Application Form
2009-10 TWRI Mills Scholarship Program

1.*Name of student*

Mark Musumba

2. *Contact Information for the Student***:**

Texas A&M University, Dept. of Agricultural Economics, Graduate Student

3. *Name and Contact Information for Faculty Advisor***:**
Bruce A. McCarl: Regents Professor and Distinguished Professor of Agricultural Economics at Texas A&M University. 340D John R. Blocker Building, 2124 TAMU, College Station, Texas 77843-2124, (979) 845-1706, mccarl@tamu.edu

4.*Description of the student's proposed research, emphasizing how it will address a water resources-related concern (particularly how, if possible, it will benefit Texas):*

Research Proposal: The main source of water in the Southern High Plains of Texas' is the Ogallala aquifer. The High Plains have historically been the most extensively irrigated region in Texas. Twenty percent of the irrigated lands in the United States are in the High Plains and about 30% of all US ground water withdrawn for irrigation comes from the Ogallala aquifer (Dugan, Sharpe, 1996). Temperature and precipitation play an important role in irrigation demand and plant growth. The 2007 Intergovernmental Panel on Climate Change (IPCC) report for scenario A2 and AIB for 2050 predicts a 2^0C increase of temperature and 5 percent decrease in precipitation for the Southern High Plains. This will raise irrigation needs and municipal water demands. Thus in an area where aquifer depletion is an issue, climate change will exacerbate this issue. We will examine the effect of projected climate change on future water use and crop yields. This study will develop and apply a model of groundwater depletion in the context of total Texas water allocation then use that model to analyze climate change implications. It will also take a long run dynamic model (Forest and Agricultural Sector Optimization Model (FASOM)) of Unite States agriculture that depicts the two regions (South West and South Central regions in the U.S.) and expand it so that it has a groundwater depletion component. This work will expand an existing Texas surface water model (TEXRIVERSIM Model) and expand it to model groundwater depletion and use.
Applicability to Texas: The 2008 IPCC report on water indicates that ground water has received little attention in climate change impact assessment compared to surface water resources. The study will examine the economic and environmental effects of projected climate change on future water use and crop yields. Improved understanding of the hydrological process and temporal variations associated with hydrological factors are important in regional planning for irrigated agriculture. In this study we will integrate an economic and hydrological evaluation of water use in the Texas High Plains. Results from this study will be useful to agricultural water users and policy makers to improve water management decision making, develop climate change adaptation strategies, evaluate cost effective ways of optimizing water supply systems, and pursue conservation efforts.

5. *Academic Qualifications of the Student***:**

Education:
Ph.D. in 'Agricultural Economics'
Texas A&M University, College Station, TX

M.S. in "Agricultural Economics"
Thesis: "Factors Influencing International graduate Students' Preferences concerning where they prefer to start their Careers."
Texas A&M University, College Station, TX

B.S. in "Economics"
Texas A&M University, College Station, TX

Objective Tests:
GRE:
TOEFL:

List of Relevant Courses

Climate Change	
Consumer Demand Analysis for Food	
Frontiers of Resource and Environmental Economics	
Resource and Environmental Economics	
Natural Resource Economics	
Applied Simulation in Agricultural Economics	
Operations Research Methods in Agriculture	
Intro. to SWAT - Spatial Sciences Laboratory	TAMU - Continuing Education

Awards: Association of Former Students' Distinguished Graduate Student Award, Masters' Research, 2007. General O.R. Simpson Corps Honor Society, 2003–2006.

6. *Proposed use of funds resulting from this Scholarship***:** I intend to use the funds for buying relevant books and software.

7. *Intended career path the student anticipates pursuing***:** When I graduate, I would like to work for an environmental and resource research organization like IUCN (International Union for Conservation of Nature) and do research at a Tier 1 Research University. I can use what I have learned in economics to model efficient use of water and provide advice to policy makers on how to manage these resources. Teaching is another option I would really like to explore mainly in the water economic or natural resource and environmental economics.

References:

Dugan, J. T. and J. B., Sharpe. 1996. "Water-Level Changes in the High Plains Aquifer – Pre-development to 1994." *U.S. Geological Survey, Water-Resources Investigations Report* 95-4208.