Ministry of Agriculture and Food Security
Directorate of Research and Training

Farmers' Assessment of Improved Coffee Hybrids in Southern Highlands of Tanzania*

By

Lyimo, S.D. and P. F. Sulumo**

* - Paper presented to the Coffee Release Committee Meeting held at TaCRI Lyamungu on the 2nd of September 2005
** - Selian Agricultural Research Institute (SARI)
   P.O. Box 6024
   Arusha, Tanzania

FARMERS' ASSESSMENT OF IMPROVED COFFEE HYBRIDS IN SOUTHERN HIGHLANDS OF TANZANIA IN 2004/2005 CROP SEASON

1.0 Background Information and Justification:
Considering the fact that the agricultural sector is the main pillar of the Tanzanian economy, which contributes about 60% of the country's GDP, 61% of the export earnings and 84% of the rural employment; accelerated agricultural growth can be achieved by increasing smallholder involvement and participation in the Technology Development and Transfer (TDT) process. Farmer participatory research has been defined as "the collaboration of farmers and scientists in agricultural research and development" (Bentley, 1994). Farmers' assessment as a participatory research method is now being used by several of the research teams in many countries including Tanzania to systematically gather farmer opinions in a more detailed manner. There is now greater appreciation of farmers' own knowledge or Indigenous Knowledge (IK) and judgement within the content of their own circumstances. Researchers are now more appreciative of the fact that farmers are able to integrate a number of site-specific factors, which are virtually invisible to researchers. Farmer opinions are therefore being given more weight than before, particularly when new varieties are concerned. Since resource - poor farmers technologies are site/location - specific, farmers play a key role in technology development. The experiences with technology development have made clear that new technologies have to be imbedded in the local society, its ecological and physical environment, its cultural experiences and its socio-economic structures.

Coffee is one of the leading cash crops in Tanzania grown by more than 400,000 households on acreage of 250,000 ha. The crop contributes about 15% of the foreign exchange in the country. The major growing areas are Kilimanjaro, Arusha, Mbeya, Ruvuma, Tanga, Morogoro, Kagera, Kigoma, Iringa, Rukwa, Mara and Manyara regions. Until 2004 the only commercial varieties grown in the country were/are Bourbon (N.39) and Kents (KP 423). N.39 was selected in the 1920s whereas KP 423 was selected in the 1930s. The estimated yields of N. 39 and K423 are 1 – 1.5 ton/ha if well managed. The main production constraints for the commercial varieties are however, high susceptibility to major coffee diseases like Coffee Berry Disease (CBD) - *Colletotrichum kahawae* (Waller & Bridge and Coffee Leaf Rust (CLR) - *Hemileia vastatrix* Ber) et. Br. The varieties are also susceptible to major insect pests like Mealy bugs, Leaf minor, Antestia, Berry moth, Berry borer, white stem and yellow headed borers.

Due to the above problems development of resistant coffee hybrid varieties started in the 50s and 60s for CLR and CBD respectively. Intensive selection and multi-locational trials was done in all coffee growing areas since 1993. In early 1996 and in 2000 on farm coffee varieties trials were started in the Northern part and in Mbeya and Mbinga districts in the Southern Highlands of Tanzania. The main objectives of the on-farm trials were to develop varieties that are high yielding, resistant to CBD & CLR diseases, with good/high cup quality, well adapted to our coffee growing conditions and also preferred by our farmers especially the resource poor ones.

Most coffee growers in the country are confronted by low coffee production due to lack of improved varieties that are potentially high yielding and resistant to diseases and insect pests infestation, high production costs due to application of pesticides to control diseases and pests,

low cup quality, low prices of the produce in the world markets and consequently low household incomes for the farming communities.

Since the selection or recommendation of the two commercial varieties research and development institutions had not released or recommended any coffee varieties to the coffee growing communities that would address their above concerns until last year (2004) when some varieties were released based upon their good agronomic performances and farmers' preferences in Northern Tanzania. Some of the coffee lines tested on-station and on-farm in Southern Highlands of Tanzania have also shown very good characteristics such as high yields, high resistance to diseases and insect pests, good cup quality, drought tolerance and faster growth compared to the current commercial varieties.

Based on the superior performance of those lines the Tanzania Coffee Research Institute (TaCRI) decided to conduct a farmers' assessment of the lines this year so that the Southern Highlands farmers can select the ones that are more adapted to their environments and also preferred by them for official release and commercial use.

2.0 Objectives:
- Identify Southern Highlands farmers' criteria for coffee preference
- Identify coffee lines/varieties adapted and preferred by farmers in the Southern Highlands of Tanzania
- Release improved coffee varieties for the coffee growing communities
- Increase coffee production in Tanzania
- Improve household income for coffee growing communities

3.0 Methodology:

Two farmers' assessments were done in Mbinga and Mbeya districts in Ruvuma and Mbeya Regions on the 15th and 18th of July 2005 respectively. The one in Mbinga district was conducted at a small-scale farmer who used correct spacing and fertilizers at irregular intervals after planting. The assessment performed in Mbeya was at a large-scale farm with a correct spacing, used high rates of chemical for old coffee varieties, regular fertilizer use at planting and during growth stages. Both small scale and estate farms were intercropped with fruit trees/few banana and gravilea/acacia respectively (Appendix 7). Coffee varieties/lines were planted in 1996 for Mbeya and in 2000 for Mbinga. Twenty one (21) famers including 16 males and 5 females from 6 villages participated in the assessment in Mbinga district whereas 17 farmers including one female from 9 villages participated in the assessment in Mbeya district. Most of these farmers had grown or were exposed to the coffee lines/varieties tested and assessed namely SC 3, SC 9, SC 11 and SC 14 for 5 – 9 years along with their old commercial variety namely KP 423. The tools used for the assessment were preference/absolute, matrix and pair wise rankings.

4.0 Brief Description of the Coffee production System in the Southern Highlands of Tanzania

The Southern Highlands of Tanzania consist of Mbeya, Iringa, Rukwa and Ruvuma regions. Coffee is produced in all the four regions with Ruvuma and Mbeya regions leading. The main type of coffee grown in the highlands is Arabica. Robusta type is grown in few areas like the Mbamba Bay area around Lake Nyasa.

Mbinga and Mbozi districts are the leading producers of coffee in Ruvuma region. The crop is mainly produced by small-scale farmers who intercrop it with gravelia or bananas. The average acreage per household ranges from 0.25 to 3.0 acres.

In the past farmers planted coffee using different spacings like 3m x 3m, 3 m x 2 m, 3 m x 2.5 m, 3 m x 2.7 m, 2.7 m x 2.7 m, 2.7 m x 2.5 m and 3m x 1.5 m. They now however prefer the 3 m x 1.5 m spacing for the new cultivars. Mbinga District receives enough rains during the rainy season and no irrigation is practiced during dry season although water canals are found almost all over the area. Average yields obtained by ordinary farmers range from 8 – 10 bags of 50kgs each per acre whereas progressive farmers get 15 – 20 bags/acre. The district has big potential for coffee production due to the fact that it has more areas for cultivation of new farms and a lot of water sources for irrigation and processing.

Mbozi, Mbeya, Rungwe and Ileje districts are main producers of coffee in Mbeya Region. The total coffee acreage in the four districts is about 57,500 ha. Mbozi, Mbeya and Ileje districts depend on the rains for their production. They don't practice irrigation with the exception of few large farms. Rungwe district has some water sources for irrigation which is however used in large/medium scale tea production. There are no large scale coffee farmers in the district. The small scale farmers in the district own about 0.25 – 1.5 acres per household.

In the other districts (Mbozi, Mbeya and Ileje) small scale farmers own acreages ranging from 1 – 10 acres, whereas medium scale farmers may own about 14 – 25 acres each. Large scale farms range from 125 -825 acres across all the districts. Some of the large-scale farms especially in Mbozi district are not well managed. Farmers intercrop their coffee with gravelia, fruit trees or bananas. The coffee spacing is 2.7 m x 2.7m, 2.5 m x 2.0 m, 2 m x 2 m and 2.7 m x 1.5 m. The new lines in Mbeya were mainly introduced to the medium and large scale farms.

In recent years rainfall trend has changed and decreased across all the 4 regions. It used to start in September but of late it goes up to December. Coffee production has decreased due to this weather change and lack of water sources for irrigation and processing. Other reasons given by the farmers for the low production were continued use of the old coffee varieties which have low yields due to lack of lower tertiary and secondary branches, disease infestation especially CBD and CLR, inadequate coffee extension services, fluctuating prices, free marketing system which does not sometimes abide to grades and hence lower prices, and expensive inputs like fertilizers and chemicals to control pests and diseases.

5.0 Results and Discussion

The main uses of coffee in the areas are shown in Table 1.

Uses	Rank	
	Mbinga	**Mbeya**
1. Cash crop	1	1
2. Firewood – pruned branches, pulped bean husks and old stems	6	5
3. Source of fertilizers (rotten pulped bean husks)	4	4
4. Stomach pain relief and application on new bruises	9	N/A
5. Prepare local brew called "wanzugi"	8	N/A
6. Mulch	7	9
7. Beverage/refreshment	3	3
8. Attracts honey bees and other insects for pollination	5	8
9. Source of employment	2	2
10. Control soil erosion from the canopy cover	N/A	6
12. Prepare utensils and small houses for poultry	N/A	11
13. Attract chameleon for control of Antestia	N/A	10
14. Raises low blood pressure	N/A	7

In both regions, coffee is mainly grown for commercial purposes. It is also a main source of employment for individuals who provide labour for different operations like weeding, chemicals application, harvesting and marketing. Other important uses are beverage/refreshment, source of fertilizer, firewood and also control for soil erosion.

Varieties/lines characteristics:

Farmers described the varieties as shown in Table 2 based on their experience with the varieties in their fields and also on the observations they made at the plots they assessed.

Table 2: Farmers' descriptions of the coffee varieties/lines in Southern Highlands of Tanzania in 2004/2005 cropping season

Variety	Characteristics
SC 3	Retains primaries from the lowest point
	Resistant to CBD and CLR
	Easily marketable (Fairly large, heavy and good bean size that is attractive)
	Many berries in clusters per branch
	Stable yield production each season
	Excellent and attractive greenish leaves
	Good cup taste
	Fast growth
	Many shoots for cuttings for seedlings
	Good yield
	Main stem-from one primary branch to another length of about 3 inches
	Internodes length of about 3 inches
SC 11	Retains primaries from the lowest point

	Branching internodes of 3 inches Clustering internodes of about 1.5 – 2 inches Very good yielder Many shoots as cuttings for seedlings Easily marketable (Big heavy bean size and attractive) Good cup taste Fast growth Excellent and attractive greenish leaves
SC 14	Retains primaries from the lowest point Average to high yield Resistant to CBD and CLR Main stem-length of about 5 inches from branch to branch Internodes length of 3 inches to 4 inches from one berry cluster to another Easily marketable (Big heavy bean size and attractive) Many berry clusters Stable yield production each season Good cup taste Many shoots as cuttings Greenish and attractive leaves
KP 423 **"Local"**	Average yield Very susceptible to CBD and CLR Few tertiary and secondary branches - Unstable and changing yield production from one season to another Easily marketable but sometimes it needs a lot of picking bad berries from the harvest Fairly good and attractive leaves Average branches Few branches used as cuttings for seedling materials Average berries and clusters that are attractive if sprayed well against CBD Good cup taste Main stem-Internodes – branch to branch 4 inches Primaries-Internodes – cluster to cluster 2 inches
SC 9	Good yield Greenish and attractive leaves Many shoots for cuttings as seedling materials Main stem-Internodes branch to branch 6 inches Primaries-Internodes cluster to cluster 2 inches Resistant to CBD and CLR Good cup taste Easily marketable (Large and attractive beans) Stable yield production each season Greenish and attractive leaves

The preference ranking of the lines is shown in Table 3.

Table 3: Preference ranking of the coffee lines/varieties in Southern Highlands of Tanzania in 2004/2005 cropping season

Coffee line/variety	Rank	
	Mbinga district (sub optimal conditions)	Mbeya district (optimal conditions)
1. SC 3	1	3
2. SC 11	2	1
3. SC 14	3	2
4. KP 423 "Local"	4	5
5. SC 9	N/A	4

The preference ranking showed that SC 3 and SC 11 were the most preferred coffee lines followed by SC 14. SC 9 which was grown in Mbeya only ranked fourth among the improved varieties. The least preferred variety at both locations was KP 423.

Farmers in the two areas selected the most important criteria for coffee selection as shown in Tables 4 and 5.

Table 4: Farmers' criteria for selecting coffee lines/varieties under sub optimal Management in Mbinga District in Southern Highlands of Tanzania in 2004/2005 cropping season

Farmers' criteria	Rank
1 High yield	2
2 Good cup taste	4
3 Disease tolerance – CBD and CLR	3
4 Easily marketable- big, heavy attractive beans	1
5 Fast growth	5
6 Many branches for getting cuttings for new plants	7
7 Stable yield production each season	6

Table 5: Farmers' criteria for selecting coffee lines/varieties under optimal Management in Mbeya District in Southern Highlands of Tanzania in 2004/2005 crop season

Farmers' criteria	Rank
1 High yield	1
2 Many branches and big berry clusters at short internodes	6
3 Easily marketable – big, heavy attractive beans	2
4 Disease tolerance – CBD and CLR	4
5 Require less costs for chemicals and pruning	5
6 Stable and constant yield production each season	7
7 Good cup taste	3

Most of the criteria mentioned were similar despite the farmers being far away geographically. The most important criteria selected by the farmers under the two management regimes were high and stable yields, easy marketability, good cup taste and tolerance to diseases. Less costs for chemicals and pruning was not mentioned under the sub-optimal conditions because the small scale farmers don't normally apply the chemicals and neither observe the other recommended practices like pruning. It was however mentioned under the optimal management that it took about 6 years before requiring a full scale pruning of the new varieties/lines.

The criteria selected were used to conduct matrix rankings as shown in Tables 6 and 7.

Table 6: Matrix ranking of coffee lines/varieties under sub optimal management conditions in Mbinga District, Southern Highlands of Tanzania in 2004/2005 cropping season

Criteria	Coffee lines/varieties				Total	Rank
	SC 3	SC 11	SC 14	KP 423 "Local"		
1 High yield	5	4	4	3	**16**	**5**
2 Easily marketable	5	5	5	4	**19**	**2**
3 Disease tolerance	5	5	5	3	**18**	**3**
4 Good cup taste	5	5	5	5	**20**	**1**
5 Stable yield production	5	5	4	3	**17**	**4**
6 Fast growth	4	4	5	3	**16**	**5**
7 Many branches – cuttings for new plants	5	5	4	3	**17**	**4**
Total	**34**	**33**	**32**	**24**		
Rank	**1**	**2**	**3**	**4**		

Key: 1 – Poor; 2 – Satisfactory; 3 – Average; 4 – Good and 5 – Excellent

All varieties were highly scored for good cup taste and easiness for marketing. The new varieties were scored excellent to good in all criteria. The least scored criteria were many branches for cutting/seedlings, high yields and fast growth. The local variety was scored average in all those criteria showing that there is great variation among the new lines and the old cultivar in these aspects.
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Based on all criteria used in Mbinga district, the farmers' preference for the new improved lines were more or less the same and very much superior to the old commercial variety KP 423.

Table 7: Matrix ranking of coffee lines/varieties under optimal management conditions in Mbeya District, Southern Highlands of Tanzania in 2004/2005 cropping season

Criteria	Coffee lines/varieties					Total	Rank
	SC 9	SC 3	SC 11	SC 14	KP 423 "Local"		
1 High yield	4	5	5	4	3	**21**	**5**
2 Big clusters with many berries at short internodes	4	5	5	4	2	**20**	**6**
3 Requires less costs for chemicals and pruning	5	5	5	5	2	**22**	**4**
4 Good cup taste	5	5	5	5	5	**25**	**1**
5 Disease tolerance	4	5	5	4	2	**20**	**6**
6 Stable and constant yield production	5	5	5	5	3	**23**	**3**
7 Easily marketable	5	5	5	5	4	**24**	**2**
Total	**32**	**35**	**35**	**32**	**21**		
Rank	**2**	**1**	**1**	**2**	**3**		

Key: 1 – Poor; 2 – Satisfactory; 3 – Average; 4 – Good and 5 – Excellent

All varieties were scored excellent to good in good cup taste and easy marketability under optimal management conditions. They were also scored high in stable and constant yield production with the exception of the local variety which was scored average due to few tertiary and secondary branches that alternate in production. All new improved lines were scored excellent to good in all criteria. The least preferred characteristics in all the varieties were low costs for chemicals and pruning, high yields, big clusters with many berries at short internodes and disease tolerance due to the average and poor scores given to the local variety, KP 423.

Based on the criteria used SC 3 and SC 11 were the most preferred varieties and they were scored excellent in all the criteria followed by SC 9 and SC 14 varieties which were equally preferred by the farmers. The least preferred variety was KP 423 as was the case under sub-optimal conditions of management. The local variety was scored average and poor in all criteria with the exception of good cup taste and easy marketability.

The pair wise ranking results under sub optimal and optimal management practices are shown in Table 8.

Table 8: Pair wise rankings of the coffee lines/varieties under sub optimal and optimal management practices in Mbinga and Mbeya Districts in Southern Highlands of Tanzania in 2004/2005 cropping season

Variety	Ranking	
	Under sub-optimal management conditions in Mbinga district	Under optimal management conditions in Mbeya district
SC 3	1	2
SC 9	N/A	4
SC 11	2	1
SC 14	3	3
KP 423 (Local)	4	5

N/A - Not assessed or available

The pair wise ranking results under both the sub-optimal and optimal conditions were similar to those obtained from the preference and matrix rankings where SC 3 and SC 11 were the most preferred varieties followed by SC 14 and SC 9. The least preferred variety in both management conditions was KP 423 or the local due to its poor qualities like tolerance to diseases, high requirements for chemicals and pruning, slow growth, average and unstable yields.

5.0 Conclusions:
The most important farmers' criteria for selecting coffee varieties/lines were good cup taste, high and stable/constant yields, easy marketability of the beans, disease tolerance, low costs for chemicals and pruning and fast growth.

All varieties assessed were scored high in cup taste and easy marketability under both management conditions. However, all introduced improved lines were in addition highly scored and preferred for disease tolerance in particular CBD and CLR, less costs for chemicals and pruning, high and constant/stable yields each year and fast growth. They also retain primaries from the lowest points, the tertiary branches can alternate with secondary ones to ensure constant and stable yields and have short internodes for the branches and berries clusters. The local variety KP 423 was scored average and/or poor in all those characteristics.

Overall, the preference, matrix and pair wise rankings results under both management practices indicated that the most preferred lines were SC 3 and SC 11 followed by SC 14 and SC 9. The least preferred variety in all the rankings was KP 423 or the local.

6.0 Recommendations:
Since the introduced lines are well adapted and have performed better than the commercial line KP 423 under both sub optimal and optimal management conditions in terms of high and stable/constant yield, disease tolerance especially CBD and CLR, less costs for chemicals and pruning, fast growth and short internodes for branches and berry clusters they should be considered for release so that the Southern Highland farmers and others can have access to the varieties and consequently be able to have sustainable increased production through use of

better materials, reduced production costs from chemicals and pruning and also conserving the farming environments through less use of chemicals.

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8.0 Appendices:

Appendix 1: Farmers' disliked characteristics in coffee in Southern Highlands of Tanzania in 2004/2005 cropping season

Disliked characteristics	Rank	
	Mbinga	Mbeya
1. Variety susceptible to diseases like CBD and CLR	1	1
2. Variety not easily marketable and fetching low price	2	2
3. Variety with little berries	8	7
4. Varieties with a tendency of high berry dropping	6	N/A
5. Varieties with unstable yield production each season	3	N/A
6. Variety with very few branches	5	3
7. Varieties susceptible to many pests	4	N/A
8. Variety producing light beans	7	6
9. Variety with excessive branches	N/A	8
10. Overbearing varieties	N/A	5
11. Variety with dull greenish appearance – less chlorophyll	N/A	4

Appendix 2: Coffee pests found in Southern Highlands of Tanzania in 2004/2005 cropping season

Pests	Part of plant attacked	Rank	
		Mbinga	**Mbeya**
1 (a) White stem borer (b) Yellow headed borer	(a) Stem (b) Branches	2	1
2. Antestia bug	Young shoots/growing points, flowers & berries	1	3
3. Green scale	Stem, branches, leaves, flowers and berries	3	5
4. Leaf minor	Leaves -underneath and in the center of the leaf	4	N/A
5. Berry borer	Berries	6	4
6. Sting caterpillar	Leaves	5	N/A
7. Cutworms	Young seedlings	8	N/A
8. Elegant grasshopper	Young seedlings	7	N/A
9. Mealy bug	Young succulent shoots, flowers and berries	N/A	2

Appendix 3: Swahili names of some pests

Pest	Swahili name
1. White stem borer	Bungua mweupe
2. Yellow headed borer	Bungua wa njano
3. Leaf minor	Kidomozi
4. Antestia bug	Kimatira
5. Green scale	Vidugamba
6. Berry borer	Ruhuka
7. Sting caterpillar	Washawasha
8. Cutworms	Sota
9. Elegant grasshopper	Senene
10. Mealy bug	Vidung'ata

Appendix 4: Coffee diseases found in Southern Highlands of Tanzania in 2004/2005 cropping season

Diseases	Part of plant attacked	Rank	
		Mbinga	**Mbeya**
1. CBD	Flowers/berries	1	1
2. CLR	Leaves	2	4
3 *Cecospora spp*	Leaves – attacked part resemble frogs eyes	3	N/A
4. Fusarium back disease	Stem - drying	N/A	3
5. Amillaria root rot	Roots and stem drying later	N/A	2

Appendix 5: Swahili names of some diseases

Disease	Swahili name
1. CBD	Chule buni
2. Coffee leaf rust – CLR	Kutu ya majani
3. *Cecospora spp*	Bakajani
4. *Fusarium* bark disease	Mnyauko Fusari wa Arabika
5. *Amillaria* root rot	Kuoza mizizi

Appendix 6: Yield potential and liquor quality of the assessed coffee lines/varieties in Southern Highlands of Tanzania in 2004/2005 cropping season

Variety	Yield potential (tons/ha)	Quality (FAQ)
SC 3	**2.6**	**5**
SC 9	**2.9**	**4**
SC 11	**2.5**	**5**
SC 14	**1.5**	**5**
KP 423 –Local	**1.3**	**5**

1.0 FAQ – Fair Average Quality **2.0 Liquor quality scale:** 1 – 6 Good commercially

7 – 14 Poor commercially

NB: The lower the score the higher the quality

Appendix 7: Comparison of Levels of Management under sub optimal and optimal management conditions in Southern Highlands of Tanzania in 2004/2005 cropping season

No	Activity	Site for farmers' assessment	
		Mr. Solanus Kamzoro (small-holder or sub-optimal management)	Mr. Clemence Maier (optimal management)
1	Standard hole size plus planting fertilizers	Standard as recommended	Standard as recommended
2	Application of Farm Yard Manure after planting	Regularly	Occasionally
3	Application of inorganic fertilizers	Occasionally	Standard
4	Weed control	Optimum	Optimum
5	Insect pest control	When observed	When observed
6	Pruning	When observed	Only suckers
7	Irrigation	None	Occasionally
8	Intercropping	Intercropped with fruit trees/gravelia	Intercropped with gravelia/acacia
9	CBD control	None in new cultivars	None in new cultivars
10	CLR control	None in new cultivars	None in new cultivars
11	General observation in the field	Regular	Regular

NB: - Sources of Farm Yard Manure in the order of importance in Mbinga District are: cattle, poultry, pigs, goats, compost (covered crop residues in the soil) from Matengo pits and applied mulch in coffee from wheat/maize/grasses/coffee husk. The FYM rate is 1 tin (12-15 kgs) per tree
– Sources of inorganic fertilizers in order of importance in Mbinga District are: CAN, Urea and S /A.
. The rate is 50 – 100 grams/tree and used by very few farmers. S/A use is quite minimal.

Appendix 8: Total coffee production in tons from a total of 10,500 ha in Mbinga district in 1992 - 2004

Year	Total production in tons
1992	10,200.0
1993	14,887.0
1994	5,188.0
1995	8,815.0
1996	12,601.0
1997	6,770.0
1998	7,100.0
1999	12,000.0
2000	7,498.0
2001	10,296.0
2002	9,000.0
2003	10,000.0
2004	7,000.0
2005	6,900.0*

* Amount sold up to now as final harvesting/processing is still going on.

Appendix 9: **Total coffee production in tons from a total of 10,500 ha in Mbeya district in 2000- 2004**

Year	Total production in tons
2000	1,150.0
2001	1,528.2
2002	1,236.5
2003	1,236.5
2004	1,979.0

Appendix 10: Total coffee production in tons from a total of 28,000 ha in Mbozi District in 2001- 2004

Year	Total production in tons
2001	12,300.0
2002	9,700.0
2003	10,850.0
2004	10,500.0
2005	11,200.0**

** Most of the harvesting/processing and selling has been done. Only very negligible amounts might be in the hands of the farmers

Appendix 11: Total coffee production in tons from 216 acres of Lunji Estate (large scale farm) in Mbeya district in 2001-2004

Year	Total production in tons
2001	69
2002	202
2003	45
2004	205

Appendix 12: Total coffee production in tons from Sinyatu Farm (medium scale farm) in Mbeya District in 2001- 2005

Year	Total production in tons
2001	6
2002	9
2003	7.2
2004	9
2005	12

Appendix 13: Coffee production problems in Mbeya Region:

- Lack of sufficient water for irrigation and processing purposes especially in Mbozi and Mbeya Districts
- Inadequate coffee extensionists
- High incidences of diseases which require money to buy chemicals for control
- Coffee price fluctuation
- Liberalized markets which buy coffee at low prices as they don't consider coffee grades.
- Lack of cooperatives societies which used to provide inputs to farmers. Farmers in Rungwe district said that most of the modern houses in their area were built during the cooperative society's era and especially when they got the second installment of payment.

Appendix 14: List of participants in Mbinga District

List of participants	Village	Gender
1. Bruno Haule	Longa	M
2. Fulgens Komba	Longa	M
3. George Ndunguru	Myangeyange	M
4. Dismas M. Kumburu	Mtama	M
5. Stephen Haule	Mtama	M
6. Alfrida Komba	Myangeyange	F
7. Philo Makarius	Myangeyange	M
8. Rotha S. Ndimbo	Tanga	F
9. Eleterius Ndunguru	Myangeyange	M
10. Inesy S. Kapinga	Tanga	F
11. Aderick F. Mbele	Tanga	M
12. Venance B. Komba	Longa	M
13. Bernadeta Kapinga	Longa	F
14. Menas B. Komba	Longa	M
15. Benjamin B. Mbepera	Longa	M
16. Gaston O. Mbepera	Longa	M
17. N. H. Mruttu – Extensionist	Mkumbi	M
18. Chrisandus Ndunguru	Myangayanga	M
19. Editha Kapinga	Longa	F
20. John Kabakuli	Myangayanga	M
21. Solanus Kamzoro	Ruico	M

Appendix 15: List of participants in Mbeya District

List of participants	Village	Gender
1. Alexander Mwanyoka	Mbalizi	M
2. Halinga S. Mwananzala	Isangala	M
3. Elisha P. Mkanda	Malowe	M
4. Nazalet H. Shitindi	Iwindi	M
5. Samson M. Mwasengo	Iwejele	M
6. Amon J. Mwampelo	Malowe	M
7. Ambalile M. Katolike	Malowe	M
8. Gifti K. Ndisa	Lusungo	M
9. Saimon L. Nyembele	Mbalizi	M
10. Laurent Y. Mwaigaga	Lusingo	M
11. Dauson N. Mwashilindi	Lusungo	M
12. Watson M. Nzuyuga	Iwejele	M
13. Samson D. Mwashilindi	Lusungo	M
14. Jeremiah S. Mwazeya	Malowe	M
15. Clemence Maier	Lunji	M
16. Mrs Clemence Maier	Lunji	F
17. Kennedy Simon	Vwawa	M