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# **Ethnic Crop Opportunities for Growers on the East Coast: A Demand Assessment**

**Ramu Govindasamy**

Chair and Associate Professor

Department of Agricultural, Food and Resource Economics

Extension Specialist, Rutgers Cooperative Extension

School of Environmental and Biological Sciences

Rutgers University

New Brunswick, New Jersey

[govindasamy@aesop.rutgers.edu](mailto:govindasamy@aesop.rutgers.edu)

**Richard Van Vranken**

Rutgers Cooperative Research and Extension Service

New Jersey Agriculture Experiment Station

School of Environmental and Biological Sciences

Rutgers University

New Brunswick, New Jersey

[vanvranken@AESOP.Rutgers.edu](mailto:vanvranken@AESOP.Rutgers.edu)

**William Sciarappa**

Rutgers Cooperative Research and Extension Service

New Jersey Agriculture Experiment Station

School of Environmental and Biological Sciences

Rutgers University

New Brunswick, New Jersey

[sciarappa@AESOP.Rutgers.edu](mailto:sciarappa@AESOP.Rutgers.edu)

**Albert Ayeni**

New Jersey Agriculture Experiment Station

School of Environmental and Biological Sciences

Rutgers University

New Brunswick, New Jersey

[ayeni@AESOP.Rutgers.edu](mailto:ayeni@AESOP.Rutgers.edu)

**Venkata S. Puduri**

Department of Agricultural, Food and Resource Economics

Rutgers University, New Brunswick, New Jersey

[puduri@AESOP.Rutgers.edu](mailto:puduri@AESOP.Rutgers.edu)

**Kim Pappas**

Marquis Who's Who

New Providence, New Jersey

**James E. Simon**

Professor

New Use Agriculture and Natural Plant Products Program

Department of Plant Biology and Pathology

Rutgers University

New Brunswick, New Jersey

[jesimon@AESOP.Rutgers.edu](mailto:jesimon@AESOP.Rutgers.edu)

**Frank Mangan**

Department of Plant, Soil & Insect Sciences

University of Massachusetts

Amherst, Massachusetts

[fmangan@umext.umass.edu](mailto:fmangan@umext.umass.edu)

**Mary Lamberts**

University of Florida

Homestead, Florida

[lamberts@ufl.edu](mailto:lamberts@ufl.edu)

**Gene McAvoy**

University of Florida

LaBelle, Florida

[gmcavoy@ufl.edu](mailto:gmcavoy@ufl.edu)

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**Abstract:** We examined the potential for expansion of production of ethnic crops on the U.S. East Coast by commercial farmers from a market-first and economic perspective based on consumer demand. A survey of consumers from four ethnic groups showed that the ethnic crops in greatest demand are as follows: Chineseâ Baby Pak Choy, Oriental Eggplant, and Smooth Luffa; Asian Indiansâ Bottle Gourd, Indian Eggplant, and Bitter Melon; Mexicansâ Chili Jalapeno and Tomatillo; Hispanicâ Aji Dulce, Batata, and Pepinillo/Bitter gourd. Results of the study have important implications to assist local growers in deciding to produce ethnic crops.

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## Introduction

The dramatic increase in the ethnic population on the U.S. East Coast is changing the demand for fresh produce available in markets (Govindasamy et al., 2006). As demographic profiles change, commercial growers might have to alter or add to the selection of fruits and vegetables that they now produce to respond effectively to the changes and new trends in demand. The objective of the research reported here is to bridge the gap that currently exists in the produce market among consumers, distributors, and growers by using a market-first approach to identify demand for the most popular vegetables consumed among four distinct ethnicities that also have potential for production in the Eastern U.S. Our hypothesis is that those farmers who are more closely linked to emerging market demands could gain a competitive edge by being ahead of the supply-side curve relative to introducing new crop(s) into commercial production and in better understanding new market entry points.

Given significant demographic changes that are already taking place and the U.S. census data that predicts even greater population shifts in the future (Census, 1990 & 2000), this paper article upon our prior work conducted as part of a study that identified ethnic consumer demands for fresh produce. There are two

ethnicities included in the study: Asian and Hispanic. Within each, two subgroups (Chinese and Asian Indian, and Puerto Rican and Mexican, respectively) were studied as the geographic focus revealed heavy concentrations of these groups in the region and thus strong market potential for products desired by these groups (Govindasamy et al., 2006). These groups were chosen based on the size of their market potential and their continued growth expectations.

The geographic region studied includes the District of Columbia, 14 states bordering the Atlantic Coast, and Pennsylvania and Vermont. The results of the project will give growers in the region a competitive advantage in their production decisions and should improve their future earning capabilities by focusing on ethnic crops to capture an underutilized market potential revealed by this study (Govindasamy, Nemana, Puduri, & Pappas, 2006; Mendonca, Raquel, Moreira, Mangan, & Brashear, 2006; Sciarappa, 2001 & 2003; Tubene, 2001). East Coast small farmers can also take advantage of their close proximity to densely populated areas where a majority of the ethnic populations are located.

The ethnic crop identification and selection process came about from a historical approach in our agricultural schools that focuses on production opportunities first while building a strong integrated research and Extension team, but often doing so without serious examination of market demand, opportunities and logistics, all of which are part of the commodity chain. Our approach here in new crop introduction was to first examine the markets of specialty and emerging ethnic produce. The top tier or most promising crops relative to market demand and production potential were then considered as appropriate crops to be evaluated in field trials by our state research and Extension specialists. The results are thus science-based supply-side recommendations.

## Methodology

In order to identify the crops with the most potential for production by East Coast farmers, the process started with a review of 100 ethnic produce items commonly sold in local markets. A panel of crop production and marketing experts eliminated from the list fruit (mango), tropical crops not likely to grow in the region or not adapted to the region (true yam), crops already commonly grown in the region (dry beans), and crops that have had previous unsuccessful attempts to establish production (fava beans). After careful discussion and using a decision matrix with criteria relating to production issues, the list was reduced to 10 vegetables for inclusion in the survey questionnaire for each ethnic subgroup plus two extra for Chinese, which brought the total number of crops listed in the survey for all ethnic communities to 42.

A stratified sampling method was used to randomly collect product-purchasing data for each of the four ethnic subgroups in the region. Each ethnic group had equal proportional representation by state, with a minimum requirement of at least one sample per state for each ethnic group. A total of 1,084 surveys were completed (271 per sub-group). An additional 271 samples were collected, regardless of state and ethnic group, for a short survey to establish behaviors and reasons for the purchasing habits of non-purchasers of ethnic produce. Sample sizes for each ethnicity were based on 2000 census population. The questionnaires were completed by the principal grocery shopper in each household between February 2006 and May 2006.

Additional analysis of the supply-side issues is ongoing (Govindasamy et al., 2007a) to aid the small producers in selecting the right crops for the ethnic market. Of the 42 crops included in the survey, a final list of 22 crops was selected for field production trials using the multiple criteria to gain base-line production, marketable harvest, and quality of produce and to identify any potential problems associated with these new crops, such as insect and disease pressures.

## Results

Survey results revealed that a majority of shoppers in each group were female between the ages of 36-50. More than half of the respondents from each group were married. Roughly two-thirds of the respondents were employed, with an average income of under \$60,000 per year. A higher percentage of Asian Indians fell into higher income categories, followed closely by Chinese, seemingly to correspond to higher education levels (Bureau of Labor and Statistics, 2005). Average monthly ethnic produce expenditures per household ranged from \$77 to \$98 by ethnic group and averaged \$86 across all respondents (Govindasamy et al., 2007a). Respondents shopped for ethnic produce four to six times per month. The most common places of purchase for all groups were ethnic grocery stores and traditional American retail grocery stores. Community farmers' markets and on-farm/roadside markets were not as popular. Roughly one third of the Mexicans grew their own ethnic produce, compared to a quarter or less of the other three groups.

A majority of ethnic produce purchasers from each group (59% - 78%) and as high as 40% of the current non-purchasers indicated that they would be "more willing" to purchase ethnic produce from ethnic rather than other outlets. More than 80% of ethnic produce purchasers from each group live within 20 miles of an ethnic grocery store/market. Freshness and quality were consistent priorities among 98% or more of all ethnic groups of current purchasers. Selection was the third most commonly cited important attribute by all groups, followed by store availability and price. As vegetarians, Asian Indians are a prime target for ethnic produce promotions, but they also have a higher price elasticity of demand. Half or more respondents from each ethnic group were willing to pay more for ethnic produce than the comparable American or conventional substitutes (Govindasamy et al., 2007a).

The Chi-square test results indicated that there is statistically significant relationship between educational levels and the willingness to pay for ethnic produce. With respect to education, among those who graduated from high school, 64% of respondents were willing to pay more for ethnic produce, whereas, among those who graduated from college, 66% of respondents were willing to pay more for ethnic produce. Among post-graduate degree holders, 56% of respondents were willing to pay more for ethnic produce (Table 1). Overall, respondents who had education up to college degree were more willing to pay for ethnic produce compared to those who had post-graduate degrees.

**Table 1.**  
Those Who Are Willing to Pay More for Ethnic Produce by Education

Education	Willingness to Pay More for Ethnic Produce				Total	
	Willing to Pay More		Not Willing to Pay More			
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Up to High School Graduate	234	64%	132	36%	366	100%
Up to College Degree	245	66%	127	34%	372	100%
Post Graduate or Advanced Degree	108	56%	86	44%	194	100%

In terms of income (Table 2), among those who earned up to \$39,999, 58% were willing to pay more for ethnic produce, whereas, among those who received between \$40,000-79,999, 70% were willing to pay more for ethnic produce. Among those who had income of \$80,000 and above, 60% were willing to pay more for ethnic produce. The overall results indicated that those who had income of between \$40,000-79,999 were 10% to 12% more willing to pay for ethnic produce compared to other income groups. The Chi-square statistics also indicated that there is statistically significant relationship between income levels and the willingness to pay for ethnic produce.

**Table 2.**  
Those Who Are Willing to Pay More for Ethnic Produce by Income

Income	Willingness to Pay More for Ethnic Produce				Total	
	Willing to Pay More		Not Willing to Pay More			
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Up to \$39,999	157	58%	114	42%	271	100%
\$40,000 to \$79,999	162	70%	68	30%	230	100%
\$80,000 and Above	103	60%	69	40%	172	100%

The total expenditures by ethnic consumer groups are presented in Table 3. The typical monthly per person expenditure for all ethnic produce items purchased averaged \$26 and ranged from \$22 to \$32 by ethnic group. The ethnic produce comprised more than 60% of total produce expenditures from each ethnic group surveyed. The ethnic expenditure data was combined with Census population data to develop market estimates for the ethnic populations along the East Coast. The extrapolations resulted in the following estimates with 90% Confidence Interval: \$245M to \$296M for Chinese, \$190M to \$230M for Asian Indian, \$281M to \$362M for Mexican, and \$531M to \$655M for Puerto Ricans (Govindasamy et al., 2007a). The results suggest a strong demand for ethnic crops in the region studied.

**Table 3.**  
Ethnic and Total Produce Expenditures by Ethnic Consumer Group

Frequency and Spending	Ethnicity				Mean of all Ethnicities	Minimum N
	Chinese	Asian Indian	Mexican	Puerto Rican		
AVG Expenditure per Month On Ethnic Produce (\$ per person)*	\$32	\$27	\$22	\$23	\$26	213

AVG Expenditure per Month on All Produce (\$ per person)	\$48	\$33	\$31	\$37	\$37	237
Ethnic as % of Total Produce Expenditure (per person)	67%	82%	71%	62%	69%	
* Average expenditure/month across all respondents (i.e. Visits/month x \$/visit, divided by household size, by respondent) is a function of Exp/month for each respondent that reported Visits/month, \$/visit, and HH size (i.e. NOT the product of AVG Visits/month pp and AVG \$/visit pp, by ethnic group).						

Several ethnic crops were not considered potential candidates for field studies because of low potential demand indicated in the consumer surveys, seed availability, or production constraints. Those eliminated were oriental mustard, basil, malabar spinach and perilla from the Chinese survey; amaranth and white pumpkins from the Asian Indian survey; anaheim pepper, chili habanero, and tutuma (white hard squash) from the Mexican survey, and berenjena (eggplant), calabacita (duplicated in Mexican group), and verdolaga (purslane) from the Puerto Rican survey (Govindasamy et al., 2007b). These specialty crops still have high market demand by these ethnic groups but were placed in a secondary tier of priority and not pursued in this initial project.

The remaining ranked lists of crops were re-evaluated to further selection from each ethnic group for field trials (Table 4). Ranked lists for each ethnic group were established according to: (1) mean weekly expenditures across all respondents (including zero purchases); (2) mean weekly expenditures across only respondents purchasing that item; (3) frequency of purchase across respondents; (4) volume (pounds, bunches or units) of purchase by item, and (5) overall rank for each item.

**Table 4.**  
Ethnic Crops Selected for Field Production Trials

<b>Ethnic Group</b>	<b>Ethnic Crop Name</b>	<b>Scientific Name</b>
Chinese	Baby Pak Choy	<i>Brassica rapa</i> L. ssp <i>chinensis</i>
	Oriental Eggplant	<i>Solanum melongena</i> L.
	Smooth Luffa	<i>Luffa aegyptiaca</i> Mill. (or <i>L. cylindrica</i> (L) M. Roemer)
	Edamame	<i>Glycine max</i> (L.) Merr.
	Napa Cabbage	<i>Brassica rapa</i> L. ssp <i>chinensis</i>
	Oriental Spinach	<i>Spinacia oleracea</i> L.

	Pak Choy	<i>Brassica rapa</i> L. ssp <i>chinensis</i>
	Snow Peas	<i>Pisum sativum</i> L. var. <i>Macrocarpon</i>
Asian Indian	Bottle Gourd	<i>Lagenaria siceraria</i> (Mol.) Standl.
	Eggplant (Raavayya)	<i>Solanum melongena</i> L. var. Raavayya
	Eggplant (Bharta)	<i>Solanum melongena</i> L. var. Bharta
	Ridge Gourd/Luffa	<i>Luffa acutangular</i> (L.) Roxb.
	Fenugreek Leaves	<i>Trigonella foenum-graecum</i> L.
	Mint Leaves (Spearmint)	<i>Mentha spicata</i> L.
Mexican	Jalapeno pepper	<i>Capsicum anuum</i> L.
	Tomatillo	<i>Physalis philadelphica</i> Lam. (or <i>P. ixocarpa</i> Brot.)
	Calabacita (Zuchini)	<i>Cucurbita pepo</i> L.
	Poblano/Ancho pepper	<i>Capsicum anuum</i> L.
Puerto Rican	Aji Dulce pepper	<i>Capsicum chinense</i> Jacq
	Batata sweetpotato	<i>Ipomoea batatas</i> ( L.) Lam.
	Pepinillo/Bitter gourd/melon	<i>Momordica charantia</i> L.
	Cilantro/Coriander	<i>Coriandrum sativum</i> L.

Ultimately, seed availability and production constraints also factored into how many and which crops were selected for field observation. The Chinese crops included mostly cool season greens, with the exception of smooth luffa, edamame, and oriental eggplant. The Asian Indian candidates included fenugreek, mustard, eggplant, ridged luffa, and bottle gourd. Mustard was not included because it is already a common crop grown by East Coast vegetable farmers. The Mexican list contained several types of peppers, while the Puerto Rican group contained a number of crops with cross-ethnic demand. No crops could be eliminated from the Puerto Rican list on the basis of low demand. However, fava beans were eliminated because experience by local growers indicated limited past market potential.

The list of 22 crops recommended for production trials contained four types of vegetables that had significant cross-ethnicity demand. These included several types of cucurbits, eggplants, chili/peppers, and coriander leaf. The cucurbit crops fell into two groups: those requiring trellising (ridge and smooth luffa consumed by both Asian groups and bitter melon (bitter gourd/pepinillo) consumed by Asian Indians and Puerto Ricans), and non-trellised cucurbits (bottle gourd (Asian Indian), calabaza (Hispanic winter squash) and calabacita (Hispanic summer squash/zucchini). These groups, while artificial, represent distinct production technologies and investments, and thus would be useful to the producer. Eggplants are consumed by all groups except the Mexicans and distinguished in ethnic markets as Oriental/Chinese eggplant, Asian Indian eggplant, and Berenjana/Dominican eggplant. Six types of *Capsicum* peppers with high demand in Hispanic markets included: Chili Jalapeno, Chili Poblano, Chili Serrano, Chili Caribe, Aji dulce and Anaheim pepper. Coriander leaf is used by all ethnicities, While all ethnic groups extensively use the ground fruit or seed as a spice, production potential of the seed as the product of commerce would be limited in the East Coast, and

the market identified was for the leaf, for which large-scale commercial production in several of our eastern states (e.g., Florida and New Jersey) is well recognized.

The cross-ethnicity demand for these crops made them high priorities for field trials. Rather than duplicating plots, however, including only one accession or variety of each type allowed us to introduce even in a preliminary manner several lower priority crops (edamame and snow peas) or multiple cultivars of a single type (Raavayya and Bharta Indian eggplant) to the field trials.

## Conclusions

Introduction of ethnic produce will expand the opportunities for producers and provide competitive advantage to their existing businesses while capturing the produce sales to the growing ethnic communities. The consumer survey results will help agriculture industry leaders and intermediaries such as wholesalers and retailers in increasing their efficiency in the supply chain of ethnic produce sector. The results also provide critical information to the small and medium-sized producers such as: what to produce? Where to supply? Whom to target? The overall survey results also provide valuable and diversified ethnic market information helping the Northeast U.S. farmers to make a decision to expand their product range while making agriculture more profitable.

This article details a unique market-first driven approach to alternative crop production research. Analysis of market demand for new crops should be conducted in advance of production-oriented research and used to identify those with the most potential in order to prioritize and justify which crops should then be included in subsequent field and greenhouse production studies. This strategic approach bridges the gap between customers, distributors, and growers, providing critical information to open sustainable new economic opportunities for local growers assuming continued long-term demand for these crops by ethnic American consumers and/or adoption by non-ethnic Americans. The latter were not part of the current study.

This approach also facilitates a closer link with the consumer and buyer to better inform those in Extension what is the specific variety acceptable to the targeted ethnic group. Strong links from the outset better inform us in research and Extension, thus enabling us to better extend the results of our research. Thus, producing the ethnic specialty crop in demand, being able to identify the best varieties, and growing the crop to meet the expectations of the marketplace all help to increase the probability of success. Extension specialists can provide a leading role in working with both the commercial growers and the ethnic communities. Subsequent production research is warranted to determine the most appropriate cultivars adapted for production in the region and to identify potential production constraints before recommending specific ethnic crops to address local markets.

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