

# Innovative Mobile Service system (IMSS) Supporting Farmers and Farming Activities

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## Abstract

Climate change is altering known weather and rainfall patterns and subtly altering seasons in Ghana and the world over. The weather changes exert impact on farming and farming activities leading farmers and farming activities into state of disarray. Knowing, for instance, when to plant and to harvest is the basis for success in agricultural pursuit, but this is gradually eluding the Ghanaian farmer due to impact of climatic change on weather. In Ghana like many other African counties knowledge on weather and climatic change is based on understanding or experience passed onto generations through ancestral heritage. But the speed and scale of this change is making the traditional knowledge less accurate and unreliable, thus impacting negatively on agricultural productivities.

As part of measures to pre-informing Ghanaian farmers about adverse effects of climatic change on agriculture, we postulate this Innovative mobile service system (IMSS) that would pre-inform or caution farmers on the nature of imminent climatic condition within the predicted period.

The stimulus for this article is based on the extraction of data from microwave links on precipitation and evaporation; an idea that was proven by Hidde Leijuse in his PhD thesis; “*Hydrometeorological application of Microwave links to measuring evaporation and precipitation*”.

The data gathered for the write-up of this article was from the above mention document, text books on innovative systems design and search on the Internet on impact of climatic change and contribution of the agriculture sector to the Ghanaian economy.

**Keywords:** GDP, Mobile Services System, ISP, SADA, FM, NCA, MoFA, Content, c2c, Developer, Database, IMSS, Service Provider, Content Provider, b2c, g2c

## 1.0 Introduction

The Agricultural sector undoubtedly is still the main stay of the economies of most non-oil producing countries of African. Even though Ghana started exploiting oil in commercial quantities for some time now, the sector still remains the back bone of the Ghanaian economy. According to a publication ([www.myjoyonline.com](http://www.myjoyonline.com)), the agricultural sector used to constitute about 31.8% to Ghana’s Gross Domestic Production (GDP), but it is now being continuously on the decline in its contribution to the GDP. According to the publication, between the periods 2009 to 2015, the contribution of the agricultural sector to the GDP of the country has declined from 31.8% (in the year 2009) to 21.1% (in 2015). According to a World Bank publication ([www.data.worldbank.org](http://www.data.worldbank.org)) about 42% of Ghana’s population depends on the sector for their livelihood. Production to a greater extend is subsistence in nature with most agricultural activities solely depending on rain fed and other natural factors.

From the above publications, undoubtedly, the agriculture sector still remains very crucial to the Ghanaian economy and that of Africa as a whole. Therefore any factor that would hamper the smooth operations of the sector has to be given critical attention.

The climate of Africa is predominantly tropical as most parts of the continent lies within the tropical zone, which is broadly classified into three main climatic zones: humid equatorial, dry and humid temperate. Within these zones, altitude and other localized variables also produce distinctive regional climates. The climate also varies cyclically over periods of decades, centuries, and millennia as well as from year to year. Changes in weather and climatic conditions are in most cases manifested by prolonged droughts, one of the most serious climatic hazards affecting the agricultural sector of the continent. Sometimes weather and climatic change result in excessive rains that at times lead to flooding and serious erosion which also destroys crops, livestock

and human life and property. As a result of the factors mentioned above, the rainfall pattern in Ghana in particular is erratic and unpredictable thus mystifying agricultural activities which exclusively rely on rain fed. Any adverse changes in the climate affecting the rainfall pattern would most likely have devastating consequences on the agriculture sector in the region, impacting sometimes negatively on the livelihood of the majority of the people.

Investigation into climate change and its impacts on agriculture and subsequently making the information on this change available to the farmers on timely basis about the early warning signs to a greater extent would most likely serve a very crucial role in the very survival of the country, the continent and its people as a whole. This is the brain behind this innovative mobile system.

Though changes in the climate affect the continent as a whole, its distribution vary across the continent. In West Africa and Ghana in particular, more frequent and longer dry periods are prevalent, again threatening crop production (crop yield).

The staple food for the region; maize, yam, guinea corn, millet, beans and rice are particularly susceptible to drought. Climate change would therefore undoubtedly worsen the food supply, thus exacerbating the widespread poverty prevalent in the region.

Four main climate change related drivers include; temperature, precipitation, atmospheric carbon dioxide content and incidence of extreme events, may affect rainfall and ultimately the agricultural sector of the country in the following ways:

- **Reduction in crop yields and agricultural productivity:**

It is evident that in the tropics and subtropics, when crops reached their maximum temperature tolerance level, crop yields will most likely decrease due to excessive increases in the temperature.

- **Increased incidence of pest attacks:** Increase in temperature is also likely to create conducive atmosphere for the breeding and spread of pests that feed on crops which is detrimental to crop production.
- **Limit the availability of water:** The unpredictable climatic change affect the water table which in its wake has the tendency of ultimately affecting availability of water in most parts of the country which reduces water availability for domestic, livestock and agricultural use.
- **Reduction in soil fertility.** Increase in temperature also results in soil moisture evaporation, reducing moisture storage capacity and the quality of the soil. Vital nutrients for agricultural products are lost in the process. In periods of excessive rainfall, most of the soil nutrients are washed down low lying lands, sometimes into the streams, rivers or direct into sea through erosion.
- **Low livestock productivity and high production cost:** Climate change will affect livestock productivity directly by influencing the balance between heat dissipation and heat production and indirectly impacting on the availability of feed and fodder.
- **Availability of human resource:** Climate changes are mostly associated with the manifestation of vector and vector borne diseases. Increase in temperature and humidity create ideal conditions for insects and pest that carry diseases like malaria, sleeping sickness and other infectious diseases that will directly affect the effectiveness (fitness) of human resources available for the agricultural sector activities.

It is in the light of the devastating effect climatic change has on the African continent and its people as a whole that, this innovative mobile service system is postulated to produce and give information about the weather and climatic changes to farmers in the Ghanaian community on timely basis to deal with the uncertainties associated with these changes. The paper discusses the methods used in gathering relevant information for the

write up, the concept of the system, the stakeholders and its sustainability.

## 2.0 Methodology

Data for this write-up constitutes only secondary data gathered from articles of other writers, especially material found relevant to our article. We also gathered a lot of material from text books and on the Internet on the design of innovative mobile systems. Finally the Internet was searched extensively for relevant information on effect of climatic change on the sub region and the role of the agricultural sector on the Ghanaian economy.

### 3.0 Motive behind the design of the Mobile service system

The motivation for the write-up stems from the discovering of Leijuse (2007) in his PhD thesis, "*Hydrometeorological application of Microwave links to measuring evaporation and precipitation*", the possibility of extracting data on precipitation and evaporation from microwave links. According to Leijuse (2007), precipitation impede microwave signal thus causing signal attenuation. This will mean boosting the signal to enable users of the mobile phone services to have uninterrupted services. The reverse is true under clear weather conditions, according him. The boosting of signals and reverting back to normal in clear weather creates set of data pattern that is available with the telecommunication service providers over their periods of operations according to his discovery.

Our innovative system would gather a ten year period data from the telecommunication service providers for the meteorological services department to analyze and determine the pattern of rainfall in Ghana over the ten year period for practical functioning of the system. This would be used to make predictions into future rainfall patterns useful for agricultural activities.

## 4.0 Literature Review

The literature review takes closer look at what mobile service systems are; the concept, users, usability, usability test, the added value and promotion of the system. It at the same time draws distinction between general concepts and that of our postulated system.

### 4.1 Mobile service system

Van de Kar and Verbraeck (2008) defined a mobile service system as a group of components that work together for delivering a coherent set of activities of intangible nature that provide added value for a mobile user using a mobile network.

According to them, in a mobile service system, all the components, such as handsets, content, applications, networks, user interfaces and involved organizations such as network operators, content providers and service providers have to work together to provide a mobile service to users that adds value to already mobile services enjoyed by the user.

Inference from the definition reveals that mobile service system combines different components to function as a unit. The major components being mobile equipment capable of accessing wireless services or content and telecommunication service provider to disseminate the purported service or content.

According to Van de Kar and Verbraeck (2008), Mobile and wireless communication by the year 2020 is expected to play central role in all aspects of European citizens' lives. Because technology will substantially expand on the current concept of "*anywhere, anytime*" to a new paradigm summarized by the authors as; "*Individual's quality of life improvement by making available an environment for instant provision and access to meaningful multi-sensory information and content*". This is most likely to transcend beyond Europe to our part of the World, as in the case of mobile telephony. Their predictions are already happening in Europe in 2016 and our prediction would most likely come to pass as theirs is already happening.

We have anticipated this and thus earmarked the agricultural sector to start with, as the sector experiences deteriorating growth (especially in GDP) partly as a result of unpredictable weather due to the rapidly changing climatic conditions.

### 4.2 Service Concept

Van de Kar and Verbraeck (2008) explained the concept of system acceptability as; user interrogating a mobile system about places of entertainment, weather, locations and other such relevant places and the mobile services provides a list from which to make a decision or settle on.

Our proposed innovative mobile service system for farmers and farming activities is intended for farmers, most of who are illiterates. The system rather provides relevant information to farmers (peasant and commercial) on timely basis to keep them updated with changes on weather and climatic conditions within relevant farming periods for them to safely take measures against adverse weather effects. Users do not need special platform to interrogate for information, since most of them cannot read or write. Their platform may be sending a special code to the telecommunication service provider for specific information. It is also a business to consumer (b2c) concept and is a service that gears towards wooing its users to embracing it.

The system is however not designed to perform the task of meteorological weather services, but rather gathers information on weather and climatic change conditions processes it into suitable form for farmer understanding and presented to them in the form of messages to be received through their mobile phones in their own native languages.

The service uses voice messages on mobile phones to provide information on climatic and weather changes to farmers on regular basis. It thus provides farmers with information on when the rains are expected to start or stop, so that they will be able to plan for the season, that is, when to sow and when to harvest yields. It would in addition to the above, provide information on likely adverse climatic conditions for the impending farming season like drought, flooding, pests and diseases, thunderstorms and the factors associated with such unfavourable weather conditions.

The service system would also provide information on regular basis about the prices of commodities in the market to help farmers get good prices for their farm produce.

The stakeholders involved are: the government, national communication authority (NCA), Internet service providers (ISP), the service providers, content developers, network service providers, farmers, Savanna Accelerated Development Authority (SADA) and local FM radio stations. To illustrate how the purported service system works, we demonstrate in a storyline on how an individual farmer who has over the years relied upon predictions of climatic and weather conditions as narrated to him or her by his or her father and/or grandfathers to exhibit challenges farmers face and how the system intends managing them.

#### **4.3 Storyline**

Based on previous knowledge and information made available through generations, a prospective farmer believes rains in Ghana start in March, and so he begins to prepare his farm land in February. He intends to plant in March. Rains start as usual and he sows. Unfortunately, due to climate change his expectations were dashed. Rains failed to fall from mid-April to June, his crops wilted and dried. He loses a great amount of money as a result of rain failure.

The following year, he prepared the land and waited for the rains to start. The rains delayed but came at last; he planted and before the crops could mature the rains stopped.

On another occasion the farmer, this time went into rice cultivation, prepared his land and sowed. The crops germinated and doing well. He thought this time he would have a bumper harvest. Unfortunately the rainfall was excessive and the river by which he planted his rice overflowed its banks and swept his crops away.

Finally, the farmer had good timing and sowed at the right time, the rainfall pattern was normal. He had a bumper harvest but does not know where to get a good price for his produce. He ends up being cheated by middle market men and women.

With this purported innovative service system, the farmer will get prior information in the form of voice messages via his mobile phone on the likely rainfall pattern for the particular period on daily basis due to predictions for the year. Based on this information he will know the duration of the raining season and therefore decide on which type of the crop to grow (e.g. short duration variety which will mature early for harvesting in short rainfall season or long duration one).

With the same innovative system he would be informed about intensity of the rainfall for the year, enabling him to take precautionary measures against cultivating in flood prone fields (especially not sowing in low lying areas).

The farmer, through several years of farming experience could know or should be able to predict diseases and pests associated with heavy rains and would thus prepare for the acquisition of the necessary pesticides. Information on plant diseases and pests would be made available to them as well, depending upon the type of weather condition to experience in that season with its associated diseases and pests.

Finally, after harvesting, the farmer would be informed on daily basis about the prices of commodities in the various markets in the country to enable him get good price for his produce.

#### **4.4 Users**

Van de Kar and Verbraeck (2008) expounded further that a service system has to support the activities of the user and has to be aligned with the goals and information needs of the user. According to them, knowing the (position) user, and knowing the setting in which they will use the service supports the development of a successful and useful service. It supports the identification of services the user may consider useful, and functionalities that need to be provided by the service system. Our service is specifically planned for farmers in Ghana. The target group is both peasant and commercial farmers.

Peasant farming is carried out in relative less developed (infrastructure wise) communities. Since peasant farmers lack adequate capital, this type of farming is not well mechanized. Peasant farmers usually employ traditional methods of farming utilizing family labour in most cases. Commercial farming on the other hand is performed on large scale, with the help of machines like threshers, harvesters, tractors, bulldozers, graders and others.

We foresee that most of these farmers would not have much purchasing power and that they will only adapt the service at very low or zero cost. As such, farmers who subscribe to our service will therefore be provided with fully connected mobile phones at no initial cost.

This cost is expected to be jointly borne by the network service providers and the Government of Ghana through the Ministry of Food and Agriculture. Once the service is going to voice messages in their traditional languages, it would be found useful and most likely, meet their aspirations

#### **4.5 Usability**

One of the most important aspects of an innovative mobile service system is usability. The functionality provided by the service (utility of the system), as well as the interfaces applied (usability) should match the context of use of the user, Van de Kar and Verbraeck (2008). The target users are mostly either illiterates or semi-literates and basically have no knowledge in using text based services or such usable interface design that may be required of such systems.

Messages will therefore have to be in the form of voice rather than text and should be delivered in the major Ghanaian languages through their phones and radios. Because it comes in the form of voice messages in the local languages, possibilities of error, difficulty in learning and memorability would be low. That would lead to high efficiency; satisfaction and eventual acceptance of the service by the users would be guaranteed.

That notwithstanding, the service has to function in very simple and as much as possible look natural for the farmers to easily adapt and use. This means the service should be as simple and as natural as possible in its use while still providing requisite information. Furthermore, the service should be offered in a variety of languages. Providing this with as less errors as possible will result in user satisfaction. The service system would therefore be well designed and tested.

#### **4.6 Usability Test**

The essence of the usability test is to evaluate user confidence, satisfaction and eventual acceptance of the service system, to identify the success factors and to get feedback on how the service could meet their aspiration and expectations, Van de Kar and Verbraeck (2008). As service providers we will interact with farmers most often to determine the acceptability of the service and discussion with individual farmers or farmer groups would reveal the reality of acceptance or otherwise.

In addition, testing of the service would be done by liaising with the agricultural extension officers on the ground dealing with the farmers directly to gather information about their perception about the usefulness of the service. Their feedback would be collated and used for possible improvement upon the system.

#### 4.7 Added Value

There could be a major difference between the perception of the user about *added value* and the *real added value* that can be established with (for instance) an economic model. This is especially true in the case of b2c, g2c and c2c service, the user will select the service on the basis of the perceived added value, and if that is judged to be low, the user will not attempt using it even though in real terms, the added value may be high. Therefore, it is important to pay attention to the perception of users, through a good service concept and well defined user interface, and to *fit* between the activities of the user and the sequence of activities as offered by the service system, Van de Kar and Verbraeck (2008).

Currently, the meteorological services department provides information on weather updates on daily basis in the media (radio and television). The forecast information is delivered in English language which most of the farmers do not understand. Also there are updates on the prices of foodstuffs from the various markets of the regional and district capitals. This is also done in English language which most of the farmers do not understand. Some radio stations broadcast this through their media, but few people have access to radios and televisions.

The added value of the service system (which we believe will meet user expectation) is that all this information would be provided in the local languages and directly to the farmers through their mobile phones. The service will also provide relatively more accurate weather forecasts with the use of the attenuation figures from the network service operators than is currently done with spot measurements. The possibility of wider coverage and convenience is another value this system adds to such existing systems.

#### 4.8 Promotion of the service

In real business no matter how good the quality a product possesses, without customers knowing about its existence and usefulness, it remains just a product in stock. This is especially true about service systems; public awareness of the service system, its uses and how it functions to enhance their lives is very crucial.

Even though the system is envisaged to be good service and is anticipated to enjoy widespread acceptance by the farmers and government alike, farmers in particular need to be informed in advance about the existence and usefulness of the service to them. They need to know the cost and their commitment to payment for the service.

This would be done through marketing and advertisement of the service through radio stations intensively for a period of one month and subsequently once a week. As part of the promotion, free mobile phones will be distributed to the farmers to entice them to subscribing to the service.

#### 5.0 Organizational Network

A network of actors has to be organized in order to provide the service for the customers. Network or network organizations emerged as organizational form to overcome problem with hierarchies and create greater structural effectiveness and responsiveness with trade-partners (Van de Kar and Verbraeck; 2008; Powel; 1990). These characteristics have enabled mobile carriers use networks in order to access scarce new know-how and capital need to develop mobile information systems, Van de Kar and Verbraeck (2008).

In our organizational network, the telecommunications network operators (MTN, Vodafone and Tigo), Meteorological Services Department, Ministry of Food and Agriculture are the major actors who would provide the relevant data to the service provider. Software Developers, the FM Radio Stations and the users form another group of equally important actors. This section will describe the main actors, the role they play and what the benefits will be for each one of them.



Figure 1: shows the complete network of actors required to provide the service to the user.

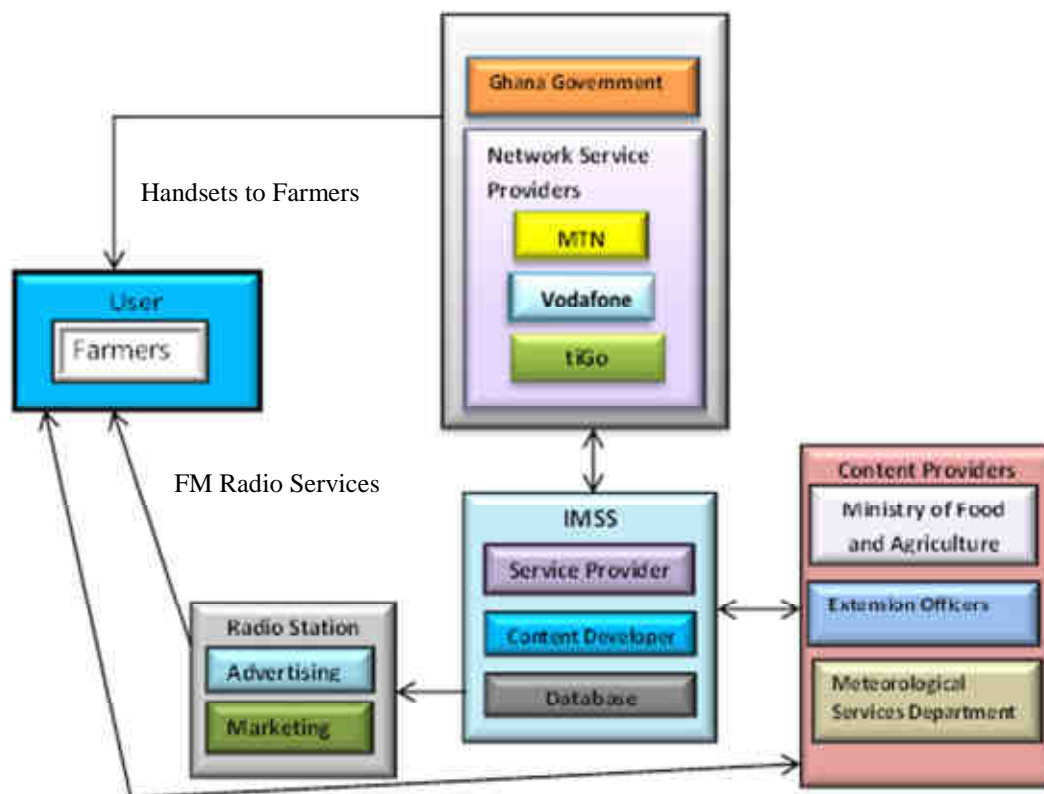


Figure 1: Network of Actors

Below gives detail description of roles of all the actors involved in figure1:

### 5.1 Service Provider

We the proponents of the innovative mobile service system would be the service providers of the service of the system. Our role is to collect data on network signal attenuation figures from the network service providers, forward it to the meteorological service department to process and add value (professional interpretation) to the raw attenuation data. We would submit the processed data from the meteorological service to the content developer who converts it (through programming) into a voice form and stored in our database.

The database is updated periodically and the information on weather and climate change or predictions sent to the network service operators who in tend would send it to farmers in the form of voice messages via their mobile phones.

### 5.2 Network (Telecommunication) Service Operators

In the interim we have earmarked the three main telecommunication service providers, they include; Mobile Telecommunication Network (MTN), Vodafone and Tigo. These network service providers would provide to us (service provider), the raw signal attenuation figures for processing, and also submit information received from the service provider on weather and climatic predictions to farmers in the form of voice messages through their mobile phones. They are in charge of billing farmers and providing some percentage of revenue generated to the service provider to pay other actors. They also supply 40 percent of handsets (mobile phones) to the farmers but cost to be recovered later as the system grows.

### 5.3 Radio Stations

They provide a platform for marketing and advertising our service. As part of the adverts, a teaser of the service is provided to farmers to entice them to subscribe to the service for more detailed predictions on climate and weather changes. Other relevant information to farmers before and during the operations of IMSS

would be delivered through the radio as the need be.

#### **5.4 Meteorological Services Department**

They process and add value to the raw attenuation data from the network service provider. They also give technical advice on how to use the processed data to make predictions on weather and climate change. They make the predictions (forecast) on weather within a period and which the service providers will send to farmers in the form of voice messages through telecommunication network service providers.

#### **5.5 Government of Ghana**

Government of Ghana is interested in predictions of weather and climate changes to help mitigate unfavourable climatic and weather conditions that hamper the agricultural productivity. The Government working through the Ministry of Food and Agriculture and SADA would provide 60 percent of the mobile phones free of charge to our target farmers as part of her commitment towards fighting the negative effects of weather and climatic change on the agriculture sector. The Government is the controller of economic and social activities of the nation. Getting the backing from the Government of this system would most likely guarantee its success; instruction from the state leadership to consider our innovative mobile system gives more weight to its actualization. The other actors like the meteorological services department and Agriculture ministry form part of Government departments.

The state's buy-in to our idea would mean automatic acceptance of the system and the other actors will play their roles as the system may require of them. The Government's buy-in is thus crucial and she forms a very important actor in this system.

#### **5.6 Ministry of Food and Agriculture (MoFA)**

MoFA provides information on current prices of food stuffs from the various markets on daily basis to the service provider for onward submission to the user through the network service operator. The department would also help provide very vital information concerning the Agricultural sector to the service providers.

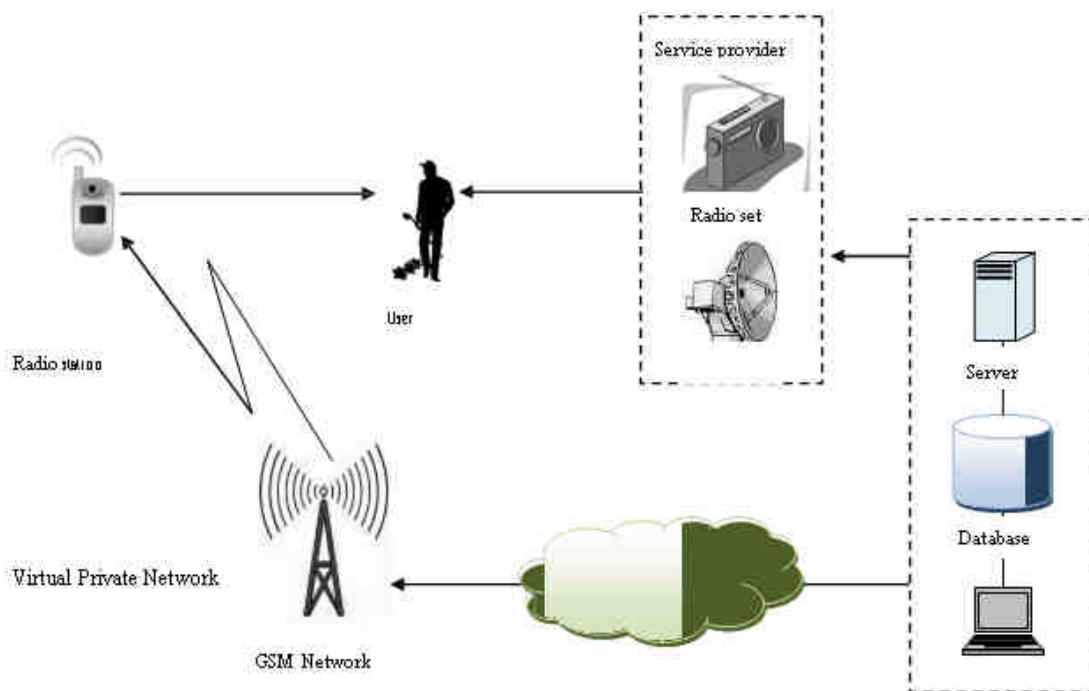
#### **5.7 Extension (Agriculture) Officers**

The extension officers serve as a link between the service provider and the farmers. Agriculture Extension Officers give the service provider feedback on the test results of the system in the farming communities and provide information on farmers and assist them to register on our services. They will also be in charge of distributing of mobile phones to farmers. Vital information delivered that is not well understood by the farmers could be explained to them through the extension officers, since they deal with farmers on daily basis. They would most likely find IMSS a very useful tool in the discharge of their duties. At the initial state they would form major agents of the marketing of the idea of IMSS to the farmers to embrace it.

#### **6.0 Technical Architecture**

The technical structure of the IMSS is complex and has a number of actors and components. The structure of our architecture takes a three tier approach. The presentation layer (Figure 2) below shows the technical architecture of our service.





**Fig 2: Technical Architecture**

### 6.1 Software Developer

The software developer would convert the processed data from the meteorological services department into forms that are communicable to the farmers (voice messages). This information will then be stored on our database, updated periodically and sent to the network service providers for onward submission to the farmers through their handsets.

### 6.2 Database

A database is required to serve as a repository for voice messages as well as list of registered farmers that would be updated periodically and sent to the network service operators for onward transmission to the farmers.

### 6.3 Virtual Private Network (VPN)

The VPN would be created between the service provider and the network provider to serve as a channel of communication, periodic updates on weather forecasts and commodity prices in the form of voice messages to the network service provider for multicasting to farmers on the service database.

## 7.0 Sustainability

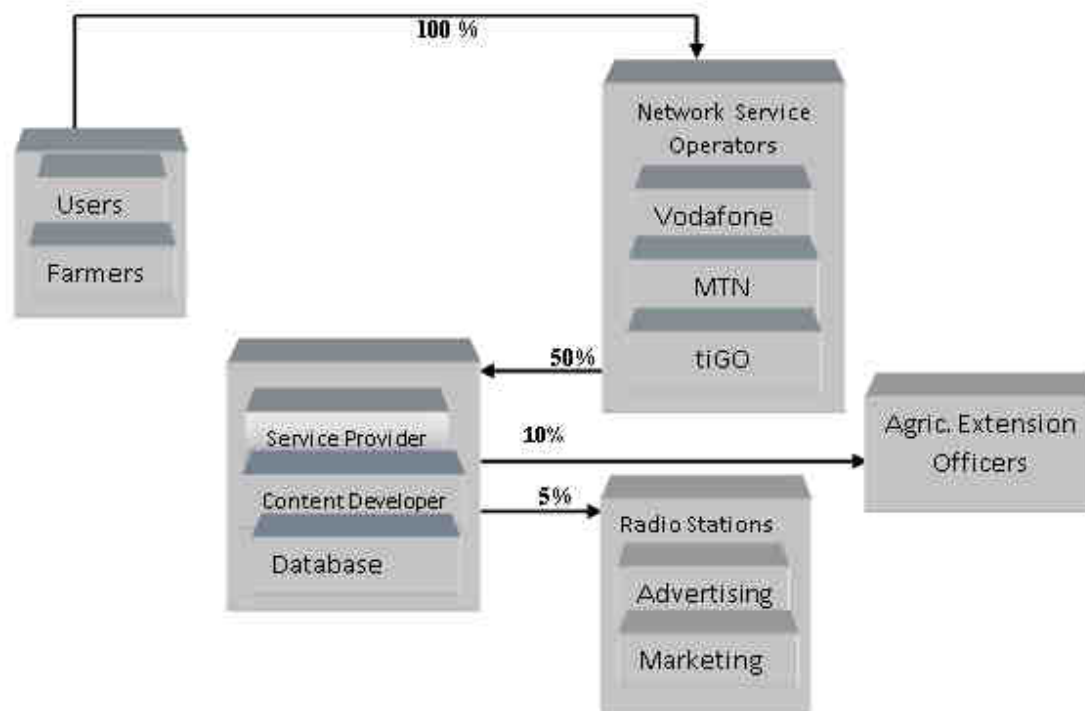
In this section we will discuss the costs and the benefits in order to buttress how we will make the system sustainable. As explained in the service concept, the main source of income is payment made by the farmers through deductions of credit by the network service operator.

### 7.1 Revenue Flows

Figure 3 below illustrates how the revenue flows and distribution of income realized from the service system. 100% of the revenue deducted from the credit of subscribed farmers goes to the Network service operator. The operator keeps 50% to himself and forwards 50% to the service provider. The service provider then pays 10 % to the extension officers and 5 % to the radio stations for marketing and advertising the service.

Our service targets about 55% of the Ghanaian farmer population and each farmer paying GH¢1.00 per month for the service. This service provided to them would most likely increase food production. More farmers would subscribe to the service and we expect to reach about 80% of the

farmer populace in the near future. This should correspondingly result in increase in our profit margin, other things being equal. The profit will enable us improve upon our services to the farmers.



**Figure 3: Revenue flow and Distribution**

### 7.2 Memorandum of Understanding

The service providers would enter into agreement (Memorandum of Understanding) with the telecommunication service providers concerning the revenue collection, distribution and the delivery of the services.

On the delivering of the services to the communities, the service providers would discuss with the telecommunication service providers to determine the strength of their signals in our targeted areas. The network that is relatively more stable signal strength within a catchment area would be signed to deliver the services to the farmers and charged the responsibility to bill for the services in that zone.

A memorandum of understanding would also be signed such that the telecommunication service providers retain 50% of the generated income for the services they render, including the VPN. The remaining 50% would be sent to us to pay for administrative running cost, the agriculture extension officers and other running cost. Amount of revenue generated by each telecommunication service provider would be monitored through our database.

### 8.0 Recommendation

Considering the advantages of the innovative mobile service system to the entire nation, we hope Government of Ghana and the donor community will take interest in it and support the realization of the system to encourage more farmers to subscribe to the service. The Government should also improve upon the road network in the farming communities to facilitate the easy transportation of foodstuffs and livestock to the market centers.

Network service operators should show more commitment to this service as part of their corporate social responsibility. They can do this by providing more handsets to the farmers and improving and expanding their network coverage to more rural areas.

### 9.0 Conclusion

The innovative system is a service system purported to provide Ghanaian farmers with relevant weather

information. Knowledge of this information empowers the farmer to plan their farming activities better which will lead to improved food production, ultimately leading to increased food security for the populace, fewer loses, better yield and more realization of dreams of farmers. Because the service also provides information on commodity prices in the various markets on regular basis, it would help the Ghanaian farmer to find a good price for his produce, therefore improving their livelihood.

The Government stands to gain from our service system in the sense that, by following our system farmers would most likely apply best practices; there would be bumper harvest, excess foodstuff resulting from bumper harvest would be exported to other countries thus resulting in foreign exchange earnings for the nation, which further improves the living standard of Ghanaians.

Factories could as well be established to process the excess farm produce thereby creating job opportunities for the youth.

We thus urge the Government of Ghana to give this system the nod for its realization because implement is feasible. Her nod would bring all onboard to making this noble idea a reality. It is implementable and its success comes with numerous benefits to the nation.

The next consideration of the authors is to present detail technical design and operational policy and plan of this innovative mobile system.

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