



Assessment of Fertilizer Distribution Systems and Opportunities for Developing Fertilizer Blends GHANA

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Executed by:



This assessment was conducted by the International Fertilizer Development Center (IFDC) and the African Fertilizer and Agribusiness Partnership (AFAP) for the Alliance for a Green Revolution in Africa (AGRA) as part of a consultancy for Assessment of Fertilizer Distribution Systems and Opportunities for Developing Fertilizer Blends. The views, information, and opinions expressed in this assessment are those of IFDC and AFAP and do not necessarily reflect the official policy or position of AGRA.

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Acronyms & Abbreviations

2SCALE	Toward Sustainable Clusters in Agribusiness through Learning in Entrepreneurship
ACDI VOCA	Agricultural Cooperative Development International / Volunteers in Overseas Cooperative Assistance
ADVANCE	Agricultural Development and Value Chain Enhancement project
AFAP	African Fertilizer and Agribusiness Partnership
AFO	Africa Fertilizer.Org
AfSIS	African Soil Information Service
AgNRM	Agriculture and Natural Resource Management Project
AGRA	Alliance for a Green Revolution in Africa
AMG	Agricultural Manufacturing Group
APFOG	Apex Farmers' Organization of Ghana
APSP	Agriculture Policy Support Project
ASAP	Adaptation for Smallholder Agriculture Programme
ASARECA	Association for Strengthening Agricultural Research in Eastern & Central Africa
ATT	Agriculture Technology Transfer Project
B	boron
CAADP	Comprehensive Africa Agriculture Development Programme
CABI	Centre for Agriculture and Bioscience International
CAN	calcium ammonium nitrate
CCA	Canadian Co-operative Association
CEOTAPS	Center for Conflict Transformation and Peace Studies
CIDA	Canadian International Development Agency
COCOBOD	Ghana Cocoa Board
COMESA	Common Market for Eastern and Southern Africa
COP	Chief of Party
CSIR	Council for Scientific and Industrial Research
DAI	Development Alternatives Inc
DAP	di-ammonium phosphate
DCOP	Deputy Chief of Party
DFID	Department for International Development, UK
DGIS	Directorate-General for International Cooperation, Netherlands
ECOWAS	Economic Community of West African States
ETG	Export Trading Group
FinGAP	Financing Ghanaian Agriculture Project
FTF	Feed the Future
GAABIC	Ghana Agricultural Associations Business and Information Centre
GAIDA	Ghana Agri-Input Dealers Association
GASIP	Ghana Agricultural Sector Investment Programme
GIRSAL	Ghana Incentive-based Risk Sharing System for Agricultural Lending
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
GSSP	Ghana Strategy Support Program
Ha	hectare
IARC	international agricultural research center
IFAD	International Fund for Agricultural Development

IFDC	International Fertilizer Development Center
IFPRI	International Food Policy Research Institute
IPO	international public organization
ISFM	Integrated Soil Fertility Management
IWAD	Integrated Water & Agricultural Development Ghana Ltd
JICA	Japan International Cooperation Agency
M&E	monitoring and evaluation
MoFA	Ministry of Food and Agriculture
MSU	Michigan State University
Mt	metric ton
NASTAG	National Seed Trade Association Ghana
NCRC	Nature Conservation Research Centre
NGO	non governmental organization
NPK	nitrogen phosphorus potassium
NPS	nitrogen phosphorus sulfur
OCP	Office Chérifien des Phosphates
OFRA	Optimising Fertilizer Recommendation in Africa
OSIWA	Open Society Initiative for West Africa
PFJ	Planting for Food and Jobs Programme
PPRSD	Plant Protection & Regulatory Services Directorate
RING	Resiliency in Northern Ghana
SARI	Savanna Agricultural Research Institute
SEEDPAG	Seed Producers Association of Ghana
SHF	smallholder farmer
SIPMA	Smallholder Inclusive Productivity and Market Access
SoA	ammonium sulfate
SRI	Soil Research Institute
SSA	sub-Saharan Africa
SSP	single superphosphate
SWOT	Strengths, Weaknesses, Opportunities, Threats
TSP	triple super phosphate
USAID	United States Agency for International Development
WAFP	West Africa Fertilizer Program
WDI	World Development Indicators

Assessment of Fertilizer Distribution and Opportunities for Developing Fertilizer Blends in Ghana

Introduction

In carrying out this assessment, we conducted interviews with key stakeholders in the Ghanaian fertilizer sector including representatives of AFAP, CSIR-SRI, Office Cherifien des Phosphates (OCP Ghana Ltd.), Chemico Ltd. (Tema), OmniFert, Yara Ghana Ltd., MacroFertil Ghana Ltd., and Glofert, among others.

We reviewed documents relating to soil fertility management by consortium partners: IFPRI, IFDC, AFAP, APSP and MSU. We also reviewed documents relating to policy and regulations, Ministry of Food and Agriculture (MoFA), fertilizer recommendations for maize, rice, soybean, and cassava of SRI and Yara Ghana Ltd., and documents and presentations from the Northern Ghana Soils and Fertilizer Forum- addressing soils, fertilizer recommendations and markets, as well as policy implications, jointly organized by ATT Project, AFAP and AGRA with funding from USAID Ghana FTF.

Available Soil Information

Soils in about half of Ghana have been mapped in considerable detail using over 4200 soil samples taken and analyzed by IFDC. The regions mapped include Northern, Upper West, Upper East, and northern portions of Brong-Ahafo, and are shown in Appendix I. AfSiS spectral maps, calibrated to Mehlich-3 methods, will soon be available for the Brong-Ahafo region. Areas mapped so far indicate extensive areas of deficiency for P, K, Ca, Mg, S, Zn, and B, and areas of extensive soil acidity, though most acidity is moderate (pH 5.5-6.0).

Rationale for Why Available Fertilizer Products Were Developed

The fertilizers available in Ghana to smallholder farmers (Table 1) are primarily NPK blends, with 15:15:15 and Yara multi-nutrient compounds dominating the market. Urea is the primary top dress fertilizer available. The 15:15:15 is a general formulation not specific to soils or crops. Yara formulations have crop specificity but are not soil-targeted. Given what seems to be a general suite of nutrient deficiencies in Ghana, this appears to be a good entry strategy into the Ghanaian market.

Table 1. Main fertilizers used in Ghana by crop

Crop	Fertilizer
Cocoa	Yara Asaasewura PK 0-22-18+9CaO+7S+6MgO
	Chemico Cocofeed PK 0 30 20
	Chemico Cocofeed Plus- NPK 2-21-17+9.9Ca 4.8Mg 4S 0.3Zn 0.1B
	LDC Cocoa Master NPK 1-21-19 + 9 CaO + 6S + 6MgO + 1B
Maize	NPK 23-10-5+2MgO+3S+0.3Zn (Yara Actyva);
	NPK 23-10-5 + 4MgO + 2Zn
	NPK 15-15-15 basal (or other types of NPK depending on availability)
	Urea and SoA in top dressing; 40:0:0+6S (Yara Amidas)
Rice	NPK 15 15 15 basal (or other types of NPK)
	NPK 23-10-5+2MgO+3S+0.3Zn (Yara Actyva)
	Urea and SoA in top dress; 40-0-0+6S (Yara Amidas)
Oil palm	NPK 15-15-15 or NPK 15-9-20 + secondary nutrients
Oil palm IP	NPK, MoP, SSP and some TSP in basal
Groundnut	SoA, SSP, MoP
Sorghum	NPK 15-15-15 basal; urea and SoA in top dress
Soybean	TSP, 15-15-15
Rubber	NPK Rubber (e.g. Yara Winner 15 9 20 + secondary nutrients)
Cotton	15-15-15
Cotton IP	SSP and TSP in basal
Pineapple	NPK 15-15-15 (or other NPK); urea and SoP
Mango	NPK 15-15-15 (or other NPK), Nitrabor after fructification

Types of Fertilizer Recommendations that are Available, and Their Suitability for Staple Crops and Agro-Ecological Zones that are Targeted by AGRA

Table 2 shows the nutrients extracted for given yield targets we believe routinely achievable for AGRA priority crops in Ghana, along with nutrients supplied in government and fertilizer company offerings.

There are essentially 3 kinds of fertilizer recommendations: those based on 15:15:15, those based on Yara formulations, and those based on the “new basal” formulations, which are blends produced by Chemico Ltd and Omnifert Company for the Savanna Agricultural Research Institute (SARI), still pending field evaluation with farmers before upscaling of the recommendations next year. The basic characteristics of these new basal formulations are adjusted NPK concentrations according to crop and the addition of an appropriate level of Zn, but they are lacking in S and B and perhaps Mg, given the deficiencies identified in the maps. As developed to date, “new” basal formulations are not balanced.

Table 2. Nutrients extracted for given yield targets and nutrients supplied in government and MFC recommendations for AGRA priority crops

Crop	Yield Target	Appl. Rate		N	P ₂ O ₅	K ₂ O	CaO	MgO	S	Zn	B	Cu	Mn	Fe
		Basal	Top dress											
Maize	Mt ha ⁻¹ 5	-----kg ha ⁻¹ -----		-----Nutrients removed in crop and residue, kg ha ⁻¹ -----										
				100	46	121	18	35	13	0.23	0.24	0.07	0.73	0.36
				-----Nutrients supplied in recommendation, kg ha ⁻¹ -----										
Blanket govt basal 15;15;15, urea topdress		250	125	95	38	38	0	0	0	0.0	0	0	0	0
Blanket govt basal 15;15;15,, SoA topdress		250	150	65	38	38	0	0	36	0.0	0	0	0	0
Guinea savannah new basal 15:20:20+0.7Zn, urea topdress		200	150	99	40	40	0	0	0	1.4	0	0	0	0
Forest-sav. trans. new basal 15:20:20 +0,7Zn, urea topdress		300	100	91	60	60	0	0	0	2.1	0	0	0	0
Yara Actyva Basal and topdress 23:10:5+2MgO+3S+0.3Zn		250	250	115	50	25	0	10	15	1.5	0	0	0	0
Yara Actyva Basal and Yara Bela Sulfan (24:0:0+6S+10.6CaO) topdress		250	250	118	25	13	27	5	23	0.8	0	0	0	0
Rice	Mt ha ⁻¹ 7			-----Nutrients removed in crop and residue, kg ha ⁻¹ -----										
				150	46	217	42	50	7	0.28	0.21	0.20	4.73	1.05
				-----Nutrients supplied in recommendation, kg ha ⁻¹ -----										
Lowland 15;15;15, urea topdress		400	100	78	60	60	0	0	0	0.0	0	0	0	0
Upland 15;15;15, urea topdress		300	100	91	45	45	0	0	0	0.0	0	0	0	0
Lowland new basal 15:20:20+0.7Zn , urea topdress		300	100	91	60	60	0	0	0	2.1	0	0	0	0
Upland new basal 15:20:20+0.7Zn , urea topdress		200	125	88	40	40	0	0	0	1.4	0	0	0	0
Lowland Yara 15:15:15+2S split and Amidas (40N+5.6S) topdress		375	125	106	56	56	0	0	15	0.0	0	0	0	0
Upland Yara Actyva split 23:10:5+2MgO+3S+0.3Zn, Amidas 40:0:0+5.66S topdress		375	125	136	38	19	0	5	19	1.1	0	0	0	0
Soybeans	Mt ha ⁻¹ 3			-----Nutrients removed in crop and residue, kg ha ⁻¹ -----										
				88	46	53	27	17	7	0.13	0.14	0.03	0.20	0.61
				-----Nutrients supplied in recommendation, kg ha ⁻¹ -----										
No government blanket recommendation														
New basal (200 kg/ha 12:30:17+0.4Zn)		200		24	60	34	0	0	0	0.8	0	0	0	0
Yara 4:18:13+6CaO+3MgO+3S+0.1B basal + Nitrabor topdress		250	125	29	45	33	47	5	15	0.0	0.6			
Cassava	Mt ha ⁻¹ 30			-----Nutrients removed in crop and residue, kg ha ⁻¹ -----										
				103	34	93	57	22	12	0.45	0.16	0.05	0.72	0.83
				-----Nutrients supplied in recommendation, kg ha ⁻¹ -----										
Blanket govt basal 15;15;15, urea topdress		200	150	99	30	30	0	0	0	0.0	0	0	0	0
New basal 17:10:10 +0.7Zn, urea topdress		300	100	97	30	30	0	0	0	2.1	0	0	0	0
Yara 10:10:30+?MgO+?B 3 splits, Nitrabor topdress 2 splits		375	250	76	38	113	64	6	8	0.0	1.5	0	0	0

From Table 2, it is clear that Yara recommendations are the best-balanced according to crop-specific needs, as they contain a good balance of S, Zn, and in some cases B and Mg, all of which have been identified as likely deficient according to the nutrient maps in Ghana. They are quite popular amongst farmers; in spite of not being subsidized, they sold volumes comparable to the government-recommended 15:15:15 (exact information is confidential but verified). While the “new” basal formulations make some progress with the addition of Zn, the lack of S, B, and possibly Mg will likely constrain optimal response. The rates for Yara fertilizers are quite high, which is in large part due to their nitrate concentrations (other fertilizers are supplying N primarily as ammonium and urea, which are more concentrated N forms). The added Ca concentrations in Yara soybean and cassava recommendations also has a dilution effect. This Ca is probably beneficial for soybean (though perhaps excessive) and unnecessary for cassava.

Generally speaking, the Yara products provide a good guide for blenders to improve their maize, rice, and soybean products with additions of S, Mg, Zn, and B. Blenders however should not try to mimic the Yara compound formulations. Particularly for maize, it is advisable to have most nutrients applied in the basal fertilizer, but with less N, and balance the N with added topdress to better time N application to N crop demand later in the season.

For maize, rice, and cassava, sulfur (S) can be supplemented into government recommendations by substituting ammonium sulfate (SoA) for urea, either all or in part. SoA is a very acidifying N source, so a partial substitution would be advised. The Amidas product from Yara, 40% N and 6% S, is similar to this, but in a compound. Alternatively, S, B and perhaps Mg can be added with Zn in the basal formulations, the usual blender approach.

We consider that the government and “new” basal formulations might be more appropriate for cassava in terms of NPK ratios. Considerable research in Africa, including some done in Ghana by Ezui et al. (2016; Fertilizer requirements for balanced nutrition of cassava across eight locations in West Africa. *Field Crop Research* 185:69-78), has indicated that cassava response to extra K is somewhat limited, whereas it has been shown responsive to greater N rates. For cassava, based on our experience, blenders might do well to retain their current NPK ratios while supplementing with S, Zn, and B.

Gaps that Need to be Addressed to Come Up with Area and Crop Specific Blends

Ghana is in a very good position: Nutrient maps in the northern half of the country have identified likely deficiencies, and maps for Brong-Ahafo will soon be released. Fertilizer blenders are already working with SARI to have their products validated and registered. These blenders, however, need support. Their main innovation (apart from NPK adjustment) is to introduce Zn into formulations. Maps have only been recently released, and provide blenders with a good basis for developing and evaluating formulations that contain S, B, and perhaps Mg. By testing a small basket of blends at each site, some area specificity may be developed. Some knowledge gaps exist regarding crop-specific demands, particularly in relation to differences between maize and rice (maize requiring less K, which is not reflected in the formulations). Rice lowlands may need more intense sampling to get to best formulations; they tend to have different soil nutrient levels than more extensive uplands due to their relatively low elevations and anaerobic environment. As well, the Ghana blenders

have different ingredients options and different ways of getting micronutrients into blends (granular micronutrients vs. micronutrient coatings) that affect nutrient rates and availability. It is important that both blenders and regulatory authorities understand these differences.

In 2017, AGRA awarded a grant to Soil Research Institute (SRI) under the Council for Scientific and Industrial Research (CSIR). SRI is proposing to collaborate with MoFA to conduct field trials for the validation of the recommendations and testing of fertilizer blends for four main crops (maize, rice, soybean, cassava) in Brong Ahafo and Northern Regions over a period of 24 months. It is critical that the development and validation of new blends be informed by the soil maps, which did not appear to be the case at the time of this report.

Fertilizer Companies and/or SME Blenders Existing in the Country and the Geographies Targeted by AGRA

Six blenders currently exist in Ghana: Macro Fertil (Kpong), Chemico Ltd., Omni Fert, Yara Ghana Ltd. (Tema); Glo Fert (Accra), and Farmer's Hope (Kumasi). These blenders have varying ingredients and processes to incorporate micronutrients as granulars or as granular coatings, and to address secondary (Ca, Mg, S) deficiencies. As an ensemble, they have the capacity to provide for all of Ghana's blending requirements.

Inventory of Partners and Ongoing Efforts or Investments that are Promoting the Availability of Appropriate Blended Fertilizers that AGRA can Leverage in the Target Countries

A list of potential partners and key country contacts is in Appendix II.

Recommendations and Interventions that AGRA could Implement to Address the Availability of Quality Fertilizers

Investment in Ghana have led to almost complete soil mapping in AGRA priority zones, which positions the country well to develop and evaluate best-bet blend options. We suggest the following:

1. **Advanced training in fertilizer formulation and blending options.** Ghana blenders are well-positioned to take advantage of the latest soils information provided by nutrient maps to develop blends for evaluation. As earlier noted, the "new" blends being evaluated differ primarily from previous blends by the inclusion of Zn, whereas widespread deficiencies of S and B have also been noted. The importance of B seems to be neglected in several countries including Ghana. One possible reason for this is hitting the boron "sweet spot"—that rate where B is effective but not toxic and applied in rates and forms that do not result in long-term toxic accumulation. When both Zn and B are applied as granulars, they can have a significant dilution effect on other nutrients in a blend. For sulfur, there are many different options that can be effective in Ghana, including OCP NPS products (OCP already sells 3 NPS compounds in Ghana, which are primarily marketed to blenders), MgSO₄ (which also supplies magnesium), sulfate of ammonia, and

elemental S pellets, with or without micronutrients incorporated, and Yara Amidas. Blenders will make decisions based on their comparative advantages and marketing strategies as to which products they will produce. Having a strong knowledge base and solid technical support regarding prevailing deficiencies, how to blend small batches required for best-bet trials, is required by both the blending industry and by government fertilizer experts. We recommend that these trainings be done by IFDC and AFAP to combine fertilizer and industry knowledge.

2. **Technical support for best-bet trials.** Currently, there are few multi-nutrient fertilizer options in Ghana, and only one or two options are being evaluated for AGRA priority crops, which do not contain the full suite of likely deficient nutrients. To accelerate new fertilizer development, multiple best bets need to be evaluated simultaneously. This involves a collaboration between SARI, fertilizer blenders, and ingredients suppliers. This should begin with an understanding as to the evidentiary requirements of SARI for approval of new blends in terms of sites and seasons. Trial design support is important, so that the maximum amount of information can be gathered from best-bet trials. It is common that treatment designs are inconclusive; for example, due to poorly selected treatments that may include increase in one nutrient while decreasing another, or comparison of fertilizers at different rates, one cannot draw firm conclusions regarding whether a nutrient needs to be in a formulation for a specific crop. Some understanding of crop-specific requirements also needs to be developed. Yara seems generally to have this expertise, but it is not evident in the blends that have been developed for Ghana so far.
3. **Liming:** Soil acidity is a clear constraint in some regions of Ghana. Associated with soil acidity are Ca and Mg deficiencies, which sometimes can be addressed in the fertilizer if the acidity is not severe. Due to time limitations, we did not assess the lime resources available in Ghana. However, most countries can develop a lime supply through the cement industry. Resolving soil acidity constraints is a key element in balanced crop nutrition. We advise that best-bet trial work should include lime where necessary in its treatment structure. This begins to form the data base required to make decisions on developing the lime industry and value chain in the short term. In the long term, it can direct AGRA investments in developing the lime value chain.
4. **Increase capacity to analyze soil, plant, and fertilizer material in-country.** The government has analytical facilities, but the technical and business skills capacity to run these laboratories is weak, and as a consequence, laboratories are in disrepair. Some new equipment is available. We recommend that laboratory business skills be developed, such that labs are capable of running as financially sustainable entities. A pre-requisite to investing in the laboratories should be government development of a viable business plan for sustainable lab functioning without further intermittent donor support for equipment, chemicals, and maintenance. Pay structures and analytical costs may require revision so that laboratories can be brought to an internationally acceptable standard, and laboratories can attract and retain key personnel.

Ghana Fertilizer Market

The Ghana Fertilizer Distribution Structure and Value Chain SWOT analysis are presented in Figures 1 and 2, respectively.

Demand

The apparent fertilizer consumption of fertilizers in Ghana has fluctuated significantly over the last 8 years, from about 264,784 MT in 2010 to about 440,000 MT in 2017, with a low of about 104,000 MT in 2014 (Figure 3). The 84% jump from 239,858 MT in 2016 to 440,661 MT in 2017 was due to two subsidy programs that run concurrently in 2017 - the normal Fertilizer Subsidy and the Planting for Food and Jobs (PFJ)¹. It is estimated that 78% of the fertilizer consumed in 2017 was subsidized – cocoa and Government, leaving only about 95,000 MT of private fertilizers. Fertilizer use appears to have been historically propped by either the cocoa plantation or Government subsidies usually targeting maize, rice, millet, sorghum and soybeans. Both systems (Government and cocoa) have contributed to lifting fertilizer consumption from about 8 kg/ha in 2008 to about 13 kg/ha in 2015.

In tandem with several other African countries, the agricultural product and input price hikes of 2007–08, seemed to have nudged the Ghanaian Government into re-starting a fertilizer subsidy program, which, has been running since then (excluding 2014) in various combinations with the Ghana Cocoa Board². Targeting of the subsidy has been less effective than anticipated: medium and large farms receive a disproportionate share of fertilizer distributed under the program³.

Since a principal objective of subsidy is to improve agricultural production, and since cereal production (Figure 4) has been increasing steadily (albeit before the new subsidy regime), the impression is that subsidy has been a success. Studies suggest that the 8-9 years of fertilizer subsidy programs have improved the use and understanding of the value of fertilizer. These have however not led to significant productivity gains (Figure 5) in the targeted crops: the production has been driven more by expansion of planted areas than by yields. Moreover, a good percentage of the subsidy is exported illegally to Burkina Faso to take advantage of the arbitrage opportunity created by the subsidy.

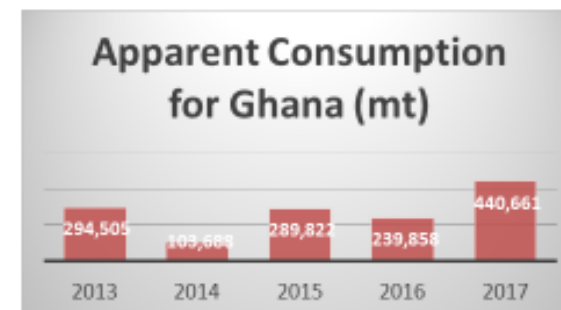
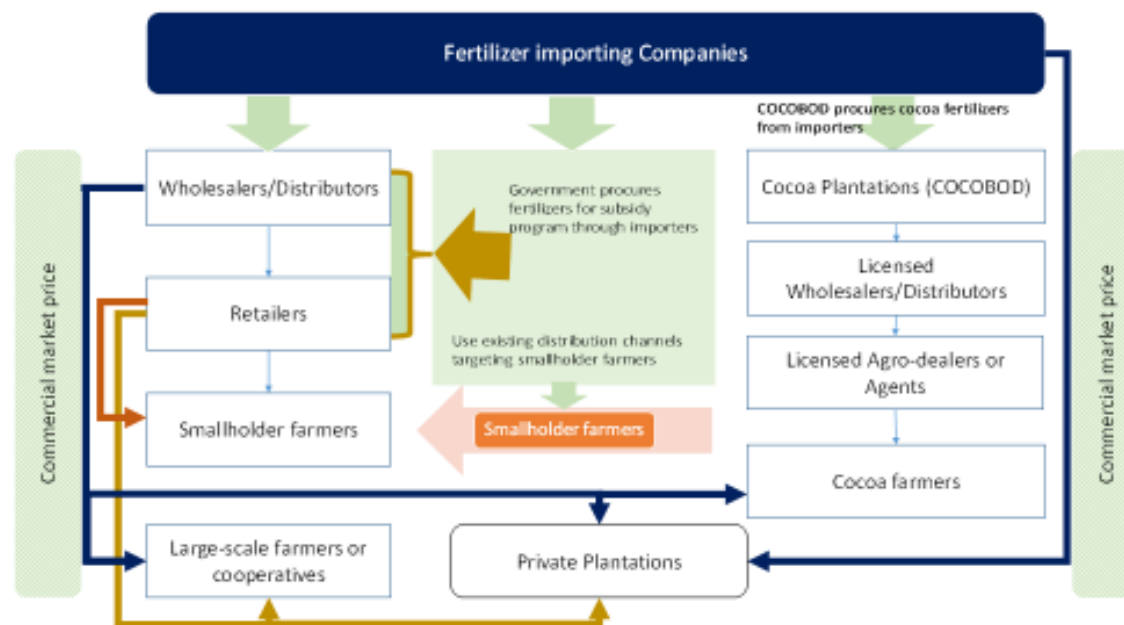
During the first four years of the subsidy program (2008–11), MoFA⁴ allocated 19–33% of its budget to the subsidy program, which grew close to 45% of the MoFA budget in 2012 (and 34% of total Government expense) before declining to 10–20% leading up to 2016. The trend is back up since 2016 and almost peaked in 2017 (Figure 6) with the introduction of the PFJ. The problem is that Government has recorded revenue shortfalls in recent years, mainly due to drops in world prices for Ghana's main export commodities such as gold, cocoa, and petroleum. With insufficient revenue, the Government has struggled to meet projected budget disbursements for agencies. In practice, many of Ghana's major agricultural initiatives have been funded through donor support, either in kind or in the form of budgetary supplements.

¹ Africa Fertilizer.Org

² The Ghana Cocoa Board (Cocobod) is a Ghanaian government-controlled institution that fixes the buying price for cocoa in Ghana (Wikipedia)

³ It is estimated that as high as 83,4% of subsidized fertilizers went to the medium and large farms in 2012

⁴ Ministry of Agriculture in Ghana



	Fertilizer system	Volume (mt)	%
Cocoa	Bulk Plantation	87,113	20%
Direct Subsidy	Bulk Government	140,000	32%
PFJ	Bulk Government	120,624	27%
Private	Private	92,924	21%
		440,661	

***345,126mt (78%) of Fertilizers were subsidized by the Government in 2017**

Figure 1. Ghana fertilizer market distribution structure, apparent consumption, and volumes distributed via various distribution systems.

	Strengths	Weaknesses	Opportunities	Threats
Manufacturer				
Importer	<ul style="list-style-type: none"> Access to finance 	<ul style="list-style-type: none"> Very little value-addition locally 	<ul style="list-style-type: none"> Flagship PFJ program that has been expanded to reach more farmers. Availability of granular urea in Nigeria 	<ul style="list-style-type: none"> Gov't policy for soil and crop specific blended fertilizer with interest in local blenders Govt subsidy program delays in paying importers
Blender	<ul style="list-style-type: none"> Access to Finance-flexible borrowing terms from international parent companies Working with regulatory body to improve available blends 	<ul style="list-style-type: none"> Adulteration lack of motivation to add secondary and micro nutrients due to subsidy and price being fixed 	<ul style="list-style-type: none"> Government subsidy plan to promote soil and crop specific fertilizer blends in Ghana promotes local producers Use of granular urea 	<ul style="list-style-type: none"> Lack of monitoring/poor regulation enforcement by PPRSD. Fear that some blenders will use low grade raw materials
Distributor	<ul style="list-style-type: none"> Agro Dealer relationship Strong distribution networks 	<ul style="list-style-type: none"> Lack of capital Distribution competence Inadequate reach of distribution network, especially in rural areas Subsidy is an important part of the business (leading to export to other countries) 	<ul style="list-style-type: none"> GHIRISAL- Credit guarantee options for distributors 	<ul style="list-style-type: none"> Fixed transport margins imposed on fertilizer distributors under FSP which discourages distribution to rural areas
Agro Dealer	<ul style="list-style-type: none"> Farmer interaction / relationships Warehouse capacity in key regions 	<ul style="list-style-type: none"> Lack of working capital Footprint still not within farmer proximity in some regions 	<ul style="list-style-type: none"> Farmer education and product promotion 	<ul style="list-style-type: none"> Open bag sales: Inadequate monitoring of fertilizer quality Inadequate Reach
Processor	<ul style="list-style-type: none"> Demand for finished product 	<ul style="list-style-type: none"> Lack of working capital Side selling by outgrowers Insufficient feedstock 	<ul style="list-style-type: none"> Government initiative to support local production especially within the poultry sector 	<ul style="list-style-type: none"> Enforcement of forward contracts Reduction in crop production

Key Takeaways:

1. Urea is mostly imported from Europe
2. The subsidy structure prevents distribution from actively seeking to make fertilizers available to farmers
3. The subsidy structure (pricing and payment delays) will push blenders into seeking compensation from product quality
4. Large distributors take advantage of subsidy to export into neighbouring countries
5. Processors have not developed a relationship with farmers though they suffer feedstock supply

Figure 2. Value chain SWOT analysis for Ghana.

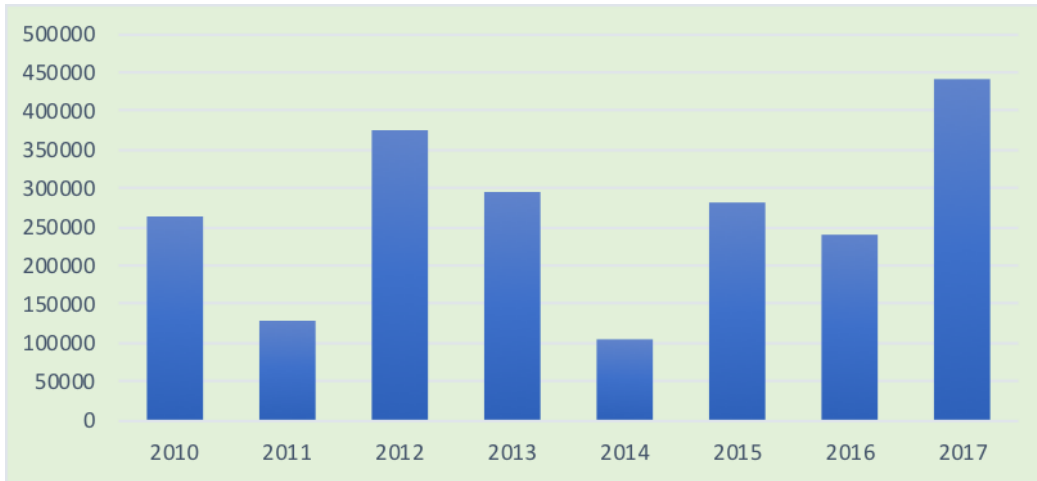


Figure 3. Apparent fertilizer consumption trends (MT) in Ghana.

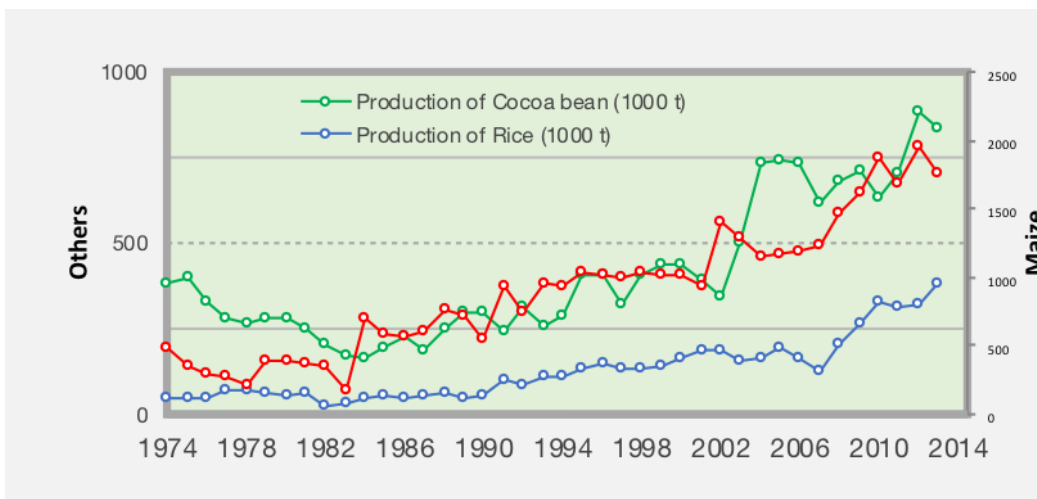


Figure 4. Production trends of major crops in Ghana

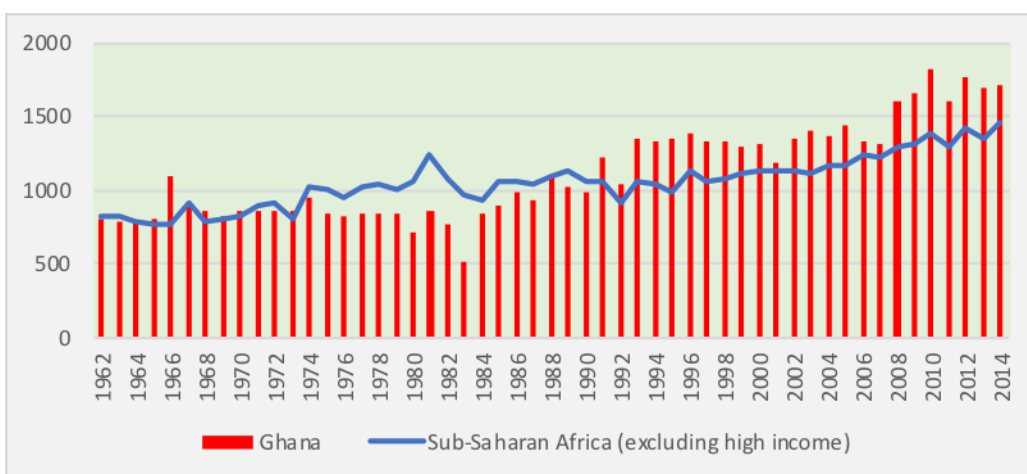


Figure 5. Evolution of cereal crop yields in Ghana (kg/ha of arable land)

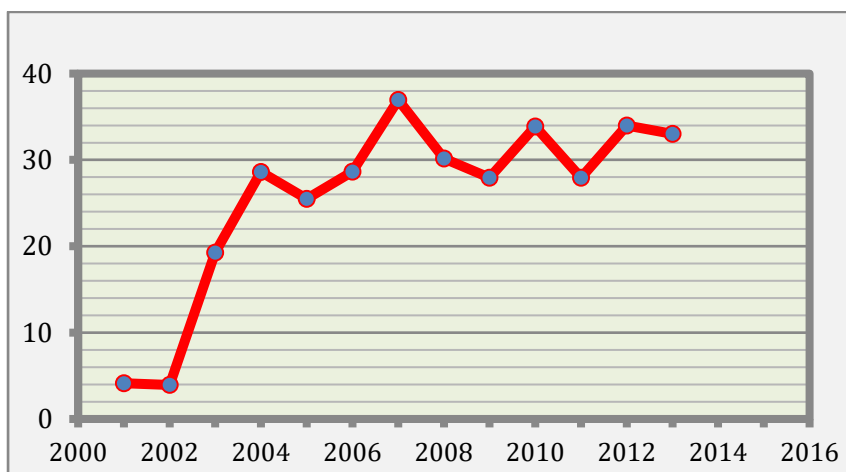


Figure 6. Subsidies and other transfers (% of expense)

It is difficult to imagine that the Ghanaian Government will be able to keep up the subsidy regime given the cost to the country. In fact, the Government has already announced the reduction in 2018 in which only one subsidy program, the PFJ, will be implemented.

The demand of fertilizer in Ghana is therefore defined by subsidies which are defined by the Government's budget which is defined by either commodity prices or political will (elections improve political will).

The current consumption of fertilizer in Ghana is not entirely reflective of the demand of the country. It is not unlikely, as has happened in the past, that the consumption drops to levels of about 100,00 MT to 150,000 MT, to reflect the real private sector investment in the sector. There however exists significant latent potential for fertilizers in the country.

Supply

Almost all the fertilizers consumed in Ghana are imported. A few private firms import all the fertilizers in the country probably due to the barrier created by the cost of importation, especially since access to finance is difficult in Ghana. At the wholesale level are distributors for or agents of the importers, other wholesalers and parastatal producer organizations, primarily the COCOBOD. Though there is excess urea capacity in Nigeria, very little of the urea in Nigeria is distributed in Ghana – the relationships between the bulk buyers and importers seem to exclude regional supply.

The 6 blenders in the country participate in the Government subsidy programs directly. The fixed price of the product and the late payment of Government create an incentive for the blenders to either adulterate (using cheaper products) or to omit either secondary or micro nutrients in the quest for profit.

The COCOBOD has its own dealer network for cocoa fertilizers, but these dealers also sell other fertilizers as well as non-cocoa agro-inputs. The vast majority of the fertilizer is sold to private retailers, who in turn sell their products to smaller retailers or directly to farmers. Armah and Gugerty (2009) identified four categories of fertilizer retailers based on their access to import supplies; ones who have contract with a single importer or multiple importers, ones who have no contract with importers, and those who repackage fertilizer from larger retailers.

The dependence of the distribution system on bulk procurement programs force a hierarchical structure where importers / blenders with relationships with the buyers are top of the pyramid. The wholesalers have very strong agrodealer relationships (control), a natural consequence of the bulk procurement systems since the agrodealer's participation is dependent on the wholesaler. The distribution networks therefore exist to take subsidized products to Ghanaian farmers though there is little incentive to distribute to rural areas: the subsidy programs insist on a fixed constant transport cost irrespective of the location. The distribution network – wholesalers and agrodealers – are not competing for efficiency but for subsidy margins and therefore have not developed efficient processes and systems to add value. Because they are just conduits for the products, they do not have product knowledge, nor do they show any desire to understand the products.

In a bid to maximize margins, the wholesalers take further advantage of the subsidy by exporting the products to neighboring countries, especially Burkina Faso - there was a price gap of \$120/MT and \$140/MT between Ghana and Burkina Faso in 2017 (AFO).

With the regularity of the subsidies, the distribution network has extended, naturally, into neighboring countries.

The activities of the distributors with subsidies are not usually legal and are not usually transparent. This lack of transparency, combined with the delayed payments associated with subsidies and the lack of assurance of Government volumes, increases the risk profile of fertilizer distribution significantly. Banks are therefore wary of financing the distribution chain downstream. Without financing, the distribution is left more vulnerable to upstream control.

Summary

The Ghanaian fertilizer market has been dominated by subsidies for the last decade. The subsidies have gradually corroded private relationships and competition. The subsidy structure, especially regarding pricing and payment delays, pushes blenders into seeking compensation from poor product quality and prevents distribution from actively seeking to make fertilizers available to farmers, rather, distribution is preoccupied with extracting value from the subsidy, including exporting into neighboring countries.

Policy Contribution and Outcomes

Subsidy policy

The price hikes of agricultural commodities between 2007 and 2008 restarted the implementation of a fertilizer subsidy program in Ghana, which has been maintained annually with the exception of 2014 when it was suspended. This Government administered subsidy program targets mainly maize, rice, soybeans, millet, and sorghum.

In 2017, the Government decided on an additional subsidy program, the PFJ, and introduced 50 subsidies on an additional 180,000 MT of fertilizers to achieve 2 primary objectives: 1) create agricultural employment; 2) increase income generated through agriculture. With this program, the apparent consumption of fertilizers in Ghana rose by 83% but there were a

number of problems that affected the effectiveness of the program⁵: the storage capacity at regional and district level were inadequate; inputs were delivered late; there was no farmer database; extension workers were not enough; and there was not enough provision for logistics – vehicles and motorbikes.

The program was modified in 2018 to be a targeted (using a coupon method) input subsidy with an objective to reach 500,000 farmers and with additional crops included (roots and tubers). Volumes were allocated to fertilizer companies and prices were fixed in a generic manner: NPK - 68GHC; Urea - 63GHC.

The Ghana Cocoa Board also runs subsidy programs which are not a part of the Government's main program.

Other regulations

Ghana has completed the ratification and gazetting of the harmonized ECOWAS fertilizer regulation.

Prior to 2017, agricultural inputs were exempted from taxation. In January 2017, the Government decided that seeds and some fertilizers that originate outside the ECOWAS zone would be subjected to 5% duty. The procedure was however that companies importing from within ECOWAS would go through a process to prove the legitimacy of their claims, post importation, before refunds are made. This process of duty rebate applications is supposed to take one month or less. Importers complained to the Government about the additional cost imposed by the duty, which includes the cost of financing. Importers also claimed that the uncertainty about the refund would oblige them to increase the price of delivered fertilizers, especially upcountry.

The PPRSD (Plant Protection & Regulatory Services Directorate of Government) is the technical agency for registering fertilizer products, issuing permits for fertilizer imports, testing and laboratory inspection of fertilizer products, and for conducting field trials on the efficacy of “new” fertilizer formulations. AGRA supported the National Fertilizer Policy framework; regulations to guide implementation of Fertilizer Act; fertilizer subsidy; fertilizer pricing; Integrated Soil Fertility Management (ISFM) policy framework. This led to Regulations L.I. 2194 to guide implementation of Plants and Fertilizer Act 803 of 2010 which was approved by Parliament; National Fertilizer Policy approved by Cabinet. The agency is under-staffed & under-equipped. Though through IFDC's West Africa Fertilizer Program (WAFP), the PPRD's inspectors have been trained to pilot a mobile phone application for the registration, tracking, & inspection of fertilizer products.

The cost of fertilizer testing and registration of new products is considered high by the private sector.

⁵ Presentation of a Government official to the AFO Fertilizer workshop in 2018 in Ghana

Ongoing Efforts or Investments that are Promoting the Availability of Appropriate Blended Fertilizers that AGRA can Leverage in the Target Countries

Savanna Agricultural Research Institute (SARI), one of the 13 research institutes of the Council for Scientific and Industrial Research Institute (CSIR), is working with blenders: Chemico and Omnifert for “new basal” formulations, which should go to trials soon. Some fertilizer companies also appear to be conducting isolated and uncoordinated individual trials.

Policy and Regulatory Bottlenecks that are or may Affect the Availability of Blended Fertilizers, and Interventions that AGRA and its Partners could Design and Advocate for Implementation to Help Farmers Access the Appropriate Blended Fertilizers

Policy constraints

The principal policy thrust of the Government is the PFJ. The PFJ is also, should it continue, likely to create constraints to developing and commercializing blends. The first problem arising from the PFJ is that it prescribes a price for NPK regardless of the NPK. In addition to the prescription, the PFJ creates a risky situation for suppliers through an allocation of volumes to suppliers. Moreover, the PFJ is usually very late with payment of suppliers. Finally the PFJ is not likely to accommodate new blends – it is more likely to demand the lowest nutrient NPK of the current blends which will enable the supplier to maximize margins.

Supply chain constraints

The private fertilizer system and culture in Ghana is diminishing rapidly due to the influence of subsidies which have become dominant in the country. The supply chain is constrained by the following:

- Importers are suppliers to either the COCOBOD or to Government’s subsidy programs. They will therefore behave more and more with a trading mentality, interested only in short term profits.
- Blenders are neither competent nor motivated to develop new products since the price of NPKs is fixed under the subsidy regime and the price will also affect NPKs in the private system. Under pressure of margins, especially from late Government payments and low regulatory control, the blender is unlikely to produce the required amount of nutrient specified in the NPK.
- Distributors and agro-dealers lack the working capital to support demand of fertilizers. They are also influenced by subsidies and look for ways of exporting to neighboring countries to capture some of the value of the subsidies. The distributors lack distribution competence beyond storing (done poorly most times) and redistributing products.

- The distribution footprint in rural areas is very sparse and it is not reflective of the potential demand in those areas. Moreover, agro-dealers do not give farmer adequate agronomic advice and do not actively promote products.
- The blenders lack blending management expertise; they also do not understand distribution and have not built any farmer relationship.
- Products (basal and top dressing) are not optimized to give maximum value to the farmer
- Research institutions have not been active in the development of the sector.
- The regulatory agency is weak on enforcement.

AGRA Intervention Options

The emerging culture in the Ghanaian fertilizer sector undermines the production and commercialization of appropriate blends in Ghana. Ghana has become a country with a typical dominant mix of Government / Bulk procurement systems and the attendant problems that combination will pose for the farmer are predictable.

To transform the systems will depend on: 1) the improvement of the existing institutional structure – regulatory system, fertilizer competence in the country, and soil mapping; 2) making the subsidy more effective by introducing better products; 3) strengthening of the implementation capacities of AGRA partners; 4) investing in best-bet trials and commercialization of optimized products within the AGRA geographies.

Improve the regulatory system with a country platform

The PPRSD is unable to operate efficiently. It is understaffed, ill equipped and deficient of fertilizer competence. In addition, Government interventions increase the work load significantly and it is isolated from the private sector. To transform the regulatory structure, it will be necessary to create an active platform of stakeholders to work with the PPRSD to:

- Understand the current landscape and its negative impact on value addition across the chain
- Develop a joint vision that is farmer-centric
- Through a scrupulous appraisal of the current system, understand the constraints to realizing vision within the fertilizer systems
- Agree on the key roles of the different actors
- Develop an execution plan that takes into consideration the level of preparedness of, and the need for self-regulation by, the different actors
- Include in the execution plan, the technical audit of the laboratories – state of equipment, procedures and competence of operators
- Institute a review mechanism

The development of the platform – convening, facilitating and funding – will require an external organization and will require the participation of technical resources that Ghana does not have in-country. The constitution of the platform should take into consideration the need for a transformation of the regulatory system and therefore recruit members that are genuinely interested in the sector and are mavericks within their trade.

AGRA Strategic Planning

Getting good quality blends sustainably to the small holder farmer will probably require a 3-phase approach that has some immediate actions, complementary actions after the initial have gained traction and there is a structural effect, and the transition into maturity. The duration from starting to maturity is estimated to be 5 years (Figure 7).

Each phase has a blend of the intervention options and is dependent on the geography but the principles can be applied to multiple locations at the same time.

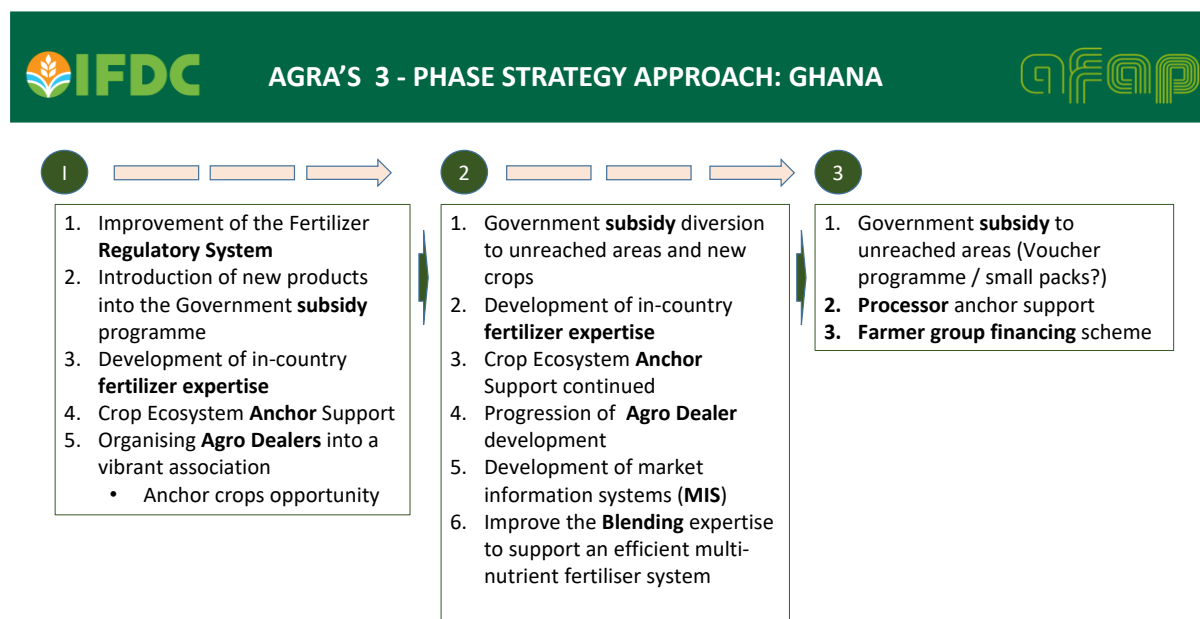


Figure 7. Suggested implementation approach in Ghana.

The first phase of proposed AGRA options has three parts:

1. Development of a more effective regulatory system. This phase, described above, will be used as the base to build the sustainability of the sector through the development of a vibrant technical and professional environment within the system.
2. Urgent need to create efficiency within the current system from improved products – blends and granular urea, especially working through the subsidy regime
3. The start of the professionalization of the supply chain, starting from the agro-dealer organizations which exist in Ghana, but which do not add value to the members and are used more for political leverage than for building professional expertise.

The **first phase** is to improve immediately the quality of products (blends and urea) while building the foundation for transparency and regulation of the fertilizer sector, leading to better distribution discipline and improved farmer yields. These institutional actions are then complemented with the improvement – with technical support and mentoring - of distribution associations.

Concurrently, best-bet products can be developed for soya beans, maize, rice and cassava and trialed within the AGRA region. Given that retail density is low within the region, a pilot

subsidy program can be used to indicate the potential of the market to the private sector. We would suggest that the subsidy focus first on a combination of staple and cash crops – maize and soya beans, for example, and to lead with soya beans⁶. Because affordability is an issue, and to avoid the leakages associated with subsidies, the pilot program can be with small packs of either 10kg or 25kg depending on the evaluation of the adoption appetite of the farmer. The pilot program can also be designed to offer the farmer flexibility on the quantity to purchase and not fixed quotas. The subsidy pilot should be designed such that the distribution of the products is accompanied by some instruction on use – a combination of both the retailers trained to advise and radio programs.

The subsidy program could be repeated for the same crops in the same areas only once; the objective is not to build dependency but to expose markets – introduce farmers and input suppliers.

The execution of the subsidy program should be used to kick-start a data gathering system, especially through the participating agrodealers. The subsidy also provides an opportunity to strengthen the agrodealer association by making participation conditional on the gathering of information and on some communication (on the new products) to the farmer. The training and supervision of the distribution should be made the responsibility of the association while a 3rd party represents the Government for M&E (AGRA could fund this). The association will however also require handholding (training and project management) to be able to execute on the subsidy demands. The handholding can be funded by AGRA whilst the supervision costs by the association are borne by the participating members.

An addition to the subsidy program could be the introduction⁷ of feed millers (processors) to the reality of the potential of feedstock production in the targeted region. The introduction could lead to an aggregation structure set up for the processors who in turn are likely to show as much interest as input providers in the consumption of inputs by farmers.

The activities in the first phase provide the opportunity to build fertilizer competence in the country. Product development and trials, blending, distribution and extension all require expertise that needs to be improved, and improvement will require instruction and handholding.

In the **second phase**, the subsidy program can apply the lessons of the first phase to cassava. Another area should be targeted and weaned within two years.

The retailer in the area becomes the core of the value chain – he offers the input manufacturers and importers the opportunity to reach farmers and could also be used by the processor to aggregate output. With such a crop anchor ecosystem, the risk of financing is reduced, and the retailer could, with support from, and relationships with, both input and processor, access finance.

The second phase also starts to build the technical capacity of blenders. The program of the first phase would have provided an opportunity for an evaluation of the capacity – technical and management - of the blenders. This information could be used to develop a program of development that is agreed by the parties and whose output is made regulatory – blending quality systems could be, for example, defined and enforced.

⁶ Cash crop peasant farmers are usually more sensitive to yields than staple farmers and are therefore to have a higher adoption appetite.

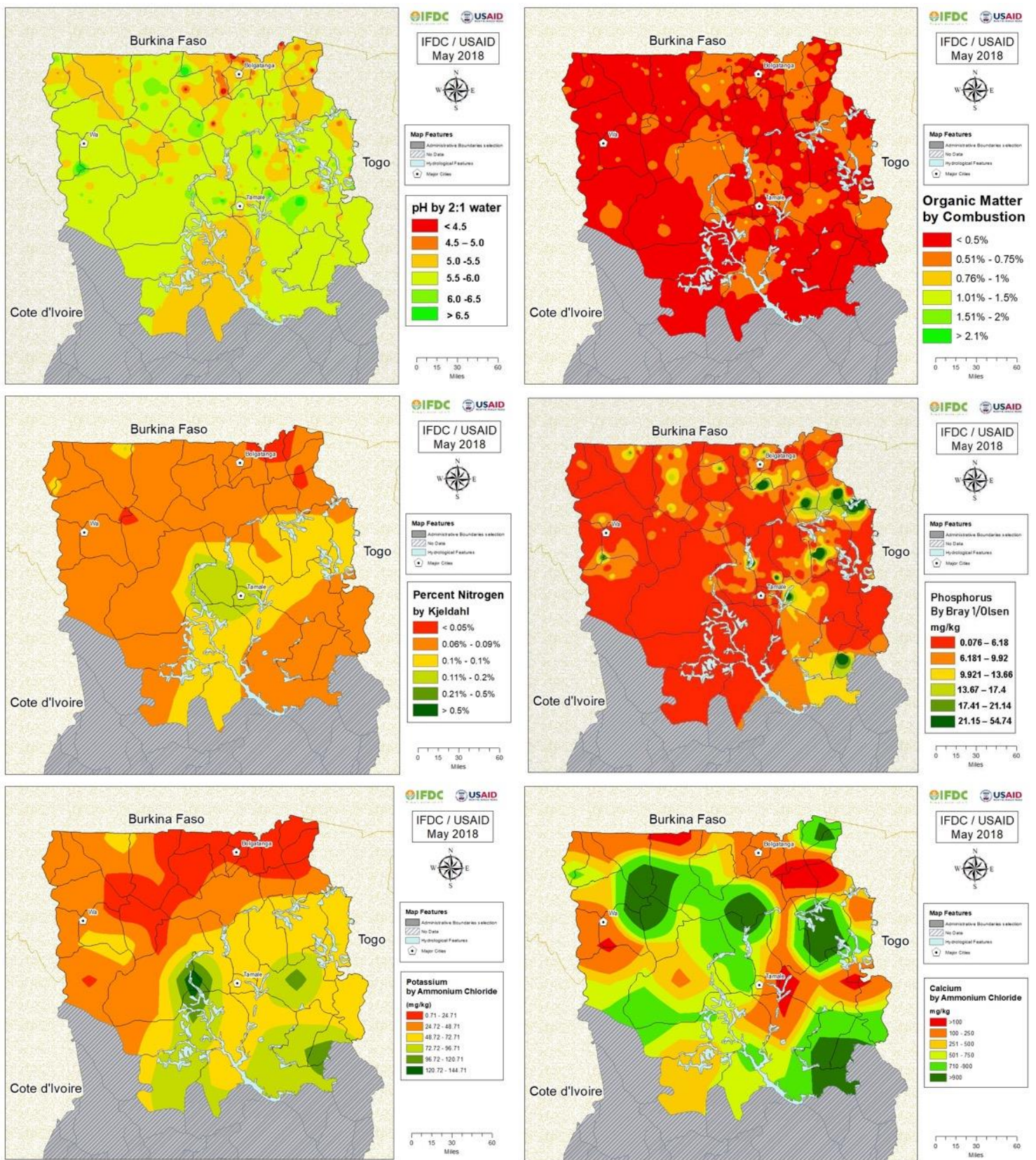
⁷ Could be a part of the responsibilities of the subsidy-execution structure

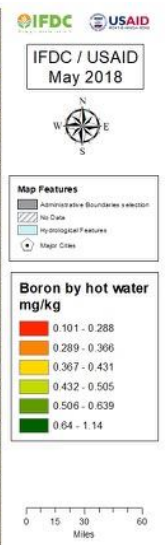
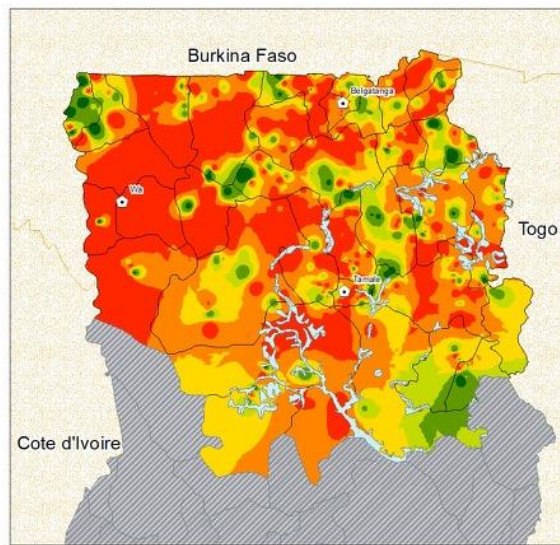
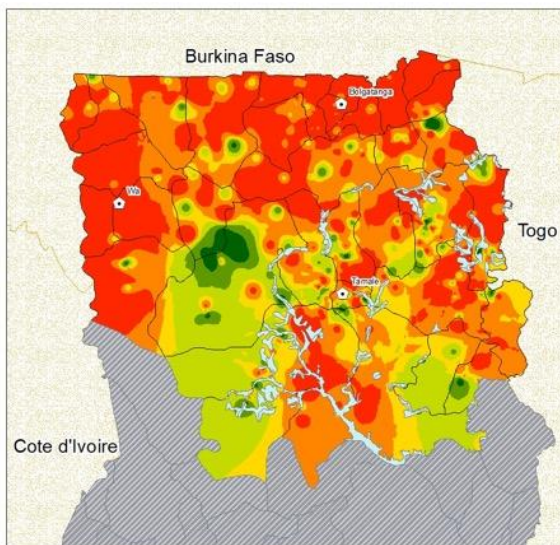
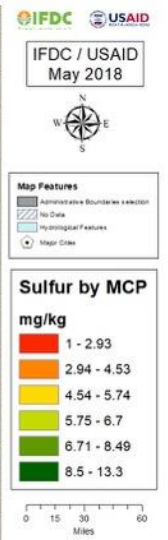
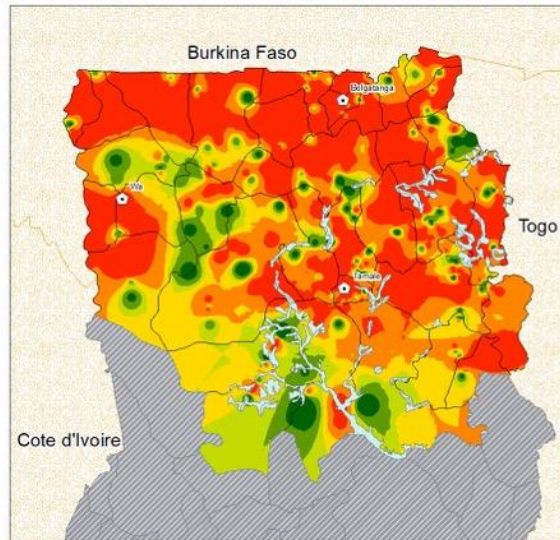
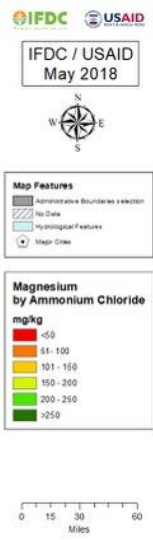
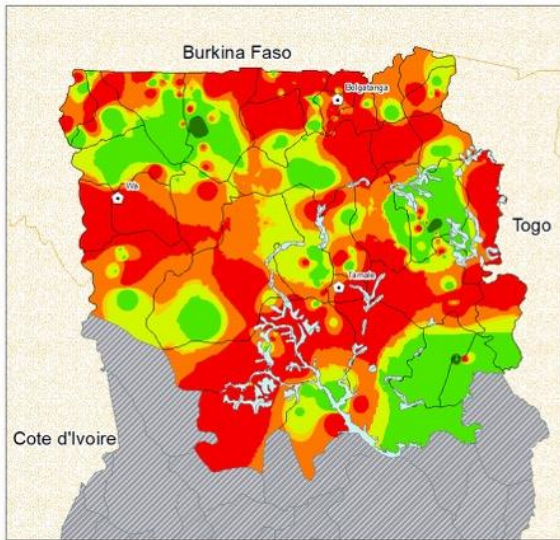
The agrodealer association could also be evolved into a self-regulatory body with processes (around product quality, storage, communication and information) defined and monitored by the association. An agreement could also be reached with the association on the output that could be built into regulation.

Between the subsidy programs, the blenders, agrodealer associations and the processors, the information gathering mechanisms are defined and utilized to make the value chain more transparent thereby improving the efficiency of decisions within the chain but also further de-risking the chain to potential investors / financial organisations.

By the **third phase**, fertilizer systems will be significantly more transparent and there would have been an increase in farmer yields which will also improve demand for inputs. The anticipation is also that Government subsidies would have reduced significantly as not to be of any serious consequence to the sector and subsidies would be easier to target to regions of need. With increased productivity and credit support both upstream and downstream, the farmer is motivated to want to grow his business. The most important activity AGRA can therefore focus on then will be farmer financing.

Appendix I. Ghana Soil Property and Nutrient Maps





Tentative deficiency criteria for maize: Bray P<7 ppm; exch. K<80 ppm; exch. Ca<500 ppm; exch. Mg<50 ppm; S<10 ppm; Zn (DTPA)<1 ppm; B (hot water)<0.5 ppm. Response to lime generally anticipated at pH (H₂O)<5.5.

Appendix II. Potential Partners and Key Country Contacts in Ghana

Organization and Contact	Region/ District	Type of Institution	Brief Description
USAID AgNRM: Dr. Julie Fischer, Chief of Party, Tamale +233(0) A20556 489 159 Julie.Fischer@winrock.org	Ghana Agriculture and Natural Resource Management Project (AgNRM)	NGO	USAID funded Ghana Agriculture and Natural Resource Management Project (AgNRM) is implemented by Winrock International in partnership with TechnoServe (TNS), Nature Conservation Research Centre (NCRC), and Center for Conflict Transformation and Peace Studies (CECOTAPS). It seeks to promote the protection both food security and the region's natural resources. It's doing this in a holistic way: boosting incomes from natural products such as shea nuts; improving food security through household gardens, cook stoves and improved water management; securing land tenure, especially for women; and strengthening environmental stewardship.
MoFA: William Boakye-Acheampong, Director of Agriculture, Northern Regional +233(0) A27244 216 918 wboakyeacheampong@yahoo.com	Brong-Ahafo and Ashanti Regions	GoG-MoFA	JICA funded Sustainable development of Rain-fed lowland Rice production Phase II, seeks to increase productivity and profitability of rice farming by disseminating land development and rice cultivation technology as well as post harvest technology (threshing, milling and packaging) to improve quality of rice.
IFDC-USAID ATT: Dr. Gary Mullins, Chief of Party, Tamale +233(0) 264735592 gmullins@ifdc.org	Nothern Region, Upper East and Upper West	IPO	USAID funded Agriculture Technology Transfer Project seeks to increase the availability and use of agric tech to maximize and sustain productivity in Northern Ghana. Main focus on improved seed sector (maize, soya bean and rice) as well as creating a sustainable private sector supply.
Peasant Farmers Association of Ghana: Charles Nyaaba, Project Manager, Accra +233(0) 203035672 ckknyaaba@yahoo.com	Brong-Ahafo	FBO	OSIWA funded Sustainable Farming and Agro Ecology focusing on Maize, Cowpea, groundnuts
SEND Ghana: Siapha Kamara, CEO, Accra +233(0) 208112322 siapha.kamara@sendwestafrica.org	East Gonja, Kpandai, Nanumba South, Nanumba North, Krachi-Nchumuru, Zabzugu, Tatale-Sangule and Chereponi	NGO	CIDA/CCA funded Fostering project tackles directly four key areas of improving food security and sustainable economic growth for small-holder farmers: improving production; better marketing of products; expansion of household activities into off-season businesses; and access to finance. The project focuses on the soya value chain.
CABI: Lydia Wairegi, Systems Agronomist l.wairegi@cabi.org		IARC	AGRA funded Optimising Fertilizer Recommendation in Africa (OFRA) project ended in 2017. The aim of the project is to contribute to improved efficiency and profitability of fertilizer use within the context of integrated soil fertility management (ISFM) practices. OFRA is also working in partnership with the African Soil Information Service (AFSIS) to use available soil spatial information, such as digital soil maps, to select appropriate sites for field trials and extend the field information to agro-ecological zones with similar soil characteristics.

Organization and Contact	Region/ District	Type of Institution	Brief Description
MoFA: Roy Ayariga, Project Coordinator, MoFA Project Building, Cantonments +233(0) 242435900 ext. 5944 info@gasip.org	Ghana wide	GoG- MoFA	IFAD funded GASIP provides a framework and institutional basis for a long-term engagement and supplementary financing for scaling up investments in private sector-led pro-poor agricultural value chain development. GASIP is built along four (4) strategic axis: (i) linking smallholder farmers to agribusinesses to enhance pro-poor growth; nationwide scaling up of a successful value chain investment approach; (iii) promoting and mainstreaming climate change resilience approaches in Ghana, in particular in the northern regions, financed through the Adaptation for Smallholder Agriculture Programme (ASAP); and (iv) knowledge management, harmonization of intervention approaches and policy support. The project supports the cassava, maize, sorghum, cowpea, soybean, yam, fruits & veg value chains.
ACDI VOCA: Emmanuel Dormon, DCOP, Tamale edormon@acdivocaghana.org	Norther, Upper East, Upper West, Ashanti and Brong-Ahafo	NGO	USAID funded ADVANCE II project adopts a facilitative value chain approach, where smallholder farmers are linked to markets, finance, inputs, equipment, and information through larger commercial farmers and traders who have the capacity and incentive to invest in smallholder production. These linkages build the capacity of smallholder farmers to increase the efficiency of their farm businesses with improved production and post-harvest handling practices. The project focuses on the rice, maize and soyabean value chain.
Global Communities: Yunus Abdulai, COP-RING, Tamale +233(0) 279800692 yabdulai@ghanaresiliency.org contact@globalcommunitiesgh.org	Central Gonja, Gushegu, Nanumba North, Sagnarigu, West Gonja Chereponi, Karaga, Nanumba South, Savelugu-Nanton, Tolon East Gonja, Kpandai, North Gonja, Tamale, Metro, Saboba East Mamprus, Kumbungu	NGO	USAID funded RING aims to address the issue of poverty and nutritional status of the vulnerable population by increasing the consumption of diverse quality foods, improve behavior related to nutrition and hygiene and strengthen local support network to address the ongoing needs
Carana Corporation/Paladium Group: Rick Dvorin, COP, Accra rdvorin@carana.com	Northern, Upper East, Upper West Regions	Private Sector	USAID funded FinGAP is an agribusiness financial facilitation project. Working with agribusiness, small medium and large enterprise in maize, rice and soy value chain; financial institutions and Business advisory services.
DAI: Carla Denizard, COP, Accra Carla_denizard@dai.com	Ghana	NGO	USAID funded Africa Lead II is building the capacity of Africa's agriculture hierarchy to develop, manage and lead programs. Their work is guided by CAADP
IFDC/ 2SCALE: Arno Maatman, Chief of Party, Accra amaatman@ifdc.org	Northern, Upper East, Brong-Ahafo, Ashanti, Volta, Central, Greater Accra Regions	IPO/IARC	Dutch funded 2SCALE project provides a range of support services to private partners (companies and farmer groups) enabling them to produce, transform and supply quality food products. 2SCALE focuses on rice, soyabean, groundnuts, mushroom, guinea fowl, mango, pineapple, vegetables

Organization and Contact	Region/ District	Type of Institution	Brief Description
IWAD: Tom Durang Martijn, Managing Director, Accra +233(0) 544348510 tom.durang@iwadghana.com	Northern Ghana specifically the Sisili-Kulpawn basin	Private Sector	USAID partnering with IWAD, a company focused on expanding commercial viable irrigation practices in Northern Ghana specifically the Sisili-Kulpawn basin through the delivery of high quality irrigation support new tech development knowledge transfer promoting water use efficiency sustainability and secure farmer revenues for both smallholders and nucleus estates.
CSIR-SRI: Lead Soil Scientist, Kumasi +233(0) 244622124 fmarthy2002@yahoo.co.uk	Brong-Ahafo, Northern, Ashanti Region	Gov't Research	AGRA funded Fertilizer Recommendation by SRI to validate crop-specific fertilizer recommendation for maize, rice, cassava and soybean in the forest-savannah transition and the Guinea savannah zones of Ghana. SRI is required to test and certify mineral fertilizer blends produced for the Northern (Guinea savannah) and Brong-Ahafo (forest-savannah transition) regions of Ghana.
SARI: Dr Stephen Nutsugah, Director, Tamale +233(0) 372023251 info@csir-sari.org	Northern, Upper East, and Upper West	Research	Government funded research, with mandate also includes the development of appropriate cropping systems, varieties of crops such as maize, rice, sorghum, millet soybean, cowpea, groundnuts, bambara groundnuts, cotton, vegetable crops, etc. which are adapted to the needs of farmers in the different ecologies of northern Ghana
CABI partnership with CSIR, AFSIS: Victor Clotney, Director, Accra +233(0) 244140727 V.Clotney@cabi.org	Brong-Ahafo and Northern Region	Research	Gates funded GhaSIS is a collaboration between AfSIS, CABI and SRI to collect soil samples from Brong-Ahafo and Northern Regions in order to build a grid of soil data to help predict soil properties and enable the creation of soil maps
MoFA Crop Directorate: Seth Osei-Akoto, Director, Crop Directorate, Accra oakoto2012@gmail.com	All across Ghana	MoFA-Crops Directorate	Oversees the government subsidy program. Working to ensure validated formulations are adopted by the government for the next subsidy.
MoFA PPRSD: Dr. Mrs Felicia Amprofi, Director, PPRSD, Accra fampronge@yahoo.com	All across Ghana	MoFA PPRSD	Responsible for regulations, registration and randomised tests of fertilizer in Ghana.
GAIDA: Pastor BTS Amartey, National President, Koforidua +233(0) 244880417 amarteybts@yahoo.com	All across Ghana	Association	Ghana Agro-Input Dealers Association
IFPRI: Karl Pauw, Country Program Leader/Senior Research Fellow, Accra K.Pauw@cgiar.org +233(0) 302780716	All across Ghana		The USAID FTF funded Ghana Strategy Support Program (GSSP), implemented by the International Food Policy Research Institute (IFPRI), has been supporting agricultural policy-making in Ghana since 2005. The overall objective is to conduct research and advise on strategic policy options to support agricultural growth, rural development, and economic transformation in Ghana. Program activities consists of rigorous policy research, policy outreach, and capacity building. The program is in its fourth phase, ending in 2018.

Organization and Contact	Region/ District	Type of Institution	Brief Description
AFAP: Isaac Asare, Country Manager, Accra +233(0) 244585583 iasare@afap-partnership.org	Brong Ahafo and Northern Regions	Social Entrepreneur /NGO	AGRA funded Smallholder Inclusive Productivity and Market Access (SIPMA), is a consortium based, market-led agricultural transformation programme that aims at increasing agricultural productivity and competitiveness in the maize and soy value chains. AFAP is the key partner on agro-inputs
Farmers Hope: Akwasi Osei-Bobie Ansah, CEO, Kumasi osbobie2@gmail.com	Ahanti, Eastern, Brong Ahafo, Northern Regions	Private Sector	Farmers Hope is an agricultural input manufacturer in the Ashanti Region of Ghana. Farmers Hope developed an organic fertilizer and called it "Asaase Nofosuo," meaning soil breast milk, to illustrate how well it nourishes the soil and provides much needed nutrients to increase crop production.
Institute for Agric Research University of Ghana: Kwame Afreh-Nuamah, Research Director, Legon knuamah@ug.edu.gh		Research Institute	University of Legon, School of Agriculture. Aim is to impact agricultural development through quality teaching, research and extension, and integrating system-wide innovations to realize tangible and practical results.
GAABIC: Edward Kofi Ametepe, President, Accra/Tamale kametepe777@gmail.com	All across Ghana	Association	The Ghana Agricultural Associations Business and Information Centre (GAABIC), represents the administrative consortium of 4 Farmer Based Organizations namely; CropLife Ghana (CLG); Apex Farmers' Organization of Ghana (APFOG); Ghana Agri-Input Dealers Association (GAIDA) and Seed Producers Association of Ghana (SEEDPAG). GAABIC was formed out of the need for a strong, effective and efficient focal point/representation for all farmer organizations along the value chain which can articulate the viewpoints of member associations.
NASTAG: Augusta Nyamadi-Clotthey, Executive Secretary augieclotthey@yahoo.com	All across Ghana	Private Sector/ Association	The National Seed Trade Association Ghana (NASTAG), a consolidated apex private seed sector organisation of all seed value chain actors in Ghana.
USAID/FTF APSP: Walter Nuñez-Rodriguez, COP, Accra wnunezr@agripolicyghana.org	All across Ghana	Private Development	USAID funded Ghana Feed the Future Agriculture Policy Support Project (APSP) works with the government, civil society, private associations, and media to gather and use accurate evidence every step of the way – from policy research to implementation to advocacy.
Glo Fert: Francis Dei, VP of Operations, Teacher Mantey-Accra-Kumasi Road +233(0) 242022517 francis.dei@glofert.com	All of Ghana	Private Sector	New Blending company that started operations in 2018.
Raymond Okrofu SAFISANA +233(0)261496685 raymond.okrofu@safisana.org	Accra	Private Sector	Organic Fertilizer Company
Yara Ghana Limited: Danquah Addo-Yobo, Managing Director, Accra danquah.addo-yobo@yara.com	All of Ghana	Private Sector	Fertilizer Company

Organization and Contact	Region/ District	Type of Institution	Brief Description
Chemico: Prince Agyemang Yeboah, Managing Director, Tema vicpee2@yahoo.com	All of Ghana	Private Sector	Fertilizer Company
OCP Ghana: Samuel Oduro-Asare, Country Manager, Accra s.oduroasare@ocpafrika.com	Importers in Ghana	Private Sector	Fertilizer Company
Macro Fertil: Franck Janier-Dubry, Agric Department, Tema franck.janier-dubry@ldc.com	All of Ghana	Private Sector	Fertilizer Company
OmniFert: Micheal Zormelo, Managing Director, Labone miczormelo@hotmail.com	All of Ghana	Private Sector	Fertilizer Company
Afcott Ghana Ltd, Tema +233(0) 246652606 ghana@afcott.com	All of Ghana	Private Sector	Fertilizer Company
Agricultural Manufacturing Group (AMG): Enerst Akwasi Appiah, Managing Director, Accra +233(0) 244417767 sales@amg-ghana.com	All of Ghana	Private Sector	Fertilizer Company
ETG Ghana Ltd: Fred Akowuah, Country Manager, Accra fred.akowuah@etgworld.com	All of Ghana	Private Sector	Fertilizer Company
Reiss and Co: George Brown, Accra +233-0302-256516 agric@reissco.com.gh rmamattah@reissco.com.gh	All of Ghana	Private Sector	Fertilizer Company
OLAM: Amit Agrawal, Country Head, Accra +233(0) 302222200 amit.agrawal@olamnet.com	All of Ghana	Private Sector	Commodities Group