

# **ICTs For Synergy: A Case Study Of Scientific Knowledge And Local Farmers' Innovative Activities In Ghana**

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## **SYNOPSIS**

The proposed study aims at understanding the existing *media* and *contents* of communication between and among local farmers (LF), agricultural extension officers (AEO) and agricultural researchers (AR) and their implications on the advent of the new Information and Communication Technologies (ICTs) for agricultural development in Ghana. While the study recognizes the transformative power of the new digital network and its applications in openly disseminating scientific knowledge (Stiglitz, 1999) from one location to another, it also argues that without an intelligent approach to unearthing the innovative activities and local experiences of the communities, the impact of the information age on these economies will remain nebulous. With underlying concepts from the literature on knowledge management (scientific and local knowledge) and the theory of absorptive capacity, the study uses a mixed method approach to analyze the current communication processes and explore new avenues for future improvement. It employs the use of survey, interviews and focus group discussions to elicit data from the three groups at two selected agricultural districts of Ghana where there is a strong linkage between research, extension, and farming. The result of the study is expected to have theoretical, practical and policy implications on knowledge sharing among the actors.

## **PROBLEM STATEMENT**

The importance of *knowledge generation* in any agricultural innovation system cannot be overemphasized. This becomes more critical in the case of Ghana considering the declining statistics on productivity despite national and international efforts and initiatives. In the wake of this, agricultural research, extension and development have progressed in Ghana through the Transfer of Technology (ToT) model from the colonial period through Training and Visit (T&V) model of the World Bank that emerged in response to the inefficiencies in the ToT system, to the current program of Farmer Field Schools (FFS). Several studies in the area reveal that the emphasis is being shifted onto sharing of knowledge between technical experts and local people (Coldevin, 2003) instead of the conventional approach of 'knowledge transfer'. This is being recognized considering the special characteristics of the new ICTs to take knowledge generated from one location to another (Stiglitz, 1999; Colle and Roman, 2003). At the same time, skeptics such as Sevigny and Prevost (2006) see ICTs as accelerating the dissemination of *information* but not *knowledge*, a view that goes to support arguments made by Polanyi (1966) and Szulanski (2003) on the nature of knowledge which makes tacit knowledge very difficult to transfer. It will therefore be interesting to explore how these technologies can help in sharing farmers local knowledge which is embedded in their day-to-day activities and experiences.

On the other hand, every successful innovation system involves a continuous exchange of knowledge for ideas to be turned into processes or products. Considering the important role agriculture plays in Ghanas' economy (Dzidonu, 2002), it is critical to

understand and analyze knowledge flow within the national agricultural innovation system, comprising mainly of farmers, researchers and extension workers. While science and technology (scientific knowledge) has heavily influenced the country's agricultural production system for decades, there is also a huge body of literature on the value of farmers' local knowledge and innovations in agriculture (Amanor, 1994).

Taking into account the rich professional and scientific work that has been going on in these three areas - i) scientific knowledge in agricultural production (content); ii) local knowledge and farmer innovations (content), and iii) ICTs for development (media), one would have expected a synergy for employing ICTs to tap farmers' local knowledge and innovative activities back into scientific research. Empirically, however, little is known (if any) of how access to ICTs by agricultural researchers and extension officers is used to unearth the existing knowledge and innovative activities of local farmers.

This dissertation research argues that, for a stable agricultural innovation system in Ghana, agricultural scientists need to reconsider ways by which farmers' local knowledge and innovative activities can be incorporated into scientific research for further innovations.

### **GOAL**

The main goal of this research is to explore with the three stakeholders, the role of the new ICTs, and how these technologies can facilitate the functions of agricultural research and extension.

### **RESEARCH QUESTIONS**

*RQ1: What is the current state (media and contents) of communication between and among local farmers, agricultural extension officers, and agricultural researchers in Ghana?*

*RQ2: What is the role of the new ICTs and how can these tools help in identifying, documenting, and acquiring farmers' local innovations by extension officers and researchers?*

### **CONCEPTUAL FRAMEWORK**

The study draws and builds upon knowledge from the following interrelated concepts and fields;

a) The significant contribution of scientific knowledge and innovations to agriculture (Agrawal, 1995; Andersen, 2007) through transfer of technology model (Rogers, 1962); training and visit model (Tanaka, 2007); and the current farmer field school model (Simpson and Owen, 2002) cannot be ignored.

b) At the same time, the value of farmers' local knowledge and innovations in agriculture in developing nations (Ghana inclusive) (Amanor, 1994; Bentley, 1992; Sperling et al., 1993; Amanor, 1994; Kamangira, 1997; Bellon, 2001) has been extensively documented.

c) The unique characteristics of the new ICTs as invaluable resources for agricultural research (ISNAR, 2003), and the driver of knowledge and information society (Okpaku, 2003; Dahlgren and Aubert, 2002; OECD, 2001; Stern and Furman,

2000) has also been argued. Colle and Roman (2003) stated that ICTs are uniquely useful for reaching many people simultaneously and overcoming geographic boundaries and capturing the reality of events.

d) But for synergy between scientific knowledge and local knowledge and innovations of farmers, there should be a willingness of the scientists to incorporate farmers' local innovations into their research activities and also for the local farmers to be willing to share their experiences with the scientists. The process of identifying, documenting, and incorporating farmers' local innovations into scientific research draws on the underlying theory for the study. This idea takes its root from the theory of absorptive capacity - the capability of any system to acquire, assimilate and exploit external knowledge makes the system innovative and competitive. Zahra and George (2002) reconceptualized to include the potential (acquire and assimilate) and realized (transform and exploit) absorptive capacity. The theory has been successfully explored in the for-profit sector such as in firms (Cohen and Levinthal, 1990; Zahra and George, 2002); inter-firm collaborations (Stuart, 1998); and within nations (Liu and White, 1997). This study therefore explores the theory under a not-for-profit organizations - research institutes but also limits its scope to only the potential absorptive capacity.

### **METHODOLOGY**

The study is designed as an analytical multi-case study aimed at using a sequential mixed-method approach of survey (quantitative); and in-depth interview and focus group discussion (qualitative) for data collection. Two cases will be selected by replication logic (Yin, 1994) and each of the two sites (or cases) will be considered as an experiment in itself. Result from the subsequent site is expected to confirm findings from the first or yield similar results (literal replication) (Eisenhardt, 1989).

Two sites in the country have met the three basic requirements for gathering the appropriate data for the study – i) presence of agricultural research institute, ii) history of agricultural extension work, and iii) extensive farming activities. The first case is located at the southern sector of the country while the second case at the northern sector. Both cases have a long history of collaborative work between research, extension and small-scale farming. The full research process will be conducted at the first site and then repeated at the second site. The process begins with a descriptive approach to understand the current communication system among and between the three groups of actors, and then analytically interpret the situation for use in the second phase. A survey technique for data collection at this stage is mainly designed for researchers and extension officers. The second phase will use exploratory approach to find ways by which the new ICTs can be effectively and efficiently deployed into the system.

The results from the survey will be used to design the instrument for the in-depth interview, and the result from the interview will be used to design the instrument for the focus group discussion. The idea behind the focus group method is that group processes can help people to explore and clarify their views in ways that would be less easily accessible in a one-to-one interview (Kitzinger, 1994). The approach also does not discriminate against people who cannot read or write and can encourage participation from people reluctant to be interviewed on their own (Kitzinger, 1994). Focus group

discussion is also useful in explaining or exploring survey results (O'Brien, 1993). The second phase will be fully explored among the three actors.

The design as employed in the first case will then be repeated in the second case with minor changes to the instruments depending on the situation on the ground.

### **SIGNIFICANCE AND EXPECTED IMPACT**

A number of gaps have been identified in the literature as mentioned above, and the results of this study will significantly contribute to bridging these gaps. This include i) strengthening the basic assumption by most development initiatives that by using ICTs, poor communities in Africa can contribute more efficiently to their own development; ii) increasing the efficiency of agricultural production, processing, storage and marketing mechanisms; iii) theoretically, resulting in the extension of the theory of absorptive capacity that has been explored in several other situations such as in firms; inter-firms; and within nations; iv) increase a sense of ownership, empowerment, and help promote and integrate local knowledge sharing habits; v) enhance farmers' welfare; increase job efficiency for scientists; and increase food production for society.

*Key Words: Scientific Knowledge; Local Knowledge and Innovation; Open Innovation; Information Communication Technologies; and Agriculture Development*

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