How Proud is Kentucky Food? A Survey of Environmental Conditions of Local Food

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Abstract: This project explores producer farming practices of local food, defined within this research project as the attitudes and practices that members associate with Kentucky Proud™ (KyP). KyP is a state-run vehicle that promotes local food through marketing campaigns. This project investigates the nature of farming responsibility and practices of members selling local foods to answer: "How is local food practiced according to different KyP members?" Quantitative descriptors of attitudes and practices are isolated through a member survey for comparison across members.

This paper evaluates how members respond to the KyP program and documents member attitude and practice patterns. The purpose of this program evaluation is to set a baseline condition for KyP that can be used by policymakers to make decisions on the future of KyP. The overarching research focuses on the political means that address the social, economic, and environmental implications of KyP as defined and practiced by program producers. Within this project, a KyP member survey is used to illustrate the impact of the program on environmental conditions.

Key Words: Kentucky Proud (KyP); local food; program evaluation; meanings and practices; regulators and producers

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INTRODUCTION

The sociological understanding of local food systems has made great strides over the past decade (see DuPuis & Goodman, 2005; Friedmann & McNair, 2008; Goodman, 2003; Guthman, 2007; Hinrichs, 2003). Research tends to focus on the extent that local food practices improve social, economic, and environmental conditions (Allen, Van Dusen, Lundy, & Gliessman, 1991; Hendrickson & Heffernan, 2002; Lyson & Barham, 1998). Theoretical, conceptual, and empirical works regarding local food draw attention to the particular social, economic, environmental, and political characteristics of such systems and contrast local food systems with 'conventional' food systems. The wide range of definitions, forms, motivations, and practices involved in local food systems is self-evident, with cases ranging from farmers' markets to consumer supported agriculture (CSA) to, more recently, big retail grocery stores. Yet, within this structural and organizational diversity, theoretical similarities abound as cases are commonly portrayed as a consumer attempt formulated to reconfigure conventional agriculture. This research project extends understanding of local foods to the meanings, motivations, and practices for local food as attributed by regulators and producers. Specifically, this project examines local foods through the lens of producers who participate in the Kentucky Proud™ program (KyP), a state branding agricultural campaign operated by the Kentucky Department of Agriculture.

The history of the KyP program can be tracked back to the year 2000, when the state of Kentucky received an historical investment opportunity from the tobacco industry (Conway, 2011). The tobacco industry settled with and paid 46 tobacco states under the terms of the Master Settlement Agreement. With no precedence stipulated from the agreement, Kentucky's state legislature delegated how the funds should be disbursed. In that same year, the state's General Assembly instituted the Governor's Office of Agricultural Policy and the Kentucky Agriculture Development Board to implement a statewide agriculture project, whereby 50% of the settlement funds were directly allocated for this initiative.

As an outcrop from this funding initiative, the KyP program is designed through the combined *political efforts* of the aforementioned agencies to improve the *economic conditions* of tobacco farmers and the communities that have been impacted by the tobacco transition by maintaining or achieving direct farm impact (Caporelli, 2011). The vision of the KyP program is to market Kentucky agriculture to prompt more consumers to purchase Kentucky agricultural products in order to provide a direct farm impact for these farmers and their communities. The program plan supports members to employ marketing *practices*, such as using the KyP label to differentiate their product, to increase their visibility in the market. Beyond member marketing services, the KyP program uses traditional marketing strategies targeted at consumers to increase awareness about Kentucky agricultural products. The KyP objectives explicitly endorse improving economic conditions and implicitly support social conditions of farmers and their communities, but the program appears to omit targets to improve environmental conditions. How does this omission play out in the farming responsibility and practices of KyP producers?

Referring to the original long-term plan, *Cultivating Rural Prosperity*, the development board's vision reveals a plan that targets economic growth and diversification in Kentucky agriculture by

addressing social, economic, and environmental conditions. As a non-model project, the KyP program received agricultural development funds and can be linked to the overarching umbrella set forth by the first priority outlined in the Commonwealth's long-term agricultural plan: Marketing and Market Development. In order of priority:

> The plan focuses on six main areas: the implementation of a statewide market development effort [*economic*], improving access to capital for farmers and value-added processors [*economic*], providing financial incentives for sound environmental practices [*environmental*], improving educational opportunities for farm families [*social*], supporting local leadership [*political*], and expanding Kentucky's research and development capacity [*political*](Hack, 2002, p.16).

> "The Agricultural Development Board has worked extensively with producers and commodity groups toward the *development of the marketing infrastructure for Kentucky agriculture*…Through cross *promotion vehicles such as advertising, marketing and public relations*, the goal is *to educate Kentuckians* about the strong contributions…growers bring to the state and emphasize the continuing need for a strong agricultural economy" (GOAP, 2003).

The argument for this research asserts that the development board designed a political mechanism to support programs that improve social, economic, and environmental conditions for tobacco-impacted communities across Kentucky. Therefore, the KyP program should reflect outcomes that support the overarching objectives. According to state statutes, the KyP program is designed to promote member agricultural products that have been grown, raised, or processed in the state (see KRS 260.016, 260.017, 246.010). According to the definition, an agricultural product ranges from food crops, to energy or pharmaceutical crops, to livestock, to milk products, such as goat's milk soap, to timber. The far-reaching definition is designed to be inclusive, so members include farmers, retailers, schools, and restaurants.

In considering the context for the agricultural landscape in the state, many tobacco farmers (past and present) in Kentucky use extensive chemical fertilizer application to raise a crop of tobacco in order to manage soil fertility (Ferrell, 2011). Today, the major elements of fertilizer are nitrogen, potassium, and phosphorus. In addition, many tobacco farmers use crop rotation as the best practice to replenish soil nutrients, and seed saving and composting are cited practices of the tobacco growing repertoire (van Willigen & Eastwood, 1998). Many farmers rely on heavy fertilization to produce higher yields, but recent research indicates that long-term exposure to pesticides has been correlated to not only environmental degradation but also to higher cancer rates and adverse health effects on the workers who apply the pesticides, residents who live near/downstream/downwind from the pesticide application, and consumers who eat food with pesticides (Green Brody & Rudel, 2008; McMichael, 2009). How do tobacco practices transition into KyP?

RESEARCH DESIGN

The focus of this paper examines the extent of responsibility and activity in sustainable practices of farmers who are members of the KyP program. The goal is to ascertain whether, all else being equal, farmers who have a past affiliation with tobacco significantly differ from farmers with no tobacco affiliation on measures of sustainability. The analysis includes additional socio-economic control variables for other common sources that could potentially influence the level of responsibility and activity in sustainable farming practices.

Findings for this paper draw upon measures of alternative or sustainable agriculture as defined by the widely used Beus and Dunlap model and scholarly conceptual framings that compare alternative to conventional agriculture (see Beus & Dunlap, 1990; Kloppenburg, Lezberg, De Master, Stevenson & Henrickson , 2000; Morgan, Marsden, & Murdoch, 2006). One of the key distinctions in sustainable agriculture suggests that these farmers demonstrate an independent nature and do not rely on externalities, such as chemicals, genetically modified seed, or livestock supplements. Another key element to sustainable agriculture emphasizes farmers who work in harmony with nature, so these farmers are more apt to follow seed saving, composting, biodynamic, or permaculture type practices that maintain a natural ecosystem based on healthy soil.

Table 1. Survey Questions Used to Analyze Types of Member Farming Practices (Kentucky Proud Member Survey 2011, N = 383)

Q1. Thinking about your role as a farmer, how much do you agree with the statement listed below? (Select the one best response. 0 = Disagree, 1 = Agree).

I have a responsibility to produce and/or sell fresh, nutritious foods.

Q2. Do you use any of the items listed below for your operation? (Select one in each row. 0 = No, 1 = Yes).

Herbicides
Pesticides
Soil amendments
Livestock feed purchased off the farm
Livestock supplements
Antibiotics for livestock
Genetically modified seed

Q3. Do you practice any of the growing methods listed below? (Select one in each row. 0 = No, 1 = Yes).

Seed saving
Certified organic
Organic, not certified
Conventional
Biodynamic
Permaculture
Holistic management
Cover crops
Composting
Spray
Tillage
Irrigation
No-till
Rotational intensive grazing
Grass-feed livestock

Sample

For this paper, select findings draw on a random probability sample survey of KyP members conducted in the fall of 2011. A self-administered mail survey and/or Qualtrics online survey collected data from 597 KyP members, or 23% total response rate. The sample frame was split into three tracks: Track 1 includes members with emails, Track 2 includes members with mail addresses only, and Track 3 includes all remaining valid email addresses. The sample size for Track 1 and Track 2 was based on proportion to size of those with email addresses to those with no email addresses. The sample randomly selected members from the sampling frame based on 70% proportioned for Track 1 to 30% proportioned for Track 2. A third track was added after two weeks of the opening of the survey in order to broaden captured responses since emails do not add additional cost to send through the Qualtrics software.

The questionnaire consisted of 54 questions and included both close-ended and open-ended questions with demographic questions at the end of the survey. The survey was designed to learn more about meanings, practices, and motivations of KyP members. Table 1 provides a summary of the specific questions that were used in the following analysis.

Table 2: Descriptive Sample Characteristics (Kentucky Proud Member Survey 2011, N = 363)

	Percent	Mean	SD	Range
White *	96%	-	-	-
Female	43%	-	-	-
Age	-	61.92	12.64	(17 - 97)
Education (# of years)	-	14.99	2.48	(8 - 20)
Children (yes)	82%	-	-	-
County (Rural) **	31%	-	-	-
Tobacco ***	49%	-	-	-

* Omitted is non-white; ** Omitted is Metro plus Micro Statistical Analysis Areas
*** Omitted is Farmer with No Tobacco Affiliation; Percent is based on Member Type (Farmer)

Measures

Dependent Variables

In Model 1, the *responsibility for 'natural' product* variable measures if a farmer agrees (1) or disagrees (0) with feeling a "responsibility to the community to provide foods free from pesticides, chemicals, and additives" as asked in the questionnaire. The variable was recoded from a four-point ordinal scale to binary to make interpretations easier since the ordinal results were in line with the binary results.

For Model 2, the conventional farm input variable measures the number of input categories used in a farmer's operation. A respondent's total can range from 0 to 7. The higher the number means that the farmer uses more conventional inputs, therefore, the farmer is less sustainable.

In Model 3, the *sustainable farm practices* variable measures the number of sustainable practice categories used in a farmer's operation. A respondent's total can range from 0 to 11. The higher the number means that the farmer uses more sustainable growing methods, therefore, the farmer is more sustainable.

For Model 4, the *conventional farm practices* variable measures the conventional practice categories used in a farmer's operation. A respondent's total can range from 0 to 4. The higher the number means the farmer uses more conventional growing methods, therefore, the farmer is less sustainable.

Explanatory Variables

The models include controls for key socio-demographic factors. The independent variable *white* measures race as either white (1) or non-white (0). The independent variable *female* measures gender, either female (1) or male (0). The independent variable *education* measures the estimated number of years of education for respondents. As an independent variable, *age* measures the respondent's age as of the fall 2011. The independent variable *children* measures offspring as a binary variable, either respondent has children (1) or does not have children (0). The independent variable *rural* measures location, either the respondent farms in a rural county or farms in a micro or metro county. The variable was recoded to binary based on U.S. Census Data for 2010 (U.S. Census, 2010). Counties designated as a "metro-statistical analysis area" or "micro-statistical analysis area" is considered non-rural (0), and counties with a designation of "none" are considered rural (1).

RESULTS

The goal for analysis is to find if patterns exist in farmer responsibility and practices. Specifically, analysis focuses on farmers who have a history with tobacco (past and present) relative to those farmers with no tobacco affiliation. The analysis deciphers if differences exist in the extent of responsibility a farmer feels towards the community to provide foods free from pesticides, chemicals, and additives, or 'natural' foods, and the extent of sustainability practices a farmers uses in their operation. The analysis determines if socio-economic factors, such as race, gender, education, age, and parent status, influence responsibility and farming practice outcomes. The first model analyzes the feeling of responsibility to provide natural foods outcome (disagree or agree). The last three models use separate sustainability measure outcomes as outlined in Tables 3 (farm input variable) and 4 (sustainable and conventional variables).

Descriptive Statistics

The models for this paper extract estimates from the member type farmer, or 428 of the total respondents[2]. After dropping missing data through listwise deletion, the responses used for testing the models are 363 farmers. Table 2 reports descriptive statistics, and Tables 3 and 4 report the percent of responses for the questions used to measure sustainability.

As indicated by the descriptive statistics in Table 2, the findings show that 96% of the KyP farmers are white, slightly higher

[2] Based on the responses from the original sample (N = 597), 72% of the KyP members are classified as farmers while 28% are categorized as non-farmer business partners.

Table 3: Survey Responses to Question on Farm Inputs Used in Operation (N = 363)

	Percent (Yes)
Livestock feed purchased off the farm	**59%**
Pesticides	**55%**
Livestock supplements	**54%**
Soil amendments	**53%**
Herbicides	48%
Antibiotics for livestock	45%
GMO seed	21%

than the state average. Almost half, or 43%, of the respondents are female. The average age of KyP farmers is 61.92 (SD = 12.64), which is slightly older than the U.S. average age for farmers. Of particular interest, KyP producers are highly educated, with an average number of years of education at 14.99 (SD = 2.48). The high level of education perhaps reflects the transition to an entrepreneurial farming spirit (Clark 2009). The majority of the KyP farmers, or 69%, reside in metro or micro counties with only 31% farming in rural counties. Lastly, almost half, or 49% of the respondents, are categorized as a tobacco farmer (presently or in the past)[3].

Table 3 illustrates that the majority of KyP farmers use four out of seven conventional inputs in their operation. Of note, "pesticides" can be used by conventional and sustainable farmers alike since the option does not quantify the type of pesticides used.

Table 4 shows the spectrum of conventional to alternative growing methods used in an operation. Alternative methods account for 11 possible choices, while conventional methods account for four potential options, including "conventional." The results in this table reflect a continuum as opposed to a dichotomy between alternative and conventional farming practices because the majority of farmers practice three alternative techniques and one conventional method (of note, close to half consider themselves to use "conventional" methods). In addition, 31% of KyP farmers classify their operation as "organic, not certified."

Table 4: Survey Responses to Question on Growing Methods Used in Operation (N = 363)

	Percent (Yes)
Alternative	
Cover crops	**57%**
Grass-feed livestock	**52%**
Composting	**51%**
Rotational intensive grazing	41%
Seed saving	39%
No-Till	37%
Organic, not certified	31%
Holistic managment	16%
Biodynamic	9%
Permaculture	7%
Certified organic	4%
Conventional	
Tillage	**55%**
Conventional	49%
Spray	48%
Irrigation	37%

[3] Out of the tobacco farmers, most do not currently grow tobacco, or 95%, and only 5% of the tobacco farmers currently grow tobacco.

This shows that perhaps a barrier to applying for certification exists for these farmers. For example, cost, confusing paperwork, time for soil transition, infrequent use of prohibited pesticides, and discord with government control are reasons cited by some of the farmers in interviews.

Table 5: Logistic Regression Predicting Farmer Responsibility to Provide Chemical-Free Foods Based on Social-Economic Characteristics
(Kentucky Proud Member Survey 2011, N = 363)

	Model 1: Responsibility	
	OR	**SE**
Tobacco (Past)	0.37***	(0.01)
Rural	1.12	(0.31)
White	0.76	(0.52)
Female	1.61	(0.43)
Education (years)	0.97	(0.05)
Age	0.97**	(0.01)
Children (yes)	1.07	(0.37)
Pseudo R2	0.07	
BIC'	11.60	

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Logistic Results

The first model in Table 5 uses logistic regression to test the relationship between a farmer's history with tobacco and responsibility to provide natural foods controlling for location, race, gender, education, age, and having children. Findings show that the odds of feeling a responsibility to the community to provide foods free from pesticides, chemicals, and additives decrease, on average, by 63% for farmers with a tobacco history relative to farmers with no tobacco affiliation, holding covariates constant ($p < 0.001$). Age has only a slight negative relationship with responsibility, with the odds of responsibility decreasing by 3% for each year increase in age ($p < 0.01$). Although not significant at the 0.05 level in this model, the odds of feeling a responsibility to the community to provide pesticide-chemical-additive-free foods are higher for females relative to males.

As shown in Table 6, Model 2 uses negative binomial regression to test a farmer's past tobacco affiliation and the number of conventional inputs used in an operation. Results indicate that, holding variables constant, farmers who have a history with tobacco are expected to use 59% more types of farm inputs in their operation compared to farmers with no tobacco history ($p < 0.001$). Conversely, farmers who feel a responsibility to the community to provide foods free from pesticides, chemicals, and additives are predicted to use 25% less farm input types compared to farmers who do not feel this type of responsibility, all else equal ($p < 0.001$). Also in a negative direction, females are expected to use 12% less farm input categories in their operation compared to males, holding variables constant ($p < 0.05$).

Table 6: Negative Binomial Regression Models Predicting Count of Farming Practices (Kentucky Proud Member Survey 2011, N = 363)

	Model 2: Farm Inputs		Model 3: Sustainable Practices		Model 4: Conventional Practices	
	IRR	**SE**	**IRR**	**SE**	**IRR**	**SE**
Tobacco (Past)	1.59***	(0.10)	1.24**	(0.08)	1.40***	(0.11)
Responsibility (Chemical-Free)	0.75***	(0.05)	1.36***	(0.11)	0.77**	(0.07)
Rural	0.97	(0.06)	0.91	(0.06)	0.91	(0.08)
White	0.99	(0.15)	0.83	(0.14)	0.82	(0.16)
Female	0.88*	(0.05)	1.09	(0.07)	0.91	(0.07)
Education (years)	1.00	(0.01)	1.05***	(0.01)	1.01	(0.02)
Age	1.00	(0.00)	1.00	(0.00)	0.99*	(0.00)
Children (yes)	1.17	(0.10)	0.78**	(0.06)	0.96	(0.10)
Pseudo R2	0.07		0.03		0.03	
BIC'	-61.32		-0.43		5.53	

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Model 3 in Table 6 presents ratios of the negative binomial regression analysis that examines the effects of responsibility to provide a natural product, tobacco history, and various socio-economic factors on the number of sustainable growing methods used in an operation. Compared to no tobacco affiliation, farmers who have a past with tobacco are expected to use 24% more types of sustainable growing practices, holding other variables constant ($p < 0.01$). As no surprise, farmers who assume a responsibility to the community to provide pesticide/chemical/additive-free foods are expected to incorporate 36% more sustainable growing methods into their operation compared to those who do not take this type of responsibility, all else equal ($p < 0.001$). For each yearly increase in education, the expected number of sustainable growing practices increases by 5%, holding covariates constant ($p < 0.001$). On the other hand, farmers with children are more likely to use fewer types of sustainable growing practices compared to farmers with no children, all else constant ($p < 0.01$).

As indicated in Table 6, Model 4 uses negative binomial regression to test the same independent variables as in Model 3 on the number of conventional growing methods used in an operation. Once again, results for farmers with a past tobacco affiliation are in a positive direction for measure of conventional practices and are expected to use 40% more types of conventional methods compared to their counterparts, all else equal ($p < 0.001$). Farmers who feel a responsibility to the community to provide pesticide/chemical/additive-free food are expected to use 23% fewer types of conventional practices compared to farmers who feel no responsibility to do so, holding covariates constant ($p < 0.01$). For each additional year in age, the expected number of types of conventional practices decreases by only 1%, all else equal ($p < 0.05$).

More women are entering sustainable agriculture, according to the U.S. Agricultural Census Bureau (2007; see Trauger, 2004), and the findings for this project indicate a strong co-efficient, although not significant at the 0.05 level, for KyP female farmers to feel more responsible than men to produce 'natural' foods.

Heightened concern about the impacts of pesticides on health, specifically breast cancer, is an underlying mechanism that can explain this gendered difference. Also, studies continue to show that women take on the brunt of household chores, including preparing meals, so females have control on what foods family members eat (Hook, 2010).

As the models unravel the story for KyP farmers with children, further research needs to be done on the impact of having children on farming practices because the findings from this project, although significant in only one of the models, show contradictory relationships of what would be expected in responsibility and farming practices. Perhaps farmers who are going into sustainable farming are not having children or having children at a later age because the transition into sustainable farming is happening among those who are switching careers and the cost to do so is high.

The conflicting results for farmers with a tobacco past in Models 3 and 4 suggests two points for consideration. First, farmers with a tobacco history are expected to have a higher number in both sustainable and conventional growing methods compared to farmers with no tobacco affiliation. Some of tobacco farming's best practices can be categorized as sustainable, such as seed-saving, cover crops, and crop rotation, while the key tobacco practice, chemical fertilizer, falls under the conventional category, which is transparent in Model 2. This is a hopeful benchmark finding because the transition for previous tobacco farmers to more sustainable farming practices makes for an easier endeavor. Second, the contradictory results support the variance in types of practices as outlined in Table 4. Again, there are not two camps of farming practices, conventional versus sustainable, but instead a continuum exists, and the in-between needs to be opened for discussion. Further research is needed to better understand the farmers who use a mix of conventional with sustainable farming practices to distinguish the motivation and learning patterns.

DISCUSSION

This paper examines the relationship between sustainability and a farmer's history with tobacco by constructing responsibility and practice measures of sustainability – types of farming inputs and growing methods used in an operation. First, the measure of sustainability captures an aspect of alternative agriculture that is discussed in the qualitative literature but has been rarely quantified. Second, the measurement of sustainability offers an alternative to on-the-ground testing that can be costly and time consuming. The level of responsibility and the number of sustainable farming practices provides a self-report measurement for how attitudes and practices change over time.

Since tobacco settlement funds are disbursed to programs across Kentucky to improve tobacco-impacted communities, then tracking the practices of KyP members, specifically farmers, helps confirm the reach of the funds. The stated objectives of the KyP program are directed at improving the economic conditions of tobacco farmers and communities. Yet, the original vision to cultivate prosperity calls for agricultural programs that address not only economic factors but also improve social and environmental conditions in the Commonwealth.

Findings from a previous evaluation of the impact of the tobacco settlement funds indicate that the KyP program has an overall positive impact on the economic conditions of KyP members (Infanger, 2008). However, the KyP program falls short in targeting environmental conditions in KyP member communities. Since the program objective does not explicitly target social and environmental conditions, then this finding

comes as no surprise. However, this reflects how the original priorities have been dis-embedded from a program that receives funds.

In reflecting on the focus of this paper, former tobacco farmers, the results show that the history of tobacco farming practices still play out today amongst KyP farmers despite the fact that tobacco settlement funds have been in effect since 2002. The good news is that tobacco farmers have a propensity to engage in seed saving, cover crops, and crop rotation, which are practices that are advocated by alternative and sustainable agriculture proponents. On the other hand, the findings show that farmers with a tobacco history are partial to depending on conventional farm inputs, such as chemical fertilizers, which are practices that have been shown to have negative consequences on the health of the soil, farm workers, consumers, and community members downstream. The results illustrate the relevance of policy in overlooking or addressing issues that impact social, economic, and environmental conditions. In this case, the KyP program neglects the history of tobacco farming practices and assumes that the transition from tobacco to other agricultural products, such as food products, is a matter of market development and does not entail a shift in production practices.

Overall, the models show a negative relationship between farmers with a tobacco history and their responsibility to provide natural foods and their engagement in sustainable farming practices. However, the contradiction in growing methods used in an operation unravels another layer to the complex relationship between Kentucky's tobacco history and the present landscape promoting diversification and sustainability as set forth by the *Cultivating Rural Prosperity* agricultural blueprint. How can KyP use political means to encapsulate the social, economic, and environmental conditions set forth in this blueprint? By implementing the priorities piecemeal, then social, economic, and environmental conditions become lost in translation and opportunity to make a broad impact on the community is missed. The findings offer policymakers a benchmark when considering the future of the KyP program because this is the first time the membership has been surveyed.

Funding

This research was supported by the Rural Sociological Society Master's Thesis Award, the Department of Sociology University of Kentucky Beers Summer Fellowship Award, and my internship with the Kentucky Department of Agriculture.

Acknowledgements

I am deeply grateful to the KJAS editors and anonymous reviewer for their extremely helpful comments, and to Brea Perry for feedback on the statistical analysis.

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