

To use mixed canal and tubewell water having a salinity of 780 ppm for crops of medium salt tolerance, about 18 per cent additional water will have to be provided for leaching purposes [18, p. 117]. This would mean that 30 per cent of the tubewell water will have to be pumped for leaching purposes only¹. If on the other hand saline water containing as much as 3800 ppm is pumped and mixed with an equal quantity of canal water and mixed water having a salinity of 2000 ppm is used for irrigation as suggested by the Panel members, nearly 67 per cent of the mixed water would be required for leaching purposes with crops of medium salt tolerance [18, p. 117]. This means that about 80 per cent of the pumped water will have to be used for leaching purposes only². In the case of crops of high salt tolerance such as cotton and barley, the leaching requirement will be about 25 per cent of the mixed water or about 40 per cent of the pumped water. Even with the provision of drainage and removal of 40 to 80 per cent of the pumped water as drainage water, there would be deterioration of land due to sodium damage and large quantities of gypsum will have to be provided to keep the soils in good condition.

Dr. Eaton has developed a method for estimating the amount of gypsum and the additional amount of water which should be applied to the land to prevent high alkalinity, serious soil impermeability and deficiencies of calcium and magnesium required for normal plant growth (*see*, pp. 387-391).

For saline groundwaters of the Northern Zone of the Indus Plain the author has calculated, from water analyses of Water and Soils Investigation Division of West Pakistan WAPDA [7; 15], the gypsum and leaching requirements for all groundwaters having a salinity between 3000 and 3900 ppm in the Chaj and Rechna Doabs according to Dr. Eaton's method. Calculations have been made for the undiluted groundwaters as well as for the groundwaters when mixed with an equal quantity of canal water. The results are summarized in Table I. For all groundwaters having an average salinity of 3500 to 3600 ppm, when mixed with an equal quantity of canal water the gypsum requirements (for the mixed waters having a salinity of 1800 to 1900 ppm) average about 3000 pounds per acre foot of mixed water in the Chaj Doab and about 2000 pounds per acre foot of mixed water in the Rechna Doab. The leaching requirement for crops of medium salt tolerance average about 75 per cent in the two doabs. This means that about 85 per cent of the pumped water will have to be used for leaching purposes only.

¹ Suppose 100 parts of canal water are used to mature one acre of crop. If 100 parts of tubewell water are mixed with the same, the total quantity becomes 200 but 36 parts of additional water is required for leaching purposes to mature 2 acres of crops. Thus canal water is increased to 118 parts and tubewell water to 118 parts. The 118 parts of canal water when used alone can mature 1.18 acres of crops. Therefore 118 parts of tubewell water mature 0.82 acres of crop and are thus equal to 82 parts of canal water. The remaining 36 parts of tubewell water or 30 per cent is used for leaching purposes.

² Calculated as explained in footnote 1 above.