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Paper Presentation:

Intra-Network Configuration *for* Smallholder Commercial Agriculture

(IC4SCA)

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Background

In Kano State, Nigeria, the smallholder farmers' cooperatives are becoming centre of focus for large agro-processing and trading firms operating in the country. For over four decades agriculture sector had suffered neglect and diminishing investment sequel to advent of petroleum discovery in the country. The current upturn that favours smallholder farmers is not unconnected with recent international crisis that befell the agriculture sector in many frontiers, with terrible consequences on local trade and consumer patterns as well as farming system. Globalization, global warming, biofuels, rising food price and food production pressure and just recently the unexpected downturn of petroleum price all spell doom to the petrol-based Nigerian economy.

The apparition of information and communication technologies (ICT) in Nigeria about a decade ago provided smallholder farmers with some form of leverage to append to scheme of things at national and perhaps international levels. The large trading firms that used to import tomato paste and rice into the country, now forced to look inward to source these commodities through local production. This is a chance for smallholder farmers to organize into efficient outgrower network so as to meet the quality standards as well as achieve commercial quantity of the required farm produce.

But tracking agribusiness performance through real time communication with smallholder farmers in rural outgrower locations presents major challenge to the IT industry. Although the mobile handset is becoming affordable, available and fast diffusing deeper into rural areas where remote farming communities are living, critical characteristics of low Human-Computer Interface (HCI) of the rural farming communities coupled with limited service coverage in the remote areas still remain a problem. Mobile handset in remote areas is a promising tool for smallholder farmers' to strike communication equilibrium with large agribusiness firms on issues such as market offers, inputs transaction and produce mobilization. This paper intends to highlight hidden IT challenges in the relationship between emerging smallholder outgrower schemes and the larger agribusiness companies for addressing to enhance smooth agribusiness that is vital in fostering social and economic development at the grassroots.

The Outgrower Network in focus

The outgrower (contract crop production) scheme in focus comprised network of over 3000 smallholder farmers' cooperative societies (75,000 members) in ten local government areas (LGAs) with more than 30,000 hectares of flood irrigation smallholder plots, and massive upland area most suitable for cultivation of traditional food crops apart from tomatoes and rice, now cash crops. Partners in the outgrower network are two firms, a tomato crushing and paddy rice packaging companies that offer secured market to the farm producers. The farm producers many of whom own mobile handset are computer illiterate.

IT Challenges in the Outgrower Network

a) Inputs distribution
   ⇒ Material inputs, services and extension training. Capturing farmer input requirement from his locality, sourcing improved inputs and ensuring prompt delivery to the target farmers on time is necessary for successful outgrower operation of large size. These critical operations that require real time effectiveness are achievable only via effective application of customised mobile technology within the outgrower network
b) Production
   ⇒ Individual farmers in the outgrower network require two-way real time communication channel to render themselves for tracking of their operation progress which may include sudden crop management problem that require urgent attention to avert large scale loss. The rural farmer needs customized mobile technology that lends itself with effectiveness of solving farmer field problems especially that which borders on produce quality and quantity.
c) Produce mobilization
   ⇒ At harvest time, produce mobilization from large spread of remote smallholder fields presents enormous challenge (*quality control, theft, adulteration etc*) that requires effective organizational coordination. Applying customized mobile technology to address issues pertaining remoteness of some areas and effective evacuation of the farm produce to central transit depot all become imperative.
d) Market arrangement
   ⇒ Tracking produce mobilization would ease up purchase operation at designated buyer stations; delivery schedule becomes a lot easier on turn by turn basis while individual farmer payment through nearest banking facility tracked down via application of customized mobile technology.
e) Transition to e-agriculture
   ⇒ The entire outgrower network is a typified community of e-agriculture that binds together by real time communication, which will contribute to achieving commercialization of subsistence farming in Africa very fast.

The IC4SCA System

Intra-Network Configuration *for* Smallholder Commercial Agriculture (IC4SCA) is a constricted service tapped from existing network service in an area, for use by outgrower project that involves many smallholder farmers in various clusters scattered within several rural local government areas (LGAs). IC4SCA aims to provide opportunity for tracking and communicating with individual farmers under outgrower scheme. Information flow such as farmer location and distance identity, text message relay from farmer to project management unit (PMU) and networking the PMU with e-agriculture community (researchers, input dealers, extension service, marketers, processors etc.) through conventional www platform. Configuration for these applications is on conventional SIM card (project SIM card) as additional functions.

Advantages of IC4SCA system

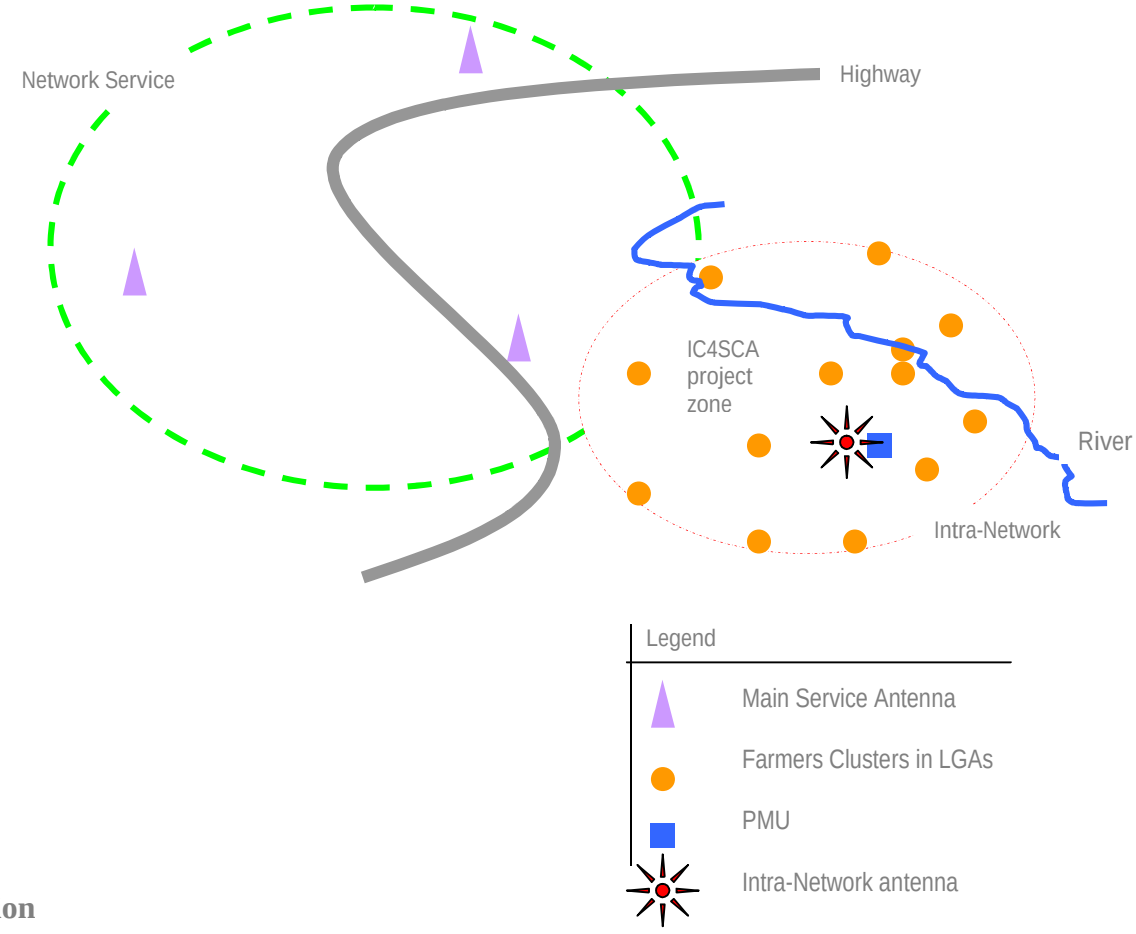
a) mobilization for participation in the outgrower scheme made easy through purchase and activation of the project SIM card by target farmers
b) enhanced tracking and communication with participating farmers in their familiar environment
c) external e-agriculture community networked for project efficiency via the www platform
d) outgrower performance optimized on every point
e) required applications made possible on conventional SIM card (project SIM card)
f) farmer feedback information captured by text via project computer in PMU for printing
g) elimination of problems such as ‘busy network, not reachable, redial again, ‘can’t recharge now etc.

h) IC4SCA system is adaptable to different smallholder outgrower project
i) IC4SCA system can be incorporated in project budget as basic project infrastructure

IC4SCA Application Components

1) Network Service – existing service tapped for IC4SCA
2) Project SIM card – conventional smart card that carries additional configurations for IC4SCA applications
3) Mobile Handset – conventional hand set for inserting project SIM card for operation in project area
4) Central Project Computer – IC4SCA coordination computer located in PMU for management of the outgrower scheme and information exchange with e-agriculture community
5) Cluster Service Antenna – Intra-Network service antenna located in distant remote area for communication efficiency within the IC4SCA covered area

Fig1. Illustration



Conclusion

Project SIM card uses airtime that reloads by recharge card sold in local markets. IC4SCA holds significant promises towards actualising the e-agriculture approach especially at the grassroots level.