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7 / Agricultural Expansion, Intensification, and Market Participation among the Kofyar, Jos Plateau, Nigeria

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Looking north from the rolling savanna plains of the Benue Valley in the Nigerian Middle Belt, the Jos Plateau escarpment is an abrupt wall rising to elevations of over 1,000 m and pocked with the cones of extinct volcanoes. The cultural ecology of this area is as distinctive as its topology. A large number of small ethnic groups with different languages, social organizations, house types, and costumes traditionally occupied adjoining territories of 300 to 800 km² in the hills and on a narrow band of well-watered oil palm land at the foot of the escarpment (Ames 1934). Some of these groups, such as the Kofyar, lived at densities of 35 to over 200/km², practicing intensive, permanent cultivation on terraced, manured homestead farms. Their dispersed homesteads, each in its own field of grains, tubers, and tree crops with stall-fed livestock, formed hamlets and villages that remained politically autonomous. The folk, whom the British colonialists called "hill pagans," were never incorporated into the Jukun or Moslem Hausa city states that dominated much of the rest of northern Nigeria.

The Kofyar homeland (fig. 7.1) on the southern margin of the Jos Plateau (9° N, 9°15' E) includes a ridge system fingering south between the Shemankar and the Dep River valleys and also the plains fringe village areas of Doka, Merniang (Kwa and Kwang), Doemak (Dimmuk), and Kwalla (Kwolla). The base of the escarpment is about 300 m (1,000 feet) above sea level. The entire area of approximately 492 km² (190 mi²) had a population of 55,000 in 1952 and 73,000 in 1963 (Netting 1968: 111). Like many of their neighbors such as the Hill Yergam, the Montol, the Tal, the Angas, the Mwahavul (Sura), and the Eggon, the Kofyar

have taken part since the 1940s in a "downhill movement" (Gleave 1966; Udo 1966) onto largely vacant lands in the Benue Valley. Extensive bush tracts south of Namu and Kwande (fig. 7.2), some 30 km south of the Kofyar homeland, have been brought under the hoe. Initial seasonal shifting cultivation of millet, sorghum, and sesame plus the cash crops of yams and rice has been replaced by an intensive sedentary farming system. Though no exact census figures are available, it appears that in the last forty years, between 25,000 and 30,000 Kofyar migrants have permanently settled in this frontier area and decisively entered the market economy as producers of food crops for urban Nigeria.

Relative isolation of the Kofyar in a rugged "refuge area" allowed their traditional system of permanent, intensive homestead farm cultiva-
tion to continue into the present as a viable, self-sufficient system supporting a dense, local population. Recent spontaneous agricultural and economic changes reflect decisions made by the Kofyar to grow cash crops using indigenous, low-energy techniques, and they now sell substantial surpluses of staple foods.1

Both the Kofyar homeland and the frontier to which they have migrated are in Qua’an Paan L.G.C. District (formerly Shendam L.G.C.) of Plateau State with its capital in Jos. The area was first conquered by the British in 1909, and further military activity along with forced evacuation of the Latok hills took place as recently as 1930 (Netting 1987). The homeland is connected by a road (that may be impassible in the wet season) to the Jos-Panyam-Shendam all-weather road completed in the 1950s, and Namu has been linked with Shendam and Lafia by an all-weather paved road since 1982 (fig. 7.1). Kofyar had already begun to head-load grain, yams, and palm oil to the tin-mining settlements of the high Plateau in the 1930s, and by the 1950s, lorries began to call regularly during the dry season at Namu, Kwande, and Kurgwi markets. Kofyar farmers could sell their yams and their bags of millet, rice, and sorghum to drivers and merchants who came to the farm gate. The extension of the road network and the increase of motor traffic, fueled by the Nigerian oil boom (Watts 1984), have made possible the efficient marketing of Kofyar primary products and greatly increased access to consumer goods, modern health services, and education.

Environmental Setting

The hill and escarpment terrain of the Kofyar homeland is based on Cambrian to Precambrian granites overlain by weathered basalts from early and late Tertiary volcanism (Morgan 1979). There are deeply incised north-south river valleys and a high stream density with slopes that are farmable although fairly steep (Stone et al. 1984). Settlement of dispersed homesteads is in the wider valleys and along ridges and the summits of flattened hills. The tan or light brown soils resulting from the weathering of granites and quartzites in the Kofyar hills are immature, having a relatively high mineral nutrient status because of the presence of decomposing rock fragments. On the barren slopes outside village settlements, soils may be thin and pebbly, but in moist valleys and where it has been regularly composted on homestead farms, the soil is darker, loamy, and quite fertile. Areas of old lava flows are reddish and oxidized, heavy and gluey when wet and very hard when dry. Such earth of recent volcanic origin on the plains near the escarpment was difficult to farm by traditional methods. Settlement was very dense, however, on the sedimentary deposits and remains of alluvial fans resulting from the erosion of the plateau (Wilshusen and Stone 1990). South of the Kofyar homeland, which reaches as far as 10 km southeast of the escarpment at Kwalla, the Benue Piedmont physiographic unit (Hill 1979) has thin, irregular soils derived from weathered Basement Complex rocks and large lateritic areas. This undulating plain with occasional bedrock outcroppings and iron pan does not easily support continuous agricultural use. Settlement is sparse on the Benue Pied-
mont, and the Kofyar, especially those from Kwalla who first moved south into it, often abandoned their farms for better land south of Kwande and Namu (G. Stone 1988). This part of the Benue trough (fig. 7.2) is characterized by the Sand Plains, Transitional Plains, and Shale Plains derived from Cretaceous sandstones and shales. The Sand Plains are dominated by well-drained reddish sands of coarse surface texture with no significant limitations to the production of yams, millet, and sorghum (Stone 1988, citing Hill 1979). The Transitional Plains are edaphically similar, but the finely textured pale clays of the Shale Plains are imperfectly drained and inhibit crop production. Kofyar who have colonized the Shale Plains areas beginning some 9 km south and east of Namu have found that after a few years of cultivation, poor drainage on the clay soils may cause growing yam tubers to rot. In dry years, on the other hand, greater surface runoff also leads to failure of the yam crop. Settlers of the Shale Plains have frequently allowed farms to revert to grassland grazed by nomadic Fulani herds. In some cases the farmers have returned to long-fallowed Sand or Transitional Plains land in an attempt to establish more permanent farms.

Namu at 190 m above sea level is on an east-west watershed forming the northern edge of the sedimentary strata that include the gently undulating Sand and Shale Plains descending gradually to the Gbokgbok and finally the Dep Rivers. That this part of the Benue Valley lacked settlement in the past was not because of the topography or of soils, and the rainfall is relatively good. This is a zone of 1,143 to 1,270 mm (44–55 inches) of annual precipitation. An almost totally dry winter alternates with a rainy season of 200 to 210 days, beginning in mid-April and concluding toward the end of October (Hill 1979). The rains show a bimodal distribution, peaking first in early June and again, following a drier July period, in September (Kowal and Kassam 1978). This was adequate to support a fairly continuous forest of the Guinea savanna type, and the Kofyar claim that their first clearings were threatened by the incursions of wild animals including elephants. Precipitation may be locally even higher due to the orographic effect when moisture-bearing winds from the south encounter the Jos Plateau escarpment.

The presence of oil palms and the growing of maize and cocoyams as staples in Bong village (Netting 1968: 79) testify to an escarpment climate closer to that of the southern Nigerian tropical forest zone than to that of the surrounding savanna. The Kofyar can grow the staple grains, millet and sorghum, and groundnuts as well as yams and cassava, which require more water. Though total crop failure is rare, there is considerable variability in annual rainfall, and a delay in the rains or an early cessation may reduce yields substantially. Severe droughts occurred in 1976 and 1983, and inconsistent early rains forced some Kofyar farmers to replant their 1986 millet twice. When the early rains are adequate, there may be a good harvest of the fast-maturing millet, but later drought may hurt sorghum yields and wipe out many yam crops.

In the past there were periodic food scarcities in the Merniang and Doemak areas at the base of the Plateau. They seemed to be less well watered than the hill communities, drinking water was scarce during the dry season, and a denser population also put pressure on agricultural resources. Communities along and above the escarpment in the Valley, Bong, Hilltop, and Ridge zones (Stone et al. 1984) seem to have had a wider range of crops, more economic trees, more bush land for grazing, and less variable rainfall than their plains-fringe neighbors.

Pests have not traditionally been a major problem on the intensely tilled homestead farms of the Kofyar. The presence of resident households with their dogs in the midst of the fields discouraged predators. Occasional plagues of locusts are remembered, but agricultural operations may have been reduced more by inter-village warfare than by pests, and the human population has been menaced by trypanosomiasis rather than famine (Netting 1973). A rapidly increasing danger to the cash-cropping area is the weed Striga hermontheca that parasitizes growing sorghum plants at the root, killing them or reducing yields if they are not removed by a mid-season weeding (Stone et al. 1990). The Kofyar have no modern methods of coping with striga, but they are buying chemical seed dressings to protect their germinating seeds from insects.

Key features of the environment in the past were (1) the location of the Kofyar homeland on and at the base of the Jos Plateau escarpment where a rugged terrain protected the Kofyar from militarily stronger neighbors, and (2) the relatively dependable and adequate orographic rainfall that supported forest crops such as the oil palm in a Southern Guinea Savanna area. These features, along with soils whose productivity could be improved by the addition of organic materials, sustained a dense sedentary farming society. In the recent period of migration into the Benue Valley and the adoption of cash cropping, unoccupied Sand Plains and Transitional Plains soils allowed agricultural colonization. These well-drained sandstone and shale-derived soils with moderate
slopes (3.5–4.4 percent) have no limitations for millet, sorghum, and groundnut cultivation, only a minor texture limitation for yams, and severe drainage constraints only for rice (Hill 1979). Only the poorly drained Shale Plains with their finely textured clays present serious problems for all of the important Kofyar crops (Hill 1979), and these areas are being deserted by farmers.

Because of relatively recent conversion of the frontier area from dry forest to first shifting and then permanent cultivation, it is not yet clear whether Kofyar composting and use of chemical fertilizer can maintain the nutrient status of the preferred soils. (In 1992, many farmers were complaining of declining yields.) An even more immediate determinant of agricultural production is the rainfall that is highly seasonal and sufficiently variable to cause unexpected shortfalls and droughts, thus possibly limiting the promise of the Middle Belt to contribute dependably to West African food supplies (Nyerges 1987). The well-spaced precipitation of 1984 as contrasted to the poor rains of 1983 allowed one group of six Kofyar farmers to increase their mean yam production by 91 percent, sorghum by 217 percent, but early millet by only 44 percent. It appears that without irrigation, Kofyar rain-fed agriculture in the Namu area will remain subject to major annual fluctuations. On the other hand, there are no obvious signs that forest clearance and shortened or absent follow has led to erosion or environmental degradation, nor have the Kofyar migrants been exposed to markedly increased parasitic diseases (cf. Nyerges 1987).

Population Size and Density in the Kofyar Homeland

Although colonial and national population estimates for the Kofyar area have been notoriously imprecise, both direct and indirect evidence suggests the presence of unusually dense, sedentary farming communities. Extrapolating from the census figures of 25,000 in 1921, 44,000 in 1931, 55,000 in 1952, and 73,000 in 1963 (Netting 1968: 111) would give a possible 1970 population of over 90,000 and, at 3.0 percent annual growth, a 1984 population of 136,000. Lacking hard data on fertility, mortality, or migration, estimates after 1963 are purely speculative, but it is not unlikely that there are well over 130,000 Kofyar in the traditional homeland and in the adjoining areas of the Benue River Valley to which they have migrated.

In 1952 before substantial permanent settlement of the frontier bush lands, population density in the restricted 492/km² homeland territory was 112/km², contrasting sharply with a density of 15/km² in Shendam Division and 19/km² in the Northern Region as a whole (Netting 1968: 110). A district officer (Findlay 1945) had earlier estimated Kofyar density, after eliminating uninhabited and wastelands, at 97/km² in the hills and 463/km² (1200/m²) on the plains at the foot of the escarpment. Given the varieties of local terrain and natural resources, there were in fact major differences among the population in Kofyar regions. Using my 1960–62 household census figures for sixteen villages and agricultural catchment areas (homesteads and local bush farms) defined by Glenn Stone on 1963 aerial stereo photos, we arrived at hill population densities ranging from 36 to over 92/km² and plains densities of at least 200 and perhaps exceeding 300/km² (Stone et al. 1984: 92).

I have speculated elsewhere that permanent rural population densities of 58/km² (150/mi²) suggest the presence of an appreciable degree of intensive cultivation (Netting 1990). Such unfallowed, annually farmed homestead land may have amounted to about 0.4 to 0.6 ha (1.0–1.5 acres) for each Kofyar household (Netting 1968: 99). If that were the sole source of agricultural support, it would have sustained 167–250 households or 868 to 1,300 people/km², which suggests that even on the plains with large areas of closely packed, contiguous homesteads, substantial areas remained in shifting cultivation or as low-grade pasture and waste lands. Estimated land use under shifting cultivation was from 0.2 to 0.5 ha (0.57–1.31 acres) per household (Netting 1968: 99), making the total household cultivated-land average between 0.6 and 1.1 ha. Maximum densities, ignoring fallow requirements, would thus have been 473 to 868 persons/km², and this practical limit seems to have been approached in only some of the plains communities.

Regional breakdowns of Kofyar population densities showed a regularly patterned inverse relationship to production. Plains areas of high population had consistently lower average numbers of grain bundles harvested and livestock owned per household than the more sparsely settled Valley and Bong areas (Stone et al. 1984: 95–96). Because mean household sizes in the hills were also smaller (3.47–5.96) than those on the plains (6.29), per capita differences in cereal supplies and domestic animals were even more pronounced (Stone et al. 1984: 101). Hill villages in the 1960s obviously had larger tracts of surrounding grasslands and, in some cases, forest as well as somewhat less constricted home-
stead farms. Production indices of the plains suggested real population pressure. There were even indications that there was a higher degree of interhousehold economic inequality in the more crowded plains as opposed to the less dense hill regions (Stone et al. 1984: 100–102).

Migration to the Cash-Cropping Frontier

The most profound change in Kofyar population since their incorporation in the British colonial state of Nigeria after 1909 has been the self-propelled movement of substantial numbers of farm families from intensive subsistence homesteads in the homeland at the edge of the Jos Plateau to a larger scale production of food crops for the market on frontier lands in the Benue Valley. The Kofyar made individual household decisions as to when and if to migrate, what to plant, and whether to resettle permanently on the new lands. There have never been government programs for resettlement, agricultural development and extension, credit, or marketing that have affected the Kofyar directly. In fact, they voluntarily began to grow newly adopted yams and rice as well as their traditional millet to sell while maintaining their staple sorghum, millet, and cowpeas for subsistence. They continued to use the familiar technology of hoe cultivation and to organize labor through the household and various means of exchange.

Migration began in the 1920s as the simple expansion of shifting bush cultivation on the southern and western perimeters of the densely settled plains communities of Kwalla, Doemak, and Merniang. People went no farther than a few hours’ walk from their homesteads and built only a shelter for occasional overnight stays. The few walled, nucleated communities to the south like Namu (linked ethnically to the Kofyar), Kurgwi with its Hausa traders, and Kwande, a Goemai settlement, maintained a desultory trade in salt with the Plateau and farmed only a small proportion of the surrounding dry forest. In 1951, some thirty Doemak households established farms in Mangkogam south of Kwande, and by 1953, Doedel, the Chief of Kwa, along with the Chief of Lardang and some others, were cultivating about 4 km south of Namu. Kwa in the Merniang home area had a dense population and relatively low per capita crop and livestock production. Doedel encouraged his villagers to grow extra subsistence food for themselves and to produce a surplus for trade and for taxes. The general practice was to visit the bush farm periodically, killing the trees with fire in the dry season, and planting sesame followed by yams, and then the staple sorghum and millet in successive years. By the early 1960s, Kofyar were spending increasing parts of the rainy season on the bush farm, but almost no one had relocated permanently or abandoned the intensively tilled original homesteads. Household members moved back and forth to the Namu bush, according to where their labor was needed.

Migratory bush cultivation increased rapidly in the 1960s, going from 22 percent of 655 households surveyed in 1961 to 46 percent of 677 in 1966 (Stone et al. 1984: 95–96). Where traditional population was heavy as in Kwa, 76 percent of the households had established bush farms by 1966. Even in Bong where there were no migrants in 1961, over a quarter of all households had accepted bush cash cropping by 1966.

With economic success in cash cropping, some families transferred their permanent residences to the new area. By 1984 a survey of home and bush migrant lands showed that 74 percent of 979 households had migrated and 514, over half the sample, had transferred their sole residence to the bush. Deserted huts rapidly disintegrated. Tax lists of this Kofyar officially recognized population in the Namu area alone went from 7,050 (1972–73) to 8,980 (1974–75), 11,061 (1978–79), 12,035 (1980–81), and 12,602 (1984–85). Namu Town was also growing rapidly, and its Kofyar population had reached 1,661 by 1984–85. In the adjoining Kwande District, 11,364 Kofyar were settled by 1984. With new bush areas still being opened up south of Assaikio on the west and in the direction of Ibi on the Benue, it is probable that a minimum of 25,000 to 30,000 Kofyar have taken up cash-crop agriculture in the Benue Valley outside of their original homeland. Tiv from south of the Benue were entering the same area in the 1930s (Rowling 1946), but the Kofyar appear to outnumber both these migrants and the traditional Goemai residents by many thousands.

Density in the bush-farm area southwest of Namu can be more accurately estimated for those neighborhoods or administrative subunits (ungwa) where we conducted an intensive household census and mapped homesteads with the aid of aerial photos (Figs. 7.3 and 7.4). The sixteen tabulated ungwa (fig. 7.2) have a total population of 3,590 on 36.22 km², giving a density of 99.12/km² (256.8/mi²) in 1984. These subdistricts, each with an appointed headman (mengwa) responsible for tax and other administrative duties to the Native Authority (N.A.) of Namu, averaged 224 members in 35.25 households. Populations range from 106 to 362, thus approximating those of traditional Kofyar hill villages. Older
neighbors like Ungwa Long, Wunze, and Goewan that may have areas of overworked soil, average only 82 to 92 people/km², but population in only one neighborhood tops 125/km².

Ten measured farms, including both cultivated and fallow land, ranged from 2.79 to 7.95 ha, averaging 5.61 ha. They were occupied by households with a mean size of 7.2 persons (slightly higher than the mean of 6.58 for 546 households in the 1984 survey population), and per capita land area for the ten households was 0.56 ha/person. A sample of ten farms measured in 1966 gave cultivated areas (excluding fallow) of 4.33 ha (Netting 1968: 200), suggesting that Namu bush farms may not
have changed a great deal in area, though shortened fallow, intercropping, and crop rotation have intensified land use. Some fragmentation among heirs and newcomers is beginning to take place. A land-use survey from aerial photographs covering portions of the Sand, Transitional Plains, and Shale Plains gives cultivated areas of 65.1 percent, 11.3 percent short to long fallow, 1.9 percent roads, 0.9 percent compounds, and 20.8 percent uncultivated or long fallow, of which 15 percent is in stream valleys that are probably uncultivable. This estimation procedure gives average farm size of 5.45 ha.

A 1963 aerial photograph of the study area shows 138 homesteads (Stone 1986, 1991a) in the neighborhoods now occupied by 546 household farming units (fig. 7.3). Using a mean household size of 6.44 based on 320 migrant households surveyed in 1961 and 1966 (Stone et al. 1984: 99), the total estimated population of the area would have been 902, and these would have been temporary residents because all Kofyar at that time maintained homestead farms in their villages of origin. Growth to 3,590 in 1984 meant that Kofyar bush-farming population had increased by 398 percent over twenty-one years. Glenn Stone (1988, 1991a, 1991b) has demonstrated that this substantial continued migration plus natural increase was accommodated by (1) the opening of new farms on the less desirable Shale Plains soils, and (2) the location of homesteads at greater distances from sources of drinking water, thereby increasing daily domestic labor. These strategies of spatial movement and declining cost/benefit ratios accompanied the process of agricultural intensification and land fragmentation among early settlers who remained in place.

It appears that Kofyar population in the bush-farm areas south of Namu increased rapidly from the 1950s to the late 1970s, but growth is now flattening out; none of the farmers we talked to had access to new land within his present neighborhood. As new households are formed, they will have to either take over a parental household, accept a smaller share of land, or move to a frontier 50 km distant or more. By 1992, young men were starting to establish new farms in Taraba State. Existing local population density, combined with a continued active participation in production for the market, suggests that shifting cultivation is now a practical impossibility and that the observed processes of agricultural intensification will continue.

There are already suggestions of the directions that further intensification might take such as the staking of yams, the planting of bananas and citrus orchards, the extension of rice cultivation in swampy areas (already present on smaller-than-average farms), and the use of low-quality soils for fenced, dry-season cassava gardens. Pump irrigation of vegetable crops from shallow wells is another possibility. Population density is still far below the levels of many Igbo groups and of the Hausa in the Kano Close-Settled Zone (Goldman, Martin, Okafor, and Mortimore, chaps. 8–11 of this volume). To the degree that opportunities for surplus production decline among the Kofyar due to land scarcity, they may be expected to diversify their economic activities, supplementing farming with trade, artisanal work, wage labor, and employment that requires education. This process has already begun among the almost 1,700 Kofyar residents of Namu Town, many of whom continue as part-time farmers.

Population Structure and Household Labor Organization

Demographic evidence for fertility and mortality is notoriously hard to collect in preliterate populations, and our data in these areas are much less reliable than those for migration. Changes in rates must be inferred from aggregate statistics drawn from household censuses with estimated year of birth or age. The material collected on 4,000 individuals in 1966–67 and for 8,728 individuals in 1984–85 indicates a relative increase in the younger age groups of the population. In 1966, 29 percent of the entire population was in the 0–10-year-old bracket and 37.1 percent 0–15, whereas in 1984 the corresponding proportions were 38.7 percent and 47.1 percent. The recent Kofyar population pyramid displays the contours of a broad-based developing-nation population with close to half of its total numbers comprised of dependent children. These cohorts were proportionately less large in 1966. We might speculatively credit this difference to lower infant mortality, to higher fertility, and perhaps to increased fecundity. In any event, it appears that population growth arising from natural increase will remain a significant factor in pressure on land resources, the provision of agricultural labor, and outmigration for the immediate future.

Although population density may correlate with the traditional intensive-farming system of the Kofyar homeland, and although the movement from shifting to intensive exploitation of the frontier parallels demographic growth, it is in the size and composition of household la-
bor groups that the most rapid adaptation to agricultural needs occurs (Netting 1993). The original hypothesis of a regular relationship between small, permanently tilled homestead farms and resident households averaging only 5.3 members (Netting 1965, 1968, 1969) has continued to be supported by reanalysis of data from the 1960s (Stone et al. 1984) and by new evidence. Traditional Kofyar households not only contrasted in size with those of neighboring groups in the same environment who practiced shifting cultivation under conditions of lower population density (Netting 1968: 131), but they also exhibited statistically significant growth to a mean size of 6.44 as they took up swidden cultivation in the land-abundant Namu bush. With no more need to economize on land and a premium on the rapid increase of cash-crop production, Kofyar mobilized labor in part by adding to the number of household workers. Although there is some suggestion that larger households from the crowded plains villages were the first to join the migratory stream (Stone et al. 1984: 98), household size grew rapidly with the number of years spent in the newly opened bush (fig. 7.5). New migrant households in 1966 averaged 5.01 members, whereas those who had spent nine years or more in cash cropping had 8.66 members (Stone et al. 1984: 99). By 1984 mean household size was 8.38, and those households with twenty-six to thirty years have now peaked at over eleven members.

Production of sorghum for subsistence, yams for sale, and cash income rises with household size in our 1984 survey population (figs. 7.6 and 7.7). The social means by which the household is expanded remain polygynous marriage (in 1984, 17 percent of Kofyar homeland households were polygynous, whereas 50 percent of the plains cash-cropping households had plural marriages), which increases the number of adult women workers immediately and the eventual workforce of resident children. The number of multiple-family (two or more married couples) households has also increased from the 5 percent characteristic of traditional family units to 26 percent among those Kofyar who in 1984 maintained both home and Namu bush farms. Household enlargement was only one method of coping with labor needs, and indeed, expenditures on hired agricultural labor rose with household size, so that multiple-family polygynous households of 15.3 members employed almost four times the labor of simple nuclear families with 4.3 members.

With the closure of the frontier and the filling in of bush land by permanent cultivation, local neighborhood populations should stabilize and households might be expected to decline in size. There are indications that per capita production does not keep pace with household growth. As fragmentation reduces farm size, the optimum number of resident workers may shrink further. Whereas the economic interests of the household head may be best served by having many wives and sev-
eral married sons, the junior members who are supplying a major part of the labor supply may see advantages in household independence. We plan to examine cases of household fission for predisposing factors of family size, age, and type of organization, but this analysis has not yet been completed.

Crops and Methods

Kofyar agriculture reflects a series of fundamental changes between the polar types of hill and plains farming, land scarcity and abundance, shifting and intensive cultivation, and subsistence with and without cash cropping. These powerful dynamic processes have been compressed into a span of less than half a century, and they embody the functional evolution of a highly integrated, indigenous farming system. The Kofyar have followed a bimodal Boserup (1965) trajectory from permanent upland cropping (Ruthenberg 1976: 116–22) on terraced, manured, subsistence homesteads to shifting cultivation of uninhabited Benue Plains land for the market production of yams, to a gradual reintensification of farming and permanent settlement of the former bush frontier. Population has gone from dense, sedentary, and isolated in the pre- and early colonial period to migratory and sparse as the new lands were opened and back to dense and permanently settled but now involved in a mod-

Fig. 7.6. Household size and sorghum production

Fig. 7.7. Household size and bush yam production
ern state's network of roads and economic integration. The identification and quantitative analysis of the factors and processes in this complex, kaleidoscopic ecosystem have only begun, but the outlines of systemic change are becoming clear.

Traditional Kofyar intensive agriculture was based on contiguous homestead fields encircling or abutting dispersed, stable residential compounds. These cellular homestead farms clustered in hill valleys or on ridgetops and formed a continuous cultivated landscape on the alluvial fans and sandy plains at the foot of the Jos Plateau escarpment (fig. 7.8). Carefully cultivated, annually manured, and often terraced plots supported intercropped grain and legume staples, vegetables, and fruit trees. The small size of the Kofyar homestead farm and the intensive horticultural techniques of cultivation resemble what have been called compound farms or permanent upland cultivation in Africa and show similarities to European infields and tropical house gardens. Where land is less constricted, Kofyar homesteads may show concentric belts of less intensively tilled cereals and groundnuts at increasing distances from the dwellings (Prothero 1957; Ruthenberg 1976: 122). Monocropped bush fallow fields, often terraced, surrounded village settlements and were used for grazing and the gathering of fodder as well as for periodic swiddening.

The most common homestead crop assemblage was of interplanted early millet, sorghum, and cowpeas with separate small plots of sweet potatoes, cocoyams, yams, groundnuts, and eleusine. Scattered plants of okra, peppers, cucurbits, and cotton would be grown with the grains near the homestead courtyard. Villages with a wetter microclimate used maize and cocoyams along with lima beans as the homestead crops. Economically valuable oil palms, locust bean trees, and canarium almonds were protected in the homestead fields, and introduced pawpaw and mango trees were often close to the huts.

The homestead field was cultivated annually in the wet season and never reverted to fallow for more than the few dry months after harvest. The organic content of the plot was maintained by annual applications of composted manure. Each homestead kept goats that were tied by day in a circular stone corral (bit) and kept in a mud hut at night. During the March to November or December growing season, grass and leafy branches were cut for the livestock, and water was brought to them for drinking. Some families also had dwarf cattle, ponies, or sheep that were herded during the day and stalled at night. The contents of the
goat corral, consisting of bedded green material and animal wastes, was distributed onto the homestead field just before the coming of the rains. Slopes that were not too steep and rocky were carefully terraced with contour walls of dry-laid stone. In a further attempt to prevent soil erosion and retain water close to crop roots, both terrace surfaces and level homestead fields were ridged in a rectangular pattern (basin listing) in such a way that there was almost no runoff of rainfall. Typically the millet stalks were buried in these ridges after the July harvest, and the ridges also were banked around the still maturing plants of sorghum. Where swampy conditions or seepage made a field too wet, the Kofyar used mounds separated by ditches to promote drainage.

Shifting cultivation on more marginal fields outside the homestead perimeter relied on less demanding crops such as groundnuts, acha (*Digitaria exilis*), and sesame. Though bush fields were fallowed, they often reverted to grassland rather than tree growth after a period of annual cropping that might be as much as nine years. Groundnuts might be fertilized with household cooking-fire ash that was carefully conserved in a special hut. Bush lands might also be terraced, though with low benches, and there were occasions when the same field was double cropped, first with an early groundnut crop and then with late millet transplanted from a nursery. Whereas the frequency of cultivation of homestead land was 100 (although there were successive harvests of interplanted crops), bush fields might have a use frequency of thirty-seven to as much as sixty-eight. Grasslands were burned annually in the dry season to improve hunting opportunities and to encourage a flush of new growth for grazing. Grass falls were merely hoed before seeding.

Kofyar tools are as technologically simple as their farming system is complex. The iron-bladed, locally forged Sudanic hoe with a short, hook-shaped wooden handle was and remains the principal implement. It is used to break and turn the soil, to lift it into ridges and heaps, and to uproot competing vegetation. Smaller pointed hoes may be used in weeding. There are also sickles for cutting fodder grass and reaping small grains, knives for cutting larger grains, and axes for harvesting palm fruit and cutting brush and trees. A variety of winnowing trays, wooden mortars and pestles, stone metates, and pottery and metal vessels are used in food processing and preparation. Ramada-like drying racks and mud granaries are present in every farming household. The plow and animal traction have not been adopted.

When the Kofyar began to enter the bush lands to the south of their homeland, they used only the extensive methods of their traditional rep-ertoire and adapted them to production of the new cash crops of yams and, to a lesser extent, rice. They did not cut the forest but merely killed the trees in the dry season by building a fire around each trunk. Sesame might be planted in the first year because it was felt that the previously uncultivated soil was too rich for other crops. Yams planted in the second year in conical heaps were followed in the third year by the early millet-sorghum association, but the traditional cowpeas were omitted because they did not yield well. A bush farmer had to first acquire a stock of yam tubers for planting by working for others or as a gift. Because yams did best in fertile soil, farmers would move the yam field every year to newly opened parts of the farm, often working downslope from the ridge with its road toward the shallow stream valley that separated one neighborhood from another (fig. 7.4). The field was gradually cleared as the standing dead, leafless trees were further burned and finally fell.

Because initially land was plentiful, no efforts were made to fertilize the crops. Farmers did not maintain goats nor did they encourage Fulani cattle herders to corral their stock on the farms, though this practice had already begun as Fulani started to pass through the Kofyar homeland villages in the 1950s (Stenning 1957). Kofyar bush farmers also planted their millet and sorghum in ridges that were relatively low, spaced widely, and without the cross-ridging and basin listing of the homeland. There was little stone for terrace walls, and the gentle slopes could be cultivated without ridging. After perhaps seven years of crops, the farmer would fallow his land for an equal period and use another portion of his farm. Poor soils and overworked land that grew up in imperata sword grass were merely abandoned, and the farmer sought a new field farther in the woodlands. In the Shale Plains, drainage problems became apparent after a few years of cultivation. There was too much water for the maturing yams, and it was difficult to find a dry spot for a compound. Alternately in the dry season, streams dried up, and household water had to be brought from a distance (Stone 1991b).

The general strategy adopted by the Kofyar for maximizing returns from the frontier lands was to bring large areas under the hoe with extensive methods and to accept lower yields per hectare in return for labor-efficient cultivation and increased total farm production. In 1966, a sample of ten migrant bush farms averaged 3.14 ha (7.75 acres) in millet-sorghum and 1.19 ha (2.94 acres) in yams, compared with the 0.62 ha (1.54 acres) in seven sample hill homestead farms (table 7.1). Bush grain production, though only 75 percent of homestead yields, was
almost four times the total volume of homestead crops (Netting 1968: 201). Though the Kofyar were not permanently resident in the cash-cropping area, they transferred household labor seasonally for periods of intense work and often left a wife or a younger family member to guard the fields at other times. They also made considerable use of cooperative beer party labor in which groups of thirty to eighty neighbors do a single task like heaping yams on the host’s field and are rewarded with large quantities of millet beer (Stone 1992). In addition to this festive labor there was some hiring of migrant workers, often non-Kofyar from the Jos Plateau, who were paid in cash for a contracted job of a few days.

We would expect that as available land was either taken up or found to be inferior and abandoned, the Kofyar would reintensify their land use. The Kofyar were obviously unwilling to accept either a decline in subsistence or a marked fall in cash income as their population on the Benue plains increased and their demand for consumer goods and services rose. The areas of highest fertility south of Namu were occupied first shortly after 1953, and they have never been deserted. Settlement here remains dispersed, but it is now permanent with open farmlands dotted by large compounds, many of which now have rectangular mud-brick houses with galvanized iron roofs. Except along the courses of streams, the only remaining trees like the locust bean and shea butter have economic uses. Clearly demarcated farms bound one another, and each named neighborhood has a neat Roman Catholic chapel. Sixty-nine percent of the households have moved permanently to the cash-cropping zone, abandoning their ancestral farms in the homeland. The rest continue to maintain a traditional homestead, but it is now a distinctly subsidiary residence with limited farming that serves mostly to house elderly parents and children attending school. The old terraced fields are now used for unmanured groundnuts or acha or are grazed by the cattle of the few remaining residents.

Shifting cultivation is no longer a possibility among the sedentary farmers in the Namu bush neighborhoods that have been occupied in some cases for over thirty years. Only about 21 percent of the arable lands are fallowed, and the fallow period has been shortened to one to three years. Intensification is evident in other ways as well. Most Kofyar farmers have begun to keep stall-fed goats again and distribute their composted manure. Pigs, spreading rapidly since their introduction in the early 1960s, are now reared in many households, and cucurbits are

| Table 7.1. Comparative Production of Traditional Homestead and Migrant Bush Farms |
|----------------------------------|----------------------------------|
| Type                             | Production per acre (pounds)     |
|                                  | Total production                 |
|                                  | Total                            |
|                                  | Millet                          |
|                                  | Sorghum                         |
|                                  | Cowpeas                         |
|                                  | Total                           |
| Traditional homestead (intensive)| 2                               |
| Number in sample                 | 1.54                            |
| Average acreage                  | 400                             |
| Production per acre (pounds)     | 498                             |
| Total                            | 305                             |
| Migrant bush farm (intensive)    | 10                              |
| Number in sample                 | 7.75                            |
| Average acreage                  | 348                             |
| Production per acre (pounds)     | 274                             |
| Total                            | 2,286                           |
| Source: Netting 1968:201          |                                  |
grown especially to feed them. They also consume the malted grain by-product of beer brewing. Within the last decade, chemical fertilizers have been distributed by the government. Most farmers are using several bags a year and seeking more, both of the subsidized supplies and of that purchased on the open market. They are also purchasing small packets of seed dressing and pesticides for use on stored grain. Though Kofyar lack information from extension services on fertilizer dosages and the use of the new inputs, they are experimenting (Richards 1986), and it is apparent that they will invest some of their agricultural profits in commodities that will slow or prevent declines in production. As one farmer told me, either you buy fertilizer or your son must move to another farm.

The combination of ingenuity and disciplined hard work that characterized traditional Kofyar agriculture appears especially in the new system of interplanting, crop rotation, and careful agronomy that has appeared (Stone et al. 1990). More work is expended on dry-season ridging and later hand weeding and thinning of millet, and some sorghum is transplanted to bare areas in the fields. Yams are rotated with the millet-sorghum complex because of the scarcity of long-fallowed fields. After the July–August millet harvest, yam heaps are made in the same field where the sorghum is still growing. This activity helps to both weed and support the sorghum stalks and provides the heaps in which the yams of the following year will be planted. A short-season crop of sesame may be planted on these heaps in the meantime. Vegetatively reproducing yam tubers can be planted during the dry season and covered with a cap of straw and earth so that they are protected from the sun and ready to sprout with the first rains. When, in turn, the yams are harvested during the dry months of January and February, the heaps are broken and reformed into ridges for the cereal succession.

A household millet-sorghum field may also be interplanted with groundnuts or Bambara nuts between the rows, and these are separately owned and cultivated by individual women (fig. 7.9). Many women also cultivate yams for sale on land loaned to them by their husbands (Stone 1988a and b). Along the edges of a field or in the shade of a tree, women may also raise coco yams and native African tubers that do best in a damper, less exposed micro-environment. Both men and women grow rice in swampy plots where grains and yams will not flourish. Because high grass must be uprooted for this crop and harvest also demands considerable labor, rice is not a favored cash crop, but its production allows marginal land to be intensively exploited. Land exhausted by shifting cultivation may also be returned to production by planting cassava, and this is just beginning to appear among Kofyar.

The Nigerian Ministry of Agriculture has a few small projects in the Kofyar area in which tractor plowing and chemical fertilizers are used to produce maize. Mechanization has not made significant inroads among the Kofyar, although contract plowing by a local entrepreneur is sometimes used to break volcanic soil in the homeland that can then be
heaped by hand for yams. The capital costs of tractor purchase and maintenance are of course significant, but Kofyar point out that the wide furrows and monocropping associated with plowing are not compatible with their own intercropping and relay cropping (one cultigen immediately succeeding another in the same field) or with the selectivity of repeated hand operations. Even innovative projects like the banana plantation in a stream valley that uses earthen dikes and raised mounds for alternate drainage and irrigation are done entirely with hoes.

It is in transportation that modern machines affect Kofyar agriculture most directly. The export of bulk farm produce like yams, millet, rice, and even bananas is by truck. Individual entrepreneurs and middlemen come on a Kofyar-built network of dry-season roads right to the farmstead gate and purchase crops for cash. Smaller amounts may be taken in pickup trucks, minibuses, and taxis that circulate especially on market days. The Kofyar have purchased some of these vehicles and literally thousands of light motorcycles that, in addition to bicycles, carry people and goods to and from the bush farms, the towns, and the homeland villages (Netting et al. 1989). The availability and cheapness of gasoline, the variety of vehicles for sale and hire, and the roads linking major Nigerian centers of population contribute to the profitability of Kofyar food cropping and prevent the monopolizing of transport services that would raise their cost to rural people. There are some suggestions (Norman et al. 1982: 85) that competitive conditions in internal Nigerian food marketing effectively translate consumer demand and maintain attractive producer prices.

Labor Intensification

With the relative paucity of mechanical technology and new sources of energy in Kofyar agriculture, the change to migrant bush cash cropping and the subsequent intensification to maintain surplus production under conditions of growing population pressure were powered mainly by increased labor application and its effective organization and scheduling (Stone et al. 1990). A central proposition of the original Boserup (1965) model was that problems of scarce land and declining fallow periods could be met by substituting labor for other resources. The familiar tasks of intensification—manuring, livestock stall feeding, terracing, transplanting, crop rotation, more frequent weeding, irrigation—all require extra effort, investment of time for deferred rewards, and a more sustained, less variable labor expenditure than does shifting cultivation. There is now little doubt that intensification demands (1) increased person hours per unit land; and (2) higher annual labor inputs per household and per individual family member (Netting 1993). Controlled comparisons of Hausa savanna communities differing in population density (Norman et al. 1982: 104-7) and of Igbo humid forest villages along a similar population continuum (Lagemann 1977: 90, 93) indicate this labor cost of intensification. The issue is complicated by the difficulty of measuring actual labor time, comparing work across gender, age, and task difficulty spectra, and calculating efficiency, that is, return per unit of labor expended. Theory predicts that efficiency and marginal productivity decline with intensification (Barlett 1976), and labor input in fact generally increases at a faster rate than yield per hectare (Pingali and Binswanger 1984). Without technological change, a decline in labor efficiency may be inevitable.

For intensive Kofyar homestead farming, no consistent figures for labor input were ever collected. The three hoeings of a homestead field of 0.48 ha might require a total of 270 person hours a year (Netting 1968: 133), but the daily chores of bringing grass and water to the goats during the nine-month growing season could easily consume another 270 hours at the minimal rate of an hour a day. Indeed, the proliferation of small tasks such as weeding, harvesting, and processing a variety of cereal, legume, and tuber crops seemed to occupy both men and women for significant parts of almost every day during the growing season. The situation among West African shifting cultivators may involve men working from 530 to 728 hours a year (Cleave 1974), whereas females may spend much less (secluded women among Moslem Hausa) (Norman et al. 1982) or considerably more (females working 954 hours in a Gambian village) (Haswell 1953). One of the few comparative time-allocation studies shows intensive farming systems demanding some 3.5 hours more per day for men and 4 hours more per day for women than does extensive agriculture under conditions of low population pressure (Minge-Klevana 1980).

When the Kofyar embarked on large-scale bush cash cropping, they added to their traditional homestead farm work the additional tasks of the distant Namu swidden. Their time in movement to and from, either on foot or by bicycle increased, and cropping times were staggered with those of the home farm, using later-maturing varieties of sorghum and
millet. Though the more rapid and less painstaking farming operations in the bush brought high returns, total labor time per capita had to rise. We do not know the extent of the increase, but the efforts of Kofyar household heads to enlist more hands through polygynous marriage and retention of married sons in the multiple-family household (Stone et al. 1984) suggest the high demand for labor.

We have analyzed time-allocation data for a 1984–85 sample of fifteen households with twenty-six adult males and thirty-six females on which resident enumerators recorded daily each task, its duration, and the labor group involved for each individual (Stone et al. 1990). Our findings are consistent with the descriptive evidence of reintensification by means of elaborate intercropping, crop rotation, and scheduling operations so as to avoid labor bottlenecks. It is apparent that Kofyar may work up to three times as much per year at their agriculture as do shifting cultivators (fig. 7.10). We estimate the average annual labor input at 1,599 hours of fieldwork and food processing for each adult. The mean was 4.4 hours per day in a seven-day week, ranging from a peak of 7.4 hours during March millet planting after the first rains to a low of 2.8 hours daily at the end of January after the dry-season harvest. Heavy grain ridging and yam mounding work absorbed an average of 4.8 to 5 hours daily.

The Kofyar mobilize impressive quantities of labor by (1) achieving balanced equivalent or complementary labor inputs for men and women; (2) using familiar, voluntary, social means of work organization by household and cooperative groups; (3) adding tasks for new crops between the seasonally dictated peak demands of their traditional crops; and (4) extending their labor into dry-season periods of formerly slack labor requirements. Men and women work side by side at most jobs, both as household members and as parts of exchange labor teams and beer party festive labor groups. Few tasks or crops are rigidly assigned to one gender (Stone 1988b). Men do 50 percent of the weeding and transplanting and women do 42 percent of the heavy mounding and ridging. Women's work in brewing subsidizes the large work groups that perform much of the yam mounding. Women put in 53 percent of total work hours in all agricultural activities, but as there are 1.36 women for every adult man in the bush farming communities, women's per capita labor contribution is 42 percent of farm work or an average of 1,473 hours annually. With the addition of brewing, cooking, and other domestic labor (but not of child care), women's per capita labor comes to 53 percent. The remarkable testimony of these figures is that intensive hand cultivation without the plow appears to elicit very equal and quite large amounts of labor from men and women. The Kofyar, in accounting for their relative success in expanding agriculture as compared to Goemai and Hausa (Hill 1972) in similar environments, cite the direct involvement of women in farming as opposed to their seclusion in the compound or their occupation in crafts and marketing.

Though Kofyar agriculture is based on individual muscle power and relatively unspecialized tasks with simple tools that the workers bring to the job, there are a number of conventional ways to organize this labor. The basic unit in both the homeland and the cash-cropping area re-
mains the residential household. The family works together or performs complementary tasks on the fields that belong to the household head and from which all members have the right of subsistence support. Male members have further rights of inheritance in this property and the expectation that the head will provide them with bridewealth from household resources as well as paying their taxes. Sixty-two percent of all agricultural labor is devoted to the household farm.

Both adult junior men and adult women, married and unmarried, may also farm independently, using land allocated by the household head or other land holders. The crops they produce may be sold or used according to their own wishes, and the household head has no claim on the resulting income. Independent production absorbs 15 percent of total Kofyar work hours, but most of this is done by women who work 21 percent of the time on their own crops and a further 10 percent on the individual crops of others. Family and individual labor are particularly well adapted to intensive cultivation because of the high incentives of household members who share in the fruits of their common efforts and the risks of poor production and because supervision costs are minimal (Binswanger and Rosenzweig 1986).

There are occasions in which the household is not large enough to perform a particular task within certain time constraints, but in which careful, disciplined work and a knowledge of Kofyar farming methods is desirable. The obvious choice for labor pooling is to join forces with other individuals or households on a reciprocal basis. Individuals voluntarily form exchange labor groups called wuk of five to twenty members. They take turns working on each other’s fields, with the explicit obligation to repay all labor received. Households also belong to wuk with their neighbors, sending various household members to each labor event. About 6 percent of all labor is done by exchange groups, and much of this is directed to millet/sorghum ridging and weeding.

When massed labor is required for some of the heaviest tasks of the agricultural year like millet/sorghum ridging, millet storage, and yam heaping, the Kofyar mobilize large mar muos neighborhood work groups (Stone 1992). These half-day gatherings employ typically thirty to sixty workers, but they may exceed 100. The host supplies millet beer made from 90 to 180 kg of grain that provides each of the workers about four liters of the nutritious, mildly alcoholic brew. Neighborhood women also exchange labor to grind the malted millet. The festive atmosphere of the work party and the friendly competition among participants who may be urged on by drummers, along with the immediate reward of beer, lessen the drudgery and increase the social attractiveness of group labor. When newly harvested millet must be tied into bundles, lifted to a drying rack, and thatched in the short midsummer trough between rainfall peaks, the cooperative work group that circulates to several households on the same day is well adapted to the task.

It is interesting to see that the high labor demands of yam heaping for the principal cash crop are also met by beer party groups. The work must be done paying attention to the growing sorghum in the same field, and it is also an added task that was not part of the traditional farming system. Kofyar contend that though it creates costs in millet, brewing time, and return labor, beer party work costs less and is more reliable than wage labor. Its cash costs are certainly less, it accomplishes an arduous task much more rapidly than could a household working on its own, and it assembles large numbers of workers dependably with no search, hiring, or supervision expense. Because migrant wage laborers are still scarce and there are almost no landless Kofyar who must work for wages, the traditional beer party institution remains an effective organizational device, and 13 percent of all farm work is performed in this manner.

Farmers wishing to expand their operations beyond the labor resources of the household and cooperative groups can hire small groups of three to five workers who come from the Plateau. They appear in September for yam heaping, and they usually contract for a certain sum at a piece rate (e.g., N-5 equal to $7, per hundred yam heaps). In 1983, 36 percent of our sample cash-cropping households employed wage workers, but the average number of person days was only twelve, constituting an estimated one percent of total agricultural labor input. With the exception of hired labor and the occasional church women’s club (zumunta) that earns money by working on others’ fields, the social organization of Kofyar labor is based entirely on traditional forms. Household members cooperate as part of the mutual dependence of family members for subsistence. Exchange and beer party groups bring together neighbors and often relatives who associate frequently in the local, face-to-face community. The fact that all Kofyar have probably increased their total labor expenditure to produce a surplus for sale has not, up to this point, essentially modified the ways in which the social forces of production are mobilized.

The technical reasons for making next year’s yam heaps during the
late rainy season in the sorghum fields are further supported by effective labor scheduling (Stone et al. 1990). If only subsistence grains were grown, there would be a trough between the peak labor demands of millet harvest and storage in mid-summer and the sorghum harvest in December and January. This is filled by the yam mounding, and the curve of total labor in the period September–November does not fall significantly (fig. 7.10). Intensive work on rice, which is also a cash crop, is fitted in before the harvests of the two staple cereal grains. The substantial amounts of time that go into millet/sorghum weeding and yam weeding are spread throughout the growing season and reflect the kind of sustained attention that intensively tilled crops demand. Intercropping means that weeding, thinning, and tending several crops at different stages of their growth proceeds simultaneously, and labor use is spread rather than concentrated at seasonal peaks (see Norman et al. 1982: 53–55). Small but nutritionally important crops like groundnuts, cucurbits, sesame, okra, and tuberous vegetables also occupy short periods in women’s days.

At an earlier period, the end of the dry season allowed considerable leisure for funeral commemoration ceremonies, hunting, beer drinking, arranging marriages, and warfare. Though Kofyar still take dry-season time for visiting and celebrations, some crop work goes on. Yam harvesting, transporting, and often storing in specially built barns take time in January and February, and yam planting can also be done in the dry season. Fields are cleared for next year’s crops, and sometimes hills are made ready for quick grain planting when the rains arrive. Women supplement their agricultural incomes by brewing beer for sale.

The cultivation of cash crops appears to have been voluntarily adopted as an addition to rather than as a substitution for traditional subsistence foods. In fact, millet is grown in larger amounts than previously for both sale in 90-kg bags and brewing the beer that rewards the labor of the big parties of yam heapers. Because the time devoted to yams and rice represents a major allocation and must be integrated with other tasks, it is clear that the Kofyar have consciously chosen to increase their total labor commitments. Yams require intensive treatment. Whereas the average Kofyar household devotes 9 to 25 percent of its cultivated area to yams, 36 percent of the household’s agricultural labor time goes into this crop. The addition of rice brings the total cash-crop time to 40 percent and, with further time spent on individual crops of peanuts, Bambara nuts, sesame, and on feeding pigs and chickens for sale, it appears that men and women farmers may devote half of all their work hours to marketed output. One can only conclude that the cash incentive has motivated Kofyar to work more than they did in the past and to choose the labor of intensification over any conflicting preference for leisure. Because they are producing a surplus by these means, it is also evident that population pressure on subsistence is less influential than economic gain in the present intensification of plains production. The market carrot is now performing the former role of the subsistence stick in the homeland communities of the hills. The Kofyar could deintensify and slide back into a less labor-demanding mode of autarchic self-provisioning on the existing land base, but they have obviously opted for continued significant market participation.

Kofyar agricultural intensification demonstrates an elaboration and widening of the primary motivating role of demand affecting the behavior of the farming household. Whereas the original adaptation of permanently tilled and terraced hill homesteads apparently reflected Boserup’s (1965) consumption or subsistence demand in response to local population pressure, the recent reintensification on the plains frontier was caused in part by the powerful additional demand for market commodities (Brush and Turner 1987: 31–35). When a shrinking per capita land base no longer permitted extensive means for growing cash crops, the Kofyar accepted the higher labor and capital investments that were required for sustained surplus production. Though we do not have a thorough analysis of commodity prices, transport costs, and opportunity costs of labor, it appears that Kofyar have found the monetary returns on their sales of food crops attractive, and their response to a relatively unconstrained market follows the tenets of neoclassical economics (Brush and Turner 1987: 34–36). Their increases in household labor are not easily accounted for in a Chayanov model that explicitly allows for expansion into unused land, a limited and static role in the market economy, and a refusal of further “drudgery” once the demands of the self-provisioning household are met (Chayanov 1966: 121).

**Outputs of Crops and Cash Incomes**

It is difficult to relate our data to questions of yield per unit area or total production by dry weight or calories. Although we gathered household-and individual-level information on the crops produced in the last two
harvests and the amounts sold and money received, there is no independent verification for these figures. Unlike agricultural economists, we did not use the measured field as the unit of production and labor input, although we measured and mapped a small number of farms. Reported quantities were in several forms: bags of millet (90 kg), headloads of sorghum (approximately 24 kg of grain), yams in 100-tuber lots, enamel basins of smaller tubers, groundnuts, cowpeas, and so on. One of two recent years (1983) was so dry that Kofyar considered expensive crop losses. Earlier estimates of subsistence grain production in both homestead and swidden fields of two hill villages ranged from a mean of 856 kg for Bogalong to 447 kg for Bong, which relied more heavily on tuber crops (Netting 1968: 91). For seven measured hill farms, estimated annual production averaged 698 kg of homestead sorghum, millet, and cowpeas without including production from bush farms (Netting 1968: 96). For 5.2-person households, grain may approach the rough per capita requirements of 0.45 kg (1 lb.)/day (Hill 1972: 254) or 145 kg/year (Simmons 1976: 16) given for the Hausa, but our data are not sufficient to allow any conclusions.

The 1984-85 survey does provide some tentative findings on subsistence production and income of households in the Namu cash-cropping area. Only quantities of the staple grains, millet and sorghum, are included, and we have not yet analyzed our material on the supplementary food crops of rice, groundnuts, cowpeas, sesame, and tubers. It appears that the bush farm households may have a declared annual production of some 55 bundles of grain, which at 22.7 kg of threshed grain each, would amount to 1,249 kg. This undoubtedly underestimates the actual production, but if it were used for subsistence alone it could support 8.6 people (at 145 kg/person annually). Combined sales of agricultural crops in this sample of 802 households exceeded N 800 ($1,120) per household. Another sample of 737 cases gave mean household income from crops as N 734 ($1,028), while individuals (usually married women) received an additional N 197 ($276), for a total mean annual income of N 931 ($1,303).*

Our observations suggest that the Kofyar have made substantial changes in residence, farming system, labor inputs, and work organization in order to produce a marketable surplus, but that they have not sacrificed subsistence in food or economic autonomy in pursuit of this goal. Though some town-based craftsmen, traders, or administrators may grow yams, maize, or cassava solely for sale, the rural Kofyar continue to produce the range of traditional staples and livestock that they eat. A year of poor crops may cut sales, but since all the crops grown for exchange can (and are) consumed in the household, there is little overt evidence of want. The movement into frontier agriculture has been gradual, there is little risk because home farms have been maintained, and the heavy new investments of labor time rather than capital means that Kofyar have not incurred substantial debt. However, land in long-settled areas is no longer free, and a market in land is now developing.

Purchased agricultural inputs are now a necessity as well. In a sample of 136 household heads 56 percent had purchased chemical fertilizer in the last year, 51 percent had hired transport of some kind, and 28 percent had bought grain, either for food or for seed. We suspect that purchases of millet beer and fresh meat are rising, and there is increasing demand for manufactured foodstuffs like bottled beer, Maggi seasoning cubes, and sugar.

The Kofyar are now sufficiently committed to the market that cloth and clothing, bicycles, and carpentered door and window frames are present in almost every household. Iron beds, kerosene lamps, radios, motorcycles, and pan roofs are prevalent. Services are a major item in many family budgets. Post-primary schools often require fees. Free-enterprise medical care in the form of clinics (often run by non-doctors) and medicine stores has spread very rapidly. A survey of 136 Kofyar households indicated that 129 individuals representing 60 percent of the households had sought paid medical care in the last month. The cost to those households with one or more patients was an average of N 32, again for a single month. Women who join savings clubs or invest in livestock may do so for the explicit purpose of accumulating money to be used in case of illness. Agriculture remains the most general source of funds for all of these purposes.

The Larger Economy

Although Kofyar agriculture is firmly imbedded in the market economy while buffered by substantially self-sufficient food production, growing numbers of people are entering nonfarm occupations. Education has given access to employment as teachers, beginning with Catholic mission schools in the 1930s and 1940s. There are now secondary schools at Kwa, Kwalla, and Namu, and some Kofyar teach outside the area, in-
cluding at the University of Jos. Government officials and businessmen (lorry and taxi owners, yam traders, motorcycle mechanics, saw-mill operators) come from the Kofyar population, whereas those who have converted to Islam have often become very successful as Namu yam or cattle traders, grain-mill owners, truckers, and landlords. It is not apparent how much cash returns to the area as remittances, but the inexpensive transport services mean that people can shuttle back and forth to Shendam or Jos with ease. Professional Kofyar from Jos may come to Kofyar for the weekend, and a number of them have built modern houses there. Their investment in agriculture is apparently still minimal, but growing, and there are no signs of accumulation of land (cf. Reyna 1987). Kofyar do not participate in regular or large-scale labor migration as do other groups in the Nigerian savanna. Unless one can secure professional employment, agriculture may pay better and give a higher level of security than unskilled or informal sector jobs in the city. When government clerks are laid off, they return to their fathers' farms and take up the hoe. Secondary school graduates exhibit a healthy respect for wealthy farmers, and university students spend summer vacations at work in their fathers' fields. Perhaps as a heritage from their own traditional grounding in intensive hill agriculture and as a reflection of current economic achievements, Kofyar do not hold farmers in contempt.

The Consequences of Change

The homeland hill and the cash-crop plains environments have changed in diametrically opposed directions as they switch places on the population/agricultural intensity continuum. The hills have become seriously depopulated, and some smaller villages have practically disappeared. Koepal, a hamlet near Bong, had seventeen homesteads in the 1960s of which two remain. Abandoned houses that are not thatched rapidly disintegrate. Homestead farms may be cropped extensively by the few neighboring families still present, growing unfertilized groundnuts or acha. Some men take advantage of the increased natural grazing possibilities by keeping larger herds of dwarf and Fulani cattle. It is probable that, with disintensification, unrepaided terrace walls are allowing increased erosion, and the scars are visible on the steep hillsides outside of Kofyar villages.

On the other hand, the former frontier lands south of Namu have gone from clearings in a forest with standing dead trees and blackened stumps to an open, carefully tilled landscape that suggests the Kano Close-Settled Zone (Mortimore 1967). Successive lumberings have eliminated the large hardwoods. It is not possible for us to judge the relative decline in the natural fertility of plains soils, but the ubiquity of intercropping, the short fallows, and the rapidly escalating use of fertilizer suggest that farmers are struggling to maintain or increase yields. The best Sand and Transitional Plain lands (fig. 7.2) have remained settled and are used permanently. Some lands near the Namu-Shendam road that were abandoned by shifting cultivators are now being reoccupied, in part by farmers whose recently established Shale Plains plots experienced severe drainage problems. The large shal areas abandoned by hoe cultivators are now pasture for nomadic Fulani herds (Stone 1991b). Individual cases of poor Kofyar yields were generally explained as lacking in timely cultivation or weeding or as receiving inadequate fertilizer. Dramatic soil degradation associated with sheet erosion or gullying is not immediately apparent on Kofyar lands. Whether their system of extensive rain-fed agriculture in a savanna environment is sustainable, and whether it can accommodate higher levels of rural population, is not clear.

Land tenure continues to associate dense, permanent populations and continuing, valuable, heritable rights in resources. Both homestead fields and bush fields were originally held by individual household heads succeeded by their sons. Owners' property rights were recognized, even though a homestead had been occupied for generations by tenants who paid dues in the form of tree produce and occasional beer. Forms of pledge and lease were practiced, and sale was possible though rare (Netting 1968: 164-68). Those bush lands first occupied by means of a token payment to the Chief of Namu and an annual tribute in millet and chickens are now held individually. Whereas no firm claim remained when shifting agriculturalists left exhausted land, intensively tilled fields are now transferred outside the family for a substantial sum in cash. Though such transactions are witnessed by the neighborhood head (mengwa), there is as yet no registry of title, and Nigeria treats rural farm lands as belonging ultimately to the state. There is little evidence of land accumulation, in part because the household labor force and the absence of large numbers of paid workers set labor limits on the amount of land effectively cultivated. Though we can document sharp increases in cash income on the frontier, inequality as measured by the
Gini index was not initially growing (Stone et al. 1984: 102). With more families at different stages of the developmental cycle, and with recently founded households having to use more marginal land or a fragment of a former holding, we would expect to find more pronounced economic differences within the Kofyar bush communities now.

When our work is complete, we will be able to provide an accurate profile of Kofyar demography, labor organization, households, production, income, and housing in the cash-cropping area. Some of these indices will be directly comparable with statistics gathered in 1961 and 1966. It is, however, difficult to generalize about the overall welfare of the population. We have not measured nutrition, nor do we have other biological variables for different time periods. We suspect that health care is somewhat better, and access to various versions of Western medicine has, for good or ill, greatly increased. Clothing, transport, house types, and religious observances have changed markedly in the last thirty years. Insofar as migration to the plains and entry into the market economy is concerned, we can only say, as outside observers, that this was what the Kofyar chose to do, and that they are successfully achieving their goals.

Factors in Effective Agricultural Adaptation

Change that takes place without governmental direction or coercive control is worthy of attention. If the Kofyar case of population increase and expansion, agricultural extensification followed by intensification, and significant increase in market production offers salient characteristics that differentiate it from other African situations, they may be as follows.

1. The traditional Kofyar adaptation to dense population in a geographically isolated area was based on intensive homestead agriculture with relatively demanding labor requirements and defined property rights, and this system remained viable through the colonial period into the present. Habits of hard work, individual decision-making, and household economic self-sufficiency continued to be economically rewarding.

2. Indigenous methods of cultivation, technology, and labor organization could be applied effectively to food crops for which there was an economic demand.

3. Adjacent areas of fertile, unused land provided a frontier that could be exploited initially without permanent departure from the homeland, high risk, or large capital investment. Subsistence grains maintained household self-sufficiency in food.

4. Kofyar change emerged from individual trial-and-error experimentation, considerable communication and cooperation among neighbors of the same ethnic group, and freely chosen economic incentives of the market. Individual farmers had various options for settlement, farming system, and labor mobilization.

5. The newly adopted cash crops were also foodstuffs sold within Nigeria. Unlike commodity crops such as cocoa and cotton, they were edible and could be consumed in years of partial crop failure. Purchasing power was never monopolized by a marketing board, and producer prices have continued to be attractive.

6. Governmental and international agency direction (misdirection?) and control of this process were absent. Expensive technology and purchased inputs were not mandatory, and innovations had to be cost-effective. Bureaucratic demands for tax, tribute, or dash, were generally minimal, because the process of agricultural production and distribution took place outside of official awareness.

7. Reintensification and accompanying increased labor arising in a gradual, evolutionary manner from the pressures of internal population (immigration and natural increase) on resources whose potential is understood and from well-articulated desires for the goods and services of a cash economy are seen by Kofyar to be reasonable and profitable rather than coercive and exploitative. The Kofyar are “making it” in part because no one made them do it.

8. The potential for continued intensification of Kofyar agriculture using chemical fertilizers, tree crops, rice, and possibly irrigation exists, and Kofyar individuals may be expected to diversify their nonfarm economic activities.

Notes

1. The Kofyar data are derived from three periods of field research, by Netting in 1960–62 and 1966–67 and by M. Priscilla Stone and Glenn D. Stone in collaboration with Netting in 1984–85. The most recent work was supported by the National Science Foundation (BNS-8318569 and BNS-8308323) and by the
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2. We estimate that average 1984 Kofyar farm size in the surveyed area south of Namu is 5.4 to 5.7 ha and that 79 percent or 4.3 to 4.5 ha are under cultivation, whereas 21 percent are fallow.

3. Mortality declines might be linked to the opening of several busy commercial clinics in Namu Town and to the proliferation of medicine shops selling antimalarial and antibiotic drugs. Roads and motor vehicles make hospitals in Shendam and Jos accessible to the Kofyar. Female fertility may be rising with a decline in post-partum sex prohibitions that appears to be reducing birth spacing from three years to two. There may even be a higher fecundity rate with fewer women suffering from secondary sterility due to venereal disease.

4. For instance the 173 percent increase in the number of adult workers in the multiple monogamous household as opposed to the simple family produces only a 78 percent increase in sorghum production, 64 percent more yam heaps, and an 89 percent growth in average cash income.

5. The official exchange rate in 1984 for Nigerian currency, the naira, was N1 = $1.4. An unofficial or parallel market rate was closer to N1 = $0.40.

6. A limited sample of twelve households covering the year 1984 when rainfall was adequate gave average income from household crop sales at N1,844 ($2,582) plus independent production of women at N1,297 ($1,816) per household or N679 ($951) each. Total income from the sale of crops alone, excluding proceeds from livestock sales, beer brewing, or wage labor, was therefore N4,141 ($5,797) or more than four times the 1983 amount.

7. The Gini index of inequality is derived from a Lorenz curve that plots the cumulative percentage of household income against the cumulative percentage of households. A straight line with a slope of 1 represents perfect equality and the Gini index measures the degree of departure from this state of equality.

References

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