

# GOATS BEFORE PLOUGHS: DILEMMAS OF HOUSEHOLD RESPONSE SEQUENCING DURING FOOD SHORTAGES

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## 1 INTRODUCTION

The question which this article attempts to answer can be simply expressed, as follows: How do poor people facing food deficits choose between the various strategies available to them for responding to this deficit? Answers to this question will be sought first in the relevant literature, then in fieldwork conducted by the author in northeastern Ghana during 1988/9.<sup>1</sup>

### 1.1 Theoretical context

Sen's 'entitlement approach' to poverty and famine analysis (Sen 1981) offers no solutions to this enquiry. Droughts and similar adverse events are conceptualised as production or income shocks, which threaten the individual's or household's access to food. The solution is simply to smooth consumption, relative to this production or income decline, through the conversion of household non-food resources (incomes and assets) into food. *In extremis*, people will starve if and when their entitlements are exhausted. But, given a choice between two or more ways of generating the necessary entitlement to food (say, selling goats, selling the family plough, or borrowing cash), which will the household choose first? And is smoothing consumption the overriding objective or priority of households facing food deficits?

More enlightenment is to be found in the literature on hungry season and famine 'coping strategies'. Watts (1983) argues that coping strategies are sequenced in a way that reflects increasing 'irreversibility' and 'commitment of domestic resources'. However, these concepts are never fully explored or rigorously defined, intuitively logical though they may seem. Moreover, Watts shares Sen's preoccupation with food acquisition behaviour, neglecting strategies which involve voluntary rationing of food consumption.

As long ago as 1975, Jodha had argued, based on empirical work in India, that 'curtailment in current consumption' is one of the first responses a poor household facing food deficit will adopt. It is remarkable that Sen, though aware of Jodha's work, dismisses any failure by individuals or households to realise fully their entitlements during a food deficit as being due to 'ignorance, fixed food habits, or apathy' (Sen 1981: 50). Jodha's important alternative explanation is relegated to a footnote on the same page: 'Also, people sometimes choose to starve rather than sell their productive assets' (see Jodha 1975).

Empirical support for Jodha's view of household behaviour under food stress was provided by de Waal (1989: 7), in his study of the 1984/5 famine in Darfur, western Sudan. 'Satisfying the pangs of hunger is not a major concern for famine-stricken families. Even during the worst of the famine, households spent only a fraction of their potential income on food. Their priority was instead to preserve their way of life, to avoid destitution.'

In other words, people suffering hunger chose not to protect their consumption of food, but rather protected their longer term viability. Even in the face of severe hunger, the poor retain broader and longer term economic and social objectives, which conflict with the satisfaction of immediate nutritional imperatives. As the economic and social cost to the household of maintaining constant food intakes for all household members rises, so does the incentive to reduce consumption in favour of these other important objectives.

The distinction between strategies that protect food consumption and those that require consumption to be modified or reduced is shown in Table 1 which lists several strategies and responses that were observed in northeastern Ghana during 1988/9.

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Trigger Event (production)	Behavioural Category (consumption)	Strategy (generic)	Response (specific)
GRAIN PRODUCTION DEFICIT	PROTECT CONSUMPTION	PURCHASE GRAIN (market exchanges)	<ul style="list-style-type: none"> <li>- sell non-food crops</li> <li>- use off-farm income</li> <li>- sell assets (eg. animals)</li> <li>- borrow cash</li> <li>- postpone debt repayment</li> <li>- reduce non-food spending</li> </ul>
		RECEIVE GRAIN (non-market transfers)	<ul style="list-style-type: none"> <li>- remittances</li> <li>- charity (eg. <i>zakat</i>)</li> <li>- begging</li> <li>- food aid</li> </ul>
	MODIFY CONSUMPTION	REDUCE CONSUMPTION (ration)	<ul style="list-style-type: none"> <li>- smaller portions</li> <li>- fewer meals per day</li> <li>- fewer snack foods</li> </ul>
		DIVERSIFY CONSUMPTION (change diet)	<ul style="list-style-type: none"> <li>- less preferred varieties</li> <li>- wild foods</li> <li>- less nutritious diet (no meat or fish)</li> </ul>
		REDUCE CONSUMERS (change HH size)	<ul style="list-style-type: none"> <li>- wife returns to father</li> <li>- children sent to relatives</li> <li>- male temporary migration</li> <li>- betroth daughter</li> </ul>

## 1.2 Empirical context

The author conducted micro-level research into household behaviour during a food shortage in the farming village of Pusiga, in Bawku District, north-eastern Ghana, from July 1988 to August 1989. An attack by armyworms (*Spodoptera exempta*, a cereals-eating insect), followed by an agricultural drought, severely undermined foodgrain production in this year. Most households were thrown from production self-sufficiency in 1988 to market dependence for staple foods in 1989. The fieldwork examined household behaviour in response to this production shock, and contextualized this behaviour in the light of recent developments in the theoretical and empirical literatures on famine, seasonality, and household 'coping strategies'. Of particular interest was the question of how households selected from the range of nutritional, economic and social responses available to them - or strategy sequencing.

## 2 SEQUENCING BETWEEN RESPONSES

Strategy sequencing is based on careful and repeated

calculations about the long-term costs and consequences of each option. These options include decisions to ration consumption as well as strategies to acquire food. Table 1 above drew this basic bifurcation. A food deficit household can choose between selling assets for food or going hungry - but these options are motivated by diametrically opposed objectives. Selling assets to buy grain is an economic adjustment aimed at protecting consumption; rationing is a nutritional adjustment which protects assets. Table 2 illustrates the broader point that each type of adjustment is associated with different objectives and has different consequences. To mention another example, betrothing a daughter is a demographic restructuring of the household which has the economic objective of minimizing food purchasing needs, but is associated with a social cost - shame or disgrace.

One implication of seeing rationing as a nutritional adjustment made for economic reasons would be to categorize at least some proportion of seasonal and even acute malnutrition as strategic responses to,

Example of Response	Nature of Adjustment	Primary Objective	Primary Effect or Consequence
Sell assets	economic (reduce wealth base)	nutritional (protect consumption)	economic (impoverishment)
Ration grain	nutritional (modify consumption)	economic (protect assets)	nutritional (hunger)
Betroth daughter	demographic (reduce consumers)	economic (protect assets)	social (disgrace)
Beg	economic (raise cash for food)	nutritional (protect consumption)	social (disgrace)

rather than inevitable consequences of, food scarcity. This proposition is supported by the way responses to food shortage were articulated by farmers in Pusiga during 1989: 'Rationing begins as soon as you have to buy food in the market'; 'Because we did not get the food from the land, we say there is hunger - because the food was got through purchasing'; 'If you have to buy food in the market there is never enough - there is always hunger.'

Among the reasons given for 'choosing hunger' rather than selling off all assets for food were 'contingency planning' ('If I sell all my animals and next year there is hunger, what will I sell to buy food?'); and a desire to retain assets for alternative uses - bullocks and ploughs for farming, cows for brideprice payments ('I need the cows for when my sons marry'), sheep and goats for funeral ceremonies ('If something happens in the night, where will my family get the goats to perform the funeral?'). Some household heads were determined not to sell any animals at all, while others sold some but retained a 'minimum stock'. Few sold all their animals.

Common to all the above quotations are: (1) a recognition that decisions made in response to food deficits reflect trade-offs between competing sets of objectives (whose relative prioritisation may also change during the episode of shortage); (2) an awareness of a future beyond the current crisis, when assets would be needed for more important purposes than to bridge a transitory food gap. It follows that rationing is not simply a way of making scarce resources last longer. It is central to the strategic management of assets (and other entitlements) over time.

In Pusiga in 1988/9, many households sold smallstock soon after the harvest to buy grain, even though consumption was not maintained at the level enjoyed during a year of production self-sufficiency. Later in the year, austerity in poorer households increased to the point of severe hunger, when major assets were sold to maintain a minimum level of consumption. Reduced consumption and asset disposal are **parallel processes, not sequential events.**

Advocates of 'discrete stages' of responses to food deficit (see Corbett 1988) suggest that each response (or cluster of responses) is adopted and exhausted before the household moves on to the next. Yet assets can be sold one at a time, borrowing and migration take a diversity of forms, and rationing intensifies - it is not 'exhaustible' in the sense that finite stocks of animals can be exhausted. The confusion arises because three different levels of response are involved:

- 1 discrete, 'once only' events (eg. 'distress migration');
- 2 a series of discrete events (eg. animal sales);
- 3 continuous processes (eg. rationing).

Several statements made by Pusiga farmers during 1989 pointed to the complicated procedure of selection from among various responses to domestic grain shortage. The relationship between borrowing, animal sales and 'choosing hunger' is indicative.

In terms of response sequencing, people will try to secure consumption loans if and when they perceive the cost of borrowing as less than the cost of other strategies - eg the revenue loss from selling a productive asset, or the welfare cost (in terms of current hunger) of not borrowing. Borrowing at low interest was generally preferred (by those who could secure loans) to selling animals. One farmer who borrowed at zero interest from his wealthy cousin, instead of selling his sheep and goats, said: 'If I couldn't borrow I would have had to sell the animals to buy food.' Another goat-owner who borrowed cash to buy grain explained that he had done so 'because there might be hunger again next year. It is better to borrow and feed, and keep the animals for next year's hunger.'

In other words, owning tangible assets was preferable to dependence on loans which might be unavailable. Physical assets cannot be reclaimed once sold, whereas it may be possible to default on a loan. Also, taking a loan enables the household to protect its revenue-earning assets, and thus to generate future income with which to repay the loan. Access to credit allows consumption and income to be smoothed across seasons and over good and bad years, reducing the likelihood that assets will be exhausted following a poor harvest.

Only occasionally were reservations expressed about raising money for food through borrowing, and then usually with high-interest loans offered on inflexible terms. Loans taken today must be repaid out of future income or wealth. Two farmers in Pusiga expressed the dilemma succinctly, both electing to 'choose hunger' rather than risk financial embarrassment: 'If I borrow money for millet and the next harvest also is not good, how will I come to repay the debt?' 'I didn't borrow, because how to repay? It is better to go hungry and not be in debt.'

Nonetheless, 45 per cent of 109 households surveyed in Pusiga acquired at least one new loan during 1989, and 62 of 104 new loans were taken for food purchases. But many poor farmers complained of difficulties in securing loans. Bank loans are not an option in this region. As for informal credit, the volume of cash circulating in Pusiga's local economy diminishes in difficult years - lenders also suffer from drought and armyworms - and the poor exhaust their access to consumption credit rapidly if they are known to be seriously in debt.

This exclusion from both formal (bank) and informal sources of credit inhibited the ability of many

poor households to smooth consumption by borrowing against expected future incomes. Rather, they were thrown back heavily onto their own resources, which they tried to conserve, by rationing food consumption. Since (mild) rationing costs little and is easily reversible, it is entirely 'rational' for rationing to precede asset sales or borrowing. More precisely, no asset will be sold, and no loan will be sought, until the perceived cost of doing so is exceeded by the perceived cost of further rationing.

The worst case scenario for poor households facing restricted access to credit is a succession of two or more poor harvests, since their savings will rapidly be exhausted without the intervention of a good year in which food stocks and animal herds can be replenished. Put another way, five good years followed by five bad years is more likely to result in household dissolution or mortality than ten years of alternating good and bad harvests.

This very real possibility of successive low income years leads to the illuminating conclusion that poor households, rather than liquidating their meagre assets to buy food in bad agricultural years, are likely to ration consumption most stringently in years of severe food deficit. The cost of consuming resources rises as the level of resources owned falls.

### 3 SEQUENCING WITHIN RESPONSES

The sequencing argument is commonly applied to choices made among various responses to food deficit. This section argues that a continuum reflecting increasing stress exists within many responses as well as between available alternatives. The example discussed here is one of the most commonly observed responses to food deficit: the disposal of physical assets.

Rural households throughout Africa hold a portfolio of assets, the majority of which can be converted, through exchanges, into food - though some assets are less liquid (difficult to sell), more 'lumpy' (indivisible), and riskier (prone to lose their value) than others. In calculating a household's 'exchange entitlement' to food, the only relevant consideration is each asset's current market value in terms of staple food. But this ignores the stream of financial returns, social utility and other benefits generated by various assets over time - their immediate entitlement value being just one component of total value. In northern Ghana, certain assets are held for directly productive purposes (ploughs), some are held primarily as

savings (goats), some are retained against future claims (cows for brideprice), while others can be thought of as luxuries (radios).

Beyond these is a further category of resources that can be marshalled in times of distress, which will be called 'latent assets' - those sources of food or cash which are not invoked until absolutely needed (eg brideprice cows owed to the household, which in northern Ghana ought not to be sold for cash, but can be). Related to this is the local practice of 'betrothing' teenage daughters to wealthier households in exchange for an advance payment of brideprice cows, a strategy which has also been observed in Kenya (Moris 1989). While not suggesting that pubescent girls should be considered as part of each household's 'exchange entitlement set', there is a sense in which they represent a source of 'latent entitlement' to food.

A related point is that rights over assets are not always clearly specified or individualised. Land in northern Ghana is not privately owned, but farmers can 'sell' usufruct rights. Rights over animals are equally complex, with individuals, households, extended families and lineages each having some private or collective claim over cattle and smallstock. Individuals sometimes appeared extremely reluctant to dispose of 'their' animals, for this reason. Asked why he had not sold his two cows for grain, an old farmer in Pusiga who was complaining of hunger during 1989 replied: 'The cows belonged to my father, so the family would not understand if I sold them and kept the money for myself.'

These factors complicate the calculation of an individual's or household's entitlement to food at any given point in time. There are other complications too. The same asset might serve different purposes at various times or in different households; and most assets generate a number of benefits simultaneously. A bicycle, for example, can be merely a luxury item or status symbol, but it might equally be an investment which provides opportunities for expanded crop production, by enabling the farmer to cultivate a field several miles from the homestead.

Hence the decision to sell assets for food is a decision about the management of the household's asset portfolio, both immediately and for the future. In terms of sequencing responses to food deficit, the critical relationship is that between an asset's current 'entitlement value', on the one hand, and its impact on

'future entitlement', on the other. Owning a plough, for instance, raises average foodgrain production and income from sales of surplus grain and cash crops, so selling the family plough to generate current entitlements can be expected to reduce future entitlements through its inhibiting impact on both food and cash crop production.

In effect, two distinct values are associated with each asset: (1) the asset's immediate realisable value (its current selling price); (2) the stream of future value the asset generates. The argument here is that assets will be ranked for disposal according to both these values. Specifically, the criterion for sequencing purposes must be to sell first (or next) that asset which minimises the return lost per unit of cash raised by its sale.

To take a stylised example, assume that a farming household owns the following portfolio of saleable assets: 8 goats, 2 bullocks, 1 plough, 1 radio, and 1 bicycle. Table 3 lists these assets, together with their selling prices and the income each is expected to generate (if any) in the coming year. The farmer's 'portfolio management' problem, facing a need to purchase grain to a certain value, is how to decide, first, which assets to sell to raise the cash required (and how many to sell of each), and second, in what sequence to sell these assets.

The selling price of a second-hand plough in Pusiga in 1989 averaged C25,000 (£50). Survey data suggested that plough owners earned an additional C30,000 in agricultural income (crop sales) *per annum* as compared to non-plough owners. Dividing this expected income by the immediate resale price gives a rate of return on the plough of 1.2. In other words, C1.20 would be lost in earnings next farming season for each C1.00 raised by the plough's immediate sale. Conversely, a radio yields zero income, so its rate of return during the coming year is zero.

In Table 3, assets are ranked from lowest to highest expected return per unit of cash raised. (Note that this ranking does not correspond to ranking the assets by their selling price, or entitlement value.) This exercise reveals that the radio is most likely, and the plough least likely, to be sold for food. If the decision-maker's problem is to raise a total of C25,000 for food purchases, the optimal strategy indicated here is to sell the radio plus 5 goats, rather than 7 goats or the plough alone.

Table 3: Sequencing Asset Sales by Rates of Return

Asset	Number Owned (N)	Selling Price/ Unit (a)	Income per Annum (b)	Rate of Return (c=b/a)	Selling Sequence
Radio	1	6,000	0	0.00	1
Goat	8	4,000	200	0.05	2
Bicycle	1	18,000	3,000	0.17	3
Bullock	2	50,000	15,000	0.30	4
Plough	1	25,000	30,000	1.20	5

Note: Prices are in Ghanaian Cedis. In 1989, £1 = C500.

This simplified model ignores asset depreciation, time preferences and rates of growth (eg. livestock reproduction). Non-monetary returns such as social utility are excluded, and other characteristics mentioned previously might enter into an asset's valuation, such as its liquidity, risk-reducing properties, and replacement cost. A radio, for instance, clearly provides positive utility of some kind, despite not generating any income. The above formulation could be extended to incorporate non-income utilities with little difficulty.

The purpose here is merely to illustrate how this hypothetical household might reach a decision about which of its assets to sell for food, imputing indicative values to asset values and expected returns. By extending the entitlement approach from a single-period to a two-period time horizon, some progress has at least been made towards understanding why and how households sequence their asset sales for food.

#### 4 RESPONSE SEQUENCING: A CASE STUDY

Table 4 tabulates chronologically the actual responses to food deficit adopted by one middle-income household in Pusiga between the main annual harvest in November 1988 (which was disastrous) and the early millet harvest of August 1989. 'Income-raising strategies' aimed at acquiring food, while 'Consumption modifying strategies' aimed at restraining the depletion of food and non-food resources. Strategic resource management is apparent in the sequencing decisions made within this array of behavioural responses.

The use of farm income for grain purchasing generally preceded wealth depletion (sales of animals and inanimate assets). Rationing was initiated as soon as grain purchasing started, but preceded both asset sales and the use of non-agricultural incomes (the wife's trading profits, the migrant son's remitted cash). Animals were sold only after attempts to borrow had proved unsuccessful.

Within each category, a sequence reflecting intensifying stress is also evident. Crop sales by the household head started with henna and were followed by groundnuts - the bag set aside after harvest 1988 for planting in 1989. As a consequence of this sale, the household head was unable to plant groundnuts in 1989, having no seeds stored or cash to buy seeds, and finding it impossible to borrow either cash or groundnuts.

In October 1988, this household owned 1 bullock, 2 cows, 6 goats and 1 sheep. By July 1989, this had contracted (through sales for grain) to 1 bullock, 1 cow, 2 goats and 1 sheep. Smallstock (goats) were sold first, livestock (a cow) last. Asked in April why he had not yet sold more animals to buy grain, the household head replied that he was planning to sell them in the rainy season, 'when I am working hard and very hungry'.

This was the only household (of 201) in Pusiga to sell its plough for grain in 1989. Asked in July why he had sold his plough rather than still more animals, he explained that the bullock was needed for ploughing (he had entered into a sharing arrangement with a neighbour who owned a plough and one bullock);

**Table 4: A Case Study Household in Pusiga, 1988/89**

'Coping Strategies'	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul
<b>Income-Raising Strategies</b>								
Agricultural Income (Sold crops to buy grain):	HHH:	<u>henna</u> <u>groundnut</u>						
	Wife:	<u>soybeans</u>						
	Son:	<u>groundnut</u>						
Income from Asset Sales (Sold assets to buy grain):	Animals:		<u>1 goat</u>		<u>3 goats</u>		<u>1 cow</u>	
	Non-animal assets:	<u>wristwatch</u>					<u>plough</u>	
Non-Agricultural Income: Wife used her income to buy grain:				<u>trading profits</u>				
Son migrated to Côte d'Ivoire to work as a cocoa sharecropper:	<u>left</u>		<u>returned</u>	<u>bought grain</u>				
Borrowing:	<u>HHH tried to borrow but failed</u>							
<b>Consumption Modifying Strategies</b>								
Consumption rationing:	Adults:	<u>smaller portions</u>			<u>skipped meals</u>			
	Children:	<u>smaller portions</u>			<u>skipped meals</u>			
Management of granary stocks (harvested grain):	<u>stocks good</u>	<u>stocks low</u>	<u>granary empty</u>	<u>ate some seeds saved to plant</u>				
Note: HHH= household head								

that the remaining cow would be needed for brideprice when his 19-year-old son married; and that the sheep and 2 goats were retained as a 'basic stock' which he hoped would breed.

A final point to note is the simultaneous adoption of several responses by this household - crop sales, asset sales, seasonal migration, rationing - which further confounds any attempt to isolate either a linear sequence or 'discrete stages'. The diverse and interlocking nature of responses to food deficit, as demonstrated by this household's strategic behaviour under stress, was repeated throughout Pusiga during the fieldwork period.

## 5 CONCLUSION

Food deficits may be transitory, but their impact on poor farming households can be permanent. Against

the pressure to reallocate assets, incomes and other entitlements towards meeting immediate consumption needs is the equally powerful imperative to protect the household's longer term economic viability, by retaining control over productive resources. Assets and incomes can either be conserved (by restraining current consumption) or consumed (by selling assets for food), which in a risky agricultural climate raises vulnerability to future food deficits, since the resource base with which to redress subsequent production shortfalls has been correspondingly reduced.

This dynamic or intertemporal dimension of household decision-making under stress requires modifications to be made to models which generalise about sequences or 'discrete stages' of coping strategy adoption. This paper has argued that response sequencing is the product of a number of complex

(though largely intuitive) calculations concerning the feasibility, relative costs and expected return of each option, both immediately and for the future. A simple formula was developed to capture some of

these criteria for the case of asset sales. Similar analyses could usefully be applied to many other commonly observed responses to food deficit.

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