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An Evaluation of the Relevance of Information and Communication Technologies (ICT) to Agricultural and Rural Development in Niger Delta of Nigeria

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Abstract
Information is vital to developmental process and the emerging information age brings about challenges that call for a shift in the ways of development. The study intends to assess the relevance of the use of Information and Communication Technology (ICT) by the development practitioners in their activities. Four research stations in Niger Delta of Nigeria where randomly selected for the study. Data collected were described using frequencies and percentages while inferences were drawn using spearman divulged and Pearson correlations. The study revealed that most of the digital ICT facilities were not available in the research stations. A test for significance

between importance of the facilities to their work and available facilities show that only radio (r=0.567) and cinema (0.550) were significant. This means the practitioners' extent of use of the available ICT facilities has not significantly influenced their work schedule. The study also revealed that there is no relationship between the importance of ICT tools to practitioners work schedule and their perceptions about the use of the facilities. Finally, the following recommendations based on the findings of the study were made: There should be vigorous efforts to use the available ICT facilities optimally and effectively by integrating the Local and germane content for the various facilities. The research and extension agent or institution authorities should deem it fit for adopts ICT for their activities as they are considered relevant by the practitioners. The research institution should teach and train both the rural farmers and extension agent on how to use the modern communication gadgets to enhance their performance in agriculture. The trained extension agent and Agricultural experts should train the local farmers on how to use modern information technology and to adapt to it instead utilising of an obsolete communication facilities.

Key words: ICT, Agricultural and Rural development, Research and Extension, NDBDA (Niger Delta Basin and Rural Development Authority Board), ADP (Agricultural Development Project), NIFOR (Nigeria Institute of Oil and Palm Research)

Introduction

The place of Information and Communication Technologies (ICTs) in development cannot be overemphasised. Development in developing countries is increasingly by awareness of stakeholder that have been a major player of responsibility for rural development and aood security, but lack of the capacity and solutions to meet the challenge. Information is critical to the social and economic activities in the developmental process. Telecommunications, as a means of sharing information, is not simply a connection between people, but a link in the chain of the development process itself (World Bank, 1995). The emerging Information Age is characterised by the transformation of information into a commodity that is created, procured, manipulated, and distributed to consumers throughout the world. Everyone agrees the massive changes are taking place, although the phenomenon is given great prominence, few planners, whether in government, business, or community sectors, are confident about how best to respond (Powell, 2003).Development stakeholders referred to as the 'dawn of the information age' with the implication that an unprecedented volume of

information is available and huge resources are invested on the technology that stores and transmits it. The unprecedented pace and scale of global flows in information, products, capital, people and ideas, if properly harnessed, offers the potential to create new opportunities for those who have thus far been excluded from gains in human on development (DOI, 2001).

Information revolution is paramount for intervention with the potential to ensure that knowledge and information is important in technologies, so that methods and practices are put in the right hands. Balit *et al* (1996) pointed out that the facilitating rural development is to improve the standard of living of the rural population, which is multidimensional in nature, including agriculture, industry and social facilities. Rural communities require information supply of inputs, new technologies, early warnings systems (on drought, pests, and diseases), credits, market prices and their competitors. Munyua (2000) related that the success of the green Revolution in Asia and the Near East are as a result of giving rural communities access to knowledge, technology and services will contribute to expanding and energising agriculture. Research has shown that farmers that are well informed are able to perform better in their production than those that are well informed and this led to higher yield and profits (Spore,2004) as reported in (Oluwatayo &. Aliyu, 2007).

In recent years, a new set of challenges to agricultural production and management activities in developing countries are emerging. These include:

i. The exponential increase in the demand for food and fibre
ii. Issues regarding the continuous introduction of new pests and diseases,
iii. Issues of cost of farm and domestic energy requirements,
iv. Value added concerns in exported agricultural products,
v. The realities of challenging inherent in world trade organisation (WTO)'s policy on trade in agricultural products.

These among other issues have brought the burden of globalisation to bear on the agricultural practices in developing countries. Given the fact that information revolution brought about globalisation, information utilisation or application is believed to hold the solution to the challenges in whatever form it is manifested. According to CTA (2000), efficient information dissemination remains the key to bridge the gap between the developed and underdeveloped countries. This is the challenge that confronts the development actors and stakeholders in developing countries. However, the

development specialists are yet to adapt the appropriate agricultural and rural development strategies to accommodate the changes brought by globalisation (Antoine, 2000).

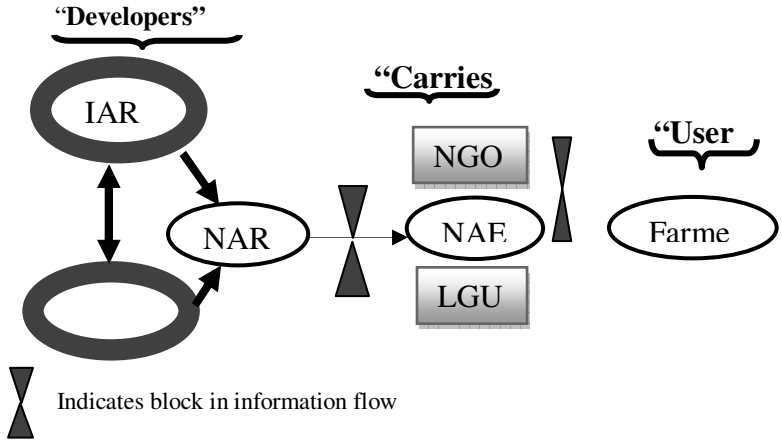
Traditional media and new ICTs have played a major role in diffusing information to rural communities, and have much more potential. There is need to connect rural communities to research and extension networks in order to provide access to the much needed knowledge, technology and services (Ferno, 1999). Agricultural research and extension institutions in Nigeria have a particularly demanding responsibility in order to make their clientele (the farmers and other stakeholders) as well as agricultural development efforts as a whole withstand the challenges of globalisation as enumerated above. Aspects of the responsibility include the determination of the information need of the various actors and stakeholders in agricultural development, acquiring and organising the information items in usable forms and more importantly communicate them through accessible and affordable means.

In addition, effective information dissemination for agricultural research and development in the developing countries is not optimal between the national and international research institutions. There equally exists a great problem in the transfer of information he research institutions to the National extension system, and a greater one in disseminating to the information users (farmers among others). George *et al* (2000) stated that:

> The research and development institutional infrastructure may be in place, but substantial blocks to information flow exist in the information hierarchy and knowledge remains inaccessible to the farmers, especially in the rural areas. Much of the knowledge and technologies thus remain on the shelves in reports, journals, books, and electronic media because ... the intended users, the farmers, have no say in their production and disposition. Thus, a knowledge divide exists between the more affluent research institutions and the less affluent delivery (extension) institutions and even a greater divide exists between delivery institutions and rural farmers.

Internet facility creates a new awareness among agricultural research and development (R&D) institutions to deploy it for faster transfer of knowledge along the chain described in figure 1.3. to this end, the International

Agricultural and Research Centres (IARC), Advanced Research Institute (ARI), and National Agricultural Research System (NARS) are being placed on the information highway. Top-tier research, development, and educational institutions are being linked and supported by high-performance networks, network centres, and applications (George *et al*, 2002).



IARC - **Fig. 1.3:** Flow pattern in Agricultural information system in developing countries

Source: George *et al* (2002)

Agricultural and Research Centres

NARS- National Agricultural Research Systems

ARI - Advanced Research Institutes

NGO - Non-Governmental Organisation

NAES - National Agricultural Extension Systems

LGU - Local Government Unit

There are several information technology (IT) initiatives in agricultural research and development. The result is that it is quite germane in agriculture; this is because enormous quantities of agricultural knowledge and decision support tools, exists on the internet, CD-ROMS, and in other media. The agricultural information highway is now capable of instantaneous

sharing of research and development knowledge among IARC, ARI, NARS and anyone who has access to the internet. However, there has not been optimal deployment of these facilities by research and development organisations for development-oriented activities in Nigeria; hence the benefit has not been optimal. For now individual access is scarce, private cyber cafés and public call offices have become a regular feature of the modern African city (Bertolini, 2004). The trend led to a situation in which the critical information required for agricultural development in the contemporary world remains solely not available and the farmers had to resolve to seek information from whatever source is available to them.

Objectives of the Study

The main objective of the study is to evaluate the relevance of information and communication technology to agricultural and rural development activities in Nigeria.

The specific objectives of the study are to:

1. Show the extent of availability of ICT facilities for use in the research and extension institutions.
2. Ascertain the importance of research and extension services practitioners attach to the use of ICT facilities for agricultural and rural development efforts.
3. Examine the perceptions of the research and extension services personnel on the relevance of ICTs to agricultural and rural development activities.

Hypothesis of the Study

The hypothesis of the study stated in null form, are as put below;

1. There is no significant relationship between the ICTs indicated as important for works, schedule and the ones available for use.
2. There is no significant relationship between the importance attached to ICT tools by the practitioners and their perceptions to the use of the facilities.

Methodology

The study was carried out in the Niger-Delta of Nigeria being the agro-ecological zone that has the most concentration of research institutes in the country. Out of the seven (7) research institutes in the agro-ecological zone, three (3) institutes were randomly selected (ADP, Songhai and NIFOR, the

coordinating institute for the zone, NDBDA was purposively selected. The research and extension personnel in the four (4) institutions constitute the population of the study.

Twenty percent (20%) of the relevant staff of the establishments were sampled. Data were collected using questionnaires as the research instrument. Eight (8) questionnaires were administered at ADP, eight (8) at Songhai, eight (8) at NIFOR and seven (7) at NDBDA. Out of the 22 questionnaires administered, 29 were returned.

The dependent variation of the study is the perceptions of the research and extension practitioners to the use of ICTs, while the independent variables are ICT facilities considered important to work schedule and extent of availability of ICT facilities for use. Data collected were analysed using descriptive statistics such as frequencies and percentages as well as inferential statistics such as spearman Rank correlations and Pearson products moment Correlation (PPMC).

Results and Discussion

Availability of ICT facilities

As seen in table 1, majority (36.4%) of the respondents indicates that radio was always available for use, while 31.8% indicates its availability all the time. Most (31.8%) of the respondents also indicated that TV is available for use all the time. Meanwhile, 31.8% of the respondents indicated video had never been used and 63.3% of them said cinema has neither been used nor available for their work schedule. These ICT facilities are the traditional or the analogue tools that had been available before the advents of the newer ICT facilities. Despite their availability, they have not been used optimally. According to Sharma (Undated), the old ICTs, such as radio and television among other analogue formats, that have been in use for agricultural and rural development programmes in most developing countries have not been used optimally because the software component (i.e. the content) have not been adequately addressed in the strategies.

Equally, 54.5% of the respondents had never used fax in their work schedules, 45.5% of them have equally not used fixed phones in their offices and 40.9% indicated that multimedia projector had never been used in their works. However, 45.5% indicated GSM/mobile phone as being available for use all the time. These set of ICT facilities constitute the digital but older forms of the ICTs. They are restrictive in nature

And have not been generally available. The advent of GSM in Nigeria earlier in this decade has the development practitioners.

The respondents equally stated that CD-ROMS technology (36.4%) organisational e-mail (36.4%), organisational website (45.5%) and personal website (68.2%) as never been used in their in their work schedules. However, most of the respondents indicated computer (36.4%), internet (45.5%) and personal e-mail ((36.4%) as being regularly used work schedules. Most of the digital ICT facilities are not available for use by the development practitioners; whereas others like computer, internet and personal e-mail are being used to the extent of their access to the facilities. According to Antoine (2000), recent years have seen an increase in the use of ICTs in almost every sphere of life, even in developing countries where there are persistent problems of access, connectivity, literacy, content and cost. Internet and other digital devices of ICTs are being used for information management to the extent to which they can cope despite the ubiquitous constraints.

Importance of ICT Facilities to Respondents' Work Schedule

As shown in table 2, the modal responses to radio (50.0%) and T.V (45.5%) considered them somewhat important. Most (54.5%) of the respondent considered cinema not relevant and equally (31.8%) of them did not consider fax relevant. Moreover, most of them considered news paper (54.5%), fixed phones (50.0%) and GSM/Mobile phone (72.7%) very important to the work schedules.

Modal responses to video (40.9%) considered it somewhat important. Equally, the modal responses to computer (81.8%), CD-ROMS technology (59.1%), internet (86.4%), organisation e-mail (63.3%), organisation website (68.2%), personal e-mail (86.4%) and personal website (50.0%) considered them very important to the practitioners' work schedule.

The importance attached to these ICT facilities (both old and new) has implications on the correct application of the facilities for development pursuit. According to UNDP (2001), the combination of the various ICTs (old and new) "are now able to work together to form our 'networked world' – a massive infrastructure of inter-connected telephone services, standardized computing hardware, the internet, radio and television, which reaches into every corner of the globe".

Practitioners' Perceptions on the Germane (Relevance) of ICTs to Agricultural Rural Development Activities

As shown in table 3, most (90.9%) of the respondents agreed that ICTs can easily network all researchers for easy access to information. More so, majority (90.9%) of them agreed that ICT can facilities international exchange of ideas for agricultural development while 86.4% agreed that ICT can facilitate research-extension institutions linkage for effective agricultural information dissemination. Also, 77.3% of the respondents agreed that ICT can incorporate field-forward mechanism into research-extension in order to have end-users input and reaction. The perceptions expressed here are in consonance with that of Van Crowder and Fortier (2000) who stated that the internet tool allows network members to capture and develop local content, share, stock, retrieve and disseminate information and connect geographically sparsely people from research and extension institutions, faculties of agricultural education, NGO workers and agricultural producers.

In addition, the modal (45.5%) responses disagreed that ICT idea is elitist; no tangible benefit will reach the farmers and 81.8% equally disagreed to the statement that ICT will render extension institution irrelevant. In the same vein, 77.3% of the respondents disagreed with the statement that ICT use will not make extension delivery any vibrant than it has been while 77.3% equally disagreed to the statement that cost of acquiring ICT cannot be justified by the accruable benefits. These opinions equally favoured the use of ICTs for developmental pursuits in developing countries. The tool can also facilitate communications, sharing information and supporting improved agricultural production and can further broaden and strengthen collaboration through facilitating co-ordination of rural, local, national and regional development programmes (Van Crowder and Fortier, 2000).

Hypothesis Testing

H_1: *Relationship between Perceived Importance of ICT facilities to Work Schedule and their Extent of Availability and Use*

As shown in table 4, only the correlation values for radio (r=0.567) and cinema (0.550) were significant. This means that the practitioners' extent of use of the available ICT facilities has not significantly influenced their perception of the importance of the facilities to their work schedule. It should be noted that the ICT facilities that were significant are both analogue formats that have not been used optimally while most of the digital ICT

formats have not been put to consistent use. The implication of this is that they have positive dispositions to the use of the facilities even whereas most of the positive dispositions to the use of the facilities even whereas most of the facilities are not available for use in their work schedules. This infers that the practitioners' are likely going to use the facilities when they are available.

H_2: *Relationship between the Important attached to ICT tools by the Practitioners to their work schedules and their Perceptions to the use of the facilities*

The result in table 5 shows that there is no significant relationship between the practitioners' perception about the use of ICT and the importance they attached to the facilities in their work schedules. This means that their perceptions about the tools do not significantly influence the importance they attach to the ICT tools in their work schedules. As shown in table 3, the practitioners' perceptions about the use of the tools are favourable throughout; but the importance they attached to the ICT formats (table2) is not as consistent.

Conclusion

The availability of the facilities for official use is far from being optimal because most of digital ICT facilities being unavailable while the analogue once available where not used constantly. Most practitioners' perceptions about the uses of ICT for developmental pursuits were generally favourable and consistent.

The test of relationship between available ICT facilities and indications of priority ICT facilities for practitioners work schedule showed only availability and use of radio and cinema were significantly influenced by their responses on importance of the tools and their importance. The study divulged that there is relationship between the importance the practitioners attach use of ICT tools and their perceptions about the use of the facilities

Recommendations

Based on the findings the study, the following suggestions are made:

1. There should be vigorous efforts to use the available ICT facilities optimally and effectively by integrating the Local and germane content for the various facilities.

2. The research and extension agent or institution authorities should deem it fit for adopts ICT for their activities as they are considered relevant by the practitioners.
3. The research institution should teach and train both the rural farmers and extension agent on how to use the modern communication gadgets to enhance their performance in agriculture.
4. The trained extension agent and Agricultural experts should train the local farmers on how to use modern information technology and to adapt to it instead utilising of an obsolete communication facilities.

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Table 1: Distribution of Respondents by Official Availability of ICT Facilities for Use

ICT FACILITIES	ALLTHE TIME	REGULARLY	OCCASSIO -NALY	RARELY	NEVER
Radio	7 (31.8)	8 (36.4)	2 (9.1)	2 (9.1)	3 (13.6)
TV	7 (31.8)	5 (22.7)	2 (9.1)	2 (9.1)	2 (27.3)
Cinema	1 (4.5)	1 (4.5)	3 (13.6)	3 (13.6)	14 (63.3)
Newspaper	5 (22.7)	8 (36.4)	5 (22.7)	0 (0.0)	3 (13.6)
Fax	0 (0.0)	1 (4.5)	5 (22.7)	4 (18.2)	12 (54.5)
Phone (fixed)	3 (13.6)	1 (4.5)	7 (31.8)	1 (4.5)	10 (45.5)
Mobile phone/GSM	10 (45.5)	6 (27.3)	0 (0.0)	0 (0.0)	6 (27.3)
Multimedia projector	2 (9.1)	0 (0.0)	9 (40.9)	2 (9.1)	9 (40.9)
Video	5 (22.7)	4 (18.2)	4 (18.2)	2 (9.1)	7 (31.8)
Computer	5 (22.7)	8 (36.4)	8 (36.4)	0 (0.0)	1 (4.5)
CD-ROM	5 (22.7)	4 (18.2)	5 (22.7)	0 (0.0)	8 (36.4)
Internet	6 (27.3)	10 (45.5)	2 (9.1)	0 (0.0)	4 (18.2)
Organisational e-mail	6 (27.3)	1 (4.5)	1 (4.5)	6 (27.3)	8 (36.4)
Organisational website	3 (13.6)	2 (9.1)	2 (9.1)	5 (22.7)	10 (45.5)
Personal e-mail	11 (50.0)	8 (36.4)	0 (0.0)	2 (9.1)	1 (4.5)
Personal website	0 (0.0)	1 (4.5)	4 (18.2)	2 (9.1)	15 (68.2)

Source: Field Survey, 2007

Table 2: Distribution of the Respondents on ICT Facilities Considered Important
Source: Field Survey, 2007

ICT FACILITIES	Very Important	Somewhat Important	Not important	Not relevant
Radio	8 (36.4)	11 (50.0)	0 (0.0)	3 (13.6)
TV	6 (27.3)	10 (45.5)	1 (4.5)	5 (22.7)
Cinema	2 (9.1)	7 (31.8)	1 (4.5)	5 (22.7)
Newspaper	12 (54.5)	7 (31.8)	1 (4.5)	2 (9.1)
Fax	6 (27.3)	7 (31.8)	2 (9.1)	7 (31.8)
Phone (fixed)	11 (50.0)	5 (22.7)	1 (4.5)	5 (22.7)
Mobile phone/GSM	16 (72.7)	4 (18.2)	0 (0.0)	2 (9.1)
Video	5 (22.7)	9 (40.9)	1 (4.5)	7 (31.8)
Computer	18 (81.8)	2 (9.1)	0 (0.0)	2 (9.1)
CD-ROM	13 (59.1)	4 (18.2)	3 (13.6)	2 (9.1)
Internet	19 (86.4)	0 (0.0)	0 (0.0)	3 (13.6)
Organisational e-mail	14 (63.3)	2 (9.1)	2 (9.1)	4 (18.2)
Organisational website	15 (68.6)	3 (13.6)	2 (9.1)	2 (9.1)
Personal e-mail	19 (86.4)	0 (0.0)	0 (0.0)	3 (13.6)
Personal website	11 (50.0)	6 (27.3)	0 (0.0)	5 (22.7)

Table 3: Distribution of practitioners' perceptions on ICTs Relevance to Agricultural and Rural Development Activities

Perception statements	Strongly Agree	Agree	Undecided	Dis-agree	Strongly Disagree
ICT can easily network all researchers for easy access to information	13 (59.1)	7 (31.8)	2 (9.1)	0 (0.0)	0 (0.0)
ICT can facilitate international exchange of ideas	15 (68.2)	5 (22.7)	2 (9.1)	0 (0.0)	0 (0.0)
ICT can facilitate research-extension institutions linkage	1 (4.5)	9 (40.9)	3 (13.6)	0 (0.0)	0 (0.0)
ICT can incorporate feed-forward mechanism into research-extension	9 (40.9)	8 (36.4)	5 (22.7)	0 (0.0)	0 (0.0)
ICT idea is elitist; no tangible benefit will reach the farmers	3 (13.6)	4 (18.2)	5 (22.7)	6 (27.3)	4 (18.2)
ICT use will render extension institutions irrelevant	1 (4.5)	1 (4.5)	2 (9.1)	12 (54.5)	6 (27.3)
ICT use will not make extension delivery any vibrant than it has been	1 (4.5)	2 (9.1)	2 (9.1)	13 (59.1)	4 (18.2)
Cost of acquiring cannot be justified by the accruable benefit	1 (4.5)	0 (0.0)	4 (18.2)	9 (40.9)	8 (36.4)

Source: Field Survey, 2007

Table 4: Relationship between ICT facilities availability and importance to official work schedule

ICT FACILITIES	Correlation
Radio	0.567***
TV	0.202
Cinema	0.550
Newspaper	0.131
Fax	0.304
Phone (fixed)	0.228
Mobile phone/GSM	0.295
Video	0.176
Computer	0.122
CD-ROM	0.137
Internet	0.000
Organisational e-mail	0.407
Organisational website	0.120
Personal e-mail	0.177
Personal website	-0.13

Correlation is significant at the 0.05 level (2-tailed)

** Correlation is significant at the 0.01 level (2-tailed)

Table 5: Relationship between perceptions to the Use of ICT and importance attached to the ICTs to work schedules

ICT FACILITIES	Correlation
Radio	0.237
TV	0.394
Cinema	0.142
Newspaper	0.341
Fax	-0.045
Phone (fixed)	-0.207
Mobile phone/GSM	0.098
Video	-0.074
Computer	0.292
CD-ROM	-0.406
Internet	-0.161
Organisational e-mail	0.051
Organisational website	0.275
Personal e-mail	0.040
Personal website	0.083

* Correlation is significant at the 0.05 level (2-tailed)

** Correlation is significant at the 0.01 level (2-tailed)