

Toxic residues of Senegal's peanut economy

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I had been urged to find the old professor before it was 'too late'. With vague directions to a private clinic, I find him sitting low behind a massive desk stacked with Arabic Sufi texts. He speaks with the impeccable manners and elegant French of the independence-generation elite.

Peanuts and deaths

The professor begins in the past tense. He tells me they first blamed aflatoxin (the metabolic by-product of a fungus) because many liver cancer patients came from the Peanut Basin, a large swathe of Senegal where peanuts are farmed. Peanuts are prone to aflatoxin contamination. This nearly destroyed (*catastrophé*) Senegal's peanut industry, he exclaims. Later, Americans (for whom he, as a student, collected blood samples) discovered that hepatitis B infection was a cause of liver cancer.

He remembers the hospital too, the ward where liver patients took up five or six out of eight or ten beds. Its name, *Laënnec*, was phonetically recomposed in Wolof as *laay bi jeexna*, meaning 'the matter is settled' (the professor's French translation is *la cause est entendue*). It is where they send patients to die.

For the old professor, time loops. He asks again what I am working on. Liver cancer, hepatitis B, aflatoxin, I reply. As he looks up, the past is suddenly now, between us. Using the polite but firmly imperative *tâchez*: 'You must show that it is not peanuts. The day they said it, a boat [filled with peanuts] was immobilized [at the port].'

The professor's present tense evokes anxieties from the 1970s. Should aflatoxin be found to be causing the deaths in *Laënnec*, as it does tumours in lab mice in Paris and London, Senegal's fiscal and farming economies, linked by their heavy dependence on peanut exports, could collapse. Confirming hepatitis B as the cause will protect the peanut trade and the alliances – between farmers, politicians, bureaucrats and *marabouts* (religious leaders) – it sustains.

One of the American collectors of Senegalese blood holds a patent on a hepatitis B vaccine. He hopes a viral aetiology can help arrest the flow of dying men to *Laënnec*. In his archived papers, there is a photo of bare-chested men lined up in the hospital courtyard, a few with their bellies pushing on the liver side up against ribcages. A journal entry, 13 July 1976:

[The doctor] showed us three cases of primary hepatic carcinoma. #1 Liver was [...] palpable below the costal margin + hard [...] a few months of life left to him. #2 36 y male, rock hard mass extending into his pelvis [...] #3 about 32 y male with enlarged hard mass below the rib cage. They have no therapy to offer them and they're doomed. Three patients with hepatoma [liver tumour] in 2 wards of about 40 patients [...] other cases still not diagnosed. It really is a Grand epidemic [sic] and I hope we will be able to see the end of it in my lifetime [...]. (Blumberg 1976)

During my fieldwork in 2018–2019, it turns out that deciding, back in the 1970s, on the viral aetiology of the tumours in *Laënnec* ended up changing little for those Senegalese still dying of liver cancer. Concern about aflatoxin's carcinogenicity prompted its regulation in European export markets, but the fungal metabolite's removal from all *exported* peanuts – shipped mainly as a refined cooking oil and detoxified oilcake for feed – did not address its potential implication in the aetiology of Senegalese deaths or its continued presence in foods eaten by the Senegalese.

Meanwhile, hepatitis B vaccines, approved in the early 1980s, were deemed too expensive for public use in Senegal until the 2000s. Viral surveys suggest at least 10 per cent, up to 20 per cent, of Senegalese teens and adults – the unvaccinated generation – are chronically infected. When they die with swollen bellies, does it matter whether it began with witchcraft, with an infection in infancy or with a lifetime of eating contaminated peanuts?

Aflatoxin is now firmly defined as carcinogenic by regulators and cancer researchers, with heavy consequences for Senegal's economy. Within Senegal, however, details are still unsettled. There is both uncertainty and disagreement about how much aflatoxin is eaten and the extent to which this exposure, relative to hepatitis B infection, is responsible for liver cancer. What might it imply for a reading of Senegalese history, ecology and pathology if peanuts – which, through trade, cooking and farming are turned into fiscal revenue and household incomes, tasty food and strong bodies, government salaries and eroded soil – are declared toxic?

Peanuts and trees

Time loops for me too when I travel into the Peanut Basin, a few hours' drive southeast to the Sine, then further south, past Kaolack, to Niore District at the edge of the region called the Saloum. A famous French geographer, Paul Péliissier, read Senegal's landscape as an archive. I see it *through* the archive of research like his. My untutored eye sees tree-dotted expanses of dry brush, soil and crops. In Péliissier's monumental study of land use (Péliissier 1966 [2008]), trees – as he observed them in the 1950s – record a memory of farming and of vanished forests. Tree spacing and species record distinctive ways of making space for the 'crushing sovereignty' of peanuts, their empire of economy and ecology.

A type of acacia tree in the Sine is easily mistaken for remnants of cleared forest or selected wild growth. These acacia are, Péliissier (1966 [2008]: 156) shows, a 'parkland built by human initiative and [...] concerted action' – specifically by humans committed to care of the soil. The Sine's majority Sereer – an ethnic denomination – keep cattle on fallow- and dry-season fields for manure. Only those acacia seeds digested and excreted by cattle can germinate. Knowing that acacia leaves and pods can feed cattle in the dry season and mulch their fields, Sereer farmer-herders raise the saplings (using, notes Péliissier, the same verb as for a child). The Sine's *Acacia albida* attest to Sereer farming skill and adaptability, to the successful addition of peanuts for cash without destabilizing a system of millet-fallow rotations and herding on densely inhabited lands.

When Péliissier's student André Lericollais studied land use in the Sine in the mid-1960s, he and Joseph Diatte counted trees in the village of Sob. Twenty years later, they counted them again. Lericollais wrote a piece he titled 'The death of trees in Sob' (Lericollais 1989). *Acacia albida* had declined by a third, and hardly any young trees were being raised, due, Lericollais and Diatte thought, to the combined effects of drought, land pressure and neglect. By the 1980s, trees recalled the failure of peanut-focused rural development, as they still do today. Millet remains, and new sources of cash arise from cities' demands for meat, hibiscus, watermelon and especially domestic workers, street laundresses and security guards.

This research was generously funded by a Wellcome Trust University Award (209911/Z/17/Z). Aissatou Diouf and Pape Pouye provided practical assistance and insightful remarks. Ruth J. Prince, P. Wenzel Geissler and Gustaaf Houtman commented on the manuscript.

As we drive south, past the River Saloum, peanuts tighten their grip on the landscape. It is mid-February, the marketing season. The harvest picked months ago forms its own topography. Near the city of Kaolack's port and oil factories are climbable mountains of pods – recognizable from colonial postcards – dozens of metres high. Heading south towards the Gambia, smaller hills of empty hulls, fed by the dusty exhalations of mechanical shellers, mark larger roadside villages in Ndoffane and Nioro District. Here are the high walls of what a magazine article indicates is the compound of secretive Chinese buyers. Jute sacks are stacked snug on the beds of heavy trucks. *Seccos*, zinc storage sheds reminiscent of post-independence state marketing, are bigger and more numerous here than those I saw in the Sine. Post-harvest, the fields feel empty. Our driver, Pape, wearing his clean, pressed Forestry Service uniform, gestures towards the window and spits out in disgust, 'Those *Saloum-Saloum* [people of the Saloum], they cut down all the trees!'

This takes me back to Péliissier (1966 [2008]: 275), who found in this area 'a despairingly monotonous agrarian landscape [due in part to] a nowhere more exclusive specialisation in peanut production'. Only half a century before he wrote, now a century ago, parts of what is today Nioro District were covered in forest. Trees that still stand, dispersed or in tufts, are its lonely remainders; they recall waves of migration, a voracious appetite for land and cash, the clearing of space for peanut fields. Trees, for Péliissier, mark the contrast between peanuts' amplification of destructive agricultural practices of the majority Wolof ethnic group as they expanded the frontier of the Peanut Basin, and their absorption, by the Sine's Sereer, into a flexible equilibrium.

Péliissier anchors peanuts' dominion in the policies and interests of the colonial administration but echoes its essentializing idealization (of Sereer care for soil) and contempt (for Wolof ecological indifference). Bernard Founou-Tchuigoua, companion of the Marxist analyst of underdevelopment Samir Amin, admires the fine grain of Péliissier's observations but criticizes his blind eye to their imperial terrain. For Founou-Tchuigoua (1981[2016]), the forest-razing Wolof agricultural pioneers are 'pure products of French needs for oilseeds and of capital's thirst for surplus value'. Keeping cooking oil cheap (and thus wages low) for French workers, while allowing French oil factories to make enough profit, drives the 'super-exploitation' – the added costs of capitalism passed off from metropolises to imperial peripheries – of Senegal's peanut-farming labour as well as of its soils' capacity to sustain life. Depleted lands absorb an accumulated debt to the profitability of peanuts for French capital.

A proliferation of figures fill Senegal's administrative archives, tracking peanuts as cash crop and commodity through fields and trade points, trucks and factories, boats and budgets. Through work like Péliissier's and Founou-Tchuigoua's, the traces of peanuts grown for export can be dug out of archives of soil and dead trees. An Africanist archive records a transmutation of exported peanuts – especially in the abundant years of the mid-20th century – into imported cloth and broken rice, bureaucrat salaries and maraboutic authority, religious salvation and dreams of economic diversification. Nothing standing or falling apart in Senegal today, no form of power or of (re)production, appears, through these archives, untouched by the exported peanuts.

Of peanuts kept and eaten in Senegal, however, the piles of paper are nearly silent: only occasional measures of the difference between harvests and legal sales for export labelled as 'own consumption', which appear to increase in both volume and percentage over the 20th century. What might the archive of cooking pots and recipes, of hand-

cranked oil presses and the art of *safle* (making tasty: see Poleykett 2020), of bodily fat and energies, of urinary markers, genetic alterations and liver cell proliferation say about the history of peanuts in Senegal and in the Saloum? Can the slow death of land (see Geissler & Prince 2010) scarred by the departure of peanuts for cash be linked to the slow death of people fed with their 'own' peanuts as food?

Peanuts and positives

Among Nioro District's nurses and midwives, the peanut-filled *Saloum-Saloum* dishes and bodies, especially the ones inhabited by the hepatitis B virus, arouse what I hear as a mix of condescension and concern. In recent years, many women are tested for hepatitis B as part of prenatal care. Donated blood, collected in small drives organized by community, youth and religious groups, is also screened. Many tests turn up positive. Primary healthcare clinicians place viral positivity alongside the ubiquity of peanuts in Saloum foods. Lists of peanut-based dishes and ingredients figure in their explanations, to me, for why the hepatitis B virus abounds in Saloum bodies. These dishes also feature in the usually unheeded advice they give their hepatitis B positive patients, namely to avoid eating fatty foods and peanuts. Mixing French and Wolof, one midwife tells me:

Because in the Saloum ... peanuts, there's so much here (repeats this). So, people are eating a fatty diet all the time. All they eat is peanuts. Lunch, dinner, it's all peanuts. Their cooking ... *maafe* [a simmered peanut sauce served on white rice], how many times do they cook it during the week! Ceere bi [millet couscous], they cook it [with a peanut sauce], how many times? Mbalaxou saloum [a Saloum specialty made with peanut flour]. ... Their [cooking] oil too, peanut-based. So their entire consumption is peanut-based. That's why there's an excessive rate of positive [hepatitis B] antigens. So liver cancer [exclamatory interjection], it happens here.

Referring loosely or not at all to biomedical evidence of synergy between the carcinogenicity of aflatoxin and hepatitis B, Nioro's clinicians evoke varying juxtapositions, in both livers and landscapes, of peanuts, fat, toxicity, viruses and damage.

These are aetiologies of proximate coexistence, of overlapping saturations by (possibly poisonous and certainly oily) peanuts and viruses, inside organs and organisms, but also in relations between them: an iteration of what Andrea Ford (2019) and colleagues call 'embodied ecologies'. They also resonate with my own reading of hepatitis B epidemiology and aflatoxin agronomy in Senegal, casting these as *endemic* and generalized presences that are woven into childcare and sibling play, and into farming and trade: the virus travels into almost *all* young children, some of whom keep it, while fungus and their toxic metabolites form at cultivated intersections of peanut seeds with soil, bugs, sheds, rain and so on.

Liver cancer stories are family stories. Clinicians remember relations tightened or stretched taut by suffering and accusations of murder. They tell me about patients, but also mothers, nephews, a best friend's wife. I've heard these stories in Dakar too, and about other districts, but clinicians in the Saloum suspect the deaths are more frequent here: one or two each year in village-level health posts; monthly at the district centre; a constant trickle to the regional hospital; families and villages in which swollen-belly deaths recur among generations and siblings. The pain, they say, is terrifying, as can be the approach of death: they deploy tact, faith and deceit, paracetamol and tramadol. The problem with witchcraft, for them, is not lack of science but suspicion and blame that persist long after death. Dakar experts see liver cancer as mainly a problem of viral infection unprevented by vaccination and untreated by antivirals. But here in the Saloum, from

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Figs 1-4. *Seccos* peanut storage sheds in Nioro District.

the health post to the regional hospital, many clinicians wonder whether peanuts and aflatoxin might not weigh more heavily on both landscapes and livers than elsewhere in Senegal, or in the world.

It is hard to gauge just how far such interrogations about peanuts in liver cancer aetiology extend beyond the clinics of Nioro District. Some medics, including the district head doctor, speak of concern among ‘intellectuals’, meaning radio-listeners such as schoolteachers. One teacher, a health post nurse, tells me, ‘raises awareness’ among his pupils. There has also been ‘awareness-raising’ and training around aflatoxin-control technologies piloted in Nioro. There is an atoxigenic fungus strain, incubated and affixed to sterilized, dyed sorghum, which farmers can buy and spread on their fields to compete against aflatoxin-excreting fungi, thus making their peanuts more competitive in export markets.

Although this biocontrol product is marketed as an entrepreneurial tool, its promoters tell stories about farmers choosing to eat rather than sell peanuts from treated fields to protect their families from (more) cancer death. A few women’s co-operatives own a special clay-filtered oil press designed in Dakar by food scientists who also train them to market their aflatoxin-reduced oil as safer than regular unrefined *segal*. ‘Awareness’ can also take more obscure, heartbreaking turns: a mother we interviewed about losing her son to liver cancer unwraps a cloth lying next to her bed into which she has carefully removed the tiny embryonic nubs from the peanuts she snacks on, where the poison concentrates, she heard at a workshop.

But peanuts, especially *segal*, also raise questions about sovereignty. In 1931, the colonial state prohibited so-called artisanal oil pressing so that harvests, even in bad years, would be sold off, even at a bad price, and made available to French oil factories. While ‘parallel’ in-country trading and out-of-factory processing were often tolerated, they were not legalized until 2010. Meanwhile, the nationalized oil firm Sonacos kept itself afloat after exports declined in the 1980s by refining and bottling cheap imported ‘vegetal’ oil (soy, then palm) that was widely seen as poor quality and unsuited to Senegalese cooking.

By the late 2010s, *segal* was a booming business, threatening plans for domestic and regional marketing of refined peanut oil. Oil firms point to the threat of aflatoxin in unrefined oil. A federation of women’s co-operatives sign an agreement to sell their *segal* to oil factories for refining and resale. For some, the emerging commercial stakes of peanuts and *segal* make such claims of toxicity suspicious. One Nioro nurse, an outlier, says he wants to ‘erase’ the peanut-cancer association because he ‘believes in local consumption’. A French peanut expert warns me, in an email, not to see aflatoxin as a reason for ‘denying’ Senegalese businesswomen and cooks access to ‘their own oil.’

Peanuts and ruins

Sonacos is the nationalized, then sold-off and recently renationalized peanut oil firm. *Seccos* are points of crop storage and trade, made into the basic nodes of nationalized peanut marketing circuits in the post-independence years. They are emblematic spaces of the state’s former stakes in and control over the peanut economy. They are rusty, as are the machines strewn around them. The action has moved elsewhere: to the high-walled compounds of Chinese buyers, *segal* workshops and *loumas*, the weekly markets in larger towns. Some *seccos* near *loumas* have been converted to private warehouses. Most, however, are quiet, with animals grazing nearby. The stillness of the disused Sonacos refinery in Dakar contrasts with the bustling port-side road, except on Sundays.

In colonial postcards, *seccos* are open-air piles of pods, but at some point (the late 1960s?) they were turned into



Figs 5-8. Sonacos peanut oil processing facilities in Dakar.

closed sheds with a distinctive barn-like design. There are many, one per cluster of villages, their density marking the size of the area's population and production. The institutional companions of the *secco* are the state co-operative, marketing board and agricultural extension services. They recall optimism, bureaucracy, corruption.

A 1973 document lays out what it would take to control aflatoxin in fields and at the *secco* (République du Sénégal 1973). This includes 150 additional extension workers (agricultural educators) armed with 77 slide projectors, portable screens, batteries and loudspeakers to teach farmers how to pick and dry their peanuts, as well as a mechanical winnower (to sort kernels by density) for each co-operative. In the report's pages, in an agricultural research library, there is still a letter, dated 6 August 1973, reporting that ministries have deprioritized this project.

That same year, oil processing was nationalized in the form of Sonacos, allowing direct state purchasing of nearly the entire harvest and turning it, through the French export market, into government jobs and other parastatal industries: textiles, phosphates, medicines, pesticides. In Sonacos factories, aflatoxin is removed to meet export standards: oil refined with hexane and oilcake detoxified with ammonia gas. In 1992, an ammonia tanker truck exploded at the factory door, near the packed port area of Dakar. 'Seventy-five dead for a safe peanut' was the headline of a French press agency journalist (Barrot 1992), cynical about the motives (commerce, not public health) driving regulatory standards.

Peanuts as residues

Global science is confident, increasingly so over the last three decades, about the carcinogenicity of aflatoxins (and their effects on growth and immune systems). A case could be made that these toxicities accumulate and are amplified in Senegalese ecologies as the 'bottom' end of a global economy, synergizing with the hepatitis B virus, food insecurity, trade liberalization and narrowing markets. Contaminated peanuts would then be literal toxic residues of an export economy, in which regulation functions only to help peanuts leave the country. By now (but since when?), a similar accusation can be made of domestic markets that tier the price of good kernels and sorting leftovers. Called *sax-sax*, the split, immature and damaged kernels are, experts say, more likely to contain fungus and aflatoxin, whose cheapness makes them better to keep and eat, or to turn profitably into oil and paste.

But I also wonder about other kinds of residues, and how these make up the *situated toxicities* of Senegalese peanuts. Past peanuts ruin (Stoler 2008) soils and forests, factories and dreams, labour and children. In and through their remains, peanuts are still grown, stored and eaten. Peanut residues stick to – or maybe, more accurately, have *become* – so many Senegalese things, persons and places, forming drought, rust, dead trees and perhaps cancerous cells, but also cuisine, entrepreneurship, authority and vigour. Residues form a past that is intensely present but unknowable *as* the past, certainly not through neat narratives of succession and transformation (Geissler & Lachenal 2016).

It would, in any case, be futile to specify toxic absorptions in Senegal over time: that is, by stitching together rare and contested approximations of 'own (peanut) consumption' with a very spotty record of aflatoxin measurements in kernels fresh and stored, *maafe* and *segal*, urine and albumin. Claims of peanut toxicity are suspicious; concerns arise but remain vague, jogging alongside fierce contests about how and for – as well as through – whom peanuts are to be made profitable. Such uncertainty, perhaps, is also residue; the palpable but undecipherable presence of a toxic world. ●