

# Estimating the Economic Viability of a New Crop Alternative for the U.S. Organic Market: Edamame – A Vegetable Soybean

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## Introduction

- Edamame is gaining popularity in the U.S and will surpass all other soy based products by 2020 (Soybean Board, 2010).
- Mostly imported frozen from Asia and rarely organically certified.
- Possibility for U.S. organic producers to pursue a high value niche product.
- Empirical evidence regarding the potential for mass production is lacking.
- An economic evaluation to determine the profitability and appropriate implementation of producing organic edamame is warranted.

## Objectives

This study addressed three questions involving the production of edamame on a commercial scale for the frozen food industry.

- (1) Is the production of edamame in the U.S. profitable for organic producers?
- (2) How do various weed management strategies, specifically cover cropping versus tillage, impact net returns?
- (3) What market prices and land area are required to economically justify the adoption of commercial edamame production

## Economic Model

- A whole farm planning, resource allocation modeling technique is used to compare producing organic edamame in lieu of organic soybeans under conventional tillage and cover cropping methods.
- The objective function maximizes net returns.
- The decision variables included the land area designated to producing organic corn and soybeans/edamame.
- The model constraints include:
  - Land and labor resource available
  - Annual sales balance by crop
  - Input purchases balance
  - Annual net returns balance
  - Expected net returns balance
  - Rotation limitations
  - Soil type balance

## The Data

- Kentucky producer growing organic corn and soybeans on 200 acres.
- Thirty years of corn, soybean, and edamame yields based on biophysical simulation (Jones et al., 2003).
- Yields adjusted to reflect loss from weed management strategies.
- Assumed a green bean harvester could be used for mechanical harvesting with a 25% yield loss (Born, 2006)

## Results

Table 1. Break-even edamame prices (\$/lb) required for a 200 acre organic farm.

Break Even Edamame Prices	Tillage	Cover Cropping
To Cover Variable Costs	\$0.25	\$0.38
To Cover All Specified Costs	\$0.29	\$0.48
Required to Switch from Soybeans	\$0.37	\$0.50

Table 2. Break-even acres required to cover all specified costs of production given various edamame prices (\$/lb).

Edamame Price	Tillage		Cover Cropping	
	Break-even Land Area	Edamame	Break-even Land Area	Edamame
\$0.30	163		157	
\$0.35	113		121	
\$0.40	86		98	
\$0.45	70		83	
\$0.50	60		72	

Table 3. General economics regarding the production of organic corn and soybeans/edamame for a 200 acre organic farm when edamame prices are at break-even level required to switch from soybeans.

General Economics	Tillage		Cover Cropping	
	Corn Soybeans	Corn Edamame	Corn Soybeans	Corn Edamame
Gross Returns	\$133,426	\$295,257	\$87,955	\$249,785
Net Returns	\$52,345	\$52,345	\$8,930	\$8,930
Variable Costs	\$46,495	\$179,958	\$47,389	\$180,852
Ownership Costs	\$34,587	\$62,954	\$31,636	\$60,003
Standard Deviation	\$15,604	\$28,286	\$9,884	\$23,801
Coeff. of Var.	29.81%	54.04%	110.69%	266.51%
Min. Net Returns	\$12,411	(\$30,186)	(\$15,675)	(\$58,520)
Max. Net Returns	\$84,501	\$95,313	\$29,602	\$45,406

## Conclusions

- If the market price for organic edamame was favorable, it could flourish in Kentucky.
- Conventional tillage was economically preferred over cover cropping for weed management.
- Market prices of \$0.37/lb. was required to switch to edamame from soybeans under the preferred weed management strategy.
- Due to an increase in the coefficient in variation when producing edamame, risk preference must also be considered and could influence the results of this study.

## Selected References

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