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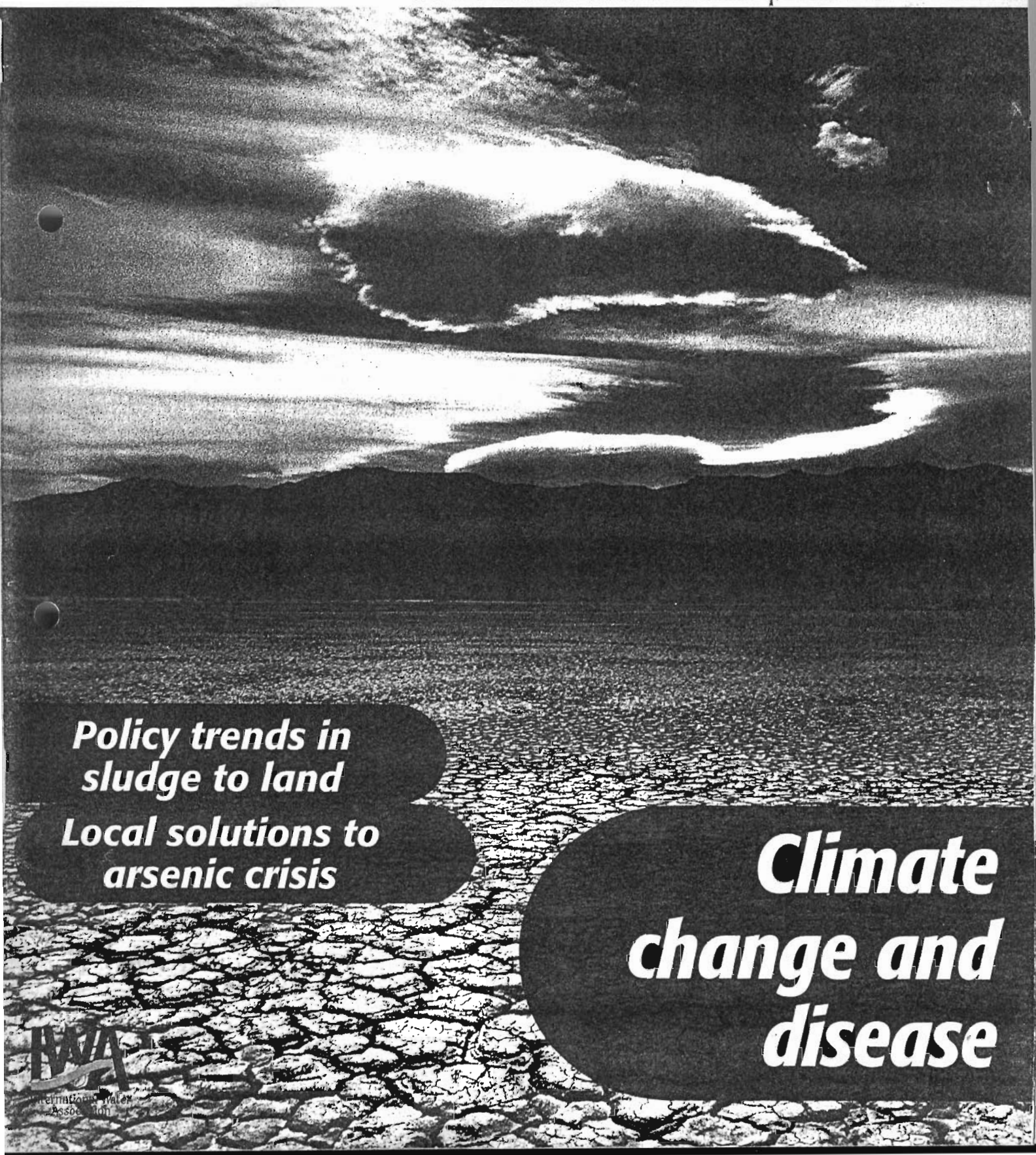

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Determining water quality for irrigation in the Quequén Salado river basin, Argentina

MARIO FABIÁN MARINI and **MARÍA CINTIA PICCOLO** review water quality studies that have been underway in an area key to Argentina's economy.

The Quequén Salado river basin is in the south west of Buenos Aires province, Argentina (Figure 1). This area plays a key role in the country's economy because of the tremendous importance of its agricultural and farming activities. Though annual precipitation is as much as 800mm, its distribution during the year does not usually coinci[illegible]ith critical times for the crops, so complementary irrigation plays an important role during these periods. The main objective of work currently being undertaken is to determine the water quality of surface watercourses and some of the lakes in the Quequén Salado river basin, in order to evaluate the possibility of using them in complementary irrigation. Information on salinity (electrical conductivity, EC) and sodicity (sodium absorption ratio, SAR) was gathered during the spring and the summer of 1998 and 1999. Subsequent to this, areas with similar water quality were defined.

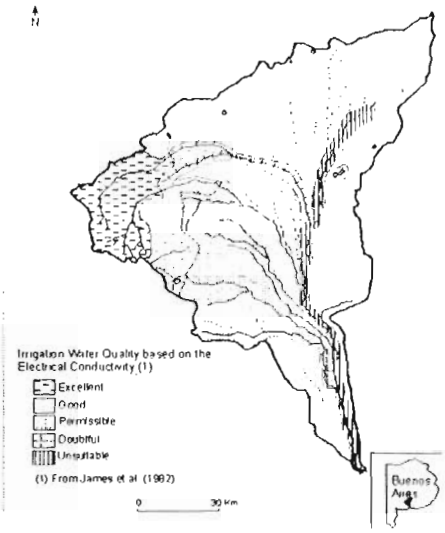
Increased salinity in irrigation water means the crop's yield potential is re[illegible]. In the basin's watercourses, EC increases from west to east (Figure 2). The tributaries flowing into the Pillahuincó Grande creek are of excellent water quality, according to the James table (1982), having an EC of less than 0.22 dS/m. The watercourses originating at the foot of Pillahuincó hill (Figure 1) vary between acceptable and good quality (0.80 dS/m in the Jagüelito creek and 2.2 dS/m in the Indio Rico creek). Quality is also acceptable close to the mouth of the Pillahuincó Grande and Pillahuincó Chico creeks. The main watercourse shows high EC values all along the river, to a maximum of 7.88 dS/m. In the lakes, poor water quality usually dominates.

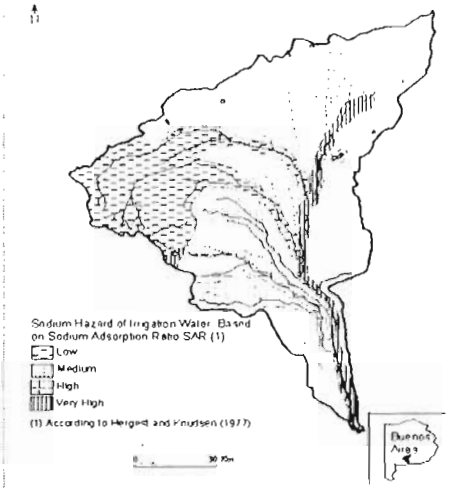
The Hergert and Knudsen water quality classification (1977) has been used to define sodicity according to the Sodium Absorption Ratio (Figure 3). The hill sector shows very low SAR values, with a minimum of 0.7 (Pillahuincó Chico creek) and a maximum of 4.2 (Pillahuncó Grande creek). The middle basin watercourses show medium to high risk (8.2 for the Jagüelito and Manantiales creeks). These conditions become worse in the Indio Rico Creek. The Quequén Salado river shows evidence of severe quality loss, with the maximum values reaching 25.7. The predominant SAR in the lakes is generally higher than 12.

The Laboratory of Salinity in the US (Richards, 1954) worked out a classification system that relates EC and SAR. It varies between low EC and RAS waters (C1 R1) to high EC and SAR waters (C4 R4). The Pillahuincó Grande and the Pillahuincó Chico creeks have very good irrigation water quality (C1 R1) up to the town of Cnel Pringles (Figure 1). The overall salinity gradually increases, from C2 R1 to C3 R1 at its mouth. In the middle basin, as many high salinity values as high SAR values (C3 R2) are found. The Quequén Salado river has the worst irrigation waters (C4 R4).

Given the tolerance limits for typical crops in Buenos Aires province (National Institute of Agricultural Technology, Argentina, 1999), three different areas have been defined in the basin:

- the Pillahuincó hill watercourse, with its tributaries. These waters are good even for the irrigation of very sensitive crops.
- the middle sector, which has irrigation waters of lower quality than the hill streams. Nevertheless, they can be used for many kinds of crops, such as wheat, sunflower, soybean, sorghum and alfalfa.
- the Quequén Salado river, whose water can be only used for crops that have very high salinity tolerance, although the yield potential might still decrease because of the water's high SAR values. ●





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