



A MEASURE OF THE RETURN ON INGENIO SAN ANTONIO'S INVESTMENT IN THE ADELANTE INITIATIVE:

**AN INITIAL ESTIMATE OF COSTS AND BENEFITS OF A WATER, REST,
AND SHADE INTERVENTION**

Prepared for the La Isla Network, with funding from the Deutsche Investitions und
Entwicklungsgesellschaft (DEG).

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May 1st, 2020

Executive Summary

La Isla Network working with the Ingenio San Antonio (ISA) sugar mill in Chichigalpa, began the implementation of its water, rest, and shade intervention for sugarcane cutters and other laborers in 2017. The project, The Adelante Initiative (Adelante), was created in response to new evidence that heavy labor in increasingly hotter temperatures is a primary cause behind the high incidence of kidney disease and the resulting deaths experienced among sugarcane cutters.

The intervention, at its most basic level, requires cane and seed cutters to hydrate sufficiently, to take multiple rest breaks during the day, and to take those breaks in shade. This regimen has demonstrably improved kidney function and reduced the incidence of kidney injury, which is believed to lead to chronic kidney disease of non-traditional etiology (CKDnt). The process behind the implementation of the intervention, however, is considerably more complex in terms of ensuring its effectiveness and success. This effort is supported by ISA's upper management, which is likely unique among other mills in the industry.



ISA's support for the water, rest, and shade regimen requires substantial investment to provide the electrolyte solution and the gear used by workers to carry the solution and water with them, mobile canopies used to provide shade during breaks, mobile medical clinics and teams of healthcare workers that attend to workers when needed, lab equipment, doctors, and lab workers.

In total, these costs represent a significant investment on ISA's part and, understandably, ISA is interested in the return that the mill is getting from its investment (ROI). This interest leads to the research question that this study attempts to answer: does ISA's investment in Adelante yield a positive or a negative return?

Using data provided by ISA, as well as data collected from secondary sources, we have attempted to estimate an ROI in Adelante. Based on what we believe to be conservative estimates, we calculate that for every dollar spent on Adelante, ISA receives a return of approximately 22%. It is important to reiterate, and cannot be overstated, that this



estimate is based primarily on ISA-provided data. While there is no reason to doubt the accuracy of the data, the fact that most of it comes from a single source should be noted.

Overview and objectives

La Isla Network, working with the Ingenio San Antonio (ISA) sugar mill in Chichigalpa, began the implementation of its water, rest, and shade intervention for sugarcane cutters and other laborers in 2017. The project, The Adelante Initiative (Adelante), was created in response to new evidence that heavy labor in increasingly hotter temperatures is a primary cause behind the high incidence of kidney disease and the resulting deaths experienced among sugarcane cutters.

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Methods

To answer this question, we have used the standard ROI equation: $ROI = \text{net benefit} / \text{cost}$ (RAND Corporation, 2017). To determine benefits and costs, we have relied primarily on data provided by ISA, as well as on notes taken during our interviews with ISA medical, human resources, and accounting staff members.¹ We have also included our own estimates of some costs and benefits (e.g., the value per ton of sugarcane during the study period).

In addition, we reviewed the available literature on workplace healthcare intervention costs, benefits, and returns on investment as they relate to the agriculture industry in Central America in general, and Nicaragua in particular (see references).

¹ We include in the calculation of the ROI a comparison of net present value of savings to ISA as a result of The Adelante Initiative to the present value of ISA's total costs, using a 3% annual discount rate.



Costs and benefits used for estimation

Costs used in this analysis included:

- Those related to the number of acute and chronic kidney disease cases from 2015-2019;
- Cost of electrolyte production;
- Salaries for staff working on Adelante (lab techs, community health workers, estimates of the portion of the doctor's salary attributable to Adelante);
- The hours lost due to CKDnt;
- Turnover costs (costs associated with hiring and training new workers);
- Equipment for cutters (sun-blocking hats, water containers, tarps for shade);
- Training costs for healthcare workers (generally);
- Training and equipment costs related to worker surveys administered by healthcare workers;
- Costs of treating dehydrated worker (including materials, portion of salaries for doctors and technicians, urine analysis costs, etc.);
- Profit loss due to lower productivity associated with time taken off due to illness; and
- Costs, not captured elsewhere, of operating two mobile clinics.

In order to estimate firm-level benefits derived from the intervention, we considered:

- Savings in terms of reduced turnover costs;
- Increases in labor productivity;
- Savings in terms of lower treatment costs for chronic and acute kidney failure.

Value of returns

In estimating the ROI, some assumptions were made. First, we found that there is a range in estimates as to the average tonnage per day a cane cutter can cut. In our interviews with them, ISA human resources staff estimated that the least productive cutters cut 4.5 tons per day on average. However, figures as high as 7.3 tons per day are found in the current literature from El Salvador (the most comparable data currently available) (Bodin et al, 2016). Chart 1 below highlights a few key outcomes from a recent study produced for Adelante, including year-to-year changes in the average tonnage levels of cut sugarcane and the amount of seed cut.



For this report, we chose to estimate an average and maximum tonnage, with 5.6 tons being the average (assuming that more experienced cutters outnumber less experienced cutters 3:1) and 7.3 tons per day being the maximum. The price of sugarcane during the period of this study (2016-2019) ranged between \$360 and \$610 per ton.

Chart 1. Tonnage and bags of sugarcane and seed

		6:00am	7:00am	8:00am	9:00am	10:00am	11:00am	12:00pm	1:00pm	2:00pm	Total Rest time (daily %)	Productivity increase (%)
Burned ane cutters Work day: 6 hours	Harvest 1 (2017 - 2018)				20 min Rest	10 min Rest	20 min Rest	End			50 min - 14% of day	5.3 Ton
	Harvest 2 (2018 - 2019)			15 min Rest	20 min Rest	20 min Rest	15 min Rest	End			70 min - 19% of day	5.6 Ton (20%▲)
Seed cutters Work day: 8 hours	Harvest 1 (2017 - 2018)				20 min Rest			30 min Rest			50 min - 10% of day	129 Bags
	Harvest 2 (2018 - 2019)			10 min Rest	10 min Rest	10 min Rest	10 min Rest	30 min Rest		End	70 min - 15% of day	146 Bags (20%▲)
Other works Work day: 6 hours	Harvest 1 (2017 - 2018)				20 min Rest			30 min Rest		End	50 min - 10% of day	
	Harvest 2 (2018 - 2019)			10 min Rest	10 min Rest	10 min Rest	10 min Rest	30 min Rest		End	70 min - 15% of day	

We calculated net change in productivity by multiplying the annual difference in the number of cane cutters (from 2017 to 2018 and 2018 to 2019) by each combination of value per ton of cane and estimates of tonnage cut per day (ranging from 5.6 to 7.3 tons). Our estimate of the average per year value in the change in productivity due to a reduction in man hours lost to illness comes to a net saving to ISA of \$33,591 (based on fewer man hours lost during Adelante than prior to).

We also estimate an annual reduction in costs related to ISA’s diagnosis and the limited treatment provided by the onsite clinic of acute renal failure at approximately \$30,164, and reduction in costs related to chronic kidney disease at \$12,927.48.

Finally, we estimate the annual savings to ISA in terms of reduced turnover rates and replacement costs at approximately \$100,409.65.

Value of investments

Regarding the value of investments on ISA’s part, we estimate the total per year costs of:

- Equipment for cutters to be approximately \$28,008



- Training costs for healthcare workers \$32,440.08 (annual average)
- Fielding a survey of each fieldworker (staff time and equipment) \$11,058.6
- Adelante’s share of production of electrolyte drink and the maintenance of the plant used to produce it at \$70,231.18

$$ROI = \frac{(\text{value of benefits}) - (\text{value of investments})}{\text{value of investments}}$$

For the purposes of this preliminary estimate, we have used the standard ROI formula (adapted from RAND Corporation, 2017):

$$ROI = \frac{(\$33,591 + \$30,164 + \$12,927.48 + \$100,409.65) - (\$28,008 + \$32,440.1 + \$11,058.6 + \$70,231.2)}{\$28,008 + \$32,440.1 + \$11,058.6 + \$70,231.2}$$

$$ROI = 0.22$$

Understanding that the assumptions noted above may be inaccurate to a degree, and understanding that data on additional costs would improve this model, we estimate:

Summary

This 22% return is based on a conservative estimate of the average net gain in productivity resulting from Adelante. For every \$1.00 ISA invests in its water, rest, and shade regimen, it gains an additional 22 cents in return, conservatively. If we assumed that our highest estimate for the cost per ton of cane is correct, and our estimate of the highest average tonnage cut per day is correct, the ROI estimate increases to 29.7%.

References

T Bodin, R García-Trabanino, I Weiss, E Jarquín, J Glaser, K Jakobsson, R A I Lucas, C Wesseling, C Hogstedt, D H Wegman, the WE Program Working Group. Intervention to reduce heat stress and improve efficiency among sugarcane workers in El Salvador: Phase 1. *Occupational and Environmental Medicine*, 2016;73:409–416.



