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Edited by Paul Halstead and John O'Shea

Excerpt

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Chapter 1

Introduction: cultural responses to risk and uncertainty

Paul Halstead and John O'Shea

The world about us is in a constant state of flux. The nomad in the Kalahari Desert and the Western city-dweller in front of his television set are both repeatedly confronted by changes in their natural surroundings and in the behaviour of other members of their own species. In this respect, at least, their experience is no different from that of all other organisms.

Culture endows man with exceptional flexibility in coping with his surroundings and, in consequence, human beings regularly cope with an unusual diversity of natural and social environments. As a result, the normal lifestyle of people in different parts of the world can be radically different. Yet the inherent temporal instability of these environments still poses problems and unusually severe perturbations frequently claim human lives. Shortage of food, one of the most basic and yet least reliable of the requirements for human survival, remains a common cause of loss of life. The means by which human beings secure their food supply in the face of such uncertainty are thus as central to society as the consequences of shortage are drastic and they have far-reaching ramifications throughout cultural behaviour and social life.

Human communities have developed an impressive array of cultural mechanisms for buffering variability. The diversity of these mechanisms, however, should not mask the fact that an effective strategy must match, in both capacity and scale, the variability with which it is to cope. The structure of environmental variability will be discussed more fully below, as will that of the corresponding cultural coping mechanisms. An issue of particular

importance, however, is that of *predictability*. Individual hazards are often quite unpredictable, in terms of their precise timing and so on, and from the perspective of a potential victim this element of uncertainty significantly exacerbates the risk from perturbations. From the more sheltered perspective of the social scientist, however, the basic structure of variability – its frequency, duration, spatial scale, severity and regularity – can often be predicted quite accurately for any given situation. It follows that the basic structure of an effective coping mechanism in the same context can also be specified.

This emphasis on variability and on cultural responses to it has important implications for both synchronic and diachronic studies in the social sciences. Synchronically this approach provides a powerful analytical tool for investigating a range of cultural phenomena attested ethnographically. Bitter controversy surrounds the interpretation of a number of these phenomena, with rival camps favouring 'functionalist' or non-materialist explanations. Both sides proceed in essentially the same, flawed manner, picking a puzzling aspect of human behaviour and then proceeding to explain it on an *ad hoc* basis in terms of some preferred cultural or environmental factor. The power of the approach presented here is that, since the basic structure of variability (and hence the basic structure of a successful coping mechanism) can be independently specified, the potential of individual cultural forms as buffering mechanisms can be investigated with rigour.

This approach offers similar analytical potential for the syn-

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chronic investigation of ancient societies. Again, the basic characteristics of the necessary buffering mechanisms can be independently predicted and the incomplete historical or archaeological record of past cultural practices and institutions can then be evaluated in this light. This analytical potential is exploited in the following chapters in the investigation of a number of ethnographically, historically or archaeologically documented societies.

Diachronically this framework has unusual heuristic value for the investigation of long-term processes of social and cultural change. Variability, particularly that which results in severe and unpredictable scarcity of vital resources, exercises a powerful selective pressure on human behaviour. Moreover, most of the buffering mechanisms deployed by man are cultural, and of these the most powerful tend to be social mechanisms. Environmental variability is thus a powerful force for long-term social change and in this respect the approach adopted here addresses one of the most critical areas in the social sciences.

Given the universal prevalence and potentially drastic consequences of variability, it is perhaps surprising that social scientists have in the past concentrated on the 'normal' or 'average' conditions of human existence. In part this simply mirrors a practical problem common to all the social sciences – variability is harder to grasp and to present than some measure of central tendency. Moreover, different aspects of variability are relevant at different scales of analysis – this issue of analytical scale is one to which we must return later. There are also other reasons, relevant to individual disciplines within the social sciences. For example, ethnographic observations rarely cover a sufficient time span to encompass the full range of variability affecting the community under study. Anthropologists are frequently more interested in cultural 'norms' – perceptions of what should happen – than in what actually happens. Similarly, some of the early agronomic treatises central to ancient economic history are as much prescriptive statements of agricultural theory as descriptive accounts of agricultural practice. Finally, archaeologists, faced with the need to model past economic systems for which they have no direct statistical data, have usually preferred the simplicity of averages to the complexity of variability.

In each case the traditional emphasis on norms or averages is readily comprehensible in its disciplinary context, but these figures are an *abstraction* of the variable reality with which mankind must of necessity cope. This variability exercises an important influence on the ways in which human beings behave and, when it extends to vital resources, on their very survival. This volume, then, poses three basic questions: (1) How do societies buffer themselves against periodic variation in food availability? (2) How do these coping activities influence other aspects of cultural organisation? (3) To what extent can these coping strategies provide the impetus for social change?

Culture and environment

Human beings do not exist in a vacuum. Rather, their behaviour is constrained by their surroundings or environment. Their environment has three major components: abiotic (physical–chemical surroundings), biotic (organisms of other species) and

social (organisms of the same species). Needless to say, human beings mould all three components of their environment to a greater or lesser extent, so we are not concerned here with rival deterministic claims, but rather with the interaction between man and his environment.

From a human perspective, this interaction can usefully be construed as a game in which the environment poses problems which man must solve. The particular problems posed by the environment in any individual case are of course a product both of local environmental conditions and of the specific nature of human behaviour in that context. For example, the specific problems posed today by the natural environment of southern England would be quite different for human beings trying to ensure their survival by hunting and gathering, farming or stock-broking.

The boundary between environment and culture is thus difficult to draw. For the sake of simplicity, however, two conventional distinctions are drawn here. Firstly, the behaviour of human beings outside the social unit of analysis will be considered an aspect of the environment and the behaviour of those inside the unit of analysis will be considered part of culture. From the perspective of the individual household, for example, taxation is as much a part of the environment as is a bolt of lightning, while from the perspective of the state it is an integral component of the cultural repertoire. The boundary between environment and culture depends, therefore, on the scale at which analysis is conducted. To a great extent this convention also distinguishes between circumstances which can be controlled and those which cannot. Secondly, problems posed by the interaction of culture and environment are treated as aspects of environment. From the perspective of the peasant farmer, the distinction between the environmental problem of drought and the cultural problem of a bad harvest (i.e. of cultural failure to mitigate the effects of drought) is largely semantic. Similarly, personal accidents of injury or illness are treated here as environmental problems, regardless of the role of human error in their causation.

These conventions perhaps blur some of the traditional dichotomies beloved of social scientists, but we are primarily concerned here with the problems faced by human beings in the real world, and not with the polarised abstractions of academics. A rather different problem is raised by the complexity of the natural and social environment and hence by the multiplicity of problems which the environment poses, whether practical problems for the inhabitant of the real world or analytical problems for the inmate of the ivory tower. A useful analytical tool in this respect, which is widely used to reduce complex ecological problems to manageable proportions, is the concept of the 'limiting factor': although organisms must cope with a multiplicity of environmental problems, their survival is usually limited in any given context by just one or two critical resources.

The limiting factors on human survival obviously vary from case to case, depending on the particular environmental and cultural context and on the temporal, spatial and social scale of analysis. Certain general observations are, however, possible. Respiration is a requirement of human survival which, in terms of its immediacy, takes logical precedence over virtually all others. Pre-

cisely because of its immediacy, however, this requirement is met by normal biological mechanisms and so rarely sets the limits on survival. At the other extreme, hazards such as dormant volcanoes may operate as limiting factors so rarely that they can be ignored by human populations. Such hazards can be, and regrettably are, 'coped' with by the ability of human fertility to compensate for occasional catastrophic mortality. Between these two extremes are other, more critical variables operating on a timescale closer to that of the human lifespan, which can be coped with neither by normal biological mechanisms nor by drastic demographic fluctuations. Culture is particularly well suited to coping with these problems on an intermediate temporal scale. The availability of staple foods is of outstanding, though by no means unique, importance in this respect. Because food is needed very regularly, and yet tends to be both irregular in its availability and unstable once acquired, it has long been a basic limiting factor on human survival. The structure of variability in food supplies is discussed in some detail in the next section.

Variability

In practice, variability may be conceptualised in two differing ways: as the actual pattern of variation in the food supply, or as the operation of those factors, ranging from climate to micro-organisms to human judgement, that influence the availability of a particular food resource. Regardless of the focus, the crucial aspect of the analysis is the timing, frequency and severity of shortages.

The influence of variability on human societies can be understood with reference to several key aspects of variability itself. Any source of variability will exhibit three diagnostic characteristics, temporal structure, spatial structure and relative intensity. These characteristics determine the scope and severity of the problem with which a society must contend. Knowledge of these features of the environment also provides the analyst with a powerful tool for predicting the kinds of strategies that would be successful in a given situation.

By temporal structure, we refer both to the timescale over which a given risk operates (i.e. how often it occurs) and to the duration of the resultant scarcity (i.e. how long it lasts). Spatial structure relates to the size of the affected area. A consideration of spatial structure also concerns the relative homogeneity of effect within an area, that is, the degree to which scarcity is evenly (or patchily) spread over the landscape. Hail damage to agricultural fields may occur over a wide area in association with a given storm cell and yet destroy fields within this area seemingly at random, with one field devastated and the next field untouched. Finally, intensity refers to the severity of shortages and to the degree of variation in severity that can occur. A particular cause of crop failure may be consistent or variable in the severity of its effects. Intensity may, therefore, be seen as having both a temporal and a spatial component.

In addition to these characteristics, variability can also be classified in terms of its relative predictability. Sources of variation that are predictable may represent seasonal or annual phenomena, such as the production of vegetal foods in the temperate zone, or

they may be cyclical over a variety of longer time scales (see Minc and Smith, this volume). What sets variation of this kind apart from other forms is its certainty. The effects are repeatedly felt at regular intervals. Likewise, the cultural responses to such scarcity can be regular and unambiguous. Indeed, within a given environment, a society's ability to cope successfully with such regular and predictable kinds of variation may be viewed as the minimum necessary conditions for survival and, as such, integral to normal existence.

Unpredictable variation may result from common factors, such as climate, isolated and sporadic occurrences, such as some forms of pest infestation, or may be cyclical phenomena on a timescale too long to be recognised. The lack of predictability associated with variability of this kind is often more difficult to buffer for the very reason that one never knows when the buffering mechanism will be called into play. So, where buffering mechanisms for times of expected scarcity are direct and unambiguous, the institutions employed to buffer unanticipated shortages may well perform many other functions within the society, particularly in good years. The necessary compromise with the institution's varied social functions may also sacrifice efficiency in risk buffering. Furthermore, the risk-buffering function of the institution may not be readily apparent either to an outside investigator or to a native.

By evaluating the factors that produce scarcity in terms of these three basic characteristics, therefore, one can obtain a relatively detailed profile of those elements with which a buffering strategy must cope. At the same time, the detailed evaluation of these characteristics may highlight unexpected solutions to problems of scarcity, made possible by exploiting particular aspects of the structure of variability. The nature of such strategies will be addressed in the next section.

Cultural responses to variability

To counteract scarcity, societies employ a wide range of practices which we term collectively 'buffering mechanisms'. As this term implies, such practices are designed to lessen the impact of variability by dampening its effects. Buffering may be realised through very different kinds of activity, including everything from myth to alternative cultivation practices and from storage to exchange. The usefulness of a given practice depends, of course, on the social and environmental context, including both the structural characteristics of the society at large and the structure of resource failure the society is likely to experience.

Despite the wide range of practices that may operate to lessen the effects of resource variability, such responses can conveniently be grouped into four basic categories: mobility, diversification, physical storage and exchange.

Mobility is the simplest of these responses and works by taking advantage of the spatial and temporal structure of resource failure in effect to move away from scarcity. The common hunter-gatherer system of flexible territorial boundaries and extensive kin networks that permits bands to move great distances in years of drought is a good example. One corollary of this use of mobility is to place a high premium, among both hunter-gatherers and pas-

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totalists, on the gathering of information to monitor environmental variability over a large area beyond their normal annual range.

Diversification is nearly as simple as mobility and includes a broad range of passive to active practices. The underlying principle of diversification is that broadening the base of the subsistence system, either by exploiting a wider range of plant and animal species or by exploiting broader and more varied areas, reduces the risk of catastrophic shortages – in effect it avoids placing all the eggs in one basket. At the passive end of the spectrum is the designation of reserved or emergency foods, that is, foods that under ordinary circumstances are not or cannot be eaten, but which are consumed in the face of extreme hunger. This represents almost a passive form of banking or savings. At the more active end of the spectrum is the use by farmers of dispersed fields (see Forbes, this volume), which are employed to lessen the risk of total loss due to micro-climatic factors, pests and the like, even at the expense of less efficient cultivation.

By the term 'physical storage', we refer to that range of activities that is directed toward stabilising available food so that it may be consumed at some later time. This is principally a means of dealing with the temporal structure of food availability. Although storage is of critical concern to agricultural societies, it may also play an important stabilising role in non-agricultural economies (see Rowley-Conwy and Zvelebil, this volume).

The final category of buffering strategy is exchange. The concepts of sharing and of reciprocity are virtually universal as social values and have been suggested by some investigators to be at the very core of the origins of human culture. As a device for buffering scarcity, exchange functions in a fashion similar to storage, in that present abundance is converted, this time via social transactions, into a future obligation in time of need. If I help my neighbour out of a lean season this year, I have the right to expect the aid to be reciprocated when the situation is reversed. The capacity of such relations, and indeed the certainty of reciprocity, can vary widely depending on the scale of the social units involved and the character of the exchange networks. So, for example, in small-scale societies, food may be given freely in time of need with little formal recognition of the anticipated reciprocity, while in more complex circumstances, it may be necessary to denote obligation through the counter-movement of valuable tokens. The process of conversion, through which a token becomes imbued with the latent equivalent value of food, finds its logical extension in modern cash economies. Interactions that are characterised by 'negative reciprocity', such as raiding, theft and appropriation, can also be placed under the broad heading of exchange.

All four categories of buffering mechanism exploit favourable aspects of the temporal and spatial structure of variability to mitigate the risk of scarcity. Mobility and diversification use local abundance to counter local scarcity, while storage balances seasons of plenty against lean seasons and good years against bad. Exchange secures a stable food supply by playing off temporal variability against spatial variability. As a result, different types of response are suited to buffering different sorts of risk.

Two categories of response may be mutually incompatible: storage, for example, seriously prejudices mobility and *vice versa*. On the other hand, different categories of response may also be combined in a single buffering strategy. The 'hxaro' system of guest friendship among the Bushmen, for example, whereby those in need visit distant exchange partners, neatly combines mobility and exchange. More important still, most societies deploy an array of different strategies in a hierarchy of responses, which are equated with both the scale of the producing and consuming units (individuals, households, villages, states) and with the magnitude of the resource failure encountered. In this sense, societies are faced with a trade-off between security, as reflected in the ability to withstand increasingly severe and rare fluctuations, and efficiency in terms of normal subsistence activities and of avoiding investment in precautions that will only rarely be used. Relatively minor shortages may be handled by a single mechanism at a local level, while serious or generalised resource failure may require mobilisation of the entire population and progressively more drastic counter-measures. In the light of this difference in the scale of response, a distinction may be drawn between low-level and high-level mechanisms. Low-level mechanisms are the most efficient and the most reliable, but are of strictly limited scope. High-level mechanisms are more powerful, in terms of the scale of shortage which they can buffer. By virtue of their size and the relative rarity with which they may be activated, however, they can be both costly, in the energy invested in their maintenance, and unreliable, in that they may depend on distant social relations, may entail reversal of cultural norms and, more generally, may fail through long periods of disuse. In a way, the fate of high-level coping mechanisms is shaped as much by the frequency and regularity with which they are not used as by that with which they are activated. In the long term, therefore, there is strong selective pressure for communities to embed these 'emergency' mechanisms as regular aspects of the cultural repertoire (see Garnsey and Morris, this volume). For example, surpluses may be earmarked for feasting at a particular annual ceremony, thus ensuring their continued production through a long run of good years. Whilst this embedding may reinforce the survival of a cultural form used only rarely as a coping mechanism, it may also undermine this latent function if the surplus cannot be redirected in time of need. In this way, high-level mechanisms may be embedded to the point where they are irreversibly transformed, with radical consequences for the articulation and survival of that society (see Jongman and Dekker, this volume).

Predicting uncertainty

In any society, therefore, we can expect an essential balance between those factors that produce scarcity and the mechanisms that are employed to ameliorate these effects. Yet, for any given environmental setting, there are numerous alternative strategies that could successfully be pursued. The particular strategy that is likely to be employed is strongly influenced and constrained by several features of the society in question, including the size and density of the local (and regional) population, the intensity of subsistence exploitation and the level of technological sophistication.

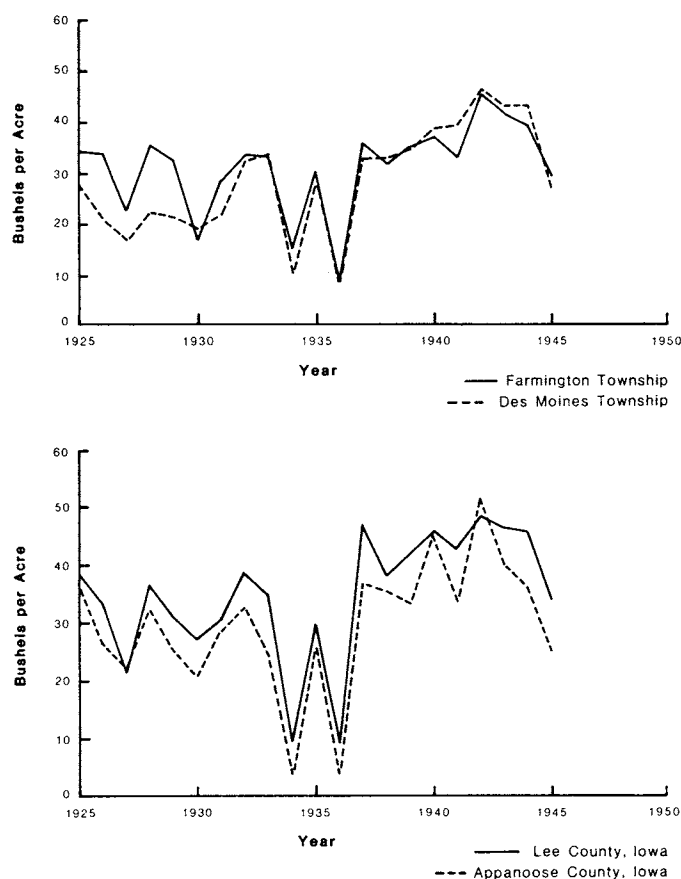


Fig. 1.1. Maize yields from southeastern Iowa, 1925–45, for (a) the two most dissimilar townships within Van Buren county and (b) the two most dissimilar counties within southeastern Iowa.

These aspects of the cultural ecology still do not determine the particular strategy a society will practise, but they do limit quite substantially the number of successful options.

Because of the limited range of choices open to a society, given these factors, it is possible to use data on variability to predict both the kinds of buffering strategies that will be employed and to estimate the parameters the various mechanisms must maintain in order to be effective. This predictability is of particular use in the study of prehistoric societies, where data on social relations and activities are necessarily indirect, but where the structure of resource variability can often be determined independently.

The nature of resource variability and of its potential fit with cultural buffering mechanisms can be illustrated by reference to maize yields from southeastern Iowa (USA) during the years 1925 to 1945. Figure 1.1a plots yields in terms of bushels per acre for the two most dissimilar townships within Van Buren county (a township is a square region, six miles [9.7 km] to a side, while Van Buren county covers an area of roughly 500 square miles). Figure 1.1b plots yields over the same period of time but for the two most dissimilar counties within southeastern Iowa, a territory encompassing roughly 6000 square miles.

Maize yields in the region are characterised by relatively high temporal variability (i.e. considerable variation from year to

year) and at the same time by a very low level of spatial variability (i.e. little variation from place to place). Given such a pattern of variability, the most likely mechanisms for accommodating years of bad harvest would be local storage of grain in good years and diversification, either in the crops grown or through the exploitation of non-agricultural food sources, such as livestock. In the absence of a sophisticated transportation network, however, the lack of spatial variability over very large areas would seem to rule out exchange as an important buffering strategy.

Although this example highlights the relationship between the structure of variability and the selection of effective countermeasures, it can also be used to illustrate how cultural variables, such as population density and subsistence technology, exert a strong influence on the definition of the effective environment. Modern-day farming in the region is extensive and largely rain-fed, meaning that summer precipitation is a crucial factor affecting crop yield over the entire area. Yet, when the same basic crop, maize, was cultivated by native Americans in the region, using small, optimally located and widely separated fields, the factors producing variation in yield were dramatically different. Although the fields were still subject to the same precipitation regime, smaller-scale effects, such as soil type, micro-climate, insects, fire and hail increased in importance as factors producing significant variability. As a result, spatial variability was probably greater than that represented for modern farmers, and may have been sufficient to make some level of exchange a useful option.

Risk buffering and social change

The importance of variability and buffering lies not only in the immediate realm of provisioning and economic activities, but extends beyond these to exert a strong influence on culture at large, shaping societal organisation and providing the crucial conditions that give rise to social change and transformation. It is these wider ramifications that make the investigation of variability and buffering so significant.

Although human beings are biologically and culturally adapted to a wide range of environments, the hallmark of culture is its flexibility and the strength of human culture is most fully realised in coping with recurrent but unpredictable deviations from normality. Yet, within any society, the delicate balance between variability and cultural response is matched by a similar balancing between increased security, represented by progressively more drastic and expensive buffering mechanisms, and increased efficiency, allowing only for common eventualities.

The most powerful mechanisms, and the most costly, are those that cope with problems of unusual severity or exceptional scale. Although prone to falling into disuse because of the infrequency with which they are activated, these high-level coping mechanisms may serve a critical function in cases of extreme shortage. As a result there is strong selective pressure for them to become increasingly embedded within more regular cultural practices and so, potentially, to develop widespread ramifications throughout the social system. In this way, the critical energy or information required for the operation of the buffering mechanism is maintained, but often at the cost of considerably reduced ef-

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iciency. At the same time, this process may serve to promote the social institution(s) within which the coping mechanism is embedded. It thereby creates in these multi-layered social institutions both the potential and the means for social change.

One likely outcome of this process is the radical transformation of society, as perhaps in the appropriation of risk-related surplus for the maintenance of an elite. In this case associated changes in other aspects of social or economic behaviour are likely to unleash new sources of risk, leading either to the development of new coping mechanisms, and potentially to the start of another cycle of cultural change, or to the undermining of existing coping mechanisms, resulting in catastrophic rather than transformational change. Either way, high-level coping mechanisms are an unstable element at the core of human culture, which can trigger a chain reaction of changes throughout society.

Prospect

The conclusion of the previous discussions has been that cultural mechanisms for coping with scarcity play a central role in the maintenance and transformation of human societies. This approach also has rather broader implications, which may be considered at three levels – empirical, heuristic and theoretical.

At an empirical level, recognition of the importance of variability may help to resolve some apparent contradictions in ethnographic or historical records. Such records are usually assumed to represent normal or average conditions and contradictory information is thus explained in terms of differing local circumstances or in terms of the unreliability of certain sources. In fact many ethnographic and historical reports are based on too few observations to make a reliable estimate of average conditions and so these 'contradictions' may be accurate reflections of actual variability, rather than inaccurate estimates of a hypothetical norm.

Of course the quality and quantity of information needed to document variability directly is far greater than that required to produce a simple average figure and such data are often unavailable. The basic structure of variability in a particular situation, however, may often be extrapolated from better-documented cases – indeed, the structure of variability can often be established even in cases where the average is unknown. For example, the *relative* structure of variability in the ancient crop yields from a particular area may be established by extrapolation from modern data for the same area without estimating any *absolute* mean value. This point is of particular importance for prehistorians, who rarely have direct evidence for such variables as average crop yields and, as has already been argued, the structure of variability may be more significant than average conditions for understanding human society.

At a heuristic level, an emphasis on variability is of considerable value in the analysis of cultural practices and institutions. Environmental variability is a fact of life and extreme variability may threaten life. The consequences of variability must be evaded or buffered and man employs a wide array of cultural mechanisms to this end. It must be stressed that not all cultural behaviour serves to buffer risk, nor can any individual cultural form

be understood solely in such terms. Nonetheless, some practices and institutions serve, literally, a vital role in mitigating the effects of variability and some of these buffering mechanisms occupy a central position in human behaviour and in the articulation of human communities. In this volume, a wide range of cultural practices and institutions is examined from this perspective, ultimately with a view to evaluating the heuristic value of this approach for understanding social change.

This approach may also be useful at a more theoretical level. Although the study of economy – of how societies satisfy their (material) wants – has long been a central concern of social science, this area of enquiry is the subject of considerable controversy. Economic and social determinists dispute the importance of this concern to the study of human society; environmental and cultural determinists dispute the definition of wants; and substantivists and formalists dispute the means by which these wants are satisfied. No polar stance is required. The environment is understood to include both a natural and a social component. Moreover, the environmental problems facing man are specific to particular cultural contexts and as such are the product of both (external) environmental and (internal) cultural factors. Finally, the indisputable anthropological observation that economic activity is normally socially embedded in no way invalidates the basic tenet of economics that this activity is frequently concerned with the allocation of resources which are scarce, and in some cases fatally scarce. On the contrary, human communities use a variety of cultural mechanisms to cope with risks such as the extreme scarcity of resources, and the most powerful of these mechanisms entail the mobilisation of social relationships. Viewed from this perspective, these traditional polarisations are as obstructive to the study of man as they are non-sensical.

Organisation of this volume

The contributions in this volume examine the problems of variability and risk buffering over a wide range of scales and in strikingly different cultural and historical contexts. The diversity is intentional and is designed to emphasise both the wide applicability of the approach adopted here and the wealth of different ways in which human communities cope with environmental variability.

The papers that follow are ordered along a continuum of increasing organisational complexity, starting with simple hunter-gatherers and ending with modern states. This organisation was selected for two basic reasons. First, buffering strategies tend to be additive, that is, as societies become larger and more complex, new higher-order mechanisms are added or superimposed onto more basic practices. The present organisation of chapters therefore allows the more fundamental kinds of mechanisms to be examined first, in the contexts of hunter-gatherers or simple farmers, and then for a variety of higher-order mechanisms to be examined which operate concurrently in more complex societies. The second value of the present organisation is the emphasis it places on the increasing scale and costs of buffering strategies as the focus shifts from simpler to more complex social forms.

It should be stressed that these contributions are all case

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studies, in which the authors have selected a particular aspect of variability and risk buffering on which to concentrate. No author has attempted to analyse all potential sources of risk or all the possible cultural practices that might play some role in risk buffering. This process of selection, exemplified in the individual chapters, highlights the value of the approach as an analytical tool, en-

abling the investigator to use risk buffering at a given scale as a means to focus on particular kinds of social institutions or practices for either synchronic or diachronic study. Equally, it stresses the practical necessity of clearly defining the nature and scale of the problem, given the nested and all-pervasive character of both risk and risk-buffering activities.

Chapter 2

The spirit of survival: cultural responses to resource variability in North Alaska

Leah D. Minc and Kevin P. Smith

While the basic structure of responses to scarcity is constrained by the nature of those stresses which coping mechanisms must mediate to be effective, the implementation of coping strategies is predicated on the sociocultural context, which defines the range of organisational and technological options for mediating periods of subsistence stress. In this chapter, we reconstruct the spatio-temporal scales of variability in the major faunal resources of interior and coastal Alaska for the late prehistoric and protohistoric periods from variability in relevant climatic and ecological factors. From the structure of resource variability, we predict the basic structure of coping responses, and examine how specific coping strategies were modified over the past 1000 years to adjust to changes in resource structure and sociocultural context.

While environmental changes of certain magnitudes require adaptive adjustments in subsistence behaviour, the nature of the response is determined in large measure by sociocultural rather than by environmental variables (Euler, Gumerman, Karlstrom, Dean and Hevly 1979: 1089).

At the time of European contact in the early 1800s, Iñupiat Eskimos inhabiting coastal and inland North Alaska pursued ecologically distinct ways of life. The *tareumiut*, or 'people of the sea', practised a subsistence economy based on sea-mammal hunting, with an emphasis on whaling. Tareumiut settlement was accordingly distributed along the coast in relatively permanent villages. The *nunamiut*, or 'inland people', in contrast, focused primarily on

hunting the migratory caribou and ranged widely over the interior regions from the Brooks Range north to the Arctic Coastal Plain (Figure 2.1).

For traditional hunting societies, the interior and coast constituted complementary resource zones which experienced similar short-term and long-term patterns of scarcity in their primary subsistence resources, but differed significantly in the timing of those fluctuations, as well as in the density, distribution and variety of alternative resources. By the historic period, cultural responses to subsistence stresses of the coast and interior had given rise to a survival strategy in which the Tareumiut and Nunamiut were economically interdependent societies, linked by inter-regional alliances which converted short-term resource abundance into long-term social insurance.

The particular configuration of responses to scarcity developed by the Nunamiut and Tareumiut represents the end point of an extended history of survival tactics, in which the changing structure of resource variability and the emergence of new institutions and technology continually redefined the constraints on, and options for, survival. In this chapter, we examine the interplay of natural and cultural factors constraining hunter-gatherer responses to risk in North Alaska. We first outline a model linking the basic structure of survival strategies to the basic spatial and temporal structure of subsistence stress for hunter-gatherers. We then evaluate the sociocultural context of survival strategies, including the social, technological and cognitive systems which sup-

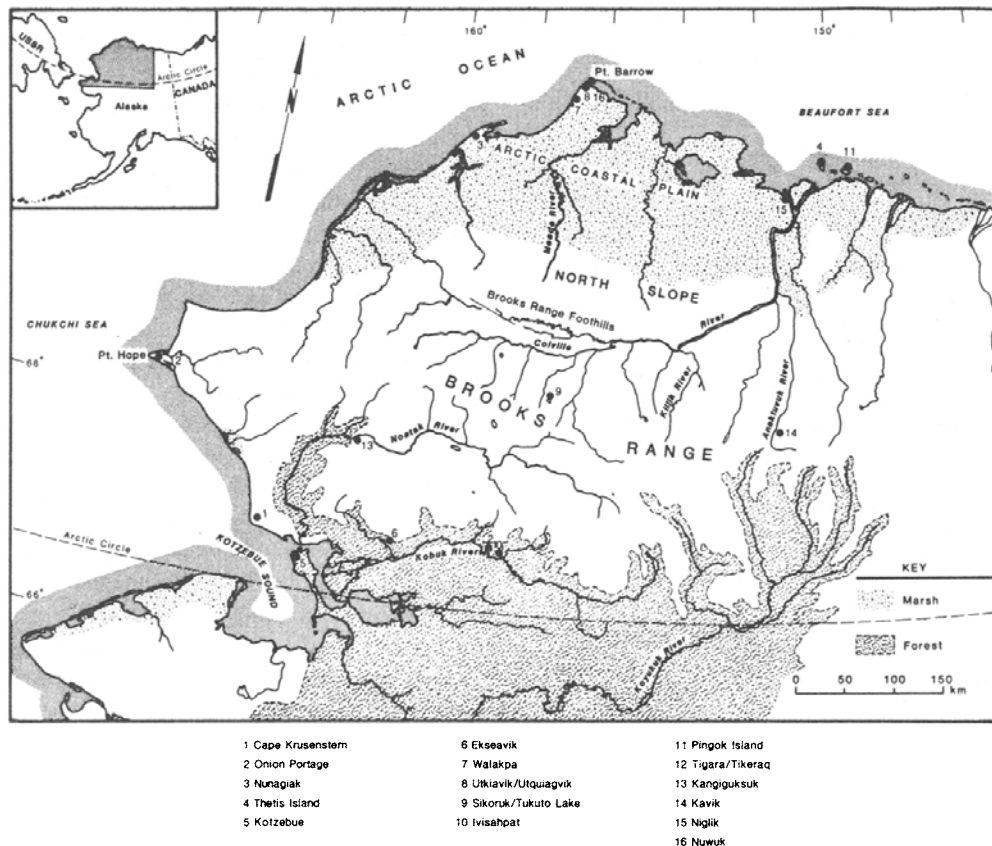


Fig. 2.1. Major physiographic features of North Alaska and sites specifically discussed within the text

port their maintenance and utilisation. Finally, we examine the operation and development of coping strategies in North Alaska over the past millennium, through consideration of the changing structure of subsistence resources and the changing sociocultural context for mediating subsistence stress.

The structure of resource variability and coping responses

Halstead and O'Shea (introduction to this volume) have identified four basic categories of response to risk which can be considered general *coping strategies*. These are (1) diversification, which attempts to counteract scarcity of one resource through recourse to others; (2) mobility, which attempts to even out spatial discrepancies in resource availability by movement between areas of localised resource abundance; (3) storage, which attempts to even out temporal discrepancies in resource availability, by 'saving it for later'; and (4) exchange, which attempts to play off temporal variability in resource availability against spatial variability in resource abundance (cf. Colson 1979; Minnis 1985: 32–42).

As general coping strategies, diversification, mobility, storage and exchange potentially operate over a broad range of spatial and temporal scales. For example, although a particular form of storage may be limited in its efficacy to mediating crises of relatively short duration (Rowley-Conwy and Zvelebil, this volume), the strategy of storage (that of evening out temporal discrepancies in resource availability by 'saving it for later') is not

necessarily so limited. It is the adaptation of these general strategies to the specific structure of subsistence stress which generates the variety of cultural phenomena collectively known as 'buffering mechanisms'.

Responses to subsistence stress are effective only if they transcend, spatially and temporally, the adverse conditions. Accordingly, an analysis of resource variability provides a basis for characterising the basic structure of mediating responses by specifying those contingencies which a given strategy must meet to be effective. Resource variability can be measured along a number of axes, reflecting differences in resource abundance, predictability, and duration and extent of fluctuations, relative to the availability of alternative resources and the coping capabilities of the group under consideration. For example, the *productivity* of a resource determines its potential for *utilisation*, while greater *predictability* or *stability* permits a greater *reliance* on a resource, *ceteris paribus*. However, *productivity* is a function of both physical characteristics, such as body size and abundance, and such cultural factors as the organisational and technological capabilities of a society to be successful in procuring that resource (Jochim 1976, 1981). Similarly, the *reliability* of a resource results both from spatio-temporal fluctuations in its availability and from the success rate of a particular method of procurement. The productive potential and reliability of a resource will therefore vary through time and space in response to differences in resource structure as well as to differences in hunting/storage tactics and technology.

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Table 2.1. *Coping strategies vs. spatio-temporal scale of subsistence stress*

General coping strategies	Continuum of stress conditions	
	Low severity (localised, short-term)	High severity (regional, long-term)
Diversification	local secondary resources	extra-regional resources
Mobility	increased intra-regional logistic/residential	inter-regional migration
Storage	intra-community (physical storage)	inter-community ('social storage')
Exchange	generalised reciprocity/informal sharing at intra-societal level	delayed reciprocity/formalised trade at inter-regional level or negative reciprocity (raiding and theft)

The structure of alternative resources is crucial to the character of environmental uncertainty. Whether the potential alternative resources respond to the same factors as the primary resources, and so vary 'in phase' or 'out of phase' with them, is a critical temporal consideration. Similarly, the spatial organisation of alternative resources, whether aggregated or dispersed, local or distant, used by other groups or not, and the scheduling necessary for their exploitation will constrain the options for buffering scarcity of primary resources.

Because effective responses to risk must match the structure of resource variability, increasing duration and extent of stress lead to a corresponding increase in the spatio-temporal scale of response. In non-stratified societies, this proceeds primarily through an expansion of the social network through which subsistence activities are organised and resources obtained (Wiessner 1977, 1982; Minnis 1985; Spielmann 1986). This network effects an averaging or 'pooling' strategy for risk reduction, in which the impact of localised disaster is diluted by spreading its effects over a wider social arena.

As episodes of stress increase in severity, the capabilities for coping locally are exceeded and the socioeconomic unit or network involved in pooling resources and risk expands. Household and community-level responses are activated first, followed by more extensive social alliances. However, as the scale of subsistence stress expands beyond the bounds of 'normal' social interaction, an increasing degree of formalisation, or ritualisation, is invested in the maintenance of the social relationships which guarantee access to needed resources.

Thus, increasing severity and scale of stress have implications for how diversification, mobility, storage and exchange are implemented among hunter-gatherers (Table 2.1). That is, as the severity and hence the spatio-temporal scale of the perturbation

increases, the size of (a) the spatial area over which a given strategy operates and (b) the social unit integrated by that response must correspondingly increase.

For instance, in the event of primary resource failure, procurement may be diversified to include local secondary resources and famine foods. However, if the duration of the failure extends beyond the limited support capacity of local secondary resources, diversification must be expanded to include non-local resources. Similarly, as the size of the area monitored or exploited increases, so does the degree of mobility. More frequent residential moves or longer-distance forays may be adequate responses to reduced local resources, but effective utilisation of non-local resources may involve extra-regional migration.

Exchange networks can also expand to dilute the impact of subsistence stress. Intra-societal exchange or sharing evens out short-term, localised differences in hunting success through the pooling of resources. In a long-term or regional resource failure, however, where survival depends on access to resources and goods outside the normal network of reciprocal obligations, social access will be maintained through increasingly formalised means of exchange, such as trading partnerships, or through delayed obligations inherent in 'social storage'. In the absence of accepted, mutualistic avenues of exchange, necessary resources may be acquired through negative reciprocity, in the form of raiding and theft.

While specific tactical uses of the various coping strategies may be mutually exclusive, at other levels of analysis, and in particular structures of response, they represent nested levels of response within the overarching survival strategy utilised by a society. For example, where high interannual variability makes the amount of a resource which is needed unpredictable (such as when resources are stored for use over the winter, but winter conditions vary greatly), one effective strategy may be physically to store enough of the resource to overcome the 'worse-case' scenario (Rowley-Conwy and Zvelebil, this volume). In good years, unused surpluses from such a tactical response may then be converted into social alliances and debts, through gift giving and the hosting of feasts, thereby creating a form of social storage against long-term variability. Examination of adaptive strategies must therefore concurrently consider solutions to long-term fluctuations and short-term variability in resource abundance and predictability, as these form the matrix upon which both immediate decision-making and long-term processual change are operative.

-The sociocultural context of survival strategies

Although the basic structure of response to stress is governed by the nature of resource variability, the realisation of a given survival strategy is embedded in its sociocultural context. The implementation of a given *coping strategy* is predicated on the existence or development of specific *sociocultural mechanisms*, including technological capabilities and social institutions. For storage to mediate a period of scarcity there must be adequate technology for preserving food caches; similarly, exchange rests on predefined social alliances and the social institutions supporting those alliances.