

Title of research The impact of a nutrition-sensitive agricultural intervention on preschool child growth in rural Panama.

Topic	<ul style="list-style-type: none">• Nutritional benefits and infection risks of agriculture and agricultural interventions
Framed issue	<ul style="list-style-type: none">• This brief will examine the impacts of an agricultural intervention on preschool child growth in rural Panama, and present agriculture-related infection risks which may diminish the nutritional benefits of the intervention.
Intended Audience	<ul style="list-style-type: none">• Panama Ministry of Health, Japan International Cooperation Agency

Define the context and the issue	<ul style="list-style-type: none">• In rural, subsistence farming communities in the province of Veraguas in Panama, 50% of preschool children have stunted growth, and 92% of households are food insecure.• An agriculture-based intervention called <i>VERASAN</i> was initiated in 2007 to address the problems of preschool child stunting and household food insecurity.• The intervention was initiated by the Panama Ministry of Health, in collaboration with the Ministries of Agricultural Development and Education and support from Japan's International Cooperation Agency (JICA).• The intervention provides agricultural training through community demonstration gardens, and education about food preparation, nutrition and hygiene.• Through the intervention there have been only marginal improvements in preschool child weight, and no decrease in stunting.
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Findings and/or Recommendations	<ul style="list-style-type: none"> • Intestinal infections and exposure to unhygienic environments have detrimental effects on preschool child growth[1], and VERASAN staff and community members agree that intestinal parasites are a problem for preschool children. Further, our surveys show that over a third of preschool children are infected with intestinal worms. • There has not been a significant improvement in preschool child growth through the VERASAN intervention, even though it has been successful in improving aspects of nutrition, including household food security and child diet. • Our findings showed that preschool children were at higher risk for intestinal worm infections if they spent time in their household’s agricultural plot, if their caregiver spent more time working in agriculture, and if their household had more intensive agricultural practices • Further, our findings showed that preschool children had worse growth if they had intestinal worm (hookworm) infections, and if they spent time in their household’s agricultural plot. They had worse vertical growth if their caregiver spend more time working in the agricultural plot, however they had better weight gain between the growing season and harvest, indicating the important contribution women’s work in agriculture makes to household food availability during this critical period in the agricultural cycle. • The increase in intestinal infections from exposure to agriculture have diminished the gains in preschool child growth from improved nutrition through VERASAN.
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Implications and/or next steps	<ul style="list-style-type: none"> • Preschool children in this population should receive regular deworming medication (as is already done for school children). This recommendation is consistent with WHO standards[2], as the prevalence of intestinal worm infections in preschool children in this population is above the threshold WHO sets for annual mass drug administration targeting preschool children. • These findings raise the issue of infection risks from agriculture, which is the primary livelihood strategy in these communities. The infection risk posed by agriculture is likely elevated for all community members exposed to agriculture, not only preschool children. • The increased risk of infection and decreased growth for preschool children whose mothers work more in agriculture raises the issue of the role of women in household agriculture versus childcare. However, the improved weight gain during and leading up to the harvest indicates the crucial role that many women play in their household’s agricultural activities. Women’s roles in agriculture should be considered in the planning of future agricultural interventions.
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Limitations and further research

- This research identified intensified agricultural practices as a risk factor for preschool child intestinal worm infections, however our analysis was not able to identify particular activities or practices responsible for this increase in infection risk. Further research is required to understand the activities/exposures responsible for increased infection risk, to mitigate the infection risks of intensified agriculture.
- To reap the full benefits of an agricultural intervention like *VERASAN*, future interventions should be designed to improve nutrition *and* decrease preschool child exposures to agriculture, and incorporate regular treatment of intestinal worms.

1. Hall, A., et al., *A review and meta-analysis of the impact of intestinal worms on child growth and nutrition*. Maternal and Child Nutrition, 2008. **4**: p. 118-236.
2. WHO, *Action Against Worms*. 2007, World Health Organization: Geneva.