APPENDIX III: socioeconomic report of smallholder coffee in Zambia [Working Paper A1163/1]

Smallholder Coffee in Zambia: A Socio-Economic Field Report

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ABBREVIATIONS

CB	Coffee Board
CBD	Coffee Berry Disease
CRU	Coffee Research Unit
GVART	Golden Valley Agricultural Research Trust
NARS	National Agricultural Research System
SCFT	Smallholder Coffee Trust
TRF	Tea Research Foundation
ZARI	Zambian Agricultural Research Institute
ZATAC	Zambia Agribusiness Technical Assistance Centre
ZCGA	Zambia Coffee Growers Association

SUMMARY

This report summarises findings from a short visit to Zambia to explore the potential of research spillovers from project experience with smallholder coffee in Malawi.

The report is based on visits to three smallholder coffee groups in the northern Province, visits to two peri-urban smallholder coffee groups, two estates (including the biggest, Kateshi) and meetings with the Zambia Coffee Growers Association and the Coffee Board.

The findings are impressionistic but they suggest that fundamental changes are needed if Zambia is to replicate the recent growth of smallholder coffee in Malawi. These include:

- Development of a clear strategy for smallholder coffee.
- Increased budgetary support for extension and material inputs.
- Greater transparency in pricing and the cost of inputs.
- An appropriate credit facility for smallholder growers.
- Stronger research-extension linkages.

Without these changes it is unlikely that smallholder coffee will increase much above current levels. The current strategy is not designed to significantly expand the number of smallholder growers in the near future. Extension services are very limited and the system of credit and input purchase by the Coffee Board and delivery by the ZCGA has led to delays in provision. The pricing strategy offers adequate incentives for smallholders but because credit will be repaid from future income smallholders will not receive the full benefits of these prices for several years after they start to produce coffee. At present research on coffee is conducted exclusively by estates, with ZARI confined to maintaining a gene bank.

The structure that is required for research to have significant impact on smallholder livelihoods is not yet in place. Under the current structure, the most useful role for research is to strengthen farmers' technical knowledge of coffee through (1) providing more appropriate extension materials in local languages and (2) funding demonstration plots that would serve as a focus for farmer learning and also strengthen linkages between national researchers and coffee extension.

INTRODUCTION

Experience with integrated crop management for smallholder coffee in Malawi suggests scope for sharing of lessons and application of research results within the region. An exploratory visit was made to assess prospects for collaborative research on smallholder coffee in Zambia.

Activities included meetings with staff from the national agricultural research system (NARS), the Coffee Board and Coffee Growers Association, and field visits to two estates and four groups of smallholder growers.

This report summarises findings on socio-economic aspects of smallholder coffee. The specific objectives are to:

- Assess the role of coffee in smallholder livelihoods.
- Identify constraints on smallholder production, particularly pests and diseases;
- Assess scope for collaboration based on experience in Malawi.

METHODS

Visits were made to four groups of smallholder coffee-growers in Kasama, Mbala, Mphika, and Lusaka districts (Table 1).

Table 1. Smallholder coffee groups visited

No	District	Village	Group	Growers
1	Kasama	Chafuniki	Twande Chafuniki	11
2	Kasama	Katito	Katito	15
3	Mpika	Lukaleshi	Ilomfi	19
4	Lusaka	Peri-urban	Makwene	
5	Lusaka	Peri-urban	Kasupe	

Since time was limited, information was collected using PRA tools, including mapping, seasonality charts, problem-cause diagrammes, and matrix ranking. Results were then discussed with the participants to clarify and collect supplementary information. Mr Ndhlovu, the Agricultural Economist at Mount Makulu Research Station, interpreted and helped with these exercises.

RESULTS

Markets

Table 2. Ranking of cash crops by Twande Chafunika group

Crop	Rank
Beans	1
Groundnuts	2
Maize	3
Millet	4
Cassava	5

(Ranking for village as a whole, by Twande Chafunika group)

Maize, millet, groundnuts, beans, and soybeans are the main cash crops. Selling maize is difficult because the nearest market is on the border with Tanzania, 160 km away. Groundnuts and millet also have to be sold at the border but soybeans can only be sold in Zambia. *(Ilomfi group)*

"With coffee at least you are sure of a sale, even if it's little and late". (Ilomfi group)

Coffee is intercropped with baby corn and the corn stalks are used as a coffee mulch*. (Kasupe group)*

Inputs

The Makwene group reported that they had received fertilisers but not chemicals for crop protection. Obtaining inputs on time was also a problem. Their order had been placed in February but still not processed. They purchased chemicals with their own money. The chairman of the Makwene group is also chairman of the Coffee Board, which buys the inputs.

Credit

Fertiliser, chemicals, and drip irrigation have been provided on credit at low interest rates (6%). They are expected to repay in year 3, when they start producing enough coffee. According to the Association extension officer, this group can have yields of 3 t/ha and repayment should not be a problem *(Makwene group).*

Irrigation

The Makwene group irrigate coffee with drip systems installed by the Agri-flora company (now defunct). These frequently become blocked by limestone deposits inside the pipes, rats eat connectors which are expensive to replace, and pipes are often slashed accidentally by hired labour.

The Simbotwe family have 200 coffee trees but cannot expand because they have only one borehole and cannot irrigate more trees because they also grow vegetables. *(Kasupe group)*

Mr Phiri planted 2000 trees in 2002 and applied to Agriflora for a drip irrigation system but the company went into receivership and his application, which is now with the Coffee Board, has still not been processed. Meanwhile he irrigates his coffee with a hose. The crop is severely stressed and now bears coffee every two years. The drip irrigation system costs US $ 2000 for one ha *(Kasupe group)*

Adoption constraints

In Chapuniki village (Kasama district) only 7 of the 60 households in the village grew coffee.

- The group started in 1994 with 56 members. Now it has only 18 members. Only one is a new member, the rest are all former members of the group. It was said to be difficult to recruit young members because “they want to make money quickly”. “Only those with a lion’s heart still grow coffee”. Older men may also find it more difficult to travel the long distances required to sell other crops. *(Ilomfi group)*

- The activities for coffee that required most labour were de-stumping (ie. clearing land for planting), weeding and harvesting. *(Kasama group)*

- A map drawn by villagers (Figure 1) showed coffee was grown on fields beside a perennial stream called the Lungu river but not alongside the Lunzuwa river because this dried up between August and October. Not everyone who wants to grow coffee has land in this area *(Mbala group)*

- Coffee can’t be grown where the river bank is steep but only where the banks are flat to allow canals to channel the water. Similarly, coffee is not grown where land is swampy, they grow vegetables there. *(Kasama group)*

- Labour for coffee competes with labour for maize in November-December (land preparation for maize) and in January-February (weeding). Also these activities have to be done on an empty stomach if maize supplies have run out. *(Mbala group)* (Figure 2).

- When the group started in 1994, 8 members were FHHs without husbands. Now there is only one FHH in the group. The others dropped out because it was difficult to find labour to work on coffee as well as manage other activities*. (Ilomfi group)*

- Irrigation starts immediately after the rains stop and finishes when they start. This is equivalent to seven months (April-November) Water is given every two weeks for 2-year old trees and every week for trees under 2 years. It takes two days to irrigate 2500 trees *(Ilomfi group)*

- Vincent Nowamwanga and his wife manage 2500 trees. They usually have to hire labour for weeding and harvesting. Last year they paid ZK 30,000 to weed 2500 trees. Coffee pickers are paid ZK 1000 per pail, which holds about 4-5 kg *(Ilomfi group)*

Table 3. “What do you need to grow coffee?”, by smallholders wanting to grow coffee, Katito group

1. Capital	9. Sprayer
2. Land	10. Trenches
3. Irrigation/water	11. Labour
4. Seed	12. Garden Forks
5. Nursery	13. Hoes/slashers
6. Plastic bags	14. Secateurs
7. Fertiliser	15. Wheelbarrow
8. Pesticides	16. Shovels

Extension

The Association extension officer visits every two months or so, but if they have problems they can phone him on his cell phone or phone the Association office. The Simbotwe family have a cell phone. *(Kasupe group)*

The contact farmer (Mrs Hakamanngwe) has not received any training on coffee and her main role is simply to inform members about meetings *(Makwene group)*

Information flow

"It's nice to see you out of the office" Makwene group to researchers from Mt. Makulu. Members had heard of Mt Makulu and one had visited it but were not aware that they could consult researchers there for advice on pest problems *(Makwene group)*

The Simbotwe family received a coffee production guide and pamphlets from Agriflora, and bought a Coffee Production Manual from the Association for ZK 6,000. They also have a photocopy of *Simply Coffee*, printed in Harare.*(Kasupe group)*

Mr Simbotwe wanted a coffee newsletter. This has been delayed for technical reasons. *(Kasupe group)*

Some members of the group have the Coffee Production Manual while others do not *(Makwene group)*

Technical knowledge

Tall and dwarf coffee varieties had been planted indiscriminately. They were told F6 varieties were disease resistant, but mixed with others they appear susceptible *(Makwene group).*

The Chairman applies copper oxychloride every month on a fixed timetable *(Makwene group)*

Incentives

- In 2002 Monica Kampamba and her husband Manuel Musonda harvested 20 bags of coffee weighing 50 kg each The coffee was sent for processing and marketing to Kateshi estate. Until now they have not been paid. Since then they have not harvested their coffee crop and are waiting for payment before resuming production. It seems unlikely they ever will be paid since responsibility for marketing has now been transferred to the Coffee Growers Association. *"They told me I could buy a car if I continued with coffee but since that day they have not been back".(Kasama group)*

- *"We don't know the costs of the fertiliser and chemicals provided by the Association. We only order what we need based on the number of trees planted. We don't know the price of our coffee. We only know the amount on the payment voucher, with something deducted for transport". (Ilomfi group)*

- *Payment takes almost a year. Coffee we sold in September 2004 was paid for a year later. If we got cash paid when the Association collected the coffee it would attract more growers, especially younger men".(Ilomfi group)*

- *"Everything that appeared so green is not green at all. But since we are already along the way I am sure we can make adjustments" (Mrs Simbotwe, Kasupe group).*

Lack of timely fertiliser

Hilly land

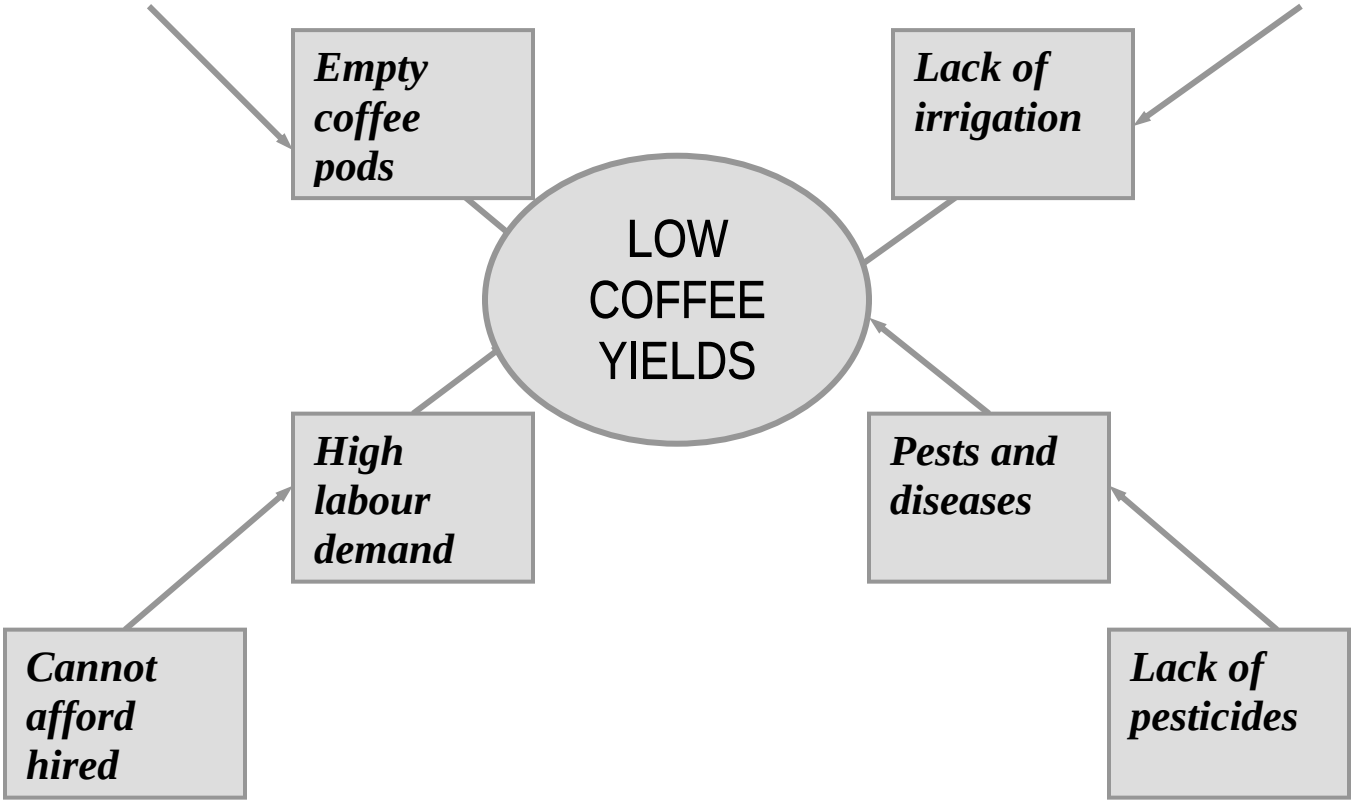

Figure 3. Problem-cause diagram, Twande Chafunika group

Figure 3. Seasonality chart, Katito village

Irish potatoes	Irrigation	Irrigation	Harvesting	Land preparation	Planting Applying fertilizer	Applying pesticide		Selling	Selling	Land preparation	Planting Applying fertilizer	Applying pesticide
Maize	Land preparation	Land preparation, planting	Land preparation, planting	Weeding, applying fertiliser	Weeding			Harvesting	Harvesting	Harvesting Shelling Bagging	Selling	Selling
Coffee	Spraying Irrigation	Irrigation Nursery	Spraying Planting	Trans-planting Weeding Fertilising	Weeding Spraying Fertilising	Spraying		Mulching	Irrigation	Irrigation	Irrigation	Weeding Irrigation
Rainfall	*	**	***	***	***	****	*					
Month	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep

Kateshi estate

Kateshi estate is the biggest single producer in Zambia with 1400 ha planted to coffee. It produces 3000 mt each year. The location was described as ideal with an altitude of 5000 ft, reliable rainfall, and deep, well-drained loam soils. Drip and pivot irrigation systems are in use. At peak harvesting, the estate employs 7,000 casual workers. Yields average 3 t/ha of good quality washed Arabica. This is sold as a blend, not specialty coffee. Costs averaged 1400 $/ha. Coffee was reported to be profitable at current prices and there are plans to expand the area planted to 2000 ha.

Coffee was vulnerable to CBD because the main rains arrived when the coffee berry was expanding. One-third of the yield was lost to CBD in 2005 because rainfall was too heavy to spray. The estate used an IPM approach and scouted before spraying.

Kateshi has its own research facility run by an expatriate (Carol Hemmings), with a lab, screen house, and trial plots. Research activities focused on (1) reducing costs of chemical crop protection (2) screening varieties obtained from CIRAD for resistance to CBD and (3) experiments with coffee under indigenous shade trees.

Makando estate

This estate is one of only three in Zambia with a smallholder outgrower scheme. The owner, Mr Makando, is a former Minister of Agriculture. Finance is coming from the profits from flue-cured tobacco, also grown on the estate. Twenty smallholders with previous experience of coffee will grow 2 ha each on customary land. Irrigation water and cash inputs will be provided by the estate. Two problems identified were (1) design of an efficient irrigation system for scattered plots and (2) recovering investment costs where coffee is grown on customary land where growers have no title. Future expansion is planned on estate land to avoid these problems. A 2-ha plot will have 5-6,000 trees which is seen as the minimum for a “viable business”.

Mount Makulu Research Station, Lusaka

The only link identified between the NARS and smallholder coffee was through the Research and Extension Technical Committee, under the Coffee Board. The Director of the NARS has a seat in this committee. No research on coffee is being done at this station.

Misamfu Research Station, Kasama

The only research on coffee by the NARS is being conducted at this station close to Kasama. The station maintains a coffee genebank of older varieties obtained from Portugal. No research is being conducted but the station is supplying Kateshi estate with varieties that have resistance to rust and CBD. There is only one coffee scientist, a senior technician. Shortage of funds has interrupted the supply of irrigation for the coffee genebank.

Coffee Board of Zambia

The Coffee Board was established by government in 1989 to regulate the coffee industry. Under the Coffee II Project (1993-2002) it also had responsibility for extension for smallholder coffee, which was passed to the ZCGA in 2002. It remains a key player for smallholder coffee because:

1. World Bank investment portfolios were passed to the Board after the end of the Coffee II Project. This means the Board is both a banker and regulator for smallholder coffee.

2. The Board is financing low-interest loans to estates on condition they start outgrower schemes. Five schemes have been identified but apparently only one is operational (Mpamfu, in the Copperbelt).

3. The Board is using funds from the government Poverty Reduction Strategy Programme ($ 800,000) to finance inputs for smallholders through the ZCGA. The Board does not provide such finance for estates.

4. The Board is funding pre-shipment finance for smallholder coffee, as from next season.

5. The Board is funding infrastructure for a Coffee Research facility at the Golden Valley Research Trust (GRVT). The GRVT is 60 % financed by contracted research, with 40 % core funds from government. CABI (Nairobi) will assist the Board develop a research strategy for this facility.

The Board's strategy for smallholder coffee is based on an outgrower model, where a nucleus estate supplies extension advice and inputs to smallholders but where smallholders are organised into a cooperative and sell their coffee through the ZCGA rather than the estate. The Board is seeking donor funding to establish 1000 ha of outgrower coffee (a minimum of 1 ha per smallholder). Outgrowers will be organised into groups of 20-30 households with a minimum of 20 ha coffee per group. The establishment cost is estimated at US $ 3,040 per ha, and total costs including maintenance for five years at US $ 9,240.

The only scheme currently operational has run into problems, with area planted declining from 50 to 30 ha. This is blamed on conflicts among smallholders within the cooperative.

Zambia Coffee Growers Association

Under the 1989 Coffee Act all growers have to be members of the ZGCA. Currently the ZCGA represents about 46 estates and roughly 120 smallholders, defined as those with under 10 ha planted to coffee. Currently the ZCGA represents about 46 estates and roughly 120 smallholders, defined as those with under 10 ha planted to coffee. Total exports in 2004/5 were 6655 mt, valued at US $ 10 million. Smallholder coffee accounted for only 2 mt of this total. This year (2005) the ZCGA hopes smallholder production will reach 15 mt. The target is to have 150 mt within the next few years.

The ZCGA provides smallholders with the following services:

- Extension. At its peak under the Coffee II Project, about 900 smallholders grew coffee. The ZCGA strategy is to work with groups to reduce service costs. Currently

there are 5 groups, formerly operational under the Coffee II Project. To reduce costs, groups were selected to achieve economies of scale: accessibility, within the northern region (Kasama and Mbala districts), and with 20-30 growers. Since the ZCGA has only one extension officer, one grower from each group is trained and is expected to train the others. These "roving managers" get regular training. Groups are self-selecting, and are expected to select only those they know have the potential to become viable coffee growers.

- Processing. The ZGCA operates a new grading mill financed by the EU with the capacity to mill 1.5 tons of green coffee per hour. The mill can process 9 grades of coffee, and there is also a silo for blending (because of small volumes, most smallholder coffee is sold as a blend). The mill is running at full capacity since it also processes coffee from estates without their own mill, and re-grades coffee from estates to obtain higher prices.

- Marketing. The ZCGA processes and markets coffee for the industry though large estates are allowed to sell 70 % of their crop independently. The ZCGA is non-profit and is funded by subscriptions from members, from which smallholders are exempt, and by a marketing levy on exports, roughly 11 % of the market price, to cover costs (transport, grading, marketing, shipping). The marketing strategy for smallholder coffee is to market this as speciality (ie high quality) coffee. Smallholders are given priority in the sale of specialty coffee. The rationale for this strategy is that prices for specialty coffee are higher and more stable, averaging US $ 2 per kg.

- Inputs. Inputs to smallholders are delivered through the ZCGA, which places orders with the Coffee Board based on requirements submitted by the smallholder groups. Delivery was late this year because of delays in purchasing by the Board and a shortage of transport by the ZCGA.

- Credit. Inputs are supplied by the Board on credit and loans are expected to be repaid from coffee sales. Agreements on repayment are made between smallholders and the Board. These are passed to the ZCGA, which will subtract credit from payments to smallholders and reimburse the Board. Credit payments will become due after three years. Since the ZGCA has only had responsibility for smallholders for two seasons, there is no evidence yet on how effectively this system is working.

- Payment. Estates receive statements with details of bids and buyers at the time of sale, and statements at payment with the price received and deductions made by the ZCGA. Growers are paid by the ZGCA not the Coffee Board. The ZCGA estimates that the whole process from collection to receiving payment from buyers takes 3-4 months. The ZCGA will introduce pre-shipment finance for smallholders next season. Coffee will be assessed for quality and growers will receive 40-50 % of the expected price within a few weeks of delivery, the balance being paid after sale.

- Out-grower schemes. The proposed model is one where smallholders sell processed coffee to the ZCGA, and a nucleus estate supplies extension and processing services to smallholders. The ZGCA sees advantages for both parties. Estates can make money from mills operating at less than full capacity and improve their security by raising living standards in neighbouring poor communities. Smallholders can earn income and reduce their costs by selling processed coffee.

Presentation to Coffee Board

Present:

ZARI:
Dr Chalabesa (Head, Mt Makulu Research Station)
G. M. Kaula (Pathologist)
Ms Zulu (Head, Crop Protection)
Dr Alfred Sumani (Entomologist)

Matheus Ndlhovu (Economist)
Robson Mulenga (Pathologist)
CB:
Mr Andrew Hamaamba (Chairman, Coffee Board)
Mr Zimba (Secretary)
David Shula (Agronomist)
Namkolo Mukuthu (Chair, finance)
ZAGC
Colin Street (Chairman)
Mr Sandando (Extension Officer)
Ministry of Agrculture and Cooperatives
Mr Phiri

Three presentations were made by the research team covering technical and socio-economic aspects of smallholder coffee. In the ensuing discussion the following points were noted:

- The Chairman requested a copy of the team's report in due course. He also asked for details about overbearing found in the smallholder coffee near Lusaka and the reasons for this.
- There was extended discussion on the correct strategy for smallholder coffee. Participants felt that concentration on production was a mistake and that the priority should be to secure specialty markets. Malawi's production-led strategy was aimed at securing consumer recognition for the Mzuzu coffee brand and thi required volume to ensure availability year-round.
- Malawi's bigger smallholder coffee industry was traced back to colonial policies favouring Malawi when it was part of the Federation.
- There was discussion about the sources of resistance to CBD among Kenyan coffee varieties.
- The CB secretary believed that smallholder coffee was moving in the right direction and was grateful to the team for highlighting areas that needed to improve. Electronic copies of the three presentations were given to the CB.

A technical meeting was held with ZARI and the ZCGA to identify areas of future collaboration. Dr Hillocks outlined the position as follows:

- ZARI has no funding for coffee research but Kateshi estate has a research programme, and donors liked to see private sector involvement.
- Research had to be based at Misamfu rather than Mt Makulu or travel would consume most of the budget.
- Most obvious scope for collaboration lay in communication systems and extension literature.

Discussion then resulted in the following points:

- The present Coffee Production Manual had to be modified and translated into Bemba. The CBD leaflet should also be translated.
- ZARI had extensive experience of publishing research manuals, with 30 booklets produced covering different field crops. Dr Sumani had experience with this.
- Researchers agreed that research had to be conducted at Misamfu and Robson Mulenga the pathologist could be posted there if needed.
- Extension literature could be routed through ZCGA current programme of in situ training for smallholder groups.
- Demonstration plots were a good focus for future collaboration between ZARI and the ZCGA and were effective in training farmers.

DISCUSSION

Coffee production in Zambia is dominated by estates. Smallholder coffee is grown primarily in the northern region with poor infrastructure and limited access to markets. Few alternatives exist for alternative cash crops. Attempts to increase smallholder coffee production in the 1990s through the World Bank Coffee II project failed because growers became discouraged by low returns and late payments. Currently there are only 120 coffee growers registered as members of smallholder groups.

This situation resembles Malawi in the mid-1990s. Since then, prospects for smallholder coffee have been transformed by the Smallholder Coffee Growers Trust (SCFT). Smallholder coffee now accounts for 17 % of production and is set to reach 100,000 mt by 2015. This has been achieved through a combination of financial incentives to growers and a change in technology to high-yielding semi-dwarf varieties.

Experience with smallholder coffee in Malawi reveals the following key features:

- Development of a clear strategy for smallholder coffee.
- Increased budgetary support for extension and material inputs.
- Greater transparency in coffee pricing and the cost of inputs.
- An appropriate credit facility for smallholder growers.
- Stronger research-extension linkages.

Strategy

Malawi has developed a clear production-led strategy with a specific target (1000 mt exports by 2011) that will allow the industry to break into the "single-origin coffee market. This will give brand-recognition for Mzuzu coffee in the export market, and which will allow the SCFT to become financially independent and operate without donor support. By contrast, Zambia appears to have no future production target. Growth projections are based on extrapolation from the existing resource base, operating at a higher level of productivity. Thus, the focus is on raising productivity among the existing groups, which is seen as a precondition for expansion. It is not known what level of target production is needed for smallholder coffee to become self-financing, and the assumption is that for the foreseeable future smallholders will continue to be subsidised by estates (which pay membership fees) and by the government.

Insofar as Zambia has a strategy for smallholder coffee, it appears to be a marketing strategy focused on breaking into specialty coffee. This market-led strategy reflects an analysis of long-term prospects for smallholder coffee produced by McKinsey consultants (Freidenberg, Jordan, and Mohindra, 2004) which recommended (1) steering growers of high quality beans towards specialty markets and (2) crop diversification. This strategy is being implemented Technoserve Inc. in Tanzania and by a sister project ZATAC in Zambia, which reportedly operates with 30 smallholders in the Copperbelt. Coffee is marketed through the ZCGA and to provide cash flow while coffee matures coffee is intercropped with vegetables for the domestic market, paprika, and sunn-hemp.

Organisation of smallholder coffee in Zambia

Organisation of smallholder coffee presents a striking contrast. Malawi's SCFT is exclusively a smallholder organisation, owned by its members. The SCFT also enjoys executive and financial autonomy, with no government role in purchasing inputs. In Zambia, the ZCGA represents both estates and smallholders, and input purchasing is the responsibility of the government Coffee Board. Zambia has only one full-time extension officer for smallholder coffee to cover a country of 750,000 km^2.

It was unclear whether a growth strategy for smallholder coffee was to rely on smallholder groups or outgrower schemes. The ZCGA emphasised working with groups while the favoured CB saw expansion primarily in terms of outgrowers. The CB's outgrower model envisaged smallholders receiving extension support and access to processing from estates, while marketing services came through the Association. One rationale for relying on outgrowers was that this would allow expansion of smallholder coffee without the need for a separate extension service. However, so far few estates have expressed interest in operating these schemes. Estates that lack experience with coffee may give poor extension advice. Management of outgrower schemes also requires resources and it is not clear whether the advantages estates would derive from outgrower schemes (eg. subsidised credit) would compensate for these.

Pricing and credit

Pricing favours Zambian smallholders, who pay no membership fees to the Association and only a small levy (11 %) on exports. In Malawi, growers are simply guaranteed 60% of the world price, and pay membership fees on top of this (200 MK/year). In Zambia, everyone is eligible for credit and loans are contracted by individual growers with the Coffee Board. In Malawi, only growers producing a minimum of 500 kg/year are eligible for credit and because individual loans were misused in 2005 the SCFT has introduced the principle of group liability. Payments are made annually from current coffee income, rather than from future income as in Zambia.

Research-extension linkages

Malawi's strategy for smallholder coffee was founded on close research linkages with estates through the Coffee Research Unit (CRU) based at the Tea Research Foundation (TRF) in Mulanje. Subsequently, linkages have broadened to include the NARS and agricultural research institutes like NRI and CABI. These later linkages were important in modifying the SCFTs original technology package based on F6 populations to a more diverse package that took account of the risk from CBD. By contrast, ZARI has no research programme on coffee and current activity is restricted to maintaining the genebank at Misamfu Research Station. The ZCGA has relied on estates for advice on technology and one of the attractions of outgrower schemes is seen as the provision of "free" extension advice for smallholder growers. Estates do not always have good access to research, however. The use of F6 Catimor populations in areas prone to CBD is sufficient proof of this.

Problems at field level

Many of the problems found at smallholder level reflected deficiencies in the areas discussed above.

Organisation. Smallholders complained of the late delivery of inputs, particularly fertiliser. One group had waited two years for delivery of fertiliser before losing patience and planting without fertiliser, with disastrous results. One peri-urban group had received fertiliser but not chemicals for crop protection. They were sourcing these chemicals themselves, but this was difficult even for a group close to Lusaka. Another peri-urban grower had waited since 2002 for approval of credit to install drip irrigation; meanwhile he was irrigating using a hosepipe. Seed supplied by the ZCGA has mixed semi-dwarf and tall varieties, which require different cultural practices.

These problems reflect the division of financial and executive functions between the Coffee Board and the Association. Until this is resolved there is little point expanding smallholder production since the result would simply be to increase the number of discouraged smallholder growers. The current impasse seems to have arisen because the ZCGA is reluctant to assume responsibility for credit to growers on the grounds that it would be held responsible for non-repayment of debts. Hence the inefficiency observed in input supply is directly linked to the design of an appropriate credit system.

Incentives. Smallholders unit costs were high because of the need for irrigation, usually through labour-intensive furrow systems, and because of calendar spraying. At the same time, farmers in some groups did not know the costs purchased on credit. Payments were usually made a year late and this was said to be a disincentive for younger men to grow coffee since they preferred crops with a quicker turnover.

In the north, the major incentive for growers was that coffee offered a guaranteed market. Access to markets in this region was very limited, with most crops sold through cross border trade. Smallholders were only continuing to grow coffee because of the lack of alternatives, particularly for older men who were unprepared to travel long distances. In peri-urban areas close to markets, the incentive was presumably high returns from coffee relative to other crops. These peri-urban growers also grew high-value crops like baby-corn, vegetables, and fruit. According to the Coffee Production Manual, coffee is competitive with crops like paprika. Another reason these smallholders grew coffee was that they had been offered technical

assistance and credit for doing so. Given the high start-up costs ($2000/ha for drip irrigation) it would be some time before they earned income from coffee, though the crops we saw looked good and there should be no difficulty repaying credit.

Constraints. Non-growers identified irrigation as a major adoption constraint. Farmers with fields that were not close to a perennial stream, or whose land was too undulating for gravity-flow systems, were unable to grow coffee. This constraint needs further investigation. There is probably scope for water-saving, either through reducing the frequency of irrigation (some farmers irrigated coffee every two weeks) or through reducing losses in seepage and percolation with furrow systems. Also, it may be possible to grow coffee without irrigation with a different technology package (eg. mulching, trenches, drought-resistant varieties). These are research issues that might allow more farmers to grow coffee and would reduce costs.

Competition for labour was also mentioned as an adoption constraint. This reflected competition with foodcrops like maize and with other cash crops like Irish potatoes. Weeding and land preparation for these crops conflicted with labour requirements for coffee. Households reported being unable to afford hired labour, which was sometimes paid in kind (eg. tomatoes). Female-headed households without adult male labour were particularly constrained. The Ilomfi coffee group reported that such households had mostly stopped growing coffee for this reason. Obviously, research can contribute little new here. Technology that raised labour productivity for foodcrops (eg. through higher yields) would obviously release labour for cash crops like coffee. Hence, food security is an important element in the household's decision to grow coffee. Expanding coffee production without provision for improvement in household food security is asking for trouble, since foodcrops will receive priority for scarce resources like labour and fertiliser.

Technical knowledge. The ZCGA extension officer clearly has an impossible mission to service 120 scattered smallholders. Relying on farmers as "roving managers" has had mixed success. In some groups farmer training was either ineffective or absent. Consequently, smallholders have limited technical knowledge of coffee growing, particularly among new groups. The information available to smallholders on coffee growing was also limited. The Coffee Production Manual was only available in English. There were no demonstration plots from which farmers could learn new techniques. Given the present structure for smallholder coffee, the most useful contribution that research could make would be to strengthen farmer training, by providing materials in local languages, funding demonstration plots that would act as a focus for collaboration between research and extension, and providing leaflets on the management of key pests and diseases.

CONCLUSION

The findings are impressionistic but they suggest that fundamental changes are needed if Zambia is to replicate the recent growth of smallholder coffee in Malawi. These include:

- Development of a clear strategy for smallholder coffee.
- Increased budgetary support for extension and material inputs.
- Greater transparency in pricing and the cost of inputs.
- An appropriate credit facility for smallholder growers.
- Stronger research-extension linkages.

Without these changes it is unlikely that smallholder coffee will increase much above current levels.

Consequently, the scope for research spillovers from experience in Malawi is limited to capacity building and development of communication media. Efforts to improve smallholder pest management would have minimal impact on coffee production and on smallholder poverty. The organisational structure that is necessary for such impact does not yet exist. Until this structure is in place, there is little point investing time and money in a programme of field research, as in Malawi.

To help the ZCGA meet the needs of smallholders more effectively, the project should assist with farmer training through making information on coffee management more accessible to growers. Specifically, this could involve translating the Coffee Production Manual into local languages, building research-extension linkages through demonstration plots located with smallholder groups, and providing farmers with written information on key pests and diseases.

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Appendix 1. List of persons met

	Mt Makulu Research Station	
1	Godwin Kaula	Senior Pathologist
2	Mrs Zulu	Head, Plant Protection Division
3	Dr Chiphiri	Biotechnologist
4	Dr Sumani	Entomologist
5	Mr Ndhlovu	Economist
	Zambia Coffee Growers Association Ltd	Zambia Coffee Growers Association
6	Mr Joseph Taguma	General Manager
7	Mr Filtone Sandando	Extension Officer
	Coffee Board	
8	Mr Benny Zimba	Secretary, Coffee Board
	Kateshi Estate	
11	Quentin Harhoff	General Manager
	Misamfu Research Station	
12	Dr Phiri	Programme Officer
13	Mrs Mwananwange	Senior Technical Research Assistant
	Ministry of Agriculture and Cooperatives	
14	Humphrey Goma	District Agricultural Coordinator, Kasama
15	Mrs	District Agricultural Coordinator, Mbala

Appendix I: Survey report of CBD incidence in Catimor varieties

Incidence of coffee berry disease (*Colletotrichum kahawae*) on Catimor coffee farms in Northern Malawi: Survey report (2005)

By

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Abstract

A survey was conducted in northern Malawi to estimate the occurrence of Coffee berry disease (CBD) caused by a fungal pathogen, *Colletotrichum kahawae* on Catimor coffee on smallholder plantations. A total of 120 farms were surveyed in five coffee associations (extension planning areas), Misuku Hills, Phoka Hills, Viphya North, Nkhata Bay Highlands, South East Mzimba, and the prevalence and incidence of CBD was recorded. Prevalence of CBD was affected by agro-ecological factors, with no CBD recorded in South East Mzimba, low levels of CBD in Phoka Hills Association, but a mean of 47.5% of all surveyed farms had CBD. However, the highest proportion of infested farms at a mean of 71% was in Misuku Hills Association. The mean incidence, the proportion of infested bushes for all surveyed farms was 40.1%, however, this ranged from 3.3% to 96.7% on the worst infested farm. Misuku Hills Association recorded the highest incidence of CBD with a mean of 33.1%. In addition, Chisi zone, a sub-division of the Misuku Association, recorded the highest incidence of CBD with a mean of 62%. Implications of these results in relation to coffee production in the smallholder coffee sector of Malawi are discussed.

Introduction

Coffee is Malawi's fourth most important agricultural export commodity. Smallholder coffee production declined since 1987/8 but is showing evidence that production is increasing, with the potential of surpassing the estate coffee sector, which has been dominating coffee production in Malawi. Even though coffee production started declining in 1978/9 under the then Smallholder Coffee Authority (SCA) which was responsible for coffee extension, providing inputs on credit, and marketing coffee, production of coffee has since picked up after restructuring which led to the formation of the Smallholder Coffee Farmers' Trust (SCFT), whose management unit is in Mzuzu, Northern Malawi. Farmers become paid-up members and co-own the primary processing facilities. The structure of SCFT is such that it has a management unit and a board which include among others, farmer representatives. The SCFT operates in five smallholder coffee producing areas in northern Malawi, which are divided into associations (extension planning areas). There are five associations in total; Misuku Hills, Phoka Hills, Viphya North, Nkhata Bay Highlands, and South East Mzimba. Each association has a business advisor and a farm guide adviser who are employees of the SCFT, but work hand in hand with the government extension personnel. The associations are subdivided into Zones. Each zone comprises a number of business centres, and has primary processing facilities (motorised pulperies, drying tables) which are owned and managed by farmers. All farmers who are members of the zone belong to a business centre.

In order to increase coffee production, the management of SCFT introduced Catimor Populations (Fig. 1) which are deemed high yielding under normal conditions. However, in the northern region of Malawi, Coffee berry disease (*Colletotrichum kahawae*) was identified, during biological and socioeconomic surveys, as one of the major coffee diseases limiting coffee production (Hillocks *et al.*, 1999; Phiri *et al.*, 2001). Even though CBD infects all stages of the coffee berry (pinheads, expanding green berries, mature green and ripe berries), most crop losses happen when the pathogen infects the green expanding berries (between 4 and 16 weeks after flowering), when the berries are most susceptible to the disease (Mulinge, 1970). Active lesions (dark sunken and may be sporulating under wet conditions) develop at this stage and coalesce and cover the whole berry, destroying the bean inside. The berries turn black and either drop or remain on the coffee plant as mummified berries. Some of the berries drop off after developing a few active lesions. The major coffee varieties found during

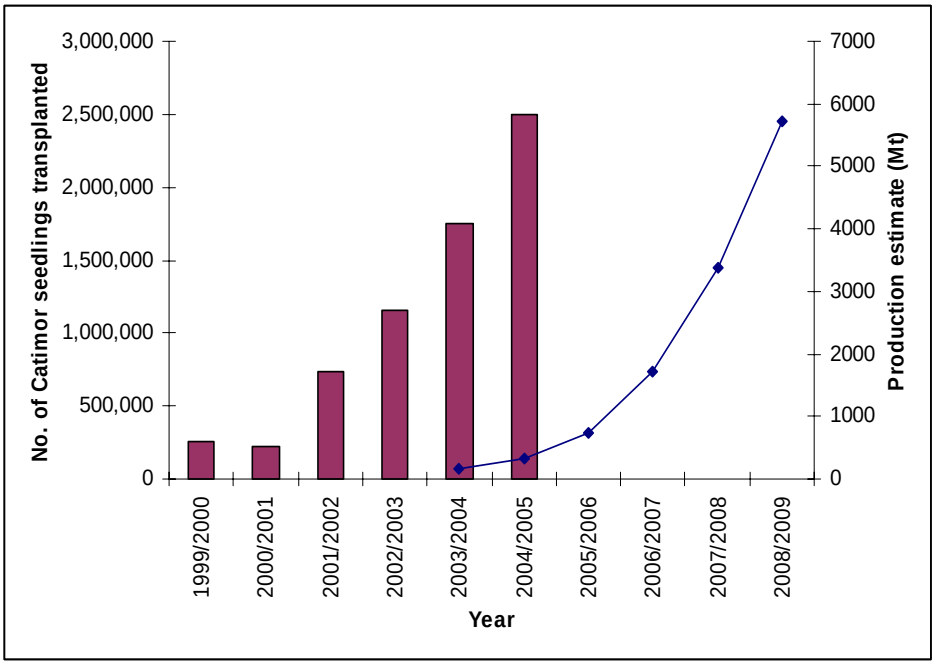

Fig. 1 New Catimor plantings and production estimates. Source Smallholder Coffee Farmers Trust

the surveys were Geisha, Caturra and Agaro, all of which were susceptible to CBD. However, there is no information on the susceptibility/tolerance of the Catimors to CBD under field conditions in Malawi.

The objective of the survey was, therefore, to determine the incidence and distribution of CBD on the new Catimor varieties under field conditions. The implications of the findings will be discussed.

Survey methodology

One hundred and twenty Catimor coffee farms were selected from the list of Catimor farmers and surveyed in all the five smallholder coffee associations, Misuku Hills in Chitipa District, Phoka Hills and Viphya North in Rumphi District, Nkhata Bay Highlands in Nkhata Bay District and South East Mzimba in Mzimba District, Northern Malawi (Fig. 2). The surveyed areas fall within the following coordinates: South 09° 39˝ 0.2´ and 12° 26.8˝ 3.2´; East 33° 24˝ 32.4´ and 34° 8˝ 5.6´. All surveyed farms were within the altitude range of 1269 and 1769 masl.

A list of Catimor coffee growers was obtained from the management unit of SCFT in Mzuzu, Northern Malawi. The survey was carried out from 27th March to 9th April 2005. Number of Catimor coffee farms surveyed in each business centre is presented in Table 2. An attempt was made to survey all Catimor coffee farms, particularly the Catimor populations which were three years or older. Nine of the 120 Catimor Coffee farms were of the Catimor 129/Nyika coffee variety, and were all in the Misuku Association (Table 1).

The selected Catimor farms were assessed for presence or absence of CBD by randomly selecting 30 coffee bushes in each farm and scoring them for CBD using a four point scale (Phiri *et al.,* 2001). The scale was as follows: **0** = no CBD; **1** = <10% diseased berries; **2** = 10-30% diseased berries; **3** = >30% diseased berries. The scale provided for working out the incidence of CWD for each surveyed farm, business zone and association. Other diseases were also recorded.

At each farm the owner was located and asked about the age of the coffee bushes, whether he/she used fertiliser or not, whether he/she used pesticides. Other information which were also recorded were whether the coffee was under shade or not, intercropped or not, intercrop type, and spacing. The bearings and altitude of each farm were also recorded. The information were recorded in a data sheet (Table 2).

The incidence of CBD (percent of CBD infested coffee bushes in a farm, a zone, or an association), drawing graphs, regression analysis of factors which may affect CBD were worked out using the Microsoft Excel package (Microsoft Excel 2003).

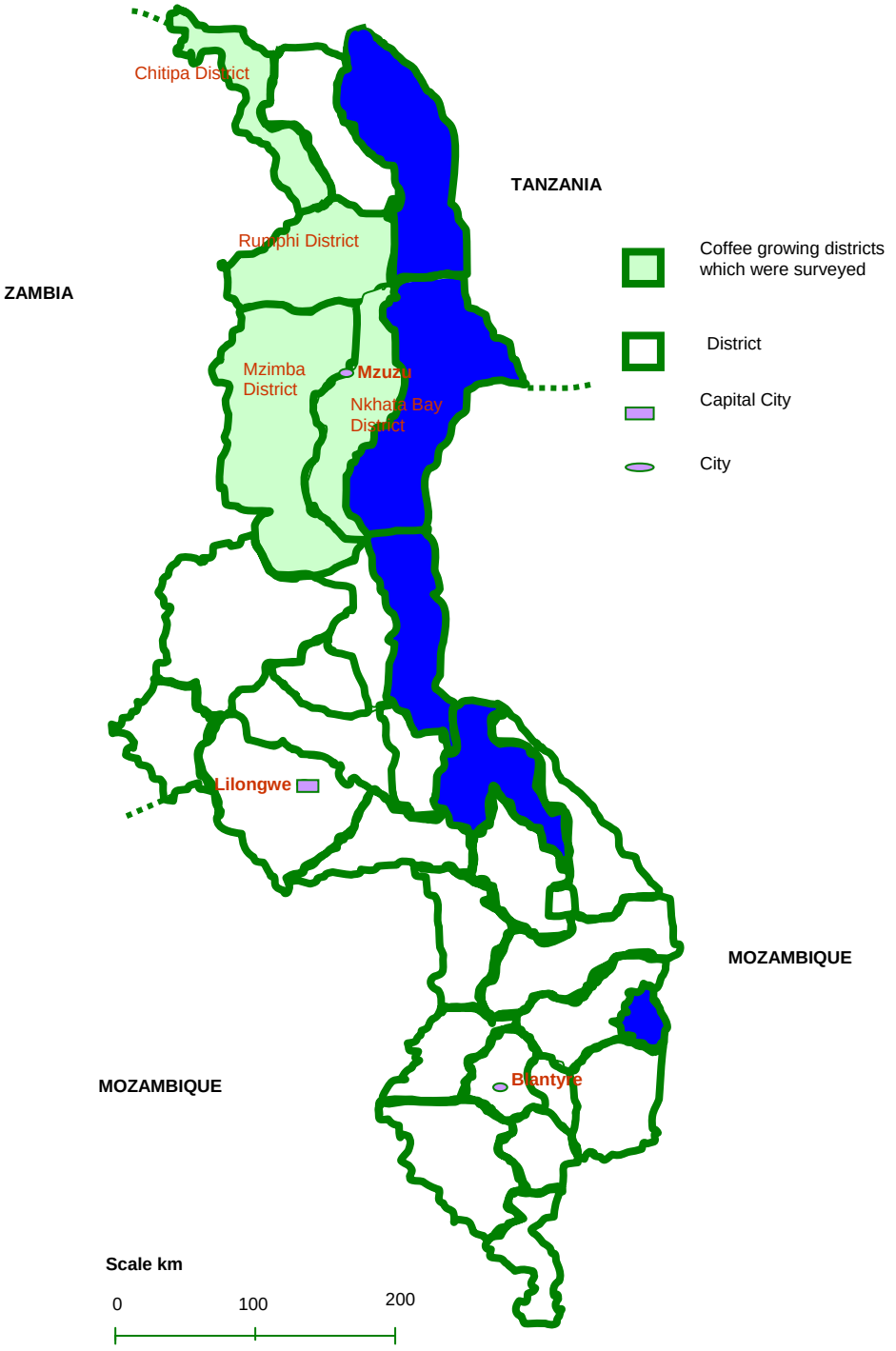

Fig. 2 Map of Malawi showing coffee growing districts where Catimor coffee survey was carried out

Table 1. Number of Catimor farms surveyed in each business centre and association

Coffee Association	Business Zone	No. Catimor coffee farms surveyed	No. Catimor population coffee farms surveyed
Misuku Hills	Chibula	10	10
	Chisi	15	13
	Kakomo	5	5
	Kasaghala	3	3
	Katowo	10	10
	Makeye	4	3
	Mondo	8	4
	Sokola	5	3
Phoka Hills	Chakaka	11	11
	Junju	3	3
	Mphachi	4	4
Viphya North	Jintha Jembe	2	2
	Khanga	7	7
	Mphompha	3	3
	Usowoya	3	2
	Uzumara	7	7
Nkhata Bay Highlands	Bula	3	3
	Chigwere	4	4
	Lukalazi	4	4
S. E. Mzimba	Kapita	7	7
	Khosolo	1	1
	Msese	2	2

Table 2. Catimor CBD survey data sheet (March to April 2005)

Farmer's name……. Association……. Business Zone……..
Business centre……GPS coordinates: S……. E…….
Altitude……
General crop health…… Fertiliser applied: yes/no. Age of bushes……. Intercropped: yes/no. Intercrop……. Shade: yes/no. Shading level (low, medium, high)…….. Weeding: yes/no.
Pesticides used ……. Coffee variety…….
Total number of bushes …… Spacing type (hedgerow / conventional type)……

Tree no.	CBD		Rust		Cercospora leaf spot		Fusarium bark disease	Comments
	Score	Lesion type	Score	Pustules/leaf	Score	Spots /leaf	Present/ absent	
1								
2								
3								
4								
5								
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Scale for CBD and other diseases:
0 = no CBD; **1** = <10% diseases berries or leaves; **2** = 10-30% diseased berries or leaves; **3** = >30% diseased berries or leaves

Results

A total of 120 Catimor growing farms were surveyed in the five associations. Among the surveyed farms, 111 farms had Catimor populations; most of which were population 3, and 9 farms had Catimor 129, all of which were in Misuku Association.

Agronomic practices

Fifty-nine percent of the farms surveyed were growing Catimor coffee under hedge-row system, which was planted at the spacing of 3m by 0.6m. Eighty-six percent of the farms had Catimor coffee bushes aged between 3 and 4. However, the age of the bushes ranged from 2 to 5 years. Only 28% of the farms were intercropped. The most common intercrop was banana (86% of intercropped farms). Almost all the Catimors were grown in the sun – only 12.5% of the Catimor farms were grown under shade of some sort. The majority of farmers (89.2%) applied inorganic fertilisers to their Catimor coffee. However, no significant relationships were found between the practices and CBD incidence, even though farms under high shade had higher CBD incidence. This was not analysed further because the number of farms under shade were too few to warrant proper statistical analysis of the result.

Use of pesticides

Eighteen percent of the farms used fungicides, most of which were in Misuku Association. Frequency of applying fungicides varied from one to three times per season. The most common fungicide used was copper oxychloride (12.5% of farms), while others were chlorothalonil and copper hydroxide (funguran). CBD was equally severe on fungicide applied farms just like where fungicides were not applied. There was apparent evidence of inappropriate application of fungicides, for example in terms of frequency of application per season and inappropriate spraying techniques (see Fig. 3).

Prevalence and incidence of Coffee berry disease

Prevalence of Coffee berry disease - Coffee berry disease was recorded on Catimor populations in all associations, except South East Mzimba where rains tailed off in February. Coffee berry disease was recorded on 47.5% of all Catimor farms which were surveyed. In addition CBD was wide-spread on the Catimor population in Misuku Hills Association where it was recorded on 71% of the Catimor coffee farms (Table 3). Further more, CBD was also wide-spread in Viphya North Association with 42.9% Catimor farms with CBD, and Nkhata Bay Highlands where CBD was recorded on 36.4% of Catimor farms. Chibula and Katowo zones of Misusku Hills had the highest proportion of CBD infested farms, at 90% (Table 3). In summary, Misuku Hills Association recorded the highest number of zones and farms with CBD followed by Viphya North (Table 4).

Incidence of Coffee berry disease - The incidence of CBD, which was calculated as percentage of trees infested on a farm, zone, or association was highest in Misuku Hills Association with a mean incidence of 33.1% for all surveyed farms (Fig. 4). However the mean incidence of CBD for CBD infected farms is much higher (46.2%) for the same association (Fig. 5). Nkhata Bay Highlands recorded the second highest CBD incidence followed by Viphya North and Phoka Hills associations (Figs. 4, 5, and 6). The mean CBD incidence per infested farm was 40.1%, however, this ranged from 3.3% to 96.7% depending on the association. Chisi zone in Misuku Hills Association recorded the highest incidence of CBD at 62% (Fig. 6). However, CBD was not recorded in South East Mzimba Association (Figs. 4, 5 and 6). In addition, CBD was not recorded on farms with Catimor 129/Nyika coffee variety.

Generally, 2004/5 season was much drier than normal. CBD was very destructive on infested farms of Catimor populations, particularly in Misuku Hills association resulting in more than 80% yield loss on some of the infested coffee bushes. Most lesions were active mostly in areas which were still wet at the time of the survey, such as Misuku Hills, Viphya North and Nkhata Bay Highlands Associations. However, Misuku Hills was the wettest of all.

Table 3. Prevalence of CBD on farms in the different associations and zones

Association	Zone	Total farms surveyed	%farms with CBD in each zone	% farms with CBD in each association
Misuku Hills	Chibula	10	90.0	
	Chisi	15	86.7	
	Kakomo	5	80.0	
	Kasaghala	3	66.7	**71**
	Katowo	10	90.0	
	Makeye	4	50.0	
	Mondo	8	50.0	
	Sokola	5	0	
Phoka Hills	Chakaka	11	9.1	
	Junju	3	0	**5.6**
	Mphachi	4	0	
Viphya North	Jintha Jembe	2	0	
	Khanga	7	42.9	
	Mphompha	3	33.3	**42.9**
	Usowoya	3	0	
	Uzumara	7	71.4	
Nkhata Bay Highlands	Bula	3	0	
	Chigwere	4	50.0	**36.4**
	Lukalazi	4	50.0	
South East Mzimba	Kapita	7	0	
	Khosolo	1	0	**0**
	Msese	2	0	

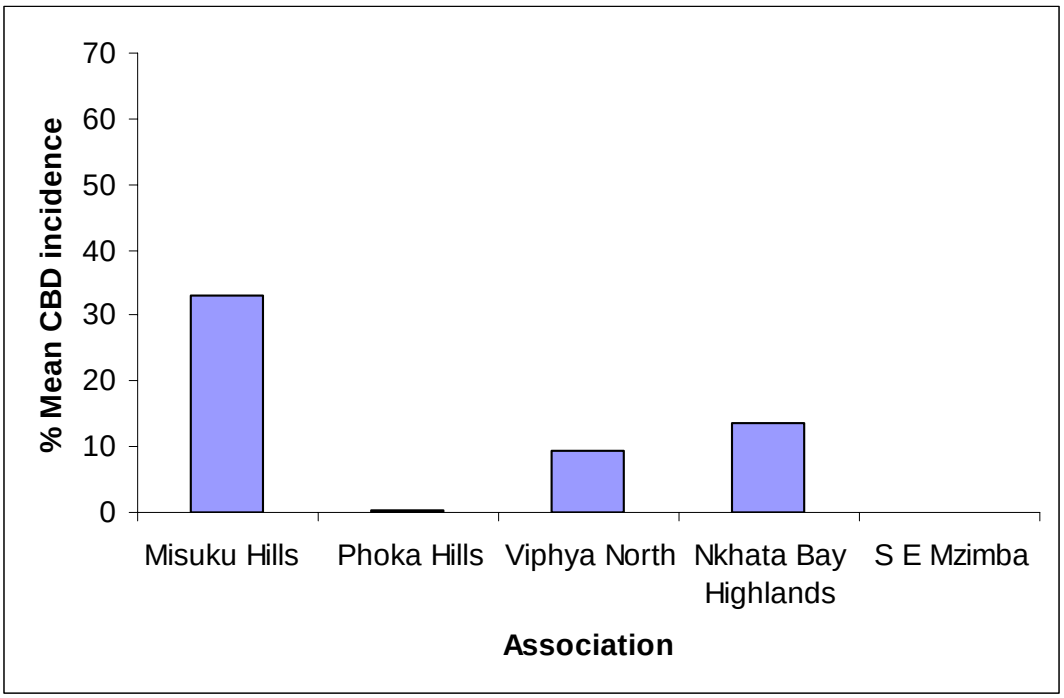

Fig. 4 Mean CBD incidence (%) for all farms surveyed in each association

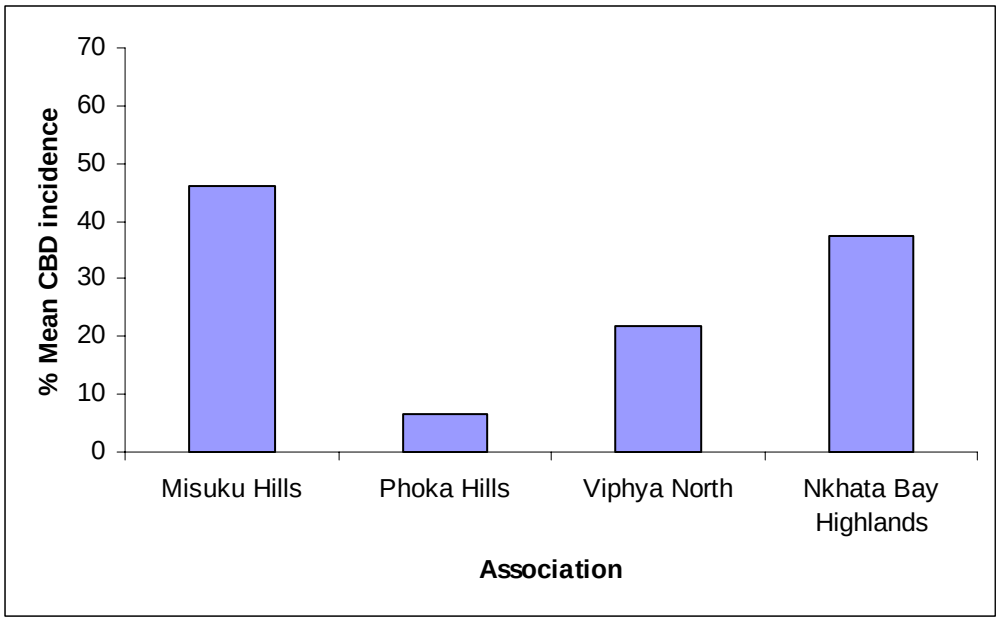

Fig. 5 Mean CBD incidence (%) for farms with CBD in each association

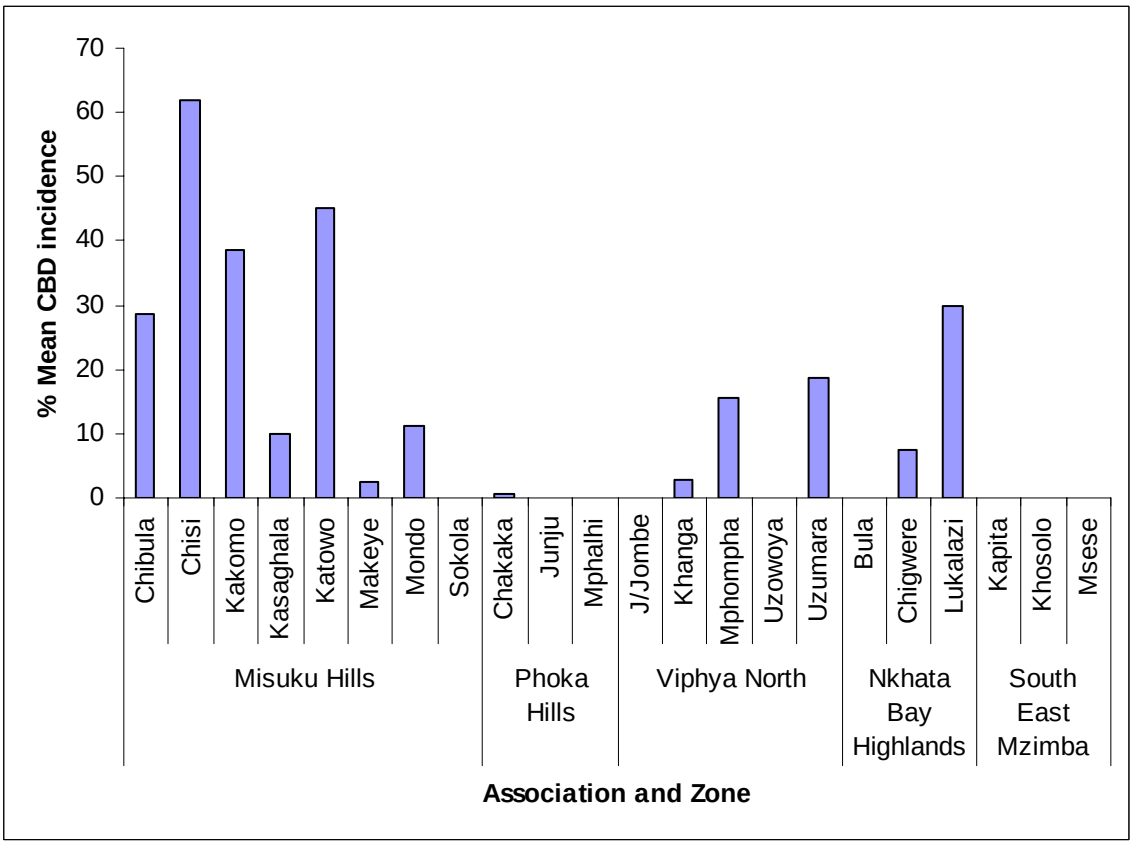

Fig. 6 Mean CBD incidence (%) for all farms which were surveyed in each association and zone

There was no significant positive relationship (R= 0.231) between altitude and the incidence of CBD on the farms.

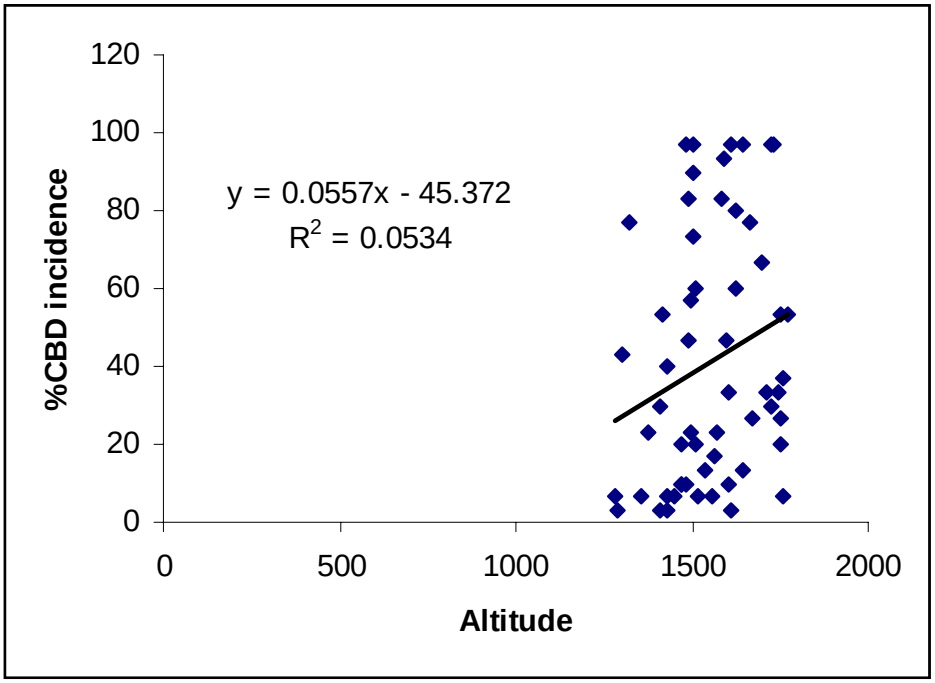

Fig. 7 Relationship between Altitude (masl) and CBD incidence. The line is the line of best fit

Other diseases

The only other disease which was recorded in the farms was cercospora leaf spot (*Cercospora coffeicola*), but this was not recorded from many farms, and was therefore not analysed.

Discussion

It is apparent that CBD is wide-spread on Catimor populations in Misuku Hills, Viphya North and Nkhata Bay Highlands associations. This result confirms the earlier laboratory and research plot studies on Catimor population in which Catimor populations were very susceptible to CBD (Phiri, unpublished). This is the first systematic and quantitative survey of CBD on the Catimor coffee varieties in Malawi. The susceptibility of the Catimor population is also confirmed by the presence of active lesions on the infected berries. Active lesions develop on susceptible varieties (Bock, 1956; Masaba and Van der Vossen, 1982; Phiri *et al*., 2001). However, Catimor 129/Nyika coffee variety is resistant (Phiri *et al*., 2001).

The high incidence of CBD in Misuku Hills, Viphya North and Nkhata Bay Highlands associations can be explained by the fact that the associations were wetter than the rest of the associations and are at higher elevation. Rainfall data presented during the previous studies showed that Misuku Hills, Viphya North, and Nkhata Bay Highlands associations all receive high annual rainfall, which is associated to the high elevation in the associations (Phiri *et al*., 2001). In Kenya occurrence of CBD was related to high rainfall and altitude (Griffiths and Waller, 1971). Rainfall is required for the dispersal and germination of the CBD pathogen, *Colletotrichum kahawae* (Nutman and Roberts, 1969).

It is apparent that coffee berry disease is very important on the Catimor populations. Incidence of up to 73% is very severe, coupled with the wide-spread of CBD on the populations, and a possible yield loss to the farmer of up to 80% warrant urgent action by the relevant authorities. However, proper loss assessment can be carried out by studying the fate of berries on tagged branches because substantial amount of infected berries drop off especially during the early stages of berry development (Griffiths *et al.*, 1971a). A lot of Catimor population seedlings have already gone and are still going to farmers in the region. It is important that in areas where the CBD is endemic, such as Misuku Hills, Viphya North and some zones of Nkhata Bay Highlands, the more CBD tolerant/resistant varieties must be promoted. Catimor 129 which has apparent field tolerance to CBD should be promoted. Single tree selections with resistance to CBD were made from Catimor 129, and was named “Nyika” coffee variety (Phiri *et al.*, 2001), and should be utilised in the CBD endemic associations. ”Nyika” is currently being propagated by the DFID funded Malawi Coffee IPM project. In addition, there should be deliberate efforts to select and develop more varieties with resistance to CBD and other coffee diseases. Earlier studies showed that Geisha is more tolerant to CBD than Agaro coffee variety (Phiri *et al*., 2001). There should therefore be projects which should carry out single tree selection from the Geisha trees in the field in Malawi. Single tree selections with CBD resistance are being successfully deployed for CBD control in Ethiopia (Van der Graaff, 1983). In Kenya, Ruiru 11, a CBD resistant variety was successfully bred for resistance to CBD in the country (Van der Vossen and Walyaro, 1981). However, the susceptible Catimor populations can be successfully deployed in associations without or with less CBD, such as Phoka Hills, South East Mzimba, and some zones of Misuku Hills, Viphya, and Nkhata Bay Associations. In addition, in areas with CBD where the Catimor populations have already been deployed and will be deployed, fungicides will have to be used to manage the disease and reduce economic loss to the crop. This undoubtedly will increase the cost of coffee production in such areas. There was evidence of some fungicide use recorded during this study; however, it was apparent that farmers lacked knowledge of proper fungicide use, as evidenced by improper spraying frequency, timing, and number of sprays per season. It is therefore imperative that farmers of Catimor populations in the associations with CBD should be trained in effective use of fungicides. Tank mixtures of organic and copper-based fungicides are most effective and economic (Okioga, 1978; Masaba *et al.*, 1990). In Malawi a tank mixture of Chlorothalonil (Bravo) and Cupric hydroxide (Kocide 101) at half rates was found to be more effective in controlling CBD on Caturra coffee variety (Phiri *et al.*, 2001).

Agronomic practices (intercropping, fertiliser use, shading, spacing) were not found to affect CBD incidence during the study. However, intercropping and fertiliser use have direct benefits and should be encouraged. Studies are currently in progress to determine the best way of intercropping bananas in coffee. Shade ought to be studied further because there were not many Catimor population farms which were under shade. The close spacing too should be studied further because close spacing results in prolonged leaf/berry wetness which is ideal for CBD development. In addition, close spacing in a form of hedge-row will make spraying for CBD control difficult because of poor spray penetration between trees, and may result in reducing the efficacy of the fungicides.

Conclusion

The incidence of CBD on Catimor varieties has been established. The following recommendations for integrated control of CBD are proposed:

1. The CBD susceptible Catimor populations should be promoted in associations/zones with less or no CBD.

2. “Nyika” coffee variety and other CBD resistant varieties should be promoted in areas with CBD. Research in developing other CBD resistant varieties should be supported and executed.
3. Catimor population bushes in associations/zones with CBD should be protected with a tank mixture of organic and copper based fungicides. An example of a tank mixture is chlorothalonil (2.2 l ha^{-1}) and copper hydroxide (5.0 kg ha^{-1}) to be applied during the immature (expansion) berry development stage (February to April in the Northern Region of Malawi or January to early April in Southern Region of Malawi) and during the onset of weather conditions ideal for CBD development, such as temperature between 20 and 25 °C or lower, RH higher than 90%, and conditions resulting in morning precipitation.
4. Farmers should be trained in proper use of fungicides for CBD control, so that they do not waste their money.

Acknowledgements

The work described is part of a collaborative project with the Government of Malawi. This report is an output from the project funded by the UK Department for International Development (DFID) for the benefit of developing countries (DFID RNRRS CPP Forest Crops Margins Production System, Project R8204). The views expressed are not necessarily those of DFID.

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Appendix II: Impact Assessment

Integrated Pest Management for Smallholder Coffee in Malawi

Assessment of the Impact of the Communication Strategy used by the Project

NEGUSSIE EFA

NOAH PHIRI (Ph.D)

December, 2005

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Executive Summary

A. Background

Coffee is one of the most important commodities in Malawi, accounting for around 4% of the country's export earnings. Coffee plays crucial role in the livelihood of the majority of smallholder farmers in Northern Malawi. There are about 4000 smallholder coffee farmers in Northern Malawi, which were organized into five Associations, which were further subdivided into 'Zones' and 'Business Centres'.

Despite its vital role, the production and productivity of the smallholder coffee sector in this part of the country remained low. Among other things, the poor crop and pest management practices used by the producers, and widespread pest and disease problems were the major contributing factors to this. To address these bottlenecks, IPM projects were designed and implemented in different phases since 1997. The first CPP coffee IPM (R6807) was undertaken from 1997 – 2000. A short project was funded (R7942, Jan 2001 – June 2002), to establish a participatory approach to the on-farm validation of this IPM system. The current phase of the IPM project activities started in January, 2001 as a follow-up project to the previous project. The project aimed at benefiting the poor by promoting an integrated crop and pest management approach to increase coffee yields. The project was funded by DFID and executed by NRI in collaboration with CABI-Africa Regional Center, SCFT, Ministry of Agriculture and Irrigation Development – Lunyangwa Research station. The project attempted to use the grass-roots farmers' organization of the SCFT as uptake path-ways for the technical information being promoted by the project.

The objectives of the project were:

- To promote improved coffee management practices for increased yield as a contribution to poverty reduction in Northern Malawi.
- To evaluate chemical and other methods of control for white stem borer.

The expected outputs of the project were:

- Best practices/integrated crop management demonstrated and promoted.
- Methods for stem borer control evaluated.
- Non-chemical approach to disease control promoted.
- Cost benefit analysis and constraints to adoption of best practice addressed.
- Farmer knowledge of ICPM improved.

B. Purpose of the evaluation

The principal reason for undertaking this evaluation was to assess whether the communication strategies used by the IPM project were successful; in other words, to see whether they reached the intended audiences, and had the intended effects. The evaluation exercise was carried out from 28th August – 9th September, 2005.

C. Methodology and approach of the assessment

Qualitative approaches such as participatory rapid appraisal methods and techniques were predominantly used in gathering the information required for the evaluation. The field assessment in all the five coffee associations was carried out using the following methods and techniques:

- Semi-structured interviews and discussions (with farmers, extension workers, SCFT and research staff),
- Key informant interviews,
- Focus group discussion,
- Field visits/tours and direct observation,
- Participatory scoring and ranking, and other relevant exercises.

In total, 187 farmers, 20 government extension staff and 15 SCFT staff and 3 Lunyangwa research staff were involved in the information collection process in different ways. Some information was also obtained from relevant CABI-ARC staff. In addition, various existing documents were also reviewed and utilized.

D. Assessment of Communication Strategies

Communication Channels employed

A number of dissemination path-ways were used to communicate the intended information to the target clients. The principal communication channels used include: demonstrations and field days, training, printed dissemination materials (leaflets and hand book), contact farmers, tour/exchange visit, farmer field schools, workshops/meetings, and agricultural shows.

Assessment of the communication activities, outputs, target clients reached and their effects.

Assessment of the demonstrations and field days

Both on-farm and on-station demonstrations were used by the project, followed by field days. Five types of demonstration trails were carried out in different associations and on research station. These include: *Coffee-banana intercropping, Evaluation of different pesticides against coffee stem borer, Physical control of coffee stem borer, ICM demonstration, and Demonstration on fipronil.*

It was realized that the distribution of the demonstrations was not fair across the different associations as they were established at few locations. Thus they had limited coverage and could not reach many farmers. It was also noted that in most cases farmers' and extension workers' role in demonstration activities were limited, and research staff seemed to play a dominant role in demonstration activities.

It was noted that five field days were held on the project's demonstration plots, though a number of field days were organized by SCFT on different coffee activities. More field days were also planned by the project to be held in September, 2005. But it was noted that no field day was organized on some the demonstrations. The fact that most demonstration plots were located close to the zonal centres where farmers are frequently assembled for various purposes provided some farmers the opportunity to visit them. However, though the visits of the demonstration fields could have been easily facilitated, the exposure was not as expected.

Despite their limited coverage, the demonstrations and field days appeared to be effective in persuading farmers, especially those who had a chance to visit, owing to the old proverb 'seeing is believing'. In particular, demonstrations and field days were found to be effective in promoting use of physical and chemical control of CSB such as smoothening of bark and the use of fipronil.

Assessment in terms of training and workshops

Training of extension workers and farmers was among the principal strategies used by the project in transferring the intended information and knowledge.

Assessment of training of extension workers

Four training programs were reported to be organized for extension workers by the project (IPM project in collaboration with CFC project). In addition, the SCFT organized periodical courses for their staff. Almost all the SCFT staff in the different Associations and district extension coordinators attended the training programs, while the extension officers participated only in one or two of the training sessions. The trainees indicated that the trainings were impressive, participatory in approach and educative in several aspects, though the frequency of the forum was low, as well as did not involve all extension workers. They claimed that the raining helped them to improve their approach by adopting participatory methods whereby farmers are actively involved in the training activities. It also allowed them to gain adequate technical knowledge on such areas as CSB control.

Assessment of farmers' training

It was generally realized that massive training activities were undertaken for farmers by the SCFT in collaboration with the government extension staff, and large number of farmers were reached through training activities rather than other channels. Though the training programs did not directly focus on the project activities, most of them somehow incorporated activities promoted by the project. Thus, majority of the interviewed farmers attended training programs on different aspects of coffee production, protection and processing. The training efforts seemed to be successful especially in creating awareness, in developing better knowledge and positive attitude among farmers. They also to some extent helped farmers to adopt some of the recommended technologies/practices. Overall,

farmers tended to favour the information communicated through extension workers in the form of training.

In addition to the formally organized training programs, the SCFT, research and government extension workers conducted a sort of awareness creation campaign on CSB, as well as briefing program on the activities of the project. Large number of farmers were reached, especially through the awareness creation campaign and thus helped them to develop better understanding about coffee stem borer.

Assessment of the printed dissemination materials used

The IPM project in collaboration with the CFC white stem borer project developed and disseminated three types of leaflets and one coffee hand book in different languages. The leaflets were produced in 2003 on: How to grow Catimors, Biology and control of white stem borer, and Coffee berry disease. The leaflets were initially prepared in English, but later on translated into Tumbuka and Chindali/Chisukwa. Initially, 500 copies of each leaflet were printed and distributed. Later on 3000 leaflets (in local languages) were produced and distributed to different associations, of which 1200 were Ndali/Chindali version, while the remaining was in Tumbuka. Almost all the SCFT and district extension coordinators had the English leaflets, though most of the extension officers didn't receive them. The distribution of those in local languages was carried out in 2005 and also reported to reach few farmers. Thus obviously it is too early to expect significant impact from the leaflets. However, it was indicated by farmers that the leaflets in local languages were useful. SCFT and extension staff also felt that leaflets were somehow effective tools in getting across brief information to farmers. They are simple, informative and can be understood as they combined both simple text and pictures. But there is a need to supplement them by training and follow-up from extension workers as well as should be produced in large quantity to improve coverage, and ensure wider impact.

Similarly, a detailed coffee hand book was initially prepared in English in 2001, and later on translated into 'Tumbuka'. About 1000 copies of the Tumbuka version were produced of which 494 copies were distributed to zone and BC officials, contact farmers, extension workers and relevant institutions. The extension workers of all associations received the English version two years or so ago. But it was noted that most of the associations received the Tumbuka version from May - July, 2005 and distributed to zone and BC officials and contact farmers recently. Thus it does not seem realistic to expect significant impact at this stage. Moreover, since the hand book was prepared only in two languages (English and Tumbuka), it was also of little help to farmers in some of the associations (non-Tumbuka speakers). Some extension workers said that the book is too bulky to read, understand and retain; but some farmers claimed that the hand book was comprehensive and more important.

Assessment of the role of contact farmers

The SCFT seemed to rely on contact farmers to communicate technical information to farmers. There were about 200 contact farmers in the five associations; one for each BC. The SCFT staff indicated that contact farmers were very much active in offering trainings to fellow farmers after being trained at association level, though some could not live up to expectations. It was also noticed that contact farmers at some zones had created information bureaus whereby different written extension materials were documented and used as a reference materials for other farmers. Group of farmers indicated that though contact farmers play crucial role, they lack adequate knowledge, confidence and necessary materials/resources, and thus need continuous support.

Assessment of the role of tour/exchange visit

Different associations reported that they had organized tour/exchange visit for farmers and extension staff, although it was not held directly on the project activities. It was felt that it gives exposure to new ideas and experiences, though it involves few people and high cost. Both farmers and extensionists believe that it is effective in persuading and motivating farmers to try out new practices and experiences and brings rapid change.

Assessment of Farmer Field School as a dissemination tool

The project, in collaboration with the CFC project, used Farmer Field School as an important training and dissemination tool. The SCFT and government extension workers were trained on FFS concepts and practices, and formed pilot FFSs on IPM (two at each association – but there was a plan to establish more), with especial emphasis to CSB control. It was reported by extension workers of all associations that farmers realized the power of FFS as a participatory learning and experience sharing tool and showed greater interest in the group activities. It was noticed that the activities of FFS groups were well on the right way. It was, however, observed that only farmers in close proximity to the FFS groups and few of the extension workers were aware of the existing FFS activities, though most extension workers were found to have idea about FFS concept. Generally, it is too early to show significant impact, though there is promising signs of success. The need for refresher course and continuous technical back-up as well as forming more FFSs and encouraging visits among the groups were realized.

Assessment of the workshops organized in relation to project activities

Two workshops were held by the project to discuss with various stakeholders on achievements of the project and issues related to coffee management and production in general. Participants drawn from Lunyangwa Research Station, SCFT, CABI-ARC and other relevant institutions attended the workshops. The workshops played important role in bringing relevant stakeholders together; though the events held were few in number.

Assessment of agricultural show

Agricultural show was used as experience exchange and information dissemination platform. Although it seems a powerful dissemination tool, its frequency and coverage did not seem to have wider impact. Thus such forum can be an important dissemination path-way if regularly and more frequently organized by all associations.

E. Assessment of farmers' preference for communication channels

Farmers indicated their preferred channels as: training by extension workers, demonstration and field days, contact farmers, tour/exchange visit, and printed extension materials, in that order. Different channels were chosen for having different merits, showing suitability of some of the channels for specific situation and their complementary nature. In general, extension workers were the most preferred source of information on coffee management for majority of the farmers, though it was noted that they were few in number and had limited coverage.

Farmers also acknowledged the persuasive power of demonstration and field days, and many tended to consider them as important dissemination media. They indicated that it boost their confidence and encourage them to put into practice the experience they gained. But they emphasized that the number of demonstration fields should be large enough to ensure wider coverage and impact unlike what has been happening with the current project. The need for holding field days on a regular basis was also emphasized.

Farmers indicated that contact farmers are instrumental in disseminating information timely as they have regular contact with the community, though they appeared to lack detailed knowledge.

Farmers also pointed out that though the printed dissemination materials are primarily intended to serve the literate section of the community, still there is some multiplier effect of the information to the illiterate groups. Their literate friends can read and explain to them, as well as they can copy the practices adopted by others. They also stated that written materials provide detailed information and can be referred to at any time; but if they are to have better use and impact, they have to be produced in local languages, being supported with good pictures and illustrations.

It was made clear by farmers that though tours offers opportunity to few farmers, it plays crucial role in providing good exposure and motivating farmers to take up new practices. However, participated farmers at times tend to withhold the information and concentrate on improving their own farms; thus it needs close followed-up and reinforcement by extension workers.

In general, most farmers tended to disfavour radio as a channel of communication for their situation. They indicated that despite its speed and wider coverage, the messages can be missed when they are on farm activities, as well as it does not allow asking questions. Language problem was also mentioned as a constraint. But few farmers indicated that it can have important role in disseminating information as most farmers possess radio. The current project, however, did not make use of radio as a communication channel.

The government extension workers and SCFT staff also showed more or less similar preference with farmers for communication channels. But they included more channels such as FFS, radio, film and video (motion pictures), and poster in addition to those mentioned by farmers.

F. Assessment of the acceptance of the information/ technologies being promoted by the project: Overall impact

It would be neither realistic nor possible to make attempts to attribute the changes observed among farmers only to a single channel of communication in isolation as different channels have interactive and complementary effects. The acceptance and adoption of new technologies is not also determined only by the means and ways they were communicated to users; it is influenced by several factors. In general, different evidences indicated that some information was reaching the target clients on most of the technologies/practices promoted by the project. Farmers indicated that although the recommended technologies/practices were found to be effective, nevertheless, they involve high costs (expensive inputs and extra labour) and these limited the extent of their adoption.

However, it became apparent that some of the improved coffee management practices/technologies being promoted by the project have been taken up by farmers. Of these, CSB (the most important pest) control measures such as smoothening of bark seemed to enjoy wider acceptance among farmers, though it is a tedious duty to use on large number of trees. Other control methods such as killing of larvae on the ground and in the stem using wire spoke were also widely practiced by farmers. Few farmers reported practicing uprooting and painting. Farmers stressed that chemicals were more effective than other methods of CSB control, and were enthusiastic about using chemicals such as fipronil, though its use was highly hampered both by unavailability and expensiveness.

Farmers also claimed that now they are capable of identifying the different coffee diseases. Though most farmers indicated that they are aware of the different pesticides and insecticides, they felt that they lack adequate knowledge on amount, time and frequency of application. Few farmers reported use of some chemicals against CBD, CSB, CLR and anthesitia bug.

With regard to use of fertilizer, it became clear that most farmers more or less knew the rate, frequency, time and method of application, and the critical need for fertilizer in growing Catimor. However, virtually all farmers reported that they grew Catimor without applying full recommendation rates mainly due to the its escalating price. But they seemed to apply no fertilizer to their traditional varieties, such as Geisha.

Although almost all farmers reported that they have adequate knowledge of proper nursery management, most of them could not use all the recommended nursery practices because of the high cost and scarcity of some of the materials and inputs.

Generally, being motivated by the relatively better yielding abilities of the new variety (Catimor), coupled with aggressive extension effort to promote catimor, farmers were inclined to abandon the old varieties such as Geisha and Agaro. Thus though majority of the farmers interviewed were aware of the importance and techniques of pruning, few of them reported using this practice as pruning was recommended for Geisha. Similarly, shade regulation was recommended for Geisha and tended to be neglected by farmers, though most farmers were fully aware of the importance of shade and good shade trees.

Regarding the status of coffee-banana intercropping, it seemed to be too early to see the effects/results of the demonstration as they were established very recently. On the other hand, most farmers knew the importance of mulch and how to use it. But due to shortage of labour and lack of commitment, very few of the interviewed farmers reported using mulch except for SE Mizumba where virtually all farmers reported using mulch because of the prevailing moisture stress problem in the area.

G. Achievements

Despite the above challenges, the project generated some remarkable achievements. The following are the major ones:

- The communication efforts of the project were successful in terms of awareness creation among the target clients. It enhanced farmers' awareness and knowledge of improved crop/coffee and pest management practices and also assisted in adopting some of them, especially those which involve low or no extra costs.
- It was indicated by the base-line survey that farmers had no control measure for white stem borer other than to try to kill the larvae that are already in the stem with a wire spoke; but at present farmers use alternative measures recommended by the project such as smoothening of bark, painting, and to some extent chemicals such as fipronil though widespread use was constrained by high cost of the chemical.
- Helped to build better linkage and communication/collaboration, especially, between the two partners of the project (SCFT and Research).

- Development of technologies/improved practices such as fipronil, and other integrated pest and disease management practices.
- Production of printed extension materials were carried out by the project, and these are of great importance especially to the extension workers as reference materials.
- Assisted research to develop a culture of moving out of station to on-farm and to adopt a participatory operation.

H. Major challenges, constraints and limitations

The following were identified as challenges, constraints and limitations that appeared to influence the impact of the project's communication efforts.

- Vastness and geographical locations of the coffee associations where the project operates, coupled with logistical and staff shortage in collaborating institutions (SCFT and research), somehow made execution and monitoring activities difficult.
- Delay in production and distribution of some of the dissemination materials, inadequacy of the quantity produced, and language problem.
- Lack of continuous and regular forum for planning, implementation, monitoring and evaluation that involve all relevant stakeholders.
- Lack of appreciation and support for coffee extension work from government extension agency higher officials was noted as a constraint. This in turn has led to lack of ownership and accountability for the project activities among field level extension workers, and this appeared to have impact on the execution of the project activities. This collaboration and linkage appeared to be weaker, especially, at Misuku and Nkhata-Bay highlands.

Scarcity/unavailability and high cost of some of the recommended inputs, such as pesticides and fertilizer.

I. Conclusions and recommendations

Though there are indications that some of the information being promoted by the project was reaching the target clients, most of the communication materials and products are yet to bring significant impact as their production/establishment and dissemination is a recent phenomenon. The communication strategies of the project, however, appeared to have remarkable impact in terms of raising the target groups awareness and knowledge with regard to integrated crop and pest management, though wider adoption and acceptance of the information/practices were constrained by several factors such as high costs and scarcity of inputs or technologies, shortage of labour, lack of complete information and continuous support, etc. It was also realized that the aggressive Catimor promotion activity has serious implication for the old varieties and related management practices.

Recommendations

The evaluation team makes the following recommendations both in order to enhance wider impact of the current project; as well as to provide a basis for designing more effective communication strategies in future similar projects:

- In order to enhance their effectiveness, printed extension materials should be backed up with other communication mechanisms such as training, field days, etc. Moreover, further large scale production and distribution of these materials in local languages is needed.
- Encouraging exchange visits and farmer-to-farmer information dissemination as fellow farmers were mentioned as important source of information. In particular, encouraging visits to FFS fields needs due attention.
- It was noted that the old varieties such as Geisha and Agaro have been offered attractive prices from some buyers. Moreover, it was indicated that the new variety (Catimor) has high fertilizer requirement, and that farmers could not afford to apply the recommended rate. Thus aggressive transfer of Catimor at the expense of the older varieties needs caution. The old varieties are generally at great risk and their maintenance needs critical attention from the loss of genetic resource point of view as well.
- Demonstration is obviously one of the most important mechanisms of information/technology transfer, as 'seeing is believing'. Thus it should be widely and systematically used as a powerful dissemination tool. Use of simple demonstration plots with few treatments and large plot size that are located in accessible places should be focused in future activities. Moreover, it is essential to organize field days more frequently to expose the demonstration fields to large number of farmers.
- FFS can play crucial role in accelerating the dissemination of technical information or outputs of the project in a participatory manner. Thus establishing more FFS and providing continuous technical backstopping to their facilitators should be given attention.
- The need for use of mass-media (especially radio) to create awareness need to be seriously considered in future similar projects as most farmers were said to have radios;
- Indigenous communication channels such as local organizations and informal networks, and local fora can play important role in facilitating information flow within the communities. Therefore, the use of such local channels for information/technology dissemination needs due attention.
- There is also a need for a wrap-up workshop to communicate the achievements and outputs of the project, and help the other partners to take up and use the outputs of the project in their future programs.
- Strengthening research efforts to serve as a spring board and continuously deliver technologies and back-up the extension efforts. It is crucial to come up with economical and appropriate basket of options for disease and pest management.

- Regular and active collaborative links need to be established between SCFT, government extension agency and research.
- Financial support should be solicited to design and implement a follow on project to widely push the available information/technologies (current project outputs) to users. The possibilities of extending the time period of the project should also be considered so as to disseminate the information and knowledge generated during this phase of the project.

1. Introduction

Coffee is one of the most important commodities in Malawi, accounting for around 4% of the country's export earnings. Coffee plays crucial role in the livelihood of the Majority of smallholder farmers in Northern Malawi, though the smallholder sector contributes only about 5% of national production. Since 2002, the smallholder sector has been expanding at a time when, due to the low world price, coffee output from the estate sector has been declining as they diversify into other crops, such as tea and macadamia nuts. There are about 4000 smallholder coffee farmers in Northern Malawi. The SCFT organized the smallholder coffee farmers into five Associations which were subdivided into 'Zones' centred on the pulperies, and each zone was divided into the entry point for farmer representation the 'Business Centre' (Table 1).

Table 1. Zones, Business Centres and membership in the 5 associations of the SCFT

Association/zones, business centres, membership		**Misuku Hills**	**Nkhata Bay Highlands**	**SE Mzimba**	**Phoka Hills**	**Viphya North**	**Total**
Business Zones		14	8	7	8	6	43
Business Centres		84	12	40	24	16	176
No. of registered farmers	2003	1956	256	520	488	271	3491
	2005	1296	426	600	695	380	3397

Sources: Final technical report and SCFT offices at different levels

Despite its vital role, the production and productivity of the smallholder coffee sector in this part of the country remained low. Among other things, the poor crop and pest management practices used by the producers, and widespread pest and disease problems acted as major contributing factors to this. To address these bottlenecks, IPM projects were designed and implemented in different phases since 1997. The first CPP coffee IPM (R6807) was undertaken from 1997 – 2000. The main output from this phase of the IPM project was a socio-economic evaluation of changes in coffee pest management by smallholders and survey reports of the main pest and disease problems in the 5 Associations. From this data an IPM system was devised (at this stage for the old varieties Geisha and Agaro). A short project was funded (R7942, Jan 2001 – June 2002), to establish a participatory approach to the on-farm validation of this IPM system. By the end of R7942, the EU-funded rehabilitation of smallholder coffee was beginning to have an impact. When the third CPP Coffee IPM project begun in September 2002, SCFT were focusing their effort on the Catimor growers. The role of the CPP project was now to ensure that the IPM/ICM messages that had been developed over the years were promoted, through, extension literature, on-farm demonstrations, field days and farmer training. The current phase of the IPM project activities started in January, 2001 as a follow-up project to the

previously implemented project. The project aimed at benefiting the poor by demonstrating and promoting an integrated crop and pest management approach to increase coffee production. The project has adopted an integrated crop management approach in an attempt to address all aspects of coffee production. At field level, the aim is to develop an integrated coffee management system for farmers with different levels of resources while the sustainable marketing channel is being looked into with SCFT management. The project was funded by DFID and executed by NRI in collaboration with CABI-Africa Regional Centre, SCFT, Ministry of Agriculture and Irrigation Development – Lunyangwa Research Station. The project attempted to use the grass-roots farmers' organization of the SCFT as uptake path-ways for the technical information being promoted by the project.

The objectives of the project were:

- To promote improved coffee management practices for increased yield as a contribution to poverty reduction in Northern Malawi.
- To evaluate chemical and other methods of control for white stem borer.

The expected project outputs were:

- Best practices/integrated crop management demonstrated and promoted.
- Methods for stem borer control evaluated.
- Non-chemical approach to disease control promoted.
- Cost benefit analysis and constraints to adoption of best practice addressed.
- Farmer knowledge of ICPM improved.

2. Purpose of the evaluation

Extension evaluation can be defined as a systematic process of assessing the value/impact or potential value of an extension program. Thus evaluation is used both to improve present interventions as well as to design effective future programs. The principal reason for undertaking this evaluation exercise was, however, to assess whether the communication strategies used by the IPM project were successful; in other words to see whether they reached the intended audiences, and had the intended effects. Thus the evaluation effort attempted to look into different aspects such as the activities, processes, outputs, and impacts of the communication intervention. The evaluation exercise was carried out from 28th August – 9th September, 2005.

3. Methodology and approach of the assessment

Two types of evidences were used in the assessment: evidence in terms of opportunity, and evidence in terms of changes in the behaviour and practice/action of people. In the former case, an attempt was made to assess the communication/learning situation the project has set up; while in the later case

consideration was given to whether target groups have changed their attitudes or practices as a result of the communication efforts.

Qualitative approaches such as participatory rapid appraisal methods and techniques were predominantly used in gathering the information required for the evaluation. Besides their relatively short time requirement, the approaches/methods provided flexibility to obtain further clarification, to explore new ideas, and develop better understanding of the issues. They also encouraged investigation and analysis by farmers themselves as well as by relevant extension workers.

The evaluation team began the assessment by review of available documents and by holding discussions with relevant staff from SCFT and Lunyangwa Research Station. Then field trips were made to all the five coffee associations in Northern Malawi. The field assessment was carried out using the following methods and techniques:

- Semi-structured interviews and discussions (with farmers, extension workers, SCFT and research staff),
- Key informant interviews,
- Focus group discussion,
- Field visits/tours and direct observation,
- Participatory scoring and ranking, and other relevant exercises.

In total, 187 farmers, 20 government extension workers, 15 SCFT staff at different levels and 3 Lunyangwa research staff were involved in the information collection process in different ways. Some information was also obtained from relevant CABI-ARC staff. The secondary sources of information reviewed by the team include: project proposal, progress and technical reports, minutes of meetings, training reports, different records, dissemination materials (leaflets and booklet) and other relevant documents.

Lack of comprehensive and clearly stated indicators in the project proposal, lack of baseline information specifically gathered for this phase of the project and shortage of time were among the major problems during the assessment. The fact that neither the SCFT nor the government extension staff could specifically identify or distinguish between the activities undertaken under different projects such as EU, IPM, CFC, etc, also somehow made the assessment process difficult.

4. Assessment of Communication Strategies

4.1. Communication Channels employed

It was clear from the assessment that a number of dissemination path-ways were used to get the intended information across to target clients. The following are

the major channels of communication used by the project or by SCFT in relation to the project activities:

- Demonstrations (both on-farm and on-station demonstrations) and field days,
- Training (of farmers and extension workers).
- Printed dissemination materials (leaflets and hand book),
- Contact farmers,
- Tour/exchange visit,
- Farmer Field Schools,
- Workshops and meetings,
- Agricultural show

4.2. Assessment of the communication activities, outputs, and the target clients reached through different communication channels.

This section of the report looks into the activities and outputs of the communication efforts, and the target groups' exposure. In other words, it attempts to assess the communication situation that has been set up, as well as evaluates exposure of the target groups to the different communication media/channels. This mainly assesses the number of communication materials produced, number of communication fora or events organized, number of people who attended the different events, or were reached in different ways. The contents, approaches used and extent of participation of the target group in the communication process will also be considered.

4.2.1. Assessment of the demonstrations and field days conducted

Both on-farm and on-station demonstrations were used by the project, followed by field days in an attempt to expose farmers to the recommended practices and their results.

Types and locations of demonstrations used by the project

1. Coffee-banana intercropping demonstration.
This demonstration trial was conducted at 10 locations, of which 8 were on-farm trials at Chakaka and Misuku, while 2 of them were on station trials at Nchenachena and Misuku. This concentrated on areas where bananas are traditionally intercropped with coffee and have a role in food security.

2. Evaluation of different pesticides against coffee stem borer
This demonstration trial was situated at 15 locations in Misuku, Phoka, V/North, and SE Mzimba, and all were on-farm, but one. In each of the first three associations, the trials were laid out at 4 sites, while SE-Mzimba had only three sites.

3. Physical control of coffee stem borer:
This demonstration trial was located at two sites, one at Nchenachena (on-station) and the other one at Junju (on-farm).

4. ICM demonstration:
This trial was initially laid out at three locations at Salawe (Phoka Hills), V/North and Misuku. But the one at Misuku was later on destroyed as a tree fell on it, and was abandoned.

5. Demonstration on fipronil:
This on-farm demonstration was located each at four sites at Misuku and Chakaka (Poka Hills). This trial seemed to be the only true demonstration trial.

It was realized that the distribution of demonstration plots were not reasonably fair across the different coffee associations and zones. They were carried out at few locations and thus had limited coverage (i.e. could not reach many farmers). Most of the demonstrations were located close to the zonal centres and on research station. For example, although the major component and focus area of the project was promoting integrated crop management practices mainly through demonstrations, the ICM demonstration was set up only at three locations of which one was abandoned due to damage caused by fallen trees. SCFT staff in different associations indicated that though the demonstrations are very important, the existing ones are a drop in the ocean; indicating that few farmers had access to the demonstration fields.

Farmers and extension workers participation on and exposure to the demonstration and field days
It was noted that in most cases farmers' role in demonstration activities was limited to providing land and undertaking some field management activities such as weeding, while the application of treatments, data collection and other technical activities were considered as the sole responsibility of the research staff. Selection of demonstration hosting farmers and farms in some of the associations (such as SE Mzimba), was carried out jointly by research staff, SCFT staff and government extension staff; though in some cases it was reported that researchers undertook farm selection and implementation of the demonstration without involving the extension staff. For example, except the coordinator, the extension workers at Phoka Hills indicated that they were not fully aware of the demonstration activities in their zones. Similarly, the government extension staff at Misuku reported that some of them even do not know what the demonstration in their operational area is about. In a sharp contrast, the extension workers at SE Mzimba indicated that they fully participated in the demonstration activities. This implies that the level of participation and collaboration seemed to heavily depend on personal commitment of the individuals assigned in the area. However, it must be noted that the government extension staff are involved in several other crops, eg. tobacco, maize, and some individuals may have less interest in coffee

Generally, five field days were held on the project's demonstration plots. It was, however, reported that a number of field days were organized by SCFT on different coffee activities. Although some of the field days organized by SCFT were on activities related to the project, they were not carried out on the demonstrations laid out by the project. For instance, nine field days were organized at Misuku and Phoka Hills in 2004/05 with attendance of 831 and 369 farmers, respectively.

The fact that most demonstration plots were located close to the zonal centres where farmers are frequently assembled for various purposes, provided some farmers the opportunity to visit them. However, though the visits of the demonstration fields could have been easily facilitated, the exposure was not as expected. Hence, farmers across the different zones generally indicated that they simply saw the demonstration plots as they pass by; but had no idea as to what some of the demonstrations were for and what was going on there.

Table 2. Field days organized on the demonstration plots and attendance

Date	Association	Zone	Attendance	
			Farmers	Extension staff
19/09/02	Phoka Hills	Salawe	53	4
18/11/04	Phoka Hills	Chakaka	29	3
19/11/04	Phoka Hills	Salawe	16	3
04/08/05	Phoka Hills	Chakaka	23	2
05/08/05	Phoka Hills	Nchenachena	20	7

In general, few field days were organized; whereas in some cases no field day was organized on the demonstrations. Moreover, as can be seen from the above table, field days concentrated on limited areas/associations as well as attended by few farmers. For example, although there were a number of demonstration fields in South-East Mzimba, no field day was organized on them. Moreover, field days were not conducted on the demonstration on coffee-banaba intercropping at Chisi though it was started in 2003. However, it was realized that more field days were planned by the project to be held in September, 2005.

4.2.2. Assessment in terms of training and workshops

Training of extension workers and farmers was among the principal strategies used by the project in transferring the intended information and knowledge to the target groups.

Training of extension workers

Four formal training programs were reported to be organized for extension workers by the project (IPM project in collaboration with CFC project). Below are the training sessions conducted by the project:

a. Training on Coffee CPM held at Mzuzu, 15 – 19 December, 2003.

b. Training held on incidence and severity of Coffee Stem Borer (CSB) at vocational training centre, conducted in 2004.
c. Training of trainers held at community training centre, 5 - 11 November, 2004
d. Training organized in 2005 on socio-economic aspects of CSB in Malawi, and other related topics (held in 2005).

In addition to these, the SCFT also organized and offered periodical courses to their staff. Generally, as can be seen from the above training programs, the trainings appeared to lack continuity and were also few in number.

Assessment of extension workers' involvement in the training sessions

It was reported that almost all the SCFT staff (Association advisors and farm guide advisors) situated in different Associations attended the training programs organized by the project. Similarly, virtually all of the government district extension coordinators attended the trainings, while the extension officers participated only in one or two of the training sessions. Some of the relevant staff located at SCFT head office as well as the research staff also took part in the trainings. The training programs were facilitated by resource persons from CABI-ARC and Lunyangwa Research Station. It was reported that each training session was attended by an average of 30 participants. Participants indicated that the trainings were participatory and educative in several aspects. But it was felt that the frequency of the forum was low, as well as did not involve all extension workers.

Assessment of farmers' trainings (events organized and audiences reached)

The trained extension workers were in turn expected to train farmers of their respective stations. In this regard, it became clear that both the government extension staff and SCFT staff made efforts to transfer the information and knowledge they gained to farmers. A number of training programs were organized and conducted especially by SCFT staff in different associations every year. But though these training programs did not directly focus on the project activities, most of them somehow incorporated activities/information promoted by the project. Thus though records of a number of farmer training activities were obtained from SCFT head office and from different association offices, it was felt that reporting details of those figures for this purpose might be of less relevance. In general, massive training activities were undertaken for farmers in different associations by the SCFT in collaboration with the government extension staff. These trainings were of three categories.

1. Mobile courses – a type of training referring to those programs conducted by the SCFT and government extension staff by moving from zone to zone, i.e. held in farmers' villages. It was reported by each association that several such training events had been carried out each year. For instance, at Misuku a number of such sessions/activities were held and about 2469 farmers were reached in 2003/04 and 2004/05.

2. Day training course – these are courses offered by inviting farmers to the association offices for a day. It is a sort of routine activity targeting large number of farmers. Several day long courses were organized at each association and reached a large number of farmers. For example, 24 day training courses were organized at Misuku in 2003/04 and 2004/05 with attendances of 610 farmers.
3. Residential training – this category refers to those courses offered for some days whereby participating farmers spend some nights at the association centres. These courses in most cases are organized for leaders in aspects such as cooperative development and other management skills, and thus have nothing or little to do with the activities promoted by the project. For instance, about 179 farmers attended this course at Misuku in 2003/04 and 2004/05.

Similarly, 13 day training courses with attendance of 246, eight residential training sessions with attendance of 120, and 65 mobile trainings with attendance of 104 were conducted at Phoka Hills in 2004/05. But complete information was not obtained on the number of training sessions from the other associations.

Majority of the farmers interviewed reported that they have attended training programs on different aspects of coffee production, protection and processing – such as nursery management, fertilizer application, trenching, hole preparation, spacing, mulching, spraying, white stem borer control, coffee processing, etc. Some of the interviewed farmers indicated that these trainings not only helped them to develop awareness and better understanding, they also assisted them to adopt some of the improved management practices. The assessment team generally realized that a large number of farmers were reached through training activities rather than other channels.

Awareness creation campaign for farmers on Coffee Stem Borer

In addition to the above regular courses, the SCFT and government extension workers made effort to conduct awareness creation campaigns on CSB. For instance, after attending the training organized by the project in 2003, the SCFT staff at Misuku (with some assistance from the government extension workers) conducted a massive campaign whereby meetings were organized for farmers at different zones to widely create awareness on the life cycle of coffee white stem borer. It was indicated that prior to the awareness creation campaigns, farmers did not have any idea about the life cycle of white stem borer, and thus the campaign helped to develop better understanding in this aspect.

Briefing of farmers

Following the planning meeting held by the researchers and SCFT staff, a briefing program was conducted for farmers by moving to different associations. The aim of the program was to let farmers know what was done in the previous year and what has been planned for the year 2003 season. It especially focused on the demonstrations and trials that were planned to be set up in different

associations. The briefing program took place between 20 – 24 January, 2003, with a total attendance of 140 farmers and extension workers.

Table 3. Briefing program attendance (by farmers and extension staff)

Date	Association	Number of farmers attended	Number of extension staff attended	Total
20/01/03	Misuku	22	10	32
21/01/03	Phoka Hills	27	3	30
22/01/03	V/North	19	4	23
23/01/03	SE Mzimba	25	5	30
24/01/03	N/bay	17	8	25
Total		110	30	140

4.2.3. Assessment of the printed dissemination materials used

The project made use of different printed extension materials as one of the dissemination path-ways.

Types of printed materials developed and disseminated

The IPM project in collaboration with the Common Fund for Commodities (CFC) white stem borer project has developed and disseminated three leaflets in different languages and translated one coffee hand book into Tumbuka. The handbook was originally developed by SCFT and Lunyangwa Research Station.

Leaflets production, distribution and accessibility to farmers

Three types of leaflets were produced in 2003 on the following areas:

- How to grow Catimors,
- Biology and control of white stem borer, and
- Coffee berry disease.

The leaflets were initially prepared in English, but later on translated into two local languages (Tumbuka and Chindali/Chisukwa). Initially, 500 copies of each leaflet were printed and distributed to coffee extensionists and coffee farmers. A total of 3000 leaflets (in local languages) were distributed in different associations in 2004, of which 1200 were Ndali/Chindali version, whereas the remaining were in Tumbuka. All the Ndali vesions were distributed to Misuku, while the Tumbuka one was allocated to the rest of the four associations (see figure-1).

According to Mr Kaunda, the SCFT operations manager, the English version of the leaflets targeted extension workers, while those in the local languages were meant for farmers. But it became evident that most of the extension workers didn't receive the leaflets. Some of the extension workers at Misuku received the leaflets in 2004, while one of them reported receiving in 2005. Similarly, all of the extension workers interviewed at Phoka Hills received copies of the English

leaflets in 2004. But all of the four extension workers who attended the group discussion and interview at Nkhata-Bay highlands indicated that they did not receive any of the leaflets. Similarly, the extension officers attended group discussion at SE-Mzimba association indicated that they did not get the leaflets, except the district extension coordinator.

Some farmers reported that they received some of the English leaflets in 2004. It was, however, noted that the distribution of the leaflets in local languages was carried out in 2005. Of the 19 farmers attended group discussion at Kapita zone in SE – Mzimba, 7 of them received the leaflets. Similarly, 4 contact farmers from Khosolo zone reported receiving the English leaflets in November 2004, while almost all of the farmers attended the meeting at Khosolo indicated that they saw some of the leaflets. Five of the 18 farmers participated in the group discussion at Viphya North received the English leaflets in 2004. Only 3 of the 35 farmers of the different zones who attended group discussion at Chisi zone had leaflets, while eight of them reported simply seeing the leaflets. In general, the leaflets in local languages reached few farmers mainly in the month of this assessment. Thus obviously it is too early to expect significant impact from these leaflets. It was, however, emphasized by farmers that the leaflets in local languages were very useful.

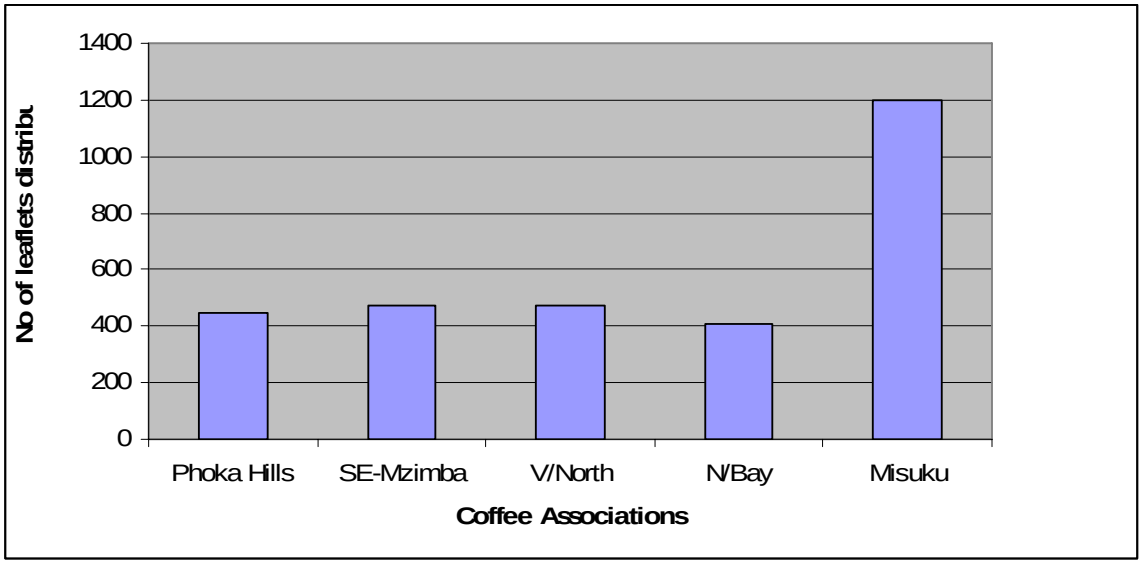

Figure 1. Number of leaflets distributed in different associations

Hand book production, distribution and accessibility to farmers

A detailed coffee hand book was initially prepared in English in 2001, and later on translated into one of the local languages ‘‘Tumbuka’’. The hand book presents all aspects of coffee production and processing in great detail. But printing of the translated version (Tumbuka) of the hand book was delayed due to the problem with the printing firm and thus finalized and distributed very recently. It was indicated that 1000 copies of the Tumbuka version of the hand book were

produced of which 494 copies were distributed to zone and BC officials, contact farmers and relevant institutions (Table 4). Extension workers and farmers of the different zones (eg. Sokola and Chisi zones) indicated that the Tumbuka version of the hand book has just reached them few days before this assessment. This similarly indicates that the Tumbuka version reached few users and is too early to bring significant impact.

The extension workers of all associations, both government and SCFT staff, reported receiving the English version of the hand book. Virtually in all associations, the Tumbuka version of the hand book was distributed to committee members (chairpersons) of associations, zone and business centres, contact farmers and in some cases to government extension workers. Of the 35 farmers attended group discussion and interview at Chisi, only one contact farmer reported receiving the book just few days before the assessment, while the remaining indicated that they did not receive any. Contact farmers of South-East Mzimba (Kapita and Khosolo zones) reported that they received the Tumbuka version of the hand book in May 2005, though the English version reached them last year. In the same association, some extension officers also received the Tumbuka version of the hand book. Similarly, in Nkata-Bay highlands, 16 copies of the Tumbuka version of the hand book were received in May, 2005 and dispatched to contact farmers in August, 2005. But none of the Tumbuka version of the hand book was given to government extension workers in N/bay highlands. Similarly, Viphya North received 44 copies of the Tumbuka version in May, 2005 and distributed to contact farmers, zone and BC officials, and some extension workers. Therefore, it was generally realized that most of the associations received the Tumbuka version of the hand book only in May to July, 2005 and distributed to zone and BC officials and contact farmers recently. The English version of the hand book, however, reached most of the extension workers in different associations two years or so ago.

Table 4. Tumbuka book distribution by SCFT

Association	Business zone	Business centre	Contact farmers	Total
Misuku	15	94	94	
Nkhata Bay	8	16	19	
V/North	6	16	21	
SE mzimba	7	42	42	
Phoka Hills	8	24	48	
Total	**192**	**44**	**224**	**460**
Staff				35
Sample to Lunyangwa				1
Sample to NRI				2
Grand total				**494**
Total printed				1000
Balance				502

4.2.4. Assessment of the role of contact farmers

It was noted that the SCFT heavily relies on contact farmers to communicate technical information to coffee farmers. The SCFT management indicated that contact farmers are a sort of practical and hands-on people. The Business Centres, in collaboration with the SCFT staff, are responsible for the selection of contact farmers, and each BC has got one contact farmer. According to Mr Kaunda, about 200 contact farmers are found in the five associations. The contact farmers of almost all associations received training as well as written dissemination materials such as leaflets and hand book. The SCFT extension staff indicated that contact farmers have been very much active in offering trainings to fellow farmers after being trained at association level, though some could not live up to expectations. It was also noticed that contact farmers at some zones had created information bureaus whereby different written extension materials were documented and used as a reference materials for other farmers. Interviewed farmers indicated that contact farmers, however, tend to lack adequate knowledge, confidence and necessary materials/resources. On the other hand, contact farmers were creations of SCFT and also expected to report to them; thus do not have much contact and communication with the government extension staff. Generally, the concept of a contact farmer is a recent phenomena (started in 2001) in the area, and thus their contribution and impact still remains to be seen. However, if they are regularly backed-up by training and relevant information, they can be effective as they are close to the community and thus have regular interaction and share a similar situation with farmers.

4.2.5. Assessment of the role of tour/exchange visit

Although it was not held directly in relation to the project activities, different associations reported that they had been organizing field tours for farmers and extension staff. For example, Misuku association organized a field tour to Mzimba and 40 farmers and 6 extension staff took part in the visit. The association advisors and extension workers stated that they found it very effective in encouraging farmers to try out new practices and experiences gained from other areas. Mr Kaunda of SCFT emphasized that tours were very effective in persuading, motivating and bringing rapid changes among farmers. Most of the interviewed farmers and extension staff also tended to favour tour/exchange visits saying that it gives them exposure to new areas, ideas and experiences. They stated that though it involves few people and high cost, it is without doubt a powerful tool because; ‘‘seeing is believing’’. However, some SCFT and government extension staff said that though it is instrumental in gaining new experiences and in motivating change and actions among farmers, tour involves high cost, as well as gives opportunity to few farmers. In general, due to financial constraints and other associated factors, so far very few farmers and extension staff were reported to get exposure through tour/exchange visits.

4.2.6. Assessment of Farmer Field Schools as a dissemination tool

The project, in collaboration with the CFC project, used Farmers' Field School (FFS) as an important training and dissemination tool. The SCFT and government extension workers of the different associations attended a training program on FFS, and formed pilot FFS groups on IPM, with special emphasis to Coffee Stem Borer control. Extension workers expressed that the FFS joint learning activities allowed both outsiders (extensionists and researchers) and insiders (farmers) to share experiences from the field and scientific knowledge. It was also reported virtually at all associations that farmers realized the power of FFS as a learning and experience sharing tool and showed greater interest in the group activities. Generally, it was noticed that the activities of FFS groups are well on the right way. Extension staff also believed that FFS are less demanding in terms of resource and that local extension workers and farmers can afford to conduct this sort of participatory learning forum. But it was observed that only farmers in close proximity with the FFS groups were aware of the FFS activities. Similarly, only few of the extension workers were aware of the ongoing FFS activities, even though most of them were found to have idea about FFS. It was also noted that attendance and meeting frequency appeared to be affected at some places by workload (as it was harvesting period).

Though the groups were said to make remarkable progress and some promising signs of success, it was, however, too early to show significant impact in this respect. The need for refresher course and technical back-up as well as the importance of encouraging visits among the groups and forming more FFS groups was clearly realized by the evaluation team.

Table 5. FFS groups formed and plan to establish new ones

Association	Number of FFS established last year	Plan to establish new ones	Total
Misuku	2	4	6
Phoka Hills	2	8	10
V/North	2	3	5
N/bay	2	4	6

4.2.7. Assessment of the workshops organized in relation to project activities

Two workshops were held by the project to discuss with various stakeholders on achievements of the project and issues related to coffee management and production in general. Participants drawn from Lunyangwa Research Station, SCFT, CABI-ARC and other relevant institutions attended the workshops. Though the workshops played important role in bringing relevant stakeholders together; but it could have played better role if held more frequently and regularly.

4.2.8. Assessment of agricultural show as an information dissemination mechanism

Agricultural show was also used as experience exchange and information dissemination platform. But the frequency was very limited and also was not organized by all associations. For instance, it was organized at Phoka Hills in August 2004 with attendance of 2364 farmers. During this event, different pest and disease control measures and other relevant experiences and products were displayed. Although it seems a powerful dissemination tool, its frequency and coverage does not seem to have wider impact. Thus such forum can be an important dissemination path-way if regularly and more frequently organized by all associations.

4.3. Outcome and impact of some of the communication channels

Outcome in this context is changes in the behaviour or actions of the target groups of the project. Though it was a bit difficult to measure the impact of each communication channel in isolation, an investigation into the effect of some of the major dissemination path-ways were made. Effort was made to assess the outcome of communication process in terms of knowledge, attitudes, and behavioural and practice change among the target group (as the communication efforts are primarily expected to influence these aspects).

Assessments of the impacts of demonstration and field days

Although demonstration plots were laid out on limited areas, somehow they appeared to be effective in persuading farmers owing to the old proverb 'seeing is believing'. Similarly, though few field days were organized, it was noted that it had significant impact on those who had a chance to attend. In particular, demonstrations and field days were found to be effective in promoting use of physical and chemical control of CSB such as smoothening of bark and the use of fipronil.

But the demonstrations did not seem to have significant impact mainly because of the following reasons:

- They were too few and had limited coverage. Moreover, though the effort in organizing field days was encouraging, few field days were organized on the demonstrations,
- Although most of the demonstrations were laid out on farmers' fields, participation of farmers and extension workers in the demonstrations were noted to be minimal,
- Some of the demonstrations were at their infant stage and need some time to produce the intended impact,
- Most of the demonstrations were in the form of experimental plots and need to be simple and clear. Moreover, the demonstrations involved many treatments which can make it difficult for farmers to easily identify the difference between the plots. For instance, the ICM demonstration

incorporated fertilizer application, shade management, pruning, fungicide application and insecticide application.

- In general, the demonstrations need to be refined and further strengthened by research,

Assessment of the effects/impacts of extension workers trainings

The SCFT and government extension staff pointed out that the trainings offered by the project were impressive both in terms of content areas and the methodologies used. They stressed that the trainings were relevant, comprehensive and highly participatory in approach. They thus claimed that after they have attended the training sessions organized by the project, they have improved/changed their training approach to participatory ones whereby they involve farmers actively in their training activities. In particular, most of the trained government extension workers and SCFT staff pointed out that before the training, they did not have any idea about the life cycle of white stem borer. They believed that now they possess adequate knowledge on this area.

Assessment of the effects/impacts of farmers' trainings

The training approaches and efforts seem to be successful especially in creating awareness and in developing better knowledge, skills and positive attitude among farmers. They also to some extent appeared to play significant role in brining about behavioural change among farmers, and in helping to adopt some of the recommended technologies/practices. During the scoring and ranking of different channels of communication, farmers tended to favour the information communicated through extension workers. The details of the adoption of the communicated information/technologies discussed in section 5.6.

Assessment of impacts of leaflets and hand book

It was indicated that leaflets were somehow effective tools in getting across brief information to farmers, but need to be supplemented by training and follow-up from extension workers. Some of the extension personnel tended to favour leaflets than the hand book, saying that leaflets are brief, simple and informative. Farmers expressed that leaflets can be understood as they combined both simple text and pictures. But there is a need to produce in large quantity to improve coverage, and ensure wider impact. Moreover, it was also claimed by some farmers that leaflets lack clarity as the units indicated were not in locally known terms (for example, it says 250gm, which does not give any sense to them). Mr Chanika, the national project coordinator, was of the opinion that leaflets were of limited effectiveness as they do not allow feedback on the status of the communicated information, farmers' opinion and reaction.

On the other hand, as the Tumbuka version of the hand book reached the end-users very recently, it does not seem realistic to expect significant impact. Moreover, since the hand book was prepared only in two languages (English and Tumbuka), it was also of little help to farmers in some of the associations (non-Tumbuka speakers). Thus farmers of some associations and zones (such as

Chisi and Sokola) expressed that they would prefer to have Chindali version of the hand book. Some extension workers said that the book is too bulky to read, understand and retain. However, some farmers at Viphya North, (especially contact farmers, zone and BC officials) said that the hand book was more important, comprehensive and easy to understand. Mr Chanika also shares this view. Mr Chanika emphasized the need for backing-up the hand book and leaflets by trainings, and making close follow-ups after their distribution, if they are to have better impact. He was of the opinion that they have to be introduced through training. He generally felt that so far the effectiveness of the written dissemination materials was very low.

On the other hand, it was pointed out by the extension workers that there is high literacy level (for instance, about 90 percent of farmers in Misuku association are literate), which suggests that there is a great potential for print extension materials to bring impact if they are properly and adequately produced.

4.4. Assessment of farmers' preference for different communication channels

Various exercises were carried out with farmers at various associations and zones to assess their preference for the different communication and dissemination media. Farmers generally indicated their preferred channels as: training by extension workers, demonstration and field days, contact farmers, tour/exchange visit, and printed extension materials (book/leaflets), in that order (see table 6). In general, the importance of receiving information directly from extension workers was emphasized by farmers. Farmers felt that information offered by extension workers in the form of training, meeting and informal contacts is crucial as they have better knowledge and can provide relatively accurate and detailed information. It was, however, pointed out that extension workers are few in number and have limited coverage. Moreover, the government extension workers tend to give less attention to activities related to coffee.

Farmers also stressed the persuasive power of demonstration and field days, and many tended to consider them as important dissemination techniques. Farmers expressed that as demonstration offers them the chance to observe what is actually happening or the results of a new practice, it boost their confidence and thus encourage them to go back and put into practice the experience they gained. But farmers emphasized that the number of demonstration fields should be large enough to ensure wider coverage and impact unlike what has been happening with the current project. It was indicated that the demonstrations carried out by the IPM project were far away from most villages, too few and had limited coverage/accessibility. In addition, the field days were not organized on most of the demonstration fields.

Table –6: Ranking of the different communication channels through open voting technique (at different zones).

Channel	Sokola	Chisi	Salawe and Junju	Nkhata-bay	Viphya North	Total	Rank
Training by EWs	12	32	16	11	15	86	1
Leaflets and booklet	4	16	6	8	9	43	5
Demonstration and field days	10	22	12	7	15	66	2
Contact farmer	8	26	7	10	6	57	3
Tour	10	3	13	6	13	45	4
Radio	0	2	3	0	0	5	6

Majority of the interviewed farmers also indicated that contact farmers are instrumental in disseminating information timely as they have regular contact with the community. They, however, pointed out that contact farmers seem to lack detailed or adequate knowledge; suggesting the need for regular and continuous provision of information and support for contact farmers if they are to be more effective.

Farmers also indicated that though the printed dissemination materials are primarily intended to serve the literate section of the community, still there is some multiplier effect of the information to the illiterate groups as their literate friends can read and explain to them, as well as copying the practices adopted by their friends. Farmers also said that written materials provide detailed information and can be referred to at any time. But they emphasized that if they are to have better use and impact, they have to be produced in local languages, as well as supported with good pictures and illustrations. Some farmers indicated that leaflets are simple, self-explanatory and easy to understand; while others like those at Khosolo zone of SE Mzimba, tended to show better preference for the hand book, saying that the book provides detailed information.

On the other hand, it was clear from farmers that though tour or exchange visit offers opportunity to few farmers, it plays crucial role in providing good exposure and motivating farmers to take up new practices. It was, however, indicated by some farmers that farmers participated in tours and exchange visits at times tend to withhold the information and concentrate on improving their own farms rather than passing on the information and experience they gained to others. The interviewed farmers emphasized that, if it is to be more effective, tour needs close followed-up and reinforcement by extension workers.

In general, farmers tended to disfavour radio as a channel of communication for their situation. They indicated that though radio is believed to be the fastest

channel in getting information to a large number of audiences, the messages can be missed when they are on farm activities as the programs are usually given short time, as well as it does not permit asking questions. Language problem was also mentioned as a constraint. But few farmers indicated that it can have important role in disseminating information as most farmers possess radio. For example, 14 of the 35 farmers attended group discussion at Chisi zone had radio and also indicated that they want to get information through radio. But the current project did not make use of radio as a communication channel.

In addition to the open voting and ranking of the different channels, assessment of farmers' views towards these channels was carried out based on various criteria through scoring and ranking by five farmers' groups at different zones.

The overall scoring and ranking of the communication channels at different zones based on various criteria was more or less similar to the results obtained through open voting technique (Table 7). As indicated in the above table, different channels were chosen for having different merits, showing suitability of some of the channels for specific situation/purposes and the complementary nature of different communication media and thus the need to use them in combination.

Table –7. Scoring and ranking of communication channels by farmer groups (average score) ***1 = low*** ***5 = high***

Channels / **Criteria**	**Demonstration/ Field days**	**Contact farmers**	**Hand book**	**Leaflets**	**Training by EWs**	**Tour**	**Radio**
Comprehensiveness	4.4	3.6	3	2.8	5	3.4	2.2
Coverage/ Accessibility	4.8	4.4	2.8	3.2	5	3	3.5
Usefulness/ Relevance	4.4	3.8	2.8	2.8	5	3	2.6
Simplicity/ Understandability	4.2	4	2.2	2.8	5	3	1.6
Use by different categories of farmers	3.8	4.2	1.8	2.4	4.8	2.2	1.4
Persuasiveness	4.6	3.4	2.8	2.8	5	3.2	2
Overall average score	**4.37**	**3.90**	**2.57**	**2.60**	**4.97**	**2.97**	**2.13**

During discussion with government extension workers and SCFT staff, they showed more or less similar preference with farmers for communication channels. But they included more channels which farmers seemed to overlook. They added some important channels such as FFS, radio, film and video (motion pictures), and poster in addition to extension workers, demonstrations/ field days, tour, contact farmers and written materials.

5. Assessment of the acceptance of the information/technologies being promoted by the project: Overall impact of the communication channels

It would be neither realistic nor possible to make attempts to attribute the changes observed among farmers in terms of awareness, knowledge, attitude and practice only to a single or few channels in isolation as different communication channels have interactive and complementary effects. On the other hand, it is also a fact beyond dispute that the acceptance and adoption of new technologies and practices is not determined only by the means and ways they were communicated to users. But factors related to farmers, farms, the technologies being promoted or other external factors also highly influence their acceptance. For instance, Mr Kaunda stated that the up take of improved practices and the intensity of coffee management practices being used by farmers, to a larger extent, depend on coffee market situation. Therefore, it would be difficult to consider low or lack of acceptance of the improved practices/technologies solely as problems associated with the communication strategies used. In general, different evidences indicated that some information was reaching the target clients on most of the technologies/practices promoted by the project, although the quality and quantity was limited. Farmers in particular indicated that although the recommended technologies/practices were found to be effective, nevertheless, they involve high production costs (expensive inputs and extra labour) and these limited the extent of their adoption.

In general, it became apparent that some of the improved coffee management practices/technologies being promoted by the project have been taken up by farmers. Of these, CSB (the most important pest) control measures such as smoothening of bark was among the practices which enjoyed wider acceptance among farmers. Extension workers and SCFT staff believed that farmers acquired better knowledge of stem borer management; and as a result its effect appeared to be on decline. It was also noticed by the evaluation team that most farmers were more or less aware of the life-cycle of stem borer, and were seen to be in a better position to manage it. Other control methods such as killing of larvae on the ground and killing the larvae already in the stem using wire spoke were also widely practiced by farmers. Some farmers also reported that they practiced uprooting and painting. However, farmers indicated that even though bark smoothening somehow was found to be effective, it is time consuming and tedious; making it difficult to practice on a large number of trees. However, some farmers showed reservation regarding the effectiveness of this practice. Farmers also indicated that piercing is not advisable as the measure is taken after the tree has already been damaged. Almost all farmers stressed that chemicals were more effective than other methods of stem borer control, though their costs are beyond the reach of most small scale farmers. But chemical control was to some extent practiced by farmers. Farmers were also enthusiastic about using chemicals (such as fipronil), though its use was highly hampered both by unavailability and expensiveness. In general, the seriousness of the CSB

problem appeared to motivate farmers to use whatever control methods made available to them.

Farmers also claimed that at present they are capable of identifying the different coffee diseases. In general, though most farmers indicated that they are aware of the different chemicals (both pesticide and insecticide) they felt that they lack adequate knowledge on amount, time and frequency of application. They reported use of some chemicals against coffee berry disease (CBD0, CSB, coffee leaf rust (CLR) and anthestia bug. But they expressed that they rely on extension workers and contact farmers in determining the correct application rate and frequency. In particular, though some farmers reported using small amount of fungicides (below recommended rate) for CBD control, the extension workers indicated that the communicated information regarding CBD was not seriously taken up by farmers. Farmers were of the opinion that though CBD used to be a serious problem, nowadays, it is not a critical issue. On the other hand, the use of some chemicals such as Fipronil was constrained both by its scarcity and its high price. However, the project was found to be successful in evaluating, releasing and introducing this pesticide to users.

With regard to use of fertilizer, it became clear that most farmers more or less knew the rate, frequency, time and method of fertilizer application, and the critical need for fertilizer in growing Catimor. Almost all interviewed farmers believed that the nature of Catimor forces them to apply some amount of fertilizer as it hardly produces any yield without fertilizer. However, virtually all farmers made it clear that they grew Catimor without applying the full package of recommendations (only once or twice) mainly due to the escalating prices of fertilizer. But they seemed to apply no fertilizer to the older varieties, such as Geisha. Unlike that of chemicals, the problem with fertilizers is only its high cost rather than availability.

On the other hand, though almost all farmers reported that they have adequate knowledge of proper nursery management, most of them could not use all the recommended nursery practices because of the high cost and scarcity of some of the materials and inputs, such as fertilizer. They also indicated that the recommended nursery management practices are demanding in terms of labour. However, despite these constraints some farmers claimed that they fully use the recommended practices.

Though majority of the farmers interviewed were aware of the importance and techniques of pruning, few of them reported using this practice. The fact that pruning was recommended for Geisha, which generally seemed to be neglected by farmers, limited the use of pruning. For example, only four of the total 18 farmers attended group discussion at Salawe and Junju zones still grow Geisha, and only two of them reported practicing pruning. However, unlike the other associations, majority of the farmers at V/North grow Geisha and also practice pruning. Similarly, some farmers at Phoka Hills also reported practicing pruning. Among other things, lack of adequate skill on how to prune, lack of appreciation

and support by extension workers, and lack of pruning shear (unavailable as well as expensive) were mentioned as bottlenecks. Some farmers even indicated using local knife for pruning. Generally, being motivated by the relatively better yielding abilities of the new variety (Catimor), coupled with aggressive extension effort to promote this variety, farmers were inclined to abandon the old varieties such as Geisha and Agaro. Thus the old varieties were on decline and at risk. All farmers were found to grow Catimor with an average number of trees of 500 and above. However, Mr Kaunda expressed his concern that though Catimor is more productive than the other varieties in the country, it might not be as needed on the market as Geisha variety. He was of the opinion that though Geisha was denied any attention among farmers, it has been demanded by a buyer from Japan and can fetch attractive prices than Catimor.

On the other hand, like pruning practices, shade regulation was recommended for Geisha and tended to be neglected by farmers. Thus many farmers appeared to be reluctant about proper shade management. But it was noticed that most farmers were fully aware of the importance of shade and good/recommended shade trees. Some of the reasons mentioned by farmers in this regard include: most shade trees grow naturally, are too high to control, and can cause damage to coffee trees if one tries to cut them. But, unlike the other associations, at Viphya North majority of the interviewed farmers grow Geisha and also carry out proper shade management as they are aware that Geisha can not grow successfully without shade. Some farmers reported that they use banana and other fruits as shade trees.

Regarding the status of coffee-banana intercropping practice, it seemed to be too early to see the effect of the demonstration by showing farmers the result/performance of the recommended practice as the demonstrations were established very recently. Hence, it was noted that most farmers still plant banana haphazardly in the rows of coffee, without following the recommendations. But some farmers who got the opportunity to attend the field days (which were organized in recent months) and those who visited the demonstrations on their own tended to appreciate the recommended intercropping practices. Few farmers (especially those at Chisi zone) even started using the practice, while some farmers (especially, at Salawe, Junju and Katowo zones) adapted and used the practice with some modification. Farmers of Viphya North, however, indicated that they stopped intercropping coffee with banana as Catimor can not thrive well under shade; rather they interplant with beans and other crops when the coffee tree is at early stage. Farmers were of the opinion that shades (such as that of banana) can aggravate the problem of pests and diseases. On the other hand, farmers of South-East Mzimba abandoned intercropping banana with coffee because of the disease problems which occurred on banana (Banana bunchy top virus disease). They rather use pulses such as pigeon peas, soybean and peas, instead. Moreover, farmers at some places (like Khosolo zone) appeared to have no idea about the

recommended intercropping practice. This implies the critical need for organizing more field days on the intercropping demonstrations.

Most farmers knew the importance of mulch and how to use it. But due to shortage of labour and lack of commitment among farmers, very few of the interviewed farmers reported applying mulch except for South-East Mizumba where virtually all farmers reported using mulch because of the prevailing moisture stress problem in the area. Farmers interviewed at Nkhata-Bay Highland mentioned fear of bush fire as a major reason apart from lack of mulching materials.

6. Planning of the project activities

Planning of the project activities has been some how carried out jointly by Lunyangwa Research Station, NRI, SCFT and CABI in the form of meeting or workshops. But this appeared to lack continuity and frequency. It also seemed to be predominantly the responsibility of research, without much involvement from the government extension agency. Hence, this lead to lack of sense of ownership and accountability among other stakeholders, and thus had negative consequences for the execution of the project activities.

7. Achievements

Despite the above challenges and limitations, it was also obvious from the assessment that the project generated some remarkable achievements. The following are the major outputs and achievements of the project:

- The communication efforts of the project were successful in terms of awareness creation among the target clients. It enhanced farmers' awareness and knowledge of improved crop/coffee and pest management practices and also assisted in adopting some of them, especially those which involve low or no extra costs. But full adoption of some of the recommendations was constrained by factors such as high cost and scarcity of inputs, and lack of complete or adequate information and knowledge on how to implement and other associated factors.
- The socio-economic base-line survey indicated that farmers had no control measure for white stem borer (the major production constraint in the area) other than to try to kill the larvae that are already in the stem with a wire spoke. But at present it was reported by the farmers that they use alternative measures recommended by the project such as smoothening of bark, painting, and to some extent chemicals such as fipronil though widespread use was constrained by high cost of the chemical.
- Helped to build better linkage and communication/collaboration, especially, between the two partners of the project (SCFT and Research), though the link is not as strong as it has to be.
- Development of technologies/improved practices such as fipronil, and other integrated pest and disease management practices is one of the

prominent outputs of the project, and this can substantially assist future coffee development activities in the area.

- Production of printed extension materials were carried out by the project, and these are of great importance especially to the extension workers as reference materials. Thus the project, in this regard, has contributed to the literature on integrated crop/coffee and pest management in the country.
- To a certain extent, assisted research to develop a culture of moving out of station to on-farm and to adopt a participatory operation by establishing links with farmers and extension workers.

8. Major challenges, constraints and limitations

The following aspects were identified as challenges, constraints and gaps/limitations that appeared to affect the performance and impact of the project's communication efforts.

- Vastness and geographical locations of the coffee associations where the project operates, coupled with logistical and staff shortage in collaborating institutions (SCFT and research), somehow made execution, follow-up and monitoring of field activities difficult.
- Delay in production and distribution of some of the dissemination materials, inadequacy of the quantity produced, and language problem were also mentioned as the major limitations/constraints. Initial delay in staring the project also appeared to, at least party, contribute to this.
- Although there were some periodical meetings and discussions, especially between Lunyangwa Research Station and SCFT, generally planning of field activities did not seem to adequately involve all relevant stakeholders. Lack of continuous and regular forum for planning, implementation, monitoring and evaluation in turn appeared to influence the execution of the project activities.
- The linkage between relevant stakeholders, especially that of the government extension staff with SCFT and research was noted to be weak. Lack of appreciation and support for coffee extension work from the government extension agency's higher officials was noted as a constraint. This in turn has led to lack of ownership and accountability for the project activities among government field extension workers, and this appeared to have impact on the execution of the project activities, as SCFT and research have no or few front-line staff to implement the project activities. This collaboration and linkage appeared to be weaker, especially, at Misuku and Nkhata-Bay highlands. Thus there was a tendency to see the project as SCFT and research project;
- Moreover, unavailability or scarcity and high cost of some of the recommended inputs, such as pesticides and fertilizer appeared to affect wider adoption of the communicated information.

9. Conclusions and recommendations

9.1. Conclusions

Coffee is a vital source of income for majority of the smallholder farmers in Northern Malawi. But its productivity was constrained by several factors of which pests and diseases were prominent ones. Thus the IPM project was initiated with the objective of promoting improved crop and pest management practices to address these constraints and raise production and productivity. Though there are indications that some of the information being promoted by the project was reaching the target clients, most of the communication materials and products are yet to bring significant impact as their production/establishment and dissemination is a recent phenomenon. The communication strategies of the project appeared to have remarkable impact in terms of raising the target groups awareness and knowledge with regard to integrated crop and pest management, though wider adoption and acceptance of the information/practices were constrained by several factors such as high costs and scarcity of inputs and/or technologies, shortage of labour, lack of complete information and continuous support, etc. In particular, many farmers seemed to be aware of coffee stem borer management and also exhibited enthusiasm and keen interest to practice whatever control methods availed to them, which could be attributed to the seriousness of the problem. In general, the assessment team concluded that, rather than lack of information and ineffectiveness of the technologies/practices being promoted, other factors were found to severely limit the acceptance of the information/technologies communicated to users.

As Geisha was generally denied of attention in terms of management, adoption of practices recommended for old coffee trees management (such as pruning and shade management) was very much limited. The assessment team realized that the management and conservation of the old varieties such as Geisha need due attention from the point of view of genetic resource conservation and demand on world market.

Generally, weak linkage and collaboration was observed between government extension staff and the two project partners (SCFT and research). In particular, the role that the government extension staff could play did not seem to be given adequate attention in the project and no or little effort was made to establish close operational link with them. As a result, the involvement of government extension workers in the project activities in particular and in coffee activities in general was not encouraging, especially in associations like Misuku and Nkhata-Bay highlands. Generally, the monitoring and follow-up of field activities also appeared to be weak.

On the other hand, the project also seemed to overlook the complementary nature of the different communication media, and focused on few channels. Moreover, distribution/location of demonstration trials, number of field days organized, number of participants of the events, and quantity of the printed

extension materials were very few to have had significant and wider impact. Moreover, for a high degree of effectiveness and impact, the intended target clients must be actively involved in the process of communication. However, it became clear that various project outputs are available that need to be widely promoted and disseminated to end-users.

9. 2. Recommendations

The evaluation team makes the following recommendations both in order to enhance wider impact of the current project; as well as to provide a basis for designing more effective communication strategies in future similar projects:

- In order to make them more effective, printed extension materials (such as leaflets and booklets) should be backed up with other communication mechanisms or be used to complement the other communication channels such as training, demonstration, field days and other events. Moreover, further large scale production and distribution of these materials in local languages is needed.
- Encouraging exchange visits and farmer-to-farmer information dissemination as fellow farmers were mentioned as important sources of information. In particular, encouraging tours and visits to the FFS fields needs due attention.
- It was noted that the old varieties such as Geisha and Agaro have been offered attractive prices from some buyers. Moreover, farmers indicated that the new variety (Catimor) has high fertilizer requirement, and that farmers could not afford to apply the recommended rate. Farmers and extension staff also felt that Catimor is more susceptible to white stem borer than Agaro and Geisha. Thus aggressive transfer of Catimor at the expense of the older varieties needs caution. Agaro and Geisha are at great risk and their maintenance needs critical attention from the loss of genetic resource point of view as well.
- Demonstration is obviously one of the most important mechanisms of information/technology transfer. It permits hands-on observational and trial experience and is preferred for the old axiom ‘seeing is believing’. Thus it should be widely and systematically used as a powerful dissemination tool. Most of the demonstration fields used by the project, however, involved several treatments, did not seem to be representative, and some of them even involved technologies/practices that are still undergoing tests. Thus use of simple demonstration plots with few treatments and large plot size that are located in accessible places should be focused in future demonstration activities. Moreover, it is essential to organize field days more frequently to expose the demonstration fields to large number of farmers.
- FFS can play crucial role in accelerating the dissemination of technical information or outputs of the project in a participatory manner. Thus

establishing more FFS and providing continuous technical backstopping to their facilitators should be given attention.

- The need for use of mass-media (especially radio) to create awareness need to be seriously considered in future similar projects as most farmers were said to have radios;
- Indigenous communication channels such as local organizations and informal networks, various meetings or local fora can play important role in facilitating information flow within the communities. Therefore, the use of such local channels for information/technology dissemination needs due attention.
- There is also a need for a wrap-up workshop to communicate the achievements and outputs of the project, and help the other partners (government extension and SCFT) to take up and use the outputs of the project in their future programs.
- Strengthening research efforts to serve as a spring board and continuously deliver technologies and back-up the extension efforts. Particularly, it is crucial to come up with economical and appropriate basket of options for disease and pest management for smallholders.
- In general, regular and very active collaborative links need to be established between SCFT, government extension agency and research.
- Financial support should be solicited to design and implement a follow on project to widely push the available information/technologies (current project outputs) to users. The possibilities of extending the time period of the project should also be considered so as to disseminate the information and knowledge generated during this phase of the project.

Appendix -1

List of persons involved in interviews, discussions and different exercises during the information collection

Name	Designation	Institution	Association
1. Mr Kaunda	Operations manager	SCFT	Head quarter
2. Mr Jones Moses Ganda	Association Advisor	SCFT	Misuku
3. Mr Young Jere	Agri Ext. Dev't Coordinator	Gov't Exten.	Misuku
4. Mr Osman H. Kayange	Senior Ass. Agri Res. Officer	Lunyangwa RS	
5. Mr Victor J. Mkandamre	Farm Guide Advisor	SCFT	Misuku
6. Mr Chimmings Chanika	Project Coordinator and Centre manager	Lunyangwa RS	
7. K.R.E. Mwakikunga		Nchenachena Res. Sub-stat.	P/Hills
8. I.C.B.E. Mwaungulu	AEDO	Nchenachena	Phoka Hills
9. D. Victor Luhanga	AEDO	Nchenachena	Phoka Hills
10. W.M.Z. Mhone	FGA		Phoka Hills
11. G.M. Kagwa	AEDC		Phoka Hills
12. O.W. Kalengo	AEDO	Nchenachena	Phoka Hills
13. W.M.Z. Mhone	FGA		
14. Christopher W. Gondwe	Assoc. Adv.		SE-Mzimba
15. Faison B. Chitowe	AEDC		SE-Mzimba
16. Cecilia K. Kakatera	AEDO		SE-Mzimba
17. Brian B. Manda	Enumerator/AEDO, Khosolo		SE-Mzimba
18. Marshall CM Ngwira	FGA		SE-Mzimba
19. F.K.C. Simbeye	AEDO		SE-Mzimba
20. Nelson C. Chunda	Assoc. Advisor		V/North
21. Farewell M. Kalera	AEDO		V/North
22. Raphael Msyali	AEDO		V/North
23. A.A.K. Chawinga	AEDO		Misuku
24. T.T.S.C Mwiba	AEDO		Misuku
25. M.M. Kamwela	AEDO		Misuku
26. Y. D. Jere	AEDC		Misuku
27. E W Nyirongo	AEDO		Nkhata-Bay
28. N. B Nyondo	AEDO		Nkhata-Bay
29. AN Kamwela	FGA?		Nkhata-Bay
30. Alex Kamwela	NBH	F	Nkhata-Bay
31. Nkhwachi B. Nyowo	AEDO	M	Nkhata-Bay
32. Emmans W Nyirongu	AEDO	M	Nkhata-Bay
33. C.K. Chetiwol	AEDO	F	Kapita

Farmers

Nkhata-Bay highlands

Name	Zone	Designation	Sex
1. Frank Mhone	Chigwere	Assoc. secretary	M
2. Elen Chunda	Limbanazo	Member	F
3. Lyson Panja	Chibavi	Treasurer	M
4. Joseph Dhlovu	Limbanazo	Secretary	M
5. Mcdonald Nguluwe	Mulele	Chairman	M
6. Foyness Chiumia	Mulele	Member	F
7. Annie Kamanga	Mulele	Secretary	F
8. Clementina Banda	Mbowe	Secretary	F
9. Loyd Gondwe	Lukalazi	Contact farmer	F
10. Justin Panga	Chibavi	Secretary	M
11. Nellie Manda	Kavuzi	Assoc. member	F
12. Mollinie Mphande	Kavuzi	Secretary	F
13. Fellunah Jere	Lukalazi	Vice treasurer	F

SE-Mzimba (Kapita)

1. Paulo Longwe	Kapita	V/secretary	M
2. Damiano Mchereka	Kapita	BC/secretary	M
3. Austin M. Phiri	Kapita	Assis. Ch.	M
4. Benard Banda	Kapita	Member	M
5. Ragthevell Chirowa	Kapita	Chairman	M
6. Kandalamo Banda	Kapita	Member	M
7. Albert Shaba	Kapita	BC member	M
8. Waited Shaba	Kapita	Chairman	M
9. Sajeni Banda	Kapita	Member	M
10.Michael Banda	Kapita	SCU Chairman	M
11. Shadre Nkhata	Kapita	Zone secretary	M
12 R. M. Zimba	Kapita	Member	
13. B. K. Longwe	Kapita	Member	
14. E. H. Tembo	Kapita	Treasurer	
15. Soch Nkhoma	Kapita	Vice chairman	
16 Fletchor Tembo	Kapita	Assoc. TR	M

SE-Mzimba (Khosolo)

1. Langford Jere	Khosolo	Secretary	M
2. Playson Nkhoma	Khosolo	Member	M
3. Sekanitore Shaba	Khosolo	Member	M
4. J. S. Shaba	Khosolo	V/chairman	M
5. F. E. Shaba	Khosolo	Member	M
6. M. A. Shaba	Khosolo	Contact farmer	M
7. H. M. Shaba	Khosolo	Chairman	M
8. Alfred Shaba	Khosolo	Chairman	M

Phoka Hills (Salawe + Junju)

	BC		
1. Chrifford Msiska	Dongo	Secretary	M
2. Spolo Mkandawire	Choma	Zone clerk	M

3. Frank Mkandawire	Choma	Zone chairman	M
4. Juton Mkandawire	Choma	Zone member	M
5. Thomson S. Harawa	Dongo	Contact farmer	M
6. Wiseman Msiska	Dongo	BC V/chairman	M
7. Boy M. Msiska	Choma	Zone Member	M
8. Mwizilachi Msiska	Choma	Z. Member	M
9. Ellina Msiska	Choma	Z. Member	F
10. Lochel Harawa	Nkhoclwa	Member	F
11. Loveness Mbake	Nkhoclwa	Member	F
12. Molly Nyirenda	Nkhoclwa	Member	F
13. Riness Mtawali	Nkhoclwa	Member	F
14. Mather Mhango	Nkhoclwa	Chairperson	F
15. Emeria Nyirenda	Nkhoclwa	Vice secretary	F
16. Goli Msiska	Nkhoclwa	Member	F
17. Loud Mshali	Chipumba	Contact farmer	M
18. Khawla Msiska		Farmer	M

Viphya North (Mphompa)

1. Winston Msowoya	Mphompa	Zone chairman	
2. Alexander Nyirenda	Mphompa	Khanga zone	
3. Michach Mhone			
4. Francisco Muthali	Mwawi	Member	M
5. Abell Harawa	Boto	Member	M
6. Rodrick Munthali	Mwawi	Member	M
7. Kawonga Mhone			M
8. Stocker Mwanza	Mwawi	Secretary	M
9. Wellington Nyirongo	Tumbanani	Contact farmer	M
10. Mary Muhango	Chkimunthaka	Member	F
11. Elson Chirambo	Khanga Zone	Secretary	M
12. C. Nyasulo	Mphompha		
13. Jatto Mumthali			M
14. Wilfred Munthali		Contact farmer	M
15. Mikombe Chiwona			
16. Wondwani Mshani			
17. Kingsly Bestone Mwawi			M
18. Bonnce Munthali			

Misusku (Sokola Zone)

1. Stephen Simwela	Mwanjotile	Zone V/chairman	M
2. Winston Kayira	Mubula	Zone secretary	M
3. Nelson Kayira	Mwanjotile	Zone V/secretary	M
4. Ephriam Mblue	Chirsale	BC chairman	M
5. Tenson Sinwela	Chirsale	Member	M
6. Willy Musham	Chirsale	Member	M
7. Lysun Musukwa	Nalusekelo	BC chairman	M
8. Danson Kayiri	Mubula	BC chairman	M
9. Chikobole Kayun	Mubula	Secretary	M
10. Wamisuku Kayuni	Mubula	Member	M
11. Noah Kiseghe	Tupalishe	Chairman	M
12. Nyambilile Kayange	Chinsale	Member	M
13. Buneti Simwela	Mwanjotile	Member	M

14. Jesi Mbene	Nalusekelo	Member	F
15. Matredah Sumbo	Nayeka	Member	F
16. Filuness Uitha	Nayeka	Member	F
17. Talia Musukwa	Mwanjotile	Member	F
18. Fanny Musukwa	Nayeka	Member	F
19. Moses kayuni	Mwanjotile	Member	M
20. Tumanyine Kanyika	Nayeka	Secretary/CF	F
21. Lizie Msukwa		Farmer	F

Misuku (Chisi zone)

1. Elias Msukwa	Matana	Zone secretary	M
2. Silveston Musukwa	Ighugu	Secretary BK	M
3. Winfond Kuyokwa	Ifugho	Committee memb.	M
4. Tomas Musukwa	Ifugho	Committee memb.	M
5. Washington Kayange	Ifugho	Treasurer	M
6. Akimu Kayange	Matana	Member	M
7. Atufwe Kabaghe	Chogwe	Committee memb.	M
8. Renald Kamwera	Kalimasi	Committee memb.	M
9. Manwel Maseso	Matana	Member	M
10. Chalrod Chabinga	Ighugu	Vice secretary	M
11. Ken Musukwa	Kaumasila	Member	M
12. Mebi Lwesha	Nabutondo	V/treasurer	M
13. Vingstone kamwela	Chisi	Member	M
14. Isaac Musukwa	Kalimasila	Member	M
15. Moloson Mwiba	Mufilu	Member	M
16. James Kambalame	Chisi	Member	M
17. Nathan Kayange	Ighughu	Member	M
18. Diston Silumbu	Matana		M
19. Henley Msukwa	Ighughu	Contact farmer	M
20. Palwin Chabinga	Ighughu	BC Chairman	M
21. Mathias Musukwa	Kalimasila	Treasurer/zone	M
22. Mphasa Musukwa	Chobwe	Member	M
23. Jelad Masebo	Kalimasila	Vice chairman	M
24. Weston Kayange	Chisi	BC Chairman	M
25. Owand Silumbu	Chisi	Member	M
26. Walleld Kamwela	Kalimasila	Member	M
27. Amon Silumbu	Chisi	BC/Treasurer	M
28. Kingston Mumukwa	Chisi	Member	M
29. Anent Mbughi	Chobwe	Member	M
30. Donola Mbughi	Nabutondo	Member	F
31. Fayines Bulambo	Ifugho	Member	F
32. Fayiress Kanyika	Matana	Member	F
33. Ketema Musukwa	Chobwe	Member	F
34. Dayiness Nguku	Chisi	Committee memb.	F
35. Maynes Bulambo	Ifugho	Member	F

Misuku (Katowo Zone)

1. Michael Kita	Katowo	P/F	M
2. W. Mateya	Ndolpa	Member	M
3. Charity Chabinga	Katowo	Farmer	M

4. Shupa Musuliwa	Katowo	Farmer	M
5. Kenaeth Kayange	Ndolopa	Pulpery Chairman	M
6. Denis Musukwa	Katowo		M
7. Nyabwile Pwele	Katowo		M
8. Synel Mbughi	Katowo		M
9. Mwalia Kayuni	Katowo		F
10. Mitson Simwela	Katowo		M
11. Peter Silumbu	Katowo		M
12. Manyishe Kuyokwa	Ndolopa		M
13. Roster Chabiga	Katowo		F
14. Ester Chisumila	Katowo		F
15. Fravwell Kuyokwa	Katowo		M
16. Harry Chabiga	Katowo	Zone chairman	M
17. Henny Musukwa	Katowo	Zone treasurer	M
18. Ward Chabinga	Katowo		M
19. Matayi Mwiba	Katowo		M
20. Station Ngonya	Katowo		M
21. Crydiness Simumbo	Katowo	Contact farmer	F
22. Edward Simwela	Katowo		M
23. Hellings Chabinga	Katowo	Contact farmer	M
24. Yipson Kita	Katowo		M
25. Marko Chabinga	Katowo		M
26. Oliva Kanjeli	Katowo		F
27. Giveness Kalagho	Katowo		F
28. Vickness Masebo	Katowo	Contact farmer	F
29. Lucky Mkembwa	Katowo		M
30. Make Silumbu	Katowo		M
31. Joseph Mwenga	Ndolopa		M
32. Jaston Musukwa	Katowo	Contact farmer	M
33.Sinaipi Chabiga	Katowo		M
34. Kayeba Kita	Katowo		M
35. Talen Kita	Katowo		M
36. Elizabeth Bulambo	Katowo		F
37. Ronald Kaonga	Katowo		M
38. Chiloka Ngulru	Ndolopa		M
39. Lutufyo Chisumila	Katowo		M
40. Joseph Musukwa	Katowo		M
41. Mebben Chabinga	Katowo		M
42. Tonny Mbossa	Katowo		M
43. Giveness Kanjeli	Katowo		F
44. Marieta Musukwa	Katowo		F
45. Sister Kayange	Katowo		F
46. Olbin Chisumila	Katowo		M
47. Blackson Mbughi	Katowo	Contact farmer	M
48. Lipson Kayuni	Ndolopa		M
49. Fred Mwegha	Ndolopa		M
50. Beckson Kayange	Katowo		M
51. Ranwell Mwiba	Ndolopa		M
52. Wedfore Chiona	Katowo		M
53. Maxon kayuni	Katowo		M
54. Stally Musukwa	Katowo		F

55. Jaston Pwele	Katowo	M
56. Aston Silumbu	Katowo	M
57. Benard Musukwa	Katowo	M
58. Jannet Musukwa	Katowo	M