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The U.S. Government's Global Hunger & Food Security Initiative

NAFAKA STAPLES VALUE CHAIN ACTIVITY MARKET SURVEY (MS) REPORT FEBRUARY 2016



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ACRONYM LIST

ACDI/VOCA	A private, nonprofit organization that promotes broad-based economic growth and the development of civil society
AOS	Annual Outcome Survey
FtF	Feed the Future
MS	Market Survey
MT	Metric Ton
PY	Project Year
USAID	United States Agency for International Development
USG	United States Government

I INTRODUCTION

I.1 Background

The NAFKA Staples Value Chain Activity is a six-year task order issued by USAID under the Tanzania Feed the Future (FtF) Initiative and administered by ACIDI/VOCA. NAFKA integrates agricultural, gender, environmental, and nutritional development efforts to improve smallholder farmer productivity and profitability within the rice and maize value chains in Morogoro (Kilombero and Mvomero districts), Dodoma (Kongwa district), Manyara (Kiteto district), Mbeya (Mbozi, Mbeya Rural, Mbarali, and Rungwe districts), and Iringa (Iringa Rural and Kilolo districts) on the mainland, as well as Pemba and Unguja in Zanzibar. NAFKA's goal is to sustainably reduce poverty and food insecurity by increasing incomes for smallholder farmers, including men, women, and youth.

This is the third market survey (MS survey) that NAFKA has conducted, which took place from 29th February to 8th March 2016. The survey aimed to update sales information from the Annual Outcome Survey (AOS) conducted in August 2015. At the time, most of the farmers had just finished harvesting and therefore very few sales had been completed. NAFKA decided to have a follow on survey after the 2015 AOS so as to have a better picture of the sales information collected seven months after harvest, when most of the farmers are selling their produce at favorable prices.

December through March is when most farmers engage in marketing the produce that has been previously stored so as to get a better price for their crops. Therefore, data collected at this time provides a better picture of volumes sold and the value of sales that allow the updating of gross margin and incremental sale figures for both maize and paddy.

Crop prices are usually lower during the harvesting period, and as farmers move on to the next growing season, once low prices begin to increase. The increase in price and volumes of both products are expected to positively affect the gross margin and value of incremental sales of both maize and rice.

I.2 Methodology

All our Annual Outcome Surveys were longitudinal studies meaning that the same households interviewed in the previous AOS were interviewed again in the next AOS in the following year (Panel survey approach). In addition, a proportionate sample of farmers reached in the current year was added to take into account the increase in the number of farmers reached by the project during that current reporting period.



Photo 1: Member of NAFKA staff interviewing a farmer in Mvomero

1.2.1 Sample size and sampling procedures

The Market Survey sampled 640 beneficiaries out of a total 1,189 sampled beneficiaries from the PY15 AOS, which were



Photo 2: Tending a maize field in Kiteto that is responding very well to input applications.

picked from 112,971 direct beneficiaries that were reached by the project through various interventions at that time. Due to the extremely large number of direct beneficiaries on the NAFAKA project, it is difficult from both a resource and logistical perspective to collect all relevant data on all these beneficiaries. Therefore a survey with a representative sample of the beneficiary population was appropriate for the market survey. The sample was thoroughly studied and findings were extrapolated to reflect the entire pool of direct beneficiaries of the project. This approach is among those recommended by USAID and other development partners.

1.2.1.1 Sampling frame

The NAFAKA sampling frame comprises a complete list of all project implementation “clusters” and/or all project direct beneficiaries - from which a representative sample was randomly drawn for the market survey. “Cluster” include geographic area covered by the project (i.e. districts and villages. The NAFAKA sampling frame included 112,971 direct beneficiaries - from which a representative sample was randomly drawn for the market survey. The sampling frame increases every year to take into account all direct beneficiaries (new and continuing) that are being reached by our interventions.

1.2.1.2 Sample Size and Sampling Procedure

The procedure that was used to determine the AOS sample in August 2015, was the same used to provide the sample for the market survey in March 2016, due to the requirement that the same households be interviewed for the PY15 AOS. Since the objective of the market survey is to gather the additional sales of the interviewed farmers during the PY15 AOS, another sample was drawn from 1,189 respondents that were interviewed in August 2015. Using a margin of error of 5% at 95% confidence level, assuming a probability of 50% and a design effect of 2 we arrived at a primary sample of $291 \times 2 = 582$. We also factored in a 10% non-response rate to be able to replace the farmers that will not show up in order to arrive at a sample of 640 farmers.

1.2.1.3 Survey teams in different clusters

The market survey was conducted by six teams (each with four enumerators with the exception of the Zanzibar team). All enumerators were NAFAKA project staff supervised by team leader [redacted], who provided guidance, coordination and day to day support for all six teams.

2 KEY FINDINGS OF THE MS

2.1 In a nutshell

- **Gross Margins of Maize and Rice:** Since the August 2015 AOS, there has been a 58% percent increase in rice gross margins, and a 5% percent increase in maize gross margins. The increase in rice gross margins is mainly due to the price increase from US\$ 310 per MT (US \$ 0.31 per kg) in August 2015 to US\$ 400 per MT (US \$ 0.50 per kg) in March 2016 (see Table 5). This caused the value of sales for rice to increase by 114%. The volumes sold also increased but it is not as much of a major contributing factor.

Maize volume of sales increased but had no effect on the values of sales because the price did not change. The gross margin for maize was largely affected by the low production last season which heavily influenced sales in March. These did not increase as expected.

- **Number of Farmers Sold Their Produce:** The number of farmers who sold their produce after the Market Survey increased compared to the Annual Outcome Survey Report. This increased from 19,148 (51%) during AOS to 25,993 (83%) in the maize area and 35,698 (36%) to 43,326 (59%) in the Rice area.



Photo 3: Maize sales start with the green maize

- **Volume of Sales:** In PY15, 24,548 metric tons (MT) (30 percent) of maize was sold out of the total production of 82,710 MT. In PY14, 29,309 MT (21 percent) was sold out of the total production of 139,042 MT. For rice, the average volume sold increased from 1 MT (PY14) to 2 MT (PY15). In PY15, 61,372 MT (32 percent) of rice was sold out of the total production of 190,139 MT. In PY14, 20,498 MT (19 percent) was sold out of the total production of 106,967 MT.
- **Value of Sales:** The total value of maize sold this year is \$5,672,164 (the proportion of men and women who sold the product: 73 percent men and 27 percent female). Last year, total sales were valued at \$4,759,680. The value of rice sales significantly increased from \$19,000,036 in August 2015 to \$40,656,348 in March 2016.
- **Average Price:** In PY15, the average price of maize per kilogram was \$0.227 compared to \$0.162 in PY14, and has slightly increased after the market survey to \$0.231, which is a 2% increase from the PY 15 price. The average price of rice, \$0.40, increased by 29% percent from the PY15 AOS price of \$0.31.
- **Value of Incremental Sales:** The extrapolated value of incremental sales is currently \$ -9,228,338 (after the March Market survey). The general value of incremental sales has always been negative except in PY 2013, when farmers received better prices. However, these figures will continue to be negative since the average sales figures for both maize and rice during the baseline year were higher compared to average sales of following years. USAID and the BFS are working on strategies to address this.

2.2 Gross Margin of Maize and Rice

During this survey, only two data points (Total Quantity of Sales and Total Value of Sales) were collected to update the August 2015 AOS Gross Margin numbers. The three data points (Area planted, Total Recurrent Cash Input Cost and Total Production) collected in August 2015 AOS were used to compute Gross Margin with New Data (Total Quantity of Sales and Total Value of Sales) collected in the March 2016 Market Survey.

Gross Margin Computation

This is computed from the five data points (Area planted, Total Recurrent Cash Input Cost, Total Production, Total Quantity of Sales and Total Value of Sales) as per the FiF Indicator Handbook.



Photo 4: Use of improved inputs (i.e. seeds, fertilizers and herbicides) are increasing the size of maize cobs in both Kongwa and Kiteto, which are in the NAFKA intervention area

Both rice and maize gross margin values have increased from those obtained in the last AOS survey. In this market survey, maize farmers recorded a 5% increase of GM from that obtained in the 2015 AOS. The Gross Margin of maize increased from US\$74 to US\$78 per hectare. Rice farmers recorded a 58% increase in GM values compared from the last AOS survey, which went from US\$459 to US\$725 per hectare (Table 1). Gender differences in GM have also been observed for both maize and rice production. GM of maize production is higher for men at US\$97, compared to US\$45 for women. The same is true for rice producers, where men have higher gross margin (\$776) compared to women (\$649). The table below provides GM figures for both maize and rice value chains during the August 2015 AOS and the MS in March 2016. The March values will replace those of August in the FTFMIS.

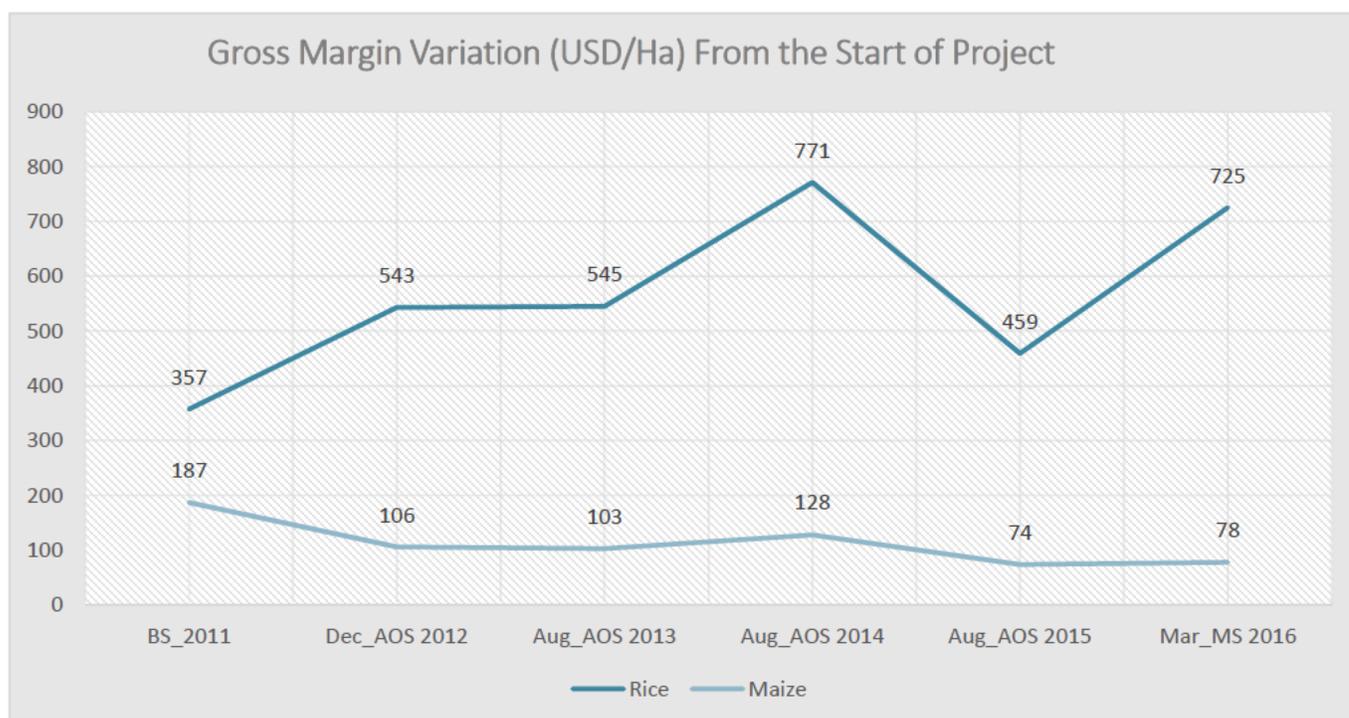
Table I: The Reviewed Gross Margin of Rice and Maize After the Market Survey

Maize							
Period of Survey	August 2015 AOS			March 2016 Market Survey			
Sex	Female	Male	Total	Female	Male	Total	% Increase
Gross Margin (USD)	52	87	74	45	97	78	5%
Total Quantity Sold (MT)	5,453	14,367	19,820	7,284	17,264	24,548	24%
Total Value of Sales (USD)	1,201,708	3,294,122	4,495,829	1,524,551	4,147,613	5,672,164	26%
Total Production TP (MT)	25,990	56,720	82,710	25,990	56,720	82,710	
Total Input Cost (USD)	3,708,323	7,515,433	11,223,756	3,708,323	7,515,433	11,223,756	
Total Area Planted (Ha)	38,479	63,167	101,646	38,479	63,167	101,646	
Rice							
Period of Survey	August 2015 AOS			March 2016 Market Survey			
Sex	Female	Male	Total	Female	Male	Total	% Increase
Gross Margin (USD)	376	508	459	649	776	725	58%
Total Quantity Sold (MT)	18,064	43,308	61,372	49,975	51,671	101,646	66%
Total Value of Sales (USD)	5,363,469	13,636,567	19,000,036	19,922,001	20,734,347	40,656,348	114%
Total Production TP (MT)	68,604	121,535	190,138	68,604	121,535	190,138	
Total Input Cost (USD)	10,716,831	18,401,173	29,118,004	10,716,831	18,401,173	29,118,004	
Total Area Planted (Ha)	25,639	39,144	64,783	25,639	39,144	64,783	

2.3 Gross Margin variation from the start of the project

Compared to the Baseline Survey number, the Gross Margin of Rice increased every year. This is different in maize growing areas where the baseline number of gross margin was high compared to the values we have obtained in 3 consecutive years. The increasing rate of maize Gross Margin is low compared to rice.

The March 2016 Market Survey Gross Margin for rice is US\$725/Ha which is a large increase from the Baseline Survey number of US\$357/Ha. During the December 2012 AOS, the number was US\$543/Ha, then increased in the August 2013 AOS to US\$545/Ha, then increased in the August 2014 AOS to US\$771/Ha but decreased to US\$459 in the August 2015 AOS. This indicates that the revenue per hectare for the rice value chain has been increasing every year, with the exception of last year when sales were low during the time that the AOS was conducted. Sales have since increased as evidence from the Market Survey that was completed in March 2016. For the maize value chain, the Baseline Gross Margin was US\$187, which is a higher number than what was recorded in December 2012. During the December 2012 AOS, the GM was USD \$106/Ha, USD\$103/Ha during the August 2013 AOS, and US\$128/Ha August 2014 AOS; The GM then decreased to US\$74/Ha during the August 2015 survey because of low yields due to the fact that the weather was not conducive to production in the maize growing areas. The Gross Margin after the March 2016 Market Survey has since risen to US\$78 as depicted in the figure below.

Figure 1: Maize and Rice Gross Margin Variation from the start of Project

2.4 Recalculated Value of Incremental Sales

The Value of Incremental Sales Computation

To compute incremental sales, the sample figure (volume of sales) is extrapolated to the number of beneficiaries reached during the reporting period and comparison made with the baseline value. In other words, the average sales figure per farmer in the baseline year is multiplied by current number of beneficiaries to get the adjusted baseline value before subtracting it from the current value of sales to arrive at the increased sales.

Note that throughout the reporting year, overall sales rose by 53% from US \$44,285,430 in August to US \$67,654,217 in the Market Survey. The value of incremental sales of maize is US \$-7,485,967 and rice US\$13,077,772 compared to US \$-6,603,573 of maize and US\$-11,173,409 of rice in the August Annual Outcome Survey. In other words, the value of incremental sales has increased by 217% in rice value chain but decreased by 13% in the maize value chain.



Photo 5: Safe storage of products in warehouses that meet the standard criteria help in marketing quality products

Table 2: Extrapolated data on the value of incremental sales

Indicator	Baseline Value	Incremental sales Aug 2015	Incremental sales March 2016	Percentage increase/decrease
Overall Incremental sales				
Value of Incremental Sales US\$	-	(17,776,982)	5,591,805	131%
Total Adjusted value of Sales (Baseline Value) USD	-	62,062,412	62,062,412	
Total Baseline sales (USD)	7,180,317	7,180,317	7,180,317	
Total Reporting year sales (USD)	-	44,285,430	67,654,217	53%
Total Volume of sales (MT)	11,923	81,192	126,194	55%
Total Number of direct beneficiaries	14,571	112,971	112,971	
Maize incremental sales				
Value of Incremental Sales US\$		(6,603,573)	(7,485,967)	-13%
Adjusted value of Sales (Baseline Value) USD		19,108,443	19,108,443	
Baseline sales (USD) -2013	3,284,959	3,284,959	3,284,959	
Reporting year sales (USD)		12,504,870	11,622,476	-7%
Volume of sales (MT)	11,923	19,820	24,548	24%
Number of direct beneficiaries	9,156	53,260	53,260	
Rice incremental sales				
Value of Incremental Sales US\$		(11,173,409)	13,077,772	217%
Adjusted value of Sales (Baseline Value) USD		42,953,969	42,953,969	
Baseline sales(USD) -2012	3,895,358	3,895,358	3,895,358	
Reporting year sales (USD)		31,780,560	56,031,741	76%
Volume of sales (MT)		61,372	101,646	66%
Number of direct beneficiaries	5,415	59,711	59,711	

2.5 Marketing and Sales Activities

2.5.1 Number of beneficiaries who sold their produce

Out of 53,260 maize farmers we have reached, 19,148 (36%) reported that they have sold their produce during the August AOS, while another 25,993 sold their maize after the market survey which is another 36% increase. Out of 59,711 rice farmers we have reached, 35,698 (60%) beneficiaries responded that they sold their rice during the August 2015 AOS, and 43,326 (73%) sold their produce after the Market Survey (Table 3).

Table 3: Number of beneficiaries who sold their maize and rice crop as of August 2015 and March 2016

Maize					
Sex	No. of maize farmers reached as of Aug 2015	No. of farmers who sold maize as of Aug 2015	No. of farmers who sold maize as of Mar 2016	% of farmers who sold maize as of Mar 2016	% increase of farmers who sold maize from the AOS 2015 to date
Female	25,893	8,542	11,018	43%	29%
Male	27,367	10,606	14,974	55%	41%
Total	53,260	19,148	25,993	49%	36%

Rice					
Sex	No. of rice farmers reached as of Aug 2015	No. of farmers who sold rice as of Aug 2015	No. of farmers who sold rice as of Mar 2016	% of farmers who sold rice as of Mar 2016	% increase of farmers who sold rice from the AOS 2015 to date
Female	28,556	16,613	21,417	75%	29%
Male	31,155	19,085	21,909	70%	13%
Total	59,711	35,698	43,326	73%	21%

2.5.2 Volume of Sales

The quantity of Maize and Rice sold after the March Market Survey is high compared to the August 2015 AOS. Out of 82,710MT, the quantity of Maize sold was 19,820 MT which is 24% of total crop during the August 2015 AOS, and 24,548 MT (30% of the total produce) was sold after the March 2016 Market Survey. As for the Rice value chain, out of 190,138 MT produced, 61,372MT (which is equivalent to 32% of total production) were sold during the August 2015 AOS and 101,646 MT (which is 51% of the total produce) were sold after the March 2016 Market Survey.

Table 4: Quantity of rice and maize sold as of August 2015 and March 2016

Maize						
Sex	Quantity of maize (MTs) produced as per Aug 2015 AOS in MTs	Quantity of maize (MT) sold as per Aug 2015 AOS	Percent of maize sold as per Aug 2015 AOS	Quantity of maize sold as of Mar 2016 AOS	Percent of maize sold as of Mar 2016 AOS	Percentage Increase
Female	25,990	5,453	21%	7,284	28%	34%
Male	56,720	14,367	21%	17,264	30%	20%
Total	82,710	19,820	24%	24,548	30%	24%

Rice						
Sex	Quantity of rice (MTs) produced as of Aug 2015 AOS in MTs	Quantity of rice (MT) sold as of Aug 2015 AOS	Percent of rice sold as of Aug 2015 AOS	Quantity of rice sold as of Mar 2016 AOS	Percent of rice sold as of Mar 2016 AOS	Percentage Increase
Female	68,604	18,064	26%	49,975	73%	177%
Male	121,535	43,308	36%	51,671	43%	19%
Total	190,138	61,372	32%	101,646	53%	66%

2.5.3 Average Price and Value of Sales

The price of maize has remained the same since the AOS, while the price of rice has increased. During the Market Survey the average price per kilogram of maize was US \$0.23 (442 TSH) which is the same as the average price recorded during the August 2015 AOS. However, the average price of rice has increased from US\$0.31(596 TSH) in August to March's price of US\$0.40 (770Tsh) per kilogram. The total value of maize sold is US\$5,672,164 (73%M/27%F) and Paddy is US\$40,656,348 (51%M/49%F). This is an increase of 26% in maize value of sales and 144% of rice value (Table 5).

Table 5: Value of maize and rice sold

Maize								
Variable	Quantity of maize sold as of August 2015 AOS	Value of sales of maize as of August 2015 AOS	Average price of maize as of August 2015 AOS	Average sales per farmer as of August 2015	Quantity of maize sold as of March 2016	Value of sales of maize as of March 2016	Average price of maize as of March 2016	Average sales per farmer as of March 2016
Unit	MT	USD	USD/Kg	USD	MT	USD	USD/Kg	USD
Female	5,453	1,201,708	0.22	141	7,284	1,524,551	0.21	138
Male	14,367	3,294,122	0.23	311	17,264	4,147,613	0.24	277
Total	19,820	4,495,829	0.23	236	24,548	5,672,164	0.23	218

Rice								
Variable	Quantity of rice sold as of August 2015 AOS	Value of sales of rice as of August 2015 AOS	Average price of rice as of August 2015 AOS	Average sales per farmer as of August 2015	Quantity of rice sold as of March 2016	Value of sales of rice as of March 2016	Average price of rice as of March 2016	Average sales per farmer as of March 2016
Unit	MT	USD	USD/Kg	USD	MT	USD	USD/Kg	USD
Female	18,064	5,363,469	0.30	323	49,975	19,922,001	0.40	930
Male	43,308	13,636,567	0.31	715	51,671	20,734,347	0.40	946
Total	61,372	19,000,036	0.31	534	101,646	40,656,348	0.40	938

3 LESSONS LEARNED AND RECOMMENDATIONS

The main objective of the Market Survey is to update the values of gross margins and the values of incremental sales that were obtained in August 2015 during the Annual Outcome Survey. Additional sale information is now available due to the fact that many farmers who stored their products have since sold them. December through March is when the majority of farmers market their maize and paddy crop in the NAFKA program operating areas and therefore can provide a better picture of volumes sold and the value of sales.

3.1 Volume of sales and values

Since conducting market surveys, there has been an overall increased volume of sales for both maize and rice. The increase in the volume of maize sold has been attributed mainly to collective marketing and linkages between producer groups and buyers such as WFP P4P program and others facilitated by the NAFKA project. NAFKA interventions have led to i) increased number of farmers who sold their produce, and ii) increased

number of bulk buyers, e.g. the National Food Reserve Agency which was offering better prices. The increase in sales in rice crop has increased over the years, but only at a minimal rate due to the fact that many farmers sell at the farm gate level. Rice producers can potentially sell more when associations become effective at collective marketing, which can contribute to an increase in average sale per year.



Photo 6: Cargo Potters Group Facilitating Transportation of bags of paddy from Igurusi warehouse to the markets.

3.2 Gross Margins at different points of the year

The increase in sales has hugely impacted gross margin values, especially that of rice. The gross margin values obtained in August 2015 were much lower than values that were obtained in March 2016. The September values were originally put into the FTFMIS system. However, NAFKA has since updated these figures in order to reflect new gross margin and incremental sales values. During the follow-on project, NAFKA will abide by the Feed the Future Indicator Handbook of October 2014 which stipulates the following:

“If the production cycle from soil preparation/planting to sales starts in one fiscal year and ends in another, report gross margin in the second fiscal year, once all data points are available. Since the four key agricultural indicators (gross margins, number of farmers applying improved technologies, number of hectares under improved technologies, and incremental sales) are all related, report all four indicators in the second fiscal year in these cases”

3.3 The challenges of adjusting the value of Incremental sales

To compute incremental sales, the sample figure (volume of sales) is extrapolated to the number of beneficiaries reached during the reporting period and the comparison is made with the baseline value. In other words, the average sales figure per farmer in the baseline year is multiplied by the current number of beneficiaries to get the adjusted baseline value before subtracting it from the current value of sales to arrive at the increased sales. The extrapolated value of incremental sales for maize in PY13, PY14 and PY15 are negative given the baseline in year 2012. The main reason being the average sales figures for maize in the baseline year were abnormally high.

The suggested solution to the problem was to use the PY13 sales results as the baseline for this indicator which better illustrates average maize sales than PY12 figures. In addition, the baseline figures may not be a good comparison for value of incremental sales given that the respondents are not the same. The baseline is based on population while annual surveys are based on number of beneficiaries.

3.4 The use of mobile technology to collect data

NAFAKA continued to use the introduced mobile data collection technology tool to collect data for the Market Survey as it was firstly administered and used in the PY15 annual outcome survey. The technology has proven to be an easy and inexpensive method of data collection. It reduced the data entry burden; improved data quality by allowing data validation rules and consistency checks that were integrated in the tablet and Magpi system; reduced interviewee fatigue with a 25-minute interview timeframe compared to 55 minutes when done using paper and pencil; enabled real-time access to information; and reduced the risk of transcription errors. It is recommended that NAFKA continue to use these tablets and even upgrade them for newer version as their use has become vital in NAFKA's data operations.

