deficiencies are sometimes corrected by the use of reclaimed water.

HEALTH CONCERNS

Public health concerns related to crop irrigation with reclaimed water include:

- Bacterial and viral agents associated with the possible transmission of disease.
- Hazardous chemicals that may reach ground or surface waters.
- Contamination of crops by chemical or biological pollutants.

The Department of Health Services regulates the use of reclaimed water for crop irrigation and has very specific treatment requirements. The treatment requirements, type of crops, and method of irrigation were shown in Figure 3-1. Disinfection is generally required to reduce bacterial or viral contamination of the water. The Health Department is also concerned with protecting the quality of other water sources that can be used as potable water. Leaching of nitrates in the soil is a primary concern in this respect.

Pollution control agencies usually require that all reclaimed water used for irrigation be totally contained on the user's property. This requires the user to recover

tailwater, thus minimizing the possibility of polluting other surface waters.

Crop contamination can result from irrigating with water which has received inadequate treatment or by applying the water improperly (sprinkler irrigation of food crops). Some trace organics which could be present in reclaimed water are known to be carcinogenic. It is generally believed, however, that these substances are adsorbed by the soil matrix and are not absorbed into the plant tissue (Uiga and Crites, 1980). Additional dangers result from the creation of aerosols by sprinkler irrigation systems which contain virus and bacteria. If ingested, these aerosols have some potential for infection by the organisms which they contain.

Uiga and Crites (1980) found that there is a greater risk to public health using reclaimed water on food crops than on nonfood crops. They noted, however, that the present use of reclaimed water for crop irrigation provides a safety factor of 10^8 to 10^{13} over the last reported incidence of disease transmittal (early 1900's) through the use of "night soil" on food crops. Of the 21 sites reviewed, there were no indications that health problems were of any concern. The farmer is probably more concerned with the quality of his crops or the effect reclaimed water might have on crop marketability. Crop irrigation in all

cases was being performed in accordance with the strict guidelines of the Department of Health Services.

MANAGEMENT ALTERNATIVES

Crop water and nutrient requirements are primarily related to the type of crop and its growth stage; climatic conditions of temperature, humidity, wind, and solar radiation; and modifications brought on by water and chemical deficiencies or imbalances. Little can be done about the weather, but water and chemical problems can be alleviated through a proper irrigation and fertility management program. This may involve dilution and/or the use of amendments, or the water source may be adapted by modifications in the cultural practices or crop selection. Following are more specific management alternatives dealing with specific problems as recommended by Ayers and Westcott (1976).

Salinity

The major objective in choosing a management alternative to overcome a salinity problem is to improve soil water availability to the crop. Some of the management alternatives include: