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Abstract: This mission report in Islamic republic of Iran presents some brief reports about the visit of seven protected areas. It indicates that in the Shiraz Province, during the visit of the Bahram-e-Gour Protected Area and National Park, the author came across Asian cheetah tracks and faeces. According their guide there are 10 to 20 Asian cheetahs in the protected area. Unfortunately in this area, there is some serious poaching problem. A study on Asian cheetah is advised by the author to take part to the fieldwork of the College of Natural Resources at Karaj.

Le rapport de mission en République islamique d'Iran présente de brefs rapports de visite de sept zones protégées. Il indique que dans la province de Shiraz, lors de la visite du parc national et de la zone protégée de Bahram-e-Gour, l'auteur a croisé les traces et des fèces du guépard d'Asie. Selon, leur guide, il y a entre 10 et 20 guépard dans la zone protégé. Malheureusement dans cette zone, il y a de sérieux problèmes de braconnage. Une étude sur le guépard d'Asie est recommandée par l'auteur comme travail de terrain au Collège des Ressources Naturelles de Karai.

REPORT

UNITED NATIONS DEVELOPMENT PROGRAMME

Project of the Government of The Islamic Republic of Iran

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1. Report on visit to Protected Areas in Iran

A. Preamble

The Islamic Republic of Iran has set aside some 60 tracts of land as Protected Areas (including National Parks, Wildlife Refuges and National Nature Monuments), totalling nearly 8 million hectares. During my two-week visit to Iran, through the courtesy and assistance of Dr Mahmoud Karami (Faculty of Natural Resources, Karaj), Mr Mehdi Kahnamooe (General Director, Department of the Environment, Esfahan), Mr Mohamad Taghi Moinian (Biologist, Department of the Environment, Esfahan), Mr Bijan Dareshuri (Biologist, Department of the Environment, Shiraz), and field personnel of the Department of the Environment in Tehran, Esfahan and Shiraz Provinces, I was able to visit seven Protected Areas. Brief reports on these areas follow.

B. Tehran Province

a. Khojir National Park. This tiny National Park, at the foot of the Alborz Range just outside Tehran, is remarkable as an example of integrated land-use in the midst of an eroded, overgrazed landscape. There is a village at its periphery, with limited rights of grazing access in the Park; permanent water; and a ruined hunting lodge formerly used by the Shah and his retinue during in pre-Revolutionary times. Some 250 plant species have been identified in the Park (this is five times the number that occur in the unprotected vicinity); prominent among these are Pistachio trees, which have vanished outside the Park. Wild Goats (Capra aegagrus) were seen during a short walk, and porcupine (Hystrix indica) faeces were found. Unfortunately, a road is being built through the Park by the Department of Defence.

Recommendation (1). The Department of Defence road should be realigned, to skirt the Park.

Recommendation (2). The Old Hunting Lodge should be restored for use as a rest-stop or overnight facility for Park visitors.

b. Sorkheh Hessar National Park. This Park, separated from Khojir by a grazing corridor, consists mainly of a valley with flat and rolling areas of semi-desert vegetation. Gazelles (Gazella subgutturosa) and Red Sheep (Ovis orientalis) were seen during a short walk, and footprints of hyaena (Hyaena hyaena) were seen. But the Park has within the past year been effectively reduced to about one-third of its former size by a new Revolutionary Guards camp, which occupies most of the flat country, including a watering point which had been set up for gazelles. The gazelle

population, according to a game guard, has been reduced from several hundreds to about 25-30, by exclusion from most of its habitat and by occasional hunting by Revolutionary Guards.

Recommendation (3). The Revolutionary Guards camp, if it cannot be removed altogether, should be reduced in size, and consolidated within a single perimeter fence.

Recommendation (4). Revolutionary Guards, like other citizens of the Islamic Republic, should not be permitted to carry weapons within National Parks. Only Game Guards must be allowed to carry firearms in National Parks.

c. General comments. It is evident that there has been a failure of communication between the Departments of Defence and Environment. The road in Khojir and the camp in Sorkheh Hessar appear to have been authorized without reference to the Department of the Environment. Yet environmental quality is perhaps the Islamic Republic's most critical internal problem; the Defence Department would certainly not have intentionally acted in way designed to exacerbate the problem. On the contrary: in that the Revolutionary Guards are a force set up to maintain the Islamic Revolution by responding to national problems, a way could be found to place them at the service of the Department of the Environment.

Comparison of the environments within the two National Parks and outside them is dramatic: the Parks have a greenness even after two unusually dry years; there is far greater plant diversity including bushy species such as Pistachio (mentioned above); there is permanent water; there is vegetation cover preventing flash floods (a connection known to the villagers on the periphery); there is a wealth of wildlife; there is a "corridor" zone demonstrating the possibility of coexistence of human use and maintenance of environmental quality. Finally, the Parks are part of Iran's natural heritage, lying within a few kilometers of the outskirts of Tehran.

Recommendation (5). Better communication must be made between the Department of the Environment and other government departments. Department of the Environment lands must never be used for other purposes, except under strict supervision by Environment employees.

Recommendation (6). The presence of the Revolutionary Guards camp in Sorkheh Hessar National Park should be utilized in the following ways: pollution control, regular patrols to remove the rubbish that unavoidably blows in from outside, antipoaching activities (unarmed patrols, in two-way radio contact with Game Guards), visitor assistance.

Recommendation (7). The National Parks in the Tehran area should be used for education, with classroom talks and controlled parties of visitors. The initial education effort should be aimed at the Revolutionary Guards, in their role as promoters of the furtherance of national goals, then at the local rural population, then at Tehran schools. Television should be widely utilized for this purpose.

Recommendation (8). The Parks have a role to play in the enhancement of environmental quality and land-use; they should become core areas of an enlarged land-use scheme. In the surrounding land, blocs should be rotated: grazed for 1-2 years, prohibited for 4-5 years (to be determined by the College of Natural Resources and the Department of the Environment), allowing regeneration of vegetation and soil using the Parks as a centre for revegetation, with some assisted revegetation by the Revolutionary Guards.

C. Esfahan Province

Mooteh Protected Area. This is a large (159,000 ha) area of Salsola steppe with patches of tamarisk thicket, backed by hilly country to the east of the Zagros Mountains. It borders the main road between Qom and Esfahan. Part of it is permitted grazing land, and this zone is noticeably eroded compared to the prohibited zone, though much less so than the surrounding countryside. The Game Guards are conscientious, and extremely involved in their work; before we were allowed to proceed into the Protected Area, we were closely quizzed as to our intentions, our attitude towards hunting, and so on. We were able to see groups of Gazella subgutturosa in the distance; they are shy because of harassment by trail-bike enthusiasts, despite the vigilance of the Game Guards. It was reported to us that three species of gazelle inhabit Mooteh; if confirmed, this would be a major discovery: the former presence of Gazella bennetti in the general area is attested by a specimen in the Tehran Museum of Natural History, but its continued existence has not been confirmed by field observations, and the existence of a third species is entirely unsuspected by mammalogists. Mooteh is also said to have good populations of wild sheep (Ovis orientalis), leopard (Panthera pardus), wolf (Canis lupus) and hyaena (Hyaena hyaena). Mr Moinian affirmed that both Sand Cat (Felis margarita) and Pallas's Cat (Otocolobus manul) occurred there; the former is not yet recorded for certain in Iran at all, while the latter is not known further southwest than the Mashhad district.

Recommendation (9). The protection of the Mooteh Protected Area should be strengthened, by hiring extra personnel,

establishment of further bases, and the purchase of two-way radios to facilitate the apprehension of poachers and other encroachers.

Recommendation (10). The main guard post should be extended as an education centre, and perhaps as a place for visitors to stay.

Recommendation (11). A full biological survey should be undertaken of the Mooteh Protected Area, to investigate the reports of three different gazelle species, and the presence of the two rare wild cat species. A photographic record should be made of larger mammals and birds, and live-trapping of smaller mammals and reptiles. Game Guards and visitors should be on the lookout at all times for skeletal remains, and these should be collected, labelled and stored.

b. Kolah Ghazi Protected Area. This medium-sized (48,700 ha) reserve straddles the Esfahan-Shiraz road, just a few kilometers from Esfahan, but its core is a long valley to the east of the road and separated from it by a hilly area with sheer cliffs. Wild Goats (Capra aegagrus) are abundant on these cliffs, and we saw many. On the valley floor, which is arid Salsola steppe, we saw small groups of Gazella subgutturosa., and leopards are reportedly common in the hills. Watering points are provided with aid of Australian-donated windmills, and in one case a carefully designed concrete/pebbledash waterhole receives flow from a small stream. These measures, undertaken on the initiative of Mr Moinian and Patrol Officer Shahmanah, have increased the carrying capacity of the area. Unfortunately, one of the hilly outcrops near the entrance to the valley is still used a stone quarry; debris has spilled down the hillside into the valley, and furnace fumes contribute local air pollution. Mr Moinian and the Game Guards report limited poaching, but because of the Guards' vigilance it is not serious; because of their differing habitats, the gazelles are more affected than the wild goats.

Recommendation (12). Stone mining should never be permitted in Department of the Environment land. The quarry in Kolah Ghazi should be closed down immediately, by government order, and limited re-landscaping should be carried out under the quidance of the Kolah Ghazi directorate.

c. Ghameshloo Protected Area. This medium-sized area (about the same size as Kolah Ghazi), lies some kilometers to the north of Esfahan, well back from any main road. Its periphery is limited grazing land, and the Game Guards live in the village on its edge; consequently relations with the local rural population are good. The landscape consists of rolling hills with abundant

wild sheep (Ovis orientalis), a few wild goats (Capra aegagrus) in the steeper areas, and Gazella subgutturosa in the intervening valleys. A feature of the area is the abandoned manor houses, one of which boasts a small mulberry grove, watered by the outflow of a qanat.

Recommendation (13). Present protection practises in Ghameshloo should be supported and strengthened by increased government interest. Consideration might be given to the restoration of one of the abandoned manor houses to serve as a visitors' centre.

D. Shiraz Province.

a. Bamou National Park. This 48,000-ha National Park on the outskirts of Shiraz may be taken as a model for the development and running of National Parks and Protected Areas in Iran. Under the guidance of Mr Dareshuri, it is developing its visitor facilities, and will soon open a new visitors' centre with a theaterette, photographic display, and a small collection of stuffed animals (none being of local origin, and not all of Iranian origin!). Protection appears excellent. Already small controlled groups visit and enjoy the Park. As a consequence, the wildlife are the tamest seen anywhere during my trip. Some 500 metres from the main guard post, a wild ewe and kid were resting within sight and sound of the main road north out of Shiraz; over the crest of a hill just beyond, a large flock (20-30) of wild sheep and a ram group could be seen at close quarters. In another part of the Park, near the new visitors' centre, Gazella subgutturosa could be seen grazing all along the motoring track.

Recommendation 14. The programmes under way in the Bamou National Park should be strengthened by increasing the available finance, and by local television and newspaper coverage.

b. Bahram-e-Gour Protected Area and National Park. This very large (about 350,000 ha) area lies 200-250km east of Shiraz. It consists of Artemisia-Haloxylon steppe with areas of rolling hills and an expanse of flat salt desert. Limited grazing is permitted in the outlying zones, but the central part, the National Park, is a prohibited area. Iran's two rarest mammals are found here: the Persian Wild Ass or Onager (Equus hemionus onager) and the Asian Cheetah (Acinonyx jubatus venaticus). We observed wild asses both in the far distance and at close quarters (about 200 metres); Mr Dareshuri, who visits the area regularly, considers their total number to be somewhat over 220. We did not see a cheetah, although we came across tracks and faeces; it is thought by Mr Dareshuri and others that there are 10 to 20 in

the Protected Area. Hares (Lepus capensis) are abundant, and probably form the cheetah's main prey. There are about 100 Bennett's Gazelle (Gazella bennetti); we saw three female/young pairs. Bahram-e-Gour lies on the border with Kerman Province, and there is a historic tower on a hill, overlooking the salt desert and adjoining areas, which was once a customs post.

Although the limited grazing rights enjoyed by local pastoralists creates considerable goodwill, there is none the less a problem with poaching. Poachers, mainly in search of wild ass meat, are well armed and open fire without hesitation when accosted by Game Guards. The Head Guard, Mr Jaffar Shikari, has lost two members of his family in this way (both were Game Guards): his brother a few years back, and his son earlier this year. On the other hand, a poacher was killed by a Game Guard, who unfortunately suffered 14 months' imprisonment because of it; we met him shortly after his release, when he had returned to the job he loves. It is this level of dedication which has kept disturbance to an absolute minimum.

There are signs of erosion around some of the watering-points in Bahram-e-Gour, and taken in conjunction with the failure of wild ass numbers to increase over the past few years this has led Mr Dareshuri to the conclusion that the wild ass population is probably at carrying capacity. He is undoubtedly correct. Negotations are in train to add another 60,000 ha to Bahram-e-Gour, but the land to be added is not prime wild ass country.

Recommendation (15). Much more money should be made available to increase the number of Game Guards and of facilities for them.

Recommendation (16). More Guard Posts should be provided, and consideration should be given to restoring the superbly placed historic customs post as a Guard Post combined with a public education centre.

Recommendation (17). Translocation of some of the Wild Asses should be contemplated. Areas from which the species has disappeared over the last 10 years could be restocked from Bahram-e-Gour, provided protection can be guaranteed in the designated areas.

E. General Comments.

There is comparatively little awareness in Iran of the richness of wildlife within its borders (and nonbe at all outside the country). It is probably this lack of awareness that has led to the failure of other government departments to consult extensively with the Department of the Environment (as

discussed above). Yet two weeks in Iran was sufficient to convince me that environmental quality is at a crisis point; not merely the obvious aspects, such as the phenomenal air pollution in Tehran, or the sewage pollution of the water supply in Shiraz, but land degradation (thrown into sharp relief by the contrast between the Protected Areas and the surrounding regions) and the threat in many areas to wildlife. It is probably not my direct responsibility to point out the effects of the current high rate of population growth, but I cannot avoid commenting on what every conservation biologist is all too aware of: that any conservation activity can only be a holding action as long as the human population continues to grow, and demand each year more and more space for dwelling, roads, crops, domestic herds, water supply and so on.

Recommendation (18). There should be a wide publicity campaign on the value of wildlife conservation. This should take the form of television and radio publicity, emphasising both the practical need to prevent and reverse the rampant environmental deterioration, and the position of Islam on wildlife conservation. The first Caliph, Abubakar, instructed his soldiers not to kill indiscriminately, or destroy vegetable or animal life. The eighth Imam, Imam Reza, whose grave is in Mashhad, was known as The Guardian of Gazelles, because he gave sanctuary to some gazelles from their hunters. The promotion of conservation by these and other revered figures in the history of Islam should be more widely promulgated. Prior to the Revolution, wildlife was too closely associated with the Shah's regime; it must be understood that wildlife is for the people, not the elite.

Recommendation (19). Visitors' Centres, with educational displays, should be set up prominently at the entrance to all Protected Areas. These could include photographic displays, specimens, and so on (on the model of Bamou National Park). Specimens should consist of skulls of large mammals found in the park, feathers, nests and so on: visitors could be encouraged to touch them and examine them. Smaller fauna, especially small mammals, could be exhibited alive in vivaria: the public are unlikely to see these during their visit but should know that they are there, and they will of course serve as voucher specimens when they die. It is, at anyrate, essential that all found-dead and captive-dead specimens be preserved.

Recommendation (20). The Tehran Natural History Museum, the national centre for the study of animal and plant taxonomy, should be kept supplied with specimens that are surplus to requirements from the Protected Areas' Visitor Centres. During my visit, it was discovered that some specimens were missing from the musem's collection, being recorded as on loan to

overseas institutions for about 15 years. Such long-overdue loans should be called in immediately.

Recommendation (21). The Worldwide Fund for Nature (WWF) should be invited to set up an office in Tehran.

Recommendation (22). Publicity for population control should be set in motion.

2. Postgraduate Programmes in Wildlife Biology in the College of Natural Resources, Karaj

A. Preamble

The College of Natural Resources at Karaj is an active training centre for wildlife biology. I have been requested to comment and advise on both coursework and research programmes.

B. Coursework

The courses on Wildlife Ecology and Principles of Wildlife Management follow very closely their American models. While this gives a sound basis, they preferably need to be adapted to more accurately serve local needs. The textbooks in current use are Bailey's Readings in Wildlife Conservation, Cox's Readings in Conservation Ecology, Errington's Of Predation and Life, and a series of Scientific American offprints. For an African input, A.E..Sinclair's Serengeti: Dynamics of an Ecosystem could be added to the list. Conservation genetics has become, over the last decade, an important topic of study, and M.E.Soulé's Viable Populations for Conservation should be considered as part of the course reading.

While Scientific American is very suitable for introducing stuents to basic concepts, it is important that as soon as possible they should become adept at consulting the primary literature. The following journals are recommended as good sources for the theory and practice of wildlife ecology and conservation:

Journal of Wildlife Management
Ecology
Journal of African Ecology
Journal of the Bombay Natural History Society
Australian Wildlife Research
Journal of Mammalogy
Biological Conservation

Subscriptions by the College library to these journals would be found rewarding in terms of quality and diversity of training.

What is lacking in the College's coursework at present - and this is realized as a gap by the teaching staff - is training in biological taxonomy. As far as wildlife conservation and biology are concerned, the groups which need to be most intensively studied are mammals (primarily), birds, reptiles, and insects. A two-week section on Principles of Taxonomy, followed by Taxonomy of Animals (and plants) could with advantage be inserted near the beginning of the Principles of Wildlife Management course. Individual students could then take particular groups as projects, and produce ten-page papers on them as part of their overall assessment.

The course at present has an Ethics component. In an Islamic country, this should be set within the context of Islam. A good argument for wildlife conservation from an Islamic point of view is:

Zaidi, I.H. 1981. On the ethics of Man's interaction with the environment: an Islamic approach. *Environmental Ethics*, 3:35-47.

Most important is the insertion of local content. Several people proved themselves well aware of Lay's *Mammals of Iran*, but this the result of a single expedition and is unsuitable as a textbook. Mammal surveys do however exist for three surrounding regions:

D.L.Harrison,. Mammals of Arabia (three volumes).

T.J.Roberts, Mammals of Pakistan.

V.G.Heptner, A.A.Nasimowitch & A.G.Bannikov, *Mammals of the USSR* (three volumes published). This is potentially the most useful of the list, but only volumes on (1) Artiodactyla and Perissodactyla, (2a) Carnivores other than Felidae, and (2b) Felidae were published, and only vol.1 is thus far available in English (but all three are available in German). But they should be included because these "big game" taxa are among the chief concerns of wildlife biologists.

I recommend the setting up of a genetics laboratory at the College, with facilities for protein electrophoresis and karyotyping. At present the staff of the College use the electrophoresis facilities of the Faculty of Natural Sciences, Tehran University; quite apart from the waste of time involved commuting, these skills should be part of the education programme of students of the College. While electrophoresis skills are available in Iran, it is recommended that a karyotyping expert from overseas (Australia or elsewhere) be sought by FAO as part of the UNDP Iran programme.

C. Fieldwork.

The choice of fieldwork topics for postgraduates of the College, carefully supervised by Dr Karami and others, is vast. I list some of the outstanding ones below:

- 1) Plotting the former distribution of *Equus hemionus onager*, and assessing the environmental quality and security status of the areas from which it has become extinct, with a view to reintroduction. Apart from Bahram-e-Gour, the Wild Ass is known nowadays only from the Touran Protected Area, where it is thought to have declined lately (B.Dareshuri, personal communication).
- 2) Plotting the distribution of small cats (Felis sylvestris cf.caudata, Felis chaus, Felis margarita, and Otocolobus manul). Not only is the very occurrence in Iran of the second and third of these species somewhat of a mystery, but their subspecific allocation is in question. A paper by Hemmer, Grubb and Groves on subspeciation in Felis margarita has been supplied to the College. Electrophoretic techniques should be used as part of this study, as the three species of Felis are not always easy to distinguish; this will involve live-trapping, and so should be done only when considerable expertise has been acquired.
- 3) Study of the cheetah (*Acinonyx jubatus venaticus*). The conservation genetics of this species is of great significance in the light of the findings of S.J.O'Brien (papers previously supplied to Dr M.Karami). Ecological study should help to elucidate its habitat requirements and so determine the possibilities of habitat improvement in the interests of conservation; blood or skin biopsy samples need to be taken for this study, and the samples returned to the laboratory for analysis (or else sent abroad).
- 4) Study of leopards (*Panthera pardus*); mapping their distribution, assessing their conservation status. It has been claimed that the subspecies in southern Iran is a different subspecies, *P.pdathei*, from that in the north, *P.p.saxicolor*; this needs to be investigated by photography (analysis of coat patterns), craniometry, and protein electrophoresis.
- 5) Goitred Gazelle, *Gazella subgutturosa*: present evidence indicates that the populations in the Tehran area are *G.s.subgutturosa*, consubspecific with those in Transcaucasia, whereas those elsewhere in eastern Iran are slightly different; there is the problem of the status of the populations to the west

of the Zagros Mountains, which may form a third subspecies, or may be intermediate with the Arabian peninsular *G.s.marica*.. The same techniques are recommended as for the leopard study (above).

- 6) Bennett's Gazelle, *G.bennetti*. Study of museum samples, including (and especially) those in the Tehran Natural History Museum, indicates that the subspecies *G.b.fuscifrons*, commonly thought to be "the" Iranian subspecies, is found only in the southeast (Sistan, Baluchistan), and that populations further west (such as Mooteh and Bahram-e-Gour) represent and undescribed subspecies. Mr B.Dareshureh reports (personal communication) a small isolated population in the Bushire region; a single museum specimen from this region appears to me to be different yet again, and may represent a third Iranian subspecies.
- 7) Arabian Gazelle, *Gazella gazella*. This was discovered a few years ago to be living on Forrur Island, offshore from Bandar Abbas. It is at present under study by Dr Karami and myself. Surveys on the mainland in search of this species need to be undertaken; in its Arabian range, its distribution is closely tied to the presence of *Acacia*.. Gazelle species are proving separable on karyotype, and this should be done on Iranian gazelles both in the interests of adding to knowledge and to assist the identification of questionable cases.
- 8) Small mammals. These are very poorly known in Iran. The occurrence of such little small mammals as the pygmy jerboa *Salpingotus*, and its taxonomy, is among the many outstanding problems. Karyotyping is vital in the case of small mammals, in which sibling species are likely.

3. Teaching during consultancy period

On the final day of my two-week consultancy I gave two seminars:

1) Gazelles and Equids in Iran. This was given to students and staff of the College of Natural Resources, Karaj. I introduced the living species of the genus *Equus* - the three zebra species, horses, true asses and onagers - and explained why a field study of the Iranian onager is vital to fill in gaps of our knowledge and understanding of equids in general. I then briefly described the several species of gazelle that are found in Arabia and South Asia, and discussed which species live in Iran, what their known range is and where they are likely to be found in future surveys, and what relationship the Iranian populations might bear to those

in neighbouring countries. I ended with a plea for taxonomic work and fieldwork on gazelles in Iran.

2) Human Evolution. This was given to students and staff of the Faculty of Natural Science at the University of Tehran. I explained changing views of the evolutionary process, and the importance of evolutionary studies in general, and study of human evolution in particular. I then outlined knowledge to date, stressing that there are both areas of secure understanding and areas of controversy. Questions from students afterward concerned matters of clarification and evinced great interest in the controversies, and indicated that the students had been following the seminar with close attention despite the drawback that I spoke in English and Dr Karami translated into Farsi.

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I thank the United Nations Food and Agriculture Organization for the opportunity to contribute to wildlife conservation in Iran; in particular, I am very grateful to Mr Janvid, Dr Ghaffarzadeh and their staff for their kindness and assistance. I thank my hosts, Dr Karami and Professor Ahmadi, and all the hospitable, efficient and admirable personnel of the Department of the Environment. I would like to record my deep admiration for every one of the Game Guards whom I met: their dedication, their conscientiousness, their love of nature, and (in many cases) their bravery in the face of danger from poachers, in one case involving tragic personal loss. I acknowledge the friendliness and warmth of the people of Iran.