

## Biodiversity conservation in the Arabian Peninsula\*

An international workshop on biodiversity conservation of the Arabian Peninsula was held during 27–30 March 2016 in Sharjah. The workshop was intended to take stock of the current and existing biodiversity knowledge, diversity of genetic resources and their conservation, identify gaps and explore options to address them. In addition, the focus was to maintain and establish a continuum in interaction among early career plant scientists of the Arabian Peninsula for collaborative biodiversity research.

Focusing on the description and conservation of Arabian biodiversity, the workshop provided an opportunity for interaction among scientists at various career levels with differing but complementary backgrounds. Highlighting various conservation measures and biodiversity assessment techniques, the workshop ignited a hopefully continuing regional dialogue on the emergent topics of biodiversity conservation in the Arabian Peninsula. It brought together more than 35 national and international participants from different institutions, including 15 speakers, to discuss the latest advances over Arabian biodiversity conservation and to form stronger links among plant scientists of the UK, UAE and larger area of Arabian Peninsula for collaborative research. Botanists, plant conservation scientists and research students from different countries of the Arabian Peninsula and UK, participated and presented their biodiversity-related research and interacted intensively in discussions.

The workshop was inaugurated by Amr Abdel-Hamid (Sharjah Research Academy (SRA), Sharjah). He welcomed all participants and mentioned that SRA was pleased to host this workshop on biodiversity conservation in Arabian Peninsula. He recounted how the per-

sonal commitment of H. H. Sheikh Dr Sultan bin Mohammed Al-Qasimi, UAE Supreme Council member and Ruler of Sharjah, for the conservation of natural habitats and plant genetic resources of the region has led to the establishment of the Sharjah Seed Bank and Herbarium in 2009, with technical support from the Royal Botanic Gardens Kew, UK. He emphasized that the conservation of biological diversity is a crucial issue to the whole Arabian Peninsula and hoped that the workshop would help in the exchange of research ideas and expertise, and strengthen networking in the region for collaborative research.

Shahina A. Ghazanfar (Royal Botanic Gardens, Kew and UK Coordinator) spoke briefly about the aims of the workshop, its particular importance to the Arabian Peninsula and expressed hope that it would equip participants with a better understanding of biodiversity conservation issues. In her keynote address, she spoke about floras of the Middle East and described various approaches in assessing plant diversity, and gave a brief account of seed banking at the Millennium Seed Bank, Kew. In his keynote address, Ali El-Keblawy (University of Sharjah and UAE Mentor) presented various threats that plant diversity is facing in arid lands. He spoke on the existing information on invasive plants in the UAE with a focus on threats posed by *Prosopis juliflora* on native plant diversity. He emphasized that future research is needed on climate change ecology and invasive species impacts on native vegetation of the Arabian Peninsula.

Sanjay Gairola (Sharjah Seed Bank & Herbarium, SRA and UAE Coordinator) in his keynote address spoke in detail about biodiversity conservation through seed banking, and activities and achievements of the Sharjah Seed Bank and Herbarium. He emphasized that biodiversity is facing crisis at genetic, species and ecosystem levels and recent years have witnessed profound progress in the transition of biodiversity conservation approaches. The need to strengthen the capacity of seed banks of the region for preservation, research and propagation of native species was highlighted. Anthony Miller (Royal Botanic Gardens, Edinburgh

and UK Mentor) in his keynote address highlighted the importance of using both classical and molecular tools for identification of plants and different categories and criteria of IUCN for establishment of Red Lists. He expressed concern on species identification and the importance of using up-to-date taxonomic revisions of the species. Stimulating discussions on the need of Red Lists and their value in controlling loss of biodiversity have resulted in various ideas for strengthening the future monitoring and assessment processes.

In a technical session, the current status of plant genetic resource collections and ongoing efforts for their conservation were addressed in some of the Arab Gulf countries. El Sayed El Azazi (Department of Genetic Resources, MoE, Qatar) gave an account of plant genetic resources conservation in Qatar, and discussed about safeguarding native species and preserving adequate genetic diversity in seed banks. Azzah Al Jabri (National Herbarium, Natural History Museum, Oman), talked about the vegetation diversity of the country and conservation efforts made through herbarium collections. Bushra Al Hajri and Thuraiya Al Jabri (Oman Botanic Garden, Oman) presented an overview on plant collection, seed banking and documentation, and conservation of medicinal plants at the Oman Botanic Garden. During the technical session, Sarah Al Ateeqi (Public Authority of Agriculture and Fish Resources, Kuwait), highlighted the advantages of biodiversity conservation through seed banking and herbarium, and emphasized that substantial efforts are needed to collect and conserve the remaining non-conserved biodiversity. Hatem Taifour (Royal Botanic Garden, Jordan) provided an overview of the seed bank and herbarium collection activities, and natural vegetation of the country. He emphasized assessing the conservation status of plant species according to the IUCN Red List criteria for accurate management plan for conservation actions regarding specific species.

In the session on applications of biodiversity, Mikhail Korshunov (Fujairah Crown Prince Office, UAE) spoke about the conservation of ecosystems by

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restoration and gave an example of Jebel Hafet. Mufid Samarai (SRA) spoke about utilizing indigenous seeds and plants as engineering materials. Studies carried out by SRA on sustainable indigenous seeds, and reeds used for low-cost housing and for the enhancement of engineering materials were also discussed. M. Ifikhar Hussain (International Centre for Biosaline Agriculture (ICBA), Dubai) talked about the local buffelgrass as an alternative to exotic Rhodes grass. Tamer Khafaga (Dubai Desert Conservation Reserve, UAE) spoke about vegetation diversity, effect of grazing on regeneration pattern in the Dubai Desert Conservation Reserve, and highlighted the need for effective biodiversity conservation and management strategies in the arid region. Jacqueline St Quinton (Birkbeck College, London University, UK) presented interesting research on invasive species, and highlighted the ecological, economic and social/aesthetic impacts of invasive plants in sensitive ecosystems. In the poster session, N. K. Rao and Mohamed Shahid (ICBA) briefed the participants about desert gourd as a potential bio-

energy feedstock crop for marginal environments and new records for the flora of the UAE. During discussions, the participants emphasized the need to define rare species of the region that require collaborative efforts for their conservation. In order to recognize the commonality of the floras and their conservation, it was recommended that a regional database be created that comprises all of the plant taxa of the region. The role of seed and DNA banks, and their importance was discussed. The need for a common GeneBank for the Arabian Peninsula was also highlighted and discussed.

Ahmad Hegazy (Cairo University, Egypt) introduced the concept of networking institutions as a supporting tool in the understanding and conservation of biodiversity in the UAE and the Arabian Peninsula. The possibility of creating a website that would help in obtaining information on scientific research, establishing research links and proposing collaborative projects for the knowledge, documentation and preservation of biodiversity was also discussed. All participants agreed on the importance of establishing a research network that-

would connect all concerned parties and researchers in the Arabian Peninsula. Participants also exchanged experiences and examples as to how these issues could be undertaken by early career researchers at universities and research institutes in the UAE and the Arabian Peninsula.

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## MEETING REPORT

### Strategic environmental assessment of hydropower projects\*

The Indian Himalayan Region (IHR), spreading from Arunachal Pradesh in the east to Jammu and Kashmir in the west and covering 530,795 km<sup>2</sup> of geographical area, holds a special place in the mountain ecosystems of the world. The IHR is also known as the third water tower of the earth and supplies water to a larger part of the Indian subcontinent. Due to the rich water potential of the IHR and the ever-increasing energy demands of the country, the Government of India recognized that hydropower potential needs to be harnessed to the maxi-

imum for economic development. The IHR accounts for approximately 18% of India's total geographical area and contrarily owns more than 75% (117,139 MW) of the total exploitable potential. In a landmark move towards implementation of hydropower projects, the Prime Minister of India launched a 50,000 MW hydroelectric initiative programme, formulated by the Central Electricity Authority (CEA) for the preparation of Preliminary Feasibility Reports of 162 new hydroelectric schemes (47,930 MW). Surprisingly, 133 of these schemes are in IHR. In order to tap the available hydropower potential, various rivers and streams have been dammed to harness hydroelectricity. For example, River Satluj in Himachal Pradesh (HP) is one of the largest river systems with a total demarcated catchment area of 21,457 km<sup>2</sup> spreading over the districts of Lahaul & Spiti, Kinnaur, Shimla, Kullu, Mandi, Bilaspur, Solan, Hamirpur and Una. Cur-

rently, there are more than 38 hydroelectric projects of different categories which are either proposed, or under construction or commissioned in the basin. HP is extremely rich in hydel resources and the state has about 25% of the national potential. Satluj, Yamuna, Beas, Ravi and Chenab are the main five rivers in HP. It has been estimated that about 27,436 MW of hydel power can be generated in the state in these basins. The basin-wise potential is 13,332 MW in the Satluj, 5,995 MW in the Beas, 4,032 MW in the Chenab, 3,237 MW in the Ravi and 840 MW in the Yamuna.

Strategic Environmental Assessment (SEA) is defined as a systematic process for evaluating the environmental consequences of proposed policy, programme or plan. At present, SEA is neither legally followed in India nor has the government framed any guidelines for it. Today, the natural resources are becoming scarce. Thus, there is a need for evolving SEA to

\*A report on a Training Workshop on 'Strategic Environmental Assessment (SEA) of Hydropower Projects: An Important tool for Sustainable Development in the Satluj basin'. The workshop was organized by the G.B. Pant National Institute of Himalayan Environment and Sustainable Development, Himachal Regional Centre, Mohal-Kullu held on 23 December 2016 at Deputy Commissioner Office, Reckong Peo, Himachal Pradesh.