

CONSERVATION PROBLEMS IN BALUCHISTAN WITH PARTICULAR REFERENCE TO WILDLIFE PRESERVATION.

by

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Sometimes the outside visitor with the perspective of less intimate involvement is able to highlight the salient problems in an otherwise complex situation even though unable to make any original observations. This note is written with only this in view.

Some months ago the writer was privileged to travel with and talk to many forestry department officials working in the Province of Sind, as a result of which a note was published in the Pakistan Journal of Forestry (Roberts, 1972) examining recent ecological changes in that province in relation to their impact on the wildlife fauna. This note is the result of a similar visit to Baluchistan and the writer wishes to thank the Conservator of Forests, Mr. A. S. Swathi as well as the many officers of his department for making the visit so instructive. Through his courtesy and enthusiastic co-operation it was possible to visit a number of interesting areas as well as obtaining much valuable information about regions not visited personally before. Conversations with Game Watchers and Deputy Rangers having an intimate knowledge of remote regions contributed further to the impressions which are contained hereunder.

Historical Background:—The Province of Baluchistan as far as is known from recent historical times, has always been a very arid region experiencing climatic extremes and supporting a comparatively sparse human population. Various regions fell under the domain of different tribes and tribal chieftains with traditional rights within those regions for grazing and cultivation of crops where possible. These rights were usually zealously defended against usurpation by any neighbouring tribes. Because of the harsh climatic conditions, the limited available forage could best be utilized by a nomadic pastoral people and even today a major portion of the rural population appears to have retained these nomadic habits. In the main valleys a limited settlement with crop cultivation under irrigation appears to have been in existence for several hundred years. Such cultivation depended mainly upon the ingenious construction of subterranean percolation trenches or tunnels which are known locally as "Kharezes". This was supplemented with a few open wells. Even from the times of the earliest British administrative control in the region, which provides the first written records, the climate was one of extremes. Shortage of water was an ever present

problem as witnessed by the ruins of the abandoned Kitchener barracks to the north of Quetta. A series of Government Gazeteers published in 1905 covering Zhob, Loralai, Sibi, Mekran and Kharan districts (Baluchistan District Gazeteer Series 1907) revealed that the winter temperatures in central and northern Baluchistan frequently dropped to 6°F. (—15°C.) in winter whilst reaching 95°F. (35°C.) in the summer. The average annual rainfall seemed to go in cycles with two or three consecutive years of much reduced precipitation followed by several years of more generous rainfall providing a minimum fluctuation from about 6 inches (15.3 cms.) in a bad year to 12 inches (30.5 cms) in a good year. In the southern part of Baluchistan the mean annual rainfall has always been lower with less extremes in temperatures. Thus in Panjgur it is about 4.8 inches in a year (Champion et. al. 1966). Moreover the relative humidity in such regions was also even lower than in north and central Baluchistan and very little permanent cultivation was possible through irrigation systems.

In such a sparsely populated region it was still possible to maintain a relatively favourable ratio of domestic live-stock to the human population and the diet of even the poorest people depended to a greater extent upon meat than was the case in the Indus Plains. It is interesting to note that the very dry climate coupled with the presence of naturally growing herbs such as Asafoetida and naturally available salt from the salt pans in southeastern Baluchistan, made it possible to evolve a tradition whereby surplus animals were slaughtered in the autumn and air dried or cured to provide a source of food throughout the winter months. This custom is dying out, but even in November, 1972 it was possible to see sheep and goat carcasses being pickled in the old traditional way in remote villages such as Kowas in Pishin.

Today the human population has increased enormously but traditional eating habits still place great emphasis on a high level of meat consumption. In sharp contrast to the Punjab, milk and milk products form an insignificant part of the poorer people's diet and the cattle population is minimal.

Against this background the most significant change in recent decades has been the great increase in the human population. In the main valley of Quetta which is the most heavily settled region, the population has increased from a figure of 18,802 persons in the year 1901 to an estimated 125,000 in 1964 and this figure was believed to be around 150,000 in 1971 (Multi-purpose Co-operative Research Project, 1971). The writer has not been able to obtain comparative figures for other regions in Baluchistan but an eightfold increase in the population of the Quetta valley in a period of roughly 80 years represents an astonishing rate of growth. It seems logical to assume that lesser development in other regions has prevented such a rapid population increase taking the Province as a whole, but there may well have been an overall quadrupling of the Province's human population in this century. It is the ecological consequences

of this greatly increased population pressure which is giving rise to a deterioration in the natural resource balance of the region at an ever increasing and alarming pace. Population pressure has led to an intensified effort to extend the areas of available cultivation. To enable this expansion to take place more and more open wells and tubewells have been excavated and extensive, costly "Kharezes" have been dug. Within the last decade the introduction of electric power in the main Quetta valley has enabled a rapid development of tubewells in the rural areas. Today in Quetta valley alone, there are now 110 tubewells and 140 open wells (Executive Engineer, W. A. P. D. A, Quetta). Whereas in 1960 there were no tubewells and slightly less than 100 open wells. There has thus been a 250 percent increase within the brief space of little over one decade and in most of the valleys of Baluchistan there is now a greater withdrawal from the available ground-water than is annually contributed by way of natural recharging from precipitation. As a consequence many "kharezes" have now become dried out and fallen into disuse. Many open wells have become dry for considerable portions of the year and in the Quetta valley itself some five or six artesian wells which gave a natural discharge at the surface have also dried up. (S. A. Swathi, pers. comm).

Impact upon Wildlife of Increased Exploitation of Natural Resources:

(a) **Hunting:**—In any relatively primitive human society hunting constitutes the earliest known form of resource exploitation. In Baluchistan, within recent history, hunting of wildlife has not been more than a part-time pursuit of the rural population (Maydon-1937). However because of the great hunger for meat, and the limited potential for growing food crops economic incentives remain strong even in the 1970's. There is still a great tradition of prowess in hunting and skill in marksmanship especially in the remoter mountain settlements. It is still possible to meet professional "shikaris" who prefer to use ancient muzzle-loading guns which have been handed down for generations. One such "shikari" used as a guide by a hunting party of German tourists just recently in the Gishk Hills of central Kalat, though obviously over fifty years of age, boasted that he still killed at least 500 "gad" (*Ovis orientalis*) each year (J. A. W. Anderson pers. comm.). His keen sight and climbing agility testified to the fact that this boast was probably no more than a slight exaggeration. With dressed carcasses from such game selling at between Rs. 5-6 per seer, an adult "gad" each week could bring the hunter an income of nearly Rs. 100. In most mountainous areas where the larger hooved game still survive, tribal jurisdiction is paramount and the laws relating to licensing of guns regrettably cannot be applied let alone enforcement of hunting regulations.

(b) **Grazing:**—The introduction of domestic flocks of livestock constitute the next development in human resource exploitation (Dansereau-1957), and until the last ten

years or so this definitely constituted the main livelihood of the rural population, in all Districts of Baluchistan rather than settled agriculture. The increase in human population has been accompanied by a concomitant increase in the number of sheep and goat flocks being maintained throughout the province. As testified by many Forestry Department officials there is serious over-grazing on all the mountain ranges bordering the Valley of Quetta except possibly the upper portions of the Chiltan Range. Because all forms of livestock (including goats) prefer palatable grass species, these have been almost eliminated from most areas. Inevitably, since goats are better adapted to subsist on browse, and easier to keep, they have tended to replace sheep which more dependant on grass species. The process of deterioration has been accelerated by this increase in the goat population because the inherent climbing ability of these animals has enabled the flocks to be driven onto the higher ridges and crests of each mountain range which areas were formerly shunned by, or inaccessible to sheep. Microclimatic conditions or lower temperature generally enable a relatively higher humidity and better vegetative cover at these higher altitudes (Dansereau-1957) which has in turn enabled more domestic animals to be supported. As a result, competition for available forage with the wild herds of Markhor (*Capra falconeri*), Ibex (*Capra hircus*) and "gad" (*Ovis orientalis*) has become so severe that the wild herds have weakened and reduced in numbers. Moreover the risk of introducing disease contagious to wild stock has been greatly increased.

(c) **Cultivation:**—As already indicated, the sinking of numerous new wells has enabled the area under cultivation in the valley to be increased but at the cost of a rapid dwindling in the available ground water resources (Geological Survey of Pakistan Report No. 14). In the past four or five years the water level in some wells in the Quetta valley has been dropping by as much as three or four feet per annum (A. S. Swathi, pers. comm.) The increase in the area under orchards and crops has on the other hand created more favourable conditions for the spread of two rodent species, the Porcupine (*Hysterix indica*) as well as the rapid spread of the Short-tailed Mole Rat (*Nesokia indica*) both of which have now become serious agricultural pests in Baluchistan.

Other Consequences of over Exploitation:—Overgrazing has denuded the hillsides so that there is nothing to check runoff when rain falls and a much higher proportion of this precious water now escapes, instead of percolating into the ground, and recharging the ground water. Rapid runoff adds to erosion problems by rushing down surface gullies. It is not surprising to note that despite the low rainfall, flash floods are an increasingly serious problem in Baluchistan whenever there is a particularly heavy rainstorm. On June, 26th, 1972 nearly four inches (10.3 cms.) of rain fell in a few hours which created such severe hill torrents that many houses were swept away

and there was even some loss of human life (Sheikh Mohammad Irshad, pers. comm). It is well known that vegetative cover on hillsides helps to absorb rainfall, encourages maximum percolation and recharging of the ground water.

The decrease in the ground water level coupled with the denudation of the hillsides which form the natural catchment areas may have resulted in deterioration of the climate in recent years. There is evidence for believing that the climate of central Baluchistan at least in the Quetta region, now experiences more extreme ranges in temperatures than in former times, together with lower rainfall. Evidence from the *Gazeteers* published in 1907 indicates that the average annual rainfall in Quetta regions at the beginning of the century, varied from 6-12 inches (15.3-30.6 cms.) whilst the temperature ranged from a low of 6°F (—15°C.) in winter to 99°F. (36°C.) in summer. In the past six or seven years in the vale of Quetta the temperature has frequently ranged from as low as 1°F. (—17°C.) in winter rising often to 105°F. (41°C.) and even up to 107°F. (42°C.) occasionally. The rainfall has moreover, fallen as low as 2 inches (5.1 cms.) in one year and rarely exceeded 7 inches (17.8 cms.) in recent years. The total annual precipitation in Quetta from 1878 up to 1972 is given in Appendix "A". A proper statistical analysis of these figures would enable more reliable conclusions to be drawn as to whether there has been any significant and permanent decline in rainfall but a rough trend is certainly evident. The problem of water shortage and lack of available forage thus becomes intensified as the climate becomes more extreme.

In the more arid regions of southern Baluchistan the severe drought of 1971-72 winter resulted in the death of many thousands of sheep and goats and it has been estimated that between three and four million head of domestic stock died in Mekran, Kharan and Chagai regions alone (Mr. Hamid Ashraf, Range Management Officer, pers. comm.)

Increased human population coupled with the severely cold winters has also led to a much greater demand for fuel. Consequently bushes and trees are being cut and gathered at ever increasing distances from human habitation and the process of denudation of the mountain sides is being accelerated. Mr. K. A. Marker, a prominent industrialist, recently recounted to the writer how his father described the appearance of Murdar as being dotted all over with juniper bushes when he first came to Quetta in 1878. The majestic Murdar Mountain range presents an ever changing pattern of light and shadow as it towers over Quetta city. But there is not a vestige of any large bush or juniper tree visible as one scans these cliffs and most citizens of Quetta assert that it has always been so.

Impact upon wildlife:—Examination of the records of the Game Department reveals that only a very limited number of shooting permits and game licences have been issued each year for the past several decades. Yet hunting pressure had increased

according to the accounts of several game watchers. This is the result of hunting by the local villagers, often desperate for food and the amateur sportsman or trophy hunter is really without consequence in determining the wildlife population. Viewed in this perspective, the recently proposed, elaborate game licensing laws and enhanced fees for the Province will really not get at the root of the problem. However there is evidence that in Las Belas and southeast Mekran the large game animals have been decimated by motorised hunting parties from Karachi city rather than from the hunting activity of local villagers.

The deterioration in the wild game population has been most severe in the northern and eastern regions of Baluchistan (Maydon-1937) particularly in the more accessible mountain ranges. The status of larger wildlife species is better in the Mekran, Kharan, Chagai and Kalat districts partly because there is a much lower human population in these regions and also because it has been possible to exercise stricter control of hunting through the local chieftains. The situation of the Markhor on Takhatu, Khaliphat and Zarghun is reported to be much worse due to poaching in recent years. For example Takhatu which had herds totalling between two and three hundred head in the mid 1960's now probably has hardly more than fifty or sixty Markhor. (Arbab Yaya, pers. comm.). Due to Chiltan being a game reserve the unique Chiltan Goat (*Capra falconeri chiltanensis*) survives in much larger numbers but even here the population is estimated to be hardly 180-200 (Schaller, 1971).

Possible Remedial Action:—It is clear from the above account that the Province of Baluchistan presents a harsh and unfriendly environment for mankind's struggle to make a living. To some extent the loss of the former abundant and diverse wildlife population must be inevitable as the human population is compelled to make greater and greater utilization of the limited natural resources. But there is a clear warning that over-exploitation besides resulting in the total extermination of all larger forms of wildlife, will ultimately bring disaster and greater hardships even to the human population due to the destruction of the ecosystem. Any conservationist who looks at Baluchistan cannot help but be impressed by the awareness of how vital it is to maintain the delicate ecological balance. Only by limiting offtake of water and natural vegetation can the extremes of the harsh climate be mitigated and the threat of severe droughts and livestock famines be diminished.

Most factors which could be introduced to restore the ecological balance would indirectly help to preserve wildlife, and perhaps it is in Baluchistan that we can most clearly realize the interdependence of all living plants and animals with the human population.

Many constructive proposals have already been made for improving conditions for the poorer people. Most of these unfortunately cannot produce quick results and

certainly will require vast inputs of capital expenditure. Adequate financial resources are regrettably lacking but it is surely the duty of other more prosperous regions and countries to help fund any worthwhile long range schemes which would make the region more prosperous. Just as man is dependant on his immediate plant and animal environment so the prosperity and security of one region of people must be dependant upon conditions in adjacent regions, and this logic has motivated many aid giving countries as much as has purely humanitarian considerations.

In order to enhance natural recharge to the ground water reservoir everything possible must be done to hold up precious rainfall. On deluded hillsides this will only be possible by building hundreds of check dams in every ravine and gully. Such a scheme has already been worked out and proposed by the Pakistan Forest Institute in co-operation with the Agriculture, Food and Co-operative Department of the Government of Baluchistan. (Multi-purpose Co-operative Research Project, 1971). This is a costly scheme which will take many years to complete and at present lack of funds has led to its being held in abeyance. I urge that outside aid should be sought if necessary in order that no more precious time is lost in instituting this scheme as a pilot project in the Quetta Valley and subsequently in every other major catchment region of Baluchistan.

Erosion and loss of rainfall from runoff and evaporation can, of course, be most effectively lessened in regions where the ground has an adequate vegetative cover, and any measure which can limit or restrict over-grazing by domestic stock immediately result in a spectacular recovery and regeneration of the natural vegetation. This has been well demonstrated in several areas where domestic livestock have been deliberately excluded by the erection of fences. Any traveller from Sibi and Sind who enters Quetta city by road will be struck by the appearance of the enclosure where the radio relay station is located. Fenced off for security reasons the ground is now thickly carpetted with vegetation whilst the area immediately outside the fence comprises bare brown earth. Most of the vegetation comprises Camel Thorn (*Athagi camelorum*) and Wormwood (*Artemisia scoparia*). But a close examination will show that many tufts of palatable grasses such as *Chrysopogon* and *Cymbopogon* species have now sprung up between the thorny bushes. An even more striking example is presented by the Maslakh Game Sanctuary immediately to the west of Quetta. This region has been fenced off and still contains a wonderful population of gazelle as well as "gad" and many game birds such as Sand Grouse and Chukor. The rocky terrain is dotted with bushes of *Sophora griffithi* and clumps of grass so that this region looks greener than anywhere else in the Quetta Valley. In the beautiful pass which winds between Ziarat and Chauter there is also an ecological enclosure at Karbi Kachh. A fenced portion of hillside has resulted in the ground becoming carpetted with *Astragalus* and grass clumps of *Stipa* and *Pennisetum* species, with numerous thickets of

Berberis baluchistani and *Cotoneaster* and *Thymus serpyllum* (Champion et. al. 1966). Enclosing any area by fencing is a costly business but such limited regions are invaluable field laboratories for ecologists and forestry workers as well as for demonstrating how rapidly range land can be improved by restricting over-grazing.

Turning to the cultivated valley regions it seems inevitable that in order to protect areas already developed and orchards already planted that some form of control and regulation of the installation of new wells, particularly of tubewells, will have to be instituted. It also strikes a visitor from the fertile Indus plains that living standards in the rural areas could be improved by a change in dietary habits. More vegetables or green food for human consumption could surely be grown with less emphasis on precious meat or imported dry rations than at present. A third angle of attack on this problem concerns the acute shortage of fuel for cooking and for keeping warm during the severe winters. Despite the acute shortage of wood and the Governments' consciousness of the value of Baluchistan's forest resources (all standing trees are declared as Government property and may not be felled even by the land owner without permission) it is a regrettable fact that most of the mountainous areas where *Juniperus macropoda* and *Pistacia khinjak* trees are cut, fall within tribal territory and this law cannot be applied. Cutting fuel wood is a means of earning cash to buy other necessities in such remote tribal areas. Surprisingly, the price of wood in Quetta city in November, 1972 was much less than prevailing prices in the southwest Punjab where there are several large irrigated forestry plantations devoted solely to the productions of fuel wood. It is very much to be hoped that Baluchistan's resources of natural gas can soon be made available for domestic fuel consumption at least in the main valley of Quetta. In a mountainous region with a relatively pure atmosphere and at such sub-tropical latitudes, solar radiation is intense as evidenced by the high temperatures reached in Baluchistan in summer even at over 5,000 feet (1550 meters) elevation. Solar energy is an immense potential source of heat which remains as yet untapped in Baluchistan. Has any research been carried out in Baluchistan on the potentialities for using this source of energy which has now been successfully exploited in a much less suitable environment in the French Alps? Modern technology is being tapped to distil sea water for supplementing the needs of the Mekran coastal area and surely similar technology is now available to make use of available solar energy to conserve scarce fuelwood.

Conclusions: One cannot help but be impressed by the harsh struggle for survival which must dominate the lives of many poorer people in Baluchistan. Yet one is impressed by their courage and cheerfulness as well as hospitality in the remoter regions. Surely it is a matter of conscience for people in more favourable regions to share some of the burden in trying to keep this area from ecological destruction. If our larger and more spectacular wildlife are allowed to vanish from the hills of Baluchistan we should take it as a warning that even Mankind may follow in their wake;

APPENDIX 'A'.

Total annual rainfall recorded Figures supplied by courtesy of Mr. Hamid Ashraf D. F. O. Range/Wildlife, and Watershed Section at Quetta from 1878 until 1971.

Year	Rainfall in inches	Seven year average	Year	Rainfall in inches	Seven year Average
1878	9.00	10.99	1915	4.50	6.04
1879	4.10		1916	8.65	
1880	5.90		1917	9.40	
1881	10.80		1918	6.35	
1882	9.90		1919	5.52	
1883	11.75		1920	5.95	
1884	7.75		1921	5.10	
1885	21.80				
1886	9.75	12.07	1922	7.65	8.01
1887	4.40		1923	11.00	
1888	8.45		1924	4.00	
1889	14.05		1925	11.50	
1890	23.25		1926	5.35	
1891	13.10		1927	8.90	
1892	7.20		1928	7.75	
1893	14.10				
1894	17.75	10.02	1929	9.60	9.76
1895	7.50		1930	12.00	
1896	9.00		1931	6.05	
1897	9.10		1932	9.95	
1898	7.75		1933	9.00	
1899	6.90		1934	9.75	
1900	15.00		1935	12.00	
1901	5.50	9.02	1936	8.95	9.51
1902	4.45		1937	10.25	
1903	11.75		1938	14.00	
1904	8.50		1939	9.95	
1905	15.00		1940	5.20	
1906	10.05		1941	10.00	
1907	9.25		1942	8.40	
1908	6.10	9.06	1943	19.80	8.41
1909	8.04		1944	8.30	
1910	5.90		1945	4.50	
1911	13.10		1946	2.00	
1912	10.10		1947	6.35	
1913	9.60		1948	8.10	
1914	13.80		1949	10.00	

Year	Rainfall in inches	Seven year average	Year	Rainfall in inches	Seven year average
1950	9.60	9.80	1965	10.46	6.27
1951	7.10		1966	5.50	
1952	6.65		1967	9.32	
1953	9.40		1968	6.68	
1954	7.20		1969	5.13	
1955	15.25		1970	5.11	
1956	14.05		1971	1.71	
1957	5.05	7.48			
1958	15.05				
1959	5.65				
1960	8.01				
1961	2.80				
1962					
1963	6.25				
1964	9.05				

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