Drip irrigation strategies for enhancing water productivity and hydrological assets of tropical wetland-based farming for food security

Agele[1]*, S.O., Agbona[1], I.A & Iremiren[2], G.O.

1. *Department of Crop, Soil & Pest Management, Federal University of Technology, Akure, Nigeria.*
2. *Department of Crop Science, University of Benin, Benin City, Nigeria*

**(Agele, S.O: Email: ohiagele@yahoo.com: Tel +234 8035784761)*

METHODS &RESULTS

In sub-Saharan Africa, inland wetlands constitutes about 135million ha of land (IWMI, 2002), however, the soil, agriculture and water resources potentials had not been fully utilized.Experiments were conducted to examine the use of differential irrigation to optimize the contribution of groundwater to rootzone moisture, water productivity and yield-water production functions of dry season pepper grown in an inland valley swamp (fadama scheme) in a humid zone of Nigeria.

Seasonal changes in groundwater table depths is in the valley bottom presented Fig.1.showed-that-fluctuations in GWT-characterize-the fadama ecosystem.

Deficit irrigation (fortnight) translated to 24 % water savings-and optimized the contribution of groundwater to rootzone moisture.Capillary flux (Cg) ranged-between-30 to 50% of pepper water use (ETa). Differential irrigation affected growth, water - yield functions and stress development of dry season pepper. The crop water stress sensitivity index (ky) is useful for yield monitoring, and a tool for enhancing the precision of irrigation scheduling and for integration into agricultural water use models.

Ground water tables via upflows, supplied-good-fraction-of-crop evapotranspiration-and therefore constitute significant component in the root zone water balance of crops. Irrigation management should be modified to optimize the contribution from water table to rootzone moisture and crop evapotranspiration.

Fig. 1. Yearly trends of ground water table, rainfall and open water evaporation

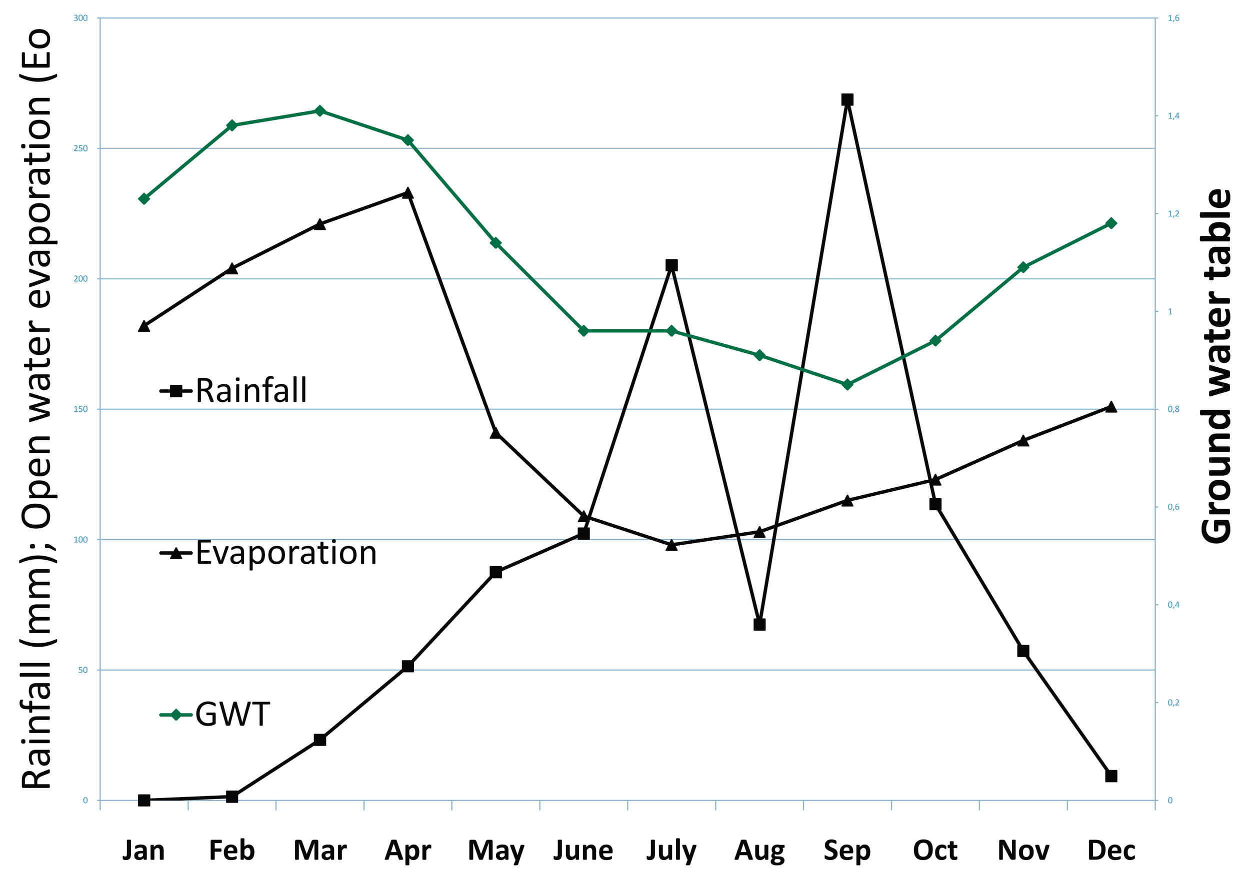


Fig. 3a. Trends in **cappilary upflux** (Cg) , Cg/ETc and ETa/Eo (Weekly irrigation)

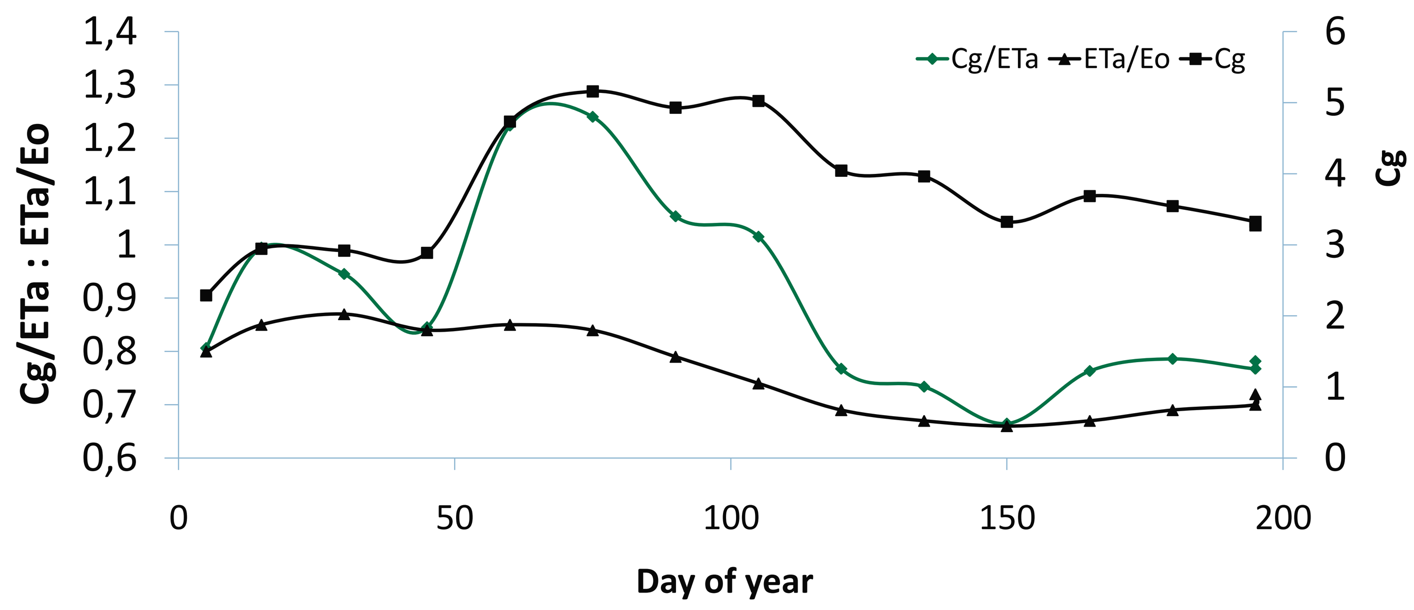
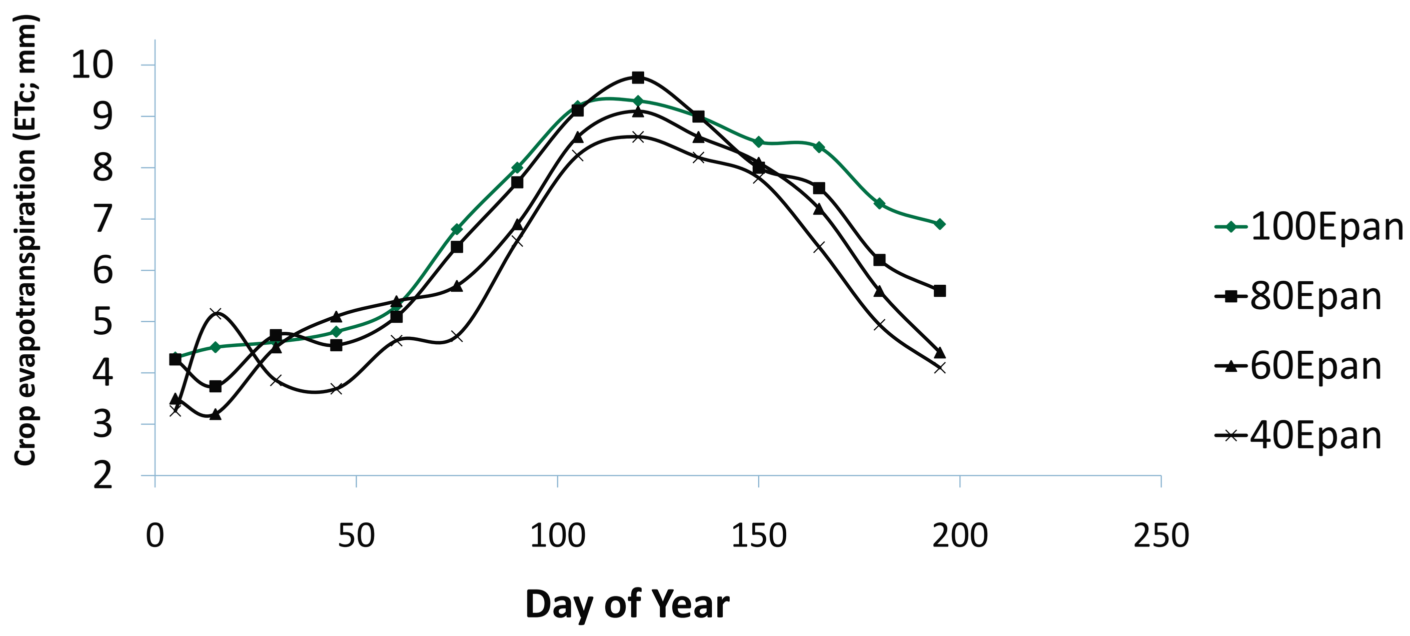


Fig. 2. Irrigation effects on the time trends in pepper ET



Conclusion

Information generated from-this-study will enhance knowledge on how best to incorporate upflows (capillary rise) into irrigation management for crops grown in inland valley swamps.

Findings will be useful in the development of management guidelines and promote adoption of low-cost technologies (low-head (gravity) drip system) for small holder farmers in the tropics.

Fig. 3a. Trends in cappilary upflux (Cg) , Cg/ETc and ETa/Eo (fortnight irrigation)

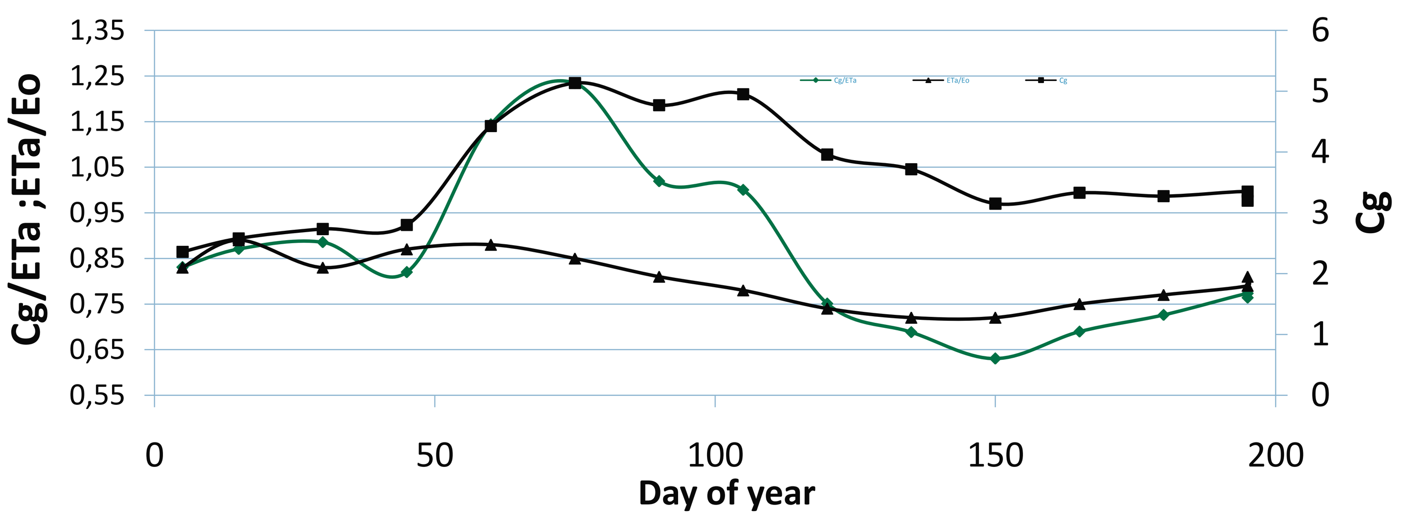


Table 1. Irrigation effects on fruit Yield, crop evapotranspiration and efficiencies of irrigation and crop water use for yield production

Irrigation regimes	Seasonal Irrigation (mm)	Relative Irrigation (%)	Season al Crop ET (mm)	Relative ET (%)	Fruit Yield (tha)	Relative Yield (%)	Water-Yield Fution (ky)	Irrigatio Water-use Efficiiency (kgmm)	Crop Water-use Efficiency (kgmm)
100-EPan	127500	100	621	100	11.2	100		0.88	1.52
80-EPan	81600	0.64	594	0.97	9.1	0.82	1.89 (1.79)	1.12	1.39
60-EPan	45900	0.36	553	0.90	8.3	0.74	1.48 (2.60)	1.81	1.35
40-EPan	20400	0.16	516	0.84	7.6	0.68	1.20 (2.30)	2.73	1.33