Final Evaluation of the "Assisting in the Management of Poultry and Layer Industries with Feed Improvement and Efficiency Strategies" (AMPLIFIES) Project

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FINAL REPORT

PREPARED BY:

EXECUTIVE SUMMARY

Assisting in the Management of Poultry and Layer Industries with Feed Improvement and Efficiency Strategies, or AMPLIFIES, is a project undertaken by the American Soybean Association's (ASA) World Initiative for Soy in Human Health (WISHH) Program to revitalize the local poultry industry.

AMPLIFIES has seen much success since its inception five years ago. Poultry farmers, crop farmers, feed millers, and members of Farmer Based Organizations saw their livelihoods and finances improve because of AMPLIFIES. These benefits included, but were not limited to, improvements in feed formulation and feeding and storing techniques and practices, as well as reductions in feed contamination and post-harvest loss. This helped participants grow larger, healthier poultry birds and optimize outputs, which translated to significant cost savings. Capacity building trainings on bookkeeping and general financial management further helped them access loans from credit facilities to support their businesses.

Importantly, AMPLIFIES engaged key stakeholder groups across the entire poultry value chain, successfully encouraging them to network and collaborate with one another to improve the greater good. Beyond trainings and services, AMPLIFIES also engaged the public at large through a national awareness raising campaign that improved negative public perceptions about eating eggs and increased egg consumption and, thereby, profits for participants.

AMPLIFIES' participants were, on the whole, satisfied with the program and expressed gratitude. Yet, many participants still face significant challenges that impede their ability to produce and store their goods and access loans, all of which make it considerably difficult to maintain their livelihoods. Participants shared their thoughts about programmatic areas that they felt needed improvement as well as ideas to strengthen the program for future iterations. Despite challenges, AMPLIFIES was found to have increased productivity and profitability along the poultry value chain, in large part achieving its programmatic goals and objectives.

ACKNOWLEDGEMENTS

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We are also thankful to the AMPLIFIES Monitoring and Evaluation team, comprised of Cephas Agbesi, Lois Aryee, Philip Annankra, and Danson Alexander Anokye, who provided assistance in training TKG on the data collection tools created by AMPLIFIES and provided background on AMPLIFIES activities and past data sources. We appreciate the inputs from all project beneficiaries who contributed to this Final Evaluation, as well as the Ghana Ministry of Food and Agriculture (MoFA) officials who were directly involved in the project and all Credit Facility Providers who participated in the evaluation.

TKG also credits all researchers and institutions who offered their support in carrying out this study. This report was prepared by TKG team members Michael Tuffour (PhD), Ifedapo Agbeja, Derrick Alledom Bakuri, Ani Jilozian, and Olalekan Olagunju. Finally, we extend our appreciation to the United States Department for Agriculture (USDA) for funding this initiative and to all local and international stakeholders.

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LIST OF ABBREVIATIONS AND ACRONYMS

ACDI/VOCA	Agricultural Cooperative Development International and Volunteers in Overseas Cooperative Assistance
ADRA	Adventist Development and Relief Agency
AMPLIFIES	Assisting in the Management of Poultry and Layer Industries with Feed Improvement and Efficiency Strategies
ARS	Annual Results Survey
ASA	American Soybean Association
ASSESS	Analytical Support Services and Evaluations for Sustainable Systems
CAC	Crop Aggregation Centers
CAPI	Computer-Assisted Personal Interviewing
CATI	Computer-Assisted Telephone Interviewing
CAQDAS	Computer-Assisted Qualitative Data Analysis Software
DANIDA	Danish International Development Agency
DSU	Delaware State University
FAO	Food and Agriculture Organization
FBO	Farmer Based Organization
FGD	Focus Group Discussions
FFPr	Food for Progress
GNAPF	Ghana National Association of Poultry Farmers
GPP	Ghana Poultry Project
IDI	In-Depth Interviews
KII	Key Informant Interview

KNUST	Kwame Nkrumah University of Science and Technology
MoH	Ministry of Health
MoFA	Ministry of Food and Agriculture
OH	Outcome Harvesting
OLS	Ordinary Least Squares
PICS	Purdue Improved Crop Storage
RFP	Request for Proposals
SARI	Savana Agriculture Research Institute
SCM	Success Case Method
TKG	The Khana Group
ToR	Terms of Reference
UDS	University of Development Studies
URI	University of Rhode Island
USAID	United States Agency for International Development
USDA	United States Department of Agriculture
VOCA	Volunteers in Overseas Cooperative Assistance
WFP	World Food Programme
WISHH	World Initiative for Soy in Human Health

INTRODUCTION

1.1 Background

Ghana's poultry value chain sector serves as a source of employment for many rural and urban dwellers. It also serves as a vital source of food security for the Ghanaian populace (Aning, 2006, Ministry of Food and Agriculture, 2010, United States Department of Agriculture, 2016). The sector witnessed a production boom in the 1950s through the 1980s. By the 1990s, the sector was performing poorly, especially with regards to production. Despite poor production, demand for poultry products was increasing. By 2005, Ghana's domestic poultry production could only meet 34% of its local demand. While poultry production was generally performing poorly, egg production was doing relatively better (USDA, 2011; Banson et al., 2015). The generally discouraging performance in poultry production over the years had a negative impact along the poultry value chain, including feed mills and hatcheries (Aning, 2006).

The significant decline of the poultry sector can be explained by several factors: the high cost of production, poor production technologies, lack of reliable credit, the emergence of pests and diseases, and poor managerial skills of the poultry value chain players. Another key factor that negatively affected the sector was the high level of competition from imported poultry products that were cheaper and of higher quality than locally produced ones (Khor, 2006; Birol et al, 2010; Tuffour and Sedegah, 2013; Sumberg et al., 2013). To a large extent, the aforementioned factors can be attributed to Ghana's Structural Adjustment Program, which promoted the reduction and later cancellation of crop subsidies to poultry farmers and also encouraged the high importation of poultry inputs and products with which local ones could not compete (Khor, 2006; Christian Aid, 2005; Kusi et al., 2015).

Over the last decades, the Ghanaian government put forth several interventions through the Ministry of Food and Agriculture (MoFA) to prevent the poultry industry from collapse. One such intervention is MoFA's collaboration with local stakeholders and international agencies. Locally, the MoFA has worked with the Ghana National Association of Poultry Farmers (GNAPF), a key local player, to revamp the poultry sector, but the results have not been significant. At the international level, the Ghanaian government has cooperated with the United States Department of Agriculture (USDA) and its local collaborative institution the United States Agency for International Development (USAID) to undertake the Ghana Poultry Project (GPP) and other projects to revitalize the local poultry industry (USDA, 2016; Agricultural Cooperative Development International and Volunteers in Overseas Cooperative Assistance (ACDI/VOCA), 2020; Khor, 2006; Christian Aid, 2005; Kusi et al., 2015). One of their most recent programs is the Assisting in the

Management of Poultry and Layer Industries with Feed Improvement and Efficiency Strategies (AMPLIFIES).

1.2 The AMPLIFIES Project

The AMPLIFIES Project was a five-year project mainly undertaken by the USDA in collaboration with foreign partners, local stakeholders, and academic institutions. Foreign partners include the Adventist Development and Relief Agency (ADRA), American Soybean Association (ASA), and World Initiative for Soy in Human Health (WISHH). Local stakeholders include the GNAPF, MoFA, and Ministry of Health (MoH). Finally, academic institutions were led by Kansas State University (KSU) in collaboration with academic institutions in Ghana (USDA, 2020). The poultry producing areas in Ghana where the project was implemented included the Greater Accra, Ashanti, Brong Ahafo, and Northern Regions (USDA, 2016; USDA, 2019).

1.2.1 Baseline Study

A Baseline Study, conducted in 2015 before AMPLIFIES was implemented, was used to assess the poultry situation in the country and was intended as a clear basis of comparison for the achievement of AMPLIFIES' goals (USDA, 2016). It was led by the USDA in collaboration with the USAID's West Africa Analytical Support Services and Evaluations for Sustainable Systems (ASSESS), a partnership that brought together the University of Rhode Island (URI), Delaware State University (DSU), and Kwame Nkrumah University of Science and Technology (KNUST).

The Baseline Study aimed at ascertaining the interventions meant to target feed producers and poultry farmers. It focused on assessing the technical and financial means, as well as the economic viability and sustainability of the poultry sector along its value chain, to be used as a point of comparison after the implementation of AMPLIFIES. The study covered the Ashanti, Brong Ahafo, and Greater Accra Regions, due to their significance in the poultry value chain in Ghana. AMPLIFIES was also conducted with participants in the Northern Regions, though this was not included in the data analysis. The study employed poultry farmers and consumers of poultry products as its key respondents (USDA, 2016).

The Baseline Study revealed that poultry production was generally not financially viable, as the market was poor and there was a lack of proper insurance schemes. Yet, the study showed potential for farmers in the sector to make a profit. Findings also revealed that the quality of feed farmers produced dictated the growth and health of their poultry birds. Additionally, it was found that poultry farmers had shifted from producing meat to producing eggs. This is despite the fact that Ghanaians often adhere to

misconceptions about egg consumption. Finally, the study found that farmers had poor marketing skills and that the lack of strong partnerships among stakeholders in the sector resulted in poor collaboration. This informed a key recommendation of the study: to form a Poultry Development Board that encouraged a high level of collaboration among key players while also making data readily available for effective decision making in the poultry sector.

1.2.2 Objectives and Key Activities

AMPLIFIES was implemented to increase productivity and profitability along the poultry value chain. It also aimed at strengthening the production, marketing, and financial performance of the poultry sector value chain by specifically targeting feed producers/production, poultry farmers, and consumers of poultry products. The program set out to achieve the following three main strategic objectives aimed at increasing the agricultural productivity of the poultry value chain:

- To increase the quantity and lower the cost of poultry feed through the reduction of post-harvest loss and procurement inefficiencies of primary feed ingredients;
- To improve poultry feed quality by boosting feed testing capacity and demonstrating the benefits of quality feed;
- To increase the trade of eggs through awareness campaigns and the trade of commercialized poultry feed through improved distribution networks and marketing.

To achieve these objectives, the program undertook ten major activities, as outlined below.

1) Improving poultry feed by introducing farmers and feed millers to strategies that would:

   a. improve feed components for poultry;

   b. lead to a cost saving in production; and

   c. encourage a sustainable way of providing feed for poultry farmers in Ghana.

2) Improving the quality and consistency of feed formulations by teaching farmers and commercial feed millers how to:

   a. test for mycotoxin;

   b. measure the nutritional content of poultry feed; and

   c. formulate the right poultry diets for each breed.

3) Increasing feed testing capacity using quality assurance manuals that teach participants how to test the quality of feed at feed testing facilities and feed mills.

4) Improving the efficiency of feed processing by training farmers and feed millers on:

a. techniques in mixing feeds to meet the nutritional requirements of the birds; and

b. standards for quantifying feed ingredients at feed testing facilities and feed milling services for other value chain players.

5) Improving efficiency around procuring feed ingredients by building strong linkages between the various players on the poultry sector value chain, including:

a. crop farmers,

b. poultry farmers,

c. crop aggregators,

d. processors, and

e. GNAPF and government officials (ASA, 2018a, 2019a, 2019b).

6) Building the capacity of farmers to obtain investments in feed processing by teaching them how to:

a. carry out basic bookkeeping and record keeping;

b. prepare income and expenditure accounts;

c. manage stocks;

d. access loan facilities; and

e. efficiently manage given loans.

7) Developing infrastructure for post-harvest storage and the aggregation of feed inputs by:

a. providing farmers with storage facilities for harvested crops needed for poultry feed;

b. constructing crop aggregation centers (CAC) and standalone drying platforms in the Northern, Brong Ahafo, and Ashanti Regions;

c. training local committees in the beneficiary communities on how to manage the facility, store produce in the warehouse, manage the produce, and handle post-harvest materials;

d. providing all local committees with the required tools and manuals, including GrainMate Moisture Meters, Purdue Improved Crop Storage (PICS) bags, and CAC operating manuals to effectively manage the facilities; and

e. Providing select local committees with Flatbed Biomass Assisted Dryers and Cleaners for crop storage (ASA, 2018a, 2018b, 2019a, 2019b).

8) Expanding the poultry feed distribution network by increasing the participation of the various stakeholders and players of the poultry industry value chain in the processing and distribution of poultry feed and, thereby, creating employment opportunities for them.

9) Organizing a national awareness raising campaign to promote egg consumption by educating the public on the benefits of eating eggs (ASA, 2018a, 2018b, 2019a, 2019b).

10) Training farmers in harvesting and post-harvest handling techniques and storing feed inputs, namely on topics relating to:

a. timely harvesting;

b. strategies to reduce pest and disease in crops; and

c. techniques to mitigate post-harvest loss, which include shelling, winnowing, drying, proper use of the GrainMate Moisture Meter, bagging, and storage to reduce aflatoxin infestation and storage losses (ASA, 2018a, 2018b; 2019a, 2019b).

1.2.3 Final Evaluation

The Final Evaluation was carried out to serve the following purposes:

1) To provide a better understanding about the perceived benefits and shortcomings of AMPLIFIES Ghana.

2) To develop additional knowledge about the confounding variables that influenced beneficiary outcomes.

3) To identify strategies for further advancing the poultry value chain and develop recommendations for future programming.

To do this, a list of recommended next steps for the USDA and the poultry value chain was developed. Based on the Terms of Reference (ToR), the AMPLIFIES Final Evaluation sought to answer the following specific research questions:

1) What aspects of the program contributed to the positive or negative outcomes experienced by the beneficiaries?
2) What external factors contributed to the level of success achieved by beneficiaries?
3) What, if any, recommendations do beneficiaries have for future programs and what other strategies can be identified to advance the poultry value chain?

With these key research questions in mind, the Final Evaluation specifically set out to assess how USDA assistance impacted:

a. the number of people who applied new techniques or technologies;
b. the number of individuals who applied improved farm management strategies (i.e. governance, administration, finance, or financial management);
c. the number of individuals receiving financial services;
d. the number of loans disbursed;
e. the value of loans disbursed;
f. the value of sales by project beneficiaries;
g. the value of commodities sold by individual beneficiaries.

1.2.4 About the Consulting Firm

TKG is a social impact management consulting and research firm working in sub-Saharan Africa focused on using data and evidence to develop solutions to positively impact and transform communities. The firm has offices in Ghana, Nigeria, Liberia, and the United States and has worked on over 200 projects in 20 countries in the past decade. TKG has a strong reputation in the market for delivering rigorous research and evaluations. TKG provides strategies that integrate results measurement and impact evaluation techniques proven through field experience, grounded in local knowledge, and informed by state-of-the-art approaches and tools.

1.2.5 Our Approach

TKG managed this final evaluation combining a team with vast subject matter expertise, technology, and a participatory approach, engaging key stakeholders at each phase of the project's implementation. The final evaluation was designed to have four distinct phases; project inception, data collection, data cleaning and analysis, and reporting and closure.

The inception phase commenced with an initial meeting with ASA/WISHH and AMPLIFIES teams to deliberate on the evaluation approach and timelines and to create that collaborative atmosphere that would go on to be the major factor for the evaluation's success. The study was initially designed with face-to-face interviews in mind, but due to the COVID-19 pandemic and resulting travel restriction policies of the Government of Ghana and ASA/WISHH, changes were made to transition from Computer-Assisted Personal Interviewing (CAPI) to Computer-Assisted Telephone Interviewing (CATI). TKG held another inception meeting with ASA/WISHH to discuss the new strategy.

Afterwards, TKG recruited and trained data collectors with prior experience in CATI and poultry projects. A four-day online training and 2-day pilot testing exercise was organized for 27 potential enumerators. Based on previous challenges with online engagements, the enumerators were divided into 3 groups and 3 training sessions were conducted daily to ensure quality. All training sessions were held on Zoom after participants had been trained on how to effectively use the Zoom application. Based on enumerators' performance during training, quizzes, and pilot exercise, 21 enumerators were selected for the project, with the rest serving as backups. The training sessions were attended by the AMPLIFIES Monitoring and Evaluation staff, who provided tremendous inputs to the achievement of the training goals.

The AMPLIFIES team also led initial introductory calls to inform beneficiaries of the final evaluation. This process also helped to filter out contacts that were presumed to be invalid from the list of beneficiaries. The inception phase ended with a desk review of the project's documents. Based on the outcome of the desk review, the AMPLIFIES Annual Result Survey (ARS) tools were revised for the final evaluation and programmed using the KoBoCollect software. The final evaluation tools and interview guides can be found in the annex section below.

During the data collection phase, enumerators collected both quantitative and qualitative data remotely from their homes. Four teams were created: three quantitative and one qualitative. Each team was led by an experienced supervisor who assigned tasks and provided quality control through back-checks and listen-ins. Each enumerator was assigned ten contacts daily and was expected to complete five. Once an

enumerator made a call and gained consent, the interview began and responses were inputted on mobile devices. The outcomes of the calls were tracked on tracking sheets and submitted to supervisors at the end of each day. Seven attempts were made at different times and days to reach each contact before the contact was reported as not available.

Successful surveys were submitted to TKG's Kobo server at the end of each day. Data was checked and cleaned concurrently with data correction and issues were immediately resolved. For qualitative data, enumerators sought the consent of respondents to record the calls. Once an interview was completed, the recording was uploaded to a Dropbox folder before being transcribed verbatim. TKG later hired a team to review all transcriptions and compare them with corresponding audio recordings before data analysis was initiated. During data collection, there was constant communication with the ASA/WISHH and AMPLIFIES teams to discuss progress and mitigate challenges. Data was analyzed using STATA and NVivo software for quantitative and qualitative data, respectively.

TKG held an initial finding presentation with the stakeholders where some inputs were added from the ASA/WISHH team. The final report was then put together by TKG's technical team.

METHODOLOGY

2.1 Introduction

TKG and ASA/WISHH agreed on an Outcome Harvesting (OH) approach for this evaluation by collecting evidence of what changed and then working backwards to determine whether and how the AMPLIFIES project contributed to these changes. There were two distinct phases of the OH. Phase 1 focused on conducting a desk review of project documents, annual reports, midterm evaluation reports, and other relevant documents. A comprehensive report was developed and submitted as part of the evaluation deliverables. Findings from OH Phase 1 were used to refine the existing AMPLIFIES Annual Result Survey tools.

Phase 2 of the OH focused on using the refined tools to collect primary data through quantitative and qualitative methods. Due to the novel COVID-19 pandemic, TKG and ASA/WISHH amended the data collection protocol to safeguard the evaluation team. Adhering to ASA's Travel Restriction Policies, TKG adopted a remote enumerators training and data collection approach, whereby training sessions were held on Zoom and data was collected using CATI. Empirical data and both subjective and objective viewpoints of respondents were used to assess the impact of the project. Employing both quantitative and qualitative components, the study analysis aimed at being well balanced and well founded, with proper triangulation of findings (Saunders et al., 2009; Tashakkori and Teddlie, 2010).

2.2 Sampling procedure

The final evaluation used a mixed approach employing both quantitative and qualitative methods. Quantitative data was collected from the project's main beneficiaries (poultry and feed millers), whereas qualitative data was collected from crop farmers via FBOs, government stakeholders, and credit facility providers. ASA/WISHH pre-determined individuals and FBOs who were included in the Final Evaluation based on past performance in the program. According to the Request for Proposal (RFP) issued by ASA/WISHH, the study was initially designed to involve in-person interviews with 260 poultry farmers, 78 feed millers, 16 government officials, and 8 credit facility providers. Focus Group Discussions (FGD) were to be conducted with 18-24 FBOs across Ashanti, Brong Ahafo, and Northern regions.

As per the COVID-19 adjustments, TKG and ASA/WISHH agreed to increase the sample size due to the transition from CAPI to CATI. TKG believed that a larger sample size would give room for a smaller margin of error and more accurate mean values and increase the likelihood of generalizing the study's findings.

The initial sample size for the poultry category was doubled to 518. The census approach was then used for the remaining categories, as shown in Table 1 below. The 18-24 intended FGDs were also converted into In-depth Interviews (IDI) with FBOs.

The final evaluation utilized Brinkerhoff's Success Case Method (SCM) to closely study the experience of individuals and FBOs considered being the project's most and least successful cases. The list was stratified to include 50% each of beneficiaries who were most and least successful before handing the sampling frame to TKG. A complete census of the beneficiaries was conducted. All beneficiaries who could be reached via phone and provided consent were interviewed. See Annex 3 for more information on sample size and selection criteria of all beneficiary groups.

In addition to beneficiaries, representatives of government agencies and credit facilities providers who providing technical support to beneficiaries during AMPLIFIES were selected based on their availability and ability to provide the required information for the evaluation.

2.3 Quantitative data collection and analysis

The survey initially targeted a total of 593 respondents (518 poultry farmers and 78 feed millers) but due to challenges with the contact details of beneficiaries, only 470 beneficiaries were contacted. A total 364 surveys were administered, with a response rate of 77.4%. The quantitative data was collected from 326 poultry farmers and 38 feed millers using a structured questionnaire that took into consideration the ten key goals of the program and key objectives of the study. Kobo Collect was used by field enumerators to collect findings. Data collected was downloaded daily in order to identify errors made, which helped in correcting them on time. All corrections to the data were made with the help of the field enumerators. Data collected wit Kobo Collect was converted to the quantitative analysis software format STATA and excel to then conduct the quantitative data analysis. This ensured that the original data was maintained. The data analysis used descriptive statistics, such as tables, graphs, and other useful illustrations, as well as inferential statistics, such as estimates of means and standard deviations. Multivariate analysis in the form of probit and ordinary least squares was also employed to categorize respondents (poultry farmers and feed millers) into two categories (least successful and most successful) and determine the underlying factors that influence the impact of AMPLIFIES on their businesses (Lind et al., 2012; Aron et al., 2013).

2.4 Qualitative data collection and analysis

Qualitative data was collected through IDIs and Key Informant Interviews (KIIs). During the data collection period, Ghana was in a partial lockdown and traveling within the country was almost impossible; therefore, the study opted for telephone interviews. Telephone interviews have several shortcomings, including reduced exploration during the interview, high refusal rate of respondents, the inability to observe non-verbal communication of the respondents, and the difficulty in taking extra notes during the interview (Saunders et al., 2009). However, the field data collectors were well-trained and knowledgeable about how to circumvent the above-mentioned challenges. On a positive note, the use of the telephone interviews ensured that the data collection period was adhered to and the study completed on time.

The IDIs and KIIs were taken from three main groups of the AMPLIFIES Project participants who had either taken part in the AMPLIFIES training or benefitted from it, namely crop farmers/FBOs (22), government officials (16), and credit facility operators (5). In conducting the IDIs and KIIs, interview guides that were prepared beforehand were used. After respondents were identified and consented to being interviewed and having their calls recorded, they were asked questions that directly related to the specific objectives of the study.

All recorded interviews were directly transcribed and also translated into English when interviews were conducted in languages other than English, such as Twi and Dagbani. The interviewer was responsible for the translation and transcription of the interviews they conducted. They used pure verbatim protocol for transcription to ensure that participants' utterances and idiosyncratic speech was used for the data analysis. This approach keeps their original voices and increases the reliability of data analysis (Mayring, 2014). In addition, memos and field interview notes were used for the analysis.

Thematic analysis was employed to interpret qualitative data using NVivo, a computer-assisted qualitative data analysis software (CAQDAS). In undertaking the thematic analysis, a preliminary code book was generated for thematic elements in the data and was adjusted as the data analysis proceeded. This helped to ensure a straightforward, quick, and well-structured data analysis (DeCuir-Gunby et al., 2011). The data was then broken down into small units called codes.

Two categories of coding–primary and secondary–were employed in the qualitative data analysis. The primary codes were the first-level codes created from the direct words of the respondents that were the foundation for the secondary codes. The primary codes were in NVivo and initial. NVivo codes were

created with the use of the direct words of the respondents while initial codes were created by putting the words of the respondents into perspectives. Some of the initial codes created the basis for the creation of the secondary codes. The types of secondary codes used were focused and pattern. The focused codes grouped the primary codes that were most frequently used or significant thematically to the objectives of the study. The pattern codes, on the other hand, grouped the codes into major units of analyses that were used to create themes directly relating to objectives of the study (Saldana, 2009; Miles et al., 2013; Gibbs, 2013).

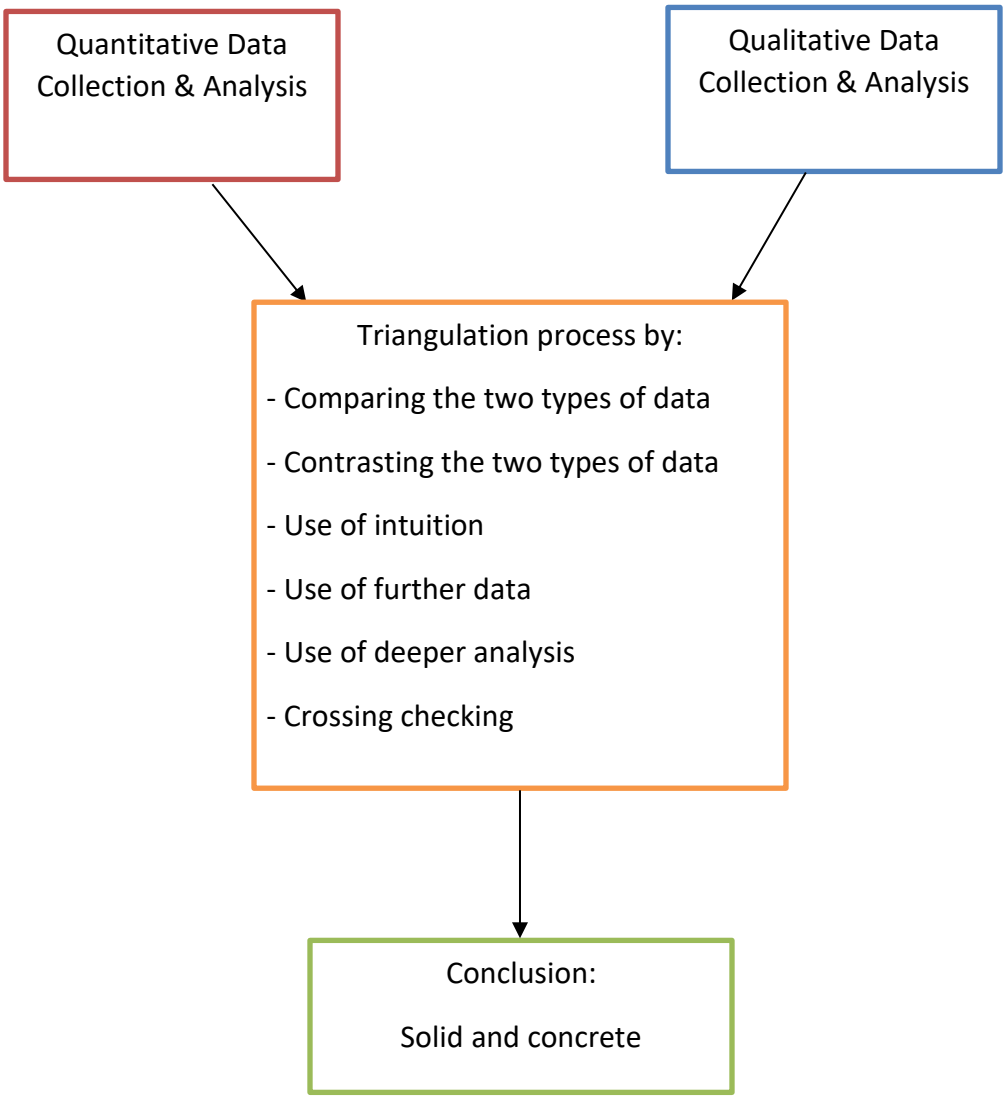
2.5 Triangulation of data

The quantitative data provides measured values to show how AMPLIFIES impacted respondents. The qualitative data built off of the quantitative data to provide deeper and more diverse findings. Finally, triangulation of the data was used to cross-check the qualitative and quantitative data.

Triangulation in the study was possible given the mixed method design used. After separately analyzing both quantitative and qualitative data, they were combined through triangulation to arrive at a solid and concrete conclusion. In the process of triangulation, two or more independent sources of data or data collection procedures (in this case, multiple qualitative and quantitative sources) employed in the study were used to support each other to ensure the reliability of the findings (Saunders et al., 2009). The data analyst also employed their intuition and discretion, a common practice in research (Flick, 2019).

In triangulating the data, there were complementary and contrasting findings obtained from the quantitative and qualitative data. Where the data aligned, the qualitative data provided a solid explanation to what the quantitative data had shown (Saunders et al., 2009). Contrasting data, on the other hand, was further investigated to gain a deeper understanding and reach a clear and convincing conclusion. Triangulating data helped to provide richer information and a more comprehensive understanding of the impact of the program. Figure 1 below summarizes the triangulation process for this study.

Figure 1: Flowchart showing the triangulation process used in the data analysis



2.6 Ethical considerations

The study ensured that rigorous ethical standards were kept in all instances. Specifically, in order to ensure that the evaluation present a clear and true reflection of how AMPLIFIES was implemented in Ghana, the following principles were maintained:

a. **No harm** - Measures were taken when designing and implementing our questionnaire to avoid causing any emotional, physical or economic harm to participants.

b. **Transparency** - Participants were clearly informed about the background and objectives of the study.

c. **Consent** - Participants were informed about topics to be covered, benefits and risks involved, and how the data will be used. Online consent was sought from each participant before filling out the survey or participating in an interview.

d. **Voluntary participation** - Participants were informed that their participation is voluntary and that they have the right to stop the interview at any time or skip a question.

e. **Confidentiality** - All information gathered was kept strictly confidential, and no names or other personal identifiers were recorded.

f. **Privacy** - Reasonable precautions were taken to reduce the risk of privacy breaches and safeguard the confidentiality of data shared online.

g. **Withdrawal** - Participants were informed about their right to withdraw at any point or retract their data after completing the study.

h. **Security** - A secure communication platform for data collection was used.

i. **No sponsor influence -** program sponsors had no influence over study findings (Saunders et al. 2009).

FINDINGS AND CONCLUSIONS

3.1 Introduction

This section details the demographics of respondents who took part in AMPLIFIES, their expectations prior to the program, and the main findings of the evaluation.

3.2 Demographics of respondents

The three main target groups included poultry farmers, feed millers, and FBO members/crop farmers, both male and female, of varying ages, based in the Ashanti, Brong Ahafo, Greater Accra, and Northern regions. See tables 5, 6 and 7 in Appendix 1 for more demographic information about project participants. As indicated in Table 5 (See Appendix 2) 1, the mean age of the poultry farmers was 46, with the majority of both male and female farmers between ages 40 and 49. The majority of male farmers (41.7%) were based in the Ashanti region, while 39.7% lived in the Brong Ahafo region and 18.6% in the Greater Accra region. Female farmers, on the other hand, were more concentrated in one region, with 48.8% living in the Brong Ahafo region, and only 26.6% in the Ashanti region and 18.6% in the Greater Accra region. Out of the 326 poultry farmers interviewed, the majority were owners (80.7%) and the remaining (19.3%) were farm assistants, caretakers, and farm managers, among others. Overall, most participants were from Ashanti (39.9%) and Brong Ahafo (40.8%); fewer lived in Greater Accra (19.3%). Among the owners, 81.4% were male and 75.6% were females. However, females were much less represented overall in the study. As males dominate poultry production in all the regions where AMPLIFIES Ghana was implemented, female participants only represented 14.4% of the total number of participants. Studies by Mensah-Bonsu et al. (2019) and Tuffour and Tenyo (2015) indicate a male domination among poultry farmers in the Brong Ahafo and Greater Accra regions of Ghana, respectively.

As indicated in Table 6 (See Appendix 2), the mean age group of feed millers was 49 years. Most of the feed millers were ages 40-49 years (36.8%) and 50–59 years (26.3%); only 5.3% were ages 20-29 years. The vast number of participating feed millers were male (94.7%), with only 5.3% female. Most of the feed millers came from Ashanti (42.1%) and Brong Ahafo (36.8%), while 21.1% were from Greater Accra. Similar numbers of participating feed millers worked off-farm (44.7%) and on-farm (55.3%). Similar numbers of feed millers also used facilities that had manual (29.0%), mechanized (39.5%), or a combination both manual mechanized and manual (31.5%) systems. Most of the feed millers had facilities characterized as large (52.6%) or medium-sized (39.5%); only 7.9% had facilities characterized as small. This was based on

the size of their storage facilities and the number of bags they could store. The majority used manual scales (73.7%), while the remaining 26.3% used automatic scales.

As indicated in Table 7, 81.8% of participating FBOs who benefitted from AMPLIFIES within the five-year period were composed of mainly males, while only 18.1% had greater female participation. Among FBOs, 81.8% were registered and 18.2% unregistered. Similarly, 90.9% had a documented mandate, while 9.1% did not. All of the FBOs had executive steering committees for their organizations.

3.3 AMPLIFIES training methods

Within the context of AMPLIFIES, training was provided on the main topics relating to the project's ten major goals. The methods used for training were seminars, small group meetings, and a training of trainers. Practical field demonstrations were also used as a key approach, whereby crop farmers were physically shown techniques on how to plan and organize their farming activities, including harvesting, post-harvesting handling, and storage, and poultry farmers and feed millers were shown how to conduct feed formulation and testing. Finally, durbars were organized to raise awareness about the benefits of egg consumption. A durbar involves different members of society, such as chiefs, opinion and religious leaders, students, poultry sector stakeholders, and community members at large, meeting in an open space. The AMPLIFIES team mainly used informal discussions and drama to educate the public about consuming eggs.

3.4 Programs implemented in parallel to AMPLIFIES

Crop farmers noted that other organizations carried out ongoing agriculture trainings in parallel to AMPLIFIES, mainly centered on growing crops. These included the World Food Programme (WFP), Danish International Development Agency (DANIDA), University of Development Studies (UDS), Savana Agriculture Research Institute (SARI), The ADVANCE Programme, Techno Serve, and the Animal Research Institute. The respondents reported that none of the programs were as detailed, focused, and impactful as AMPLIFIES.

3.5 Expectations before the implementation of AMPLIFIES

Program beneficiaries had several expectations before the program was implemented. Participants from all three groups expected financial support and production inputs. The crop farmers and FBO members also expected to see an improvement in the planting, harvesting, and storage of their produce. Moreover,

the FBO members expected to form stronger ties and become more united as a group.

Case 1: An FBO in the Dormaa Central Municipality

The statement below was taken from an FBO of crop farmers located in the Dormaa Central Municipality in the Brong Ahafo Region that had 40 members in total, 22 of whom are active. It is a registered association with bank accounts, a well-documented mandate, and an executive steering committee. The crop farmers mainly produce maize, which is vital for poultry feed. During the evaluation period, one of its top executives noted that he expected the AMPLIFIES project to provide him with financial support for farming activities to be used for seeds, fertilizer, chemicals, and other inputs for their maize production. Even though that expectation was not met, they were satisfied with the end results of the training. As he put it:

> **So, our initial expectation was to receive funds to expand our farms, but when we got the education and training from AMPLIFIES, we were very happy. So, I will say our expectations were met; although AMPLIFIES didn't give us physical cash, but the training that they gave us augmented our yield and I am happy with that.**

3.5.1 Application of activity, benefits and impact

Participants assessed each of the 10 major themes as poor, neutral, good, very good, or excellent. With respect to improved poultry feed, the lowest rating given by respondents was good, at 33.3%, with 58.3% rating it as very good and 8.3% rating it as excellent. Similarly, improvements in the quality and consistency of feed formulations was not rated as poor or neutral. In total, 27.3% of respondents rated it as good, 45.5% as very good, and 27.3% as excellent. With regards to increased feed testing capacity, 23.1%, 46.2% and 30.7% rated it as neutral, good and very good, respectively, while none rated it as poor or excellent. For increased efficiency in feed processing, all respondents gave a rating of either good (67.6%) or very good (33.3%). Increase efficiency in feed procurement of feed ingredients was rated mainly good (40%) and very good (50%), with 10% of respondents rating it as excellent; none rated it as poor or neutral. With regards to loans for investments in feed processing, the majority (71.7%) rated it as good, while 14.2% rated it as poor and another 14.2% rated it as excellent. Post-harvest storage and aggregation of feed inputs had no ratings of poor or neutral; 30.8%, 46.1% and 23.1% rated it as good, very good, and excellent, respectively. The majority rated expansion of poultry distribution network good (80%), with 10% rating it as very good and another 10% rating it as excellent; none rated it as poor or neutral. Organizing a national awareness campaign to promote egg consumption had no ratings of poor, neutral,

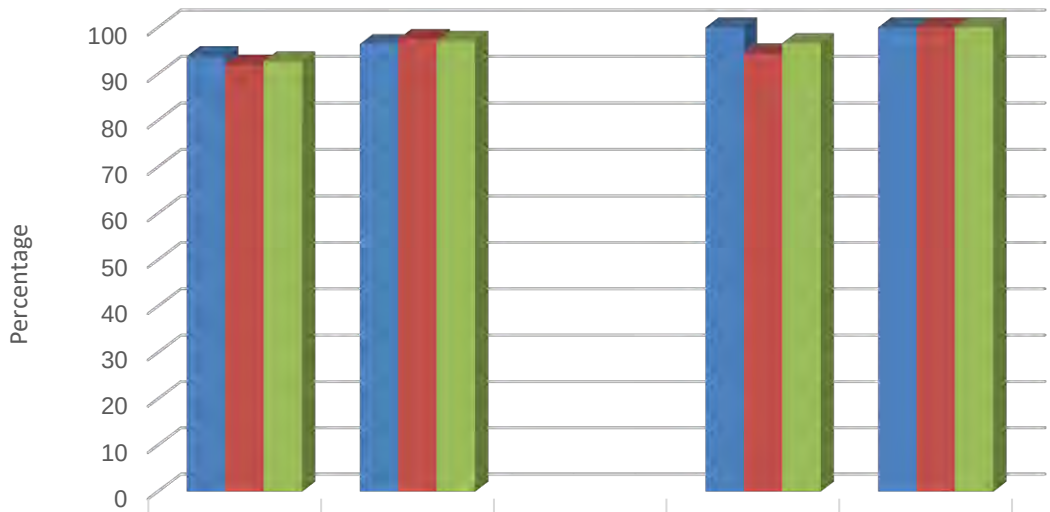
or good; rather, 50% each rated it very good and excellent. Harvesting, post-harvest handling, and storage of feed inputs also had no ratings of poor or neutral; 37.5%, 50% and 12.5% rated it as good, very good, and excellent, respectively. See

in Appendix 1 for details and the following sub-sections for a more detailed analysis of each of the 10 themes.

3.5.1.1 Activity 1: Improved Poultry Feed

Overall, the reported use of applied knowledge of the AMPLIFIES training was very high among both poultry farmers and feed millers. Among poultry farmers, 93.8% and 92% of the least and most successful poultry farmers confirmed that they applied the training on the use of the right feed component, while 100% and 94.4% of the least and most successful feed millers reported the same. As indicated in Figure 2 below, a total of 92.7% and 96.6% of poultry farmers and feed millers, respectively, noted that they put the training on poultry feed into practice. Similarly, 96.4% and 97.5% of the least and most successful poultry farmers and 100% of both least and most successful feed millers reported applying the AMPLIFIES training on cost-effective ways of feeding.

Figure 2: Poultry farmers and feed millers applying improved poultry feed



	Poultry Farmer: Using right feed component	Poultry Farmer: Cost effective ways of feeding		Feed Millers: Using right feed component	Feed Millers: Cost effective ways of feeding
Least Successful (%)	93.8	96.4		100	100
Most Successful (%)	92	97.5		94.4	100
Total (%)	92.7	97.1		96.6	100

Source: Field Data, 2020

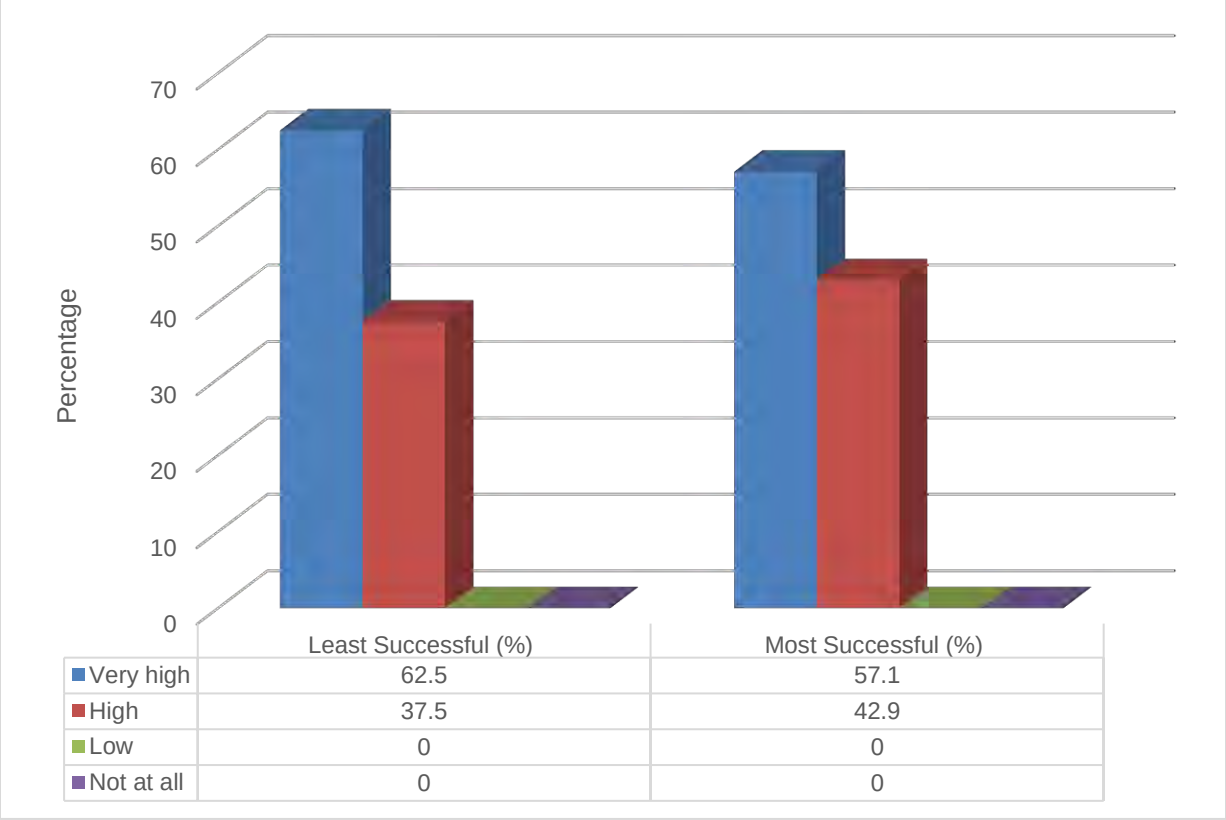
The majority of poultry farmers and feed millers confirmed they benefitted from the training, with less than one 1% reporting that applying their knowledge did not make much of a difference. Of those who described positive outputs, beneficiaries noted learning alternative ways of adopting poultry feed and were more knowledgeable on good feeding practices, which they were able to apply to generally improve their poultry feeding, prevent contamination of the feed they gave to their poultry birds, and shift to feed formulation as farmers. One respondent expressed:

> **It was equally very good because the cost of the locally formulated feed was low as compared to imported feeds.**
>
> Male, MoFA Staff, Ashaiman Municipality, KII, May, 2020

> **This theme was good… because during the training they (AMPLIFIES) gave various alternatives on the adoption of feeds.**

As indicated in Figure 3 below, 62.5% of the least successful respondents said they experienced a very high reduction in their cost of feed processing, while 37.5% reported a high reduction; none indicated they had low reduction or no impact at all. Similarly, among the most successful respondents, 57.1% reported a very high reduction in cost and 42.9% a high reduction, with none reporting a low reduction or no impact at all.

Figure 3: Impact of reduction in cost of feed processing



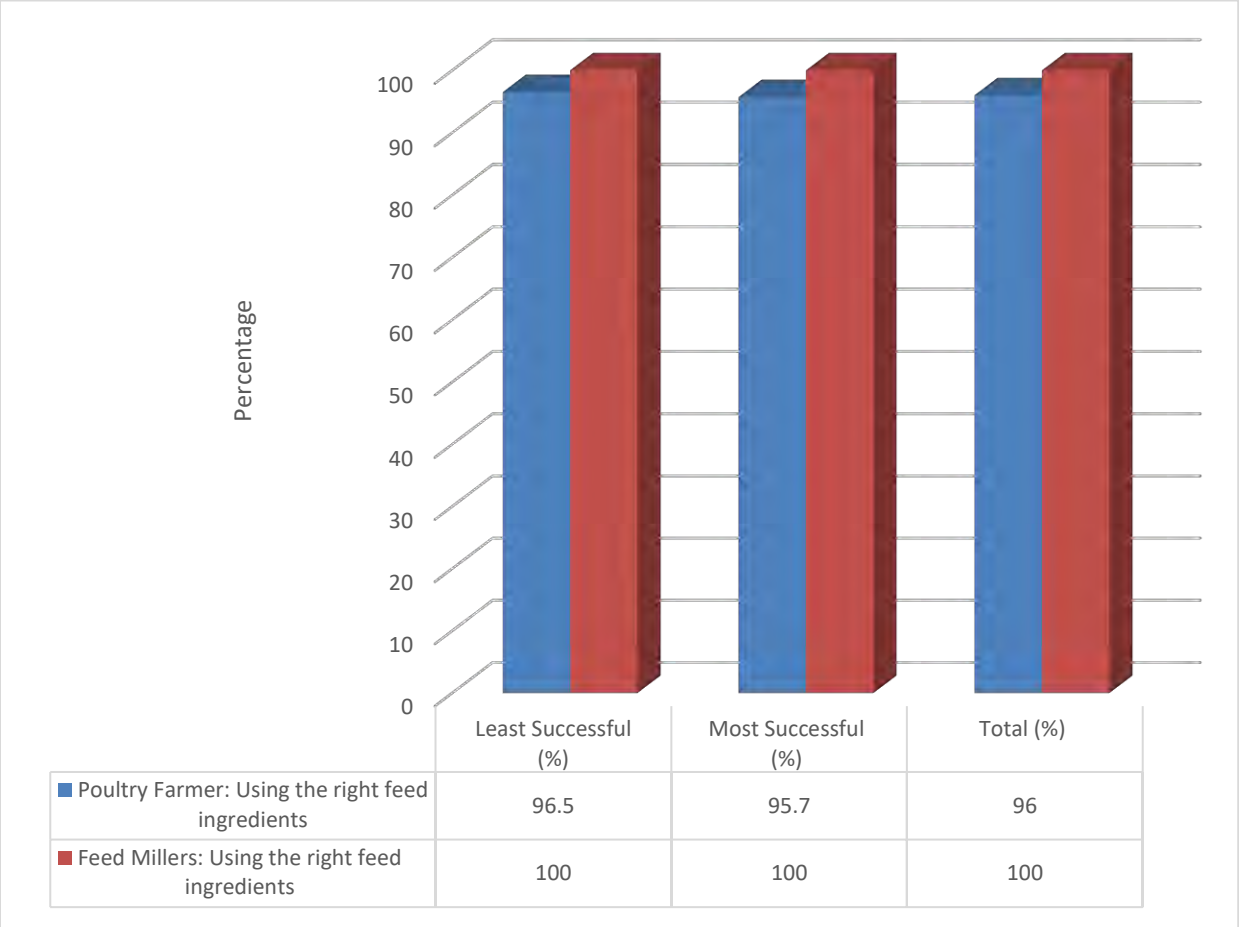
	Least Successful (%)	Most Successful (%)
Very high	62.5	57.1
High	37.5	42.9
Low	0	0
Not at all	0	0

Source: Field Data, 2020

3.5.1.2 Activity 2: Improvements in quality and consistency of feed formulation

Among the least and most successful poultry farmers, 96.5% and 95.7% reported applying what they were taught during the training on using the right feed ingredient to ensure quality and consistency of feed formulations, while 100% of both least and most successful feed millers reported the same, as indicated in Figure 4 below.

Figure 4: Poultry farmers and feed millers applying improved quality and consistency of feed formulations



	Least Successful (%)	Most Successful (%)	Total (%)
Poultry Farmer: Using the right feed ingredients	96.5	95.7	96
Feed Millers: Using the right feed ingredients	100	100	100

Source: Field Data, 2020

Responses regarding the applied use of the right feed components and feed formulation to improve poultry feed were similar; almost all the poultry farmers and feed millers reported applying what they were taught by AMPLIFIES. Moreover, poultry farmers and feed millers shared that the ability to formulate high quality feed for their birds due to the training helped them to grow their birds better and produce feed at a very low cost, which ultimately improved their livelihoods and finances. Below are quotes taken from MoFA officials who participated in the training with the farmers and later monitored their activities:

> **I will say [the training] was good because they gave the training on how a farmer can combine various crops of different corresponding nutrients to get a high quality feed without going outside to buy. That idea was very good, since in the poultry sector feed is one of the most expensive commodities.**

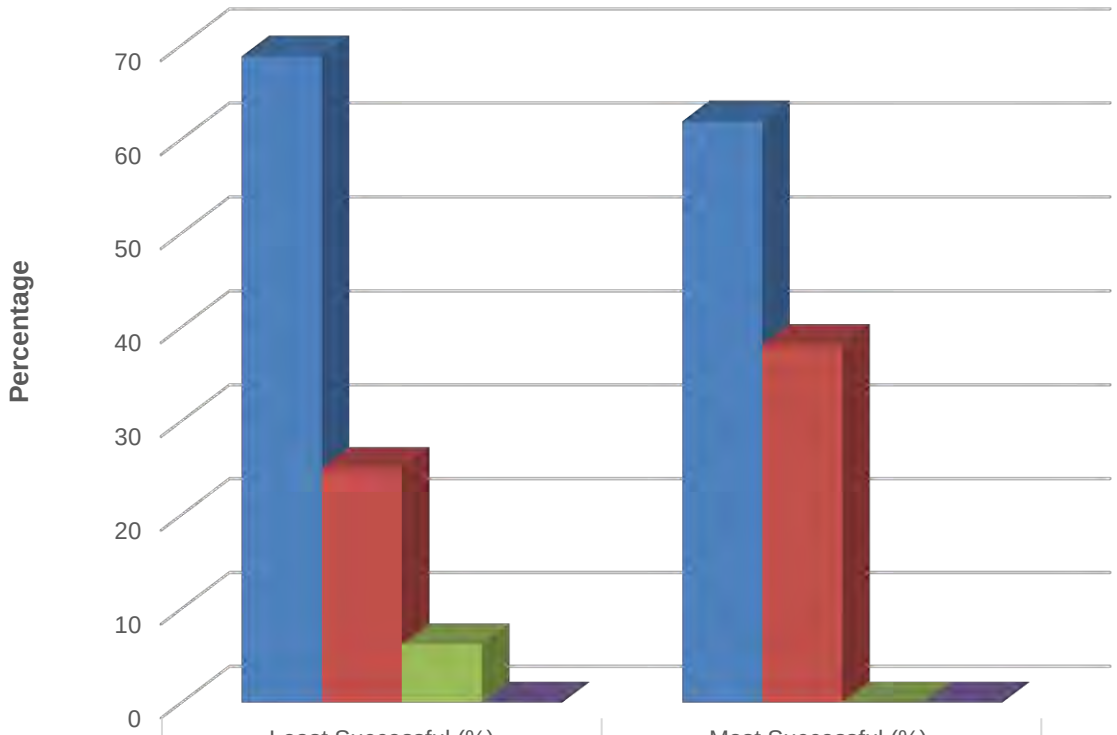
Male, MoFA Staff, Ga East Municipality KII, May, 2020

And also the growth rate when the birds were fed with the locally made feed was also good. Example, farmers can sell their birds as early as six months using the locally formulated feed, which was almost the same as using the imported feed.

Male, MoFA Staff, Ashaiman Municipality, KII, May, 2020

As indicated in Figure 5, the vast majority of least successful respondents reported that the AMPLIFIES training had a very high impact (68.8%) or a high impact (25%) on how they mixed the right feed, with only 6.2% reporting a low impact and none reporting no impact at all. All of the most successful respondents reported a very high impact (61.9%) or a high impact (38.1%); none reported a low impact or no impact at all.

Figure 5: Poultry farmers and feed millers applying improvements in the mixing of feed



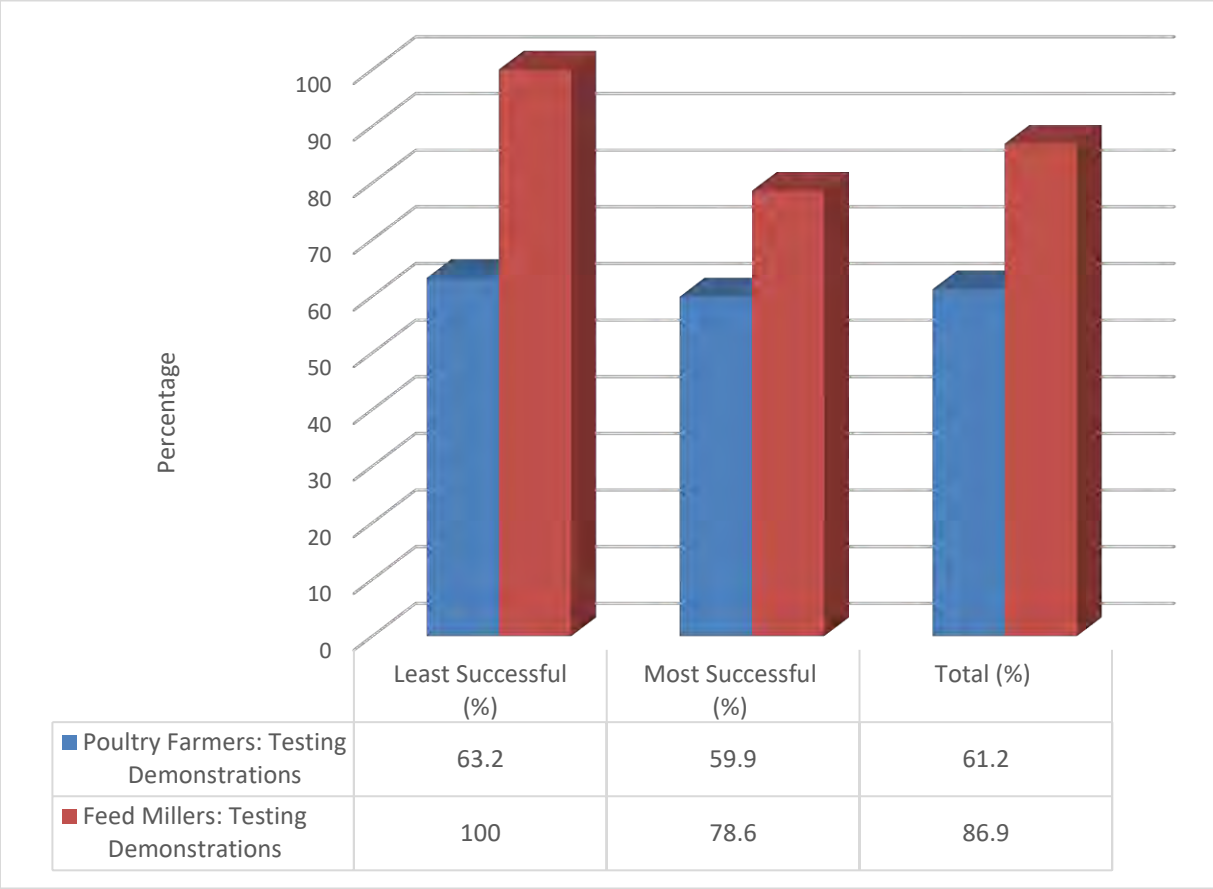
	Least Successful (%)	Most Successful (%)
Very high	68.8	61.9
High	25	38.1
Low	6.2	0
Not at all	0	0

Source: Field Data, 2020

3.5.1.3 Activity 3: Increased feed testing capacity

With regards to feed testing capacity, the study mainly assessed how participants applied what they learned from feed test demonstrations. Among the poultry farmers and feed millers, 63.2% and 59.9% of the least and most successful, respectively, and 100% and 78.6% of the least and most successful feed millers respectively, stated that they applied what they were taught, as indicated in Figure 6.

Figure 6: Poultry farmers and feed millers applying techniques to increase feed testing capacity



	Least Successful (%)	Most Successful (%)	Total (%)
Poultry Farmers: Testing Demonstrations	63.2	59.9	61.2
Feed Millers: Testing Demonstrations	100	78.6	86.9

Source: Field Data, 2020

Table 9 in Appendix 2 indicates that, after completing the training, a little over half of poultry farmers (57.9% of least successful and 55.8% of most successful) were still not testing their feed. Feed millers, on the other hand, were somewhat more likely to test their feed following the training, with 58.8% of least successful and 57.1% of most successful engaging in the practice. Even though 42.1% of the poultry farmers admitted they tested for feed, further analysis of the data indicated that 4.91% always tested for feed, 12.27% test for feed once a while 26.07% rarely tested for feed. This implies, even though they tested for feed, the testing rate was low. Data on the regularity of testing by feed millers could not be obtained.

The qualitative data showed that those who received training felt they had adequate knowledge about improving the quality of feed they gave to their birds, because they had learned the nutritional component of the feed. Participants of the training confirmed they were given feed testers as a reliable tool for testing

the quality of feed given to their birds. A veterinary service division officer expressed how farmers gained knowledge from the AMPLIFIES training on feed testing capacity:

> **The man [trainer] showed us that, if you are going to buy maize or any kind of nutrients that you are going to formulate to feed your poultry, 1) you have to check the moisture content, so they showed us how to test the moisture by using an instrument that you can just dip into the maize to check the moisture. They gave the farmers testers.**
>
> Male, Veterinary Service Division Offical, Afigya Kwabre South, Ashanti Region, KII, May, 2020

Case 2: A First Account of a MoFA Staff at Berekum West District, Brong Ahafo Region

The staff member featured here joined the AMPLIFIES training program in 2018 and functioned as a key coordinator between farmers and officials partaking in the program. He expressed being able to help serve as a link between the farmers and officials during practical field sessions that he participated in. In doing so, he reported witnessing the benefit of the program to farmers, asserting:

> **It [the training] is good. This is because farmers have gotten to know the need to test their feed, which is intended to know the nutrient components the feed comprised of.**

Notwithstanding the rich knowledge gained from the training by poultry farmers and feed millers, the issue of availability of feed testing kits was equally a challenge. This is how KII respondents expressed the challenge with feed testing kit availability:

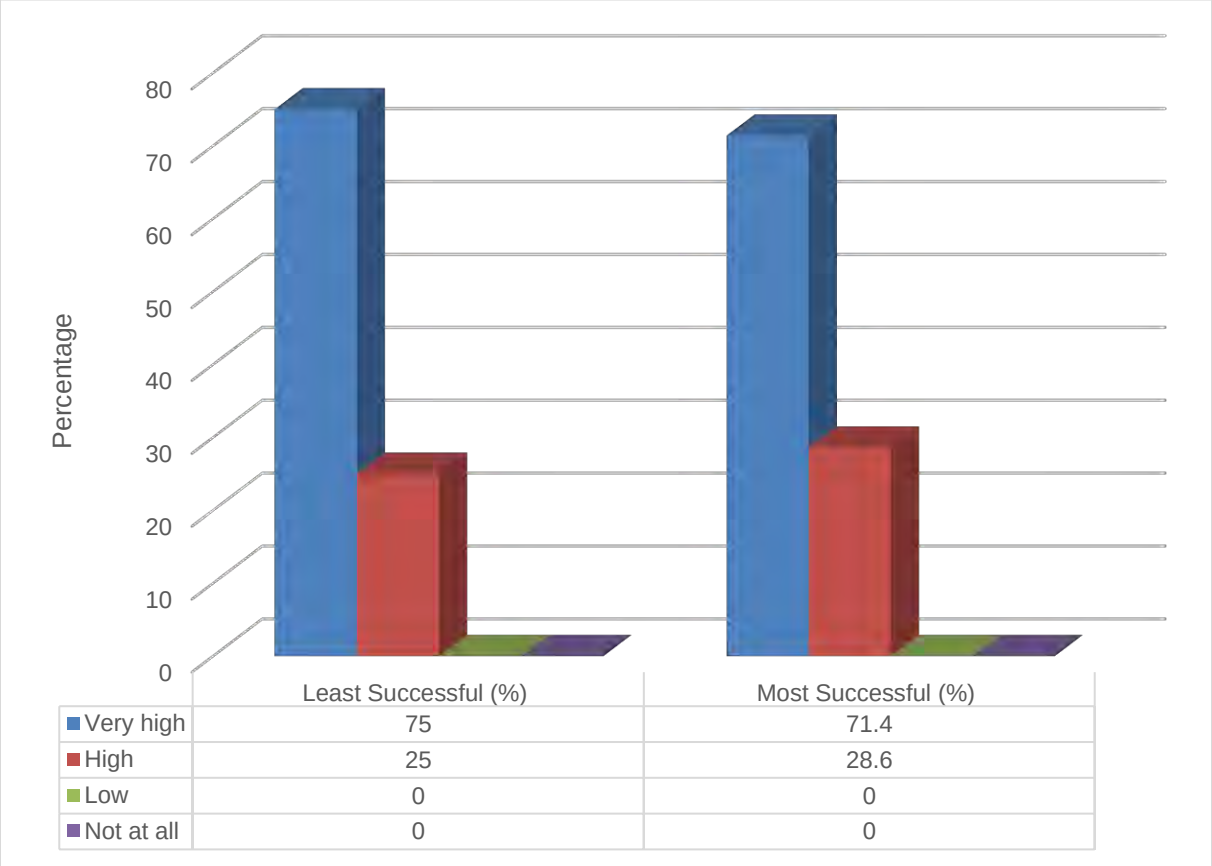
> **Though we were taught at the training but I have not tested any feed before. This is because there is no simple testing kit for that.**
>
> Male, MoFA Officer, Ga East, Greater Accra Region, KII, May, 2020
>
> **AMPLIFIES should develop simple feed testing kit at a cheaper rate to check basic but important nutrients in feed. It will be good when this simple test kits are made available at a cheaper price for farmers.**

Male, MoFA Officer, Berekum West, Brong Ahafo Region, KII, May, 2020

3.5.1.4 Activity 4: Improvement in the quality of feed

Among the least successful respondents, 75.0% and 25.0% confirmed very high and high improvement in the quality of feed produced, respectively. As indicated in Figure 7, 71.4% of the most successful respondents indicated that impacts were very high and 28.6% indicated that impacts were high with regards to producing high quality feed; none reported a low impact or no impact at all.

Figure 7: Poultry farmers and feed millers applying improvements in the quality of feed



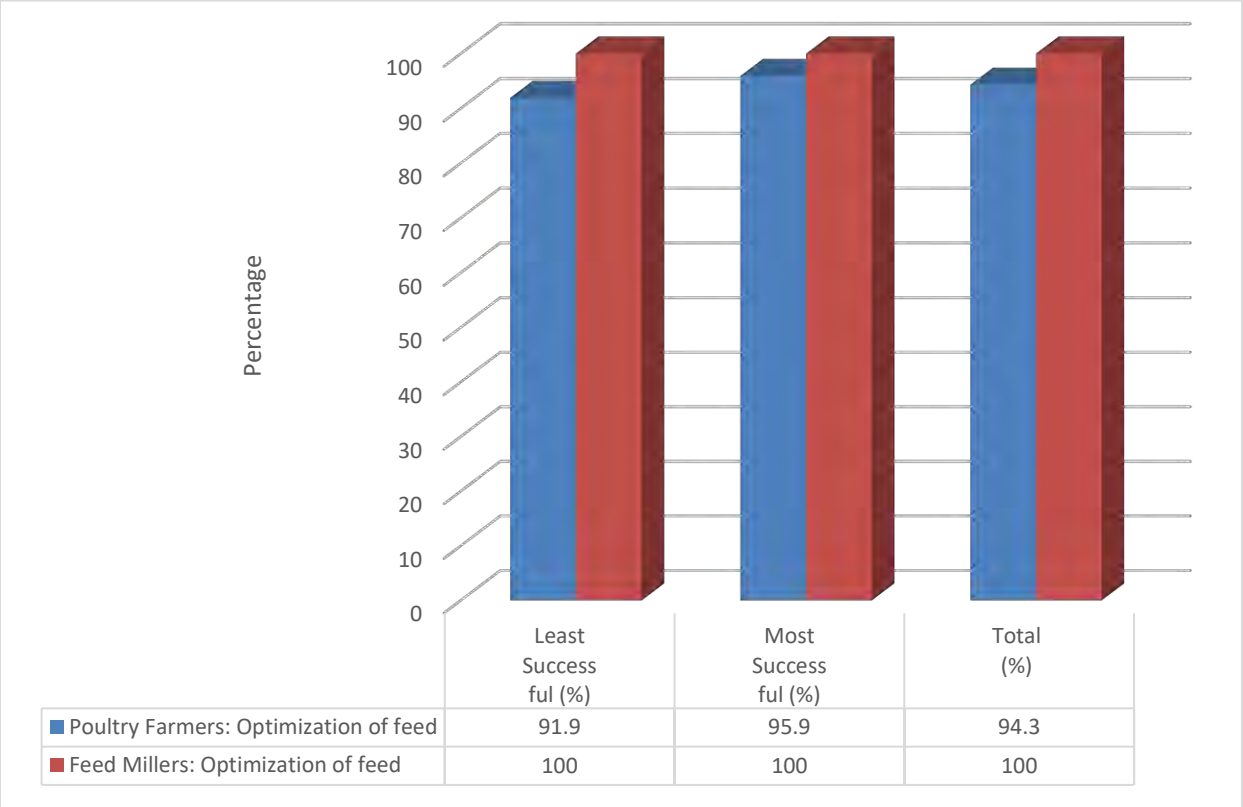
	Least Successful (%)	Most Successful (%)
Very high	75	71.4
High	25	28.6
Low	0	0
Not at all	0	0

Source: Field Data, 2020

3.5.1.5 Activity 5: Increased efficiency in feed processing

Among poultry farmers, 91.9% and 95.9% of the least and most successful, respectively, stated that they applied what they were taught about optimizing feed processing. Among feed millers, 100% of both the least and most successful reported applying their knowledge, as indicated in Figure 8 below.

Figure 8: Poultry farmers and feed millers applying knowledge to increase efficiency in feed processing



	Least Successful (%)	Most Successful (%)	Total (%)
Poultry Farmers: Optimization of feed	91.9	95.9	94.3
Feed Millers: Optimization of feed	100	100	100

Source: Field Data, 2020

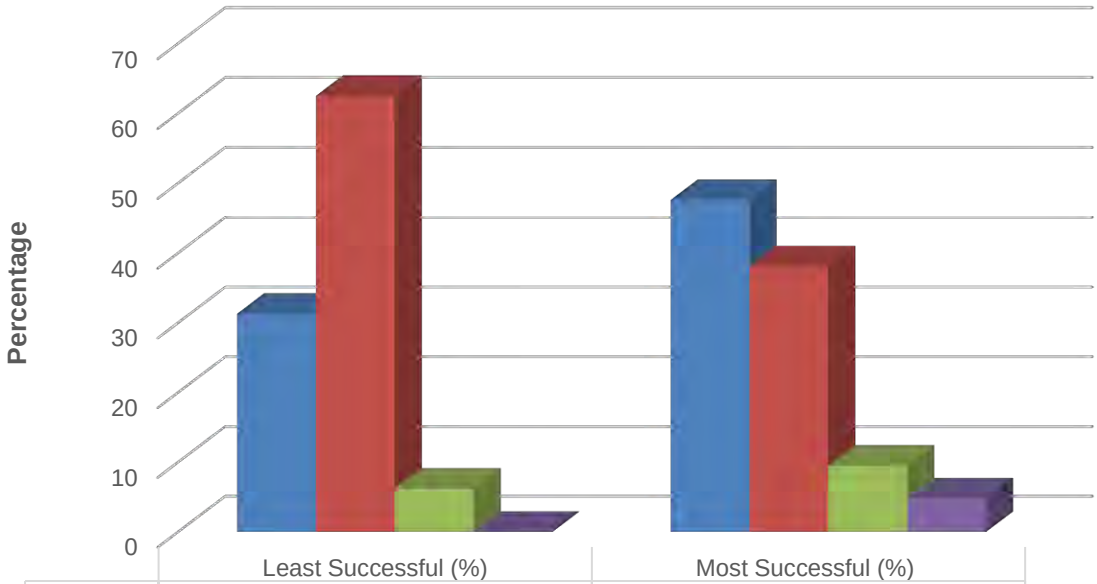
Practically all of participants thus reported a gain in knowledge that translated to improved techniques to optimize feed processing. Moreover, the qualitative data revealed that participants had begun to strategize how to feed their birds as a result of the training. This was mainly because they gained an understanding of the importance of feed formulation and how to efficiently feed their birds–techniques in their farming that were lacking before the AMPLIFIES program was implemented. A MoFA official with AMPLIFIES reported seeing farmers apply this knowledge and gain positive results:

> **It is very good. The reason been that farmers are now aware that is it not all about the feed but how efficient that feed is been utilized**
>
> Male, MoFA Officer, Berekum West District, Brong Ahafo Region, KII, May, 2020

As indicated in Figure 9, among the least successful respondents, 31.3% and 62.5%, reported a very high or high impact of the training, respectively, when it came to efficiency in feed production. Only 6.2% reported a low impact, and none reported no impact. Similarly, a majority of the most successful

respondents reported the same: 47.6% and 38.1% stated that training had a very high or high impact, respectively, with only 9.5% reporting a low impact and 4.8% reporting no impact in this area.

Figure 9: Poultry farmers and feed millers applying efficiency in feed production



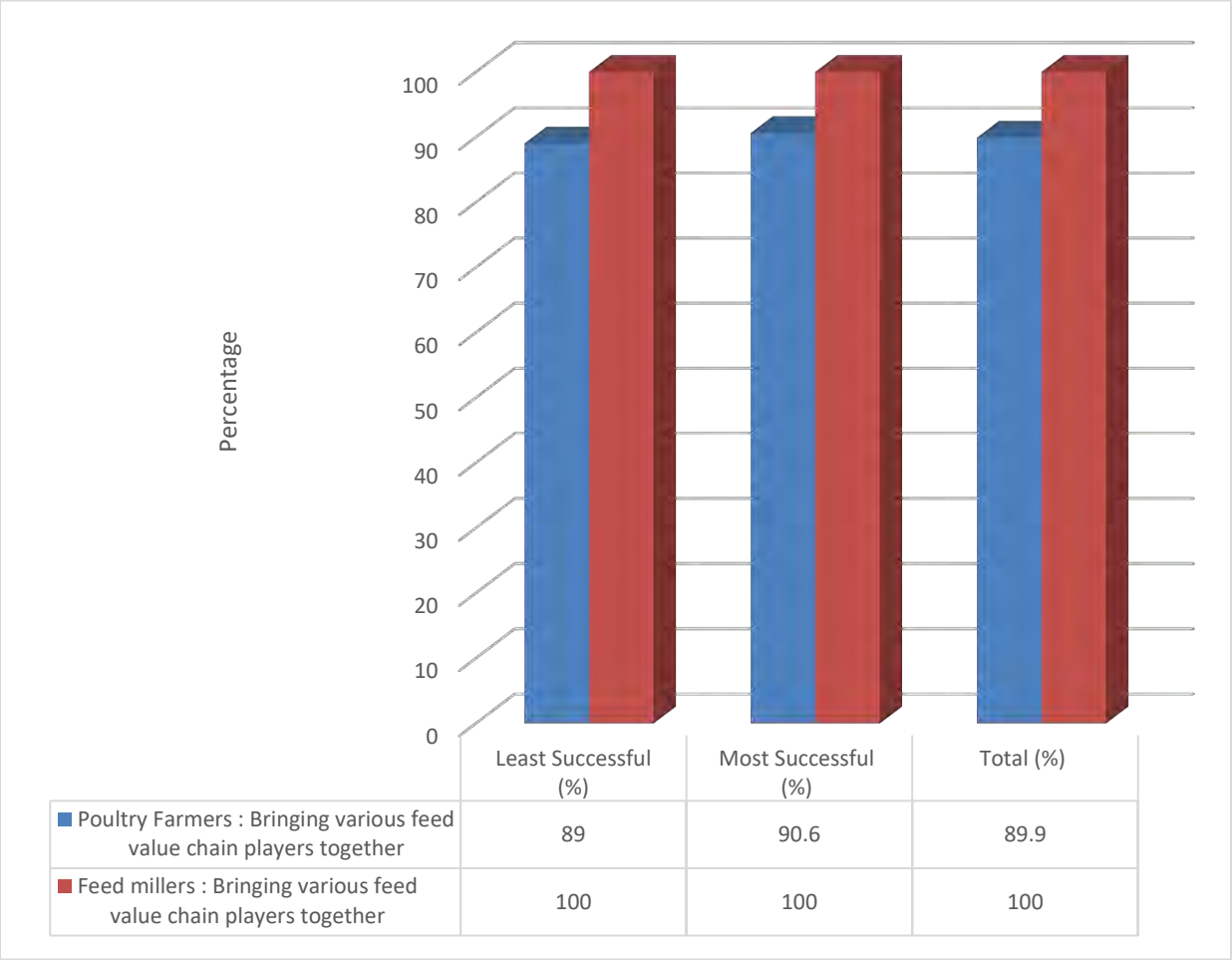
	Least Successful (%)	Most Successful (%)
Very high	31.3	47.6
High	62.5	38.1
Low	6.2	9.5
Not at all	0	4.8

Source: Field Data, 2020

3.5.1.6 Activity 6: Increased efficiency in the procurement of feed ingredients

As indicated in Figure 10 below, 89.0% and 90.6% of the least and most successful poultry farmers, respectively, and 100% of least and most successful feed millers, asserted that they reached out to other players on the poultry feed value chain as a result of AMPLIFIES. This helped them establish links to efficiently procure feed ingredients. Overall, the number of improved collaborations was seen as a successful marker of the program.

Figure 10: Poultry farmers and feed millers applying increased efficiency in procuring feed ingredients



	Least Successful (%)	Most Successful (%)	Total (%)
Poultry Farmers : Bringing various feed value chain players together	89	90.6	89.9
Feed millers : Bringing various feed value chain players together	100	100	100

Source: Field Data, 2020

Farmers noted that they procured more feed and improved how they stored feed as a result of being able to efficiently procure feed ingredients. Both poultry farmers and feed millers reported becoming more knowledgeable about the right component of feed, adding that they were able to use local raw materials as components in their feed. Participants believed that all these activities increased the rate at which their poultry birds grew. One respondent expressed:

> **There has been an increase in procurement because formally most of the farmers were not paying much attention to the ingredients that are necessary for good performance in terms of production but once AMPLIFIES introduced them to the good ingredients, they try to get them for their formulations.**
>
> MoFA Officer, Berekum Municipality, Brong Ahafo Region, KII, May, 2020

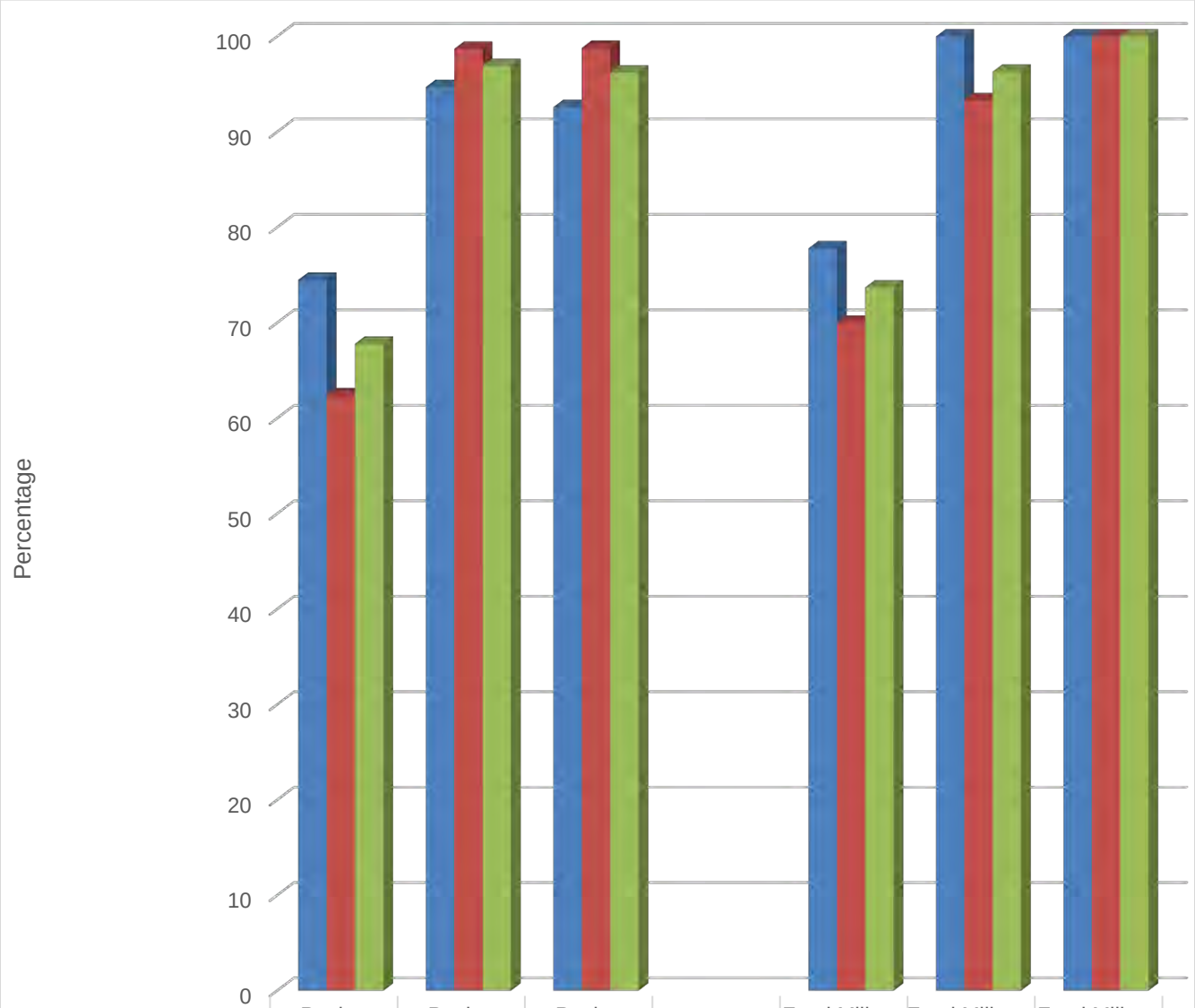
They introduced us to people we can purchase the local raw materials from so I will say it was very good.

Male, MoFA Officer, Ashaiman Municipality, Greater Accra Region, KII, May, 2020

3.5.1.7 Activity 7: Loans for investments in feed processing

The final evaluation assessed poultry farmers' and feed millers' access to loans, financial management, bookkeeping and record keeping, as these factors play a key role in determining the impact on value chain actors. Concerning access to loans, 74.5% and 62.4% of the least and most successful poultry farmers, respectively, and 77.8% and 70% of least and most successful of feed millers, respectively, stated that they put into practice what they were taught by AMPLIFIES to obtain loans for investments in feed processing. This is indicated in Figure 11 below.

Figure 11: Poultry farmers and feed millers applying techniques to access loans for investments in feed processing



	Poultry Farmers: Access to loans	Poultry Farmers: Financial Management	Poultry Farmers: Record keeping		Feed Millers: Access to loans	Feed Millers: : Financial Management	Feed Millers: Record keeping
Least Successful (%)	74.5	94.7	92.6		77.8	100	100
Most Successful (%)	62.4	98.7	98.8		70	93.3	100
Total (%)	67.8	96.9	96.2		73.7	96.3	100

Source: Field Data, 2020

In terms of applying knowledge about financial management learned during the AMPLIFIES training, 94.7% and 98.7% of the least and most successful poultry farmers, respectively, reported putting into practice what they learned. Among feed millers, 100% of the least successful and 93.3% of the most successful

reported doing the same. With regards to record and bookkeeping, 92.6% and 98.8% of the least and most successful poultry farmers, respectively, and 92.6% and 100% of the least and most successful feed millers reported applying their knowledge.

Among the poultry farmers, 92.4% and 89.0% of least and most successful, respectively, who applied for loans shared that they had been successful in securing loans after the AMPLIFIES training, while 76.5% and 95.2% of least and most successful feed millers, respectively, reported successfully securing loans. The findings indicate a high success rate in loan applications among beneficiaries, in comparison to the Baseline Study numbers, which indicated that very few farmers could secure loans from credit and financial institutions prior to AMPLIFIES, especially considering that the money available in the form of credit for poultry farmers by these credit institutions is very limited.

The qualitative data from participants revealed that stakeholders on the value chain benefitted from improved knowledge about loans and took advantage of opportunities to access them. Participants shared their improved knowledge of financial management which, in addition to other factors, helped them improve their financial status. One MoFA staff who took part in the training reflected:

> **Formerly, people or the farmers, they are afraid and they don't know the processes in accessing loans, or getting loan from the banks but through the training they are now equipped and they know how to put things in other and organize themselves very well, especially into groups and other things, so that they can access the loan facilities. Though they were not given money during the training, they have been trained to know how they can go through and access loans for their project.**
>
> Unknown Sex, MoFA Staff, Ga East Municipal Assembly, KII, May, 2020

Case 3: An observation made by a commercial bank officer introduced to AMPLIFIES

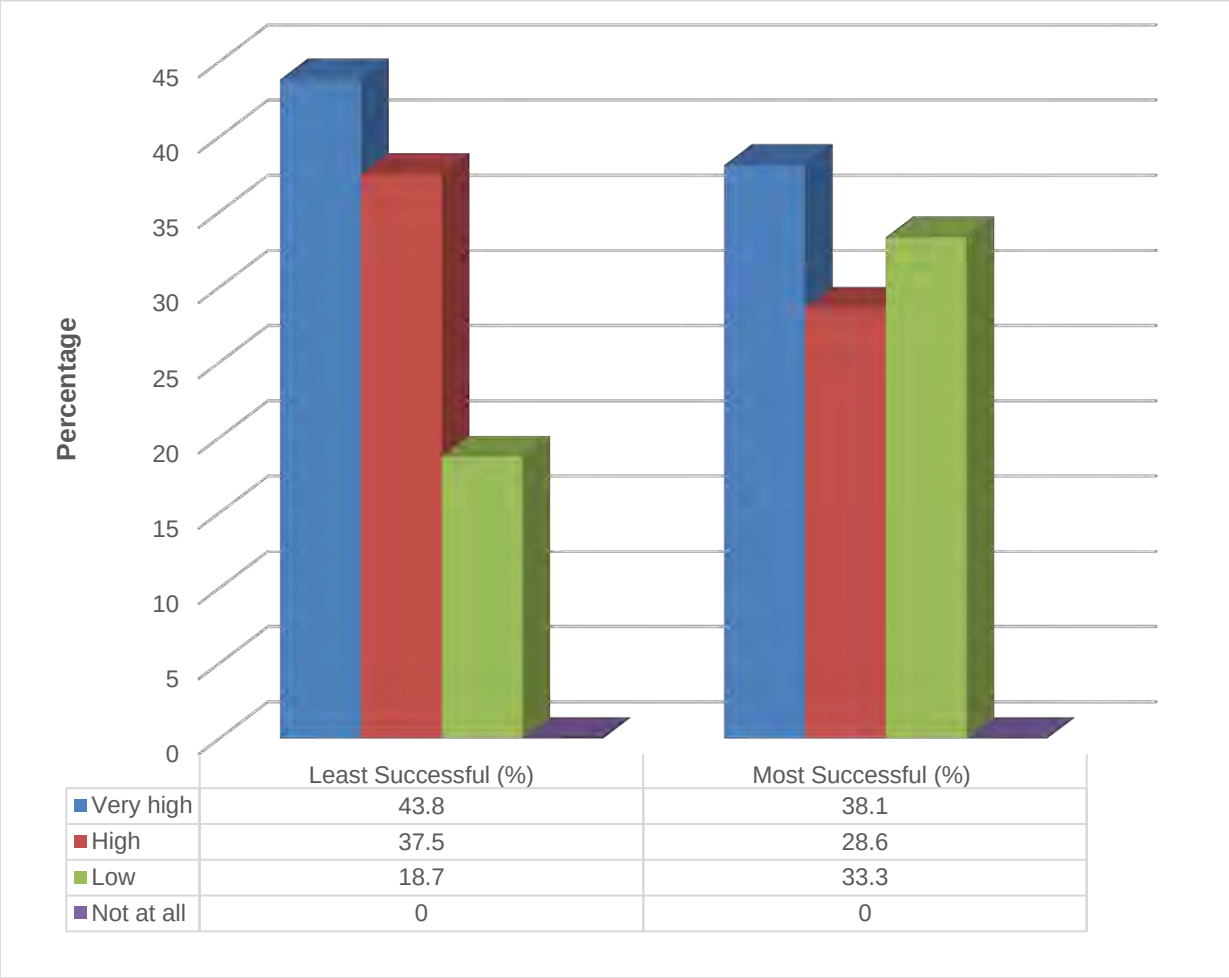
The bank described here is among Ghana's most prominent commercial banks, with branches in almost every region of the country. Even though the data did not show when its staff learned about AMPLIFIES, the loan officer stated that he was introduced to AMPLIFIES at a branch in the Bono Municipality in the Brong Ahafo Region when poultry farmers, feed millers, and crop farmers needed credit. The loan officer reflected that AMPLIFIES training participants benefited by learning about bookkeeping, financial management, and strategies to access credit, stating:

> **Through AMPLIFIES they have also had the opportunity to expand their businesses and also given a good education on how to properly prepare books of account and how to access some credit facilities.**

The loan officer further stated that, due to their increased capacity from the AMPLIFIES training, the bank was prepared to grant players on the value chain continued credit to expand their businesses.

As indicated in Figure 12 below, 43.8% of the least successful respondents reported a very high impact in terms of funding for their feed operations, and an additional 37.5% reported a high impact. Only 18.7% reported a low impact, and none reported no impact. Of the most successful respondents, a slightly lower percentage reported positive outcomes: 38.1% reported a very high impact on funding for their feed operations, 28.6% reported a high impact, and 33.3% reported a low impact; none reported no impact at all.

Figure 12: Improvement in funding feed operations



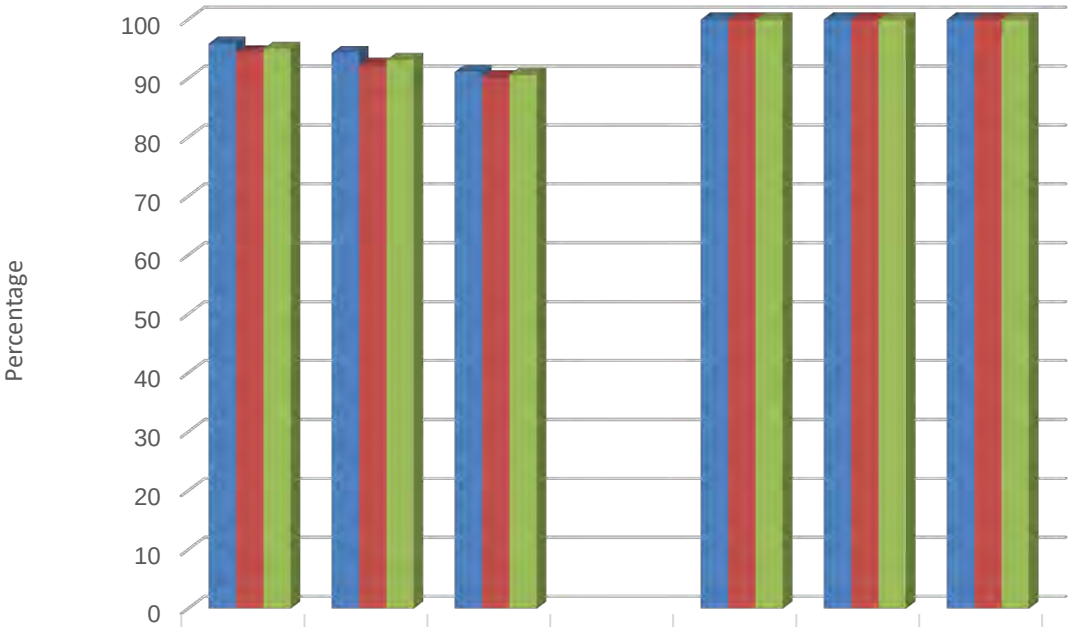
	Least Successful (%)	Most Successful (%)
Very high	43.8	38.1
High	37.5	28.6
Low	18.7	33.3
Not at all	0	0

Source: Field Data, 2020

3.5.1.8 Activity 8: Post-harvest storage and aggregation of feed inputs

With regards to post-harvest storage and aggregation of feed inputs, the key activities assessed included management of warehouse facilities and produce, reception of produce in warehouses, and handling of post-harvest materials. As shown in Figure 13 below, 95.9% and 94.4% of the least and most successful poultry farmers, respectively, and 100% of the least and most successful feed millers reported applying what they learned about managing warehouse facilities and produce.

Figure 13: Poultry farmers and feed millers applying knowledge of post-harvest storage and aggregation of feed inputs



	Poultry Farmers: Manage warehouse facility and produce	Poultry Farmers:Applying: Received produce in the warehouse	Poultry Farmers: Handle post-harvest materials		Feed millers: Manage warehouse facility and produce	Feed millers:Applying: Received produce in the warehouse	Feed millers:: Handle post-harvest materials
Least Successful (%)	95.9	94.3	91.1		100	100	100
Most Successful (%)	94.4	92.3	90.2		100	100	100
Total (%)	95	93.1	90.6		100	100	100

Source: Field Data, 2020

Among poultry farmers and feed millers, 94.3% and 92.3% of least and most successful, respectively, and 100% of least and most successful confirmed that they learned how to receive produce in warehouses for feed production. Similarly, 91.1% and 90.2% of least and most successful poultry farmers, respectively, and 100% of the least and most successful feed millers reported applying the training on post-harvest material in their farming activities. Crop farmers, another key stakeholder group, also benefitted immensely from this training. They learned about the dangers of post-harvest contamination of their produce, and are now aware of the improved storage facilities available to them, due to support from AMPLIFIES. They expressed that their post-harvest losses had reduced significantly due to the availability of storage facilities and new knowledge they gained about post-harvest storage. As the data shows, this

program initiative was successful; however, storage still remains a challenge, as about 48% of feed millers said that they still do not have proper facilities to store their feed. Case 4 below describes the impact of the training on an FBO in the Brong Ahafo Region of Ghana.

Case 4: The impact on an FBO at Dormaa Central in the Brong Ahafo Region

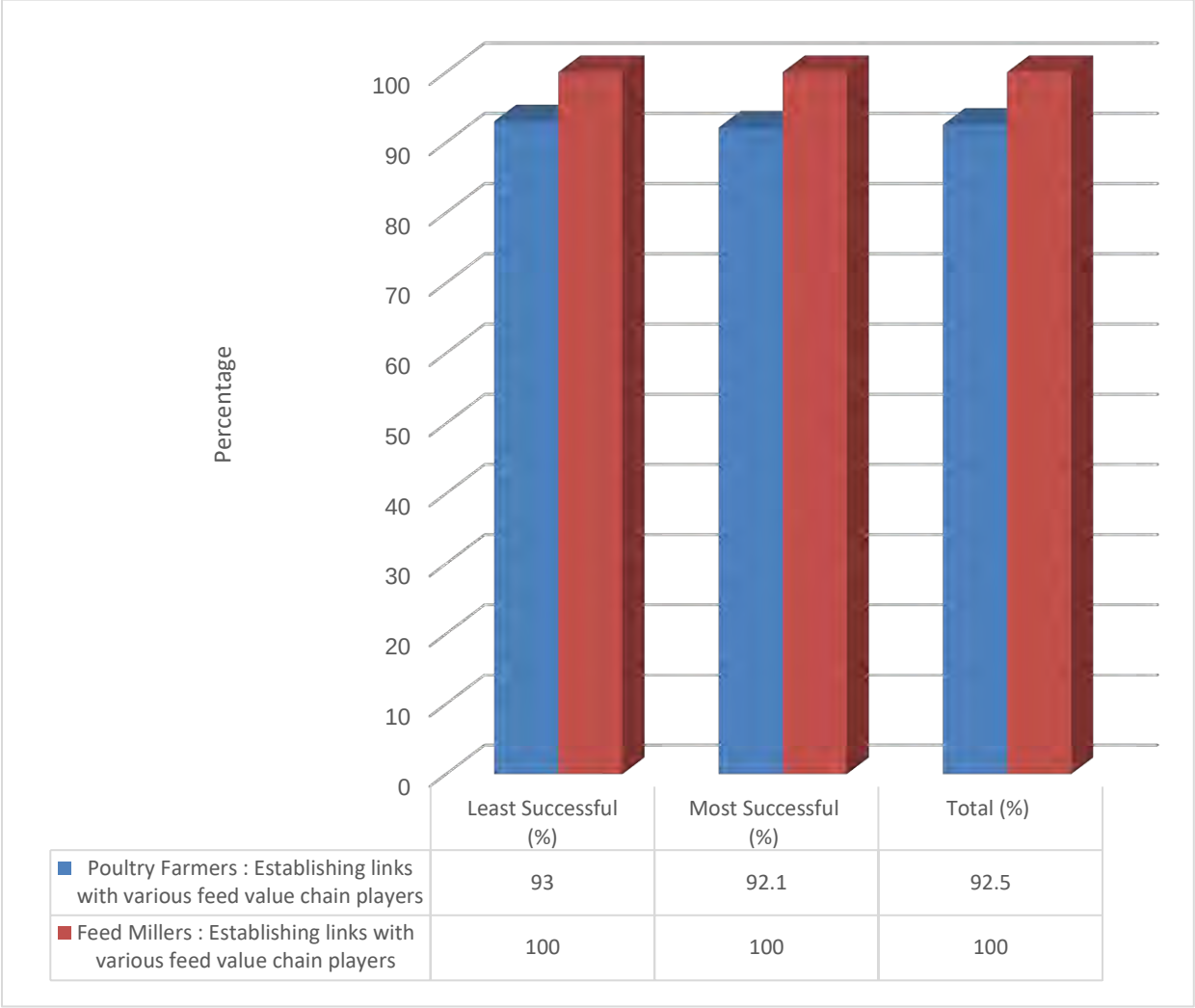
This FBO has 20 members, 18 of whom are men and 2 of whom are women. It is registered, has an executive steering committee, bank accounts, and a written mandate to regulate its activities. The major crop its farmers grow is maize and the minor crops include pepper, tomatoes, and garden eggs. As an FBO, one of its greatest challenges has been storing its maize produce, which is used post-harvest for the production of poultry feed. They joined AMPLIFIES in 2015, at the program's start. Among the numerous training topics were post-harvest storage and aggregation of training inputs. The FBO attests to the immense support AMPLIFIES has given them, with one of their top executives describing it as follows:

> The AMPLIFIES project has really helped us because previously we were losing our maize due to infections. Through the training, we were taught how to prevent the maize from aflatoxins which causes poultry birds to die. They told us to carefully remove the bad maize from the good ones and also introduced us to PICS bags for storing the maize. This helped in storing the maize for a very long time without it going bad. So now, they have seen improvement in our maize production unlike previously.

The confirmation by this FBO is one among several testimonies that other well-established FBOs also gave about the benefit of the AMPLIFIES program.

Among poultry farmers and feed millers, 93.0% and 92.1% of the least and most successful, respectively, and 100% of the least and most successful feed millers noted that they were better linked to the other players on the feed value chain as a result of AMPLIFIES, as indicated in Figure 13 below. Crop farmers indicated that they benefitted from the initiative by being connected with poultry farmers and feed millers. Together, they worked to create strong networks, learn where feed can be easily located and purchased, and find better deals.

Figure 14: Poultry farmers and feed millers applying greater linkages with other members of the poultry feed distribution network



	Least Successful (%)	Most Successful (%)	Total (%)
Poultry Farmers : Establishing links with various feed value chain players	93	92.1	92.5
Feed Millers : Establishing links with various feed value chain players	100	100	100

Source: Field Data, 2020

Crop farmers, in particular, added that they could sell their produce with ease. Two FBO executives and a MoFA officer expressed:

> **Yes, we received training. That's why we were linked with the poultry farmers and aggregators during the training. We took the phone contacts of the poultry farmers and aggregators and they also took ours. This helped us to market our produce easily by just calling them. They also called us whenever they needed the maize so that we can take it to them to buy.**

FBO Executive, Dormaa Central Municipal Assembly, Brong Ahafo, KII, May, 2020

What I have benefited from them is that, right now I have five bags of soya beans. If I have five bags of soya beans and if I call them, they can call the poultry farmers to come and buy and I will get much money than to send it to the market side (traditional market).

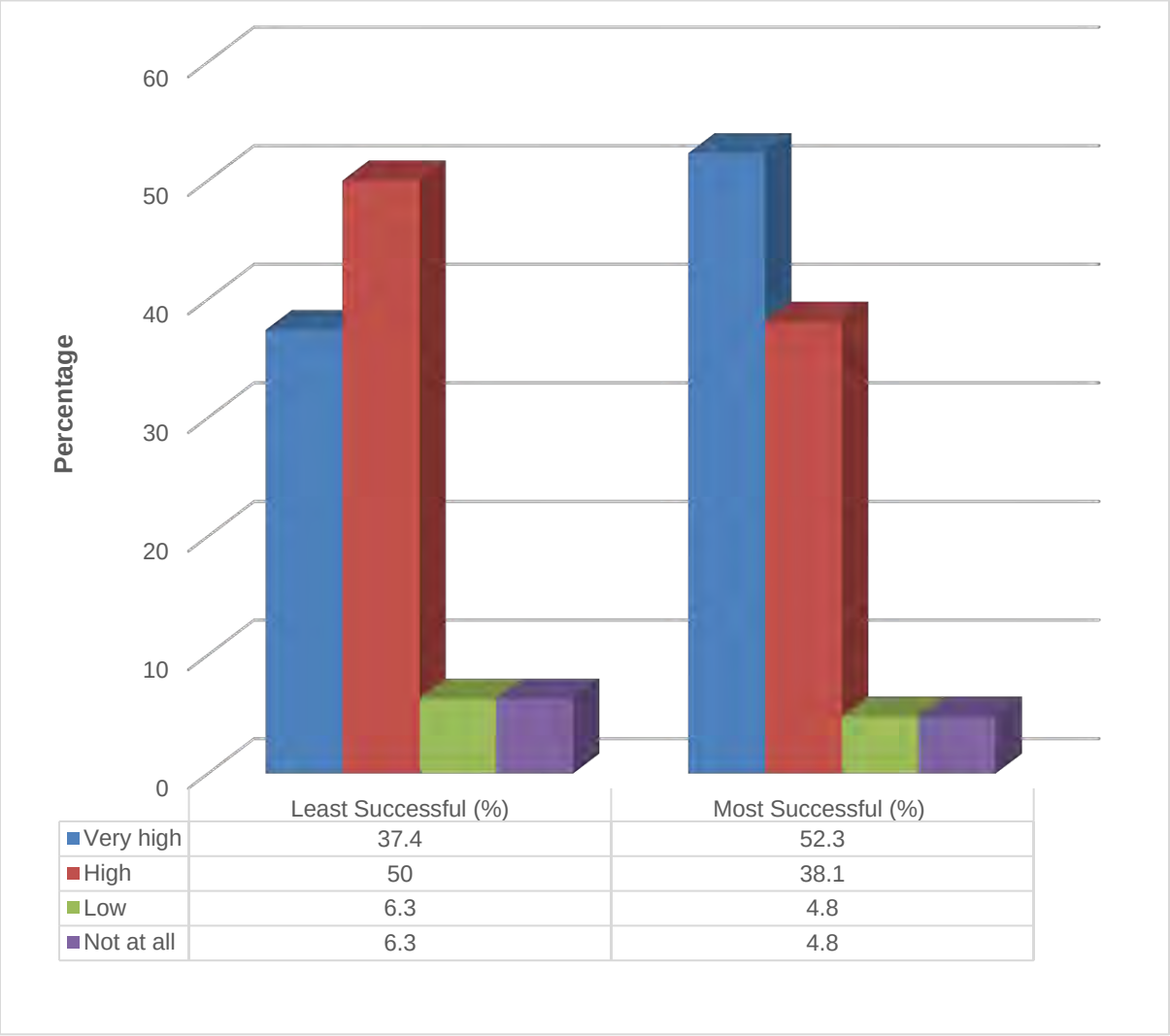
FBO Executive, Tolon District, Northern Region, KII, May, 2020

It has help them a lot and then their education so now they are able to locate where they will need the feed and those also who need the feed. So those who are in need of feed can locate where they can get and those who are also distributing will also know where the demand is and they also send it. Therefore I can say it has helped a lot. The network is now ok. I will say it is good

Unknown Sex, MoFA Staff, Ga East Municipal Assembly, KII, May, 2020

As indicated in Figure 15 below, among the least successful respondents, 37.4% and 50% confirmed very high and high improvements in marketing poultry feed, respectively, while 6.3% reported a low improvement and another 6.3% reported of no improvement. Of the most successful respondents, 52.3% and 38.1% indicated that impacts were very high and high, respectively, while 4.8% indicated that impacts were very low; an additional 4.8% reported no impact whatsoever.

Figure 15: Improvement in marketing of poultry feed by feed millers



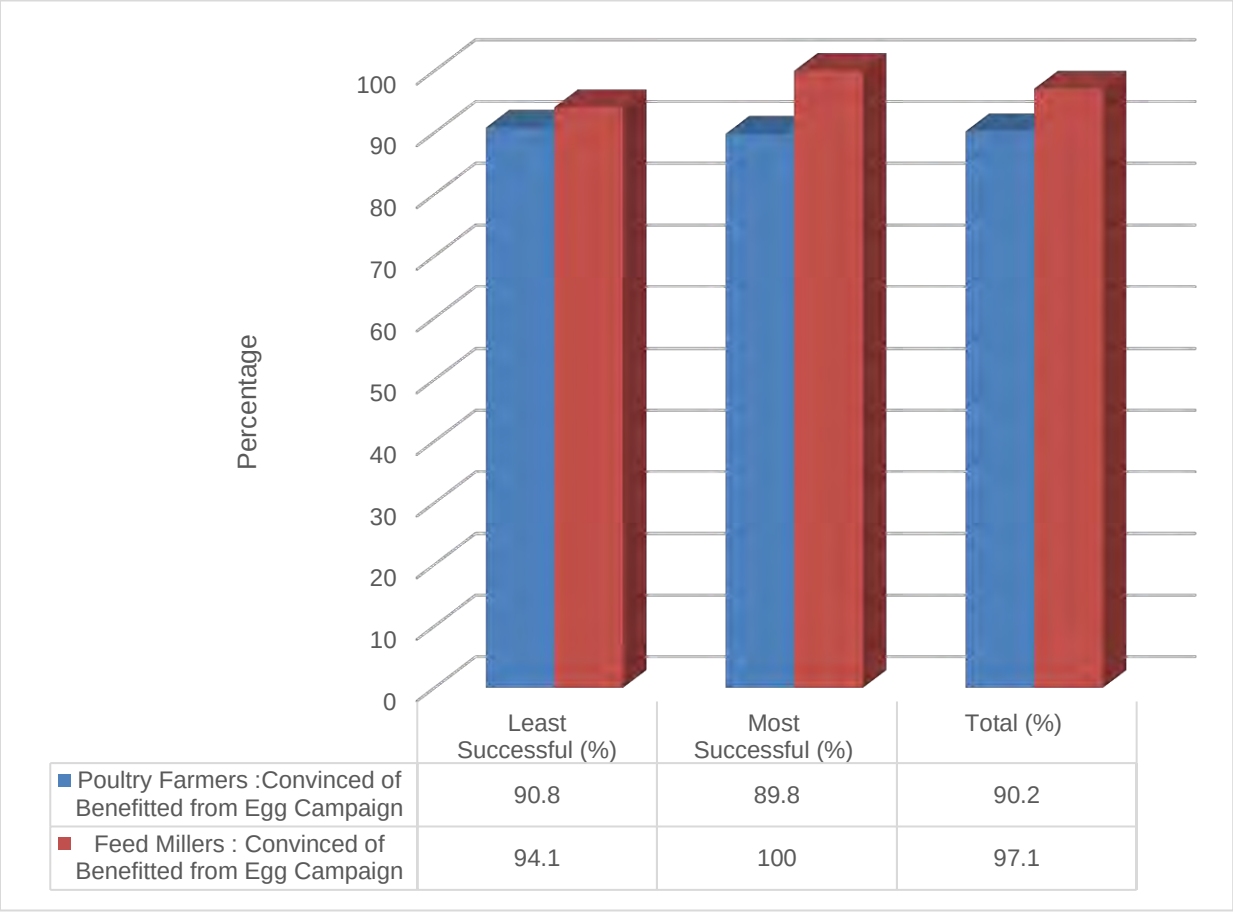
	Least Successful (%)	Most Successful (%)
Very high	37.4	52.3
High	50	38.1
Low	6.3	4.8
Not at all	6.3	4.8

Source: Field Data, 2020

3.5.1.9 Activity 9: Organizing a national awareness raising campaign to promote egg consumption

The evaluation focused on assessing the perceptions among poultry farmers and feed millers on the benefits of the national awareness raising campaign. As shown in Figure 16 below, 90.8% and 89.8% of least and most successful poultry farmers, respectively, were of the view that their businesses had benefited from the activity, while 94.1% and 100% of the least and most successful feed millers, respectively, shared the same view.

Figure 16: Poultry farmers and feed millers who found the awareness raising campaign beneficial



	Least Successful (%)	Most Successful (%)	Total (%)
Poultry Farmers :Convinced of Benefitted from Egg Campaign	90.8	89.8	90.2
Feed Millers : Convinced of Benefitted from Egg Campaign	94.1	100	97.1

Source: Field Data, 2020

Respondents expressed that the campaign increased knowledge of the benefits of eating eggs and boosted egg consumption by improving negative public perceptions around it. As a result, poultry farmers and feed millers saw increased profits. A MoFA staff member who observed the program expressed:

> **I will rate it [the theme] as excellent. Because for some time now there has been some myth on egg consumption. And people have the believe that too much eggs consumption is bad. In that case, farmers were having sums of eggs but cannot market it but now the consumption of egg has increased tremendously which was an excellent work they did.**
>
> MoFA Staff, Ashaiman Municipal Assembly, KII, May, 2020

> **For that I will say it is excellent because AMPLIFIES came on board and people are now consuming egg in an incredibly high rate. It has even come to our attention that the demand**

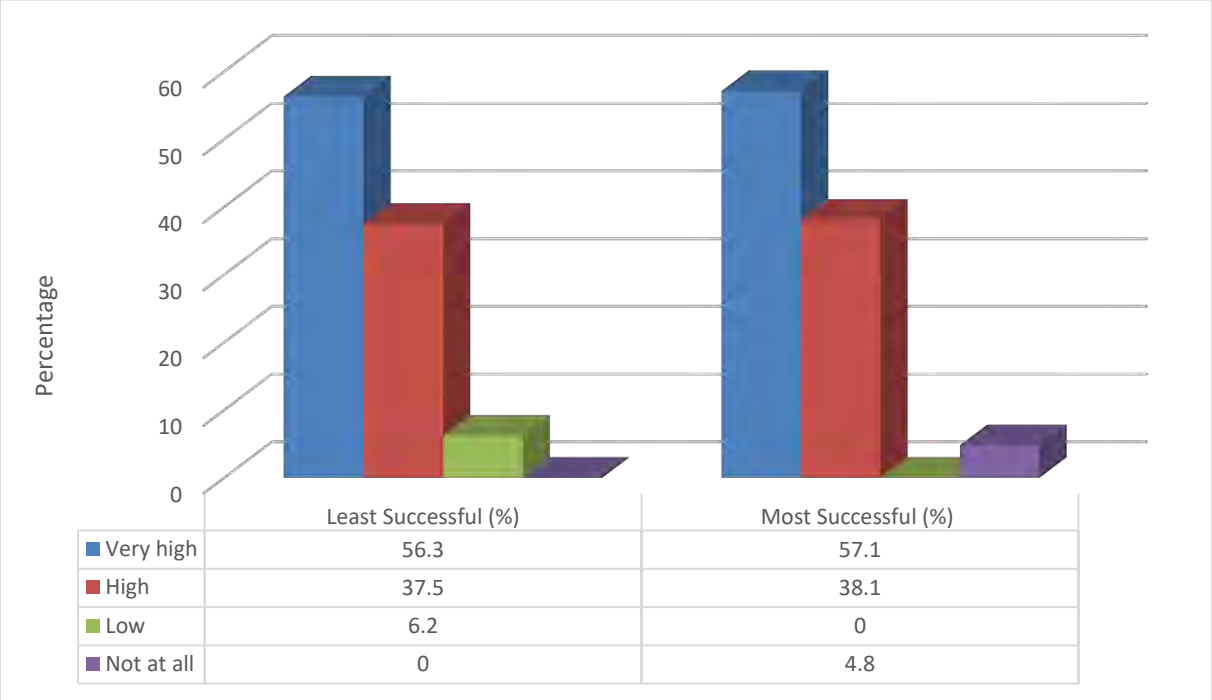
for eggs cannot be met by the poultry farmers in this very district. AMPLIFIES has contributed massively in regards to egg consumption.

MoFA Staff, Berekum West District Assembly, KII, May, 2020

3.5.1.10 Activity 10: Harvesting, Post-harvest Handling and Storage of Feed Inputs

As indicated in Figure 17, 56.3% and 37.5% of the least successful respondents reported a very high and high impact, respectively, when it came to improvements in storing their feed, while 6.2% reported a low impact and none reported no impact at all. Of the most successful respondents, 57.1% and 38.1% shared that impacts were very high and high, respectively, while none reported a very low impact and 4.8% reported no improvement at all in the storage of their feed.

Figure 17: Improvement in the storage of feed



	Least Successful (%)	Most Successful (%)
Very high	56.3	57.1
High	37.5	38.1
Low	6.2	0
Not at all	0	4.8

Source: Field Data, 2020

Crop farmers most impacted by the training on harvesting, post-harvest handling, and storage of feed inputs stated that AMPLIFIES was beneficial in helping them at every stage. Although AMPLIFIES training did not focus on crop planting, some FBOs reported to have learned how to plant crops better, as they became knowledgeable about how to space crops and improve how they apply fertilizers and chemicals. When it came to harvesting, crop farmers reflected that they learned to harvest strategically and were

given harvesting sacks and other resources to help in storing their produce. They attributed their increases in yield and improvement in the quality of yield to their newfound knowledge. Two respondents shared the following:

> **We received training of how to grow the maize and how to it so that it doesn't destroy. At first, the maize was grown in a haphazard order but AMPLIFIES taught us how to grow the maize using lines to get more yield. They also, taught us when to know the maize is dried and ready for harvesting. And indeed, when we followed the methods, we realized that the maize wasn't destroyed again like how it was before.**
>
> **Had it not been AMPLIFIES, some of us wouldn't know certain things in post-harvest. Logistics such as PICS bags and zero fly bags were introduced by AMPLIFIES. Right now, as I am talking with you the zero fly bag is in total shortage because they are always on my neck. They farmers have now seen the essence of these zero fly bags and there is a high demand for them. Those who store their grains in normal sacks, their grains go bad in no time.**
>
> Male, MoFA Officer, Dormaa Central Municipality, Brong Ahafo Region, KII, May, 2020

> **They also, taught us when to know the maize is dried and ready for harvesting. And indeed, when we followed the methods, we realized that the maize wasn't destroyed again like how it was before.**
>
> Male, FBO Executive, Dormaa Central Municipality, Brong Ahafo Region, KII, May, 2020

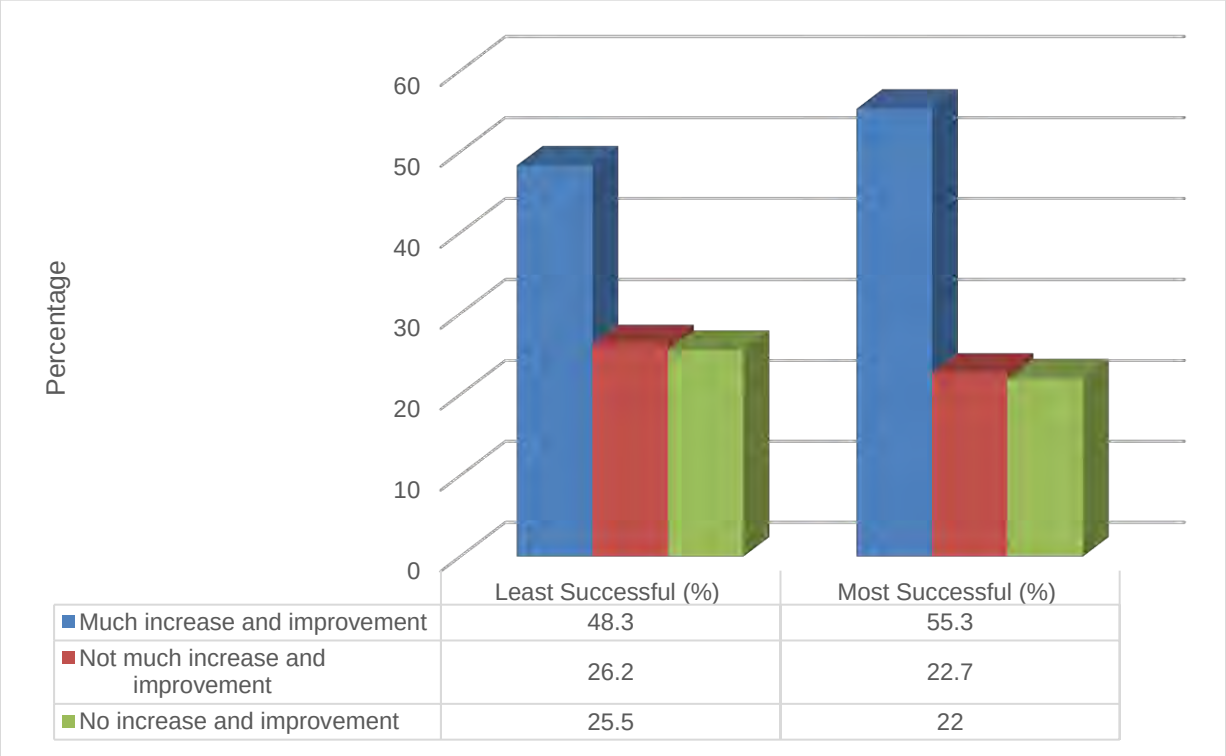
3.5.2 Impact of AMPLIFIES on the ten main goals

The impact of the main activities of the AMPLIFIES program extended to two crucial aspects of poultry production: egg and broiler production. More specifically, the evaluation looked at the impacts on the price and output of the production of eggs and broilers. It should be noted, however, that all outcomes for broiler production shared below are largely attributable to the GPP, who worked with farmers to produce broilers.

3.5.2.1 *Impact on egg production*

As indicated in Figure 18 below, among the least successful respondents, 48.3% reported a significant increase and improvement in the price of their eggs, while 29.2% reported a moderate increase and 25.5% reported no significant increase. Similarly, 55.3% of the most successful respondents reported a significant increase in the price of their eggs, 22.7% reported a moderate increase, and 22.0% reported no increase.

Figure 18: Reported increase in the price of eggs

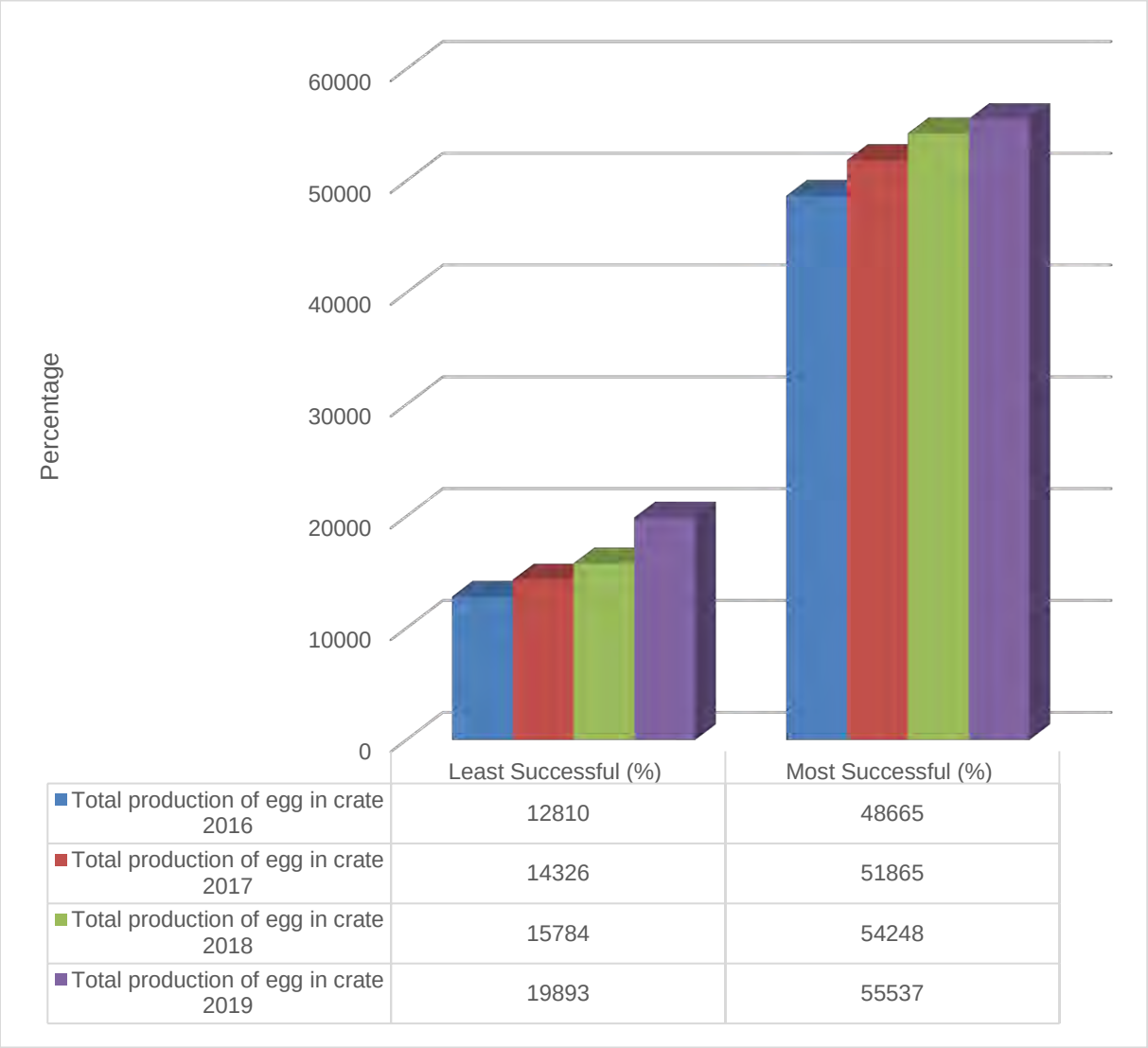


	Least Successful (%)	Most Successful (%)
Much increase and improvement	48.3	55.3
Not much increase and improvement	26.2	22.7
No increase and improvement	25.5	22

Source: Field Data, 2020

The mean number of crates of eggs that were produced during the AMPLIFIES program increased steadily each year, as indicated in Figure 19 below. Among the least successful respondents, the mean total in 2016 was 12,810. This went up to 14,326 in 2017, 15,784 in 2018, and 19,893 in 2019. The most successful respondents recorded a mean number of 48,665 in 2016, 51,865 in 2017, 54,248 in 2018, and 55,537 in 2019.

Figure 19: Mean number of crates* of eggs produced from 2016 to 2019

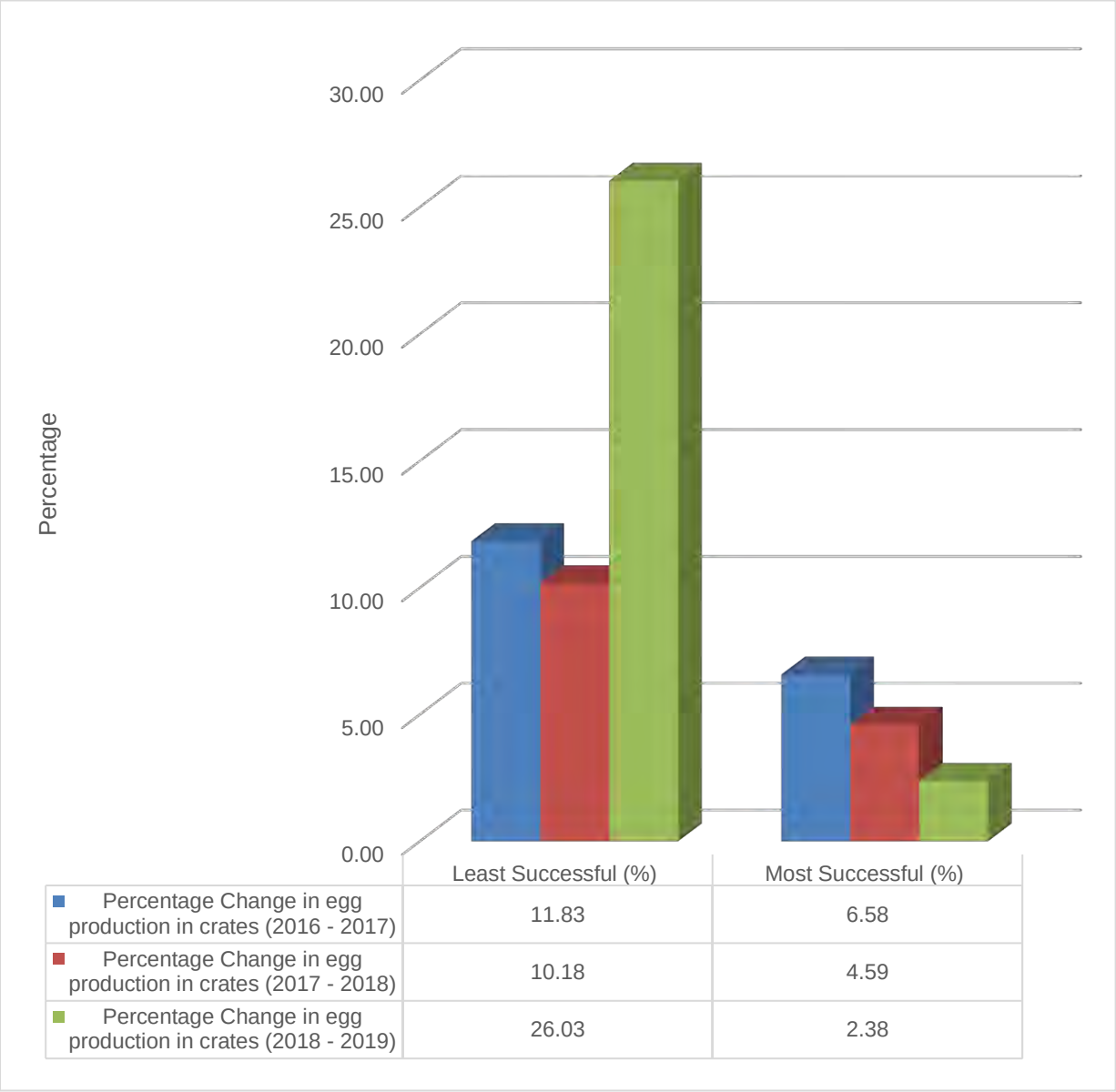


Source: Field Data, 2020;

*N**ote:** 1 crate holds 24 eggs

Though total numbers were lower for the least successful respondents, they experienced a greater percentage change in mean number of crates over the years. More specifically, they saw a 11.83% increase from 2016 and 2017, 10.18% from 2017 to 2018, and 26.03% from 2018 to 2019. The most successful respondents, on the other hand, recorded a mean change of 6.58% from 2016 and 2017, 4.59% from 2017 to 2018, and 2.83% from 2018 to 2019. The data is shown below in Figure 20.

Figure 20: Mean Percentage change in egg production

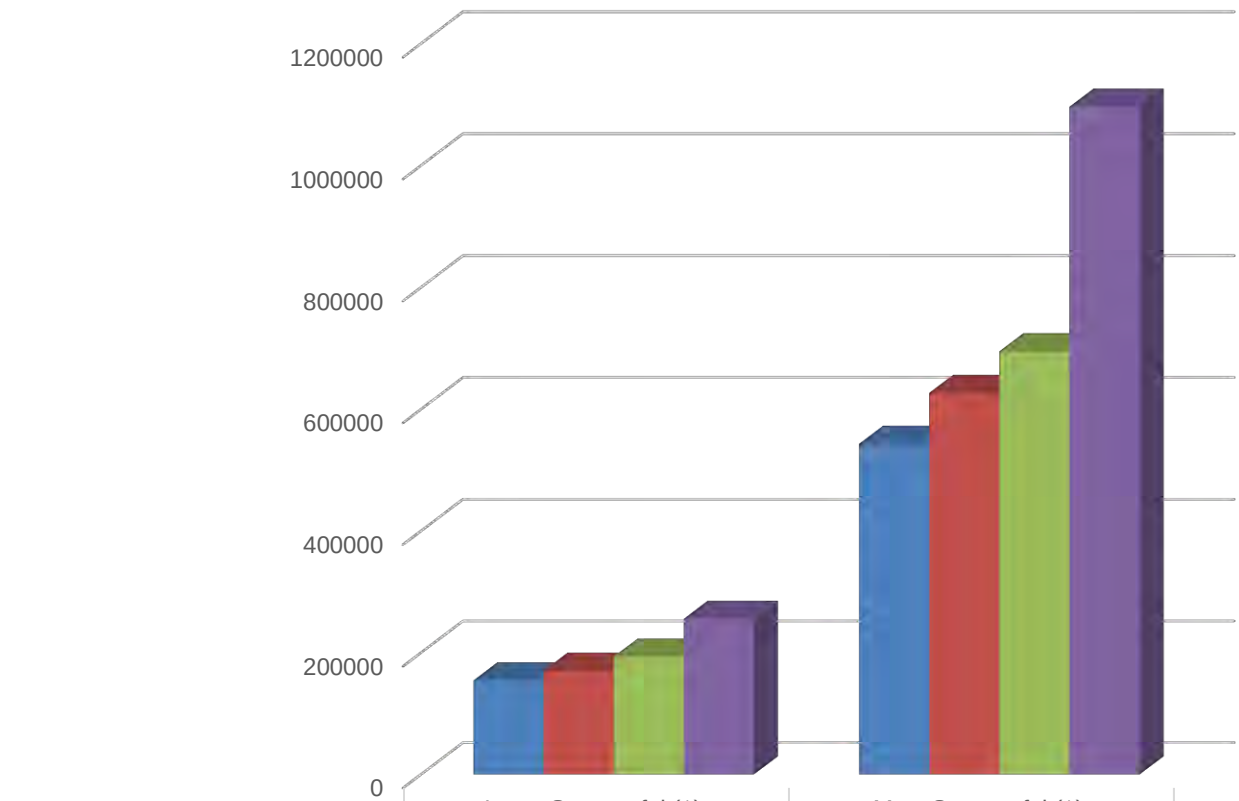


	Least Successful (%)	Most Successful (%)
Percentage Change in egg production in crates (2016 - 2017)	11.83	6.58
Percentage Change in egg production in crates (2017 - 2018)	10.18	4.59
Percentage Change in egg production in crates (2018 - 2019)	26.03	2.38

Source: Field Data, 2020

As shown in Figure 21, the least successful respondents had 154,546 cedis in mean total sales of eggs in 2016, 170,315 cedis in 2017, 193,411 cedis in 2018, and 255,635 cedis in 2019. The most successful respondents also had an increase in mean total sales over time, with a great increase from 2018 to 2019. They received a mean total of 543,165 cedes in 2016, 626,792 cedis in 2017, 695,033 cedes in 2018, and 109,6347 cedis in 2019.

Figure 21: Mean total sales in egg production

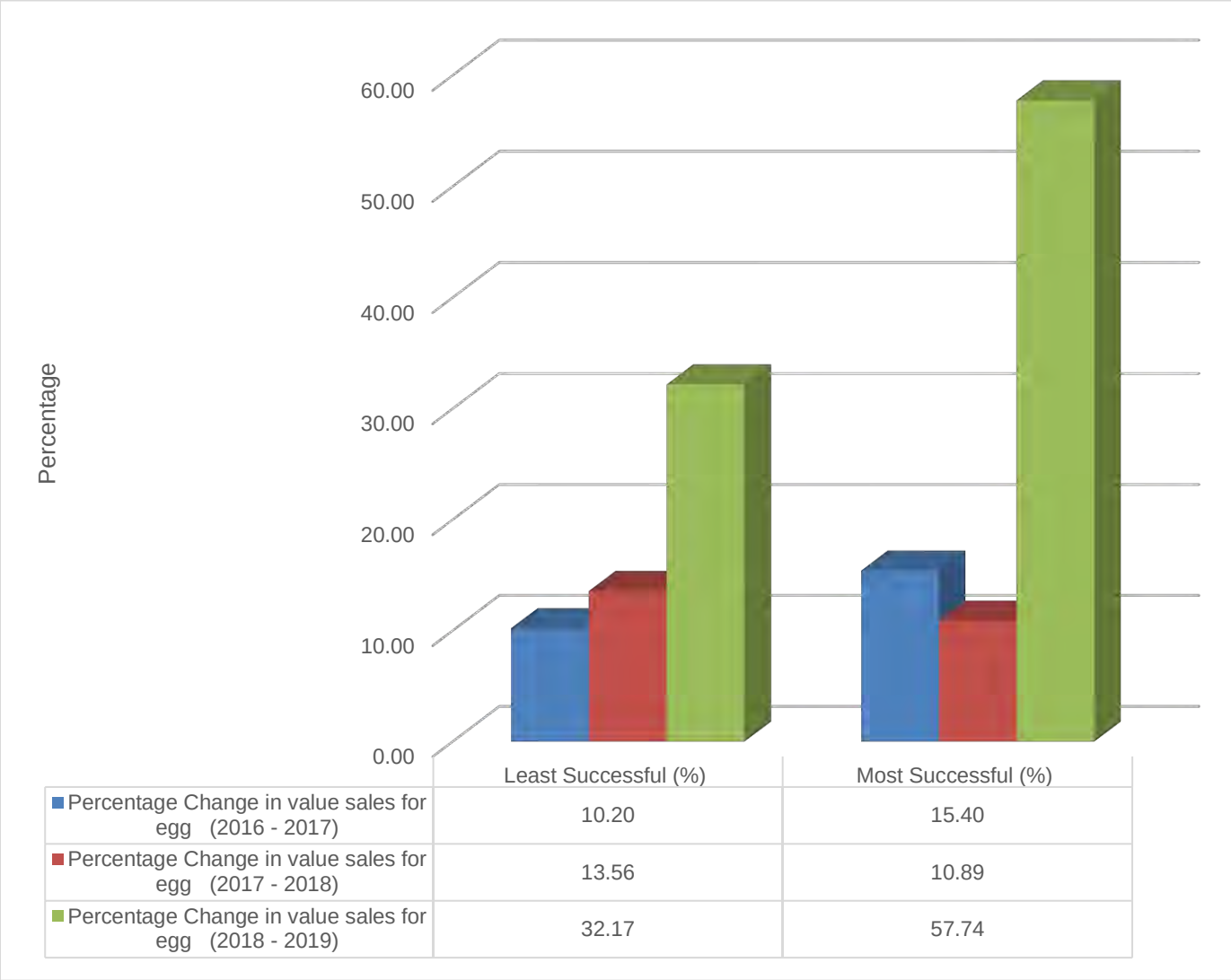


	Least Successful (¢)	Most Successful (¢)
Total annual value sales for egg in 2016	154546	543165
Total annual value sales for egg in 2017	170315	626792
Total annual value sales for egg in 2018	193411	695033
Total annual value sales for egg in 2019	255635	1096347

Source: Field Data, 2020

In terms of percentage change in mean total egg sales, the least successful respondents saw a 10.20% increase from 2016 and 2017, 13.56% from 2017 to 2018, and 32.17% from 2018 to 2019. The most successful respondents experienced a mean change of 15.40% from 2016 to 2017, 10.89% from 2017 to 2018, and 57.74% from 2018 to 2019. See Figure 22 below.

Figure 22: Percentage change in mean egg sales

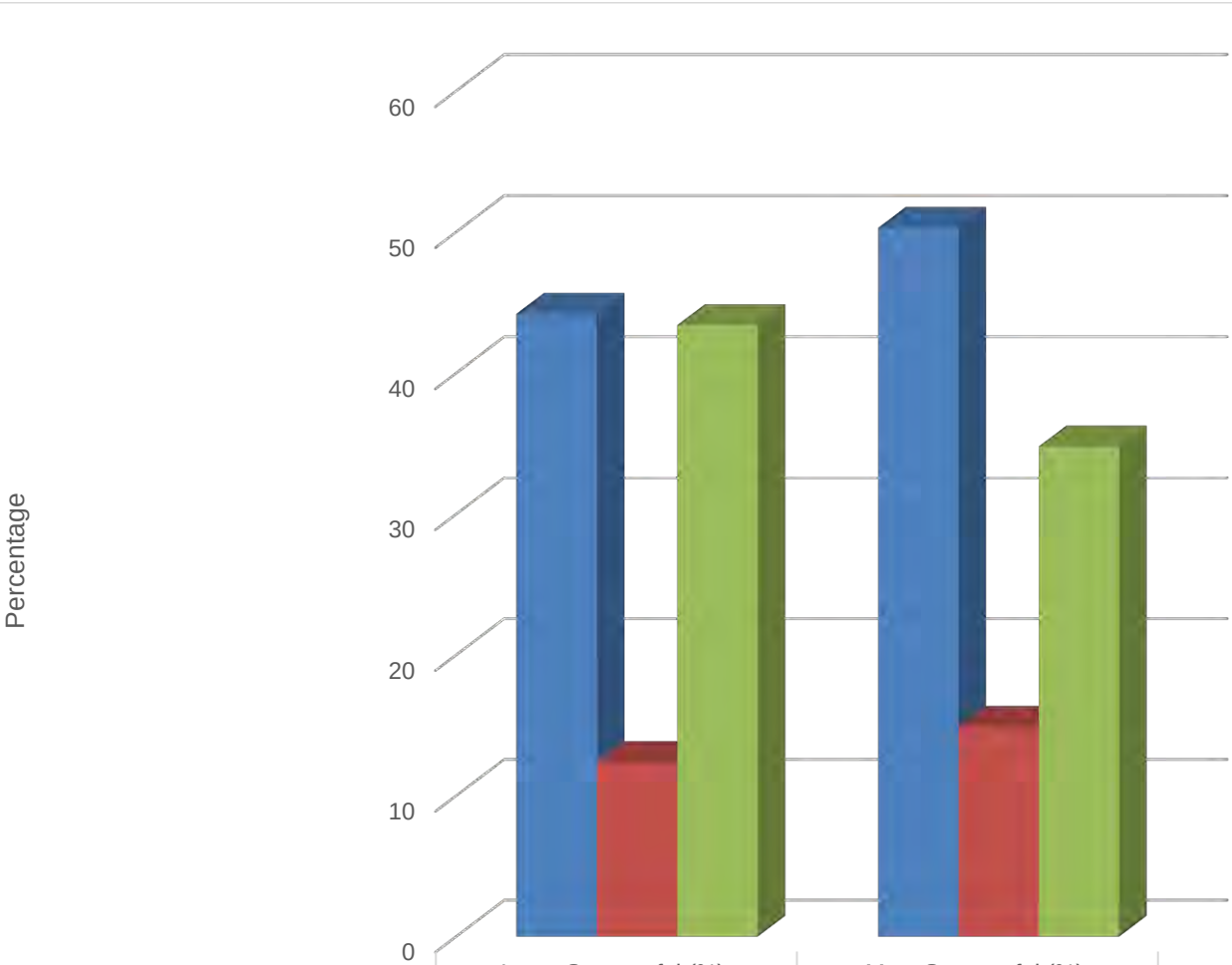


	Least Successful (%)	Most Successful (%)
Percentage Change in value sales for egg (2016 - 2017)	10.20	15.40
Percentage Change in value sales for egg (2017 - 2018)	13.56	10.89
Percentage Change in value sales for egg (2018 - 2019)	32.17	57.74

Source: Field Data, 2020

As shown below in Figure 23, 44.2% of the least successful respondents reported a great increase in their output of broilers after participating in the AMPLIFIES training, and 12.4% reported a low increase; 43.4% reported no increase in output. Similarly, 50.3% of the most successful respondents reported a great increase in their output of broilers, with 14.9% reporting a low increase and 34.8% reporting no increase.

Figure 23: Increase in the output of broilers

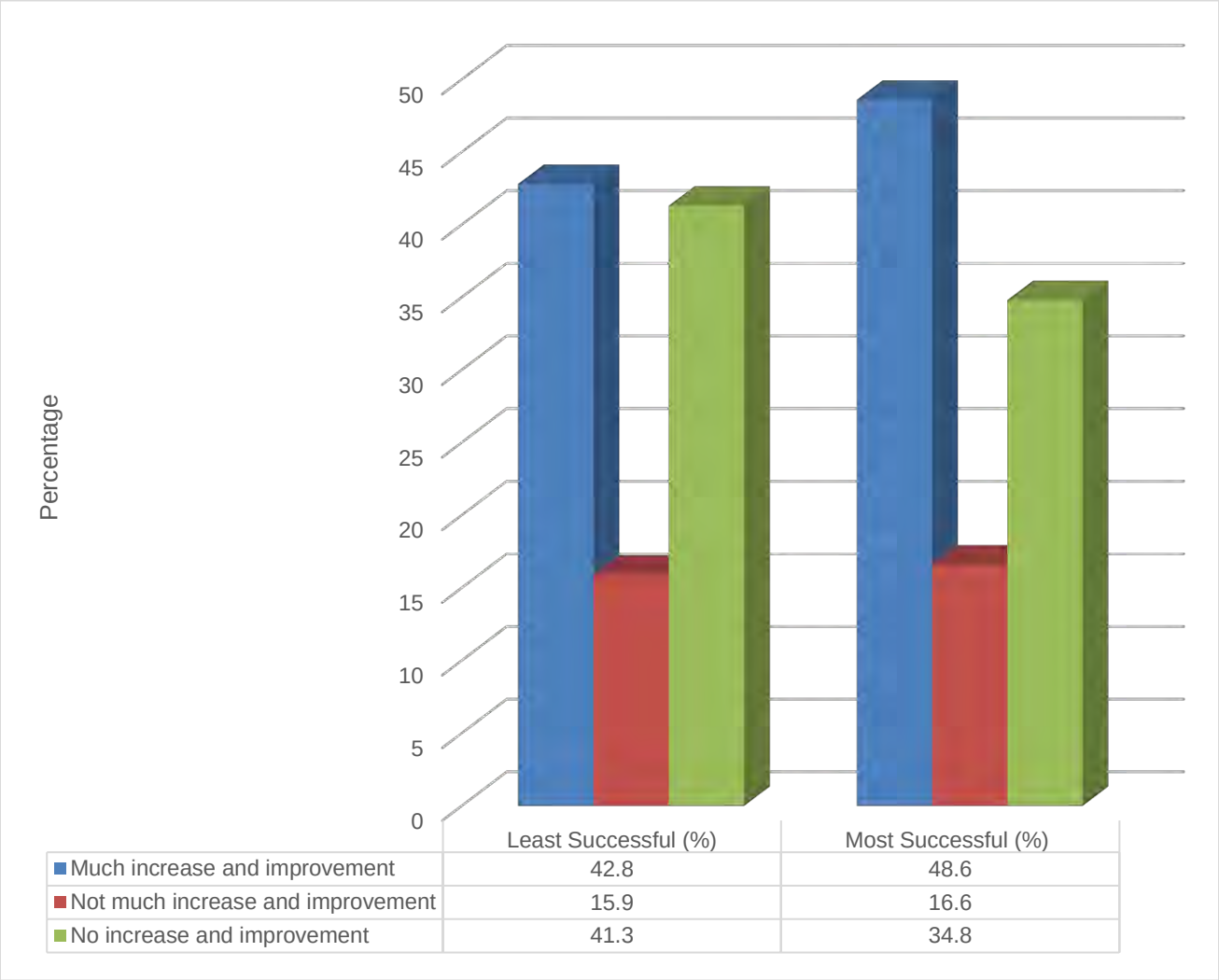


	Least Successful (%)	Most Successful (%)
Much increase and improvement	44.2	50.3
Not much increase and improvement	12.4	14.9
No increase and improvement	43.4	34.8

Source: Field Data, 2020

With regards to the price of broilers, 42.8% of the least successful respondents stated a great increase in the price of broilers after participating in the AMPLIFIES training, and 15.9% stated a low increase; 41.3% stated no increase in price. Among the most successful respondents, 48.6% saw a great increase in the price of broilers and 16.6% saw a low increase, while 34.8% saw no increase. See Figure 24 below for more details.

Figure 24: Increase in the mean price of broilers

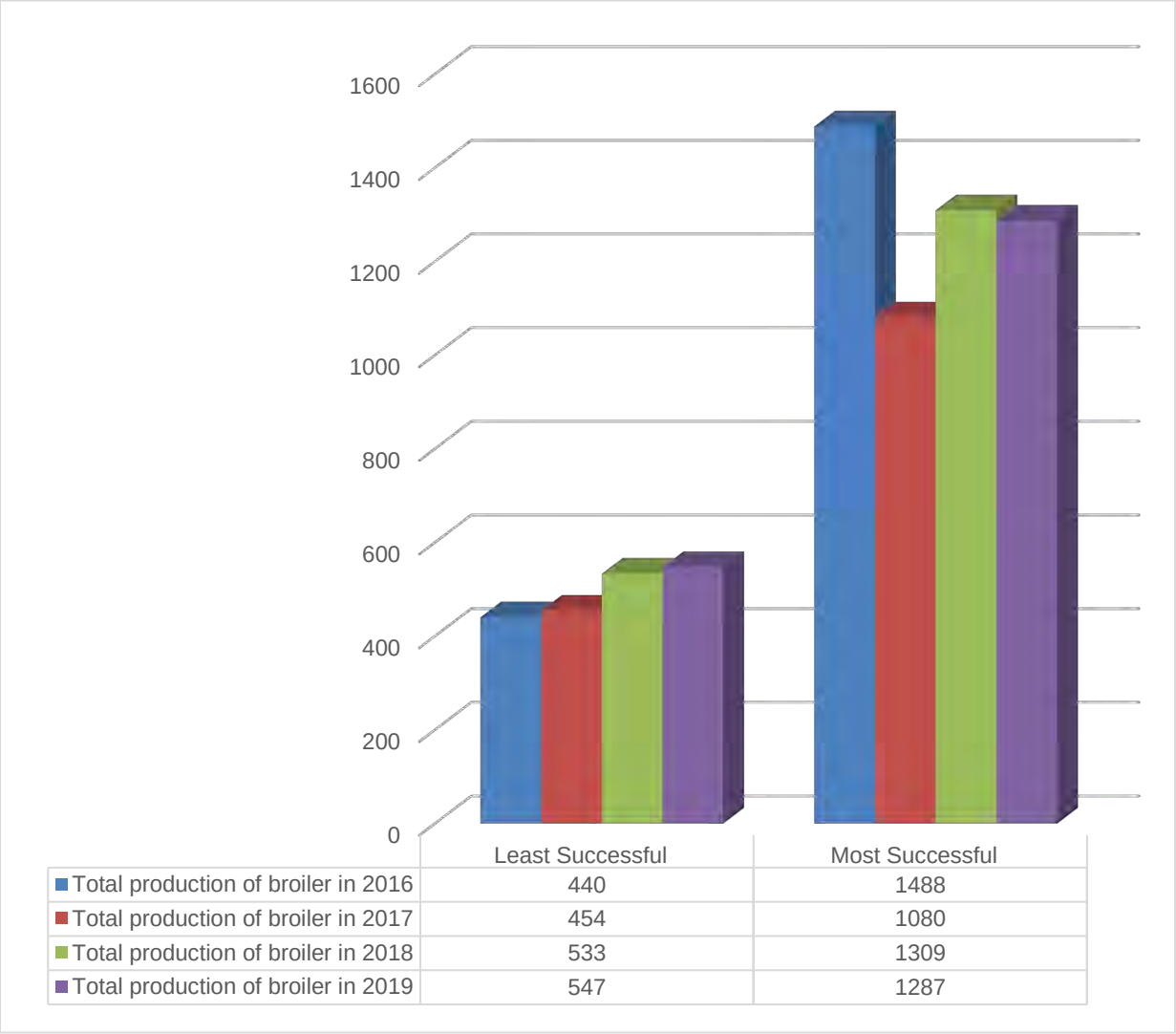


	Least Successful (%)	Most Successful (%)
Much increase and improvement	42.8	48.6
Not much increase and improvement	15.9	16.6
No increase and improvement	41.3	34.8

Source: Field Data, 2020

The mean total number of broilers produced by the least successful respondents rose steadily throughout the project period. They produced 440 in 2016, 454 in 2017, 533 in 2018, and 547 in 2019. The most successful respondents, on the other hand, saw their highest mean output of broilers, at 1,488 in 2016. They went on to produce a mean total of 1,080 in 2017, 1,309 in 2018, and 1,287 in 2019. This data is shown below in Figure 25.

Figure 25: Mean total broiler production

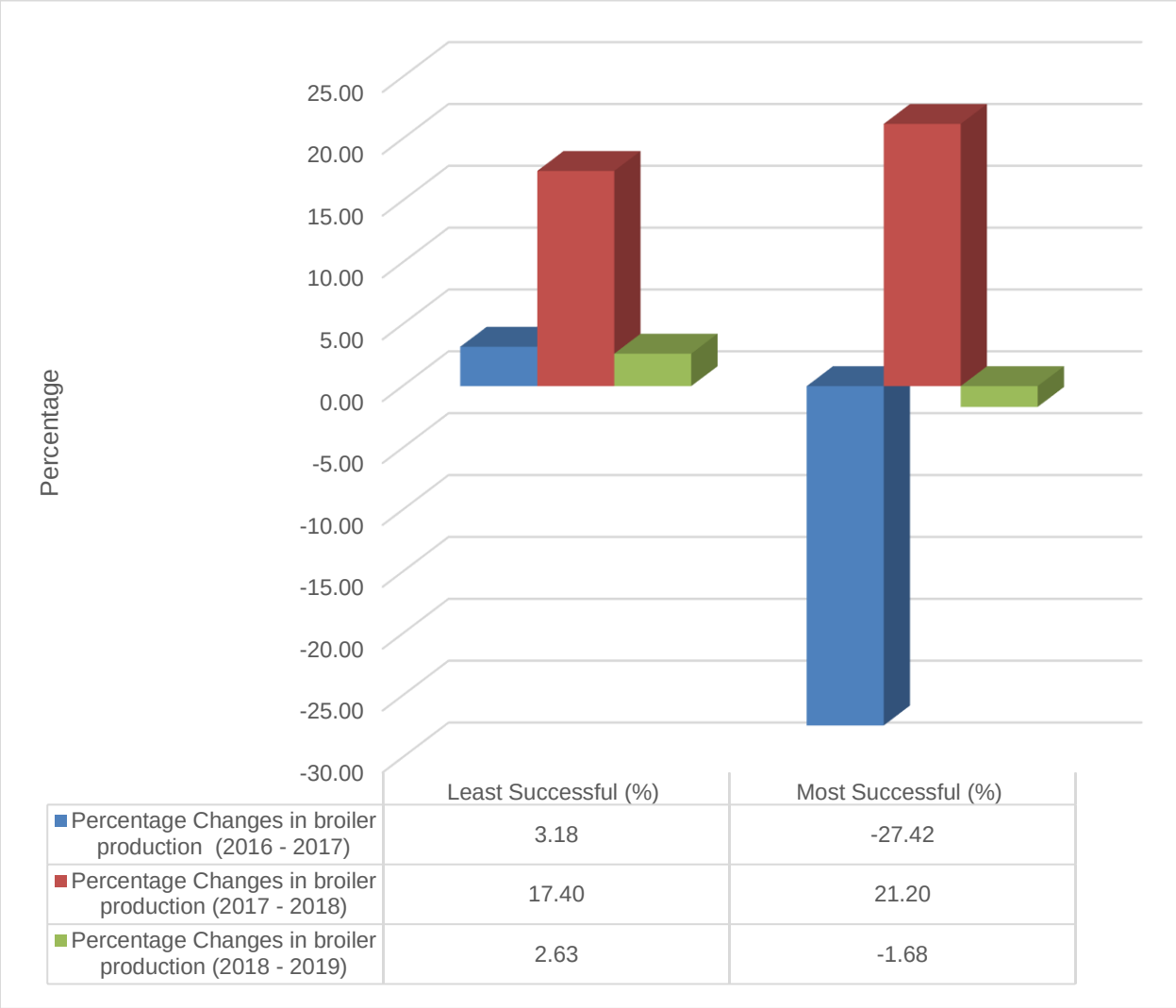


	Least Successful	Most Successful
Total production of broiler in 2016	440	1488
Total production of broiler in 2017	454	1080
Total production of broiler in 2018	533	1309
Total production of broiler in 2019	547	1287

Source: Field Data, 2020

As indicated in Figure 26 below, among the least successful respondents, the percentage change in mean broiler production was 3.18% from 2016 to 2017, 17.40% from 2017 to 2018, and 2.63% from 2018 to 2019. The most successful respondents recorded a mean change of -27.42% from 2016 to 2017, 21.20% from 2017 to 2018 and -1.63% from 2018 to 2019.

Figure 26: Percentage change in mean broiler production

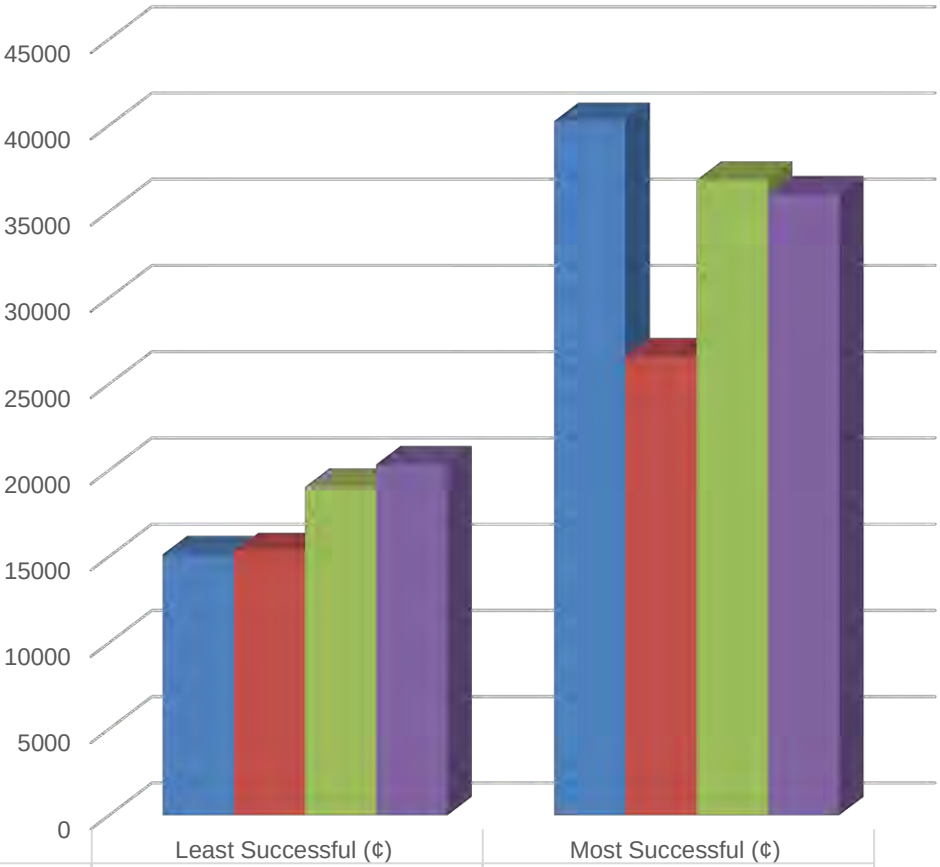


	Least Successful (%)	Most Successful (%)
Percentage Changes in broiler production (2016 - 2017)	3.18	-27.42
Percentage Changes in broiler production (2017 - 2018)	17.40	21.20
Percentage Changes in broiler production (2018 - 2019)	2.63	-1.68

Source: Field Data, 2020

As shown in Figure 27 below, the least successful respondents saw a steady rise in their mean total sales of broilers, from 15,111 cedis in 2016, to 15,285 cedis in 2017, 19,023 cedis in 2018, and 20,328 cedis in 2019. The most successful respondents recorded a mean sales of 40,243 cedis in 2016, 26,593 cedis in 2017, 36,826 cedis in 2018, and 35,986 cedis in 2019.

Figure 27: Mean total sales of broilers



	Least Successful (¢)	Most Successful (¢)
Total annual value sales for broiler in 2016	15111	40243
Total annual value sales for broiler in 2017	15285	26593
Total annual value sales for broiler in 2018	19023	36826
Total annual value sales for broiler in 2019	20328	35986

Source: Field Data, 2020

Examining the percentage change in mean broiler sales, the least successful respondents saw a 1.15% increase from 2016 to 2017, 24.46% increase from 2017 to 2018, and a 6.86% increase from 2018 to 2019. The most successful respondents recorded a 33.92% decrease in mean broiler sales from 2016 to 2017, 38.48% increase from 2017 to 2018, and 2.28% decrease from 2018 to 2019. This data is shown in Figure 28 below.

Figure 28: Percentage change in mean broiler sales

	Least Successful (%)	Most Successful (%)
Percentage Change in value sales for broilers (2016 - 2017)	1.15	-33.92
Percentage Change in value sales for broilers (2017 - 2018)	24.46	38.48
Percentage Change in value sales for broilers (2018 - 2019)	6.86	-2.28

Source: Field Data, 2020

3.5.3 Areas of improvement for AMPLIFIES

Notwithstanding the successes of the project, participants felt that there were some shortcomings. Farmers complained about the training schedules and lack of advance notice for trainings, as well as the decision to hold trainings at plush hotels where they felt uncomfortable. With regards to the training itself, participants had expected to be thoroughly trained in all techniques, from planting to harvesting. They also noted that demonstrations on the farms were inadequate, pointing out the lack of birds available for practical training. Some farmers also had difficulties with the maize varieties they were introduced to during the program. In addition, crops farmers especially felt that AMPLIFIES should have provided them with materials, including yellow corn seeds, farm machinery, fertilizer, and other chemicals for farming.

Regarding administrative issues, some respondents felt the program did not collaborate enough with farmers, FBOs, and MoFA officials. Finally, some respondents noted the challenges involved in helping farmers secure loans, due to financial difficulties and issues with general management. Commenting on the difficulty in securing loans, two respondents stated:

> **Inability in loan assessment especially on beginners. This is even worse when they have not even completed one cycle of production.**
>
> Poultry, Berekum West Municipal Assembly, Brong Ahafo Region, KII, May, 2020

> **In terms of loan assessment is zero because they do not get. This is a serious challenge.**
>
> MoFA Officer, Ashaiman Municipal Assembly, Greater Accra Region, KII, May, 2020

3.6 Variables that influenced beneficiary outcomes

A probit regression was used to analyze the factors that influenced the most and least successful beneficiary outcomes. As indicated in Table 9 below, feed millers had a higher probability of being successful when they were male and living in the Brong Ahafo and Greater Accra regions as compared to the Ashanti region. The most successful feed millers had a lower installed capacity in metric tonnes but higher actual capacity compared to the less successful. They were also least likely to exceed installed capacity compared to the least successful. Off-farm feed millers were more likely to be less successful than on-farm feed millers. Success was also more likely among those using both mechanized and manual systems as opposed to either only manual or only mechanized systems. The most successful feed millers who benefitted most from the training were those working at large facilities and using a manual system for weighing. Finally, those feed millers who were most successful were more likely to say that their success was totally, not partially, due to AMPLIFIES than the least successful. See Table 10 in Appendix 1.

Among poultry farmers, success was associated with being female, hailing from the Greater Accra as opposed to the Ashanti region, and not managing their own farms. They were more likely to be successful when they employed a greater number of total workers and did not implement layer production but did implement broiler production before AMPLIFIES. The most successful poultry farmers were less likely to

purchase white maize from aggregators and farm gate than the open market but were to female farmers after going through the AMPLIFIES training. Additionally, the farmers who had broilers before the AMPLIFIES training saw reduced egg production by 8.90 eggs. Farmers who purchased white maize from aggregators on average produced 45,147 more eggs (1881.13 more crates) than those who bought from the open market. Similarly, those who purchased white maize from farm gate produced 31,131 more eggs (1,297.12 more crates) more than farmers who bought from the open market. On the other hand, farmers who bought yellow maize from aggregators produced 36,799 less eggs (1,533.29 less crates) than farmers who bought from the open market.

The data implies that male farmers were impacted more positively than female farmers in the AMPLIFIES program. Also, farmers may have shifted their production resources from broiler to layers after been introduced to the program, since broiler bird production was, on average, reduced during the three-year period. Farmers who bought white maize from aggregators and farm gate had an advantage in egg production over those who bought yellow maize from the open market in terms of egg production. Farmers who bought yellow maize from the aggregators, on the other hand, saw less egg production than those who bought from the open market. See Table 12 in Appendix 1.

3.7 Strategies for further advancing the poultry value chain and develop recommendations for future programming

This section gives a detailed assessment of AMPLIFIES, examines inherent challenges and opportunities for boosting the poultry sector, and provides well-founded recommendations for future programming.

3.7.1 Assessment of AMPLIFIES

The assessment of AMPLIFIES shared below is separated into four main sections: the training process, outstanding themes, general themes, and the overall program assessment.

3.7.1.1 Assessment of the training process

The training process was assessed by looking at the methods used for training, the training environment and atmosphere, and effectiveness of the training. Participants noted a high level of interaction during the training sessions. They expressed that trainers were patient and also exhibited good rapport with participants. One participant shared:

> **The farmers were free to ask questions that baffled their minds regarding their farming activities. It was an interactive meeting.**

FBO Executive, Dormaa Central Municipality, Brong Ahafo Region, KII, May, 2020

Beneficiaries were generally satisfied with the training program. Farmers used language such as “excellent”, “good", and "very good”, with the majority emphasizing that they were very satisfied with the training. Similarly, MoFA officials used words such as “excellent" and “perfect" to describe how the training was organized. Notwithstanding the high level of satisfaction with the AMPLIFIES training, participants noted the following areas that they felt needed improvement:

- training sessions started late;
- trainings were not scheduled at convenient times;
- training facilitators did not cover all themes as outlined at the beginning of the program;
- they were not given enough advanced notice before trainings;
- training sessions were held outside of their communities; and
- training sessions were held at expensive locations, such as hotels.

3.7.2 Outstanding themes

Two of the ten main initiatives implemented by AMPLIFIES were thought by various groups of respondents to be outstanding. Crop farmers, FBO members, and MoFA officials alike reported that the greatest gains from AMPLIFIES was in improving harvesting, post-harvest handling, and storage of feed inputs, as the knowledge gained was used to significantly increase yields and the distributed storage facilities resulted in massive improvements in how produce was stored. FBO members described the impact as follows:

> **For that one, I will give 90% because, if only you followed the methods, the maize doesn’t get destroyed again. I cannot give it 100% because nothing is perfect but most of the trainings under this topic were very helpful and had impact on our farm operations.**

Male, FBO Executive, Dormaa Central Municipality, Brong Ahafo Region, KII, May, 2020

> **For me, the most thing I thought it was very important is the post-harvest losses. That is the most important thing, because a farmer will suffer all from the time the rain sets in and then in the last minute, everything in the farm will go waste. That is why I think it is the most important for the training.**
>
> Male, FBO Member, Yendi Municipality, Northern Region, Personal Interview, May, 2020

Government officials also highlighted the enormous positive impact the national awareness raising campaign to promote egg consumption had on the poultry value chain, as it increased the demand for eggs.

> **All their programs worked very well, but if I am to choose one of them then I will say egg campaign was exceptional.**
>
> Veterinary Services Division, Kumasi Metropolitan Assembly, Ashanti Region, KII, May, 2020

> **All of them work well but the egg campaign was very perfect.**
>
> MoFA Officer, Asokore Mampong Municipal Assembly, Ashanti Region, KII, May, 2020

3.7.3 Overall Assessment

Training participants highly praised AMPLIFIES. These expressions of appreciation for the program came from crop farmers, FBO members, poultry farmers, and MoFA officials. They reflected that the program had positive impacts on the general management of their businesses and marketing of their products. This, as a result, improved their profitability and financial standing. One of the MoFA officials testified:

> **Yes [participants] have also benefitted because at first, they worked individually and how to access loan and other forms of financial help was also was very difficult. Now that they have put themselves into groups and due to the training that they have, they are able to access to access loan facility and then expand their farming.**

MoFA Officer, Ga East Municipal Assembly, Greater Accra Region, KII, May, 2020

On marketing, it has benefited crop farmers to have readily available poultry farmers to purchase their produce to manufacture their own feed.

MoFA Officer, Ga East Municipal Assembly, Greater Accra Region, KII, May, 2020

Some crop farmers expressed that they were satisfied with the program and saw a big difference in their farming, while others went further to state that they felt real changes to their businesses. When asked to describe the program, they said it was very helpful, good, and reliable, and that it had a positive contribution. One crop farmer expressed:

Everything has changed. It has helped us a lot… we are praying that they should still be on our side.

Crop farmer, Kumbungu, Northern Region, Personal Interview, May, 2020

Most MoFA officials, similarly, emphasized that the program was "excellent" with some describing it as "very good" and "good". The credit facility providers also indicated that they felt the overall program to be "very good" and "good", with most of them sharing their satisfaction with the program. The crop farmers and FBO members also rated the program as "excellent", "very good", and "good". This is how one crop farmer put it:

Very good, very very very excellent.

Crop farmer, Kumbungu, Northern Region, Personal Interview, May, 2020

3.7.4 Meeting expectations

Crop farmers, feed millers and poultry farmers largely felt that their expectations were met and that all ten activities positively impacted their production. Crop farmers and poultry farmers alike noted that their expectations were exceeded in some cases. Crop farmers were especially pleased with learning techniques for harvesting and storage of their produce, and poultry farmers with the increase in their egg sales. One area in which expectations were not met was with regards to accessing loans and available funds for their businesses. Some participants expected the program to provide them with funds to support

their business activities, though they were generally satisfied with the skills training that helped them manage their finances and access loans from credit facilities.

3.8 Challenges AMPLIFIES beneficiaries still face

Despite the numerous benefits of AMPLIFIES, participants continue to face some significant challenges with regards to finances, bookkeeping, marketing, and production. Farmers and feed millers often had poor financial standing and carried out poor bookkeeping as a result of having a low level of education, which impeded their ability to access credit facilities. The high cost of production and lack of incentives, such as inputs for production and warehouse for storage, continue to pose as a challenge for participants. Finally, yields are impacted by climate change, pests and diseases, and other external factors outside of the beneficiaries' control. A MoFA officer and crop farmer describe some of these barriers as follows:

> **How to get money to produce more crops. They find it difficult in getting loans due to lack of collateral so they always depend of friends and families.**
>
> MoFA Officer, Ga East District, Greater Accra Region, KII, May, 2020

> **This pest, they disturb a lot across all the crops we are planting in the community. Especially last two years, this the fall of army worms is so prevalent and that they were coming on our farms always.**
>
> Crop farmer, Yendi, Northern Region, Personal Interview, May, 2020

3.9 Opportunities for AMPLIFIES beneficiaries

Despite being confronted with challenges in their farming activities, crop farmers, poultry farmers, and feed millers have numerous opportunities available for them since completing the AMPLIFIES training program, specifically with regards to general management, financial management, and marketing and loan assessment. All key stakeholder groups have greater potential to access credit facilities from financial institutions, as they can collaborate to keep proper farm records and show reliability in loan repayment

through the production of more crops, feed, eggs, and birds. Participants are also more equipped to increase their marketing opportunities by meeting their clients' demands and expanding their client base. With access to MoFA officers, farmers who participated in AMPLIFIES have a resource they can turn to if they need further support for production. Finally, participants can share access to improved warehouses to properly store their produce and also share ideas from AMPLIFIES with their colleagues when needed.

3.10 Suggestions for future iterations of AMPLIFIES

Views on suggestion were taken from government officials who took part in all the training sections and followed up on the farmers after the training. Others also from the FBOs and the poultry farmers. AMPLIFIES was assessed as highly successful. Future iterations of the program can offer more resources to ensure continued success. Participants had several suggestions to improve marketing, finances, production and inputs, training, implementation, and collaboration. They suggested that AMPLIFIES make more buyers available for their produce, add financial aid to the package, assist more with accessing loans, and help participants collaborate with more financial institutions offering loans. Participants also suggested that trainers increase the practical training sessions and make inputs such as fertilizer, storage, farm machinery, and seeds available to farmers. A MoFA staff member offered:

> **With the program organization, even though there were some practicals, I think they are not enough. I think there should be more practical since it is easy to remember than theory.**
>
> MoFA Officer, Ga East Municipality, Greater Accra Region, KII, May, 2020

Government officials who took part in the training and followed up with farmers and FBOs felt that training should be extended to more farmers, communities, and tertiary students. They also felt that trainings should be carried out more frequently, involve MoFA early in the program's training, and provide participants with ample advanced notice and certificates of completion. Moreover, respondents felt that more MoFA field workers should be involved in trainings, with logistics and training manuals available to MoFA officials and farmers, and more feedback collected. With regards to training topics, participants thought AMPLIFIES would be strengthened by more training on local varieties in feed formulation. Finally, more collaboration between MoFA and FBOs was encouraged. Participants felt that the MoFA should be involved in helping to ensure the sustainability of program outputs and achievements.

The poultry farmers also suggested several ways in which the program can be improved for the future.

They specifically recommended introducing new technology, helping farmers more in marketing their produce, and having the MoFA or AMPLIFIES team carry out follow up visits to farms. They emphasized the importance of helping make loans with reasonable interest available to farmers by credit facility providers and providing financial assistance to farmers. Moreover, they recommended that feed testing facilities be available to farmers. Finally, poultry farmers, government officials, and FBOs alike suggested extending the program to all of Ghana and intensifying the training. See Table 12 below for a breakdown of suggestions made by farmers with regards to financing, marketing and training.

3.11 Conclusion

AMPLIFIES was implemented to increase productivity and profitability along the various sections of the poultry value chain. It also aimed at strengthening the production, marketing, and financial aspects of the value chain by specifically focusing on the feed producers/production, poultry farmers, and the consumers of poultry products.

The Final Evaluation process used the Outcome Harvesting (OH) approach to determine how the AMPLIFIES project has impacted on participants within the period of implementation by specifically analyzing the perceived benefits and shortcomings of AMPLIFIES Ghana, develop an additional knowledge about the confounding variables that influenced beneficiary outcomes and identify strategies for further advancing the poultry value chain and develop recommendations for future programming. It started with a desk review which was later followed with the collection of data. Data collection of took into consideration the required precautions and protocols due to the COVID-19 pandemic. Following the mixed method design, the study collected and analyzed quantitative data from the project's main beneficiaries (326 poultry farmers and 38 feed millers and qualitative data from 22 crop farmers via FBOs, 16 government stakeholders and 5 credit facility providers in the form of KIIs and IDIs. The qualitative data was analyzed with thematic and content analysis while the quantitative data was analyzed with descriptive and inferential statistics as well as probit and ordinary least squares regressions. It undertaking the quantitative analysis, the concept of least and most successful poultry and feed millers were factored in.

The results show that in terms of applying their knowledge, at least 90% of poultry farmers and feed millers reported putting into practice what they learned for six of the main goals to improve poultry feed, improve the quality and consistency of feed formulations, improve the efficiency of feed processing, improve efficiency in procuring feed ingredients, and expand the poultry feed distribution network.

Around 60% also reported applying what they learned when it came to increasing feed testing capacity using quality assurance manuals and obtaining investments in feed processing through loans. Additionally, participants reported being impacted by the national awareness raising campaign to promote egg consumption and harvesting and post-harvest handling techniques and storing feed inputs, though direct measurements could not be made.

Impacts were felt at all levels of the program. All of the least and most successful respondents reported high or very high impacts on their poultry feed, with reductions in feed processing. Over 60% reported high impacts on the quality and consistency of feed formulation, with the remainder reporting some level of impact. With regards to increased feed testing, at least 40% of all respondents stated they were practicing the technique after the AMPLIFIES training, and all of them indicated that impacts to the quality of their feed were high or very high. Around 90% of all respondents confirmed they applied knowledge and saw benefits that led to greater efficiency in feed processing. Roughly 80% of all respondents reported high or very high impacts to make their feed production efficient. At least 90% of all respondents confirmed they were able to procure feed ingredients with greater efficiency. Moreover, at least 90% of participants stated that they benefitted from the modules on post-harvest storage and aggregation of feed inputs. Finally, at least 94% of the respondents said that impacts on harvesting, post-harvest handling and storage of feed inputs was high or very high.

Around 62% of all respondents said they applied and benefitted from what they were taught to secure loans for investments in feed processing. Of those who applied, at least 79% and as many as 95% confirmed they were successful in securing loans. At least 67% reported high or very high impacts in funding feed operations.

At least 90% all respondents also reported an impact from efforts to expand the poultry feed distribution network; of these, nearly all (87%) confirmed that the impact was high or very high on their businesses. Regarding the organizing a national awareness raising campaign to promote egg consumption, at least 90% believed they were directly impacted by it.

Overall, at least 75% of all poultry farmers saw increases and improvements in egg production. There was a positive percentage change in terms of egg production annually for all poultry farmers from 2016 to 2019. While some of the increases were as low at 2%, others were as high as 26%. Similarly, there were increases in the percentage change in egg sales from 2016 to 2019, with some experiencing egg sales that were as high as 57% greater over the project period. Moreover, at least 64% of all farmers confirmed they

experienced an increase in broiler production. There were increases and decreases in mean total broiler production from 2016 to 2019, though reasons for the decreases were not given. Similarly, there were increases and decreases in the percentage change in broiler sales from 2016 to 2019.

Success among feed millers was more likely among males living in the Brong Ahafo and Greater Accra regions. Those who had a lower installed production capacity, larger actual capacity, worked off-farm rather than on-farm, used both manual and automatic facilities, and used a manual weighing system fared better. Among all farmers, males were impacted more positively than females and those producing eggs fared better than those who produced broilers. Among poultry farmers, success was more likely among females than males and those living in the Greater Accra as opposed to the Ashanti region. Farmers who had more total workers and a lower number of layers before the implementation of AMPLIFIES were more likely to see greater benefits. The most successful poultry farmers saw the greatest benefits when they purchased white maize from the open market and yellow maize from aggregators and farm gate.

Overall, the various initiatives carried out by AMPLIFIES were rated as good, very good, or excellent. An exception was the initiative focused on helping participants access loans for investments in feed processing, which was rated as mostly good but had equal responses for poor and excellent. However, taken as a whole, the ratings were consistently high.

The evaluation study shows that AMPLIFIES has, to a large extent, achieved what it set out to accomplish. All of the ten key goals were implemented and the results were successful, translating to improvements in the livelihoods of farmers.

Appendix 1: References

ACDI/VOCA (2020). Increasing the Competitiveness of the Production and Processing of Poultry Meat and Eggs. USDA Ghana Poultry Project (GPP). Retrieved:

https://www.acdivoca.org/projects/ghana-poultry-project-gpp/. 04/11/2020.

Adei, D., & Asante, B. K. (2012). The challenges and prospects of the poultry industry in Dormaa District. *Journal of Science and Technology (Ghana)*, *32*(1), 104-116

American Soybean Association (ASA). (2018). *Assisting in the Management of Poultry and Layer Industries with Feed Improvements and Efficiency Strategies (AMPLIFIES).* USDA AGREEMENT NO. FCC- 641-2015/010-00, SEMI-ANNUAL REPORT October 1, 2017 to March 30, 2018. Retrieved from St Louis, MO.

American Soybean Association (ASA). (2018). *Assisting in the Management of Poultry and Layer Industries with Feed Improvements and Efficiency Strategies (AMPLIFIES).* USDA AGREEMENT NO. FCC- 641-2015/010-00, SEMI-ANNUAL REPORT April 1, 2018 to September 30, 2018. Retrieved from St Louis, MO.

American Soybean Association (ASA). (2019). *Assisting in the Management of Poultry and Layer Industries with Feed Improvements and Efficiency Strategies (AMPLIFIES).* USDA AGREEMENT NO. FCC- 641-2015/010-00, SEMI-ANNUAL REPORT October 1, 2018 to March 31, 2019. Retrieved from St Louis, MO.

American Soybean Association (ASA). (2019). *Assisting in the Management of Poultry and Layer Industries with Feed Improvements and Efficiency Strategies (AMPLIFIES).* USDA AGREEMENT NO. FCC- 641-2015/010-00, SEMI-ANNUAL REPORT April 1, 2019 to September 30, 2019. Retrieved from St Louis, MO.

Aning, K. (2006). The structure and importance of the Commercial and village based poultry in Ghana, Final Review Report. Rome: FAO of UNO.

Banson, K. E., Muthusamy, G., & Kondo, E. (2015). The import substituted poultry industry; evidence from Ghana. *International Journal of Agriculture and Forestry*, 5(2): 166-175

Birol, E.; Asare-Marfo, D.; Ayele, G.; Mensah - Bonsu, A.; Ndirangu, l.; Okpukpara, B.; Roy, D.; Yakhshilikov, Y. (2010). Investigating the Role of Poultry in Livelihoods and the Impact of Avian Flu on Livelihoods Outcomes in Africa: Experience from Ethiopia, Ghana, Kenya and Nigeria. IFPRI Discussion Paper 01011. International Food Policy Research Institute.

Christian Aid. (2005). For richer or poorer: Transforming economic partnership agreements between Europe and Africa. London: Christian Aid.

Flick, U. (2019). From intuition to reflexive construction: Research design and triangulation in grounded theory research. *The SAGE Handbook of Current Developments in Grounded Theory*, 125.

Khor, M. (2006). The Impact of Globalization and Liberalization on Agriculture and Small Farmers in Developing Countries: The Experience of Ghana. Impact of Globalization and Trade Liberalization on Poor Rural Producers – Evidence from the Field and Recommendations for Action. Accra: Third World Network.

Kusi, L. Y., Agbeblewu, S., Anim, I. K., & Nyarku, K. M. (2015). The challenges and prospects of the commercial poultry industry in Ghana: a synthesis of literature. *International Journal of Management Sciences*, *5*(6), 476-489.

Mensah-Bonsu, A., Lartey, N. N., & Kuwornu, J. K. (2019). Gender-segregated analysis of the poultry value chain in Ghana. Gender, Technology and Development, 23(2), 130-164.

Tuffour M & Sedegah, D. (2013). *What holds us back. Constrains among broiler farmers in Ghana.* Scientific Journal of Animal Science *2(10) 264-272*

Tuffour, M., & Tenyo, R. M. (2015). Farmers'appreciation of Poultry Insurance in the Greater Accra Region of Ghana. *Applied Research Journal*, *1*(2).

United States Department of Agriculture (USDA). (2016). USDA - FFPr GHANA Poultry Value Chain Projects GPP and Amplifies: Baseline Study (Vol.; Draft Final Report). Washington D.C: USDA.University of Evans School Policy Analysis and Research (EPAR). Evans School Publ. Affairs.

USDA (2019). Assisting in the Management of Poultry and Layer Industries with Feed Improvement and Efficiency Strategies (AMPLIFIES). Draft Mid-Term Performance Evaluation Report. USDA. Washington D.C.

USDA (2020). Assisting in the Management of Poultry and Layer Industries with Feed Improvement and Efficiency Strategies (AMPLIFIES). Request for Proposals (RFP) to Conduct a Final Evaluation for ASA/WISHH's Food for Progress (FFPr) Program in Ghana. USDA. Washington D.C.

Appendix 2: Data Tables

Table 1: Sample Size

Type of Beneficiary	Region	Number of Beneficiaries	Initial Sample	Adjusted Sample Size
Poultry farmers/Producers	Ashanti	495	100	198
	Brong Ahafo	590	118	236
	Greater Accra	206	42	84
Feed Processor/Millers	Brong Ahafo	30	30	30
	Ashanti	22	22	22
	Greater Accra	26	26	26
Government officials	Brong Ahafo	6	6	6
	Ashanti	5	5	5
	Greater Accra	5	5	5
Credit facility providers	Brong Ahafo	2	2	2
	Ashanti	4	4	4
	Northern	2	2	2
TOTAL		**1,393**	**362**	**620**

Table 2: Criteria for selecting poultry farmers

Most Successful	Least Successful
Poultry farmers who utilized trainings on improved poultry feeding and saw positive changes in productivity and profit from 2015 through 2019	Poultry farmers who utilized trainings and experienced a loss in productivity and profit or saw no positive change from 2015 through 2019
Poultry producers who tested their feed regularly and saw an increase in productivity	Poultry producers who benefitted from feed testing trainings but saw no positive change in the quality of feed

Poultry producers who successfully accessed loans/credit facilities through the support of AMPLIFIES	Poultry producers who completed financial trainings but were unable to access loans from credit facility providers they were linked to by the project
Poultry farmers who benefitted from market linkage meetings and other assistance that resulted in increased sales	Poultry farmers who saw no significant increase in sales in poultry products after receiving technical assistance from AMPLIFIES
Poultry farmers who saw a significant increase in productivity through the application of improved farm management practices	Poultry farmers who saw no significant increase in productivity through the application of improved farm management practices

Table 3: Criteria for selecting crop farmers

Most Successful	Least Successful
Crop farmers who applied post-harvest loss techniques and technologies and saw a significant increase in productivity (volume of crops) from 2015 through 2019	Crop farmers who applied post-harvest loss techniques and technologies and had a loss or no change in productivity (volume of crops) from 2015 through 2019
Crop farmers who successfully accessed loans through the support of AMPLIFIES	Crop farmers who were unable to access loans from credit facility providers they were linked to by the AMPLIFIES Project
Crop farmers who benefitted from technical assistance and saw an increase in sales in crops (maize and soy)	Crop farmers who saw no significant increase in sales in crops (maize and soy) after receiving technical assistance from AMPLIFIES
Crop farmers who saw a reduction in post-harvest loss and increase in volume of crops due to the use of Crop Aggregation Centers	Crop farmers who benefitted from the use of Crop Aggregation Centers but saw no reduction in post-harvest loss

Table 4: Criteria for selecting feed processors/millers

Most Successful	Least Successful
Feed processors/millers who conducted feed testing which resulted in increased productivity and quality feed	Feed processors/millers who benefitted from feed testing trainings but saw no positive change in the quality of feed and productivity
Feed processors /millers who benefitted from feed formulation training and saw improvements in the quality of feed production	Feed processors /millers who benefitted from feed formulation training but saw no significant change in the quality of feed
Feed processors /millers who benefitted from sourcing of quality feed ingredients for feed production that led to low cost and quality feed	Feed processors /millers who were linked to feed ingredient suppliers but saw no significant change in the quality of feed and no reduction in the cost of feed production

Table 5: Demographics of poultry farmers

Variable	Male N=285	Female N=41	Total N=326
Age group			
20-29	5.6%	4.9%	5.5%
30-39	27.4%	14.6%	25.8%
40-49	29.1%	53.7%	32.2%
50-59	25.6%	19.5%	24.9%
60+	12.3%	7.3%	11.6%
Mean	45.7	45.5	45.7
Location of respondents			
Ashanti	41.7%	26.8%	39.9%

Brong Ahafo	39.7%	48.8%	40.8%
Greater Accra	18.6%	24.4%	19.3%
Position of respondents			
Owner	81.4%	75.6%	80.7%
Others	18.6%	24.4%	19.3%

Source: Field Data, 2020

Table 6: Demographics of feed millers

Variable	Total N=38
Age group	
20-29	5.3%
30-39	13.2%
40-49	36.8%
50-59	26.3%
60+	18.4%
Mean age	49 years
Gender	
Male	94.7%
Female	5.3%
Region	
Ashanti	42.1%
Brong Ahafo	36.8%
Greater Accra	21.1%
Category of beneficiaries	
Off-farm feed miller	44.7%
On-farm feed miller	55.3%
Type of facility	
Manual	29.0%

Mechanized	39.5%
Manual Combined with Mechanized	31.5%
Size of facility	
Small	7.9%
Medium	39.5%
Large	52.6%
Weighing system used	
Automatic	26.3%
Manual	73.7%

Source: Field Data, 2020

Table 7: Demographics of FBO members

Variable	Total N=22
Membership Composition	
Majority male	81.8%
Majority female	18.1%
Equal numbers of males and females	0.1%
Registered	
Yes	81.8%
No	18.2%
Documented Mandate	
Yes	90.9%
No	9.1%
Bank Accounts	
Yes	90.9%
No	9.1%
Executive Steering Committee	
Yes	100%

No	0%

Source: Field Data, 2020

Table 8: Assessment of 10 major themes

Theme	Poor (%)	Neutral (%)	Good (%)	Very Good (%)	Excellent (%)
Improved Poultry Feed	0	0	33.3	58.3	8.3
Improvements in the Quality and Consistency of Feed Formulations	0	0	27.3	45.5	27.3
Increased Feed Testing Capacity	0	23.1	46.2	30.7	0
Increased Efficiency in Feed Processing	0	0	67.7	33.3	0
Increased Efficiency in the Procurement of Feed Ingredients	0	0	40	50	10
Loans for Investments in Feed Processing	14.2	0	71.6	0	14.2
Post-harvest Storage and Aggregation of Feed Inputs	0	0	30.8	46.1	23.1
Expansion of Poultry Distribution Network	0	0	80	10	10
Organizing a National Awareness Campaign to Promote Egg Consumption	0	0	0	50	50
Harvesting, Post-harvest Handling and Storage of Feed Inputs	0	0	37.5	50	12.5

Source: Field Data, 2020

Table 9: Success of loan application after training

	Poultry Farmers	Feed Millers

Acceptance of Loan Application	Least Successful	Most Successful	Least Successful	Most Successful
Yes	92.4%	89.0%	76.5%	95.2%
No	7.6%	11.1%	23.6%	4.8%

Source: Field Data, 2020

Table 10: Probit regression explaining most and least successful feed millers' outcomes

Independent Variable	Marginal Effect	Robust Standard Error
Male	0.226**	0.109
Brong Ahafo Region	0.212*	0.117
Greater Accra Region	0.260**	0.108
Installed Production Capacity	-0.000**	0.000
Actual Production Capacity	0.000**	0.000
On farm miller	-0.641***	0.075
Only Mechanized	-0.019	0.157
Both Manual and Mechanize	0.279**	0.129
Exceeding Installed Capacity	-0.288***	0.108
Medium Capacity	-0.026	0.083
Large Capacity	-0.297***	0.089
Manual Weighing System	0.391***	0.116
Success Partly Attributed to AMPLIFIES	-0.292***	0.100
Observations	38	
Probit regression parameters		
Wald chi2(13)	51.63	
Prob > chi2	0.0000	
Log pseudo likelihood	-10.5556	

Pseudo R2	0.5960

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 11: Probit regression explaining most and least successful poultry farmers' outcomes

Independent Variable	Marginal Effect	Robust Standard Error
Female	0.189*	0.108
Owner managed farm	-0.174*	0.095
Brong Ahafo Region	0.061	0.0898
Greater Accra Region	0.204*	0.110
Total workers employed	0.051***	0.015
Type of poultry system	0.066	0.109
Layers capacity before AMPLIFIES program	-0.000*	0.000
Broiler capacity before AMPLIFIES program	0.000**	0.000
Size of storage facility	-0.000	0.000
Purchase White Maize from Aggregators	-0.489***	0.050
Purchase White Maize from Farmgate	-0.393***	0.094
Purchase Yellow Maize from Aggregators	0.549***	0.042
Purchase Yellow Maize from Farmgate	0.428***	0.119
Average monthly white demand for maize	0.001	0.001
Average monthly white demand for maize	-0.002	0.001
Observations	151	
Probit regression parameters		
Wald chi2(16)	537.75	
Prob > chi2	0.000	
Log pseudo likelihood	-87.85	
Pseudo R2	0.131	

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 12: Factors explaining improvement in egg output among poultry farmers' in AMPLIFIES

Independent Variable	Marginal Effect	Robust Standard Error
Most Successful	3,949	7,107
Female	-12,839**	6,283
Owner managed farm	8,257	9,968
Brong Ahafo Region	-7,269	7,931
Greater Accra Region	-12,728	10,092
Total workers employed	-2,516	2,473
Type of poultry system	-4,300	9,190
Layers capacity before AMPLIFIES program	0.108	0.490
Broiler capacity before AMPLIFIES program	-8.908*	5.305
Size of storage facility	5.058	6.413
Purchase White Maize from Aggregators	45,147***	9,881
Purchase White Maize from Farmgate	31,131*	16,871
Purchase Yellow Maize from Aggregators	-36,799***	7,706
Purchase Yellow Maize from Farmgate	-27,329	17,857
Average monthly white demand for maize	4.319	5.180
Average monthly white demand for maize	2.999	14.60
Constant	15,385	13,104
Observations	151	
R-squared	0.3543	

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Appendix 3: Questionnaires and Interview Guides

I. Questionnaire for poultry farmers

AMPLIFIES Annual Results Survey Poultry Producers Questionnaire

A. FOR FIELD STAFF	
A1. Date:…….. **A2. Enumerator Name:…….** **A3. Supervisor Name:……**	
B. KNOWLEDGE ON AMPLIFIES PROJECT	
B1. Do you know about the AMP project? [ ] Yes [ ] No	
B2. What do you know about the AMP project?	*To be coded*
C. CONSENT	

Good morning/afternoon. My name is ……..I am an interviewer with The Khana Group. We are helping ASA/WISHH to conduct an evaluation of the Ghana Food for Progress Program (FFPr) Project. The project is also referred to as AMPLIFIES. The purpose of the AMPLIFIES project was to revitalize Ghana's poultry sector and improving food safety through strengthening the poultry value-chain. This research will help ASA/WISHH and their partners to understand how the AMPLIFIES project has affected your community and the entire country. Information collected through this questionnaire will be used only for purposes of research and thus strictly confidential. Such information will not be used as the basis or justification of any new obligation on individuals or as evidence in any kind of judicial investigation. Your name will not appear in any data that is made publicly available. The information you provide will be used purely for research purposes; your answers will not affect any benefits or subsidies you may receive now or in the future. Other colleagues of ours are also asking other beneficiaries about the same questions that I will be asking you. We have not made provisions for monetary incentives for your participation in this study. This process will not last beyond 35 minutes. You may withdraw from the study at any time and if there are questions that you would prefer not to answer then we respect your right not to answer them. Do you want to proceed with this interview? [ ] Yes [ ] No	

D. FARMER INFORMATION

D1. Region ……. **D2. District……** **D3. Community…….** **D4. Farm Name…….** **D5. Respondent Name……..** **D6. Position:** **D7. Gender:** [ ] Male [ ] Female **D8. Age in years:_____** **D9. GPS coordinates** Longitude…… Latitude……	*To be preloaded*
E. PARTICIPATION IN AMPLIFIES ACTIVITIES	
E1. Have you received any training (be it one-on-one), technical assistance or attended any AMP event within the past year? [ ] Yes [ ] No	

E2. If yes, which of these were you trained in: a. Adoption of Improved Poultry Feed [ ] Yes [ ] No b. Improvements in Quality and Consistency of Feed Formulations [ ] Yes [ ] No c. Increased Feed Testing Capacity [ ] Yes [ ] No d. Increased Efficiency in Feed Processing [ ] Yes [ ] No e. Increased Efficiency in the Procurement of Feed Ingredient [ ] Yes [ ] No f. Loans for Investments in Feed Processing [ ] Yes [ ] No g. Post-harvest Storage and Aggregation of Feed Inputs [ ] Yes [ ] No h. Expansion of Poultry Feed Distribution Network [ ] Yes [ ] No i. Organize National Awareness Campaign to Promote Egg Consumption [ ] Yes [ ] No **j.** Harvesting, Post-harvest Handling and Storage of Feed Inputs [ ] Yes [ ] No	
E3. If yes, what new thing did you learn from through AMPLIFIES assistance under the various sections in D2.	*(to be coded)*
E4. Which of these techniques/technologies in D2 learnt have you applied so far in your poultry business?	
1.0 FARM OPERATIONS AND PRODUCTIVITY	

1.1 Is your poultry farming business registered?

[ ] Yes [ ] No

1.2 What type of production system do you employ?

[ ] Free Range [ ] Semi-Intensive [ ] Deep litter [ ] Battery cage

1.3 What is your current bird capacity?

Broilers_____ Layers_____ Cockerels_____

1.4 Before your training what was your bird capacity?

Broilers_____ Layers_____ Cockerels_____

1.5 Please describe your production cycle for the following *(please tick)*:

	Continuous (All year round)	Seasonal (Festival & Holidays)	Custom (Special occasions)
Broilers			
Layers			
Cockerels			

1.6 What is your total production of the following poultry products for the last year *(September '16 till date)*?

Table Eggs_____ Broiler _____

1.7 What was your total value of sales for the last year for the following *(September '16 till date)?*

Table eggs_____ Broiler _____

1.8 What is the average eggs do you produce per hen per life cycle? _____

1.9 In how many weeks does your bird start laying? _____

1.10 How long does your layer bird lay (in weeks)? _____

1.11 What is the true cost of producing an egg? (total cost of feed per hen/total eggs produced per hen) *Hint: The cost of the feed taken into the pen/the total number of eggs taken out* _____

1.12 At what weight/price do you take your broilers to the market *(maturity weight in Kg/price in cedis)?* _____

1.13 How long does the bird take to reach the ideal weight/price *(maturity time in weeks)?* _____

1.14 What is the usual end market for your products?

[ ] Open market [ ] Distributors/Wholesalers [ ] Direct retail supply [ ] Export

2.0 DIRECT AND INDIRECT BENEFICIARIES, JOBS CREATED	
2.1 How many members are in your household *(including children)*? Male_____ Female_____ **2.2 How many household members actively work on your farm? *(do not include children/only adults above 18 years)*** Male_____ Female_____ **2.3 Do you employ additional farm hands? [] Yes [ ] No** **2.3.1 If yes, How many?** Male_____ Female_____	
3.0 FEED PROCUREMENT & PROCUREMENT	

3.1 Do you produce your own poultry feed?

[ ] All the time [ ] Sometimes [ ] Not at all

3.2 What is your source of poultry feed? *(select more than one answer if multiple sources)*

[ ] Self-mixing/Concentrates [ ] Commercial feed mills [ ]On-site feed mills/ processing plant

3.3. Which of these do you use the most [1=most of the time **, 2 =** some of the time**, 3=** not frequently**]**

[ ] Self-mixing/Concentrates [ ] Commercial feed mills [ ]On-site feed mills/ processing plant

3.4. If you mix your own feed and don't purchase commercial feed, is there a reason why?

3.5. What would your usual feed typically consist of? *(you can select more than one)*

[ ] Maize

[ ] Maize bran

[ ] Wheat bran

[ ] Soybean meal

[ ] Fishmeal

[ ] Concentrates

[ ] Premix

[ ] Oyster shell

[ ] Essential amino acids (lysine, methionine etc.)

3.6 Kindly estimate the percentage composition of each ingredient? *(you can select more than one)*

[ ] Maize

[ ] Maize bran

[ ] Wheat bran

[ ] Soybean meal

[ ] Fishmeal

[ ] Concentrates

[ ] Premix

[ ] Oyster shell

[ ] Essential amino acids (lysine, methionine etc.)

3.7 Where do you procure the following feed ingredients *(please tick)*

	Open market	Aggregators	Farm gates	Imported
White Maize				
Yellow Maize				

3.7.1. How sure is your source of feed chosen in 3.5?

Very Sure [ ] Sure [ ] Not Sure [ ]

3.7.2 If you buy from an aggregator or directly from farmers, can you please name them?

(Please put the name, a comma, the location, a comma and contact telephone number)

	Name #1	Name #2	Name #3
White Maize			
Yellow Maize			

3.8 How do you procure your soybean-bean based feed ingredients *(please tick)*

	Local soy processors	Imported
Soybean meal/cake		

3.8.1 Is there any particular reason(s) for your choice above in 3.6?

[ ] No reason

[ ] Imported soy ingredients more quality

[ ] Local soy ingredients cheaper

[ ] Local soy ingredients is of more quality

[ ] Imported soy ingredients cheaper

[ ] Local soy ingredients easily available

[ ] Imported soy ingredients easily available

3.8.2 If you buy from local soy processors please name them?

(Please put the name, a comma, the location, a comma and contact telephone number)

	Name #1	Name #2	Name #3
Soybean meal/cake			

3.9 Can you please estimate your average monthly demand for the following in metric tons *(1000kg=1 Ton):*

White Maize _____

Yellow Maize _____

Soybean meal/cake _____

3.10 How much do you spend to produce a 50kg bag of the following feed:

Chick Mash _____

Grower Mash _____

Layer Mash _____

Broiler (Starter) _____

Broiler(Grower) _____

3.11 How regularly do you undertake feed testing/Analysis/Quality control?

[ ] Every time [ ] Once a while [ ] Not at all

3.12 What type of feed testing do you undertake? Specify:_____

3.12.1 If you do where do you take it?

[ ] University of Ghana

[ ] KNUST

[ ] Food Research Institute

[ ] Animal Research Institute

[ ] Ghana Standards Board

[ ] Food and Drugs Board

[ ] Other (Specify)_____

3.13 How much does it cost for a complete feed analysis per test *(in Cedi)?* _____

3.14 What is the average turnaround time for your feed testing results?_____

4.0 STORAGE

4.1 Do you have storage facility for your feed ingredients?

[ ] Yes [ ] No

4.1.1 If yes, what is the size of the storage facility (in meters square or feet) _____?

4.1.2. If not, where do you store your feed?

[ ] FBO Facility [ ] Private Business Facility [ ] AMPLIFIES Assisted Facility [ ] No proper facility

5.0 ACCESS TO FINANCIAL SERVICES

5.1 Have you ever received a loan or grant for your farming activities?

[ ] Yes [ ] No

5.2 If yes, from where?

[ ] Bank

[ ] Lending firm

[ ] Micro Finance Institution

[ ] Friends/family members

5.3 Which of these is the financial institution is linked to?

[ ] FBO [ ] AMPLIFIES [ ] Others (Specify)_____ [ ] None of them

5.4 What amount did you receive_____?

5.5 What was it used for?

[ ]Build infrastructure

[ ]Procure feed ingredients

[ ]Buy day old chicks

[] Purchase plants and equipment

[] Other (please state)……

5.6 Have you ever been rejected or denied a loan or grant application?

[ ] Yes [ ] No

5.6.1 If yes, what was the reason?

[] No documentation

[] No collateral

[] No guarantor

[] Other (please state)……	

6.0 PARTICIPATION IN DEVELOPMENT PROGRAMS

6.1 Have you ever participated in any developmental programs under the AMPLIFIES program? [ ] Yes [ ] No **6.2 If yes, what was the project about?** **6.3 Are you aware of the national awareness campaign to improve egg consumption?** [ ] Yes [ ] No **6.4 (If yes) Do you think the awareness campaign improved the nation's egg consumption?** [ ] Yes [ ] No	
THANK YOU	

II. Questionnaire for Feed Millers

	CONSENT	

	Good morning/afternoon. My name is ……I am an interviewer with The Khana Group. We are helping ASA/WISHH to conduct an evaluation of the Ghana Food for Progress Program (FFPr) Project. The project is also referred to as AMPLIFIES. The purpose of the AMPLIFIES project was to revitalize Ghana's poultry sector and improving food safety through strengthening the poultry value-chain. This research will help ASA/WISHH and their partners to understand how the AMPLIFIES project has affected your community and the entire country. Information collected through this questionnaire will be used only for purposes of research and thus strictly confidential. Such information will not be used as the basis or justification of any new obligation on individuals or as evidence in any kind of judicial investigation. Your name will not appear in any data that is made publicly available. The information you provide will be used purely for research purposes; your answers will not affect any benefits or subsidies you may receive now or in the future. Other colleagues of ours are also asking other beneficiaries about the same questions that I will be asking you. We have not made provisions for monetary incentives for your participation in this study. This process will not last beyond 35 minutes. You may withdraw from the study at any time and if there are questions that you would prefer not to answer then we respect your right not to answer them. Do you consent or agree to be part of this study?	

		Yes [ ] No [ ]

A	**GENERAL INFORMATION**	
A1	Name of facility	
A2	Location (town, district, region)	
A3	Contact telephone	
B	**FEED PRODUCTION**	
B1	Type of facility	1.Manual 2.Mechanized 3.Manual+Mechanized
B2	Size of facility	A. 1. Length _____ 2.Width _____ B. 1. Small _____ 2.Medium_____ 3.Large_____
B3	What weighing system do you use (e.g. automatic or manual)?	
B4	What is your installed versus actual production capacity?	Installed Capacity_____ Actual Capacity _____
B5	Do you sometimes exceed your installed capacity? If yes by how much	Yes [ ] No [ ] Excess Capacity _____

B6	What is your pelleting capacity, if possible?	Installed _____ Actual _____
B7	What is your production rate (tonne per hour or day)?	
B8	Estimate your total monthly production of the following: Chick Mask Grower Mash Layer Mash Broiler (Starter) Broiler (Grower)	
B9	What is the price per Kg of the following feed in cedis? Chick Mask Grower Mash Layer Mash Broiler (Starter) Broiler (Grower)	
B10	What is your total volume of sales for the last year in cedis?	Broiler feed_____ Layer feed_____ Poultry feed mixes_____ Other poultry feed_____
B11	What is your total value of sales for the last year in cedis?	Broiler feed_____ Layer feed_____ Poultry feed mixes_____ Other poultry feed_____
D	**FEED TESTING**	

D1	Do you do feed analysis/testing?	1.Yes 2.No
D2	If yes, where?	1.University of Ghana 2.KNUST 3.Food Research Institute 4.Animal Research Institute 5.Ghana Standards Board 6.Food and Drugs Board 7.Onsite 8. Other
E	**MARKETING & BRANDING**	
E1	How do you sell your feed?	1.Distributors 2.Directly to poultry farmers
E2	Do you package/brand your feed?	1.Yes 2.No
E3	If yes, does labeling include nutritional content? Please describe.	
E4	Are you aware of the national awareness campaign to improve egg consumption?	1.Yes 2.No
E5	(If yes) Do you think the awareness campaign improved the nation's egg consumption?	1.Yes 2.No
F	**JOBS/TRAINING**	
F1	How many people do you employ	Male Female

F2	Have you received any training (be it one-on-one), technical assistance or attended any AMPLIFIES event within the past year?	Yes No
F3	What was the training about? a. Adoption of Improved Poultry Feed b. Improvements in Quality and Consistency of Feed Formulations c. Increased Feed Testing Capacity d. Increased Efficiency in Feed Processing e. Increased Efficiency in the Procurement of Feed Ingredient f. Loans for Investments in Feed Processing g. Post-harvest Storage and Aggregation of Feed Inputs h. Expansion of Poultry Feed Distribution Network i. Harvesting, Post-harvest Handling and Storage of Feed Inputs	Yes No **Note:** This is for all indicators
F4	Is your facility applying any of the techniques/technologies learnt from the trainings?	Yes No
F5	Which of the list mentioned in F4 are you applying in terms of frequency?	Rank 1 = highest 8 = lowest
F6	Have you observed any improvements in your operations?	Yes No
F7	In what form 1. Efficiency in feed production 2. Reduction in cost of feed processing 3. Improvement in marketing of poultry feed 4. Increase in efficiency of feed mill 5. Improvement in the quality of feed 6. Improvement in the mixing of feed 7. Improvement in the storage of feed 8. Improvement in funding feed operations	Very High [ ] High [ ] Low [ ] Not at all [ ] **Note:** This is for all indicators
F8	Is it attributable to AMPLIFIES assistance?	Yes No

G	LOANS AND GRANTS	
G1	Have you ever received a loan or grant for your activities?	1.Yes 2.No
G2	If yes, what was the amount *(in cedis)*?	
G3	If yes, which type of institution? [ ] Bank [ ] Lending firm [ ] Micro Finance Institution [ ] Friends/family members	
G4	The financial institutions is linked to?	[ ] FBO [ ] AMPLIFIES [ ] Others (Specify)_____ [ ] None of them
G5	What specifically did you use it for?	1.Build infrastructure 2.Procure feed ingredients 3.Purchase plants and equipment 5. Other (please state)…….
G6	Have you ever been rejected or denied a loan or grant application?	1.Yes 2.No
G7	If yes, what was the reason?	1.No documentation 2.No collateral 3.No guarantor 4. Other (please state)……..

III. Semi- structured questionnaire for Credit Facility Providers

CREDIT FACILITY PROVIDER - KEY INFORMANT INTERVIEW GUIDE

(Semi-Structured Questionnaire)

Name of Credit Facility Provider (CFP):

Community:	**District:**	**Region:**
CFP Contact Person:		**Position:**
Contact Telephone:		**Email:**

1. What type of financial institution are you?

   [ ] Bank

   [ ] Lending firm

   [ ] Micro Finance Institution

   [ ] Friends/family members

2. Have you obtained funds from the AMPLIFIES project to loan to players on the value chain? [ ] Yes [ ] No

3. If yes in 3, how much have you received in all and at what rate do you loan to the borrowers?

4. How many firms/people have benefitted from your loan facility through the AMPLIFIES project and what are the categories?

   Number

   a. Crop farmers _____

   b. Feed millers _____

c. Poultry farmers _____

d. FBOs _____

5. Apart from loans that you provide to the players, how do you interact/support them in terms of:
   a. Training?
   b. Advice?

6. How has the AMPLIFIES project in terms of loan provision benefitted the following on the poultry value chain?

	Financial Standing	Productivity	Profitability	Marketing	Management
Crop farmers					
Feed millers					
Poultry farmers					
FBOs					

7. What are some of the major challenges of these players in terms of the following:

	Loans assessment	Financial management	General management	Marketing	Others (Specify)
FBOs					
Crop farmers					

Feed millers					
Poultry farmers					

8. What are some of the opportunities of these players in terms of the following?

	Loans assessment	Financial management	General management	Marketing	Others (Specify)
FBOs					
Crop farmers					
Feed millers					
Poultry farmers					

9. What is your overall performance rating with respect to the benefits of the programme to the players?

10. In what way has the AMPLIFIES programme benefitted your organization ?

11. What do you think the AMPLIFIES program should have done more under these sub headings:

    a. Amount given?

    b. Training given to players?

    c. Timing of programme implementation?

    d. Places of programme implementation?

Thank you

IV. In-depth interview guide for FBOs/Crop Farmers

FBO (CROP FARMER) – IN-DEPTH INTERVIEW GUIDE

(Semi-Structured Questionnaire)

Name of FBO:

Community: **District:** **Region:**

FBO Contact Person/ Farmer: **Position:**

Contact Telephone: **Email:**

12. How many members are active in your FBO?

Members	Active	Inactive
Male		
Female		
Total		

13. Is your FBO registered?

Yes No

14. Does it have a bank account?

Yes No

15. Do you have a constitution or operations document?

Yes No

16. Do you have a management committee and/or elected leaders?

Yes No

17. What crop(s) do you or your FBO usually grow?

18. How has your FBO membership helped you to benefit from the AMPLIFIES project?

19. What specific training have you as a farmer or an FBO member received from the AMPLIFIES project?

    a. Crop Production efficiency
    b. Financial support in production
    c. Storage and harvesting
    d. Marketing of crops

20. How was the training programs conducted?

	Crop Production efficiency	Financial support in production	Storage and harvesting	Marketing of crops
Seminars				
Inspections				
Durbars				
Field Demonstrations				

21. What benefits do you as a farmer or FBO member obtained from the AMPLIFIES project in terms of the following:

    a. Crop Production efficiency

    b. Financial support in production

    c. Storage and harvesting

    d. Marketing of crops

22. What is your overall performance rating with respect to the benefits of the programme?

	Excellent	Very Good	Good	Poor
Crop Production efficiency				
Financial support in production				
Storage and harvesting				
Marketing of crops				

23. What do you think the AMPLIFIES program should have done more to improve poultry feed crops in Ghana?

Thank you

V. Key Informant Interview guide for Government Officials/Policy Stakeholders

Government Officials/ Policy Stakeholders - KEY INFORMANT INTERVIEW GUIDE

(Semi Structured Questionnaire)

Organization: **District:** **Region:**

Position:

Contact Telephone: **Email:**

1. How long have you associated with the AMPLIFIES project?

2. What role have you played on the AMPLIFIES project or programs?

3. How has the project coordinated with as an organization?

4. How frequent do you participate in the AMPLIFIES project and under which programs?

	Feed	Marketing	Financing	Networking	Management	Others
Training						
Seminars						
Inspections						
Durbars						
Other						

5. How will you assess or rate AMPLIFIES performance in terms of the following over the years of implementation?

	Excellent	Very good	Good	Poor

Adoption of Improved Poultry Feed				
Improvements in Quality and Consistency of Feed Formulations				
Increased Feed Testing Capacity				
Increased Efficiency in Feed Processing				
Increased Efficiency in the Procurement of Feed Ingredient				
Loans for Investments in Feed Processing				
Post-harvest Storage and Aggregation of Feed Inputs				
Expansion of Poultry Feed Distribution Network				
Organize National Awareness Campaign to Promote Egg Consumption				
Harvesting, Post-harvest Handling and Storage of Feed Inputs				

Note: Crops, Farmers, Feed Millers and FBOs involves

6. How has the AMPLIFIES project benefitted the following on the poultry value chain?

	Financial Standing	Productivity	Profitability	Marketing	Management
Crop farmers					
Feed millers					
Poultry farmers					

FBOs					

7. What are some of the major challenges of these players in terms of the following:

	Loans assessment	Financial management	General management	Marketing	Others (Specify)
FBOs					
Crop farmers					
Feed millers					
Poultry farmers					

8. What are some of the opportunities of these players in terms of the following?

	Loans assessment	Financial management	General management	Marketing	Others (Specify)
FBOs					
Crop farmers					
Feed millers					
Poultry farmers					

9. What is your overall performance rating with respect to the benefits of the programme to the players?

10. In what ways have the AMPLIFIES programme benefitted your organization as a key stakeholder in the poultry sector?

11. In what ways have the AMPLIFIES project benefitted the agenda of government or Ghana in the efforts to promote the poultry industry?

12. What do you think the AMPLIFIES program should have done more under these sub headings:

    e. Period and style of Implementation?

    f. Programs organized?

    g. Places implemented?

    h. Relationship with stakeholders?

Thank you