A COMPREHENSIVE STUDY ON THE ACTIVITIES OF SOY PROCESSING FACILITIES IN KUMASI AND ITS ENVIRONS

FINAL REPORT ON MAPPING OF SOYBEAN PROCESSING FACILITIES IN KUMASI

PREPARED BY UCC YOUTHMAPPERS AT THE DEPARTMENT OF GEOGRAPHY AND REGIONAL PLANNING, UNIVERSITY OF CAPE COAST FOR SIL/USAID
EXECUTIVE SUMMARY

Soybean is one of the few crops that offer a good combination of fiber and great source of crop protein as compared to other meat protein sources. A look at Ghana’s agriculture indicates that the three Northern regions in Ghana serves as the hub for the cultivation of soybean but the real market for the soy product is known be in the Middle and Southern part of Ghana namely in Kumasi, Accra and Brong Ahafo. To take a view at the soybean value chain, the University of Cape Coast YouthMappers chapter under the auspices of the USAID and Soybean Innovation Lab collaborated to explore the operations of soy processing facilities in Kumasi. Following a series of interaction with Dr. Peter Goldsmith, the director of SIL, the team formulated two hypotheses which included the following; 1) whether the soy processing facilities in Kumasi had any influence on the price of the soybeans and 2) the factors that influenced their decision to set up their facilities in Kumasi. Aside this, the USAID GeoCenter mounted a task on the tasking manager of the Humanitarian OpenStreetMap Team which UCC YouthMappers used to map all the soy processing sites in Kumasi and its environs having gone through a series of training.

Since the study area was in Kumasi, the team had to reside at the Kwame Nkrumah University of Science of Technology (KNUST) at Kumasi since this location was relatively closer to the soy processing facilities as compared to our campus in Cape Coast. Having gone through the training of the state of soy production in Ghana, the team developed an interview guide as the principal data collection instrument for this field exercise. The choice of questions were informed by the two research hypotheses and these questions were deployed with the KoBo Toolkit which as an opensource android data collection tool. This tool further allowed the team to pick GPS coordinates of all sites visited which helped in mapping and designing of our maps for this report. The target population for this project includes managers of the various soy processing plant, feed mixers and poultry farmers who were all in the value chain of the soy industry in Ghana.

The participants for the study were identified with the assistance of resource personnel from the Catholic Relief Services who had a long-standing relationship with many actors in the soybean industry in Ghana. At each site, all interviews were conducted after approval was sought from the participants. At each interview site, permission was further sought to take both audio and video recording of the interviews as well as take pictures while the team went on a tour to the facility. Variables of interest in the tour included the presence of warehouse, alternative storage facilities,
output of processed soy, processing plants and company vehicle. All participants were assured of full confidentiality, anonymity and privacy. The entire field data collection was undertaken from the 3rd August to the 8th August, 2018 and range of the interviews was from 17 to 71 minutes.

From the field, the audio interviews were transcribed verbatim and emerging themes were put into categories for analysis. Findings from the field showed that, the relatively small scale of soybean production makes it difficult for the processors to acquire the needed soybeans for an all year-round production. In terms of the price of soybean, the standard measure was the 100 kg bag and no two prices mentioned were the same. Reasons attributing to the difference in prices ranges from the relatively long distance from Kumasi, the use or reliance on aggregators as well as the time of year of production.

In the case of the shortage of the local soybeans from the Ghanaian market, none of the participants interviewed had the financial power to import soy grains from other countries like Argentina and Brazil given the fluctuating of exchange rate and the large quantities of soy grains needed to make some gains if importation is done. Instead, the managers of the large companies buy their needed imported soy from large importers from time to time from Ghanaian market. On location, all participants revealed that, the strategic location of Kumasi was the key reason for siting their factories. Kumasi is known to be the hub of poultry farmers who constitute a substantial part of the customers of the soy processors hence the reason to be closer to their customers since the cost of buying from the Northern Ghana was relatively cheaper. On financing, the study revealed that the main source of financing to the business was from family, ploughing back profits and other foreign investment companies. Their submission, local banks deem the agriculture sector as a high-risk business area which reflects in the banks neglect.

The study recommends a national agenda to incentivize farmers to increase their production which can equally help processors reduce the cost of buying imported soy grains. Also, a national agenda should be initiated to increase awareness on the use of soy products like the oil and the milk. This will serve a good substitute for animal protein, help combat malnutrition and increase the market for soy processors. In addition, Agriculture Development Bank (ADB) should equally pay close attention to the agriculture sector which is actually enshrined in their mandate of operation. This can be seen as directing their loans to persons in the agricultural sector instead of concentrating on the other category of customers.
ACKNOWLEDGMENTS

We students from the University of Cape Coast YouthMappers express our sincere gratitude to the Soybean Innovation Lab (SIL) and USAID for giving us all the needed support and resources from the beginning of this project to the end.

Secondly, we would like to express our heartfelt gratitude to Dr. Peter D. Goldsmith for his enlightening experience which gave us a great start to this project.

We would also like to express our thanks to Anna Brenes, Chad Belvins, Rosemary B. Keane, Ahmed Kablan and Courtney A. Tamimie for their guidance and motivation during the project. The efforts of Daniel Baako of USAID, Ghana as well as Apanka Kwadzo Asigbee Mawuli and Phlipe Atiim of the Catholic Relief Services who facilitated our trips and interaction with the managers of the various processing facilities, we are grateful for their efforts.

We would like to express our profound gratitude to the research participants of the various processing facilities, feed mixers and poultry farmers for their responses and great reception. We thank Mrs. Naomi Boateng for her catering services during the project.

Finally, we are grateful to the Head of Department and staff of the Department of Geography and Regional Planning for their support.

While expressing our gratitude to all those who have supported and assisted in one way or the other in the implementation of the project, the University of Cape Coast YouthMappers take full responsibility for the omissions and errors contained in this report.

UCC YouthMappers
University of Cape Coast
October, 2018
RESEARCH TEAM

Kwame Odame
Ebenezer Nana Kwaku Boateng
Bert Nii Odoi Manieson
Faustina Lina Yeboah
Sabina Abuga
Anthony Acquah
Gladys Adjei
Daniel Osei Agyemang
Francis Debrah
Godfred Afful Eshun
Kingsley Kanjin
Confidence Kpodo
UCC YouthMappers Advisor - James Kweku Eshun
# TABLE OF CONTENTS

EXECUTIVE SUMMARY .................................................................................................................. ii

ACKNOWLEDGMENTS ................................................................................................................... iv

RESEARCH TEAM ......................................................................................................................... v

LIST OF PLATES ........................................................................................................................... viii

LIST OF FIGURES .......................................................................................................................... ix

LIST OF TABLES ............................................................................................................................ x

BACKGROUND ............................................................................................................................... 1

1.1 Introduction ............................................................................................................................... 1

METHODOLOGY ............................................................................................................................. 3

2.1 Introduction ............................................................................................................................... 3

2.2 Research Design and Approach ............................................................................................... 3

2.3 Study Area ............................................................................................................................... 3

2.4 Target population ...................................................................................................................... 5

2.5 Sampling techniques ............................................................................................................... 5

2.6 Sources of data ......................................................................................................................... 5

2.7 Research instrument ............................................................................................................... 6

2.8 Systematic representation of data collection and analysis ....................................................... 6

2.9 Challenges ............................................................................................................................... 7

FINDINGS ......................................................................................................................................... 9

3.1 Primary output of facilities ..................................................................................................... 9

3.2 Price of soybeans ..................................................................................................................... 12

3.3 Reliance on imported soy grains and meal ............................................................................. 13

3.4 Carting soybeans to Kumasi ................................................................................................. 16

3.5 Road and Transport in Kumasi .............................................................................................. 16
3.6 Access to market ................................................................. 17
3.7 Access to raw materials ..................................................... 21
3.8 Access to credit ................................................................. 22
3.9 Power situation ................................................................. 23
3.10 Spatial Analysis of processing sites ..................................... 26
CONCLUSION AND RECOMMENDATION .................................... 28
4.1 Conclusion ........................................................................ 28
RECOMMENDATION ................................................................. 29
REFERENCES ........................................................................ 30
# LIST OF PLATES

<table>
<thead>
<tr>
<th>Plate</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Refinery and other machinery at a soy refinery plant</td>
<td>10</td>
</tr>
<tr>
<td>2</td>
<td>Soybean warehouse of a processing plant, 2018</td>
<td>13</td>
</tr>
<tr>
<td>3</td>
<td>UCC Youthmappers inspecting bags of imported soy meal from Argentina</td>
<td>15</td>
</tr>
<tr>
<td>4</td>
<td>Feed mix in yellow bags and imported soy meal in white bag</td>
<td>19</td>
</tr>
<tr>
<td>5</td>
<td>Alternative power source during teams' visit to some facilities</td>
<td>26</td>
</tr>
</tbody>
</table>
# LIST OF FIGURES

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Map of the study area</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>A flow chart showing the various steps used in collecting, cleaning and analyzing the data</td>
<td>6</td>
</tr>
<tr>
<td>3</td>
<td>Map showing the various facilities visited in Kumasi</td>
<td>20</td>
</tr>
<tr>
<td>4</td>
<td>Map showing various facilities and industrial Area in Kumasi</td>
<td>24</td>
</tr>
<tr>
<td>5</td>
<td>Spatial analysis between processing facilities and their ready market</td>
<td>27</td>
</tr>
<tr>
<td>Table</td>
<td>Page</td>
<td></td>
</tr>
<tr>
<td>-------</td>
<td>------</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>9</td>
<td></td>
</tr>
</tbody>
</table>

List of facilities visited by research team
BACKGROUND

1.1 Introduction

The soybean value chain ranges from the primary producer to the final consumer. The consumer may be a man or woman making use of soy and its products to improve his or her diet, or an animal whose diet is being improved by its owner (Wilson, 2015).

Soybean is an environmentally-friendly grain legume. Globally, it is a major source of protein, oil and health-promoting Phyto-chemicals for human nutrition and livestock feed (Ali & Singh, 2010). Due to the wide range of geographical adaptation, unique chemical composition, good nutritional value, functional health benefits and industrial applications, it has become a very vital world commodity (Ali & Singh, 2010).

Upper West, Northern, Brong-Ahafo and Volta Regions are the major soybean production areas in Ghana (SRID, 2012) but Northern Region alone contributes about 70% (49,950 ha) of national soybean area and about 66% of national (76,000 ha) production (SRID, 2012). Average Ghanaian soybean yields remain well-below global averages (Tamimie, Goldsmith, and Winter-Nelson, 2018). Dogbe et al., (2013) find that the average soybean yield in the Northern Region of Ghana, which contributes to approximately 70% of the national soybean area and 77% of national production, ranged from 509 to 642 kilograms per hectare (kg/ha). These yield figures represent only 25% of the global soybean yield average of 2,310 kg/ha (Masuda & Goldsmith, 2009). Total domestic production (59,000MT) in northern Ghana is not sufficient to meet domestic demand (Gage et al., 2012). Etwire, Martey & Dogbe (2013), made mention of the fact that most agricultural interventions in northern Ghana such as Youth in Agriculture Program, Northern Rural Growth Program, Savannah Accelerated Development Authority projects, Alliance for a Green Revolution in Africa (AGRA) projects, Danish International Development Authority projects, United States Agency for International Development projects, among others, are also encouraging and promoting the production and utilization of the soybean crop mostly through value chain enhancements.

According to Masuda and Goldsmith (2009), soybeans are a good source of protein for human diet and a valuable source of feed for livestock and fish. Soybeans contain 19 percent cholesterol free oil, 36 percent protein (United Soybean Board, 2016) and also contain most essential vitamins required by human beings.
Despite the fact that soybean is a relatively new crop in Ghana (Akramov & Malek, 2012), yet the important role of the crop among rural households within the three northern regions of Ghana cannot be overlooked. With most farmers used to the cultivation of the traditional crops, changing from old ways to relatively new things may prove difficult. The potential for soybean cultivation in peasant agriculture in sub-Saharan Africa is a subject that has long been controversial. A commonly held view is that sub-Saharan Africans will not eat soybean (Shannon & Kalala 1994). Many motives have been given, including slow cooking time and the high energy requirement, undesirable taste, or the belief by some that the crop is poisonous or causes sterility (Weingartner et al., 1987). Etwire et al. (2013) reported that the crop is gaining popularity and acceptance among farmers in Ghana including those of Saboba and Chereponi districts of Northern Ghana. With the major consumers of soybean products being the poultry industry and an increasingly awareness by the public on the rich nutritional value of soybean, the market of soy has a huge potential to grow.

In Ghana, the majority of the soybean processing facilities though is located almost 400 kilometers to the south in the central part of Ghana, within the city of Kumasi as well as the outlying districts. Most of these businesses processed other crops before venturing into soybean processing. The 2012 Enabling Agriculture Trade report indicates that there is great potential to increase processing of soybeans since there is growing demand from poultry industry. A closer look at the distribution of poultry farms across the country indicates that a greater proportion of these poultry industry also happens to be located within Kumasi.

As per this project, the Soybean Innovations Lab in partnership with YouthMappers at the University of Cape Coast sought to understand the impact of soybean processing in the value chain in Ghana. This research focused on the mapping of soybean processing facilities in Kumasi and assessing whether Kumasi is a good site for the establishment of soybean processing plants and also to determine who influences the price of soybean on the Ghanaian market.

Many processing facilities in Kumasi are faced with a number of production constraints from power supply to poor road networks as well as access to credit. Getting access to their raw materials (soybean) all seasons has also been a problem since most processing plants do not either get the grains all year round or do not have the storage facilities and the capital to buy and store the grains in large quantities.
2.1 Introduction

This section describes the methods and materials used to analyze the two research hypothesis. Topics covered in this section comprise research design and approach, description of the study area, target population, sampling techniques, sources of data, research instrument, data collection and analysis and challenges.

2.2 Research Design and Approach

This study adopted an exploratory research design which provided a comprehensive description of the state of soy processing plants in Kumasi and its environs. It also provided possible explanations for its location. The study made use of a blend of primary source data such as in-depth interviews, observation and documentary, and archival data, as recommended by Yin (2003). Based on these hypotheses, a qualitative approach was used.

The use of qualitative research approach was deemed necessary since it afforded the team the opportunity to explore issues in ways that could not have been done if we had employed quantitative research approach.

2.3 Study Area

Kumasi, the ancient capital of the Ashanti kingdom and the second largest city in Ghana was chosen as the study area. The city was founded in the 1680’s by King Osei Tutu I. Given its strategic location and political dominance, Kumasi developed into a major commercial center with most trade route in Ghana converging on it. Its beautiful layout and greenery accorded it the accolade of being the “Garden City of West Africa” due to much urban green spaces interspersed with physical developments (Quagraine, 2011). Geographically, Kumasi is roughly considered to be in the center of Ghana making it a very important transit point for travelers and traders commuting from the North to the South and vice versa.

From the three communities of Adum, Krobo and Bompata, it has grown in a concentric form to cover an area of over ten (10) kilometers in radius. The direction of growth was originally along the arterial roads due to the accessibility they offered resulting in a radial pattern of development. Currently it encompasses about ninety (90) suburbs, many that were absorbed into it as a result of the process of growth and physical expansion. The metropolis has further been
Kumasi is subdivided into 9 sub metros for administrative purposes. This garden city was chosen because, majority of the soybean processing facilities in Ghana are located in the metropolis. In addition, a large portion of the soy meal market such as poultry also is principally located in Kumasi and its suburbs, with the remaining industry located further south near the capital of Accra.

Kumasi is 270 km north of Accra, the national capital of Ghana. According to 2010 Population and Housing Census, it has a total population of 1,468,609 making Kumasi the second most populous city in Ghana (Ghana Statistical Service, 2012). Kumasi is also known to be located in the moist tropical semi-deciduous vegetation zone of Ghana which has favourable soil conditions that support farming activities.

In the course of obtaining more data for this study, the team extended its scope to capture soy processing facilities which were located outside Kumasi. These included facilities in Sunyani and Techiman which were both in the Brong Ahafo Region. Particularly, these towns are located north of Kumasi and mimic the economic atmosphere in Kumasi.

Figure 1: Map of the study area

Source: UCC YouthMappers, August 2018
2.4 Target population
The target population for this report included managers of agro-processing facilities specifically soybean processors, feed mixers and poultry farmers within Kumasi and its environs. Specifically, the study targeted soybean processors, feed mixers (manufacturers) and poultry farmers within Kumasi and its environs. This group of persons were deemed to be well vested in the daily operations of the agro-processing facilities and possess vital information that was not available to other persons due to their exposure and experience in the soybean value chain.

2.5 Sampling techniques
This study adopted two non-probability sampling procedures to engage its participants namely; purposive and snowballing. With regards to the purposive sampling, the few known agro-processors were reached. Attempts to identify the processors would had been near impossible since the research team did not have any idea on where to locate these facilities. With the assistance of the Catholic Relief Services representatives who have a long-standing relationship with some of these facilities, we purposively located some facilities in Kumasi. Upon, reaching out, the team noticed that Kumasi had more facilities than what was purported by the representative of Catholic Relief Services. These other facilities employed for the study were located by snowballing approach.

Eight (8) soybean processors/processing facilities served as participants for the study. In attempts to appreciate the impact of soybean processing on the value chain, three (3) feed mixers were also interviewed to elicit some information such as their ability to meet market demand, quality of produce, and pricing of soy products. In addition, two (2) poultry farmers were interviewed to solicit their views about the locally processed soybean. In all, 12 participants were engaged for the study and 13 sites because one processor had two sites.

2.6 Sources of data
The data used for this study were both primary and secondary. However, majority was based on the primary data. The primary data alone would not be enough for interpreting the results obtained from the field. Therefore, to be able to compare and contrast the primary data, secondary data was introduced. The secondary data was obtained from articles, journals, and documentary sources.
2.7 Research instrument

In the conduct of any scientific report, the collection of primary data is important and it is dependent on the research instrument used. With regards to the focus of this exercise, the team decided to employ the use of interviews as the primary data collection method. This approach offered the team the opportunity to gather detailed information on the participants’ experiences which would not have been possible if we had employed a questionnaire or any other instrument.

Specifically, a semi-structured interview guide was developed and deployed using KoBo Toolbox. The purpose of using the KoBo Toolbox was to collect data for analysis. The semi-structured interview guide deployed by the KoBo Toolbox focused on factors that influences prices, processing capacity, source of soybeans, source of energy, nature of roads, and issues relating to being located in Kumasi. In addition to the semi-structured interview, an observational checklist was also developed and deployed using KoBo Toolbox. The observational checklist accessed the nature of the roads leading to these facilities. The observational checklist was prepared for the research to obtain some information which went a long way to support the results and discussion.

2.8 Systematic representation of data collection and analysis

The section presents the systematic approach for the development of the data collection instrument, data collection, data integration and data analysis.

![Flow chart showing the various steps used in collecting, cleaning and analyzing the data](source: UCC YouthMappers Construct, August 2018.)
From Figure 2, after the semi-structured interview guide was developed, it was deployed for the data to be collected using KoBo Collect and audio recorders. Before going to the field for the data collection, letters were sent to facility owners/managers declaring the intention of the visit and to elicit some information. Specially, the letter introduced the team, stated the exact date and purpose of the visit as well as provided a reliable contact person who was Faculty Advisor of the UCC YouthMappers. The team began visiting the various processing centers after the approval of these facility owners/managers. The field data collection began on 3rd August, 2018 and ended on 8th August, 2018.

At each site, the team first engaged each participant in an informal discussion where each student takes turn to introduce him/herself. After this session, permission was sought from the participant to record the interview. Each participant was assured of total anonymity and confidentiality of any information given.

After the field data collection, the audio recordings were transcribed into text. This was done to help the researchers obtain more and detailed information from the participants. The data gathered with KoBo Collect was also downloaded. The entire data was then integrated for analysis.

The integrated data was categorized into summary themes for the purpose of analysis. The analysis of the qualitative data combined the summary views of the participants with captured scenes and annotations which were taken from the transcribed text. Analysis from this approach created a mental picture of the contribution of soybean processing facilities to the value chain of soybean. The findings from the qualitative data was further discussed with related literatures.

2.9 Challenges

The team encountered a series of constraints which includes noncompliance of some participants in participating in the study. Though the team offered notices and a copy of the research instrument prior to the interview, the reception from some participants could not be considered as friendly. In the first instance, some participants failed to allow the team into their facility. In another case, the team was given the opportunity into a facility, but the participant failed to offer any information. On asking the first, five questions, ‘I don’t know’ was repeated as the response to the questions. Clearly, this participant was not willing to offer any information to the team. On requesting for another resource person, the team was declined. Another case of noncompliance was a decline of the team’s request to visit or inspect some facilities that had been
outlined in the team’s observational list. With several request to take a tour of their facility, some managers simply refused to allow the team to take such a tour. In some other cases, the team was subjected to long waiting period before interview was granted.

Though Kumasi has an industrial area, none of the soy facilities were located in this industrial hub. By this, the team had no option than to endure long travelling hours since these facilities were located on the outskirts of Kumasi. Aside the long travelling hours, the bumpy and poor road conditions made the trips quite tedious but with collective enthusiasm and focus, the team was determined to undertake this project.
FINDINGS

This section presents the main findings of the fieldwork and situates issues in the context of whether the processing manager had any influence in determining the price of soybean in the Ghanaian market and the reason for siting their facilities in Kumasi. The Table 1 below shows the various facilities that were visited during the field exercise.

Table 1: List of facilities visited by research team

<table>
<thead>
<tr>
<th>No</th>
<th>Name of facility</th>
<th>Designation</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Kingsworth Industries</td>
<td>Soy processing facility</td>
<td>Kumasi</td>
</tr>
<tr>
<td>2</td>
<td>Vester Oil &amp; Mill Ltd.</td>
<td>Soy processing facility</td>
<td>Kumasi</td>
</tr>
<tr>
<td>3</td>
<td>3K &amp; A Company limited</td>
<td>Soy processing facility</td>
<td>Kumasi</td>
</tr>
<tr>
<td>4</td>
<td>Awurade Akwan Soy Company Ltd.</td>
<td>Soy processing facility</td>
<td>Kumasi</td>
</tr>
<tr>
<td>5</td>
<td>Crop Care Ltd.</td>
<td>Soy processing facility</td>
<td>Kumasi</td>
</tr>
<tr>
<td>6</td>
<td>BioTex Processing</td>
<td>Soy processing facility</td>
<td>Kumasi</td>
</tr>
<tr>
<td>7</td>
<td>Ghana Nuts Ltd.</td>
<td>Soy processing facility</td>
<td>Techiman</td>
</tr>
<tr>
<td>8</td>
<td>Yedent Agro Group of Companies</td>
<td>Soy processing facility</td>
<td>Sunyani</td>
</tr>
<tr>
<td>9</td>
<td>Agricare Ltd</td>
<td>Feed mixer</td>
<td>Kumasi</td>
</tr>
<tr>
<td>10</td>
<td>Akropong Feeds &amp; Trading Limited</td>
<td>Feed mixer</td>
<td>Kumasi</td>
</tr>
<tr>
<td>11</td>
<td>Akate Farms and Trade Company Ltd.</td>
<td>Poultry farm/Feed mixer</td>
<td>Kumasi</td>
</tr>
<tr>
<td>12</td>
<td>TIG Farms</td>
<td>Poultry farm</td>
<td>Kumasi</td>
</tr>
</tbody>
</table>

Source: UCC YouthMappers, August 2018

3.1 Primary output of facilities

At all eight soy processing facilities visited, only two of them exclusively processed soybeans throughout the year. These two soy companies were relatively smaller in capacity than the other six (6) visited due to the nature and market of their produce. These two (2) exclusive companies included 3K&A and Ewurade Akwan Soy processing whose output entailed soy oil for domestic consumption and soy milk respectively. Distinctly, the size of the machinery observed in these companies were quite small which also required a significantly smaller quantity of soybeans for the years’ production.

The other six (6) soy companies visited, largely processed soybeans and other crops like oil palm and maize. This is because, the machinery employed in the processing of soy was also
used in the processing of these other crops. Though some observed difference were noticed in the method of processing soy, the output of these six (6) soy processing companies were similar. The output of these companies includes soy cake which is used as feed for poultry as well as the soy oil which is sold to paint manufacturers when it is in the crude state. As at the time of the visit, none of the six (6) companies visited had commenced its operation in refining the crude soy oil into edible oil for domestic consumption. However, Vester Oil Company had started installing its machinery to process the crude oil to edible oil. The photos below show a refinery and other facilities for refining crude soy oil.

Plate 1: Refinery and other machinery at a soy refinery plant
Source: UCC YouthMappers, August 2018

Regardless of the kind of output from these companies, one common denominator observed from the field was the dependency on soybeans and how the availability or otherwise impairs or promotes their operations. At all eight (8) companies, the primary source of soybean to these factories was from the local farmers in the Northern Part of Ghana namely Upper East, Upper West and the Northern Region.

When the team inquired how these processing companies get the needed quantity for their factories, the manager of one of the companies had this to say:

"We go there (Northern Ghana) ourselves but we avoid dealing with the farmers. The reason is that they are small scale farmers. You will go to one woman and she has only one bag to offer, you will go to another man, he has maximum three bags. If you want to deal directly with them then it means that your mobilization cost is going to be that high. As much as possible, we try to deal with the aggregators."
They (the aggregators) are their own people, they understand their language and they know the terrain”. [IDI with manager A, 3rd August, 2018]

‘’...We have agents, we send the money to them, they normally move from market to market on their market days so they gather them. You can’t get your whole bunch in a day. So, they will take time to be gathering them and then packaging them in the right sacks with right weight normally they bring them in 100kg sacks. You can see that we’ve packed some sacks; we are waiting for them to tell us beans are available then we send the sacks for them to uh bring the beans...’’ [IDI with manager B, 4th August, 2018]

‘’... what we normally do is that we don’t go there to buy but we have middle men. We have middle men who go in there to buy from the various farmers and then sell them to us. Then again, we also have some out growers. They have their own association where they collate the beans at the end of the farming season. The middle men buy from them then come and then sell them to us we don’t go there ourselves...’’ [IDI with manager C, 6th August, 2018]

The above narrative depicts the relatively sparse and small scale of production which further increases the cost of acquiring the soy beans needed for processing in Kumasi. That the farm gate price- the price paid to the farmer- reflects the costs to acquire the grain and transport it to the facilities in the central part of the country. Put another way, farmers would receive a higher price were they to sell in Kumasi. This narrative was shared by all the participants except for one company who purchases their soy grains from the Techiman market since he only requires a minimum of about 2 kg of soy grains for his small soymilk processing plant. To this small company, the relatively small quantity of soy needed meant that soybeans will always be available for their factory but this was not the same for the other companies hence their inability to meet the demands of their customers.

This field exercise took place in early August and at that time, processing companies were in their lean season since the supply of soybeans was in shortage. During this period the team gathered that farmers are busy preparing for the next harvesting season since the harvesting period of soy in Ghana ranges from late September to February. At the time of the study, it was revealed that the main source of local soybeans to these processing companies were from aggregators or middlemen since these people usually buy in bulk quantities during the harvest season and sell when the grains are in shortage. The main motive here is to take advantage of the situation and make more profit when the beans were in short supply.
3.2 Price of soybeans

When the field team inquired of the price of soy on the market, no two response were the same. One key observation was that, the price of soy was largely based on the seasonality of soybeans on the market. At harvest time, the price of soybeans could go as low as GH 130 cedis ($26.9 USD) for every 100 kg bag and as high as GH 250 cedis ($51.8 USD) for the same quantity in the lean season. When asked for some of the reasons for this disparity, the following were some of the responses from the participant;

‘’...Well, for soy delivered in Kumasi, you will not get it less than GH 250 cedis ($ 51.8 USD) for 100 kilo per bag. It could even range from GH 250 - GH 300 ($51.8 – 61.9 USD) when it is delivered to Kumasi. Even there, the final price depends upon when you are buying the grain. So the crop is seasonal. The grain is cheaper in terms of price when the season is at hand and this is around late November, December, January. This year (2018) it started around GH 130 cedis ($26.9 USD) for the same 100 kilo bag and as at now it has risen from GH 250 ($51.8 USD) and beyond... ’’ [IDI with manager A, 4th August, 2018]

‘’...Yeah for the price of soy, it depends on the current market prices. It’s not stable or fixed depending on the weather. For now, you will get it for about 240 per 100kg bag. Because we are in the lean season but they (the farmers) are now planting. They plant from June, July, August and by September it is ready so when you get to the harvest season it can come down to about 180, 170 cedis ($37, $35.2 USD) per bag... ’’ [IDI with manager B, 5th August, 2018]

‘’...For now, is around GH₵ 250 ($51.8 USD) per 100kg bag. This is not the price at all times. Two months ago, we’ve been monitoring the prices, I check Tamale and I check Yendi and it was around GH 180 Cedis ($37 USD). And then sometimes too we also follow the business news when they do their research and publish the prices, we get more information from there. We also find out because we need the prices for us to work out our budget... ’’ [IDI with manager C, 6th August, 2018]

From the above narratives, the difference in price between the harvest and the lean season is just about 96% and this makes it difficult for producers to properly plan for their business year. To break even, these processors have no option than to depend on aggregators who have long standing relationship or stock their storage facilities during harvest. It must be noted that aside Awurade Akwan Company who produced soymilk and process between 2 to 10 kg per day and yearly output is less than a ton, all the processing facilities visited had storage facilities of varying sizes ranging from 55 tons to as high as 75,000 tons. From this estimate, the two companies who exclusively processed soybeans had the least storage space of 55 and 600 tons and given the small
scale of these businesses, these two processing companies did not experience the same level of shortage as experienced by the other six (6) large companies who processed other food crops. Below are some plates of storage facilities observed in the field exercise.

Plate 2: Soybean warehouse of a processing plant, 2018
Source: UCC YouthMappers, August 2018

With the other (six) 6 large companies, Crop Care Ltd. had a storage capacity as high as 75,000 tons but it must be noted that none of the six (6) used all of its storage facilities for soy grains. When inquired about the proportion of storage facility that is used for soy grains, it was made known that the proportion stood at 25%. The reason was that these processing companies relied on soy as the principal source of protein in the feed produced for poultry and other animals’ feed and the soy content in the feed was just about 20 to 25%. With an indication of these variation and different price quotation by each processor, it is safe to say that, soy processing facilities in Kumasi have no influence on the price of soybeans in the Ghanaian market.

3.3 Reliance on imported soy grains and meal

In the wake of the observed seasonal shortages, one area that calls for attention is the alternative source of soybeans if domestic supply does not meet the needed demands of these processing companies. In all cases, none of the processing companies directly imports soybeans since they did not have the financial strength to make such purchase given the varying exchange rates and huge capital required for such import. On the other hand, the four (4) largest processing
companies among those visited claim to have purchased imported soy grain from Ghanaian importers to complement their production. When asked on the issues relating to the purchase of imported soy, the following was revealed:

‘‘As for the source, you know soybean mainly thrives in the savannah climate we have no choice to buy from the North. In Tamale (which is in the North of Ghana) there’s no market for soy products. The market is in Kumasi and the cost is cheaper if I set up in Kumasi than other part of Ghana.’’ [IDI with manager D, 4th August, 2018]

‘‘…Yes, I used imported soya bean depending on the availability of local grains on the market, you can see that there are imported ones in the market. Even the fish feed I’m doing right now due to shortage of local soya I am using imported ones. Yes, I used imported soybean…’’. [IDI with manager E, 5th August, 2018]

In further examination, the study found that this imported soy came from Benin, Brazil, Argentina and the USA. With reference to quality, none of the participant expressed any opinion on a difference in quality between the local grains and those imported. The only reason why they resorted to the imported grains was that, local farmers did not produce enough to meet the demand of these companies. It must be noted that, any fall in the value of cedi to the dollar further results in a rise in the cost of production since the price of the imported soybeans becomes more expensive. Another reason why these companies resort to imported soy was to maintain their customer base and keep them from being captured by other competitors. The picture below (plate 3) shows imported soy as observed during our data collection.

Unlike soy processing facilities that rely on the imported soy grain to feed their factories, large feed manufactures preferred to purchase of imported soymeal since the soy processors find it difficult to supply the needed quantity during the lean season. In addition, these large feed mixers also rely on imported soy meal since they are largely produced using the solvent extracted method as compared to the mechanically pressed method which is largely practiced in Ghana. In accounting for why feed manufacturers prefer to use imported soy product, the following observations were made;

‘‘...You always have shortages of soybean very early in the year. In fact, by June of every year, our own soy stock is almost finished so you depend on imported. And let me say that, largely, soy that we use, 60% is imported. When I say soy, I am referring soybean meal, 60% is imported, only 40% is local and it runs out by June. You find some soy on the market but the price is like that [up]. We are not producing enough at all...’’ [IDI with manager D, 6th August, 2018]
‘...With the mechanic process, the soy is pressed till the oil drains from it but it keeps fats which causes the soymeal to go rancid because of the high level of fat left as residue. Once you can’t guarantee the fat content in the soymeal will be low, it will be difficult for us to buy from such processor. I must say that if we have a producer who is able to process it well and can guarantee that the fat level is relatively low which passes some microbiological tests, we can use it. We always prefer the solvent approach of producing soymeal as much as possible but this is not widely done in Ghana since its way too expensive to do so. As much as possible, we want to promote the Ghanaian industry because we are members of Association of Ghanaian Industries and wouldn’t want to buy it from others for others to enjoy but processing constraints...’ [IDI with manager F, 5th August, 2018]

Owing to the above, the study found that, there were two distinct method of processing the soy grains and these included the mechanically compressed and the solvent extraction methods. The mechanically compressed method required the use of compression machines to drain the oil from mashed soy grains. This method requires the use of very little or no chemicals and relatively cheaper to deploy. The issue of concern with this method has to do with its low efficiency when it comes to its ability to drain the required oil from the mashed soy grain. With an expected 5% residual oil and 95% extracted oil, the mechanical method only delivers less than 70% of the expected oil leaving about 30% residual oil (Wulfsohn, Irudayaraj, Sosulski, & Bargale, 1999). Such volumes of residual oil produce strong peptides that makes it difficult for poultry birds to digest when applied as feed. This has been the main reason why some large feed manufactures preferred to purchase imported soymeal and also rely on a few local processing facilities like Vestor Oil who employ the use of the solvent approach.

Plate 3: UCC YouthMappers inspecting bags of imported soy meal from Argentina
Source: UCC YouthMappers, August 2018
3.4 Carting soybeans to Kumasi

On the means of transport, all companies revealed the use of various haulage firms as the best option for the carting soybeans from the northern districts to Kumasi. Hiring these haulage firms was also confronted with issues which were clearly out of the reach of the soy processors. Though petroleum prices have relatively been a key factor that determines the cost of transportation in Ghana, this was not the only determining factor for carting soybeans from the Northern part of Ghana. Other factors that influence the cost of transportation are the conditions of the roads as well as the number of bags of soy on board.

During the dry season when road conditions are slightly improved with relatively small/few potholes, transportation costs could be as low as GH 4 cedis (less than $1 USD) for a 50kg per bag of soy. On the other hand, when road and driving conditions are poor, the cost of transportation increases nearly threefold as expressed by one participant:

‘’...At the beginning of the soy season we were unable to buy beans in November when the soy was at its peak. The reason was that the Biupe bridge (A bridge that connects the Northern region to Kumasi) was down and therefore where they (haulage firm) were going to use another route before it (soy) comes here. So, they were charging 3 times the transport cost. If the transport cost from Tamale to here (Kumasi) for 50 kilo bag then was GHC10, (nearly $2 USD) the bad nature of the bridge which made it impossible to pass on made them charge about GHC 30 ($6.2 USD) per bag (the amount is just an example) ...’’ [IDI with manager E, 5th August, 2018]

The irony of the processors is that, these transport costs are absorbed by the processing companies since they want to stay in business and not lose their customers to imported soy products in the market.

3.5 Road and Transport in Kumasi

In the wake of exploring the factors that influence the price of soy, the state of transport in Kumasi was not left out. Attention was placed on both the transport route and the means of transport available. At the visit, all eight (8) soy processing sites owned a few means of transport which ranged from trailers to minivans. Purposively, none of these vehicles were used to cart soy beans from the three (3) Northern regions of Ghana to Kumasi but were only used in the distribution of soy product to the various customers in Kumasi and other communities. Even with
the distribution, the processing managers complained about how poor roads in Kumasi frequently increase their cost of production. This was the view of one participant on the subject matter:

‘‘...It’s not good, it’s not good at all in Kumasi. From Atonsu to this place, you will see a lot of potholes. So, the road in Kumasi honestly is not good. It’s the same way outside Kumasi. But we are managing. The only thing I can say is that, because of it being unmotorable, there is a lot of vehicles repairs. Honestly this will definitely just hit our profit because anytime the vehicle goes once or twice, it ends up at the mechanical shop...’’ [IDI with manager F, 5th August, 2018]

‘‘...Looking at the nature of roads, there are places that the roads are very bad. You know, some of the roads to the farmers are really bad. Even if we use the soy agents, some of roads are so bad that whilst sending the soy grains to us, some of them are really affected in transit. There has been occasion that there have been arguments, we send some soy products to some customers. We know that we have sent 100. It gets there then it might be 99 or 98. And who knows what might have happened. Maybe along the line the car broke down and 1 or 2 might have gotten missing. So, the road naturally is having an effect on business....’’ [IDI with manager G, 6th August, 2018]

‘‘...of course. See we have some road tarred recently. Before, it was un tarred and we had a lot of dust here. But now, we are comfortable here. You don’t have much dust. But the potholes in all our roads spoils our car. So, these are the constraints, if the roads are not good, your maintenance cost of your vehicle goes high....’’ [IDI with manager H, 3rd August, 2018]

To make the situation clearer, none of these factories were sited in a densely populated residential area but rather situated in the outskirts of Kumasi where their activities would not greatly impair the lives of residents close by. The assertions stated above was equally shared by the other participants during our visit and the team equally had a fair share of this poor roads which was characterized by un tarred and pothole laden paths.

3.6 Access to market

The narrative in this section reflects the decision of the managers to establish their facilities in Kumasi. A review of farming practices in Ghana reveals that, soybeans are heavily cultivated in the three (3) Northern regions which is not less than 390 kilometers from Kumasi. Knowing that the location of raw materials is one key factor that influences the siting of facilities, the team was quite intrigued to ascertain the reason (s) why these processing factories have predominantly lined up in Kumasi and not in any other locations.
To get a fair understanding, questions related to the above stated hypothesis was posed to the managers of the eight (8) processing facilities and these were their views;

‘‘If you look at the geographical nature of Ghana, Kumasi is a focal point and is almost in the middle. In my first economics lesson, I was thought that location of industries must either be close to the market or close to the raw material source. If you choose to put a fish meal factory in Tema (which is to the south of Ghana), all the grain (raw material) you will need will come from northern part of Ghana which will have to be transported back to Tema. The market of feed is in the middle part of Ghana where most livestock farms are located. That is, you are carrying the raw materials from the North to mill in Tema, after which you need to bring the finished goods to Kumasi or to Sunyani. This is just a waste of resources and transport cost. To avoid that, position the facility in the middle of Ghana (Kumasi) where you are firstly closer to the market (in Kumasi) and secondly, closer to the raw materials’’. [IDI with manager G, 6th August, 2018]

‘‘…Even though the raw material source is in the north, when you look at the poultry and livestock industry, okay the hub of it is in the Ashanti Region and Brong Ahafo okay, even though oil mill was set up to produce oil, so after you have produced your finished goods, where you market your produce is very important and if you are closer to your market the better for you. Do you see, so even though, the raw material source is in the north, I believe it is not by accident that whoever set up the company located it around this area since both the oil and the meal have a ready market here…’’ [IDI with manager D, 7th August, 2018]

‘‘…I wasn’t here 50 years ago and I was then in middle school anyway. But what I hear is that Kumasi happen to be in a central position. So, they were established in Kumasi here and the idea that it is easy to supply this good to every part of the country with our processing. I also know that this establishment was made here so that they can easily fell on any local ingredients from any part of the nation for example maize and soy. Also, this is the most important one, the fact that they realize that this area Kumasi area happens to be the hub of poultry. That was the time that Darko farms and the others that small farm. So, there were a lot of poultry farms around here...’’ [IDI with manager C, 4th August, 2018]

From this narrative, three (3) factors that influenced the siting of the factories in Kumasi can be derived and these include; proximity to market, proximity to raw material and transport cost. In accessing the value chain of soybean production, one observation that was made was that, each component of the value chain supplies others and also depends on the supplies from other components to survive and this was evident in the case of the soy processing facilities.
While processing the soy grains from the North, the main output of the milling process is the soy cake and the soy oil. The soy cake constitutes about 80% of the entire output while the oil constitutes the other 20%. This soy meal or cake is heavily demanded by the feed millers or mixers who combine the protein rich soy meal with other crops to produce feeds for the poultry and other livestock.

Though the feed millers were not the main focus of this study, the team further took steps to visit Agricare Ltd which was one of the largest feed manufacturers in Ghana and also serves as ready market for the output of the soy processing facilities. The picture below indicates some scenes from the team’s visits to the Agricare.

Plate 4: Feed mix in yellow bags and imported soy meal in white bag
Source: UCC YouthMappers, August 2018

To confirm the assertions of the stated above, the team further inquired what motivated feed milling companies to site their companies in Kumasi and these was their responses;

‘’... most of the poultry farmers are located in the middle and southern sector of Ghana so if you go to the North, you will not find any poultry farm there. So, when you decide to set the processing facility there (in the North) because of closeness to the raw material, you will process it (soybeans) and definitely will bring it down here (Kumasi and other communities in the south) and sell ...’’
[IDI with manager D, 4th August, 2018]

Indeed, the above narrative further points in the direction of other components of the soy value chain and this refers to the poultry industry. A review of the Ghana’s poultry sector by the
Food and Agriculture Organization in 2014 indicates that the Ashanti Region of whose capital is Kumasi is the leading producer of poultry in Ghana. Owing to this revelation, the study was not surprised to encounter many large-scale farms like Akati and TIG farms which had a minimum of about 150,000 birds as at the time of the field visit. All these facilities have been indicated in the map below.

According to the above responses, Kumasi is closer to the soybeans production regions as compared to Accra and Tema. The distance from Kumasi to Tamale, Wa, Bolgatanga, and Yendi is 379.9km, 445.7km, 542.6km and 477.7km respectively. As opposed to the distance from Tema (the industrial city) to Tamale, Wa, Bolgatanga and Yendi which is 649.3km, 711.2km, 811.9km, and 496.7km respectively.

Figure 3: Map showing the various facilities visited in Kumasi

Source: UCC YouthMappers, August 2018
3.7 Access to raw materials

It is common knowledge among processors and poultry farmers that northern Ghana which includes the Upper East, Upper West and Northern regions, is the major hub of soybean production. The crop, originally introduced to the country in 1910 was used by farmers in Bimbila, Nakpanduri, Karaga, Tilli and Bawku. The situation has not changed much in recent times. According to the CSIR 2006, 90% of local soybean production is carried out in the north with only 10% in southern Ghana specifically Ejura farms.

‘...As for the source, you know because soya bean mainly thrives in the savannah climate thereabouts we have no choice. Tamale there’s no market, not big market for the soya bean, they all bring it down the country, so you send money to them and then the quantity you want, then they give it to a truck to be delivered to you...’ [IDI with manager A, 3rd August, 2018]

In the course of the study, one of the participants said they are established in Kumasi since it is easier to get local ingredients such as maize and millet from Upper west and Brong Ahafo and Northern regions as compared to getting them when they are in Accra and so, establishing in Accra will be stressful and more expensive getting the grains all the way from north. Also, soybeans are not the only raw materials they process, some said they process maize and other grains in addition to soybeans.

‘Yes, if we want to talk about soy production, you will agree with me that you cannot produce soy better than any other place apart from the North. When it comes to the climate, the North is the best environment for soy production but we don’t also use only soy for our production, we also use maize. When it comes to maize too, you cannot also produce so much maize leaving out Brong Ahafo. Have you seen that? Yes. When it comes to millet too, the millet also grows better in the North, yes, so considering all these factors and all factories are also sited in Tema and other places in the south...’ [IDI with manager E, 5th August, 2018]
It therefore concludes that the decision to setup the processing facilities in Kumasi is one that was largely motivated by the presence of ready market (feed millers and poultry farmers) and proximity to the raw materials in the Northern part of Ghana.

3.8 Access to credit

Availability and access to credit facilities to soy processing was one issue that emerged from the study. With a capital-intensive business like this, access to additional credit goes a long way to assist managers to keep up with current trends in technology as well as meet increasing costs of doing business in the country. In all eight (8) soy processing companies none of them acknowledged the readiness of domestic financial institutions to support the agricultural sector in general and the agro-processing companies in particular. When the team asked managers for their experience in securing additional credit facilities these were some of the reason stated;

‘’...The banks are not smiling at us. Not at all. All because they rated agric business as risky. So, they find it difficult to just smile at us. Since we’ve started we’ve not had any support from the banks. We have applied for loans so many times. They (the local banks) come in and go and we don’t hear from them again. It’s this foreign bank, this financial institution that have been helping us. We had Root capital: they are in Kenya and they have their office in Accra but it’s a U.S base bank. So, they have been helping us but with the local banks, we don’t have any benefit from them because they rated agric business as risky...’’ [IDI with manager F, 5th August, 2018]

‘’...They are not and the interest rate at which they are charging is too high. It means that I will be working and the profit I get, I go and give it to them (the bank). Why should I work at this age and give you (the bank) my profit? Then I will as well let the building be there (and not produce at all). The interest rates in Ghana is prohibitive. Is not business friendly at all. And that is what is killing a lot of Ghanaian businesses. You have to raise the money by yourself. When I am paid at the end of the month, I come and invest into the business and then I fast (go without food). I invest and then take it slow. But God willing, we will get somewhere. To me, it makes more sense than rather to go and borrow and be in debt.

I am working to get money but not working to be a slave to somebody. I will not go for your loan and when the loan payment is due then I come and give excuses. I won’t do that. So, I will not take your loan...’’ [IDI with manager C, 4th August, 2018]

A review of interest rate in 2017 among the various commercial banks indicates an average of 33.2% interest to the agricultural sector. In details, this rate to the agric sector could go as high as 41.2% (Eduku, 2017). The issue of credit to the agric sector is not just about the interest rate
charged but the complex process that needs to be observed just to access the loans. Aside the
administrative process, banks usually shy from business that cannot be predicted with certainty
and also presents a high level of risk to investment.

Ghana agricultural sector is largely dependent on weather and exchange rates and with
such unpredictability, it is quite difficult for the bank to boost their confidence in venture especially
when it comes to farmers who supply raw materials for various usage. In the case of agro
processors who rely on raw crops and also needs some considerable capital injections to keep
afloat in their business, access for them is more difficult. It was therefore not a surprise that, the
only source of credit to their outfit was a foreign bank who is deemed to understand the plight of
agro- industries.

3.9 Power situation

With regards to power as a determinant for siting the processing facilities in Kumasi, it can
vividly be seen from the study that most of the processors were facing power issues because of
instability of power supply and high cost of power. It was revealed that in the previous years, the
power supply was so terrible and this affected production greatly. Aside from the effect of the
unstable power supplies, some processors had to adopt an alternative source such as, using
generators for their operations.

It’s not been long since the country escape the period of the erratic power interruptions which
was locally termed ‘dumsor’. In March this year, the government announced a 30% reduction in
tariff for commercial users of power in Ghana and this saw a great deal of praises by the members
of Association of Ghanaian Industries of which soy processors were no exception (Allotey, 2018).
A careful view of the geography of Kumasi reveal the existence of an industrial enclave in Kumasi
but to our surprise, none of these soy processing facilities were situated in this enclave. This
industrial area is demarcated by the Electricity Company of Ghana since the power needs of such
companies differ significantly from residential zones. Here, power supply to such area is improved
with power transformers that are able to supply the needed volume of power required by all the
companies (Figure. 4).
In the case of the soy processing plants, these firms were all located in outskirt and sometimes experience some power fluctuations but on the whole, the supply of electricity to these facilities is somewhat better than what it used to be during the eras of ‘dumsor’ of 2016. The distance of these processing facilities from the industrial area ranges from 3.15 km to 32.5 km. This call for rezoning of those areas to be included in the industrial enclave to enjoy electricity subsidy being offered by the government of the day to industries in Ghana to boost production and employment generation. On closer inspection, the study further revealed that most of these facilities had alternative power supply but had not used these for a while since the supply from Electricity Company of Ghana has relatively been stable for their usage. It must be noted that, participants’ account of the current power supply was done in comparison to the days erratic power
supply (dumsor). On the account of the state of power supply, the following responses were elicited;

“...Sometimes there is power fluctuation on and off but not often...” [IDI with manager F, 5th August, 2018]

“...Is available now but before we went through a struggle (periods of erratic power fluctuations) I was the vice chairman for the Association of Ghana Industries for Ashanti and Brong Ahafo. We fought government and we shouted on the radio and everywhere. When the power outages were common, Kumasi suffered more than Accra because Accra have a lot of huge hospital and the big people (influential people) who were not happy about the rate of power outages in Accra. Now, you don’t have to cry because there is power anyway you can use it readily. The cost is about the same as any part of the country so that’s the description I can give...” [IDI with manager G, 6th August, 2018]

“...That one too is another story, here. Last year or three years back it was tough, I think we all know about “dumsor” we used to have about 150kv of backup power which was always used when there is light out and this was used to take care of the plant but when we want to add the 22 tons machine per day, the backup power couldn’t cover it so we had to buy another one. We added on 400kv so when the light is out we use that one. Other than that, we cannot be able to work throughout the day...” [IDI with manager D, 4th August, 2018]

The above narrative depicts the comments raised by the participants for the study about their views on power supply. In validating these views, other literature were consulted and there was no contrast. Power outages had significant impact on productivity because it increases the cost of production since firms had to secure alternative power source. Aside the cost of acquisition, another issue of concern is the recurrent cost of fueling and maintenance/repairs which equally increase processors cost of production. After the purchase, the recurrent cost of fueling and maintaining these power plants was another constraint in those eras (Abeberese, Ackah and Asuming, 2017). Below are images of some alternative power sources during our visit to some facilities;
Even though most of the processors in Kumasi and its environs had serious issues with electricity supply, other processing facilities such as Yedent and Ewurade Akwan were in full operation without facing any issue about power. For Ewurade Akwan, they generated their own power for production. The manager explained that, the cost of acquiring alternative power source was relatively cheaper compared to power from the national grid. With Yedent, they did not experience any power crisis since the power crisis was focused on the southern part of Ghana.

3.10 Spatial Analysis of processing sites

In an effort to assess the viability of Kumasi as an ideal location for soybean processing and its market, spatial analysis using buffer operation of the study was generated. The result shows that soybean processing facilities, feed manufacturers and poultry farmers in Kumasi are clustered in one area and also within some few kilometers drive from each other. The operation was performed with the following kilometer of buffer generation from visited facilities i.e. 5 km, 6km, 8km and 10km.
Figure 5: Spatial analysis between processing facilities and their ready market  
Source: UCC YouthMappers, August 2018  

Figure 5 looks at the radius of operation and it can be seen that there is ready market for the products. This is seen in the number of ancillary businesses that surround these processing centers (these businesses being feed mixers and poultry farmers) and more so their close proximity. It could be inferred from such operation that the soybean processing facilities, feed manufacturers and poultry farmers are relating in a symbiotic situation. The product of the processing facilities serves as a raw material for the other facilities. For example, the soy meal serves as a raw material to feed mixers and poultry farmers.
CONCLUSION AND RECOMMENDATION

4.1 Conclusion

The project in all has provided an in-depth knowledge into the soybean industry. This research has thrown more light on the entire value chain of soybean ranging from the cultivation, processing to its usage. With first hand experiences from processors and poultry farmers alike, the team has come to appreciate the challenges they face in their day to day operations not forgetting the numerous opportunities and benefits they already enjoy. This project is a major stepping stone with regards to studies on soybean processing in Kumasi and on a large scale, Ghana and leaves room for further studies on the entire value chain. The study provides relevant insight on realities that will call for the attention of stakeholders like the Government of Ghana, Donor Agencies and Non-Governmental Organizations and will be essential in influencing policy and decision making regarding the soybean industry specifically, agriculture and food security in general.

From the data collected and analyzed, the following conclusions were drawn:

1. Local production of soybean does not meet its demand.
2. Price of soybean varies throughout the year.
3. Temporal arbitrages exist on the soybean market. The major determinant of price being the availability or otherwise of soybeans on the market with low prices during harvest times and major spikes in price during lean seasons.
4. Spatial arbitrages exist between soybean farms in the north and processing centers in and around Kumasi. The main contributor to this being transport costs incurred and aggregator commissions charged for the gathering of the soy grains.
5. Kumasi is an ideal location for the siting of a soybean processing plant.
6. Kumasi is an advantageous location in accessing soy grains from the three northern regions. The city has become the trade bridge between northern and southern Ghana.
7. Kumasi is in close proximity to ready market- livestock and poultry farms. It is the hub of poultry products in Ghana.
RECOMMENDATION

Based on the findings obtained from this study, the following recommendations are made:

1. Inclusion of soy products in school feeding programme: In order to improve the patronage of soy products, it would be recommended for the Government should direct caterers in charge of its flagship school feeding program cooking to use soy products such as soy oil. This would help improve the economy and nutrition of the pupils.

2. Financial Assistance: Inadequate capital was recognized as one of the major challenges these processors were facing. The Government, NGOs, financial institutions and other stakeholders should make available low interest loans which soy processors can easily contract to help grow the soybean processing industry.

3. Establishment of storage facilities: The Government could curb the fluctuating prices of soybeans through the establishment of storage facilities. This facility will help create a buffer stock which will ensure an all year supply of soybean and also stabilize the price of soybean throughout the year.

4. Boosting the soybean market will lead to the provision of employment for farmers and the many people that will be employed by the processing facilities.

5. Improvement in the road infrastructure leading to both the processing sites and the farms.

6. Foreign exchange: The government should encourage local cultivation and production of soybean and its products in order to boost the market of the soy industry and to also encourage the exportation of soy while reducing the importation.

7. Giving tax exemptions to processors in order to enable them import processing plants especially those for chemical extraction. This method is needed to increase output, reduce wastage and increase profitability of soy processing firms.

8. The government should ensure the supply of stable electrical power and to make sure that all processing plants are connected to the grid.
REFERENCES


