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INTEGRATING INDIGENOUS AND EXOGENOUS COMMUNICATION CHANNELS AND CAPABILITIES THROUGH COMMUNITY-BASED ARMYWORM FORECASTING

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ABSTRACT

Many development interventions have failed to generate the desired impact among African resource-poor farmers for reasons including the centralised and top-down approach, lack of active community participation, and over-reliance on external information and technology delivery strategies and channels. The migrant African armyworm, *Spodoptera exempta*, is among the major challenges threatening livelihoods of millions of farmers in East and Southern Africa. Outbreaks occur suddenly and can devastate crops and pasture. National and regional forecasting services have been operational since the 1960s to provide warning of potential outbreaks. This system relies on information from armyworm moth traps usually operated at district level. These centralised services have a number of difficulties and limitations which include: delays in communicating trap catch data to the forecaster; forecasts are not village specific; forecasts do not reach many farmers; lack of responsibility and local ownership of traps. An innovative approach called community-based armyworm forecasting (CBAF) was developed as a response to these limitations. The new approach has been piloted and tested in several East African countries and found to be effective. CBAF establishes a system that allows each village to have its own traps and trained forecasters who collect and interpret data, and provide village specific forecasts. A recent project on CBAF piloted the approach in 10, 5 and 39 villages of Malawi, Zimbabwe and Tanzania, respectively, in the 1st year, and in a further 25 and 38 villages of Malawi and Tanzania in the 2nd year. Discussion with stakeholders, field observations and assessments conducted by the authors indicate that the initiative has generated a number of benefits. It built local capacity, and because of the location specific early warning it enabled farmers to combat the pest more effectively. It was noticed by the authors that local communication channels and folk media play an important role in CBAF, complementing and enhancing the effectiveness of exogenous channels. This paper discusses how CBAF makes effective use of different communication channels and capabilities, and highlights preliminary results.

Key Words: Armyworm, communication, folk media, forecasting, informaton flow

RÉSUMÉ

Tant d'interventions de développement n'ont pas pu générer un impact satisfaisant parmi les fermiers africains sans resources pour de raisons multiples, dont l'utilisation de l'approche coercitive et centralisée, le manque d'une participation active de la communauté et le fait d'avoir plus d'attachement aux informations, aux stratégies et guides externes de vulgarization de technologies. *Spodoptera exempta*, une chenille aussi nommée "chenille africain migratrice" est parmi les contraintes majeures aux moyens de subsistance de milliers de fermiers d'Afrique orientale et australe. Son éruption est soudaine et peut dévaster des cultures ainsi que des pasturages. Les services nationaux et régionaux de prédiction étaient opérationnels depuis 1960 pour fournir des alertes sur des irruptions potentielles sur base d'informations collectées sur des pièges tendus aux chenilles au niveau du district. Ces services centralisés présentent un bon nombre de difficultés et limitations entre autre, le retard dans la communication des données de

pièges au prévisioniste, le manqué de spécificité des prévisions, la lenteur dans la livraison des prévisions aux fermiers, le manque de responsabilité et d'appropriation locale de ces pièges. En réponse à ces limitations, une approche innovatrice appellée prédiction des chenilles au niveau communautaire (CBAF) était initiée et testée dans plusieurs pays d'Afrique de l'Est. Cette approche s'était avérée efficace à point qu'il avait permis à chaque village d'avoir ses propres pièges et des prévisionistes formés pour la collecte et l'interprétation des données ainsi que pour fournir des prévisions spécifiques aux villages.Un projet recent sur CBAF avait exécuté cette approche dans 10, 5 et 39 villages de Malawi, Zimbabwe et Tanzanie, respectivement, dans la première année, et dans plus de 25 et 38 villages de Malawi et Tanzanie au cours de la deuxième année. Des réunions avec des partenaires ainsi que des observations et évaluations sur terrain par des auteurs indiquent combien l'initiative avait été bénéfique. Le renforcement de capacité locale avait été realisé et les alertes localement spécifiques ont permis aux fermiers de combattre avec plus d'efficacité la peste. Il était remarqué que les chaînes de communication locale ansi que les "folk media" jouent un role important dans CBAF par leur complémentarité et la promotion de l'efficacité des chaînes exogènes. Cet article discute comment CBAF fait bon usage de différentes chaînes de communication et compétences, et met en évidence les résultats préliminaires.

Mots Clés: Chenille, communication, folk media, prévision, véhicule d'informaton

INTRODUCTION

Africa has experimented with a variety of development strategies and approaches. Many past interventions, however, failed to achieve the desired changes and impacts due to various reasons. They were characterised by a top-down and centralised approach and tended to rely on externally introduced strategies and channels to deliver information and technologies. However, rural communities have well established communication systems through which they traditionally generate, store, share, communicate and utilise information. Local communication channels and networks provide an effective means for rural communities to access various types of information related to their farming and day-to-day life.

The significance of indigenous communication systems lies in the fact that people are familiar with them and can understand, trust, accept and handle them better than externally introduced ones. They are heterogeneous, flexible in time, location specific, suited to local socio-cultural conditions, are already in place and so involve less cost, and are accessible to the majority of a community. Indigenous channels can trigger development as informal interactions play a crucial role in influencing people to innovate or change. Interpersonal, peer, and group communication networks are important factors in farmers' decision-making (Mundy and Compton, 1995).

In contrast, exogenous channels have limited coverage, are more rigid, and local people are often sceptical about externally controlled channels and information. Even extension personnel and radio, the most widespread forms of exogenous channels, fail to reach many rural people (Mundy and Compton, 1995). Unfortunately, local knowledge and practices were not given due consideration in many development efforts in the past. For instance, a study conducted in South-western Ethiopia indicated that farmers have a wide range of indigenous knowledge relating to maize production, crop protection and utilisation, but much of this was being neglected and eroded mainly as a result of the promotion of modern technology packages such as hybrid seeds and associated inputs and practices (Negussie *et al.*, 2005).

Armyworm attack is among the major challenges facing farmers in East and Southern African countries. The African armyworm (*Spodoptera exempta*) is a pest of pastures and cereal crops in Africa south of the Sahara, parts of Arabia, Asia, Australia and the Pacific (Rose *et al*., 2000). This migrant pest is capable of destroying entire fields of cereal crops and pastures in a few days. Indirect losses to livestock due to armyworm outbreaks in pastures can be severe, as a result of starvation or poisoning. The main problem with armyworms is that they are highly migratory, so larval outbreaks appear very suddenly at very high density, catching farmers unaware and unprepared. For

control measures to be effective they must be carried out in the first few days after larvae emerge from the eggs. However, the presence of larvae is often only noticed when they reach later instars, when control is more expensive and often too late to be effective.

In an attempt to address this problem, national and regional forecasting systems have been operating in East Africa since the 1960s to provide forecasts of the likelihood of outbreaks. The systems rely on centralised decision-making and forecasting using information collected from armyworm moth traps, often located at district level. This system has a number of limitations and was not as effective as expected. Forecasts are issued for districts, not for each village, and due to communication difficulties the forecasts from national services often do not reach farmers in time (Day and Knight, 1995). The delays in communication between the national forecast office and local communities often leave farmers with very little time to get prepared and take control actions. A survey carried out in four high-risk armyworm districts of Tanzania showed that the central forecast service, as it was originally conceived (Odiyo, 1979; 1990), was not meeting the needs of the farmers. Less than 25% of all farmers interviewed could recall ever receiving a forecast (Njuki *et al*., 2003, quoted in Mushobozi *et al.*, 2005). Responsibility for operating national forecasting traps often lies with non-farmers, which can result in lack of ownership among the community. District staff and national armyworm coordinators in Malawi and Tanzania report that sometimes traps of the central forecast service have been stolen or vandalised.

Day and Knight (1995) suggested the possibility of decentralised forecasting to address the limitations of the central forecasting, but it was not until a workshop in Tanzania in 2001, that the new approach called Community-Based Armyworm Forecasting (CBAF) was devised (Knight, 2001). Since then, the new approach has been piloted and tested in Tanzania, Kenya, Ethiopia and Malawi and found to have a number of benefits that will be reported in detail elsewhere.

The results of trials with CBAF in Tanzania showed that village forecasters achieved a high level of forecasting accuracy, with 75% of all positive forecasts having corresponding outbreaks (Mushobozi *et al*., 2005). Building on previous experiences, a three year project on CBAF in Malawi, Tanzania and Zimbabwe was launched in 2007. This paper discusses how CBAF makes effective use of indigenous communication channels and networks, and how they are integrated with exogenous information and capabilities.

METHODOLOGY

Community-Based Armyworm Forecasting (CBAF). CBAF complements and addresses several of the shortcomings of the national forecast service. It does so by establishing a system that allows each village to have a trained farmer forecaster who operates an armyworm moth trap, collects data, makes village level forecasts, and disseminates the information. The village communities themselves identify the best ways to disseminate the warning rapidly throughout the village. CBAF alerts farmers to monitor their fields, and thus helps them to detect armyworm larvae when they are young, and so be able to take timely control actions to prevent crop loss. It promotes community participation, builds local capacities and makes effective use of local communication channels. The approach uses simple forecasting rules and low-cost equipment.

Identification of communication channels and the CBAF approach. During the first season (2007/08) 39, 10 and 5 villages from 4 districts of Tanzania, 2 districts of Malawi and 2 districts of Zimbabwe, respectively, were selected for implementing CBAF. District authorities, in collaboration with extension workers, selected villages known to suffer from outbreaks. The selected villages were at least 10 Km away from each other. The activity was up-scaled in 38 and 25 more villages of Tanzania and Malawi during the second year. To facilitate the scaling up process, selected district and extension staff were trained as trainers, who then introduced the

activity to new villages in collaboration with the national coordination unit.

Implementing CBAF in an area starts with meetings with administration, extension and technical staff, at division and district levels, to discuss CBAF activities, to agree on the roles and to establish communication links. This includes how to select villages where CBAF will be introduced.

Prior to the intervention, surveys were conducted in villages to obtain information on baseline socio-economic conditions against which the performance and impacts of CBAF could be assessed. The survey methodology combined individual farmer interviews and focus group discussions. Another key activity was holding community meetings in each village with the main objective of sensitising the community, providing an overview of CBAF and developing a clear understanding and sense of ownership, and to elect farmer forecasters. Two farmer forecasters (lead and assistant) were democratically elected in each village by the community members using secret ballot and other methods as preferred by the community. Communities used various criteria for selecting forecasters, such as permanent residence and farming in the village, acceptability and respect among the community, ability to read and write, and willingness to carry out the community forecasting.

Another core activity during the village meeting was identifying and agreeing on appropriate communication channels to disseminate forecast information. The community members listed all available means of communication in the area and then prioritised them based on agreed criteria such as accessibility to all community members, degree of current use to disseminate information within the village, and flexibility in time and place.

Immediately after the village meeting, the elected forecasters, a village leader (or representative) and the village extension worker, attended a two-day forecasters' training course. The forecaster training involved both class room and practical sessions. The classroom sessions focused on armyworm biology, migratory behaviour, control and concepts and practices of the CBAF approach; how to set up traps and rain gauges, daily data recording and weekly forecast calculation. The practical exercises allowed participants to learn and practice how to set up forecasting equipment, take daily records (moth catch, rainfall and vegetation) and calculate forecasts.

At the end of the training, the village forecasters are presented with the forecasting kit which consists of a moth trap and lure, a rain gauge and measuring cylinder, data sheets, instruction sheets, and outbreak report cards.

The forecasters then conduct season-long forecasting which involves daily data collection, calculating the forecast once a week, and issuing warnings when the data show a positive forecast. The forecaster disseminates warnings of likely outbreaks using agreed local communication channels. Mid- and end-of-season monitoring and evaluation took place through field visits, field days, key informant interviews, focus group discussion and review of forecasters' records, to assess progress, performance and challenges, and what went well and what needs improvement.

Use of outcome mapping in the planning and implementation process. Different elements of outcome mapping were used in the planning, implementation and evaluation of the process. Outcome mapping is a methodology for planning, monitoring and evaluating development initiatives that aim to bring about social change (Smutylo, 2005). The methodology is comprised of several tools, which can be adapted to different contexts. Outcome mapping assisted project partners to identify key actors that influence CBAF, and to consider how to involve or communicate with them to change ways of doing things so that CBAF can be effectively implemented.

Many actors were identified for each project country at an initial workshop (through visualized brainstorming using cards) and an additional exercise was carried out to develop an actor linkage map describing roles and behaviours of different actors and how they interact or communicate. This exercise allowed partners to identify those with whom they interact directly, "boundary partners" (in outcome mapping terminology) who would be considered

"within their sphere of influence", and whom they need to pay particular attention to in terms of communication. It also described and assessed the linkages and patterns of interactions between the actors, and mapped the flow of information and products.

In general, the process of outcome mapping helped the initiative to be specific about the actors it targets, the changes it expects to see and the strategies it employs. During the course of implementation, it facilitated tracking of changes in behaviour, relationships, interactions and actions of key boundary partners, as well as helped to assess the effectiveness of the strategies employed. This was mainly attained through use and assessment of the outcome challenges, progress markers and strategy maps developed by partners during the initial workshop.

RESULTS AND DISCUSSION

Communication channels identified. During the village meetings communities' traditional communication channels and networks were identified by the community members using various participatory exercises (Table 1). None of the CBAF villages identified exogenous communication channels as their preferred means of disseminating forecast information. In addition to the traditionally existing channels, some of the recently initiated community structures were identified as potential channels to communicate forecast information. For instance, in Nsanje district of Malawi there were Area Civil Protection Committees and Village Protection Committees, which had smaller branches such as village disaster committees. Similarly, there was a structure known as the Disaster Management Committee in Balaka district. Though village runners were identified as the most effective and preferred channel, in practice it was seen during outbreaks that other locally available channels such as village meetings, churches, schools and posters also played an important role in rapidly disseminating warnings throughout the community.

McCorkle and McClure (1995) stress that farmers endeavour to access agricultural information and ideas through a multiplicity of communication networks and channels. Farmers rely more heavily upon informal sources in evaluating information and formulating decisions, because formal sources do not (and cannot by themselves) fully meet farmers' needs for credible and usable information. McCorkle and McClure (1995) believe that instead of the thinly-spread and poorly trained field agents of the government extension service, farmers rely on, and place more credibility in, a wide range of informal communication mechanisms. They further underscored that the greater the number of such informal sources and the greater the diversity of sources that attest to the value and workability of a given innovation, the more likely it is to be tried out and adopted.

Forecast information flow and channels. In the case of CBAF, forecasting was done by elected representatives of farmers who speak the same language and share the same experience and problems. They were the primary source of forecast information. However, the centralised

TABLE 1. Preferred communication channels identified by village communities in Tanzania and Malawi

Malawi	Tanzania
Village runners/criers	Drum beaters
Village meeting	Pembe (horn blowers)
Churches	Filipi (whistle)
Posters at public places (markets, mills etc)	Schools
Farmer-to-farmer informal contact	Churches and mosques
Village extension workers	Sports events
Schools	Posters
Local committees (Area and Village Protection; Disaster Management)	Market centre
Village court	Public meetings

forecasting system traps are often operated by non-farmers at district or sub-district level. As a result, they give a general indication of the likelihood of outbreaks in the district, and can not point out which specific village would get outbreaks. As some farmers dramatised, the central forecast office sometimes sends warnings to farmers *via* extension officers when they already know that there are outbreaks in their farms.

As presented in Table 2, the information generated by CBAF forecasters is mainly transmitted through indigenous means of communication, while the centralised service is characterised by vertical flow of information through exogenous, formal channels. In the case of centralised forecasting, there is no link or direct interaction between the forecaster and the village communities. For instance, in Malawi the national trap operator at an Extension Planning Area (EPA) passes on the information to the district office which in turn forwards it to the division, who finally channels it to the Ministry. In the case of a positive forecast, the warning gets back to the community using the same channels, often reaching the community very late, although radio can be used to try and get round this.

The CBAF approach enhanced both horizontal and vertical communications and interactions. With CBAF, upon calculating a positive forecast, forecasters reported warnings to village officials and also informed the village extension officer. The village leaders then alerted the village community to immediately go and inspect their farms and check for the presence of larvae and take control actions. In doing so, the village authority sent the village runner to announce to the village community, and/or called village meetings.

Other locally available channels including churches, schools, markets, posters and informal contacts were also used to rapidly disseminate the information. The forecasters also directly informed fellow farmers after being authorised by village officials. The use of a loud speaker, notice board and shops was also mentioned in some villages. Meanwhile, the village extension officers informed the EPA and district office who then reported to the division,

TABLE 2. Comparison of some features of CBAF and the central forecast system

Feature	CBAF	National forecasting system	Remarks
Source of information	Village forecasters	District trap operators and national coordinator	
Type of information	Indigenous	Exogenous	
Communication channels	Mainly indigenous, informal	Exogenous, formal	CBAF can contribute to national forecasts through exogenous channels
Role and participation of community	Part of entire process	Passive information receivers	
Decision makers	Mainly village community	District and national authorities	
Community ownership and commitment	Strong	Weak	Traps run by the central system are sometimes stolen or vandalized
Credibility among community	High	Low	Local communities are not familiar with the source of central forecasts
Timeliness of information	Arrives in time	Delays common	

who finally requested the ministry to mobilise resources (pesticide and sprayers). In Tanzania, the national forecaster reported receiving forecast information from village forecasters through mobile phones.

Use of mobile phones was also reported in Malawi to inform the district, division and the ministry. In Moshi district of Tanzania, mass media such as the local radio station (BOMA radio) was also used to disseminate the forecast information. These are good indications of integration and the complementary role of indigenous and external information sources and channels.

Are the two forecasting systems substituting or complementing each other? Community-based armyworm forecasting was designed to address the existing gaps and limitations in the central forecasting system. For example, the results of the baseline surveys show that before the introduction of CBAF in the area, farmers had very limited understanding about armyworms; 64 and 49% in Malawi and Tanzania, respectively, did not know what causes armyworms. Similarly, only 8 and 19% of the interviewed farmers in the two countries reported that there was an organised government system that issues outbreak warnings. In the years with outbreaks, only 16% of the farmers received prior warnings in Malawi. In many cases farmers found their farms already attacked by armyworms before they received warnings.

In contrast, the results of CBAF mid-season and end-of-season assessments indicate that the majority of the interviewed farmers demonstrated awareness and better understanding about armyworm, the fact that armyworm outbreaks can be forecast, what causes armyworm outbreaks, and how to control them. Indeed there are already indications that the CBAF initiative has started to effectively complement and strengthen the national forecast service.

One such way is by reaching areas which were not covered by the national forecast service and by providing location/village specific information. For instance, in Tanzania the national armyworm coordinator contacts communities to get their data and forecasts. This local information has been used to fine-tune the national forecasting information. Local forecasts based on local data are more accurate, but when added to a central database, local data can strengthen national forecasting (Research into Use, no date).

Above all, it was observed that the new approach has addressed the communication problems that were prevailing between the national forecasting office and the local communities. Mushobozi *et al.* (2005) stated that a major constraint was that the national forecast usually failed to reach people in time, but that this has been overcome by putting forecast generation in the hands of the people who use the information it generates. However, the national forecasting office supplied some forecast equipment, and it can also give directions for long-term planning and capacity building.

It was reported by CBAF stakeholders (farmers, extension staff and national coordinators) that before the introduction of CBAF, the link between farmers, district and national armyworm coordinator was very weak or absent. In general, the combination of central forecasting with the community based system appears to be more flexible and effective in that it adjusts to variable local socio-economic and cultural conditions. This applies in general to indigenous and external/modern knowledge and technologies. For example, as a result of the introduction of the hybrid maize technology packages in South-western Ethiopia, a wide range of indigenous knowledge/practices such as traditional plant protection, local seed systems and networks have been weakened resulting in increasing reliance on external sources (Negussie *et al*., 2005). The authors go on to recommend that as local seed channels are more accessible to the majority of the farming community, efforts should be made to integrate the formal and informal seed systems in order to enhance their effectiveness. Mundy and Compton (1995) similarly indicated that the erosion of indigenous communication systems by exogenous education and media endangers the survival of much indigenous knowledge, suggesting that ways to integrate the two types of information and knowledge are required.

Effectiveness of CBAF forecast information flow. The communication of forecast information relies on locally existing and accessible channels, mainly face-to-face communication. As a result, there was timely and effective communication of the forecast information to village communities and other stakeholders. It was reported by farmers and other stakeholders that warnings have been reaching farmers before outbreaks or when the larvae are still young (instars I and III). The entire village community can be informed of the possible outbreaks in a day or two through a village assembly or village runner. As a result of the early warning, adequate preparation and timely control actions, the majority of the farmers in the villages with CBAF reported that there was no replanting needed following armyworm infestation. On-the-spot early warnings give farmers time to act quickly and to save their crops. This is particularly important as the time available to achieve control is limited, because armyworms are in the larval stage for only about 2 weeks (Rose *et al*., 2000).

Farmers indicated that there were changes in the way forecast information was received; "information is now being received earlier than used to be the case before CBAF". All farmers that participated in the focus group discussions during end-season evaluation reported that they received forecast information about armyworms. Based on views obtained from different stakeholders, local communication channels and networks proved to be vital in timely and effectively communicating forecast information.

The most frequently mentioned merits of local communication channels were familiarity, credibility and proximity of the information source to users/community; accessibility, diversity and complementarity of the channels; relevance of information; control over the source and channel by the community and use of local knowledge and terms. Mundy and Compton (1995) similarly stated that indigenous communication systems have three features: they have developed locally, are under local control, and use low levels of technology, and this describes the local forecast dissemination in CBAF. They go on to stress that an understanding of indigenous communication improves the chances of true collegial participation by local people and outsiders. If ignored, indigenous communication can result in inappropriate development efforts.

It was reported during mid-season and end-of-season assessment that different stakeholders take different actions upon receiving a warning about an impending outbreak. Different stakeholders reported that farmers were more likely to respond to the warnings from CBAF forecasters as the information came from reliable local sources through familiar channels. For instance, 92% of the interviewed farmers in Malawi during the end-of-season evaluation reported that the forecasting was trustworthy. Mushobozi *et al*. (2005) similarly highlighted that farmers appreciated early warning information because forecasting was at the local level. They went on to say that a sense of ownership of the process has increased the likelihood that farmers will act on forecasts.

Interviewed farmers indicated that the first action that followed receipt of a warning was visiting their fields to check if there were armyworm larvae present. If there was none, they continued regular monitoring, while also establishing where they could access pesticides in case of outbreaks. But some farmers reported that on receiving a warning they immediately sought for pesticides from the village or district office or private stockists, before checking their fields.

Forecasters indicated that a few farmers sought the assistance of the forecasters to verify the presence of larvae in their fields. Whenever armyworm outbreaks were found, some farmers reported asking the village authorities for pesticides, while others purchased pesticides from the available sources. The farmers who already had some pesticides immediately responded to outbreaks by spraying.

Upon receiving a positive forecast, the village extension officer and village authority advised farmers to monitor their fields, to purchase pesticide, and to control if an outbreak occurred. They also reported to the district offices and sought for assistance. In addition, they informed pesticide dealers to prepare to supply pesticides. If the district has any stock of insecticides, they take it to the affected villages and distribute to

farmers. However, it was frequently indicated by interviewed farmers and extension staff that government pesticide supply is not adequate and often arrives late.

Different channels and media enhanced interaction and communication. It was reported by different stakeholders that CBAF enhanced interaction and networking among the community and other stakeholders. The findings of the baseline survey conducted in Tanzania show that though different stakeholders were involved in agricultural activities in the areas, none of the interviewed actors indicated direct participation in armyworm forecasting. No meetings were conducted specifically concerning armyworms although it was accepted that armyworms were very destructive to crops, causing up to 100% loss.

Community-based armyworm forecasting recognised the role and importance of involvement and collaboration of different stakeholders including farmers. The use of indigenous channels offers opportunities for participation by local people in development efforts (Mundy and Compton, 1995). The use of outcome mapping during the planning of the project activities also helped to identify relevant boundary partners and to determine how to actively involve these actors.

Unlike the central forecasting system, the new approach facilitated horizontal interaction and collaboration among farmers themselves, and with other stakeholders, in addition to the upward and downward channelling of information. Interactions and communications were facilitated in various ways including forming a national armyworm advisory committee, and organising different events and forums and involving relevant stakeholders such as training, meetings, workshops, exhibitions/ shows, field days and exchange visits.

Electronic and print media gave coverage of the CBAF initiative and played a role in creating awareness about CBAF. This is a good example of how endogenous and exogenous communication channels can effectively complement each other to enhance success. Mass media such as radio, newspapers and television are generally the least expensive media for transmitting messages to large numbers of people (Van den Ban and Hawkins, 1996). Mass media can accelerate existing change processes, but they seldom bring about changes in behaviour and actions by themselves. Mass media may play an important role in introducing information and developing opinions when the wider public do not have strong views about a particular issue.

Enhanced role of folk media. Although the communities traditionally believe that combating armyworms is the responsibility of the government, awareness creation through CBAF has caused substantial attitudinal change. Farmers started to actively respond to warnings and outbreaks by taking control actions using their own resources without waiting for the government. Active involvement of the local communities in the initiative allowed combination of tacit and codified knowledge, as well as local and external capabilities. In general, community members demonstrated interest, a sense of ownership and full support for CBAF, witnessed in various forms.

Full participation of local communities and their leaders in various CBAF events, feedback obtained in different forums, and requests from neighbouring farmers and their leaders to be involved in the activity, are some of the indications. During field days, several villages in Malawi performed various folk arts that attempted to depict damage caused by armyworms, causes of armyworm outbreaks, how to get rid of armyworms, the need to cooperate in controlling them, the benefits of community-based forecasting, and taking care of the village forecasting equipment (Table 3). Similarly, a song about armyworm forecast and control was composed by local people around Dodoma in Tanzania. The folk performances attracted community members, and stimulated interest and discussion. The performers were well acquainted with local language, dialects and culture, familiar to the community, and presented the issues in a lively manner. Thus, it has been observed that folk media can be effective communication tools in CBAF. They provide an important tool in the process of motivating rural communities toward social change (Chapke and

TABLE 3. Examples of community folk performances on armyworm forecasting

Drama 1	
Actor 1:	Who allowed you to display this armyworm poster on my grandfather's road? This is our road not yours.
Actor 2:	The poster is about today's field day on armyworm forecasting.
Actor 1:	I am going to remove the poster because I am not concerned about armyworms.
Actor 2:	Just come and attend the field day and you will know what armyworms are; they are the enemies of every community member.
Drama 2	
A villager goes and shouts at his neighbour, and tries to attack him because he thinks that the armyworms attacking his crop were a result of magic performed by his neighbour. He thinks the neighbour bewitched his field, causing it to be infested by the pest. But his friends explain to him how armyworm outbreaks occur, how armyworms destroy the crop and the fact that they can cause famine in the entire region if they are not controlled. So they agree to join hands to control armyworm.	
Drama 3	
Husband:	Madam wife, this year we are going to harvest a bumper yield because armyworms have been controlled thanks to CBAF
Wife:	Good, so let us go to bed early and make more children, since there will be plenty of food to eat.
Husband:	No, that is another form of hatching armyworms.
Wife:	I agree, but I am happy, as we have more food and no hunger, now that our enemies are gone!!

Rekha, 2006). Traditional media are effective in rural communication because the techniques are simple and easy. They reflect the cultural ethos and so are easily understood. Such media have an impact on rural society because of their acceptable idioms, functional significance as well as entertainment component (Intodia and Uppadhyay, 1991; cited in Chapke and Rekha, 2006). An integral part of folk media is active audience participation. We suggest the efforts and talents of folk performers could be further tapped into, encouraged, and utilised in scaling-up CBAF.

CONCLUSION

The scaling up of CBAF is still in progress, but the results so far attained have been encouraging. The experiences and achievements suggest that the successful integration of indigenous and exogenous communication pathways and approaches has been an important contributing factor. Farmers tend to be more receptive to information which comes from sources that are considered trustworthy and reliable, such as neighbours and friends. Thus, using communities own preferred channels of communication enhances the chances that the information they receive will be accepted and acted on.

The village communities of different countries demonstrated good understanding, increasing interest and commitment for community-based armyworm forecasting. These were especially witnessed through full participation in various events with wide use of folk media and performances by community members. The initiative has demonstrated that local communities, their traditional networks, power structures and communication channels can be instrumental in effectively communicating information on monitoring and control of armyworms. In particular, it has become evident that folk media can be very effective in sensitising and educating the community in a lively and entertaining manner. Widespread scaling-up and out of CBAF has been an issue of common interest and concern among all key stakeholders, and we envisage indigenous communication systems playing a key role.

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