

# Contributory Outcomes of Medium Term Agriculture Sector Investment Plan and the Northern Rural Growth Programme Interventions on Smallholder Farmers Food Security Based on Sen's Entitlement and Capability Approaches

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## Abstract

While smallholder farmers are presented with vulnerabilities that burden production, they present a huge potential for change with proper policy and targeting. In view of this, this study sought to assess the contributory outcomes of METASIP and NRGp on smallholder farmers' food security in the Upper West Region. A cross-sectional survey design was adopted, using the mixed method approach. Both questionnaires and a FGD guide were used to collect data. Kredjcie and Morgan's (1970) sample size determination table was used to select a total of 341 smallholder farmers. SPSS was used to analyse data for this study. Out of all six (6) intervention outcomes, the study found that there has been an improvement in food security among small holder farmers after the intervention of METASIP and NRGp based on Sen's approaches. The differences in improvement were significant at ( $\chi^2=114.200, 60.391, 299.707, 182.199, 27.109, 23.580, df = 1, p<0.001$ ) for indicator 1 through to 6 respectively.

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## 1. Introduction

Food security is a subject of keen interest for policy makers, practitioners and academics around the world. This is due to the fact that not only is food security a global phenomenon that affects populations around the world (Acheampong et al., 2022; Jones et al., 2013; Nkegbe et al., 2017; Adeniyi & Dinbabo, 2019; Adeniyi, 2020; Ogundari, 2017), but the world is progressing neither towards Sustainable Development Goal (SDG) target 2.1, of ensuring access to safe, nutritious and sufficient food for all people all year round, nor towards target 2.2, of eradicating all forms of malnutrition according to Food and Agriculture Organization [FAO] et al. (2020), given that the number of people suffering from food insecurity continue to increase (FAO et al., 2020; Simon, 2012).

As at the year 2020, estimates of FAO showed that more than 2 billion people in the world did not have access to adequate food, representing one in three people, highlighting the immense challenge of achieving the Zero Hunger target by 2030 (FAO et al., 2019). Notably, a huge population of the people being hungry live in sub-Saharan Africa (SSA) (Ogundari, 2017; Owusu et al., 2011; FAO et al., 2019; World Bank, 2016) representing a percentage proportion of 20 percent out of the 98 percent in Low and Middle Income Countries across the globe (FAO, 2019). Inclusive, Ghana is faced with the challenge of making significant improvement in food security (Acheampong et al., 2022; Nkegbe et al., 2017). For instance, according to the Ministry of Food and Agriculture [MoFA] et al. (2022a), a total of 3.6 million implied food insecure people were found to live in the country as at 2020, out of which 1.6 million (5.2%) and 2 million people (6.5%) were reported to be severely and moderately food insecure respectively. Particularly, northern Ghana, which includes the five northern regions are considered the worse food insecure in the country (World Food Programme [WFP], 2012; MoFA et al., 2022b).

Without doubt, the magnitude and quantitative evidence of food insecurity around the world is essentially accountable for its prominence (Nkegbe et al., 2017). As such, several declarations and resolutions have been agreed upon, which aim at enhancing food security and reducing poverty (FAO, 2003). Some of which include the Maputo and Malabo declarations by African Heads of State and Government, the United Nations (UN) millennium declaration to adopt the Millennium Development Goals (MDGs) and the UN General Assembly resolution on agenda 2030 to formulate the SDGs. However, targets set during these meetings have not always been met, leaving future expectations not promising. This is evident following the latest declaration and adoption of the SDGs by nations of the world in 2015. The SDG's are a revised form of the unsuccessful MDG's, with one of several major targets of having to eliminate hunger and all forms of malnutrition while ensuring food access for all people, particularly the poor and vulnerable (Adeniyi & Dinbabo, 2019; UN, 2015) of which agriculture can effectively play a key role (FAO, 2017) owing to the fact that agriculture can ensure food security, central to the world development agenda (Béné et al., 2016; Omache, 2016). The "recognition of this fact therefore, has brought agriculture back onto the international development agenda" (Seville et al., 2011, p.2). However, data from the World Bank suggests that while about 70 percent of the population in less developed countries are directly employed in the agricultural sector the share of the population in agriculture keeps declining as countries develop

(Roser, 2017; Mozumdar, 2012).

With smallholder farmers accounting for the largest share of agricultural production globally (IFAD & UNEP, 2013; Graeub et al., 2016), particularly in developing countries including Ghana, there are often implications for productivity and for that matter food security (Roser, 2017; Mozumdar, 2012) as smallholder farmers have poor resource base, poor access to markets etc. and thus are vulnerable to food insecurity (Adu et al., 2018; IFAD & UNEP, 2013; MoFA, 2010a, 2010b). Hence, hunger remains one of the biggest development challenges of our time (International Institute for Sustainable Development [IISD], 2017; Zakari et al., 2014; Gassner et al., 2019). While smallholder farmers vulnerabilities burden production (Acheampong et al., 2022; Adu et al., 2018; MoFA, 2010b) they present a huge potential for change with proper policy and targeting (Adu et al., 2018).

In view of the huge potential for smallholder farmers' production with proper policies, this study sought to assess the contributory outcomes of METASIP and NRGPs on smallholder farmers' food security in the Upper West Region.

## 2. Literature Review

### 2.1 Understanding Food Security from Sen's View Point

According to FAO et al. (2019), conflict and instability, climate change and increasing climate variability and extremes are affecting agricultural productivity, food production and natural resources, with impacts on food systems and rural livelihoods. This signals the traditional believe that famines occur because of the sudden collapse of the level of food production and supply (Tseng, 2011; Sen, 1981; Dreze & Sen, 1989).

However, Sen's case analysis of famines challenges this conventional wisdom, showing that there exists the strong possibility that the most devastating effects of famine do not result from the significant shortage of food production, but rather, the sudden collapse of the direct and/or trade entitlement to food is key in this regard (Sen, 1983 cited in Clarke, 2005; Tseng, 2011; Sen, 1981) even though he has acknowledged the link between growth and living standards, and praises traditional development economics for identifying the factors that facilitate growth in poor countries (Sen, 1983 cited in Clarke, 2005). According to Sen (1981), food shortage is the characteristic of some people not having enough food to eat, rather than the characteristic of there being not enough food to eat. Thus, what people eat depends on what food they are able to acquire according to Dreze and Sen (1989).

Given the prevailing legal, political, and economic arrangements, a person can establish command over some alternative commodity bundles which could be extensive or very limited. What a person can consume hence, will be directly dependent on what these bundles are (Sen, 1981). In order to understand food security, it is therefore necessary to go into the structure of ownership (Sen, 1981) which can best be clarified in the entitlement and capability approaches of Sen.

### 2.2 Sen's Entitlement Approach

The ability to command resources is at the centre of Sen's (1981) pioneering analysis of famine. Sen refers to the capacity to command different bundles of commodities as entitlements (Dreze & Sen, 1989; Clark, 2005). The 'entitlement approach' provides a framework for assessing the relationship between 'rights-structure' that prevails in a particular society on hunger and starvation and individual entitlement to things (Overseas Development Institute [ODI], 2001).

The entitlement concept unifies three institutional distinct ways people have secure access to food. Whilst the first type of institutional structure is an income-based entitlement (People with an income-based food entitlement buy their food), the second structure is referred to as a gift- or grant-based entitlement by Sen. The third type of food entitlement is the direct production-based entitlement (people rely on farming, fishing or some form of hunting and scavenging to obtain the food they eat) (Thompson, 2015).

Thus, the concept of entitlement focuses on a person's 'command over things', given the complete specification of the rights and obligations that an agent has vis-à-vis others, and the rights and obligations that others have vis-à-vis oneself (Vizard, 2005; ODI, 2001). In illustration, a farmer who grows his own food is entitled to what he has grown, adjusted for any obligations he may have (e.g., to money-lenders). He can sell, if he wants a part of the product for cash to buy other goods and services, and all the alternative commodity bundles he can acquire through these means lie within his entitlement set. Similarly, a wage labourer's entitlement is given by what he can buy with his wages, if he does in fact, manages to find employment (Dreze & Sen, 1989). Generally, an entitlement to food would be the actual ability, whether morally justified or not, to acquire food by some legally or socially approved means whether by producing it, trading it, buying it, or receiving it in a government feeding programme (Crocker, 2008). This, Sen argues that the right focus for assessing people's well-being and standard of living in society is neither commodities, nor characteristics, nor utility, but their 'capacity to achieve valuable functionings' (Sen, 1993, p.31). This brings more fundamental elements such as rights and other social arrangements into the frame of wellbeing, providing a better understanding of what is involved in the challenge of wellbeing and standard of living (Tseng, 2011).

### 2.3 Sen's Capability Approach

The Capabilities Approach is a broad normative framework for the evaluation of individual well-being and social arrangements, and the design of policies and proposals about social change in society (Gombert et al., 2017; Bassinello, 2009; Robeyns, 2005). The core characteristic of the capability approach is to de-emphasize an exclusive preoccupation with income-led evaluation methods, and to focus more generally on the ability people have to achieve the things they value (Robeyns, 2003; Bassinello, 2009; Frediani, 2007; Todaro & Smith, 2012). In this view, well-being can be measured by assessing people's freedom and choices, rather than their level of income or consumption (Frediani, 2007). Sen argues that the right focus for assessing people's well-being and standard of living in society is neither commodities, nor characteristics, nor utility, but their 'capacity to achieve valuable functionings' (Sen, 1993, p.31).

Sen's capability approach' to assessing deprivation and wellbeing is an enhancement and transformation of the concept of entitlement (Sen, 1992; Sen, 1993). Thus, proposals for capturing and formalising individual substantive freedoms in the form of the valuable 'beings' and 'doings' in 'capability space' build on the 'entitlement approach' but recognise that the mapping between a person's entitlements (i.e. their command over commodities) on the one hand, and a person's capability to achieve valuable functionings on the other, depend on personal features (such as bodyweight, health status and aspects of a person's situation reflected in 'environmental conditions') (Vizard, 2005). This implies that Sen's approach to well-being assessment is based on two concepts: capabilities and functionings.

From this capability "set", a person chooses his or her "functionings", the particular "beings" and "doings" he or she enjoys at a particular point in time (Bassinello, 2009). Thus, the functionings include features of a person's state of existence ranging from relatively elementary states (e.g., being adequately nourished), to complex personal states and activities (e.g., participation and appearing without shame) (Sen, 1993; ODI, 2001). Sen argued that the "capability to function" is what really matters for status as a poor or non-poor person (Todaro & Smith, 2012, p.16). "The 'good life' is partly a life of genuine choice, and not one in which the person is forced into a particular life, however rich it might be in other respects" (Sen, 1996, p.59).

## 3. Methodology

### 3.1 Research Design

A cross-sectional survey design was adopted, using the mixed method approach to conduct this study.

### 3.2 Profile of the Study Area

The Upper West Region (UWR) of Ghana is the research area for this study. The region falls within coordinates 10.2530° N; 2.1450° W and covers a geographical area of approximately 18,478 square kilometres (Ghana Statistical Service [GSS], 2013). The Region is bordered to the North by Burkina Faso, to the East by Upper East Region, to the South by the Savanna and Northern regions and to the West by Cote d'Ivoire.

Agriculture is the main occupation of the people of the UWR (GSS, 2013). It is highly dependent on rains; hence, the rainy season remains the busiest period where a lot of clearing and planting of crops is done (Nsiah-Gyimah, 1994; GSS, 2013). Generally, a farmer from the UWR is a peasant farmer with approximately 25 acres for farming and their output used for subsistence or commercial purposes (GSS, 2013).

### 3.3 Sampling Procedure

The study area has 11 administrative areas. However, because of the dispersed nature of the areas, coupled with the cost and time constraints in writing this paper, the researchers clustered the study area into 8 sets. Set 1 comprised of Nandom, Lawra, Lambusie Kani, and Jirapa. Set 2 included Sissala West while set 3 encompassed Sissala East. The rest of sets were: Nadoli-Kaleo representing set 4, Dafiana Bussie representing set 5, Wa West, Wa municipality and Wa East representing set 6, 7 and 8 respectively. These sets of clusters were sort out based on proximity and homogeneity of the areas in terms of culture and farm practices. Out of the 8 sets of clusters, 5 were selected using simple random sampling. Four districts and one municipality were sampled from the 5 sets of clusters. Whereas Wa East, Wa West, Sissala East and Sissala West districts were selected purposively because they were the sole represented districts in their sets, Lawra municipality was selected using simple random sampling. Simple random sampling was again used to select 3 communities in each district using the lottery system, thus, 15 communities in all were considered for the study. In addition, 5 sampled communities out of the 15 were randomly selected for Focus Group Discussions (FGDs). These communities were: Tokaali, Manwe, Jeffisi, Sakai and Lawra-Yagtuuri.

### 3.4 Sampling Size Determination

Kredjcie and Morgan's (1970) sample size determination table was used to select a total of 341 smallholder farmers based on each community population. The number of the districts, communities and sample size of the smallholder farmers are illustrated in Table 1 below

Table 1: Districts, communities and sample size of the smallholder farmers

Selected District	Selected Communities	Population Frame	Sample Size
Wa West	Tokaali	27	26
	Naaha	30	28
	Tanina	24	23
Wa East	Kpagalahi	19	18
	Manwe	29	27
	Goripie	24	23
Sissala West	Jeffisi	21	20
	Pulima	19	18
	Bullu	10	10
Sissala East	Sakai	24	23
	Kulfoo	16	15
	Bugubelle	16	15
Lawra	Yagtuori	45	40
	Kunyukuo	39	35
	Bagri	21	20
<b>Totals</b>	<b>15</b>	<b>364</b>	<b>341</b>

\* Only farmers who belonged to registered associations constituted the population frame

### 3.5 Analytical Approach

From Sen's view point, the right focus for assessing people's food security is their 'capacity to achieve valuable functionings' which brings more fundamental elements such as rights into the fore. As a result, in assessing the contributory outcomes of METASIP and NRGF interventions on smallholder farmers food security based on Sen's capability approaches, Sen's capability approaches were summarised into six (6) components. They include: Food availability, Entitlement, Utility, Empowerment, Food productivity and food Stability. Guided by these 6 components, measurable indicators based on the interventions implemented by METASIP and NRGF were formed. This was meant to assess whether or not the two policies considered in the study took into consideration Sen's view on food security. Below in the Table 2 are the identified intervention indicators and how they were measured

Table 2: Intervention Indicators and Measurement Modes

Sen's Approach	Policy Indicators	Intervention	Mode of Measurement	Measurement Expectation
Food availability	Access to food all year round		Availability of food to meet basic consumption	Enough or otherwise
Entitlement	Access to farmland		Land Access preference or ownership	Only male household heads accessed land or otherwise
Utility	Wellbeing among smallholder farmers		Safe/Quality grain consumption	Unwholesome or wholesome
Empowerment	Voice and influence in decision making processes		Farmers' participation in price determination	Participate or otherwise
Food productivity	(Credit, Technology & High yielding seeds)		Production capacity	Declined or Increased
Food Stability	Income stability (Alternative livelihood)		Income	Declined or Increased

Since, Sen's view point of food security is a shift away from conventional wisdom, coupled with the fact that there is no single indicator to measure food security even with the conventional wisdom, an attempt was made by the researchers to blend some concepts of Sen's (such as entitlement and empowerment) together with some of the conventional wisdom (such food availability, productivity, utility and food stability) because Sen acknowledges these conventional wisdom of food security indicators. In measuring the contributory outcomes of METASIP and NRGF on smallholder farmers' food security therefore, a simple affirmation of whether or not, any of the identified 6 indicators had improved upon the intervention of METASIP and NRGF was used to measure the contribution of the 2 policies.

### 3.6 Data Collection and Analysis

Primary data from smallholder farmers were collected with the aid of questionnaires and a FGD guide as instruments. While the use of Statistical Package for Social Sciences (SPSS) was used to analyse quantitative data descriptively using frequencies and chi-square test, qualitative data were analysed using quotations and narrations.

## 4. Results and Discussion

### 4.1 Socio-Demographic Characteristics of Respondents

Age, Years of farming, Farm size (acres) and House hold size were considered the socio-demographic characteristics in this study. Table 3 below thus, presents the results of respondents' socio-demographic characteristics

Table 3: Socio-Demographic Characteristics of Respondents

Variables	Median	Maximum	Minimum
Age	40	80	18
Years of farming	8	20	3
Farm size (acres)	2.5	160	5
House hold size	7	12	3

From the Table 3 above, the maximum age, farming years, farm size and house hold size of respondents was 80 years, 20 years, 160 acres and 12 members respectively. Furthermore, as revealed in the study (see Table 3), while the typical age, farming years, farm size and house hold size of respondents were 40 years, 8 years, 2.5 acres and 7 members respectively, the minimum age, farming years, farm size and house hold size of respondents were 18 years, 3 years, 5 acres of land and 3 household members respectively.

### 4.2 Outcomes of METASIP and NRGIP Interventions amongst Smallholder Farmers

#### 4.2.1 Empirical Outcomes of Interventions amongst Smallholder Farmers

The outcomes of METASIP and NRGIP on smallholder farmers were assessed on a before and after basis following 6 intervention indicators identified in line with Sen's based entitlement and capability approaches. Below in Table 4 presents the results gathered in the field

Table 4: Outcomes of Policy Interventions

Policy Intervention Indicator	Before	Freq (%)	After	Freq (%)	Chi Sq. $\chi^2$	df	P. Value
1. Access to food all year round	Farmers did not have enough food for basic consumption	125 (36.7)	Farmers have enough food for basic consumption.	216 (63.3)	114.200	1	.000
2. Access to land	Access to land was for only male household head	101 (29.6)	Women and youth own land	240 (70.4)	60.391	1	.000
3. Wellbeing among farmers	Farmers consumed unwholesome grains	165 (48.4)	Farmers consumed wholesome grains	176 (51.6)	299.707	1	.000
4. Voice and influence in decision making	Prices for outputs were set without farmers' participation	144 (42.2)	Farmers participate fairly in price negotiations	197 (57.8)	182.199	1	.000
5. Food productivity	Declined production in Maize, Sorghum, Yam, Rice and Millet.	75 (22.0)	Increased production of Maize, Sorghum, Yam, Rice and Millet	266 (78.0)	27.109	1	.000
6. Income Stability (Alternative livelihood)	Decreased Income	71 (20.8)	Increased Income	270 (79.2)	23.580	1	.000

In the Table 4 above, it is revealed that the interventions of METASIP and NRGIP have had significant impact on smallholder farmers food availability in the UWR ( $\chi^2=114.200$ ,  $df = 1$ ,  $p<0.001$ ). For instance, as indicated in the Table 4, while 36.7 percent of respondents indicated that they did not have enough food to eat all year round, 63.3 percent of respondents after the interventions of METASIP and NRGIP revealed that they had enough food for consumption all year round, especially those who have shifted to maize production and therefore hunger in the region is very much reduced to the barest minimum. This corroborates the findings of a report by IDS and IFAD (2015) entitled: "Brokering Development: Enabling Factors for Public-Private-Producer Partnerships in Agricultural Value Chains" that the UWRs all reported a reduction in the number of months in which there is a hunger gap. Furthermore, in explaining their success path, discussants in FGDs across the districts under study indicated that beans and millet which are predominantly cultivated as their major staple food crops took a long period of time before they were due for harvest or even in some instances got destroyed by pests before harvest.



This according to participants in several instances threw them (smallholder farmers) into hunger. However, as at the time of the study, farmers had been introduced to a wide range of food crop varieties, including, millet, beans and maize varieties which were widely cultivated. As a result, smallholder farmers in the UWR now have access to food all year round. A male participant from Jeffisi in the Sissala West district stated:

... With our traditional crop varieties, the rain could stop abruptly, leaving the crops to wither, but now with the availability of the short-term maturing crop varieties we are able to cultivate and harvest foodstuffs to take care of ourselves the whole year and also avoid hunger.

Another male participant from Manwe in the Wa East district had this to add:

Traditional food crop varieties were limited for crop diversification to enable farmers reduce losses and maintain their livelihood in the event of crop failures. With the current increase in the varieties of food crops, farmers who diversify are able to withstand crop failures from one or more crop varieties and weather shocks by continuously maintaining their livelihood using produce from other farmlands.

Furthermore, the Table 4 above reveal that before the intervention of METASIP and NRGP, and access to land as an entitlement was mainly the reserve for male household heads representing 29.6 percent and this accounts for one reason why the UWR has lagged behind in terms of poverty reduction and food security in the past especially for the women, since Berner (2009, p9) mentioned that in recent debates about poverty, lack of productive assets such as land is considered as a major weakness. But, after the interventions of METASIP and NRGP, women and youth now own land, representing 70.4 percent which has aided in increasing the productivity levels of female beneficiaries and reducing poverty stakes. Thus, the results reveal that METASIP and NRGP have had a significant impact on smallholder farmers in terms of land access ( $\chi^2=60.391$ ,  $df = 1$ ,  $p<0.001$ ). This outcome was largely confirmed by participants in various FGD across all the districts, as they revealed that METASIP and NRGP had come to improve their wellbeing through access to land for farming. In a narration, an FGD female participant in Jeffisi in the Sissala West district said:

Master, if you never had something and now you have it, is it not good? In fact, if my husband farms and I also farm, won't it help us all? If I don't harvest, my husband will, and if my husband does not have a good harvest I will and if we all have good harvest it means we are double saved. So, I can boldly say the intervention of METASIP and NRGP have yielded positive outcomes in ensuring food security in our communities

Again, in assessing the outcomes of METASIP and NRGP on smallholder farmers' wellbeing, the results revealed that before METASIP and NRGP, 48.4 percent of smallholder farmers consumed unwholesome grains. However, after the interventions of METASIP and NRGP, 51.6% of smallholder farmers reported consuming good-quality grains as of the time of the study, implying that the policies have had significant impact on smallholder farmers wellbeing ( $\chi^2=299.207$ ,  $df = 1$ ,  $p<0.001$ ). According to the respondents, METASIP and NRGP have enabled smallholder farmers in the UWR to produce more and better-quality grains as a result of improved access to inputs such as improved seeds. Likewise, in FGDs conducted, participants indicated that because of the usage of improved seeds in recent times, pests do not destroy the maize and beans, and so, their grains are always in good condition to prepare healthy food. Below is a statement made by one of the female FGD participants from Yagtuuri in the Lawra municipality:

Sometime past, we used to eat pest and insects and called it food. You can imagine, you fetch beans to cook and it is full of insects, you fetch maize to cook and the story is same. So, what we used to do was to dry the foodstuff as much as possible and remove those we could and cook the rest of the beans or maize like that with the insects. In this way, can one say he or she was eating healthy food? Not at all.

In furtherance, a male participant from Manwe in Wa East district added:

Sometimes, because of the way the pests and insects have eaten up the grains, there will be nothing nutritious left if you go to fetch it to cook. In many instances the weight of the grains will be as light as nothing anytime it has been infested and so, when you cook it you are just doing so to fill your stomach but not to do anything for the body. In fact, if you are even lucky to have little infections, trying to get rid of the infested grains by washing would get all the nutrients away. But for now, because of improved seeds and storage facilities we have healthy grains to feed on, which ultimately helps to nourish our bodies.

Besides, in assessing farmers' voice and influence in decision making, 42.2% of respondents reported that before the intervention of METASIP and NRGP, prices for inputs and outputs were set without farmers' participation. However, after the interventions of METASIP and NRGP, 57.8% of respondents indicated that they had fair participation in price negotiations. This suggests a significant improvement on the part of respondents empowerment ( $\chi^2=182.199$ ,  $df = 1$ ,  $p<0.001$ ). According to the smallholder farmers, they verbally agreed and sometimes signed a written contract with an aggregator though, usually, the contract does not specify the price at which the aggregator takes the maize, and this is similar to findings by IDS and IFAD (2015) who revealed that the price farmers receive for their maize is not determined at the point when they are making crop production decisions and discussing contracts; it is determined later in the season, at a post-harvest forum, when supply far outstrips demand, thus bringing prices down. Furthermore, in acknowledging this outcome, FGD participants in

the various districts revealed that through the intervention of METASIP and NRG, though not satisfactorily, they have had opportunities to negotiate prices of farm produces. Below is what one of the male participants from Tokaali in the Wa West district had to say:

You know in the past we farmers were just farming with individual minds and so a lot of things used to elude us as farmers including the pricing of produce. But now, because of the intervention of METASIP, NRG and other stakeholders, we farmers have formed various groups and our voices are now heard. Sometimes we as farmers through our groups meet the various developing partners including government to settle on prices of some major farm produce unlike first when we did not have the opportunity to negotiate prices.

Food productivity was also considered in assessing the outcomes of the two policies (METASIP and NRG) on smallholder farmers and the results reveal significant increase in the production of some major staples in UWR ( $\chi^2=27.109$ ,  $df = 1$ ,  $p<0.001$ ) after the intervention of the policies. Empirically, the study revealed that before the intervention of the two policies, production in maize, sorghum, yam, rice and millet declined representing 22.0 percent of respondents, whereas after the intervention of METASIP and NRG, 78.0 percent of respondents indicated an increase in the production of these staples. This was confirmed in a FGD held in all the districts studied as smallholder farmers. Below is what one of the male participants from Yagtuuri in the Lawra municipality had to say:

At first, farming was not encouraging. There was nothing in it that was attractive, but for now, we have assistance ranging from farming inputs to credit facilities from various stakeholders. So, we are motivated to farm more and so, there is more food in the community.

Another participant from Manwe in the Wa East added:

In the past, for instance, it took us more than four months to cultivate and harvest maize, and that used to be a worry because of the long duration it took to mature. Sometimes, it used not to even yield well because of the climate variations but in current times, it takes us less than three months (90 days) to cultivate and harvest maize and so, some of us are able to even farm two times in a year which implies more food.

In addition, a male respondent from Yagtuuri in the Lawra municipality said:

Unlike the past, when we used to farm with hoes and cutlasses, now, with the intervention of METASIP and NRG, we now have access to inputs like tractors which enable us farm in large acres.

Last but not least, income stability was assessed as one of the outcomes of METASIP and NRG. The results found that before the intervention of METASIP and NRG, there was a decline in the income of smallholder farmers representing 20.8 percent, and so, in the event they ran out of food they cultivated themselves, it was always difficult to buy from the market to make up the deficit because of limited income. However, after the intervention of METASIP and NRG, smallholder farmers had increased their income, representing 79.2 percent of respondents, as a result, they could afford to buy food stuffs from the market anytime they ran out of food at home. The results thus indicate a significant improvement in the income of respondents ( $\chi^2=23.580$ ,  $df = 1$ ,  $p<0.001$ ) after the interventions of METASIP and NRG. To further confirm this outcome, all the FGDs held across all the districts revealed that smallholder farmers are better off than in the past. They (participants) indicated that quite apart from farming in the rainy season, majority of them do irrigation farming. Also, whereas the groups' participants indicated that they rear animals in addition to the farming they do, especially the male groups, it was generally revealed by the female groups that they do other businesses and petty trading especially in the dry season to complement their farming activities. In explaining further, a female participant from Jeffisi in the Sissala West district said:

As for me, I have been trained on how to make shea butter and so, if am not farming, then I am selling.

Again, a male respondent from Yagtuuri in the Lawra municipality said:

With the establishment of irrigation dams some of us now do irrigation farming especially vegetables. This is what we do to earn income when we are not doing any major farming. Previously when there were no dams, we used to suffer a lot during the dry season.

Notably, it was discovered in FGDs across the various districts studied that there were disparities in incomes across the various study districts, because of the input costs, sizes of farms and prices smallholder farmers are able to sell at markets during different times as well as the different trades smallholder farmers were engaged in. This is similar to the findings by IDS and IFAD (2015) as they also reported considerable variation in net incomes of farmers across districts after the intervention of NRG and others, reflecting the different input costs and prices farmers can get on local markets at different times of the year.

#### 4.2.2 *Sen Based Outcomes of Interventions amongst Smallholder Farmers*

According to Sen, daily routines including utility, price negotiations etc., financial situation and food accessibility have an impact on people's food choices, therefore, Sen's (1979); Sen (1985) capabilities approach becomes useful, as it moves beyond food entitlements (Gombert et al., 2017). In view of this, as shown in the Table 4 above, it is revealed that the intervention of METASIP together with NRG have yielded positive outcomes in terms of food

security amongst smallholder farmers in the UWR following Sen's entitlement and capability approaches. For instance, as argued by Sen (1981) and Todaro and Smith (2012) hunger and starvation are not conditions that must inevitably require a decline in food availability, rather, they reflect the circumstances of people not being able to secure access to food. Examples of these circumstances are bundles and entitlement relations such as the access to land, income and products (credit, technology, High Yielding seeds) that could be exchanged for food.

Evidently, as revealed in the Table 4 above, majority of respondents after the intervention of METASIP and NRGP had access to food all year round owing partly to the income, credit high, technology and high yielding seeds bundles that have improved after the two policies' interventions. In addition, access to land as an entitlement resource contributed immensely to ensuring food security as more women and the youth, who hitherto would have been a burden on the male household head, now have their own land to farm, feed and also sell to make income to support the family.

Furthermore, though, these bundles and entitlement provide the basis for survival, new circumstances may unfavourably impact upon them. For example, grain prices can affect the demand for or purchase of grains. Thus, market forces can play strong roles to affect food security (Sen 1981; Todaro & Smith, 2012). In consequence, there is the need to empower smallholder farmers by providing or giving them the opportunity to participate in price negotiations which Sen term's as empowerment. Accordingly, upon the intervention of METASIP together with NRGP, majority of smallholder farmers have been empowered as they now have greater participation in price negotiations.

## 5. Conclusion

The assessment of the study's results reveal that farmers' access to bundles and entitlements such as the ability to partake in price negotiations, access to credit, technology, high yielding seeds, alternative livelihood to provide stable and high income as well land access got improved after the interventions provided for under METASIP and the NRGP, hence contributed to the food security of small holder farmers in UWR. Thus, smallholder farmers, did not only have enough food produce for consumption or increased production of staple foods in their region due to the provision of credit, technology and high yielding seed/grain varieties, or the improved access to land for women and youth, but they did consume wholesome grains. In addition, smallholder farmers after METASIP and NRGP interventions, were empowered through voice opportunity for greater participation in price negotiations as well as through the provision of alternative livelihoods to provide stable and increased income. The results of the study therefore suggest that the continuous intervention of government in the area of agriculture through the formulation and implementation the right policies can go a long way not to improving the food security situation in the country alone, but also reduce the importation of food stuffs which have implications on the Ghanaian currency, not counting poverty among smallholder farmers.

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