

Sow What You Know: The Struggle for Social Reproduction in Rural Sudan

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Abstract. The unity between production and social reproduction is under constant threat of dissolution. The practices by which it is maintained or threatened are the stuff of everyday life, and can be witnessed on the ground. A key practice of social reproduction is the socialization and education of children. This piece presents detailed findings on various practices of social reproduction—the production, exchange, and deployment of environmental knowledge—and points to the transformative potential inherent in the mundane practices of work, play, and learning. The village of Howa in Sudan has been incorporated within a state-sponsored agricultural development project and the content, mode of acquisition and utility of children's environmental knowledge has thereby changed dramatically. In addressing these, my larger research goal is to locate instances of rupture, resistance, or reformulation in the face of socioeconomic and cultural-ecological change imposed externally. The study employs ethnographic methods to elicit information on the content and organization of children's environmental knowledge and the means of its acquisition and use. Children contribute significantly to all environmental tasks associated with providing or producing household subsistence. In their work, play, and formal learning activities, they acquire, integrate, and use a substantial body of environmental knowledge, including knowledge of agriculture, animal husbandry, and the use of local resources. The socioeconomic processes of differentiation and commoditization associated with inclusion in the agricultural project increased demands for children's labor and began to dissolve the existing unity of work and play, to dislodge the home as the locus of social reproduction, and to deskill the peasant population. Coupled with static land tenure relations, these changes are likely to lead

to significant disjuncture between what children learn and what they will do as adults. The trajectory of economic development may thereby also be altered.

Key Words: children, Sudan, environmental knowledge, social reproduction, household labor, socioeconomic change.

A child is perched precariously atop a donkey laden with a sack of sorghum seeds, a digging stick, and a couple of hoes. She steadies herself and rides surely along the canals as the sun rises. It takes nearly an hour to reach her family's field. She and her brother and sister will spend the morning planting part of their family's farm tenancy in sorghum while their father clears the irrigation ditches nearby. Punctuating their work at irregular—and to their father annoying—intervals, this girl and her brother will set up a homemade net trap in an unsuccessful attempt to ensnare some of the birds that descend on the area during the rainy season. On other days they may succeed in trapping a dozen or more small birds which the boy will kill, following Islamic practice, and the children's mother or older sisters will cook for a family meal. School is out during the rains, mainly to allow teachers to return home from rural areas which become inaccessible and difficult to live in during this time. Partly by design, but mostly by coincidence, this schedule also allows all children, including students, to assist their households with the heavy burdens of agricultural work. As the children make their way to the fields, they cross paths with a number of herdboys leading flocks of small animals out to pastures just turning green with the arrival of the rains.

THE survival of agricultural production systems over time turns, at least in part, on what children learn about the natural environment, and how they use this knowledge and its attendant skills during their childhood and as they come of age. This narrative drawn from a year of geographic field research in rural Sudan suggests both the importance of and variation in children's environmental interac-

tions in an agrarian community. What children learn about the environment and how they use this knowledge in their work and play are fundamental cultural forms and practices, shared in a social matrix and bearing a specific relationship to the prevailing social relations of production and reproduction in the area. Inherent in them are the contradictory possibilities of replication, reformulation, and resistance. While this contradictory relationship is increasingly recognized in social theory, there have been few studies in any field and almost none in geography that examine its possibilities and practices on the ground.¹ This piece invokes one such investigation to argue that the cultural forms and practices of social reproduction, such as those which were its focus—the production, exchange, and use of environmental knowledge—have the potential to disrupt, subvert, and even reconstitute the accumulation of capital and its attendant social relations of production.

In an agriculturally based economy, learning about the environment—about farming, animal husbandry, and the use of local resources—is an aspect of socialization essential to maintaining and reproducing society. Moreover, as is documented amply in the literature on household labor in the Third World (e.g., Cain 1977; Caldwell 1977; Galal el Din 1977a; Mascarenhas 1977; Michaelson 1981; Nag et al. 1978; Rodgers and Standing 1981; Rosensweig 1977; Tienda 1979), children's work often is fundamental to the daily maintenance of their households, and thus the community as a whole. My study approached the question of children's environmental interactions as central not only to the activities of production but as fundamental to the daily reproduction of their households, and their environmental learning and knowledge as crucial to the long-term maintenance of the socioeconomic system itself.

My research on these questions enabled me to examine the entwined processes of socioeconomic transition and cultural-ecological change from a perspective little addressed in the development literature in geography, sociology, anthropology or economics, and to cast new light on the practical response of Third World populations experiencing pronounced shifts in the nature of their articulation with the relations of capitalist production. This study links the human-environment tradition in geogra-

phy, and in particular its concern with how people come to know the environment and act to transform it, with the larger project of cultural studies which seeks to understand the connections between particular aspects of culture, such as art, ideology, consciousness, dreams and fantasies, literature, knowledge, and everyday life, and social and economic structures and practices (e.g., Aronowitz 1973; Bourdieu 1977; de Certeau 1984; Genovese 1972; Gramsci 1971; Johnson 1979; Said 1978; Samuel and Jones 1982; Spivak 1987; Thompson 1963; Williams 1977; Willis 1977). Its central argument is that under circumstances of socioeconomic transformation, what children learn about the environment and how they acquire and use that knowledge can have contradictory effects not only upon the children as they come of age but on the outcome of the social change itself.

The goals of my research were threefold: (1) to discover and document both the activities through which children acquired and used environmental knowledge, and the content and organization of that knowledge; (2) to examine these as cultural forms and practices, that is, in dynamic articulation with the labor process and the social relations that underlie it; and (3) to describe, and if possible analyze, how children's environmental learning, knowledge, and interactions appeared to be changing in relation to the larger social, economic, and environmental changes taking place in rural Sudan.

In recent years geographers have addressed the complex relationships between human agency and the social and economic structures of society. Their work represents an admirable effort to enrich our understanding of the central problematics of human geography—spatial relationships, the making of place and human-environment relations—by articulating rigorous historical analyses of socioeconomic, spatial and political structures, and the means by which people create, transform and respond to them (e.g., Harvey 1989, 1990; Soja 1989; Warf 1988; Gregory and Urry 1985; Pred 1984a, b; Smith 1984; Clark and Dear 1984; Thrift 1983; Christopherson 1983; Watts 1983; Gregory 1982). It is difficult, however, to move analytically between structure and substance, and most studies end up concentrating on socioeconomic and political structures without any real analysis or understanding of the practical activities of the people who create and are constituted by these structures. Alternatively, they focus on

human behavior and consciousness without locating these in a mutually determining socio-spatial and political-economic field. All too often, people are recognized as "making their own history," but this history is rather thin and pale, a narrative of socioeconomic change that points to but glosses over the material social practices of everyday life to focus only on their temporal and spatial outcomes. Equally problematic, the fact is elided that people do not make their own history out of circumstances of their own choosing, and the material social practices of everyday life are presented as if unbounded by any social or economic structures. In this way, history and geography become voluntaristic free-for-alls.

These are political decisions and omissions. Part of the problem is that few of the analyses claiming to address structure and agency empirically are grounded in theory that can analyze or explain the mutual determinations between the two and their material outcomes over time and space. Moreover, few of these studies draw even partially on an ethnographic approach to address the multiplicity of forms and practices that constitute social activity. We are often left with only the traces of human action that are measurable and lose the texts and textures of that action.

Serious consideration of feminist theory and research over the last two decades would improve this work substantially. Although it is not clear from reading geographic work in what has come to be known as the structurationist school, much of the ground linking human agency to social and economic structure was broken by feminist theorists who turned to "everyday life" to find subversive power in the voices that had been systematically excluded from history (e.g., Dalla Costa 1972, 1977; Moraga and Anzaldúa 1981; "Development and The Sexual Division of Labor" 1981; Sargent 1981; Caulfield 1974; Ehrenreich and English 1975; James 1975; Conference of Socialist Economists 1977).² In addition to its influence on the direction of research in social science, feminist theory is at the root of much poststructuralist literary theory which analyzes texts as, *inter alia*, expressions of socioeconomic and political struggle (e.g., Spivak 1987; de Lauretis 1982; Haraway 1984). In broadly defining the "text" and analyzing it against the grain of sociocultural and political-economic structuring, this work, though rarely acknowledged by geographers,

is at the root of the social science project linking agency and structure.

As a geographer, part of my project in Sudan was to address a single place—the village of Howa—at a particular historical moment—ten years after its incorporation in a state-sponsored capitalist agricultural project—as one such "text," constituting at once the ground (literally) for a particular set of material social practices and a repository which expressed in material form the outcomes of these practices. These were understood as mutually constituting. The scale was local, the historical subjects small, but the material social practices associated with their acquisition and use of environmental knowledge are articulated fundamentally with the profound socioeconomic and cultural-ecological changes underway there and in the rest of Sudan. In addressing these, my intent was to analyze theoretically and practically the relationship between the social relations of production and social reproduction under conditions of socioeconomic transformation.

Background

During 1980–81 I conducted a year-long ethnographic study in a farming village I call Howa in central eastern Sudan. My study focused primarily upon the environmental learning, knowledge, and interactions of ten-year-old children addressed in relation to household production and the reproduction of the social relations of production. I chose to undertake this study in an area undergoing profound socioeconomic change in an attempt to locate instances of contestation between the reproduction of what Bernstein (1982, after Marx, 1967, vol. 3) calls the natural economy and the reproduction of capitalist relations of production.³ The latter had been imposed on the area most decisively by incorporation in the government-sponsored Suki Agricultural Development Project in 1971, ten years prior to my study and the year the children who are its focus were born.

Study Site

Howa, a village on the banks of the ephemeral Dinder River east of Sennar in central east-

ern Sudan (Fig. 1), was settled in the late nineteenth century by pastoralists. Until 1971, its people cultivated sorghum on a subsistence basis, supplemented by sesame which they sold to passing traders in order to meet their limited needs for cash. Animals were an important source of subsistence and savings for the population. According to local residents and historical accounts of the area, most families kept at least a few goats and sheep for milk and occasional meat, and many households kept some cattle or camels along with flocks of ten to fifty small animals (Ahmad 1974; Duffield 1981; Gruenbaum 1979; O'Brien 1978; al Tayib 1970; Tothill 1948). Many families maintained close ties with relatives who remained exclusively pastoralist, not only having their herds travel with the pastoralists for part of the year, but renewing and maintaining familial relations by intermarriage.

During the 1950s the village was further integrated with the national cash economy through the private cotton schemes along the Blue Nile approximately fifty kilometers away. Men from the village worked as agricultural wage laborers and a few managed to become tenants in these private pump schemes. These tenants apparently began to accumulate capital when cotton fetched record prices during the 1950s and early 1960s. Apart from involvement in these schemes, most of the population of Howa remained subsistence cultivators until 1971.

That year, Howa was incorporated in the state-sponsored Suki Agricultural Development Project. Not only was the basis of the socioeconomic formation of Howa altered from the subsistence production of food crops to the irrigated cultivation of cotton and groundnuts as cash crops, but more importantly local control over production and reproduction was undermined and the relation between them interrupted (cf. Barnett 1975, 1977; Duffield 1981 for other examples in Sudan). Under the Project, agents of state capitalism—the project authorities—determined not only which crops would be grown by tenants, but also the production schedules and acceptable agricultural tools and practices for their cultivation. The peasant farmers of Howa actively resisted each of these externally imposed changes on their farming practices.

At the root of this disruption in the rhythm of daily and annual work cycles was an altered

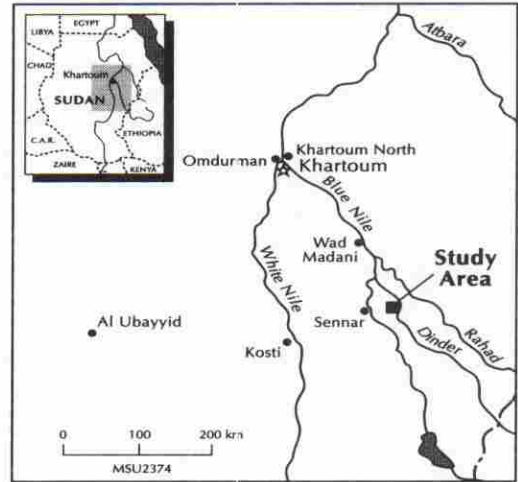


Figure 1. Sudan, showing provincial boundaries, main rivers and location of study site.

relationship between the local population and productive resources, primarily the land. Land in the vicinity of Howa historically had been held in common and allocated through customary right by local sheikhs to villagers for dryland cultivation. The local economy was geared primarily to the production or extraction of use-values, i.e., goods to satisfy its own subsistence needs, from a combination of agriculture, animal husbandry and forestry. Under these socioeconomic conditions, constraints on production were determined more by the physical and economic limits of available labor and other resources than by external political-economic relations such as those associated with the Suki Project. It not only circumscribed the land available for cultivation, but determined who had access to it under what conditions.

It would be erroneous to assume that state intervention and economic penetration by merchant capital are the sole sources of transformation in this or any socioeconomic formation. Indeed, my conceptualization of the problematic was one of active negotiation between social, economic, cultural, political, and ecological relations and practices. This study addresses some of its manifestations on the premise that people are not dupes, but rather are active subjects making their own histories and geographies within and against the deter-

minations of historically and geographically specific structures. In Howa these practices were a nexus of struggle between and among the local population and fractions therein, including agents of state capitalism such as school teachers and Project authorities, and local religious leaders, particularly of mystical and fundamentalist orders of Islam (cf. el Hassan 1980). It is noteworthy that these struggles, which are fundamentally over capitalist hegemony, were carried out between, and even within, real people. They are trivialized if they are constructed as roles *played* out in a structuralist drama that pits the agents of state capitalism against the poor peasants (cf. Thrift 1983, 35).

Many of the changes brought about by inclusion in the agricultural project were welcomed by the local population. For years many had sought increased incomes as agricultural laborers, and when possible, tenants in the private cotton schemes along the Blue Nile. They saw the Suki Project as offering the opportunity for increased income at home. But under the Project the local community lost much autonomous control over production, and it was over these relations that much of the ensuing struggle turned. This shift in the social relations of production and reproduction—what Watts (1987) calls the “multidirectional and episodic” nature of capitalist development—marks the larger context for my study of children’s acquisition and use of local environmental knowledge.

Having outlined the larger context, I refer briefly to some of the specific changes brought about in Howa as a result of incorporation in the Suki Project. First, the Project removed 35,700 hectares (85,000 *feddans*) in the area (1050 hectares in the immediate vicinity of Howa) from a system of mixed land-use combining the dry-land cultivation, animal husbandry, and woodlands. Land was cleared, graded, and irrigated for the intensive cultivation of cotton and groundnuts, virtually eliminating the cultivation of sorghum and other staple food crops in favor of export crops. Most households in Howa became dependent on the market to provide the means of existence. Prior to 1971 most households purchased grain only during extremely dry years, and many farmers noted that in good years, surpluses were saved to offset future shortfalls.⁴ Indeed, by 1980 *matmura*, the underground grain storage mounds which characterize the landscape in much of central

eastern Sudan, had disappeared completely from Howa and its surrounds—vulnerability represented on the landscape.

Second, incorporation in the Project marked a dramatic shift toward capitalist production relations in which peasants become tenant farmers. Fundamental issues such as what crops were cultivated, what tools were used, how family labor was allocated, and the timing of agricultural operations were all sites of struggle in 1981. In Howa production for consumption has been gradually displaced by production geared to exchange and ultimately the accumulation of profit. This transformation, resisted by many, propelled socioeconomic differentiation, exacerbating previously existing differences between households’ earnings and assets as it created new ones. These changes were also inscribed on the landscape as families who were accumulating capital replaced their mud and thatch homes with sturdy brick houses, established general merchandise stores, and acquired market trucks. The most marked effect of the agricultural project was that it altered people’s relationship to land, the primary productive resource in the area, and this, more than the heightening of socioeconomic differentiation, was the focus of their response and resistance.

Finally, the Project altered the local environment fundamentally and had a marked effect on human-land relations in the area. The shift in control of more than 1050 hectares bordering the village from traditional land-use patterns with access determined within the community, to the irrigated cultivation of cash crops carried out as part of a state-sponsored agricultural development effort, has had a pronounced effect on forestry resources, pasture lands, and the practice of alternative methods of agriculture in the area. The preexisting land-use system left adequate fuel and grazing resources in the local environment. The landscape speaks of these changes too. The project area, cultivated in 100 percent rotation, leaves little room for natural vegetation; and the non-project area, already marginal, has been devegetated due to overcutting and overgrazing (Fig. 2).

Methodology

I lived in Howa from late 1980 to late 1981. At the outset I conducted a villagewide house-

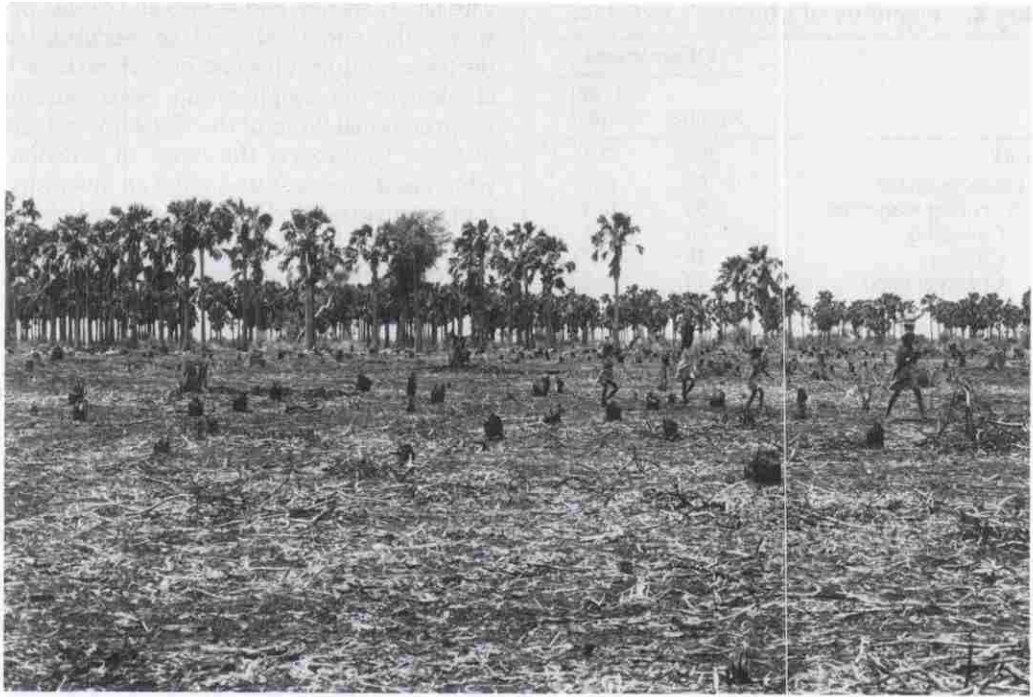


Figure 2. Deforestation in the area surrounding the village. *Acacia arabica* has been replanted by the Government forestry department, but of necessity, villagers and outsiders frequently cut seedlings even in protected areas, published with permission of *Children's Environments Quarterly*.

hold survey both to introduce myself and my work, and to establish a socioeconomic and cultural profile of the study area. The survey included a census, the findings of which were corroborated by an enumeration undertaken independently by the village school teachers at my request. The population profile of Howa as revealed in my census is presented in Table 1. It is noteworthy that more than 52 percent of the population of Howa was under fifteen years old. This figure is similar to the general population profiles of both Sudan and Africa as a whole, and points to the importance of studying children in these settings. I chose to study ten-year-old children because I wanted children from middle childhood, between the "age of reason" (seven years old), and adolescence. Working with children of this age circumvented the effects of developmental delays associated with early childhood and the social psychological changes associated with adolescence.

There were approximately 180 children

roughly ten years of age in Howa. Fifty-six percent were male. (A similar ratio between male and female children was reported in the 1973 population census of Sudan [cf. Sudan, Ministry of National Planning].) I selected a sample of eighteen children, ten boys and eight girls, drawn from a socioeconomic cross-section of village families as derived from the household survey. One girl withdrew from the study within the first months.

A range of ethnographic methods were used

Table 1. Population Profile of Howa

Years of age	Male N (%)	Female N (%)
65 & over	21 (2.2)	16 (1.8)
15-64	432 (45.3)	412 (45.7)
0-14	500 (52.5)	473 (52.5)
Total	953 (100)	901 (100)

Source: Household survey conducted by author, January-March 1981.

Table 2. Inventory of Children's Activities

	Observations	
	Number	Percent of total
Work	390	67.1
Fetching water	89	15.3
Procuring woodfuel	60	10.3
Collecting	26	4.5
Cutting	18	3.1
Charcoal prod.	11	1.9
Charcoal scav.	5	1
Herding	42	7.2
Farming	40	6.9
Errands	38	6.5
Shelling groundnuts	29	5
Gathering plants	20	3.4
Child care	19	3.3
Animal care	11	1.9
Construction	9	1.5
Cooking	8	1.4
Selling water	6	1
Laundry	5	<1
Washing dishes	4	<1
Sweeping	3	<1
Misc. chores	3	<1
Making mat	2	<1
Selling	2	<1
Leisure	192	33.0
Talking/hanging out	51	8.8
Gross motor play	48	8.3
Dramatic/modeling play	19	3.3
Watching adult activities	15	2.3
Walking	15	2.3
Quiet play	9	1.5
Resting	9	1.5
Out of village	7	1.2
Making toys	7	1.2
Bird trapping	6	1
Reading	3	<1
Knocking berries from tree	1	<1
Fishing	1	<1
Fighting	1	<1
Total	581	100

Source: Observations by author 1980-81.

to elicit information on the content and organization of children's environmental knowledge and to discover the means of its acquisition and use. Participant observation was used throughout the study to observe village life in general and children's activities in particular. I undertook three types of observations. The first focused on particular sites within and around the village such as the fields, canal, footbridge between the fields and the village, river, mill, playing field near the school, school, clinic, pri-

vate family spaces, and streets and public open spaces throughout the village. Second, I undertook random observations of each of the children in the sample group. Here, I attempted to cover all times of the day with each child in order to discover the range of activities in which each engaged and build an inventory of molar activities in which ten-year-old children were involved (Table 2). Third, I undertook extended observations of those activities that explicitly involved environmental interaction such as herding, farming, fetching water, procuring fuelwood, gathering food and other resources from the local environment, scavenging charcoal, trapping birds, and watering animals.

Each child participated individually in a child-led walk and an exercise combining environmental modeling and "geo-dramatic" manipulation of miniatures (cf. Hart 1978). These methods were designed to enable children to demonstrate their knowledge of the local environment and practices associated with its use. Use of these methods was intended to complement those means that relied more heavily on the children's verbal expression and thus to compensate for children less facile verbally than others. In the child-led walks, the children were asked to show me whatever they thought it important for me to see in and around Howa. While several of the children began by showing me particular sites within the village such as the well, the mill, the defunct bakery, or a general merchandise shop, all of the children ultimately made their way out of village bounds to show me the local vegetation, as well as particular land forms, such as the riverbed, the canal, a termite mound, or a gully. I structured the walks by asking the children to name what they were showing me and to explain to me whether and how each feature identified was used locally.

In the environmental modeling exercise, the children were asked to model their village in dirt using sticks, straw, thorns, and water as additional materials. A few children responded to this request by sketching tentatively in the dirt—outlining squares for houses and one or two additional features such as the canal, the field, or the river. Other children constructed three-dimensional houses, ridged the fields, dissected them with irrigation canals, and gouged out the river channel to fill it with water. Most of the seventeen children fell between these extremes in their models. At the point when they considered their models com-



Figure 3. Surveying props for environmental modeling/geo-dramatic exercise.

plete, the children were given miniature toys—farm animals, people, trucks and farm vehicles—and asked to use them in their models to “show me life in Howa” (Fig. 3).

The research also drew on ethnosemantic and open-ended interviews conducted with adults and children. The ethnosemantic interview is a linguistic technique designed to elicit the shared knowledge of a particular group in the terms used by that group (Spradley 1979). Taxonomies of shared knowledge are constructed based upon the terms used and the organization revealed by participants in a series of open-ended interviews built one upon the other. These were conducted intensively with five of the children in the sample group who produced taxonomies of their shared knowledge about the local environment, including for example, their plant and botanical knowledge and the specialized place knowledge of herdboys (Katz 1986b, 1989a).

The second type of interview, “oral geography,” was undertaken with both children and elders. “Oral diaries” on their everyday activities were elicited from the children on an ongoing basis to complement my observations. Each time I visited a child in the sample group I asked what they had been doing prior to my arrival and encouraged them to work backwards to

describe their day’s activities. In this way I built up the widest possible picture of the children’s customary activities. Second, in extensive interviews with the parents and grandparents of several of the children, I elicited oral historical geographies to assess the changing world of childhood in Howa, and to learn what environmental curricula and life aspirations elders had for their children. These detailed interviews included questions on their own childhoods, on the differences between them and that of their children and grandchildren, on how Howa had changed during their lifetimes, and on what they were teaching their children about work and other material social practices. The methods used in the research are summarized in Table 3, indicating the time frame in which they were deployed.

This study was primarily ethnographic. I worked intensively with a small number of children and their families with constant reference to the sociocultural and political-economic dynamic of the village as a whole. The children were from households of tenants and nontenants of each socioeconomic status. They themselves were a diverse group—boys and girls, students and nonstudents, of each birth order. This population was selected based on a full enumeration and survey of the entire village.

Table 3. Research Methods

Method	Sample	Schedule	Purpose
Observation (Short, long, film)	17	Through-out	Discover and document environmental interactions
Oral diaries	17	Through-out	Learn about children's activities in general & environmental activities in particular
Child-led walks	17	May-Oct.	Enable children to select, identify and give uses for local environmental features they considered important
Environmental modeling—geo-dramas	17	May-June	Reveal children's knowledge of Howa as a socio-physical environment
Ethnosemantic interviews	5	May-Oct.	Discover content and organization of particular domains of children's environmental knowledge
Adult interviews	9	April-Oct.	Learn about parents' curriculum for children's environmental learning. Provide information on childhood experiences of adults in Howa, their sense of socioeconomic & cultural-ecologic change in the area, & understanding of nature of childhood and responsibilities of children

This, along with the diversity of the methodology I developed, the standards I maintained in working with the children, and comparisons of my results with those of the few existing relevant studies, give me confidence in the validity of the information produced. Nevertheless, it was not my intent to produce findings that could be analyzed statistically with any reliability; the complexity of the information and the small sample size raise questions about even the simplest of statistical analyses. Rather, my agenda was to discover, document, and describe the range of children's environmental interactions and the forms and content of their environmental knowledge in all their complexity; and to analyze these in relation to the larger context in which they occurred.

The experience of living in the area for a year and working closely with the children and their families produced extremely rich data. These data were discovered and grounded in a particular temporal and geographic context which I shared. It is important to remember that in this sort of research, distantiating is impossible (cf. Koptiuch 1985; Probyn 1990). Unlike most positivist approaches to empirical research, ethnographic research does not claim to be objective. Indeed, its essence is that it is not. Its goal, cultural description, is reached in a wholly subjective manner even though a range of scientific methods are employed. This text is the result of my experiences during a particular year in Howa. Not only my research inter-

ests, but my background and personality framed my experience and filtered both what I saw and the way I interpreted it. I do not claim, then, to speak for "the other" (cf. Spivak 1988; Clifford and Marcus 1986; Marcus and Fischer 1986), the children and adults who participated in this study, but only for myself. To claim otherwise would be dishonest intellectually.

Children's Role in Production and Reproduction

Environmental Work

Because Howa is a farming community, virtually all the major activities undertaken to produce or procure either the means of existence or household income involved environmental interaction. As in most such communities in the Third World, children figured prominently in these activities whether undertaken on a subsistence or income-producing basis.

The Tasks of Agriculture and Animal Husbandry. Observations of ten-year-old children in Howa indicated that they contributed importantly to the two main income-producing activities there, agriculture and animal husbandry. In particular, ten-year-old children participated significantly in planting, weeding and harvesting. Within the sample group, three children (18 percent) participated in clearing, six (35 percent) in planting, nine (53 percent)

in weeding, and seven (41 percent) in harvesting on a regular basis. Boys predominated in all of these tasks except harvesting. Moreover, many boys of this age (approximately 20 percent overall) worked daily as herdboys guiding their households' flocks.

Unlike shepherding in which the children's work was autonomous, children's role in agriculture were most often as auxiliaries or assistants to their parents and older siblings. Nevertheless, young children made a substantial contribution to the work of agriculture in Howa. All but one child in the sample group participated in at least one agricultural task during the year. The one child who did not was a female student whose father worked as a clerk in the nearby headquarters of the Agricultural Project. The research indicated that four of the seventeen children (24 percent) were integral to their households' total agricultural labor effort. The others participated at least sometimes in one or more field tasks either in the tenancies of their households or those of their extended families. Seven of the children (41 percent) also worked as paid laborers in the tenancies of other villagers.

The nature of children's agricultural work is revealed in the following excerpt from my fieldnotes, when ten-year-old Ismael helped his teenage uncle weeding a field of groundnuts:

Ismael had a child-sized hoe with which he moved up and down the rows. Straddling the young groundnut plants, he cleared away the unwanted growth. His uncle was more skilled and speedy, but Ismael worked hard and competently at the task. They stopped occasionally to clean the wet clayey soil from the hoe blade. Weeding the row closest to the irrigation ditch Ismael did not recognize some recently sprouted *onkolib* (*Sorghum* spp. *graminae*), but his uncle stopped him from removing it. Ismael explained that he thought it was 'adar (any of several varieties of tall uncultivated grass in the sorghum family, unwanted in cultivated areas). He was good at recognizing other vegetables planted along the borders of the field, including for example, haricot beans, lentils and corn. Now he recognizes *onkolib*.

It took almost an hour and a half to weed about a quarter of a hectare. It was too wet to continue in the rest of the field. Before leaving, Ismael picked his mother a bunch of *mulayta* (*Picridium trigitanum* Desf.), an uncultivated bitter green favored for salads which grew profusely along the canals and irrigation ditches.

The other main income-producing activity in Howa was raising livestock. The primary tasks

of animal husbandry were herding, feeding and watering livestock, cleaning and caring for the animals, and milking. Boys and girls assisted with all of these tasks except milking, which was done largely by women. Herding was almost entirely the responsibility of boys between ten and eighteen years of age. Those who worked as herdboys generally participated in this task at the exclusion of other chores. Unlike agricultural work, herding was undertaken by children on their own, not as auxiliaries or assistants to elders. However, herdboys were briefed and debriefed by their fathers each day about where they led the animals, the conditions of pasture areas and stock, and any unusual circumstances encountered. An excerpt from my fieldnotes provides a more textured account of some of these interactions:

It was time to move on and the four shepherds worked with lightening speed to gather and divide the flocks. This task is a wonderful and totally crazy thing to watch; each boy runs around yelping and whipping goats and sheep in and out of place, flying between the collective flock, each crying out his version of the clicks, gurgles, and squeaking sounds made by shepherds in order to get the animals together and moving in the right direction. The marvelous and amazing thing is how they know their own and one another's animals at this (or any other) pace. When I asked them how they distinguished the animals they responded variously, by their faces, by their colors, by their brands, and because, quite simply, they have known the animals from birth. This rapid-fire round-up of all the animals and their subsequent division into individual flocks requires real team work. The boys race through the task together and coordinate their actions, all the while shouting orders back and forth to catch that stray or push another in the opposite direction. The whole procedure took about half an hour, after which we moved on to another depression nearby.

Three of the boys in the sample group (30 percent of the males) worked full time as herdboys. A fourth boy was a student whose household owned less than ten small animals. He herded on his day off from school each week and shared the task with his adolescent brother during school vacations. When school was in session, their family paid a village herdboy to tend their small flock, as did many smallholders. Apart from these boys, only two other children in the sample, both boys, participated significantly in any of the chores of animal care. One watered his family's donkey. The other watered and fed a donkey that was for his use in fetching water and wood. He also cleaned the corrals,

and each night during the rainy season built a smoky fire to protect the livestock from insects. No girls in the sample group were observed engaged in any of the tasks of animal husbandry, although two girls in the group indicated that they were frequently responsible for leading the few animals kept by their households to and from pastures near the village where they were left to graze on their own.

Fetching Water. Perhaps even more important than their work in agriculture and animal husbandry, children in Howa contributed centrally to a range of subsistence tasks that involved environmental interaction. They played a central role in the provision of domestic water supplies, in collecting or cutting fuelwood for their households and in gathering food and other resources from the local environment.⁵ Howa was an Islamic community in which a moderate form of *purdah*, the seclusion of women, was practiced. Children's work was of heightened significance there because many of the tasks that are the responsibility of women elsewhere in Africa, such as procuring water and wood, generally fall to them (cf. Schildkrout 1981 for an example of how children's work partially enables the continuation of *purdah* in Kano, Nigeria.)

In Howa, the labor of children was most significant in the provision of water for domestic use. Thirteen (77 percent) of the children in the sample population fetched water for their households and extended families at least some of the time. Five of these children were responsible for fetching all or most of the water used in their households. One boy also sold water to village households regularly. Of the five who drew most or all of the water for their households, four were girls. Three of the girls and the sole boy were, significantly, the oldest children in their families. The fourth girl had an older sister close in age with whom she shared most tasks including drawing water. Four children in the sample group were never observed fetching water for their households. All were boys who had older sisters responsible for the tasks.

Of all of the environmental tasks involved in the provision of basic needs in Howa, fetching water was the central one in which the contribution of children outweighed that of adults in gross task completion (the total time spent in the completion of a particular task at the community level).⁶ While the literature on do-

mestic labor in the Third World often mentions in passing the importance of children to the provision of the domestic water supply, it is indicative of the paucity of data on children's labor, particularly within the household or in nonremunerative activities, that few authors discuss, let alone document systematically, the labor of children in such important tasks as drawing water or collecting fuelwood. Thus it is difficult to compare my findings on children's participation in drawing water with those of others working with children elsewhere.

Provision of Fuel. The provision of fuel was another basic needs activity in which children's labor was essential. As with the provision of water, most village children of ten years old participated in this task. In many households children provided the bulk of fuel consumed. Thirteen in the sample group (77 percent) provided fuelwood for their households or extended families. But unlike the supply of water, wood procured by children was often augmented with fuelwood cut or gathered by other household members, or with small amounts of purchased fuel.

The major reasons for children's more auxiliary role in fuel provision were sociocultural, ecological, or task-specific. First, most cooking was done over a hot three-stone fire for which women preferred wood more than a meter long and greater than four centimeters around. The best wood of this type was available only by cutting, and most children of ten years did not wield an axe well enough to provide these large pieces of wood on a consistent basis. This wood was provided largely by men and older boys, although in many households, particularly those in which women were nearing the end or past their child-bearing years, household fuel supplies were cut by women. Second, the deforestation affecting this area had led to significant increases in the distance traveled and time required for fuel collection in Howa. Much of the wood that remained proximate to the village was of poor quality and small size and thus had to be collected with greater frequency than before. According to the local population, journeys to adequate wood supplies had almost doubled since the early 1970s when land was cleared for the Suki Project. These factors of time and distance had led to both the increased participation of children collecting kindling near the village and the need to supplement this with larger pieces cut further afield by older

household members (cf. Katz 1984). Third, even without stress on the local wood supply, the amount of fuel required to cook two or three meals a day coupled with the average load that can be carried by a ten-year-old child (Fig. 4), requires that fuelwood be collected about every three days. Given children's domestic chores such as child-minding, errand-running, cooking, and cleaning; their other responsibilities such as drawing water, farming, and herding; school attendance; and their need and desire for free play time, many children in Howa did not collect wood often enough to provide an adequate supply of even smaller pieces.

As indicated above, thirteen of the seventeen children in the sample group participated in the work of fuel provision. Eight (five girls and three boys) provided about half of the wood consumed in their households. The other five children participated in these activities less extensively, two collected wood and the other three collected or helped produce charcoal for sale in nearby towns. In each case, their work made a meaningful contribution to their households. The four children who did not participate at all in the activities of fuel provision were all boys. Three were herdboys and the fourth was a student. Significantly, each of them and the three children whose only work in this domain was assisting with charcoal production had an older sister responsible for the provision of a major portion of their households' fuel supply.

Gathering Food. The final set of environmental tasks concerned with the provision of the means of existence is the collection of seasonal food and other resources. Most often it was children's responsibility and joy to collect these for their families. Almost all of these foods were found outside the village, in scenic or otherwise valued places, and hunting or gathering them was as much fun as it was work. Most of the wild foods around Howa were no longer available in sufficient quantity for them to have value except to children, and their collection was largely for the children's own enjoyment. However, certain of these foods were seasonal delicacies savored by all.

Ten of the children in the sample population were observed or told me of procuring wild foods during the field period. Most of these children provided seasonal fruits and vegetables for their households and extended families in quantities sufficient to be a major compo-



Figure 4. Representative size of a headload of firewood carried by girls.

nent of or complement to family meals. Most prominent was the collection of the fruit and branches of the *doleib* palm (*Borassus aethiopicum*). Of the seven children who engaged in this activity, three (all boys) collected the fruit both for household consumption and to sell for a few cents apiece back in the village. Two of the girls collected *doleib* branches which they burned in the palm grove. The ash was used to thicken stews. Three other children regularly gathered wild greens from around the cultivated areas. An excerpt from my fieldnotes on a trip to the grove of *doleib* palms with two girls in the sample group, Su'ad and Awatif, and ten other girls, breathes life into the unfolding of these environmental practices across time and space:

After an hour's walk from the village, we arrived at the *doleib* grove. The girls immediately ran in all directions looking for and collecting the choicest fruit from the seemingly limitless number strewn

about the area. After devouring several fruits apiece, the girls began to produce *wekab* (a starchy ash) for their mothers. The younger girls continued to collect and eat the fruit, while the others collected armloads of fallen branches. *Su'ad* piled branches high in a small clearing and rapidly set fire to them, running from the hot flames. The girls fooled around on the side, singing and eating more fruit as the branches burned. They fetched water from the riverbed nearby to douse the embers. Using long branches with fan-like fronds as rakes, the girls swept the embers outwards and sprinkled them with the water. Each girl swept her damp ashes into a bucket. They repeated the entire process, which took about two hours, to make more ash. When they were done, they loaded their containers with the heavy ash and a few fruits, lifted these to their heads, and set off for the village in the hot midday sun.

Other wild foods were procured by ten-year-old children in Howa, but either because of present environmental conditions or the children's young age, their procurement did not add systematically to family nutrition. These activities, such as knocking berries from trees, were more play than work, undertaken solely to satisfy the children's interests and appetites. One activity that straddled the line between play and work was trapping. Three of the children, two boys and a girl, assisted older brothers or other male relatives in trapping several varieties of small birds that descended upon the area during the rainy season. While these bite-sized birds were consumed most often within the extended family, upwards of a hundred birds might be trapped in a good day. Ever the entrepreneurs, boys tried to sell surplus birds within the village for a few cents each. Only one of the boys in the sample group participated in trapping at this level. The other two, like most in Howa, approached trapping as a sport more than as a practice of any economic significance.

Analysis of Data on Children's Work. The data on children's environmental work are analyzed according to the individual demographic characteristics of sex, age, birth order, and school enrollment; and the socioeconomic variables of father's occupation and household socioeconomic status as determined in the village-wide survey. My research suggested that children's participation in work that was subsistence oriented, such as fetching water or collecting wood, was influenced more readily by individual demographic characteristics such as gender, birth order, and age; while partici-

pation in activities related to the accumulation of wealth or undertaken for exchange, such as charcoal production, animal husbandry, or agricultural field work, was determined to a greater degree by socioeconomic factors such as household status or father's occupation. Given the small sample size, this finding, while illuminating as a way of conceptualizing children's responsibilities and use of time, should be treated as a hypothesis to be tested in future research with a larger population.

As the discussion above indicated, all of the children in the sample group participated in the work of their households and, at a more general level, the work of the village as well. The average child in the sample group spent at least two but less than four hours daily the year round engaged in environmental tasks, or participated in environmental work four or more hours daily during certain times of the year. Of the five major categories of environmental work—agriculture, animal husbandry, water drawing, fuel procurement, and food gathering—children in the sample group participated at least sometimes in an average of 3.3 task categories. Their participation was essential to their households in an average of 1.1 of these.

Reference to the adult working day and the broader range of tasks in which young and old engaged in Howa helps to put these figures in perspective. In Howa the average adult worked eight hours a day during most of the year, but it would be wrong to conclude that the average child worked less than half the time the average adult did. The figures presented here on children's labor cover only the environmentally oriented tasks in which children engaged. Excluded were other time-consuming tasks in which most children participated, including child-care, food preparation and processing, cleaning, washing, and running errands. Were they included in the analysis, the average time worked by ten-year-old children easily would have exceeded half the hours worked each day by adults.

There were significant differences between boys and girls in the amount of time spent working at environmental tasks. Because of their role in the time-consuming task of shepherding, boys were overrepresented among those working more than four hours a day all year long. Girls, on the other hand, tended to work steadily (two to four hours daily the year-round or four or more hours seasonally) at a range of

environmental activities. While because of herding, boys were found to work more hours at environmental tasks than girls, the data suggested that girls participated in a greater range of tasks and made a contribution of greater significance overall (i.e., contributed centrally to a greater number of tasks critical to household maintenance or exchange) than their male counterparts. In other words, while only boys participated in herding, a particularly time-consuming task, girls played a greater role in the daily round of activities by which the means of existence were secured and household reproduction was ensured. Girls' role in the provision of fuel and water stands out. Moreover, if we consider the full range of domestic tasks, i.e., not just those involving environmental interaction, the importance of girls' labor would be highlighted even further. Indeed, if these additional activities were considered, girls might be found to work more time than boys as well. The nature and implications of these gender divisions in children's labor remain an important question for future research.

In much of the literature on the economic value of children in agricultural economies the assumption is that boys do more work and are, therefore, more of an economic asset than their sisters (e.g., Cain 1977; Tienda 1979; Galal el Din 1977a, b). My findings on the gender differences in children's total work contribution in Howa raise questions about the findings characteristic of much of the work in this field and the assumptions that underpin it. My research, which clearly revealed the significance of girls' labor, suggests that in analyzing children's economic value, it is important to consider all forms of children's work, *both* productive and reproductive, in order to better assess the real economic significance of children. Nag, White and Peet's seminal study of children's economic activities in Java and Nepal took this broader perspective and found that in almost all age groups, girls did more work than boys (1978, 296). Like the work of Nag and his colleagues, my results contrast sharply with those of studies which look mainly at the remunerated work of children (e.g., Peek 1978; Tienda 1979; Cain and Mozumder 1981; Morice 1981). In addressing only rates of labor force participation, these authors fail to recognize the full importance of children's economic significance, and in particular, the contribution of girls.

While there were variations in children's par-

ticipation in environmental work at the household level, for the village as a whole the contribution of children was meaningful to the accomplishment of every category of environmental work. Children's work participation with reference to the temporal nature of the work itself and the village economy as its larger context is shown in Table 4. It summarizes the range and intensity of children's work in Howa, making clear its importance to the reproduction of the household as well as to the village economy as a whole.

The distinction between work undertaken independently and work done as an auxiliary or an assistant is also noted in Table 4. The distinction indicates a variation in children's vocational and environmental learning experiences. For the most part, children operated independently in tasks which they not only had mastered, but in which their contribution was central. Children assisted their elders, from adolescent siblings and cousins to parents, grandparents, relatives, and employers, in tasks which required either greater physical ability than that of the average ten-year-old or a coordination of discrete operations too complex and/or important to be entrusted to young children alone. Cutting fuelwood and clearing fields are activities representative of the former; producing charcoal and sowing fields are representative of the latter.

Finally, Table 4 indicates the temporal nature of children's environmental tasks to show their role both in children's daily lives and in the work calendar of the village as a whole. A task like shelling groundnuts, for example, was participated in intensively by a majority of children, but only for a short period in the weeks just before planting. Herding, by contrast, was undertaken by a minority of children who worked all day almost every day of the year. Herding thus consumed more child-hours per year than certain tasks engaged in by many more children.

Environmental Knowledge

Given that most of the work of production and reproduction in Howa centered on manipulating the local environment, the tasks of children generally required the use of environmental knowledge of various degrees of complexity and sophistication. Not surprisingly

Table 4. Summary of Children's Participation in Environmental Work in a Village in Rural Sudan

Activity	Percent participating at least sometimes	Gender	Nature of children's contribution	Proportion of total effort undertaken by children ^a	Temporal nature of work	Importance of task in village economy ^b
N = 17						
Agriculture						
Shell groundnuts (Seed preparation)	65	F/M	Independent	4	Seasonal	1
Clear	18	M	Auxiliary	1	Seasonal	1
Plant	41	M/F	Assistant	3	Seasonal	1
Weed	47	M/F	Auxiliary	2	Seasonal	1
Pick vegetables	24	F/M	Auxiliary	2	Seasonal	2
Pick cotton/groundnuts	29	F/M	Auxiliary	2	Seasonal	1
Bird scaring	18	M/F	Independent	4	Seasonal	2
Animal husbandry						
Feed/water	18	M	Auxiliary	1	Regular	2
Animal care	18	M	Auxiliary	1	Regular	2
Milk	6	M	Auxiliary	1	Regular	2
Shepherd	24	M	Independent	4	Regular	2
Water provision						
Well	65	F/M	Independent	3	Regular	1
Riverbed	35	F/M	Independent	3	Occasional	1
Canal	18	M/F	Independent	3	Occasional	1
Fuel provision						
Collect fuelwood	53	F/M	Independent	3	Regular	1
Cut fuelwood	12	M	Auxiliary	1	Regular	1
Charcoal manufacture	12	M/F	Assistant	1	Seasonal	2
Scavenge charcoal	24	F/M	Independent	3	Seasonal	3
Retrieve flotsam	12	M	Independent	3	Seasonal	3
Food procurement						
Trap birds	12	M/F	Assistant	1	Seasonal	3
Pick vegetables	24	F/M	Independent	4	Seasonal	2
Pick/gather fruit	35	F/M	Independent	4	Seasonal	2.5

^a Approximation based on my observations: 1, $\leq 1/4$ total effort expended on task; 2, $> 1/4 \leq 1/2$ total effort expended on task; 3, $> 1/2 \leq 3/4$ total effort expended on task; 4, $> 3/4$ total effort expended on task.

^b Importance to household maintenance and reproduction is subsumed under this head: 1, Central significance; 2, Medium significance; 3, Incidental significance.

Source: Author (1986b).

then, as is often the case in such settings, learning about the environment was an important component of children's upbringing in Howa (cf., Middleton 1970; Modiano 1973; Raum 1940; Ruddle and Chesterfield 1977; Wisner 1970). Their environmental knowledge was both practical and abstract, acquired and used largely in the course of their work and play. Direct instruction by older children or adults was often an integral part of the process of children's work. My research presented clear evidence that these activities of work, play, and learning were relatively unified in the lives of children

in Howa during 1981. Indeed, in the literature on children's learning in settings characterized by similar socioeconomic conditions, the integrity between instruction and practice is referred to repeatedly (e.g., Ruddle and Chesterfield 1977; Raum 1940; Modiano 1973). So too is the easy back and forth between work and play in the course of children's learning (cf. Raum 1940).

Environmental Learning. The major themes developed in the literature on children's learning in nonindustrialized economies were borne out by my study as well. First, children learned

about the environment and its use largely in the context of their participation in the work and other everyday practices of their community as these took place in their customary settings (cf., Fortes 1938; LeVine and LeVine 1963; Mead 1928, 1930; Modiano 1973; Raum 1938, 1940; Ruddle and Chesterfield 1977; Wisner 1970). Second, children's work was often fused with play in time, space, and meaning (cf., Ammar 1966; Fortes 1938; Lancy 1975; Middleton 1970; Modiano 1970; Raum 1940; Ruddle and Chesterfield 1977; Spindler 1974; Whiting and Whiting 1975). Finally, children's play itself was often a creative means for the acquisition, use, and consolidation of environmental knowledge (cf., Fortes 1938; Modiano 1973; Raum 1940; Wisner 1970). These findings were illustrated in the narrative that introduced this piece. When a child assists her family with planting sorghum and then runs off with her brother to trap birds, she is both working and playing, and in this case both activities have environmental content. These three themes are developed in the discussion below.

In Howa, herding was a skill acquired on the job. Interviews and observations revealed that in the main, the knowledge associated with it was passed on herdboy to herdboy in the everyday course of leading the animals. Novice shepherds were guided by more experienced boys in such tasks as strategies for choosing a grazing area, the evaluation of particular plants as grazing resources and hazards, and the local ecology of these and other resources such as water, sources of food, and special places where herding could be combined with particular play activities. To some extent, new herders were also given direct instruction by their fathers and other older male relatives. This exchange of knowledge took place as new herdboys were accompanied to pasture by one of their relatives in their first weeks of herding. In these instances they were instructed in such relevant matters as plant identification, the social and environmental hazards to which animals were exposed, and specific attributes of the local terrain. This body of knowledge was not necessarily shared in the course of herding, but rather in forays around the village for other purposes and in discussions at home. In Howa the knowledge of shepherds was reinforced by the questions and admonishments of their fathers in the course of almost daily debriefings on where they had led the animals, what had been grazed

upon, when the animals were watered, and what unusual circumstances had been encountered. Finally, the special and extensive body of knowledge shared by herdboys also was acquired and reinforced in their play. They knew and with obvious delight shared riddles and songs that incorporated the names and attributes of local flora and fauna, for example. This brief discussion of herding illustrates the integrated fashion in which children's environmental learning took place in the course of work, play, and direct instruction.

Similar discoveries have been made by others who have worked with children in rural settings of the Third World. Working with Chaga people in what is now Tanzania, Otto Raum found that boys began herding on their own at about seven years of age, but were responsible only for small animals and were relieved by their fathers by midday. At these younger ages, boys acquired most of the relevant knowledge in the course of their participation in herding. By twelve years old, however, they were taught more systematically to identify fodder plants and to discern those plants that caused animal problems (Raum 1940, 198). Raum noted, as did I, that herdboys were also well versed in the legal and economic matters relevant to animal husbandry. In contrast to Howa, Chaga girls participated in these activities as well. From as early as four or five years of age, Chaga girls accompanied their mothers to cut fodder grasses and by ten years old were responsible for making dairy products. The population of Guara in the Orinoco Delta of Venezuela studied by Ruddle and Chesterfield (1977) seemed to be significantly less involved in raising livestock than that of Howa or the Chaga community studied by Raum. As a result, although the children of Guara did work as herders, they appeared to have had less experience with some of the more specialized aspects of animal husbandry which were common in the other communities. The specialized knowledge characteristic of herdboys in Howa was not found by Ruddle and Chesterfield in Guara, despite their noting the same easy familiarity with farm animals that I observed among children in Sudan.

Other instances in which children's work and play were intertwined were revealed in Howa. These offered grounded opportunities both to acquire and use environmental knowledge. For example, several children in Howa played an elaborate sociodramatic modeling game called



Figure 5. Playing "fields." Versions of this game included playing out the activities of both subsistence cultivation and the agricultural project.

"fields" in which they undertook in miniature the full range of activities associated with agriculture from seed preparation to harvest, storage, and marketing (Fig. 5). For some children this was a chance to reinforce what they had learned during work and other expeditions to the fields, and to experiment on a more manageable scale with coordinating work activities in which they participated piecemeal as assistants or apprentices in a larger family enterprise. For other children, the game of "fields" was an introduction by slightly older friends to the agricultural practices of their community. In a similar vein, children who assisted their fathers with the production of charcoal occasionally constructed miniature charcoal kilns in which a small amount of usable fuel was produced. Adults in Howa as elsewhere recognized that in these and myriad other play activities, children learned, practiced, and reinforced environmental knowledge and skills essential to production and reproduction. (See

Katz 1986a for an extended discussion of the relationship between children's environmental work and play.)

Content of Environmental Knowledge. The content and organization of children's knowledge about the environment was central to my project in Howa. All instances in which environmental knowledge was revealed were recorded, and the content of that knowledge was carefully documented (Katz 1986b). For example, in days spent with children working in their households' fields, I observed and documented what skills the children had mastered in order to accomplish their tasks, and what knowledge was called into play in order to carry out these activities. In repeating this process with all of the children engaged in each environmental practice, I constructed a picture of the collective knowledge of ten-year-old children concerning the use and manipulation of the local environment. These were documented on film as well (cf. LaPore and Katz 1983). (A more detailed discussion of children's knowledge of agriculture is presented in Katz 1986a, their botanical knowledge in Katz 1989a.)

The knowledge revealed in this manner was rooted in practice. Nothing of the ways in which the children organized it could be inferred from observation. In order to elicit the content and organization of their shared knowledge as a cultural form separate from its deployment in practice, I conducted a series of ethnosemantic interviews with five of the children. These interviews were focused on constructing taxonomies of particular aspects of the children's environmental knowledge. All five developed detailed taxonomies of their plant knowledge (Katz 1989a), and one, a shepherd, also produced a detailed taxonomy of places in and around Howa. The focus of the latter, which we mapped crudely, was his knowledge of the location and attributes of particular places for grazing. He identified fifty-seven discrete pasture areas in the vicinity of Howa (Fig. 6.)

The children shared an extensive and detailed knowledge of the environment and its use by the local population. The ethnosemantic interviews also enabled them to reveal the ways that this knowledge was organized. Not surprisingly, the children's categories were inconsistent with those of Western botanical scientists. The ways in which they differed reveal, at least in part, the children's practical connection

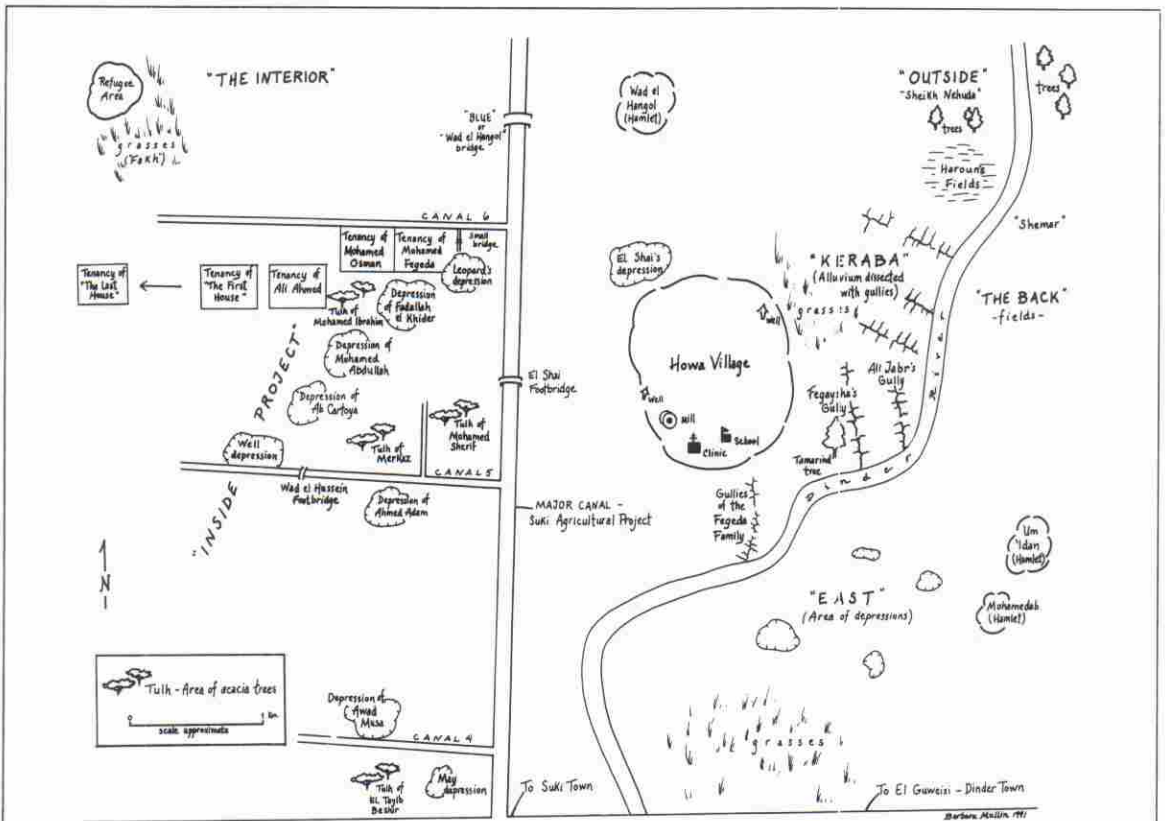


Figure 6. Shepherd's map of pasture areas near Howa, constructed by a shepherd and the author during course of ethnosemantic interview.

with the plant environment. For example, categories based on innate characteristics of plants broke down around the inclusion of cultivated varieties. For some children these appeared to form a category unto themselves. That is, the children frequently marked three discrete categories of trees, vines, and other soft-stemmed plants along with a parallel category of cultivated plants, even though the attributes they defined for the latter were consistent with those they presented for the other three categories. For example, the children might give the attributes of cucumbers and recognize that each of these matched the characteristics by which they had defined vines, but still not place cucumbers in that more generic plant domain. These children made a separate category of cultivated plants.

The Changing Roles of Children during Socioeconomic and Cultural-Ecological Transformation

The general hypothesis that guided this work from the outset was that a change in the production system, such as was caused by incorporation in the Suki Agricultural Project, would alter the settings and activities for reproducing that production system. My interest in this question was rooted in the perspective that these settings and activities were not simply the outcome of economic factors, but rather were themselves constructed by the material social practices of living historical subjects. My goal was to examine the articulation between the

two, for in it lie the multitudinous possibilities of reproduction, reaction, resistance, and reformulation. The household, the peer group, and the school or other sites of formal training were the settings of particular concern, and children's work, play, and formal learning were the activities of particular interest. Following Marx (1967), reproduction was understood as physical—encompassing both biological reproduction and the appropriation and/or production of means of subsistence adequate to ensure the daily maintenance of the population, and sociocultural—reproducing the conditions of life and labor in which the skills and knowledge associated with social production figure prominently. My research addressed children's roles in production and the provision of the means of existence, and their acquisition of the knowledge and skills necessary to maintain the system of production and reproduction over time. These were examined as lived experiences and contested practices.

Although there is a generally recursive nature to these material social practices addressed analytically in the literature on everyday life (e.g., Lefebvre 1984), these practices and their relationships to the social relations of production and reproduction are always everywhere in flux. Everyday life is significant as a critical concept, not as a descriptive notion for the mundane and unspectacular practices by which we construct ourselves and reproduce society, but because inherent in these is the potential for rupture, breakdown, and transformation (cf. Kaplan and Ross 1987; Katz 1989b). At particular historical junctures, the potential for these is heightened. The altered relations of production imposed by inclusion in the Suki Agricultural Project created such a moment in Howa. The acquisition, deployment, content, and organization of children's environmental knowledge were addressed to examine the means by which the social formation of Howa was being reproduced and to locate discontinuities in these cultural forms and practices.

By the time of my research in 1981, the Suki Agricultural Development Project, established in 1971, had already had a significant effect in transforming not only the social relations of production and reproduction in Howa, but the local ecology as well. These transformations had led to conditions which altered, among other things, the nature of children's interactions with

the environment as well as the means and content of their environmental learning. My initial hypothesis was that as a result of the socioeconomic changes underway, more children would attend school and thus participate less in the work of their households. By extension, I thought that the decline in children's work would begin to erode the traditional relationship between work and play, and in turn, the experience of the two as means of environmental learning. While a year of field research did not allow sufficient time to analyze definitely how these activities were changing either in themselves or in relation to one another, analysis of the sample population of children and return trips to Howa in 1983 and 1984 made clear that this hypothesis was off the mark.

One of the contradictory effects of incorporation in the agricultural project was that rather than increasing school enrolment and children's play time as I had hypothesized originally, it appeared that the changes wrought by inclusion in the Project demanded more labor from children. According to teachers in the village school, enrolment had not increased in the years since Howa was included in the Suki Project. Moreover, it was their impression, although they did not keep figures, that a greater proportion of children in the village primary school left before completion than had done so prior to inclusion in the Project. The reasons for this were threefold: (1) the higher labor demands associated with the irrigated cultivation of cotton and groundnuts compared with the rainfed cultivation of sorghum and sesame; (2) the environmental changes brought about by the irrigation project; and (3) the increased need for cash engendered by incorporation in the agricultural development project and the global cash economy which it represented. These are discussed in turn.

In interviews concerning the changes taking place in Howa, adults frequently indicated that the demands of cultivating cotton and groundnuts as cash crops exceed those associated with the rainfed cultivation of sorghum and sesame that had prevailed before 1971. In addition to the labor demands of irrigation and the use of imported fertilizers, pesticides, and herbicides, Project authorities required four weeding of each crop with a short-handled hoe that was more difficult and tiresome to use than the customary long-handled or very short-handled variety.⁷ In most households, these labor de-

mands were met with the increased use of family labor, especially children. Many tenant households, particularly those of lower socioeconomic status, reported that children were kept from school enrolment or forced to withdraw after a couple of years because they were needed to help with the full range of agricultural tasks, many of which took place during the school year. Some studies that address children's contribution to household labor suggest that when children are needed for labor-intensive agricultural or other tasks, they are kept home from school (e.g., Landy 1959; Tienda 1979). My experience suggest that when this was the case for specific seasonal tasks, households managed without the inputs of their children. But when children's labor was important to a range of tasks such as agriculture, or for an essential year-round activity such as herding, either they were never enrolled or they left school prematurely.

Another reason that children's work in Howa appeared to have increased was the deforestation that had resulted from the shifts in land-use associated with the irrigation project. The traditional system of mixed land-use, combining subsistence dryland agriculture and the raising of small animals, left wooded areas adequate to meet local needs. With the establishment of the Project in 1970-71, the amount of woodland in the vicinity of the village was severely curtailed. By 1981 there were few trees apart from ornamentals within a half-hour's walk from the settlement, and most of the remaining trees within an hour's walk were less than five centimeters in diameter. Adults in the village noted that this situation had increased the time required to procure adequate household fuel supplies. In Howa, where many aspects of fuel provision were the responsibility of children, these changes led to substantial increases in children's work time. Not only did they have to go further afield to collect or cut fuelwood, but the poor quality and small size of most of what was available increased the number of trips per week necessary to provide sufficient wood for domestic consumption.

Finally, children's environmental and other work had increased because of the larger economic changes associated with the introduction of the agricultural project. Not only did the Project bring about enormous changes in the relations of production in Howa, but it heightened the integration of the village into

the national cash economy. With the establishment of the Project, access to many goods that had been commonly held or freely available was restricted, for example, wood products. The issue of forestry resources again provides an example of particular relevance to the question of children's labor. As wood products became more difficult to procure, some wealthier households began to purchase them rather than increase the demands on children or other household members. Members of poorer households in the village, including children, began to provide wood for sale. In this way a freely held good gradually becomes a commodity. As more freely held goods become commodities, the need for cash increases. By 1981 this process was well underway, compounded by an explosion in the number of merchants and traders in the village since 1971. Their presence introduced an increasingly wide array of consumer goods to the village.

Commodification is tied to socioeconomic differentiation. In Howa, the ascendance of the cash economy led to increases in children's work, because in many households they were needed to earn money to help meet the growing needs for cash. Twelve of the seventeen children in the sample group earned cash that helped provide household subsistence. The twinned processes of commoditization and differentiation particularly affected two resources that children were significant in procuring: wood and water. When marginalized families sought new means to earn cash, it often fell to children to fetch water or cut wood for sale. Ten-year-old children also helped to produce and scavenge charcoal for sale in nearby towns, harvested vegetables from family garden plots and hawked these in the village, and worked as hired help in the tenancies of other village households. In these ways, the increased need for cash, created by the agricultural project and fanned by the exigencies of the monetized economy of which it was a part, increased the work of children in Howa.

These shifts in children's work had consequences for the relationship between work and play, and the nature of these as means for the acquisition and use of environmental knowledge (cf. Katz 1986a, b), as well as for school attendance. The gains in school enrollment I expected may have been limited, at least in part, by the increased demand for children's labor in Howa. In 1981, 42 percent of the boys

and 4 percent of the girls seven to twelve years old were enrolled in the village school. During 1979 in the largely rural Blue Nile Province as a whole, 53 percent of the boys and 25 percent of the girls between these ages were enrolled in primary school (Sudan, Ministry of Education and Guidance 1981). Whatever the cause, the implications of low school enrolment are serious both for the children as they come of age and for the socioeconomic formation of Sudan as a whole.

My research indicated that most ten-year-old children in Howa were learning the knowledge, skills, and values necessary to reproduce the social relations and practices of production that characterized their community in 1981. In their work and play, children learned the environmental knowledge and practices associated with maintaining a farming community. But for a combination of reasons, it was apparent that relatively few of those ten years old in 1981 would have access to a farm tenancy when they come of age in the 1990s. Displacement of the farming population results from three interrelated phenomena: (1) the static land tenure relationships associated with the agricultural project—with 250 tenancies allocated to the village in 1970, there were from the outset fewer tenancies than the number of households (335 by 1981); (2) the size of the average household in Howa—with the fixed number of tenancies, and an average household size of 5.7, most children do not stand to inherit access to their family's tenancy; and (3) the frequent proximity in age between children and their parents, i.e., the parents of many ten-year-old children were still in their twenties or early thirties and thus unlikely to turn over their tenancies until well after their children reached adulthood. In the absence of further agricultural development (and none was planned for the area) much of what children played and worked at during their childhoods will not exist for them in the world of their adulthood. This eventuality points to a serious disjuncture in the course of social reproduction which could lead to profound shifts in the children's lives as they reach adulthood.

The outcomes differ for boys and girls. My research suggests that while most of the boys were learning to be farmers, they will not be. Rather they will be marginalized as agricultural wage laborers or forced to seek nonagricultural

work in the Project headquarters nearby, in regional towns, or in urban centers further away. By contrast, girls were being socialized largely to assume their mothers' social and work roles. While women's roles were likely to be stable for a longer period than men's, it appeared likely that as men increasingly migrate from the area in search of labor, women would assume a large role in agricultural production. While girls participated extensively in agricultural tasks such as planting and harvesting, unlike boys they were not taught to organize the full range of agricultural operations, had little practical experience in some of these, including clearing and weeding, and had not mastered the use of most tools. Moreover, their participation in all agricultural tasks except harvesting tapered off as they reached puberty. When these girls come of age, they are likely to need knowledge they will not have acquired fully in their childhoods.

This discontinuity between childhood learning and adult opportunities is part of a process that, in effect, results in the wholesale deskilling and marginalization of rural populations such as those in the area of Howa. Given the general lack of formal schooling which might offer the chance for "reskilling," there was little likelihood of most children finding employment in their adulthoods except at the lowest skill requirements. These discontinuities were not the same for all children. The dramatic differences in the rates of school enrollment between girls and boys in Howa (4 percent and 42 percent respectively), suggest that girls will be even less capable than boys of undertaking nonfarm or nondomestic work. Just as girls lacked experience with the full range of agricultural tasks and were not instructed in their overall organization, many boys in Howa did not have the opportunity to acquire particular agricultural skills and knowledge because their households lacked land in the agricultural project. Children from nontenant households lost much of the opportunity shared by tenants' children to acquire and use agricultural knowledge in the course of their everyday lives. Thus, certain children, by virtue of their parents' socioeconomic or occupational status, will be less skilled in agriculture than many of their contemporaries, and possibly at a disadvantage in obtaining and holding positions as agricultural wage laborers. Under prevailing socioeconomic conditions, these were among the only viable jobs

available. In this way, the process of socioeconomic differentiation engenders further differentiation. My research revealed some of the mechanisms of this process in children's experience.

For the socioeconomic formation of Howa, the intertwined processes of deskilling and differentiation may lead in the short-run to declines in rural productivity and, in the long-run, to an adult population unable or unwilling to carry out the tasks of production associated with the Suki Project. Rural productivity may decline as the changing relations of production and the ensuing redefinition of vocational skill dislocate the household as the center of production and reproduction (cf. Dalla Costa 1977). These dual dislocations have resulted historically in the depopulation of the household, first as waged work is found outside of the home and ultimately as children leave in growing numbers to attend school. As a result, less labor is available to the rural household to maintain previous levels of agricultural productivity. The process of labor migration was just beginning in Howa in 1981.

Finally, the increases in children's work in Howa had begun to alter the traditional relationship between work and play, the balance between the two as means for the acquisition and use of environmental knowledge. This process appeared likely to continue whether the work responsibilities of the children continued to increase or greater numbers began to attend school. When play and work are separated, play becomes trivialized as "childish" activity in the eyes of adults. Severed from work, play remains a central means by which children are socialized in terms of both mastering particular kinds of knowledge or skills and internalizing cultural values and other principles. However important its socializing role may be, play divorced from work is less grounded in the general experience of the community as a whole and thus comes to be viewed as inconsequential. When play becomes isolated and trivialized as an activity *only* for children or as something adults do *only* in their time off from work, the peer group becomes less integral to the larger society because it is no longer a social setting in which work and play are united. This represents the loss of an important aspect of autonomous traditional culture and is thus a means by which capitalism "colonizes" experience.

Conclusion

This study has examined some of the ways that capitalism is articulated on the landscape of everyday life. Its central logic, the accumulation of capital, at once engenders and is achieved in the colonization of experience and the transformation of time, space, place, and nature. In Howa it was possible to witness these entwined processes taking place. My research on the practices of social reproduction, and in particular children's learning, their use of knowledge, and the organization and content of their knowledge concerning the environment, was spurred, in part, by the desire to find spaces that won't be colonized or to locate instances of experiential decolonization, glimmers of oppositional practice. These ends and those of the children are connected. Engaged myself in the production of knowledge that opposes received notions about the relationship between production and reproduction, I have written this piece at once to point to the subversive power that inheres in the everyday practices by which knowledge is produced, deployed, and exchanged, and to reformulate or subvert that knowledge in a way that recognizes the oppositional potential of these very practices of social reproduction.

What I have shown—that children shared a rich and intricate knowledge of a resource use complex under erasure; that their autonomous practices of work and play were being transformed and sundered as unified means for the acquisition and use of particular kinds of knowledge; and that in the wake of capitalism's local impress, children were not being prepared for the world they are likely to face as adults—does not occasion optimism about the potential for opposition. But in examining the acquisition and use of local knowledge as practices of social reproduction in articulation with the political-economic relationships that at once structure and are structured by them, this piece not only has demonstrated the breadth and intensity of children's environmental interactions, but, in constituting these within the critical construction of everyday life, has pointed to their contradictory potential to alter the trajectory of socioeconomic change.

Most of the evidence presented indicates signs of rupture in the means by which children

acquired and used environmental knowledge, and breakdown in the relationship between production and social reproduction. These disjunctures appeared to serve the advance of capitalism in Howa. The transformation of the local production system and its attendant processes of socioeconomic differentiation, environmental degradation, commoditization, and deskilling, are emblematic of the erosion of the countryside as a viable arena of noncapitalist relations of production and reproduction. Capitalist hegemony is neither achieved nor maintained without struggle, and the community as a whole was responding to the changes imposed upon them in a range of ways. The state regulation of production practices, for example, was successfully limited by the tenants' union when they gained the right to grow sorghum on Project land. The shifting contents of what constitutes adequate socialization for adulthood was recognized by the villagers, and met in the mid-1980s with a village self-help project to construct a girls' school. While the extension of formal schooling may further capitalist hegemony in the area, inherent in the nature of education is the possibility that it may not, but in fact, may enable a population to become conscious of their position in the larger society and resist such changes actively rather than reactively (Freire 1970). These are but two examples of the local response to the socioeconomic and structural changes imposed in Howa since 1970. The great vitality and variation I discovered in the children's work, play, and learning and the contradictions that inhere in them as material social practices of production and reproduction, suggest another possible arena by which these changes might be opposed, resisted, or subverted. In order for this to be accomplished, children and their elders would have to consciously appropriate and link to political struggle the strength inherent in the production and exchange of knowledge, returning it to their own interests—to steady themselves and ride surely along the canals as the sun rises.

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Notes

1. Notable exceptions include Willis (1977) in sociology, Taussig (1980) and Scott (1985) in anthropology, and Johnson (1977) in geography.
2. The literature on everyday life associated with the French social theorist Henri Lefebvre (1984) is germane here as well. In recent years it has been getting increasing attention in North American geography and social science in general. In geography it has been drawn on largely by those interested in the articulation between social and spatial relations (e.g., Soja 1989; Harvey 1989), rather than in the reproduction of particular human-environment relations. Its crucial insight is its construction of everyday life as a critical concept, that is, one in which the possibilities of its own transformation are immanent to the very practices of reproduction that constitute it (cf. Kaplan and Ross 1987). However, this formulation, with the associated literature, is one that I came upon after completing the present project. In tracing my path to it, feminist theory has been most influential and offers emancipatory insights that geographers interested in social change frequently ignore.
3. According to Marx, the natural economy is based in agriculture complemented by domestic handicraft and manufacturing. Its central characteristic is that "a very insignificant portion" of the product enters into the process of circulation (1967, Vol. 3, pp. 786-87). In other words, "the conditions of the economy are either wholly or for the overwhelming part produced by the economy itself, directly replaced and reproduced out of its gross product" (p. 795). The abstraction natural economy describes a particular relationship to the production of the means of existence and the relative lack of surplus and thus circulation. It should not invoke notions of classlessness; indeed, socioeconomic differentiation is often a characteristic of so-called natural economies. I follow Bernstein (1982) in using Marx's category of natural economy as an abstraction to suggest a social formation in which the production of use-values predominates, although there is an exchange of surpluses at a basic level. This is an apt characterization of the socioeconomic formation of Howa prior to 1971. Since my purpose is an analysis of the relationship between production and reproduction as material social practices in Howa, and not one of the historical transformation of the village as a socioeconomic system, an abstraction such as natural economy is useful as a means to locate the village theoretically.
4. During the initial decade of the Project, when, for the first time, most households in the village were forced to purchase the bulk of sorghum they consumed, the price for this staple increased by a

devastating 2000 percent! In 1981 the tenants union succeeded in their struggle with the Ministry of Agriculture and won the right to cultivate sorghum once again. This activity was restricted, however, to one-half of the 2.1 hectares available to each tenant for groundnut cultivation. With groundnuts by far more lucrative than cotton—the gains from which accrued to the agricultural project and not the individual tenant—this change traded food security for a substantial reduction in potential income for those electing to grow sorghum.

5. Children were also significant in a range of other tasks important to household maintenance, e.g., cooking, child care and cleaning, but my focus on environmental interaction precluded addressing these activities systematically.
6. Because systematic labor budgets were not undertaken as a part of field research with children or adults, all time data are my own best estimates based on extensive observation and checked in comparison with time budgets undertaken in similar socioeconomic and ecological settings. Thus, when comparing children's labor contribution with that of adults, it is best to think of it in terms of general units of participation rather than minutes or other precise measurements of time (Table 4).
7. This information was provided in the course of open-ended interviews I conducted with nine couples, eight of whom were parents of children participating in the research. The remaining couple were the grandparents of two children in the sample population. More significantly, a similar perspective was revealed in the open-ended discussions I had with adults in most village households while I was completing the village-wide census at the start of my project. Also, it was reinforced consistently during the informal discussions with a range of adults in Howa throughout the study period.

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