at Shoppers Supermarket and at Mangi's Duka. I have not studied them as closely due to time limitations and because they do not sell in large volumes in Dar es Salaam. The local chickens that lay these eggs do make up a significant part of the country's chicken stocks [18] (p. 3) and [50] (p. 11), and people who can afford them are willing to pay higher prices for the eggs and meat of "local chickens" believing them to be of a superior quality, healthy and free from chemicals [50,51].

The "local chicken" is an interesting alternative to the commercial supply and while currently a niche product, the ubiquitous nature of the "local chicken" in rural areas means that it seems likely to survive. There also appears to be potential for the expansion of this market [51].

## 6. Egg Distribution and Producers

### 6.1. Bicycles

Others [18,19,52] have noted the large number of bicycles making deliveries of eggs in Dar es Salaam especially from the Kitunda village and surrounds, just beyond the international airport, the same area Samuel comes from (Figure 8). Bicycles on the Nyerere Road (also known as Julius K. Nyerere Rd and Pugu Rd) coming from the airport into town were counted in February 2012 and again in November 2012. In addition to counting the bicycles with eggs, the number of trays was counted on a sample of bicycles to be able to estimate the total eggs being carried by bicycle on this route.

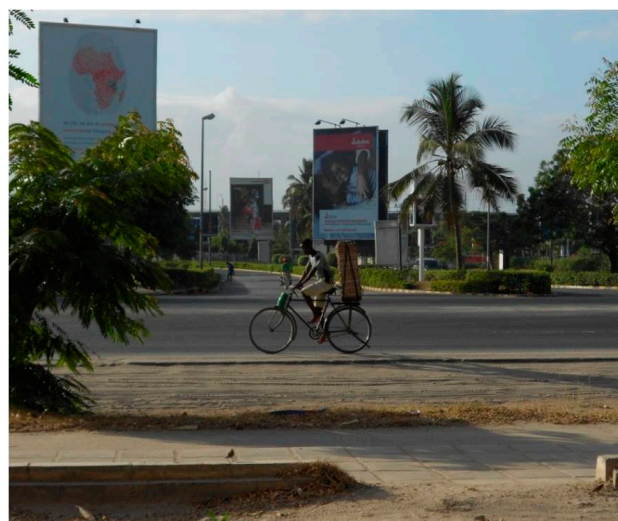
In February 2012, the count was done over three days and gave estimated figures of over 1000 bicycle journeys a week carrying more than 20,000 trays or over 600,000 eggs. The November count was done for a full week, and 1543 bicycle trips were observed carrying eggs to town on the Nyerere Road with an estimated over 33,000 trays, just under 1 million eggs for the week (A further 9190 bicycle trips, without eggs, were counted on the Nyerere Road in that week). This represents a gross income of over TSh9 billion (close to \$6 million) to the small-scale egg farmers in the villages along that road. These figures are only for the bicycle deliveries going to town; other forms of transport are used, and sales also take place within the villages and nearby suburbs. From observation on other routes it appears that the Nyerere Road is the busiest one for this particular trade, but it is not the only route linking peri-urban egg production to the urban market by bicycle. This is a substantial industry that helps to support thousands of self-employed egg distributors and small-scale egg farmers [52] (p. 344).

At the end of 2011, and into early 2012, Samuel, who delivers to Mangi's Duka, made an average of three trips to town a week to deliver eggs and was clearing a profit from this of around TSh195,000 (\$125.81) a month. By 2013, Samuel had increased his deliveries to five times per week, and also the number of eggs he carried on each trip, varying from 15 to 30 trays a trip. Despite Mangi at times buying from another source, Samuel's egg business had expanded as he found more customers and his net income had gone up to over TSh300,000 (\$193.55) per month, well above TSh70,000 (\$45.16), which is the monthly minimum wage in the agricultural sector, and also over TSh150,000 (\$96.77) per month which is the minimum wage in the "inland-transport" sector [21].

For peri-urban egg farmers, the bicycle-based egg traders provide convenient access to markets. Cyclists come to the farms and pay cash for small and flexible quantities as they collect eggs from a number of small producers to make up a load to take to town. *Duka* owners and other buyers have the convenience of delivery to their doors and being able to buy in flexible quantities. Direct supply from farmer to retailer in small quantities ensures a fresh product. This is an excellent example of the "short and decentralized circuits" characteristic of a peasant mode of food provisioning [5] (p. 3).

What the cyclists are not able to do is meet single orders for large quantities from supermarkets. These require either a large producer or an intermediary who will do a greater level of aggregation and packaging to meet the demands of supermarket procurement systems [53].

**Figure 8.** A bicycle loaded with eggs passes Julius Nyerere International Airport.



Far from being the “itinerant middlemen” that Msami refers to [18] (p. 19) the cyclists I have interacted with are part of the communities in which the eggs are produced. They spend their income in those communities, they know the egg farmers, and are part of the social and cultural life. It was notable that when asked about the challenges their businesses face, many of the cyclists spoke about the problems faced by the egg farmers—such as the costs and poor quality of chicken feed—clearly empathizing with the farmer as well as seeing the impacts of competitiveness on an industry that they both depend on.

The bicycle-based delivery system is environmentally friendly with extremely low carbon emissions, reuse of minimal packaging, and little other environmental impact. In addition, the accessible technology of a bicycle, which costs less than a load of 30 trays of eggs, and less than the profit that can be made in a month, must be a key factor in encouraging the large number of independent operators in the sector. The generally flat terrain of Dar es Salaam and some of the better tar roads, such as the one to the airport, as well service roads and side paths, help to put the city within bicycle reach of the peri-urban villages.

## 6.2. Peri-Urban Egg Farmers

I first accompanied Samuel to his village in 2011, cycling home with him after he had made his egg deliveries. We arrived at his home before 1pm and joined his family for lunch in the shade of a tree outside his house. I found that as well as buying from neighboring small farmers he himself owned 100 commercial egg layers as did his sister in law who lives in the same homestead. These chickens were in sheds around the edges of the plot on which his house stands.

I also visited other egg farmers in the area who supply the bicycle egg traders. Most were fairly small-scale egg farmers who had up to 500 commercial layers, but I found some who had a few thousand chickens. The chicks come from different places including Zambia, Kenya, Interchicks and, in the past, from a government-run farmers’ support organization that has since closed. Financial assistance to start came from the National Bank of Commerce (before this was privatized), from a savings and credit cooperative or from the farmers’ own resources and networks.

The farmers are using commercially bred layers, but in a way that is far removed from the forms of “factory farming” that have come in for much criticism from critics of industrial agri-business and groups dedicated to animal rights and healthy food in many countries [54–56]. The typical chicken farm in peri-urban Dar es Salaam is on a small plot that is also a family home with children running around, some shady trees to sit under, sometimes with a few cattle and some crops being grown as well. The chickens on these small, or even micro farms, are generally in spacious enclosures; they have space to run and places to perch.

The main input cost for chicken farmers is the feed that is bought from companies such as Mfugaji Company Ltd., Kiboko, Falcon, and Taboka some of which have operations in Kitunda. All of these appear to be medium-sized Tanzanian businesses. Samuel’s chicken farming was made more affordable, by his being able to walk to the local feed factory with his wheelbarrow to collect sacks of chicken feed. Much of the feed is a by-product of the numerous maize milling and rice threshing operations mixed with some dagaa (tiny fish found in Tanzanian lakes and widely eaten).

The main challenges for these farmers are avian diseases as well as the poor quality and high prices of chicks and feed. They are concerned that the government does not regulate and supervise the production and proper inoculation of chicks or the production of feed.

In early 2013 Samuel restocked with 100 new layers as his old flock was not performing so well. By October, however, his chickens and his sister in law's flock had been sold after some of the chickens got sick. Samuel and his sister-in-law intend to restock again.

There is a wider debate on the ecological sustainability of animal production for food with a growing world population, especially due to high grain consumption with all its negative impacts and feed to food conversion inefficiencies [57]. This critique is stronger for meat than for egg and milk consumption and, while proving this requires a more in-depth and technical study, I would argue that the form of egg farming described here has a very limited "hoofprint".

### *6.3. Public Transport*

Interestingly, public transport with its regulated fares, that is also flexible enough to allow goods like trays of eggs to be carried, enables aspects of this provisioning pattern by linking the periphery with other parts of the city. Public transport, namely buses, were used by Marriam and Hadija for transporting eggs and seems to be particularly important for women who are very rarely seen riding bicycles in Dar es Salaam.

### *6.4. Supermarket Suppliers*

My efforts to obtain information from several of the egg suppliers that supply Shoppers Supermarket did not succeed due to their apparent reluctance to share information. One of the egg suppliers was, however, cooperative and was visited in February 2012 and on a number of occasions after that. The heart of that business turned out to be an entrepreneurial woman, Viola, who works from a small shop in an alley at the back of the Shikilangu people's market. Viola buys eggs from small and medium-sized farms in Bunju, Bagamoyo, Kiluvia, and Kibaha—all peri-urban or rural areas on the periphery of Dar es Salaam, but further away than Kitunda. She phones the farmers who deliver their eggs to her. In early 2012, she was paying TSh6000 (\$3.87) per tray of 30 eggs, but the prices had been higher in December 2011, lower before that, and continued to fluctuate at around TSh6000 (\$3.87) per tray.

Viola saw an opportunity and started selling to Shoppers and Shrijees supermarkets in 2008. She does not sell to Shoprite because "they delay a lot in paying, they send to South Africa to get it approved and only pay after more than a month...while I wait life is tough". This is another example of Shoprite's inaccessibility for local small-scale suppliers [35,36]. Viola thus sells to Shoppers and Shrijees, which both take stock on credit, but pay after only a few days. She also buys from the farmers on credit, paying them after a few days, but she says if she could get access to more capital she would pay cash up front in order to secure larger and more consistent supplies.

When Viola gets an order from Shoppers, which is once or twice a month, the eggs that are delivered to her are packed by her and her children into plastic trays imported from Kenya. They stick labels on the trays and put them into cardboard boxes. Her usual orders for Shoppers are for 300 trays of six eggs. They sometimes also order trays of 15 or 30 eggs. When packed in trays of six, the cost of

the packing materials comes to TSh1333 (\$0.86) per 30 eggs. Viola also arranges and pays for the transport to deliver the eggs to the supermarkets. In February 2012 she was selling a tray of six eggs to Shoppers for TSh1600 (\$1.03). In a neighboring shop Viola was selling eggs at TSh6500 (\$4.19) per tray of 30 in a very similar operation to that of Mama Hamisi and other egg wholesalers I have visited. Prices fluctuated around these levels during the research period and at some points Viola also varied her prices according to different egg sizes.

## 7. Pricing and Accessibility

### 7.1. The Eggs

Eggs were purchased from all the retail outlets mentioned. They were weighed and eaten. Among the cheaper eggs there was no significant difference in the weights and other qualities of the eggs between suppliers, thus making price comparisons between these eggs valid.

The more expensive “local eggs” are smaller and their yolks are significantly more yellow than the other eggs. Other eggs, including imported eggs and eggs claiming to have more yellow yolks, were available at various times at substantially higher prices. Given the erratic availability and the substantially higher prices of these eggs they not really part of this analysis as my focus is on the more affordable eggs that sell in larger volumes.

### 7.2. Prices for the Eaters

Comparing the prices over the two-year period of the study (Table 1), it is clear that there is a competitive market place; and that egg eaters in The Street and across the city have a wide range of options. Prices between all the egg sellers, with the exception of the supermarket and the chip seller, fluctuated up and down within an approximately 20% range. Mangi sells at a price above the wholesaler, but not much higher or buyers will take the extra walk to get cheaper eggs. Conversely, if wholesalers like Mama Hamisi with her mark up of as little as TSh500 (\$0.32) per tray do not offer a better deal, customers, apart from those nearby, will not walk the extra distance and the wholesalers will not sell the volumes they need to sustain their businesses. Customers can always turn to Hadija, Marriam and similar traders for eggs.

**Table 1.** Retail prices for eggs in Dar es Salaam, November 2011 to October 2013.

	TSh per egg	TSh per 6 eggs	TSh per 30 eggs
<b>Eggs bought end November 2011</b>			
Hadija's house	<u>250.00</u>	1500.00	<u>7500.00</u>
Mangi's Duka	<u>250.00</u>	1500.00	7500.00
Shoppers: cheapest option for 6	<u>325.00</u>	<u>1950.00</u>	9750.00
Shoppers: cheapest option for 30	<u>280.00</u>	<u>1680.00</u>	<u>8400.00</u>
<b>Eggs bought February 2012</b>			
Mama Hamisi's shop: less than 30	<u>250.00</u>	1500.00	7500.00
Mama Hamisi's shop: tray of 30	<u>216.67</u>	<u>1300.00</u>	<u>6500.00</u>
Hadija's house per egg or tray of 30	<u>250.00</u>	1500.00	<u>7500.00</u>
Mangi's Duka	<u>300.00</u>	1800.00	9000.00
Shoppers: cheapest option for 6	<u>350.00</u>	<u>2100.00</u>	10,500.00

Table 1. Cont.

	TSh per egg	TSh per 6 eggs	TSh per 30 eggs
<b>Eggs bought April 2013</b>			
Mama Hamisi's shop: less than 30	<u>250.00</u>	1500.00	7500.00
Mama Hamisi's shop: tray of 30	<i>233.33</i>	<i>1400.00</i>	<u>7000.00</u>
Hadija's house per egg or tray of 30	<u>250.00</u>	1500.00	<u>7500.00</u>
Mangi's Duka	<u>300.00</u>	1800.00	9000.00
Shoppers: cheapest option for 6	<i>366.67</i>	<u>2200.00</u>	11,000.00
Shoppers: cheapest option for 30	<i>300.00</i>	<i>1800.00</i>	<u>9000.00</u>
<b>Eggs bought October 2013</b>			
Mama Hamisi's shop: less than 30	<u>250.00</u>	1500.00	7500.00
Mama Hamisi's shop: tray of 30 small	<i>216.67</i>	<i>1300.00</i>	<u>6500.00</u>
Mama Hamisi's shop: tray of 30 large	<i>233.33</i>	<i>1400.00</i>	<u>7000.00</u>
Hadija's house per egg	<u>300.00</u>	1800.00	9000.00
Hadija's house per tray of 30	<i>266.67</i>	<i>1600.00</i>	<u>8000.00</u>
Mangi's Duka	<u>300.00</u>	1800.00	9000.00
Shoppers: cheapest option for 6	<i>466.67</i>	<u>2800.00</u>	14,000.00
Shoppers: cheapest option for tray of 15	<i>366.67</i>	<i>2200.00</i>	11,000.00
Shoppers: cheapest option for tray of 30	<i>350.00</i>	<i>2100.00</i>	<u>10,500.00</u>
Marriam's delivery per tray of 30	<i>250.00</i>	<i>1500.00</i>	<u>7500.00</u>
<b>Lowest Shoprite prices during 2013</b>			
Cheapest option for tray of 6	<i>500.00</i>	<u>3000.00</u>	15,000.00
Cheapest option for tray of 30	<i>373.33</i>	<i>2240.00</i>	<u>11,200.00</u>

Notes: The amounts underlined indicate the units for which the price was determined (for example, per egg at Mangi's and usually per tray of six eggs at Shoppers). Prices are compared per egg, per 6 and per 30, even though, for the amounts shown in italics, you could not actually buy that quantity for that price (that is, where a price per egg is only available if you purchase a tray of 30 you cannot buy 6 at that price).

Mama Hamisi maintained the lowest per-egg price, equaling the prices of other traders at times if one bought small quantities, but always cheaper than anyone else if buying a tray of 30. While her prices fluctuated slightly (in a range of around 20%) during the period of research, by October 2013 she was again selling eggs at the same price she had been early in 2012. She had also innovated by charging different amounts for small and large eggs. She complained of stiff competition and there is little doubt this kept her prices low, but she was still in business.

Mangi kept prices in the range of TSh250 (\$0.16) to TSh300 (\$0.19) per egg, ending the two year period with prices at the 20% higher TSh300 (\$0.19). This jump of 20% is to some extent determined by the fact that the smallest denomination coin in circulation in Tanzania is TSh50 (\$0.03). When Mangi bought eggs at TSh7000 (\$4.84) a tray he usually sold them at TSh250 (\$0.16) each for a gross profit of only TSh500 (\$0.32) a tray. When Samuel's per tray price went to TSh7500 (\$4.84) Mangi had to adjust to make a profit and increased his price to TSh300 (\$0.19) an egg, making for a three times better gross profit per tray of TSh1500 (\$0.97). He never sold trays or larger quantities at lower prices perhaps as most of his customer buy in small numbers and his small store did not make it advantageous for him to stock higher volumes at a lower profit margin.



The chip seller kept his prices the same for two years absorbing the cost increases even though the price of eggs and potatoes fluctuated. Competition, including the fact that a new chip seller opened a stall only 100 meters away on the same road, probably contributed to this keen pricing.

Egg prices at Shoppers Supermarket rose steadily. They started as the most expensive option (aside from other supermarkets that were further away and had even higher prices) and the prices steadily increased ending at 43% more expensive for trays of six eggs at the end of the two-year study period. This seems to indicate that the supermarket is insulated from competition posed by other egg sellers by catering for a different market. Their customers almost all use motorized and mostly private transport, many stop on their way from work and buy a number of goods at the same time, including more imported and luxury items than the average Dar es Salaam resident. Perhaps they have bought into the comforts and lifestyle associated with supermarkets. It would certainly appear that these eaters are not as price sensitive on basic food items and are perhaps not exposed to the lower prices they could get in local shops and markets.

At times it was possible to buy trays of 15 or 30 eggs at Shoppers for relatively lower prices than the normal options. While this worked out cheaper per egg than the trays of six from the same store, these eggs were only once as affordable as the eggs from Mangi's Duka, and were always considerably more expensive per egg than options available from other traders such as Mama Hamisi.

Although I focus in this paper on the case of one food item, it is worth noting that the prices of basic foods in supermarkets in Tanzania are regularly higher when compared to other outlets. For example maize meal, rice, beans and cooking oil have all been consistently cheaper at Mangi's Duka and are cheaper still at the "people's markets" than in any of the supermarkets during the two years of this study.

A key element of sustainable development, as defined in the "Brundtland Report", is meeting the needs of people who live in poverty [8]. For the poorer eaters in Dar es Salaam low prices are a key factor. The supermarkets are clearly not meeting, or even trying to meet the needs of these citizens. They are overpriced, inaccessible and inflexible, offering no credit facilities. Luckily for these people, the *duka* sells cheaper eggs, and you can get even lower prices if you knock on Hadija's door or walk for fifteen minutes to Mama Hamisi's egg wholesaler and buy a tray of eggs.

### 7.3. Accessibility

Almost as important as price for the buyer of eggs is the accessibility. Mangi's Duka appears to be the main source of eggs for people in The Street and equivalent *dukas* populate almost all streets in Dar es Salaam. Even when his prices are higher Mangi is, perhaps due to convenience and loyalty, selling more eggs than Hadija sells from home. Marriam delivers her trays of eggs to regular customers in the neighborhood including a few in The Street, but she only sells trays of 30 and of course you can only buy from her when she is there. You can call on her cellphone and ask her to come, but that will likely be the next day unless you call early in the morning. Shoppers Supermarket is selling mostly to people with motorized transport, and draw customers from a larger area. They claim a turnover of around 3000 eggs a week (although information from suppliers indicates that this is a high estimate), which is not large considering the size of the shop and that a wholesalers such as Mama Hamisi sells twice that amount.

When compared to other retailers the *duka* clearly provides superior benefits to the consumer in terms of accessibility related to: (1) proximity, Mangi's Duka or another similar store, is always within walking distance; (2) the flexibility of being able to buy small numbers of eggs from one upwards (as in Tabu's "two, two") at a competitive price; and (3) potential access to short-term interest-free credit. Such factors are crucial for people surviving on limited and sporadic incomes. In addition, these factors do away with the need for storage space, something not to be taken for granted by people who live in cramped spaces, often sharing, with uncertain tenure and with limited or no assets such as fridges or other furniture.

#### 7.4. Price for the Egg Producers

While egg eaters benefit from low prices, egg farmers are, of course, made wealthier, more able and more motivated to maintain production and supplies if they receive higher prices for their eggs.

From among the sample of egg suppliers looked at in my study, Shoppers Supermarket provided eggs at the highest price to consumers, but this did not result in better returns for the egg farmers (Figure 9). Egg producers supplying the Shoppers Supermarket through Viola appeared to be getting similar prices to others, but on worse terms in that they had to transport the eggs to Viola and provide them on credit.

In looking at the benefits to egg farmers related to the different modes of egg supply, a significant spatial dimension emerged (Figure 4):

- Peri-urban small and medium size egg producers who farm within reach of bicycle or public transport get TSh6000 (\$3.97) at their farm gates.
- Egg producers who farm beyond bicycle range, but close enough for motorized transport (public or private) to be feasible, get TSh6000 (\$3.87), but usually have to cover the transport costs and at times have to sell on credit.
- Producers who live well beyond the city or produce quantities that require larger scale transport, depend on agents and transporters and receive less for their eggs. Agents get the TSh6000 (\$3.87) but take a cut to cover their own costs and to make a profit.

**Figure 9.** Simplified diagram showing amounts paid by eaters per 30 eggs to different retailers and amounts paid to producers or other distributors, Dar es Salaam, February 2012.

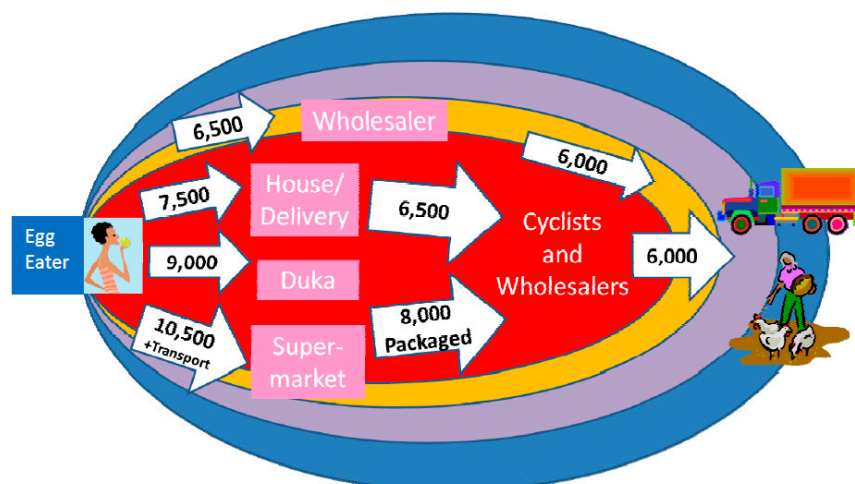
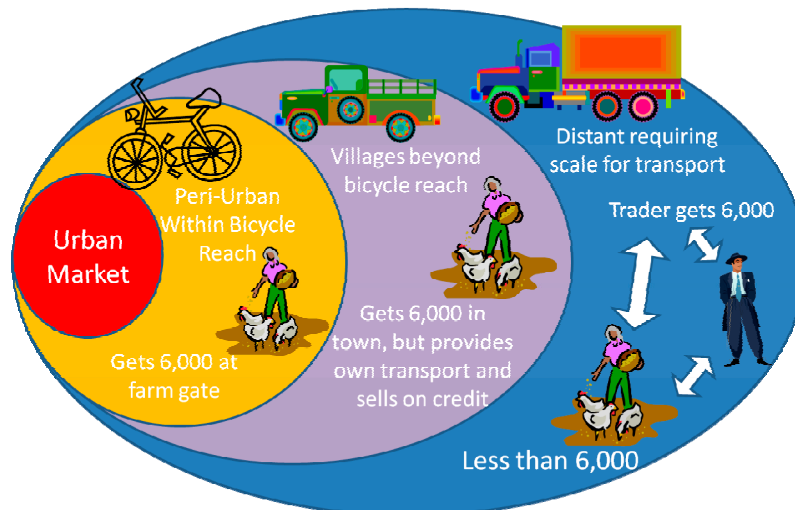


Figure 10 shows the prices paid per 30 eggs in February 2012. While prices fluctuated during the research period this basic pattern of benefit remained similar. Each sphere represents the situation of different producers according to their locations and links to the market.

**Figure 10.** Simplified diagram showing different relationships to the urban market and benefit of egg producers affected by location.



Essentially egg producers have access to a number of different patterns of distribution and retailing that connect them to Dar es Salaam's growing urban market and which offer them different levels of return. These patterns of provisioning also create numerous income earning opportunities that on the whole have fairly low entry barriers, such as bicycle or public-transport-based distribution channels. There is also space local entrepreneurs to start larger enterprises, such as the dukas and egg wholesalers. Low entry barriers for small business owners not only enable existing operators to get back into or continue in business if they suffer losses, but also make it possible for new operators to replace any who drop out and to expand the sector to meet growing needs. This all makes the system as a whole quite sustainable in that it is capable of fulfilling its role even as demand increases.

## 8. Reflections on Sustainability and the Advantages of Different Patterns of Provisioning

In this section, I assess Dar es Salaam's egg production and distribution systems in relation to the key elements of sustainability mentioned at the start of the article, namely environmental sustainability, economic sustainability and community sustainability. I also touch on some other key issues such as gendered roles in the patterns of provisioning and the spread of supermarkets.

### 8.1. Environment

In a world in which rising carbon levels in the atmosphere are driving global climate change, patterns of provisioning such as the extremely low to no greenhouse gas emitting bicycle mode have obvious advantages in terms of sustainability. Distribution that makes use of public transport also appears to be fairly low in carbon emissions. Deliveries by car and small vans are less attractive from a carbon point of view.

A key saving related to the environmental impact of transport is having retail outlets within easy walking distance of people's homes or having food delivered to the home. Not only does this save the carbon emissions and fuel consumption involved in eaters driving to shop, it also avoids road congestion and reduces the needs for more road expansion. Supermarkets, on the other hand, are largely patronised by people who have cars, fill parking areas and add to traffic congestion on the surrounding roads.

In relation to egg packaging and storage, all the systems except the supermarkets, reuse materials again and again ensuring extremely low levels of waste. The one blight on this is the ubiquitous plastic bag often handed out at the *duka*, including with egg purchases. Supermarkets, however, use packaging that is entirely plastic, and do not reuse or recycle any of this. Worse still, this plastic packaging is imported and the supermarkets, like the *duka*, also give plastic bags to customers.

Energy consumption and carbon emissions by Shoppers Supermarket is high as they have air-conditioners running all day and store their eggs in fridges that run 24 hours a day. Mangi's Duka, on the other hand, stands under a shady tree and is open to catch any passing breeze. He also has a much more effective and energy efficient way of ensuring customers get fresh eggs, which is to have small quantities delivered directly from nearby farms every other day.

On the small farms, dependence on commercial egg layers can be seen as limiting bio-diversity, but hens are sourced from a number of different places. The small chicken farms are mostly family homes that are involved in other agricultural and economic activities—a far cry from the “factory farms” that cause much concern to animal-rights activists and critics of corporate agri-business.

## 8.2. Economy

The most compelling aspect of the economic sustainability of the combined patterns of egg provisioning in Dar es Salaam is their diversity and flexibility. All of the egg outlets looked at changed their egg suppliers during the two-year period of the study, and some did so several times. Egg eaters have choices, not just of different brands, but between substantially different modes of provisioning. Egg producers have access to different ways of reaching the market which means they have choices relating to who to sell to. This puts them in a stronger negotiating position. If one pattern of provisioning does not work, others can fill the gap ensuring a strong level of system sustainability.

The keen pricing and even price reductions shows a competitive and active market for the majority of the distribution systems. Prices in the supermarkets, however, rose steadily with increases beyond the inflation rates.

To be able to sell eggs for cash at their farm gates, as they do to bicycle distributors and to traders like Marriam, is a big advantage for the egg farmers, saving them time and the expense of transporting their goods to their markets. Other advantages include being able to stay at home to do tasks such as caring for the family or carrying out other business activities.

A large number of individual and small operators are securing reasonable incomes in different parts of the patterns of egg provisioning from production to transport and retailing, and some are earning well above the minimum wages they might earn in similar sectors. The high level of economic participation in the sector makes an important contribution to poverty reduction and social stability in a country where poverty levels are high.

### 8.3. Community

Outlets such as Mangi's Duka, which was linked to bicycle deliveries, as well as traders who deliver from door to door, avoids the distance and "disconnect" that often tends to undermine trust between consumers and producers [58] (p. 370). Instead the level of "connection" that is evident here is what many alternative food networks and urban food strategy initiatives aim to achieve [58] (pp. 380–382). Mangi knows Samuel the cyclist who delivers the eggs and knows the part of town that he comes from. Regular customers at Mangi's Duka will see Samuel coming to the shop every two or three days and some will talk to him as he transfers the eggs from the bicycle to the counter and sits to rest a bit and chat to Mangi before proceeding to another shop. If they want to ask where the unbranded and unpackaged eggs are from they can do so directly. In this case they would be talking directly to one of the egg farmers and Samuel is also in daily contact with other egg farmers in his area.

The *duka* and chip seller create spaces and opportunities for social interaction enabling and even requiring people to meet and interact if they want to buy. All this is contact that contributes to holding the community together. The space outside and around Mama Hamisi's shop is, like the market area it is part of, also a social space—the traders all know each other and many of their customers stop to talk.

Supermarkets, on the other hand, draw people away from streets on which they live and create a more depersonalized shopping experience. Customers help themselves from the shelves, and can pay the cashiers and leave without saying a word. The purchasing manager does not know where the suppliers or the eggs are from. Deliveries are made to the back of the shop usually by a driver who never meets the customers. This is a classic example of producers and consumers "disconnecting" although, in this case, the benefit of improved cost effectiveness is not there [58,59]. The high level of personal contact at the *duka* is replaced by packaging, labeling and refrigeration which is all aimed at inspiring consumer confidence.

It can be argued that supermarkets in cities such as Dar es Salaam create a new social space of "western style shopping" [60] for users—a place where they are more likely to meet car owners, senior managers and professionals. The air-conditioned "amiable space with the highest standards of safety, cleanliness and comfort" [61] is a welcome change for some people from the heat and humidity of Dar es Salaam. If you are already at the supermarket for other reasons it is easy to pick up a tray of eggs, and this offers a different form of accessibility for those in this social and economic sphere. The coffee shop above Shoppers Supermarket is a place to meet others who can afford the coffee that costs 30 times more per cup than the excellent coffee that Mzee Steven used to drink outside Mangi's Duka.

### 8.4. Egg Supplies and Gender

It is essential to understand the gender dynamics embedded in the different patterns of egg supply as they can impact on sustainability and reveal advantages or disadvantages for different people. Of specific concern is the ubiquitous social and economic marginalization of women [62–64]. Aside from such gender marginalization having a potential impact on sustainability, I would not want to fall into espousing the values of particular patterns of food provisioning in terms of their sustainability, or other criteria, without taking an interest in whether these perpetuate or not the human rights abuse of gender discrimination.

Many of the retail outlets mentioned are male dominated—from the supermarket owners and managers to Mangi's Duka and the chip seller. This is the norm across Dar es Salaam; it is rare to see a woman running a food *duka* (although they do run clothes and other types of stalls). It is also uncommon to see a woman cooking chips on the side of the road (although they do cook rice, beans and cassava). Hadija is finding a space selling eggs from her home and women are employed in the supermarkets as tellers, cleaners and shelf packers.

Women like Viola and Mama Hamisi are running wholesale operations, and Viola is an example of an entrepreneurial woman taking a lead in the sector, although men continue to dominate the transport and egg trading that supplies most of the wholesale outlets.

The bicycle delivery operations are also completely male run. They do, however, play a key role in the viability of the small-scale peri-urban egg farming in which many women are involved. Understanding why women are not involved in particular activities would be a worthwhile area of further study. It appears that a range of factors from cultural, including the roles women are expected to play in the home, to technical play a role. If we take bicycle-based deliveries, for example, we could speculate that there are cultural obstacles, yet women do ride bicycles in Dar es Salaam. It could be that women are often primary caregivers for children, so need to stay near to their homes or be able to take their children with them. Marriam, for example, sometimes brings her child on the bus when selling eggs door-to-door. On other hand it might simply be that the sturdy Pheonix bicycle favored for egg and other deliveries has a large frame that is too big for many women.

Women in Dar es Salaam still carry the primary role in household reproduction. This leaves women involved in micro-enterprises like egg distribution dependent on certain public services. It also means that their businesses are vulnerable when health, child care, education and other household expenses have to take priority. Marriam, for example, benefits from the city's functioning and affordable public transport system, but almost went out of business due to her son's need for medical care. Ensuring access to public services, along with financial services such as credit and insurance to meet household as well as business needs, could assist women to participate more in food provisioning and enjoy greater benefits from it.

Parts of the egg-supply pattern in Dar es Salaam support women's involvement by enabling them to work from home and to control their time when running their own micro-enterprises. Women egg farmers who produce chickens at their homes and sell directly to cyclists or other traders not only have a financial advantage, but are able to be carry on with their household responsibilities. Hadija also sells from home, and while Marriam travels to town most days she can choose not to sometimes and as she said "I like this business because I am home with my baby by 10 or 11 in the morning."

### 8.5. Supermarket Sustainability

The Shoppers Supermarket is reasonably successful and they opened a second store in 2012. It seems they are not guilty of some of the negative conduct often laid at the door of large retailers—such as squeezing lower prices out of producers and displacing local farmers and smaller retailers. Their impact in Dar es Salaam is more nuanced and varied [35,65].

Shoppers Supermarket have experimented with imported eggs and, given that they sell butter and milk from Kenya and stock other imported products, they appear to be well positioned and willing to



take advantage of import opportunities. One can conclude, therefore, that for now the local suppliers of eggs are more competitive when compared with the option of importing.

The corporate control of supermarkets prioritizes returns to investors and (often) debt servicing, creating a downward pressure on prices to farmers and upward pressure on costs to consumers [66]. The example of Shoppers in this study illustrates how added costs for packaging, advertising and the creation of a “western-style shopping” experience [60] (p. 1) are paid for partly by consumers who are willing to pay higher prices and are partly externalized as impacts on the environment and public services such as roads. The risk is a future where, without other viable options, producers have to absorb more of the costs of the supermarket, and eaters who need the food, will be forced to shop at supermarkets and pay the higher prices.

Much as Shoppers Supermarket did not appear to be impacting very negatively on local farmers and suppliers during the study period, the threat represented by the supermarket model of provisioning as shown in other studies should not be underestimated [17,35,65]. The flip side of the supermarkets’ lack of competitiveness is that both egg buyers and egg producers would be worse off if they did not have strong alternatives to the supermarkets. The supermarket threat is currently mediated by various forms of resistance including from farmers and traders who refuse to supply and traders and retailers who offer real alternatives for those farmers and the eaters.

Just as Abrahams found in Lusaka [35], the much talked of supermarket revolution does not seem to be materializing in Dar es Salaam. Shoppers is growing, but slowly. The South African supermarket group, Shoprite has been, at least in terms of eggs and other basic foods, even less competitive than Shoppers. They clearly struggled in the Tanzanian market, closing one of their stores in 2008 and announcing in late 2013 that they plan to sell their three remaining stores in Tanzania to Nakumat. This challenges assumptions about the speed and inevitability of supermarket “progress” exemplified by statements such as Reardon’s “Development agencies must understand that ‘product markets’ will mean ‘supermarkets’” [17] (p. 1146).

A specific challenge found by Kenny and Mather in Zambia is that smaller producers and processors “cannot meet the extended credit cycle which Shoprite often expects of its suppliers” [65] (p. 60). This was confirmed in Dar es Salaam by Viola and others—Viola reported that at times she could not get eggs at the price offered and that she believes that buying on credit makes her a buyer of last resort for the egg producers who come to her. Still Shoppers was a viable option for her, but Shoprite was not.

Far from facilitating farmer and processor adaptation to the requirements of the supermarkets, as advocated by Weatherspoon and Reardon [17,53] and no doubt by supermarket owners and managers, I would argue that every effort should be made to support the existing alternatives. Whereas, perhaps heeding the advice and assumptions of Weatherspoon and Reardon, many value chain interventions try to link producers to specific companies, this type of value chain development undermines other more diverse patterns of food provisioning. This was the case in Zambia with the failed partnership involving Shoprite and farmers from Luangeni which was supported by development organizations [47]. It is clear from this study that there are other more diverse patterns of provisioning that give farmers and eaters a range of options, thus mediating the negative impacts of supermarkets and challenging the power of the agro-food industry [1,67].

### 8.6. On Formality and Informality

While critiques of the industrial food system and supermarkets, which would certainly consider themselves to be “formal”, are strong, criticism of the “wishful thinking of bootstrap ideologues” [6] (p. 181) who see the “informal” sector as the development solution is also vehement. So far in this paper I have deliberately avoided using the concepts of “formal” and “informal” as I am not comfortable with them. However, since this is not the focus of my paper and I do not have the space here to engage the debate in full, I will highlight just a few issues I think are important to clarify in relation to my findings and some of the debates on “formal” and “informal”.

The eaters and traders I talk to and the patterns of egg supplies I see in Dar es Salaam give me a lot more hope for the future than the picture I get from Davis’s *Planet of Slums* [6]. Many of these eaters and traders would be considered by UN Habitat definitions to be living in “slums” [40] (pp. 8–16), yet they have resilience, ingenuity, and aspirations that are not simply “survivalist”. Mangi never tried to be a civil servant or to get “formal” employment; he worked in a small shop, saved, started his own shop, saved, bought a motorbike, and now runs a complex business with many suppliers and customers. There are so many “Mangis” like him in Dar es Salaam, and they form such a central part of the patterns of food supply that I am loath to refer to them as “informal”. Samuel, runs his own small business producing, buying, transporting and selling eggs. He makes choices, such as whether to invest in more chickens of his own or buy more eggs from others. In terms of working hours and net profit, what he does is far superior to what he could get from a “formal” job. Many such egg traders have a good deal of autonomy and they want this; they don’t want “formal” jobs.

The traders I have spent time with have also not succeeded simply due to having secure land titles (they don’t) or access to a bit of capital, as De Soto and his followers might have us believe [68]. Many relied on family and friendship networks for the information, experience and other resources they needed to enter the businesses they are in. Mangi started as an assistant in a shop owned by someone from his home area, and from the same ethnic group as himself, and progressed from there. Samuel was shown the ropes and introduced to customers by a friend. While these networks play a key role in enabling people to get established in aspects of food provisioning, they may well also exclude others.

I am also well aware that the patterns of provisioning I am looking at in this paper involve only one food item. Other sectors will have different kinds of actors and different sets of relations. Some products are perhaps more prone to exploitation, including self-exploitation, or more supportive of bottom-up accumulation. Even within this one sub-sector a multitude of different actors with different levels of enterprise play different roles, and as Davis (drawing on the work of House in Nairobi and Portes and Hoffman in Latin America) points out we need to be aware that there is large differentiation within what some call “informal” [6] (p. 180).

### 8.7. City Planning for Sustainable Food Supplies

The patterns of egg provisioning described in this paper seem to have emerged organically: people with larger plots on the city’s periphery use their space to go into chicken production; cyclists use the better road built to service the airport as a route for egg deliveries; trees planted along this road provide shade for bicycle-repair stalls and for traders selling water and other drinks; shopkeepers and chip

sellers find small spaces on road sides of the city to set up their businesses. These and other considerations could be factored into future city plans to enable the continuation and expansion of the sustainable patterns of egg and other food supplies. At minimum one hopes care would be taken not to have urban developments that undermine existing patterns of food provisioning.

Eggs and other agricultural outputs produced in Dar es Salaam's mixed residential and urban agricultural zones are clearly making a contribution to the city's economy. They also provide green space, low-cost housing, and a more rural way of life that some people value within and close to the city [25]. Ensuring that women and people who live in poverty have access to land in such areas would strengthen their opportunities in egg production and other urban agriculture [27]. Spaces for people's markets and the shopping areas around them need to be protected, and new markets need to be planned for as the city grows, so that people's markets are located within walking distance of as many people as possible.

Dar es Salaam planners could take advantage of the largely flat terrain and existing community of cyclists to improve opportunities for other bicycle-based and environmentally friendly economic activities. Better designed cycle paths would increase safety and extend the effective range of bicycles, making the bicycle-based product-distribution business more viable and expanding the number of peri-urban farmers benefitting from it.

## 9. Conclusions

The case of egg provisioning in Dar es Salaam demonstrates a fundamental sustainability in diverse patterns of egg supplies that, in price and accessibility, dramatically outperform the corporate modes of supply represented by the supermarkets and their supply chains. Further research is needed, in particular looking at other key foods, but what I have found in this study gives me hope that alternatives to the unsustainable industrial food system are not only possible, but actually exist already, albeit with room for enhancement.

Patterns of provisioning based on linking small-scale producers with small to medium-scale retailers have sustained egg supplies throughout the two years of this study in ways that kept eggs accessible and keenly priced. They have done so in a way that makes a positive economic and social contribution to Dar es Salaam and has little negative environmental impact. There is no reason to believe that these patterns of provisioning could not sustain themselves and expand if demand for eggs continues and grows.

Many of the roles played within the patterns of egg supply seem to be highly gendered; the reasons for this and its full impact could be researched further. What is clear is that as long as women take primary responsibility for household reproduction, including child care, and while basic social services are unavailable or expensive, women's participation in aspects of egg supply will be limited or risky. On the positive side, factors such as women being able to work from home and controlling their own enterprises, do support women's active participation in certain aspects of the provisioning process.

The patterns of egg supply in Dar es Salaam reveal multiple and differently connected actors who have choices. The dynamic and diverse patterns of provisioning gives this food system its current sustainability. The notion of "food chains", along with the related concepts of supply chains and value chains, focus on a linear and rigid linking of different actors, and are often based on assumptions that

corporations, including supermarkets, are an inevitable part of the future. This ignores what is good for the eater and risks undermining patterns of provisioning that give producers better options. It is time to move away from thinking in this way and from promoting the appropriately termed “chains”, to valuing and encouraging vibrant patterns of provisioning that can be replicated and adapted, giving food eaters and producers more choices. Let us support the weaving of patterns of sustainable food provisioning from the many strands that link many different interdependent actors together.

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## Conflicts of Interest

The author declares no conflict of interest.

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