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TECHNICAL REPORT

PLANT BASED BIODIVERSITY NEEDS AND THEIR REPRESENTATION IN THE NATIONAL PROTECTED AREA SYSTEM OF AFGHANISTAN

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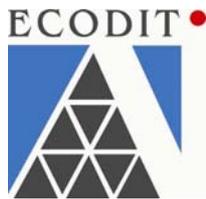


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Report

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Introduction

The Terms of Reference stated:

'A general shortage of information about the plant diversity of Afghanistan currently inhibits full consideration of which species are most threatened, and their present distribution, so that areas of occurrence might become potential candidates to be included in the national protected areas system. While international databases such as those of the World Conservation Monitoring Centre (WCMC), IUCN, and CITES provide useful data about globally and regionally threatened species, insufficient new information has come to light about floral diversity within Afghanistan during the past 30 years.'

This statement translates into the goal of identifying areas meriting special protection status because of the presence of threatened plant species. One of the expected outcomes of the task is a scoring matrix that considers information such as distribution status, threat status, function as essential habitat component for threatened fauna, and data ('to the extent possible') about species of interest and their distribution in the country.

Besides the above listed conservation status databases, four additional sources of information were suggested: a project by FAO on plant species used for food and medicinal purposes, the US-AID funded PEACE project, information compiled by AREU, and a publication titled 'Watershed Atlas of Afghanistan'.

ACTIVITIES

The activities conducted included collection and review of existing information material, and interviews and visits with botanists who worked in Afghanistan in the past. A detailed timetable of activities is listed in the appendix.

- Online databases containing information on endangered plant species were reviewed;
- Publications (printed scientific papers, mission reports, FAO reports, books, on-line media) were reviewed;
- Information obtained from existing endangered plant species lists was cross-referenced with herbaria databases in Munich and records of the Freitag collection at the University of Kassel (Germany);
- Leading botanists with emphasis on Afghanistan were interviewed in order to identify species and locations of special concern and relevance for the identification of sites for protected areas.

RESULTS

Review of existing information

IUCN. From the *IUCN* databases, a list of plant species for Afghanistan, Tajikistan, Turkmenistan, Uzbekistan, Iran and Pakistan was compiled. This list numbers a total of 65 species. Of these, 7 are listed as critically endangered, 5 as endangered, 8 as vulnerable, and 4 as near-threatened; the rest has least concern status, or insufficient data.

Characteristically, the majority of the 'concern' categories are occupied by woody species. Interestingly, the possibly rarest plant of Afghanistan (now probably extinct, Breckle, pers. comm.), *Rhododendron afghanicum*, is not on this list. Likewise, no plant that has been listed on the preliminary FAO database on medicinal and food plants is included on this list.

The *IUCN* list was cross-referenced with a preliminary plant check list for Afghanistan prepared by Prof. Podlech, University of Munich (the leading taxonomist for Afghanistan). The Podlech list has been cross-referenced recently in Munich with the *Flora Iranica*. This process is not complete as major taxonomic uncertainties persist, for example in the *Chenopodiaceae* (Podlech, pers. comm.). However, the Podlech list is currently the most comprehensive plant list for Afghanistan. It is not released for wider circulation or publication because full validation with other collections and the *Flora Iranica* can currently not be completed. It also must be noted that the *Flora Iranica* contains a number of plant groups in need of thorough revision, and therefore, it is not the *ultima ratio* on plant species for Afghanistan. As a result of this cross reference analysis, one (only) plant species (*Pyrus*

korshinskyi, IUCN number 63482) could be identified on the Podlech list that is classified as 'critically endangered' by IUCN. One other species, *Ulmus wallichiana*, is also on the IUCN list and contained in the Podlech list, but IUCN states 'only' vulnerable status (presumably over its entire region of distribution, which includes Pakistan, Nepal, Kashmir and parts of India).

The taxonomic situation of *Pyrus korshinskyi*, a wild pear, is quite characteristic for the desolate state of knowledge of the Afghan flora. The USDA-ARS Germplasm Resources Information Network (GRIN) has only one publication listed (from the Russian Academy of Sciences Proceedings 1:17, 1902. The name was 'verified' by ARS botanists in 1985 (although, internationally, taxonomic disagreement persists). A BIOSIS search lists three publications, all from Russian sources. One paper (Vasilchenko (1979, Byulletin Moskovskogo Obshchestva Priorody Otdel Biologicheskii 84 No 4, p. 108-109) compares a newly identified wild pear species to various other previously known wild pears, including *P. korshinskyi*. In this comparison, *P. korshinskyi* is differentiated from *P. bucharica*. However, other authors treat *P. korshinskyi* and *P. bucharica* as synonyms (Rehder, 1949; Browicz and Zielinski, 1978; Prator, 1978). Finally, Czerepanov (1995) recognizes *bucharica* and *korshinskyi* as separate species. Other online databases follow the sources given by IUCN, which, however, do not include any of the scientific papers. This case documents a problem that is quite typical for Afghanistan: there is no up to date distribution information, there is considerable taxonomic uncertainty because work opportunities in Afghanistan have been historically limited and are currently almost impossible, and there is confusion in the international literature.

Browicz and Zielinski (1978), in a monograph on the chorology of trees and shrubs of South-West Asia note a few scattered stands of *P. korshinskyi* in Afghanistan. The map of identified stands they provide includes the site on which it was found by Freitag in the early seventies (Freitag, pers. comm.) These locations are found in the higher elevations of the *Pistacia vera* belt between 1000 and 2000 m elevation. Freitag found the plant in Badghis; however, the Podlech specimen at the Munich Herbarium was found in Nuristan. Browicz and Zielinski (1978) emphasize the special value of this plant as a genetic resource for pear breeders due its characteristics of drought and disease resistance. Given the rich diversity of wild relatives of domestic fruit trees (pears, prunes, figs, among others) found in Afghanistan, criteria related to genetic resource importance should also be defined and employed in the future. Similar considerations apply to several grasses, for example *Aegilops spp.* And *Agropyron spp.*

IUCN further published a few documents with references to Afghanistan. One relevant document on trade of medicinal plants lists two species as native to Afghanistan. However,

only one of these (*Taxus wallichiana*) was found on the Preliminary Checklist (Podlech, unpubl.). Interestingly, IUCN refers to the conservation status this species as ‘insufficient data’.

CITES. The CITES website allows the search for Appendix I-III species by country. For Afghanistan, 6 plant species are listed, all from Appendix II. Of these, 5 are not contained in the Podlech list. For the one species on the Podlech list (*Taxus wallichiana*), IUCN cites insufficient data (see above). There is no other overlap between CITES and IUCN; in other words, none of the critically endangered species according to IUCN is listed on any CITES appendix.

PEACE project. This project has a thematic focus on the determination of forage value and condition of rangelands. Plant specimens are collected, but no systematic geobotanical analysis is conducted, as this is not the mandate of the project. The collection work suffers from the lack of available taxonomic expertise. Since collections are unsystematic and conducted only in very few areas due to security constraints, and do not appear to be focused on the description of range sites and plant biodiversity, no data relevant for the description of distribution and conservation status can be extracted from the available information.

AREU/Watershed Atlas. Neither AREU nor the Watershed Atlas team included any plant specialist. The information assembled in the Afghanistan Watershed Atlas is all derived from secondary and tertiary sources, very unsystematic, and not peer-reviewed. No information relevant for plant biodiversity can be extracted.

FAO Medicinal/Food Plants Project. As of December 2008, the database contained 226 local names. A very large proportion of these plant names was not identified by their Latin names, and according to FAO personnel, proper identification was lacking because appropriate reference material or expertise was not available. Although prices for some marketed plant species had been collected (it appears that price collection is planned to continue), this was done only for a few markets in one season, and the origin of the plant material found in markets could not always be verified.

Plant collections. The herbaria in Vienna, Munich, Edinburgh and Kew, as well as the collection of Helmut Freitag, jointly cover probably comprehensively the flora of Afghanistan. However, large groups of plants have not been consistently identified and cross-referenced yet – there is no 'Flora of Afghanistan' (although there is a book with this name, authored by Kitamura, it is only a very superficial and unsystematic expedition summary).

Other sources. Probably the most relevant sources of information were not identified in the original ToR for the present project. In the late sixties and early seventies, a group of

German botanists worked as lecturers at the University of Kabul. Because of frequent interruption of classes due to student strikes (Freitag, pers. comm.), these botanists had many opportunities to conduct plant collection surveys. Dieter Podlech (taxonomist) has a very extensive collection housed at the Herbarium of the University of Munich. As a taxonomist, he conducted only floristic collections without any site and plant community assessment. Siegmund Breckle and Helmut Freitag had a geobotanical focus and divided the country between them, with Breckle focusing on the high alpine areas, and Freitag extensively traveling in all other regions. Freitag later changed his disciplinary area and became a taxonomist. Consequently, he did not extend his analysis past a summary monograph which is the basis of all vegetation maps of Afghanistan currently in use (including the map published by WWF). His collections are larger than Breckle's collections, and he has probably also a larger data set of field notes. However, both scientists never computerized their data. They are contained in field books (Freitag has 12 field books and estimates that he collected about 500-700 site relevés). Together with Breckle's as of yet undetermined number of site analyses, this data set constitutes the only source of information that could answer some, but not all, of the questions of distribution, abundance, endemism, site specificity, ecosystem function, and, to a degree, conservation status. However, there are substantial issues associated with these data collections. These are:

- 1) The field surveys span a period of several years. In the beginning, the scientists had only limited floristic knowledge and could record in many cases only genus, sometimes only family names. Because they did not undertake a systematic analysis of their field notes, there was no incentive to complete the field notes subsequently. At least Freitag, however, numbered all specimens so that cross-referencing with his herbarium is possible.
- 2) Freitag conducted what could be called 'cumulative' recording, i.e. did not list species if they had been recorded earlier for the same site. The problem is that he did not record the details in the field book. This means that only a complete computerization of the whole data set, with subsequent extensive checking (which would of course require his assistance) allows an analysis answering some of the questions of the gap analysis.
- 3) While physical site descriptions are recorded, use and management information is typically lacking.
- 4) As is typical with the Braun-Blanquet method, site entitation was accomplished heuristically. It is obvious that entitation may not have been as unbiased in the beginning as it was towards the end of the period of collection expeditions, when the scientists had gathered more experience. Given the extreme degree of human use

(and overuse or abuse) of Afghanistan's ecosystems, information about management and current use is important for selection of representative sites. It will take considerable interaction with Freitag and Breckle to determine how representative the sites they described are for the distillation of range site descriptions needed for the gap analysis. Both Breckle and Freitag are retired, but extremely busy people.

Conclusions

Information about the conservation status is sparse for almost all wild species in Afghanistan. However, in the case of plants, it is almost non-existent. Certainly, no emblematic plant species comparable to the twelve mammals present in Afghanistan and on CITES Appendix I, or the well-known butterfly *Parnassius autocrator*, apparently under threat by butterfly collectors, have been recorded for Afghanistan. Breckle (2007) describes *Rhododendron afghanicum* as the possibly rarest plant of Afghanistan. This designation would certainly make it an emblematic plant; however, this species is not present on any list identifying plant species in need of special protection.

On the other hand, the destruction of Afghan ecosystems is of course most apparent in the plant kingdom. The reason is the extremely destructive human influence on the natural vegetation of Afghanistan through centuries, perhaps millenia, through unchecked harvesting of plants for animal forage and fuel consumption for cooking and heating. Descriptions of destruction of natural ecosystems of Afghanistan date back to the mid 19th century, and it is obvious that the extreme extent of environmental destruction of this country cannot be attributed only to the decades of war and civil strife of recent history. The environmental destruction is so pervasive that some experts (see Chris Shank's report for UNEP of 2006) speculate about the possibility of long-term anthropogenic climate change driving and accelerating vegetation change in this country. Certainly, what is *not* available is the most basic information necessary for the designation of protected areas from a plant perspective – distribution, abundance, and conservation and management status. Without question, protected areas are urgently needed to conserve remnants of native vegetation and least disturbed plant communities. However, I have concluded that it is not possible to identify these areas based on a review of individual plant species. Instead, I propose an alternative to the current gap analysis approach focusing on specific, individual plant species. My suggestion is to designate protected areas based on the concept of *preserving least affected/disturbed representative samples of ecosystems*. This approach would require collaboration with the (only) three taxonomists in possession of extensive field collection data. While a thorough review of their field notes would be required to identify areas that are the least disturbed or affected by human activities, it is not necessary to computerize and analyze all their data, as would be required to ascertain status of individual

plant species. The latter objective should be pursued as well, but in order to reach the goal of identifying individual plant species of special protection need based on information about distribution, abundance and current demand, work such as planned in the proposed E-Flora project is required.

Proposal for closing information gaps

The following activities are proposed as a follow up to the review and analysis presented here.

1. Discuss an agreement with Professors Breckle, Freitag and Podlech about the use of their field notes for the identification of proposed protected areas. A qualitative review of their field notes is needed to identify the most representative and least disturbed that are exemplary for the major plant associations/communities identified by Freitag (1971).
2. Participate in the proposed E-Flora project. Participation by NEPA would ensure that ecosystem considerations including conservation needs of animals assist in guiding the work on identifying individual plant species in need of special protection status. A working group finalized in the summer of 2008 a proposal for an E-Flora of Afghanistan. Part of the stated objectives of this proposal covers the task intended to be accomplished in the plant perspective gap analysis for protected areas. In the review of the existing information sources it became obvious that, contrary to initial expectations, the information sources to be mobilized for the E-Flora project would not just be 'additional' sources for the gap analysis. In fact, they are the only, or at least, the by far most relevant sources. It took me over a year to convince Freitag, Podlech and Breckle to commit to the E-Flora project. It appears to be critically important to consider their advanced age, which makes this project proposal doubly urgent.
3. Establish a working group that serves as a clearing house for all current botanical field work in Afghanistan. Several projects have conducted, and some are still conducting range ecology and botanical research in Afghanistan. It is my understanding that currently field work is only possible (to a very limited extent) in Badakshan and in Bamyan. Although not nearly sufficient to significantly improve our current information of plant distribution and conservation status in Afghanistan, this information must be collected and archived. More importantly, establishing a working group would allow to standardize methods and to centrally record specimens. This would definitely contribute to the work in the proposed E-Flora project especially in those aspects relevant for the continued gap analysis.