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A reprise and renewal: African agricultural historiography

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A Reprise and Renewal: African Agricultural Historiography

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African Agriculture's Ecology: A Framework

In 1991 I published a review article in the *Journal of African History* (4, 32 [1991]) that evaluated the then state of the art or writing and research on the history of African agriculture. It is now worth revisiting that assessment in light of a new generation of work.

For the last three decades African agricultural history and its historiography had emerged as a subset of broader rubrics of economic, social, or political history and under a more general interest in peasant studies. More recently, agriculture as a topic fell under the larger framework of political ecology, and perhaps rightly so, rather than as a specific study of agriculture itself—e.g., field systems, technology, and crop science. In retrospect, the most important work in that early period came from scholars trained in other fields, including economics, geography, archaeology, and anthropology. Historians and others reflecting on the past tended to accept these perspectives on agricultural systems as static and without empirical evidence available in traditional historical records.[1]

The earlier emphasis on agriculture as a function of political economy had then, understandably for the sake of source material and chronological proximity to current conditions, tended to concentrate on the period of colonial engagement to the exclusion of longer-term trends rooted in ecology. Later concerns over the historical context of African famines of the 1970s and 1980s, and even more recently, generated a growing focus on the agricultural past. For East Africa a key compass point had been studies generated from accounts of the hungry Swahili caravans in the mid-nineteenth century or the first European settlements there a half-century later, despite the absence of the actual volume of demands and changes in agricultural practice. That view of famine as agriculture has now changed as famine as a topic has properly moved away from production of food to the political ecology of distribution has more or less accepted Amartya Sen's persuasive entitlement thesis that necessarily minimized a focus on agriculture itself.[2]

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[1] For a comprehensive review for the earlier period, see James C. McCann, "Review Article: Agriculture in African History," *Journal of African History* 32 (1991), 507–13, and Allen Isaacman, "Peasants and Social Protest in Africa," *African Studies Review* 30 (1990), 1–20, and more recently his study of the political ecology of dams and agriculture on the Zambezi, *Dams, Displacement, and the Delusion of Development: Cahora Bassa and Its Legacies in Mozambique, 1965–2007* (Athens: Ohio University Press, 2013). An early example of agricultural history was John Tosh, "The Cash Crop Revolution in Tropical Africa," *African Affairs* 79 (1980), 79–94.

[2] For Sen's compelling analysis on famine, see *Poverty and Famines: An Essay on Entitlements and Deprivation* (Oxford: Oxford University Press, 1981). For a view that profitably blends agriculture and famine, see

A key point of transition in historians' perspectives on African agriculture took place in the early 1990s were new studies that turned attention from purely political ecology to agricultural practice, as noted as early as 1990 by Malawian historian Elias Mandala as marking the antithesis between nature and society based on the 1980s "preoccupation" with neo-Marxist Althusserian relations of production over analysis of production itself (Mandala, 1990). Historical reflections on the famines of the 1970s into the twenty-first century nevertheless continued to treat agriculture as secondary to political factors

The early dearth of solid empirical work on agriculture for the historical and pre-historical period reflected not only neglect by historians but also the overall lack of historical archaeology of Africa as a whole. The British Institute in Eastern Africa, for long the premier archaeological research center in Africa, brought something of a watershed in the historical ecology of African agriculture with the 1989 issue of its journal *Azania* entitled *History of African Agricultural Technology and Field Systems*, edited by archaeologist John Sutton. Subsequently, the British Institute has supported a quarterly journal, the *Journal of Eastern African Studies.* Founded and edited by David Anderson and now by Oxford's Jason Mosely, that journal has been transformative in publishing research by younger and established scholars that includes empirical data and perspectives on agriculture, including work by a new generation of scholars working in the East African field. That journal now exists in its eleventh volume. The 1989 *Azania* volume's focus on African agriculture thus was the precursor to a new generation of empirical work focused on agriculture.

John Sutton's contribution to that volume was visionary, and his statement there on an "ecological agricultural history" foretold the mission of the next generation to the next decades in that field:

> how any agricultural system began is less important than how it has developed and what is has achieved. These achievements, the success of African agriculture in other words, reflect not so much the adherence to an unchanging "traditional" system and the maintenance of a perfect ecological equilibrium in one's cultivation year by year, generation by generation—an impossible, essentially mythical situation—but on the contrary, constant adaptation in the face of ecological stresses and the growth of population which normally result from it. The success of agriculture has demanded therefore new solutions at every period in every region (Sutton, 1989).

Sutton also foresaw the larger question of method for historians in reconstructing past practices in African agriculture as bound up with evidence of current conditions:

> Just as comparative linguistics works backwards from the present, using existing languages and relevant parts of their vocabularies alongside an ethnographic base and the documentation of the recent past, so too much an archaeological [or historian's] approach to agriculture (Sutton, 1989).

The emergence of a new African agricultural history has now firmly become part of a broader ecological/environmental history which encompasses features of the physical environment and

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Megan Vaughn, *The Story of an African Famine: Gender and Famine in Twentieth-Century Malawi* (Cambridge: Cambridge University Press, 1987).

human constructions of gender, class, and social institutions embedded within agriculture as practiced in Africa. The new directions represent a movement as strong as occurred more than two generations ago when historians of Africa undertook to include linguistics, anthropology, and geography as perspectives to enrich appreciation of the past. That trend has now emerged at the center of African ecological history (see below). The ability to understand technical data on agronomy, soil science, and epidemiology in combination with historical empiricism using oral testimony, archival records, and even participant observation has been essential to historical reconstruction agricultural practice and ecological systems. The research and new bodies of publication stands alongside an impressive body of work on African agriculture conceived as part of a broader agrarian economy, even as African urbanization and megacities pose a new reality for agriculture in a global economy.

As we look forward, the rich documentary record of the colonial period will continue to be attractive to historians of Africa. Yet, more recent, more specialized technical research on large-scale agriculture in many regions of Africa will make African agriculture part of global trends in commodity production in areas like coffee, legumes, fisheries, palm oil, flowers, and specialized market crops that depend on contract farms requiring reliable and timely delivery to developed world markets. Historians and archaeologists have come to be a part of the investigation of Africa's agricultural products and bodies of knowledge about its changing ecologies of field crops and their relationship to well being in both rural and urban populations.

Rhythm of the Seasons:

What Africans in the pre-industrial era grew in their fields, in what they ate and when they ate it, was, as with all human cultures, a compromise between individual choice, cultural preference, and the vagaries of nature. Africa's physical environment and climate imposed on it a distinctive annual rhythm—that of the seasonal calendar of climate, human movement, and human ritual. Unlike temperate zones in which growing seasons and cycles of life respond most directly to fluctuations in temperature, Africa's rhythms of life reflect its own distinctive pattern of the availability of moisture, especially rainfall. The shifting of the seasonal rain-bearing turbulence on an annual basis sets a general two-part pattern of seasons, one wet and one dry. The movement of that turbulence (called the Inter-Tropical Convergence Zone) brings rainfall to regions north of the equator in the June to September period (the northern summer) and then to regions south of the equator in the December to March period (the southern summer).

In terms of food and diet, therefore, the seasons have imposed on many African societies a harsh historical template of a pre-harvest "hungry season" that runs from the end of the rains until the fall harvest. During the hungry season stocks of stored grain and tubers dwindle and households often turned to the collection of wild plant foods or insects or relied on hunting for protein or saleable meat. Some of those seasonal scarcities appear in modern cookbooks as delicacies, but were part of seasonal food collections.

Rainfall has its greatest volume and is most consistent in areas near the equator, affecting the types of food crops available and framing human actions in agriculture At opposite ends of the continent at the north and south at the Cape and on the North African coastline a wetter and more balanced Mediterranean climate prevails, making wine, citrus, and grain production possible. It is not surprising then that areas like South Africa's Cape or northern Algeria attracted

the earliest colonizing European settlers to areas that proved healthy to colonial settlement and agriculture. Grains, citrus fruits, vineyards, and other Mediterranean crops made living conducive to settlers who needed both markets and cheap local labor. These raw materials combined with the flavors and bulk starches from trade or their own fields to shape what each African farmer or cook concocted in her pots and in her imagination.

The historian's problem here is to try and understand how and from where distinctive agriculture and cookery emerged out of necessity, and invention, to become coherent communities of agriculture, food, and cultural identity. Why did certain crops and foods become emblematic of particular peoples? Some examples of African agriculture can help us understand why certain agriculture products evolved in certain places. At least part of that answer is the seasonal nature of food crops and local solutions to that problem of what people ate and when.

Such a description of the phenomenon of seasonality comes from the work of anthropologist Audrey Richards, who in the 1930s recorded the agricultural season, diet, and foodways of the Bemba people of Northern Rhodesia (Zambia). Her work showed clearly that what African people cultivated, and ate which changed radically over the year depending on the patterns of rain, movements of livestock, and Africa's peculiar wet/dry oscillations. Her book *Land, Labour, and Diet in Northern Rhodesia* (1939) was to become a classic in social anthropology as a whole and in the field of food studies as a whole.[3] Her description of the seasonality of food in that era is an important primary historical document produced by a colonial government agency attempting to understand the material culture of their colonial subjects (See Figure 1).

Note the pre-harvest scarcities of the January—March period, which in central Africa (what was to become northern Zambia). It was in those periods that Richards noted the increased consumption of collected food sources like caterpillars, ants, and honey. Richards also tells us what she observed about local agricultural calendar and food habits:

> In effect the people have a harvest season from May to September in which millet, beer, green food, ground-nuts, pulses, are plentiful, and meat in some areas, and the diet is therefore ample and probably varied. This is followed by a dry season (October–November) in which millet and beer are still available but green vegetables scarce or non-existent. The wild fruits are much liked, but only for about a month or six weeks. Meat and fish are obtainable in these months also, but only in certain districts. At the beginning of the rains, November and December, the diet changes. Millet is already beginning to be short, and mushrooms and caterpillars are the main standby as additional relishes. In the late rains millet is practically non-obtainable, and gourds and occasional maize cobs are often the only available foods. Thus the diet changes completely in composition from one season to another …[4]

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[3] For insights into the origins of Richards' work, see also Valentina Peveri's "Ghosts of Hunger: An Anthropological View of Agricultural Intensification in Southwestern Ethiopia." Boston University African Studies Center, PSAE, 13 (2016).

[4] Audrey Richards, *Land, Labour, and Diet in Northern Rhodesia: An Economic Study of the Bemba Tribe* (Oxford: Oxford University Press, 1939), 52.

Seasonality of Foods, Bemba (Northern Rhodesia/Zambia)

	Wet Weather				Cold Weather			Hot Weather			Wet Weather	
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
Gardens												
Millet				------	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	------	------
Maize			------	xxxx	xx--							
Kaffir Corn					------	xxxx	xx					
Curcubits	xx	xxxx	xxxx	------								
Ground Nuts				---	xxxx	xxxx	xxxx	xxxx	xxxx	------	------	
Legumes (fresh)		---xx	xxxx	xxxx	xxxx	xxxx	xx---					
Legume Leaves		---	xxxx	xxxx	xxxx	xxxx	xxxx	xx---				
Sweet potatoes				xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx		
Bush												
Wild spinaches					------	xxxx	xxxx	xxxx	xxxx	------		
Mushrooms	xxxx	xx									------	xxxx
Orchids						---	xxxx	xxxx	--			
Fruit												
Meat								xxxx	xxxx	xxxx		
Fish	------			xxxx	xxxx		xx	xxxx	xxxx	------	xxxx	xx
Caterpillars	xxxx	------	------	------						------	xxxx	xxxx
Ants &c.										xxxx	xxxx	
Honey				xxxx	xxxx	xxxx	xxxx			xxxx	xx	

Figure 1. Audrey Richards' Chart showing Seasonal Changes in the Food Supply of the Bemba (Richards, 1938). Key: xxxxxx supplies plentiful; ----------supplies scarce. The lines indicate the length of time the average Bemba uses each foodstuff, either because it ripens during that particular month or in the case of game and fish, can be trapped then, or because he has only planted sufficient for the supply to last for a given number of months. For instance, maize could be made to last to 12 months of the year, but the ordinary Bemba only grows enough to use it fresh during 2, and therefore this period only is shown as a line. Dried relishes do not appear here, but were an important feature of regional diet. Caterpillars swarm at different periods in different districts and hence are marked from November to April.

Was Richards' iconic description this typical, or normative? Though an accurate rendering of what Richards observed, this description of Bemba diet offers little insight into agriculture that

appears at other times and at other places in Africa. Would that we had such rich descriptions of African agriculture(s) for other areas as well.

Both the seasonal climate and the political calendar of empires determined in many ways what Africans cultivated or collected in a particular place or in neighboring ecologies. The seasonality of moisture in the African climate affected not only the abundance and variety of food, but also disease, migration of humans and livestock, the timing of military campaigns, and ritual cycles of politics and religion. Kings and their subjects feasted at harvest time, but tightened their belts in the seasons before the harvests. Each of these actions, especially the ritual feast cycle, had implications for food, and cookery. Most tropical diseases, whether epidemic or endemic, were also seasonal events tied to moisture, temperature, and the life cycle of vectors and parasites. Military states, like the Zulu, generally organized raids and large military campaigns during the dry season when their soldiers were free from agricultural work and enemy harvests were in storage. Roaming armies of young men fought their rivals but also foraged among the enemy village granaries and corrals. In many cases camps of women followed the armies to cook the spoils on campfires, a pattern that encouraged simplicity of both tools and ingredients (Richards, 1939).

Other African societies adapted to seasonality in ways that reflected an agrarian system with livestock, i.e., meat, or fish as a greater part of the diet than with the Bemba diet which Richards tells us about in the mid-colonial era of the 1930s. For another society further south historian Diana Wylie has described the nineteenth-century Zulu diet, a local menu that she assembled from accounts of observers of the time. There was a clear rhythm of seasonality evident in her reconstruction, but with the subtle differences of a society where cattle were a more important symbolic and nutritional focus than in Bembaland:

> The staples of the 19th century Zulu diet were fermented milk, cereals boiled as porridge, and cultivated vegetables, eaten twice daily, first after milking and then before sunset. Zulus spoke of solid and watery foods. People stored their food by fermenting in the form of thick sour milk (*amazi*) and sorghum beer. Sour milk—extraordinarily rich in cream where the cattle graze on long grass, but low in yield after the calves had sucked—was ideally the basis of each of the two meals eaten daily. Only children drank fresh milk. Beer was a seasonal delight, the post-harvest reward for a good season's crops. People ate boiled or roasted maize every day, supplemented by pumpkins, beans, taro root, and sweet potatoes. The consistency of the porridges depended mainly on how coarsely the grain was ground and for how long it was boiled. When the grain and vegetable supply ran short in late winter and early spring, that is between June and August, people scoured the bush for wild spinaches (*imifino*), gathering greens perhaps three of four times a week in the spring, drying some leaves for winter meals when they might have to ration themselves to one daily meal. While looking for *imfino*, they could also hunt for bitter herbs to help their stomachs accommodate the radical shifts in diet brought by the changing seasons. Meat was rarely served…. By products of a slaughtered beast produced highly prized dishes of fatty dumplings and sausages and congealed blood. Only at such time and few others did nondairy animal fat enter the Zulu diet (Wylie, 2001.

Bemba agriculture of the 1930s and the nineteenth-century Zulu food culture were seemingly unremarkable and monotonous compared to maritime Cape Town and the East African coastal ports, however, both Bemba and agriculture were then undergoing change through contact with the wider world of neighboring people, economic forces, and European intruders. Though southern African societies like Zulu and Bemba are quite different in cultural and economic terms, by the mid-nineteenth century their foods nevertheless included adopted New World plants like maize and ground-nuts, but not yet cassava (see below). Both societies consumed maize not as a grain but as a vegetable snack in the milky green stage, but not yet as a rough milled flour used in porridges. Millet (for Bemba) and sorghum (for Zulu) were the dominant grains historically and as a rural people not yet drawn into an urban orbit, both the Zulu and farmers and cooks also had access to a natural world of wild plants, game, and seasonal insects. Locusts, ants, and caterpillars were treats that broke the seasonal monotony. That rural diet was also distinct from an older maritime and cosmopolitan world of the coastal areas of the Indian Ocean and Atlantic Rim where fish, fruit, and spicy curries with coconut milk brought a wider variety of agricultural to local diets.

Primary Crops: The Carbohydrate Base

African agriculture(s) follows a well-marked geography of starchy staples like rice, cassava, maize, plantain, and/or yam. And that geography includes not only the list of available grains (maize, rice, sorghum or millet), and/or root crops (yams, cassava, Irish potatoes, cocoyam), but also people's cultural preferences for a proper and filling meal judged, perhaps, more by the texture of particular glutinous starch, than by its taste. And they use this marker far more than a meal's meat, fish, vegetable, or spice components that are part of the sauce that accompanies a meal. Even if people have a choice of starchy staples in a particular area, local farmer practices, including culinary cultures have strong preferences for a particular type, e.g., Ghanaians typically prefer *fufu* made from pounded yam as the feeling of a proper meal, though in the gastric sensibilities of other areas like southern Nigeria or Western Congo many prefer *fufu* made from cassava, plantain, rice, or a mixture of these.[5] These choices reflect the history of ecology, cultural geography, and changes in individual tastes over time.

As food produced by local agriculture(s), starchy staples usually offer calories and variation of texture, but actually little in the way of taste. Starches are … bland. Yet, they provide an essential factor of texture, shape, and bulk that frames other components of a meal. In fact, for most world culinary cultures and foodways it is often the carbohydrate base that is its defining feature. For some cultures of consumption it is the texture or stickiness of rice (East, Southeast and South Asia), or yeasty wheat bread (Europe), or potatoes (Latin and North America), or the gritsy texture of maize porridge (northern Italy, Serbia, Eastern and Southern Africa) that a make a meal that parallels an annual cycle of labor in agricultural fields.

Africa historically has embraced a number of starchy staples, though their historical geography reflects a combination of innovation in endemic African crops: it was African rice, or yam, or sorghum, versus starchy staples adopted and embraced from other world areas, such as

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[5] *Fufu* is a stiff paste molded by the eater into a ball then dipped into sauce and swallowed, usually without chewing. It leaves a distinctive feeling in the stomach at the end of a meal.

maize and cassava (New World), *Oryza sativa* (Asian rice); or plantain/bananas (southeast Asia, Indonesia) that African farmers quickly adapted to local farm ecologies and cooking pots. African cooks quickly followed the farmers' lead in incorporating new starches. We may never know whether it was the farmer or the cook who played the larger role in choosing the new foods to grow. But a study of agriculture is about the end results of the labors of farmers, herders, gatherers, and cooks.

Rice

In the 1970s, botanical research on the world origins of domesticated rice reached a consensus that only two genetically distinct varieties existed: *Oryza sativa* from Asia and *Oryza glaberrima* from Africa. The African version of rice appeared over a broad region of West Africa from Senegal to Liberia (and a small part of Ghana) along the coast and inland for more than a thousand miles to Lake Chad. In fact, African rice was probably domesticated first on the freshwater wetlands of the Niger River in Mali by 300 A.D. from whence it spread to coastal estuaries and the rain-fed highland area between Guinea and Sierra Leone where it became a staple crop well before the arrival of New World crops after 1500.[6]

Is was no accident that the domestication of African rice and its spread as a food crop coincided with the history of the Mande people and the formation of great West African empires —Ghana, Mali, and Songhay—near the watersheds of the Niger and Senegal Rivers. Early European travels along the West African coast commented on the local foods, and often mentioned rice prominently in particular cultural or ecological areas. Valentin Fernandes, a Portuguese traveler noted in the period 1506–1510 about the Gambian Mandinka (Mande) people who lived in the hinterland of the old Mali empire:

> They eat rice, milk, and millet.… Poor people who don't have sweet potatoes [yams], have rice.… Their food is like the Wolof [of Senegal] except that they eat more rice and they have so much that they take it to sell and exchange, also [palm] wine, oil, and meat and other foodstuffs.
>
> Because this Mandinka land is very rich in food like rice and millet, etc.[7]

Rice therefore existed alongside other staple crops in Africa's culinary past and it dictated agricultural labor. Fernandes also noted that along the tidal river floodplains of the Senegambia area that: "Twice they sow and twice they harvest rice and millet etc. knowing that they will harvest in April and September, and when they gather in the rice then they sow yams and these they cultivate year round."[8] So, while African diners may have preferred to eat rice, African farmers in this part of the continent, especially in West Africa, also hedged their bets by planting yams. African rice, however, also had a global appeal. By the middle of the eighteenth century amateur naturalist Benjamin Vaughn of Halowell, Maine had collected and sent African rice to

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[6] Judith Carney, *Black Rice: The African Origins of Rice Cultivation in the Americas*. Cambridge, MA: Harvard University Press, 2002.

[7] Ibid., 14–15.

[8] Ibid., 16.

Thomas Jefferson in Virginia for experimental cultivation at his plantation at Monticello. It failed there, but eventually found a home in the wetlands of the South Carolina colony along with Africans, captives from the Upper Guinea coast.

African rice, similar to other rice varieties, produces almost twice the protein content of wheat per unit of land and slightly more than maize. Like other true grains, rice is rich in B vitamins and contains complex carbohydrates (starch and fiber).[9] The key to rice's nutrition and characteristics as a food, however, is its processing and cooking. Processing involves threshing, milling, and winnowing. Unlike the processing of wheat, rye, or oats (European grains) intended as flour, rice processing intends to produce grains without breakage. African processing of rice with a mortar and pestle requires that women use a skilled tapping and rolling motion that minimizes breakage of the individual grain and yields white rice by removing the bran and germ from the soft endosperm.[10]

The evolution and selection of the personality of West African rice as an agricultural system, however, was probably as much the preferences of women's cookery as it was the farmer's choice about the characteristics of the plant itself or even the techniques of processing. West African cooking of rice favored a particular method that yielded separate grains of rice rather than the sticky clumps preferred in East Asian cooking. The method involves steaming and absorption by boiling the rice for 10–15 minutes, draining off the excess water, removing the pot from the heat and allowing the grains to absorb the moisture. Judith Carney points out that this method not only yields the separate grains typical of West African rice dishes, but also saved energy and scarce wood that women had to collect from the historically wood-scarce landscapes of West Africa's middle Niger Valley (Carney, 2002; Davidson, 2016).

Carney also points out key distinctions between African –and African diaspora—methods for rice cookery and the cooking aesthetics of both Asia and the Mediterranean. West African long-grain rice was different altogether. For that type it was thus African women who developed the method of steaming and parboiling of long-grain rice chosen more widely by most New World cooks preferred than the Arab/Spanish/Italian method. Euro-Americans for whom Carolina long-grain rice became the standard type had quite specifically adopted that cooking style and taste from African cookery rather than from the Spanish or Italian methods. Guatamalan *arroz precocido*, a rice grain variety preferred in Mexico and Central America, for example, is parboiled and resembles its African cousin, though the use of hands to scoop up the rice and sauce was efficient and more common in West Africa (Carney, 2002; Davidson, 2016).

The geography of African rice cooking today thus reflects both historical ecology and evolving tastes of urban consumers. But Africa's encounter with rice pre-dated the New World Carolina connection. The rice that reached African cooking pots in pre-Columbian times also included Asian types (*Oryza sativa*) that had arrived by a number of Africa's trade networks, including the trans-Saharan trade with the Arab/Berber Mediterranean that predated Columbus and Atlantic contacts. Asian rice had also reached East Africa as early as the ninth century when

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[9] See John Lobell, *The Little Green Book* (Boston: Shambhala Publications, 1981); for rice nutritional information, see www.pechsiam.com/allabout_nutrition.htm.

[10] Carney, *Black Rice*, 124–25.

Indonesian migrants began to populate Madagascar and brought Asian *sativa* rice with them on their journey. These adoptions included types that European visitors described as "as fine as that of Valencia and very white" suggesting an Asian type found at the Gold Coast that local traders had received indirectly via India (Alpern, 1992).[11] But rice contacts and exchanges seem to have been continuous from Asia. Another variety known as "Carolina Gold" came to Sierra Leone with West Africans who liberated themselves from the slave ship Amistad, who returned to their homeland after release from captivity in New Haven, Connecticut, in the 1840s. That type was a white Asian variety that proved very popular with West Africans who liked both its color and its high yield compared to local *glaberrima* type.

Rice thus appears as a favorite African starch in various forms and in some areas, such as Senegal, Sierra Leone, Liberia, and part of Ghana, while in other areas by the mid-twentieth century imported Uncle Ben's Converted Rice ("converted" refers to parboiled in the West African style) had already emerged as a post-colonial affectation in urbane diets and cookery. That result shows not just current globalization but also a longer history of farmers, cooks, farmers, and household diets.

Rice(s) for West African areas became a fulcrum for understanding key social relations that underlay the Atlantic slave trade (Hawthorne, 2003), such as the Upper Niger delta (Twagira, 2014), and symbolism of both cuisine and commensality that bound both ecology and identity in the Upper Guinea forest (Davidson, 2016). Food and agricultural cultures together expressed a regional identity for otherwise disparate ethnicities from the early to colonial and post-colonial worlds. Rice framed a common regional cultivar whose production made common ground within distinct regions of West Africa, including both humid and riverine zones (the Upper Guinea forest, the Sahel's upper Niger and river deltas of Tanzania an island cultures of Zanzibar and Pemba).

Other African Grains: Millet, Sorghum, and Teff

Three indigenous African grain crops—millet, sorghum, and teff—made the transition from wild grasses to domesticated food by the hands of several African agrarian cultures who collected seed grains of local wild grasses as food, planted the best of those grains as seed, and continued over generations to select from those domesticated grains the characteristics that best suited their tastes and farm ecologies. Language tells us a great deal about the history of food in Africa, where borrowings and invention of nouns and verbs referring to agriculture—to reconstruct the early history of grains and agricultural practice in Africa. UCLA historian Christopher Ehret has been a pioneer in using grains as a measure of Africa's innovations in agriculture. His complex but intriguing studies posit three major African regional historical innovations in food grain. From these areas of innovation came key grain staples, such as sorghum and millet, that spread to the diets and emerging cuisines of the Mediterranean, India, Korean, Japan, and China well before 2000 B.C.[12] In those world areas sorghum and millet from Africa were important for local

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[11] Stanley Alpern, "The European Introduction of Crops into West Africa in Pre-Colonial Times. *History in Africa* 19 (1992), 20–21.

[12] Christopher Ehret, *An African Classical Age: Eastern and Southern Africa in World History, 1000 B.C. to A.D. 400* (Charlottesville: University of Virginia Press, 1998), 5–14. Ehret argues for three zones: the Sudanic

food ecologies and climatic regions where rice or wheat did not grow, especially in the times before maize's arrival around 1500 from the New World. These African grains were particularly important since their domestication in Africa showed selected traits of drought resistance, storability, and provided a rich source of B vitamins. Whole grains of sorghum contain 12 percent protein starch (equal to wheat), 4 percent fat, and 4 percent minerals, a vital mix to sustain humans. These African sorghums and millets spread eventually to Asia and to southern Europe as basic parts of the diet of Venice, Mughal India, and Ming China.

Other African grains stayed closer to home. African millets and millet-like cereals include small-grain types: finger millet (*Eleusine coracana*), pearl millet (*Pennisetum glaucum*) and endemic African cereals, fonio (*Digitaria exilis*) from West Africa, and teff (*Eragrostis tef*) from the Ethiopian highlands. These types of African grains are especially nutritious because their small size means that the entire grain is consumed, unlike wheat or rice that humans often process to remove their bran. African grains offer sources of protein, iron, and calcium. Moreover, the tiny size of millet and teff grains means that they store for a long period without damage from weevils or fungus because the small space between grains allows little oxygen for insect pests and mold to survive and propagate. In humid Africa's climate good storage characteristics of a crop was a major advantage. After all, storage was the stage between the farmer's field and the cook's fire.

Both sorghum and millet were also important in Africa for the production of alcohol in the form of beer and spirits. Ironically, however, sorghum's greatest influence in Africa is in places where the influence of Islam and its proscription against alcohol is greatest: Egypt, Sudan, eastern and northeastern Ethiopia, northern Nigeria, and the Sahelian countries of Niger, Mali, Chad, and Burkino Faso.[13] In many of these areas pre-Islamic and syncretic religious practice recognized the value of grain beer and tolerated its use even after Islamic influence appeared. Beer was food, of sorts, while the later arrival of distilled spirits proved socially important, even if not nutritionally so.[14] Beer was fermented grain consumed as food, while distillings from grain into spirits reduced that grain to pure alcohol. In some areas of Africa the spread or revitalization of Islam was a reason why certain grains declined since their major use had been for producing beer and local "white lightning" alcoholic spirits. Islam forbid alcohol and thus reduced demand for sorghum.

Agripastoral Tradition at the southern edge of the Sahara (for sorghum, pearl millet, and fonio—another African grain); the Cushitic Agripastoral Tradition of the Red Sea/Nile Valley area (for teff and finger millet); and the West African Planting Agriculture that developed the yam.

[13] For a good survey of the qualities and geography of sorghum in Africa, see "Sorghum in Africa," www.uea.ac.uk/cap/sorghum/Africa. Also see, Kenneth F. Kipple and Kriemhild Coneé Ornelas, *The Cambridge World History of Food*, vol. 2 (New York: Cambridge University Press, 2000), 1814.

[14] On the comparative history of beers and distilled spirits, see Justin Willis, *Potent Brews: A Social History of Alcohol in East Africa 1850–1999* (Oxford, OH: Ohio University Press, 2002), and Emmanuel Akyaempong, *Drink, Power, and Cultural Change: A Social History of Alcohol in Ghana, c. 1800 to Recent Times* (Portsmouth, NH: Heinemann, 1996).

While these African grains indeed have a variety of uses, in more arid ecologies of the Sahel and southern Africa they were most of all the base of porridges or gruel served with meat, or vegetable sauces to make a meal. Since none of these grains—sorghum, millet, and teff—contain gluten, bread made from them is unleavened and over the course of the twentieth century those breads lost favor with some African urban elite populations that have adopted wheat bread. The millet and sorghum porridges made by boiling either grains or milled flour from those grains were the key staples of most areas that at some point of the twentieth century gave way to maize porridges under the local names of *ugali*, *miele pap*, *sadza*, *bidia*, *nsima*, or *upswa*. Moreover, historically, sorghum along the West African coast, along the escarpment of the Ethiopian highlands, and on the veld in southern Africa have in the twentieth century quickly lost ground in the fields and diet to maize (see below) in the years after its arrival from the New World. Along the West African coast, for example, maize replaced sorghum within a century of that New World crops arrival via the Atlantic trade.

If African staple foods changed over time in some places, in other places they had true staying power. In Ethiopia the indigenous grain teff was the primary base for their local flat, spongy bread called injera that was the foundation of a full meal.

Maize

Unlike rice that had cultivars on both humid and riverine areas that arrived on farms from the Indian Ocean and, later, Atlantic circulations—and had an African indigenous variety, maize had its origins fully in the New World. Maize was a newcomer that yielded its food (as grain or as vegetable in its young, milky stage.) Yet, after maize's post-Columbian arrivals in Africa took several paths to farmers' fields, storage devices and cooking pots. Maize's names in most African languages almost all implied that it had come from elsewhere: by referring to its origins across the sea (Chimanga in Chichewa; "Sorghum from the Sea" in several Ethiopian languages; Arab sorghum in Somali; Mealie in South Africa; Muhindi in Kiswahili) (McCann, 2005). By the end of the twentieth century in terms of yield per hectare, early maturation, and its low labor requirements is was Africa's most productive crop, where non-arid conditions allowed. As a wind pollenated crop with seed selection of traits, it was manageable by farmer choices.

Maize arrived in Africa by the early sixteenth century and spread in three of its major forms: flint, dent, and floury, though flint was at first its most adaptable given its early maturation, hard starch that stored well—and in wide palette of colors from which farmers could choose. African farmers in each location of contact quickly learned to select seeds for replanting depending on their choice of characteristics: color, texture, plant height, disease resistance, or storeability.[15] Remarkably, farmer choice over time nurtured maize's genetic personality to create local variations from small holders' preference for early yielding flint types and, over time, commercial farms that chose uniformity of texture (soft for machine milling) and color (white for uniformity), even if local names for the maize staple porridge took distinctive local names (ugali/mealie pap/sadsa/nsima/kenkey/gunfo).

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[15] See James C. McCann, *Maize and Grace: Africa's Encounter with a New World Crop* (Cambridge, MA: Harvard University Press, 2005); also see Marvin Miracle, *Maize in Africa* (Madison: University of Wisconsin Press, 1965), which focuses primarily on West Africa.

Farmer choices for maize types and personalities in Africa reflected the influences of consumer demand, industrialized or hand milling, and commercial markets. Maize's color preferred in Africa and international markets signaled a trend in mass consumption by urban dwellers and its trend toward homogenization of color and texture suppressed biodiversity of earlier years when it was a farm niche crop. By the mid-1990s, 95 percent of Africa's maize was white (McCann, 2005). Only South Africa's industrial economy that used yellow maize for livestock and poultry production where yellow maize's small fraction of yellow betacarotine gave consumer preferences for yellow egg yokes and beef fat. If taste and texture among women cooks and family consumers favored flint maize flour, the rigors of high yield the spread of composite (OPV) and new hybrids favored planting of dent types.

Over four centuries of maize's engagement with African farms, maize's attractions had replaced older grain types (e.g., finger millet, sorghum, fonio (*Digitaria exilis*), wheat, barley, and even teff) where climate conditions and soils allowed. Moreover, by the end of the first decade of the twenty-first century, governments and international aid had championed hybrid varieties from international seed companies or national programs to increase mechanization, row planting, chemical fertilizer (DAP, urea, zinc additives) overall food production, yield per unit of land, and even attempts to enhance drought resistance. The biodiversity that African farmers had nurtured and sustained has decreased, except where local smallholder farmers have persistently preserved older maize types on farm. In the early 2000s, the seed bank of the International Centre for the Improvement of Wheat and Maize outside Mexico City began collecting and storing maize from Africa, a late but valuable recognition of African farmers' own selection process of maize biodiversity in the post-1500 period.

Tubers and Minor Grains

African farmers had long practiced the inclusion of root crops adopted from neighbors and international contacts. Manioc—or, cassava—cocoyams, taro, Irish potatoes and sweet potatoes came to West Africa and thence to other African regions from the Americas, while indigenous yam, and other locally specialized root crops were part of in-ground storage intercropping strategies as farmers received and adapted root crops to their local *terroir* and field systems. Root crops were either rotated or intercropped with beans as an understory for maize or legumes like field peas, various beans, and chickpeas. Cassava in particular had been part of the Columbian circulation that had sustained populations of African captives in the New World settlements on plantations or in maroon communities in Jamaica, Surinam, Belize, or Bahia (Brazil) as well as transforming field systems in Africa itself. In West African humid zones cassava joined plantain and pounded yam as part of the staple of *fufu*, the carbohydrate base for local soups and stews. Elsewhere in the Nile Valley and drier areas it was washed to remove traces of cyanide and then boiled as a starch with little in the way of nutrition, but stomach-filling bulk.

Other crops either cultivated or gathered to farms had local or regional impact *chat* (or *qat*) in the Horn (Gebissa, 2004), coffee, tea, kola, baobab seed powder (aka cream of tartar), shea butter, locust bean, *sumbala* (a stew thickener), to name a few.

Yams (*Dioscorea cayenensis* and *Dioscorea rotundata*)

Christopher Ehret, the historical linguist, tells us that what he calls the "West African planting agricultural tradition" had its origins before 5000 B.C. and had its foundation in the indigenous

African yam. The homeland of this African root crop tradition was West Africa's woodland savanna zone where natural forest clearings would have provided an ideal setting for yam cultivation.[16] In turn, the yam-fed concentration of population in otherwise carbohydrate-poor forest ecologies formed the basis of powerful political and artistic cultural complexes of West Africa, such as Benin, Ife, and Akan (including the well known Asante people of Ghana). The yam, in fact, nurtured a set of related cultivation traditions that raised the cooking of root crops to an art of the edible.

A native West African plant, the white yam grew in forest areas under the careful tutelage of West African farmers who built mounds, planted root cuttings, protected young tender tendrils, and hoed the mounds to keep down the weeds. Yams are big, ranging from 30 to 100 pounds, or they may be the size of New World sweet potatoes, which they resemble (though the two root crops are genetically unrelated). They also contain from 15 to 40 percent starch, much less than cassava, another root crop common in West and Central Africa (Nweke). The common English term yam comes from the word, *nyami*, the name used commonly in West African languages for that tuber. In French it is *igname* and in Spanish, *ñame*.

And as the central starchy staple food of the cuisine of the forest ecology yam also had a role in the human life cycle in the forest zone that stretches from Guinea to the Congo.

Cassava

Cassava is second only to maize as Africa's favorite staple. Despite its relatively slow adoption of the root crop (compared to maize, for example), Africa now produces more cassava than the rest of the world combined and that root crop is the second most important food staple cooked and eaten in the African diet. Cassava appears in the diet of forty African countries—though about 70 percent of Africa's total production of cassava is takes place in Nigeria, Congo, and Tanzania.[17] For farmers the spread of cassava historically, and in more recent times, has been because:

- it adapts to poor soils on which other crops fail
- it is easily propagated by stem cuttings
- it resists drought, except at planting time; it resists locust damage
- it has a high yield (ten metric tons per hectare) and is a low-cost source of calories
- it can be planted at any time of the year
- Cassava roots can be left in the ground and harvested from six to forty-eight months from harvest (Nweke, 2002).

Cassava (also called manioc, yuca, and tapioca) arrived in West and Central Africa from Portuguese trade links to Brazil in the sixteenth century, though it did not have its full effect in

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[16] Ehret, *An African Classical Age*, 13. Cocoyam (*Colocasia esculenta*), also called taro, was an import and arrived in Africa via the Indian Ocean, and later, the Atlantic Rim, and played a supporting but minor role in African cookery.

[17] Felix Nweke, Dunstan S. C. Spencer, and John K. Lynam, *The Cassava Transformation: Africa's Best Kept Secret* (East Lansing: Michigan State University Press, 2002), xvii.

many areas until the nineteenth or twentieth century. Yet, it reached Angola and the mouth of the Congo River by the late sixteenth century and was a staple food in southern Gabon by 1612 and had been abundant on the island of Sao Tomé by 1619. In 1644 the Dutch traveler Dapper testified that cassava in the Niger Delta (at an area in southeastern Nigeria, Warri) was already being ground into flour and made into a type of bread (Alpern, 1992; Nweke, 2002).

Cassava comes in several varieties, often labeled as sweet or bitter, though each contains poisonous cyanogens (prussic acid) that require careful processing to make them safe for human food consumption. Slow adoption by women was likely partially a result of its tedious and labor-intensive processing requirements to remove the poisons. The methods for using water or heat (roasting, boiling, or sunshine) to remove cyanogens poisons seem to be a historical mix of technology transfer from New World women to African women as well as a substantial bit of local invention, trial and error, and accumulated local experience. Eventually, these methods for processing cassava safely to remove the cyanide included some combination of peeling, grating, fermenting, and toasting or by soaking in water for four or five days and then sun drying to eliminate the poison. Sweet-type cassava roots are low in cyanogens poison, are mealy after cooking and usually eaten raw, boiled or roasted in an open fire. Bitter cassava varieties have a higher dose of poison, are waxy after cooking, and cooks process them by peeling, grating, and or toasting the root pieces. Depending on the texture they desire, women might also soak or boil the roots and then sun-dry them (Nweke, 2002; Jones, 1959).

Nutritionally, cassava is one of the foodstuffs highest in carbohydrates; the roots contain only 1–2 percent protein and are also low in minerals. Peeling of the root for processing further reduces the protein content since part of the protein is in the roots' skin. Cassava root contains calcium and vitamin C, but large proportions of its thiamin, riboflavin, and niacin are lost during processing. Cassava fills the belly but its value lies in its carbohydrates rather than its overall nutritional qualities.

Together with cassava roots processed as a starchy staple, cassava leaves form a major part of the plant's value in some areas like Sierra Leone, or in Congo where women concoct dishes like *pondu* (cassava leaves, onion, and dried fish) and *saka-medesu* (cassava leaves and beans), taking care not to overharvest the leaves and damage the growing roots. Cassava leaves have a nutritive value similar to green leafy vegetables: vitamin A (carotene), vitamin C, iron, and calcium; they are richer, in fact, in protein than the roots of the plant. Pounding the leaves in a mortar and then boiling them with groundnuts, fish, and oil eliminates the cyanide traces and makes them safe as a relish for *gari*, rice, or yam.

Plantain (*Musa paradisiaca*)

Plantain made its way to Madagascar and thence to East Africa in the later part of the first millennium A.D. (500–1000) as part of the botanical and human settlement of the Indian Ocean rim. Known as *matooke* in Uganda and western Kenya, or *ndizi* in eastern Congo, or *ndeze* in Mozambique, the plantain is a close relative of the sweet banana. But African plantain is starchy rather than sweet and prepared in the green form by boiling, steaming in its own leaves, pounding as *fufu*, frying in oil, or grilling on charcoal.

Plantain, in fact, appeared in Africa even earlier than in the New World, and spread into moist areas around the Great Lakes in western Kenya, Tanzania, Rwanda, and eastern Congo.

Unlike Africa's indigenous grains that were first collected in a wild form and then domesticated on Africa's small farms, plantain spread across Africa's forested and moister landscapes purely as a product of human action, rather than pollination or natural dispersal of seed. Plantain, as with other bananas, grows fast—reaching as much as 7 meters in a year—and responds to human efforts to propagate them by farmers' deliberate transplanting of stems (suckers).

In the era before the arrival of maize and cassava, plantain was, along with rice, sorghum, millet, and yams, critical to African agriculture in both annual and perennial crops. In West Africa plantain were less important than root crops as a staple, but nonetheless, added to the potential cooking ingredients of moister and forested areas. Drier areas were better suited to grains like millet, sorghum, and African upland rice. In the Great Lakes area the low labor and high yield characteristics of plantain likely played a significant role in the rise in the late eighteenth and nineteenth centuries of compact and powerful kingdoms like Buganda that competed with livestock and grain-based neighboring kingdoms. Some historians argue persuasively that it was the productivity of plantain gardens in equatorial Africa that allowed population expansion of the great Niger-Congo peoples (i.e., Bantu-speaking groups) who came into contact with grain-producing people at the forests, northern and southern edges. Unlike yam, cassava, or maize, however, plantain cultivation appeared in areas with fairly rich soils and dense human settlement, and especially in moist forest zones of West and Central Africa.

Like other non-grain starchy staples, plantain are able to present themselves as either a snack or as the core texture element for a meal with stews and sauces. Cooked plantain is high in carbohydrates (97%), low in fat (1%), and low in protein (2%), while, like many fruits, high in vitamins A and C. Fried plantain using palm oil, or other oils is found almost everywhere plantain appears.

The story of Africa's starchy staples and their distribution over time and space strongly indicates the dynamism nature of agricultural systems spread across the continent over time. The decline of indigenous grains—sorghum, millet, and fonio—in the past century mark a contrast with the spread of those crops into world food systems in the Mediterranean, India, and East Asia. At the same time as Africa's own grains—sorghum and millet—spread into other world areas, African farms have appropriated other starchy staples—maize, cassava, Asian rice—from other parts of the globe into their fields and pots. Those staples mark the feel, the weight, and the texture of what African women prepared, shared, and presented on the occasions of high ritual as well as the daily meal. The spread of the flavor and fiery hot peppers, also an acquisition from the Atlantic World biome followed, and perhaps preceded the movement of the blander New World starchy staples into African agricultural fields.

Capsicum: The Democratization of Heat and Flavor

If Africa's culinary geography of texture rests on the consistency and bulk of its bland starchy staples, its most ubiquitous staple marker of flavor is that of the capsicum pepper, otherwise known as *chilli*, *pimiento*, *berbere*, *harisa*, *piri piri*, or red pepper. For many areas of Africa we cannot imagine sauces and meats without the distinctive qualities of capsicum peppers in one form or another.

Capsicum peppers can trace their lineage from a plant native to the New World (tropical South America) that expanded its range into the Old World, especially in the tropics in Africa,

southeast Asia, Sechuen China, and India—after the opening of the Atlantic world and Indian Ocean trade. Two types of capsicum peppers had the greatest effects on global flavors (and heat), *Capsicum annunum* and *Capsicum frutescens*. The *C. annunum* category contains most other types of red and hot peppers, including paprika, jalapeño, and other hot red peppers. The Frutescens type includes tabasco, a type processed commercially in North America and birds-eye peppers, a small red type found especially in Ethiopia and parts of East Africa. The Ethiopian type is known there as *mitmita* and the verb describing its effect on the tongue is the same one used for scalding with hot water or red-hot coals.

Virtually all of these varieties of capsicum (except sweet bell peppers) contain capsaicin, a lipophilic chemical that causes a strong burning sensation to the mouth of the eater. The amount of capsaicin varies in each type of pepper, affecting their volatile balance of heat and flavor. Virtually all mammals (except for some humans) find the burning sensation unpleasant and avoid contact with it. Birds, however, are unaffected and appear to be attracted by the bright colors and vitamin A in the flesh of the fruit. The presence of capsaicin, therefore, may well be a plant adaptation that repels mammals but attracts birds that will spread the seeds widely, an effect quite different than the purely deliberate human propagation of the grains, tubers, and maize that arrived in Africa from the New World. Bacteria may also have an aversion to capsaicin since dishes spiced with hot powdered capsicum have a longer life in storage than those without it, a fact well known to experienced cooks in the tropics.

Once the capsicum seeds had crossed the Atlantic, Mediterranean, and Indian Ocean African farmers were able to select their favorite capsicum types since it is garden-based, insect pollenated annual crop that they could modify by seed selection and home-grown seedlings over successive seasons to refine the characteristics of color, flavor, and size that they most desire for the market or the pot. They may also obtain the peppers by collecting the volatile fruit from "volunteer" plants whose seeds had been spread by vitamin A-seeking birds. Just as birds democratized the spread of capsicum in Africa, it seems likely that the pepper seeds and dried pods spread around Africa and the Indian Ocean world via Arab, Indian, and Portuguese traders that brought them from the Mediterranean, India, and directly from the Brazil, MesoAmerica, and the Caribbean.[18] The seeds were durable, easily stored, and gave great value as trade items in markets like Zanzibar, Cairo, and Sao Tome. European travelers to Cuba in the 1500s already knew the power of the "aji-aji" peppers that inflamed *ajiaco criollo*, the favorite dish of the native Cubans that included many types of root staples, meats, and hot peppers.[19]

New Historiography of African Agriculture

African agriculture and Africa's local farmers had long participated in developing small grains and other local crops that complemented seeds and plant materials adopted from analogous

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[18] Jean Matthews, "Chilli Peppers," in Kipple and Ornelas, eds. *The Cambridge World History of Food*, 281–87. From other evidence on other crops (such as maize), it seems likely that capsicum's route may have included Venetian contact with the Ottoman Mediterranean and the eastern spice trade and India and thence to Africa's East Coast or up the Nile Valley.

[19] James C. McCann, *Stirring the Pot: A History of African Cuisine* (Athens: Ohio University Press, 2009), 172–73.

global ecologies. Chief among the small grains with African origins were finger millet (*eleusine*), fonio, glabberima rice, several sorghums, and the secondary dispersal of barleys and wheats in the Horn of Africa (Ehret, 1979). These grains showed farmers' and crop germplasm adaptations to the rigors of season and aridity that was a feature of various African tropical and sub-tropical ecologies.

In the nineteenth century following the early industrial revolution the expansion of global trade, industrial demands for lubricants (vegetable oils) and fiber (cotton) also spurred Africa's involvement in global participation by Africa's farmers. That expansion into the twentieth century also meant competition between indigenous agricultural food crops and new food commodities like maize, cassava, cotton, and local food systems—as well as palm and peanut oils and, more recently, biofuels (Nalepa, 2011).

New scholarship has pointed to agricultural and food consumption changes at the local level as farmers and food consumption changed. Recent trends also reflect more established insights into the complexity of African farmer participation in the modern period and the longue duree. Important new insights on ecology of African agriculture are also emerging. Historian Kathryn De Luna uses language and regional patterns to reconstruct early adaptation of agriculture and society in Central Africa builds on earlier work on Eastern Africa from David Schoenbrun (DeLuna, 2016; Schoenbrun, 1998). Her work on language and linguistics in central Africa leads us to new insights into early African ecologies of agriculture. Similar themes and questions are also emerging for more contemporary issue of food and agriculture. For non-Semetic Ethiopia anthropologist Valentina Peveri has studied and evaluated the effects of more recent global change in both the rhetoric of African agriculture and nutritional impact on local culture of production and food. Peveri addresses the rhetoric of nutrition policies in Ethiopia and based on primary sources and on an analysis of policy documents from international organizations and the Ethiopian government regarding feeding and nutritional programs. Her research based in southern Ethiopia (Hadiya) analyzes how in ensete (*Ensete ventricosum*) based Ethiopia the dictates of the Green Revolution—which privilege productivity over justice, and calculation over taste and experience—translate into, and inform, national nutritional guidelines that reveal a policy rhetoric intended to persuade the public and the producers to enter into new modes of diet and technological fixes. Her approach is to complement this "expert scientific view" with the voices of charismatic small farmers and useful plants, shifting the focus from nutritional deficits to self-sufficiency in food production; and from nutrition security to food systems that are sympathetic to history, locality, and cultural identity. An integration of diversified (cultural and agri-cultural) resources into the national food basket is advocated as a strategy for broadening the diet as well as a sense of meaningful citizenship of otherwise disenfranchised peripheral communities (Peveri, 2016).

Another perspective on vegetative cover and its interface with agriculture builds on changing forest ecologies, farmer community strategies and the "invention" of forest fallow rotation method (Amanor, 1994 Wilks, 1978). Most importantly for the historian of Africa's agriculture has been the work on anthropologist James Fairhead and geographer Melissa Leach. Their seminal work from 1997 set on the forest "mosaic" in Guinea demonstrated the importance of reversing the degradation narrative and putting forward agency of African farmers and ecological managers over time (Fairhead and Leach, 1997). Their research with Guinean colleagues and many who have followed through the Institute of Development Studies at Sussex

set African farmers as ecological managers who impact on the present landscape was conscious and effective historically.

The emergence of a new African agricultural history is now become part of a broader ecological/environmental history which encompasses features of the physical environment and human constructions of gender, class, and social institutions. The new directions represent a movement as strong as occurred more than two generations ago when historians of Africa undertook to include linguistics, anthropology, and geography as perspectives to enrich appreciation of the past. The ability to understand technical data on agronomy, soil science, and epidemiology in combination with historical empiricism using oral testimony, archival records, and even participant observation has been essential to historical reconstruction of ecological systems. The research and new bodies of publication stands alongside an impressive body of work on African agriculture conceived as part of a broader agrarian economy.

As we look forward, the rich documentary record of the colonial period will continue to be attractive to historians of Africa. And more recent, more specialized technical research on large-scale agriculture in many regions of Africa will make African agriculture part of global trends in commodity production in areas like coffee, legumes, fisheries, palm oil, flowers, and specialized market crops that depend on contract farms that require reliable and timely delivery to developed world markets.

Looking backward, changed in agricultural in Africa's various regions, and ecologies, have resulted from farm-level decisions to adapt new seeds, adjust rural diets, and experiment with new techniques of soil and fertility management. In the first decades of the twenty-first century most African farmers are still smallholders, but overall investment has increasingly included international investments in national and regional efforts to change agriculture's focus. These efforts are on a continental scale, including funding preference for AGRA (Growing Africa's Agriculture, https://agra.org/2016AnnualReport/milestones-2016), that lists its major donors as Bayer, Grow Africa, International Finance Corporation, Rabobank, Syngenta, World Food Program, and Yara International, a group that also has its primary business focus on pharmaceuticals, chemicals, and global commodity marketing. Research on health (e.g., WHO and bilateral aid) has also focused on biofortification with new ingredients, such as zinc and QPM (quality protein maize) in seed programs pointed at smallholders, but also on large-scale farming in marginal areas where leased land (a.k.a. "land grab" areas) aim to increase commodity production in global crops like chickpeas, biofuels, oil palms, etc., that focus on exports rather than local consumption.

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