Periodic High Risk as a Cause of Fertility Decline in a Changing Rural Environment: Survival Strategies in the 1980–1983 South Indian Drought*

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In the attempt to explain persistent high fertility in much of the Third World, attention has been drawn both to current returns from child labor and to the mitigation or avoidance of future risks. The latter can be subdivided into meeting emergencies while the parental generation is still of working age and providing for old age or even safeguarding the transmission of family property on parental death. The problems of old age have recently received most attention, and they may well be of paramount importance in many societies.[1]

Yet, in a research program that we have conducted in rural south India since 1979, the reasons given for demographic behavior have more frequently emphasized the need to plan strategies to meet periodic crisis than to ensure old-age support.[2] Nevertheless, one should not underemphasize the latter merely because the problem is predictable and the solutions understood. In the study area, for the great majority of the aged, the support system still worked well.[3] In contrast, in our investigations of marriage, fertility control, and education, we repeatedly discovered that a fundamental consideration with regard to parental decisions in these areas was to strengthen the ability of the family to withstand periodic crises.[4] By far the most important type of crisis in this dry, drought-prone area was recurrent famines resulting

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from crop failure during 1 or a succession of years with abnormally low rainfall.

There is no other way of studying the efficiency of such defenses except during drought-induced famine. Such a study has value not only for testing the success of the traditional strategies in mitigating disaster but in examining why new strategies—made possible by changing occupational and educational opportunities—were being increasingly employed. Indeed, we already had some evidence that these social and economic changes might completely reverse the strategies for obtaining the same end and that, far from reinforcing the supports for high fertility, they might undermine those supports.

The examination of defensive measures taken during drought provides not only the opportunity to test the soundness of demographic and other strategies adopted earlier but also to identify the supplementary behavioral changes taking place in the course of the crises and the demographic sequelae of the measures employed.

Mead Cain compared risk and fertility in India and Bangladesh in a paper published in 1981.[5] The Indian data were from three villages in the Maharashtra–Andhra Pradesh border country, and attention was paid to retrospective information on the experience of the 1970–73 drought, especially during its climactic final year. Cain categorized the various possible sources of crisis support in the absence of institutional forms of insurance and well-functioning capital markets. He also raised the question of the impact of household composition, especially as determined by the life cycle. This question was first addressed by A. V. Chayanov in terms of the Russian peasantry and has since been investigated in the case of hunting and gathering and shifting cultivation societies by Marshall Sahlins.[6] Recently, Susan Greenhalgh has analyzed the situation among families in a rapidly developing Asian economy, Taiwan, and has concluded that, even there, the life-cycle stage is an important determinant of relative economic well-being.[7]

Cain decided that risk insurance was more effective in rural India than in Bangladesh, as judged particularly by distress land sales, and also that the childless and those with only very young children did not suffer greater privations than others during the Indian drought. He concluded that high fertility was probably not the most rewarding strategy in the Indian situation because of the life-cycle pressure when most of the children were young and because the investment in future sons for the defense of the family property was not a critical consideration in the relatively secure conditions of the Indian countryside.

Jodha had argued in 1978 that periodic drought crises and the resulting sale of assets, especially farm animals, together with subsequent slow restocking rates, meant that agriculture in India is usually undercapitalized and that farmers are reluctant at all times to invest too much in their farms.[8]

There was, then, a need to explore the whole matter further during a crisis. Was Cain correct in identifying two aspects of the family, life-cycle problems and the declining need for physical protection, as sufficient discouragement to very high fertility? Was the only effect of increasing risk insurance a reduction in the optimum family size or did it play a more complex and dynamic role in promoting fertility reduction? Were the undercapitalized farms slowing down fertility decline since such decline was likely to be most rapid when economic development was fastest? How did their findings fit in with ours that one of the major concerns of the rural population was its deep suspicion of the periodic nature of rural incomes and that the commonest reaction was not to improve farming or storage so as to attempt to make returns more constant but to invest effort and money in securing the best marriages for daughters, preferably into nonfarming families?[9]

We found ourselves in a situation where we could test some of these conclusions and explore risk mitigation further in an Indian rural locality 400 miles to the south of the villages on which Cain reported. Since 1979, we had been working on a collaborative project studying the nature of demographic change in a complex of nine villages in Karnataka, about 80 miles west of Bangalore.[10] From 1980, each monsoon was progressively poorer, culminating in an almost complete failure of the 1982 rains, which should have occurred in the second half of the year. As a result, most farmers harvested no crops at all at the end of 1982 or during most of 1983, and crisis conditions had been reached by mid-1983, when the special study reported here was undertaken. Adequate rains did come in late 1983 but did not affect the food supply before the November harvest of that year began.

The Study Area

The nine study villages are found in the rain shadow to the east of the west coast mountains, the Western Ghats, and they annually average only about 25 inches of rain. Given the evaporation at 13 degrees north latitude, even at an altitude of 3,000 feet, this results in a semiarid agricultural economy. The region has been plagued by periodic droughts, and their inevitability has helped to shape the society and its economy. The area is dominated by rocky hills, typical of the higher part of the southern Deccan plateau. There are no large streams and 95% of the agricultural area is devoted to the dryland cultivation of ragi (Indian finger millet) for human consumption and red jowar (sorghum), which is largely for animal fodder. Sorghum, in the form of white jowar, is a staple food where it can be grown further north in Karnataka, but in the survey area only the very poor eat any of the locally grown red jowar during normal times. About 5% of the land is irrigable from "tanks," reservoirs formed by throwing earthen walls across small streams. This land can grow rice and sugar, which are important

cash crops, although the rich also eat some of the rice. Some supplementary irrigation is undertaken with tube wells equipped with electric or motor pumps, and there is also land with an above-average water table suited to coconut groves. Even though land reform has had some impact in Karnataka, the landlord class has managed to retain nearly all the irrigated land and most of the coconut areas while surrendering ragi-growing and poor hill pasture lands. One-quarter of families neither own nor lease land, but, as many of these are involved in business, crafts, or other nonagricultural activities, the true level of landlessness among agriculturally oriented families is under 10%. Nevertheless, one-quarter of all farming families own less than 1¼ acres and one-half own less than 2½ acres, mostly dry land; 10% own more than 7 acres and 5% own more than 10 acres, in both cases with a significant proportion of irrigable and coconut land. Coconut land sells for at least twice the price of dry land, and irrigable land for at least five times as much. Two salient points can be made about the agricultural system: the average size of a landholding is about half what it was at the beginning of the century because of population growth; also, the Green Revolution has had little impact, farming methods being generally similar to the situation a generation ago.

An ancient and moderately large tank explains the existence of the largest village of 2,500 residents, which, alone among the villages, is on a good and trafficable road. This village is where the largest landlords live, almost entirely Brahmins and Jains, and hence also most of the Harijans, who work as laborers for them. The largest village has become a service center, as the weekly market has been supplemented by small shops—which are mostly owned by Muslims, who are the commercial class of south India—and, because the government has made it a center for bureaucrats, the health service and schools. There are also small businesses owned by artisans and a rice and a sugar mill built by Jain landlords. Now, half the adult male labor force works outside agriculture. In contrast, the eight smaller villages, with another 2,500 people, are mostly close to being single-caste villages; the majority are Vokkaliga, the predominant peasant caste, and over 90% of adult males are either farmers or agricultural laborers.

In the whole area, the Vokkaligas make up one-third of the population, and the Muslims one-fifth. The most powerful groups, the Brahmins and the Jains, constitute 5% and 3%, respectively, of the population, while another economically powerful peasant caste, the Lingayats, form 6%. In contrast, Harijans make up 8%; other backward castes, 12%; and service or artisan castes, 10%. There is a close association between position in the caste hierarchy and education and wealth. Approximately 45% of the population over 5 years of age has some schooling, whereas two-thirds of all boys and half of all girls now enroll in school for at least some time. Elementary schools have been

provided only very recently in the smaller villages, but there has been one in the larger village for 60 years, with the consequence of a steep differential in adult education between the two areas of residence.

Increasingly, farming households are seeking to insulate themselves from the seasonality of the agricultural cycle and its proneness to periodic disaster. Three-fifths of all families now have at least one member working outside the area, usually in Bangalore city or in the rich irrigated area 60 miles to the south around Mandya on the Cauvery River. In fact, the effort to achieve this situation lies at the heart of the family educational and demographic strategies.[11] Half the farming families have at least one locally resident member earning some income outside agriculture, if only working as a part-time contract road laborer, assisting a truck driver, or selling in the weekly markets that rotate around the district.

The 1983 Drought Study

The 1983 study was carried out at the appropriate time to detect support mechanisms under maximum strain. After 2 dry years had reduced food stocks and savings, if any, from crop sales and coolie employment,[12] the monsoonal rains, which should have begun in June 1982, had been an almost complete failure. The farmers continued to postpone the planting of the staple ragi crop, hoping until it was too late that adequate rains would begin, and ultimately very few planted at all. The state government ruled that the water level in the only big tank, which is near the largest village, was dangerously low, and accordingly the normal December annual release of water to allow rice to be grown on the downstream irrigated land did not take place. Because this low-lying irrigable land retains some moisture from the previous year and receives some seepage through the tank wall, some of the landlords who own the area successfully planted a substitute ragi crop there. The whole district was seized by a crisis outlook, and the outsider was repeatedly assured that times had never been as bad.

The study was carried out in June and July 1983, while it was still too early to be certain that the rains would be adequate to end the drought and 5 months before any relief could be expected from the ragi harvest even if the rains were to continue. The work consisted of both a detailed survey and in-depth discussions with families previously well known from the continuing study. The survey aimed at sampling 50% of households in each village, but, because of dislocations and movements arising from the crises, as well as our focus on households that we had previously known and for which we had continuing information, full data are available and are reported here for only 45% of households or 387, of which 194 were in the largest village and 193 in the eight smaller villages.[13]

During the 6 months preceding the survey, 21% of households had

secured incomes solely from nonfarming activities (36% in the largest village and 6% in the smaller villages), whereas 32% had no other source of income apart from their own land (17% in the largest village and 48% in the smaller villages). These figures exclude loans and crisis help from relatives, which is examined below. The much greater resistance of this remote rural community to drought, as the old repeatedly told us, than had been the case 40 or 50 years ago, was based more than any other factor on this diversification of income. Such diversification is increasingly possible because of the growth of the economy and the accompanying development of a monetized exchange system, with subsistence production playing an ever smaller role. In rural India this process has been abetted by governments since independence, progressively increasing the bureaucracy and services in rural areas. Thus, even during the downturn in the local economy during the crisis, one-fifth of families were employed outside agriculture, and a further 47% had some employment outside their own land—36% if coolie labor on others' land is excluded. If this nonfarming and nonagricultural coolie labor is analyzed, it is found that 44% is in commerce (both the tiny shops, which are appearing in the villages, and the trading of products from or to different places), 24% in jobs that require no education (road laboring, stone quarrying, *beedi* [cigarette] manufacture, traditional crafts), 18% in positions for which education is required (bank clerk, hospital orderly), and 14% in positions where employers would probably give preference to the educated (factory hands where literacy is often an advantage). The farming population is extremely conscious of the need to secure this diversification, and it is the major reason for the increasing number of children being enrolled in school.[14] In turn, the costs of keeping children at school explain the largest demand for family-planning services.[15] The need for this education does not emerge forcefully from the figures quoted above for off-farm employment for at least three reasons. First, some of the employment sought for the educated involves migration to Bangalore and elsewhere. Second, some of the parental ambition is sheer optimism that vastly exaggerates the chance of securing a government position. Third, when aiming at local employment, some parental decisions are shrewder than may appear from the gross figures above because many jobs are created and filled by older, powerful, illiterate persons, while the young are competing for only a fraction of the employment market where, in a greater proportion, education is an advantage in securing the position. What is clear is that the diminishing size of landholdings alone is no measure of increasing risk during famines; in fact, the old believe that, in the past, moderately larger farms provided little extra security once all the crops failed.

To provide a baseline for the study of the impact of the drought, we assisted the householders to assess the predrought food situation:

72% obtained at least some of their food from land they owned or leased, and a further 9% were paid part of their coolie wages in food. Of those with land, one-quarter normally met all their needs for staple foods (grain, pulses, milk, and meat, if eaten) and one-half met two-thirds or more. In a normal June/July, half the farmers would have in store at least 600 kilograms (1,350 pounds) of grains and pulses (calculated on the basis of 60-kilogram bags). Of those farmers who, at this time in a normal year, would still have food in store, nearly half had completely exhausted their stocks in 1983 and only one in 25 families had sufficient food stored to last at their usual level of consumption until the next harvest.

The Impact of the Drought on Life and Welfare

The single most important reason for investigating the impact of the drought and the mechanisms that reduced the risk to life was our knowledge that even disasters of this kind resulted in only some of the demographic reactions that had been the normal experience in the past. Mortality did not rise but remained at a level corresponding to an expectation of life at birth around 50 years and an infant mortality rate probably below 120 per thousand live births.[16] On the other hand, few marriages took place, and we anticipate that the 1984 birthrate will be considerably lower than the 32 per thousand recorded before the drought.

In spite of the absence of a Malthusian impact from the drought, every respondent agreed that it was a period of acute community crisis, although 7% of households, mostly salaried professionals and larger businessmen selling essential commodities or those with prices that rose during drought, reported that their way of life was little affected.

Among the farmers, almost three-quarters reported that they would harvest no crop at all, and not a single one claimed that there would not be a major decline in his production. One striking aspect of the drought was the visible change from largely robust cattle and other animals, at least by Indian standards, to much thinner beasts. Only 70% of those with land had any animals (although the remainder were mostly those with very small plots), and, of these, all reported problems: over one-third, mostly the richer farmers, were actually buying grass or other fodder, while nearly all reported great trouble in pasturing animals or finding grass to cut for their feed. Only 2% reported that animals had died and 1% that some were probably already beyond recovery, although a further 7% said that they had sold their stock to prevent this situation.

Nearly three-fifths of all farmers said that they were working less than usual, the remainder reporting that they were keeping to normal schedules either because of the search for animal fodder (although this was largely done by children, some of whom were working unpre-

cedentedly long hours cutting and fetching grass from distant hills or bush country for cattle or even tree leaves for goats and sheep) or because of utilizing the period for additional manuring and field preparation beyond what was normally possible. The latter was partly an insurance that, if the rains were good, there would be an above-average harvest to replenish food stocks. Among those families of Harijans, poorer Vokkaligas, and others accustomed to working only by selling their own labor, nearly all reported a substantial reduction in their total employment, whereas 12% reported no employment for family members and 8% that this would have been the situation but for government relief work.

There was a surprising acceptance of the inevitability of such bad times and less bitterness than might have been expected. Perhaps the major reason for this was the explanation for the cause of the crisis. Of all households, 14% explained the drought tautologically as the lack of rain (as people in any society might); 32% said that they did not know or that it was not proper for people like themselves to venture an opinion on such cosmic events; 43% were convinced that the gods were chastising the population;[17] 12% proffered a scientific or naturalistic explanation. The religious explanations rarely took the form of a lack of religious observations, but nearly all asserted that the gods disapproved of changes in behavior. Those changes cited were the move toward individualism, selfishness, corruption, and other aspects of the transition from an older form of communal life based on family authority, a firm social structure, and subsistence farming—in fact, the move toward a capitalistic society and market economy, which we suggest was the main reason that the impact of the drought was mitigated. A few attested that the offending behavior was family planning or sterilization.

The scientific explanation was dominated by the belief that persistent low rainfall was an outcome of the reduction in tree cover, an interpretation of a widely promulgated government informational program and a message taught in almost every school. It was frequently stressed that rain continued to fall on the *malnad* (the wet Western Ghats) because the tree cover remained there. The religious explanation was given by half of all illiterates, declining with increased schooling and reaching zero among those with tertiary education. Education dominated religious or caste determination; only one-eighth of Brahmins or Jains provided such answers, compared with nearly half of the Harijan or peasant castes. The religious response was higher than could have been predicted from educational levels only among the Muslims, who are tending more than Hindus to resist secularization, and the service or artisan castes, such as washermen, barbers, or blacksmiths, whose duties also embrace religious ritual roles as among the first two castes, or who need divine help in their activities as among

the last. The provision of a religious explanation by a family did not mean a lack of effort to ensure a better support system in a future drought.

Although drought is identified with water shortage, this was true for most people in this drought only with regard to the irrigation of crops. In recent years, the Karnataka government has extended the provision of tube wells to most villages, and, even though some are usually in disrepair, these plus wells and ponds meant that nine-tenths of all households experienced no greater difficulty than usual in securing sufficient supplies for domestic use. Where it had to be sought from an unusually distant source, the burden fell mostly on women and girls: entirely on females in four-fifths of the households, on males in one-tenth, and with at least some male help in another tenth. However, clothes and house floors became dirtier in some villages.

The true measure of the drought was hunger. In 35% of households (as assessed by families and checked as far as possible by the study team), there was by mid-1983 real hunger and the proportion was rising. It was general knowledge that the worst affected were those who had no income outside farming, largely the landless agricultural laborers or the smaller farmers, especially those where no member worked in a nonagricultural job or no son was so employed elsewhere. Thus, the hungry constituted 30% of the population of the largest village but 40% of those of the smaller hamlets almost entirely devoted to farming. Among the hungry there were no large landlords, only 20% of those engaged in commerce (even with miserably small stores), 40% of small farmers, 60% of agricultural laborers, and 44% of illiterates (compared with 33% who had been to primary school and 23% of those with secondary schooling). There were some thought-provoking findings in the demographic sphere. There was no trend in hunger by household size or by total number of children born or surviving. However, the proportion of hungry households did increase with the number of young children (under age 12) in the household at the time: from 31% with no children or where all were older, to 33% with one to three dependent children and 39% with four or more. These differences were not the product of different parental characteristics, there being little in the way of differentials in fertility or family-planning practice.[18] The Indian drought provides support for Chayanov's analysis of the impact of the life cycle; families tend to be economically relatively deprived when they have a disproportionate number of young children in the household but to improve their position as the children grow older. However, there was no difference in the situation of families practicing family planning (sterilization in almost 90% of cases) and those not doing so—a situation pointed out by a significant number of those sterilized.

Only 8% of families believed that the hunger was the cause of

serious illness in their households, and this is in keeping with the mortality evidence. Most of what was reported was consonant with famine symptoms although also found readily enough in normal times: stomach pains, diarrhea, fever, and some intensification of anemia in three-quarters of all cases. The balance largely consisted of pain and swelling in the joints, put down by most sufferers to eating coarser grains, usually sorghum. When inquiries were made from male household heads as to who bore the greatest brunt of the food shortage, 43% reported that all shared equally in the cutbacks; 35% that adults had taken the greater part of the ordeal on themselves (although none said "men"); and 22% that it was mostly borne by women, children, and the old. The investigators reported that women appeared to suffer to a considerably greater extent than these reports suggested, partly because, as they ate last, no one actually knew what they ate.[19] Many of them felt that the family fortunes during the crisis depended on the adult men retaining their strength.[20] A truer picture of the situation might be provided by a breakdown of those afflicted by sickness attributed to insufficient food: 60% of families reporting such illness listed only women, children, and the old; 23% only adults; and 17% a broad distribution by age and sex.

A special investigation was made of the 15 old people in the sample who were either living alone or as a couple. There were five couples and five single-person households, the latter being two males and three females. These three women were all widows, two of whom were Harijans. Except for the widows, these residential arrangements were largely with the agreement of those involved, and relatives living close by provided adequate support systems. Two of the five couples and the single male still owned land. Only the two Harijan widows reported being hungry (i.e., 20% of households or well below the community average), and neither of them associated this with any increase in ill health.

The Avoidance of Disaster

How, then, was wholesale disaster averted in a largely dry-farming rural area experiencing a series of dry years culminating in the almost complete failure of the harvest? Why were the majority of families not even really hungry, and why was there no significant rise in mortality even among those who were? We explored the latter in depth with the 365 of the 387 households who were cooperative and who were prepared to be analytical. The major strategies (including multiple responses) are given in table 1. That table does not include a numerical response for eating less than usual because this was universal, dictated by both care and rising prices. Equally important, the majority of households usually get some money or other help from family members working elsewhere; most felt that this assistance increased during the

TABLE 1

CHIEF DISASTER-AVOIDANCE STRATEGIES IN 1983 DROUGHT (% of Households)

General Type	Specific Action	All Villages (N = 365)	Large Villages (N = 182)	Small Villages (N = 183)
Reducing consumption	Eating less food: all levels	Nearly all	Nearly all	Nearly all
	Eating less food: to point of hunger	35	31	40
	Changing type of food eaten	9	5	13
	Spending less on festivals	18	18	18
	Spending less on clothing	15	11	18
	Postponing marriages	7	6	8
	Spending less on entertaining and visiting	3	3	3
	Removing children from school	1	0	2
Selling possessions	Animals	6	1	10
	Valuables	2	3	1
	Land	1	2	1
Employment	Changing rural employment	3	3	3
	Changing to nonrural employment	3	4	2
	Working on natural resources	1	1	0
	Some family members migrating	2	1	3
Exchange transactions	Securing loans	13	9	16
	Food from members of their community	1	2	0

drought, sometimes in response to frantic appeals for help, but few felt they could exactly distinguish the situation from other years and we were far from satisfied about the accuracy of attempts to do so.

The important point in interpreting the table is that these are the major strategies. This can be understood when it is realized that very few households indeed made no change at all in the type of food that they were eating, but only 9% regarded this as making a major contribution to their survival. Similarly, over twice the proportion shown believed that they would have arranged at least one more marriage but for the drought, but half this number were not completely sure or regarded such delay as not being particularly serious. Half the families secured a loan of some type, but most families regarded such action as marginal compared with the belt-tightening that had to take place.

The important point is that most families still regard their ability to weather droughts as being based on savage cutbacks to their living standards, dominated by reducing food to the minimum. The rich families moved from three to two meals a day, and many ordinary families from two to one. The rich gave up most milk and ghee (clarified butter) and ate more ragi and less rice. The poor moved increasingly from ragi to jowar (normally animal food) and attributed a good deal of physical distress to this change. Most of the jowar being eaten was not the animal food but white jowar, which was being brought into the district for sale through the fair price stores run by the panchayat or local council. By mid-1983 almost half of all households were eating some jowar. The nonvegetarians no longer had meat once a week but once every several months (although Harijans may have underreported eating dead animals).

The next largest saving, which filled many with deep guilt, was that on festivals, clothing, and entertaining and visiting. These categories cannot really be separated because much entertaining and visiting parallels religious festivals, new clothes are bought if festivals are to be celebrated, and those in rags are reluctant to attend. Even the postponement of marriage is largely similar.

The sale of valuables, mostly jewelry, or land is a desperate measure. Only 3% of landowning households sold any land at all, and the proportion was higher in the large village, where the blocks sold were not regarded as ancestral possessions. In no case was the land sold to relatives because, although this was the preferred sale, relatives were usually of much the same socioeconomic status and in equal difficulties. Animals were another question, not because there was much less anguish with regard to their sale, but because the cost of fodder was beginning to prove prohibitive or because there was a fear that the animals would die. One-quarter of all families with animals sold at least some, and, while land was sold almost without exception to fellow villagers, most animals sold went outside the village and even the district.

Employment changes were complex. Small farmers who rarely worked for anyone but themselves took on coolie labor when they could find it, usually with neighboring landlords but sometimes with government relief schemes. Sometimes they displaced agricultural laborers who sought nonagricultural employment, such as on road construction, in increasing numbers. Some farmers established small shops, and these grew in number throughout most of the drought period, although in the later stages their numbers began to fall as money available for purchases declined significantly. Heads of households, or adult sons, increasingly looked for employment outside the district.

Demographic and Social Aspects of the Drought

The drought did little to change trends in either mortality or acceptance of family planning, the first stable, and the latter gradually rising from the low point following the end of the 1975–77 emergency.[21] Some of the rise in sterilizations after 1980 can be attributed to the greater importance of the monetary "incentives" in hard times. It did, however, have a dramatic impact on marriages, and this will doubtless be reflected in a more subdued fashion in the birthrate. Because many anticipated marriages fail to take place when expected even in normal times,[22] it is impossible to calculate what proportion of marriages were postponed during 1983. Of all households, 15.5% claimed to have put off a marriage, and a reasonable estimate for the whole area might be that the marriage level was around one-quarter of what might otherwise have occurred.

Marriage postponement was not directly associated with poverty or the extent of suffering from the drought and hence was not a method of risk aversion equally open to all. It was greatest among those sections of society that paid the highest dowries and spent most lavishly on weddings—the landlord and peasant classes—reaching 20% among the Vokkaligas who canceled nearly all marriages.[23] It was little more than half that level among the Harijans and backward castes, many of whom do not as yet pay any dowry, and among the Muslims. In normal times, lavish marriages are related to landownership, and, during the drought, deferment rose regularly with the extent of land owned from around 10% among landless agricultural laborers, to 15% among those with less than 4 acres of land, to 30% among those with over 10 acres (slightly exaggerated because of increasing household size with land, although that increase is not steep in this area).[24] Some of the lower castes hastened their daughters' marriages to get them off their hands. For every family that said that raising the dowry was the main problem, two said that they could not afford the cost of the wedding celebrations.

The drought had no significant effect on accelerating or retarding household division, although there was a temptation to claim division in order to become eligible for separate bank loans. Nor was school

attendance much affected, at least in the aggregate: a few had to leave school to be placed in bonded employment to places like hotels (small businesses selling drinks of tea and coffee and sometimes food), but others stayed on because there was little demand for their labor.

The Economic Impact

The self-assessment of the impact of the drought on the family necessarily is affected by conventional living standards, but this has definite advantages when estimating felt needs, and the assessments seemed in most cases to be accurate. These assessments are presented in table 2.

Those families providing a range of self-assessments from

TABLE 2

PERCENTAGE OF FAMILIES ASSESSING THEIR CONDITIONS AS RESULT OF DROUGHT AS FAIR OR BETTER THAN FAIR, MID-1983

Characteristic	%
Residence:	
All villages	42
Large villages	55
Small villages	21
Caste:	
Brahmins and Jains	65
Muslims	60
Artisans	53
Peasant castes	33
Backward castes	30
Harijans	30
Occupation:	
Professional and managerial	78
Landowner	71
Merchant	61
Nonagricultural laborer	43
Farmer	30
Agricultural laborer	11
Source of income:	
Nonagricultural	58
Mixed agricultural and nonagricultural	45
Agricultural	27
Land acreage (farmers):	
≥ 10 acres	50
4–9.9 acres	32
2–3.9 acres	36
< 2 acres	37
No. of children in household:	
< 4	43
4–5	42
≥ 6	35
Family planning (wife of reproductive age):	
Practicing	51
Not practicing	35

"managing reasonably well" to "not greatly affected" numbered 42% of the total. The major determinant of this response is clearly not usual living standard but the extent to which livelihoods are nonagricultural in origin. Thus, the large village did much better than the small farming hamlets. The peasant castes, many of whom owned considerable areas of land, felt almost as distressed as the agricultural laborers, and far more so than Muslim merchants or the artisan and service castes with their little businesses increasingly concentrated in the large village. In fact, the size of the farm made little difference until very large areas were achieved. The critical difference is found between rural families, whether farmers or agricultural laborers, with incomes solely from rural activities and those who have managed to diversify by having one or more family members working full- or part-time outside agriculture. In good times, there may be a net flow of assistance from farms to family members in the towns, especially in the form of food from the family land on which all family members have a claim. By mid-1982 the flow was solely an urban-rural one. The boom-bust cycle is far more accentuated in farming than even in the nonagricultural occupations of little rural villages that would seem to be so dependent on agricultural prosperity. The relative well-being of nonagricultural laborers arises from the fact that a considerable part of the funding for their work is governmental and does not originate in the district; some of it took the form of higher allocations because of the drought. The number of children in the household does not appear to have any considerable impact until they are quite numerous. On the other hand, family-planning practice appears to help, although the major mechanism appeared to be the greater amount of assistance that the sterilized received from other relatives than did the nonsterilized. The major explanation appears to be a greater apprehension of child illness or death, arising from an acute awareness that dead children can no longer be replaced. This anxiety leads to a greater persistence in pressing relatives for assistance.

The Support System

Nearly half of all families had taken loans during the drought, and most felt that they had been a considerable factor in maintaining minimum living conditions. There was a small number who reported that they would have been forced to postpone a marriage but for the loan. Many of the loans from banks or cooperatives were sought on grounds that differed from their intended use (e.g., agricultural improvements instead of dowry). Table 3 presents an analysis of those who obtained one or more loans during the drought.

The securing of loans in times of crisis is a mixed measure: partly of need and partly of the ability to find a lender. This is well displayed in the distribution by caste, where there is a very clear inverted U-

TABLE 3

FAMILIES SECURING LOANS DURING THE DROUGHT

Characteristic	%
Residence:	
All villages	46
Large villages	39
Small villages	53
Caste:	
Brahmins and Jains	31
Muslims	34
Artisans	47
Peasant castes	55
Backward castes	45
Harijans	35
Occupation:	
Professional and managerial	34
Landowner	14
Merchant	33
Nonagricultural laborer	43
Farmer	52
Agricultural laborer	50
Source of income:	
Nonagricultural	32
Mixed agricultural and nonagricultural	48
Agricultural	54
Land acreage (farmers):	
≥ 10 acres	50
4–9.9 acres	51
2–3.9 acres	57
< 2 acres	52
No. of children in household:	
< 4	48
4–5	48
≥ 6	43
Family planning (wife of reproductive age):	
Practicing	45
Not practicing	44

shaped curve with the fewest loans being to the least needy, the Brahmin and Jain landlords and the Muslim merchants, and to the neediest, the Harijan agricultural laborers. This does not appear so clearly by occupation because the large Vokkaliga peasant caste includes agricultural laborers as well as considerable farmers, and the former find it easier to obtain loans from the latter, because of reasons of community solidarity, than do Harijan laborers. Those with large numbers of dependent children may also find that lenders are more skeptical of their ability to repay (this differential is not lessened by controlling for other family characteristics). Below the landlord class, the size of holding makes no significant difference, but being dependent on it alone renders the need for a loan much more urgent.

TABLE 4

SOURCES OF LOANS DURING DROUGHT

Source of Loan	%
Governmental (through bank or agricultural cooperative)	18
Professional moneylender	9
Less professional moneylenders:	
Landlord, employer, business associate	13
Other well-off persons	6
Relatives	20
Persons usually from same "community":	
Friends	22
Neighbors	12
Total	100

The source of loans, set out in table 4, throws considerable light on the changes in rural society and its economy. The government share in lending is rising and, as a proportion of money loaned rather than the number of transactions, is close to one-third. Much of the loans extended through the cooperatives is in the form of credit for the purchase of fertilizer or other agricultural needs, but even this can be readily converted into cash by resale. The proscribed professional moneylender still exists, but the group defined broadly (including some kindly and not very rapacious employers) constitutes 28% of all lenders and accounts for another one-third of money lent. Relatives, somewhat surprisingly, made up only one-fifth of lenders, but they, together with other members of the same caste community, are a majority of those giving loans although providing only one-third of the funds. This tripartite division in funding between government, private money lending of a traditional type, and funding influenced by social bonds means a certain diversity in the support system. Even in a district in crisis, two-thirds of the funds are still locally generated, and the government does not play as significant a role as politicians often suggest. It may play an even less significant part in warding off real disaster as those groups securing the highest proportion of loans through the bank and the cooperative were the Brahmins, Jains, and Muslims, at 25% of the loans they secured, compared with the Harijans at 15%. It was the Harijans who continued above all to be the forced clients of the traditional moneylender at 31% of all loans. The peasant castes received a disproportionate number of loans from relatives and other members of the same community at 61% of all loans. Thus, those with a great deal of land or considerable businesses in the larger village, near the banks and the cooperative, which are run by people like themselves and often of the same caste, employ government money. Some of them undoubtedly employ it in order to make loans at higher interest rates; thus

government may finance traditional moneylending as well as competing with it. The peasant farmers of the smaller villages assist each other, and many have more money to do so now that cash cropping has increased and many households have nonagricultural sources of supplementary income. The Harijan and backward caste agricultural laborers are increasingly dependent on moneylenders because a growing proportion no longer have the traditional family links with a single landlord, which involved reciprocal obligations including loans when in need. The median loan was Rs 2,000 (US$250) but the distribution of loans by size was not concentrated, for the poor received small loans and the rich larger ones: 20% of loans were for Rs 200 (US$25) or less, whereas 40% were for Rs 2,000 (US$250) or more. One family claimed to have received a loan from government money specifically allocated for drought relief (although 5% had at least one family member on relief work that would not have existed without such funding).

Table 5 analyzes the assistance given by relatives beyond the undivided family. Thus, it does not include unmarried children, even if adult and living in distant places, or married sons in cases where the property has not yet been formally divided.[25] Those excluded in this way are part of the family and, at least in theory, have no right to withhold assistance that is under the control of the family head as a single budget.

Once again, the curve by caste (and economic status) is an inverted U-shape, although relatives among landlord families do provide each other with loans, partly as a cheaper form of financing. The analysis clearly brings out the importance of marriage networks as a central mechanism in the insurance system against disaster. It helps to explain why the economic standing of a spouse's family is so important and helps to explain questions why Indian families spend so much effort and money on a daughter's marriage.[26] In south India there is a very real obligation to help a married daughter if she and her family are in distress, and the analysis in the table shows that this occurs on a considerable scale. A high dowry can ensure that the daughter is economically well placed; a low one may mean continuing subsequent assistance. This situation has been confirmed in an area about 65 miles from our study district, as described by A. Shariff.[27] In terms of assistance from relations, India is not a lineage system but one where affinal networks play a key role.

In a district where 70% of adult males work in agriculture, only 46% of help comes from such families. Indeed, agricultural laborers can provide almost no help to each other in times of crisis and this is their plight. The nonagricultural help comes mostly from the larger urban areas, and Bangalore dominates the picture. Furthermore, those relatives in urban areas who do give support tend to be those in jobs requiring educational qualifications. There is support here for the growing belief that education provides a route to economic safety.

TABLE 5

ANALYSIS OF ASSISTANCE SOUGHT AND RECEIVED FROM RELATIVES IN DROUGHT

Characteristic	%
Families who sought and received help from relatives, by caste (N = 378):	
All families	18
Jains and Brahmins	15
Muslims	7
Peasant castes	18
Artisans	17
Backward castes	13
Harijans	8
Families receiving help, by relationship to male household head (N = 71):*	
Siblings	13
Sons	6
Wife's relatives	43
Married daughter and her husband's relatives	13
More distant relatives of husband	25
Location of relatives providing help (N = 71):	
Same village	11
Other rural area	35
Bangalore	33
Other urban area	21
Occupation of relatives providing help (N = 71):	
Landlord or farmer	49
Agricultural laborer	1
Nonagricultural employment where education essential	21
Nonagricultural employment where education an advantage	22
Nonagricultural employment where education little or no advantage	7
Type of assistance received (N = 69):	
Loan of money	84
Food	12
General help (food, money, clothing, etc.)	4

* In the case of female-headed households, relationship to previous husband.

Finally, we returned to our detailed study of whether older persons living alone either singly or in couples were particularly badly hit by the drought. Only one of the five couples reported themselves as being in a fairly bad way. In fact, in all cases, for reasons specific to their families, they had somewhat accidentally found themselves living alone although not far from relatives, and there was little feeling of abandonment. The situation was different with those who lived alone; four out of five came from laboring families, and, although none feared starvation, all four were in a poor state. They blamed the drought for reducing the number of laboring jobs and so almost extinguishing the demand for older workers.

Discussion

The examination of the situation in the study district during severe drought is not an exotic or specialized concern. It is at the heart of rural demographic strategies and demographic transition. It was a crisis, above all, of peasant farmers and agricultural laborers—some of those in nonagricultural employment were almost as unconcerned as the population of Bangalore, where the newspaper paid little attention to the drought. One finding dominated our conclusions about these rural Indian families, even in better times: their chief, all-pervasive worry was the instability of rural incomes, both their seasonality and their longer-term cycles from relative plenty to widespread scarcity. They discussed desired marriages largely in these terms, much preferring daughters' husbands to have urban jobs with guaranteed continuing incomes than to be farmers of even substantial size. For the same reasons, they preferred some of the family to work off the farm, at least part-time, and felt safer if a son had a job in Bangalore, especially a permanent position with the government or in a bank, necessarily requiring education.

These emerging demographic strategies that underlie the gradual fertility decline can only be partly understood by fair-weather research. Their basic sanity is revealed only by prolonged crisis. They are "emerging" because they can only be undertaken on the present scale as a mixed farming/nonagricultural economy develops. That mixed economy works in two ways, in terms both of having some family income originating in agriculture and some outside it, and of having close contacts with individuals and families working outside agriculture. Some of the local nonagricultural work is in the off-farm local economic sector; much is in distant urban areas.

When the agricultural sector was larger, and town communities were more self-contained and took in fewer rural migrants, and when the villages had scarcely any schools to assist the migrant to secure a town job, rural security had to be achieved through unchecked fertility and carefully arranged marriages, by farmers scrimping to acquire more land and control over more labor, and by agricultural laborers maintaining strong social links with patrons even if the latter were often mean or overbearing.

This situation has changed because of the diversification of the economy. It is now often safer to have fewer but educated children and to marry them to urban or rural nonagricultural families. This strategy is not equally open to all, for most Harijan families do not have the kind of background that will allow a child to continue to do well at school, and teachers and fellow students often discriminate against them.

The conflict between schooling and family size is a temporary one in the life cycle. Any resident of the study district would probably benefit greatly by having three or four sons with university or other

tertiary qualifications and an equal number of daughters married to such persons. This is possible for some of the larger landlords. However, most families testify that there is a real struggle, which may not be won, to keep all children at school in a large family.[28] The drought produced evidence of a Chayanov effect by demonstrating the likelihood of greater distress in families with young children. The effect is similar in normal times if the dependency status of children is prolonged by schooling.

Our picture of risk aversion during drought is close to that in the studies analyzed by Jodha.[29] Diets change, festivals are forgone, clothes are worn until they become rags, marriages are postponed, animals are sold, and help is sought from where it can be obtained and often through channels established decades earlier.

The emphasis, however, is changing more rapidly in Karnataka than in some areas of India, particularly in an area such as the one studied, which is only a 5-hour bus journey from Bangalore. Few families feel safe if all their income is derived from agriculture, and the securing of some of the family's income from other sources is increasingly regarded as a prudent and even necessary measure. The move out of sole reliance on farming has been necessitated by the reduction in farm size with population growth, which has not only made some family labor redundant on the smaller holdings but has replaced agricultural laborers by family members on the larger ones. Nevertheless, labor has moved out of farming not only because of the duress of population pressure but because diversification is safer. Thus, ratios of population to available land are inadequate measures of either distress or insecurity.

Such diversification is still far from being a complete insurance against drought distress. Loans were secured by half of all families in 1983. They were needed by more, for the most ironic finding from the study was the existence of an inverted U-shape curve, whereby fewer loans are secured both by those who need them least and by those in most need but who are bad risks and who have relatives economically like themselves, unable to provide assistance. In the area of financial assistance, government is not yet dominant. In terms of the volume of money lent, there is an almost equal three-way split: government through banks and cooperatives; traditional moneylenders, employers, businessmen, and large farmers; and relatives, neighbors, and caste group members. The patron-client relationship has largely broken down as lifelong family agricultural laborers have become more of an agricultural proletariat selling their labor to those wishing to buy it. Nevertheless, laborers working frequently for the same farmer are more likely to borrow from him than from others, whereas borrowing from businessmen is likely to be from those with whom one has regular contact in transactions or employment. In these cases, repayment may

be made by the subtraction of a fraction of wages or commodity prices. Government relief work or food allocations were not a major feature of the 1983 drought, although purchases through ration shops were stated by many to be important to their budgets. Larger-scale governmental relief would probably have come in 1984 if the drought had persisted. The help received from relatives is changing quite dramatically. Major support in the drought came from urban-based relatives or those in nonagricultural employment.

Yet this is not a stable situation, and the pressures toward further change are intensifying. One reason is rising educational levels: between the 1971 and 1981 censuses, the proportion literate among all persons in India increased by one-quarter (one-third for females) and for those 5–9 years of age by one-third.[30] In the study area, the rate of educational growth had been even faster. There is an almost desperate realization that it takes more and more education for children to maintain a constant chance of securing a town job or a government position. There is also a vivid realization that an ever-growing proportion of grandchildren will not find employment in agriculture but will have to seek jobs in the nonagricultural sector.

The findings of the study broadly agree with the diagnoses of both Cain and Jodha. Nevertheless, a growing demand for fertility control was related not only to increasing security but to problems arising from promoting this improvement. So much of the improved security depended on family involvement through occupational shift and the building of marriage networks to nonagricultural incomes that the schooling of children was becoming an ever more central family concern with substantial resultant economic problems during their dependent years arising from having too many children or having them too close together. There is little sign in the study area of any competition being offered to these risk-aversion strategies by a greater capitalization of farming, for the very reason that Jodha distinguished, a belief—almost certainly correct—that the higher the aim, the greater the fall.

No claim is put forward that this is a universal pattern for Third World fertility decline. There may be other parts of India, perhaps in irrigated districts, where investment in farming improvement may stabilize incomes. It is likely, however, that most parts of the country are similar to Karnataka, in that land-reform provisions are sufficiently threatening to rule out substantial and continuing land purchases as a favored economic strategy. To take one example, this pattern is not applicable to sub-Saharan Africa for at least two reasons. First, the costs of schooling are frequently not borne by the parents alone and the costs of the younger generation are sufficiently diffused among relatives in the older generation to ensure that a life-cycle financial crunch usually does not occur. Second, support comes mostly from within the lineage rather than from marriage alliances and from deci-

sions of old men whose power is increased by the prolificness of their descendants.[31] In rural south India, risk aversion is still a major determinant of individual and family behavior. Demographic behavior has changed only because there are new strategies for reducing risk that were not previously available. The major reason for this new availability is economic change, especially in the form of the growth of nonagricultural employment. The government has played a considerable role in reducing rural risk through extending credit facilities, creating work-for-food programs and assisting with food supplies during famine, and maintaining a very considerable measure of law and order through the bureaucracy and the police. Cain's contrasts with rural Bangladesh may well all be valid. Nevertheless, if we keep the focus only on India, the government's major contribution to the new risk-aversion strategies and the related decline in fertility has been the provision of rural schooling and, at least in the short term, of the family-planning program. The motive force, which explains the effort put into risk aversion and the changes that follow from that effort, is the periodic occurrence of major rural disaster—in south India, this is usually drought-induced famine.

Notes

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1. See Jeffrey B. Nugent, "The Old-Age Security Motive for Fertility," *Population and Development Review* 11 (March 1985): 75–97. On the transmission of property, see Mead Cain, "The Household Life Cycle and Economic Mobility in Rural Bangladesh," *Population and Development Review* 4 (September 1978): 421–38.

2. John C. Caldwell, P. H. Reddy, and Pat Caldwell, "The Determinants of Fertility Decline in Rural South India," in *India's Demography: Essays on the Contemporary Population,* ed. Tim Dyson and Nigel Crook (New Delhi: South Asian Publishers, 1984).

3. John C. Caldwell, P. H. Reddy, and Pat Caldwell, "The Support of the Aged in Rural Karnataka," in *Proceedings of a Conference on the Support of the Aged in India,* ed. T. Nair (Trivandrum, 1985).

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John C. Caldwell, P. H. Reddy, and Pat Caldwell, "Educational Transition in Rural South India," *Population and Development Review* 11 (March 1985): 29–51.

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6. A. V. Chayanov, "Peasant Farm Organization" (originally published in Moscow, 1925), in *The Theory of Peasant Economy*, ed. Daniel Thorner, Basile Kerblay, and R. E. F. Smith (Homewood, Ill.: Richard D. Irwin, 1966), pp. 29–269; Marshall Sahlins, "The Intensity of Domestic Production in Primitive Societies: Social Inflections of the Chayanov Slope," in *Studies in Economic Anthropology*, ed. George Dalton (Washington, D.C.: American Anthropological Association, 1971), pp. 30–51; Marshall Sahlins, *Stone Age Economics* (Chicago: Aldine Publishing Co., 1972).

7. Susan Greenhalgh, "Is Inequality Demographically Induced? The Family Cycle and the Distribution of Income in Taiwan, 1954–1978," Center for Policy Studies, Working Paper no. 103 (New York: Population Council, 1983).

8. N. S. Jodha, "Effectiveness of Farmers' Adjustments to Risk," *Economic and Political Weekly* 13, no. 25 (June 24, 1978): A-38–A-48; see also N. S. Jodha, "Famine and Famine Policies: Some Empirical Evidence," *Economic and Political Weekly* 10 (October 11, 1975): 1609–23.

9. Caldwell et al., "The Causes of Marriage Change in South India."

10. John C. Caldwell, P. H. Reddy, and Pat Caldwell, "The Causes of Demographic Change in Rural South India," *Population and Development Review* 8 (December 1982): 689–727.

11. Ibid., pp. 714–19.

12. Laboring, usually agricultural labor (the term is used in south India to mean both the work and, more frequently, the wage earned for it).

13. The distribution of most characteristics varies very little from that of the total population. The distribution of caste by families (differing slightly from the individual data quoted earlier) was as follows: Muslims, 18%; Brahmins, 4%; Jains, 3%; Lingayats, 7%; Vokkaligas, 34%; Harijans, 10%; backward castes, 12%; service castes, 9%.

14. Caldwell et al., "The Causes of Demographic Change in Rural South India," pp. 716–18, "Educational Transition in Rural South India" (see n. 4 above).

15. Caldwell and Caldwell, "The Family Planning Programme at the Local Level" (see n. 4 above); see also Caldwell et al., "The Determinants of Fertility Decline in Rural South India" (n. 2 above).

16. John C. Caldwell, P. H. Reddy, and Pat Caldwell, "The Social Component in Mortality Decline: An Investigation in South India Employing Alternative Methodologies," *Population Studies* 37 (July 1983): 185–205.

17. See also John C. Caldwell, "The Sahelian Drought and Its Demographic Implications," Occasional Paper no. 8 (Washington, D.C.: Overseas Liaison Committee, December 1975).

18. Caldwell et al., "The Causes of Demographic Change in Rural South India," p. 714.

19. See Caldwell et al., "The Social Component in Mortality Decline," p. 198.

20. Ibid., p. 199.

21. Caldwell and Caldwell, "The Family Planning Programme at the Local Level" (see n. 4 above).

22. Caldwell et al., "The Causes of Marriage Change in South India" (n. 4 above), p. 354.
23. Ibid., p. 346.
24. John C. Caldwell, P. H. Reddy, and Pat Caldwell, "The Determinants of Family Structure in Rural South India," *Journal of Marriage and the Family* 46 (February 1984): 215–29, esp. 227.
25. Ibid., pp. 215–29.
26. See Caldwell et al., "The Causes of Marriage Change in South India" (n. 4 above).
27. Abusaleh Shariff, "The Beginning of Fertility Decline in South India: A Micro-Study of a Cluster of Four South Indian Villages" (Ph.D. thesis, Australian National University, Canberra, 1984).
28. Caldwell et al., "Educational Transition in Rural South India" (n. 4 above).
29. Jodha (n. 8 above).
30. *Census of India 1981, Series 1, India Part II, Special: Report and Tables Based on 5 Per Cent Sample Data,* coordinated by P. Padmanabha, Indian Administrative Service, Registrar General and Census Commissioner for India (Delhi: Controller of Publications, 1984), p. 78.
31. See John C. Caldwell and Pat Caldwell, "Cultural Forces Tending to Sustain High Fertility in Tropical Africa," Technical Note no. 85-16 (Washington, D.C.: World Bank, Population, Health and Nutrition Department, 1985).