

Sugar-cane harvesting – can we protect both the workers' health and their jobs?



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Introduction:

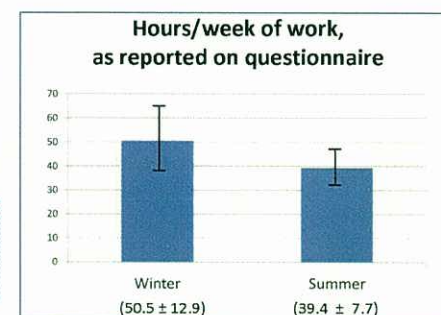
Sugar-cane harvesting requires extremely strenuous physical labor in hot climates. Risks to workers include acute traumatic injury, musculoskeletal disorders (MSDs), heat stress, and dust inhalation.

This project results from a **binational, union-academic collaboration** with the union (SCIV) representing 1200 workers who harvest sugar cane in Milagro, Ecuador, and the national agricultural workers' federation (FENACLE).

Mixed methods (qualitative/quantitative) are being used to characterize these jobs, with the hope of being able to develop ergonomics and safety measures that are feasible, effective, and acceptable to the workers.



The harvest begins at the end of the rainy season. In South America, the "zafra" lasts from about July to December.



Methods:

- Group interviews at the union hall provided detailed information about work organization and job content (tasks by season, pay basis, etc.).
- Harvesting work was observed and videotaped by the lead investigator (RH).
- A standardized questionnaire was developed to cover medical and injury history, work history, physical and psychosocial job features, MSDs, and demographics.
- The questionnaire was pilot-tested and revised through one-on-one interviews with union leaders and members.
- At the end of the harvest season (2011), the survey was distributed at a general assembly of the union.

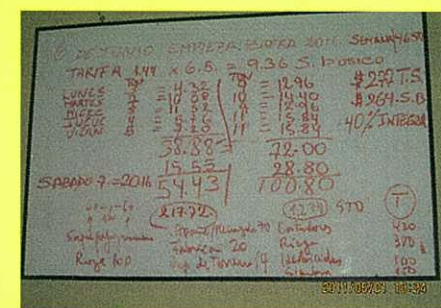


Key jobs include planting, irrigation, application of fertilizer and herbicides, in addition to harvesting ("cutting") of the mature cane. Weeding is performed with a machete, in a manner similar to the harvesting procedure but somewhat less strenuous.

Some jobs are seasonal and others are year-round. Some cutters perform other tasks during the rest of the year.

Primary job assignments of 386 male sugarcane workers, Ecuador, 2011

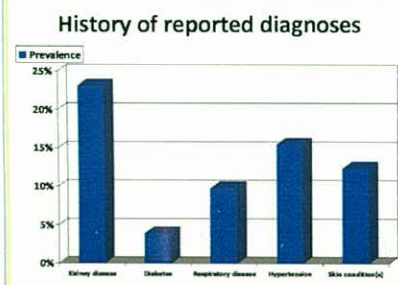
Job	(n)	Percentage of respondents
Cutting	213	55%
Irrigation	68	18%
Herbicides	15	4%
Planting	30	8%
Weeding	37	10%
Mixed	21	5%



Results:

Of about 400 assembly participants, nearly all completed the questionnaire.

Primarily young and middle-aged men, a majority of them reported their health as "very good" (16%), "good" (47%), or "regular" (28%).



Demographic characteristics of 386 male sugarcane workers, Ecuador, 2011

	Mean	Std. Dev.
Age (yr)	44.5	12.2
Height (cm)	165.2	8.1
BMI	24.5	3.9



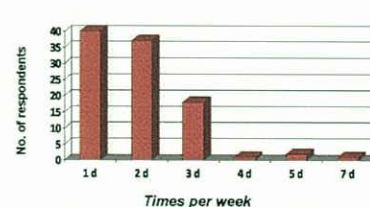
All workers have a state-guaranteed minimum wage. However, cutters are paid primarily on the basis of production. The complicated incentive system includes double wages for weekend work.

Cutters' output (in tons), as reported on questionnaire

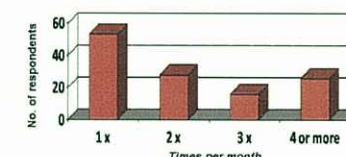
	Mean	Std. Dev.
Per day	8.5	4.3
Per week	47.9	17.4

- Almost 25% of respondents (n=90) reported at least one accident at work in the past year. These included cuts from machetes, snakebites, ash and particles in the eye.
- The fields are burned before the harvest, to reduce weeds and to drive away snakes. Often they are still hot when the workers enter.
- Despite being paid for the amount that they harvest, interviewed cane cutters reported regularly being too fatigued to be able to work more than 6 hours per day, even when more work was offered.

In a typical work week, how many days do you have to leave work early because of excessive fatigue?



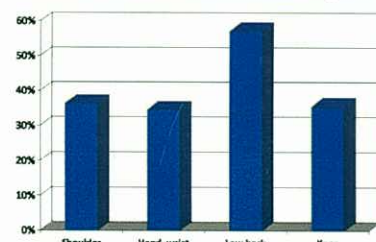
In a typical month, how often do you have to enter a field that was recently burned or is still burning?



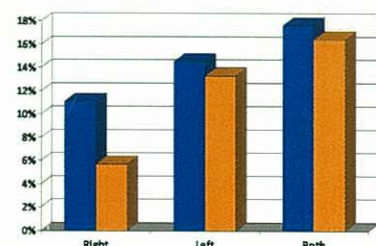
Harvesting tasks are marked by heavy loading on the low back (postural strain and heavy lifting).



Prevalence of musculoskeletal pain



Which side (upper extremity) bothers you?



In other parts of the world, ergonomics studies have focused on improving the design of the machete or cane-cutting knife.

However, the interviewed cutters emphasized the effort required by the non-cutting arm, especially high-force dynamic motions to pull the cane stalk down towards the ground while cutting with the other hand. They also described severe left shoulder pain from these motions.

Although 83% of survey respondents were right-handed, the left shoulder and arm were more often affected (see above).



Discussion:

Cane cutting is a relatively well-paid job compared to others in this region of Ecuador but involves a high risk of injury and potential disability.

The combination of quantitative and qualitative methods has provided valuable insights into the problems as well as obstacles to their resolution.

Possible changes in work practices, which might permit workers to reduce the strain on the back and shoulder while harvesting, are under discussion.

Automated harvesting equipment is reported by union workers to damage the cane somewhat. It is also unpopular because of its likely negative impact on wages and job security. Efforts continue to find or develop ergonomic and safety improvements that do not adversely affect employment options.

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