MALTEM PROJECT: Quantifying the economic impact of malaria control interventions in Maragra, Mozambique: a win-win for private industry and public health

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Summary

This document serves to give an overview of the rationale for assessing the impact of malaria control interventions on economic outputs, as well as the advantages of such an analysis, from both the perspectives of the research team (CISM, ISGlobal), as well as Maragra Açucar, CA.

(+ Researchers specific to this sub-project)
(++ Over-arching project - MALTEM economic protocol associated researchers)
(+++ Maragra Açucar CA)

Background

The burden of malaria is extremly high in Mozambique, even by regional standards (Brundtland, 1999). With a prevalence as high as 40%, malaria accounts for 29% of all deaths, and 42% of deaths among children under five (USAID, 2011). Nearly a quarter of maternal deaths are due to malaria (K. Singh *et al.*, 2014).

In addition to malaria's impact on the health of its victims, the illness also has major economic consequences for the ill. 32-34% of households incur malaria-related costs which rise to the level of "catastrohpic" per the World Health Organization's standards (ie, 10% of household income or 40% of non-food income) (Castillo-Riquelme *et al.*, 2008). Though the burden of malaria is decreasing (Murray *et al.*, 2014), the costs of the disease at the individual level remain enormous, given that the disease affects primarily those with low socioeconomic status.

The economic effects of malaria are not only absorped but its direct victims, but also by the economy as a whole. Malaria control has been found to be associated with population-level economic growth in multiple studies (Barofsky *et al.*, 2015). By eliminating early-life blocks on the development of a population's human capital, the returns on a reduction in malaria's burden are long-term and exponential.

From a public health perspective, the case for the need to control and eventually eradicate malaria is strong and has been made clear in multiple studies across time and geography. However, the role which private firms which operate in malaria endemic regions can be expected to play is less obvious, given the current lack of compelling evidence regarding the return on investment in short- and medium-terms for privately-funded malaria control activities. To the extent that many firms already carry out some form of "in-house" malaria control, analyzing those firms' data offers the unique opportunity to assess whether the benefits (in purely economic terms) of those activities outweigh the costs, or vice-versa.

Though private, foreign-owned firms are a potential source of funding for malaria control and eradication, it is not reasonable to expect significant participation at the population level without a clear demonstration of the value proposition from a private perspective. Though the non-tangible benefits of "corporate social responsibility" (good publicity, etc.) are certainly appealing to private firms, investment would likely increase significantly if the costs and benefits of malaria control from a purely economic perspective were quantified. On the one hand, if it can be compellingly demonstrated that privately-funded malaria control interventions offer a significant return on investment, this evidence could entail an organic/spontaneous investment increase across the country. On the other hand, if it were found that private foreign investment is not cost-effective from the perspective of private foreign firms, then this may spur donors and the public sector to better coordinate, scale, and work with firms to fill the gaps.

Ultimately, the justification for this study is opportunity. Maragra Açucar CA has sophisticated sophisticated systems for inventory, employee activities, and even health. Analyzing the outputs of those systems offers the chance to improve business and health: a true win-win.

Advantages

From a public health perspective

Cooperating with Maragra will entail multiple benefits from the perspective of both research and public health. Especially in light of the Mozambican Alliance Towards the Elimination of Malariaś increased activities, understanding the experience of Maragra is vital to program strategies and efforts.

Specifically, the research team benefits from this collaboration in the following ways:
- Access to a rich dataset on both the temporal and spatial dimensions of malaria control interventions.
- Access to a rich dataset on the social and demographic characteristics of workers targetted by those interventions. - Access to health and economic outcomes.

From Maragra's perspective

Maragra Açucar can also benefit directly from this collaboration. Specifically, potential areas of interest include:

- The cleaning and digitization of clinic data.
- Study results pertaining to absenteeism and productivity which could have an impact on operations.
- A side cost-effectiveness analysis which could be useful from a business perspective.

The data needed

Individual level data (i.e., data per worker) will be needed. Individual information on absenteeism (possibly with the reason of absenteeism), age, gender, job position, workers' place of residence, educational level, information on whether the worker is a migrant and if yes, when and how long the worker lives and distance to job are all of great importance for this study.

In the best case scenario, a complete panel data (e.g., monthly individual data) would allow to discern how malaria control activities are translated into the outcomes of interest, in time.

In addition, available information on malaria control activities is needed on: - type of activity: bed nets distribution, fumigation, etc; - when these activities have been carried out: exact dates; - who carried out such activities: Maragra Açucar or Ministry of Health; - where the activities are carried out: "barrios". Importantly, both workers data and information on malaria control activities should be available for a period of, at least, 5 years.

Table 1: Worker characteristics

This table should consist of all known characteristics regarding to workers. This includes (but is not limited to) age, sex, location of residence, type of work, salary, place of origin, etc.

id	name	sex	residence	type	origin	contract	education_yrs	religion	contract_start	contract_end
1	Joao	M	Bairro 1	Field	Manhiça	d	8	Evangelical	2010-11-05	still
2	Eusebio	M	Bairro A2	Field	Manhiça	f	10	Catholic	2011-12-29	still
3	Maria	F	Bairro 13	Field	Manhiça	p	7	Muslim	2012-04-20	2012-09-26
4	Ana	F	Bairro 4	Secretarial	Maputo	m	4		2014-12-08	still
5	Pedro	M	Bairro 1	Management	Maragra	h	9	Catholic	2012-06-04	2013-04-14

Table 2: Worker attendance / absences

This table should consist of one row for each day that an employee was employeed.

id	date	status
1	July 03, 2012	absent
1	July 04, 2012	absent
1	July 05, 2012	late
1	July 06, 2012	present
1	July 07, 2012	present
2	July 03, 2012	present
2	July 04, 2012	present
2	July 05, 2012	present
2	July 06, 2012	present
2	July 07, 2012	present

Table 3: Worker health

This table should consist of one row for every visit to the Maragra clinic, indicating both the id number of the worker/patient being attended and the date, as well as the reason for the visit (and discharage diagnosis, if available).

id	date	reason
490	July 11, 2010	accident
372	October 27, 2010	fever
103	November 08, 2010	accident
770	April 09, 2011	accident
637	April 23, 2013	accident
140	March 10, 2014	vomiting
397	April 02, 2014	fever
187	May 24, 2014	malaria
627	October 30, 2014	unknown
921	December 04, 2014	left before being seen

Table 4: IRS activities

This table should consist of any information pertaining to indoor residual spraying, at the most granular level possible.

date	longitude	latitude	address	chemical
June 08, 2011	-3.22	-33.16	House 183, Lot Y	DDT
June 26, 2011	-3.28	-33.39	House 649, Lot S	DDT
July 06, 2011	-3.53	-34.00	House 340, Lot K	DDT
May 30, 2012	-3.59	-33.07	House 96, Lot C	DDT
October 21, 2012	-3.17	-33.54	House 107, Lot U	DDT
November 12, 2012	-3.78	-33.57	House 923, Lot Z	DDT
June 10, 2013	-3.05	-33.67	House 860, Lot B	DDT
December 02, 2013	-3.56	-33.62	House 992, Lot O	DDT
February 11, 2014	-3.72	-33.48	House 8, Lot A	DDT
May 24, 2014	-3.17	-33.79	House 813, Lot H	DDT

Table 5: Bednet distribution activities

If available, this table should include any information regarding either the distribution or presence of bednets among workers.

id	date	nets.distributed	number.of.residents
703	August 22, 2010	1.00	6
30	February 05, 2011	2.00	1
418	February 19, 2011	2.00	7
408	September 10, 2011	1.00	3
180	August 25, 2012	3.00	1
614	October 11, 2012	3.00	6
393	February 04, 2013	3.00	5
239	August 28, 2013	1.00	6
956	September 02, 2013	3.00	5
227	February 20, 2014	1.00	4

Table 6: Costs

If available, this table should include any cost information pertaining to malaria control activities (IRS or bednet distribution) carried out by Maragra.

date	item	amount	currency
January 31, 2010	Purchase of spraying equipment	42459	Meticais
February 01, 2010	Salary of sprayers	56730	USD
September 26, 2012	Salary of sprayers	79327	USD
January 06, 2013	Purchase of bednets	65749	USD
June 17, 2013	Gas for distributing bednets	38082	Meticais
July 11, 2013	Misc office items	10127	Meticais
April 18, 2014	Salary for bednet distributors	72423	Meticais
June 19, 2014	Purchasing of bednets	29100	Meticais
September 29, 2014	Purchase of spraying eqipment	11235	Meticais
November 12, 2014	Purchase of insecticide	19227	Meticais

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