

BRIEF NOTE ON THE STATUS OF SALT AFFECTED SOILS IN GUJARAT (S. RAMAN)

Status and Types of Salt Affected Soils

The soil salinity / sodicity is an important factor affecting the soil health and crop productivity. The total salt affected soils in India was reported to be app. 8.1 m ha out of which 3.2 m ha is coastal saline soil and 2.8 m ha is sodic soil and the rest 2.2 m ha is inland saline soil. Gujarat with an extent of 1.2 m ha contributes to 15 percent of the total salt affected soils in the country. Of course this is a dynamic problem. While with the available technology some of this area is being reclaimed, simultaneously good soils are becoming saline / sodic due to multifarious reasons including improper irrigation in irrigated areas and sea water ingress in coastal areas.

- **Arid coastal salt affected soils**

Gujarat comes next only to West Bengal in the total extent of coastal salt affected soils with an estimated area of about 7.2 lakh hectares. This is 59 per cent of the reported salt affected area of 12 lakh hectares in the state and 21 per cent of total coastal saline soil of the country in the state. This 7.12 lakh hectares is distributed in the districts of Kutch in North Gujarat, Ahmedabad in middle Gujarat, Surendranagar, Rajkot, Bhavnagar, Jamnagar and Junagadh in Saurashtra and Valsad (Bulsar), Surat and Bharuch (Broach) districts of South Gujarat.

The reason for the development of coastal salinity in this region is mainly attributed to the intrusion of sea water into the main land coupled with the transportation of salt particles through wind from salt affected patch creating salinity in normal soils.

- **Inland salt affected soils**

The salinity / sodicity problems occurring in the mainland, away from the coastal belt and not contributed due to sea water intrusion can be termed as inland salt affected soils. This can be either natural salinization or secondary salinization which occurs widely in the irrigated belt. The causes for the above may be aridity, topography, basic parent material, poor drainage, over irrigation, poor quality water etc. Generally it is due to a combination of some of these factors though there is a predominance of a particular factor in specific locations.

Rise in water table as consequence of canal irrigation and poor drainage are the main factors for the salinity development in Gujarat. About 15-16 per cent area in the Mahi Command is affected by water logging due to rise in water table. In the Ukai-Kakrapar and the Mahi Command areas, the salinity and sodicity is attributed to the rapid rise (0.3 m/yr) in underground water. The salinity near *Nal Sarovar lake* in Gujarat is due to flat topography and aridity. The salinity in North Gujarat is mainly due to poor quality water and underground salt deposits.

In the two major commands of Gujarat 1) Ukai – Kakrapar and 2) Mahi – Kadana about 66,000 ha is saline which includes both coastal and inland areas. Out of the 1.2 m ha of salt affected soils in Gujarat about 0.5 m ha are estimated to belong to inland salinity. These distributed in different districts of South, middle, North Gujarat and Saurashtra region.

Constraints:

Some of the main constraints of soil productivity and ultimate agriculture production in these arid coastal salt affected areas are:

- Sea water intrusion through high tides and back flow in river estuaries affecting soil and crop growth.
- Inadequate drainage resulting in waterlogging during monsoon.
- Poor soil physical condition restricting crop production and nutrient availability.
- High osmotic potential affecting the crop production.
- Cultivation restricted to mainly mono cropping system.
- High temperature during summer especially, in resulting in salinisation by capillary rise.
- High water table conditions developing into secondary salinization affecting soil health and crop productivity.

Impact on Crop Production

In both the types of salt affected soils yield reduction varying to the tune of 30 to as high as 70 per cent have been observed in various crops, depending upon the degree of the problems

Reclamation and Management

Primarily these soils develop salinity, sodicity or a combination of both due to either sea water ingress or poor quality underground water or poor drainage or a combination of all.

As a first step, the ingress has to be stopped. Provision of embankments with sluice gates along the sea coast and the estuaries to prevent the ingress of water is being adopted by the Irrigation Department and Kharland Development Board in the state.

Another step to prevent the ingress is to reduce the excess withdrawal of ground water especially in around the coastal areas. This can be done by adoption of water saving irrigation methods and devices which includes adoption of micro irrigation.

A package of practices including crop/ varietal selections to suit the coastal/inland saline conditions have been identified along with agro techniques including those of sowing techniques, crop spacings, planting techniques, fertilizer selection and its method of application, irrigation technologies including mulching, proper amendments along with their dosages drainage etc. have been developed by the Agricultural University in the state.

Future needs

In spite of the development of the above technologies their adoption pattern is very low and slow mainly due to the fact that many farmers are not aware of the technologies developed and their location and problem specificities. Hence, to hasten the spread of the technologies, and rejuvenate the salt affected soils with the ultimate objective of improving the socio economic conditions of the farmers; there is a vital need for the popularization of the technologies among the farmers through awareness creation education and demonstrations. If neglected, the salinized areas will be slowly and steadily increasing affecting not only the socio economic conditions of the farmers but also the government's exchequer. The coastal salinity Prevention Cell established at Ahmedabad, with the support of SRTT and the backing from the Government of Gujarat can play a vital role in mitigating the salinity problems in the state through appropriate interventions.