

yield response to water

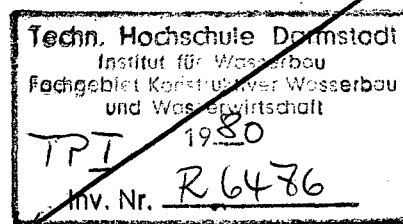
j. doorenbos
water management specialist
land and water development division
fao, rome

and

a.h. kassam
fao consultant
crop ecologist - land-use planner

with

c.l.m. bentvelsen, v. branscheid,
j.m.g.a. plusjé, m. smith, g.o. uittenbogaard
and **h.k. van der wal**



FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS
Rome 1979

Bibliothek Wasser und Umwelt
(TU Darmstadt)



CONTENTS

	<u>Page</u>
<u>PART A: YIELD AND WATER</u>	1
I. Maximum Yield (Y_m)	3
II. Maximum Evapotranspiration (ET_m)	15
1. Reference evapotranspiration (ET_o)	17
2. Crop coefficient (k_c)	19
3. Maximum evapotranspiration (ET_m)	19
III. Actual Evapotranspiration (ET_a)	26
1. Adequate soil water	26
2. Limited soil water	27
IV. Actual Yield (Y_a)	35
V. Yield Response Factor (k_y)	37
VI. Application in Planning, Design and Operation of Irrigation Projects	41
1. Adequate water supply	42
2. Limited water supply	48
3. Additional related applications	55
VII. Adaptive Research	58
1. Site selection	59
2. Irrigation treatments	59
3. Experimental design	62
4. Data collection	63
5. Evaluation and presentation of results	67

PART B: CROP AND WATER

	<u>Page</u>
Alfalfa	69
Banana	73
Bean	77
Cabbage	80
Citrus	83
Cotton	88
Grape	93
Groundnut	97
Maize	101
Olive	105
Onion	109
Pea	112
Pepper	115
Pineapple	118
Potato	121
Rice	125
Safflower	131
Sorghum	134
Soybean	137
Sugarbeet	141
Sugarcane	145
Sunflower	150
Tobacco	153
Tomato	157
Watermelon	161
Wheat	164
APPENDIX I	Calculation of Actual Evapotranspiration (ETa) 171
APPENDIX II	Glossary 173
APPENDIX III	Persons and Institutes Consulted 177
APPENDIX IV	Selected References 180