

DEDICATION

To my Father,

Mother,

Brothers and Sisters,

Teachers in my life

And my Friends.

ACKNOWLEDGEMENT

Thanks to God for every success and uncountable mercies.

I would like to express my deepest thanks and appreciation to my supervisor Dr. Elsadig Elmahdi for his generous assistance and his patience.

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Abstract

In spite of multi sources of irrigation water in the College of agricultural studies farm, there has been a continuous and growing complaint of irrigation water shortage. This shortage complaint sometimes embraced domestic water supply.

This is actually the main incentive behind this study. The main objective of the study is to estimate the actual total monthly capacity of all the college farm water resources, the actual farm water requirements and judge the situation.

The computer program (cropwat 4 windows) was used to estimated the actual reference evapotranspiration (ET₀), crop coefficient (K_c) for farm crops and hence the actual farm crop water requirements.

Gross water requirements was estimated by adding about 15% total losses.

Individual monthly water sources capacity was estimated for the four water sources i.e : Two shallow wells, one deep bore and the river pump station.

The total monthly water capacity of the college ranges between (56722) and (65988) m³, While the total monthly water requirement ranges between (4776.1) and (13943.4) m³. This yields a monthly water surplus that ranges between (48818.7) and (58508.6) m³. This water surplus can monthly irrigate the areas ranges between (48 fedd) and (136 fedd).

The current irrigation water rates are estimated to be 210 SDG per feddan.

The study results showed that the monthly water capacity of the college farm is more than sufficient, even under the present operational time table. More water can be made available if the operational time is raised from six hours per day to eight hours.

The chemical laboratory tests of Shambat shallow wells water quality showed that Shambat water is highly suitable for irrigation.

The biological laboratory tests showed that the infectious bacterial load is very high and that the shallow wells water is not safe for human use.

الخلاصة

على الرغم من تعدد مصادر مياه الري إلا أن مزرعة كلية الدراسات الزراعية بها شكاوى متنامية ومستمرة في مياه الري. وهذه الشكاوى تتعدى في بعض الأحيان لتشمل شكاوى في شح مياه الاستخدام المدني.

وهذا بالتأكيد الدافع الحقيقي من وراء هذه الدراسة. والهدف الرئيسي من هذه الدراسة هو حساب الإنتاج الشهري الفعلي

لمصادر مياه مزرعة الكلية, الاحتياجات المائية الفعلية للمزرعة وتقيم الوضع.

تم استخدام أحد البرامج المحوسبة (4 cropwat windows) لحساب البخرنتج المعياري للمحصول (ET_0), معامل المحصول (Kc) والاحتياجات المائية الفعلية لمحاصيل المزرعة. تم حساب إجمالي الاحتياجات المائية وذلك بإضافة 15% من صافي الاحتياج المائي كفاقد كلى. تم حساب إنتاج المصادر المائية الشهري لأربعة مصادر مائية وهى: بئرين سطحتين, بئر جوفي ومحطة رفع المياه من النيل.

إجمالي إنتاج المياه الشهري يتراوح ما بين 56722 متر³ و 65988 متر³, بينما إجمالي الاحتياج المائي الشهري يتراوح ما بين 4776,1 و 13943,7 متر³ فى ظل هذا الإنتاج فان إجمالي وفرة المياه الشهرية تتراوح ما بين 48818,7 متر³ و 58508,6 متر³. وهذه الوفرة من المياه يمكن أن تغطى ري مساحات تتراوح ما بين 48 فدان إلى 136 فدان.

قدرت تعريفة مياه الري الحالية ب 210 جنية سوداني للفدان.

نتائج هذه الدراسة أوضحت أن إجمالي الإنتاج الشهري من مصادر مياه الكلية يفوق الاحتياجات المائية الشهرية للكلية حتى في ظل برنامج التشغيل اليومي الحالي.

كما يمكن توفير كميات إضافية من المياه إذا عدل برنامج التشغيل اليومي الحالي من 6 ساعات إلى 8 ساعات في اليوم.

أوضحت الاختبارات المعملية الكيمائية لمياه الآبار السطحية بشمبات الصلاحية العالية لهذه المياه للري.

أوضحت الاختبارات المعملية الإحيائية أن الحمل البكتيري المعدي عالي جدا وبذلك فان مياه الآبار السطحية غير آمنة لاستخدامات الإنسان.