

e-Agri Transport Network Ghana

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Abstract

Nearly seventy percent of the population of most African countries are directly engaged in the production and distributing of food. Across the continent, food production, distribution and consumption are perhaps the most important economic activity. In Africa there is the urge and need to improving food distribution and marketing systems which could have both economic, health and security implications regionally.

The innovative design, data collection and implementation of user-friendly, less technical and an effective project which involves the use of Information Communications Technological tools including mobile phones, specially designed platforms for mobile phones which are Global Position Systems enabled to assist smallholder farmers in the transportation, marketing and selling of farm produce.

More people and farmers are now using and have access to mobile phones than ever; while these devices and applications are now more accessible by many farmers, there is the need to harness these basic yet important technological tools intensively to better serve farmers with less cost and high level of efficiency.

Reducing high post-harvest losses among smallholder farmers, internet and mobile phone to facilitating timely transporting of agriculture produce from local communities have been a challenge to farmers and the project is effectively addressing that uniquely with data gathered by our citizen volunteers

The cost and time involved in the transportation and marketing of agriculture produce including the prevention of preventable post-harvest losses has been greatly reduced through our project.

Keywords: Albert Yeboah Obeng, Foresight Generation Club, Ghana, Agribusiness.

1. Introduction

As nearly seventy percent of the population of most African countries including Ghana are directly engaged in the production and distributing of food across the continent, as food production, distribution and consumption are perhaps the most important economic activity in Africa there is the urge and need to improving food distribution and marketing systems which could have both economic, health and security implications regionally.

The innovative design, data collection and the onward implementation of user-friendly, less technical and an effective project which involves the use of Information Communications Technological (ICT) tools including mobile phones, specially designed communication platforms for mobile phones and Smartphones which are Global Position Systems (GPS) enabled and infused to assist smallholder farmers in the transportation , marketing and selling of their farm produce at designated food markets across Ghana, Messages through bulk SMS

alerts are also sent to the mobile phones of subscribed farmers and residents on new agricultural products and services which has been made available by businesses and stakeholders for the benefits of registered farmers of our project.

More people and farmers are now using and have access to mobile phones and local radio stations than ever; while these devices and applications are now more accessible by many farmers and residents in Africa and Ghana, there is the need to harness these basic yet important technological tools to better serve residents and with less cost to farmers and high level of efficiency while also enhancing the profitability of agriculture produce.

Currently successfully being implemented in Ghana is the e-Agri Transport Network with the main goal of reducing high post-harvest losses among smallholder farmers at catchment communities Ghana, having early access to vehicles to facilitate the early and timely transporting of agriculture produce from farms and local communities has been a real challenge to many farmers. The project is effectively addressing that uniquely, also with the expert data gathered by our expert technology volunteers known as citizen volunteers (CV'S), we have access to a network of food markets where subscribed farmers could have ready buyers for their farm produce.

The cost and time involved in the transportation and marketing of agriculture produce including the prevention of preventable post-harvest losses has been greatly reduced through our project. Information on current produce prices and other agriculture information are sent to the mobile phones of subscribed farms at no other cost and on time: this information has proved very useful to many farmers in having alternatives in agriculture- related products and services to boost their economic activities. The regular damage to food produce during loading of food produce onto vehicles has been reduced as it is required by all member transporters to reduce damage to agriculture produce during loading and transporting in that the higher the quality of produce , the better the price tag thereby enhancing profitability for farmers.

2. Project Aims and Objectives



The most popular means of food transport in a typical rural Ghana

The main aim and objective for the design and implementation of the eAgri Transport Go Network includes

- Providing a viable transport access to farmers in transporting farm produce from their farms to their villages and selected market centers so boosting the economic standing of the farmers and residents and our projects catchment communities through selling produce.

- Providing innovative marketing of agricultural produce through our access to the network of marketing centers we deal and work with across Ghana as farmers in rural areas do not have the required capacity in selling and marketing their farm produce.
- The lack of accessible and better means of transportation to farmers has been a major driving force in the design and implementation of our innovation to counter this problem.
- Non availability of direct and indirect marketing channels for farming and agricultural produce in most farming and agricultural producing areas in Ghana is a source of motivation and interest to our projects methodology of implementation.

3. Policy and Public Investments

Generally the lack of investment by national governments in Sub Sahara Africa including developing countries including Ghana are mostly the results of government policies. These do not seek to factor infrastructural development such as building key access roads in rural farming towns and villages to the national development roadmaps. This disadvantages farmers in producing areas and there is the larger economic impact on the affected areas and the country as a whole which have been negative in the affected communities and villages particularly in rural areas in Ghana.

As it is the practice in many developing countries, public investments and infrastructural development have largely been on the basis of electoral votes and the associated political advantage political parties could derive from such targeted areas and with rural areas and farming communities lacking the larger population numbers required by political organizations such areas tend to be looked over and have been largely sidelined in the construction of roads and infrastructure which do not follow any laid down policy on political advantage of successive ruling governments and parties.

The table below summarises the information gathered when local farmers were asked how often does transport come to their locality to farm produce during the harvest season in Ghana indicating the general situation and the difficulty the farmers encounter on access to transport during raining seasons (June-October) which is the period for harvest in my parts of Ghana.

4. Transport frequency During Harvest Season Overview

Table 1 Categories

Value	Category	Cases	Percentage
0		1	0.0%
1	Once	1244	32.3%
2	Twice	1337	34.7%
3	Three times	505	13.1%
4	More than three times	482	12.5%
5		8	0.2%
6		2	0.1%
7	N/A	273	7.1%

Regardless of such discrepancies in the lack of the required supporting infrastructure policy in farming areas and lack of much needed investment on road infrastructure in catchment communities and areas in our project areas which is the *e-Agri Transport Network* , we seeks to innovatively improve the economic standing of farmers and the catchments communities while they work to support the national government goal of providing food security and better employment opportunities for young adults and residents in catchment farming communities.

5. Factors Affecting Economic Activity and Produce Quality

Economic activities in most farming communities in Ghana are highly dependent on the nature of the roads and road facilities in farming areas. In the case of farmers who form the bulk of the population of farming communities in rural communities in the Nkoranza, Techiman, Kintampo, Akomadan, Abofour (including the surrounding towns located in the Brong Ahafo and the Ashanti Regions of Ghana and nearby villages) for whom food production and distribution is highly reliant on the nature of the roads in such areas.

The condition of the nearest road condition in the rainy season for market access for agricultural produce of Households whose main occupation was farming (for a sample study in Ghana by the statistical services) showed that the situation on the ground about access to cars, vehicles including mobile transport gave challenges to many farmers and farming communities in Ghana. Below are some important data for our project farming areas.

Table 2

Value	Category	Cases	Percentage
1	Motorable	874	22.3%
2	Motorable with difficulty	2259	57.7%
3	Unmotorable	780	19.9%
	Sysmiss	637	

A once lucrative agriculture industry which used to be very attractive and was a reserve of a happy group of commercial farmers, the agricultural export industry in most Sub Sahara Africa is dying and fading out as the bad nature of the access roads is having negative impacts on export products such as bananas, pineapples and other potential vegetables destined for European and other foreign markets. Damages to such produce makes them unfit and unsuitable for export, Farmers and producers are forced into selling such produce at a low cost to local markets with great economic disadvantage to farmers which is drastically affecting the ability of many farmers in Sub Sahara Africa to grow and export for better prices for their produce while also meeting local demands.



Ripe garden eggs (vegetable) ready for harvest

In practice farmers in some of our catchment beneficiary marketing and producing centers are direct victims to this phenomenon and this includes communities in the Techiman District, the Nkoranza District, Abofour and other catchment and surrounding communities and villages who are part of our network; it has wider economic and at times health implications on the lives of residents of such communities and surrounding towns who patronize the produce from such communities.

The growth of private transport systems and innovative initiatives by other societal actors including our project **e-Agri Transport Network** in supporting the transport of farm produce and its onwards distribution through its sales at the market centers is providing a much needed economic vibrancy in our projects catchment communities in the Brong Ahafo and Ashanti Regions of Ghana while we seek to expand the project through replications in other communities and regions in Ghana.

6. Limited Market Supply – In the midst of Plenty

The abundance of high yield food stuffs after harvest and agriculture produce in the farms and forests in Eastern Region, Ashanti, Brong Ahafo and other regions of Ghana is not a reflection of the food shortage being experienced in many homes and communities in other parts of Ghana, as this situation of limited market supply in the midst of plenty at the farms has been due to the lack of better transportation systems and the bad nature of roads which become unusable during the rainy seasons making farmers resort to portering which is the carrying of food stuffs on the heads of farmers from very long distances to marketing centers.

7. Main difficulty in Market access for agricultural produce

Some of the residents and people of households in farming communities in selected areas whose main occupation was farming had difficulty marketing their farm produce due to the nature of roads in their region and districts in Ghana.

Figure 3

Value	Category	Cases	
1	No access road	120	9.6%
2	Bad road	459	36.7%
3	No means of transport	293	23.4%
4	Transport cost high	246	19.7%
6	Other	133	10.6%



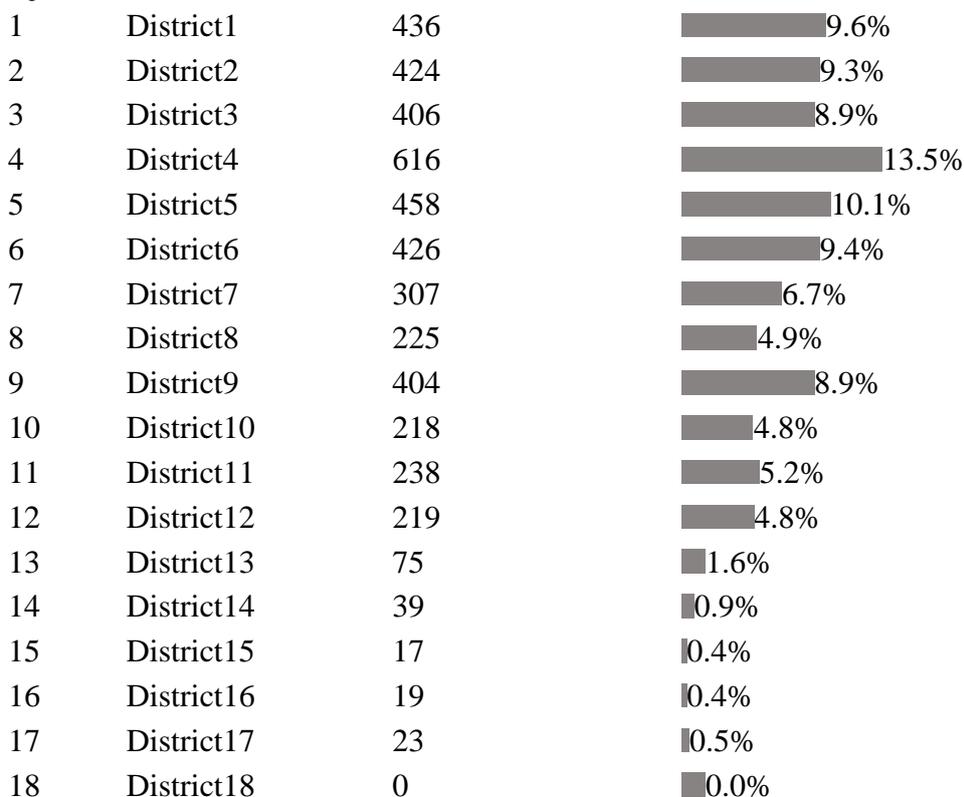
Tropical African plantain ready for the food market

Market women and mostly the female farmers who carry these food stuffs on their heads from their farms which in most cases are very far from both home and marketing centers is a real hindrance in the quantity of food and the quality of farm produce which is able to reach the distribution points and the consumers are few and thereby limiting the farmers' ability to transport and sell more produce for income and improving the economic situation of their families and communities.

Below is the National district market access for agricultural produce by the Ghana Statistical Service in Agriculture producing districts and communities as examples of the challenges nationally encountered by farmers and residents of farming communities and agricultural producing areas in Ghana.

Ghana-District - Market access for agricultural produce

Figure 4



Warning: these figures indicate the number of cases found in the data file. They cannot be interpreted as summary statistics of the population of interest.

8. The concept

A database has been compiled and created by our Project Team and this data is stored at our Data Center. It is made up registration details and contact phone numbers of our individual members, farming associations and transport owners and drivers who are responsible for the transportation of the farm produce from the farms to the villages and also from the villages to the marketing centers. Messages and alerts via txt or SMS are sent to the mobile phones of members when there is a request from any of our members and a confirmation will be sent to our short code for confirmation to fulfill such a request. Field agents who are responsible for the collection of such data are specially trained to serve also as mobile data center agents who send information and details of registered members to the headquarters for processing, storage and administrative purposes.

9. Problem Statement

The challenge facing Smallholder farmers and commercial farmers in most farming communities in Ghana are numerous however there are three main challenges which are evident and visible and have been an impediment in the economic empowerment of farmers; these are the lack of access to vehicle in good time to transport the produce from the farms and villages to the marketing centers; the second is the high cost of transporting such farm produce and farm animals as transporters charges high rates due to the bad nature of the roads in the ordinary season; the situation is compounded during the raining seasons most vehicles

break down at times during the process of transporting such food produce. Sometimes cost for spare parts and workmanship are passed on to farmers or market women. In some cases the vehicles break down during the process of transporting the food produce, meaning if it is at night it becomes a security threat for both drivers and the market or farmers involved in the transport of such farm produce.

As there is no official or direct marketing mechanism for farm produce and farm animals in Ghana and most surrounding villages and towns, there is the need to work with strategically marketing centers and buyers of importance to facilitate better marketing of Agricultural and farm produce. This will ensure that adequate income is earned by the individual farmers and boost the economy of farming communities and villages in Ghana and the project's catchment communities and towns nationally.



Market women during a typical market day in local agricultural community in Ghana

10. Deployment of the Initiative

Project field agents visited prospective members to register farming associations and individual farmers who are members of our organization and project; also members of our system are a group of transport and vehicle owners both in the project's catchment communities and the district capitals where the market centers are located to facilitate easy and cheaper transportation of agricultural produce from the farms to the target market centers across our catchment communities and towns in Ghana.

11. The e-Agri Transport Initiative Goal

Our main goal and aim in the design and implementation of this project which is the e-Agri Transport Initiative in Ghana is to provide a locally designed solution to meet pressing transportation and marketing challenges of farm produce including other agricultural products of our farming communities in Ghana whilst we also seek to replicate the concept in other African and developing countries reliant on agriculture at both commercial and subsistence levels.

As part of our project's initial study to get reliable data on **the main purpose of engagement in agriculture for residents and citizens** in our projects catchment community, below is an important survey of the identified purpose of engagements in the agriculture in catchment areas.

Table 5 Categories

Value	Category	Cases	Percentage
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1	Commercial crops mainly for export	384	9.8%
2	Commercial crops for both export and domestic market	309	7.9%
3	Food crops for export market	11	0.3%
4	Food crops for domestic market	185	4.7%
5	Both for domestic market and own consumption	2306	58.6%
6	Food crops for own consumption	737	18.7%
96	Other	3	0.1%

The Adoption of basic and user-friendly technological applications in agriculture is key to the increase of production, reduction of post-harvest losses, provision of better marketing of the farm produce, creating ion of direct and indirect employment opportunities in the catchment areas whilst it ensures that the supplied farm produce is in a healthy state for buyers and consumers in the implementing communities in Ghana.

Whilst the project seeks to address particular challenges facing farmers and vehicles owners in the catchment areas it is a goal of the project to also make profits and earn some profitable income on the service we are providing to the farmers and the larger community.

12.Impacts

The impacts of this project have been very positive with important measurable results in the catchment communities and implementing areas in Ghana. This is because the problem of locating and finding suitable buyers for selected farm produce including farm animals has been largely solved by the project. Farmers have prior information on markets with demand for their produce from Ashanti region and the Brong Ahafo regions across districts with good market prices for their produce hence bringing some happiness and much needed income to farmers and increasing the economic situations of the local communities. This is turn creates direct and indirect employment opportunities for other actors who are import stakeholders in the agriculture industry such as trucks responsible for short journeys of products.

13.Replication and Sustainability

Linking farmers with the need market centers on time is a wider challenge facing farmers across Africa and also in other developing countries whilst the lack of vehicles to facilitate the timely transportation of agricultural produce from farms to villages and to marketing centers remains a major challenge to farmers in Africa. The cost involved in transporting such produce has been a major deterrent to other young adults who would have liked to venture into agriculture as a fulltime business. This project is of greater importance to many African and developing countries whose economies are dependent on agriculture. It does not need huge funds to initiate such a project as there is the need to build important partnerships and above all good management skills and the required technical information and communications technological skills needed for such a project to be successful.



Brisk business activity at the Nkoranza food market in Ghana

14. Multi-stakeholder Partnerships

The whole concept of Agri Transport is working in collaboration with key stakeholders in its catchment communities; such a partnership is important for the success and sustainability with their important contributions for the project. Among our partners are the district assemblies in the catchment communities, chiefs and elders, Unions of Transport Owners, Heads of Market Centers and leaders in the catchment communities and towns whose contributions has included tools , logistics and transport assistance.

15. Farming/Agricultural Based Associations and Group Benefits/ Advantages

It has been evident that during our project’s implementation and replication in catchment communities across beneficial regions in Ghana those farmers who tend to join associations and forms groups derive many benefits including better negotiation on transport costs for members of the associations and also getting corporate buyers for their farm produce. This is good for them as it prevents high post-harvest losses as they get ready buyers for their produce as most of these farmers do not have adequate storage facilities and spaces.

A practical example was when the Ghana Free School Feeding Program (GFSFP) in May 2007 came into an agreement with a group of 25 farmer -based groups in the WA East District of the Upper West Region of Ghana as the project sought to buy 80 percent of the production of the group of farmers in that association which was a boost to the economy of the local areas.



School children from Ghana benefiting from the effective production and food marketing innovations, eAgri Transport.

16. Financial Viability

The individual farmers and farming associations who are members of our network have to pay registration costs to be a member of our project to benefit from our services. Membership costs are also levied on owners of vehicles and drivers as members of our network. As the project is highly SMS driven and uses mobile communications and selected Information Communication Technology tools, our project is involved in the sales of phone cards, call credit and associated materials to enhance our income generation to sustain the project and make profits to achieve a break-even point of self-reliance by 2016.

To expand our financial generation sources, the project is currently working to advertise and market agricultural products such as fertilizers and farming inputs including tools such as pumping machines, weeding chemicals, pesticides to farmers and subscribers of our network to generate further income for the project and work on this is very advance.

We have also learnt of the availability of Ghana government funding for such start-ups and projects designed taking into consideration employment creation for youths and young adults in agriculture; we are currently working to access the funding mechanism. We are confident that this will be vital in boosting our expansion and sustainability while improving early prospects for our targets for the break-even point of profitability.

Currently we are seeking to expand the services beyond agricultural products to other challenging sectors of importance in Ghana with replications of interest nationally and regionally to generate additional needed income.

17. Lessons Learnt

Among the most important lessons this project has learnt was the importance and the benefits of the use of volunteers and interns for start-ups as it is a useful means of recruiting qualified project personnel at a very less cost to such project who will provide very useful expert service to the project while such individuals also gain the much needed working experience and working exposure demanded by employers.



At the Techiman Market in the B/A, Ghana which is the Biggest Food Market in West Africa

Multi-stakeholder partnership is very useful for a new project with scarce financial resources, logistics and infrastructure. To get support and assistance needed by such programmes, resources are acquired in the short term through such partnerships including skills transfer.

There is the real need for project Managers of such ICT projects to have some working experience in project management and more importantly some skills and experience in the better application of Information Communications Technological tools. In such projects experience in human resource and project management is vital to the success of such project and people management experience is vital to the longevity and profitability.

18. What to know about key Agricultural Facts in Ghana

- Only 25 per cent of the available land area is under cultivation.
- Small-scale farmers (using shifting cultivation, no tillage or irrigation and little fertilizer) account for about 80 per cent of agricultural production.
- The average farm size is less than 1.2 hectares.
- Women are responsible for 55-60 per cent of total agricultural production. They are especially predominant in food production and processing. They also supply labour on many farms across.
- Men predominate in selected produce including cocoa farming, where there is individualized land ownership.
- About 6,000 out of 2,740,000 farm households (0.22 per cent) used irrigation in 1998/99. About 20 per cent of the households used fertilizers. About 10 per cent bought seeds for planting (Ghana Statistical Service, 2000).
- Fertilizer use in Ghana is about 8 kilograms per hectare; the average for developing countries is 60 kg.
- Post-harvest losses are 20-30 per cent of harvested produce.
- Storage losses range from 8 per cent after one month to 20 per cent after four months of storage.
- Of about 22,700 km of feeder roads, only 40 per cent is classified as good.
- The Medium-Term Agricultural Development Plan of the 1990s aimed to rehabilitate 1200-2000 km of roads a year. Annual performance ranged from 212 to 1,080 km only.

- About 90 per cent of farm produce is carried from farm to village mainly on the heads of women and children.
- Farmers sell about 80 per cent of their marketed surplus within four months of harvest.
- While productivity in the livestock sector is low, Ghana imports about \$100 mn of livestock and livestock products a year.
- The meat yield of local livestock is about 20 per cent of that of other breeds. Lack of access to high-yielding breeds is a major constraint.
- Over 80 per cent of poultry in Ghana is a local breed that produces about 100-150 eggs a year compared to 180-250 eggs from other breeds.
- Currently, there is one extension officer to 2,500 farmers.
- Ghana's forest cover has diminished from 8.2 mn hectares at the start of the 20th century to 1.7 mn ha in 2001.

19. Feed Back and Complaints

While this project *e-Agri Transport Networks* seeks to provide an expert and value-added services to our members including farmers and transporters involved in the business of the Marketing and Transport of Agro Products and Services, we are conscious of the prospects of lapses and the inability of our project staff lacking in some areas of expectations by customers. Hence we do accept complaints through our field agents. Should a complaint be about a particular agent? Such requests should be made directly to our organization through our SMS Complaint Unit and also via normal phone call to our offices.

20. References

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Biography

Albert Obeng is a graduate of University of Ferrara, Italy, NIIT-Ghana, also an Alumni of University of Penang in Malaysia, an expert in Technology Management and Transfer working with the Foresight Generation Club based in Ghana.

He has been Research Fellow with the International Center for Science and High Technology of UNIDO (ICS-UNIDO) at Trieste, Italy and awarded the Mayor of Rome's Innovative ICT Award, Global Social Entrepreneurs Award by the Global Knowledge Partnership in 2007, speaker at the EU-Africa ICT Partnership Forum, Lisbon, Portugal, 2012 and has been a Technical Committee Member and discussant of the UNESCO World Summit on Information Society UNESCO+10 Forum on E-Science and public Policy in Paris, France 2013.

