Oman Salinity Strategy

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Direct visits to 395 farms were used to assess the impact of salinity on crop production as well as socio-economic indicators for local farmers.

Thematic Area: Policies for Resilience

Purpose: Develop a national strategic plan to combat salinity and protect water resources from pollution and salinity in Oman

Geographic Scope: Oman

Timeline: 2009 - 2011

Partners:
- Ministry of Agriculture and Fisheries
- Ministry of Regional Municipalities and Water Resources
- Ministry of Environment and Climate Affairs
- Public Authority for Electricity and Water
- Oman Wastewater Services Company
- Sultan Qaboos University

Project Lead:
Dr. Abdullah J. Al-Dakheel
a.dakheel@biosaline.org.ae

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The expansion of agriculture in the Sultanate of Oman during the 1990s, especially the growth of perennial forages, has led to a dramatic deterioration and depletion of natural resources, especially groundwater aquifers. The coastal regions of Al Batinah and Salalah that make up the majority of Oman's limited agricultural land were particularly affected due to groundwater salinization and sea water intrusion. This resulted in a major decline in agricultural productivity, and harshly impacted farmers.

In response to this situation, His Majesty Sultan Qaboos bin Said Al Said, Sultan of Oman, directed the Ministry of Agriculture and Fisheries in 2008 to prepare and develop a national strategic plan to combat salinity and protect water resources from pollution. Consequently, the Ministry entered into a partnership with the International Centre for Biosaline Agriculture (ICBA) to prepare a Strategic Plan in collaboration with other relevant partners in the Sultanate of Oman.

Activities and Outcomes

The scope of the Oman Salinity Strategy (OSS) involved comprehensive assessment of the current status of Al Batinah and Salalah regions' agricultural systems that represent most of Oman's agricultural land. It included analyzing the extent of the salinity problem, water resource distribution, different agricultural system productivity and the impact of salinity on farmers' income, policy and legislation. The resultant strategy addressed socio-economic aspects and capacity-building needs at all levels. It identified alternative scenarios for sustainable water resources and production systems to bring about a more efficient and sustainable use of natural resources.

During the course of the OSS project, detailed water balance calculations were carried out for Al Batinah and Salalah as a representative sample of all of the countries' agricultural land. The analysis clearly demonstrated that salinization is costly in terms of productivity losses and water wasted, and that reducing groundwater utilization will add significant value to the economy and enable agriculture to be sustained in the country. It also confirmed that groundwater overdraft is the primary cause of this salinization and that sea water intrusion and salinization of agricultural lands in Oman are inseparable. Therefore the problem cannot be solved without addressing measures to reduce and eventually eliminate groundwater overdraft.

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The Oman Salinity Strategy provides recommendations for improving agricultural production systems in the Sultanate of Oman through efficient and sustainable use of the country's natural resources.

Each measure was separately analyzed and ranked in terms of its effectiveness. Subsequently, all of the tactical measures were incorporated into an economic optimization model that looked at various scenarios and determined the costs and benefits compared with the 'business as usual' (BAU) baseline. The analysis clearly demonstrated that the best option to reduce agricultural water use is to employ a combination of tactical measures, which together form the proposed OSS.

Strategy Recommendation

The Strategy›s recommended tactical measures are grouped into four main areas: regulation, economic and financial incentives, public goods, and capacity-building.

As groundwater overdraft is a major cause of sea water intrusion leading to agricultural land salinization, all the recommended measures aim to reduce and eventually eliminate overdraft, conserve agricultural water use and increase productivity and incomes. The main Strategy recommendations are related to:

1. Taking highly saline areas out of production, combined with shifting some agriculture to new areas with suitable soils.
2. Upgrading on-farm irrigation efficiency through improved agricultural extension services, and continuing subsidies to upgrade and improve on-farm irrigation equipment,
3. Further investments in new recharge dams and treated wastewater reuse.
4. National coordination between major water users and planning, monitoring and regulatory agencies.
5. Capacity building involving stakeholders at all levels – individual, organizational and institutional.
6. Alternative approaches to reduction in groundwater utilization

A cornerstone to reducing precious groundwater depletion in the Strategy is extending the concept of zoning by taking highly saline areas out of production and shifting some of the agricultural production to new areas. Since the OSS adoption, the Government of Oman has been actively pursuing this recommendation.

The shifting of agricultural production to new areas of suitable soils where the groundwater is of good quality is forecasted to significantly increase farm productivity and income. In tandem, the OSS recommends that each new farm be allocated a right to water use which would be monitored as farms should be equipped with subsidized irrigation equipment, automated soil sensors, and water supply monitors. To maintain a commercial approach to the new farms, the Strategy proposes applying conditional leases rather than ownership.

Since capacity development is a key but often neglected area, the OSS stressed that capacity building will need to involve stakeholders at all levels including individuals, civil society organizations as well as public and private institutions.

The strategy stresses on the need to pursue all measures in tandem, as no single measure will be sufficient to slow down the rate of sea water intrusion.

Future Directions

The development plan of the OSS was approved by the Cabinet on 4 January 2009. In February 2010, it was added to the national program for implementation and it was formally adopted in October 2012.

Implementation of the strategy is critical and research and development works is needed to facilitate implementation. For example, currently the exact quantity of agricultural water demand in Oman for different crops is poorly defined. Extensive on-farm research and monitoring to refine knowledge on actual water use in order to reduce the uncertainty in predicting changes in groundwater availability and sea water intrusion is required. The economic efficacy and water conservation gains from irrigation efficiency improvements to date is unknown, necessitating additional research to establish the status quo.