Satellite Images, Maps and Photographs of the Dry Aral Seabed

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Fig 1. Satellite image (Satellite: Aqua / Sensor: MODIS / Resolution: 250 m / 22 June 2003) of the Aral Sea region. The location of the Uzbek border is shown. The width of the picture area is 450 km. See the detailed picture of the Project area below.

The irrigated areas and grasslands appear in green, forest (e.g. saxaul) areas brown, sandy deserts in pale yellow, eroded steppe in light orange and clay or salt beds grey and clean water areas blue.

Especially close to towns and other populated areas deforestation and increased erosion are common features whereas areas of intact saxaul forests (dark brown) occur in remote and unpopulated areas. This can be seen e.g. in the area characterized by aeolian landforms in the right center of the picture as well as close to the river courses (bottom right).

Satellite imagery will provide good basis for the mapping of soil types and vegetation. Such maps are necessary in order to plan the techniques and species to be used in the revegetation program as well as to consider environmental characteristics of the area.
Fig 2. Satellite image (Satellite: Aqua / Sensor: MODIS / Resolution: 250 m / 22 June 2003) of the eastern shore of the Aral Sea. The location of the Uzbek border is shown. The width of the picture area is 200 km. See the sample pictures from the different major vegetation/soil zones below.

B – Barsa-Kelmes Nature Reserve (a former island of the Aral Sea)

**Soil and vegetation zones are:**
1 – Saline clay beds without vegetation (erosion and drifting sand common);
2 – Coastal zone of pioneer vegetation (sarasasan and halophilious grasses);
3 – Zone of soil crust (salts and shells) with sparse desert vegetation;
4 – Areas of re-activated erosion, sands, blow-outs and sand dunes and occasional saxaul and sarasasan patches;
5 – Thick forests and bushes (mostly saxaul and sarasasan) (dark brown);
6 – Irrigated agricultural lands (mostly rice fields).
Fig. 3. Recently emerged land close to the present shoreline of the Aral Sea is characterized by drifting sands and salts and there is no vegetation (zone 1 in Fig. 2).

Fig. 4. Pioneer vegetation (especially halophytes) may occupy the emerging land quite quickly (zone 2 in Fig. 2). The Aral Sea is in the background.

Fig. 5. In the central parts of the dry seabed conditions for vegetation growth are worse (zone 3 in Fig. 2). The soils are dry, land surface is covered by a lag gravel (soil crust; desert pavement) and drifting sand dunes suppress vegetation.
Fig. 6. Soil crust composed of salts, pebbles and shells protects deposits for further deflation (zone 3 in Fig. 2). Erosion will be re-activated whenever this layer is broken.

Fig. 7. Further inland permanent vegetation cover has been established (left), but in places wind erosion has been re-activated and blow-outs and sand dunes formed (right). Erosion and also accumulation of sand have destroyed vegetation cover established earlier and closer to the shoreline (zone 4 in Fig. 2). Sarasasan vegetation is best capable of growing in this environment.

Fig 8. Thick saxaul forests occur in the upper parts of the dry seabed in areas where these trees have not been cut by local population and where wind erosion is not prevalent (zone 5 in Fig. 2).
Fig. 9. A saxaul plantation in the central parts of the dry seabed (zone 3 in Fig. 2). Tractors have been used to plow a furrow 2 m wide and major part of the natural vegetation has been destroyed. Natural vegetation is composed of pioneer species, which are adapted to these environments and which would have been important in making the growth conditions better for other plant species. The method will also cause the re-activation of wind erosion. This technology is harmful for the environment and cannot be used in the revegetation program.

Fig. 10. A ten years old experimental saxaul plantation in the central parts of the dry seabed (zone 3/4 in Fig. 2). Negative impacts of the furrowing can still be seen. Natural vegetation has been spreading quickly to the terrain covered by hard and salty soil crust.
Fig. 11. A ten years old experimental saxaul plantation in the central parts of the dry seabed (zone 4 in Fig. 2). Wind erosion has been re-activated and natural vegetation destroyed probably as a consequence of furrowing and off-road traffic.

Fig. 12. Saxaul planting of a GTZ project in the dry Aral seabed. In this kind of terrain the trees will help to fix the drifting sands and to make growing conditions better for other plant species.
Fig. 13. In the dry seabed there are some habitats, which are valuable for biodiversity conservation (site marked with number 5 in Fig. 2). Here an artesian well maintains rich flora, especially reeds.

Fig. 14. The former island of Barsa-Kelmes is now connected to mainland and it has been demarcated for a nature reserve (B in Fig. 2). The reserve is an ideal place to study vegetation succession caused by the displacement of the shoreline and interrelations of soils, hydrology and vegetation. The reserve is also important for several rare species of fauna and flora. The Aral Sea is in the background.