

CULTURAL AND ECOLOGICAL PERSPECTIVES FROM THE TURAN PROGRAM, IRAN

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INTRODUCTION

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THE HISTORICAL SIGNIFICANCE OF DESERTS

A zone of arid and semi-arid country stretches from the Atlantic through northern Africa and the Middle East into Central Asia and India. Besides the Sahara and the Arabian and Iranian deserts it includes vast areas which although not totally barren are subject to low and unreliable rainfall. They include parts of the Fertile Crescent where economies based on the domestication of grains and animals first developed in the Middle East, and they have contained the sites of significant human activity since the earliest times. But as a result their appearance and composition have changed, and they have recently become the subject of serious controversy on a global scale: ecologists see a long-term trend towards the final desertification of these lands, but although they can formulate technical management programs to stem or reverse the trend, the local populations cannot always be persuaded to implement them.

The modern era of industrial technology and agricultural development has come to most of these areas only in the last two decades. It involves a new perception of natural resources and tends to cause distrust of traditional agricultural and pastoral practices. Local populations are accused of causing long-term environmental degradation especially by reducing vegetation cover and allowing wind and water erosion and sand accumulation, and by salinization through inefficient irrigation. Since populations are now in most of these areas demonstrably larger than ever before, it is assumed often that these trends towards degradation threaten imminent ecological disaster, and that traditional technologies must be changed by intervention, in order both to save the local popu-

lations from the consequences of their own actions and to conserve the natural resources for the world community in perpetuity.

An alternative point of view emphasizes that despite their vulnerability the populations of these areas have survived from antiquity, showing little or no technological change for several millennia up to the development efforts of recent decades. Their survival suggests that they may be "co-adapted" with their natural environment: that their traditional pastoral and agricultural strategies and the present conditions of the natural environment together form a system which has developed by mutual interaction as a response to irregular cycles of relative humidity and drought. Despite what now appear according to modern standards to be unsatisfactory living conditions and unpleasant short-term fluctuations, many groups and sites have remained significantly stable, and are documented for well over a thousand years. Interference in this type of system could cause more harm than good.

From 1968 to 1973 a major drought afflicted the drylands of Asia and Africa. In the Sahel region of Africa, where the ensuing famine and human misery have been reported in most detail, this drought appeared at first to mark an historical change in the ecology of traditional systems of food production. Although the severity of the drought was no greater than might statistically be expected to recur more than once in a century, this time the local populations appeared to have lost the adaptive capability to survive it without radical long-term effects that would change for good the culture and the political and economic structures of the area. Advisers from international and

Acknowledgments

The Turan Programme, and therefore also this project, owes its existence in the first place to Mr. Eskandar Firouz, who as Director of the Department of the Environment in Tehran both commissioned it and consulted and advised in the details of the research from 1975 through 1977. At one time or another during that period the Programme called on the majority of the staff of the Department in Tehran, but among them Dr. Fred A. Harrington who carried out the first ecological survey of Turan in 1971 and Dr. H. Mohammadi who supervised the administration of the Programme, deserve especial mention for their support and help; also, the local employees of the Department—the game wardens in Turan, helped enormously with the physical and logistical problems of fieldwork.

Since 1977 when the Programme was transferred to the Ministry of Agriculture we are in the debt of Dr. A. H. Borhan, Deputy Minister for Research, for his invaluable support and of Dr. I. Nassiri-Toussi, Deputy Director of the Soil Science Institute, for his administrative assistance. The American

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The desert supplies the city. In a mediaeval classic Persian tale, shepherds offer milk to Farhad and Shirin from a channel specially dug to convey the milk direct from the dry rangeland to the palace. (From the *Khamsa* by Nizami, a manuscript in the University Museum Collection: NE-P-33)

Institute of Iranian Studies in Tehran also rendered valuable assistance.

The support of the Secretariat of UNESCO's Programme on Man and the Biosphere has been important not only financially but in the opportunities it has afforded for interaction with similar research programs in other areas.

Many members of the population that is the subject of this study also participated in it. Without their cooperation and hospitality it could not have been done. Each of us enjoyed getting to know them and their environment and sharing some of the events of their lives. We hope they will feel that the trouble they went to in assisting us was worthwhile.

Finally, we all gladly acknowledge once again the special debt we owe to Ms. Eileen Bliss for her invaluable assistance without which the Turan Programme would never meet its publication deadlines.

Except as noted, photographs are by Brian Spooner, Lee Horne and Mary Martin. Satellite images are by Christopher L. Hamlin.



bilateral agencies impugned the traditional technologies. Whether or not these traditional systems of food production had worked in past conditions or sparser populations, the people appeared now to have lost the flexibility of organization which would have allowed them to cope with drought, and to be locked into a course which could only lead to disaster both for themselves and for the resources on which they are dependent.

As the facts became clearer it appeared that although population growth was undoubtedly a factor, the effects of the development programs of the previous decade had been a major contributor. Briefly, development programs had offered new technology which had been developed in the West for use in different situations. For example, they provided new water sources which increased grazing opportunities. The local people had accepted the new technologies, but had not changed their herd management strategies. As a result, the herds increased in size beyond the point where they could survive on the grazing available in years of low rainfall. When the drought came, the vegetation suffered long-term damage from excessive pressure of grazing and many herds perished from starvation while they still had access to plenty of water. To change traditional herding strategies it would be necessary to reorganize the societies in which they are embedded, but this social dimension of technological change has generally been lacking in development planning.

As a result of what came to be known as the Sahelian tragedy, a new and broader interest in drylands and their problems began to appear. The development decades had tended to isolate the drylands since they gave lower returns and attracted less investment than more fertile areas. However, it was now gradually realized that altogether arid and semi-arid land comprises a full third of the land surface of the world and contains as much as twelve percent of the world's population, and that although their productivity per hectare is low, because of their vast extent their total productivity is of great significance for the future of world food production.

But their populations have become isolated and impoverished, and their production has not been integrated into national economic systems. Attempts to impose Western systems of pastoral production on them have not worked because they have not adopted Western social and economic objectives.

In order to realize the potential of these traditional production systems for the world community, it may be better therefore to appreciate their adaptive value in view of their historical success (whatever may appear in the present), to accept that traditional systems are inseparable from the societies that developed them, and to seek to understand how they worked, in order not to replace them but to build on them.

Such a change in orientation towards the study of traditional or pre-industrial food production systems involves rethinking our own established ways of studying them. Both academic and non-academic research agencies are organized according to a clearcut division of labor between disciplines and even though recent years have seen a trend towards increasing consciousness of the need to break down the barriers between disciplines and define all problems in human terms rather than in terms of resources, the barriers between the natural and the social sciences remain formidable. As one way of generating a sociocentric orientation in this type of human ecology the project reported on in the following articles focused not on particular production systems, such as pastoralism, but on the ecology of settlement.

THE TURAN PROGRAM

During the five and a half years that have elapsed since the United Nations General Assembly called for an international campaign to combat desertification, several comprehensive interdisciplinary ecological research programs have been initiated, with the aim of establishing baselines of information on the interaction of human activities and natural processes in a range of different sites that are vulnerable to desertification.

The Turan Program in northeastern Iran is one of these. It was initiated by the Department of the Environment in Tehran and from the outset was closely associated with the United Nations Environment Program and other international agencies involved in the global effort to combat desertification. It covered what is now the Turan Biosphere Reserve in northeastern Iran, including neighboring populations—the districts of Khar and Tauran—that have traditionally used the area, and adjoining land forms that have direct relevance to the Reserve.

The Reserve presents a variety of habitats, including three extensive plains at different altitudes, varying from 700 to



2 Map of Iran showing Turan Biosphere Reserve.

3 Map of northeastern Iran showing location of Khar and Tauran within the Turan Biosphere Reserve.



1400 meters, a saline river system, three mountain systems rising to a maximum of 2200 meters, large areas of broken country, some 200,000 hectares of sand including moving dunes, and a vast expanse of barren playa (known in Iran as *kavir*). The 200 mm. isohyet passes through the northern part of the area, and the southern plain probably receives less than 100 mm. average rainfall per year. A light snow covering appears on the higher mountains for two to four months in most years and snow lies on the higher northern plains for short periods. Only the central salt river flows at least intermittently throughout the year. Rainfall of several millimeters at a time generates sheet run off and wadi (*arroyo*) flooding. Springs occur along the base of the mountains. Soils are generally light and sandy except for solonchak in the *kavir*. Vegetation varies according to land form, and secondarily, according to human activity patterns. Woody shrubs predominate with ephemerals and annuals growing largely in their protection. Perennial cover over most of the plains varies between 5 and 40 percent. Flora and mammalian fauna generally show great

affinity to the Kara Kum in Soviet Turkmenistan to the north, and include onager, gazelle, ibex, cheetah, and leopard.

The predominant economic activity in Turan is pastoralism of various types, sedentary and transhumant. Some 150,000 sheep and goats winter in the area from November to May, of which 25,000 belong to the local settled populations who remain in the area through the summer. Local populations also keep camels, donkeys and a few cattle. Agriculture is also important around most villages and is conducted by means of irrigation, from qanats, springs, diversion of run-off and to a limited extent by direct rainfall.

The total human population using the area presently is in the region of 3000. The following articles deal with selected aspects of the relationship between this population and the ecology of Turan. Lee Horne explains the distribution of different types of settlement and discusses the nature of the built environment. Mary Martin narrates the stories of two families from one community and discusses the choices they have to make between different agricultural and pastoral opportunities. Endre Nyerges focuses on the behavior of the pastoralists' animals and the effects of pastoralism on the vegetation, with the purpose of evaluating how the various economic activities of a settled community affect the surrounding territory. Lastly, Christopher L. Hamlin presents methods for monitoring the ecology of these processes over time and discusses the problems of distinguishing between short

and long term, reversible and irreversible processes of change.

DESERT AND TOWN

This introduction would be incomplete if it did not leave the reader with a clear impression of interdependence between areas and populations like those of Turan and the larger geographical, economic and cultural world. Areas such as Turan, however small, scattered and isolated their populations, have histories that are inexplicable except in relation to the histories of adjacent more fertile and more densely populated areas. The crises that they have survived in the past have been as much and as often a consequence of political and economic changes in the world outside as of local drought.

The most conspicuous link between Turan and the rest of the country at present is provided by Sangsari transhumant pastoralists who come down from their summer grazing in the Alborz mountains north of Tehran to find milder winter grazing in the arid rangeland along the edge of the kavir. Unlike the better known nomadic pastoralists in the Zagros mountains in western Iran, the Sangsari keep their families and homes in the mountains and simply send their flocks down with shepherds. They also hire shepherds among the local population, trade in local animals, and generally act as a conduit of information and goods connecting Turan with the markets and administrative centers of Tehran and provincial cities. Since the major product of their pastoralism is



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4 A view of the Turan plain containing four of the villages and a line of trees along an abandoned millrace.

5 Government sponsored programs to stabilize sand dunes by planting saxaul have been amazingly successful in some parts of the deserts.

6 A nomads' camp. Kurdish nomadic pastoralists still migrate seasonally north and south just east of Turan.

meat for urban markets, their activities bring both the population and the resources of Turan into direct contact with the national economy. The price of meat in Tehran is reflected in the wages of a shepherd in Turan. Even more significantly, the Sangsari production strategies and therefore their impact on the economy and the ecology of Turan are similarly a function of the urban economy. The people of Turan are not in a position to control their own resources independently of the outside world.

Less conspicuously, but no less importantly, city and desert have always been interrelated by the economies of fuel requirements. The most important natural resource in Turan is the vegetation, and it is the value of the vegetation as grazing that ultimately serves as the major economic base for settlement. But the vegetation is also used as fuel. The pressure of cutting for fuel has probably been even greater, historically and presently, than overgrazing. One aspect of this problem is dealt with in the article by Nyerges.

There is abundant evidence throughout Turan that at some unremembered and undetermined historical period simple small-scale copper smelting, using shallow locally mined ores, consumed vast amounts of ligneous vegetation. The transformation of desert shrubs and trees into charcoal for urban use was a staple cottage industry that was finally only a decade ago prohibited in order to conserve the vegetation. One of the major economic activities—processing milk into oil, cheese





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A newborn camel stands for the first time. Most surviving camels now range freely and are rounded up periodically to be sold for meat.

Suggested Reading

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and other products—both in the villages and out on the range depends entirely on fuel cut from the surrounding vegetation. Even though kerosene is now available there are as yet no appliances that would make its use practicable for large-scale traditional milk processing. Before the revolution it had begun to be used generally for home lighting, heating, cooking and samovars and the new village bath house, but brush was still used for baking bread and cooking communal meals on holy days. The revolution disrupted the supply of kerosene and relaxed controls on wood cutting, but the process of increasing dependence on kerosene will probably soon resume.

Apart from transhumance and fuel, areas like Turan appear always to have been dependent on neighboring cities for investment in agriculture and irrigation. The apparent isolation of desert settlements in the modern period probably began with the motorization of communications in these areas after the Second World War. It may end as national economic and communications systems gradually comprehend everything within their borders. In the meantime, the research reported in these pages was designed with the assumption that both the populations and the resources of drylands like Turan are of increasing economic and cultural importance to the larger national and regional community into which they are being drawn.



Brian Spooner teaches anthropology at the University of Pennsylvania and has worked in the desert areas of southwest Asia since the late 50's. He has concentrated on the comparison of culturally different ways of coping with desert conditions and of how and why they change through time. He is currently studying these problems in the deserts of northwest India.