Because it was observed that interactive effects between crop growth stages existed (i.e. reduced vegetative growth during early stages caused a reduction in photosynthetic material for fruit production at later stages), multiplicative models were formulated.

One such model was that developed by Jensen (1968):

$$\frac{Y}{Y_p} = \left[\frac{ET}{ET_p}\right]_1^{\delta_1} \times \left[\frac{ET}{ET_p}\right]_2^{\delta_2} \times \ldots \times \left[\frac{ET}{ET_p}\right]_n^{\delta_n} \tag{23}$$

where $\frac{Y}{Y_p}$ = relative yield

$\frac{ET}{ET_p}$ = relative evapotranspiration during the ith stage of physiological development

δ_i = factor expressing crop sensitivity to water stress during the ith growth stage, $i = 1, \ldots n$,

n = number of plant growth stages.

The crop sensitivity factors for four growth stages of Bragg soybeans calculated from yield data of Hiler and Clark (1971) were 0.24, 0.48, 0.84, and 0.26 for vegetative, flowering, early pod fill, and late pod fill stages, respectively. Those data indicated that water stress effects during the early pod fill stage reduced yield more than stress at other growth stages.

Other researchers have found similar results with other field crops, including corn, grain sorghum, and soybeans (Sudar et al. 1981). Effects of water stress and reduced ET at various growth stages in yield reductions for many crops are summarized by Doorenbos (1979). With the exception of ongoing research at the IFAS Irrigation Research and Education Park, no known research of this type has been conducted under Florida conditions. There is, however, evidence to indicate that the general patterns of stress effects on yield are similar in this climatic regime to those in other areas. The general relationships between corn, peanut, and soybean yields and estimated ET (based on Penman and daily water balance calculations) are shown in Figures 13, 14, and 15. These data resulted from several years of water management studies on well-drained sandy soils in North Central Florida (L. C. Hammond, et al., unpublished data, Florida Agricultural Experiment Station, Gainesville). Different levels of water use were obtained by imposing various water management treatments—nonirrigated and different seasonal amounts of irrigation. In some irrigation treatments, timing and amount per application were managed so as to place the crop under water stress for short periods throughout the season. The general relationships between grain yield and ET were linear, in agreement with the findings of others (Stegman, et al. 1980). However, these linear responses may be altered by the timing of stress. These data demonstrate the fact that