# Salt Loading in Agricultural Fields Irrigated with Dairy Lagoon Water

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A current need exists to better understand salt and nutrient loading on soils irrigated by diary lagoon water. Dairy lagoon waters are very high in salts of nitrogen, potassium, sodium, and chloride increasing the livelihood for salt and nutrient movement to the groundwater. Improper lagoon water applications to field crops can result in reduced crop productivity, nutrient imbalances in soils, and an increased need to apply excess amounts of irrigation water to leach these potentially harmful salts.

This applied research project proposes to develop practical information on 1) salt and nutrient content of dairy lagoon water, 2) dairy lagoon irrigation water impact on soil salt transfer below the crop root zone, 3) nutrient transformation rates on soils irrigated with dairy lagoon water, and 4) work with agronomists to develop recommendations on salt loading limits thereby minimizing the potential for groundwater contamination by the producer.

**Approach:**

Our program activities will be concentrated in Fresno, Tulare, and Kings Counties working with UCCE dairy farm advisors and producer cooperators. Because of the extreme variation in dairy lagoon water quality, approximately 20 dairies will be selected to obtain lagoon water samples to survey the range of salt and nutrient contents that are observed in the region. From this survey, representative dairy lagoon water samples will be used to conduct more specific measurements on nutrient and salt loading on a range of soil types representing the area. Salt and nutrient loading studies will be conducted on two to four contrasting soil types representative of the region.

Field lysimeters will be used to track salt and nutrient movement through the soil profile as dairy lagoon water is blended with irrigation waters at several concentrations. Salt and nutrient content measurements will be coupled to crop nutrient needs to estimate an "optimum" treatment based on current knowledge of crop nutrient demand. This will serve to help validate current recommendations for dairy lagoon water blending. Salt and nutrient transport to the subsoil will be monitored and each treatment related to the potential for groundwater contamination hazard.

**Budget Request:**

To conduct the outlined activities, one full-time staff support individual will be needed. In addition, travel to survey and study sites will require vehicle reimbursement rates according to University and State guidelines. Soil and water samples will be processed to identify key salt and nutrient components. Water quick test equipment purchased will be used to obtain more specific data from a large number of samples and used to develop quick test procedures needed for developing future salt loading limits. Simple lysimeters will be constructed for the salt loading and nutrient movement studies.

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| Wages: SRA I (1.0 FTE) | 31,300 |
| Benefits: | 7,825 |
| Supplies: (Lysimeters/misc. supplies) | 1,500 |
| Travel: | 2,000 |
| Soil/water laboratory fees: | 3,200 |
| Equipment: EC meter, Ion specific electrodes | 2,500 |
| Total Project Budget Estimate: | $48,325 |