

Accepted Manuscript

Assessing the productivity and profitability of the Solar Market Garden

Jennifer Burney, Sandra Phillips, Jeff Lahl

PII: S2352-7285(16)30091-4

DOI: [10.1016/j.deveng.2018.01.002](https://doi.org/10.1016/j.deveng.2018.01.002)

Reference: DEVENG 24

To appear in: *Development Engineering*

Received Date: 25 December 2016

Revised Date: 8 December 2017

Accepted Date: 16 January 2018

Please cite this article as: Burney, J., Phillips, S., Lahl, J., Assessing the productivity and profitability of the Solar Market Garden, *Development Engineering* (2018), doi: 10.1016/j.deveng.2018.01.002.

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



Assessing the Productivity and Profitability of the Solar Market Garden

Jennifer Burney^{1*}, Sandra Phillips², Jeff Lahl²

¹ School of Global Policy and Strategy, University of California, San Diego, San Diego CA USA

² The Solar Electric Light Fund (SELF), Washington DC USA

* Corresponding Author: jburney@ucsd.edu

Abstract

Successful scale-up of any development project requires a deep understanding of the real-world economics of the intervention, and compelling evidence that such an investment would be worthwhile. This cost-benefit estimate is typically assessed in two ways: (a) by comparing the coefficient of impact along some margin measured in an impact evaluation ($\hat{\beta}$) to the unit implementation cost of the project, and/or (b) by conducting adoption studies, where autonomous adoption is assumed to indicate that the adopter has deemed the investment worthwhile (i.e., financially sustainable). However, these two techniques can be particularly difficult for development engineering projects that are large at the unit scale (or are group-based) and for projects that may have impacts on many margins or outcomes at once. Here we present the framework for, and analysis from, a field monitoring campaign in the interim evaluation period for community-scale solar-powered irrigation systems (Solar Market Gardens, or SMGs) in north-east Benin, West Africa. We used this interim monitoring to directly construct a CBA, and to document the pathways of impact actually at play for a project hypothesized ex-ante to have potential economic, food security, and gender impacts. We monitored all garden activity at the individual and group level for most of the dry season, including total production, sales, home consumption, input use, marketing, and labor (a key factor often overlooked when considering the cost of agricultural development projects). By combining production and sales data with cost information, we show that the most productive agricultural groups using the system only in the dry season would be profitable in a full cost-recovery model with no economies of scale, but that lower performing groups would not; we also show that many plausible scale-up models and financing mechanisms would be profitable. We then show how this type of monitoring can complement impact evaluation by elucidating different pathways of impact that could be used to understand heterogeneity in outcomes among beneficiaries. We document variance both within and between groups across numerous potential pathways of impact for the SMG; the heterogeneity in intraclass correlation coefficients (ICCs) across these indicators highlights the importance of understanding the causal chain(s), especially for cross-sectoral development engineering projects like the SMG. We conclude by discussing how this monitoring effort fits into the larger evaluation of the SMG, and how such data have been used to both adaptively refine the project, improving the likelihood for successful scale-up.

Keywords:

smallholder farmer; drip irrigation; horticulture; solar photovoltaics; Benin; development; food security

Abbreviations:

SMG: Solar Market Garden

Download English Version:

<https://daneshyari.com/en/article/7216208>

Download Persian Version:

<https://daneshyari.com/article/7216208>

[Daneshyari.com](https://daneshyari.com)