

RURAL RADIO IN AGRICULTURAL EXTENSION: THE EXAMPLE OF VERNACULAR RADIO PROGRAMMES ON SOIL AND WATER CONSERVATION IN N. GHANA

**Robert Chapman, Roger Blench, Gordana Kranjac-Berisavljevic'
and A.B.T. Zakariah**

Abstract

Radio is a powerful communication tool. Experience with rural radio has shown the potential for agricultural extension to benefit from both the reach and the relevance that local broadcasting can achieve by using participatory communication approaches. The importance of sharing information locally and opening up wider information networks for farmers is explored with reference to the specific example of vernacular radio programmes based on research on soil and water conservation. This paper describes this specific experience in the context of rural radio as a tool for agricultural extension and rural development, with reference to the dramatically changing technology environment that is currently influencing information and communication processes worldwide. The implications for policy makers of harnessing rural radio to improve agricultural extension are also discussed.

Research findings

- Rural radio can be used to improve the sharing of agricultural information by remote rural farming communities.
- Participatory communication techniques can support agricultural extension efforts especially using local languages and rural radio to communicate directly with farmers and listeners' groups.
- A format that combines a drama performed by local actors with corresponding thematic discussions is popular amongst farmers listening to agricultural extension radio programmes.
- Targeted audience research can help to determine programme content, broadcast schedules and the preferences of listeners regarding the mix of information and education in the format.

Policy implications

- There is a need for national communication and media strategies which incorporate pluralistic approaches to the media within the more traditional centralised broadcasting and information systems and promote the cross-sectoral importance of information and communication in budgetary planning processes such as Poverty Reduction Strategy Papers (PRSPs).
- The national policy environment in many developing countries could be improved through legislation to encourage independent community broadcasting, including streamlined licensing and subsidies for new information services such as FM stations, internet providers and rural telecommunication services.
- Governments and donors should invest in up-to-date socio-linguistic analyses of the numbers and geographical dispersal of minority languages with a view to improving information services such as government public service information, broadcasting and research networks.

Contact details

Robert Chapman is a Research Officer of the Overseas Development Institute, 111 Westminster Bridge Road, London SE1 7JD, UK. Tel: +44 (0) 20 7922 0330 Email: r.chapman@odi.org.uk

Roger Blench is a Research Associate of the ODI and independent researcher. He can be contacted at 8 Guest Road, Cambridge CB12 4AL, UK. Tel: +44 (0) 1223 560687 Email: rogerblench@yahoo.co.uk

Gordana Kranjac-Berisavljevic' is Head of the Department of Agricultural Mechanisation and Irrigation Technology, Faculty of Agriculture, University for Development Studies, 1882 Tamale, GHANA. Email: gordanak@africaonline.com.gh

A.B.T. Zakariah is Communication Officer, Central Administration, University of Development Studies, P.O. Box TL 1350 Tamale, GHANA.

The Agricultural Research and Extension Network is sponsored by the UK Department for International Development (DFID)

The opinions expressed in this paper do not necessarily reflect those of DFID.

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Network Coordinator: Robert Tripp Administrative Editor: Alana Coyle Administrator: Fiona Drysdale

CONTENTS

	Page
Abstract	i
Contact details	i
Acronyms	iv
1 INTRODUCTION	1
2 APPROACHES TO RURAL RADIO	1
Experiment or established tool?	
Participatory communication and CATS	
Community participation and empowerment	
Radio and extension in the wider development context	
Use in agricultural extension	
Partnerships and networks	
3 GHANA CASE STUDY	6
Creating awareness of soil and water conservation issues via FM radio: experiences from northern Ghana	
Programme design	
Audience research methods	
Demographic and socio-economic characteristics of the farmers surveyed	
Farmers' reactions to the radio programme	
Final evaluation results: situation at the end of the growing season	
Conclusions	
4 IMPLICATIONS FOR DEVELOPMENT	10
Policy issues	
5 CONCLUSIONS	11
REFERENCES	11
ENDNOTES	12
 Tables and figures	
Table 1 Estimated number of radio sets in use in Africa (1955–95)	2
Table 2 Target audience's understanding of radio programme	9
Table 3 Aspects of the programme most enjoyed by farmers	9
Table 4 Perceived main messages of the programme	9
Table 5 Whether we practise SWC techniques or not, farming will always continue	9
Table 6 There is no point in wasting time on soil and water conservation	9
Figure 1 Radio and population growth in Africa	2
Box 1 Gender-differentiated programming	5
Box 2 Programme content and farming cycle	6
Box 3 Programme messages	7

Acronyms

ADRA	Adventist Development and Relief Agency
AMARC	The World Association of Community Broadcasters
<i>CIERRO</i>	<i>Centre interafricain d'études en radio rurale de Ouagadougou</i> (Burkina Faso)
CATS	Community Audio Tower System
CMDC	<i>Compagnie malienne de développement des textiles</i>
DAB	Digital audio broadcasting
DCFRN	The Developing Countries Farm Radio Network
DFID	Department for International Development (UK)
FAO	Food and Agriculture Organization of the United Nations
GBC	Ghana Broadcasting Corporation
ICT	Information communication technology
IDRC	International Development Research Centre (Canada)
ISNAR	International Service for National Agricultural Research
MoFA	Ministry of Food and Agriculture (Ghana)
NGO	Non-Governmental Organisation
ODI	Overseas Development Institute (UK)
PRSPS	Poverty Reduction Strategy Papers
RST	Radio Savanna Tamale
SEC	Strategic Extension Campaign
SWC	Soil and water conservation
UDS	University of Development Studies (Ghana)
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNICEF	United Nations Children's Fund
URA	Upper Region Radio

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1 INTRODUCTION

The terms rural radio and community radio have come to be used interchangeably to describe FM stations established to broadcast to a local and predominantly rural audience. The growth of rural radio stations over the past few decades reflects both the improvements in information technologies and the shifting development paradigm towards a more participatory style of information and knowledge transfer. The 'community' aspect of local radio initiatives combines a number of approaches. The most obvious is that a local radio station gives the community a voice, and by encouraging the active participation of the audience in the making and scheduling of programmes this voice can play an empowering and potentially uniting function. The community focus can also serve another function: by employing members of the community both as station staff, such as radio presenters, correspondents and programme facilitators or *animateurs*, and as intellectual resources, for example providing programme material and content. This not only reinforces the participatory nature of the development approach but ensures local ownership and a greater chance of sustainability. Therefore, although the terms rural and community are used interchangeably it is the community element which has been a deliberate focus of many initiatives to ensure that the stations are run not only *for* the community but *by* the community. Rural radio has other elements: a development focus and an elevated cost per listener compared with urban stations which often make subsidy inevitable. Advertising, as opposed to public service announcements, is often uneconomic. Rural radio is the focus of this paper because the predominantly agricultural audiences of these stations can benefit from information to improve their livelihoods.

There are several approaches to using radio for development, and Section 2 outlines some of those being used to harness radio for agricultural extension. Radio initiatives as part of broader communication for development strategies have been used by international organisations such as the United Nations Children's Fund (UNICEF), the United Nations Educational Scientific and Cultural Organization (UNESCO) and the Food and Agriculture Organization (FAO) of the United Nations since the late 1960s. Other media such as video, television, the internet and information communication technologies (ICTs)¹ are also the focus of an increasing number of international organisations, non-governmental organisations (NGOs) and governments investigating the role of communication in development. The impetus of the current revolution in information technologies has led to a more acute recognition that, without a concerted effort to ensure greater information equity, current information

asymmetries could be accentuated. On a global scale, this debate is manifested in the discussion of 'digital opportunities' or 'digital divides' (according to optimistic or pessimistic views). Although the focus of this paper is on the agricultural content of rural radio programmes, some involvement in the digital debate is unavoidable. A satellite digital radio network, Worldspace, is already broadcasting over much of Asia and Africa and could reach farmers in any locality if they had the necessary receiver; cost is presently the only barrier. Of more immediate relevance is the increasing flexibility and interconnectivity of digital information technologies. Well-established community radio stations are starting to harness ICTs, e.g. Kothmale in Sri Lanka, set up in 1989, which was connected to the internet in 1998 with funding from UNESCO. In discussing approaches to rural radio, therefore, this backdrop of the 'digital information revolution' will also be addressed in Section 2, to explore the current context of agricultural extension radio programmes and anticipate the implications for future strategies. Section 3 discusses the specific case of six vernacular radio programmes in Northern Ghana to examine how content and training material for agricultural development can evolve. The lessons learned from this experience will then be considered in the context of wider experiences with rural radio and the challenges facing agricultural extension in many developing countries.

2 APPROACHES TO RURAL RADIO

Rural radio is a well understood term. It is relatively jargon-free and self-explanatory but its meaning has changed over time. 'In 1985 the term rural radio usually referred to a division within the national broadcaster that produced programmes in the capital and broadcast them to the countryside. Now *rural* radio is *local* radio' (Girard, 2001: 6). At the most fundamental level it is understood to be a coherent sub-division of radio communication. More specifically it is a geographically descriptive term which acts as a powerful metaphor for the developmental process of connecting people together across remote communities so that they can share their knowledge, information and culture. Rural radio is generally perceived as a force for good, providing both education and entertainment where these might otherwise not exist. However, it is also an unusual term in that no other communication medium is spatially differentiated in this way. In this sense, it leads to a presumption of isolation, of information poverty and a lack of coordination which provides a *raison d'être* for a radio intervention. Most rural radio stations have been established by international agencies, NGOs or governments expressly for development purposes and it is therefore inherently a supplement where other delivery systems are seen to

be failing. The particular experience of agricultural extension systems in many developing countries has led to a review of the approach and a shift to a more advisory and facilitation-based approach (Roling, 1995). The corresponding shift towards more participatory development approaches (Chambers, 1994; Brown et al., 2002) has meant that a greater understanding of community perspectives is required to identify the local resources that can be built on to address local priorities. Similarly, efforts to improve agricultural extension have focused on innovations in communication to improve the points of interaction between research, extension and farmer to encourage a greater sharing of information. This is intended to replace the top-down, one-way technology transfer approach widely perceived to have failed to improve the prospects of most farmers and their rural communities. This section identifies the way that agricultural extension and rural radio have come together to tackle common community development goals.

Experiment or established tool?

Experiments with radio as a communication tool have been going on since the 1940s. According to Mytton (2000), Harry Franklin pioneered broadcasting in indigenous African languages as early as 1941 in Northern Rhodesia to provide news of the war to those whose families were fighting in Somaliland as part of the Northern Rhodesia regiment. The problem he faced was getting receivers into villages because the wireless sets were not portable and required mains electricity. He managed to persuade Ever Ready to manufacture the 'saucepan special' battery set that could be used to power a small low-cost radio that required less electric

power than conventional sets. This proved very successful prior to the introduction of the transistor radio about a decade later. The use of radios across Africa has grown to over a 100 million by some estimates. Table 1 shows the growth in the number of radio sets compared with population growth over the same period. Although the ratio of people to radios remains quite low they have a big impact because so many sets are shared and people listening in groups is common. However, Figure 1 illustrates the regional disparities in Africa; and further national and sub-national variations in radio penetration and use could be identified especially between many rural and urban areas.

As radio technology has developed over the past half-century or so it has been adopted widely in many developing countries, not just in Africa. Radio stations are run by organisations ranging from the government to private commercial enterprises, NGOs and religious organisations. Experiments with rural radio by the FAO began in the late 1960s and by 1969 a Development Support Communication branch had been established within the Information Division to assist with its field activities (Coldevin, 2000). The FAO-funded rural radio stations that broadcast in local languages were initially managed centrally like those state radios run from urban capitals such as Ouagadougou and Bamako (Querre, 1992) and developed in the '90s into more participatory community-based radio stations (Ilboudo, 2000; Fardon and Furniss, 2000). One such community approach was to use 'narrowcasting' technology based on a community audio tower system (CATS), which used karaoke equipment and an amplifier with microphones in a studio linked to a metallic tower with all-weather loudspeakers.

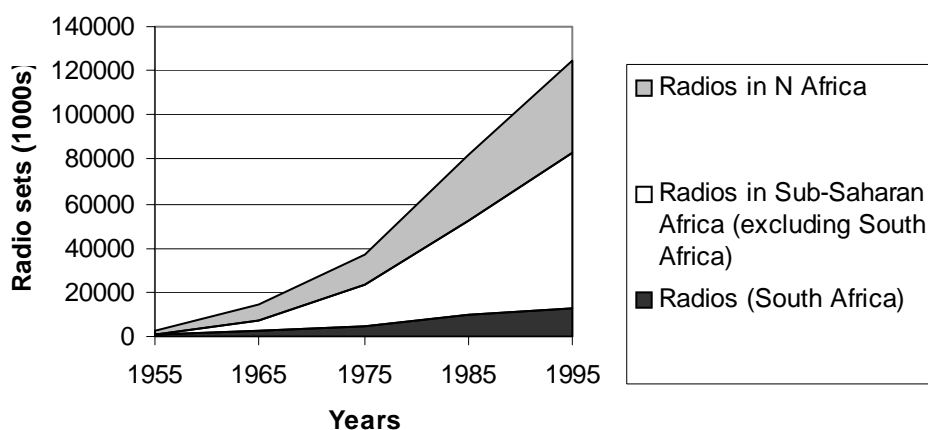
Table 1 Radio sets and population in Africa, 1955–95

Years	1955	1965	1975	1985	1995
Radios in Africa*	1865	11,900	32,600	72,000	111,560
Population *	230,871	293,295	380,238	506,234	663,454
Ratio of radios to people	1:124	1:25	1:12	1:7	1:5

* (1000s) (excluding South Africa)

Source: Mytton (2000), FAOSTAT, (1998)

Figure 1 Radio sets in Africa



Source: Mytton, 2000

Participatory communication and CATS

CATS were installed in the Philippines in the late 1980s and early 1990s by FAO, the United Nations Development Programme (UNDP), UNICEF and the Department of Agriculture. The CATS in Tacunan, a small *barangay* in Mindanao, started in 1992 and can 'narrowcast' over a three-mile radius using a team of local volunteer presenters who form the Community Media Council (CMC). The Council meets to discuss community issues and the programme schedule which is now well established, with health issues on a Monday and farming on a Tuesday, for example. The programmes, such as *Agrikulturang Pangmasa* (People's Agriculture), are presented in the evening between six and seven. Specific agricultural problems affecting the community have been successfully tackled, such as control of banana pests and the problem of the rhinoceros beetle which affects coconut trees (Dagron, 2001).

The CATS have also been used in FAO's multi-media campaigns such as the four-month 'School of the Air' aimed at improving rice production. This campaign used three half-hour presentations a week over a four-month period to provide farmers with information on a range of issues relating to local rice production, including integrated pest management techniques. The programmes were followed up in the community with training using printed materials and field demonstrations. A before and after evaluation of the impact of the campaign was carried out, based on both the rice farmers' knowledge and their use of recommended practices. Amongst the farmers surveyed their knowledge had increased from 55% to 92% and their use of recommended practices from 46% to 68% respectively (Coldevin, 2000). The cost of a CATS is estimated at US\$2000 for the equipment, the studio being provided by the community (Coldevin, 2000). The communities where CATs were installed in the Philippines averaged around 4000 inhabitants all of whom could be reached by the loudspeakers. Experiments have also been carried out in rural communities in Ethiopia, Thailand and Mozambique and have served as catalysts for community mobilisation. This narrowcasting approach is inherently inclusive with no problems about the cost of radio receivers or their batteries to worry about. In less densely populated rural areas such as in many parts of Africa the increased reach of a radio transmitter is needed but the principles of local ownership and control have been well established by CATS. In the case of Maragusan, benefiting from the CATS experience of Tacunan, the transition has been made from a CATS to a fully fledged local radio station and although 'a transmitter makes a difference technology wise... the contents and operational framework remain the same' (Dagron, 2001).

This experience is therefore more than simply an experiment with narrowcasting technologies and has helped to develop the participatory communication approaches that have been adopted by many rural radio stations. An interesting variation of the approach is the village information centre established in the coastal

village of Veerampattinam in Southern India which provides weather bulletins to the fishermen via loudspeakers. The information centre has been equipped with two personal computers linked to email via a spread spectrum mast installed alongside the loudspeakers. An information centre in the nearby town of Vilanur collects information on a range of local issues and regularly updates the village information centre by email, for example, with information on market prices and government schemes. The villagers, in addition to receiving the information announced through the loudspeakers, are also able to make specific requests at the centre which are then sent to the central 'hub' in Vilanur, staffed by personnel trained to search the internet and maintain databases of local information (Chapman and Slaymaker, 2002). The 'hub' and outlying village centres have been established with the help of a local NGO, the M.S. Swaminathan Research Foundation, and support from the Canadian International Donor Agency (IDRC). The FAO is now also investigating the possibility of connecting the network of rural radio stations, such as those established during the 1990s in Africa, to the internet. To many people it is the local focus and participatory communication approach of rural radio that has the greatest potential to harness the internet and other information communication technologies and provide the information intermediary necessary to bridge the 'rural digital divide' (Richardson, 1997; Ilboudo, 2001; Heeks, 1999).

Community participation and empowerment

The strength of rural radio as an extension tool is widely regarded to lie in its ability to reach illiterate farmers and provide them with information relating to all aspects of agricultural production in a language they understand. This does not mean simply reading technical information over the airwaves in local languages, but understanding the way farmers themselves discuss their problems in the community and providing relevant information in the local agro-ecological and cultural context. Extension services have been criticised both for failing to reach the majority of farmers in many developing countries and to communicate successfully with those that fall within range. Rural radio offers both the reach and the relevance to its listeners when the programmes are generated in a community-based and participatory fashion. 'More than any other mass communication medium, radio speaks in the language and with the accent of its community' (Girard, 2001: 6). It is easy to understand the appeal to listeners of having local issues discussed in the 'accent' of the local community. The challenge for international organisations such as FAO has been to use rural radio as an extension tool which can take technical information from the wider agricultural research community and translate it both literally and figuratively into the local language with the most appropriate 'accent' for the target audience. This requires a shift away from simply delivering extension 'messages' and a move towards understanding the local farmers and their knowledge

of the subject in question (FAO/CTA, 2001). The experience of four rural radio stations set up in Kolondieba, Bougouni, Koutiala, and Bla in Southern Mali in 1999 with technical assistance from FAO found that listeners' groups were very helpful. The cotton farmers, in particular, formed groups in order to coordinate their production for the parastatal *Compagnie malienne de développement des textiles* (CMDT) which was a partner in establishing the radio stations.

The radio stations already established in Mali are part of a wider project of community empowerment involving the establishment of over 40 community radio stations between 1995 and 2014. This is part of the government's plans to promote democracy and decentralisation and encourage the formation of community groups such as farmers' organisations. Participation in constructing and financing the stations has been fundamental to their establishment, and the staff and programming committee have all been selected locally by the community. Training in running and managing the stations has been given by the *Centre interafricain d'études en radio rurale de Ouagadougou* (CIERRO). The FAO is providing ongoing training in how to monitor and evaluate the impact of the programmes 'to determine who is listening to what programmes, whether they change their farming practices as a result and what, if any, impact this has on farming, livestock rearing, health and natural resources' (Mundy and Sultan, 2001).

Radio and extension in the wider development context

Radio stations set up in rural areas have a predominantly agricultural clientele. Whether those who run them are pursuing the development objectives of the station's funder or simply aiming to entertain, they are aware that agricultural issues are very high on their listeners' priorities. However, agricultural extension systems have only shifted to more participatory approaches relatively recently and so much of their early efforts used the top-down technical scientific information approach which tended to ignore the diversity of both local agricultural problems and the farmers' existing knowledge and skills. Other social development sectors, such as health and education, have been more effective, using rural radio to communicate messages to a target community or a specific demographic group. In many areas radio stations have become highly valued for interacting with specific disadvantaged groups and for handling complex social problems. Youth radio, for example, has emerged as a powerful tool for international organisations promoting the UN Convention on the Rights of the Child, encouraging children to participate in and produce programmes on issues that are important to them. The Hatemolo Radio Programme in Nepal encourages disabled children to share their experiences and produce radio programmes about them to encourage others. The children arrange the programme schedule, develop ideas and scripts, and produce the shows (Communication Initiative, 2002).

The Soul City project in South Africa is probably one of the best known multi-media approaches to

tackling complex social development problems such as violence against women, HIV/AIDS and other health issues. Central to Soul City is a television programme combining education on HIV with an entertaining soap-opera-style format. The educational messages are then followed up through a series of radio discussion programmes called Healing Hearts which are broadcast in nine languages on regional radio stations. The stories are serialised in ten newspapers in two languages, and 2.25 million booklets are distributed in national newspapers and to community-based projects. The characters from the TV show are also used in a range of different formats from school books to comics and adult information materials (Dagron, 2001). This multi-media approach is based around a process of 'edutainment' which aims to encourage public debate about health issues rather than simply dictate messages. It is useful, therefore, to consider the use of radio as an extension tool for agricultural development in this context of wider social development concerns. There is however a political dimension that should be explored, although by necessity only briefly here, before considering the use of radio in agricultural extension more specifically.

Rural radio in many countries has been promoted as part of a broader process of democratisation. The development of decentralised and pluralistic media also corresponded to many of the objectives of the World Bank's structural adjustment policies aimed at reducing state monopolies and encouraging privatisation. The process of achieving radio pluralism, however, has not always been smooth. In Burkina Faso, rural radio stations established in the '70s and '80s with German funding broadcast in 17 recognised indigenous languages (*langues nationales*). However, with the political coup and the end of funding, the stations became unsustainable. The FAO continued to provide technical assistance during the 1990s but the political context meant that the rural radio stations remained constrained by their links to the state radio and limited statutory authority. More recently, the Ministry of Communication and Culture has attempted to provide a comprehensive regulatory framework to enable the private, rural and state radio stations to coexist (Nombré, 2000). Similarly, in Benin, the problems with establishing five community FM radio stations (*radio rurale locale*) in Lalo, Ouèssè, Banikoara, Ouakè and Tanguiéta were more political than financial. Very basic equipment was used consisting of a small studio, transmitters and solar panels with batteries that contributed to a very low cost of installation. The stations were intended to broadcast on FM with a range of up to 100km in two languages each to cover large rural areas where there is considerable linguistic diversity. However, problems arose, for example in Tanguiéta as the choice of languages, staffing of the station and even its location all became political issues (Grätz, 2000). Effective legislation enshrining the decentralisation of political authority and liberalisation of the media needs to correspond with a community management structure that avoids local radio stations being constrained by local political disputes rather than

fulfilling their intended role as agents of democratic change. In many countries, such as India, rural radio stations are not permitted to broadcast independently of the state broadcasting authorities.

Use in agricultural extension

The FAO developed the Strategic Extension Campaign (SEC) methodology in many countries of Africa, Asia and Latin America in order to support the local extension agents in their work whilst also harnessing the multimedia tools available to encourage greater community participation. Various media were employed including local radio, posters, local theatre, audio-cassettes, comics and silk-screened printed materials. The radio slots were used strategically to advertise the key messages of the campaign and target particular listeners' groups. For example, the campaign in Malaysia, in collaboration with the FAO's Inter-Country Programme on Integrated Pest Management in Rice in South and South-East Asia focused on rat control. Based on a survey of the extent of the problem and focus group discussions on approaches being used to tackle the problem the campaign began in 1985 with a series of training workshops for the core group responsible for the management of the SEC. The multimedia materials were then designed and tested with specific strategies and channels of delivery chosen to have the maximum impact. The radio in this case was used to discourage the use of a particular poison, zinc phosphide, in preference to a safer wax and dust poison, easier to use and more effective. This was followed up with a portable flip chart and booklets used by trainers for physical control methods and group discussion, including religious leaders' sermons. A follow-up evaluation in 1987 showed that the number of farmers using zinc phosphide fell from 92% to 40% and the number of farmers reporting total damage from rats fell from 47% to 28%. The use of the alternative poison dust and baits recommended by the campaign rose from 14% to 58% and 31% to 94% respectively. Although successful, the campaign was expensive at over \$140,000 (approximately \$1000 per person) with over 50% being spent on multi-media materials and the rest on training field personnel which involved 34 people in five workshops for a total of 32 working days (Adhikarya, 1994). This compares to the current perception that rural radio can function as a low-cost educational tool. The World Health Organization (WHO) estimated that HIV/AIDS educational programmes in developing countries carried out through mass media such as television and radio ranged in cost from only 0.041 to 0.07 US cents per person (Bouhafa, 1997 in Myers, 2000).

Simli or 'friendship' radio operating in Northern Ghana was established with assistance from the Danish Community Development Programme. The radio broadcasts in Dagbani and Gonja have a range of approximately 60km including West Gonja, Tamale, Savelugu/Nantong and parts of West Mamprusi and Gushiegu/Karaga districts in the Northern Region. The station provides a mix of entertainment – music, drama and news – and discussion programmes on local issues

aimed at tackling community development problems. Its educational and extension role is well established through the development of local schools where the teachers are trained to integrate specialist broadcasts into the curriculum. Teachers also use recorded cassettes of programmes for special classes to encourage the local adult population, including farmers, to improve skills such as basic literacy. Agricultural extension programmes are prepared by trained community radio agricultural extension officers. Their role is to visit farmers in the community, discuss their problems and priorities, then prepare a series of discussions with local experts, a drama or a combination of techniques including interviews with farmers in the field. The programmes are felt to be far more accessible to local farmers if they can hear themselves or their neighbours discussing the issues directly on the radio. Norrish (1998) has observed that, 'it is no longer considered good enough for media professionals to isolate themselves from the audiences they are supposed to serve.' In order to achieve a level of farmer participation the radio extension officers have to spend at least 12 days a month recording out in the villages, spending the rest of the time editing in the studio with the producer, tracking down specialists from the district offices of the Ministry of Agriculture, regional universities and local NGOs, and researching the programme topics.

The rural radio stations Radio Mampita and Radio Magneva in Madagascar are credited locally with the introduction of new agricultural techniques. Local associations were encouraged to become members of the *Conseil d'administration* in order to participate in the running and funding of the stations. Although the government issued the FM licences for free the stations are only partially funded by donors and commercial advertising revenues. Members from the community-based peasant associations were expected to pay *Francs Malgaches* (Fmg) 50,000 (US\$8) or 60kg of rice per year to join the *Conseil d'administration* with individuals paying Fmg5,000 for a one minute message but half

Box1 Gender-differentiated programming

Farming programmes do tend to be relevant to a broad swathe of the community including both men and women. In many communities, however, there is a clear division of labour, with well defined roles for men and women in terms of the crops they grow and the activities they are responsible for. In rice production in Ghana, for instance, women are predominantly involved in the harvesting, winnowing, manual de-stoning, parboiling and marketing. Men are predominantly responsible for the land preparation, sowing, water management and weeding; and the household may join together for certain tasks such as threshing and transport. Radio extension programmes, therefore, need to be prepared and broadcast in a way that makes them accessible to the target audience. This will require consultation with the community to identify not only the different subject priorities of men and women but also the timing of the broadcasts including any meetings of listeners' groups or follow-up training, to fit in with work and household schedules. Radio Peace in Southern Ghana broadcasts to the women's cooperative on issues such as fish processing and marketing but on Tuesdays, for example, programmes are targeted at the fishermen who stay ashore in Elmina port to repair their nets.

that if they were members of an association that had joined. This cost recovery mechanism has not proved very successful but the agricultural programmes broadcast mainly in the evenings are popular. The local language issue is also not so much of a problem in Madagascar as elsewhere in Africa because the majority of the population understands a single national language, Malagasy. The monitoring of local livestock thefts has also resulted in a dramatic increase in the number of livestock recovered (Dagron, 2001). Rural radio has also been credited with preventing conflict between farmers and pastoralists in Mali where farmers have been able to inform the local radio station when their fields will be harvested and become free for browsing by migrating herds of cattle (Myers, 2000).

Partnerships and networks

One of the difficulties of operating a schedule of agricultural extension programmes on rural radio is accessing agricultural research material to support the range of topics requested by farmers. The International Service for National Agricultural Research (ISNAR) aims to improve the linkages between agricultural research and rural radio in Ghana, Mali, Uganda and Cameroon in a collaborative project with the University of Guelph and FAO. The Developing Countries Farm Radio Network (DCFRN), a Canadian NGO, is also a partner in the project which helps community radio broadcasters to share their experiences and provides training in scriptwriting. Agricultural researchers and radio broadcasters are being brought together to improve the planning, preparation, format and evaluation of their extension programmes. The collaboration between a wide range of partners involved in farm radio broadcasting is intended to be a capacity-building exercise which will provide the stations with additional tools to improve the impact of their programmes (Hambly Odame and Kassam, 2002). The FAO is also collaborating with the World Association of Community Broadcasters (AMARC) to develop training programmes for community radio broadcasters (Ilboudo, 2001).

A further benefit of networking is the ability to share programme material and ideas. The international NGO, PANOS, maintains a database of radio programme materials obtainable on cassette or via the internet for community radio stations to use directly or translate and assimilate into local programmes. UNESCO and Danida helped to set up small networks such as the Tambuli network of 20 community radio stations in the Philippines in the 1990s. Providing communication between remote stations and wider networks is often the greatest challenge (Dagron, 2001). Mytton (2000) points towards the future of satellite-based networks and the potential of digital audio broadcasting (DAB) which is already a reality in many developing countries. Apart from reaching the many rural areas that are not served by rural radio due to the lack of a terrestrial FM network, satellite-delivered digital radio can be used to provide large quantities of programme material to existing stations relatively cheaply. The use of the internet as a networking tool is being tested by

the FAO both for rural radio and for extension services more generally such as through the Farmnet and Vercon concepts (FAO, 2000a,b). The considerable store of information available on the internet and the speed at which information can be shared between networks of people and institutions offers the potential to rapidly increase the availability of information on international agricultural research and community development experience in many developing countries. Many developing countries also have a considerable amount of public information that could be made more accessible nationally using the internet. To benefit from this potential effort needs to be focused on improving the user interface, adapting ICTs to provide low-cost applications that suit the local physical (geography, climate and infrastructure) and cultural conditions. Many of the lessons of harnessing rural radio through more participatory communication approaches could also be applied to the presentation of information through the internet. Contrary to some expectations the internet has not undermined radio as a communication medium but in some ways offers real opportunities for enhancing the role that existing community radio stations play as the local voice of a decentralised people-centred communication network. In the meantime, 'in most of the world radio is still the medium of choice and offers the greatest potential for serving farm and rural populations' (Hilliard, 2001).

3 GHANA CASE STUDY

A long-term research programme, 'Resource degradation in sub-Saharan Africa: policies to support sustainable soil fertility management and soil and water conservation among resource-poor farmers in semi-arid areas', was completed in 2000 with the publication of three volumes, two in English and one in French (Blench and Slaymaker, 2001a,b,c). This was a collaborative project between six African countries² and the Overseas Development Institute (ODI) UK, funded by the Department for International Development (DFID). The wrap-up workshop on soil and water conservation (SWC) techniques was organised by the University for Development Studies (UDS), Tamale, as one of the partner institutions. As a consequence, there was considerable discussion about the best method of disseminating the findings of the study to farmers, given the problems of the extension services in the partner countries.

Box 2 Programme content and the farming cycle

The experience of agricultural extension at Simli Radio has shown that the most popular programmes are those that can provide farmers with a direct income-earning opportunity. This frequently involves discussion and training on topics that help to combine growing traditional crops with a supplementary activity that does not require high levels of investment or risk in terms of ceasing existing activities. Specific examples of popular programmes have been on bee-keeping, rearing grass-cutters and giant snail production especially for sale to customers in the south of the country. These additional extension programmes are most popular during the dry season when farmers have the time to consider alternative strategies. During the cropping season specific advice is preferred on the full range of crops being grown locally, timed to coincide with the various stages of land preparation, planting, weeding, water management, harvesting and marketing.

Despite the breadth of experience with rural radio mentioned above, few African countries have experimented with transmission in minority languages; usually the national language or the dominant regional language is used or else minority language broadcasts (on AM) are simply translations of centrally-approved government broadcasts, as in Nigeria. For this reason, messages often do not reach the very audience they are intended to influence (Ansu-Kyeremeh, 1992). However, Ghana has taken the innovative step of setting up FM stations for minority communities in the North, communities that are excluded in many countries wealthier than Ghana, such as Nigeria. In Northern Ghana, the use of FM radio for broadcasting development-oriented programmes started in the early 1980s with the establishment of the Upper Region Radio (URA) Station at Bolgatanga which had the responsibility of broadcasting development messages in local languages to the people of the Upper East and Upper West regions of northern Ghana. In 1997, a second FM radio station, Radio Savanna, Tamale (RST), was established through collaborative efforts between Ghana Broadcasting Corporation (GBC) and the Non-Formal Education Division of the Ministry of Education. The RST, like URA, broadcasts mainly in local languages, Dagbani and Gonja. It covers almost all the Northern Region with the exception of Saboba/Chereponi, East Mamprusi and Zabzugu/Tatale districts. More recently still, broadcasts have begun in the Upper West region, transmitting from Wa. The task of these stations is to use a participatory approach to broadcast development messages and non-formal educational programmes.

Apart from the national network, GBC, other radio stations, especially in the regions, devote considerable air time to agricultural topics. One of the early examples of using rural radio for agricultural extension was the Wonsuom project. This was a grassroots development communication project in Swedru District, managed by the University of Ghana Communication Department and funded by UNESCO, started in 1983 (Obeng-Quaidoo, 1988). The project covered 18 villages and towns with a combined population of 90,000. According to 2000 estimates, Ghana has 18 FM and three short wave radio stations, with a total of about 4.4 million radios in use. This means that a sizable part of the population (currently 18.5 million) is exposed to radio broadcasts daily. Vernacular radio also exists in large urban centres in the south, but these are commercial stations which do not necessarily see rural development as their mission.

Given this unusual situation, the team decided to experiment with vernacular broadcasts in six local languages to extend the reach of the messages emerging from the study project. The core of the programme was to be a drama. A skeleton script was written then six acting troupes discussed it and adapted the text and situations to culturally appropriate forms for each language group. The programme was produced in a magazine format, featuring drama, topical talk and discussion, interspersed with jingles and traditional music. An hour-long draft was designed by a

collaborative team from UDS and ODI in February/March 2001 and copies were distributed to the radio producers in Tamale and Bolgatanga, as well as to extension workers and NGO representatives who were all involved in producing the programme and identifying suitable farmers' groups. The local languages chosen are spoken in Northern Ghana (Dagbani and Gonja at Radio Savanna, in Tamale, Northern Region, and Kusaal, Kasem, Gurune and Buli at Upper Region Radio, at Bolgatanga, Upper East Region). The programme was about an hour long and contained information and advice on the importance and practice of SWC methods. It was broadcast three times in each language during March and April 2001.

Programme design

The programme was designed to combine music and drama with information from the presenter and SWC topics discussed by a panel. The drama script was prepared in outline by representatives from the UDS Faculty of Agricultural Engineering and a local NGO, Trax. The story featured male farmers discussing SWC on their land with each other and their wives. A man from the village tries to explain how to reduce the risk of soil erosion using such techniques as contour ploughing to reduce water run-off from sloping land and the importance of preserving and planting trees. Scepticism amongst the farmers is used to air various points of view about a range of conservation techniques such as using organic fertilisers or green manuring, reduced bush burning, control of chemical inputs for cash crops and migration strategies. The drama presents an extension officer and an educated farmer being challenged by farmers as to why they should change their current practices. Although light-hearted the drama shows the tensions inherent in sharing information in a local context, for instance what level of trust can be afforded to certain individuals by their peers and the status of such as extension agents. The issues explored in the drama are shown in Box 3 but more importantly, by capturing agricultural issues in an entertaining format, the programme aimed to highlight the importance of sharing information in farming communities and recognising that there are various channels of information available locally. The local extension service, university, NGOs and local farmers all took part in the discussions after the drama was broadcast to help build on its themes and explain to listeners who they should contact for more information.

Box 3 Programme messages

- Be aware of the dangers of bush-burning.
- Consider alternatives to chemical fertiliser such as animal manure and green manure from plants.
- Agroforestry can help to improve soil fertility and prevent erosion. Protect and plant trees where possible.
- Be aware of the dangers to the long-term soil fertility of the land of growing cash crops.
- Consider investing time in farm improvements using soil and water conservation techniques rather than migrating to urban areas for short-term work.

The drama script was adapted locally by the producers responsible for each of the six local languages to ensure the characters' names and phraseology were suited to the target audience. The story line and themes remained the same but the approach taken by the performers was specific to the language and group in question. The performance in Dagbani that was repeated for the final evaluation workshop, for example, exploited the comic elements of farmer scepticism over suggestions that a neighbouring farmer might have learnt something that could also be useful to him. The female role in village-level information transfer appeared to be a topic relished equally by the performers and audience alike.

Obviously, it is easier to make such programmes than to ensure they are having the intended impact. For this reason it was decided to use a sample survey to try and establish farmers' understanding and impressions of the broadcasts. The rest of this section describes the methods used to measure impact, and the results of the survey.

Audience research methods

The impact of the radio programme on the listening public was estimated using a sample survey. Groups of ten farmers were interviewed before the first transmission to create a baseline and to assess the level of their knowledge of and attitudes towards SWC. The farmers were selected with the assistance of officers of the regional extension service and NGOs working with farmers on SWC problems. The criteria for selection were that the farmers regularly listened to the radio (not necessarily their own) and that farming was their primary occupation. These farmers were then specifically requested to listen to the programmes. At the end of the farming season, the impact of the radio programme was measured again, this time by going to the field, to see if the farmers had actually applied the knowledge gained through the programme to their crop cultivation practices.

The study was conducted during the 2001 cultivation season in six districts in the Upper East and Northern Regions, chosen because the main language groups in northern Ghana are spoken there. The baseline study was carried out in Yapei, West Gonja (language, Gonja), Tolon, Kumbungu (language, Dagbani), both in Northern Region. In the Upper East Region it was conducted in Bolgatanga (language, Guruni), Navrongo, Kasena Nankana (language, Kasim), Binabu, Bawku East (language, Kusaal) and Wiaga-Kondoma, Builsa (language, Buli). A total of 60 farmers were selected, 10 for each language.

Semi-structured questionnaires were used to collect the relevant data on demographic characteristics, radio audiences, use of chemical inputs, use of organic materials and alternative methods in agriculture, production problems with cash crops, and attitudes toward SWC practices. Questionnaires were administered thrice, the first set being the baseline study carried out prior to the broadcasts, in March 2001. Following the broadcasts, in June 2001, a second set

of questions was administered to the same farmers, to assess the impact of the programme and how well they understood the content. The final questions were administered after the harvest (October/November 2001) in order to estimate how many of the interviewed farmers actually applied advice from the radio programme on their farms.

The broad objectives of the study were:

- to identify target communities where farmers follow radio broadcasts in their local language;
- to assess the general level of knowledge about SWC methods prior to the broadcast;
- to discover what level of knowledge or understanding of SWC had been gained from the radio programme immediately after the broadcast;
- to gauge the extent to which farmers enjoyed the programme format and felt the information was readily accessible.

Demographic and socio-economic characteristics profile of the farmers surveyed

The average age of the farmers was 47 years (the range was 25–70). Only one of the 60 respondents was female. The great majority were married (85%). The average number of dependants in the respondents' households was eight, the minimum three and the maximum about 20. The main occupation was farming (96%). Other occupations mentioned were bicycle repairing (men) and teaching and trading by the only female respondent. More than 60% had no formal education, 18% had completed middle school, and 5% attended some form of adult education. All the farmers interviewed said that they listened to the radio regularly, and some 58% owned radio sets, the rest relied on their friends or neighbours. The average income of farmers involved in the study was estimated at about 160,200 cedis per month (US\$23 in 2001).

Those involved in the radio study were mostly small farmers growing food crops such as groundnuts, maize, rice and millet. Other crops included sorghum, yam, cassava and cotton. Most farmers were growing four or more crops. The size of farm plots was relatively small and most of the farmers (71%) relied on family labour for cultivation, the other 29% using a combination of extended household and family labour. The majority (85%) cultivated less than 4 ha of land for their household needs. About 48% of the respondents said that they did not see any problems in cultivating cash crops. However, about 52% stated that those who farmed cash crops were still poor and had to sell their cash crop in order to buy food. They also said that those farmers cultivating cash crops ended up destroying the fertility of soil on their farms.

Most of those interviewed considered SWC to be important and some were actively practising many SWC techniques, ranging from tree planting to compost making. The majority of the farmers stated that bush burning was not beneficial, while many considered that even non-economic trees should be left on the farms. Asked about the benefits of having trees, the farmers observed that they acted as wind breaks,

provided organic matter, fruit, shade, fodder, etc. Surprisingly, many farmers believed that chemical fertiliser is actually harmful to the soil. This may be attributed to the rapid deterioration of the soil under cash crops such as cotton, where heavy fertiliser rates are normal. The respondents were of the view that the use of organic rather than chemical fertilisers should be encouraged.

Farmers' reactions to the radio programme

In June 2001, after the radio programme had been transmitted, the same target audience was questioned about the content of the programme and their level of understanding of SWC matters. Three-quarters of the respondents said that they understood the programme well, while some 7% were less confident. The results are presented in Table 2.

Responses	Frequency (n=60)	%
Understood well	45	75.0
No response	8	13.3
Understood but not well	6	10.0
Had little understanding	1	1.7

Asked if they believed the messages of the radio programme were true, 83% replied affirmatively, while 17% would not answer the question. As to which part of the programme they enjoyed most, farmers ranked the various parts as follows (Table 3).

	Frequency (n=119*)	Ranking
The drama	41	1
The talk	31	2
The conclusion	15	3
Music	11	4=
The introduction	11	4=
The jingle	8	5
All	2	6

*Respondents were permitted more than one response

They seem to have particularly enjoyed the drama. Asked about the main messages in the programme, they gave the answers listed in Table 4.

	Frequency (n=89)	Ranking
Proper soil and water conservation practices	34	1
Importance of tree planting	15	2
The use of animal manure	12	3
Prevention of bush burning	10	4
Agro forestry and organic farming	8	5
How to make compost	3	6
Proper way of farming	5	7
Proper land preparation methods	1	8=
The use of crop residues as organic matter	1	8=

All the broadcasts went out in the afternoon, between 4 and 5 p.m. Most of the respondents (78.3%) agreed that this was suitable, but if given a choice, they would have preferred the evening, between 7 and 9 o'clock.

In order to ensure that the farmers were not simply seeking to please the interviewers by giving only positive responses, two questions were asked inviting negative views about the importance of the programme's topics (Table 5 and Table 6).

	Frequency (n=60)	%
Strongly agree	1	1.7
No response	3	5.0
Not sure	9	15.0
Agree	13	21.7
Strongly disagree	16	26.7
Disagree	18	30.0

	Frequency (n=60)	%
Agree	3	5.0
No response	4	6.7
Strongly agree	6	10.0
Not sure	7	11.7
Disagree	13	21.7
Strongly disagree	27	45.0

To outsiders, it may seem evident that farmers should practise SWC measures; with access to worldwide data, the deleterious effects of any other strategy are all too well-known. But real farmers live in a world of limited capital and labour resources; and in an individual household, the expenditure on these may not justify the return. Despite these constraints the results indicate that the majority of the respondents had a genuine commitment to the importance of SWC.

Final evaluation results: situation at the end of growing season

At the end of cultivation season, in the second half of October 2001, interviews with the same respondents were carried out, followed by visits to farms to determine how much of the advice given by the radio programme was actually applied. The answers regarding the major areas covered by the programme are presented below.

All the farmers interviewed were aware that bush burning is a harmful practice. But the radio programme had reinforced their decision not to burn. Asked why they considered it harmful, after listening to the radio programme, farmers mentioned that it damaged the soil (44%), destroyed the grass used for roofing the local houses (5.6%) and killed trees (5.6%), while others mentioned that keeping from burning enriched the soil (16.7%), and conserved soil and water (5.6%) which showed they understood the programme's messages about bush burning. This basic message that limiting bush burning where possible is consistent with SWC techniques is one which the discussion panels were able to develop in greater detail.³

About 61% of farmers did not cut the trees on their farms, while about 33% did, to create more space for food crops, for fuel wood, rafters, etc. Of the farmers who confirmed that they cut the trees on their farms, about 38% said that they also planted them. Those who did not plant trees gave as the main reasons scarcity of land, insecure tenure, lack of seedlings and destruction of young trees by animals. The radio programme had had some influence on 94% of the respondents regarding their decisions whether or not to cut trees on their farms in future.

Conclusions

The respondents, in general, liked the radio programme, and the parts that they enjoyed most were the drama and the group discussion between the presenter, extension agents, NGO representative and the invited farmers.

Understanding of soil and water conservation practices, agroforestry and organic manuring seem to have improved after listening to the programme. If similar programmes were to be transmitted regularly, they could be used as an educational tool, especially in the area of agroforestry, where farmers stated that there is a lack of information. Bush burning was recognised as a negative practice by almost all the respondents, even before the programme was transmitted. The broadcast has, however, increased the farmers' resolve to reduce this practice on their own farms and in the immediate environment.

It can be concluded that the radio programme was well received by the target audience, and the format in which it was presented was popular and easily understood. The vernacular used in the broadcast was also very important; this aspect made the programme immediately acceptable. Drama, which formed a large part of the programme, also contributed to its popularity. Almost any type of information and advice can be prepared for radio transmission. However, the timing, sustainability and continuity of these types of programmes must be taken into consideration for future work. The programme would have had even more effect if continued over several cultivation seasons. The broadcasts should be timed to coincide with the start of the farming season and repeated at regular intervals, i.e., once or twice monthly, until harvest time.

4 IMPLICATIONS FOR DEVELOPMENT

Policy issues

Rural radio has developed over the years into a well-established tool for both community empowerment and improving the information and communication capacity of remote rural populations. The developmental potential of rural radio is recognised by international organisations, NGOs and governments alike through a wide array of sectoral foci. Efforts to improve the transfer of knowledge for agricultural development have been concentrated for some time on improving the information interface between researchers, extension agents and farmers. The experience of the vernacular radio programmes on soil

and water conservation described above illustrates the type of interaction which can be achieved with farmers living in remote rural communities through the use of carefully designed content. In an era of rapidly developing information and communication technologies rural radio is a powerful mechanism for linking old and new technologies, providing information resources cheaply to those who need them most to improve their livelihoods, whilst at the same time strengthening existing resources of knowledge, enterprise and cultural identity.

Changes in the structure of agricultural extension services worldwide have led to an increased emphasis on demand-driven, participatory and pluralistic mechanisms of information and technology transfer. Extension services are increasingly expected to encourage and facilitate farmer experimentation and enquiry. This corresponds to a shift towards more democratic and decentralised government frameworks within which private sector and market based service delivery mechanisms can operate. The political and technological climate is therefore conducive to rural radio and agricultural extension continuing to grow and link together as part of wider development strategies. However, in order to build on the current positive but often fragmented experience a more comprehensive policy framework will need to be established, including the following:

- national communication and media strategies that incorporate pluralistic approaches to media within the more traditional centralised broadcasting and information systems;
- up-to-date sociolinguistic analyses of the numbers and geographical dispersal of minority languages with potential for broadcasting;
- ICT strategies that constantly explore how technological advances can best be integrated into all national broadcasting, government and research networks over the medium to longer term;
- legislation and initial subsidies to support the establishment of independent community radio broadcasting;
- streamlined licensing and bureaucratic procedures for information services such as local FM stations, internet service providers and rural telecommunication services;
- mainstreamed information and communication development strategies in cross-sectoral budgetary planning processes such as PRSPs.

Mainstreaming the development of local broadcasting networks into cross-sectoral budgetary planning will be essential to cover both short-term infrastructure expansion costs and long-term sustainability. Many rural radio stations are reliant on external donor funding for their existence and longer-term survival. This is likely to continue in the foreseeable future due to both the limited incomes and relatively low population densities of many rural radio audience catchments. However with increased networking and innovative approaches to harnessing new flexible information sharing technologies, local programming could benefit from a wider range of

materials that can be integrated cheaply into local programmes. A strategy attempting to create isolated, financially self-sustaining, community-based radio stations in the world's poorest villages is an unrealistic application of the hegemonic privatisation paradigm. Efforts to privatise agricultural extension should not necessarily include those extension services that are being provided by rural radio. Rural radio should represent the sort of legitimate low-cost, high-impact expenditure that governments and donors continue to support with the savings afforded by the rationalisation and privatisation of public services in other areas.

5 CONCLUSIONS

The importance of providing a long-term strategic approach to the establishment of rural radio networks can be seen to be threefold. First, the legal framework setting out the constitutional authority for the operation of independent broadcasting is a fundamental requirement still required in many developing countries. This coincides with the political project of international democratisation and decentralisation of power and control as a means to improve governance structures in general. Second, cross-sectoral budgetary planning will increasingly be a prerequisite for international donor funding in developing countries. National strategies that allow for the combined development impact of rural radio across a range of sectors such as health, education and agricultural extension could help to ensure the longer-term sustainability of local broadcasting through more stable and longer-term funding; and a rational expenditure schedule that corresponds to the regional spatial and sectoral priorities for cross-sectoral development. Finally, the coordination of technological developments and information network integration needs to retain local autonomy whilst ensuring the full potential of the technology available is harnessed. Digital satellite radio receivers, for example, are presently too expensive (around \$100) to be used individually by farmers but could be employed strategically by the rural radio networks and extension services to maximise information sharing. Without comprehensive national strategies the reliance on state-run information networks could be replaced less by community-based, participatory communication than by the information networks of the even less relevant international mass media.

There is an interesting combination of approaches in the use of rural radio for agricultural extension. On the one hand they are locally focused, using indigenous knowledge to build on local cultural and agro-ecological diversity. On the other hand there is an inherent didactic, progressive, developmental aspect that reinforces external cultural priorities by embracing change based on technical and scientific knowledge. Historically, agricultural extension has often failed to communicate technical information to farmers in a way that has enabled it to be adopted locally. The combination of approaches encapsulated in the best examples of rural radio based extension strike an effective balance between indigenous and scientific approaches to agricultural development. There are,

however, likely to continue to be considerable challenges in the future in providing farmers, extensionists and radio broadcasters with the training and skills to manage the burgeoning information supply for practical poverty-reducing outcomes. In the midst of a digital revolution a pragmatic focus on increasing access to community radio by small-scale farmers in areas with little or no electricity and no formal experience of the extension service would go a long way towards improving agricultural development and rural livelihoods in many developing countries.

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ENDNOTES

- ¹ For a discussion of ICTs see Chapman, R. and Slaymaker, T. (2002) 'ICTs and Rural Development: Review of the Literature, Current Interventions and Opportunities for Action'. ODI Working Paper No. 192. www.odi.org.uk
- ² Ghana, Senegal, Tanzania, Uganda, Nigeria and Burkina Faso.
- ³ There are a number of political, cultural and agro-ecological considerations surrounding the topic of bush burning that are discussed in detail by Amanor, K. (2001) Discourse coalitions and the politics of fire in Ghana. Unpublished draft.

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Rural radio in agricultural extension: the example of vernacular radio programmes on soil and water conservation in N. Ghana. R. Chapman, R. Blench, G. K. Berisavljevic, A. Zakariah. *Geography*. 2003. i. 105. 10. Assessing the Potential of Local Radio for Agricultural Communication in Ghana. 1. 1. PDF. Save. Alert. Cite. Research Feed. Radio agricultural programs are timely and can extend message to target audience irrespective of location, socio economic issue, topography and distance (Omenesa, 1994). Radio programs has been used for dissemination of agricultural information for better farmers performance (Enitan, 1988) both in developed and under developed countries. *Multidisciplinary Journals* www.multidisciplinaryjournals.com. 48. Rural radio in a agriculture extension: The example of vernacular radio programs on soil and water conservation in N.Ghana. *Agricultural Research and Extension Network(AgREN)*. Network Paper No. 127. Agriculture Extension Tools Computers and Community Radio Outline SimCorn: A Software Designed to Support Site-Specific Nutrient Management for Farmers of Small Parcels in the Tropics Rural Radio in Agricultural Extension: The Example of vernacular Radio Programmes on Soil and Water Conservation in N. Ghana. Bandwagon effect. Times of Crisis High Demand Farmers prosper or fail as a group Blanket Fertilization. Many types of soil, but everybody uses the same amounts/types SimCorn the goals Precision Agriculture Empower farmers. (2003). Rural radio in agricultural extension: the example of vernacular radio programmes on soil and water conservation in N. Ghana, Overseas Development Institute. Jayade, K.G. (2014). Impact of ICT and Mobile Technology in Agriculture in Maharashtra, *International Journal of Emerging Technologies in Computational and Applied Sciences (IJETCAS)*. TCRA. (2011). Reaching to Rural (R2R). Connecting the rural Tanzania through Tele centers, Report on Joint Impact Assessment, Services Need Analysis and Designing Business Model Towards Developing A Sustainable Network of Tele centres in The United Republic of Tanzania. World Bank (2011). *ICT in Agriculture: Connecting Smallholders to Knowledge, Networks, and Institutions*.