Urban Markets, Changing farms: Dual-Tiered Targeted support for Ethnic and Specialty crops

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1. Introduction

The Washington, DC metropolitan area has experienced rapid expansion, where the current population is about 5.7 million people and more than a quarter of this population is represented by Black or African Americans (United States Census Bureau, 2013). Moreover, with more than 161,000 Africa-born residents, the Washington DC metropolitan area has the second highest percentage of metropolitan statistical areas with the largest foreign-born populations from Africa [Gambino, et al. 2014 (Appendix 1)]. Unfortunately, the growing niche of African-born residents is not associated with the number of food producers. There is currently a small number of vegetable producers growing West African Ethnic Crops in the DC metropolitan area.

Ethnic foods have grown in popularity through the United States in recent years, and this trend is projected to continue. The Washington Post reported that one in five Americans is eating more ethnic food than in 2008 (Rosenwald, 2010), and thanks to the Ethnic and Specialty Program of the University of the District of Columbia, the residents of the Washington metropolitan area have also access to a wider variety of foods as about eight tons of top quality produce were grow last year (2014) for food banks like Bread for the City and DC Central Kitchen, and for the prestigious Hay Adams Hotel.

Unfortunately the current production of West African Ethnic Crops is limited to the UDC Ethnic and Specialty Program and other few small local farmers that seasonally grow these produces and sell them to the distributors of the area. The distributors later sell them to small entrepreneurial distributers that finally sell them to the consumers with a large spread between the price received by the farmer and the final consumer price (Center for Urban Agriculture and Gardening Education, 2015).

Nevertheless, considering that the DC metropolitan area is among the highest per capita densities of farmers markets with about 40 facilities, it has a high competition zone among farmers and a high African-born population (USDA, 2015). It greatly enhances the potential for a niche market strategy and makes plausible that an assessment of the demand that consumers have for West African ethnic produces would be a potential driver of changes in agricultural production decisions as local and regional farmers would have a wider market with more choices and less competition, and consumers would have a major availability of fresh and locally grown produces.

In order address this gap and to inform local producers for opportunities to expand their operations, the Center of Sustainable Development of the College of Agriculture, Urban Sustainability and Environmental Sciences (CAUSES) has collected information from consumers in the Washington, DC metropolitan area regarding their familiarity and preference in nine traditional West African produces. Similarly, CAUSES has collected data from various distributors in the area to also assess the demand and availability of these vegetables in the market. Finally, considering the consumer and distributor's opinion as the top source of information in the demand of West African produce, CAUSES analyzed the results attempting to showcase options for Mid-Atlantic producers seeking profitable alternative crops to plant.

This study focused on nine selected varieties of West African Ethnic Crops grown at UDC's Muirkirk Research Farm (refer to Table 1).

Table 1: West African crops grown in Muirkirk Research farm.

Vegetable	Also known as	Description
Avuvo	Celosia, Lagos Spinach, Quail grass, and Soko	Popular and nutritious leafy green. Similar to kale in calorie and protein content.
Garden Egg	African Eggplant, Nyanya Chungu, and bitter tomato	Both the leaves and the fruit are edible. They come in many colors.
Gboma	Aubuergine and Scarlet Eggplant	Both the leaves and the fruit are edible. It is an excellent source of calcium
Kitely	*Solanum anguivi*	Small fruit that looks like a cross between a tiny eggplant and a green tomato.
Sawa Sawa	Sour Sour, Sour Leaf	Hibiscus variant with edible greens and flowers
Hot Peppers	Habanero	Known as one of the hottest peppers in the world with a value of 10 in the Chili Heat Scale.
Jamma Jamma	Cultivated Huckleberry	Leafy green that is prepared in mostly the same way than mustard and collard greens
Jute Leaf	Jute Mallow or Jew's Mallow	Leafy greens similar to okra
Waterleaf	Caruru, Surinam Spinach.	Leafy greens similar to spinach

2. Data and Methodology

This project is to conduct surveys on focus groups of consumers and distributors in the Washington, DC metropolitan area to assess their demand for nine varieties of African vegetables in order to inform local producers about opportunities to expand their operations and access new niche markets. To accomplish that, the Center of Sustainable Development of the University of the District of Columbia conducted a survey analysis for each focus group:

2.1 Consumers' Data Collection and Analyzing methods

CAUSES carried out a total of five West-African food tasting and presentations for consumers (Figure 1) in which free samples of at least two chef-prepared dishes were offered in exchange for feedback using the consumer paper based survey form (Appendix 2). The Center for Nutrition, Diet, and Health at UDC was a vital partner in this effort, as their chefs were able to recreate traditional flavors and allow data collection on the desirability of the product as prepared.

Figure 1: "Chef T" Henson and Chef Herb Holden at the Africa festival.

While consumer research was not limited to the African Diaspora, much of the data collection took place at events where Black and African-Americans participated in (Table 2).

Table 2: Consumer's data collection at the series of West-African food tasting and presentations

Date	Event	Responses collected
08/03/14	African Festival (Sponsored by DC Mayor's Office of African Affairs)	220
08/15/14	UDC campus	19
08/16/14	UDC Farmers' Market	80
08/17/14	Smithsonian-Anacostia Museum	47
08/30/14	Special Events	96
	Total responses:	**462**

The compiled survey data for consumers was based on key demand metrics such as gender, race, age group, buying patterns for the nine focus African ethnic crops of this study, perceptions of crop popularity, interest for ethnic crops, appreciation for their taste, attitude towards eating ethnic crops at restaurants, preference rank from the list of vegetables, etc.

Consumer's data is then summarized in Excel and analyzed in statistical software STATA. Factor analysis, OLS, and logistic regressions were conducted.

Ward variables are grouped into two groups: wards with high (higher than DC average) African American concentration (Wards 4, 5, 7, and 8) and wards with low (lower than DC average) African American concentration (Wards 1, 2, 3 and 6)[1]. Since the zip code information for non-DC location is scarcely filled, we decided to eliminate the samples in the analysis with location.

[1] Percentage of black non-Hispanic population in 2010 information from Neighborhood info DC. http://www.neighborhoodinfodc.org/wards/wards.html

2.2 Distributors' Data Collection and Analysis

CAUSES conducted one-on-one interviews with several of the major importers of African produce in the Washington Metropolitan area using a paper based survey form (Appendix 3).

The compiled survey data for consumers was divided in multiple choice questions (quantitative analysis) that aimed to assess the distributors' knowledge in ethnic crops, the availability of their produce, a priority rank from the list of most demanded crops, a priority rank from the list of supported crops, the consumer's demand, the distribution of their market, etc.; and open questions (qualitative analysis) to assess their monthly sales, current supplying channels, latent demand for currently unavailable products, etc..

For the quantitative analysis, the raw data was summarized in Qualtrics® (a statistical software analysis program) where several tests were conducted including descriptive analysis to measure frequency, central tendency (mean/average value), dispersion, (minimum and maximum values), and variance (standard deviation).

For the qualitative analysis, qualitative responses were transcribed to be analyzed. After transcription, the data was sifted through to observe the invariants within each response. Categories were established based on the observed invariants.

3. Collaborations and Contributions

- College of Agriculture, Urban Sustainability and Environmental Sciences – CAUSES of the University of the District of Columbia: Was the primary grantee for this project.
- Dr. Dwane Jones, Director of the Center for Sustainable Development at CAUSES: The principal investigator of the study.
- Mr. Yao Afantchao, Extension Agent of the UDC Ethnic and Specialty Crops Program: Contributed in the investigation and conducted vital outreach to local distributors
- Oluwakemi "Kemi" Adeola (UDC Master's Degree Candidate in Nutrition and Dietetics Candidate), provided leadership, project management, and coordination of the study. Kemi also assisted with data collection and travel arrangements for the study.
- Marie Jo Faye (UDC student), provided food preparation services.
- Dr. Xiaochu Hu, Project Specialist for Applied Economic Evaluation at CAUSES: Provided statistical analysis for the consumers' Data.
- Cecilia Andrea Herrera, Graduate Assistant at CAUSES: Contribute to the consumers and distributors data collection, provided statistical analysis for the distributors' data, and compiled the report.
- Dr. Lillie Monroe from the Center for Nutrition, Diet and Health – CDNH of the University of the District of Columbia: Provided important feedback on the survey instruments and culinary staff.
- Maryland Department of Agriculture: Assisted with providing marketing services for the project by conducting outreach to farmers on the Maryland's Best Database, encouraging participation in the online producer survey.

- The Mayor's Office of African Affairs (DC): Provided vital information on African owned distributors and retailers, a generous willingness to share information on informal émigré networks, and a free tent space at the African Festival in downtown DC.
- University of Maryland Extension Service: Conducted vital outreach to local farmers and very important feedback on the market obstacles for new crops.
- United Burundian American Community Association (UBAC) and Ecocity Farms: Acted as important networking centers to reach small scale, urban, and immigrant farmers.
- Farmers Market Management Associates: Acted as consultant to the project, with particular emphasis on farmer/producer market research and analysis of the direct-to-consumer marketplace.
- MarketMaker: Was used to input information on the farmers and other producers in a network database.
- Robert Moffitt: Provided some (though not complete) support with regard to IT development services and consumer market research.

4. Results, Conclusions and Lessons Learned

4.1 Results of Consumers' Surveys

Out of nine sample crops, Avuvo, Sawa Sawa, Gboma, Jamma Jamma and Garden Eggs are all well received by our customers. African Americans definitely have a better knowledge in African ethnic crops and are more interested in knowing more purchasing and nutritional information about these crops, as well as more likely to cook and to grow these crops at home. Our attempts could not identify the target customers who are willing to pay a premium for these ethnic crops.

Customers of all ages, genders, races and locations enjoyed the taste of the ethnic crops, and are willing to pay a premium price for these produces. Women and customers living in high-income wards show more interest in eating these crops at a restaurant. This is a surprising finding, and may suggest that the potential market of African ethnic crops should be expanded to non-African American communities in the metropolitan area.

Consumers' Demographics:

From the 462 people who filled out the consumer survey on the different series of West-African food tasting and presentations about 64 percent were females, 64 percent African-Americans, and 64 percent were between the ages of 26 and 60 years old. Also, results show that 47% of the people who visit the farmers Markets are from Virginia or Maryland; and 16% of the Ward 7 of Washington DC (Review Figure 2 and Figure 3).

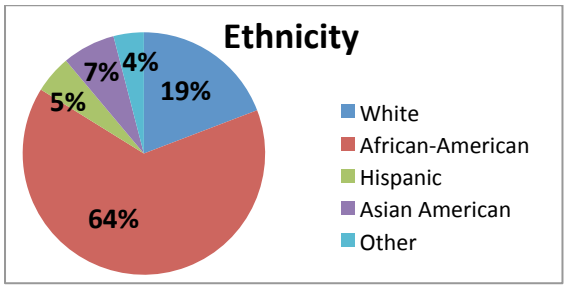

Figure 2: Demographics by Ethnicity

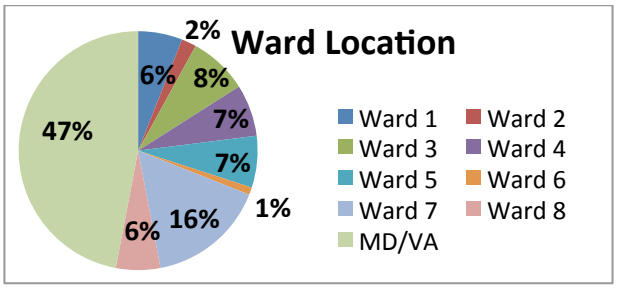

Figure 3: Demographics by Location

Consumers' appreciation of the taste

After tasting the crop, customers were asked to rate the taste of each crop on a 1-9 scale (Question 17-23). The results are shown in Table 3. Because each crop was giving to different numbers of audience, the number of respondents who rated each crop varied from 3 (for Waterleaf) to 208 (for Jamma Jamma).

In general, Avuvo and Sawa Sawa received the highest rating with relatively small standard deviation, meaning that customers enjoyed the tastes and their opinions do not vary much. Gboma, Jamma Jamma and Garden Eggs were also fairly well received, with average ratings more than 7.38 to 7.84 out of 9. Jute was not very well received, with the least average rating (5.74) and the largest standard deviation.

Table 3: Rating of Seven Ethnic Crops based on a 1-9 scale, ranked by mean

Ethnic Crop	mean	median	Max	min	Standard Deviation	N
Avuvo	8.01	9	9	1	1.73	69
Sawa Sawa	8.01	9	9	1	1.67	74
Waterleaf	8	8	9	7	1	3
Gboma	7.84	9	9	1	2.17	19
Jamma Jamma	7.74	9	9	1	1.95	208
Garden Eggs	7.38	8	9	1	2.22	151
Jute	5.74	5	9	1	3.04	38

Therefore, consumers' favorite crops were the Avuvo and Sawa Sawa, while the Gboma, Jamma Jamma, and Garden Eggs had a positive rating. Jute Leaf was the least favorite.

Consumers' knowledge about ethnic crops

Roughly, 59 percent of the respondents said they didn't know where to purchase ethnic produce or where a restaurant that serves West African Food is located. As an important factor, results show that being African American increased the odds of knowing where to purchase West African crops by 68 percent[2], and the odds of knowing a restaurant that sells West African crops by about 55 percent[3].

[2] Results based on single logistics regression. Statistically significant at 5% level.
[3] Results based on single logistics regression. Statistically significant at 5% level.

We asked customers if they know where to purchase West African Ethnic produce (Question 9) and if they know a restaurant where these food are served (Question 10), in order to gauge their knowledge on where to purchase these produce. Then we integrated the survey results of these two questions into one, called "knowledge about ethnic crops" to get a more accurate result. Multiple regression analysis results show that African American customers have a better knowledge about the purchase of ethnic crops than non-African Americans, controlling for customers' gender, age and wards[4]. Other demographic characteristics such as age, gender and ward do not bear statistical significance affecting knowledge about ethnic crops.

Consumers' interest about ethnic crops

In average, 87 percent of the surveyed population is interested in knowing where to purchase them, how to prepare them, and learning about their nutritional value. However, only a 46 percent would consider growing a garden with them.

Interest about ethnic crops are taken from survey questions "I would like to know where to purchase West African Ethnic Crops" (Question 7), "I would like to explore recipes and know how to prepare the West African Ethnic produce for my family and friends" (Question 8), "I would like to know more of the nutritional information about the West African produce" (Question 12), and "I would to know how to develop a garden to grow ethnic crops" (Question 16), all adjusted to a one to five scale (1 being the least interested and 5 being the most interested). Multiple regression analysis shows that being African American increases the interest score in West African ethnic produces by 0.35, controlling for age, gender and ward[5].

Consumers' attitude towards eating ethnic crops at restaurants

Results show that 45.8 percent of the respondents are interested in visiting restaurants, hosting special events, and ordering food from restaurants that feature West African Ethnic crops.

We asked customers to express their feeling about eating African ethnic vegetables and fruit at a restaurant by checking five statements about eating these produce at a restaurant (Question 11(1-5) in the survey). The survey results are coded on a zero to five scale, 0 being the least interested and 5 being the most interested.

A single variable is then created by integrating answers to Question 11 (1-5): each respondent is given a score of 0 to start with, adding 1 if he/she checked one of the first four statements (expressing positive attitude), minus 1 if he/she checked the fifth one (expressing negative attitude) Multiple regression analysis using this integrated attitude score shows that gender bears statistical significance affecting attitude towards eating ethnic crops at restaurant: being female increases the interests in eating African ethnic vegetables and fruits at a restaurant by 0.17, controlling for other demographic characteristics[6].

[4] Results based on multiple regression. Statistically significant at 5% level.
[5] Results based on multiple regression. Statistically significant at 1% level.
[6] Results based on multiple regression. Statistically significant at 5% level

Consumers' Price Premium

We asked about customers' willingness to pay a premium for African ethnic crops and whether at the 5 or 10 percent (Question 13). No one agreed that they would pay up to 10 percent premium, and about half said they would pay 5 percent premium. Logistic regression shows that being an African American does not increase the odds of being willing to pay the price premium, nor does gender, living in high-income wards affect this willingness.

4.2 Results of Distributors' Surveys

There is a clear gap between what is demanded and what is available in the West African Market. About 70 percent of the African Ethnic produce is imported frozen, dried, or canned from different African or Asian Countries, and the fresh availability of these products is limited to the seasonal local production or their importation from South American countries. Because fresh vegetables are a healthier option and "Africans don't believe in frozen food" (in the own words of a female distributor), the vast majority of the surveyed distributors in the DC Metropolitan area stated they would most definitely purchase their goods from local producers if they were available.

Regarding the crops' availability and demand, Hot Peppers, Jute Leaf, Waterleaf and Kitely are the most demanded produces from the distributors and therefore are also the ones they request more supplies from as when available they are sold fast. Similarly while Garden Egg is highly demanded by customers, distributors expressed a higher interest in Gboma. Distributors expressed their particular concern about the low availability of Waterleaf, as 71% of it is imported frozen, even when this particular vegetable is mostly eaten fresh.

4.2.1 Quantitative Analysis

Distributors' Demographics:

From the ten people who filled out the distributors' survey, all of them were residents of the DC metropolitan area, three were from Nigeria, three from Ghana, one from Sierra Leon, one from Cameroon, and two from the United States. Because they all have a grade of African American ethnicity, they all were able to quickly identify the West African Ethnic Crops of this study and they all were aware of the Ethnic Crops Program that the UDC CAUSES operates. All of these distributors are important part of the supply chain of African produce in the DC Washington Metropolitan area as they all distribute at least three of the nine focus ethnic crops and have a nationwide distribution extent. Moreover, two of them distribute their products internationally.

Producers' Preferred and available Methods of Packaging and Storage

We asked distributors to rate the consumer's preference in the packaging and storage of produce (Fresh, Frozen, Dried, or Canned) they perceived they have (Question 17; Figure 4) and asked them about the packaging and storage method in which they mostly distribute the 9 types Ethnic Crops of this survey (Question 8 to Question 16; Figure 5). Descriptive statistics shows that while 80 percent of the consumers look for fresh produce, the real availability of it is

of only 31 percent; moreover, while only 10 percent of the consumers look for frozen produce, there's a 57 percent availability of it; being 7 and 4 percent the current availability of dried and canned produces respectively. No distributor said customers look for canned vegetables.

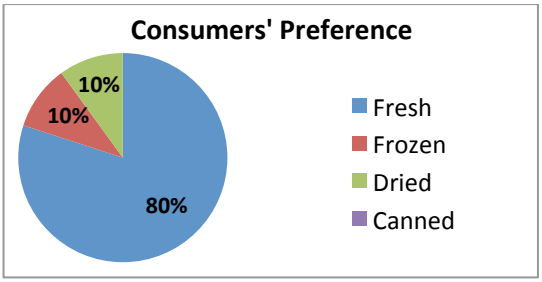

Figure 4: Preferred methods of packaging and storage

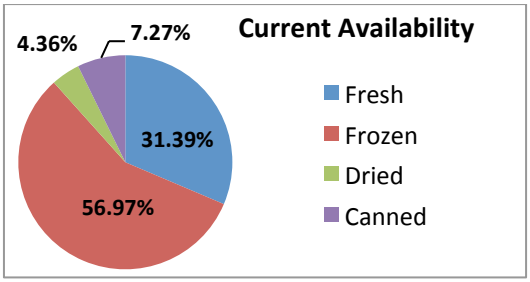

Figure 5: Available methods of packaging and storage

Producers' seasonal availability and supply

We also asked distributors about their ability in acquiring and selling their produces all year around (Question 19 and Question 20 in the survey) and asked them about their possible interest in purchasing local grown ethnic crops if they were available (Question 21 in the survey). The survey results are coded on a zero to five scale, 0 being the least interested and 5 being the most interested. Descriptive statistics shows that while all the distributors are able to sell their produce all year around, they only do it because they acquire them either from South America or Africa. Simultaneously, 90 percent of the respondents said they were definitely interested in acquiring fresh local grown produce if they were available in the area.

West African Ethnic Crops Demand vs. Availability

We asked distributors to rate the crop's demand on a 1-5 scale (Question 22) and to rate on a 1 -5 scale the crop's the availability, being 1 the one they have the least supply from (Question 23). Results show that the most demanded vegetables (Figure 6) are Hot Peppers, Jute Leaf, Kitely, Garden Eggs and Waterleaf. Similarly the respondents said that the vegetables they have the lowest availability from (Figure 7) are Hot Peppers, Jute Leaf, Kitely, Gboma, and Water Leaf.

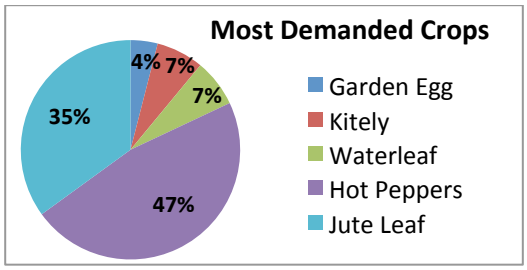

Figure 6: Ethnic crops with the highest demand

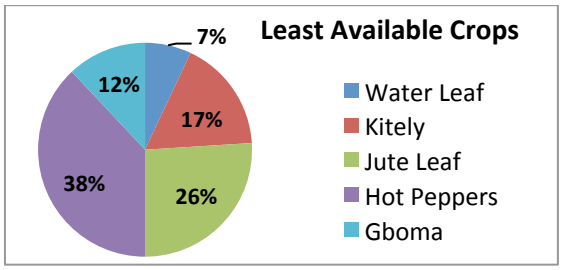

Figure 7: Ethnic crops with the lowest availability

4.2.2 Qualitative Analysis

Avuvo's Distribution, Source of supply, Availability and Monthly sale

4 of the 10 surveyed respondents are currently distributing Avuvo in the DC Metropolitan area, and in average they all together sell a total of 41200 pounds per month. 75% of the Avuvo comes either frozen (50%) or dry (25%) and is imported from Nigeria, Cameroon, and Ghana. The remaining 25% comes fresh from a DC local farm.

Garden Egg's Distribution, Source of supply, Availability and Monthly sale

7 of the 10 surveyed respondents distribute Garden Eggs in the DC Metropolitan area, and in average they all together sell a total of 43600 pounds per month. 50% of the Garden Eggs come either frozen (25%) or canned (25%) and are imported from Ghana; and the remaining 50% comes fresh from South America, Southern Maryland or Pennsylvania.

Gboma's Distribution, Source of supply, Availability and Monthly sale

4 of the 10 surveyed respondents are currently distributing Gboma in the DC Metropolitan area, and they all said that they import as much as they have available and sell it all. 75% of Gboma comes fresh from local producers, Southern Maryland, or Pennsylvania; and the remaining 25% is imported frozen Nigeria, Cameroon, Liberia, or Ghana.

Kitely's Distribution, Source of supply, Availability and Monthly sale

8 of the 10 surveyed respondents are currently distributing Kitely in the DC Metropolitan area, and in average they all together sell a total of 28420 pounds per month. 100% of the Kitely comes frozen and is imported from Nigeria, Cameroon, Liberia, Ghana, or Sierra Leon.

Sawa Sawa's Distribution, Source of supply, Availability and Monthly sale

10 of the 10 surveyed respondents distribute Sawa Sawa in the DC Metropolitan area, and in average they all together sell a total of 36570 pounds per month. 80% of the Sawa Sawa comes imported frozen from Sierra Leon, Gambia, Liberia, Cameroon, Senegal, and Togo; 10 % comes canned from Sierra Leon and Gambia; and the remaining 10% comes fresh from South America.

Hot Pepper's Distribution, Source of supply, Availability and Monthly sale

9 of the 10 surveyed respondents are currently distributing Hot Peppers in the DC Metropolitan area, and in average they all together sell a total of 27080 pounds per month. 78% of the Hot Pepper is imported fresh from South America; 11% comes either fresh or frozen from the United States; and the remaining 11% is imported dry from Ghana.

Jamma Jamma's Distribution, Source of supply, Availability and Monthly sale

None of the surveyed respondents distributes Jamma Jamma in the DC Metropolitan area,

Jute Leaf's Distribution, Source of supply, Availability and Monthly sale

9 of the 10 surveyed respondents are currently distributing Jute Leaf in the DC Metropolitan area, and in average they all together sell a total of 50100 pounds per month. 83% of the Jute Leaf is imported frozen from Philippines, Egypt, Ghana, Gambia, Sierra Leon; and the remaining 17% comes fresh from South America.

Water Leaf's Distribution, Source of supply, Availability and Monthly sale

7 of the 10 surveyed respondents are currently distributing Water Leaf in the DC Metropolitan area, and in average they all together sell a total of 3100 pounds per month. 71% of the Water Leaf is imported frozen from Cameroon, Sierra Leon, and Ghana; and the remaining 29% comes fresh from local producers

4.3 Conclusions and Lessons Learned

- Customers of all ages, genders, races and locations seem to enjoy the taste of the ethnic crops, and are willing to pay a premium price for them.

- While African Americans have a better knowledge of ethnic crops, on average, 87 percent of the surveyed population (of all races) is interested in knowing where to purchase them, as well as more likely to cook and to grow these crops at home.

- About 70 percent of the African Ethnic produce is imported frozen, dried, or canned from different African or Asian Countries, and the fresh availability of these products is limited to the seasonal local production or their importation from Hispanic countries.

- The vast majority of the surveyed distributors in the DC Metropolitan area stated they would most definitely purchase their goods from local producers if they were available.

- According to the appreciation of taste, Avuvo, Garden Egg, Gboma, Jamma Jamma, and Sawa Sawa are the most favored crops by the customers.

- Distributors rated the Hot Peppers, Garden Egg, Jute Leaf, Waterleaf, and Kitely as the most demanded crops in the DC metropolitan area market

- While distributors rated the Hot Peppers, Gboma, Jute Leaf and Kitely as the crops that have less availability, 90% of them expressed their concerned about the low availability of fresh Waterleaf, as it is imported frozen and don't last long.

As lessons learned, incorporating Kitely and Hot Peppers into the CAUSES tasting samples could have allowed us to analyze and compare the consumer's appreciation of taste with the distributors' demand. As a matter of fact, the consumer's appreciation of taste for the Kitely especially, was somehow essential for the assessment of ethnic crops' demand, as unlike Hot Peppers, Kitely is not easily found in regular super markets moreover, distributors rated it as highly demanded.

5. Discussion

The results of this study identified that Hot Peppers, Waterleaf, Garden Egg, Gboma, and Kitely are the ethnic crops with the highest potential to increase the market niche of local and regional farmers of the DC Metropolitan area and expand their operations (Review Figure 8). These West African Ethnic crops are highly demanded by customers and distributors, their availability is limited during cold seasons. Furthermore, a very small percentage of what is in the market is produced in the U.S., and their taste is widely appreciated by the consumers.

Figure 8: West African Ethnic Crops Potential:

1. Hot Peppers	• Distributors rated it as the most demanded produce (+) • Distributors rated it as one of the produce with less availability (+) • 9 of every 10 distributors sell them in the DC Metropolitan area (+) • In average, 27080 pounds are sold monthly and 11% of it is produced in the U.S. (+) • It is the only vegetable (between the nine ethnic crops) that is popular worldwide (+)
2. Waterleaf	• Is upon the most demanded crops by distributors (+) • Distributors rated it as the scarcest product in the African Market (+) • 7 of every 10 distributors sell them in the DC Metropolitan area (+) • In average, 3100 pounds are sold monthly and 29% of it are produced in the U.S. (+) • Consumers and producers demand it fresh because of its high deteriorative rate (+)
3. Garden Egg	• Distributors rated its demand as one of the highest in the DC metro area (+) • 7 of every 10 distributors sell them in the DC Metropolitan area (+) • In average, 43500 pounds are sold monthly and 25% of it is produced in the U.S. (+) • It received a 74% positive rating by the consumers (+)
4. Gboma	• Distributors rated it as one of the scarcest produce in the market (+) • 4 of every 10 distributors sell them in the DC Metropolitan area (-) • While 75% is produced in the U.S., sells are linked to the availability (+) • It received a 78.4% positive rating by the consumers (+)
5. Kitely	• Distributors rated it as the most demanded produce (+) • Distributors rated it as one of the produce with less availability (+) • 8 of every 10 distributors sell them in the DC Metropolitan area (+) • In average, 28420 pounds are sold monthly and none of it is produced in the U.S. (-)
6. Jute Leaf	• Distributors rated its demand as one of the highest in the DC metro area (+) • Distributors rated it as one of the produce with less availability (+) • 9 of every 10 distributors sell them in the DC Metropolitan area (+) • In average, 50100 pounds are sold monthly and none of it is produced in the U.S. (-) • It received the lowest appreciation rate by the consumers (-)

7. Sawa Sawa	• 10 of every 10 distributors sell them in the DC Metropolitan area, mostly frozen (+) • In average, 365700 pounds are sold monthly and none of it is produced in the U.S. (-) • It received a 80% positive rating by the consumers (+)
8. Avuvo	• 4 of every 10 distributors sell them in the DC Metropolitan area (-) • In average, 41020 pounds are sold monthly and 25% of it is produced in the U.S. (+) • It received a 80% positive rating by the consumers (+)
9. Jamma Jamma	• None distributors sell them in the DC Metropolitan area (-) • It received a 77.4% positive rating by the consumers (+)

6. Recommendations

There is a strong demand for the selected West African Ethnic Crops in the DC metro area. There is not enough supply. This study offers evidence that opportunities should be developed to increase access + emerging farmers in the specialty crop industry. A similar study should also be conducted on other similar ethnic and specialty crops. Finally, we should develop or integrate these programs into a comprehensive network of producers, distributors, and consumers.

Beneficiaries

- Local and Regional Producers
- Distributors located in the DC, Metropolitan area
- Center for Urban Agriculture and Gardening Education of the University of the District of Columbia

7. Appendices

Appendix 1: African Populations in the Metropolitan Areas of the United States

Fifteen Metropolitan Statistical Areas With the Largest Foreign-Born Populations From Africa: 2008–2012

(Numbers in thousands. Data based on sample. For information on confidentiality protection, sampling error, nonsampling error, and definitions, see *www.census.gov/acs/www/*)

Area[1]	Foreign-born population		African-born population		Percent of foreign-born population	
	Number	Margin of error (±)[2]	Number	Margin of error (±)[2]	Percent	Margin of error (±)[2]
United States	**39,784**	**105**	**1,582**	**14**	**4.0**	**Z**
New York-Northern New Jersey-Long Island, NY-NJ-PA	5,413	18	212	5	3.9	0.1
Washington-Arlington-Alexandria, DC-VA-MD-WV	1,205	7	161	3	13.3	0.2
Atlanta-Sandy Springs-Marietta, GA	714	6	68	3	9.5	0.4
Los Angeles-Long Beach-Santa Ana, CA	4,396	16	67	3	1.5	0.1
Minneapolis-St. Paul-Bloomington, MN-WI	314	4	64	2	20.3	0.6
Dallas-Ft. Worth-Arlington, TX	1,114	8	61	3	5.5	0.3
Boston-Cambridge-Quincy, MA-NH	756	7	60	3	7.9	0.3
Houston-Sugar Land-Baytown, TX	1,319	9	50	3	3.8	0.2
Philadelphia-Camden-Wilmington, PA-NJ-DE-MD	571	6	48	3	8.3	0.4
Chicago-Joliet-Naperville, IL-IN-WI	1,666	11	43	3	2.6	0.2
Seattle-Tacoma-Bellevue, WA	574	6	39	2	6.7	0.4
Baltimore-Towson, MD	248	4	31	2	12.5	0.8
Columbus, OH	127	3	29	2	22.9	1.3
San Francisco-Oakland-Fremont, CA	1,296	8	23	1	1.8	0.1
Providence-New Bedford-Fall River, RI-MA	201	3	22	1	11.1	0.6
Remainder of the United States	19,870	61	604	9	3.0	Z

Z Rounds to zero.

[1] United States refers to the total population living in metropolitan and nonmetropolitan areas. Metropolitan statistical areas are defined by the Office of Management and Budget as of December 2009. See <www.census.gov/population/metro/files/lists/2009/List1.txt>.

[2] Data are based on a sample and are subject to sampling variability. A margin of error is a measure of an estimate's variability. The larger the margin of error is in relation to the size of the estimate, the less reliable the estimate. When added to and subtracted from the estimate, the margin of error forms the 90 percent confidence interval.

Source: U.S. Census Bureau, 2008–2012 American Community Survey, 5-year estimates.

Appendix 2: Consumers' Survey (Part I)

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Ethnic Crops Evaluation Questionnaire

Consumer Evaluation Survey

Center for Urban Agriculture/Ethnic Crops Program

Section1: Demographics/Ethnicity (To be completed by focus group participant)

1. **Gender** ☐ Male ☐ Female
2. **Ethnicity/Race** ☐ White ☐ African-American ☐ Hispanic ☐ Asian American ☐ Other
3. **Age Group** ☐ 18 or younger ☐ 19-25 ☐ 26-45 ☐ 45-60 ☐ 60 and older
4. **Which Ward do you live in?** ☐ Ward 1 ☐ Ward 2 ☐ Ward 3 ☐ Ward 4 ☐ Ward 5 ☐ Ward 6 ☐ Ward 7 ☐ Ward 8 ☐ Zip Code (If not DC) 20743
5. I have a better understanding of West African Ethnic produce.
   A. Agree B. Disagree
6. I have sampled some of the West African Ethnic produce, and have enjoyed the taste of these foods.
   A. Strongly agree B. Agree C. Neutral D. Disagree E. Strongly disagree
7. I would like to know where to purchase the West African Ethnic produce.
   A. YES B. NO
8. I would like to explore recipes and know how to prepare the West African Ethnic produce for my family and friends.
   A. YES B. NO
9. I know where to purchase West African Ethnic produce.
   A. YES B. NO
10. Do you know a restaurant or eating establishment where African Ethnic Vegetables/fruit are sold?
    A. YES B. NO

Appendix 2 (Continuation): Consumers' Survey (Part II)

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11. How do you feel about eating African Ethnic Vegetables/fruit at a restaurant?

A. I would hold a special occasion in a restaurant that featured West African foods on the menu

B. I would patronize a restaurant that featured West African foods as the primary menu

C. I would be likely to order African Ethnic Vegetables/fruit from the menu of a non-West African restaurant

D. I would consider ordering it from the menu of a non-West African restaurant

E. I do not order West African vegetables on the menu of any restaurant

12. I would like to know of the nutritional information about the West African produce.

A. Strongly agree B. Agree C. Neutral D. Disagree E. Strongly disagree

13. Would you be willing to pay more money for West African Vegetables?

A. YES (up to 10%) B. YES (up to 5%) C. NO

14. To the best of your knowledge, how much money is your household spending on ethnic foods per week?

A. 0-$20 B. $20-$40 C. $40 or more

15. Which of these meals are prepared at home?

☑ Breakfast ☑ Lunch ☑ Dinner

16. I would like to know how to develop a garden to grow ethnic and specialty crops, and I intend to apply this knowledge.

A. YES B. MAYBE C. NO

Appendix 2 (Continuation): Consumers' Survey (Part III)

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Rate "1" being strongly dislike to 9 being strongly like

17. Do you like Jamma Jamma?

☐ Preference (1-9) 8

JAMMA JAMMA (aka HUCKLEBERRY)

18. Do you like Avuvo

☐ Preference (1-9)

Appendix 3: Distributors' Survey (Part I)

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Ethnic Crops Evaluation Questionnaire

Distributors Evaluation Survey

Section1: Demographics/Ethnicity

1. Preferred Contact method _____
2. Immigrant/Naturalized citizen ☐ Yes ☐ No
3. If "yes", please state country of origin _____
4. Are you a citizen/resident of the DC Metropolitan Area? ☐ Yes ☐ No ☐ Not Applicable

Section 2: Knowledge of Ethnic Crops Program at CAUSES

5. Are you aware of African Ethnic Crops? ☐ Yes ☐ No
6. Can you easily identify these crops? ☐ Yes ☐ No
7. Are you aware of the UDC College of Agriculture/Ethnic Crops Program? ☐ Yes ☐ No

Section 3: Ethnic Crops stock at the Distributors market

Please indicate which of the following crops you distribute, what is your source of supply, how much is sold monthly, what form do you get it in, and what is their current demand:

Ethnic Crop	Do you distribute it?	What is your source of supply?	How much is the monthly sale?	In what form do you get it?	What is the demand of this product?
8. Avuvo/Soko					
9. Garden Egg					
10. Gboma					
11. Kitely					
12. Sawa Sawa/Sorrel					
13. Mixed hot Peppers					
14. Jamma Jamma Huckleberry					
15. Jute Leaf/Moulokhia					
16. Waterleaf					

Appendix 3 (Continution): Distributors' Survey (Part II)

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Section 4: Ethnic Crops availability and demand at the market

17. In what form do consumers want to buy your products? Please rank them 1 to 4, 1 being the form that is most wanted for the consumers.

☐ Fresh ☐ Frozen ☐ Canned ☐ Dried

18. Do consumers look for these vegetables in winter time? ☐ Yes ☐ No

19. Do you sell these produces all year around? ☐ Yes ☐ No

20. If you are able to distribute them in winter time, where do you get your supplies from?

_____

21. If African Ethnic Crops were available all year around, would you buy them for distribution?

☐ Definitely ☐ Most likely ☐ Probably ☐ Probably not ☐ Definitely now

22. From all the crops in your opinion, which one has the highest demand? Please rank them 1 to 5, being 1 the most demanded.

☐ Avuvo ☐ Garden Egg ☐ Gboma ☐ Kitely ☐ Sawa Sawa
☐ Hot Peppers ☐ Jamma Jamma ☐ Jute Leaf ☐ Water Leaf

23. From all the crops, which is the one you don't have enough supply from? Please rank them 1 to 5, being 1 the one you have the least supply.

☐ Avuvo ☐ Garden Egg ☐ Gboma ☐ Kitely ☐ Sawa Sawa
☐ Hot Peppers ☐ Jamma Jamma ☐ Jute Leaf ☐ Water Leaf

24. What is the extent of distribution from your market?

☐ DC Metro ☐ Region wide ☐ Nation wide ☐ International

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8. Bibliography

Center for Urban Agriculture and Gardening Education. Commercial Value of most Ethnic and Specialty Crops. (2015) Pg. 5

Gambino Christine, Trevelyan Edward, and Fitzwater John. The Foreign-Born Population From Africa: 2008–2012. U.S Census Bureau, American Community Survey Briefs (2014): 4-5. Web 20 Feb. 2015.

NeighborhoodInfo DC. Neighborhood Profiles. DC 2012 Ward Profile: Population (2015) Web 7 Jun. 2015. Available at: http://www.neighborhoodinfodc.org/wards/nbr_prof_wrd8.html

Rosenwald, Michael (2010). Tyler Cowen's appetite for ethnic food. The Washington Post, pages 1-3. http://www.washingtonpost.com/wp-dyn/content/article/2010/05/12/AR2010051202637.html

U.S. Census Bureau, 2009-2013 5-Year American Community Survey. American Fact Finder. Race. Universe: Total Population. 2009-2013 American Community Survey 5-year Estimates.

USDA. Agricultural Marketing Service. Farmers Market directory Search (2015). Web 20 Feb. 2015.

AVUVO©

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(Sp.Celosia argentea)

Celosia argentea (aka Avuvo, Lagos spinach, quail grass, Soko, feather cockscomb) is widespread across northern South America, tropical Africa, the West Indies, South East and Southeast Asia where it is grown as a native or naturalized wildflower, and is cultivated as a nutritious leafy green vegetable.

GARDEN EGG©

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(Sp.Solanum aethiopicum)

Garden Egg is also known as African eggplant, mock tomato, ngogwe or nyanya chungu. The leaves are eaten as a leaf vegetable and are more nutritious than the fruit. The fruit of the plant is eaten both raw and cooked. Garden egg is one of the most important vegetable crops grown in West Africa, especially in Ghana.

GBOMA©

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(Sp.Solanum Macrocarpon)

Gboma is also known as African eggplant, aubergine, and Scarlet eggplant. Gboma is grown in many West African countries and probably occurs in all coastal countries. It is also widespread in Central and East Africa. It can be found in Southern Africa (Malawi, Zambia, Zimbabwe and Mozambique). Several fruit cultivars can also be found in South America (Suriname) and the Caribbean.

KITELY ©

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(Sp.Solanum gilo)

It looks like a strange cross between a tiny eggplant and a green tomato. Gilo is originally from Africa and was brought to Brazil with the slave trade. It is still grown in West Africa where in some countries it is known as “garden egg.”

SAWA SAWA©

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(Sp.Hibiscus sabdariffa)

Sawa Sawa means "sour leaf" in Sierra Leone, West Africa. The hibiscus sabdariffa is a shrublike plant that has many branches. It is a broad annual that has deep green leaves that are about six inches in width. The leaves consist of five slender lobes that are edible as green leafy vegetable in salads or cooked as greens alone or in combination with other vegetables, meat or fish. The flowers are traditionally used for tea in Asia and Africa.

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MIXED HOT PEPPERS©

(Sp.Capsicum chinense)

Scotch Bonnet is a type of Habanero, considered one of the hottest pepper in the world. Scotch Bonnet peppers are among the most intensely hot of all peppers, with a Scoville heat rating that starts out around 150,000 and can climb as high as 300,000 in carefully cultivated specimens. Scotch Bonnet peppers are grown in Jamaica, the Caribbean, and Guyana, but used primarily in Latin American cuisine.

JAMMA JAMMA/ HUCKLEBERRY©

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(Sp.Solanum scabrum)

Huckleberry occurs as a cultivated vegetable in Africa from Liberia to Ethiopia, and south to Mozambique and South Africa. It is very common in lowland as well as highland regions in West and East Africa. Jamma Jamma is a type of leafy green vegetable that is prepared in much the same way as mustard and collard greens. Other local names for Huckleberry are: Ogunmo (Nigeria), Mnavu (Democratic Republic of Congo), Ewa (Southern Nigeria), Nsugga (Uganda), and Jammajamma (Cameroon).

JUTE LEAF©

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(Sp.Corchorus olitorius)

Jute leaf is grown in tropical Africa as a wild or cultivated vegetable. It is a leading leaf vegetablein Cote d'Ivoire, Benin, Togo, Nigeria, Cameroon, Sudan, Kenya, Uganda and Zimbabwe. Jute Leaf is part of the mallow family of plants. It is also cultivated as a leafy vegetable in the Caribbean, Brazil, India, Bangladesh, China, Japan, Egypt and the Middle East.

WATERLEAF©

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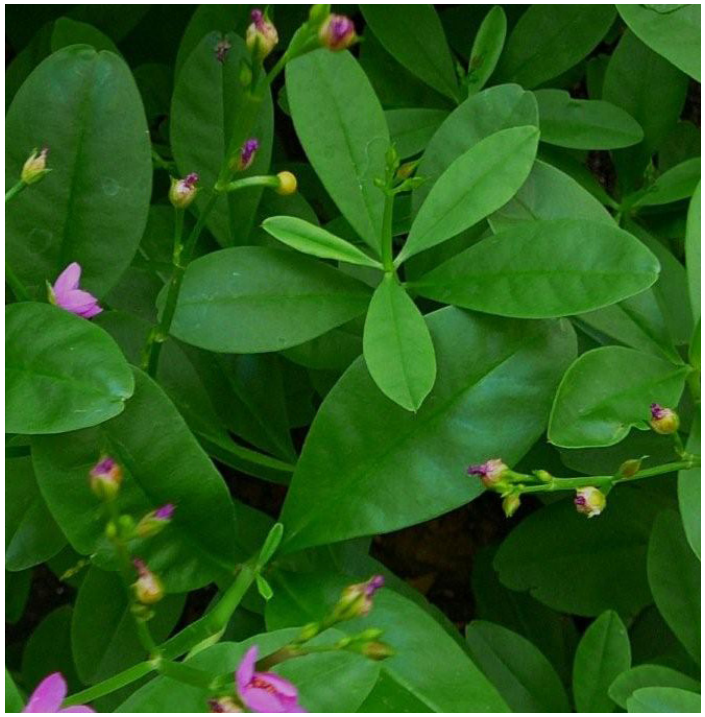
(Sp.Talnum triangular)



Waterleaf is a leafy vegetable grown in West Africa, the West Indies, South and Southeast Asia, and the warm regions of North America and South America. Common names include caruru, Surinam purslane, Philippine spinach, Ceylon spinach, Florida spinach, potherb, fameflower, Lagos bologi, and sweetheart.