



REPORT OF A COLLABORATIVE FIELD DEMONSTRATION

Led by

National Seed Trade Association of Ghana (NASTAG)

As part of the

USAID - Ghana Agriculture Transformation Project:
**STRENGTHENING THE GHANA SEED SYSTEM TO ENHANCE
QUALITY SEED DELIVERY**

2021

Collaborating Partners



Knowledge grows



ACKNOWLEDGEMENTS



Our warm appreciation goes to our major donor, USAID Ghana Inclusive Agricultural Transformation Project through the Implementing Partner AGRA for the opportunity given us to be of service to our gallant farmers.

We also acknowledge immense contributions (various improved certified seeds) from members of the Association (Heritage Seeds Company Limited, Arikun Company Limited, Antika Limited Company, SeedCo/Agriseed, Mayiya Seed Company) in support of the intervention; partnership and support in making the season's field demonstrations a very big success.

The immense contribution of YARA Ghana Limited and Rainbow AgroSciences Company Limited cannot be overemphasized. The improved seeds introduced to the farmers could only perform to their full potential through the right application of the fertilizers and Crop Protection Products supplied by the two companies respectively.

To our lead farmers and all participants in the season's field demonstrations, we appreciate you all for your time, efforts and contributions made towards a very successful season.

To all others who in one way or the other contributed towards making the intervention a success we say God bless us all. The best we can do in return is to put lessons learnt into good practice.



Introduction

Under the USAID-GIAT project, Field Technology demonstration farm set ups formed one of the activities identified to be implemented, aimed at introducing smallholder farmers to new improved seeds for enhanced yields. Knowing very well that seeds do not grow in isolation, NASTAG appealed to fertilizer and Crop Protection Product (CPP) companies to support the intervention and reiterate the recommended associated agronomic procedures to achieving optimum yields while leveraging on the collaboration to promote their products.

As part of the intervention, NASTAG collaboratively carried out the activity successfully: established thirteen (13) demonstration farms during the 2021 cropping season with YARA Ghana, Rainbow AgroSciences and five NASTAG members to promote certified seeds of hybrid maize, soya bean, cowpea, and groundnut within the northern zone of Ghana.

OBJECTIVES

The objectives for establishing the fields demos are to:

1. promote the use of quality certified seeds (hybrid maize, soya bean, cowpea, and groundnut) among farmers within the project's catchment zones;
2. promote best Crop Protection Products (CPPs) associated with these crops for crop yield optimization;
3. create the platform for the collaborating CPP companies by mobilizing farmers at the demo field days for the companies to introduce their products and educate farmers on the best application rates, timing, procedures, and application equipment that will result to the best results to the farmer; and
4. to take farmers through the necessary good agricultural practices (GAPs) related to these crops for best yields.

PARTNERSHIP

A written open appeal was sent to all members of NASTAG for partnership for seeds and CPPs. Five seed companies (Ariku Seed Company, Heritage Seed Company, Mayiya Seed Company, SeedCo/AgriSeed and Antika Seed Company) and two fertilizer / CPP companies (YARA Ghana Ltd and Rainbow Agrosciences co. Ltd) responded positively and supported with various inputs/products for the thirteen demo fields.

NASTAG serving as the lead coordinator of the demo farms entered negotiations with lead farmers with support from AFAP for suitable sites and farmer mobilization to create the enabling environment for the demos. The lead farmers targeted were mainly nucleus farmers who provide inputs to other farmers on credit for payment in-kind. As already established in most communities in the Project's Zone of Influence, the idea of using lead farmers and/or nucleus farmers field was for ease of using them as a conduit by all collaborators to promote/ distribute respective partners' products within the catchment of the lead farmer on a sustainable basis. Again, most of these nucleus or lead farmers are acknowledged to be influential in the communities and had lands at vantage points for demo set ups.

TABLE 1: PRODUCTS PLAN BASED ON RESPONSES FOR COLLABORATION FOR 2021 FIELD DEMOS

COMMUNITY	CROP	VARIETY	PLANTING DISTANCE	FERTILIZER APPLIED	CROP PROTECTION PRODUCTS
BAZUA-ARIKU	GROUNDNUT	SARI NUT 2	20CM X 50CM	YARA LEGUME (100KG/ACRE)	RIDOUT, TARGET, PORCELEN, COLAM
NANTON-HERITAGE	SOYA BEAN	FAVOUR	70CM APART IN DRILLS	YARA LEGUME (100KG/ACRE)	RIDOUT, TARGET, PORCELEN, COLAM
TOLON-HERITAGE	COWPEA	WANG-KAE	20CM X 50CM	YARA LEGUME (100KG/ACRE)	RIDOUT, TARGET, PORCELEN, COLAM
NASIA-MAYIYA	MAIZE	WANG-DATA	25CM X 75CM	YARA ACTYVA (200KG/ACRE)	RIDOUT, MAESTRO, NICOKING, PORCELEN,
BIHE-ANTIKA	COWPEA	WANG-KAE	20CM X 50CM	YARA LEGUME (100KG/ACRE)	RIDOUT, TARGET, PORCELEN, COLAM
BUJAN-ANTIKA	SOYA BEAN	FAVOUR	70CM APART IN DRILLS	YARA LEGUME (100KG/ACRE)	RIDOUT, TARGET, PORCELEN, COLAM
JEFFESI-ANTIKA	MAIZE	OPEABURO	25CM X 75CM	YARA ACTYVA (200KG/ACRE)	RIDOUT, CYNAPLUS+MESTRONG.
SAPALIGA-ARIKU	SOYA BEAN	FAVOUR	5CM X 60CM	YARA LEGUME (100KG/ACRE)	RIDOUT, TARGET, PORCELEN, COLAM
BULENGA-ANTIKA	MAIZE	OPEABURO	25CM X 75CM	YARA ACTYVA (200KG/ACRE)	RIDOUT, MAESTRO, NICOKING SUPER,
SAKAI-ANTIKA	GROUNDNUT	SARI NUT 2	20CM X 50CM	YARA LEGUME (100KG/ACRE)	RIDOUT, TARGET, PORCELEN, COLAM
SAKAI-SEEDCO	MAIZE	LG501, LG336, LG345	25CM X 75CM	YARA ACTYVA (200KG/ACRE)	RIDOUT, CYNAPLUS+MESTRONG.
BUJAN-SEEDCO	MAIZE	SC719, SC649, SC419	25CM X 75CM	YARA ACTYVA (200KG/ACRE)	RIDOUT, CYNAPLUS+MESTRONG.
NYIMETI-ANTIKA	MAIZE	WANG BASING	25CM X 75CM	YARA ACTYVA (200KG/ACRE)	RIDOUT, MAESTRO, NICOKING SUPER,

MATERIALS AND METHODOLOGY

NASTAG proposed and solicited for materials for an acre for each of the thirteen demo sites. In response, Antika Company Limited provided seeds for four (4) fields (Bihe, Bulenga, Nyemati and Jeffesi), Ariku Company Limited provided seeds for Bazua and Sapaliga, Heritage Seeds Company Limited provided seeds for Tolon and Zoggu, Mayiya Seed Company provided for Nasia while SeedCo/Agriseed made seed provisions for Sakai and Bujan.

YARA Ghana Ltd provided fertilizers for all the thirteen (13) demos for all four (4) crops while Rainbow Agrosiences provided all crop protection products, ranging from glyphosate, pre-emergence, post emergence to insecticides.

For effective collaboration and definition of roles, NASTAG proposed and put forward a Memorandum of Understanding (MoU) for the partnership. In this document (attached as appendix I), all sites, crops, field layouts, roles and responsibilities for each party were well spelt out for which each party and were satisfactorily adhered to.

NASTAG played a lead role; working very closely with the respective lead farmers at each stage from Land Preparation till the final yield analysis with all the necessary protocols followed as defined by each partner. During each field day (Planting, Green and Brown) in each of the community, the respective collaborators: YARA Ghana, Rainbow AgroSciences and the respective Seed Company (depending on



location) were present to educate / sensitize the farmers on their products and appropriate application/ use.

TABLE 2: PARTNERS PRODUCTS CONTRIBUTION AND VAULE (GHC)

PRODUCT	TYPE	QTY	PARTNERS	SAMPLE VALUE (GHs)
SEEDS IN KG	Hybrid maize	60	Antika Seed	1,140
	Cowpea	50	Antika &	570
	Groundnut	50	Antika &	713
	Soya beans	45	Antika, Arikku	428
				-
FERTILIZERS IN 50 KILO BAGS	Actyva	24	Yara Gh. Ltd	5,520
	YARA Legume	14	Yara Gh. Ltd	3,220
				-
CROP PROTECTION IN LITRES	Ridout	12	Rainbow Agrosiences	420
	Maestro	7	Rainbow	315
	Meastrong	8	Rainbow	320
	Target	14	Rainbow	420
	Porcelen	30	Rainbow	600
	Colam	21	Rainbow	252
	Nicoking Super	12	Rainbow	540

PRODUCT APPLICATION PROTOCOLS AND EFFICACY

SEEDS

Maize Seeding: All maize varieties were planted 25cm X 75cm, using one seed per hill. The certified hybrid seeds were planted next to the farmer saved seeds field for easy comparison.

Groundnut And Cowpea Seeding: Groundnuts (SARI Nut 2) was sown 25cm x 50cm using one seed per stand against a farmer saved seeds from Chinese variety harvested in the previous year. The same planting distance was applied for Wang Kae cowpea variety which the project promoted in the season against and farmer-saved seed by the farmers.

Soya Bean Seeding: Favour variety was promoted due to its early maturity, making it a climate smart variety. Seeds were drilled 70cm apart. The Jenguma, which is the traditional variety, was used as farmer saved seed to enable farmers observe the growth habits and yield values at harvest.

FERTILIZER APPLICATION:

All maize seeds were given basal application (YARA ACTYVA MILLA) 100Kg/acre at planting at approximately 5cm from the seed by dibbling and burying. Each plant received approximately 5 grams of fertilizer as a basal dose. Top dressing took place three weeks after planting following the same distance from the base of the maize and buried 5cm into the soil.

YARA Legume (100Kg/acre) was applied to soya fields at seeding time in drills approximately 5cm from the seed drills and 5 cm deep except at Bazua where application was done by dibbling and covered due to planting on ridges.

The YARA Legume (100Kg/acre) for cowpea and groundnuts was broadcasted and incorporated into the soil with hoes just before planting. There was no top dressing of fertilizer for the legume fields. All fertilizers applied were very effective in nourishing and maintaining the deep green colour of the leaves of the crops from growth through their active vegetative stages (Figures 22-25). The outcomes were translated into very good yields and reflected in table 4).

CHEMICAL APPLICATION (CPPs):

Land preparation chemicals (Ridout) were distributed to lead farmers for spraying two weeks ahead of ploughing, together with ploughing cost for tractor arrangement at Bujan, Sakai and Nyimeti, Tolon and Zoggu. Pre-emergence chemicals (Mestrong) were applied to fields immediately after planting (on the same day or a day after planting). The glyphosate for all other fields (Bazua, Bihe, Sapaliga, Bullinga and Nanton) were withheld and mixed with the pre-emergence chemical (Ridout + Mestrong) for spraying at planting at the onset of the rains.

Upon a special request, Jeffesi had a different treatment - Ridout as glyphosate, 2 weeks before ploughing, Cynaplus + Mestrong at planting, followed by Nicoking at the vegetative stage. This was to clear a doubt raised by a farmer on the efficacy of Cynaplus which necessitated the whole demo in that community.

Post emergence herbicides (Nicoking for maize and Target for soya bean, cowpea and groundnut) and all insecticides (Porcelen and Colam) were given to lead farmers after the planting field day trainings for use in times of need. Nicoking Super was later distributed to lead farmers to help control notorious weeds at vegetative stages of the crops.

Porcelen and Colam were later complemented when the FAW activities were becoming more rampant. Maize fields were sprayed almost every two weeks to help sustain them from destruction by FAWs.

At every planting field day, participants together with the lead farmers were thoroughly taken through the protocols, pointing out how, when, how much and what methods should be used in applying each product for the best results. Rooms were opened for questions and answers to enable every participant to understand the procedures and processes before planting of the field. This was to enable them replicate what was learnt on the demo fields on their own farms.

PLANTING FIELD DAYS

The Planting field days brought together a total of 543 farmers (as against a target of 520) with 41.8% being female as indicated in Table 3 below.

TABLE 3: PARTICIPATION IN FIELD DAYS

S/NO	COMMUNITY	PLANTING DATE	MALE	FEMALE	TOTAL
1	BIHE	17/06/21	14	5	19
2	BULENGA	18/06/21	18	38	56
3	BUJAN	19/06/21	37	22	59
4	SAKAI	21/06/21	49	10	59
5	JEFFESI	22/06/21	33	17	50
6	NYIMETI	23/06/21	38	1	38
7	BUJAN	24/06/21	4	19	23
8	SAKIA	25/06/21	45	16	61
9	BAZUA	26/06/21	21	24	45
10	NASIA	29/06/21	9	28	37
11	ZOGGU	30/06/21	5	9	14
12	TOLON	15/07/21	16	24	40
13	SAPALIGA	17/07/21	27	15	42
	TOTAL		316	227	543

Each company's representative took turns to school the farmers present on the recommended usage for their products: application rates, time, methods, and appropriate tools to use to derive the best output from the products. However, for this field day, NASTAG schooled the farmers on behalf of Yara Ghana and Rainbow. The respective seed companies depending on where and which type of seed was adopted at a location educated the farmers present. Summary of responsibilities prior to planning and the fields days activities includes:

- Land preparation and education on GAP related to the respective crops: NASTAG
- Land for the respective Demos: Respective Lead Farmers
- Refreshment during Planting Field days: Respective Seed Companies,



Fig 1: PM in a discussion



Fig 2: Farmer education



Fig 3: Learning by doing at planting



Fig 4: Planting with fertilizer

SEED QUALITY AND GERMINATION

Germination percentage for seeds used for the demos were scored two weeks after planting (2 WAP) on each field mostly by the NASTAG field officer.

In total two (2) out of the thirteen (13) fields were cancelled due to poor germination rates. Maize and groundnut fields at Nasia and Sakai respectively were cancelled due to poor germination below 85%. Immediate reasons for the poor germination could not be ascertained as the same seeds from the same companies performed above expectation in other locations.



Fig. 5: Maize at germ.sStage



Fig. 6: Cowpea at germ. stage



Fig. 7: Soyabean at germ. stage



Fig. 8: Soyabean at germ. stage

GREEN FIELD DAYS

Green field days were observed on ten (10) out of the total thirteen (13) fields with a total of six hundred and sixty - four (664) farmers participating green field days as against a target of five hundred and twenty (520) expected participation. The total participation saw three hundred and seventy – one (371) females representing 55.9%.

The main objective of the green field days was to afford farmers the opportunity to observe the performance of the seeds, GAPs, CPPs/ fertilizers applied, and general performance of the crops as compared to their own practice. It also served as an opportunity for collaborating partners to re-echo their products available to farmers and best application methods, time and rates of application and appropriate equipment use in applying the products to achieve the best results. The product companies/partners equally used the programs as opportunity to assess the performance of their own products on the field to inform their future plans. Pertinent questions for direct answers from the experts from the companies boosted farmers confidence in use of their products.

The physical interactions further allowed partners and farmers to interact and exchange ideas on challenges and to also inform partners on new products that could be developed to help resolve these challenges. Finally, the companies used the opportunity to introduce other available and new products that were not used on the demos but were relevant in helping solve farmers' challenges on other crops.

All partners took active part in the green field days on almost all fields where the physical impact of their products performance was at the peak. Rainbow Agrisciences provided for snacks for all green field days as per the MoU.

The table below shows the details of green field day activities for 2021 demo season.

TABLE 3: GREEN FIELD DAYS ATTENDANCE

S/NO.	COMMUNITY	DATE	MALE	FEMALE	TOTAL
1	JEFFESI	14/09/2021	69	41	110
2	NYIMETI	15/09/2021	45	120	165
3	SAKAI	16/09/2021	21	0	21
4	BUJAN	17/09/2021	24	1	25
5	BIHE	18/09/2021	0	22	22
6	BULENGA	18/09/2021	34	38	72
7	BAZUA SAPALIGA	20/09/2021	15	82	97
8	NANTON	21/09/2021	61	20	81
9	TOLON	22/09/2021	23	48	71
TOTAL			231	371	664



Counting from Left to right Fig 9 to 12

Fig. 9: Farmers receiving education at a green field day

Fig. 10: Participant observing the efficacy of hybrid maize seed in combination of quality CPPs

Fig. 11: Excellent grain filling supported by Actyva Miller

Fig. 12: Farmer expressing satisfaction on the size of cowpea pods to product companies on his farm

The objective for organizing brown field days was to give participants the opportunity to assess the yield performance of the seeds/crop varieties coupled with the effect of effective GAPs and use of quality CPPs and fertilizers. Though most of the yield potentials were obviously visible at the vegetative stages, the opportunity created through the brown field days to assess the actual yield in term of quantity / weight provided the farmers enough evidence to make informed choices in the future.

The lead / nucleus farmer per location led his family and selected farmers to undertake the yield analysis under the supervision of the Project Manager of NASTAG as most farmers at the time of harvest were busy on the fields to harvest in light of the intense temperature which poses danger of bush fires on their respective farms. This was carried out in 10 Out of the 13 fields established from the beginning.

However, in Zoggu in the Nanton District participation was huge; also, with the visit of the USAID – AGRA team to observe the yields of the demonstration set up at the time of the field day



Viewing From Left to Right

Fig. 13: A farmer explaining his observations in terms of yield to team of visitors from AGRA and NASTAG
Fig 14: Bagging and weighing of maize at Sakai demo field



Viewing From Left to Right

Fig 15: LG from SeedCO

Fig 16: Soya from Zoggu

Fig 17: Processed from Zoggu

Fig 18: Opeaburo from Antika



YIELD ANALYSIS

Yields were harvested from a quarter of an acre (1,011.714m²) from all fields and used to determine total yield per acre due to resource and time constraints. The measuring tape was used to demarcate 1,011.714m² out of the one-acre 4,046.856m² demo fields and farmers practices where applicable after which all crops within the demarcated area were harvested, shelled and winnowed. The resultant yields were multiplied by four (4) to arrive at figures for the full acre as reported in the table below:

TABLE 4: YIELDS FROM DEMO FIELDS AGAINST THE FARMERS YIELD

S/NO.	COMMUNITY	CROP	VARIETY	POTENTIAL YIELD (Kg/ac)	YIELD FROM DEMO (Kg/ac)	YIELD FROM FARMER PRACTICE (Kg/ac)	%AGE DIFF BETWEEN DEMO & FARMER SAVED FIELD	PERCENTAGE DIFFERENCE
1	Jeffesi	Maize	Opeaburo	3000	1,728.00	3,980.40	-2252.4	(130.35)
2	Nyimet	Maize	Wang Basing	2200	1,560.00	1,148.00	412.0	26.41
3	Sakai	Maize	LG501	3200	2,422.75	1,820.00	10340.7	426.81
4	Sakai	Maize	LG336	3200	2,550.00			
	Sakai	Maize	LG345	3200	3,157.70			
	Bujan	Maize	SC719	4000	4,030.20	1,044.60	2985.6	74.08
	Bujan	Maize	SC649	4000	3,670.20			
	Bujan	Maize	SC419	3200	3,310.20			
5	Bihe	Cowpea	Wang Kae	960	988.40	-	N/A	
6	Bulenga	Maize	Opeaburo	3000	1,680.80	988.20	692.6	41.21
7	Bazua	Groundnut	SARI Nut 2	960	920.80	-	N/A	
8	Sapaliga	Soyabean	Favour	1400	1,002.00	380.60	621.4	62.02
9	Nanton	Soyabean	Favour	1400	1,342.60	692.40	650.2	48.43
10	Tolon	Cowpea	Wang Kae	960	960.60	-	N/A	

FIELD MONITORING

This was a collective responsibility for all parties. Though much was not seen from partners in this aspect, NASTAG took responsibility to periodically visit the fields to provide guidance.

Each demo field was visited at least four (4) times by the NASTAG team in addition to the organized field days. The team offered suggestions on the application of CPPs, especially on the maize fields to check the devastating attacks from the Fall Army Worms (FAW). These visits equally offered opportunity to observe the crops' physiology, weed and other pest challenges and suggest immediate remedies for a successful completion of the season and best yields.



Fig. 19: CEO visit groundnut Field at Sapaliga



Fig. 20: PM visits maize field in Jeffesi



Fig. 21: PM visits Maize field in Jeffesi



Fig. 22: CEO visits cowpea field during a monitoring visit

BRANDING & PUBLICITY

NASTAG as part of promoting partners' products and the best application regimes also created a 2-hour radio platform on RANSFORD FM, Tumu, covering Sissala East, Sissala West and Wa Est Districts for experts from our partner companies to introduce their products to the public and educate them on their application protocols. The phone in component of this radio program was very key as farmers asked relevant questions for address by the experts from Antika seed Company, YARA GHANA LTD and RAINBOW AGROSCIENCES LTD.



Fig. 23: Each Collaborating Partner Represented at the Studio to educate farmers on their product and publicize the demo field activities

PARTNER COMMITMENT

Generally, all partners provided inputs for the demos on time, making the execution very smooth. There was high commitment from almost all lead farmers right throughout the demo period.

Based on the expertise of the collaborating partners, it was envisaged that partners would be present at the planting field days to introduce their products and use the opportunity to educate farmers on the best application protocols. The case was same during field monitoring visits. Though unfortunate, the Project Manager and Agronomist stepped in to educate farmers on the product.

It is however worth noting that, YARA Ghana and Antika representatives monitored some of the fields at their own time and shared reports on the observations.

Based on the MoU, YARA Ghana and Rainbow AgroSciences supported with the snacks during the green and brown field days respectively which was very much appreciated.

Unfortunately, some seed companies could not meet their obligation of providing snacks to farmers during the planting field days which remained a cost to NASTAG.

CHALLENGES

- The season faced climatic challenges, especially in Upper East where rainfall was generally poor, affecting the yields of crops.
- Fall army worm infestation was rampant on the maize fields, resulting in frequent spraying.
- Some crops on a few demo fields were destroyed by animals.

GENERAL RECOMMENDATIONS

Participation in major activities on the demo fields should be made a priority for all partners. The essence of the whole field demo is to create a platform for our partners to market their products and receive feedback from the farmers. Though our staff have broad knowledge on these products and can confidently speak to them, a person speaking to all products may not be as effective as individuals speaking on their own products.

All collaborators /partners are encouraged to put in more promotional materials and support further branding efforts as a means of making their products known to the farmers.

TOGETHER WE MADE IT. LOOKING FORWARD TO GOOD BUSINESS IN THESE AREAS

