Artificial Wetlands in Khuzistan, Iran; Problems and Solutions

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Drainage water of agricultural and fish farms in Khuzistan Province flows into the artificial wetlands.

Due to quality problems, the drainage water cannot be discharged into the nearby Karun River.

The area of the wetlands and its water salinity is increasing.

To keep water salinity in an acceptable level, an outlet is needed to be implemented.

Hence, the environmental threats of the wetlands could be altered to opportunity.
Location of Khuzistan Province in South West of Iran
Karun River Basin

Khuzistan Province

Karun River

Agro-industrial units and fish farms 30000 ha.

Artificial Wetlands Annual Drainage water 336 MCM
Sugarcane units: 24000 ha.

Main Drain:

- E. wetland
- W. wetland

Irrigation water use: 720 MCM/year

Drainage water: 324 MCM/year

Area of E. Wetland: 11000 ha.

Area of W. Wetland: 23000 ha. (Expanding)

6 - 8 dS/m

10 dS/m

30 - 40 dS/m

>100 dS/m

Karun, 2.5 - 3 ds/m

Connection channel

Drainage Water Pump Station of Sugarcane Units - 20 m³/s
Mean Annual Inflow and Outflow of wetlands

<table>
<thead>
<tr>
<th>Inflow (MCM/year)</th>
<th>Outflow (MCM/year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sugar Cane units</td>
<td>336</td>
</tr>
<tr>
<td>Fisheries</td>
<td>165</td>
</tr>
<tr>
<td>Khorramshar Unit</td>
<td>38</td>
</tr>
<tr>
<td>Rainfall</td>
<td>53</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>592</strong></td>
</tr>
<tr>
<td>Evaporation</td>
<td>465</td>
</tr>
</tbody>
</table>

592 > 465

Hence, the area of the wetlands is increasing.
Expansion of the wetland area in recent years

Area of West Wetland

Area of East Wetland

Year

Area of Wetlands - hectar

Expansion of the wetlands during last 3 years

- 2015
- Expanded in 2016
- Expanded in 2017
1. The wetlands are still expanding.

2. Water quality is deteriorating.

3. Water will be lost for reuse.
Recommendations could be categorized in 2 scales:

- On-Farm scale
- Wetlands scale
Water consumption reduction in Sugarcane Farms through improving irrigation efficiency.

Water allocation reduction to agricultural units, since crops use less water when their yields are decreasing.

Modification of cropping pattern i.e.:
- sugar beets instead of sugarcane (12000 m³/ha. vs 30000 m³/ha)
- salt tolerant rice,
- salt tolerant cotton,
- jute (knaf), etc.

Using controlled drainage to reduce drainage water volume and to improve water quality.

Recommendations: On-Farm scale
Recommendations: wetland scale

- Using saline water for aquaculture
  - Fish
  - Shrimp
  - Algae
  - Artemia

- Using saline water for Biosaline agriculture
  - Quinoa
  - Salicornia
  - Atriplex
Changing approaches to the wetlands

- Wetland is now an opportunity rather than a threat
- Study on the optimum size of the wetland
- Construction of an outlet.
- Using wetland water for different uses based on its salinity.
The size of the wetland depends on the outflow.

<table>
<thead>
<tr>
<th>Area of Wetland (ha.)</th>
<th>Min.</th>
<th>Mean</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>29,456</td>
<td>37,268</td>
<td>45,667</td>
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<td></td>
<td>27,341</td>
<td>35,802</td>
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<td>22,763</td>
<td>29,213</td>
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<td>15,673</td>
<td>21,457</td>
<td>31,562</td>
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<td></td>
<td>7,936</td>
<td>13,671</td>
<td>31,484</td>
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<tr>
<td></td>
<td>1,119</td>
<td>7,334</td>
<td>31,484</td>
</tr>
</tbody>
</table>

Optimum size of the wetland

The desired size of the wetland is based on the decisions of the beneficiaries especially Department of Environment.
Thank you