

Historical case studies of famines and migrations in the West African Sahel and their possible relevance now and in the future

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Published online: 4 March 2015
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Abstract Case studies of three famines that occurred in rural northwest Nigeria during the latter half of the twentieth century are presented. Research found that continuum models and entitlement theory did not adequately conceptualize famine-related migration, though they may be more accurate now and in the future. Projects examining the climate-migration nexus should consider the possibility that famines and large-scale migrations from the Sahel will occur as a consequence of both heavy, poorly timed rainfall and intense droughts. The savanna's historical function as a refuge for stressed Sahelian people continued into the 1980s, but research is urgently needed to determine whether that is still true.

Keywords Famine · Migration · Sahel · Savanna · Climate change

Introduction

Massive population displacements are among the dire potential consequences of twenty-first century global warming. Some UN agencies and private humanitarian organizations assert that climate change will force millions from their homes in the coming decades (Christian Aid 2007; Warner et al. 2009). Sea-level rise is projected to be the main driver of mass migrations from densely settled coastal zones, while in semiarid lands, drought and desertification are usually invoked. Such anxieties stem from the publications of prominent writers whose views have been highly influential in policy debates and with journalists (Myers 1997, 2002; Brown 2011). Because the possibility of major, and perhaps uncontrollable, South to North movements has

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been brought to the fore, expected migration due to climatic change is politically charged.

Over the past several years, two high-profile projects have been investigating the climate-migration nexus: The UK Government Office for Science has carried out “Migration and Global Environmental Change” within its Foresight program and the European Commission has sponsored the “Environmental Change and Forced Migration Scenarios” (EACH-FOR) initiative. Most of the works cited in Foresight and EACH-FOR reports focus on the role that relatively slow changes in rainfall regimes and vegetative cover may have in causing major population movements (for example, Henry et al. 2004a, b; Barrios et al. 2006; van der Geest et al. 2010; van der Geest 2011). Few address the possibility that climate change will increase the frequency or severity of famines, which have been the main drivers of comparatively sudden migrations in the Sahel. Most reports do not take into account the difficulty of defining and detecting desertification, or land degradation, and the tentativeness of knowledge about these phenomena.

This article focuses on famines and crisis migrations and evaluates theoretical perspectives that continue to influence famine early warning and mitigation. It also contributes to a better understanding of the climate-migration nexus by showing that the unfavorable timing of rainfall during farming seasons, not simply drought, has caused crop failure and famine. The data result from a program of field research sustained over 32 months (1988–1990) in two rural localities in northwest Nigeria, one in the southern Sahel and the other in the northern savanna (Fig. 1). Family migration was the primary emphasis because, unlike temporary labor migration by individuals, it has often been viewed as a last desperate measure. It is closest, then, to the type of migration envisaged in the forecasts of calamitous displacements. The Sahel locality was mainly an origin for famine-related migrations, and the savanna locality a destination. Interviews with groups and with individual male family heads were the most important data sources. These were conducted in the Hausa language

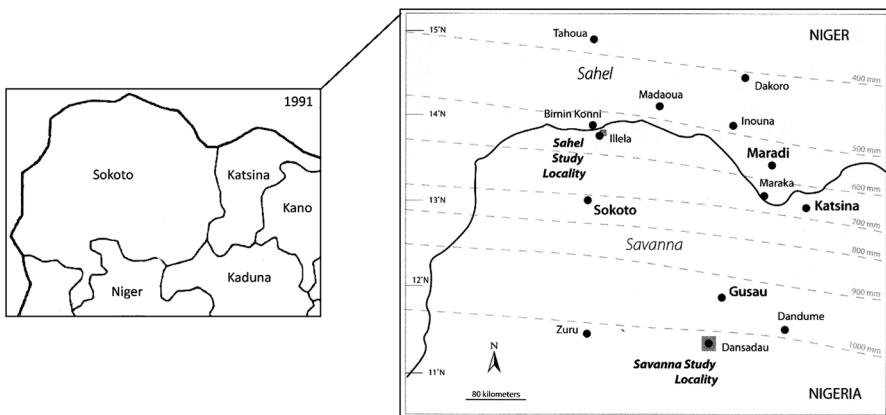


Fig. 1 Sahel and savanna study localities, places mentioned in the text, average annual rainfall, and northwest Nigerian states in 1991

by the author and his field assistant. More detailed information was obtainable for the 1983–1985 famine, as it had occurred just 3–5 years prior to fieldwork. Research on earlier crises and migrations was guided by local, regional, and national chronologies developed from information imparted in group interviews and from published and unpublished sources. Documents at the Nigerian National Archives shed some light on a colonial-era famine, and a daily rainfall series for the years 1933–1990 provided important context.

The next section briefly reviews prominent perspectives on famine: its definitions, causes, and the nature and consequences of crisis-impelled migration. Findings from the Sahel study locality, and the research methods used there, are presented in the third section. The fourth section, based on fieldwork in the savanna study locality, presents data that could be useful if climate change forces further resettlement of people from dry lands. Research methods are also described. The concluding section attempts to judge the relevance of the historical case studies for the West African Sahel and savanna now and in the coming decades. An effort to map famine vulnerability could lead to a better understanding of the impacts of environmental and socioeconomic change on migration and to improved early warning.

Environment, famine, and migration

In the Sahel, the primary trigger of famine is crop failure brought about not necessarily by drought, but by rainfall poorly distributed in relation to stages of crop growth. As is true of desertification, famine has been hard to define. Mortality from frank starvation anchors most Western definitions, but for Africans the essence of famine is a threat to their future economic viability. If adversity entailed widespread asset liquidation and destitution, but conditions improved so that deaths were averted, a famine nonetheless took place (Laya 1974; Walker 1989).

Sen's (1981) entitlement theory has come to dominate thinking on the ultimate cause of famine. Various socioeconomic groups have different "entitlements," or assets (labor, animals, social capital, land) that they may use to acquire food. Even if aggregate food supplies in a particular region are adequate, famine will occur when certain "vulnerable groups" experience "entitlement failure" from the coincidence of soaring food prices and the collapse of prices for commonly sold assets. Related to entitlement theory are continuum models of the progression of famine through time. During the early phase of a crisis, people rely on local wage laboring, wild foods, short-term labor migration, and other strategies that require minor commitments of domestic resources. Selling livestock and other possessions at low prices, purchasing expensive grain, and borrowing at exorbitant interest rates occur as the crisis deepens. The continuum ends with families liquidating farmland and migrating permanently from home villages. Because prices increase often by several hundred percent in the aftermath of famine, households have little hope of regaining land and other assets that continuum models show they were forced to sell (Watts 1983; Corbett 1988). As an end point in a process of destitution, family migration represents a failure to adapt.

Other analysts had suggested that migration might actually be a strategic withdrawal, an adaptation that aims to preserve the basis of future livelihoods or to secure new and possibly better assets in new lands (Wood and Knight 1975; Burton

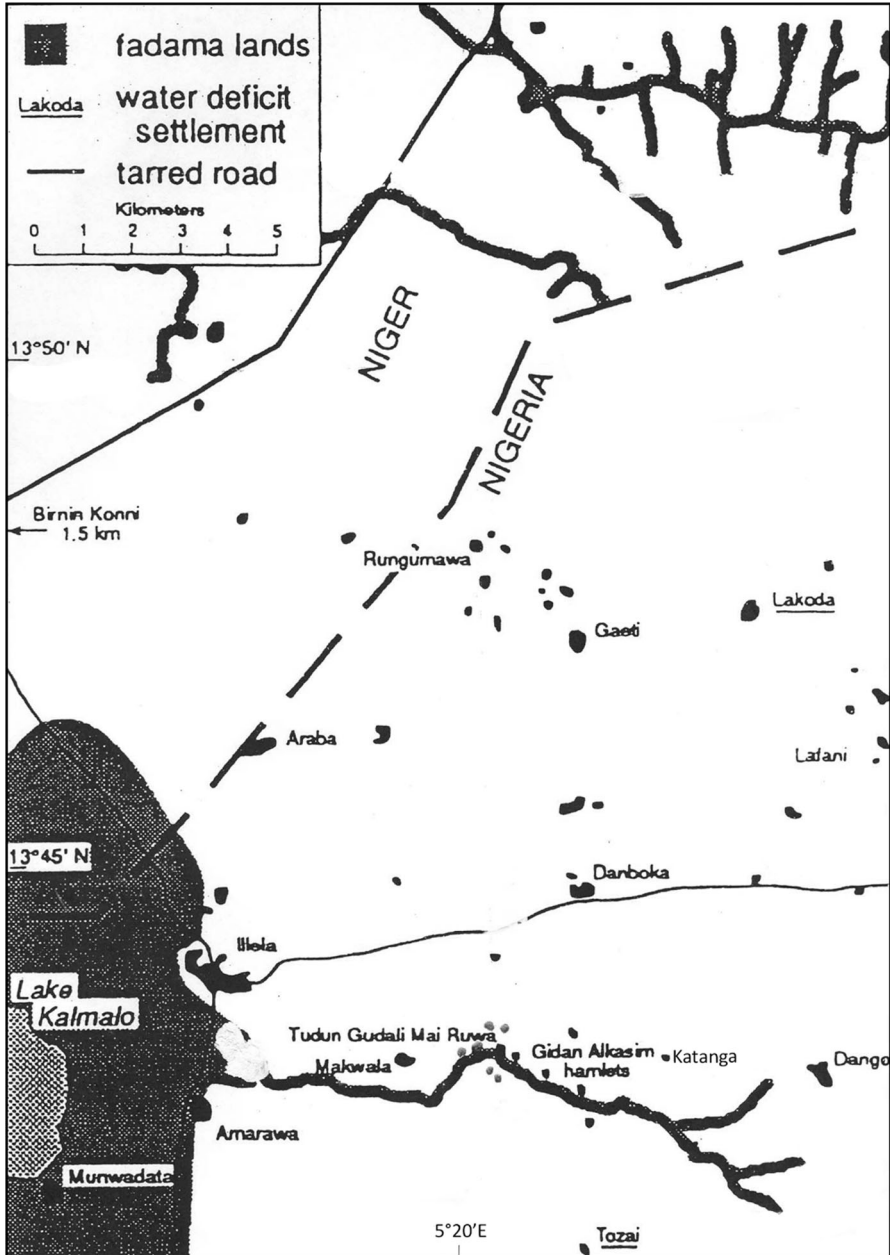


Fig. 2 Sahel study locality

et al. 1978). Strategic withdrawal had been documented for the Tuareg, a pastoral group that in pre-colonial times relied on economic diversification and a rigid system of social stratification to cope with the vicissitudes of climate. During droughts, they and their vassal farmers withdrew from the Sahel, taking refuge in subservient agricultural communities that had been established previously in the savanna. When climate improved, Tuareg herding, trade, and farming expanded again toward the Sahara, but the savanna communities were always maintained in anticipation of future droughts (Lovejoy and Baier 1975). The possibility that Hausa and other Sahelian farming groups have practiced strategic withdrawals comparable to the Tuaregs' had not been explored.

The African definition of famine and the asset preservation emphasis have been used in critiques of entitlement theory and continuum models. Yet because it is a key element in the health crisis model of famine mortality, migration to avoid liquidating assets is potentially hazardous. Epidemics of measles and diarrheal diseases killing thousands have been attributed to the congregation of migrants in encampments lacking safe water and sanitation (de Waal 1989; Salama et al. 2001). Another danger, documented by fieldwork in rural Niger following the 2005 crisis, is that preserving assets may heighten mortality risks of weak or ill children (Hampshire et al. 2008, 2009).

Three case studies in a Sahel locality

The Sahel study locality comprised approximately the northeastern quarter of the former Illela Local Government Area (Fig. 2). In addition to the small town of Illela, there were about three dozen other permanent settlements. Eight were large villages with 100–250 habitations, and others hamlets of five to 30 compounds. For administrative purposes such as tax collection, some hamlets were under the authority of the heads of the large villages. Tozai and Lakoda did not have a perennial source of water for domestic purposes, so their residents retrieved water from wells in the hinterlands of neighboring settlements (thirteen other water-deficient settlements were located between 2 and 10 km to the east and southeast of Lafani). Daily rainfall had been recorded continuously since 1933 at Birnin Konni, a town just across the border in Niger. Average annual rainfall was about 530 mm, with nearly all rain events occurring from June through September. During the rainy season millet, the main staple, was grown together with sorghum and cowpea on the expansive sandy (and in places rocky) uplands. Fallowing was rare, and apart from a livestock grazing reserve, very little land was left uncultivated. Most families owned goats, sheep, and one or more cows, and the manure was crucial in maintaining soil fertility. The herds of pastoralist Fulani and Buzu, who paused here on their annual treks to and from the Sahara, also contributed. The hinterlands of some settlements had mostly small tracts of moist, clayey soils known in Hausa as *fadama*. Farmers grew sorghum, corn, and rice on these parcels during the rains; irrigated dry season crops of wheat, onions, and other vegetables often were more valuable than the wet season *fadama* crops. Virtually all farm work was done with hand tools. The number of trees on upland farms differed considerably from one village hinterland to

another, as did the abundance of hedges and other natural vegetation used to mark farm boundaries and for fodder, crafts manufacture, and traditional medicines.

Land shortage and a chronic lack of self-sufficiency in staple foods had been noted in northwest Nigeria since before 1950 (Prothero 1957; Udo 1971). Non-farm income therefore was essential. Local opportunities included agricultural and other wage labor, trade (vegetables, grain, livestock, cola nuts), and traditional occupations (Koranic teaching, barbering, butchering, tailoring). Dry season

Table 1 Long-term migrations to/from Amarawa (A), Tudun Gudali Mai Ruwa (TGMR) and Gidan Alkasim (GA). The mid-1960s famine (*Mai Zobe*) occurred in other parts of northern Nigeria and in Niger

	In-migration F/IM	Permanent out-migration F/IM/SI	Out-migration/ return F/IM
Muda (1953–1954)			
A	4/1	6/1/2	3/2
TGMR	5/0	0/0/0	0/0
GA	0/0	1/0/0	0/0
c. 1955–1964			
A	5/0	3/1/3	6/1
TGMR	0/0	0/0/0	0/3
GA	0/0	0/0/0	0/0
Mai Zobe (1965–1966)			
A	0/0	9/1/6	1/2
TGMR	0/0	7/0/0	0/0
GA	0/0	0/0/0	0/0
c. 1967–1971			
A	0/0	0/0/1	1/0
TGMR	0/0	0/0/1	0/0
GA	0/0	0/0/0	0/0
Drought period 1972–1974			
A	1/1	2/2/1	1/0
TGMR	0/0	0/3/0	0/3
GA	0/0	1/0/0	0/0
c. 1975–1982			
A	1/0	0/1/1	1/4
TGMR	0/0	1/0/1	0/0
GA	0/0	2/1/0	0/0
Buhariyya (1983–85)			
A	3/0	4/4/4	3/1
TGMR	0/0	1/1/1	2/1
GA	0/0	3/0/0	1/0

F family, IM individual adult male, SI sources inconsistent

migration, usually practiced by young adult males, was very prevalent. The most frequently reported destinations were the cities and rural vicinities of Ibadan, Dandume, and Gusau.

The case studies were chosen to offer insights that may be useful in view of the forecasts for changes in agro-climatic conditions in the Sahel over the coming decades. Crop failures in 1953 were caused by heavy and badly timed rainfall, and extreme hunger was attributed in part to the poor colonial-era road network and lack of motor vehicles. The early 1970s drought, while severe in a meteorological sense, did not result in pervasive hardship in the Sahel study locality. Although annual rainfall totals in 1983 and 1984 were higher than those of 1972 and 1973, the mid-1980s was remembered as a famine period. Poor harvests were caused by an agricultural drought related to unfavorable intra-seasonal rainfall distributions.

Approaches to research in the Sahel

Research in the Sahel study locality involved: (1) series of interviews with groups; (2) series of interviews with expert informants; (3) in-depth interviews with individual family heads; and (4) informal interaction with family heads and younger men. The principal research village was Amarawa, where Abdu (1976) found that entire families had emigrated during the early 1970s drought. Group interview series were followed by in-depth interviews with 162 family heads from among the village's 220 habitations. An interview schedule included items on farmland holdings and means of acquisition, crop yields and food self-sufficiency, non-farm occupations, temporary dry season migrations, coping strategies during the 1983–1985 famine, and longer-term migrations practiced by informants and/or their acquaintances. Informants provided the names and destinations of those who had left and not returned, thus cross-checking was possible. Using a method pioneered by Hill (1972) and adopted in research by Watts (1983) and Lennihan (1987), those interviewed in Amarawa were stratified according to four commonly accepted socioeconomic categories: wealthy, middle class, peasant, and extremely poor. Through the deliberations of groups of informants, each household head was assigned to one of the above groups. In-depth interviews with individual family heads also were carried out in two constellations of hamlets named Tudun Gudali Mai Ruwa (TGMR) and Gidan Alkasim. A total of 54 family heads from among TGMR's 75 habitations were interviewed, and 18 from the 40 habitations of Gidan Alkasim.

Table 1 shows the record of long-term migrations for the principal study settlements for three famines and the early 1970s drought, as well as for three non-famine periods. It indicates that migration events during famines were more numerous than those occurring during the longer "normal" intervals and that during crises family migration had been more prevalent than migrations by individual adult males (some of whom reportedly abandoned their families).

Another effort, begun midway through the research in Amarawa and the hamlets, relied primarily on series of interviews with groups. This process started in Araba and Katanga, both centers of traditional authority. Selected in consultation with village heads, participants included prominent farmers, local grain and livestock

traders, town criers, village scribes, and other oral historians. Settlement history and twentieth century famines were initial foci. The groups then developed settlement-by-settlement assessments of land cover variables and the coping strategies based on them, including resort to wild plant foods, fodder sales, and crafts manufacture. The most difficult topic was addressed during the second or third interview in the series. After often lengthy discussions, the groups came up with estimates of family distress migration during the 1983–1985 famine. Subsequent group interview series were carried out in Makwala, Tozai, Rungumawa, Gaeti, Lakoda, and Lafani, where the same topics were addressed (group interview series in Amarawa and the Gidan Alkasim and TGMR hamlets had covered the same topics).

Community mores in the Muslim far north of Nigeria precluded participation by women in any form of interviewing. Individual household heads who declined to be interviewed, and two settlements whose residents did not wish to participate in group interviews, may have resulted in additional biases.

Heavy rainfall and famine, 1953–1954

The 1953–1954 famine is known in northwest Nigeria as *Muda*, a name that evokes a man warning his wife that he will divorce her if she continues pressuring him to provide food. Perhaps because it occurred during a decade of above-average rainfall and abundant harvests, severe famine in the mid-1950s Sahel has not often been recognized. But an examination of diverse sources indicates that it was widespread, having afflicted southwest and south-central Niger, north-central and northeast Nigeria, and northern Cameroon (Boureima 1993; Fuglestad 1983; Hill 1972; Oguntoyinbo 1981; Campbell 1981). The cause of crop failure seems rather obscure; though the year is not specified, a table in Oguntoyinbo (1981) is the only source to cite heavy early 1950s rains on light sandy upland soils.

Why crops failed in 1953, with a total of 931 mm at Birnin Konni, is not easy to determine through an analysis of annual or monthly rainfall series. The 990 mm total in 1952 was the highest ever recorded for the study locality, but harvests were excellent. Archival documents show that in Sokoto city, millet and sorghum prices fell following the harvest to their lowest levels (both £11/ton) in the entire 1950–1954 period. Daily rainfall data may be the key. Inspection of daily series for other years with high totals found no pattern comparable to 1953: 11 rain events totaling 127 mm from May 23 to June 9, and then only 6 mm until a 40 mm event on June 23; July rainfall was the highest in the 1933–1990 series, but 281 mm of the 299.5 mm monthly total fell on just 7 days, including 77 mm on the 13th (the most recorded for a July day in the series), 63 mm on the 15th, 20.5 mm on the 21st, 39 mm on the 27th, and 36 mm on the 30th. British agricultural officers' reports related that flooding on fadama lands destroyed high-value dry season crops just before they were due to be harvested and that the heavy rains of May and June also caused a "setback" to millet crops from which they never recovered. Resident Mr. K.P. Maddocks began his 1954 Sokoto Province report by stating that anxiety and hunger had caused a blight over the region during the first 9 months of the year. Food shortages had been acute and fear of famine nearly universal. Grain prices in

Sokoto began to shoot up after November 1953, and the prices of both millet and sorghum reached their highest point in July 1954 at £57/ton.

Distress migrations to the south and east of the province were reported as having been extremely heavy. An archival document titled “Settlements in Southern Sokoto, Proposal for” may indicate how large the migrations could have been. Skepticism is warranted in part because the data come from different sources—census results (1952) and tax returns (1954). They show that population declines in ten northern districts ranged from 11 to 32 percent and that the total number of migrants would have been about 85,000.

Illela-area elders affirmed that Muda was the worst famine since 1913–1914, and the most recent to kill people. Deaths were attributed not to starvation, but to “swelling” caused by eating cassava bark and spoiled, hardened cowpeas. A glimpse into the difficulty of traveling in northern Sokoto during the 1950s is provided by Prothero (1962). Even 4 months into the dry season, flooding on low-lying lands was pervasive, and one stretch of dirt road was so inundated that the only way across was by canoe. Nonetheless, an early coping strategy undertaken by family heads was to set out with donkeys for places to the south in an attempt to procure and bring back grain.

A group of five families from the village of Cilgo, just across the border in Niger, arrived in TGMR, where cassava crops did well on the surrounding well-drained land. Four families migrated to Amarawa from settlements not far beyond the study locality, eventually secured farmland, and became permanent residents. Other families undertook long-distance migrations, including a group from Tozai that established a new settlement, named Mashe, on uncultivated land near Dandume. Other Tozai families migrated to four existing settlements in southern Sokoto. Two Amarawa informants and their families helped to found the village of Unguwar Gwandu in the Dansadau area.

The 1972–1973 drought

The early 1970s famine was the first to attract attention from international news media. Televised images of scorched crops and livestock carcasses and intense human suffering in refugee camps presented to the world a grim view of the rural Sahel. In Nigeria, everywhere north of 12°N latitude was declared a drought disaster area by the federal government. The two lowest annual totals in the Birnin Konni series were recorded in 1972 (329 mm) and 1973 (290 mm). Nearly complete harvest failure and distress migrations were reported for the Illela area and for rural northern Sokoto generally (Van Apeldoorn 1981), and by April 1973 grain prices in Sokoto city reputedly had increased by 400 percent from pre-drought levels (Watts 1983).

Yet about half of all Illela-area informants stated that there had been no famine in the early 1970s. A common assessment was “yunwa Franci ta” (a famine of Niger). Small government grain distributions were seen simply as help, not famine relief. They could have gotten along without them. The only data on crop yields for the Illela area indicate that they ranged from 30 to 60 percent of those recalled for 1971

(Aliyu 1976), which seems to accord with a 1974 UNICEF report of “tolerable” harvests around Birnin Konni through 1973 (in Campbell 1977: 199).

Long-term migrations to and from the principal research settlements were not significantly different from non-famine periods (Table 1). Some groups of Buzu and Fulani herders encamped in and near the study area reportedly succeeded in keeping their animals alive, while others suffered debilitating livestock losses. Groups of apparently destitute Buzu pastoralists from Niger passed through study area settlements begging for food.

Illela-area informants who did identify the 1972–1974 interval as famine all stated that it was nowhere near as bad as 1953–1954 or the 1965–1966 famine. Elders in Tozai, where wells and fadama reportedly had begun to dry up, had given a name to this period of hardship, although they stated that family migration was not common. Most informants who related that famine did not occur cited the effectiveness of dry season and other temporary labor migrations in warding off serious hardship.

These findings contrast with Mortimore’s (1989) research. Approximately 400 km to the east, in former Kano State, 271 of 631 village heads reported out-migrations that they believed were permanent. Though data on famine-related migrations for Niger are rare, indications are that they occurred on a large scale. From one district in the northwest of the Maradi region (south-central Niger), 40,000 of about 110,000 people were estimated to have migrated (UNICEF, 1974, in Campbell 1977). Fieldwork in a locality about 100 km to the southwest, near Madaoua, found that in one village earnings from temporary labor migrations kept family distress migration to a minimum, but four neighboring settlements lost between 55 and 80 percent of their people in moves to Nigeria that were regarded as permanent (Faulkingham and Thorbahn 1975).

The 1983–1985 famine Buhariyya

In the mid-1980s, famine afflicted much of Sub-Saharan Africa. Western news media focused primarily on northeast Africa, but West Africa, especially the Sahel, suffered greatly (Derrick 1984). According to a UN report, an estimated 400,000 people in Niger migrated to find water and food (in Timberlake 1985). Because it corresponded to General Muhammadu Buhari’s tenure as Nigeria’s military head of state, the famine is known as *Buhariyya* in northern Nigeria and Niger. Without exception, Illela-area informants averred that it was a hunger, or famine. Assets were liquidated and livelihoods threatened. But no one said that Buhariyya killed.

Rainfall in 1983 was 387 mm in Birnin Konni, but the totals for June (22 mm) and August (72 mm) were among the lowest ever recorded, and crops were very poor. The 1984 rainy season totaled 375 mm, with a well-above-average June, but rainfall in July and August amounted to less than half of the mean values. As a consequence of this agricultural drought, harvests were extremely deficient, and for about 10 percent of informants, complete failures. Grain prices at the village level more than doubled. Prices for livestock fell progressively during the 1984 post-harvest period and had collapsed by the beginning of the rains in 1985. Hardship stemming from the acute shortage of grain was exacerbated by two actions of the

Buhari government. A rapid currency change operation in April 1984 left some people with worthless money, and the official closing of Nigeria's land frontiers curtailed trade at border markets such as Illela's.

A large majority of informants regularly purchased cassava flour, a normal food for southern Nigerians but one not appreciated in the Sahel. In Amarawa, TGMR, and Gidan Alkasim, about half stated that they had received help in the form of money or food from relatives or patrons, and 65 percent reported selling or slaughtering livestock. Of those family heads classified as "commoners," about 40 percent went on temporary labor migrations; 30 percent had sons or younger brothers who did so. Almost all of those classified as the poorest migrated for temporary work. Farmland was sold by 10 percent of the "middle class," 15 percent of the commoners, and 20 percent of the poorest. But nine percent of the commoners actually purchased land, and 14 percent managed to buy animals.

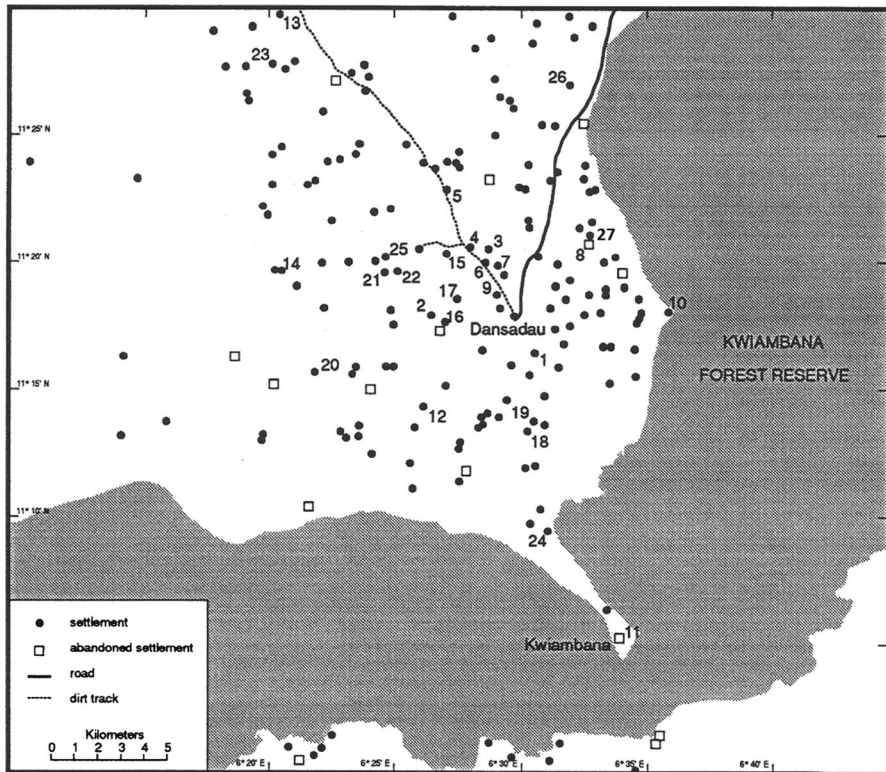
The group interview series determined that major family migrations had occurred only from Lakoda and Kadadin Buda, a large village located about 15 km to the east-northeast of Lafani in the former Gada Local Government Area (where permission to conduct research had not been secured). In the other villages, coping strategies, especially dry season migration, reportedly were effective in limiting family migration, as had been the case during the early 1970s in the study locality as well as in other Sahel localities (Faulkingham and Thorbahn 1975; Mortimore 1989). There was no in-migration to the hamlets, but a total of seven families left, three of which had returned by 1988. Apart from three families that migrated to Amarawa from nearby settlements, no other in-migration to the study locality was reported.

Amarawa and Lakoda, both large, older settlements (3000–3500 people), exhibited sharp contrasts in their hinterlands' natural resource endowments. Their sandy uplands were of similar size, but Amarawa's had at least twice the number of trees, and farm boundaries were designated with hedges and other natural vegetation. Lakoda's were marked mainly with rocks. Amarawa's hinterland included perennial wells and a relatively large tract of fadama land where, excepting the poorest, nearly all families had one or more parcels suitable for dry season gardening. Since the late 1970s, Lakoda had no fadama and dry wells. People were getting water from wells in settlements 2 and 3 km away. About 650 trips per day, totaling more than 1,000 person-hours, were required to meet Lakoda's needs for basic household water.

During Buhariyya, a total of seven families migrated from Amarawa. Three of them had returned within 3–5 years. Group interview participants in Lakoda cited 29 incidents of family migration, 13 in 1983 and 16 in 1984. A total of 12 had returned and reportedly reclaimed their farms after having passed one or more farming seasons at mainly rural savanna destinations. Special plantings on fadama lands of sweet potatoes and other crops helped buffer Amarawa from famine impacts, while some species of natural vegetation served as emergency food and raw materials for making crafts. Vegetation-based coping strategies in Lakoda were comparatively limited, and the time necessary for retrieving water was time that people did not have to devote to other types of coping

Famine-related migration to a savanna locality

Dansadau Emirate was one of the more sparsely populated localities in northern Nigeria (Fig. 3). Close to half of its territory was taken up by the Kwiambana forest reserve, where farming was prohibited. Outside the reserve, only about 25 percent of



- | | | |
|----------------------------|-----------------------------|----------------------|
| 1. Maganawa | 10. Karauci | 19. Gobirawa |
| 2. Mai Tukuniya (Gobirawa) | 11. Kwiambana | 20. Baban Doka |
| 3. Han Han | 12. Dan Gurgu | 21. 'Yan Sawaiyu |
| 4. Unguwar Mai Jan Kai | 13. Naduka | 22. Nasarawa (II) |
| 5. Mai Goge | 14. Ruwan Tofa | 23. Randa |
| 6. Nasarawa ('yan kasa) | 15. Tunga | 24. Madada |
| 7. Nasarawa (Rugan Fulani) | 16. Mai Tukuniya Baban Gona | 25. Kufan Dan Bar Mu |
| 8. Unguwar Gwandu | 17. Mai Tukuniya Dan Goge | 26. Marabou |
| 9. Unguwar Barau | 18. Dandala | 27. Tabani Marabawa |

Fig. 3 Savanna study locality

the land was under cultivation. The largest settlement was Dansadau, a village of about 400 compounds. All of the other settlements were much smaller. Most were farming hamlets established by people indigenous to the locality. The rains start in April and continue well into October. No rainfall data were available for Dansadau, but a series for Zuru, a town about 170 km to the west at almost the same latitude, suggests that average annual rainfall was about 1000 mm.

Sorghum was the main crop. On most farms, it was interplanted with millet, corn, and peanuts. Owing to the heavy clayey soils and greater rainfall, land preparation and weeding required more than twice the labor as in the Sahel. Nearly all farmwork was done with hand tools, as only a small number of families had oxen and plows. After farming a parcel for 3–4 years, the soil's natural fertility diminished and crop yields declined. Fallowing was then essential, and a new parcel had to be cleared from forest or bushland. In attempting to maintain fertility, some farmers used small amounts of livestock manure; larger amounts, if available, reportedly would promote weed growth too profuse to control. Farmers asserted that an affordable supply of mineral fertilizer would obviate the need for long fallows and, together with oxen and plows, would enable more intensive food production. Indigenous informants related that their fallows, estimated at 20–30 years, had been long enough to permit regeneration of the natural forest–savanna vegetation. Occasional nonviolent disputes between immigrants and indigenes over long-fallowed land were reported.

Local holdings of livestock were obviously much smaller than in the Sahel, even though the tsetse fly, the vector of trypanosomiasis, apparently had been controlled. Food self-sufficiency was the norm, not the exception. Sale of peanuts and surplus grain was the predominant means of earning cash. The small Friday market in Dansadau and other, even smaller weekly markets offered few additional opportunities for trading. Traditional occupations, which here included woodworking and hunting, were more significant. Some younger men would go on dry season migration, but the practice was not nearly as common as in places farther north.

Approaches to research in Dansadau

Fieldwork in Dansadau Emirate involved: (1) series of interviews with groups; (2) series of interviews with local experts; (3) single in-depth interviews with individual family heads; (4) in the village of Maganawa, series of interviews with individual family heads; and (5) informal interactions with family heads and younger men. The scribe of the Emir of Dansadau was very helpful and knowledgeable, but the preeminent local historian was Al Haji Magaji Barau Dansadau, an elder who was recognized by indigenous people as the rightful heir to traditional authority in the area. The data he furnished proved to be remarkably accurate.

Interviews with groups of indigenous elders were carried out in Dansadau, Unguwar Barau, Mai Tukunia Babban Gona, Mai Goge, Babban Doka, 'Yan Sawaiyu, Tabani Marabawa, Nasarawa ('yan kasa), and Dan Dala (Fig. 3). These men's ancestors began arriving more than a century earlier from northern Katsina, a part of Hausaland's core region, while the previous inhabitants, the Kamuka people, gradually moved southward. Nearly all of the abandoned settlements in Fig. 3 had

been inhabited by indigenous people. As more and more farmland in these hamlets' vicinities was put in fallow, they cleared increasingly distant lands for cultivation and shifted the sites of their settlements to be closer to their new farms. Unguwar Gwandu was the only settlement known to have been abandoned by more recent immigrants from the north.

Interviews with immigrants were often energetic and incisive, but at other times difficult. According to Watts (1979: 373), "The sensitiveness of matters pertaining to 'origins' in Hausa society is such that it is often impossible to collect data on refugee families." Concern over deportation, though, was probably a greater hindrance. In January 1983 and again in May 1985, the Nigerian government expelled tens of thousands of foreigners, many of whom had been attracted by the expanded opportunities of the oil boom years. The Western press focused on the plight of the estimated 900,000 to 1.2 million Ghanaian deportees, but accounts indicate that those sent back to Chad, Mali, and Niger were, collectively, at least as numerous (James 1987; Swinton 1988).

Data on immigration and resettlement are summarized in Table 2 and Fig. 4. In all, 11 immigrant groups were interviewed, and 40 individual family heads agreed to private in-depth interviews. Interview schedules for both groups and individuals focused on conditions in villages of origin during the years prior to departure, coping strategies, the journey to Dansadau, survival after arrival, means of securing farmland, crop yields and the attainment of food self-sufficiency, what was necessary to improve productivity and living standards, and prospects for the future.

Overview of immigration and resettlement

Consequent upon Muda, Unguwar Gwandu and Dan Gurgu were established as new settlements, and a group of five northern families joined the existing indigenous settlement of Mai Goge. According to indigenous elders in the nearest settlement, Tabani Marabawa, the leader and a plurality of Unguwar Gwandu's founders were from Makina, a village located about 15 km south of Illela. They were joined by two families from Amarawa and others from Mamman Nsuka and Koringo (20 km south and 20 km east of Illela, respectively). The settlement had disbanded by *c.* 1970. Most of the inhabitants reportedly returned to their Sahel villages of origin, but a minority moved to settlements near or within Dansadau Emirate, including three families to Mai Goge. The site of Unguwar Gwandu had the ruins of about 15 clay-brick compounds; Tabani Marabawa informants indicated that perhaps ten other, less sturdy habitations had completely disintegrated. Dan Gurgu was founded by 11 families from proximate villages (Kimbawa and Dankal) located about 80 km southwest of Sokoto. The five families that migrated to Mai Goge were from Denge village, about 40 km south of Sokoto. Both Dan Gurgu and Mai Goge accommodated immigrants from the north in the early 1970s and again in the mid-1980s.

Two of the biggest influxes during the early 1970s were from the large villages of Maraka and Dakoro, Niger (Fig. 1). Both groups comprised 13 families. The Maraka people left in March 1973 after 3 years of very poor harvests. The group's leader had detailed knowledge about Dansadau through his interactions with Buzu pastoralists. They had the means to hire space in trucks and completed the entire

Table 2 Immigration to Dansadau Emirate

Village	Sources of information	Year of founding or first influx	Reported no. of immigrant families ^a	Reported area(s) of origin ^b
Dan Gurgu	+ • *	1953	24	Northern Sokoto State; Northern Katsina State
Mai Goge	+ • *	1953	32	Northern Sokoto State
Dansadau (neighborhood)	+ *	1973	13	Maradi (Niger)
Naduka	+ •	1973–1974	SI	Maradi (Niger)
Randa	+ •	1973–1974	SI	Northern Sokoto State; contiguous areas of Niger
Ruwan Tofa	+ •	1973–1974	SI	Northern Sokoto State
Mai Tukuniya (Gobirawa)	+ • * ×	1974	64	Dakoro (Niger)
Unguwar Mai Jan Kai	+ • * ×	1975	10	Northern and Central Katsina State
Tunga	+ • ×	1975	2	Northern Sokoto State
Unguwar Dama	+ •	1983–1984	SI	Northern Sokoto State
Kwarkwaci	+ •	1983–1984	SI	Northern Sokoto State; contiguous areas of Niger
Maganawa	+ • * ×	1984	28	Northern Sokoto State; contiguous areas of Niger; East-Central Sokoto State
Dan Dala (neighborhood)	+ • *	1984–1985	5	Central Katsina State
Babban Doka (neighborhoods)	+ • *	1984	32	Northern Katsina State; Dakoro (Niger)
Nasarawa	+ • *	1984	6	Northern Sokoto State
‘Yan Sawaiyu (neighborhood)	+ • *	1984	14	Madoua/Bouza (Niger)
Kufan Dan Bar Mu	+ •	1985	SI	Northern Katsina State; Maradi (Niger)
Madada	+ •	1985–1986	SI	Northern Sokoto State; contiguous areas of Niger
Gobirawa	+ •	1986–1987	10	Northern Sokoto State; contiguous areas of Niger
Kwaca	+ •	1987–1988	SI	Northern Sokoto State; contiguous areas of Niger
Nasarawa (Rugan Fulani)	+ • *	1987	12	Maradi (Niger)

Sources: +, Alhaji Magaji Barau Dansadau; •, Group interviews in other settlements; *, Group interviews in settlements named; ×, Interviews with individuals in settlements named

SI, sources inconsistent

^a Includes first immigrants and immigrants who arrived in later years

^b Refers to ultimate areas of origin, not villages of intervening opportunity in the case of stepwise migration

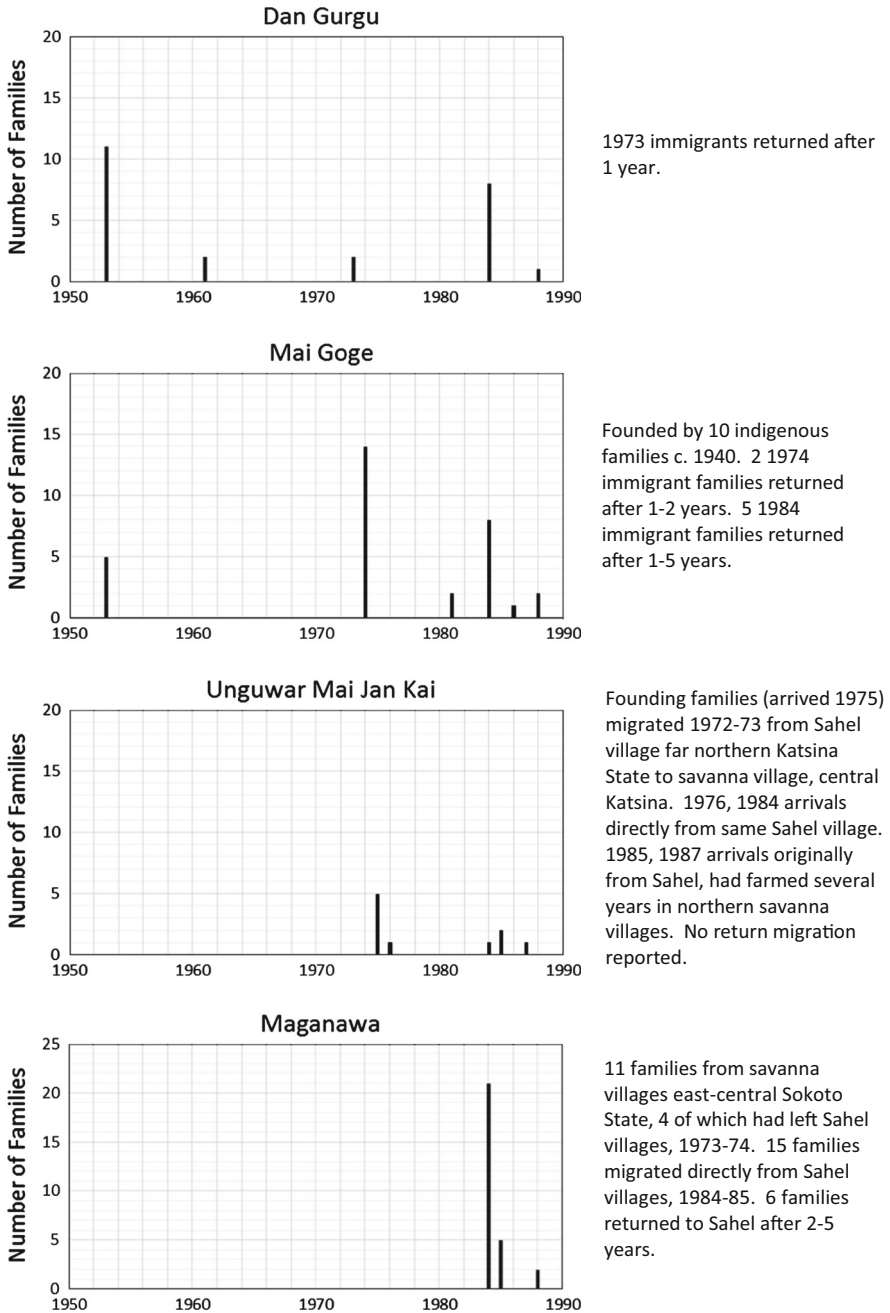


Fig. 4 Migration to seven Dansadau settlements

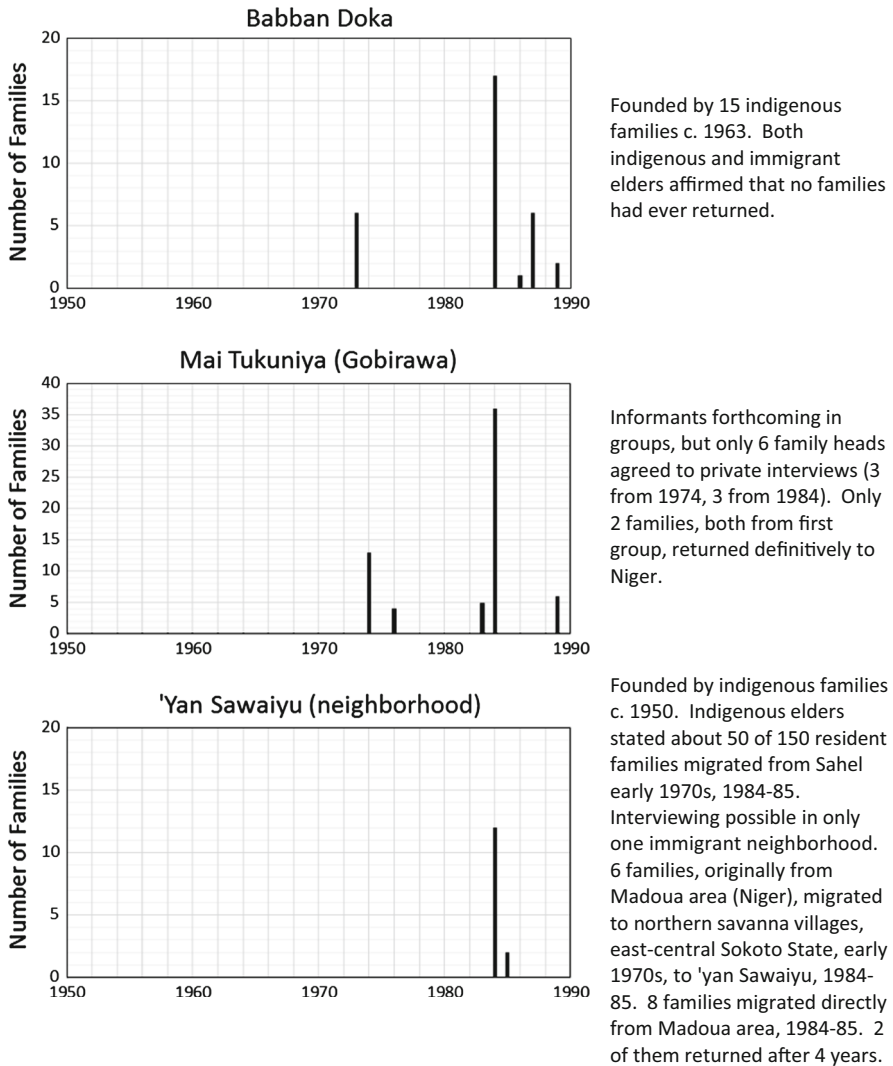


Fig. 4 continued

journey in just 2 days. The Emir delimited a farming area for them to clear and a plot near his palace for constructing homes. Wage labor was the basis of the settlers' subsistence for two and half years, as they had no donkeys to use in collecting firewood or for portage. They became self-sufficient in grains after excellent 1975 harvests. By the late 1970s, four families had returned to Maraka and reclaimed their farms.

The Dakoro group, in contrast, subsisted for two deficient rainy seasons on the wild legume *anza* and from special plantings of a tasteless variety of melon. By August 1973, the deprivation had become intolerable, and the families had no choice but to migrate south on foot or on donkey back. They faced a 9-month

ordeal, staying in squatter settlements on the outskirts of villages and small towns, where they relied on charity and earnings from occasional wage labor. An undisclosed number of their group died during this interval. The village head at their first stop in Nigeria advised them to continue to Dansadau, where, in April or May 1974, the Emir designated a site for their village and an area for farming. When not engaged in clearing land and then farming on their own account, they did wage labor and donkey portage and sold firewood. Self-sufficiency in staple foods was achieved after the 1975 harvest. Their village, Mai Tukuniya (Gobirawa), must be considered a success. In the years since the early 1970s famine, it had served as a refuge for and offered opportunities to other Dakoro people. Forty-one families migrated to the village in 1983 and 1984, and six more arrived after locust attacks and lean harvests in 1989. Only two families, both from the original group, had ever returned definitively to Niger. Informants claimed that virtually all village farmers were not only self-sufficient in staples, but produced surpluses of these grains for sale as well as cash crops of peanuts. Most families owned livestock, and ten plows and oxen had increased the size of the village's farms.

Some families in Unguwar Mai Jan Kai, 'Yan Sawayu, and Maganawa had been involved in stepwise migration (Fig. 4). They had left villages in the Sahel in the early 1970s, farmed for several rainy seasons in villages in the northern savanna, and then migrated farther south to Dansadau Emirate. These second migrations were mostly during Buhariyya. The other families migrated directly from the Sahel in those years.

Maganawa was founded in May 1984. Eleven of the 28 families migrated from villages in the northern savanna of east-central Sokoto State. The high cost of acquiring additional farmland, as well as reduced yields due to flooding and dry spells during rainy seasons of the early 1980s, were reasons cited for their migrations. Four of them had migrated to the intermediate savanna destinations from villages in the Sahel, one in 1965 and the others in the early 1970s. Five family heads from the savanna villages stated that they sold some of their farmland around the time of departure, and two did so after becoming established in Maganawa. Fifteen families arrived directly from the Sahel during the period August 1984–May 1985, nine from the village of Kadadin Buda (KB; identified as an origin by Illela-area informants), two from nearby villages, and four from villages in Niger. After 2–5 years in Maganawa, six families returned to the Sahel, two to KB, and four to Niger. Three of the nine remaining Sahelian migrants reported selling some of their farmland to pay for motorized transport and food stocks. Unsold farmland was left with relatives. Six family heads from the Sahel, and one from the savanna, related that earnings from dry season labor migrations helped to finance their moves to and resettlement in Maganawa. Of the nine Sahelian migrants, only three stated that they had had access to dry season gardens in the very small fadama (dry streambed) corridors at their origins. Wells in KB and its vicinity had not dried up, but their yields had been declining, and more and more time was becoming necessary to retrieve water.

The people of Nassarawa (Rugan Fulani) had been semi-sedentary agro-pastoralists based in a village east of Maradi. During the early 1970s famine, their cattle died and crops were very poor. They survived by relying on wild food plants,

wage labor, food aid, and sales of small livestock. Despite better distributed food aid, the 1984–1985 famine was worse because harvests were complete failures and they had fewer sheep and goats to sell. Fasting, wild foods, occasional local wage labor, and labor migration were their main coping strategies. Harvests were good in 1985, but the informants viewed 1986 and 1987 as a continuation of the 1983–1984 drought. Crops failed again in 1987, which prompted three of the men to seek work in Nigeria. They eventually reached Dansadau village, where they found 1 month's work and were offered the opportunity to farm on fallow land to which their employer had rights. They returned to Niger to collect their families, and nine other men and their families decided to join them. News of good harvests in 1988 inspired five of the 12 families to return to Niger.

Figure 4 shows that a minority of arrivals did not coincide with famines. Some of these families exemplify chain migration to join kin and friends who had migrated during the earlier crises. The four families that arrived in Dan Gurgu and Mai Goge during the latter half of the 1980s were looking for more or better land and had not confronted hardship in their Sahel villages of origin. But the eight families that migrated to Babban Doka in 1987 and 1989 reportedly did so as a response to lean harvests.

Of the Sahelian migrants interviewed both in groups and privately, only one-third of those from areas where land transactions commonly took place for a wide variety of reasons reported selling *some* of their farmland. Nearly 60 percent left either before or at the normal harvest time, which indicates that they took strategic action instead of liquidating their most productive assets in a buyer's market to satisfy hunger in the near term. Land was available to immigrants, and during the initial phase of resettlement they were able to subsist by selling firewood and their labor. Overall, about 70 percent of the immigrants reported achieving self-sufficiency in grains after their second harvest, and an additional 20 percent met that goal after the third. In the large majority of cases, incomes from sales of cash crops and surplus food crops had not been sufficient to enable purchases of mineral fertilizer and oxen and plows.

Potential relevance of the case studies

In attempting to assess the relevance of the historical case studies, it is necessary first to review research on the environmental and socioeconomic changes that have taken place since the famines and migrations occurred. An analysis of vegetation data from NOAA satellites found that in the West African savanna, the length of the growing period (LGP) had actually increased during the period 1981–2011. In the Sahel, no trend was observed except in the region's northern fringe, where LGP had shortened (Vrieling et al. 2013). Officially, Nigeria's population grew from 88 million in 1991 to 140 million in 2006, but there is no clear evidence from satellites that anthropogenic land degradation has occurred as a consequence (see Hein et al. 2011; Wessels et al. 2012; Fensholt et al. 2013). Fieldwork in Niger, where population has grown at a similar rate, discovered nuanced forms of degradation,

and sometimes improvement, within localities (Luxereau and Roussel 1997; Warren 2002).

No consensus is evident concerning the influence population growth may have on vulnerability to famine. Pessimists argue that food production has not kept pace with population growth, and farmers are forced to degrade natural vegetation and mine soils without adequately restoring nutrients (Breman et al. 2001; Koning and Smaling 2005). Optimists have determined, in case studies, that farmers have been successfully contending with population growth and apparent loss of vegetative resources through intensification, which entails closer integration of farming and livestock rearing and planting or selective preservation of trees. Income diversification, accomplished mainly with labor migration, has had a major role in feeding more people (Mortimore and Adams 1999; Hoffman et al. 2001; Mortimore and Turner 2005).

That labor migration and locality-based adaptations have been losing their effectiveness is suggested by the best study of the well-publicized 2005 crisis in Niger (Olivier de Sardan 2007). Fieldwork in seven rural villages found that it was not a famine comparable to the early 1970s or mid-1980s, but rather was amplified rainy season hunger. In preceding years, household self-sufficiency in staple foods had become uncommon, and annual seasonal hunger progressively worse. Food insecurity had evolved into a chronic state, as evinced by the incorporation into everyday livelihood systems of village-level strategies that had been used only during famines (for example, sale of wild food plants, fodder, firewood). Remittances from men on temporary migrations, especially to Nigeria and Libya, were very likely more important than food aid and local strategies. In contrast to the mid-1960s, early 1970s, and mid-1980s, no influxes of suffering rural people to cities were observed. Rural–rural migration was not discussed in the report. Two other works argued that in Niger, famine is a chronic condition and should no longer be viewed as a discreet event (Mousseau and Mittal 2006; Crombé 2009).

The case studies found that rural Sahelian people had the capacity to avoid the irreversible impoverishment depicted or implied in continuum models and entitlement theory. In addition to labor migration, family migration to the savanna was an important strategy for doing so. A crucial question is whether the savanna has retained its historical role as a safety valve for stressed Sahelian people, or whether it has become saturated.

Chronic food insecurity has been identified as a cause of gradual, rural–rural, north to south migration in Ghana during non-famine periods (van der Geest et al. 2011; van der Geest 2010). Knowledge regarding similar migrations from the rural Sahel to rural savanna areas is limited to case studies. Research in two villages in western Niger indicated that migrations to cities and to the rural savanna had continued after the large-scale crisis migrations of the mid-1980s (Mounkaila 2002). In the savanna of southern Burkina Faso, case studies that integrated remote sensing and fieldwork found that serious problems of environmental degradation had been occurring as this agricultural frontier approached saturation. Major influxes took place in the mid-1980s, but resettlement by Sahelian families continued at a slower rate in succeeding years (Paré and Tallet 1999; Paré et al. 2008; Ouedraogo et al. 2009, 2011). In one locality, only poor quality land had been available to

immigrants arriving after *c.* 1990, and land tenure security was a serious problem for them. That case study also documented that while remote sensing data show degradation on a broad scale, such was not necessarily true at the scale of individual farms. Though fallows had been reduced, farmers had been able to intensify by maintaining soil fertility with manure while building anti-erosion barriers and preserving selected trees (Gray 1999, 2005).

In Dansadau, resettlement and relative prosperity were achieved peacefully and without external assistance. But here, indigenes and immigrants were both Muslims. Three villages founded by indigenes (Mai Goge, Babban Doka, ‘Yan Sawaiyu) actually absorbed Sahelian immigrants. In Nigeria’s more southerly savanna zones, though, violent conflicts between Hausa–Fulani “famine” immigrants and indigenous Christians over land and sharia law have been reported with some frequency since the early 2000s (Harnischfeger 2004). Possibly owing to security concerns, published, systematic research on the availability of land in the expansive Nigerian savanna and the consequences of resettlement there is lacking.¹

Concerns for the future

The emergence of chronic food insecurity and the closure of the savanna to resettlement could mean that entitlement and continuum models now more closely represent reality. While the Ghana studies and the Burkina Faso case studies lend support to the Foresight and EACH-FOR projects’ emphasis on gradual, non-crisis migrations, planners should seriously consider the possibility that future major crop failures comparable to those of the case studies could rapidly propel chronic insecurity into discreet famine of higher magnitude. Pulsed, temporally concentrated migrations could ensue (Fig. 4). Regarding climate change in the coming decades, one set of models predicts drier conditions for the Sahel, while another forecasts greater rainfall (Giannini et al. 2008). In view of the case studies, perhaps the most alarming prediction is for an increase in the frequency of dry spells and heavy rains during farming seasons. Some models that forecast drying also indicate higher probability of more individual heavy rain events (Black et al. 2008). According to the IPCC fourth assessment report (2007), greater frequency of extremes would likely have worse effects on crops than changes in mean precipitation and temperature. IPCC’s 2013 report stated that in West Africa and other monsoonal regions, future increases in precipitation extremes were very likely.

The extent to which reliance on wild foods, labor migration, and strategic withdrawal to the savanna are still effective in maintaining productive assets has

¹ Harnischfeger’s (2004) article is to date the most comprehensive review of conflict in the Nigerian savanna. In 2014, Google Scholar showed that it had been cited only once. In that article, Harnischfeger cited a work by James (n.d., though evidently between 1996, when Zamfara state was created, and 2004) in which are listed more than 20 farming “colonies” that had been established in the savanna by Hausa “famine migrants” from the Sahel. The US Commission on International Religious Freedom reported that sectarian violence had claimed the lives of about 14,000 people in Nigeria’s “Middle Belt” (savanna) since 1999 (Reported on the Voice of America’s Web site, April 17, 2013). The figure on fatalities may also include urban violence.

implications for early warning and mitigation. If anticipatory migration, as best demonstrated by the people from Maraka, was not uncommon, then warnings based on grain prices may have been tardy. If socioeconomic and environmental changes have reduced or will reduce the scope for such strategic actions, then the emphasis on price monitoring, as justified by continuum models and entitlements, may indeed result in more timely warnings than in the past.

The case study in the Illela locality suggests that an effort to map poverty and famine vulnerability could help not only in improving early warning, but also to clarify the climate-migration nexus and the possible impacts of changing natural environments and socioeconomic conditions. The differences in family migration between Amarawa and Lakoda—settlements 15 km apart—indicate that mapping the status of wells, fadama, and vegetation in villages' hinterlands may be the most practical starting point, given the difficulty in defining and locating land degradation. The idea of mapping these features accords with Warren and Olsson's (2003) emphasis on ground water depletion, devegetation, sand dune mobilization, and other measurable phenomena that demonstrably affect farming and animal husbandry. A good example of links between village-scale natural resources and migration is from one *c.* 150-km² locality in south-central Niger. Newer villages, especially those founded during or in the aftermath of the 1972–1974 drought and famine, are situated farther from wells than the older villages and have inferior farmland with fewer trees, smaller fallows and bushlands, and active sand dunes. Rates of participation in temporary dry season migration were as high as 75 percent in the newer settlements, but only 10 percent in the oldest. Though actual data are not presented, newer villages also had been the main origins of crisis-impelled migrations (Rain 1999). The case of Tozai, where family migration in the mid-1980s was reported as having been minimal despite drying wells and the loss of fadama, indicates that the links may not always be direct.

An attempt in Niger to produce high-resolution vulnerability maps that included villages' wells and natural vegetation showed promise, but was constrained by problems of data availability (Stone Environmental 2001). In mapping vulnerability to heavy rainfall and flooding, Tarhule's (2005) research in Niger would offer important insights. More recently, present and future "hotspots" of hunger were mapped at 50-km² resolution for all of Sub-Saharan Africa using Demographic and Health Survey data and a model based on Geographic Information Systems (Liu et al. 2008).

These efforts intersect with Gemenne's (2011) proposal for establishing field "observatories" to monitor "environmental migration." Mapping projects also could be instrumental in identifying sentinel communities to improve early warning. Observatories, or sentinel communities, could be selected from among villages found to be highly vulnerable, as well as from those determined to have different, lesser degrees of chronic vulnerability. Data reported frequently from sentinels could be used to assess the efficacy of agricultural intensification, labor migration, and other forms of income diversification in contending with population pressure and possible declining vegetation. Monitoring also might document the extent to which chronic food insecurity has contributed to gradual permanent out-migration to the savanna and to urban areas. Although the case studies found no incidents of

migration to Europe, data from sentinels might help to determine whether increased reliance on protracted labor migration has contributed to making such expensive long-distance moves more likely.²

While USAID's Famine Early Warning System Network (FEWS NET) has made impressive strides in finding relationships between conditions at the village level and its mainstays of price monitoring and satellite data, the system has had very limited capabilities for monitoring migration (Brown 2006, 2008). Monitoring in sentinel communities could determine whether chronic insecurity has been leading to heightened famine vulnerability and greater risk of large-scale family distress migrations. An important focus should be on the potential for major migrations to the savanna.

Summary

Research on the climate-migration nexus should be broadened to include the possibility that famine will be a driver of future major migrations. In addition to drought, other rainfall extremes, as exemplified by 1953, need emphasis as well. Two consecutive years of deficient rainfall in 1972–1973 and 1983–1984 led to “patchy” famines and distress migrations. Continuum models and entitlement theory were not wholly accurate representations of these famines’ impacts, as coping strategies, especially labor migration and family migration to the savanna, enabled people to preserve rights to farmland in the Sahel. If, however, there is a new baseline of chronic food insecurity in the rural Sahel, rainfall extremes could lead to discrete famines of greater magnitude. Whether peaceful resettlement or temporary refuge in the savanna is possible today needs to be evaluated with satellite remote sensing and field research. Because land degradation and desertification remain vague concepts, attempts to find relationships between migration and changes in natural environments should focus on readily measureable features, especially village water sources.

Acknowledgments Many thanks to David Helgren and Evelyn Ravuri for very helpful comments on earlier versions of the article. The criticisms of Population and Environment’s editor and five anonymous reviewers were extremely valuable; one reviewer offered especially detailed and insightful comments. Fieldwork was supported by a Fulbright-Hays Doctoral Dissertation award and by awards from Michigan State University. The author is indebted to Dr. Mohammed Iliya and his colleagues in the Department of Geography, Usman Danfodio University, Sokoto, for making research in northern Nigeria possible.

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² See Schapendonk and Steel (2014) for a biographical approach to investigating migration from Nigeria and Sudan to EU countries.

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