DOI: 10.5191/jiaee.2009.16104

Testing the Market Potential for a New Value-Added Cowpea Product to Improve the Well-Being of Women Entrepreneurs in Niger

Germaine Ibro
Institut National de Recherche Agronomique du Niger
E-mail: geribro@yahoo.fr

Ramatou Seydou
Institut National de Recherche Agronomique du Niger
E-mail: boubarahma@yahoo.fr

Kaka Saley
Institut National de Recherche Agronomique du Niger
E-mail: inran@intnet.ne

Kira Everhart-Valentin
International Programs in Agriculture Purdue University
E-mail: kevalentin@purdue.edu

Joan Fulton
Department of Agricultural Economics Purdue University
E-mail: fultonj@purdue.edu

James Lowenberg-DeBoer
International Programs in Agriculture Purdue University
E-mail: lowenbj@purdue.edu

Miram Otoo
Department of Agricultural Economics Purdue University
E-mail: motoo@purdue.edu

Abstract

Women street vendors are an integral part of the economy of Niger. They prepare and sell inexpensive food for passersbys and use the money they make to support their families. A common product these women have traditionally made is kossai, a nutritious, high-protein product that has been a customary food for generations. An important challenge for women street vendors is preparing the kossai batter from whole cowpeas, as it is a highly labor-intensive and physically-demanding process. In this study, researchers conducted a direct market test in which 100 women in the city of Niamey, Niger, were given two kilograms of coarse textured cowpea flour to use in their daily kossai production. Research indicates that finely ground cowpea flour produces dense, unpalatable kossai, while coarser flour results in a lighter, more palatable product. The women were then surveyed to determine the quality of the kossai produced from the flour and overall client satisfaction. The women found the flour to be highly advantageous, saving them time, energy and inputs, and 79% reported that they would use the flour for their kossai production if it were made available to them. The adoption of this new technology would have numerous effects, including enhanced economic development of Nigerien communities, positive health and nutritional impacts, and the creation of a new sector in the value chain.

Keywords: Women in development, Economic development, Entrepreneurship
Introduction

Women street vendors are a familiar part of the marketplace throughout West Africa and in Niger, particularly. They prepare and sell inexpensive food for passersbys and use the money they make to support their families. A common product these women have traditionally made is a deep-fat fried fritter comprised almost entirely of cowpeas - commonly known in the U.S. as black-eyed peas - with pepper or garlic added for flavor. This fritter is referred to by a number of names, including “kossai” in Haussa, “kékéna” in Dgerma, “akara” in languages along the Nigerian, Senegalese and Ghanaian coasts, and “samsa” in Burkina Faso. For the purposes of this article, the word “kossai” will be used. Kossai is a nutritious, high-protein product that has been a customary food for generations. It is eaten by virtually everyone in Niger, from small children to the elderly. It may serve as a breakfast food for children or adults on their way to school or work, or as a late afternoon snack as individuals return home. Regardless of how commonly kossai is consumed, in Niger it is most often not produced at home, instead being purchased from street vendors. The production and sale of kossai is an important business activity for women street vendors (Ibro, Fulton, Lowenberg-DeBoer, Moussa, & Otoo, 2007a).

The role of cowpeas in Niger

Niger is a very poor country located in West Africa. It is landlocked and bordered by Nigeria, Benin, Burkina Faso, Mali, Algeria, Libya and Chad. Of the nearly 13 million people living in Niger, only 28.7% of those over the age of 15 years are literate (42.9% of men and 15.1% of women). The average age is 16.4 years and life expectancy is 44 years. The GDP per capita was only $244 US per year in 2005, and the country is ranked 174 out of 177 total countries on the Human Development Index (United Nations Development Programme, 2008). Agriculture employs 90% of the labor force and represents 39% of the Gross Domestic Product (GDP). However, only 11.43% of the land is arable and reoccurring droughts, soil erosion and desertification pose significant challenges (CIA, 2008).

Cowpeas are one of the few crops that can grow well in the harsh conditions in the semi-arid areas of West Africa. Niger is the number one exporter of cowpeas worldwide, and according to official statistics, nearly 300,000 metric tons of cowpeas were traded in West Africa in the 1990s (Langyintuo et al., 2003). Because of this, they are an important cash crop for small-scale farmers in Niger. As a legume, cowpeas are an important source of protein for the entire population, both rural and urban. This nutritious food is prepared in a variety of dishes, some of which are prepared at home, and others that are purchased on the street either for immediate consumption or to take home for family consumption, such as kossai (Ibro, Fulton, Lowenberg-DeBoer, Moussa, & Otoo, 2007b). Value-added processing of cowpea for use in street food uses a significant amount of the input, with the three main urban areas of Niger (Niamey, Maradi, and Zinder), having an average daily use of cowpea of more than 3,500 kg for the production of kossai alone (Ibro et al., 2007a).

Women and kossai: The informal sector and economy

Women street vendors are an important part of what is known as the informal sector that plays a vital role in the economies of the developing world. Charmes (2000) notes that in 1995 over 25% of the population was employed in the informal sector with the contribution to GDP being over 37%. The informal sector in Niger has seen steady growth over the past decades, and in fact, in recent years, the
income gained from the small informal businesses has surpassed that of the formal sector in the city of Niamey, Niger (Charmes, 1998). Women constitute more than 75% of the participants in the informal sector (Canet & N’Diaye, 2006). The preparing and selling of food items, such as kossai, is one of the primary business types in the informal sector (Ibro et al., 2007a).

The value-added processing of cowpea into kossai is performed almost entirely by women. The cultural and economic realities faced by Nigerien women present them with significant challenges to income generation. This “feminization of poverty” is often manifested through more restrictions on women’s choices and opportunities, as well as lower incomes, than men (Fukuda-Parr, 1999), making kossai production and sales a particularly important business activity for them. Women are responsible for the care of children and the household (Kevane, 2004), and have been shown to spend the income they earn from their kossai business on their families for food, clothing, medical expenses, school, and savings, thus contributing directly to economic development and poverty alleviation (Ibro et al., 2006).

The challenge for women: Preparing the kossai

An important challenge for women street vendors is preparing the kossai batter. The process is highly labor intensive and physically demanding. It involves soaking then dehulling the cowpeas, taking the cowpeas to the grinder for wet grinding to make a paste, creating a batter from the paste and finally deep-fat frying the batter to make kossai. Fulton (2006) found that this process is so time and labor intensive that in some regions in West Africa, where the opportunity cost of women’s time is greater, women have abandoned the tradition of producing kossai, instead choosing to produce and sell deep-fat fried wheat-flour beignets. Since the wheat-flour beignets are made from imported wheat flour, there is no longer the use of a locally-produced input (Otoo, Ibro, Fulton, & Lowenberg-DeBoer, 2008). In addition, this new product has significantly less nutritional value for the consumers.

Previous research in Niger explored the challenges that these women street vendors face in order to determine ways to improve the well-being of this important informal sector of the economy. After concluding that the preparation of the batter was an important constraint, multidisciplinary research (involving economists and food scientists) was conducted to determine the potential to use a dry cowpea flour product that could be mixed with water to make kossai. Research revealed that a dry cowpea flour that is course in texture and where the particle size is large (resulting in a texture similar to cornmeal) is effective in producing good quality kossai (i.e. kossai with the same quality characteristics as kossai prepared traditionally) (Fulton, 2006; Singh et al., 2005; McWatters, Hung, Chinnan, & Phillips, 2001).

Currently, it is difficult to produce cowpea flour with the coarse texture in the marketplace in West Africa. More finely textured, homogeneous cowpea flour can be produced with available grinders (small mills). The mills commonly available in the marketplace in Niger are plate mills where the product is ground by being forced between two metal plates. Since fine adjustments are not possible with plate mills it is not possible to get the coarse-textured flour product. The fine-textured flour from the plate mills results in kossai that is not even-textured, but rather has larger air holes in some places and is dense in other areas and, perhaps most importantly, is not desired by consumers. Work carried out as part of the Bean/Cowpea Collaborative Research Support Program (CRSP) in the summer of 2006 revealed that flour of the appropriate coarse texture could be produced with a hammer mill. With a hammer mill, the screen size can be selected for the desired large particle size for the flour.
Hammer mills are not regularly found in the marketplace in West Africa, it is not currently possible to produce the coarse-textured cowpea flour in the private sector (Fulton, 2006).

Producing the cowpea flour for kossai vendors using a hammer mill represents the potential for improved quality of life for kossai vendors and their families, as well as an important new entrepreneurial activity. African women are often expected to work longer hours than men (Africa Recovery, 1999), and the time and energy saved by the women through the utilization of the cowpea flour would allow them to focus on other activities, rest or even undertake other income-generating enterprises. In addition, the development of a successful cowpea flour would likely result in a new stage in the value chain with the production of cowpea flour that would be sold to the women street vendors. This new business activity has potential if the women street vendors are willing to purchase the flour at a price that would be profitable for the entrepreneur owning the mill.

Adoption theory as related to cowpea flour for kossai

The market potential of a new cowpea flour by women street vendors will be dependent on several factors, not the least of which is women’s willingness to adopt this new technology. Literature on adoption provides important insight. Rogers (1995) identifies that relative advantage, compatibility and complexity are important in determining whether any new technology is adopted. In particular, the new technology must represent an advantage for the user relative to the alternative. Second, the new technology must be compatible with the way the users of the technology function, including being consistent with tastes, preferences and cultures. Third, the new technology must not be so complex as to make it impossible for the user to adopt. In relation to the proposed cowpea flour, this means that for the women street vendors to adopt the new technology, it must offer a greater benefit and advantage than preparing kossai through the traditional method. In addition, the implementation of that technology must be compatible with not only the women’s enterprises, but also within the structure of their lives as a whole. As Rogers (1995) explains, if the proposed technology is found to be outside or contrary to the societal norms within which the women exist, the chances that it will be adopted are greatly reduced. The complexity of the proposed cowpea flour is also important to take into account, as if it is too complex or difficult to utilize, hopes for adoption will quickly be replaced with the reality of rejection by the women vendors. Education level has also been shown as having a positive effect on adoption rates of new technologies (Agwu, 2004). In the case of the kossai vendors in Niger, the education level of the women vendors is very low, a factor which could be a challenge. In particular, formal communications with the user group (in this case, the women vendors) that require literacy will not be effective. Ajayi (2001) found that adequate follow up with the adopters can be an important factor in adoption. This practice could be of particular importance when working with individuals with lower levels of formal education and limited access to information resources, such as the women kossai vendors. A final factor in adoption is the availability of the technology (Rogers, 1995). For the cowpea flour, this is reflected by the need to make the proposed cowpea flour easily accessible and available to interested vendors. It is necessary to consider these various elements of adoption when determining the market potential of proposed cowpea flour.

Purpose and Objectives

The objective of this paper is to report the results of a research and extension project involving women entrepreneurs in Niger selling street food from cowpeas.
results of the combined research and extension effort will allow us to determine the potential for a value-added cowpea product (cowpea flour with coarse particle size) in the marketplace and the potential to increase the well-being of an important group of entrepreneurs in Niger, as well as in many other areas of West Africa, through the adoption of this new technology.

This particular research is one component of a multi-disciplinary research project on consumer acceptance involving women selling cowpea-based street foods in Niger. The objectives of this project include the following:

1. Measure the perceptions of both kossai vendors and consumers in regards to kossai prepared with the proposed cowpea flour.
2. Identify the advantages and disadvantages for kossai vendors of utilizing the proposed cowpea flour.
3. Measure vendors’ willingness to purchase the proposed cowpea flour and at what price.

**Methods**

This project combined research and outreach (extension) from a multi-disciplinary approach to collect primary data from a target population of women kossai vendors regarding a newly developed cowpea flour and the proposed flour’s market potential. Researchers from food science and agricultural economics pooled knowledge and experience in conducting a direct market test in which 100 women in the city of Niamey, Niger, were given two kilograms of cowpea flour (of the coarse texture that makes high quality kossai) to use in their daily kossai production. This quantity was enough to produce a full day’s supply for most vendors. These women were selected using a stratified random sample approach from the 1,300 women who had already been identified as the kossai producers in the city. The researchers met with each of the women when the flour was distributed, giving directions on how to use the flour and asking them observe the quality of the prepared kossai and the reaction of their customers. The researchers returned the following week and through one-on-one interviews obtained data on how the vendors liked the flour, how cooking with the flour compared with traditional methods, the quality of the kossai they were able to make, vendors’ perceptions of customer preferences regarding the kossai, and their willingness to purchase the flour.

**Findings/Results**

**Characteristics of the women vendors**

Of the 100 women who participated in this study, ages ranged from 16 years to 73 years with the average age being 40.7 years and 50% of respondents falling between the ages of 35 and 50 (Table 1).

<table>
<thead>
<tr>
<th>Range</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>16-73</td>
<td>40.7</td>
</tr>
<tr>
<td>Experience (years)</td>
<td>1-30</td>
<td>10.2</td>
</tr>
<tr>
<td>Quantity of cowpeas used per day (kilograms)</td>
<td>1.25-7.5</td>
<td>2.5</td>
</tr>
</tbody>
</table>

The respondents reported very diverse levels of experience in selling kossai (Table 1), ranging from one to 30 years, with an average of 10.2 years. Thirty-three percent of the women surveyed had five years of experience or less, 22% had between five and ten years, 17% had between ten and 15 years, 10% had between 15 and 20 years and
7% had more than 20 years experience. Eleven percent of the women did not respond to this question. In preparing their kossai batter, respondents reported using an average of 2.5 kilograms of cowpeas per day. Responses showed a daily usage of anywhere between 1.25 to 7.5 kilograms, with 76% of the respondents using between one and 2.5 kilograms.

More than 35% of the women surveyed had completed no education, while 41% had some Koranic education and less than 20% had formal primary or secondary education or some basic literacy training (Figure 1). Kossai production and sales is an important activity for a segment of the population with very little formal education.

![Education Level of Women Vendors](image1)

**Figure 1**: Education Level of Women Vendors.

While all women surveyed sold kossai, 66% sold one additional product, 11% sold two additional products, and 4% sold at least three additional products, with virtually all of these being a deep-fat fried food product of some kind (Figure 2). In addition to kossai, 82% of the women also sold fari massa, a wheat-flour fried fritter, 8% sold fried sweet potatoes (patate douce), 7% sold igname (yam) fries, 5% sold tsala, a millet-based fried flat cake, and 2% sold bouillie, a thick, millet-based beverage. In fact, of the women who sold at least one additional product, all but one identified fari massa as being one of those products.

![Products Sold by Women Vendors in Addition to Kossai](image2)

**Figure 2**: Products Sold by Women Vendors in Addition to Kossai.
The respondents represented a relatively wide spread of daily income (Figure 3), ranging from less than 250 CFA francs (FCFA) per day to more than 2,000 FCFA per day. However, the greatest number of women (43%) reported daily earnings of 500-1000 FCFA per day and 27% reported 1000-2000 FCFA per day. With current exchange rates ($1US = 416 FCFA), these income levels range from less than $.60 to approximately $4.80 per day. The daily income earned by kossai vendors is substantial in a country where 60.6% of the population lives on less than US$1/day (World Bank, 2007).

![Daily income](image)

Figure 3: Daily Income Reported by Women Vendors.

**Perceptions of the cowpea flour**

When the women vendors were later surveyed on their experience with the flour and the kossai that resulted from using the flour, several questions were asked regarding the culinary qualities of the flour. In general, women were pleased with the flour quality (Table 2). The characteristics of color, texture and taste of the resulting kossai were seen as satisfactory, with 81%, 82% and 80% of respondents, respectively, describing them as “acceptable” or “better.” Similarly satisfied, 72% of respondents found the moisture level of the prepared product to be “sufficient,” and 70% found that the kossai required less oil than the traditional product, an important cost-saving benefit. Regarding cooking time, 87% of respondents reported that the batter from the flour took less or equal time to cook into the kossai, showing that the batter appears to be time-saving for many. However, for a number of characteristics, the responses collected were somewhat inconclusive regarding the flour’s quality. For the characteristics of mixing/preparation ease, mixing/preparation time and yield after cooking, responses were split nearly equally between all three options, with only yield after cooking seeing a slightly higher percentage of women (40%) responding “less.” These inconclusive responses may indicate a lack of understanding by the respondents in the preparation process, demonstrating the need for more thorough explanation and training in batter preparation for future distribution.
Table 2: 

**Respondent Reactions to the Culinary and Sensory Qualities of the Provided Cowpea Flour**

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>M</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydration rate (moisture level)</td>
<td>72%</td>
<td>18%</td>
<td>6%</td>
<td>1.26</td>
</tr>
<tr>
<td>1=Sufficient, 2=Insufficient, 3=Too much</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mixing/preparation ease</td>
<td>37%</td>
<td>30%</td>
<td>33%</td>
<td>1.96</td>
</tr>
<tr>
<td>1=Easier, 2=Identical, 3=More difficult</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mixing/preparation time</td>
<td>32%</td>
<td>36%</td>
<td>32%</td>
<td>2.00</td>
</tr>
<tr>
<td>1=Shorter, 2=Equal, 3=Longer</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amount of oil required</td>
<td>70%</td>
<td>16%</td>
<td>14%</td>
<td>1.44</td>
</tr>
<tr>
<td>1=Less, 2=Equal, 3=More</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cooking time</td>
<td>40%</td>
<td>47%</td>
<td>9%</td>
<td>1.61</td>
</tr>
<tr>
<td>1=Shorter, 2=Equal, 3=Longer</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yield after cooking</td>
<td>40%</td>
<td>24%</td>
<td>32%</td>
<td>1.84</td>
</tr>
<tr>
<td>1=Less, 2=Equal, 3=More</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Color</td>
<td>10%</td>
<td>63%</td>
<td>18%</td>
<td>1.90</td>
</tr>
<tr>
<td>1=Not good, 2=Acceptable, 3=Better</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Texture</td>
<td>11%</td>
<td>71%</td>
<td>11%</td>
<td>1.86</td>
</tr>
<tr>
<td>1=Not good, 2=Acceptable, 3=Better</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Taste</td>
<td>13%</td>
<td>58%</td>
<td>22%</td>
<td>1.95</td>
</tr>
<tr>
<td>1=Not good, 2=Acceptable, 3=Better</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Potential impacts of cowpea flour on respondents' businesses

During the one-on-one interviews, the women were asked a number of open-ended questions regarding their impressions of the cowpea flour. When asked to identify the advantages that the cowpea flour provided, 93% of respondents identified at least one advantage (Table 3): 56% noted that the flour saved them time and energy by offering faster preparation, increased time for rest and/or eliminating the need to go to a mill for traditional processing. Twenty-nine percent were pleased to see that the flour consumed less oil than traditional methods of preparing kossai, and 28% noted improved conservation, meaning that they could store the cowpea flour (once kossai batter is prepared the traditional way it is very perishable). Other advantages that were mentioned included a good taste to the kossai, the ability to make kossai even when it rains and an increase in income when selling kossai made from the flour.
Table 3

Advantages and Disadvantages of Provided Cowpea Flour as Identified by Respondents

<table>
<thead>
<tr>
<th>Advantages</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Saves time and energy (faster preparation,</td>
<td>56%</td>
</tr>
<tr>
<td>increased time for rest, no need to go to the mill)</td>
<td></td>
</tr>
<tr>
<td>Consumes less oil</td>
<td>29%</td>
</tr>
<tr>
<td>Improved conservation</td>
<td>28%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Disadvantages</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Kossai becomes hard after cooling</td>
<td>15%</td>
</tr>
<tr>
<td>Kossai not white enough</td>
<td>10%</td>
</tr>
<tr>
<td>Consumes too much oil</td>
<td>7%</td>
</tr>
</tbody>
</table>

In addition to advantages, the women were requested to identify the disadvantages of the cowpea flour (Table 3). It is important to note that 44% did not identify any disadvantages at all. However, there were some disadvantages that were identified by multiple respondents. One of these was that the kossai becomes hard after cooling, with 15% of respondents noting this concern. It was not determined how this characteristic compared to the kossai prepared in the traditional way, as that kossai, too, tends to harden after cooling. Ten percent of respondents found that the internal color of the kossai was not white enough, and 7% found that preparing the kossai consumed too much oil. This final disadvantage is particularly interesting in light of the fact that one of the main advantages identified by the respondents was that the kossai consumed less oil. There is a strong possibility that the individuals who had problems with too much consumption of oil may not have clearly understood the preparation techniques needed in utilizing the flour. Other disadvantages reported included the flour not being milled well, difficulty in mixing/preparing the batter and that their clients did not like the kossai prepared with the cowpea flour.

When asked about how difficult or easy it was for the women to sell the kossai prepared from the provided flour, 79% indicated that selling was “easy” and 11% indicated it was “moderate.” In addition, 86% of the respondents reported that the cowpea flour saved them time in the kossai preparation process as compared with the traditional methods. In response to an open-ended question regarding how the women used the time saved, 82% of respondents said that they used the time to rest, and a number also mentioned that their children were able to get more rest, as they no longer needed the same assistance from their children as with the traditional methods. Other activities included taking care of household chores and visiting or assisting family members.

Willingness to purchase the cowpea flour

The women were very positive in their responses regarding the cowpea flour. Seventy-nine percent of the respondents stated that they would utilize the flour to prepare their kossai if it were made available to them. Only 19% stated that they would not. For those that indicated that they would utilize the flour, the women offered a number of reasons justifying this decision. These included not having to go to the mill to process whole cowpeas, better conservation, saving time and energy as well as having more time to rest. There were also several women who reported that while they would be willing to purchase the flour, it...
would serve more as a back-up plan in case they find they have more demand than expected of their traditional kossai or if they are not able to get their cowpeas processed at the mill one day. The primary reason for those who said they would not purchase the flour if it was made available was that their clients did not like the kossai prepared with the flour. Other reasons included the kossai becoming too hard after cooling, the kossai consuming too much oil and the mixing/preparation being too difficult.

Positive responses when asked in a general question do not tell the entire story. In order to determine the potential for the cowpea flour it was necessary to obtain information from the women concerning the amount of money that they would be willing to pay for the cowpea flour and at what prices they would purchase cowpea flour compared to purchasing cowpea grain and preparing kossai the traditional way. During the in-person interviews each woman was asked a series of questions to determine the different prices that she would be willing to pay for cowpea flour. During this portion of the interview each vendor was presented with different pairs of prices. Each pair included the price of one of the one kilogram packages of cowpea flour and the price of one tia of cowpea grain (one tia of cowpea grain is a common unit equal to two kilograms). For each pair of prices the vendor was asked whether she would purchase the cowpea flour or the cowpea grain. In the analysis of the data the ratio of the price of one kilogram of cowpea flour to one kilogram of cowpea grain was calculated. Then the percentage of women vendors who indicated they would purchase flour and grain was calculated. The results are reported in Table 4. More than three-quarters of the women were willing to purchase the cowpea flour over the cowpea grain when the price of one kilogram of cowpea flour was twice the price of one kilogram of cowpea grain. When the price of one kilogram of cowpea flour was between two and three times the price of one kilogram of cowpea grain, the percentage of women willing to purchase the cowpea flour decreased to the range of 30 – 40%. Once the price of one kilogram of cowpea flour was three times the price of one kilogram of cowpea grain, the percentage of women willing to purchase the cowpea flour was significantly lower at 12% or less.

Table 4

---

<table>
<thead>
<tr>
<th>Ratio of Price of Cowpea Flour to Price of Cowpea Grain</th>
<th>% of Women Kossai Vendors Who Indicated They Would Purchase Flour</th>
<th>% of Women Kossai Vendors Who Indicated They Would Purchase Cowpea Grain</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 1.6</td>
<td>78.0</td>
<td>22.0</td>
</tr>
<tr>
<td>1.6 – 2.2</td>
<td>76.1</td>
<td>23.9</td>
</tr>
<tr>
<td>2.2 – 2.6</td>
<td>29.8</td>
<td>70.2</td>
</tr>
<tr>
<td>2.6 – 3.0</td>
<td>41.3</td>
<td>58.7</td>
</tr>
<tr>
<td>3.0 – 3.4</td>
<td>8.5</td>
<td>91.5</td>
</tr>
<tr>
<td>3.4 – 4.0</td>
<td>12.1</td>
<td>87.9</td>
</tr>
<tr>
<td>&gt; 4.0</td>
<td>7.6</td>
<td>92.4</td>
</tr>
</tbody>
</table>

---

Summary of Results
The results suggest that the women were very pleased with the product and would purchase it if it was available in the market. In the area of relative advantage, the cowpea flour performed positively, saving women time, energy and even resources, while still allowing them to
participate in a traditional income-generating enterprise. The women generally found that preparing the kossai batter with the cowpea flour was compatible with their other activities and was not inconsistent with any cultural practices. Finally, evidence from the women was that the flour was not overly complex to use. There were some women who reported that kossai made from the flour used more oil for cooking, a sign that they may not have understood the best way to prepare kossai with the flour. This would suggest that an education program for the women on how to use the flour would be beneficial. One of the greatest challenges associated with the traditional production of kossai is the time and energy required for the batter preparation (particularly in taking the soaked and dehulled cowpeas to a local mill for grinding). These mills can often be multiple kilometers away. According to the women, the cowpea flour provided to them removed this constraint and provided them with much needed time, which many used to rest or catch up on household duties. They also noted that, in addition to the convenience of not having to travel to a mill, the preparation of the batter as a whole was less time-consuming when using the flour.

The flour was also reported as having better conservation properties than the traditional method, as the women were able to mix batter based on the demand they encountered throughout the day, as opposed to having to estimate what a day’s particular demand would be, only to find that they did not sell all their kossai and then being forced to throw away the remaining batter, representing a significant loss for these businesses. Another positive attribute identified by the women was that the batter made from the cowpea flour requires less oil to make kossai than the batter from a traditional method. Since oil is one of the most expensive inputs for kossai production, this translates into cost-savings for the women.

It is also important to note that the women are willing to pay a premium for the value-added cowpea flour, with more than three-quarters of them willing to purchase the cowpea flour when the price of one kilogram of cowpea flour is twice the price of one kilogram of cowpea grain. Thus, there is potential for the development of a new sector of the cowpea value chain involving the production of cowpea flour for the women street vendors producing kossai. Further study is needed to determine the complete costs of production for the cowpea flour and the level of profitability for entrepreneurs who would take on the business of cowpea flour production.

**Conclusion, Recommendations, and Implications**

The feedback gathered from the kossai street vendors regarding the proposed cowpea flour shows important market potential and a willingness to adopt a new technology that the women feel would offer improvements to their business and lifestyle. The flour’s relative advantage, compatibility with their lifestyles and complexity of use all appear to be within a range that is acceptable for the women, making them inclined to take the next step of implementing the flour in their enterprises when it becomes available.

To ensure continued adoption and implementation, researchers must make the flour accessible to the vendors, both in price and quantity. A promising way of doing this would likely be through the establishment of hammer mills as new entrepreneurial activities. In addition, in-person follow-up with the women will be key to sustained implementation to train the women in the preparation of the kossai batter as well as assisting with any difficulties associated with its use.

The potential impact of an affordable and available source of the course cowpea flour is significant. The women involved in kossai production contribute directly to poverty alleviation in some of the poorest regions of the world. Their improved ability to be successful will enhance the economic...
development of the communities around them. In addition, by providing these women with a time-saving cowpea flour, they will have additional time to rest and care for themselves and their family. This could contribute to greater health and well-being for the women, as well as the children they care and provide for. In addition to improving the quality of life for women and their families, growth in kossai production and sale in Nigerien cities will result in an increased consumption of this highly-nutritious food. It will also support the existence, and even resurgence, of a traditional street food in many parts of Niger, and potentially in other areas of West Africa, where research has shown kossai production is being replaced with other easier-to-produce products, such as wheat flour beignets, which are much less nutritious. This has important implications for Nigerien and African health. In addition, this new technology offers the promise of creating a new stage in the value chain, as the demand for such a flour will open doors to entrepreneurial activities involving the utilization of hammer mills to grind the course cowpea flour.

This research presents numerous other possibilities, including testing the cowpea flour in other Nigerien cities, as well as observing the impacts of such a flour on the overall kossai markets in these cities. Another important area for future study would be on the best way to develop the new sector of the value chain that is likely to arise as a result of this new technology. It will be necessary to determine what it will take to establish the new enterprises that would undertake the processing of course cowpea flour with hammer mills, all of the fixed and variable costs of production, and the best way to manage these new entrepreneurial opportunities to ensure the greatest benefit for all.

References


