



SALINITY INGRESSION IN COASTAL AREA: A NEW CHALLENGE TO AGRICULTURE IN DEVGAD TEHSIL

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Abstract:

Salinity intrusion is an increasing problem in the coastal areas around the world. Climate change and its associated hazards like sea level rise, global warming and cyclone has been increasing the salinity problem in many folds. The coastal zone of Devgad Tehsil has now come into focus due to reduction in agricultural production due to rise in the soil salinity in last few years. Although the salinity ingress ion has been putting its negative impact on the crop production over the years, the impact of salinity in the interior coast in terms of loss in crop production has been ignored so far. The agricultural lands are now covered with mangrove vegetation including their associates and marine fauna. Thus crop production have been hampered in coastal zone. Present study was intended to explore the impact salinity on agricultural area, crops productivity, drinking water, animal husbandry and socioeconomic condition of farmers. This study also intends to quantify the cause and gives possible solutions to address the problem. The changing scenario of sea level rise will promote salinity intrusion in coastal area; thereby creating more pressure to the farmer by reducing yield on one hand and threatening livelihood and food security on the other hand. Therefore, to reduce the future loss and to prevent the land degradation, the study recommends some adaptive techniques like check dam, adding lime and gypsum to check salinity.

Keywords: Devgad, Salinity ingress ion, sea level, agriculture, livelihood

Introduction:

Salinity is the saltiness or dissolved salt content of a body of water or in soil. Salinity is discovered in two physical factors of our earth those are soil and water. India has a dynamic coast line of about 7500 km length, including the main land coast line of about 5400 km. Near about 25 percent of the total population of India resides in the coastal tracts of the country. Maharashtra has coastline of 720km, of this Devgad Tehsil has coastal belt of 32 km. Devgad Tehsil is gifted with natural assets and rich in biodiversity. Salinity intrusion is an increasing problem in the coastal areas around the world. Climate change and its associated hazards like sea level rise, global warming and cyclone has triggered the salinity ingress ion issue. The coastal zone of Devgad Tehsil has been already under the constant threat of salinity. The populations residing in the coastal zones have agriculture as their principal source of income. Thus, these regions have come into focus due to reduction in agriculture potential and land degradation.

Salinity is one of the environmental factors limiting the productivity of crop plants as most of the crop plants are sensitive to salinity caused by high concentrations of salts in the soil (Haider 2013). It creates huge impacts on soil profile including nutrient content and fertility. That subsequently arrests the crop production. The phenomenon of salinity ingress ion had affected almost 33 coastal villages of Devgad Tehsil, where a large group of population is

engaged in agriculture, animal husbandry and related occupations. Major crop grown here are rice, nachani, ground nut, kulith, etc.

Ingress of sea water has converted the available groundwater resources into a saline belt making it unsuitable for irrigation and drinking purposes (Tanwir 2003). Subsequently animal husbandry is also hampered in the coastal belts. Some farmers have either partially or completely lost their productive land. In some places agricultures land located nearby coastal area are under constant threat of salinity. If this issue is not addresses at earliest, agricultural plots at coastal region are likely to turn saline in successive years.

Presently number of agricultural areas has completely lost their productivity due to soil. Salinity progression has also put its negative impact on ground water making it unsuitable for use. Both of the soil and water salinity have adverse effects on people's livelihood, daily life activities and socio-economic conditions (Miah 2004). The intensity of the problem is large which has made it very difficult for the farmers to combat with the present situation. Salinity ingress ion is degrading soil quality and ultimately the whole agricultural set up in rural areas. Negligible research has been done so far to explore the impact of salinity on the socio-economic condition and livelihood strategies of the farmers. Therefore, the present study investigates the impacts of salinity on agriculture and farmers' livelihood.

Methodology:**I] Study Area:**

Proposed study was carried out in Devgad Tehsil that is located on the western coast of Sindhudurg District. Devgad is furnished with rich marine resources and fishing is exclusively carried out in sea and estuaries. Main occupations of people here are agriculture and fishing. For proposed study 33 coastal villages of Devgad Tehsil were explored. In these villages agriculture lands are low lying within in vicinity of estuaries. This fact encourages the authors to select the villages along coastal area such as Devgad, Vijaydurg, Rameshwar, Shirse, Jambhari, Katali, Wadaker Poi, Thakurwadi, Tirlot, Mohulgaon, Girye, Padel, Pural, Kalambai, Wada, Nadan, Padvane, Phanase, Malegaon, Mondpar, Tembavali, Kalvi, Jamsande, Dabhole, Padthar, Elaye, Mithmumbhari, Kunkeshwar, Tambaldeg, Bagamal, Naringre, Morve, Hindale and Munage.

II] Methods:

The present was carried out along the coastal belt of Devgad tehsil. Coastal villages were explored during the study period. Data was collection was done by using questionnaire to avoid any kind of bias and confusion moreover to enable a uniform data collection from all sites. Apart from questionnaire, experiences of respondents were shared through group discussions. These discussions proved very fruit full in further studies. From each village 6-7 respondents were randomly selected to participate in questionnaire session. Total 200 respondents were interrogated during study work. The respondents include community leader, village representative, farmers and labors. Data was also collected from Khar land office. Besides these relevant literature was reviewed during study period.

Result and discussion:

- **Impact of salinity ingress on agriculture**

Salinity ingress had been significantly putting its negative impact on the agriculture sector in rural areas. Most of the agriculture lands along the coastal line are affected by salinity and the phenomenon was found to be continuation. Farmers have lost their productive land and ultimately their livelihood. Cultivation of crops in saline area arrest the growth of crop and finally crops die due to excess salt concentration. The income generated from these crops is the key means of livelihood for local people. Invasion of saline water in agriculture land made the land unsuitable of crop cultivation. Lands owned by

farmers are logged with saline water making them unsuitable for agriculture practices. Farmers mentioned that now they have to work as laborer daily wages or migration for getting better occupations.

- **Crop productivity in saline soil**

Salinity of the soil adversely affects crop production. There is reduction in agricultural income due to low fertility and productivity. Farmers cited that crop grown in saline area are small in size and die later. They further mentioned that before 20- 30 years they used to grow rice, nachani, groundnut and other crops in their field. But at present their land is completely degraded and no crops can be cultivated on such lands. Salinity has also hampered the coconut production which is supplementary source of earning. Coconut plantations along the borders of the field either have stunted growth or died due to high salinity.

- **Impact of salinity on groundwater**

The Devgad coastal region has witnessed severe problems of drinking water owing to salinity ingress in the recent year. Saline water had affected the quality of groundwater resource along coastline. Dug wells in villages are the main source of water in villages. The supply of drinking water through taps is unpredictable. This means that the people are left without a reliable drinking water source. Presently most of wells are flooded with saline water and villagers are facing water crises. People have to travel mile away to fetch water. Unavailable of fresh water in turn affect agriculture and animal husbandry.

- **Degeneration of Animal Husbandry**

Agriculture and animal husbandry are interrelated occupations. Animal husbandry is additional occupation of farmers in villages. Raring animal require considerable amount of freshwater and fodder. Reduction in agriculture couple by unavailability of fresh water has reduced the number of livestock. Also the fodder essential for livestock such as rice stalk is no more available at hand. Thus it has become quite difficult to rear animals on coastal belt. Subsequently many biogas plants in villages are discontinued due to unavailability of cow dung and agricultural waste.

- **Decreased Per Capita Income**

In a nutshell per capita income of the farmers has been drastically reduced. Farmers have lost their agricultural income from crop production like rice, groundnut, nachni, etc. Besides, the earnings from additional sources like returns from coconut fruits are also deducting. Similarly decline in number of cattle have reduced the

income generating from the sale of milk, cow dung, cow dung cakes, etc.

Causes of Salinity Ingression

Both climatic and anthropogenic factors are responsible for inducing salinity ingression in coastal area. However, climate change induced factors such as sea level rise is the key cause of salinity ingression in coastal areas. Similarly siltation in estuaries is another major problem. Deforestation in nearby area leads to deposition of soil at the estuarian base reducing its depth (Adyaar 1963). Thus saline water spreads in the adjacent areas causing salination of soil and water bodies. Further, mangroves covers along the intertidal zones that protect the shoreline are being axed for miscellaneous reasons.

Recommendations:

I] For Government:

1. Government should constitute a High Level Review and Monitoring Committee comprising experts from multiple disciplines such as irrigation, agriculture, forest, soil conservation, and groundwater.
2. Khar land office should be carryout survey of coastal belt and construct Bandhara at sensitive area.
3. Government should assistance for long-run sustainable solution to address salinity problem.

II] For Farmers:

1. Farmers should build small check dam through community participation to stop saline water entering in land.
2. Farmers should be trained for alternate livelihood strategies like prawn culture.
3. Lime and gypsum should be added to agriculture land to reduce soil salinity.
4. Salt tolerant varieties should be planted in saline soil.
5. Soil analysis of farm soil should be done annually to know soil composition and deficiency of micronutrients if any, in the soil.
6. Animal Husbandry should be promoted to expand the livelihood options

Conclusion:

Salinity is a severe problem which is not only reducing the agricultural potential, but also significantly influencing livelihood strategies of farmers residing in the coastal belt. The most significant impact of salinity is the changes in land use pattern. Land degradation has grabbed the productive land from farmers and ultimately their livelihood. Agriculture lands adjacent to estuaries are covered with mangroves including their associates. Gradually marine flora and

fauna start invading the same. It was observed that majority of farmers do not adopt any temporary or permanent solution to check salinity. Some handful farmers with adequate finance built check dams confined to their plots. But small scale and marginal farmers are unfortunate to cope up with soil salination problem.

Studies revealed that salinity ingression induced unavailability of drinking water, soil degradation, unemployment and food insecurity is making life difficult in coastal villages. Thus large group of population is migrating to urban areas leaving behind senior citizens only. Villagers mentioned that earlier check dams were built by community participation. But at present very less population stay in the village that can support this activities. No committee has been appointed by Government to monitor and evaluate the impact the salinity ingression. Khar land office is building bandharas at coastal belt but they are insufficient to arrest salinity ingression at present scenario. Gradually year by year salinity is putting its impact on the productive land leading to deterioration of the environment in coastal areas with adverse implications on agriculture and ground water which is a major threat to agriculture and coastal population.

Acknowledgement:

Authors are thankful to farmers, villagers and local leaders. They shared their knowledge and experiences. Also we express sincere thanks to Khar Land Officers to share the data and provide essential guidance.

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