# 7. HUNTING VERSUS GATHERING IN AN ARID ECOSYSTEM: THE EVIDENCE FROM THE NAMIB DESERT

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A recent paper by Foley (1982) has reconsidered the role of hunting of large mammals by tropical hunter-gatherers. He argues that regions that receive less than 500 mm mean annual rainfall support economies that are more dependent on gathering than on large-mammal hunting. This paper will consider the relevance of Foley´s model for understanding hunter-gatherer adaptations in the Namib Desert.

In his paper, Foley (1982) looks at current models of hunter-gatherer adaptations which predict that tropical latitudes are more suited to gathering than hunting. He refers most frequently to Lee´s (1968) report of his work among the Kalahari San which suggested that the importance of hunting relative to gathering was related to the availability of resources and this in turn was related to latitude. The tropics were more suited to gathering than to hunting, a situation which is reversed at high latitudes where few plants are available. Lee showed (1968) that plant food was abundant and predictable and was more economical to harvest than animals which were more unpredictable, both in space and time. This work was subsequently confirmed by Silberbauer (1972) for the G/wi, and by Tanaka (1976) for the Central Kalahari San. Foley, however, feels that these samples are not representative of San populations and that a direct examination of ecological conditions is necessary for modelling hunter-gatherer adaptations. For the African tropics, he shows the strong positive correlation between rainfall and large-mammal biomass. Three points are made. Firstly, large-mammal biomass peaks at between 1 200 and 1 400 mm precipitation (reading from the graph in his Fig. 6). Secondly, between 500 and 1 500 mm rainfall plant communities are dominated by grasses with few edible species available for humans. Below 500 mm one finds xerophytic plant communities with many edible species; above 1 500 mm are found woody communities with many edible species. Thirdly, by combining these data he obtains a graph of "percent dependence on hunting" (PDH), an index of the relative importance of hunting to gathering, by which it is predicted that the PDH rises to as much as 80 % between 500 and 1 500 mm mean annual rainfall but drops to less than 40% for those areas below 500 mm or greater than 1 500 mm. The shortcomings of Lee´s (1968) model were due to the fact that hunter-gatherers are no longer to be found in savanna areas. Rather, these areas are inhabited by pastoralists who are dependent upon large mammals for their subsistence, and not on plant foods.

There are, I think, two important points that need to be considered in connection with Foley´s model. Firstly, I do not think that the model can be divorced from topography. For example, a mountainous area receiving 1 200 mm rain will not have the same carrying capacity of large-mammal biomass as a savanna grassland. Irregular topography leads to fragmentation of grazing resources, and rough terrain severely inhibits the movements of large numbers of cursorial ungulates. There is also the problem of substrate. A sandy substrate such as that of the Kalahari results in rapid draining of surface water whereas the stony substrate of the Namib gravel plains, particularly in granite areas, tends to trap surface water, thereby making it available for a considerable period of time. This gives water-dependent species such as zebra (Equus zebra hartmannae) longer term access to such areas. Secondly, we must consider how well the model has stood up to the archaeological evidence. Much research, undertaken by Parkington (1972) in the western Cape and by Deacon (1976) in the southern Cape, has shown the importance and variety of plants in the subsistence strategies of Later Stone Age (LSA) peoples. Klein's (1977) faunal analyses have shown a reliance on snaring small game rather than on hunting big game during the LSA. Most of these sites are within the 500 mm isohyet, with the exception of Melkhoutboom which appears to be closer to 700 mm but perhaps topography is the deciding factor here. At the same time, archaeological assemblages from these sites, as well as others in the northern Cape, have shown a very high ratio of scrapers to backed elements such as segments and backed blades. If we make the not unreasonable assumption that segments and backed blades may have been used as projectile points on arrows (Clark et al. 1976), then their low relative frequencies (Fig. 1) add confirmation that gathering was relatively more important than large-mammal hunting. The frequencies for the Zambian assemblages are reversed; the sites occur in areas formerly rich in wildlife, with rainfall varying from 650 mm to greater than 1 000 mm. Although abundant plant remains were also found, it is clear that large-mammal hunting was relatively more important here than further south.

I will now turn to a description of the Namib in order to test its "goodness of fit" to Foley's model. The Namib Desert extends from the northern Cape Province through Namibia into southern Angola. It is a coastal desert some 75-150 km wide and consists of two main physical units, namely sand dunes to the south of the Kuiseb River and gravel plains to the north. It gradually grades into the semi-desert transition savanna to the east and thence to the higher rainfall areas. The most important limiting factor for primary productivity in any arid system is water. Precipitation in the desert proper is, on average, less than 50 mm per annum. In the transition zone it is less than 200 mm. Rainfall is also highly variable with regard to both space and time. Rainfall typically occurs in thunderstorm "cells" up to 5 km across that sweep across the country. A single fall could provide the total water for the season. Seely (1978) has shown, however, that it requires only 21 mm of rain to produce a standing crop of grass. It is possible for a single thunderstorm to produce up to 60 mm of rain in a single 24 hour period (60 mm fell at Pelican Point on 30/3/76 out of a total of 71,4 mm for that year). Primary productivity resulting from this type of rainfall is patchily distributed over the landscape. These green patches in turn attract herds of grazers from inland (Simoes 1971). Consisting primarily of zebra, gemsbok and springbok, these herds coalesce and can number several hundred animals. Even in modern times, herds of up to 600 gemsbok (Oryx gazella) have been seen in the southern Namib (C.G. Coetzee, pers. comm.). These seasonal concentrations were unlikely to have been a regular annual event at any one place but probably only occurred when conditions were favourable (Jacobson 1981). There would also be a time lag to allow growth to take place between the rainfall and the exploitation of a green patch. One point needs stressing: however ephemeral, infrequent or even luxuriant the plant growth of the plains, it has all the characteristics of a savanna grassland. From the point of view of the hunter-gatherer, plant foods are extremely sparse, with one exception (W. Giess, pers. comm.). Vast quantities of grass seeds are collected and stored in underground chambers by the harvester ant (Messor barbarus capensis); these seeds are then taken from the nests by present-day pastoralists. The seeds can be used in a variety of ways either whole or ground into meal. Nests are abundant, easily spotted and the seeds can be rapidly collected.

The desert corresponds very closely, on an irregular seasonal basis, to the zone defined by Foley (1982) as lying between 500 mm and 1 500 mm and predicted as having a high "percent dependence on hunting". For a few weeks or months after minimal rainfall the carrying capacity over small areas rises steeply (Fig. 2) matching or even exceeding the average annual carrying capacity inland. The large game concentrations consequently provided excellent hunting opportunities, thus probably resulting in the development of a specific, highly mobile hunting technique. One can predict from this that those sites with a catchment focused on the gravel plains are likely to have higher ratios of backed pieces to scrapers. I should emphasize that not every site or assemblage should be expected to conform to this model as changes in the use of artefacts or raw materials could possibly be expected as a result of contact with, for example, herders or metal users. Sites could have also been used for activities not necessarily related to immediate subsistence needs. Figure 3 shows the frequencies of scrapers relative to backed blades and segments for four restricted areas: the Brandberg, Twyfelfontein, the Erongo and Mirabib (Jacobson 1978). The first two lie approximately on the 100 mm isohyet, the Erongo close to the 200 mm isohyet and the last is in the less than 50 mm isohyet. The assemblages show a quite different pattern from those from South Africa and Zambia. The interpretation of Figs 1 and 3 is obviously complex and cannot be dealt with in detail here. One thing, however, that should be pointed out is that those Namibian assemblages with relatively higher scraper ratios are from sites whose catchments tend to be mountain-orientated. They also tend to represent assemblages that are also more recent in age. A careful examination of Fig. 1 will show that South African assemblages also tend to become scraper-dominated over time. These similar tendencies could thus result from contact with ~~immigrant Europeans~~ and the introduction of new technologies and raw material such as metal.

Faunal remains are unfortunately not very informative because sample sizes are small and the bones highly fragmented. Analysis does, however, show that, in addition to small game, large bovids and equids were being taken (R.G. Klein, pers. comm.), particularly in those sites with a plains catchment.

In conclusion, one final point may be made. Foley cites, as further evidence to support his hypothesis for a greater dependence on hunting in savanna grasslands, the fact that these areas are today inhabited by pastoralists who are dependent upon their animals for sustenance. There is also evidence that the Namib gravel plains were used by pastoralists on a seasonal basis in the past (Carr et al.

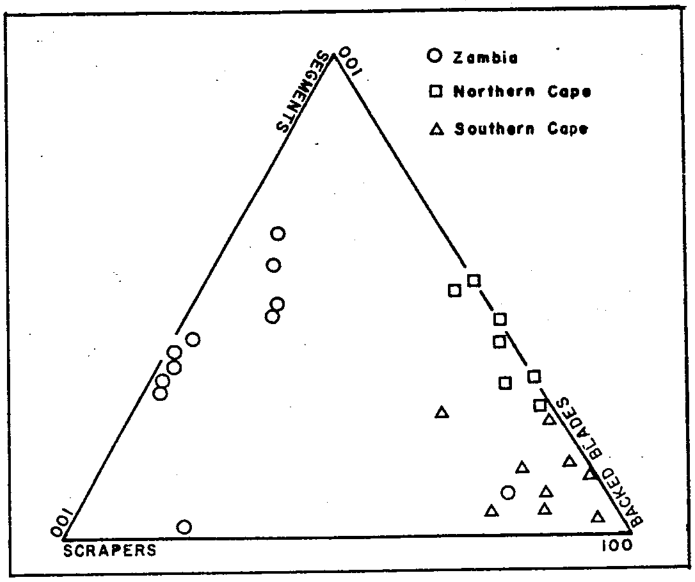


Fig. 1 Tripolar graph showing assemblages from Zambia and the northern and southern Cape Province, South Africa. (After Jacobson 1978.)

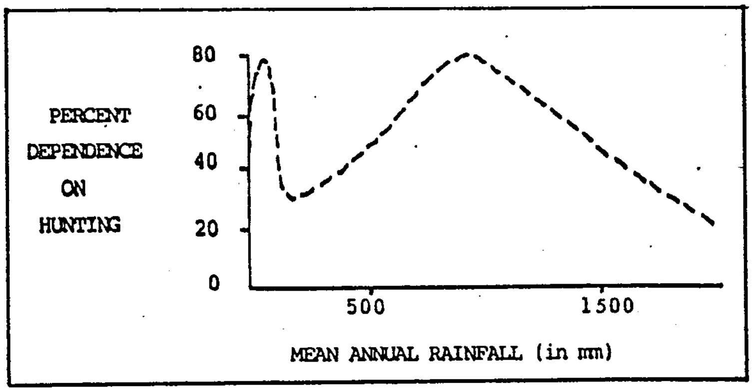


Fig. 2 Foley's (1982) model revised to take into account the seasonal occupation of semi-desert grasslands.

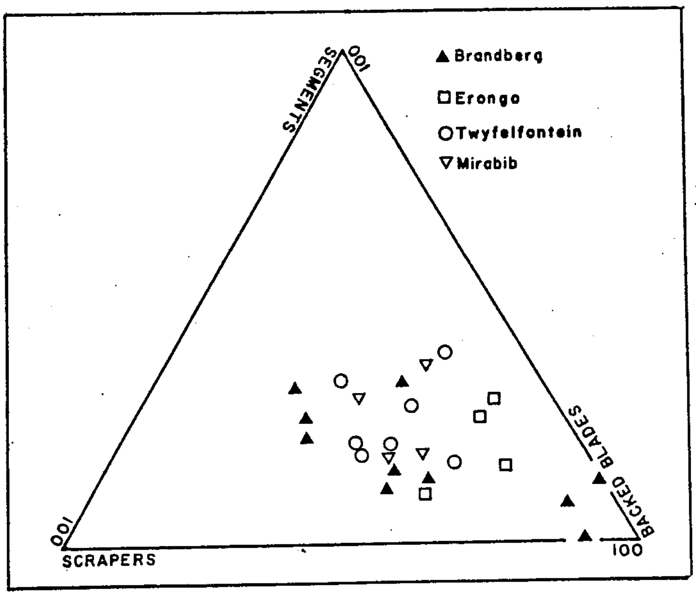


Fig. 3 Tripolar graph showing assemblages from SWA/Namibia. (Data from Jacobson 1978.)

1978) as they are today (Honey 1982). We are in fact looking at two similar systems, one short-term, the other long-term. Both the hunters and their large-mammal prey and the herders with their flocks would have been responding to a similar signal, rain in the desert. Foley's model, suitably amended, would thus serve to explain some aspects of inter-assemblage variability in the archaeological record.

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