Perceptions of extension agents and researchers on the constraints in the research-extension linkages in Ghana

P. K. DOAMEKPOR
Department of Agricultural Economics & Extension, School of Agriculture, University of Cape Coast, Cape Coast, Ghana

Abstract

An assessment of the research-extension linkages indicated that attendance at farmers' day celebrations, mini demonstrations, on-farm trials and joint problem diagnosis of farmers' situation were among the highly ranked activities by researchers and extension agents as closely bringing farmers, extension agents and researchers together. On the other hand, joint priority setting and planning exercises, an activity which the RELC undertakes were ranked low because prioritisation of problems and needs of farmers at the zonal level ignored certain pressing needs of farmers at the district or local level. Problems perceived as hindering the research-extension linkages were differences in policy directives because research and extension belonged to separate ministries, inadequate or no funds for logistics support to enhance research-extension activities, and high costs of agricultural inputs which make it difficult for farmers to use technologies or adopt technology packages.

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Introduction

Public agricultural research institutions often have poor relations with extension agencies. According to Seegers & Kaimowitz (1989), in 16 out of 20 research projects evaluated by the USAID in 1982, and in all of the 12 projects evaluated by the FAO in 1984, communication between research and extension was weak. According to World Bank study in 1985, bridging the gap between research and extension is the most serious institutional problem in developing an effective research-extension system.

Swanson & Peterson (1989) also recognized weak linkage between research and extension as the most serious institutional problem that constrained the flow of technology to farmers in many developing countries. Several factors contribute to this weak linkage. They include such factors as separate institutional housing, separate budgets and workplans, attitudinal problems, and social, economic and educational gaps between research and extension personnel.

Previous authors noted that extension workers see researchers as working in "ivory towers" and producing technologies that are not applicable to the farmers they work with (FAO, 1984; Samy, 1986). Researchers look down on extension and question extension agents' ability to perform their job (Quisumbing, 1984). Lack of communication between research scientists and extension personnel could cause a serious set back to the flow of technology. These problems are caused by differences in background, training, experience, responsibilities, status, institutional setting and physical location, all of which promote competition between the two groups and, thus, hinder their ability to understand each other's work (Bagchee, 1994; Bennell, 1989; Ewell, 1989).

To be effective, agricultural research must be relevant to farmers' needs and its results, including the necessary inputs, must be made available to the farmers. This usually requires specific efforts to extend the new technology. Attempts have been made over the years to improve the linkage between agricultural research and extension services in order to enhance the flow of information to farmers, the end-users of agricultural technologies (Eponou, 1996; Bagchee, 1994; Merrill-Sands & Kaimowitz, 1990; Bourgeois, 1989; Byerlee & Tripp, 1988). These

include farming systems research (FSR) and the training and visit (T & V) extension system, all in a bid to develop and transfer appropriate technologies to farmers in Ghana (Ntifo-Siaw & Agunga, 1994).

To further strengthen the linkage between agricultural research and extension in Ghana, the National Agricultural Research Project (NARP) and the National Agricultural Extension Project (NAEP) were instituted in 1991 and 1992, respectively. Also, to synchronise extension efforts and harmonise research activities with the extension services of the Ministry of Food and Agriculture (MOFA), Research Extension Liaison Committees (RELCs) were set up to play a co-ordinating role for research and extension activities in Ghana.

The paper is part of a study conducted in the Volta Region to assess the impact of research-extension linkages on technology transfer to farmers. It assesses the perceptions of agricultural researchers and extension agents on the constraints in the research-extension linkages on the development and dissemination of improved (cassava) technologies to farmers.

The objectives of this paper are to:

1. identify and describe the demographic characteristics of the respondents (that is, extension agents and researchers);
2. assess the effectiveness of the research-extension liaison committee's activities;
3. identify the constraints in the research-extension linkages in the development and dissemination of improved cassava technologies.

Materials and methods

A descriptive survey approach was used to study samples drawn from five out of 12 districts in the Volta Région. The districts were Akatsi, Ho, Hohoe, Ketu and Kpando. Field extension agents of the Department of Agricultural Extension Services in the Volta Region were sampled for the study. Forty field extension agents (FLSs) were selected out of a total of 65 agents in the five districts mentioned above. Research scientists from the research institutes, namely Soil Research Institute (SRI) and Crop Research Institute (CRI), and the faculties of Agriculture of the University of Cape Coast (UCC) and Kwame Nkrumah University of Science and Technology (KNUST), as well as researchers from Kpeve Agricultural Station (KAS), who engaged in cassava research and its related activities, were included in the sampling frame. After careful scrutiny of the list of names from these institutions, 20 names were obtained. However, there were three non-respondents.

In all, a total of 60 respondents made up of 40 extension agents and 20 cassava researchers were targeted. Out of this, 55 responded. This was made up of 38 extension agents and 17 researchers. Two validated instruments (questionnaire and interview schedule) were used to collect the required information from the sampled respondents. Interviews were arranged with the RELC co-ordinator, the regional training, agricultural extension and management information systems officers, and three subject-matter-specialists to seek additional information relevant to the study.

The questionnaires for the extension agents and researchers contained 35 and 31 items, respectively. The items were made up of open-ended and checklist type. These were divided into six parts. Part 1 comprised personal data. Part 2 was based on linkage and linkage mechanisms between farmers, extension agents and researchers in the 1994-1996 cropping years. Part 3 highlighted items on the participation of the respondents in research-extension activities for the period 1994-1996. Part 4, mainly open-ended, focused on farmers' adoption problems and problems associated with research-extension linkage activities. Respondents were asked to enumerate the problems they perceived as hindering close working relationships with farmers, extension agents and researchers, and to offer suggestions that could improve or foster good working relationships.

Part 5 sought the perception of both extension agents and researchers on the effectiveness and frequency of use of research-extension activities. A 5-point Likert type scale was used to measure this effectiveness, with values ranging from 1 for very ineffective to 5 for very effective and for frequency of use as 1 for not at all or never used to 5 for used very much. Part 6 of the questionnaires assessed the efficiency of the technology transfer methods used to disseminate information to farmers. These had values ranging from 1to 5 on a 5-point Likert type scale. Cronbach's reliability coefficients for the questionnaires were 0.82 and 0.87 for the extension agents and researchers, respectively.

The study was conducted in March 1997. Data collection covered a period of 3 months. Data from the questionnaires were analysed through the use of descriptive statistics, such as frequencies, percentages, means, as well as t-test and analysis of variance (ANOVA). An alpha level of 0.05 was used for all statistical analysis.

Results and discussion

Objective one of the study sought to identify the demographic characteristics of the extension agents and researchers. Participants in the survey were predominantly male: 92.1 per cent extension agents and 100 per cent researchers. On the average, the extension agents were 41.7 years of age, and had worked for an average of 15.3 years. Ninety-two per cent were married, while 7.9 per cent indicated being single. Twenty-two, representing 57.9 per cent were between 31- 40 years of age. More than half (57.9%) were technical grade two officers (TO_2) while 18.4 per cent were senior technical officers (STO). Fifty per cent indicated having been engaged in farming prior to their formal agricultural training with an average farming experience of 6.4 years. About 82 per cent (81.6%) held a Certificate in Agriculture qualification while 18.4 per cent held Diploma in Agriculture. Only eight, representing 21.1 per cent, indicated being attached to special projects. The average number of farmers they were in contact with was 179. The distribution of the extension agents by districts for the study were 21.1 per cent from Akatsi, 17.3 per cent from Ho, 23.7 per cent from Hohoe, 21. 1 per cent from Ketu and 18.4 per cent from Kpando districts.

Among the cassava researchers, the average age was 43.2 years, with 15 of them representing 88.2 per cent being married. Six (35.3%) were research officers, two (11.8%) senior research officers, three (17.6%) senior lecturers and one each representing 5.9 per cent for associate professor, lecturer, communication and training officer, station manager, principal production officer and technical officer grade one (TO_1). Almost half (47.1%) of the researchers held a MSc degree with six (35.3%) holding a PhD degree. The remaining held a BSc degree, a diploma and a certificate in agriculture, each representing 5.8 per cent. Twelve of the researchers representing 70.6 per cent indicated having engaged in farming prior to their training, with an average experience of 7 years in cassava research. However, 47.0 per cent indicated having spent 1-5 years on cassava research and 35.3 per cent indicated spending 6-10 years. One each (5.9%) indicated spending 11-15 years and 16-20 years, respectively. Regarding the area of research, five (29.4%) worked in general agronomy, three (17.6%) in plant breeding, two (11.8%) in soil science and one (5.9%) plant protection. The remaining were in adaptive trials (17.6%), post-harvest, cropping/farming systems agronomy, and communication and training each representing 5.9 per cent. The distribution of researchers by institutions indicated that 17.5 per cent were from Kpeve Agricultural Station, 35.5 per cent from Crop Research Institute, 23.4 per cent from Kwame Nkrumah University of Science and Technology, 11.8 per cent each from Soil Research Institute and University of Cape Coast.

Tables 1 and 2 are summaries of the activities together with the percentage responses given by extension agents and researchers carried out under the objective two of the study. Extension agents ranked participation in farmers' day celebrations as effective with 89.5 per cent of the

TABLE 1

Perception of Extension Agents on their Assessment of the Effectiveness of the Research-Extension Linkage Activities and the Frequency of Use (N=38)

Research extension linkage activity	*Degree of effectiveness*							*[d]Freq.*	*N*
	1	*2*	*3*	*4*	*5*	*[c]NR*	*Mean SD*		
Participation in farmers' day celebration	1 [b](2.6)	-	3 (7.9)	18 (47.1)	16 (42.1)	-	4.26 0.83	4.06	36
Attendance at mini demonstrations	4 (10.5)	1 (2.6)	8 (21.1)	15 (09.5)	9 (23.7)	1 (2.6)	3.65 1.21	3.24	34
Joint problem diagnosis of farmers situation	2 (5.3)	6 (15.8)	6 (15.8)	14 (06.8)	5 (13.2)	5 (13.2)	3.42 1.15	2.87	31
Joint programming and review meetings	7 (18.4)	2 (5.3)	8 (21.1)	10 (26.3)	9 (23.7)	2 (5.3)	3.33 1.43	2.88	34
Joint field visits	2 (5.3)	5 (13.2)	14 (36.8)	11 (28.9)	5 (13.2)	1 (2.6)	3.32 1.06	3.11	36
Attendance at workshops, seminars, etc. on farming	5 (13.2)	5 (13.2)	11 (28.9)	9 (23.7)	7 (18.4)	1 (2.6)	3.22 1.29	2.66	35
Attendance at field days	4 (10.5)	7 (18.4)	7 (18.4)	10 (26.3)	6 (15.8)	4 (10.5)	3.21 1.30	3.03	32
Joint recommendation on the release of technology	3 (7.9)	8 (21.1)	5 (13.2)	16 (42.1)	2 (5.3)	4 (10.5)	3.18 1.09	2.85	33
Joint priority setting and planning exercises	3 (7.9)	11 (28.9)	5 (13.2)	11 (28.9)	5 (13.2)	3 (7.9)	3.11 1.25	2.61	33
Participation in on-farm trials	5 (13.2)	8 (21.1)	8 (21.1)	12 (31.6)	5 (13.2)	-	3.11 1.27	2.79	34
Informal consultation with researchers and farmers	6 (15.8)	12 (31.6)	8 (21.1)	6 (15.8)	4 (10.5)	2 (5.3)	2.72 1.26	2.25	32

Note:[a] Scale 1 = very ineffective 2 = ineffective 3 = somewhat effective 4 = effective 5=very effective. b = numbers in bracket are percentages and may not equal 100 per cent due to rounding. c = No response. d = frequency of use of linkage mechanisms, a mean value calculated based on 5-point Likert type scale: 1 = not at all, 2 = very little, 3 = little, 4 = much, 5 = very much used.

TABLE 2

Perceptions of Researchers on their Assessment of the Effectiveness of Research-Extension Linkage Activities and Frequency of Use (N=17).

Research extension linkage activity	*Degree of effectiveness*							*[d]Freq.*	*N*
	1	*2*	*3*	*4*	*5*	*[c]NR*	*Mean SD*		
Participation in on-farm trials	-	2 (11.8)	-	5 (29.4)	10 (58.8)	-	4.35 0.99	4.31	16
Joint problem diagnosis	1 [b](5.9)	-	-	8 (47.1)	8 (47.1)	-	4.29 0.99	4.06	16
Attendance at workshops, seminars etc. on farming	1 (5.9)	-	2 (11. 8)	7 (41.2)	7 (41.2)	-	4.12 0.92	4.19	16
Attendance at field days	-	1 (5.9)	3 (17.6)	6 (35.3)	7 (41.2)	-	4.12 0.79	3.81	16
Attendance at mini demonstrations	-	1 (5.9)	2 (11.8)	10 (58.8)	4 (23.5)	-	4.00 0.79	3.81	16
Joint field visits	-	1 (5.9)	2 (11.8)	10 (58.8)	4 (23.5)	-	4.00 0.79	3.88	16
Joint priority setting and planning exercises	2 (11.8)	-	3 (17.6)	5 (29.5)	7 (41.2)	-	3.88 1.32	3.75	16
Informal consultation with farmers and FLSs	-	2 (11.8)	6 (35.3)	4 (23.5)	5 (29.5)	-	3.71 1.05	3.63	16
Joint programming and review meetings	2 (11. 8)	1 (5.9)	3 (17.6)	5 (29.5)	5 (29.5)	1 (5.9)	3.62 1.36	3.25	16
Joint recommendation on the release of technology	2 (11.8)	2 (11.8)	3 (17.6)	8 (47.1)	1 (5.9)	1 (5.9)	3.25 1.18	3.25	16
Participation in farmers' day celebration	2 (11.8)	4 (23.5)	6 (35.3)	4 (23.5)	1 (5.9)	-	2.88 1.11	3.00	16

Note: [a]Scale 1 = very ineffective, 2 = ineffective, 3 = somewhat effective, 4 = effective, 5 = very effective. b= numbers in bracket are percentages and may not equal 100 per cent due to rounding. c = No response, d = frequency of use of linkage mechanisms, a mean value calculated based on 5-point Likert type scale: 1 =not at all, 2 = very little, 3 = little, 4 = much, 5=very much used.

38 agents responding with a mean value of 4.26. Attendance at mini-demonstrations were ranked the second highest with a mean of 3.65 and 63.2 per cent of the 37 agents responding. Joint priority setting and planning exercises, a common activity carried out by the RELC since its inception ranked ninth with a mean of 3.11. The least ranked activity was informal consultation with researchers and farmers and this scored a mean of 2.72. However, the extension agents perceived the RELC activities as somewhat effective, scoring an overall mean of 3.39 (sd = 0.84).

On the other hand, researchers ranked on-farm trials as the highest with a mean value of 4.35. Joint problem diagnosis of farmers' situation and attendance at workshop and seminars on farming ranked second and third, respectively, with mean values of 4.29 and 4.12. Joint priority setting and planning exercises were ranked seventh with a mean of 3.88 (which was almost effective). However, participation in farmers' day celebration was ranked the least effective with a mean score of 2.88. The frequency of use of these activities indicated that researchers used participation in on-farm trials, joint problem diagnosis of farmers' situation, and attendance at workshops and seminars on farming very much (mean > 4.00).

Table 3 gives the means, standard deviations, t-values and probabilities of scores on the perceptions of extension agents and researchers on the effectiveness of the research-extension linkage activities. There is a significant difference in joint field visits, attendance at field days and mini-demonstrations. Researchers rated joint field visits as effective (mean = 4.00; sd = 0.79), whereas extension agents rated it as somewhat effective (mean = 3.32; sd = 1.06). This result indicated that researchers have been using this mechanism for some time now. This is evidenced by the responses provided by researchers from the CRI as well as SRI. Attendance at field days and mini-demonstrations were also common with the research institutes, especially CRI. However, there is a setback due to inadequate funds to supply logistics for the establishment of more of such demonstrations in order to disseminate technology to farmers. For an effective and efficient technology transfer a critical look should be given to the mentioned mechanisms, as they look promising in fostering the link to help improve the research-extension linkage.

Objective three of the study sought to identify the constraints in the research-extension linkages with respect to the development and dissemination of improved cassava technology and its related agronomic practices to farmers in the Volta Region. Extension agents and researchers were requested to indicate those factors they perceived as limiting them in working closely with one another. These factors were to be ranked in order of importance beginning with 1 as the most important factor.

Different policy directives, non-availability of funds to supply logistics, mobility or transportation problems, lack of frequent joint meetings with FLSs, and FLSs not well-motivated were some of the mentioned problems that ran through all the sampled institutions (Table 4). However, different policy directives and non-availability of funds to supply logistics attracted the most response amongst the researchers.

Table 5 summarises the factors perceived by extension agents as hindering their working closely with researchers. The first five factors ran through all the districts with financial constraints to supply logistics and different policy directives being the highly ranked responses among the agents (FLSs). The least ranked response, which also ran through all the districts, was lack of frequent joint meetings between researchers and extension agents (FLSs).

Policy directives that establish research and extension as two different ministries, and non-availability of funds to supply logistics were among the first two most important factors ranked by both researchers and extension agents (Tables 4 and 5). These factors were perceived as very crucial if strong and cordial relationships are to be fostered between researchers and extension workers. There is no doubt that some form of

TABLE 3

Means, Standard Deviations, T-values and Probabilities of Scores on the Perceptions of Extension Agents and Researchers on the Research-Extension Linkage Activities

Variable	*Status*	*N*	*Mean*	*SD*	*t*	*P*
Joint priority setting and planning exercises	Extension agents	35	3.11	1.26		
	Researchers	17	3.88	1.32	-2.00	.60
Joint problem diagnosis of farmers' situation	Extension agents	33	3.42	1.15		
	Researchers	17	4.29	.99	-2.79	.12
Joint programming and review meetings	Extension agents	36	3.33	1.43		
	Researchers	16	3.63	1.36	-.70	.63
Participation in on-farm trials	Extension agents	38	3.11	1.27		
	Researchers	17	4.35	1.00	-3.93	.12
Participation in farmers' day celebration	Extension agents	38	4.26	.83		
	Researchers	17	2.88	1.11	4.58	.17
Joint field visits	Extension agents	37	3.32	1.06		
	Researchers	17	4.00	.79	-2.61	.04*
Joint recommendation on release of technology	Extension agents	34	3.18	1.14		
	Researchers	17	3.25	1.18	-.21	.90
Attendance at field days	Extension agents	34	3.21	1.30		
	Researchers	17	4.12	.93	-2.88	0.05*
Informal consultation with farmers,	Extension agents	36	2.72	1.26		
extension agents and researchers	Researchers	17	3.71	1.05	-2.99	.39
Attendance at mini demonstrations	Extension agents	37	3.65	1.21		
	Researchers	17	4.00	.79	-1.27	.03*
Attendance at workshops, seminars etc.	Extension agents	37	3.22	1.29		
on farming	Researchers	17	4.12	1.05	-2.71	.13

Note: * *Significant at* $P \leq 0.05$

TABLE 4

Factors Perceived by Researchers as Limiting Them in *Working Closely with Extension Agents (N*= 17).

*Ranked *responses*	*Institution of researchers*				
	CRI	*SRI*	*University*	*KAS*	*Total*
Different policy directives and no formal link between research and extension due to separate ministries/institutional barrier.	4(23.5)	1(5.9)	2(11.8)	2(11.8)	9(52.9)
Non-availability of funds to provide logistics and other inputs for research work	2(11.8)	2(11.8)	1(5.9)	3(17.6)	8(47.1)
Differences in academic orientation due to wide educational gap between researchers and FLSs resulting in poor communication	3(17.6)	-	1(5.9)	1(5.9)	5(29.5)
Mobility problems or non-availability of transport facilities	1(5.9)	1(5.9)	1(5.9)	1(5.9)	4(23.5)
Lack of frequent joint meetings between FLSs and researchers	1(5.9)	1(5.9)	1(5.9)	1(5.9)	4(23.5)
FLSs not well motivated owing to lack of incentives	1(5.9)	1(5.9)	1(5.9)	1(5.9)	4(23.5)
Level of commitment on the part of FLSs to undertake research	1(5.9)	1(5.9)	-	1(5.9)	3(17.6)
Inadequate SMSs in all the SMS centres	1(5.9)	-	-	1(5.9)	2(11.8)
FLSs' level of understanding basic research	2(11.8)	-	-	-	2(11.8)
Insufficient training being given to FLSs	-	-	1(5.9)	1(5.9)	2(11.8)
Lack of recognition/no promotion	1(5.9)	1(5.9)	-	-	2(11.8)
Distortion of research finding messages by some SMSs	1(5.9)	-	-	-	1(5.9)

TABLE 5

Factors Perceived by Extension Agents (FLSs) as Limiting Their Working Closely with Researchers (N=38)

*Ranked *responses*	*District of extension agents (FLS)*					
	Akatsi	*Ho*	*Hohoe*	*Ketu*	*Kpando*	*Total*
Financial constraints/inadequate funds to supply logistics for research work	2 (5.3)	1 (2.6)	3 (7.9)	4 (10.5)	2 (5.3)	12 (31.8)
Different policy directives because research and extension belonged to different ministries	1 (2.6)	2 (5.3)	4 (10.5)	2 (5.3)	2 (5,3)	11 (28.9)
Research findings (results) not reaching FLSs on time	2 (5.3)	1 (2.6)	2 (5.3)	2 (5.3)	2 (5.3)	9 (23.7)
Researchers do not know farmers' priorities to make suitable recommendations for them	1 (2.6)	1 (2.6)	3 (7.9)	2 (5.3)	1 (2.6)	8 (21.1)
Very few research stations which are remotely sited	2 (5.3)	1 (2.6)	1 (2.6)	1 (2.6)	1 (2.6)	6 (15.8)
Level of FLSs understanding of basic research	-	-	3 (7.9)	2 (5.3)	-	5 (13.2)
Lack of frequent joint meetings between FLSs and researchers	1 (2.6)	1 (2.6)	1 (2.6)	1 (2.6)	1 (2.6)	5 (13.2)
No visits to research stations by FLSs	2 (5.3)	-	-	1 (2.6)	-	3 (7.9)
Distortion of extension messages by SMSs, because no direct communication exists between researchers and FLSs	1 (2.6)	1 (2.6)	-	-	-	2 (5.3)
Differences in academic orientation	-	-	1 (2.6)	-	-	1 (2.6)
Mobility/transportation problems	-	-	1 (2.6)	-	-	1 (2.6)
Inadequate SMSs in all the sms centres/limited number of qualified cassava researchers	-	-	-	1 (2.6)	-	1 (2.6)
Insufficient training of FLSs	-	-	-	1 (2.6)	-	1 (2.6)

Multiple responses exist thus total responses may exceed sample size.

relationship has been developed by the Ministry of Food and Agriculture and some of the agricultural research stations or institutions notably Kpeve Agriculture Station and CRI, where collaborative activities take place between them. This collaboration has been between the Crop Services Department (CSD) and the research institutes, in which case the CSD is tasked to conduct adaptive trials for the research stations. The problem that emerges here is that personnel who handled these trials do not belong to the extension services, and, where on-farm trials were being conducted, the field extension agents do not participate very much.

Another problem identified was with the supervision of staff who conducted these projects or trials. The researchers who oversaw these trials are not able to perform effective supervision. This is so because the trials are managed by different personnel who do not belong to their Ministry. This makes sanctioning very difficult in an event of failure of a trial. In areas where staff are rotated or seconded to a project, as it is the case at Kpeve Agricultural Research Station, these staff still belonged to their parent institutions and, therefore, complained about lack of recognition and incentives for working. In other words, who is to promote them? Is it the Ministry of Food and Agriculture or the Ministry of Science and Technology under which the research stations fall? Such problems have been managed in some countries through resource allocation procedures, involving formal guidelines for allocating time to linkage activities, specific allocation of funds for linkage activities and staff rotation and secondment (Ewell, 1989; Kean & Singogo, 1990).

In solving the problem of lack of funds to meet operating costs, such as transportation and fuel, Merrill-Sands & Kaimowitz (1990) suggested the following: making collaborative activities a line of item in programme budgets, placing funds for collaborative activities under the control of those individuals responsible for carrying out these activities, and, where the activities are based on a partnership between two units or institutions, obtaining a specific allocation of funds from each partner to support linkage activities.

From the survey, it was observed that most of the department and institutions relied on the Department of Agricultural Extension Services and the RELC for research-extension activities. Results obtained from the interviews with the RELC co-ordinator, the Regional Agricultural Extension Officer (RAEO) and the Regional Training Officer (RTO) indicated that where the Extension Service was unable to provide funds for research-extension activities, programme of activities scheduled to take place was hampered. Most important of these activities were the field visits and monitoring tours in which researchers and extension personnel were to tour farmers' fields to obtain first hand information about farmers' situation. Also there was a setback to the monitoring and evaluation exercises by subject-matter-specialists to observe the performance of the field extension agents' training being given to them and the impact made on farmers.

Since formal collaboration existed to some extent with the Department of Crop Services, and now that the concept of Unified Extension System is in place, the various departments involved in the dissemination of technologies should endeavour to pool resources for effective and sustainable linkage. Lack of frequent joint meetings with frontline staff was a problem that has also been crucial to the two groups of respondents. This could also be due to the institutional barrier brought about by the different set up. Although there have been some form of meetings held with extensionists, these were only at top management levels and not with frontline staff. At the local or district level of planning RELC activities, where researchers were expected to attend meetings together with frontline staff and farmers, only some SMSs and, on very rare occasions, some technical heads of departments attended. This might probably be due to the very heavy work schedule reported by some researchers, and the inability to accommodate

them and provide certain logistics should they be present at such meetings.

A collaborative professional consideration is, therefore, needed for solving such a problem. Collaborative activities foster integration by providing an opportunity for participants to gain more insight into each other's problems, working methods and objects. These, according to Merrill-Sands & Kaimowitz (1990) can promote the mutual respect on which successful linkage activities depend. Collaborative activities can also have the direct benefit of improving the quality of both groups' work. In this regard, the RELC has done very well in co-ordinating activities of researchers and extension staff to foster this close working relationship. This has been through the various planning sessions, and monthly or bimonthly technology review meetings.

The survey also sought to identify the constraints that tend to hinder researchers and frontline staff from working closely with farmers. Tables 6 and 7 show the factors perceived as influencing technology development and delivery. Among the researchers the most important in order of importance are summarised in Table 6. Responses from all the institutions of the researchers indicated that lack of resources in the form of logistics was ranked by all researchers as the most important factor. Inaccessibility of farmers due to remoteness of farms was ranked second, and researchers from SRI, the universities (KNUST & UCC) and KAS indicated this as a problem. Communication difficulties, resulting in difficulty in explaining certain scientific terms in the local dialect was observed by all but the University as a critical problem hampering researchers from working closely with farmers. Another critical problem which all the institutes/institutions reported was inadequate credit facilities for farmers to enable them expand their farms and, thus, improve upon their farming system. Conflict of priorities and heavy schedule of research work was also seen as a critical factor for all the institutions.

From the first five critical factors reported, it is evident that inadequate resources hampered researchers very much to establish trials or demonstrations for technology transfer. Farmers who are very sceptical about new technologies or innovations would feel reluctant to donate resources to carry out research. Even letting out land to carry out on-farm trials also proved very difficult, if not impossible. Accessibility to farmers due to the way the farms are remotely sited and even scattered proved very difficult. The solution of this problem would rely heavily on the provision of transport to access farmers in order to critically assess their needs and also interact with them. Farmers have been saddled with the problem of credit facilities for a long time due to the fact that they have no collateral security to offer and would not risk any new innovations by researchers if they were not sure of their performance.

Conflict of priorities and heavy schedule of research work had been a very critical problem of researchers especially those located in the research institutes. The priorities set by research institutes might not be directly linked with helping farmers in the field. Indirectly farmers might benefit in the long run from the results of these researches that they carry out only if they are relevant to the needs of the farmer. Priorities set for the research work are in line with the institute's programme that the researchers follow. Since most research institutes carry out on-station and adaptive research and, in few instances, conduct on-farm trials involving some selected farmers much of their time is spent on these trials, leaving little time to interact with farmers. This, no doubt, necessitates the need for recognition of researchers who are always in contact with farmers in trying to make a break-through in the development and delivery of new technologies that farmers easily accept and adopt. As this is not the case as reported by some researchers that their promotion is linked with papers published and not with helping farmers, there will still be this continuous conflict in the setting up of research agenda by research institutes.

TABLE 6

Factors Limiting Researchers' Working Closely with Farmers (N= 17).

*Ranked *responses*	*Institution of researchers*				
	CRI	*SRI*	*University*	*KAS*	*Total*
Lack of resources in the form of logistics	3(17.6)	2(11.8)	3(17.6)	2(11.8)	10(58.8)
Inaccessibility of farmers due to remoteness of farms	1(5.9)	2(11.8)	4(23.5)	1(5.9)	7(41.2)
Communication difficulty resulting in difficulty in explaining certain scientific terms in the local dialect (language)	3(17.6)	2(11.8)	-	1(5.9)	6(35.3)
Inadequate or no credit facilities for expansion of farms making it impossible for farmers to readily approach researchers for help	1(5.9)	1(5.9)	1(5.9)	1(5.9)	4(23.5)
Conflict of priorities and heavy schedule of research work	1(5.9)	1(5.9)	1(5.9)	1(5.9)	4(23.5)
Researchers being cut off from farmers due to policy directives	1(5.9)	-	2(11.8)	-	3(17.6)
Poor acceptance of new technologies	-	1(5.9)	1(5.9)	1(5.9)	3(17.6)
Control of land for long term research work	1(5.9)	1(5.9)	-	1(5.9)	3(17.6)
Few cassava-farmer groups thus making contact very difficult with other cassava farmers	1(5.9)	1(5.9)	-	-	2(11.8)
Lack of good collaborators	-	-	2(11.8)	-	2(11.8)
Promotion linked to papers published and not to helping farmers/lack of recognition	1(5.9)	1(5.9)	-	-	2(11.8)
Long gestation period of cassava making information flow very slow	1(5.9)	-	-	-	1(5.9)
Farmers do not approach researchers for assistance due to their mode of staple food crop production	1(5.9)	-	-	1(5.9)	1(5.9)
Farmers being unreliable and not time conscious	-	-	-	-	1(5.9)
Too few joint meetings with farmers	1(5.9)	-	-	-	1(5.9)

.*Multiple responses exist thus total responses may exceed sample size.

TABLE 7

Factors Limiting Extension Agents (FLSs) in Working Closely with Farmers (N=38)

Ranked responses	*District of Extension agents (FLSs)*					
	Akatsi	*Ho*	*Hohoe*	*Ketu*	*Kpando*	*Total*
Financial constraints and poor working conditions	4(10.5)	2(5.3)	5(13.5)	3(7.9)	2(5.3)	16(42.1)
Mobility problems and high cost of motor bike maintenance	4(10.5)	3(7.9)	3(7.9)	4(10.5)	-	15(39.5)
No inputs to help establish demonstration farms/plots	3(7.9)	1(2.6)	3(7.9)	2(5.3)	1(2.6)	10(26.3)
High cost of farm inputs	-	-	3(7.9)	4(10.5)	2(5.3)	9(23.7)
Lack of recognition/no promotion	3(7.9)	1(2.6)	1(2.6)	3(7.9)	-	7(18.4)
Farmers' farms being scattered making frequent visits impossible	-	-	4(10.5)	1(2.6)	1(2.6)	6(15.8)
Farmers disinclination to change	3(7.9)	-	2(5.3)	1(2.6)	-	6(15.8)
Farmers being unable to afford the expensive nature of some of the technologies	1(2.6)	1(2.6)	1(2.6)	1(2.6)	1(2.6)	5(13.5)
Farmers unwillingness to form groups, but rather prefer being contacted individually	-	-	-	-	3(7.9)	3(7.9)
FLSs not able to meet farmers' non-extension demands	-	-	1(2.6)	1(2.6)	1(2.6)	3(7.9)
Research findings not reaching FLSs early enough	-	-	2(5.3)	-	-	2(5.3)
Accommodation problems making it impossible for FLSs to live with farmers	1(2.6)	-	-	1(2.6)	-	2(5.3)
Risk and insecurity of agents travelling to remote areas	-	-	2(5.3)	-	-	2(5.3)
Weather problems hampering the adoption of technologies	-	-	-	1(2.6)	1(2.6)	2(5.3)
Farmers difficulty in attending meetings when meetings are arranged	1(2.6)	-	-	1(2.6)	-	2(5.3)
Marketing problems	-	-	1(2.6)	-	-	1(2.6)
Language barrier	-	-	1(2.6)	-	-	1(2.6)
Extension methodology being too theoretical	-	-	-	1(2.6)	-	1(2.6)

From the problems ranked above, the least ranked problem was too few joint meetings with farmers and farmers being unreliable and not keeping to time. Another problem worth mentioning is that farmers do not approach researchers for assistance due to their mode of staple food crop production. Farmers, especially the resource-poor farmers, normally produce for their personal use and do not bother much to sell the surplus. They, therefore, do not see the need to approach researchers for help to improve upon their mode of production. They tend to be used to what they have been doing over the years and, thus, things that appear to be problems for researchers are not considered as problems for the resource-poor farmer. They tend to be satisfied with the little they have.

Table 7 summarises the factors or problems perceived by extension agents (FLSs) as limiting them in working with farmers. Financial constraints, mobility, lack of inputs or resources to establish demonstration plots or farms, high cost of farm inputs and lack of recognition/ incentives/promotions were among the first five critical problems enumerated by the extension agents. The problems appeared to be critical in all the sampled districts. Other problems mentioned by three out of the five districts that appeared very important are farmers' disinclination to change, farmers being unable to afford the expensive nature of some of the technologies, and frontline staff not able to meet non-extension demands of farmers. Most of the farmers interviewed indicated that although they perceived the improved technologies or practices as good, they could not afford the high cost inputs that accompanied the use of these technologies.

Lack of promotion/incentives/recognition and accommodation problems could frustrate extension agents so much that if nothing were done extension agents, especially frontline staff, would not be motivated to work closely with farmers to help establish the needed linkage with research and extension. According to Moris (1987), it is hard for extension to serve its clients well without adequate staff incentives. In Kenya for instance, these incentives include housing, transportation, salary, health insurance, subsistence allowance while on official duty and working under well-trained extension supervisors with personnel management skills needed to motivate their staff (Mwangi & McCaslin, 1995). Beder (1990), Cohen (1990) and Watanabe (1991) asserted that motivation depends on incentives that the staff valued and believed to be attainable with increased individual performance, and is high when staff frustration is minimal.

Conclusion

For an effective work to be achieved by the RELC and to sustain its activities, there is the need to carry out an extensive impact assessment of all existing technologies to determine the cost/ benefit ratios and recommend the cost effective ones. Problem diagnosis of farmers' situation is contributing to the relevance of research to farmers. However, joint priority setting and planning exercises are not effective to address farmers' needs at the grassroots or local levels. Prioritising problems and needs at the zonal level eliminates crucial problems and needs in certain districts which are dropped during the regional or zonal planning sessions.

Attendance at farmers' day celebrations, mini demonstrations, on-farm trials and joint problem diagnosis were among the highly ranked research-extension linkage activities. However, joint priority setting and planning exercises was ranked low. Researchers and extension agents are not motivated enough to foster strong working relationship to help the farmer. The issue of communication skill should be critically looked into for personnel who play the linking role between research and extension.

Recommendation

The following recommendations are made:

1. A preliminary planning session at the

grassroots involving all actors who should be initiated to address all linkage problems at the local levels. This will enable effective planning at the zonal planning sessions.

2. Agricultural scientists and extensionists must be brought together under one Ministry and the linkage between scientists and extensionists strengthened at the policy levels. Alternatively, funds could be set aside for research institutes and extension services for joint collaborative activities.
3. Agricultural research funded by government should be based on problems identified on the farmers' fields or problems that would satisfy the real needs of farmers. The District Assemblies could play an important role in the organisation and funding of linkage activities.
4. Implementation of research findings should be supported by cost-effective logistics to facilitate the diffusion and adoption of improved technologies.
5. Communication of research findings to extension staff and farmers should be simplified on flip charts or other publications to the level that everybody can understand. This could be in a pictorial form. Findings should be in simple language and easily available at a price that the farmer can afford.
6. Subject-matter-specialists and other personnel who co-ordinate research-extension activities should be trained in basic extension communication and methodology for effective communication with the actors in the agricultural knowledge and information system.

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