



SDI Review Form 1.6

PART 1:

Journal Name:	American Journal of Experimental Agriculture
Manuscript Number:	2013_AJEA_3664
Title of the Manuscript:	The Economic Feasibility of Implementing Irrigation in Small, Limited Resource Farming Systems

General guideline for Peer Review process is available in this link:

(<http://www.sciencedomain.org/page.php?id=sdi-general-editorial-policy#Peer-Review-Guideline>)

- This form has total 7 parts. Kindly note that you should use all the parts of this review form.



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PART 2: Review Comments

	Reviewer's comment	Author's comment (if agreed with reviewer, correct the manuscript and highlight that part in the manuscript. It is mandatory that authors should write his/her feedback here)
Compulsory REVISION comments	Justification of irrigation is based on water deficit assessment and assumption of yield improvement. Assessment of water deficit uses only the balance between rainfall and ET, without taking into account the role of soil in water storage. Levels of yield increase (from 10% to 84%) with irrigation are not justified. Assessment of water deficit should be based on calculation of soil water balance using a simple reservoir model. Economic analysis should take into account the variability of yield and weather (and maybe of costs and prices) and should lead to an analysis of financial risk with profitability of irrigation over 10 years for instance. Specific comments: Line 261-262 authors explain that variability of sweet potato yield can not be easily correlated with variability of total rainfall because there are a lot of constraints. If water deficit is not the main constraint, then irrigation is not the priority solution to improve sweet potato yield.	Thank you for pointing this omission out. The MIST calculates soil water balance to track soil moisture through the growing season. The explanation of this has been expanded in the manuscript to make this point more clear (section 2.4). The potential yield increase is based on literature values of yield increase with irrigation (Gomes and Carr, 2001; Van Heerden, 2008; Smittle et al., 1990; Brodie, 2012) and the yield difference between MS and CA. A figure demonstrating the yield differences has been added to clarify this point (new Figure 1). Such an economic analysis is beyond the scope of this study. You have wisely pointed out the very challenge in this research. The goal of this study was to examine potential technologies that could be incorporated into small, limited resource farms to improve their economic return. We are using irrigation as a simple, readily available technology (as opposed to precision technologies, or other technologies that are much more expensive). Also, we are using sweet potatoes only as a model system. The goal of



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	Figure 1: Average of annual yield (without irrigation) should be added. Figure 5: levels of yield increases should be in accord with some references; distinction between 1%,2.5% and 5% are not relevant (no yield increase should be enough).	our long-term research is to transfer this information to vegetable production systems in general. The goal of the study was not to determine the primary limitation to sweet potato production or economic return. Rather, we wanted to determine what would be required to transfer new technologies to limited resource farmers, and if this was in fact economically feasible. The challenge with sweet potatoes is that they are sensitive to too much water due to potential root rot. Therefore, total growing season rainfall is not well-correlated with yield. As (Brodie, 2012) has shown, early season rainfall is more highly correlated with yield. However, we do not have enough information on timing of sweet potato planting in MS, which can occur anyway from April through July. We have carefully reviewed the discussion presented on lines 261-262 to remove any ambiguities. Thank you for the suggestion. An additional figure to compare crop yields has been added to clarify this point, and demonstrate yield differences with irrigation (new Figure 1). These are taken from published values (Gomes and Carr, 2001; Van Heerden, 2008; Smittle et al., 1990; Brodie, 2012). The manuscript has been modified to enhance this presentation and clarify the points.
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<u>Minor</u> REVISION comments		
<u>Optional/General</u> comments	This study aims to assess economic interest of irrigation for small farmers. This assessment should: - better assess water deficit for rain fed sweet potato cropping using calculation of soil water balance, - explain assumptions on yield improvement through irrigation. - take into account economic risk due to weather, yield, costs and prices variability. Moreover, irrigation increases labor. This topic requires to analyse the place of irrigated sweet potato cropping within the farm.	Surprisingly, little information is available on sweet potato water needs, especially in MS. This was a deficit identified by the study. The additional expenses associated with added labor with irrigation have been accounted for in the analysis. Analyzing the economic impact of sweet potato production within the limited-resource farming system would make a fascinating study, but is beyond the scope of the current research.