



Value of irrigation water usage in South Florida agriculture

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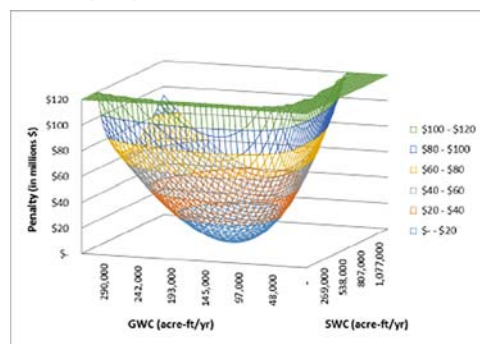


HIGHLIGHTS

- Overall results show economic losses due to irrigation water in S. Fl. agriculture.
- Irrigation water use penalties differ by crop and sub regions in South Florida.
- Given ground water usage changes, the UEC area would experience higher penalties.
- The KB area experiences a significant penalty if surface water irrigation changes.

GRAPHICAL ABSTRACT

Figure: penalty function at various levels of Ground Water Consumption (GWC) and Surface Water Consumption (SWC) inputs per acre-ft/yr in the South Florida Lower East Coast (LEC) region in 2010.



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ABSTRACT

This study estimates economic loss from South Florida croplands when usage of agricultural irrigation water is altered. In South Florida, 78% of the total value of farm products sold is comprised of cropland products. The majority of Florida citrus and sugarcane are produced in the area, and agricultural irrigation was the largest sector of water use in 2010, followed by public water supply. The Florida Department of Environmental Protection announced in December 2012 that traditional sources of fresh groundwater will have difficulty meeting all of the additional demands by 2030. A shortage of water will impose significant damage to the rural and agriculture economy in Florida, which may lead to higher prices and costs for consumers to purchase citrus or other Florida agriculture products. This paper presents a methodology for estimating economic loss when usage of irrigation water is altered, and examines economic values of irrigation water use for South Florida cropland. The efficient allocation of irrigation water across South Florida cropland is also investigated in order to reduce economic cost to the South Florida agricultural sector.

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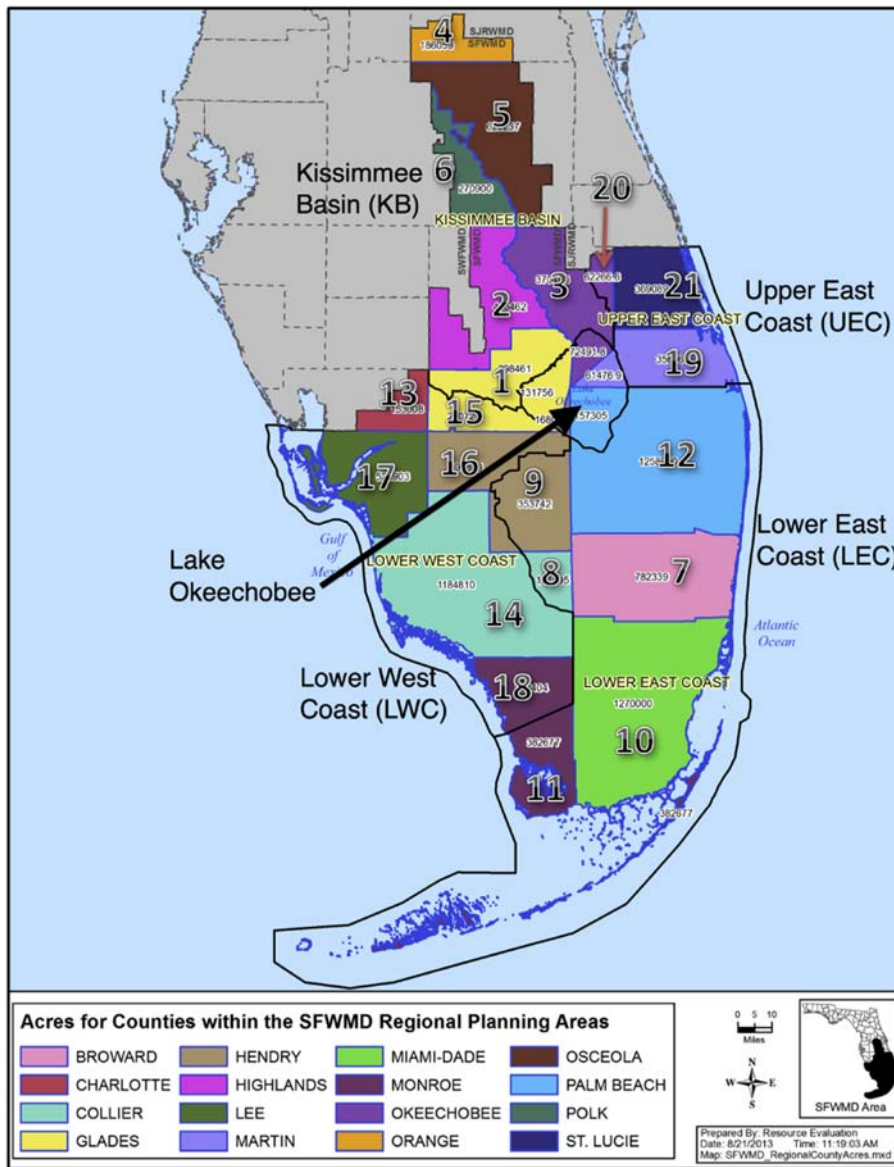


Fig. 1. SFWMD map and area number.

1. Introduction

A recent study indicates that the total annual precipitation has increased over land areas in the U.S. for the last century (EPA, 2015). However, some areas in the country experience severe drought conditions. South Florida is one of the areas that is discussed in the study in the context of pertaining to issues of drought. South Florida experienced severe drought conditions from 2006 to 2009 and in 2011 (SFWMD, 2014). Limited landscape irrigation and reductions in agriculture uses were required during the water shortage in 2011. The Florida Department of Environmental Protection announced that traditional sources of fresh groundwater would have difficulty meeting all of the additional demands by 2030 (FDEP, 2012; SFWMD, 2012). The state of Florida produces approximately 67% of the U.S. oranges and 40% of the world's orange juice (FDACS, 2014). Florida sugarcane production is ranked first in production in the US (USDA, 2012). Limited water resources, as a main production factor, will affect agricultural production and thus the economy in South Florida. Potential water supply issues may impose significant damage on the rural and agricultural economy in Florida, which may lead to

higher prices and costs for consumers to purchase citrus or other agriculture products produced in Florida. Water resources in the South Florida system must be managed in order to mitigate costs associated with climate change in the future.

This paper presents a methodology for estimating economic loss for the South Florida cropland when the use of irrigation water is altered. The research focuses on the South Florida Water Management District (SFWMD), which is one of the five water management districts in Florida that are directed by the Florida Water Resources Act to develop a regional water supply plan (FDEP, 2012). This study focuses on cropland in the district, since 78% of the total value of farm products sold in the SFWMD is comprised of cropland products. The majority of Florida citrus and sugarcane are produced in this area, and agricultural irrigation was the largest sector of water use in 2010, followed by public water supply (FDEP, 2012). Changes in irrigation water use for agriculture production will affect the economy in the District. This study examines values of irrigation water usage. Efficient allocations of irrigation water across regions in the SFWMD are also investigated in order to minimize economic losses to the South Florida agricultural sector. The map in Fig. 1

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