

Utilizing Sea Water, as a Source of Nutrition,
for Farm Products Cultivation (Report 1)
Comparison of Variety of Spinach and Density
of Diluted Sea Water

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Arid desert areas are so vast that domain 1/4 to 1/3 of the global land, which remain as the largest of all non-utilized lands. Furthermore, the desertification is progressing year by year that the increased size of desert area in five years time is just as great as the size of our home land (Japan).

Insufficient amount of rainfall causes shortage of irrigation water in desert, and moreover, this scarcely acquired, valuable water generally contains inorganic salts. In irrigation agriculture, salt containing rain on a cultivated land together with great evaporation will result in salt accumulation. Therefore, avoidance of salt build-up is one of the important subjects.

However irrigation farming can bring in remarkably increased harvest compared to dry farming. Therefore, the balance and cooperative interaction salt build-up is extremely important.

Concerning above points, it is advisable to practice irrigation farming with both the open ditch drainage and the underground drainage. However, in reality, there are difficulties to install them in each and every one of the experimental farms for an economic reason.

However, under the present circumstance, there are no appropriate means for final disposition of leached drainage. On the other hand, by utilizing the dune of coast desert, irrigation of fresh-waterized, ever bountiful, sea water and/or irrigation of diluted sea water are thought to be effective ways of utilizing ever precious irrigation water.

Fresh-waterization of sea water and its use for desert irrigation will result in decreased level of the sea surface, which is predicted to rise, in the global warming caused by increased CO₂, at the same time producing a clean, verdure covered earth.

Based on the thoughts above, presented here is the report of the study of comparison in growth of 13 varieties of spinach, irrigated by diluted, low salt density sea water.

Average harvest of all 13 varieties at irrigation of 1000ppm of salt density compared to fresh water irrigation was increased by about 30%. This could be the result of fertilizer effect by various sorts of ions, such as Na and Cl which are contained in sea water. At 2000ppm, though increased harvests were shown in some types, the average harvest was about as good as that of fresh water harvest. At 5000ppm, the harvest was decreased to half that of the fresh water caused by the high salt density damages. In order to avoid salt build-up, sandy soil was used for these studies. Dripping, which is conservative and popular among desert farming, was applied as a method of irrigation to avoid direct contact of irrigation water to the crop.

The effects of salt water irrigation may differ on each crop according to the methods of irrigation and the characteristics of soil.