Republic of Ghana

Ministry of Food and Agriculture

AGRICULTURAL SECTOR PROGRESS REPORT 2015

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Republic of Ghana

AGRICULTURAL SECTOR PROGRESS REPORT 2015

Ministry of Food and Agriculture
Monitoring and Evaluation Directorate

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ABBREVIATIONS AND ACRONYMS

AAA	Accra Agenda for Action
ABL	Accra Brewery Limited
ACDEP	Association of Church Development Projects
ADB	Agricultural Development Bank
AEA	Agricultural Extension Agent
AESD	Agricultural Engineering Services Directorate
AgGDP	Agricultural Gross Domestic Product
AGRA	Alliance for Green Revolution in Africa
AHPC	Animal Health and Production College
AIDS	Acquired Immune Deficiency Syndrome
AIS	Automatic Identification System
AMA	Accra Metropolitan Assembly
AMSECs	Agricultural Mechanization Service Centres
APD	Animal Production Directorate
APR	Annual Progress Report
AR	Ashanti Region
ASF	African Swine Fever
ASWG	Agriculture Sector Working Group
BAC	Business Assistance Centre
BADEA	Arab Bank for Economic Development of Africa
BBS	Bread Basket Strategy
CAADP	Comprehensive Africa Agricultural Development Programme
CARGS	Competitive Agricultural Research Grants Scheme
CAVA	Cassava Adding Value for Africa
CIP	International Potato Centre
COCOBOD	Cocoa Marketing Board
CPI	Consumer Price Index
CRI	Crop Research Institute
CRIG	Cocoa Research Institute of Ghana
CSD	Crop Services Directorate
CSIR	Council for Scientific and Industrial Research
CSOs	Civil Society Organizations
DADU	District Agricultural Development Unit
DAES	Directorate of Agricultural Extension Services
DCS	Directorate of Crop Services
DDO	District Development Officer
DFATD	Department of Foreign Affairs, Trade and Development
DFR	Department of Feeder Roads
DPs	Development Partners
DVCCs	District Value Chain Committees
ECOWAS	Economic Community of West African States
EDAIF	Export Development and Agricultural Investment Fund
EMQAP	Export Marketing and Quality Awareness Project
EPA	Environmental Protection Agency
ER	Eastern Region
EU	European Union
EWS	Early Warning System
FA	Farmer Associations
FAO	Food and Agricultural Organisation

FASDEP	Food and Agricultural Sector Development Programme
FBO	Farmer Based Organisation
FC	Fisheries Commission
FDA	Food and Drugs Authority
FOSPREP	Food Security for Empowerment and Poverty Reduction Project
FRI	Food Research Institute
GADS	Gender and Agricultural Development Strategy
GALVMED	Global Alliance for Veterinary Medicine
GAPs	Good Agriculture Practices
GAR	Greater Accra Region
GASIP	Ghana Agriculture Sector Investment Programme
GATRA	Ghana Agricultural Transformation Agenda
GAVEX	Ghana Association of Vegetable Exporters
GCAP	Ghana Commercial Agriculture Project
GCC	Ghana Grains Council
GCX	Ghana Commodity Exchange
GDHS	Ghana Demographic and Health Survey
GDP	Gross Domestic Product
GEPA	Ghana Export Promotion Authority
GGBL	Guinness Ghana Breweries Limited
GGC	Ghana Grains Council
GHA	Ghana Highway Authority
GHABROP	Ghana Broiler Revitalization Project
GIDA	Ghana Irrigation Development Authority
GIMPA	Ghana Institute of Management and Public Administration
GITA	Ghana Industrial Trawlers Association
GLSS	Ghana Living Standards Survey
GMA	Ghana Meteorological Agency
GNCFC	Ghana National Canoe Fishermen Council
GOG	Government of Ghana
GSA	Ghana Standards Authority
GSFP	Ghana School Feeding Programme
GSGDA	Ghana Shared Growth and Development Agenda
GSS	Ghana Statistical Service
GIZ	German Agency for International Cooperation)
H1N1	Avian Flu
HIV/AIDS	Human Immune Virus/Acquired Immune Deficiency Syndrome
HQC	High Quality Cassava Chips
HQCF	High Quality Cassava Flour
HRDMD	Human Resource Development and Management Directorate
ICCAT	International Commission for the Conservation of Atlantic Tunas
ICOUR	Irrigation Company of Upper Region
ICT	Information, Communication Technology
IEZ	Inshore Exclusive Zone
IFAD	International Fund for Agricultural Development
IFPRI	International Food Policy Research Institute
IGCF	Industrial Grade Cassava Fluor
IITA	International Institute of Tropical Agriculture
IPB	Inter-professional Body
IPR	Intellectual Property Rights
ISPM	International Standard for Phytosanitary Measures

IUU	Illegal, Unreported and Unregulated
IVR	Interactive Voice Response
IVRDP	Inland Valley Rice Development Project
JSR	Joint Sector Review
KEEA	Komenda-Edina-Eguafo -Abirem
LEAP	Livelihood Empowerment Against Poverty
LGS	Local Government Service
M&E	Monitoring and Evaluation
MCS	Monitoring Control and Surveillance
MDAs	Ministries, Departments and Agencies
MDG	Millennium Development Goal
MED	Monitoring and Evaluation Directorate
METASIP	Medium Term Agricultural Sector Investment Plan
MOAP	Market Oriented Agriculture Project
MoFA	Ministry of Food and Agriculture
MoFAD	Ministry of Fisheries and Aquaculture Development
MoTI	Ministry of Trade and Industry
NADMO	National Disaster Management Organisation
NAFAG	National Fishers Association of Ghana
NAFCO	National Food Buffer Stock Company
NAFPTA	National Fish Processors and Traders Association
NARS	National Agriculture Research Systems
NCD	Newcastle Disease
NDPC	National Development Planning Commission
NGO	Non-Governmental Organisations
NR	Northern Region
NRGP	Northern Rural Growth Programme
NSAICU	Northern Sector Agriculture Investment Coordination Unit
NVRRC	National Varietal Release and Regulation Committee
OFSP	Orange Flesh Sweet Potato
OVCF	Outgrower and Value Chain Fund
PGRRI	Plant Genetic Resources Research Institute
PMF	Performance Monitoring Framework
PPRSD	Plant Protection and Regulatory Services Directorate
PSP	Participatory Scenario Planning
RADU	Regional Agricultural Development Unit
RCB	Rural and Community Bank
RCC	Regional Coordinating Council
RDO	Regional Development Officer
RELC	Regional Extension Liaison Committee
REP	Rural Enterprises Programme
ROA	Research and Operations Assistant
RSSP	Rice Subsector Support Programme
RTIMP	Roots and Tuber Improvement and Marketing Program
RVCC	Regional Value Chain Committee
SADA	Savannah Accelerated Development Authority
SAKSS	Strategic Analysis and Knowledge Support System
SALMS	Sustainable Agricultural Land Management Strategy
SARI	Savannah Agricultural Research Institute
SEPs	Supervised Enterprise Projects
SFIP	Small Farms Irrigation Project

SLM	Sustainable Land Management
SLWMP	Sustainable Land and Water Management Project
SRID	Statistics Research and Information Directorate
SST	Sea Surface Temperature
SWaP	Sector Wide Approach
TC	Technical Coordinator
UN	United Nation
UNIDO	United Nations Industrial Development Organizations
USAID	United States Agency for International Development
VR	Volta Region
VSD	Veterinary Services Directorate
VTMIS	Vessel Traffic Monitoring Information System
WAAPP	West African Agricultural Productivity Programme
WAPFP	West African Regional Fisheries Programme
WIAD	Women in Agriculture Directorate
WR	Western Region
WRI	Water Research Institute
WUA	Water User Association

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The Ministry of Food and Agriculture therefore, wishes to express its appreciation to all the team members who participated in the process, including the Director and staff of the Monitoring and Evaluation Directorate. Appreciation also goes to all our partners and stakeholders including the Ministries, Departments and Agencies as well as National, Regional and District Agricultural Directorates for their inputs, collaboration and cooperation which enabled us respond to the sector objectives during the reporting period.

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All errors and omissions in the report are the responsibility of the entire Monitoring and Evaluation Directorate Team of the Ministry of Food and Agriculture.

FOREWORD

The Agricultural Sector is one of the key drivers of the Ghana's economy, for which the Ministry of Food and Agriculture is mandated by law to develop policies and programmes for the transformation of the sector. This is expected to result in a food secured economy, creation of employment along value chains resulting in poverty reduction in the country.

The sector policy, Food and Agricultural Sector Development Programme (FASDEP) and its investment plan, Medium Term Agricultural Sector Investment Programme (METASIP-2011 to 2015), are both in harmony with the objectives of New Partnership for Africa's Development (NEPAD's) Comprehensive Africa Agriculture Development Programme (CAADPP) and Ghana Shared Growth and Development Agenda (GSGDA). The METASIP has six pillars;

1. Food Security and Emergency Preparedness.
2. Increased Growth in Incomes.
3. Increased Competitiveness and Integration into Domestic and International Markets.
4. Sustainable Management of Land and Environment.
5. Science and Technology applied in Food and Agriculture.
6. Improved Institutional Coordination.

In line with the Maputo Declaration, at least ten percent of government's discretionary budgetary expenditure is expected to be used to finance these programmes and to achieve a minimum of 6 percent annual growth of the sector.

The Annual Progress Report (APR) provides an assessment of the indicators adopted for measuring the sector's performance. The APR of 2015 gives an account of the progress made in the sector in achieving the METASIP targets and objectives.

This report would not have been possible without the significant contribution of a number of individuals, groups and institutions. The partnership between these key stakeholders has ensured that information on the achievements during the period is reliable, timely and relevant for a wide range of stakeholders.

This report is the fourth to be published by the Ministry and last within the five year implementation period of the METASIP. It contains data and information necessary for evaluation of these programmes. It therefore will serve as a reference point for all stakeholders in the sector including ministries, departments and agencies as well as research, academia and students.

Hon. Mohammed-Muniru Limuna (Alhaji)
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Accra, Ghana

EXECUTIVE SUMMARY

The Annual Progress Report (APR) provides an assessment of the indicators adopted for measuring agricultural performance in Ghana during the METASIP period. It presents the achievements of relevant international, sub-regional, national and sectoral targets during the implementation of the Medium Term Agricultural Sector Investment Plan (METASIP I): 2011- 2015. METASIP is in harmony, at a the national level, with the sector policy (FASDEP) and Ghana Shared Growth and Development Agenda (GSGDA); at regional level with NEPAD's CAADPP and at international level with the MDGs. Majority of targets set at all levels were achieved, though programmes, projects and policies needed to be more targeting for better impact.

Available information shows that, Ghana is the first country in sub-Saharan Africa to meet the MDG 1 target of halving extreme poverty by 2015. The country has reduced the level of its poor population from 7 million in the early 1990s to less than 1 million in 2015. This singular achievement was attained in 2006. However, there are still pockets of extreme poverty in many locations across the country. Giant strides have also been made in the area of child malnutrition. There are general reductions in the indicator level from 2008 compared to 2014. The percentage of stunting children under 5 years has reduced from 28 percent to 19 percent while those severely stunted reduced from 10 percent to 5 percent.

National expenditure review measures the achievement of the Maputo target of 10 percent government discretionary expenditure on agriculture. The expenditure review process in Ghana was last carried out in 2011. Per the result, Ghana's agricultural expenditure averaged 10.36 percent from 2008 to 2011. The average annual agricultural growth rate for the period 2008 to 2015 is about 4.6 percent. This is below the projected growth rate and Maputo target of 6 percent.

In the year 2015, there was an outbreak of bird flu which affected 36 poultry farmers. However, interventions were implemented to prevent the spread of the disease including payment of compensation and intensification of monitoring activities. Twenty five (25) poultry farmers from the Volta, Ashanti and Western Regions out of the total of 36 that were affected were compensated with an amount of GH¢1,067,849.00 during the period whilst an amount of GH¢843,933.00 was being processed to compensate the remaining 11 affected farmers in the Greater Accra and Eastern Regions.

Productions of crops, livestock and fish have all achieved moderate successes over the period. Aquaculture production has exceeded the METASIP target of 15,000MT by 197.4 percent. Production figures for rice, cassava and yam showed upward trends from the years 2008 to 2015 by 128 percent, 52 percent and 49 percent respectively. Productivity of major crops also recorded gains though could not meet the targets set. Cassava recorded 39 percent improvement in yield, yam 20 percent, maize 13 percent and rice about 1 percent.

The quantity of domestic meat produced increased by 27.2 percent whereas meat imports declined by 71 percent. The country produced an average of 65.4 percent of its meat

requirement annually. For fish, an average of 72.1 percent has been produced and thus imported an average of 27.9 percent to meet national demands. This translates into the production of about 2.2 million metric tonnes of fish annually between 2011 and 2015. In 2008, the country produced about 69 percent of her fish requirement. This proportion increased to over 74 percent in 2013 and reduced marginally to over 71 percent in 2015.

There was a general increase in average annual crop incomes of GH₵1,637.27, GH₵96.87 and GH₵2,757.21 in the deciduous forest, guinea savannah and transitional zone, respectively. Processors receiving MoFA support recorded an increase of GH₵1,021.05 average weekly revenue. There are several individual stories across the country showing that the interventions of government and its partners are yielding the intended results. The rate of adoption of improved varieties was also found to have increased over the period of evaluation. The adoption rate among 'with-project-districts' increased by 23.94 percent to 45.52 percent. Those of the 'without- districts' also increased by 26.90 percent.

The overall export volume of all the commodities increased significantly from 167,776 metric tonnes in 2008 to 430,457 metric tonnes in 2015. This represents a percentage increase of 157 percent over the baseline year. The expectation of the Government was to record at least a 50 percent increase of all exports over the baseline. This target has been exceeded by about 107 percentage points.

The National Implementation Efficiency Ratio for the Ministry for the period 2008 to 2015 averaged 73 percent with the highest of 82 percent recorded in 2010 and 2011. The period, 2015 recorded the lowest of 55 percent. This is against a national implementation efficiency target of 80 percent for the year 2015. The National Implementation Efficiency Ratio has experienced a consistent decrease from 2011 to 2015. This is attributable to the late and non-release for funds by the Ministry Finance for goods and services to the various directorates.

Against the approved budget of GH¢411.82 million, total funds released during the year amounted to GH¢262.89 million representing 63.8 percent, whereas the actual expenditure amounted to GH¢276.62 million representing 105.3 percent of the total amount released. The expenditure amount exceeded the amount released because of increased employee compensations and payment of outstanding commitment from previous years. In addition to the actual releases, the Ministry received from the Non-Road Fund Arrears, an amount of GH¢55.02 million. An amount of GH¢5.44 million was also received from refunds, interests earned on bank balances and foreign exchange. Both receipts had not been factored into the budget. The Ministry therefore received a total inflow of GH¢323.35 million made up of budgeted amount of GH¢262.89 million and unbudgeted amount of GH¢60.46 million.

Performance of Key Indicators at a Glance

No	Outcome Indicator	Baseline (2008)	2012	2013	2014	2015*
1	At least 6 percent agricultural sector GDP growth	7.4	2.3	5.2	4.6	2.4
2	Value of Non-Traditional Agricultural Exports(million dollars)	187.6	276.4	306.1	340.7	396.9
3	Crop Productivity (Mt/Ha)					
	Maize	1.7	1.87	1.72	1.73	1.92
	Sorghum	1.27	1.21	1.10	1.14	1.15
	Cassava	13.51	16.75	18.30	18.59	18.78
	Yam	14.17	15.57	16.78	16.8	16.96
	Rice	2.27	2.54	2.64	2.69	2.75
	Cowpea	1.17	1.78	1.24	1.24	1.25
4	Quantity of chicken produced (Mt)	31,056	46,308	50,985	54,809	57,276
5	Quantity of meat of small ruminants and pigs produced (Mt)					
	Pig	17,002	20,224	21,432	22,932	24,513
	Sheep	15,881	18,087	18,703	19,507	20,347
	Goats	17,444	21,198	22,429	23,573	24,774
6	Quantity of cultured fish produced	6,514	27,451	32,512	38,547	44,610
7	Percentage decrease in levels of underweight and stunting in children under five years					
	Stunted (percent)	28	23	N/A	19	N/A
	Severely stunted (percent)	10	6	N/A	5	N/A
	Under weight (percent)	14	13	N/A	11	N/A
	Severely under-weight (percent)	3	2.6	N/A	2	N/A
8	Quantity of grains stored by private sector (Mt)	n/a	25,000	18,100	291,566	90,745
9	Total Area under irrigation (Ha)	27,702.50	30,345	28,304	35,902	
10	Number of existing mechanization centres	12	55	63	89	59
11	Percentage increase in incomes from crop production	N/A	52.55	32.74	12.28	13.39
12	Percentage increase in incomes from livestock	N/A	45.59	18.44	0.48	13.33
13	Percentage increase in incomes from fish culture	N/A	50.22	35.36	33.36	35.02
14	Number of new products developed from agricultural products	N/A	N/A	1-Cassava beer	1- Rice beer	N/A
15	Number of pilot value chains developed in each ecological zone	N/A	N/A	Citrus VC , Pineapple VC, Maize VC, Mango VC	N/A	N/A

No	Outcome Indicator	Baseline (2008)	2012	2013	2014	2015*
16	Number of FBOs strengthened and access services - financial services, market information etc.	N/A	2,518	1,641	5,193	4,956
	Number of fish farmers Associations developed	N/A	26	26	N/A	1
17	Percentage change in export of Non-Traditional Export crops:					
	Pineapple (Mt)	35,134	41.21	40.09	(16.12)	29.22
	Yam (Mt)	20,842	25.07	28.2	26.96	(20.97)
	Mango (Mt)	858	1.22	1.79	(28.70)	73.92
	Pawpaw (Mt)	968	426	1118	15.83	(48.71)
	Banana (Mt)	69,779	60.4	8.65	547.80	69.74
	Fish and sea food (Mt)	40,025	30.69	13.83	140.42	(48.18)
18	Number of grading and standardization systems reviewed and made functional	N/A	6	5	2	8
19	Number of policies, laws and regulations reviewed	N/A	1	N/A	2	2
20	Number of laws enacted to enhance application of technology	N/A	1	N/A	N/A	1
21	Number of Agricultural technologies developed	N/A	20	1	N/A	15

Provisional

CHAPTER ONE

1.0. Introduction

The Ministry of Food and Agriculture (MoFA) is mandated to produce periodic progress reports on achievements of the agricultural sector. The Annual Progress Report (APR) is one of such reports. This report presents the agricultural sector's contribution towards the achievement of Ghana Shared Growth and Development Agenda (GSGDA) targets and Food and Agriculture Sector Development Policy phase two (FASDEP II) objectives. Additionally, it assesses the performance of indicators contained in the METASIP Results Matrix for its five-year period. The report highlights the strengths and weaknesses of the sector, makes relevant recommendations and proposes strategies to address the weaknesses and build on the strengths of the sector.

The report is organized along the six METASIP programme areas, which are:
(1) Food Security and Emergency Preparedness;
(2) Increased Growth in Incomes;
(3) Increased Competitiveness and Enhanced Integration into Domestic and International Markets;
(4) Sustainable Management of Land and Environment;
(5) Science and Technology Applied in Food and Agriculture Development; and
(6) Improved Institutional Coordination.

1.1 Structure of the Report

The report is presented in seven chapters. Chapter one presents the introduction, including the sector's contribution to international and national targets while chapter two discusses outcomes and impacts of food security and emergency preparedness initiatives. Chapter three highlights successes chalked by way of income improvement of key stakeholders (especially small holders), while chapter four touches on initiatives geared toward ensuring commodity competitiveness in both international and domestic markets. Chapters five and six discuss efforts to ensure sustainable management of land and the environment and the application of science and technology in the agricultural sector respectively. Chapter seven looks at budget allocation and expenditure, capacity building and activities implemented to ensure effective harmonization and coordination of efforts among key players.

1.2 Global, Regional and National Targets

The report tracks the performance of global, regional and national targets. For example, the report gives an account of the achievement of the MDG target of halving poverty by 2015. A key regional target – 'Maputo Declaration' of government spending at least 10 percent of national discretionary expenditure on agriculture – has also been reported on. Attention has also been given to the achievement of selected national targets including the projected 6 percent growth rate of the agricultural sector.

1.2.1 Malnutrition and Poverty Reduction

Ghana is the first country in sub-Saharan Africa to meet the MDG 1 target of halving extreme poverty by 2015. The country has reduced the level of its poor population from 7 million in the early 1990s to less than 1 million in 2015. This singular achievement was attained in 2006 but only at the national level. Poverty still remains quite endemic in the three regions of the north (Northern, Upper East and Upper West) as compared to the south. This may be due to the specific climatic, agro-ecological and economic conditions in that part of the country. For instance, the south has two rainy seasons while the arid north has only one. In the north, climate change is contributing increasingly to the erratic rainfall leading to low productivity. The achievement of the target in these regions has remained a difficult hurdle over the period. To be able to halve poverty in these regions, it should be reduced by a range between 11.7 percentage points in the Northern Region and 41.8 percentage points in the Upper West Region.

To reduce the gap between the poverty levels in the northern and southern parts of the country government and its partners have introduced interventions. Some of these interventions include: (1) Increased resource commitment and restructuring of the Savannah Accelerated Development Authority (SADA), (2) continuation of targeted social intervention programmes, particularly the Livelihood Empowerment against Poverty (LEAP), Ghana School Feeding Programme and Capitation Grant and (3) Improved infrastructure development, particularly road networks in areas that are not well accessible among others. Consistent and targeted investment in agriculture has been shown to be the only effective means to reduce the high levels of poverty.

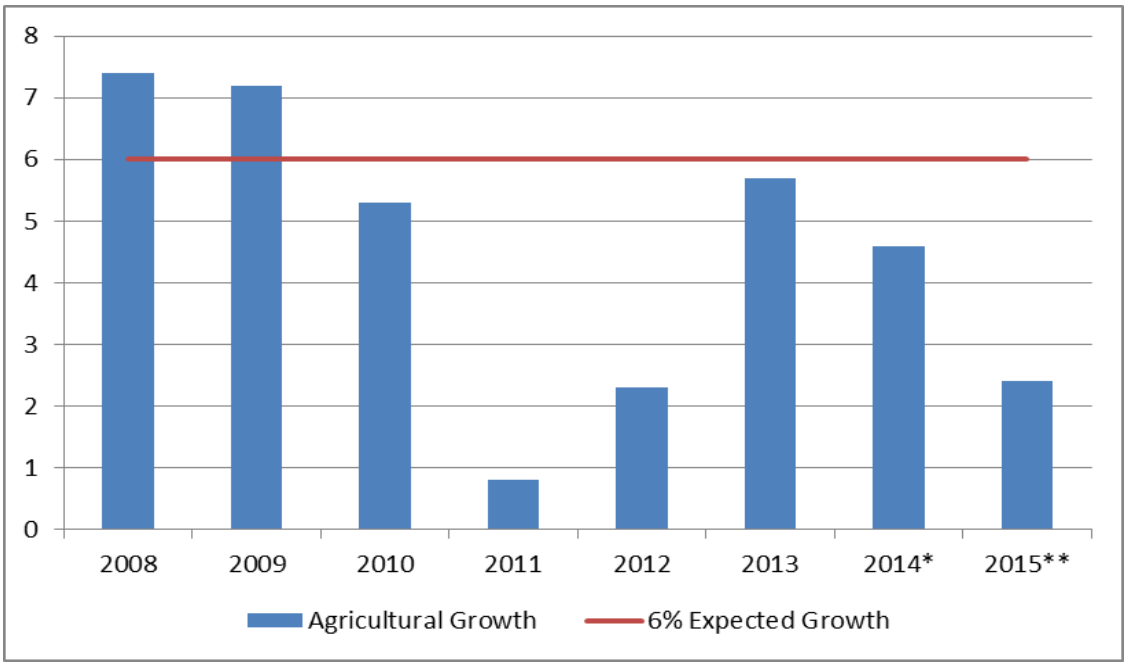
Giant strides have also been made by the country in the area of child malnutrition. There are general reductions in the indicator level from 2008 compared to 2014. According to the Ghana Demographic and Health Survey (GDHS, 2014), the percentage of stunting among children under 5 has reduced from 28 percent to 19 percent while those severely stunted reduced from 10 percent to 5 percent over the same period. Similarly, GDHS, 2014 noted that 5 percent of children are wasted and less than 1 percent are severely wasted, representing a decrease from the figures reported in 2008 (9 percent and 2 percent, respectively). There are also improvements in the percent of children who are underweight. Eleven percent of all children are underweight while 2 percent are severely underweight. This also shows a decrease from the 2008 figures of 14 percent and 3 percent respectively.

1.2.2 Achievements of Maputo Declaration Targets

Under this declaration, governments of member states are expected to allocate at least 10 percent of their discretionary budgeted expenditure to agriculture. This level of expenditure is expected to stimulate at least a 6 percent growth in the agricultural sector. Current data on government's expenditure on agricultural sector are not available. These data are normally collected and analysed through an expenditure review process. The expenditure review process was last carried out in 2011. Per the result, Ghana's agricultural expenditure averaged 10.36 percent from 2008 to 2011. This may explain the growth rates in the agricultural sector

during the period 2008 and 2009, when the country exceeded the expected 6 percent growth rate.

Ghana's average annual agricultural growth rate of about 4.6 percent is below the projected growth rate and Maputo target of 6 percent over the past 8 years (2008-2015). From Figure 1, the lowest performance was recorded in 2011 (0.8 percent). To realize the potential of agriculture in the next decade, the country must be committed to the "enhanced Maputo" agreement – Malabo Agreement.



Source: 2016 Budget Statement ****Revised*** *****Provisional***

Figure **1. 1***: Ghana's Agricultural Growth*

1.2.3 Achievement of National Targets

National targets for the agricultural sector are set by the Ministry of Food and Agriculture in conjunction with the National Development Planning Commission (NDPC) and other stakeholders including development partners. These targets are documented in the Ghana Shared Growth and Development Agenda (GSGDA I & II), Food and Agricultural Sector Development Policy (FASDEP) and Medium Term Agricultural Sector Investment Plan (METASIP). The targets in this section of the report are centred on national and agricultural Gross Domestic Product (GDP).

1.2.3.1 Performance of Gross Domestic Product (GDP)

The level and growth of GDP, economic production and growth, has a large impact on the country's economy. Provisional estimates show that, the country (GDP) grew at 4 percent in the reporting year (GSS, April, 2016). This is 2.1 percentage point lower than the growth rate in the preceding year. The services sector recorded the highest growth rate of 5.7 percent,

followed by the agricultural sector (2.4 percent), with industry recording the lowest growth rate of 1.2 percent.

Table 1. 1: GDP Growth Rates by Sector at 2006 Constant Prices (Percent)

	2008	2009	2010	2011	2012	2013	2014*	2015**
AGRICULTURE	**7.4**	**7.2**	**5.3**	**0.8**	**2.3**	**5.7**	**4.6**	**2.4**
Crops	8.6	10.2	5.0	3.7	0.8	5.9	5.7	**2.0**
o.w. Cocoa	*3.2*	*5.0*	*26.6*	*14.0*	*-9.5*	*2.6*	*4.3*	**-1.4**
Livestock	5.1	4.4	4.6	5.1	5.2	5.3	5.3	**5.3**
Forestry and Logging	-3.3	0.7	10.1	-14.0	6.8	4.6	3.8	**3.8**
Fishing	17.4	-5.7	1.5	-8.7	9.1	5.7	-5.6	**1.2**
INDUSTRY	**15.1**	**4.5**	**6.9**	**41.6**	**11.0**	**6.6**	**0.8**	**1.2**
SERVICES	**8.0**	**5.6**	**9.8**	**9.4**	**12.1**	**10.0**	**5.6**	**5.7**
GDP at basic prices	*9.1*	*4.8*	*7.9*	*14.0*	*9.3*	*7.3*	*4.0*	*3.9*
GDP in purchasers' value	*9.1*	*4.8*	*7.9*	*14.0*	*9.3*	*7.3*	*4.0*	*3.9*

Source: GSS; Revised 2015 Annual GDP, April 2016
****Revised***
***** Provisional***

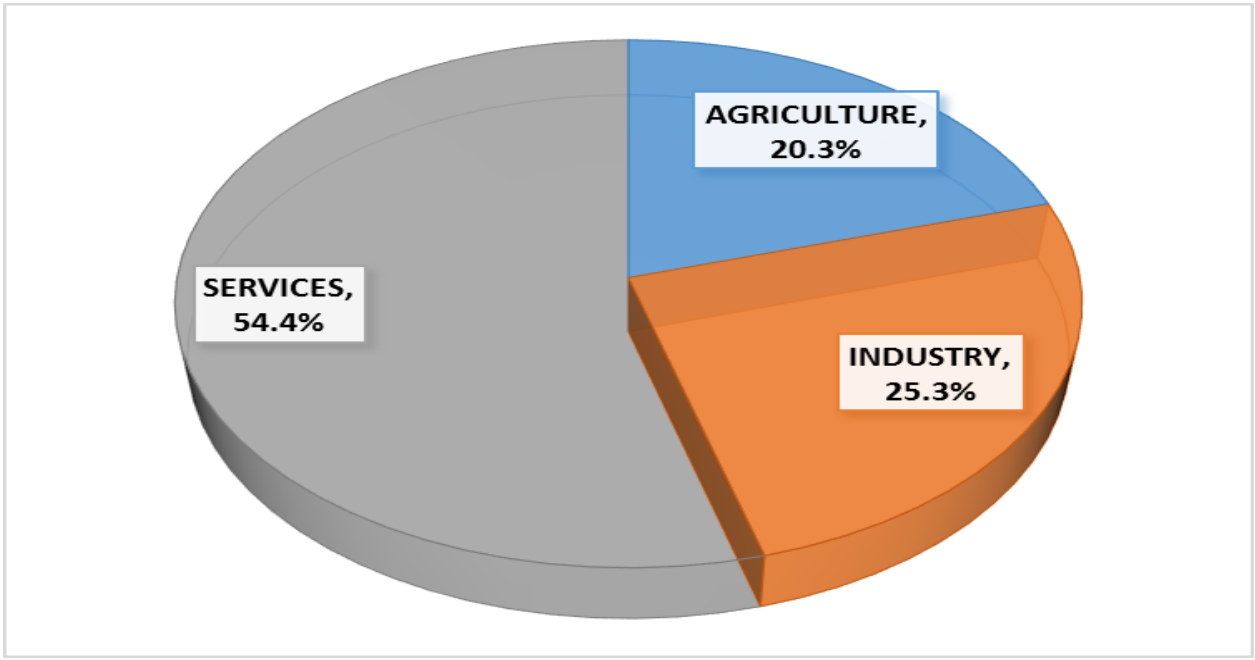


Figure **1. 2***: Distribution of GDP (at Basic Prices) by Economic Activity Percent; 2015*
Source: Drawn from data from Ghana Statistical Services, April, 2016

Figure 1.2 shows percentage shares of the three economic sectors in 2015 on the basis of GDP (at basic prices). It can be observed that the services sector still contributed the highest share

of 54.4 percent to overall GDP percent whiles the agricultural and industrial sectors contributed 20.3 percent and 25.3 percent respectively.

The growth of the agricultural sector over the years has contributed immensely to the national GDP. The contribution of the agricultural sector to GDP however has been on the decline in recent years. For example, the growth of agricultural GDP reduced from 4.6 percent in 2014 to 2.4 percent in 2015. In spite of the declining fortunes of the sector, the crops sub-sector still remain as the single largest activity in the economy with a share of 15.7 percent of GDP.

A declining share of agriculture in national employment and GDP is an inevitable consequence of economic progress (Byerlee, de Janvry and Sadoulet, 2009; Timmer, 1988; Cervantes and Brooks, 2009). This is largely due to higher income elasticities of demand for non-agricultural goods and services. As people's incomes grow, consumers increase their consumption of manufactured goods and services faster than their consumption of food. Paradoxically, the process is usually accompanied by rising incomes and a lower incidence of poverty among those who depend on agriculture for a living.

CHAPTER TWO

2.0. Food Security and Emergency Preparedness

The World Food Summit of 1996 defined food security as the situation that exists "when all people at all times have access to sufficient, safe, nutritious food to maintain a healthy and active life." Generally, the concept of food security includes both physical and economic access to food that meets people's dietary needs as well as their food preferences. Food security is built on three pillars:

- Food availability: sufficient quantities of food available on a consistent basis.
- Food access: having sufficient resources to obtain appropriate foods for a nutritious diet.
- Food use: appropriate use based on knowledge of basic nutrition and care, as well as adequate water and sanitation.

This chapter discusses the food security status of the country; challenges faced and also propose some key recommendations for consideration.

2.1 Rainfall and its Effect on Agriculture

Ghana's agriculture is still largely rain fed. Adequate volume and reasonable distribution of rainfall is therefore a key determinant of a successful season. The national average rainfall shows a declining trend from 2008 (1,276mm) to 2015 (937mm).

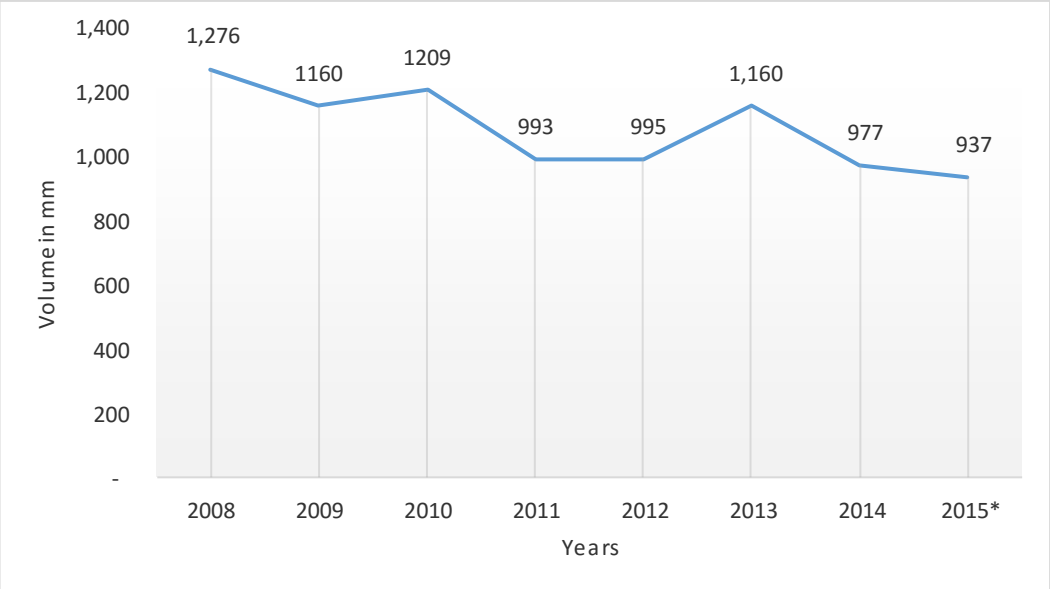


Figure **2.1***: National Average Rainfall (mm) 2008-2015 (* Jan to Nov)*
Source: SRID, MoFA.

The poor distribution and continuous decline in volumes of rainfall, (Figure 2.1) affected agronomic practices and yields of crops. Rainfall data across the country in 2015 indicated a decline in most of the regions as compared to 2014. Upper West, Upper East and Greater Accra Regions recorded positive percentage changes (73.73, 28.93 and 3.57) for the year 2014

against 2015 rainfall volumes. However the seven other regions recorded significant decline, the worst of which occurred in the Central Region (-40.17 percent). The average number of rain days, a good indicator for rainfall distribution, has also reduced from 73 in 2014 to 62 in 2015. This means that efforts must be tailored towards increasing irrigated agriculture to avert any adverse effect on agricultural production.

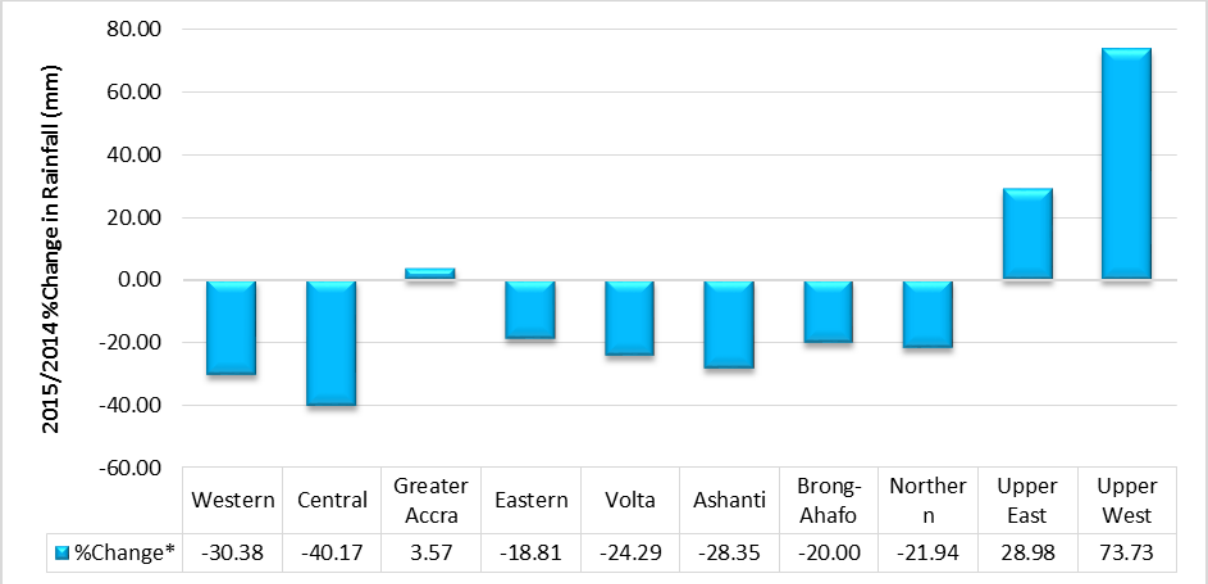


Figure **2. 2***: Percentage Change in Regional Rainfall Volumes, 2014/2015 *Jan-Nov*

Source: SRID, MoFA Ghana.

2.1.1 Summary of Regional Weather Situation

The performance of rainfall in terms of volume and distribution has been mixed across the country. The beginning of the year (2015) was characterized by dryness and sunny conditions leading to reduced vegetative cover compared to the same period, the previous year. This condition however gave way to some heavy rains resulting in floods in some instances. The months of May and June especially in the northern part of the country recorded very low rainfall which was not sufficient for agricultural activities. Dry spells with sporadic rains were common conditions across the country, especially in the second quarter. This resulted in the drying of small streams and reduction in volumes of big rivers. The combined effect of the phenomenon resulted in poor agricultural performance especially during the minor season in the southern part of the country. Details by region, is contained in Appendix 1, key indicators of rainfall distribution.

2.2 Impact of Climate Change on Agriculture

Climate change poses risk of potential hazards and disasters. It is a global phenomenon that requires international, national, and local level efforts towards addressing the issue. A holistic approach including: (1) more specific, adaptation practices that are consistent with the future; and (2) a practical adaptation planning process to guide selection and integration of recommendations into existing policies and programs.

In recent times the impact of climate change on agriculture has intensified in Ghana. One significant impact of climate change is observed in the rapidly changing rainfall regime. Droughts and floods are now common challenges that farmers face. Agricultural lands are becoming poorer by the season due to loss of vegetative cover. The net effect is that, general productivity has stagnated over the years leading to low incomes and food insecurity. It is against this background that the Ministry implements strategies and interventions to build resilience of farmers to adequately adapt their production systems to the phenomenon. To this end, a road map for mainstreaming climate change into implementation of national activities has been developed.

Sensitization workshops being organized by the Ministry are on preventive measures which often form part of longer-term programmes to promote resilience and sustainability. Some of these agriculture-specific prevention and mitigation measures include:
Crop and livestock diversification;
Soil and water conservation including zero tillage and grazing;
Plant breeding for short cycle crops that are resistant to drought; and intensification of pest and disease control measures. The rest are improved coastal fishing practices; afforestation; forest management; and improved food storage and preservation.

*2.*3Early *Warning Systems and Emergency Preparedness*

An Early Warning System (EWS) is a set of capacities needed to generate and disseminate timely and meaningful warning information of the possible extreme events or disasters (e.g. pests and disease outbreaks, floods, drought, fire and earth tremors) that threaten lives. The purpose of this information is to enable individuals, communities and organizations prepare and act appropriately in real time to reduce the possibility of harm, loss or risk.

Accurate, reliable and timely early warning system enhances climate change adaptation efforts at all levels by enabling communities and institutions to make informed and timely decisions. The 2015 floods in parts of the country highlighted the importance of reducing risks and improving early warning systems. Key actions that were implemented to reduce the impact of disasters on farm families have been discussed in this section.

2.3.1 Preventive and Mitigation Initiatives

During the year 2015, Ghana's neighbours, (Nigeria, Niger, Burkina and Ivory Coast) reported outbreaks of HPAI (H5N1). As part of the ECOWAS Transhumance protocols, free movement of animals across borders is allowed. This protocol, though, based on good intentions, has the probability of spreading infectious diseases. To prevent the spread of some of these contagious diseases to the country, the Ministry intensified disease surveillance and sensitization activities for three epidemiological zones and borders in the country. As part of the preventive measures, markets in six districts in the Upper West, five districts in Upper East, three in the Northern and ten in the Volta Regions were sensitized on these diseases. This was done to ensure a swift control of the disease resurgence in the country.

The Ministry also monitored and controlled other endemic diseases like the Newcastle Disease. The current strategy for control of the disease is by preventive vaccination using NDI_2 vaccines. The NDI_2 is preferred due to the numerous advantages it has over the conventional injectable vaccines. It is thermo stable, farmer friendly, locally produced and affordable to most poultry farmers. With assistance from the West Africa Agricultural Productivity Program, the Accra Veterinary Laboratory produced a total of fifty four million doses of NDI_2 vaccine in 2015.

2.3.1.1 Emergency Preparedness and Disaster Management

Ability to predict disasters and implement appropriate actions reduces the total effect of the disaster on humans. With the current climate variability, agriculture has become more vulnerable to disasters. Devastating bush fires, army worms, drought and flood are some of the disasters recorded within the year. The Ministry in collaboration with the National Disaster Management Organization (NADMO) valued damages caused and in some instances, provided relief aid to support the victims. .

In the year under review, there were very devastating bush fire outbreaks across the country. The long drought period caused bush fires in some parts of the country. In the Ashanti Region the incidences, were estimated by NADMO to have affected 276 people with 1 death; destroying properties worth GH¢5,566,850.00.

There were also reports of army worm incidences in the Ashanti and Brong Ahafo Regions affecting mainly maize farms in and around Mampong Municipality and Nkoranza among others. The estimated area damaged was about two thousand hectares (2,000ha). The result was that, the productivity of maize reduced in 2015 compared to 2014 affecting total production. The productivity of maize in the year 2015 was 2.3 percent lower than 2014. The destruction of the 2,000 hectares of the crop has undoubtedly contributed to the reduction of yield and total volume produced in the year.

2.3.1.2 Establishment of Strategic Stocks

The National Food and Buffer Stock Company (NAFCO) has the mandate to hold strategic food stock for Ghana. Though the company faced several limitations, it was still able to operate quite effectively during the period. Purchases of maize, rice, and seldom sorghum and millet were made and released unto the market during periods of scarcity. From 2011 to 2014, the company released at least 57,754 mt of rice and maize to the market through various institutions, Table 2.2. Forty-eight percent of this total was rice (48 percent -rice, 29 percent – white maize) with the rest (23 percent) being yellow maize.

Further analysis of the data showed that, for rice, up to 95 percent was released for utilization by Ghana School Feeding Programme (GSFP) whiles the remaining 5 percent was used by NADMO for disaster relief services. For white maize, 69 percent was released to selected poultry farmers in the middle zone of the country, 31 percent to NADMO and 1 percent for flood victims in the Eastern Region in the year 2011.

Table 2. 1: Sales by NAFCO (Metric tonne): 2011 – 2015

Period	Rice (Milled)	White Maize	Yellow Maize
2011	**700**	**5,100**	**n/a**
2012	**13,886**	**n/a**	**7,354**
2013	**6,926**	**50**	**4,813**
2014	**6,228**	**11,364**	**1,333**
Sub- total	***27,740***	***16,514***	***13,500***
2015*	**n/a**	**10,000**	**5,000**
Total	**27,740**	**26,514**	**18,500**

Source: NAFCO
****Imports***

Due to relatively higher prices of cereals in the local markets in 2015, NAFCO could not make enough purchases locally. The company rather imported a total 15,000 metric tonnes of maize, 67 percent of which was white maize. Though this quantity was not large enough, it was able to keep local prices at acceptable levels over the period. The guarantee price set by NAFCO needs to be reviewed upwards to make it more attractive to farmers.

2.3.1.3 Strengthening of Early Warning Systems

Every year, disasters caused by climate extremities such as severe storms, floods, heat waves and droughts lead to significant losses of life and socioeconomic activities. These disasters can significantly compromise development and growth, particularly in countries with the least capacity to respond.

It is expected that as climate change unfolds, the frequency and intensity of climate related shocks will change, therefore improving Early Warning Systems (EWSs) is one way to respond to the changing climate. As an adaptive measure, EWS also benefit the poorer segments of society. Implementation of successful EWSs requires collaboration at all levels. The Ghana Meteorological Agency (GMA) is one of such collaborators. The Agency forecasts and publishes weather conditions in the electronic media. This allows farmers and fishers to adequately prepare and carry out their activities in good time for maximum productivity.

The publications of monthly bulletins on prices of agricultural commodities by SRID and Esoko is another means of informing the public ahead of any eventuality. In addition, SRID published at least three food situation reports in the year, the last of which predicted an eminent maize shortage. This elicited high level discussion which resulted in importation of some quantities of maize to augment local production.

2.3.2 Scheduled Disease Outbreaks

Diseases have the potential to adversely affect both the farmer and the consumer by reducing the quantity and quality of agricultural products. The Ministry monitored twenty eight (28) scheduled diseases in the year 2015. The most prominent scheduled disease outbreaks in both

2014 and 2015 that affected and killed most farm animals were African Swine Fever (ASF), Newcastle Disease (NCD), Gumboro and Avian Influenza. In 2015, the country lost a total of GH¢ 3.4million as a result of the death of affected farm animals to these diseases compared to GH¢ 1.7million in 2014.

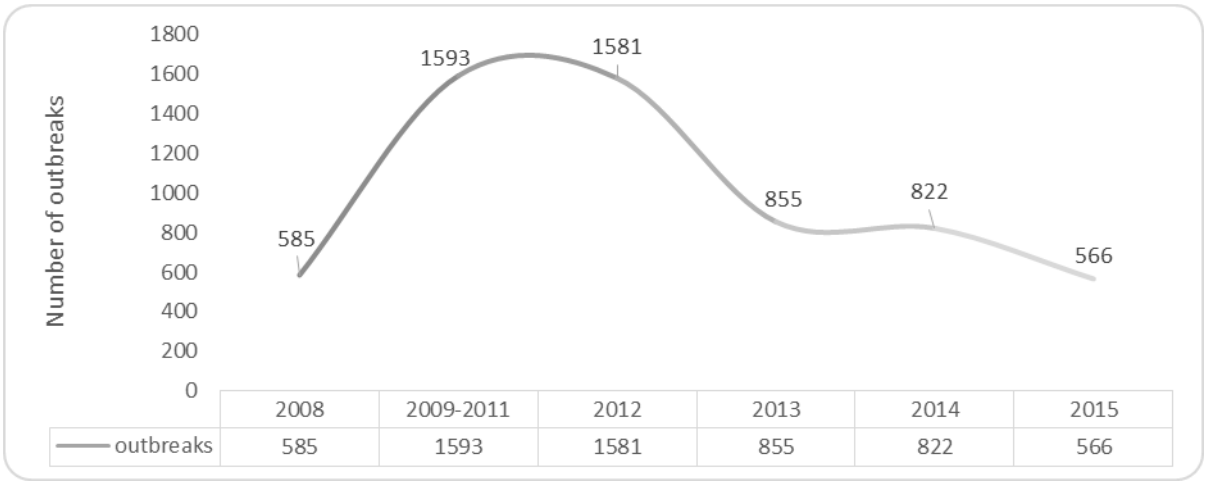


Figure **2. 3***: Trend of Schedule Disease Outbreaks*
Source: V SD, (2008-2015)

Prominent among the scheduled diseases in the year 2015, was Avian Influenza *(HPAI-H5N1)*. The disease is mostly transmitted by direct contact with the faecal droppings or respiratory secretions of infected birds. During the year, a total of 75,010 birds from 36 farms in 5 regions were affected and subsequently destroyed as part of measures to control the spread of the disease.

As part of government effort to save the poultry industry from collapsing, 25 poultry farmers from the Volta, Ashanti and Western Regions out of the total of 36 that were affected were compensated with an amount of GH¢1,067,849.00 during the period whilst an amount of GH¢843,933.00 was being processed to compensate the remaining 11 affected farmers in the Greater Accra and Central Regions.

Table* 2. 2: *Avian Influenza (HPAI-H5N1) Outbreaks by Region, 2015

Region	Number of Outbreaks	Number of Farms	Population of Birds in the Farm	Number of Birds Destroyed	Natural Deaths (Poultry Birds)
		A	B	C	D=(B-C)
Greater Accra	**24**	**30**	**91,773**	**68,242**	**23,531**
Volta	**2**	**2**	**3,400**	**950**	**2,450**
Ashanti	**1**	**1**	**1,948**	**1,883**	**65**
Western	**3**	**2**	**5,131**	**3,459**	**1,672**
Eastern	**2**	**1**	**510**	**476**	**34**
Total	**32**	**36**	**102,762**	**75,010**	**27,752**

Source: VSD, 2015

Based on the lessons learnt from existing outbreaks, the following specific measures were put in place to minimise the chances of future occurrences:

- Enhancement of best practices of bio-security measures on farms
- Streamlining the issuance of movement permits on poultry and poultry products
- Intensification of surveillance activities on all diseases including bird flu
- Engagement of all stakeholders on identification and reporting

2.4 Domestic Food Supply and Demand

A food balance sheet presents a comprehensive picture of the pattern of the country's demand and supply of food during a specified reference period. Supply of selected key staple food crops, (Appendix 2) exceeded total expected demand. All the starchy staples and legumes recorded surpluses on the food balance sheet. On the other hand, there were deficits for cereals except for sorghum. Rice recorded a deficit of about 41,000 metric tonnes during the year 2015, whiles maize recorded a significant 63,000 metric tonnes deficit compared to a surplus of 61,000 metric tonnes in 2014.

2.4.1 Production of Crop

Production figures for rice, cassava and yam showed upward trends from the years 2008 to 2015 whiles, maize, sorghum and soybean oscillated over the same period (Table 2.3). The upward trends of rice, cassava and yam are attributable to efforts made by the government and its partners in increasing yield and area under cultivation by smallholder and commercial farmers. Increase in yields resulted from the adoption of improved technologies such as high yielding, disease resistant and drought tolerant varieties of planting materials, and improved harvesting techniques.

Major programmes such as the Block Farm, and the Fertilizer and Seed Subsidy brought technology to the door step of small and commercial farmers, resulting in increased production levels. The Northern Rural Growth Programme (NRGP) supported maize and rice farmers in northern Ghana to expand area cultivated and increased yield through technology dissemination and provision of credit to farmers. The Rice Sector Support Project (RSSP) supported rice farmers in northern Ghana and the Volta Region to increase rice production by developing irrigation schemes. The West Africa Agricultural Productivity Programme (WAAPP) supported root and tuber farmers with improved planting materials, fertilizer and money for other services such as ploughing, weeding etc. These increased production levels of cassava, yam and sweet potato.

Table* 2. 3 *: Production Trends of Major Staples ('000mt)

Crop	2008	2009	2010	2011	2012	2013	2014	2015
Maize	1,470.10	1,619.60	1,871.70	1,684.00	1,949.90	1,764.50	1,768.54	1,691.64
Rice	301.9	391.4	491.6	464	481.1	569.5	604.04	641.49
Cassava	11,351.10	12,230.60	13,504.10	14,240.90	14,547.30	15,989.90	16,523.66	17,212.70
Yam	4,894.90	5,777.90	5,860.50	5,855.10	6,638.90	7,074.60	7,118.89	7,296.15
Sorghum	331	350.6	353	287.1	280	256.7	259	264.04
Soybeans	74.8	112.8	144.9	164.5	151.7	138.7	141.47	142.36

Source: GAPS/MRACL Survey, SRID/MoFA

2.4.2 Production of Livestock

In the absence of a comprehensive livestock survey for the past 30 years, data on livestock population has been based on estimation. Table 2.4 illustrates the trend from 2008 – 2015. Over the years, there have been intensive interventions by the ministry to promote the development of the livestock sub-sector. Some of these are; training of livestock farmers on improved husbandry practices (nutrition, improved housing, and breeding), supply of improved breeds to farmers (credit in kind pig and small ruminant project), and the guinea fowl project. In addition to the above, the Ministry also stepped up general vaccinations, surveillance and treatment of livestock species.

Table* 2. 4*: Livestock Production ('000)

Year	Cattle	Sheep	Goats	Pigs	Poultry
2008	1,422	3,529	4,405	506	39,816
Av.(2009-2011)	1,463	3,763	4,872	542	47,882
2012	1,543	4,019	5,435	602	57,885
2013	1,590	4,156	5,751	638	63,732
2014	1,657	4,335	6,044	682	68,511
2015	1,727	4,522	6,352	716	71,594

Source: SRID, 2015

2.4.3 Production of Fish

The demand for fish in Ghanaian diet is substantial, estimated to be contributing about 60 percent of national dietary animal protein supply. Policies and guidelines aimed at increasing production through empowering local industry actors have been put in place. Some of these policies and guidelines are; the National Fisheries and Aquaculture Development Policy (2008), National Aquaculture Development Plan (2010), Marine Fisheries Management Plan (2015), National Aquaculture Code of Practice and Guidelines, Certification for Hatchery Operators, fingerling Export Permit, fish feed export and import permits.

2.4.3.1 Production of Cultured Fish

Aquaculture production has been on the rise since 2008. Figure 2.4 shows levels of fish output from aquaculture production. The targeted aquaculture-fish production was 15,000MT by 2015, the ending year for the METASIP. However, actual production out stripped the target by 197.4 percent (44,610MT).

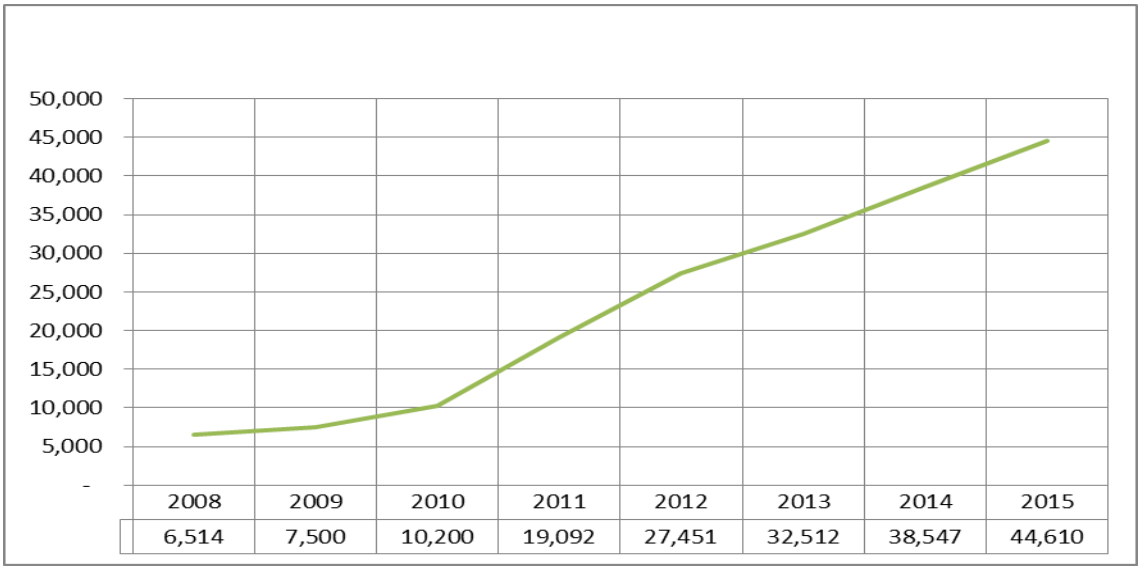


Figure **2. 4: *Productions of Cultured Fish, MT (2008 -2015)***

2.4.3.2 Captured Fisheries (Marine and In-Land)

Changes in the marine environmental parameters (temperature, salinity, oxygen, nutrients, turbidity and plankton) seriously affect fish production, especially the pelagic. In the absence of a research vessel only temperature and salinity were monitored during the period. It has been observed that, the round sardinella-*Sardinella aurita* does well when temperatures are below 26^{0}C and for tunas around 22^{0}C. Table 2.5 depicts variations in marine temperature and salinity. Temperature and salinity conditions are varied, showing an average of 26.6^{o}C and 35.3‰, respectively in 2015.

Table 2.* 5*: Average Temperature, Salinity and Upwelling index

Year	Sea Surface Temperature (^{o}C)	Salinity ($^o/_{oo}$)	Upwelling Index
2008	26.7	34.5	24.4
2009	26.7	35.1	17.1
2010	26.5	34.4	14.0
2011	26.1	33.8	20.1
2012	26.1	33.3	24.2
2013	26.2	33.2	23.1
2014	26.3	34.8	17.8
2015*	26.6	35.3	17.9

Source: MoFAD **** Provisional***

Total marine fish production has been decreasing from year 2008 to 2015. It has declined from 343,877 MT in 2008 to 312,534 Mt in 2015. The average temperature of 26.2° C (2011-2015) and the average upwelling value of 20.6 coupled with high average salinity of 34.1 within the same period should have favoured fish production. However, this was not realized due to illegal fishing activities leading to depleted stocks of some marine fish species especially the demersal (bumper, long-finned herring, sea breams, red mullets, cuttlefish,

threadfins, etc.) as shown in Table 2.6. One of the strategies being implemented to increase marine catch is direct support for the acquisition of fishing inputs. During the year, a total of 320 outboard motors were procured and distributed at subsidized prices to the fishers. These are expected to increase the efficiency of the fishers and hence improve total fish production in the coming years.

Table* 2.6: *Marine Fish Production by Sub-sectors, MT

Fleet	2008	Average: 2009-2010	Average: 2011-2015	2015
Artisanal	255,439	214,878	213,297	223,774
Semi Industrial	6,140	10,936	9,388	6,679
Industrial	18,298	19,847	19,610	19,560
Tuna	64,000	72,173	73,461	62,521
Total	343,877	317,833	315,756	312,534

Source: MoFAD

The inland fisheries comprise inland capture, cultured (aquaculture) and culture based fisheries. The Volta Lake, lagoons, reservoirs, irrigation dams and dugouts as well as other inland water bodies are the main sources of inland capture fisheries production. The Volta Lake contributes about 90 percent of the total inland fisheries production and forms the backbone of the entire inland capture fisheries.

Figure 2.5 shows a fluctuation in inland fish production from 2008 to 2015. In 2008 inland fish production stood at 72,590MT, whiles the average productions for 2009-2010 and 2011-2015 were 77,013MT and 89,749MT respectively.

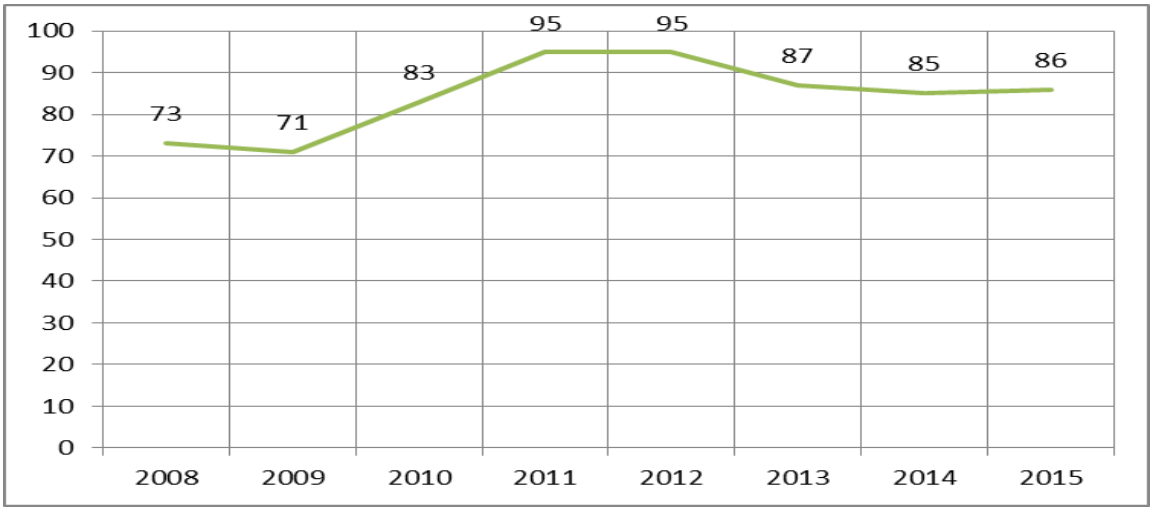


Figure **2. 5** *Inland Fish Production, '000MT*
Source: MoFAD

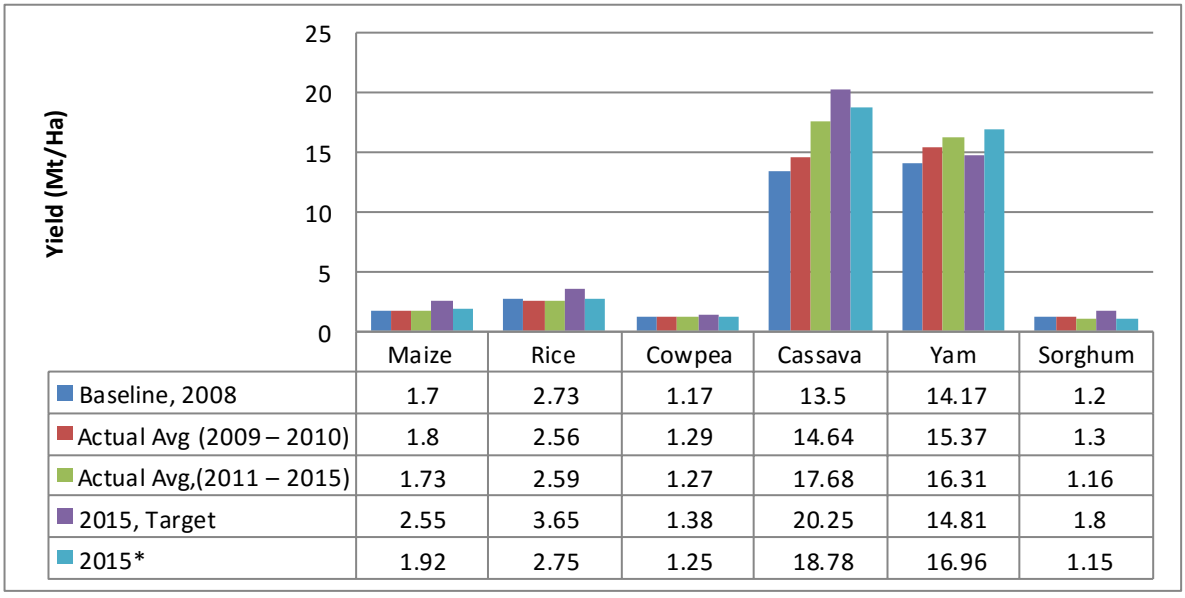
2.5 Productivity Improvement

Attainment of the objective of ensuring food security and emergency preparedness depends on a number of factors, one of which is improvement in productivity. This was achieved by the Ministry through the development and implementation of interventions such as dissemination of improved technologies in the control of pests and diseases, facilitation of the establishment of mechanisation centres, fertilizer and seed subsidy programme among others.

2.5.1 Productivity in Major Staple Crops

Crop productivity has witnessed a general increase over the METASIP period. The increase is attributed to adoption of improved technological packages disseminated to farmers and implementation of various project and programme interventions by MoFA, NGOs, Development Partners and other institutions. Some of the interventions included the Block Farm Programme which made improved seeds, fertilizer, agrochemicals and ploughing services available to farmers on credit basis. Under this programme beneficiaries were expected to pay back in kind or cash. This resulted in substantial increase in the productivity of rice, maize and vegetables contributing immensely to household and national food security.

Even though the productivity of cereals and legumes consistently increased from the base year (2008) to 2015, it could not meet the METASIP target of 2.55mt/ha, 3.65mt/ha, 1.38mt/ha and 1.8mt/ha for maize, rice, cowpea and sorghum respectively as shown in Figure 2.6. The inability of these commodities to meet the yield targets in the METASIP document is mainly attributed to longer dry spells resulting from climate change. Another reason is the inability of smallholder farmers to wholly adopt improved technologies. Farmers who received support through projects to enable them adopt technologies such as use of improved varieties, land preparation services and fertilizer use, witnessed an increase in their productivity.



	Maize	Rice	Cowpea	Cassava	Yam	Sorghum
Baseline, 2008	1.7	2.73	1.17	13.5	14.17	1.2
Actual Avg (2009 – 2010)	1.8	2.56	1.29	14.64	15.37	1.3
Actual Avg,(2011 – 2015)	1.73	2.59	1.27	17.68	16.31	1.16
2015, Target	2.55	3.65	1.38	20.25	14.81	1.8
2015*	1.92	2.75	1.25	18.78	16.96	1.15

Figure **2. 6***: Yield of Major Staple Crops*
Source: SRID, MoFA **** Provisional***

The root and tubers performed better in terms of yield compared to the grains and legumes. The improvement in yields of cassava and yam are attributable to adoption of high- yielding and drought- tolerant varieties introduced by WAAPP and the Root and Tuber Improvement and Marketing Programme (RTIMP). There are several beneficiaries of this programme. The success story of Mr Kpesese is shown in the text box.

In the Greater Accra Region, cassava farmers have completely switched from planting of the local variety to improved varieties such as Otuhia, bankye hemaa, sika bankye which are high yielding, disease- resistant and drought-tolerant. Mr. Kpesese, a farmer in Adentan Municipality, who completely switched to Otuhia variety, witnessed a hundred percent increase in his production. According to him, harvesting about 10 stands of Otuohia variety could feel a 100kg sack compared to about 20 stands of the local variety he used to cultivate.

With proceeds from his cassava farm, he has been able to set up a gari processing unit and a piggery which serve as alternative sources of income for the household. He feeds his pigs with the cassava leaves, peels and uses the lower part of the stems as firewood for processing his gari. He indicated that every part of the cassava plant is useful in generating income. His financial status has improved significantly and he is able to pay his children's school fees with ease.

Box 1*: RTIMP Beneficiary's (Mr Kpesese) Success Story*

Fertilizer usage is another factor that affects productivity. It is therefore necessary to apply fertilizers appropriately and in adequate amounts to counteract the loss of nutrients in depleted soils, increase crop yields/productivity, ensure integrated soil fertility management and contribute to the achievement of the Abuja Declaration (2006) by increasing fertilizer use from the current 8-10kg/ha to 50kg/ha on the African continent.

Anecdotal evidence suggests that, fertilizer usage in Ghana increased with the implementation of the fertilizer subsidy programme in 2008. Fertiliser import over the 5year period (2011-2015) is adopted as a proxy to determine the usage per hectare. Figure 2.7 indicates that the highest usage per unit area was obtained in 2012 where farmers on the average used 210kg/ha. This was as a result of the fertilizer subsidy and the Block Farms Programme leading to increased crop yields.

The lowest usage per unit area was observed in 2014 when the Government could not implement the fertilizer subsidy programme. The usage reduced drastically to 60kg/ha. This was because the open market price of fertilizers increased beyond the reach of many ordinary farmers. Reasons accounting for this high open market prices include domestic cost of transporting fertilizers from the port to the farm gate.

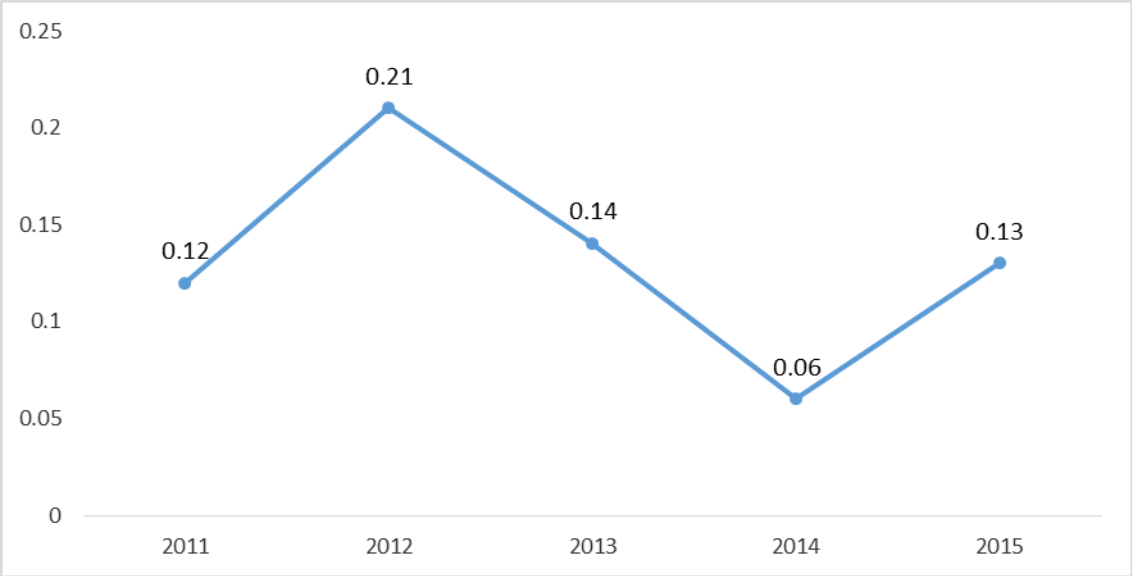


Figure **2.7** *Fertilizer Import (Mt/Ha)*
Source: MoFA – PPRSD, DCS (2015)

2.5.2 Productivity in Livestock

The Ministry recognized that increasing the productivity of small scale livestock farmers will ultimately improve production and hence, food security. Efforts towards productivity improvement were directed at increasing the production of various livestock species (cattle, sheep, goat, pig and poultry). In that regard, the Ministry through its national livestock breeding stations produced a total of 1,077 livestock of various species. In 2015, the number of livestock supplied to farmers increased by 25.1 percent compared to 2014 as shown in Table 2.7.

Table* 2. 7*: Improved Breed of Animals Supplied to Farmers

Livestock	Births				Percent Achieved		No. of Breeding Stock Supplied	
	2014		2015					
	Target	Actual	Target	Actual	2014	2015	2014	2015
Pigs(LW)	**350**	**305**	**383**	**287**	**87**	**75**	**202**	**262**
Sheep	**250**	**171**	**588**	**268**	**68**	**46**	**347**	**565**
Goats	**200**	**146**	**224**	**161**	**73**	**72**	**118**	**105**
Cattle	**60**	**41**	**133**	**68**	**68**	**51**	**115**	**100**
Rabbits	**230**	**115**	**204**	**151**	**50**	**74**	**67**	**35**
Pigs(ABP)	**150**	**83**	**254**	**142**	**55**	**56**	**110**	**133**
Total	**1240**	**861**	**1786**	**1077**	**67**	**62**	**959**	**1200**

Source: APD, 2015

Another vehicle being used by the Ministry to increase production in the livestock sub-sector is the credit-in-kind project. The credit in-kind small ruminant project is an intervention introduced by the government to make improved breeds of livestock accessible to farmers to enhance productivity and income as well as to create employment. To make the project

sustainable, 2,224 animals were passed on to 223 farmers in 7 regions in 2015. Recoveries of progenies from the project stood at 60 percent as at December, 2015.

2.5.3 Productivity in Fisheries

Pond and cage production of fish indicates different levels of productivity. The highest pond productivity was 3.65 mt/ha in 2013 whilst highest cage productivity level was 0.26 mt/m^3 in 2014. In 2014, cage productivity increased while pond productivity decreased. Figure 2.8 shows trends in marine sector fish catch in metric tonnes from 2008 to 2015. Fish production averaged 325,000 metric tonnes from 2008 to 2015. There are observations that fishing effort (number of fishing vessels) is increasing annually but there are no corresponding increases in catches. Catch per unit of effort has consequently decreased and hence reducing income levels. This is as a result of over-exploitation of the fisheries resource through the use sometime of un-approved and illegal fishing methods. This is leading to overcapitalization of the industry and hence diminishing returns eroding economic gains from fishing.

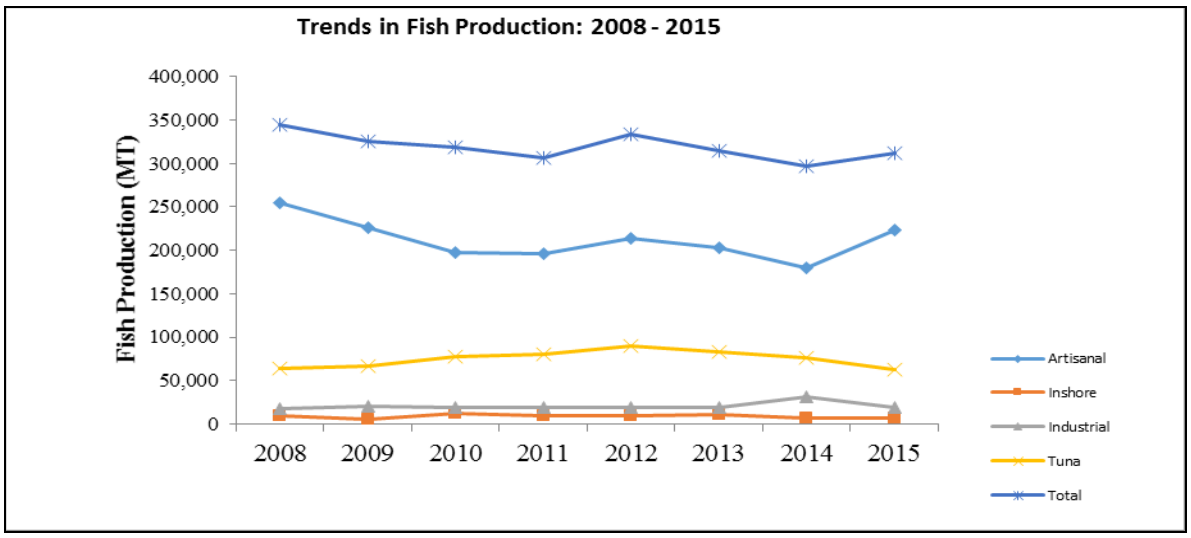


Figure **2. 8***: Trends in Fish Production*
Source: MoFAD

Improved productivity and production hinges partly on fingerlings' quality. To meet the quality and quantity demand for fingerlings, the Ministry of Fisheries and Aquaculture Development (MoFAD) in 2013 collaborated with the Water Research Institute (WRI) to put in place a training programme for farmers who wanted to go into fingerling production, especially for their farms. In addition, MoFAD trained both staff and fish farmers in hatchery management and this has resulted in increased fingerling production. Figure 2.9 shows that, generally fingerling production has been increasing since 2010 and is expected to lead to increased production of cultured fish.

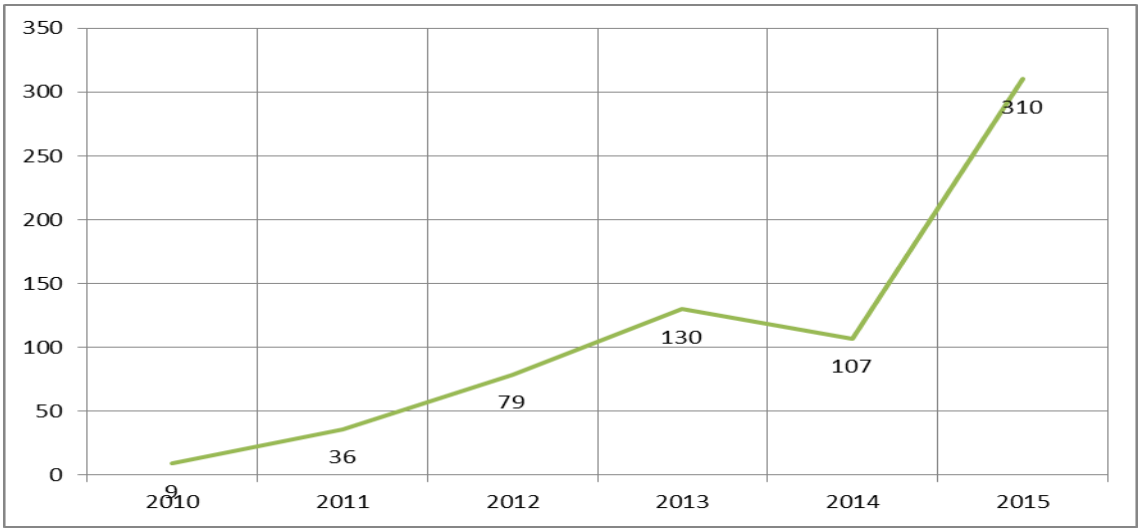


Figure **2.9:** *Trend in Fingerling Production, Million MT*
Source: MoFAD

2.6 Import of Crops, Meat and Fish

Importation of crops, fish and meat products are made to generally supplement local production especially when local demand exceeds local production. Import of staple foods support the food security and emergency preparedness efforts of governments. Though large volumes of imports are made from year to year, efforts are being made to increase domestic production through the effective implementation of policies, projects and programmes.

2.6.1 Food Crop Production and Import

Ghana imports several food commodities to augment domestic production. These include tomatoes, onions, rice and some maize. Available data show that Ghana has been food sufficient in maize except for 2015. The deficit in local production of rice has caught the attention of government over the years. The high domestic demand is largely due to a shift in consumer tastes and preference, thus resulting in the import of large volumes of rice. Government is determined to close this gap and therefore has developed and is implementing policies, projects and programmes to achieve this.

2.6.1.1 Domestic Production and Import of Rice

The total quantity of rice available for consumption in the year 2015 was 970,058 metric tonnes of which 46 percent was locally produced. The proportion of local production available for national consumption in 2015 reduced by 9 percentage points compared to 2014 (55percent).

Table* 2. 8*: Rice Production and Import (metric tonnes)

Item	2009	2010	2011	2012	2013	2014	2015*
Transit (@15% Import)	57,598	48,023	81,520	76,288	96,650	62,041	93,010
Total Imports	383,985	320,152	543,465	508,587	644,334	413,609	620,069
Imports Available (Total less Transit)	326,187	272,129	461,945	432,299	547,684	351,568	527,058
Domestic Milled Rice (@69% Extraction Rate)	270,094	339,206	320,142	331,898	392,972	422,829	443,000
Total Rice Available (Mt)	596,481	611,335	782,087	764,197	940,656	774,397	970,058
Share to Total Supply by Source							
	2009	2010	2011	2012	2013	2014	2015*
Domestic Rice	45%	55%	41%	43%	42%	55%	46%
Imports	55%	45%	59%	57%	58%	45%	54%

Provisional

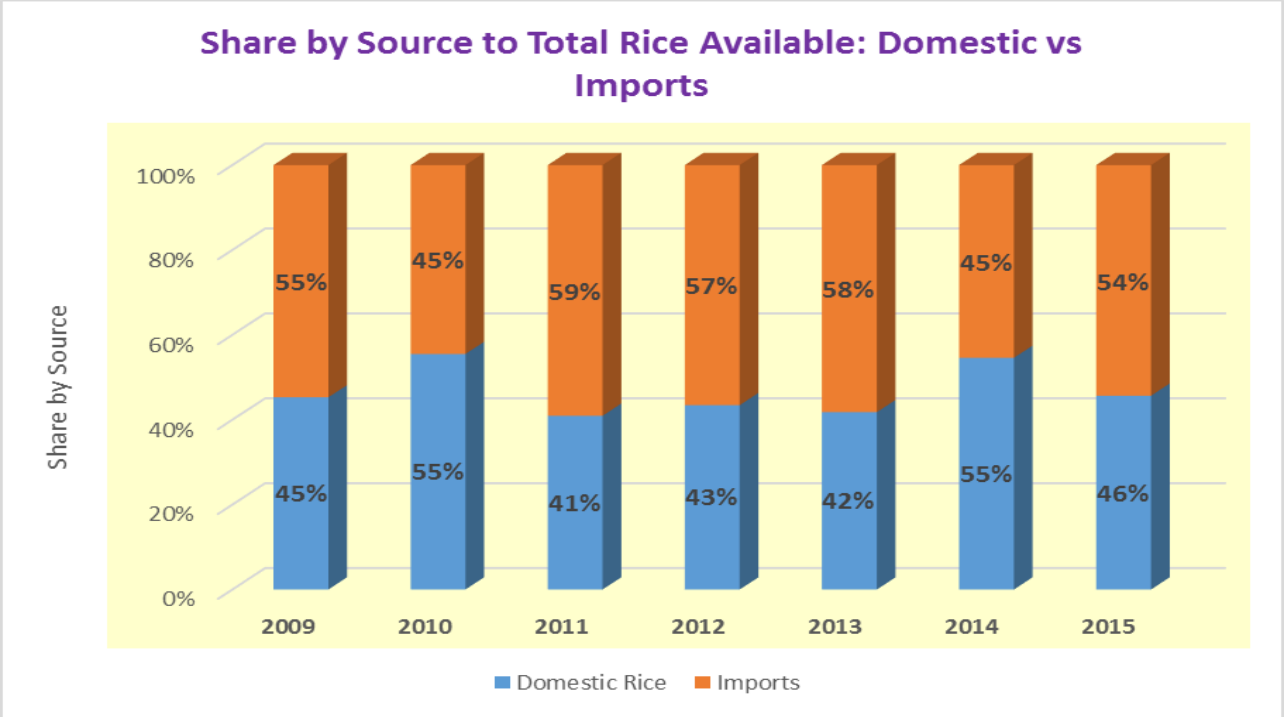


Figure **2.10***: Domestic production against Import of Rice 2009-2015*
**Provisional*

Averagely, from 2009 to 2015, 47percent of total rice available on the market originated from domestic source. Though production of the commodity has been increasing steadily, the rate of growth in total supply (Imports + domestic production) – *proxy for demand* - is slightly ahead that of production (based on average for 2009 to 2015). As domestic production grew averagely by about 9.1percent per annum, the average annual growth rate of demand computed to 9.8 percent. For domestic production to outpace growth in demand, more productive and farmer friendly interventions need to be put in place.

2.6.2 Domestic Supply and Import of Meat

Trade liberalization has had varying effects on meat/ poultry markets in the West Africa sub-region, with some countries experiencing large import flows of frozen meat/poultry from the European Union and others. Ghana is among the net importers of frozen meat and other livestock products. The EU is the major exporter of these products to the country. Import of meat and other livestock products is regulated by the Veterinary Services Directorate through the issuance of import permits. Meat consumption is largely based on availability, price and tradition.

Table 2. 9: Domestic Production and Import of Meat

Item	2008	2009	2010	2011	2012	2013	2014	2015*
Import	125,208	95,176	91,904	111,285	97,720	88,258	45,817	48,144
Domestic Production	100,935	105,772	111,390	118,504	127,038	135,412	143,603	150,751

Source: SRID ****Provisional***

Estimates of domestic meat production and quantity of meat import show that quantity of domestic meat produced kept increasing through the period 2008 to 2015 (Figure 2.12). This has created a gap between quantities of meat imported and domestic meat production. The gap has kept widening especially after year 2010. From the year 2011, quantity of meat imported experienced a dramatic dip whilst the local production increased. In 2015 however, there was a moderate 5 percent gain in imports over 2014 levels. The remarkable reduction in quantity imported was because of the prudent interventions introduced by the Ministry. Averagely, the country over the period met about 59 percent of its meat requirements annually from local production.

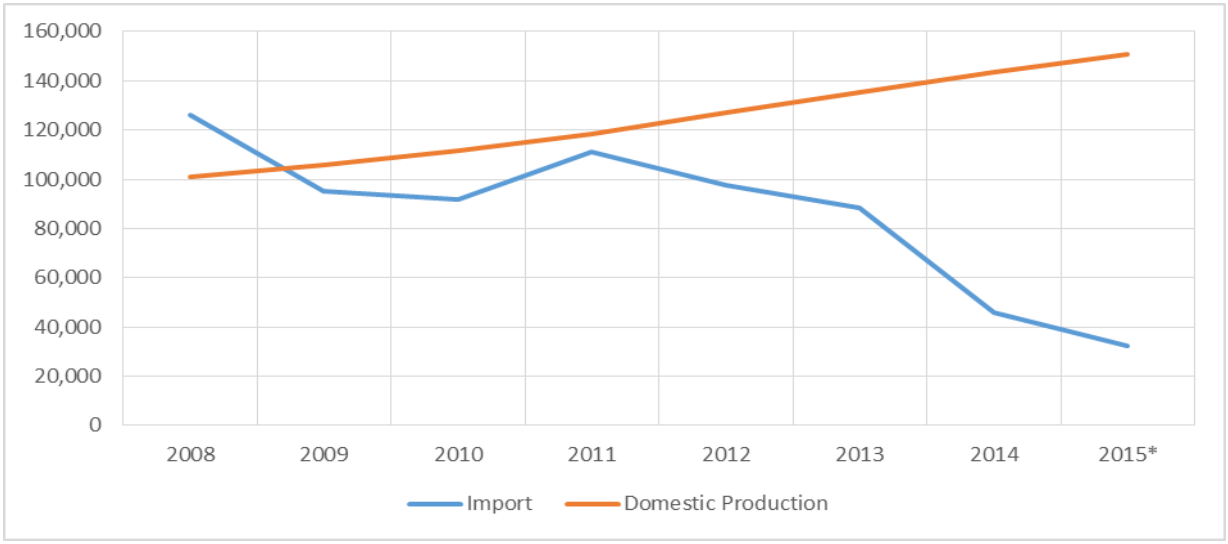
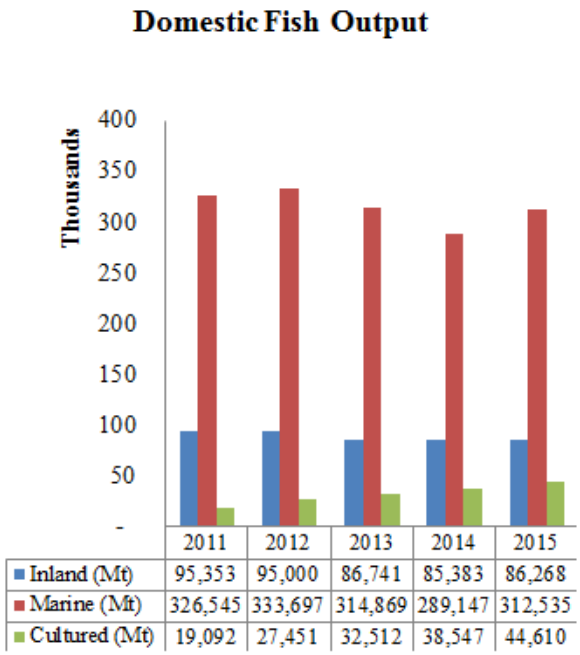


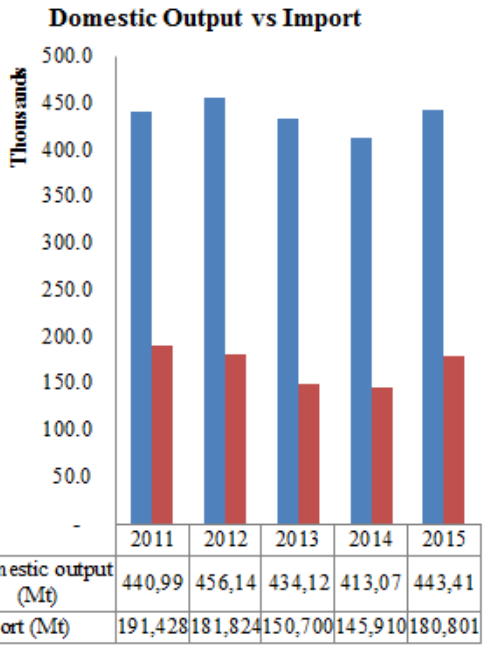
Figure **2. 11:** *Domestic Production and Import of Meat 2008-2015*

2.6.3 Domestic Fish Output and Import

Trading in fish continues to be a vital livelihood activity, especially for women. Between 2011 and 2015, an average of 170,133 mt of fish, valued at $ 141.1 million was imported to supplement the quantity locally produced. Out of the domestic output (2,187,750 mt) produced within the METASIP I implementation period, marine fish production contributed approximately 72.1 percent, followed by inland fish production (20.5 percent) with cultured fish contributing the lowest (7.4 percent). The country produced about 69.7 percent of her fish demands in 2011. This proportion increased to over 74.2 percent in 2013 and reduced marginally to over 71 percent in 2015. On average, Ghana produces 72.1 percent of her national fish requirement and import 27.9 percent to supplement domestic production. Figure 2.14 show that domestic production has an inverse relationship with import. For the past years, when the volume of import decline, domestic production increases and vice versa.



	2011	2012	2013	2014	2015
Inland (Mt)	95,353	95,000	86,741	85,383	86,268
Marine (Mt)	326,545	333,697	314,869	289,147	312,535
Cultured (Mt)	19,092	27,451	32,512	38,547	44,610



	2011	2012	2013	2014	2015
Domestic output (Mt)	440,99	456,14	434,12	413,07	443,41
Import (Mt)	191,428	181,824	150,700	145,910	180,801

Figure **2. 12:** *Domestic fish production and Import*
Source: MoFAD

2.7 Support to Improved Nutrition

Many nutrition experts have been engaged in the promotion of Orange Flesh Sweet Potato (OFSP) consumption and utilization to combat vitamin A deficiency. This initiative received significant support when the "Orange Day" was commemorated by the Kofi Annan Foundation in 2015. This was in collaboration with the International Potato Centre (CIP), CSIR and WIAD among others. In addition, WAAPP supported WIAD to train individuals and groups to incorporate OFSP into various local foods nationwide in an effort to enhance food security and nutritional quality. The technology has largely been adopted by over 95 percent of the beneficiaries including members of the Tabora Area Flour-users Association. The association now uses OFSP flour for their commercial productions of pie, cake, bread,

and "*atsomo"*. The OFSP flour has the added advantages of adding bulk (weight) and reducing the quantity of added refined sugar.

Figure **2. 13***: Training Session for Flour-Users at Chantan*

Figure **2.14***: OFSP Cakes and Cupcakes*

Figure **2.15** *: OFSP Bread rolls*

Source: MoFA - WIAD (2015)

Nutrition and food security are inherently connected to food safety. During the year, there were media reports of palm oil adulteration with the carcinogenic Sudan III & IV dyes. It was reported that 95 percent of samples taken from major markets in Greater Accra tested positive for the substance. This negatively impacted the consumption of the product in the latter part of 2015. Many markets reported poor sales of not only palm oil but also culinary accompaniments such as okra, *kontomire* and garden eggs.

To address the declining patronage of the product, a joint team from WIAD and the Food and Drugs Authority (FDA) carried out surveillance and sensitization at all major markets during the last quarter of the year. The exercise employed the use of a MoFA public address van as well as discussions with market queens, various commodity leaders, middlepersons and traders. Some arrests were also made. The effort proved very effective in reducing the practice of the vice and restoring consumer confidence. In the process, patronages of the affected agricultural commodities were revived.

2.7.1 Underweight and Stunting in Children

As reported earlier, findings for prevalence of underweight and stunting in children have improved (2014 GDHS). According to the report, underweight and stunting cases have reduced by approximately 3 and 9 percentage points respectively compared to that of the GDHS report of 2008. This shows a considerable reduction in incidence, and consequently, improvement in the general nutritional status of children in the country.

The Ministry plays a prime role in ameliorating the incidence of malnutrition (wasting, stunting, underweight and overweight) through its extension services delivery. Beneficiaries are given nutrition-based education on how to plan their meals for improved household health using talks, discussions, demonstrations, and visits to markets, homes and processing sites.

In 2015, there was a decrease in the total number of beneficiaries of food-based nutrition outreach activities due to funding and logistic limitations. However, the Ministry engaged in a number of activities in respect of food-to-food fortification demonstrations that targeted female headed households, and individuals directly involved in food choices and feeding of children. In all, 15,937 beneficiaries (12,918 female and 3,019 male) were trained to use nutrient-rich local foods such as soybean for household consumption.

2.8 Support for Diversification of Livelihood Options

Alternative livelihood activities are important strategies for meeting subsistence needs as well as absorbing shocks resulting from reduced agricultural income. Research has shown that participation in off-farm activities financially empower rural and less endowed farmers especially women. The Ministry's policy document aims to support 5 percent of people falling below the extreme poverty line with off-farm livelihood alternatives by 2015 In this regard some key interventions (Table 2.10) were implemented to reduce extreme poverty through diversification of livelihoods.

Table 2.10 shows that, the total number of beneficiaries of the interventions increased by 384 percent over 2014 figure. This was due to the increased support received from WAAPP. Moreover, male participation increased from 38 percent to 46 percent while that of females decreased from 62 percent to 54 percent from 2014 to 2015.

Table 2. 10: Interventions to Ensure Household Food Availability/Access

Interventions	Number Beneficiaries					
	2014			2015		
	M	F	**Total**	M	F	**Total**
Establishment of backyard/home gardens	306	221	**527**	2,379	2,491	**4,870**
Raising of small animals and poultry	1,109	1,546	**2,655**	2,153	1,957	**4,110**
Planting of fruit trees; mango, pear etc.	-	60	**60**	1,376	1,128	**2,504**
Establishing of woodlots.	-	45	**45**	435	365	**800**
Dry season gardening	48	106	**154**	1,152	1,756	**2,908**
Raising of school gardens	62	421	**483**	710	508	**1,218**
Registration of farmers to produce orange flesh sweet potato	-	-	-	28	102	**130**
Storing of cowpea using the Pergion Improved Cowpea Store (PICS) bag methods	-	-	-	30	56	**86**
Farmer training on Onion storage	-	-	-	-	25	**25**
OTHERS (Soap making, Head Porters, Fetching of water for sale, Weeding, Burning of charcoal, Fish processing, Fuel wood sale, Forage sale, Use of improved cassava variety (bankye ohemaa), Safe and effective use of agro-chemicals in the home, Fertilizer Application, Vegetable production, Mushroom production)	-	48	48	546	2,046	**2,592**
Total	**1,525**	**2,447**	**3,972**	**8,809**	**10,434**	**19,243**

Source: MoFA – WIAD (2015)

2.8.1 Engagement in Off-Farm Livelihood Activities

According to the Ghana Living Standard Survey (GLSS 6) conducted by Ghana Statistical Service (GSS), Ghana's poverty level has declined to about 24.2 percent from the 51 percent recorded in 1991. This means about 6.4 million Ghanaians cannot afford to spend GH¢3.60 (US$1.00) on food a day.

In an effort to reduce the high poverty levels in the country, various interventions were implemented. For example, the Rural Enterprise Programme (REP)/ Business Advisory Centre (BAC) trained farmers and processors in five communities in the Komenda-Edina-Eguafo-Abrem (KEEA) Municipality in the Central Region, to boost their income-generating activities. The beneficiaries were trained to acquire skills and knowledge in processing cassava, soybean and plantain into various products. Other areas of training were soap and cosmetic making, financial and business management. A total number of 136 participants benefited.

In the same vein, farmers in Upper West Region, were trained in off-season activities, to enable them supplement their incomes. Some of the products produced by the women as results of the training are round bar and liquid soap, soya milk and soya kebab.

2.9 Gender Mainstreaming

The full integration of the marginalized, including women, physically challenged and the youth, into the global economy has become one of the most important goals of developmental efforts. The ministry recognizes the importance of this fact and therefore implements strategies for all-inclusiveness. For example, NRGP organized leadership training for 43 women District Value Chain Committee (DVCC) members and 43 District Assembly gender desk officers. The training was aimed at equipping rural women with leadership skills as a way of promoting women participation in decision-making, having a voice and holding leadership positions in rural communities and especially in farmer –based organizations.

Other efforts were towards the re-aligning the GADS I for effective implementation. Similarly, a stakeholders' workshop was organized to restructure and finalize the Gender and Agricultural Development Strategy II (GADS II). This afforded the team an opportunity to identify the gaps in both GADS I and GADS II and fill the gaps based on the Gender Analysis of the Agriculture Sector in Ghana report. The outcome of the workshop was a finalized GADS II document.

Basic Needs Ghana with support from CIDA implemented the Food Security for Empowerment and Poverty Reduction Project (FOSPREP) in West Mampurusi, Builsa and Talensi Districts. The project aimed at integrating rehabilitated mentally retarded persons and individuals from leprosarium into the communities. They were made up of 276 males and 266 females. These persons were organized into groups to produce various vegetables (tomato, onion, cabbage, pepper, amaranthus and other leafy vegetables). The resultant effect was that the people are integrating very well into their families and the larger communities. Clearly, stigmatization has reduced following their participation in the project.

2.10 Food Storage and Distribution

In an increasingly competitive world, reducing postharvest losses is a major agricultural goal for most countries. Investments made to reduce post-harvest losses usually are less costly for the grower and the consumer and less harmful to the environment compared to the value of the loss. Even a partial reduction in postharvest losses can significantly reduce the overall cost of managing production along the value chain.

2.10.1 Post-Harvest Losses along the Value Chains

Many factors which contribute to post-harvest losses include environmental conditions such as heat, mechanical damage, improper post-harvest sanitation, poor cooling and other environmental conditions. Interventions such as introduction of efficient harvesting and post-harvest technologies, construction of warehouses and pack houses have contributed to the reduction of losses in grains.

Currently, there are no recent data on post-harvest losses though targets were set in the GSGDA (Table 2.11 for selected crops. The Ministry is in consultation with its partners to

conduct a research to determine the level of post-harvest loss of some of the major commodities.

Table 2. 11: Targets Set in the GSGDA for Post-harvest Losses

Crop	2013	2014	2015	Expected percent (2015 /2013)
Maize	28.10	26.35	24.60	12
Rice	5.46	4.98	4.50	18
Sorghum	3.01	2.68	2.35	22
Cassava	24.88	22.45	20.02	20
Yam	16.28	14.25	12.22	25

Source: GSGDA II

2.10.2 Grain Storage Capacity Development

Grain storage capacity development requires the efforts of both the government and the private sector. The government sector is spear headed by the NAFCO whilst the private sector by Ghana Grains Council (GGC) in conjunction with Ghana Commodity Exchange (GCX).

The Ghana Grains Council is implementing the Warehouse Receipt System which allows members to deposit their grains in a certified warehouse and use it as collateral for borrowing money from a member bank or other member lending institutions. So far 90,745MT (Table 2.12) of maize have been stored under the Program. This has enabled many small holder farmers to avoid selling their grains immediately after harvest when prices are low. Warehouse receipts system have also helped address the problems of price volatility and lack of quality standards usually attributed to market liberalization in the Ghana grain industry.

Table* 2. 12*: Quantity of Grains Stored by Private Sector

Years	Number of Warehouses Certified	Commodities	Total Capacity (MT)	Locations
2011	1	Maize	350	Nkoranza
2012	1	Maize	25,000	Tamale
2013	5	Maize	18,100	Tamale, Bonyon, Aframso, Tema, Accra
2014	N/A	N/A	-	No receipting was made due to the review of the GGC WRS program, aimed at addressing the gaps.
2015	12	Maize	47,295	Tamale, Bonyon, Aframso, Tema, Accra, Kumasi
		TOTAL	**90,745**	

Source: GGC

In the year 2015, there was also the establishment of the Ghana Commodity Exchange Project (GCX). This project is a public-private partnership initiative with the aim to transform

Ghana's economy, create prosperity for all in the commodity value chains and become a regional and global commodity trading hub. The project was launched in June, 2015 with sponsorship from the Government of Ghana through the Ministry of Trade and Industry, in collaboration with a private sector consortium and Eleni LLC as Technical Partners. The exchange is expected to commence full operations in the coming years.

2.11 Irrigation and Water Management

Effective and efficient use of irrigation facilities is the surest way to address the effects of climate change. In 2014, the country irrigated only 0.6 percent of its total agricultural land. Policies and programmes are being implemented to put more land under irrigation. As a result of the collaboration between the Ministry and the Arab Bank for Economic Development of Africa (BADEA), a loan was provided for the rehabilitation of a number of irrigation facilities under the Small Farms Irrigation Project (SFIP). This has made available a total irrigable area of 494ha for cropping. The rehabilitation of Dawhenya Irrigation Scheme under the Dawhenya Integrated Rural Development Project has been completed and the 200ha scheme is being cropped to rice and vegetables all-year-round and contributes about 1,800 metric tons per annum.

2.11.1 Formal Irrigation

Under formal irrigation, Government provides the headwork, conveyance and primary distribution infrastructure, while the private investor is to provide secondary distribution and water application machinery and equipment.

In 2015, area developed under formal irrigation remained unchanged as in 2014 however, an increase of about 0.4 percent in the area cropped was observed. In spite of the increases in area cropped, crop production declined by 18 percent over the period. This was as a result of a severe drought which hit the Upper East Region in the second half of 2014 which led to the drying of Tono and Vea reservoirs. This consequently resulted in only a single cropping in 2015 on the two schemes, thus affecting productivity. The overall performance of vegetable production decreased by 57.5 percent but that of cereal increased by 8.5 percent over 2014 figures. Average yield of notable crops are rice - 4.3 tonne per hectare, tomato - 22.6 tonne per hectare, pepper - 8 tonne per hectare and okra - 10.7 tonnes per hectare.

2.11.2 Informal Irrigation

Informal irrigation is defined as irrigation practised by individuals who cultivate own land of an area of about 0.5 hectare or more using simple structures and equipment for water storage, conveyance and distribution. Capital investments are provided from the investor or farmers' own resources. However, there are situations where some NGOs fund the provision of informal irrigation facilities.

Informal irrigation was reported for 8 regions (Upper East, Upper West, Northern, Ashanti, Eastern, Central, Volta and Greater Accra Regions). Area cropped in 2015 increased by 17 percent compared to that of 2014 (from 26,471ha to 30,936ha). The increment came mainly

from the Eastern and Central Regions. This can be attributed to improvement in data collection in the two regions.

Three cropping cycles were recorded in five regions (Greater Accra, Upper East, Volta, Ashanti and Eastern) while two cropping cycles were recorded in the Central Region and one cropping cycle in Upper West and Northern Regions. Two and three cropping cycles were recorded under formal irrigation. The combined area cropped under both formal and informal irrigation in 2015 was 40,420 hectares, an increase of 13 percent over 2014.

2.11.3 Irrigated Land Use Efficiency

Irrigated land use efficiency is expressed as intensification ratio and it is a measure of how developed lands have been judiciously used for irrigation. It shows the number of times the land has been cropped within a year and normally reported on formal irrigation schemes. The land intensification ratio for irrigation schemes in 2015 was 0.88. The reason for the low intensification ratio is that most of the irrigation schemes are plagued with challenges hence, partial or no cropping was done on some of these schemes. Typical examples are Tono and Vea schemes which were partially cropped once in 2015 due to the drying of the reservoirs.

2.11.4 Water User Groups/Associations

A Water User Association (WUA) is an organization for water management and use. It is mostly made up of a group of small and large-scale water users, such as irrigators, who pool their financial, technical, material, and human resources for operation and maintenance of a local water system, such as a river or water basin. This makes them more efficient in their production. In the year 2015, 359 WUAs operated across the country with the majority (32 percent) operating in the Upper East Region. The Upper East Region recorded about 37 percent of the total area put under formal irrigation during the year. The total membership of all the groups was 22,718 with 37 percent female membership.

2.12 Access to Agricultural Services

The ease of access to agricultural services by farmers tends to enhance their enterprises / operations. These services include extension, information on inputs and output prices, and mechanization.

2.12.1 Agricultural Information Centres

The numbers of Agricultural Extension Agents (AEAs) have dwindled over the years. This has a direct bearing on the dissemination of improved technologies, including food safety issues. To make agricultural information accessible to more farmers, agricultural information centres were established across the country. These centres, by design, are situated at very accessible locations especially markets. A total of 39 centres were reported by all ten regions to be functioning. Of the number about 59 percent are located in the Northern Region alone. Unfortunately, there is none in the Greater Accra Region.

To augment the conventional extension delivery method, the e-agriculture system was set up to provide agricultural extension and advisory services to the public through its 4 components:

Call Centre, Interactive Voice Response (IVR) system, E-agriculture and E-extension portals and use of smart phone in extension delivery services.

During the first half of year 2015, a total of 17,330 new users subscribed to the IVR system and 551,804 users made IVR calls (according to the FARM DIRECT users and IVR summary). On the e-agriculture portal, 2,492 sessions/hits were recorded and out of this figure, 2,072 were new users (according to Google Analytics). On the average, users spent less than 2 minutes per visit and viewed less than 2 pages. The users accessed the e-agriculture portal in different languages. Currently, the e-extension portal is under redevelopment. A total of 1,200 staff have been trained and resourced with smartphones to deliver extension services in 7 regions. The centres encountered some challenges which include unstable power supply; faulty UPSs; and erratic (slow and unstable) internet connectivity.

Another support platform to enhance extension delivery is the Esoko platform. This platform is an ICT platform designed primarily to help actors in the value chain access and share market information, communicate with other actors, establish business relationships and manage the flow of goods and services among them. This enabled 1,005 actors exchange market information on the Esoko platform.

2.12.2 Mechanization Centres Established

Agricultural mechanization is the application of machineries, equipment and implements in the day to day farm activities. It reduces drudgery which makes it difficult for large scale food production and has also made it difficult for the country to meet her food requirement for her increasing human population.

In order to reduce drudgery, a number of interventions were implemented to mechanize agriculture. One of these major interventions was support to the private sector to establish Agricultural Mechanization and Service Centers (AMSEC) nationwide.

Appendix 5 shows the status of AMSEC (New centres established, total existing centres, total operational, total area ploughed). A total of 89 AMSECs (Ashanti-5, Brong Ahafo-13, Central-4, Eastern-10, Greater Accra-3, Northern-28, Upper East-7, Upper West-9, Volta-9 and Western-1) were established nationwide from the year 2007 to date. In 2012 and 2013, no new AMSECs were established. Total number of existing AMSECs as shown in Appendix 5 is as follows; 55, 63, 89 and 59 for 2012, 2013, 2014 and 2015 respectively. It is expected that with the arrival of the tractors and equipment under the Brazilian facility the numbers will increase considerably.

Appendix 5 also shows the number of functional or operational AMSECs that operated under the AMSECs and the total area ploughed in hectares over the years. Number of operational centres (AMSECs) increased from 45 in 2012 to 82 in 2014 but decreased drastically to 48 in 2015. Averagely, each operational AMSEC ploughed about 697 hectares in 2012, 1,001 hectares in 2013, 673 hectares in 2014 and 476 hectares in 2015. The gradual reduction in the average area ploughed is largely due to old age of the machines.

To address the situation, the government arranged and imported various farm implements during the period. Table 2.13 contained the details of the types of machinery imported and the numbers. Figure 2.16 also shows a cross-section of farm implements imported in 2015.

Table* 2.13*: Type of Agricultural Machinery/Equipment

No	Type	Number
A. Land/Seed Bed Preparation Machinery/Equipment		
1	Same Tractors - 85 hp with matching implements (plough, harrow, 5 ton trailer)	77
2	Cabrio Compact Tractors - 50hp with accessories (rotovator, mulcher, rice cutter, 1.5 ton trailer)	100
3	Power Tillers (walking tractors) with accessories (rotovator, 1.5 trailer, swamp wheel)	49
B. Harvesting/Processing Machinery for Rice Production		
1	Rice Reapers	11
2	Rice Threshers	20
3	Rice Mills	6

Source: AESD

Figure **2. 16:** *A Cross-section of Farm Machinery Imported, 2015*

2.13 Incentives for Agro-Processing Industries

The food processing industry plays a major role in Ghana's economy. Over the years the Government of Ghana has implemented policies that add value to Ghana's raw agricultural produce. In this regard a number of tax incentives have been put in place over the years to attract investors into agro-processing industries.

Some of these include;

- Custom duty exemptions for agricultural and industrial plants, machinery imported for investment purposes
- Listed companies enjoy Corporate tax for the first three years
  agro-processing enterprises that use local agricultural raw materials as the main input also have corporate tax rates based on their locations;
  - ✓ Accra-Tema – 20 percent
  - ✓ Other Regional Capitals – 10 percent
  - ✓ Outside Regional Capitals – 0 percent
  - ✓ 3 Northern Regions- 0 percent

- Location incentives (tax rebate) for agro-processing and manufacturing industries located in the regional capitals and districts within the country
- Agro-processing businesses established in Ghana enjoy a five year tax holiday from the date of commencement of business

This is designed to suit different types of agricultural activities e.g. cash crops, tree crops, aquaculture, fish and livestock processing.

- Aquaculture, fish and livestock - Tax holiday of 5 years from date of commencement of farming activities

In addition, other incentives include the recent implementation of a number of projects and programme to facilitate agriculture and agribusiness in the country. The Ghana Commercial Agriculture Project (GCAP) for example, presents an opportunity for public private partnerships in the provision of infrastructure in the Savanna Agricultural Development Authority (SADA) zones and Accra plains. The project is also developing a land bank and model lease agreements to facilitate acquisition of land by investors. The just ended Export Marketing and Quality Awareness Project (EMQAP) have constructed a pack house in the Volta Region to boost horticulture exports. MoFA has recently launched the Ghana Agricultural Sector Investment Programme (GASIP) which will facilitate investment into the agricultural sector through provision of agricultural infrastructure, such as feeder roads and pack houses.

CHAPTER THREE

3.0. Increased Growth in Incomes

It has been established that improved agricultural performance has a direct impact on rural incomes. Agriculture plays a critical role in addressing a wide range of needs of Ghanaians in terms of nutrition, raw materials for industries and income. This section of the report covers the extent to which the objective of increasing growth in income has been achieved.

3.1 Promotion of Cash Crop, Livestock and Fish Production for Income

Selected cash crops, livestock and fish have been promoted for income during the period. This was done mainly through direct and indirect support to farmers and fishers. The effects of these interventions can be measured by means of values of production and accounts by beneficiaries.

3.1.1 Increased Income from Cash Crop Production

The production of cash crops requires considerably more working capital than crops produced for own consumption. In addition to this, the depreciation of the Ghana Cedi made production of traded crops such as cocoa, oil palm, rubber and cashew more profitable than crops sold on the local market or largely consumed at home.

Results of a panel study conducted by WAAPP (2013 compared to 2014), covering 750 beneficiaries in 22 MMDAs across the country, revealed that farmers obtained an increase in average annual crop income of GH₵1,637.27, GH₵96.87 and GH₵2,757.21 in the deciduous forest, guinea savannah and transitional zone, respectively. Farmers in the 'without-districts in the guinea savannah recorded a decrease in their average annual crop income by GH₵315.50. The report showed that agro-processors observed average weekly revenue of GH₵393.03, GH₵632.13, GH₵2,792.65 and GH₵691.52 in the Ashanti, Brong Ahafo, Eastern and Volta regions, respectively. Processors in the Central region, however, recorded a reduction of weekly revenue by GHC1, 899.43. Processors receiving WAAPP support recorded an increase of GHC1, 021.05 average weekly revenue over the survey period. While their counterparts in the control/without group recorded average weekly revenue of GHC309.27.

There are several individual stories across the country showing that the interventions of government and its partners are yielding the intended results. Reports from the Upper East Region showed that the income of Madam Atiiga Asumbun, a 52 year old widow and a rice farmer from Nomboko, in the Garu-Tempane District, increased from GH₵960.00 with 378 kg to GH₵1, 920.00 with 756 kg per half an acre. She achieved this feat as a result of technology adoption. Total income generated from food crop was quite significant; attributable to the adoption of Good Agricultural Practices (GAPs) resulting in increased production.

Table* 3. 1*: Nominal Value of staple crops Produced ('000)

Crop	2008	2009	2010	2011	2012	2013	2014	2015
Maize	504,688	599,871	596,495	825,929	1,257,083	990,007	1,259,757	1,414,739
Rice	103,609	151,846	189,704	215,521	304,485	569,848	677,781	1,000,253
Sorghum	173,976	195,826	156,556	154,859	213,841	204,611	238,161	264,339
Cassava	1,594,143	1,831,011	2,298,663	2,485,110	4,247,486	6,747,403	7,529,006	8,731,188
Yam	1,806,395	2,174,783	2,612,362	3,098,305	4,384,839	5,546,750	6,067,857	6,444,836
Soybean	38,611	66,275	95,465	150,082	147,144	155,721	187,560	220,184

Source: SRID, 2015

In 2015, the total value of selected major staples was GH¢18 million as against about GH¢16 million in 2014. This generated a percentage difference of 13.25. The value of all major staple crops increased in 2015 due to increase in general production and increase in price of the various commodities. The resultant increase in value of crops over the period may not necessarily imply significant improvement in farmers' income levels. More analysis needs to be done for verification and conclusion.

The Ministry also continued to support the establishment and maintenance of tree crops including cashew, citrus, and mango among others. A 1.2 hectares citrus orchard which was established in 2003 to serve as a source of budding materials for the production of seedlings was maintained. It has six varieties of orange namely valencia, blood orange, sweet mediterranean, ortanique, satsuma mandarin and ponkan mandarin. The orchard which is currently producing fruits was maintained and routinely sprayed with insecticide to control pest.

During the period, at Afraku, budding of root-stocks and other nursery operations such as insect-pest control among others were carried out. Five thousand (5,000) seedlings earmarked for planting in 2016 have been successfully nursed. This citrus nursery is made up of five varieties of orange. This number of seedlings is expected to plant about 31 acres.

3.1.2 Increased Income from Livestock Rearing

Livestock production is a major source of income for farm families by serving as food and traction in smallholder farming systems. Keeping livestock forms an integral component of risk reduction strategy for vulnerable communities during crop failure.

Table 3. 2: Nominal Value of Meat Production ('000GH¢)

Years	Types of meat			
	Pork	**Chevon**	**Mutton**	**Beef**
2008	34,004	95,942	87,346	87,989
Av (09-10)	44,395	126,815	112,470	129,240
Av (11-15)	144,844	256,564	215,098	304,117
2015, Target	42,505	119,928	109,182	109,986
2015, Actual	20,427	21,888	15,690	494,004

Source: VSD, 2015

In Ghana, the key driver for past increases in the value of meat production is linked to average unit price per carcass weight. The total nominal value of meat produced stood at GH¢1.5 million in 2014 as against GH¢ 1.7 million in 2015. This generated a percentage change of 13.33 percent over the period. The increase in the nominal value of meat is due to increases in average unit price. The average unit price per carcass weight for meat in 2014 was GH¢16.25 compared to GH¢18.25 in 2015 representing a percentage change of 12.31.

Monitoring reports show that individual farmers are also increasing their incomes as a result of government interventions. The story of Nafisa Mumuni of Garu Tempane District explains it all.

Success story (NAFISA MUMUNI) from Kugsabla in the Garu - Tempane District
During monitoring, this was what a farmer had to say about the project benefit to her:

- *I sold 80 guinea fowls at GHC1, 200.00 and paid my son's Agric College fees*
- *My coop is also built from the sale of my guinea fowls*
- *I also get income from the sale of the guinea fowls to pay for my children's health Insurance*
- *Eggs were also sold last season to buy fertilizer for my farm*
- *I now also have reliable fertile eggs for hatching.*

Box 2: Success story of Nafisa Mumuni from Kugsabla in the Garu -Tempane District

Evaluation results of an intervention titled '*Introducing Intensive Smallholder Pig Farming for Better Income'* in the Lawra and Nandom Districts showed that income of the entire beneficiary farmers increased. The project started in 2013 with 22 farmers and ended in 2015 with 31 farmers, made up of 6 men and 25 women. It involved the construction of improved housing structures 3-unit pigsty and adoption of improved feeding regimes. As a result, of good management practices, litter size increased from 4 to 7 piglets whiles mortality reduced from 50 to 5 percent. This increased off take levels.

3.1.3 Increased Income from Fish Culture

Fish culture is a potential source of income for the stakeholders in the fish industry. From 2011 to 2015, an average value of fish from marine, inland and aquaculture was about GH¢ 2 billion, GH¢617 million and GH¢340 million respectively. The value of fish from aquaculture increased from GH¢184.2 million in 2012 to GH¢231 million in 2013 representing a 25

percent increase. It further increased to GH¢1.0 billion in 2014 (91.9 percent). This high increase was due to interventions such as intensive extension service delivery, subsidy on imported fish inputs and facilitation of the supply of improved fingerlings to farmers.

Table* 3. 3*: Nominal Value of Domestic Fish Produced

Period	Value of fish produced (Million GH¢)		
	Marine	**Inland**	**Aquaculture**
2008	763	n/a	n/a
Average:2009-2010	1,273	n/a	n/a
Average:2011 -2015	1,943	617	340
2015	3,859	596	521

Source: MoFAD

3.1.4 Post-Harvest Losses

Increases in the production of various crop types cannot assure maximum food security unless the food produced is handled and stored in a manner that reduces losses to the barest minimum. Post-harvest losses have been identified as a major source of reduction in the income of farmers. Tackling post-harvest losses is expected to make significant contribution to hunger reduction.

Current data on post-harvest losses is not available, however, estimates by the ministry shows that post-harvest losses of cereals and legumes are at 30 percent, whereas that of fruits, vegetables and root crops, being less hardy than cereals, can reach as high as 50 percent. Activities including sensitization and training workshops were carried out on post-harvest losses during the period. These are to help reduce the problem in the long run. For example, losses in the fisheries sub-sector are also being tackled.

The fisheries ministry, recognising the need for on-shore cold chain development recommended the use of insulated ice boxes (Figure 3.1) for hook and line fishermen in the fishing industry. A pilot scheme was put in place to provide two of such boxes to fishermen for trial. Two fishermen were chosen from Kpone in the Greater Accra Region and Winneba in the Central Region. The pilot exercise was to compare the quality of fish catch landed with and without insulated ice boxes. The intervention will be evaluated after a year.

Figure **3.1** *Ice Box for on-shore Fishing*

3.2 Development of New Products

Developing a product that meets consumer wants and needs is the object of successful business development. In today's complex and fast-changing world, creating a product with the desired attributes to meet changing consumer demand is critical. The development of new products using locally produced raw materials has been on the increase in recent years.

3.2.1 Development of New Commercially Viable Products

Over the METASIP implementation period, various new products have been developed using maize, rice, wheat and millet. These products include packaged products such as tom brown, maize grits, hausa koko etc. Other special products developed using the staples include: organic semi polished rice, organic unpolished rice and organic banku mix among others. These are patronized mainly by health conscious people.

Figure**.3. 2**: OFSP products

With the introduction of the highly nutritious Orange Flesh Sweet Potato (OFSP), various products have been developed. We now have yoghurt, fortified Gari, chips, leaf powder and root powder, all from OFSP. The demand for the OFSP products is increasing and thus creating market for OFSP farmers.

There has been the development of the instant "gari fortor" where gari mixed with stew (shito) is being marketed at various supermarkets across the country. Boarding house students have been identified as major consumers of this product.

3.3 Development of Pilot Value Chains

For efficiency and cost effectiveness, the Ministry seeks to develop and pilot at least two key value chains in each ecological zone. Development of value chains involves the analysis of the existing segments of the chains and taking steps to link and nurture the chains. Evaluating the performance of the entire segments of the chain allows determination of weaknesses and strengths of the chains. Addressing the weakness whiles building on the strength allows for cost effectiveness. The goal is to deliver maximum value at the least possible cost.

Selected value chains have been piloted across the country including maize, rice and mango value chains. Currently efforts are on way to upscale successful value chains. District and at least three regional value chain committees have been formed in the SADA zone. This has offered the committees a strong voice which allows them to negotiate for better prices for their products.

3.4 FBO Development

The development of Farmer Based Organisation is an approach/strategy that empowers the members to influence policies that affect their livelihoods. FBOs have improved farmers' access to extension and financial services.

The Northern Regional Value Chain Committee was successfully formed and inaugurated in the year. This brings all the RVCC formed to three in addition to that of Brong-Ahafo and Upper East Regions. The various actor category groups are represented. These include FBOs, nucleus farmers, mechanization service providers, financial institutions, aggregators and stakeholders from Department of Agriculture, environmental protection agency, ministry of gender, children and social protection. A total of 25 actors and stakeholders participated in the function.

A cumulative number of 10,149 FBOs have been strengthened from 2011 to 2015 to specifically access financial services and market information. Membership of these FBOs has declined by 14.5 percent over the period. Anecdotal evidence suggests that this is due to poor leadership, mistrust among members, high interest rate, demand for collateral and inadequate rural financial institutions in the communities.

During the year, NRGP also registered 3,667 new FBOs with a total membership of 91,668 (34,779 males and 56,909 females). This brought to a cumulative total of 6,712 FBOs (males, 77,024 & females, 106,412) under the programme. These FBOs are operators of value chains which include cereals, vegetables, small ruminants and fowls. The effects of the activities of these FBOs on their membership will be evaluated and reported in the coming years.

3.4.1 Development of Fish Farmer Association

In order to aid co-management of fisheries resources and curb illegal fishing activities of fishermen, the West Africa Regional Fisheries Programme (WARFP), with the objective of strengthening fisheries associations, formed a National Fish Processors and Traders Association (NAFPTA). This was inaugurated in 2015. A three-year Action Plan (2015 –

2017) has been prepared and a technical advisor has been contracted to support the association. In addition, an advisory board has been setup to oversee the activities of NAFPTA.

In a related development and in an effort to augment fish production through aquaculture, the nucleus out-grower credit scheme is being adopted. So far a stakeholder sensitisation has been carried out in addition to the selection of 280 pilot beneficiaries. These beneficiaries would be given input credit, technical support and linked to market outlets to improve their output.

3.5 Development of Rural Infrastructure

Rural infrastructure includes farm access roads and irrigation and storage infrastructure. Under the NRGP, irrigation facilities have been constructed and handed over to beneficiary communities. Works are ongoing on the construction of warehouses and pack houses and are expected to be completed in the first quarter of 2016, Table 3.4.

Table 3. 4: Construction of Warehouses and pack houses by NRGP

Regions	Districts		Facilities	
	Warehouse	**Packhouse**	**Warehouse**	**Packhouse**
Northern	Chereponi, Nanumba North, Gushiegu Sawla-Tuna-Kalba.	Savelugu/Nanton,	4	1
Upper West	Sissala West, Lawra, Nadowli	Jirapa	3	1
Upper East	Builsa, Garu-Tempane	Kassena-Nankana East, Talensi-Nabdam	2	2
Brong Ahafo	Tain		1	0
Total			**10**	**4**

NRGP, 2015 Annual Report

3.5.1 Transportation of Agricultural Produce

An efficient transport system is critical for efficient agricultural marketing. High transport charges lead to high access costs and therefore high produce prices. This also has the tendency of damaging some of the produce and hence reducing the market value.

Seasonally impassable roads or slow and infrequent transport services, coupled with poor storage, can lead to losses as certain crops (e.g. fresh vegetables, fruits) deteriorate quickly over time. If the journey to market is made over rough roads, then other crops e.g. bananas, mangoes and oranges may suffer losses from bruising; which can result in unattractive produce and reduced prices to the farmer. Roads, especially farm and feeder roads need to be improved to enhance easy passage.

Over the period of METASIP implementation, spot improvement and rehabilitation of feeder roads improved significantly. Under spot improvement, a total of 3,605 kilometres of feeder roads was carried out between 2011 and 2015. With regard to feeder road rehabilitation, 4,230 kilometres was covered as indicated in Table 3.5. This opened up more access roads and improved movement of goods and people to and from marketing centres. It is expected that this would ultimately improve the livelihood of rural farmers.

Table* 3.5*: Length of feeder roads and bridges constructed and rehabilitated

Item	2011	2012	2013	2014	2015
Spot improvement (km)	469	1,285	530	948	373
Rehabilitation (km)	623	1,325	1,395	418	469
Bituminous surfacing (km)	-	-	-	195.95	N/A
Steel bridges (No)	17	16	21	-	N/A

Source: Department of Feeder Roads

3.6 Industrial Processing of Agricultural Produce

Processing of agricultural produce is fundamental to improving food supply and employment creation especially in rural areas. The development of industries had to be based on an integrated approach which should take into consideration raw material production, post-harvest handling, storage, conservation, processing, marketing and distribution. All these activities are interrelated and cannot be planned and implemented separately from each other.

In recent times, the agricultural sector has been enjoying the patronage of key agro based industries. The Ghana Brewery Industries (Guinness Ghana Breweries Limited (GGBL)) and Accra Brewery Limited (ABL)) have continued to show interest in the processing of local materials into finished products. During the implementation of the METASIP, the industries used local raw materials in their respective breweries. The introduction of beer and malt made from cassava, rice, maize and sorghum is providing ready market for these crops especially cassava and sorghum. This may partly be responsible for the general increase in the area put to cassava and sorghum production. In Tables 3.6 and 3.7 are the quantities and values of raw materials purchased by these companies. .

Table* 3. 6*: Local Raw Material Purchase by Guinness Ghana Breweries Limited

Commodity	***Year***	***Quantity (Mt)***	***Value (GH¢)***
Cassava	*2013*	*3,527.00*	*n/a*
	2014	*7,368.32*	*1,105,248.00*
	2015	*6,409.7*	*1,153,747.00*
Subtotal		***17,305.02***	***2,258,995.00***
Maize	*2015*	*4,813.00*	*n/a*
Sorghum	*2015*	*4,885.00*	*n/a*
Total		***27,003.02***	***2,258,995.00***

Source: Guinness Ghana Breweries Limited

From Table 3.6, GGBL purchased a total of 27,003.02 metric tonnes of cassava, maize and sorghum. Cassava was the main local raw material purchased amounting to 17,305.02 MT for the years 2013 to 2015. Form Table 3.6, the quantity of cassava purchased reduced by 13.01 percent in 2015 over 2014. Cassava accounted for about 40 percent of the three commodities purchased locally.

Table* 3. 7*: Local Raw Materials Purchased by Accra Brewery Limited

Year	*Commodity*	*Quantity (Mt)*	*Value (GH¢)*
2013	Cassava	1.214.00	n/a
2014	Cassava	794.6	488,431.77
	Red Sorghum	161.1	233,196.40
	Maize Grits	2994.5	4,299,936.10
	Whole Grain	270.35	279,348.96
2015	Cassava Flour	85	192,256.00
	Red Sorghum	584	884,400.00
	Paddy Rice	825	1,155,000.00
	Whole Maize	25,900.00	36,460,000.00
Total		**31,614.55**	**43,992,569.23**

Source: Accra Brewery Limited

From 2013 to date, as in Table 3.7, ABL purchased a total of 31,614.55 metric tonnes of cassava, rice, maize and sorghum valued at about GH₵44 million. This served as a source of ready market and revenue for the farmers. It is important to highlight that, during the 2013 and 2014 the industries purchased cassava dough from the farmers. However, due to bulkiness and high cost of transporting the dough, the industry shifted emphasis to the purchase of cassava flour/starch for their 2015 operations.

Sorghum is used as the main ingredient in the brewing of beer. Interventions by international agencies such as United Nations Industrial Development Organisation (UNIDO-2008) and the technical assistance by institutions like TechnoServe, encouraged breweries in Ghana to increasingly use malted sorghum as a substitute for barley in the production of beer. This explained the quantities of the commodity purchased locally. For example, in 2015, a total of 584 metric tonnes of red sorghum was purchased locally by ABL.

In addition to the above, there are aggregators and intermediary organizations that purchase fresh cassava directly from farmers. For example, the Cassava: Adding Value for Africa (C: AVA) Project, during 2008-2013, purchased 70,833 metric tonnes of fresh cassava from the Brong Ahafo and Volta Regions for processing into various products. C: AVA produced and sold 3,928 Mt of High Quality Cassava Flour (HQCF), Industrial Grade Cassava Flour (IGCF), High Quality Cassava Chips (HQCC) and gari.

The objective of improving local processing of cocoa is on course. During the 2013/2014 production year, the country processed about 28 percent of its raw cocoa beans locally

(896,219 metric tonnes). This rate increased to 32 percent during the 2014/2015 production year constituting 233,748 metric tonnes of a total production of 740,254 metric tonnes. This shows that the country still exported about 68 percent of its raw beans. Efforts are in place to further increase local processing including building and commissioning of local processing industries. There are however, unofficial complaints by local processing companies of the inability of COCOBOD to supply them with the required quantities of raw cocoa beans. This could erode the gains made so far in the quantities processed locally. This issue should be investigated and corrective measures taken.

3.7 Support to Urban and Peri-Urban Agriculture

Urban and peri-urban agriculture have become an important component of Ghana's agricultural programme in and around urban areas. This has been necessitated by the loss of agricultural lands to estate development. Usually vegetables and other horticultural crops are cultivated.

3.7.1 Production from Peri-Urban Agriculture

It has been very difficult to measure the productivity and production of urban and peri-urban agriculture in the country. Though there are few identifiable groups, their activities are quite uncoordinated. Efforts are underway to support urban and peri-urban farmers and then regulate their activities. The Accra Metropolitan Assembly (AMA), for example has outlined strategies to promote backyard gardening, poultry and rabbit production in the Metropolis. The strategy is expected to rejuvenate the spirit of farming and increase the outputs on lands around Korle Bu, Dzorwulu, and the Council for Scientific and Industrial Research (CSIR) areas in Accra.

Peri-urban farmers in the Ashanti Region have received some assistance that has resulted in improved production. One hundred and twenty (120) vegetable farmers were trained in small scale irrigation farming. The beneficiary farmers were able to produce vegetable all year round, harvesting an estimated 22.5 metric tonnes per hectare instead of the initial 12.5 metric tonnes. This apparently has translated into increased income levels from an estimated GH₵ 30,000 to GH₵ 50,000 per acre in the case of cabbage farmers. These farmers now serve as contact farmers to other farmers in their communities.

The main drawback to their operations is the use, by some of these farmers, of unwholesome water in irrigating their crops. An effort to address this problem has not been quite successful due to their recalcitrant attitude. Also most of these farmers are itinerant and therefore are not prepared to invest in wholesome irrigation systems.

The ministry through WAAPP as part of the effort to promote greenhouse technology in and around urban and peri-urban cities, has established 160 greenhouses countrywide (150 constructed through Dizengoff and 10 others for demonstration purposes). This was to promote and encourage the technology amongst peri-urban vegetable farmers. The

intervention is expected to generate direct jobs for at least 1,000 vegetable farmers and 5,000 indirect beneficiaries by December, 2017.

Figure **3.3:** *Greenhouse technology, Adidome, Volta Region*

CHAPTER FOUR

4.0. Competitiveness and Integration into Domestic and International Markets

The agricultural sector seeks to accelerate growth by facilitating the process of transforming the operational capacities of smallholder producers and processors into commercial operations. This aims at strengthening the smallholder farmers' production capacities to meet the complexities of both local and international markets.

4.1 Marketing of Ghanaian Produce in Domestic and International Markets

The quality of export products remains a major challenge. Three hundred and thirteen metric tonnes (313Mt) of fresh products shipped from Ghana were rejected in the year 2014 at the European Union (EU) borders due to poor quality. In October 2015, an import ban was imposed on some vegetable exports from Ghana. This is a significant setback to the achievement of the objectives set by the various programmes. However, the problem is being addressed.

The support provided to farmers by GIZ funded Market Oriented Agriculture Programme (MOAP) to certify their produce has helped to improve the quality of food produced for local, regional and international markets. To date, about one thousand (1,000) small-scale farmers are GlobalGAP certified. A total of thirty-six (36) pineapple producers from the Eastern, Central and Greater Accra Regions have also been bio-certified after a three-year process. Due to the success of the programme, many other small scale farmers in the regions have expressed a strong interest in obtaining organic certification and have requested for support.

4.1.1 Marketed Output of Commodities by Smallholders Increased

The level of development of domestic markets is measured by the quantity of produce traded. Currently, it is very difficult to measure the total quantity of agricultural produce sold in the domestic market. Quantities purchased by major beneficiaries of locally produced commodities have been used as a proxy for level of development of the domestic market. The Ghana School Feeding Programme (GSFP) is one of the consumers of locally produced commodities. Under the programme, an estimated 9,300 MT of local rice is purchased annually. This is expected to increase with the expansion of the programme to cover more schools and thus create a market for, especially rice and maize producers in the country.

Ghana's fish production is increasing while the export quantities are decreasing. The trend may imply that more quantity of fish is being sold locally. Therefore, MoFAD is engaging local stakeholders for knowledge transfer of best practices that would boost domestic fish trade.

Domestic meat production has been on a steady rise from 100,935 metric tonnes in 2008 to 150,201 metric tonnes in 2015 (Table 4.1). The 2015 meat production figures exceeded the previous year's output by 4.6 percent. This is attributed to livestock intervention measures

(poultry revitalization project as well as credit in kind small ruminants and pigs projects) by the government. In terms of percentage distribution, poultry (38.1 percent) constituted the greatest proportion of total domestic meat production followed by chevon (16.5%), pork (16 percent), beef (15.8 percent) and mutton (13.5 percent).

Table* 4. 1: *Domestic Meat Production (Mt)

Type of Livestock	2008	2009	2010	2011	2012	2013	2014	2015*
Beef	19,553	19,773	19,993	20,592	21,221	21,863	22,781	23,746
Mutton	15,881	16,389	16,916	17,491	18,087	18,703	19,507	20,349
Chevon	17,444	18,315	19,226	20,341	21,198	22,429	23,573	24,773
Pork	7,002	17,506	18,010	19,072	20,224	21,432	22,932	24,058
Chicken	31,056	33,790	37,247	41,008	46,308	50,985	54,809	57,275
Total	**100,935**	**105,772**	**111,390**	**118,504**	**127,038**	**135,412**	**143,603**	**150,201**

Source: SRID, 2015 *Provisional

4.1.2 Export of Non-Traditional Agricultural Commodities

The Government of Ghana has promoted the development of non-traditional export products over the past decade. Table 4.2 indicates the volume, value and percentage changes for the various commodities over the past two years. The quantities of oil seeds and nuts, horticultural products, games and wildlife exported increased in 2015 as compared to 2014 with a corresponding increase in income except game and wildlife. On the other hand, cereals, coffee/tea/spices and fish/sea foods recorded losses in export quantities. The low volumes recorded in 2015 compared to 2014, were still enough to achieve the target of the indicator.

Table* 4. 2*: Export of Non-Traditional Agricultural Commodities

Commodity	2013		2014		2015*		Percent Change 2014/2015	
	Quantity (Mt.)	Value (GH¢)	Quantity (Mt.)	Value (GH¢)	Quantity (Mt.)	Value (GH¢)	Percent Change Quantity	percent Change Value
Oil Seeds & Nuts	443,089.91	437,143,806	338,465.04	598,667,668.00	434,474.42	1,027,103,047	28	72
Horticulture products	109,652.07	111,434,224	192,933.57	192,465,156.00	215,124.13	286,560,948	12	49
Game & Wildlife	80.27	820,371	52.48	316,515.00	53.08	201,834	1	-36
Fish & Sea foods	13,836.83	65,654,095	33,267.17	166,223,389.00	17,240.33	128,607,607	-48	-23
Coffee/ Tea/ Spices	5,559.11	10,748,532	1,411.92	4,099,760.00	1,336.90	8,265,921.00	-5	102
Cereals	5049.82	1,508,208	869.38	930,993.00	570.57	1,302,967.00	-34	40

Source: Ghana Export Promotion Authority, 2015

Export quantities of fish and sea food recorded a significant decrease in 2015 compared to 2014 which in turn adversely affected the export values, resulting in negative percentage

change of 59 percent. The general decrease in quantities exported was due to the high volatility of the cedi during greater part of the year.

Table* 4. 3*: Export of Non-Traditional Agricultural Commodities (Mt)

Years	Pineapple	Yam	Mango	Pawpaw	Banana	Fish and sea food
2008	35,134.00	20,842.00	858.00	968.00	69,733.00	40,241.00
Av (09-10)	35,854.00	18,528.00	363.00	851	55,907.5	28,068.5
Av (11-15)	40,691.68	23,480.82	1,474.83	884.65	56,819.01	21,687.10
2015, Actual	43,460.83	28,295.79	2,218.54	664.22	95,179.52	17,240.33

Source: Ghana Export Authority, 2015

The total volume of commodities exported from 2008 to 2015 increased by 11.5 percent from 167,776.00 metric tonnes to 187,059.23 metric tonnes respectively. In 2015, Banana contributed 50.88 percent of the total quantity of commodities exported, followed by pineapple (23.23 percent), yam (15.13 percent), fish sea food (9.22 percent), mango (1.19 percent) and pawpaw (0.36 percent). By comparing 2015 exports of commodities against the baseline figures, mango recorded 158.6 percent with banana, yam and pineapple recording 36.5 percent, 35.8 percent and 23.7 percent accordingly whiles pawpaw and fish and sea food recorded losses as seen in table 4.3. The expectation of the Government was to record at least a 50 percent increase of all exports over the baseline. To sustain this, more targeted and concerted efforts need to be executed.

Although Ghana's fish export is declining in quantity, the export market still contributes substantially to fish income. For example, between 2009 and 2010, earnings from fish averaged about $82 million; but during the METASIP period, an average of $260 million was earned per year. Measures are being put in place by the MoFAD to make Ghana's fish competitive in terms of its demand on the international market. These interventions include: introduction of improved fish processing technologies, training on best fish handling practices and intensified certification of feed and fingerling for exports.

4.1.3 Grading and Standardization Systems of Agricultural Commodities.

The Ministry in collaboration with the Ghana Standards Authority is developing standards to increase the competiveness of Ghanaian products on the international and domestic markets. Per the information available, standards for rice were completely developed and made functional over the period.

The following Ghana standards were also reviewed in 2015 to be in line with current technological changes. Publishing of the reviews is expected by the end of the first quarter of 2016.

- *GS 765: 2016 Specification for rice*
- *GS 101: 2016 Specification for pineapple*
- *GS 533: 2016 Specification for sweet potatoes*
- *GS 545: 2016 Specification for papaya*

- *GS 560: 2016 Specification for sweet cassava*
- *GS 734: 2016 Specification for millet grains*
- *GS 96: 2016 Specification for sorghum grains*

Other agricultural standards are currently being reviewed and are at various working draft stages.

The MoFAD in consultation with relevant stakeholders has established a Hatchery Certification System as a means of ensuring the production and supply of quality fingerlings to fish farmers. To date, thirty (30) hatcheries have been identified, of which seventeen (17) have been certified to operate. The Ministry intends to publish the names of the certified hatcheries.

CHAPTER FIVE

5.0. Sustainable Management of Land and Environment

The inappropriate use of land for both agricultural and non-agricultural purposes necessitate that Sustainable Land Management (SLM) is accorded the needed recognition to enhance production, improve income and livelihood for the present and future generations. Over the years, a number of activities have been carried out to promote sound environmental practices with the aim of ensuring increased production to sustain food security. In pursuit of that objective, awareness creation on climate change and SLM technologies were promoted by the ministry in 2015.

5.1 Awareness Creation and Use of SLM Technologies by Farmers

A total of 6,139 farmers were sensitized (3,192 males and 2,947 females) on climate change and sustainable land management technologies in 2015. The sensitization focused on soil and water conservation practices, improved cropping systems, buffer protection and importance of afforestation. Others include: creation of fire belts, cereal-legume integration, cereal-legume rotation, and control of soil erosion using sand bags. These were done to improve and protect the environment for sustainable agricultural development.

In 2015, with support from NRGP, (a project under the Ministry of Food and Agriculutre), four (4) Conservation Centres were established in Upper East Region (Tilli in the Bawku East District); Northern Region (Garimata, in the Saboba District); Upper West Region (Piiri, in the Nandom District) and Brong-Ahafo Region (Kobeda in the Kintampo North Municipality). These centres are being managed by graduates who have been trained at Dr. Boa's centre in the Ashanti Region. All the centres have been equipped with implements (tractor with accessories, leveller, chisel plough and boom sprayer) used to practice conservation agriculture. The centres are also intended to be used to train interested groups of farmers and individuals.

Within the same period, the centres in the three northern regions cultivated maize, soya and cowpea whilst maize was cultivated at the centre in the Brong-Ahafo Region using land conservation technology.

Figure **5. 1***: Minimum tillage field with maize at Garimata, N/R*

In the Upper East Region, a lead farmer conducted demonstration on conservative agriculture at Tilli in the Bawku West District with 53 out-growers participating as a way of spreading the technology to other famers for adoption. The main crops cultivated were maize and cowpea.

Figure ***5 .2****: Minimum tillage field with cowpea at Tilli in the Bawku West district.*

5.1.1 Policies and Regulations to Support SLM

The Ministry collaborated with the relevant stakeholders to develop a Sustainable Land Management Strategy and Action Plan in 2009. As part of the implementation plan, policies and regulations were to be reviewed to meet current challenges as efforts are made to promulgate new laws. However, due to technical and financial challenges, the policy reviews has not been done. The ministry also teamed up with key stakeholders to develop a National Climate Change Action Plan to tackle issues related to land and environment and their effect on climate change.

The long term sustainability of Ghana's fisheries resource is seriously threatened by the incidence of Illegal, Unreported and Unregulated (IUU) fishing which is also universally recognized as a serious threat to global fish stocks with devastating impact on food security and biodiversity. The ban on the exportation of Ghana tuna products to the EU Market in

2013 was attributed to IUU fishing activities engaged in by some Ghanaian fishing vessels. In this regard, Ghana developed a National Plan of Action to Combat IUU Fishing in 2015.

Ghana has been given a Green Card after correcting all the loop holes in its monitoring system including Catch Certificate in accordance with the guidelines of the EU. The implication is that Ghana can now export tuna and other tuna products to increase its foreign exchange earnings.

The Monitoring Control and Surveillance (MCS) Division of MoFAD is mandated to enforce Fisheries Laws and Regulation towards combating IUU. The MCS Division implements its activities in collaboration with the Ghana Navy, the Fisheries Enforcement Unit, the Ghana Maritime Authority, the Judicial Service and the Ghana Police Service. The MCS in conjunction with the above mentioned institutions carried out the following activities to reduce Illegal, Unreported and Unregulated (IUU) fishing:

- Quayside inspection of fishing vessels (industrial fishing vessels and import reefer vessels)
- Sea patrols (Western and Eastern Borders)
- Supervised Trans-shipment at Port
- Land Patrols/Beach combing along the coast
- Deployment of Compliant observers on Industrial trawlers
- Electronic Monitoring and Surveillance operations at the Fisheries Monitoring Center

In addition, the Ghana Maritime Authority installed Vessel Traffic Monitoring Information System (VTMIS) and the United States Government Department of Agriculture installed Automatic Identification System (AIS) at the Fisheries Monitoring Center (FMC). The FMC is equipped with VHF and HF radio equipment on all the vessels. The FMC undertakes 24/7 monitoring exercise and the VMS reports now form part of an improved Catch Certification System for the fish export trade with the EU. The VMS facilitated the detection and arrest of several vessels for committing fisheries infractions such as fishing in the Inshore Exclusive Zone (IEZ) and fishing along the gas pipeline.

The above operations resulted in 92 arrests involving artisanal canoes and industrial trawlers. Also, over 439 illegal nets, 128 generator sets and 108 lighting equipment have been confiscated.

5.1.2 Promotion of Institutional Capacities to Support SLM

Seventeen (17) staff members were trained in 2015 as against 16 in 2014 in SLM technologies. In 2015, the knowledge acquired by these staff members, was disseminated to a total of 1,683 farmers in the three northern regions. These farmers have since started practicing these technologies on their various farms. The expectation is that, more farmers will learn from these beneficiaries in the near future.

5.1.3 Dissemination and Adoption of SLM Technologies

As part of efforts to mainstream Climate Smart Agriculture, six (6) learning sites were established in six (6) different districts on cassava, cocoyam and sweet potato. The learning sites were used to create awareness on issues relating to Climate Smart Agriculture and improve climate knowledge base amongst farmers. Owing to the increased awareness of challenges posed by climate change, the Ministry facilitated and supported a stakeholder workshop to develop Climate Change and Natural Resource Management Action Plan for Ghana. A road map for mainstreaming the plan has also been developed.

Further, a Participatory Scenario Planning (PSP) review workshop was held at WAAPP Climate Smart Agriculture learning sites in Tain, Birim South, Abura-Asebu-Kwamankese and Ho West Districts. This was organized to review and share advisories developed at the previous PSP workshop with the entire community. The communities were advised among other activities, to undertake afforestation, livelihoods/crop diversification, good animal husbandry practices, water management, harvesting and storage and cultivation of early maturing and drought tolerant crop varieties.

5.1.4 SLM Knowledge Generated and Managed

Inter-agency platform for knowledge sharing and collaboration for the implementation of the Sustainable Land and Water Management Project (SLWMP) was strengthened in 2015. Relevant stakeholders from the Department of Agriculture (Directors and schedule officers) from the 10 SLWMP implementing districts, EPA, Forestry Commission and Ministry of Environment Science Technology and Innovation and a beneficiary farmer from each project implementing district made presentations on their respective sub-project implementation, watershed protection, successes, challenges, lessons learnt, and the way forward. It was envisaged that, the lessons learnt from this interaction will be implemented by all participants in their various regions and districts.

CHAPTER SIX

6.0. Science and Technology Applied in Food and Agriculture Development

Agricultural development and modernization is pivoted on the application of science and technology. The Council for Scientific and Industrial Research (CSIR) is one of the major research organizations within the National Agricultural Research Systems (NARS) and the main research wing of the Government of Ghana.

The Ministry in collaboration with the CSIR has introduced, the Research and Extension Linkage Committee (RELC) concept and a Competitive Agriculture Research Grant Scheme (CARGS) to promote demand driven research. The key development areas include: crops, livestock, fisheries and socio-economic research. Progress towards research in crop improvement to enhance food security and reduce poverty is prominent compared to other areas and as a result, many crop varieties have been developed and released to farmers for adoption.

6.1 Application of Technology in Agriculture

Agricultural technology that is affordable, user friendly and readily available to farmers enhances adoption. In line with that, the Ministry facilitated the production of improved planting material as a pre-requisite for good and optimum agricultural production and undertook adaptive trials of materials at the Agricultural stations in collaboration with relevant stakeholders. The Agricultural Stations, based in the 5 different agro-ecological zones facilitated the production and distribution of foundation seeds for cereals (maize and sorghum) and legumes (groundnut, soybean and cowpea). In total about 165 ha of cereals and 43.26 ha of legumes were cultivated.

In addition, about 3ha of yam mini setts and vine setts were planted at the Wenchi and Mampong Agricultural Stations. The Ministry further established a cassava museum at the Wenchi Agricultural Station, covering all varieties of cassava released in the country to serve as source of planting materials and also as a learning, educational and exhibition reference.
The Ministry also liaised with relevant research institutions (CSIR-SARI and CSIR-CRI) to conduct adaptive trials on selected crops for adaptability and promotion. A total of seven (7) adaptive trials on quinoa, cashew, cassava, yam, maize and cocoyam were conducted for their adaptability and promotion at the agricultural stations.

6.1.1 Release of Agricultural Technologies

The National Varietal Release and Registration Committee (NVRRC) is mandated to bring improved technology for farmers' application through recommendation to the National Seed Council for approval. To be able to satisfy increasing demands of productivity improvement, a number of technologies were developed and released. In 2015, five (5) hybrid maize, six (6) cassava and five (5) pearl/early millet varieties were released. Furthermore, 137 released crop varieties of 13 different genera were registered into the national list/catalogue. The release processes were supported by WAAPP as shown in Table 6.1.

Table 6. 1: Number of Varieties Released in 2015

Commodity	Number Released	Name of Commodity
Maize	4	Suhudoo, Kunjor-wari, Kpari-faako and Warikamana
Pearl Millet	5	Kaanati, Akad-Kom, WAAPP-Naara, Naad-Kohblug and Afribeh-Naara
Cassava	6	CRI-Duade kpakpa; CRI-Amansan; CRI-AGRA Bankye; CRI-Dudzi; CRI-Abrabopa and CRI-Lamesese

Source: DCS

These hybrid maize varieties are drought and striga tolerant and are adapted to all the agro-ecological zones of Ghana, more particularly to the Guinea and Sudan savannas which are most challenged with such constraints. The hybrids which are high yielding and enjoy farmer and or consumer acceptability are expected to contribute to increased productivity, food security and income.

In addition, during the year, 141 varieties of 12 different genera have been registered into the National list. Twenty five varieties of crop genera were also released and registered in the ECOWAS catalogue. Three agricultural stations (Wenchi, Babile, Kpeve) rehabilitated to be transformed into Technology Transfer Centres.

Furthermore, in a process to fully integrate climatic issues into agriculture, 25 technologies including released genetic materials and soil and water management have been assessed (qualitatively) and profiled for climate smart responsiveness. These technologies play a vital role in removal and storage of carbon from the atmosphere through physical or biological processes.

In a bid to secure Intellectual Property Rights (IPR) for released technologies in the country, a total of 191 potential technologies and innovations were identified for the IPR out of which 48 have received full copyrights status from the Registrar-General's Department.

6.1.2 Adoption of Improved Technologies

Low adoption of modern agricultural production technologies amongst farmers has been identified as one of the main reasons for the low agricultural productivity in the country. The contribution of technology to income growth can only be realized if new technologies for production are widely disseminated and used. In the year under review, a total of 418 improved technologies have been disseminated to 1,363,820 farmers across the country.

Results of a panel study conducted by WAAPP in 2015 involving a total of 750 respondents (495 producers and 255 processors) in 22 districts revealed that the rate of adoption of improved varieties increased over the period of evaluation (2013 and 2014). The adoption rate among 'with-districts' increased by 23.94 percent to 45.52 percent. Those of the 'without-districts' also increased by 26.90 percent. This shows more farmers are now adopting improved technologies for their farming business.

Technologies adopted by farmers are yielding results. The story of Ms Lucy Baah, one of the beneficiaries of a processing technology, has been documented in Figure 6.1.

Lucy Baah (Faati) is a cassava processor at Korkormu in the Akuapem North District of the Eastern Region who has received lots of support from MoFA/WIAD and other organizations in the form of training and exposure visits. As part of the reasons behind her success, the processor adopts and practices those technologies.

She added value to her Gari by fortifying it with coconut, pawpaw, soya bean, ginger, ripe plantain, orange fleshed sweet potato and garlic. This has helped her to increase her income from sales to customers who export her products. She has been able to build two improved smokeless stoves to cope with demand and also put up a new building.

Figure **6. 1:** *Faati demonstrating frying of Gari in a stainless steel pan*

Under the quality rice seed program supported 10,000 farmers with agro-inputs including 200 MT of quality certified seeds and 1,500 MT fertilizers. The Ministry also established 90 System of Rice Intensification (SRI) demonstrations and supported 12,342 farmers under the initiative countrywide. The initiative is expected to improve technology adoption in the country.

6.1.3 Laws and Regulations to Enhance the Application of Biotechnology in Agriculture

The focus of biotechnology considers two major areas; plant and animal biotechnology.
Ghana passed the Biosafety, Act 2011 (Act 831) and as part of it, the country is expected to benefit from capacity building outreach programs that would support science-based regulatory efforts and provide accurate information to the broader public on the positive benefits of biotechnology. Ghana now has the capacity for the development and production of modern agricultural biotechnology crops. With the passage of the Ghana Biosafety Act, 2011 (Act 831), some confined field trials on rice, soybeans etc. using modern agricultural biotechnology methods are being carried out by research institutes and universities in the country. Sensitization and awareness creation has been intensified across the country on the Plant and Fertilizer Act 2010 (Act 803) and the Biotechnology Bill is still on-going. The targets include: farmers, agro input dealers, security services, importers, researchers and judiciary.

As part of the implementation of the Plant and fertilizer Act, 2010 (Act 803) and its accompanying regulations, fourteen (14) fertilizer companies, 34 fertilizer products, 19 distributors and 249 fertilizer retailers have been registered during 2015. The enforcement of the regulations has to date resulted in the prosecution and imprisonment of one person for three years for faking fertilizer.

Table 6.2: Enactment of Laws and Regulations to enhance Application of Biotechnology

Years	Type of laws enacted to enhance application of biotechnology
2008	n/a
2009	n/a
2010	Plant and Fertilizer Act, 2010 (Act 803)
2011	Ghana Biosafety Act, 2011 (Act 831)
2012	Biotechnology Bill Plant Protection Regulations, 2012 (L.I.2193), Plant Fertilizer Regulation, 2012 (L.I. 2194) , Public Health Act , 2012
2013	n/a
2014	n/a
2015	Regulations on Biosafety Law (approved by Cabinet)

Source: Global Agricultural Information Network (GAIN), 2015

6.2 Agricultural Research Funding and Management of Research Information

It is a known fact that as population increases; food production should also grow at the same rate or even faster to feed the growing population. This could be achieved with little or no increases in the size of arable land and volume of water resources available. This therefore calls for more agricultural research funding and well-managed programs especially in the areas of competitive research for innovation and productivity gains.

6.2.1 Funding Of Agricultural Research

Using Council for Scientific and Industrial Research (CSIR) as a case, on the status of agricultural research funding, the indication was that most of the funds that go to CSIR for agricultural research are from programs and projects being implemented by the ministry. During the year under review for example, the Council received a total of three million six hundred and sixty five thousand and ninety cedis (GHC 3,665,090.00) from WAAPP for the implementation of agricultural research projects on roots and tubers in collaboration with the National Agricultural Research System (NARS).

6.2.2 Research Extension Linkages Strengthened and made Functional

The ultimate goal of the Research-Extension-Linkage system is to increase agricultural production. The complementary role of researchers generating technologies for extension officers to transfer to farmers and other stakeholders is a concept, which has helped in the development of agriculture in the country. Through this, the Ministry in collaboration with CSIR established the Research-Extension-Linkage Committee (RELC) to oversee the implementation of the concept.

During the period under review, a total of 20 problems that affect agricultural productivity in the various agro-ecological zones were identified for consideration during the 2015 RELC planning meetings. Out of these, the CARGS Board has considered 9 for award, which are:

- The presence of obnoxious graminaceous weeds in rice fields in the Western Region
- The woody tuber disease in yam cultivated in the Afram Plains of the Eastern Region.
- The 'Jamporo' disease characterised by disfigured cormels and rotting cormels in cocoyam found in the Brong -Ahafo Region.
- The white mole rat destruction of cassava tubers on farmers' fields in the Eastern Region
- Problematic Cylas infestation in sweet potato production and storage in the Central Region.
- Citrus brown spot disease in the Volta Region.
- Ethno-veterinary health management options for small ruminants in the Upper East and greater Accra Regions.
- Millipede infestation in farm lands for roots and tubers as well as vegetables in the Western Region.
- Field pests and diseases on cereals and legumes in the Upper West Region

The expectation is that these researchable areas would receive the needed funding to resolve farmers' problems on time to increase production.

Table 6.4 shows that over the periods 2011-2014, an average of 32 planning meetings were held per annum. The average participation was 63 (female participation – 58%).

Table* 6.3*: Research-Extension-Linkage Committee Activities

Item	**2008**	**2009-2010 (Avg)**	**2011-2014 (Avg)**	**2015**
Number of RELC Planning Meetings	81	88.5	32	10
Average Number of Participants (per planning meeting)	46	76	63	59.2
Percentage of female participation (%)	27	6	58	45
Number of problems recommended during planning meeting	428	304	127	20
Number of problems researched and completed	0	-	13	0
Percentage of problems resulting from RELC researched into	46	24.8	15	45
Number of problems being researched into	198	75	19	9
Level of participation by category in Research Extension Linkages Committee meetings (%)				
Farmers	39	42	33	19
AEAs	21	28	27	39
Private Sector	10.7	11	26	18
NGOs	7.7	8	8	7
Others	21.6	10	17	17
Total	**100**	**100**	**100**	**100**

Source: RADU's

CHAPTER SEVEN

7.0 Improved Institutional Coordination

Observations made from the agricultural working environment indicate that qualitative and quantitative data are very essential in reporting. Governments, agencies, ministries, non-governmental organisations, farmers and other stakeholders need information on agricultural sector performance. This may be for investment, policy and other purposes. Achievements relating to adopted agricultural technologies should be made available and accessible to the government, investors and other stakeholders for decision making. Free flow of information and feedbacks from collaborating institutions should be promoted. This is expected to enhance coordination among institutions leading to effective and efficient implementation of programmes, projects and policies. For the sector to develop holistically there is the urgent need to strengthen and improve data management and information flow.

7.1 Strengthening Intra/Inter-Ministerial Coordination

Effective coordination plays an important role in addressing key institutional and ministerial challenges by stimulating innovation through new methods, tools and standards. These challenges require the mobilization of significant resources which can be pooled from various stakeholders. Over the years, the Ministry coordinates its activities through various platforms but with moderate results. Continuous and greater coordination are critical for the successful achievement of the Ministry's objectives and targets.

The overall objective of ministerial coordination is to ensure coherence between initiatives and strategies of various stakeholders including Ministries, Departments and Agencies (MDAs) that are engaged in agriculture. This enhances collaboration and synergy for effective and efficient implementation of programmes. Key among these MDAs are Ministry of Lands and Natural Resources, Environmental Protection Agency, Ministry of Trade and Industry, Department of Feeder Roads, MoFAD, among others.

In 2015, the Government of Ghana instituted the National Fish Festival as a way of recognizing the role of the fisheries sub-sector in the development of the economy. The maiden edition organized in 2015, provided an interactive platform for fishers, fisheries managers and policy makers. This exposed fishers to more efficient and less harmful fishing technologies. The organisation was done in collaboration with the Greater Accra Regional Coordinating Council (GARCC), National Fisheries Association of Ghana (NAFAG), Ministry of Tourism, Gender and Creative Arts, Ghana National Canoe Fishermen Council (GNCFC), Ghana Industrial Trawlers Association (GITA) and MoFAD.

7.1.1 Strengthening Capacity for Planning, Monitoring and Evaluation

Effective and efficient monitoring and evaluation is needed to track performance of activities in the agricultural sector. Coordination is central to Monitoring and Evaluation (M&E), and for a comprehensive assessment of agricultural activities, there is the need to develop and

establish a monitoring and evaluation framework. There are notable constraints in the agricultural sector in the data management environment. Key among these are inadequate data, poor data management and incomprehensive and untimely submission of data.

The Ministry addresses these constraints by updating its database on agriculture, training staff in data capturing, analysis and data management through the Ghana Agricultural Production Survey (GAPS), and harmonizing indicators in the agricultural sector.

7.1.1.1 Agricultural Census

The conduct of the agricultural census has been delayed for decades. The last census conducted in Ghana was in 1984/5. A new one has been planned to be implemented over a four-year period – November, 2013 to November 2017 and in four phases.

- **Phase I** which is the preparatory stage was to span a period of two years from November 2013 to November 2015.
- **Phase II** will involve carrying out complete enumeration to collect information on basic indicators from agricultural holdings of households and institutional farms covering sixteen (16) core items.
- **Phase III** will include the implementation of the Comprehensive (Supplementary) module, which is expected to generate detailed information on Crops and Livestock and the Thematic Modules which involve the collection of information on horticulture, forestry, fisheries, post-harvest losses and use of fertilizers on holdings among others; and
- **Phase IV** will be devoted to the preparation of technical reports and dissemination of the results from the Comprehensive and Thematic modules.

The preparatory phase (Phase 1) of the agricultural census was completed in 2015 with support from the Food and Agricultural Organisation (FAO) at a cost of US$370,000.00. By 2014, the Government of Ghana had provided GH¢5.00 million out of budgeted amount of GH¢22 million.

7.1.1.2 Ghana Agricultural Production Survey

As part of the strategy to strengthen the agricultural statistics system in the country, an enhanced form of the Multi Round Annual Crops and Livestock Survey (MRACLS) called the Ghana Agricultural Production Survey (GAPS) was launched in 2011, with support from USAID. The survey was first piloted in 2011 major season and 2012 minor season in 20 districts. In the 2013 minor season, it was up-scaled to 60 districts across the country.

In the 2015/16 agricultural season, GAPS was refocused in 50 districts in the three regions of the north and 7 in the Brong Ahafo Region. Key outputs of the 2015 GAPS include:

a) Listing of farmers (40 Enumeration areas per district) completed
b) Holding enquiry completed
c) Selected field areas measured
d) Yield plots established and yields estimated
e) Holding enquiry of Commercial Farms also completed

7.1.1.3 Harmonization of Core Indicators in the Agricultural Sector

Activities to harmonize the core indicators in the agricultural sector commenced in 2014 and continued in the year 2015. To allow for broader consultations, zonal workshops were organized. The workshop for the southern zone was organized in 2014 while that of the northern and middle zones were held in 2015. A draft core indicator matrix is ready awaiting national and final consultation.

In a similar vein, a mission was organized to all ten regions where opportunity was given to all regional and district department of agriculture staff to familiarise themselves with the proposed Department of Foreign Affairs Trade and Development (DFATD) indicators for assessing performance under the up-coming budgetary support by the Government of Canada to the agricultural sector. The team was made up of consultants from DFAT-D and the Monitoring and Evaluation Directorate (MED). This afforded the Departments of Agriculture the opportunity to review the regional and district sections of the Performance Monitoring Framework (PMF) and reporting in their various departments. This also gave the RCCs an insight into the operations of Department of Agriculture in the various regions.

7.2 National Implementation Efficiency Ratio

The efficiency and effectiveness of cost centre planning, budgeting, co-coordinating and using of resources is shown by the Implementation Efficiency Ratio (IER). IER is the ratio of the number of activities that was planned and budgeted for as against the number that has been implemented and completed on schedule. The IER for the Ministry for the period 2008 to 2015 averaged 73 percent with the highest of 82 percent recorded in 2010 and 2011. The reporting period, 2015 recorded the lowest of 55 percent. This is against a national implementation efficiency target of 80 percent for the year 2015. The IER experienced a consistent decrease from 2011 to 2015. The decrease in trend can probably be attributed partly to inadequate and late release of funds and increasing cost of goods and services which most often affect implementation of prioritized activities.

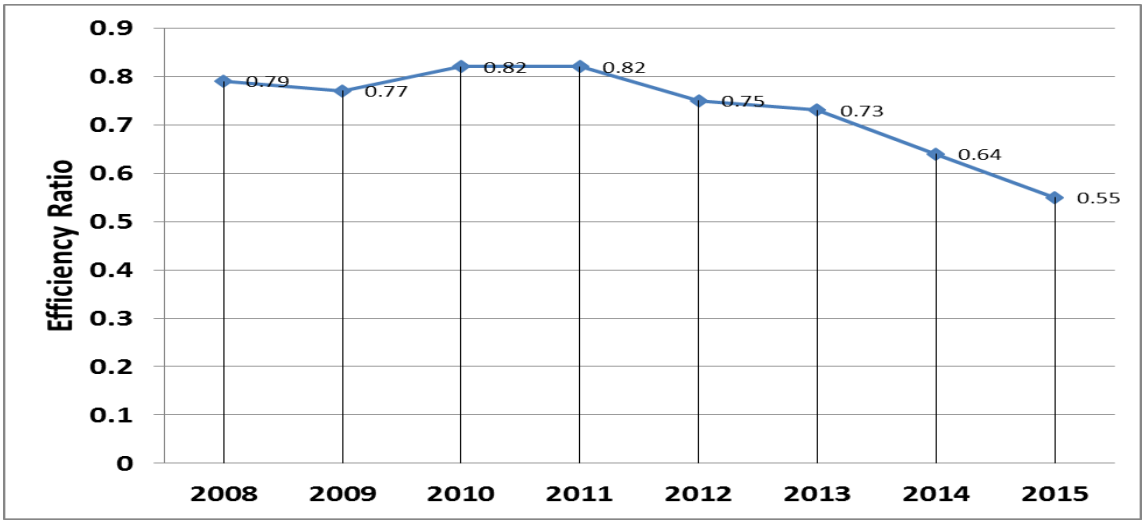


*Figure **7. 1: Implementation Efficiency Ratio*** ***Source: Computations from RADU Reports, 2015***

7.3 Human Resource and Capacity Development

Human resource and capacity development lies at the heart of economic, social and environmental development. It involves empowering people by promoting their contributory capacities that they bring to bear on the improvement of the quality of life, communities, enterprises, societies and institutions. The concept is expressed mainly through staff development in this report.

7.3.1 Staff Development

Staff development can be viewed as the activities and programs (formal or informal and on or off campus) that help staff members learn about responsibilities, develop required skills and competencies necessary to accomplish institutional and divisional goals and purposes, and grow personally and professionally to prepare themselves for advancement in the institution and beyond. Although staff development encompasses all the foregoing, training of staff has been used broadly to assess the extent of staff development. Training is an integral part of staff development. Staff training has been segmented into foreign, local and in-service training.

7.3.1.1 Foreign Training

Foreign training represents official trainings that have been undertaken outside the boarders of Ghana. This helps expose staff to new technologies and new ways of solving current challenges in the sector. During the year under review, a total of 52 staff of which 25 percent were women participated in a number of foreign training courses (Table 7.1). The trainings, made up of mainly short courses, exposed the participants to best practices in various aspects of agriculture. They returned with broadened horizons and the willingness to adopt these best practices at their various places of work.

Table 7.1: Staff Participation in Foreign Training

COUNTRY	**COURSE (TOPIC)**	**No. OF PARTICIPANTS**		
		M	**F**	**TOTAL**
China	Tropical Fruit and Vegetable and Processing Technology for Developing Countries.	4		**4**
	Circulation System Construction of Agricultural Products for Developing Countries.	2		**2**
	Agricultural Environment Technologies of Arid Areas for Developing Countries.	4		**4**
	Management of Protected Agriculture for Developing Countries.	3	1	**4**
	Cereal and Tuber Crops Processing Technology for African English Speaking Countries.	1	3	**4**
	Agriculture and Animal Husbandry Development for English Speaking Countries.	4		**4**
	Cotton Planting Technology Co-operation for English Speaking Countries.	3	1	**4**
	Hybrid Rice Comprehensive Technology for Developing Countries.	4		**4**
	Soil and Water Conservation and Dryland Farming for Developing Countries.	2	2	**4**
	Agricultural Environment Controlling Technologies of Arid Areas for Developing Countries.	1	3	**3**

COUNTRY	COURSE (TOPIC)	No. OF PARTICIPANTS		
		M	F	TOTAL
	Operation and Maintenance of Small- Scale Agricultural Machinery for Developing Countries.	3	1	**4**
	Cotton Processing, Textile and Trade for Developing Countries.	3	1	**4**
	Import- Export Commodity Quality Inspection Officials of African Countries.	3	1	**4**
	Master's Degree Programme In Agronomy	1		**1**
India	Regional Plant Health Analysis Programme	1		**1**
Total		**39**	**13**	**52**

Source: Human Resource Development and Management Directorate, 2015

7.3.1.2 Local Training

A total of seven (7) staff participated in a number of academic training courses organized locally. These are indicated in Table 7.2. With ceding of the districts and regional staff to the Local Government Service (LGS), staff strength has reduced and this explains the reducing numbers of officers pursuing academic programmes. Efforts are being made to capture officers trained in the decentralized departments.

Table 7.2*: Local Training*

Course (Topics)	Duration, years	No. of Participants		
		M	F	Total
BSc. Agricultural Extension	2	2	0	2
MSc. In Extension and Livelihood	2	1	0	1
BSc Agric. Science Education	2	1	0	1
BSc. Information Technology	2	1	0	1
BSc. Human Resource Management	3	1	0	1
BA. Business Administration (Accounting & Finance)	4	0	1	1
TOTAL		**6**	**1**	**7**

Source: Human Resource Development and Management Directorate, 2015

7.3.1.3 In-Service Training

In-service training is the kind of training organized for staff while on the job, i.e. not moving out of their office environment. It is normally centred on topics related to the roles and responsibilities of the staff. During the year, staff participated in a number of training courses organized locally as indicated in Appendix 6. Some of the topics treated include report writing, speech writing, and research methodology among others. Some of the key output/outcomes of the trainings include:

- Enhanced and proper understanding and comprehension of different documented forms of information
- Improved communication skills and proper documentation of information
- Enhanced professionalism and technical writing ability
- Improved speech and oral presentations

- Improved research abilities of beneficial employees in undertaking research exercises
- Enhanced understanding and comprehension of research work by beneficial employees
- Enabled a more efficient and effective data collection and utilization

In addition to the above, training was also carried out in financial and procurement management processes. This ensured that practitioners in the sector complied with international standards and professionalism. Efforts were made in 2015 to bring to speed staff in modern and international practices. In this regard, a member of staff was trained at GIMPA on procurement and contract management. This training programme is expected to help the beneficiary deliver real strategic and sustainable value for money.

7.3.1.4 Exit of Staff

During the period under review, a total of twenty-three (23) members of staff exited the Ministry for various reasons. Retirement accounted for fifteen (15) representing 65.2 percent, seven (7) representing 30.4 percent, resigned and one person (4.4 percent) vacated post.

7.4 Collaboration between MoFA and other MDAs

The Ministry has institutionalized various platforms through which it shares policies, programmes and new initiatives among others for smooth implementation. These are to strengthen collaboration between MoFA and its stakeholders. Some of the platforms are Agricultural Sector Working Group (ASWG) meeting, Joint Sector Review (JSR) and Strategic Analysis and Knowledge Support Systems (SAKSS). These platforms have reduced duplication of roles, enhanced efficiency and monitored progress of implementation of activities in the sector.

7.4.1 Agricultural Sector Working Group (ASWG) Meeting

The Agricultural Sector Working Group (ASWG) is one of the various platforms on which MoFA interacts with some of its key stakeholders. During 2015, the number of sub-groups on this platform was re-organized and reduced from three to two. The governance sub-group was subsumed into the policy harmonization sub-group. This was to encourage broader consultations and enhance efficiency. The ASWG met three times in the year instead of the six, planned. This slowed activities of the sub-working groups.

Some key achievements by the platform during the year include;

- Coordinated the identification and mapping of key existing investment areas and produced a draft matrix. The purpose of the database was to build and continuously update data on investments activities by the partners. It is also expected to help reduce duplication, improve complementarity and synergy, and enhance geographical targeting of interventions
- Directed and supervised the organization of 2015 Joint Sector Review
- Made follow ups on recommendations of 2014 Joint Sector Review.
- Quarterly Business Meetings have been introduced and held as one of the strategies to improve governance of the sector.

- Representation on the ASWG meetings has been widened further to increase private sector operators, Farmer Based Organizations, and CSOs.

7.4.2 Joint Sector Review

The Joint Sector Review (JSR), initiated in 2008, is to foster policy dialogue, harmonize priorities and programs within the agricultural sector. The JSR provides a forum for key stakeholders such as MoFA, DPs, MDAs, Private Sector and Civil Society Organizations. This is to share and discuss achievements, implementation challenges, and progress on strategic reforms during the preceding year and to reach consensus on the sector priorities for the following year. It is expected that the findings and recommendations of the JSR would inform and shape future plans and budgets and focus of DPs' support. This is in line with the Paris Declaration and Accra Agenda for Action (AAA) on improved harmonization and coordination.

In this regard, the Government of Ghana (GoG) and DPs in the agricultural sector have been making efforts to streamline and harmonize their development interventions to achieve the common sector objectives. Key achievements of JSR in 2015 include but not limited to;

- In-house review of M&E framework of programmes / projects that are being implemented by MoFA and harmonized same along the METASIP programme objectives.

The Ministry is making efforts to replicate these platforms in the regions and possibly in the districts. In the Northern Region for example, the Northern Sector Agriculture Investment Coordination Unit (NSAICU) has been initiated. NSAICU was created in 2013 under a two-year grant agreement between the Alliance for Green Revolution in Africa (AGRA) and the Government of Ghana. The unit is to assist the Ministry to coordinate the implementation of a Bread Basket Strategy (BBS). This strategy is designed to increase agricultural productivity and incomes in the Northern Region of Ghana. Key achievements of the coordination unit include;

- Established a database of agricultural private stakeholders including NGOs for the three regions – Northern, Upper East and West Regions. This databank serves as a quick reference point for partner information.
- Facilitated district level planning sessions by bringing together agricultural sector stakeholders at the District level for programme planning, coordination and harmonization of partner activity. This resulted in better planning in the districts.

7.4.3 Strategic Analysis and Knowledge Support System (SAKSS)

SAKSS is a network of experts in the agricultural sector that seeks to facilitate strategic analysis, knowledge management and capacity building towards evidence-based policies and decision making that can accelerate agricultural development. The establishment of SAKSS at the regional and national levels was a mechanism to effectively implement the Comprehensive Africa Agricultural Development Programme (CAADP) that seeks to eliminate hunger and reduce food insecurity in Africa.

SAKSS in Ghana started functioning smoothly after its inauguration in 2011, but became dormant for some time, due to various reasons including inadequate financial resources and dwindling enthusiasm of members. Even within the challenges, some key activities were implemented. Key outputs of SKSS activities in the year include;

- Recruited Technical Coordinator (TC) and Research and Operations Assistant (ROA)
- Reviewed action plans of all thematic groups
- 27 SAKSS members were trained in policy formulation, evaluation and analysis

7.4.4 MoFA – DPs Coordination and Collaboration

Coordination between MoFA and its partners is to allow the Development Partners (DPs) and Ministries, Departments and Agencies (MDAs) fund a common agricultural strategy. The design and formulation of Ghana Agricultural Transformation Agenda (GATRA) is based on this principle. GATRA is a sector wide investment programme that seeks to direct all investments from government and development partners. In 2015, a draft program concept document was developed and approval obtained from MoFA Management to carry on with the programme development process.

7.5 Financial Allocation, Releases and Expenditure

Budgetary allocations are integral components of annual financial plans, or budgets, of the Ministry. They indicate the level of resources MoFA is committing to a budget line item. Without allocation limits, expenditures can exceed revenues and result in financial shortfalls. This section highlights approved budgets, releases and expenditure of the Ministry, in 2015.

Against the approved budget of GH¢411.82 million, total funds released during the year amounted to GH¢262.89 million representing 63.8 percent, whereas the actual expenditure amounted to GH¢276.62 million representing 105.3 percent of the total amount released. The expenditure amount exceeded the amount released because of increased employee compensations and payment of outstanding commitment from previous years.

In addition to the actual releases, the Ministry received from the Non-Road Fund Arrears, an amount of GH¢55.02 million. An amount of GH¢5.44 million was also received from refunds, interests earned on bank balances and foreign exchange. Both receipts had not been factored into the budget. The Ministry therefore received a total inflow of GH¢323.35 million made up of budgeted amount of GH¢262.89 million and unbudgeted amount of GH¢60.46 million.

7.5.1 Total Inflows from Funding Sources

As stated earlier, the total revenue received out of the approved budget of GH¢411.82 million for the year 2015 amounted to GH¢262.89 million representing 63.8 percent. GoG component of inflows is made up of Compensation of Employees, Goods & Services and Assets.

Table 7.3: Approved 2015 Budget against Actual Releases in Million Cedis

Budgeted Revenue	Approved Budget (GH¢ million)	Actual Annual Releases (GH¢ million)	Percent Released
GoG Funds	59.63	62.97	105.60
ABFA	204.00	30.00	-14.71
Internally Generated Funds	1.81	1.82	100.55
Donor Funded Projects	146.39	168.10	114.83
Sub-Total	***411.83***	***262.89***	***63.83***
Non Budgeted Revenue			
Non-Road Fund	-	55.02	-
Others	-	5.44	-
Sub-Total		***60.46***	
Total	411.83	323.35	

Source: Annual Financial Report, 2015

Table 7.4: GoG Component of Revenue against Budget, 2015

Budget Item	Approved Budget GH¢ million	Amount Released GH¢ million	Percent Released
Compensation of Employees	53.16	59.72	112.34
Goods & Services	5.47	3.25	59.41
Assets	1.00	-	-
Total	**59.63**	**62.97**	**105.60**

Source: Annual Financial Report, 2015

7.5.2 Availability of Credit to the Agricultural Sector

Actors in the agricultural sector need adequate and timely credit to support their operations. With the relatively low growth rate and the declining contribution of the sector to national GDP in recent times, more needs to be done to boost the performance of the sector. Sources of data on credit to the sector as presented in this report, in the main, is the Bank of Ghana with specific cases of Agriculture Development Bank. However, the provisions of credit by EDAIF, OVCF and credit facilitated by NRGP have also been highlighted.

7.5.2.1 Distribution of Outstanding Credit to Agricultural Sector by Bank of Ghana

According to Bank of Ghana, the percentage of outstanding credit to the agricultural sector (including cocoa) compared to credit to all sectors has consistently decreased over the years. It has reduced from 6.7 percent in 2011, 4.26 percent in 2013 and 3.66 in 2015. This may be due to the quantum of credit going to the agricultural sector, in relation to the other sectors, is decreasing by the year. The volume of outstanding credit by money deposit banks to all sectors in the economy has however, been on the rise. It increased by 44.81 percent over the period (from ₵6,674.72 million in 2011 to ₵305,795.13 in 2015).

Table 7.5: Trends of Outstanding Credit

Items	Periods (GHC 'million)				
	2011	**2012**	**2013**	**2014**	**2015**
Agric., Forestry and Fisheries	6,054.33	7,312.27	7,078.79	9,467.42	11,650.85
Cocoa Marketing	34.86	599.54	600.6	744.02	756.82
Total Agriculture	6,089.19	7,911.81	7,679.39	10,211.44	12,407.67
All Sectors	6,674.72	137,791.78	180,359.30	260,572.91	305,795.13
Agriculture as percentage of total (percent)	6.71	5.77	4.26	3.92	3.69

Source: Bank of Ghana

From Table 7.5, a little over Nine Thousand Four Hundred and Sixty Seven million Cedis (GH ₵ 9,467.42) was given to agriculture, forestry and fisheries in 2014 as against about Eleven Thousand Six Hundred and Fifty Million Cedis (11,650.85) in 2015. The average interest rate for the years 2014 and 2015, are 27.01 percent and 28.62 percent respectively. The increase in general interest rate has contributed to an increase in default rates in agricultural loans in the economy. The rate of default of agricultural loans was 23.32 percent and 29.10 percent for 2014 and 2015 respectively.

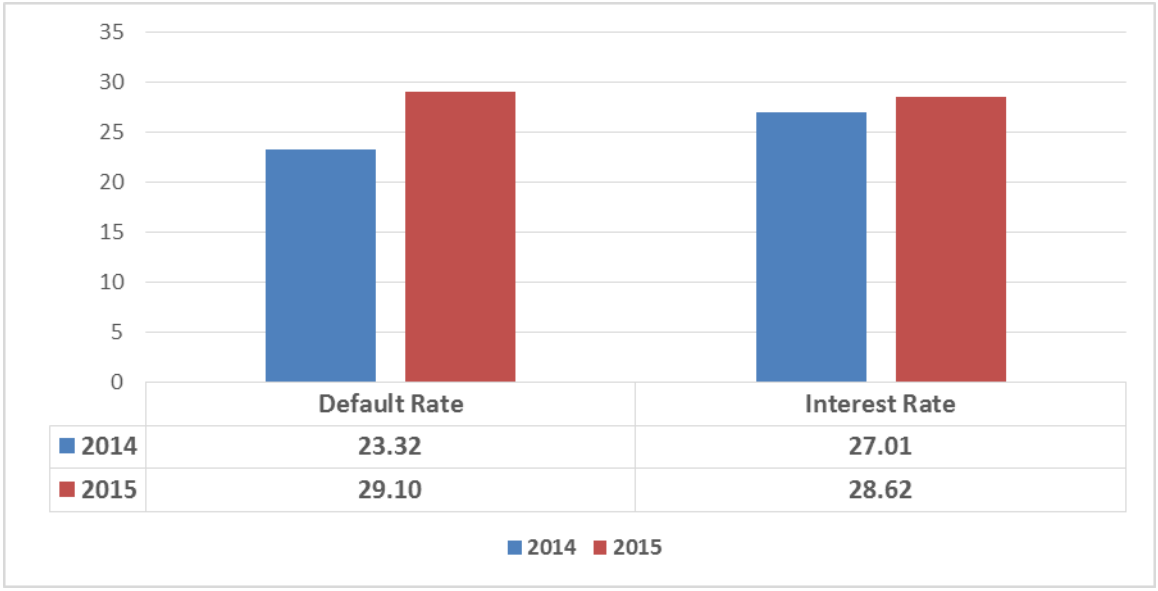


Figure **7. 2:** *Agricultural Interest and Default Rates, 2014/15*

7.5.2.2 Loan by Agricultural Development Bank (ADB)

The Agricultural Development Bank is by far the main bank supporting the agricultural sector. However, over the years, the total loan approval to the agricultural sector by ADB has not been consistent. From as low as about Fifty Two Million Ghana Cedis (GH₵ 51.99M) in 2008, it increased to about One Hundred and Forty One Million Ghana Cedis (GH₵ 140.63)

in 2010. This has however been declining in recent years to a little over Sixty Six Million Cedis in 2013. This improved a little in 2014 and dropped again in 2015, (Figure 7.3).

The average annual growth rate of ADB loans to the agricultural sector over the METASIP implementation period (2011– 2015) is about 7 percent. With the rate of expansion of the other sectors of the economy, more needs to be done to at least maintain the contribution of the agricultural sector to the economy.

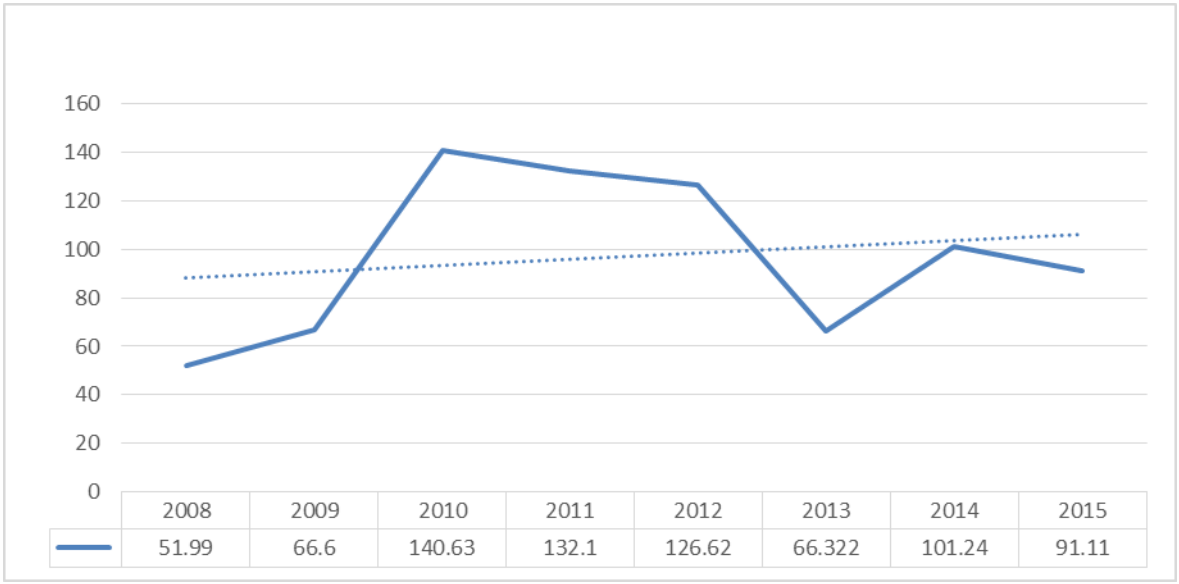


Figure **7. 3***: Total loan approval to the Agricultural Sector by ADB (*GH¢ *Million)*
Source: ADB

Table 7.6: Loan Approval to the Agricultural Sector by ADB (GH¢ Million)

Subsector/Year	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Agricultural Production	10.47	11.31	76.51	33.42	88.43	42.111	47.4	57.75
Agro-Processing	6.17	8.23	45.52	84.51	35.14	18.83	46.7	15.47
Agro-Marketing	32.5	42.03	14.98	12.92	0.61	5.381	7.17	4.39
Agro-Export	2.85	5.03	3.62	1.25	2.44	-	-	13.5
Total	**51.99**	**66.6**	**140.63**	**132.1**	**126.62**	**66.322**	**101.24**	**91.11**

Source: ADB

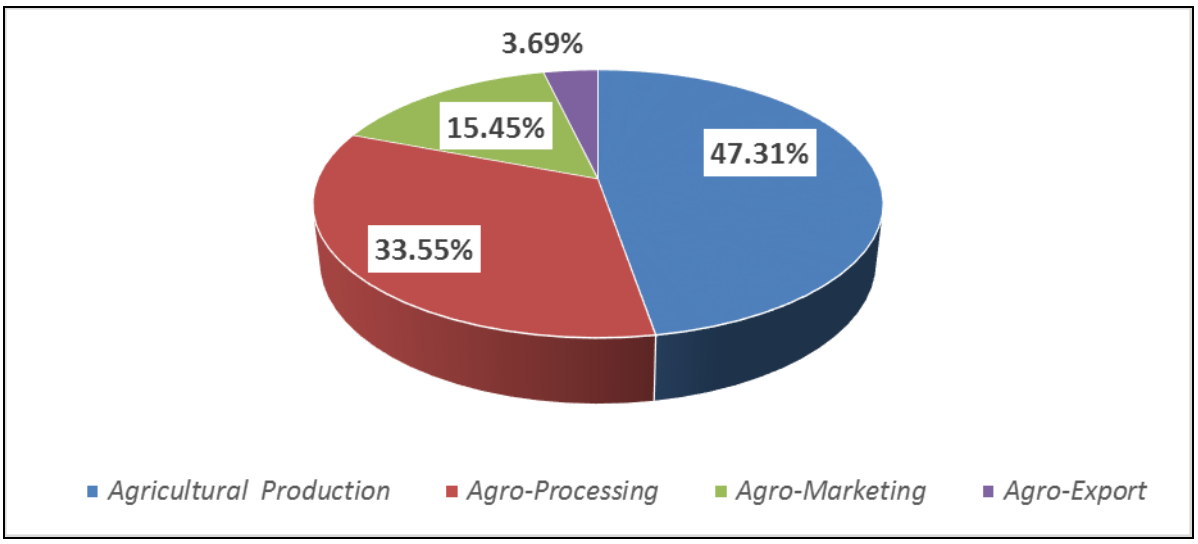


Figure **7. 4***: Total loan to agricultural sector by ADB (2008-2015)*

A large portion of the ADB loans (47.31 percent), over the 2008-2015 periods, were for agricultural production with about 3.69 percent for export of agricultural produce, (Figure 7.4). From Figure 7.5, in the years 2008 and 2009, agro marketing had the highest share of the loan given out by ADB. Agricultural production took over in the 2010 and remains the highest beneficiary except 2011 where agro processing had the largest share.

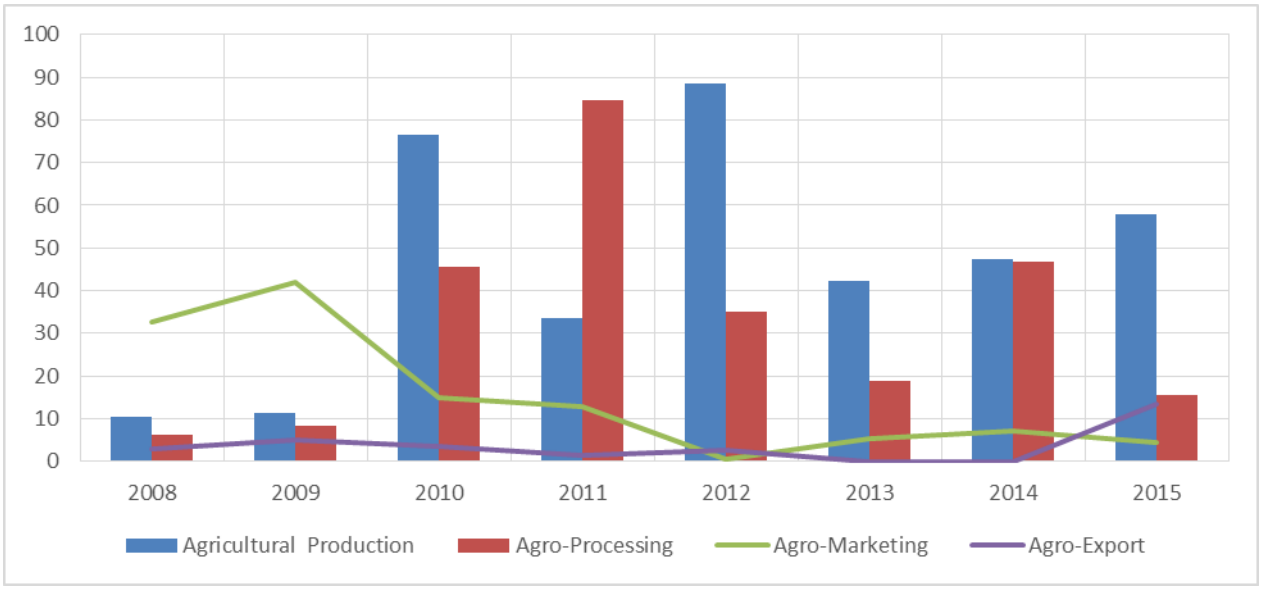


Figure **7. 5** *: Total Loan to various sub-sectors by ADB*

7.5.2.3 Loan Disbursement by EDAIF

By December, 2014, the Export Development and Agricultural Investment Fund (EDAIF) disbursed a total of over GH¢ 199 million, 24 percent of which was grant. In 2015, the fund disbursed over GH₵45 million, 27.26 percent of which was grant. Almost 62 percent of the total loan over the period, went to agro-processing and export. About 46 percent of this share

is made up of grants. From Table 7.7 there was no support to Ghana Irrigation Development Authority and Mango Project Account in 2015.

Table 7.7: Loan Disbursement by EDAIF

No	Sector	Amount Disbursed (GH¢)			Percentage
		2014	2015	Total	
1	Agro-Processing and Exporters (Grant)	28,965,143.97	12,355,840.82	41,320,984.79	28.20
2	Agro-Processors and Exporters (Credit)	23,408,641.10	25,567,553.99	48,976,195.09	33.43
3	Project Account (Poultry)	3,523,675.00	5,090,848.80	8,614,523.80	5.88
4	Project Account (Rice)	21,466,053.00	2,309,316.00	23,775,369.00	16.23
5	Project Account (Mango)	3,993,572.84	n/a	3,993,572.84	2.73
6	Ghana Irrigation Development Authority	19,822,026.00	n/a	19,822,026.00	13.53
TOTAL		**101,179,111.91**	**45,323,559.61**	**146,502,671.52**	**100.00**

Source: EDAIF

The rice project account went into the support of 1,000 rice farmers (with at least 20 percent females) in the form of agro-inputs including 900 mt of certified seeds, 4,000 mt of fertilizers, 90,000 litres of weedicides and 270,000 jute sacks.

7.5.2.4 *Performance of the Out-grower and Value Chain Fund*

The Out-grower and Value Chain Fund (OVCF) project has been in operation since 2011. The cumulative number of out-growers supported as at December 2015, stood at 2,866. They were in the areas of maize-soya-sorghum, rubber, cassava, rice and oil palm. From the Table 7.8 more outgrowers were engaged in maize-soya-sorghum than the remaining crops. On areas cultivated for the various crops, rubber and maize had equivalent areas of 1,656ha each. This was followed by cassava with a cultivated area of 350ha. By December 2015, the cumulative volume of credit disbursed to Technical Operators (TOs) and Outgrowers was about GH¢21million. The total disbursements undertaken in 2015 amounted to about GH¢6million.

Table 7.8: Performance of the OVCF, 2014 and 2015

Scheme #	Commodity	Number of Outgrowers per Scheme			Volume of Credit Disbursed to TO and Outgrowers				
		2011-2014	2015	Cumulative	2011- 2014		2015		Cumulative
					(TO)	Outgrowers	(TO)	Outgrowers	
1	Rubber	588	293	881	-	3,022,580.28	-	2,721,168.88	5,743,749.16
2	Oil Palm	77	23	100	514,900.00	215,044.00	273,034.50	189,839.00	1,192,817.50
3	Rice*	136	-	136	9,599,500.36	546,534.00	-	-	10,146,034.36
4	Pineapple	63	31	94	601,140.00	393,130.00	-	-	994,270.00
5	Maize-soya-Sorghum*	1,655	0	1655	-	-	-	2,000,000.00	2,000,000.00
6	Cassava	-	125	125	-	-	811,540.00	-	811,540.00
Total		**2,519**	**347**	**2,866**	**10,715,540.36**	**4,177,288.28**	**1,084,574.50**	**4,911,007.88**	**20,888,411.02**

Source: OVCF, 2015 Annual Report

7.5.2.5 Facilitation of Credit Disbursement by NRGP

As part of an objective of strengthening linkages with Financial Institutions (FI), especially in the three regions of the north, the Ministry, through the Northern Rural Growth Programme (NRGP) and other stakeholders, has been linking FBOs to selected FIs over the years. This undoubtedly has improved access to financial services by smallholder farmers, women, micro entrepreneurs and agro-businesses. As a result, in 2015, 277 FBOs got their credit released/disbursed, amounting to GH₵1.5 million. Twelve others also got their loan applications approved.

In Table 7.9, Upper East Region had the highest number of FBOs benefiting (184) with a total amount of GH₵896,593.00. The Upper West Region recorded the lowest credit disbursement with 9 FBOs benefitting a total amount of GH₵79, 990.00. Many of the FBOs decided not to access the credit because the rains delayed. In some cases, the loans were approved late. Available monitoring reports revealed that, farmers postponed the use of the credit to the following cropping season, to avoid high default rates.

Table 7.9: 2015 Credit Disbursements

Region	Credit request		Amount Approved		Amount disbursed	
	No. of FBOs	Amount (GH¢)	No. of FBOs	Amount (GH¢)	No. of FBOs	Amount (GH¢)
UER	325	2,383,009.00	194	1,019,082.00	184	896,593.00
UWR	42	543,360.00	9	79,990.00	9	79,990.00
NR1	212	1,761,904.00	22	169,100.00	20	157,500.00
NR2	217	1,761,948.60	49	206,040.00	49	185,436.00
BAR	26	264,070.00	15	188,141.00	15	188,141.00
Totals	**822**	**6,714,291.60**	**289**	**1,662,353.00**	**277**	**1,507,660.00**

Source: NRGP, 2015 Report

7.5.2.6 Loan Recovery, 2015

As per normal banking practice, loans advanced need to be collected. Efforts toward collection of these loans have been largely successful. Averagely, each region recovered 89.85 percent of the loan. About 93 percent of the total loan has been recovered. Table 7.8, has the details of loan recoveries in the three beneficiary regions.

Table 7.10: Loan Recoveries, 2014&2015

Regions	FBOs	Loan + Int. (GH¢)	Amount repaid (GH¢)	Amount Outstanding (GH¢)	Percent Recovery
UER	109	521,796.59	504,438.53	17,358.06	96.67
UWR	8	148,091.71	118,312.13	29,779.58	79.89
NR1	32	228,700.00	210,968.00	17,732.00	92.25
NR2	101	54,858.02	45,812.26	9,045.76	83.51
BAR	14	166,703.09	161,614.09	5,089.00	96.95
Total	**264**	**1,120,149.41**	**1,041,145.01**	**79,004.40**	**92.95**

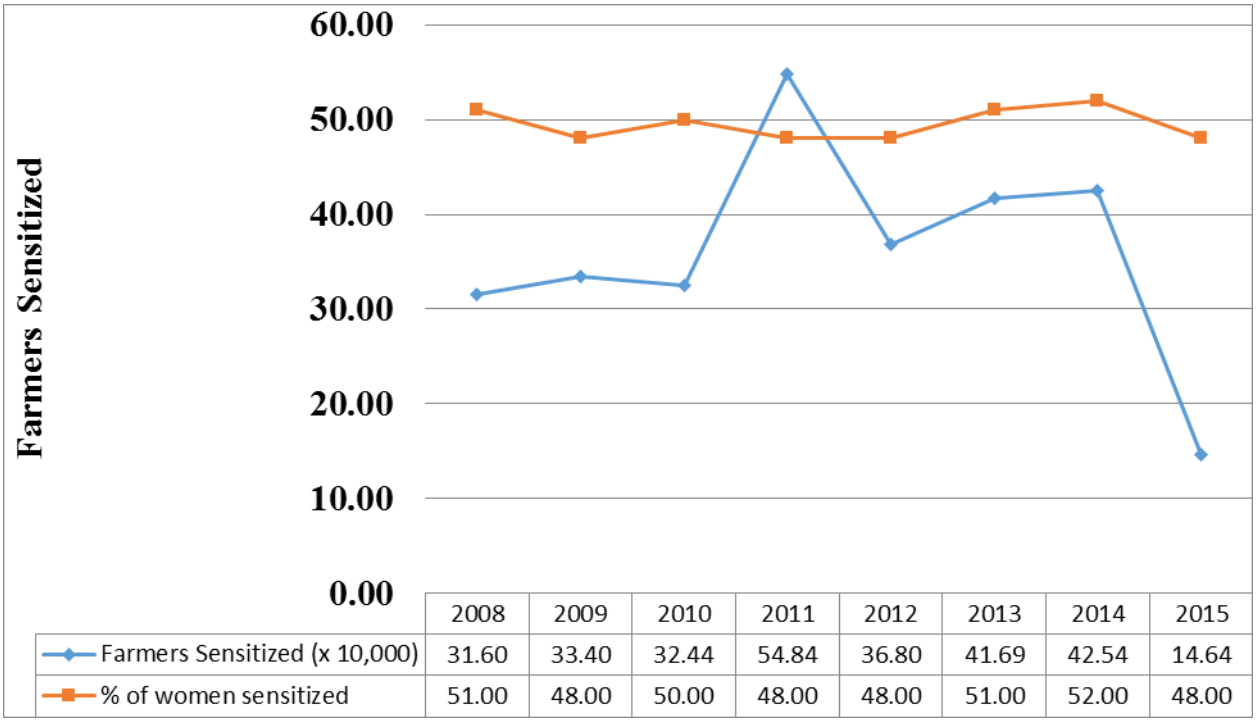
Source: NRGP, 2015 Report

The Association of Church Development Projects (ACDEP) is one of the facilitating agencies engaged by NRGP is to develop and implement Value Chain development plans in the programme area. As at the time of reporting, credit recovery with support from of ACDEP stood at 92.95 percent with Brong Ahafo Region having the highest recovery rate of 96.95 percent. The Upper West Region recorded the lowest rate of 79.89 percent. However, loan recovery for the previous year (2014) is still in progress through facilitation from ACDEP, and DVCCs/PFIs which are pursuing joint loan recovery campaign mechanisms.

7.6 HIV/AIDS

The continuous sensitization carried out by the various departments of agriculture and their respective stakeholders is yielding positive results. According to the GDHS, 2014, 77 percent of women and 86 percent of men (aged 15-49) know that, consistent use of condoms prevents the spread of HIV. Eighty-four percent of women and 92 percent of men know that limiting sexual relationship with one faithful and uninfected partner can reduce one's chances of contracting HIV. The proportion of women and men with this knowledge are 70 and 82 percent, respectively.

Though the participation of women has not been regular over the period, (Figure 7.7), the results show that currently 70 percent of women are aware of the preventive measures of the disease. More efforts however, must be made for a hundred percent coverage for both men and women.



	2008	2009	2010	2011	2012	2013	2014	2015
Farmers Sensitized (x 10,000)	31.60	33.40	32.44	54.84	36.80	41.69	42.54	14.64
% of women sensitized	51.00	48.00	50.00	48.00	48.00	51.00	52.00	48.00

*Figure **7. 6**: Number of Farmers Sensitized on HIV/AIDS*

APPENDICES

Appendix 1: Key Indicators of Rainfall Distribution

Region	Indicators
Volta	Vegetative cover for 2015 reduced as compared with that of 2014. This was as a result of unfavourable rainfall pattern in 2015. There were floods in Ho-Municipal, Agortime, Ziope and Adaklu Districts which affected rice, tomato and maize fields. Uneven distribution of rainfall in 2015 resulted in intermittent short dry spells during certain periods of the year. This affected crop establishment, vegetative growth and yields of most crops (maize, rice, cassava) during the major and minor seasons in all 25 districts as compared to 2014. Small streams dried up whilst big rivers reduced in volume in 2015 as compared with 2014. As a result water was rationed for home consumption in Ho and its environs. Dry season irrigation was also affected and cattle travelled long distance in search of water. Most of the production figures recorded for the major crops in 2015 was slightly lower as compared with that of 2014.
Western	The minor season rainfall started very early but was short lived and caught many farmers off guard. As a result, many farmers could not plant and those who planted experienced stunted growth of plants resulting in reduced yield due to the terminal dry spell experienced in the fourth quarter. Some stands of cassava, maize and plantain died out. The terminal dry spell during the latter part of the fourth quarter though affected the yield of most minor season food crops provided somewhat perfect conditions for farm maintenance, planting and harvesting of crops such as oil palm, citrus, pre and post harvesting processes of cocoa, coconuts among others.
Ashanti	Drying and withering of crops and vegetation were recorded in the region. Bushfires were recorded in the transitional zones. Fewer incidences of rainstorms and floods and less destruction of plantain through lodging was observed. Land preparation and planting for the major season started late from April to June. High relative humidity was experienced during the second and the fourth quarters which affected drying of maize. There was no sign of harmattan at the end of December.
Central	The weather conditions for the first quarter of the year was dry, sunny, humid and associated with some gusty winds which affected most existing plantain plants. The second quarter had heavy rainfall with cloudy cool weather conditions in the evenings and sunny warm weather in the mornings and afternoons. The third quarter experienced heavy rainfall once a week interspersed with intense sunshine in the afternoons with a cool weather at night. The last quarter had an erratic rainfall ushering in the harmattan period.
Eastern	There was a delay in onset of both major season and minor season rainfall. Rainfall distribution was very erratic. The duration of rainfall experienced in both major and minor seasons were much shorter compared to the normal year.
Northern	Harmattan conditions experienced in January followed by severe sunshine in February and March. Dry soils with dusty environment.
Upper East	Moderate temperature especially from July to October. Favourable amount of rainfall and distribution. Few flooding in some parts of Binduri and Bawku West districts along the White Volta.
Upper West	The months of May and June recorded very low amounts of rainfall which were insufficient for agricultural activities. Dry spells with sporadic rains in various locations in the region in the second Quarter. Normal intensity and distribution during 3rd Quarter.
Greater Accra	Dry vegetation, withered crops, grass and dusty conditions especially in the early and last quarters of the year. Cloudy, wet and humid weather with interspersed sunshine. Flooding of farms and farm houses. Erosion
Brong Ahafo	Erratic rainfall interspersed with short drought. Short period of heavy rainfall, accompanied by strong winds, causing lodging of crops. High humidity with intermittent sunshine. Wet with drizzle like rainfall distribution.

Appendix 2: Provisional Food Balance Sheet (2015/2016)

Type of Commodity	Gross Biological Production ('000MT)	Available Total Domestic Production Available for Human Consumption* ('000MT)	Total Imports of Commodities ('000MT)	Carry Over Stock ('000MT)	Total Exports of Commodities (MT)	Total Supply of Commodities ('000MT)	Per Capita Consumption (Kg/Annum)	Estimated Net Consumption of Commodities ('000MT)	Closing Stock ('000MT)	Total Needs ('000MT)	Net Deficit/ Surplus ('000MT)
CEREALS	***2,554***	***1,855***	***973***	***255***	***699***	***3,083***		***2,856***	***308***	***3,165***	***-82***
Maize	1,692	1,184	5	169	612	1,358	45	1,285	136	1,421	**-63**
Rice (Milled)**	443	305	620	44	87	970	32.0	914	97	1,011	**-41**
Millet	157	137		16		153	5.0	143	15	158	**-5**
Sorghum	263	229		26		255	5.0	143	25	168	**86**
Wheat	-	0	348	0		348	13.0	371	35	40	**-58**
STARCHY STAPLES	***29,762***	***22,481***	***0***	***0***	***36,826***	***22,445***		***11,502***		***11,502***	***10,942***
Cassava	17,213	12,049				12,049	152.9	4,367	0	4,367	**7,682**
Yam	7,296	5,837			36,826	5,800	125.0	3,570	0	3,570	**2,230**
Plantain	3,952	3,360				3,360	84.8	2,422	0	2,422	**937**
Cocoyam	1,301	1,236				1,236	40.0	1,143	0	1,143	**94**
LEGUMES	***763***	***669***	***0***	***0***	***177***	***669***		***543***		***543***	***126***
Groundnuts	417	375			177	375	12.0	343	0	343	**33**
Cowpea	203	173				173	5.0	143	0	143	**30**
Soyabean	142	121				121	2.0	57	0	57	**64**

Appendix 3: Land Use Efficiency

	Area of Irrigated Land (Hectares)						Land Intensification Ratio						Production of Irrigated Crops (mt)				
	2011	**2012**	**2013**	**2014**	**2015**	**Percent Change**	**2011**	**2012**	**2013**	**2014**	**2015**	**Percent Change**	**2011**	**2012**	**2013**	**2014**	**2015**
National																	
Total irrigated areas developed (formal and informal)	28,304	28,304	28,324	29,508	-	n.a	-	-	-	-	-		-	-	-		
Total informal irrigated developed areas	17,636	17,636	17,636	18,820	-	n.a	-	-	-	-	-		-	-	-	_	_
Total formal irrigated area developed	10,243	10,668	10,688	10,688	10,688	-	-	-	-	-	-		-	-	-	_	_
Total formal irrigated area cropped	9,745	9,913	11,136	9,368	9,400	0.35	0.91	0.93	1.04	0.88	0.88	0.35	Veg: 12,022 Cereal: 38,709.0 Leg: 190	Veg: 11,235 Cereal: 41,633 Leg:235	Veg: 13,813.30 Cereal:41,373 Leg: 78	Veg: 22,541.6 Cereal:31,977.6 Leg: 126.9	Veg: 9,745 Cer:34,698.4 Leg: 39.6
Total informal irrigated area cropped	9,798	10,138	10,542	26,471	30,936	16.87	0.41	0.56	0.57	0.6	n.a	n.a	Veg: 34,365 Cer: 19,762	Veg: 40,098 Cer: 12,544	Veg: 40,544 Cer: 12,743.1	Veg: 57,957.0 Cer: 67,079.9	Veg:92188.4 Cer:82,788.5 Fruit: 682
Total formal area irrigated with single annual crop	4,924	5,247	5,142	3543	5,215	47.20	0.43	0.46	8.2	0.48	0.49	1.66	Veg: 5,648 Cereal: 20,049 leg: 46	Veg: 5,120 cer: 21,366 leg: 156	Veg: 5,082.2 Cer:22,350.30 Leg:34.30	Veg: 8,0905 Cer:11,046.77 Leg:65.88	Veg:6,233.94 Cer:13,2001.8 Leg:148.5
Total informal area irrigated with single annual crop	4,521.00	6,350	6,570	10,431	10,213	-2.09	0.17	0.26	48.4	0.37	n.a	n.a	Veg: 12,350 Cer: 10,104	Veg: 11,136.4 Cer: 11,900	Veg: 25,253 Cer: 7,942.7	Veg: 19,219.98 Cer: 24702.4	Veg:30,043 Cer:27,031.35
Total formal area irrigated with double annual crop	4,822	4,666	4,785.50	5,825	4,269	-26.70	0.45	0.45	0.44	0.45	0.40	- 11.23	Veg: 6,374 cer: 18,660 leg: 132	Veg: 6,114.9 Cereal: 20,266.4 leg: 78.6	Veg:8,731.10 Cer: 19,023.20 Leg: 44.3	Veg:14,451.06 Cer: 20,930.87 Leg: 61.09	Veg:3,342.4 Cer:21,496.6
Total informal area irrigated with double annual crop	3,103	32	2313	8,156	10,239	26	0.13	0.18	31.5	0.13	n.a	n.a	Veg: 10,370 Cer: 8,485	Veg: 15,398 Cer: 612.8	Veg:8,893.7 Cer: 2,795.6	Veg:21927.74 Cer: 20,3888.8	Veg:33,434.0 Cer:27,955.56
Total formal area irrigated with three annual crops	-	-	-	-	-		-	-	-	-	-		-	-	-		
Total informal area irrigated with three annual crops	2,176	23	1,659	7,883	10,484	33	0.1	0.12	23.4	0.09	n.a	n.a	Veg: 7,049 Cer: 5,767	Veg: 15,563 Cer: 31.2	Veg:6,379 Cer:2,005	Veg:16,809.28 Cer:21988.69	Veg:28,711.37 Cer:27,801.50

Source: GIDA, 2015

Appendix 4: Regional Performance of Irrigation Schemes

Item	Irrigated areas developed (hectares)	Number of crop cycle in irrigated areas, with respective surface irrigated cropped and harvested areas in 2015 (hectares)			Average land intensification ratio on irrigated cropped area	Production of irrigated crops	
		First crop	Second crop	Third crop			
UPPER EAST						**Total**	**Mt**
Formal	**3,942.00**	1,091.33	1,091.33	-	**0.55**	Vegetable	693.0
		-	-	-		Cereal	3,910.4
		-	-	-	-	Legume	21.1
						Sub-total	**4,624.5**
Informal	884.65	272.35	291.42	37.52	-	Vegetable	4,621.2
		-	-	-	-	Cereal	8.2
		-	-	-	-	Legume	0.0
Sub-total	***4,826.65***	***1,363.7***	***1,382.8***	***37.5***	***0.58***	***Sub-total***	***4,629.4***
					Regional Total		**9,253.8**
UPPER WEST							
Formal	**194.5**	0	0	-	-	Vegetable	-
						Cereal	0
						Legume	0
						Sub-total	**-**
Informal	711	250.4	0	0	**0.35**	Vegetable	160.4
						Cereals	43.5
Sub-total	***905.5***	***250.4***	***0***	***0***	***0.28***	***Sub-total***	***203.9***
					Regional Total		**203.9**
NORTHERN							
Formal	**782.3**	498.1	60.4		**0.71**	Vegetable	1,114.2
					-	Cereal	324.3
						Legume	3.2
						Sub-total	**1,441.6**
						Vegetable	0.0
Informal	**1,147.00**	12.786	0	0	**0.01**	Legume	142.4
						Cereal	0.0

Item	Irrigated areas developed (hectares)	Number of crop cycle in irrigated areas, with respective surface irrigated cropped and harvested areas in 2015 (hectares)			Average land intensification ratio on irrigated cropped area	Production of irrigated crops	
		First crop	Second crop	Third crop			
Sub-total	***1,929.30***	***510.8***	***60.4***	***0.0***	**-**	***Sub-total***	***142.4***
					Regional Total		**1,584.1**
BRONG-AHAFO							
Formal	**311**	47.2	55.8	-	**0.33**	Vegetable	718.5
		-		-		Cereals	87.2
		-	-	-	-	legume	15.3
						Sub-total	**821.0**
Informal	2,941.00	0.0	0.0	0	-	Vegetable	0.0
		-	-	-	-	Cereals	0.0
Sub-total	***3,252.00***	***47.2***	***55.8***	***0.0***	***0.03***	***Sub-total***	***0.0***
					Regional Total		**821.0**
ASHANTI							
Formal	**335**	146.6	54.0		**0.60**	Vegetable	1,775.0
			-		-	Cereals	592.5
						Legume	0.0
						Sub-total	**2,367.5**
Informal	2,063	1575.9	947.5	935		Vegetable	1,050.0
		-	-		-	Cereals	2,613.0
Sub-total	***2,398.00***	***1722.5***	***1001.5***	***935.0***	***1.14***	***Sub-total***	***3,663.0***
					Regional Total		**6,030.5**
WESTERN							
Formal	**108**	0.0	0.0	-	-	Vegetable	0.0
		-	-	-	-	Cereals	0.0
						Legume	0.0
						Sub-total	**0.0**
Informal	916	0.0	0.0	0	-	Vegetable	0.0
		-	-	-	-	Cereals	0.0
Sub-total	***1,024.00***	***0.00***	***0.00***	***0.00***	-	***Sub-total***	***0.0***

Item	Irrigated areas developed (hectares)	Number of crop cycle in irrigated areas, with respective surface irrigated cropped and harvested areas in 2015 (hectares)			Average land intensification ratio on irrigated cropped area	Production of irrigated crops	
		First crop	Second crop	Third crop			
					Regional Total		**0.0**
EASTERN							
Formal	**2932**			-	-	Vegetable	0
						Cereal	0.0
						Legume	0.0
						Sub-total	**0.0**
Informal	3,685	2524.3	2188.6	381.5	**1.28**	Vegetable	16,573.8
						Cereal	2,114.0
					-	Legume	0.0
Sub-total	***6,617***	***2524.3***	***2188.6***	***381.5***	***0.71***	***Sub-total***	***18,687.8***
					Regional Total		**18,687.8**
CENTRAL							
Formal	**134.1**	60.5	98.0	-	**1.18**	Vegetable	634.8
					-	Cereals	333.9
						Legume	0.0
						Sub-total	**968.7**
Informal	426	1089.2	0.0	0	**2.56**	Vegetable	402.0
					-	Cereals	6.0
						Fruits	682.0
Sub-total	***560.1***	***1149.7***	***98.0***	***0.0***	***2.23***	***Sub-total***	***1,090.0***
					Regional Total		**2,058.7**
VOLTA							
Formal	**1,399.00**	966.7	757.0	-	**1.23**	Vegetable	848.0
						Cereals	6,282.1
						Legume	0.0
						Sub-total	**7,130.1**
Informal	2,133.00	0.0	6324.0	8924	**7.15**	Vegetable	63,620.0
		-	-		-	Cereals	51,217.6

Item	Irrigated areas developed (hectares)	Number of crop cycle in irrigated areas, with respective surface irrigated cropped and harvested areas in 2015 (hectares)			Average land intensification ratio on irrigated cropped area	Production of irrigated crops	
		First crop	Second crop	Third crop			
Sub-total	***3,532.00***	***966.7***	***7081.0***	***8924.0***	***4.81***	***Sub-total***	***114,837.6***
					Regional Total		**121,967.7**
GT. ACCRA							
Formal	**550.00**	2404.8	2152.9		**8.29**	Vegetable	3,961.6
						Cereals	20,202.5
						legume	0.0
						Sub-total	**24,164.0**
Informal	1,807.00	4,488.00	487.2	206	**2.87**	Vegetable	5,761.0
					-	Cereal	26,786.2
						Legume	0.0
Sub-total	***2,357.00***	***6892.8***	***2640.1***	***206.0***	***4.13***	***Sub-total***	***32,547.2***
					Regional Total		**56,711.2**
Total Formal Area	**10,687.90**	**5,215.2**	**4,269.5**	**-**	**0.89**	***Vegetables***	***9,745.0***
						Cereals	***31,732.8***
						Legumes	***39.6***
Total Informal Area	**16,713.65**	**10,212.94**	**10,238.7**	**10,484.0**	**1.85**	***Vegetable***	***92,188.4***
						Cereals	***82,788.5***
						Fruits	***682.0***
TOTAL	***27,401.55***	***15,428.2***	***14,508.2***	***10,484.0***	**1.48**	***Total***	***217,176.2***
						Vegetable	**101,933.3**
						Cereal	**114,521.3**
		40,420.4				**Legumes**	**39.6**

Source: GIDA (2015)

Appendix 5: Farm Mechanization Centres

Regions	**Number of farm mechanization centres operational**															
	2012				2013				2014				2015			
	New centres established	Total existing centres	Total operational	Total area (ploughed-ha)	New centres established	Total existing centres	Total operational	Total area (ploughed-ha)	New centres established	Total existing centres	Total operational	Total area (ploughed-ha)	New centres established	Total existing centres	Total operational	Total area (ploughed-ha)
Ashanti	0	2	2	1,712	0	2	2	1,876	0	5	6	1,882	0	3	2	3,745
Brong Ahafo	0	3	3	1,982	0	2	3	2,152	0	13	12	4,376	0	4	4	2,924
Central	0	2	2	30	0	1	1	36	0	4	5	450	0	1	1	30
Eastern	0	10	10	1,513	0	8	8	1,331	0	10	4	830	0	5	1	0
Greater Accra	0	3	0	0	0	3	3	14,500	0	3	4	314	0	9	8	4,015
Northern	0	11	6	290	0	10	8	300	0	28	27	30,150	0	11	9	2,990
Upper East	0	6	8	16,472	0	8	8	21,200	0	7	7	7,450	0	7	6	5,866
Upper West	0	15	15	13,000	0	25	25	13,420	0	9	9	8,550	0	9	9	4,248
Volta	0	2	2	422	0	3	3	6,420	0	9	7	985	0	9	7	898
Western	0	1	1	-	0	1	1	0	0	1	1	170	0	1	1	46
Total	0	55	45	35,421	0	63	62	61,235	0	89	82	55,157	0	59	48	24,762

Appendix 6: In-Service Training

No.	TRAINING PROGRAMME	DURATION	MALE	FEMALE	TOTAL
1.	Report writing and draft	4 days	4	1	5
2.	Speech writing	2 days	1	1	2
3.	HIV/AIDS and Employee welfare	4 days	1		1
4.	Research methodology	4 days	1		1
5.	End user training on HRMIS	3 days	5	1	6
6.	Introduction to Organizational Development	3 days	1	1	2
7.	Review of Agricultural sector report	4 days	1		1
8.	E-capacities training	3 days	1	1	2
9.	Training in value chain awareness	2 days	1		1
10.	Validation of MOFA fact and figure	2 days	18	5	23
11.	Development of a 5 year Strategic plan for ATVET Institutions	2 days	14	3	17
12.	Agri-preneur curriculum development	3 days	12	2	14
13.	Workshop on import and export of the High Risk commodity	5 days	2	1	3
14.	Regulated pest and their identification	3 days	1	1	2
15.	Ghana Bio- fertilizer Registration guidelines	1 day	1		1
16.	2nd Pan African Conference on sanitary/Phytosanitary Analysis	2 days	1		1
17.	International Bio-safety short course for Policy and Decision making in Ghana and Nigeria	3 days	2		2
18.	E-Phytosanitary symposium	5 days	2	1	3
19.	Analysis and characterization of Areas at Risk of food and Nutritional Insecurity in Ghana.	5 days	1	1	2
20.	Table Top Exercise for National CBRN Emergency Response plan.	2 days	1		1
22.	National Fertilizer stakeholders workshop	2 days	5		5
23.	Training on General laboratory Technology	6 months		2	2
24.	Preventive Maintenance and validation of UV/VIS Spectrophotometer	1 week	1	1	2
25.	Training for seed Inspectors on cashew Production and certification	3 days	1	2	3
26.	Short course on Decision Making for Bio safety Regulations	3 days	2		2
27.	Food security and Nutritional situation Analysis	5 days	2		2
28.	Papaya mealy bug training	4 days	2		2
29.	Risk Communication for GMO'S	3 days	2		2
30.	Technical Variety Release Committee Workshop	2 days	1		1
31.	SPS regulation and Risk Analysis	3 days		1	1
32.	Plant wise Data Validation	4 days	3	1	4
33.	Research uptake		10	4	14

No.	TRAINING PROGRAMME	DURATION	MALE	FEMALE	TOTAL
34.	Procurement of contract management	5 days	3	2	5
35.	Underground resource Development	1 week	1		1
36.	Mobilising science for sustainable development	1 week	1	1	2
37.	Training on SAME Explorer 85 Tractor	2 days	3	1	4
38.	RELC Review Session	2 weeks	1		1
39.	Ghana market and Trade action	1 day	1		1
	Total		**108**	**34**	**142**

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