

Novel and Practical Conservation Strategies following
Mining in Sierra Leone

Report on Practical Workshops conducted at
Sierra Rutile Operational Areas
17th – 22nd December 2006

Submitted to Darwin Initiative

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Executive Summary

The aim of this field work was:

- a) to conduct practical workshops on seedling production and provide advice on making compost,
- b) to conduct simple “market research” on the cost, availability and quality of locally produced compost,
- c) to examine the proposed location of the field plots and if possible set some of them out.

Five half day seedling production workshops were held at: Yangutoke, Mokoba, Bonjema, Kpetema and Lungi; we were unable to give the Bamba community sufficient notice to go there. Oranges (*citrus x sinensis*) and grapefruit (*citrus x paradise*) were used in the seedling production workshops as the plant is attractive to the local communities and the seed is readily available. We had initially planned to use *Gmelina arborea* but there was little enthusiasm among the local communities for that species.

Compost used in the seedling production component was purchased at all villages but the quantity available and quality varied considerably (Table 1).

Village	Quality	Cost / 34cm bucket	Ease of reaching an agreed price
Yanatoke	Good	Le 8,000 (£1.60)	Easy
Makoba	Poor	Le 12,000 (£2.40)	Moderate
Bonjema	Good	Le 10,000 (£2.00)	Difficult
Kpetema	Good	Le 8,000 (£1.60)	Easy
Lungi	Acceptable	Le 10,000 (£2.00)	Difficult

Site selection for the location of some of the field plots had (at the time of the field trip) been quite strongly determined by Sierra Rutile Ltd. The location of those plots therefore reflects the needs of SRL and further work with the communities for additional locations is required. Sites tend to be quite distant from the villages but either readily accessible by road (Lungi & Bonjema) or clearly visible from the road (Lanti North). Seven plots were set out; four at Lanti North, two at Bonjema and one at Lungi, Appendix 1 provides the coordinates.

1.0 BACKGROUND

After the first field visit 13th-17th November 2006 it was felt that it would be beneficial to the local communities to have follow-up meetings in one month's time. The primary objectives of this visit were threefold:

- a) to conduct workshops on seedling production (not covered in initial workshops) and to provide advice on compost production.
- b) to carry out "market research" into the current value and quality of locally produced compost.
- c) to examine some of the candidate sites for field plots and if possible set them out so as to allow people to visualize how large they were going to be.

The secondary objectives of the visit were:

- d) to reinforce the messages given in the first round of workshops,
- e) to answer any questions that might have arisen since the first meetings.

Conducting the seedling production workshops was led by Kabbie Kanu (FBC) supported by Jestina Jusu and Gbator (CADEM) and for the final day Leslie Mboka (CADEM). Market research and surveying (setting out) were led by Richard Wadsworth (CEH). Initial visits to the villages (to arrange times for the workshops) was carried out in conjunction with SRL; Anthony Smith-Sam (SRL) joined the team for the workshop at Mokoba and Bonjema.

1.1 Itinerary – December, 2006

December 13th – pre-meeting between Richard Wadsworth (CEH) and Leslie Mboka (CADEM) in Freetown.

December 17th – travel to Sierra Rutile site (R. A. Wadsworth CEH & Kabbie Kanu FBC), unfortunately Arnold Okoni-Williams (FBC) and Dr A. Sundufu (NUC) who were due to join us to collect base-line data had to withdraw at the last minute. Problems with the vehicle meant a late start but a relatively quick journey ~5 hours. Leslie Mboka planned to travel the day before but he was detained in Freetown by problems with his own vehicle (but we knew too late to go back to collect him).

December 18th – short meeting with Hadji Bado (Manager, Community Affairs SRL). Visited Yangutoke, Mokoba, Bonjema & Lungi to let them know we would like to hold workshops.

December 19th – workshops at Yangutoke and Mokoba, as Mokoba was not on the original set of villages we conducted an "abbreviated" version of the first workshop before moving on to the seedling production and compost making. Set out 2 plots at Lanti North

December 20th – workshops at Bonjema and Kpetema. Constructed a template for setting out plots

December 21st – workshop at Lungi, set out plots at Lanti North x2, Bonjema x2 and Lungi.

December 22nd – wrap-up meeting with SRL and return to Freetown.

1.2 Participants and Facilitators of the technical workshops

Table 2 Darwin Team participants and roles		
Name	Organisation	Role
Mr. Kabbie Kanu	FBC, USL	Plant taxonomist – lead in seedling production and practical aspects of compost production.
Dr. Richard Wadsworth	CEH	Landscape Ecologist – “market research” into existing value of compost, setting out plots
Mr. Leslie Mboka	CADEM	Community Activist (Lungi workshop)
Ms Jestina Jusu	CADEM	Community Liaison
Mr Gbator	CADEM	Community Liason.
Anthony Smith-Sam	SRL	Community Affairs (Mokoba & Bonjema workshops).

2.0 MEETINGS AND WORKSHOPS CONDUCTED

2.1 Pre-workshop Meetings

Before the workshops we had a brief meeting with Hadji Bado (SRL) before he set out for Freetown to discuss progress with the project and the plans for this meeting.

Accompanied by Dousa, Ezikiel and Anthony Smith-Sam (SRL) and Jestina and Gbator (CADEM) visited Yangutoke and Mokoba (the other “half” of Yangutoke) before lunch. At lunch time Bob (the driver) decided to clean the carburetor (there being no air filter on the engine) this put the vehicle out of commission until around 6pm. Visited Bonjema and Lungi (myself, Kabbie, Jestina and Dousa). Ezikiel (SRL) to inform the Kpetema village (where he lives) when we want to come.

Decided on the following workshops:

Yangutoke – Tuesday morning – seedlings
Mokoba – Tuesday afternoon – compost and seedlings
Bonjema – Wednesday morning – seedlings
Kpetema – Wednesday afternoon – seedlings
Bamba – Thursday morning – seedlings
Lungi – Thursday afternoon – seedlings.

Location of the places mentioned is provided in Figure 1.

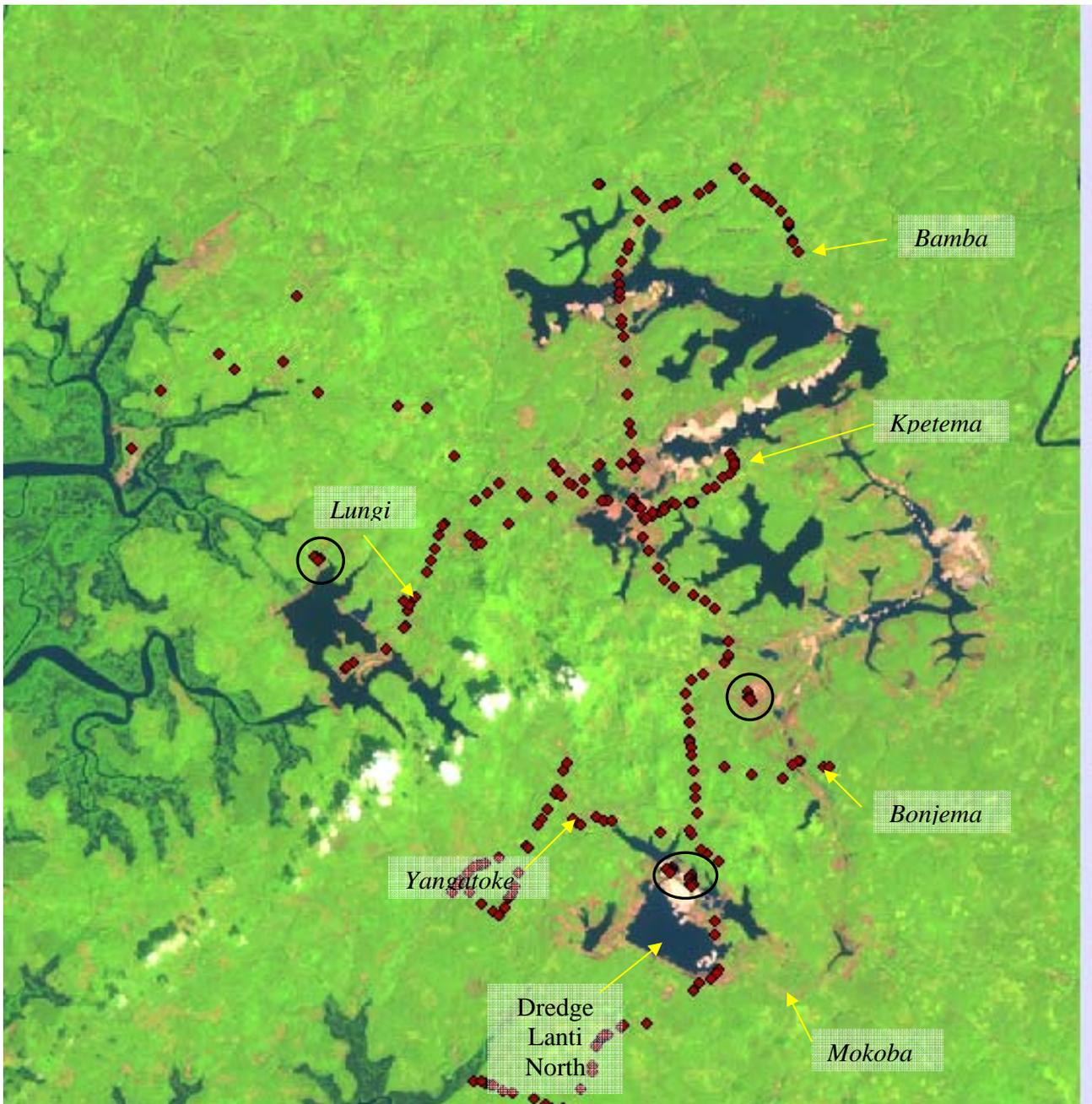


Figure 1 Location of the places mentioned in this report. Location of field plots surrounded by the black ovals

2.2 Location of the proposed plots.

The proposed sites at Lanti North, Bonjema and Lungi plot sites had all been suggested by SRL; there has not yet been time to consult with the local communities on where they would like the experimental plots. At all the sites it was difficult to find large enough truly uniform areas for the plots. GPS coordinates of the corners of all plots are provided in the Appendix.

Lanti North – sites easily visible from the main road at the point where there is the best view of the active dredging operation. The first two plots are reasonably accessible, with a little work a vehicle could probably get to the edge of the first plot. Plots 3 and 4 are less accessible but only a few hundred meters from the first two plots. There is a significant slope on plots 1, 2 and 3. Three of the four plots are square to ensure as uniform conditions as possible. The white sand has some crusting of algae on it in places and might be more hospitable than the brown sand despite the presence of

more fines in the brown sand.

Figure 2 shows the location of the plots, and figures 3 and 4 the view from the main road.

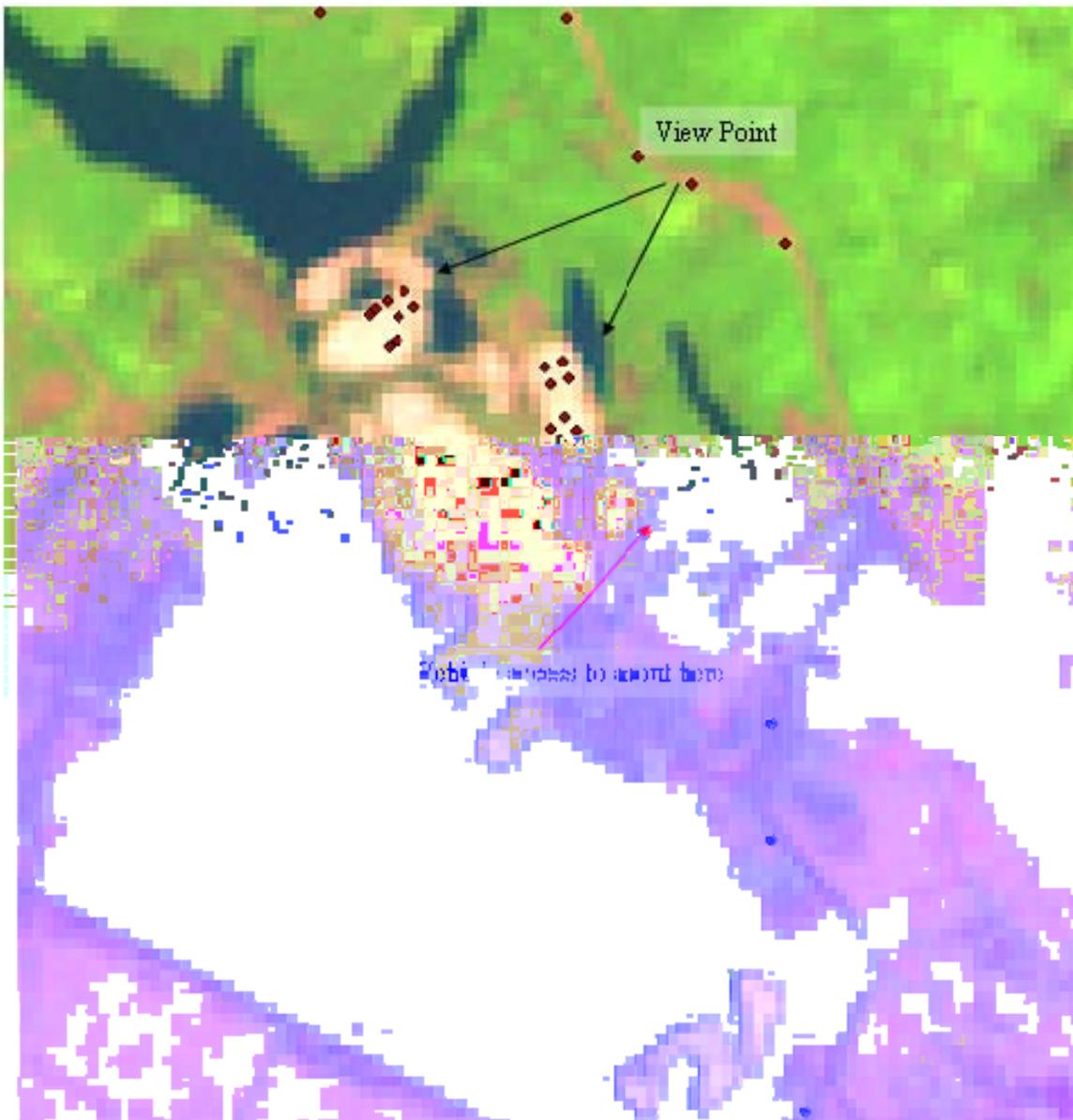


Figure 2 location of the Lanti North Plots.



Plots 1 & 2

Figure 3. Lanti North Plots 1 & 2 as seen from the road with the dredge in the background.



Plots 3 & 4

Figure 4 Lanti North Plots 3 & 4 as seen from the main road.

Bonjema – the site was dry mined in the 1980's. It is approximately 700m x 400m in extent and approximately 5 to 10 meters depth of material was dug out leaving a dish shaped depression. Standard earth moving equipment was used in the mining and the removed material had to be transported and dumped in front of the dredge for the primary processing. In some areas the land has eroded down to a coarse sand stone bedrock. Some sediment has filled the lowest parts of the site and made a slightly more attractive media for plants especially sedges. There appears to be two patches of latterite that are large enough for the plots, soft enough to dig and currently unvegetated, however, one is distinctly yellow and the other red so it is not certain if they form a “pair”. The other problem is that the site is quite a long way from the village (about 2 km); it is relatively close to the main road.

The location of the Bonjema plots is shown in Figure 5 and setting out the plots in Figure 6.

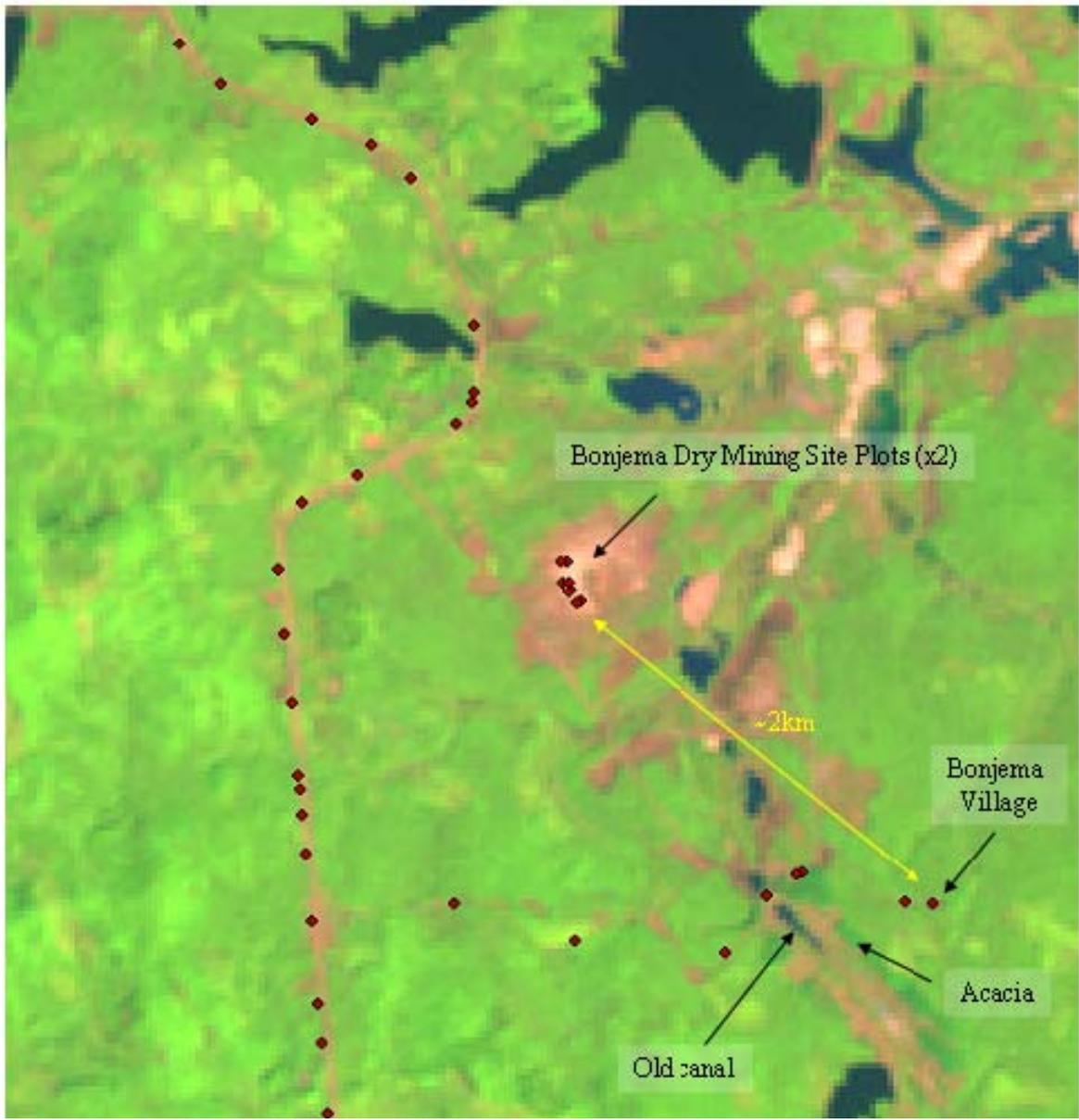


Figure 5 Location of the Bonjema Dry Mining Sites.



Plot 1 (note lowest point behind rhs figure is wetter and has more soil)



Gully between plots



Plot 2 (2nd 25m x 25m cell)

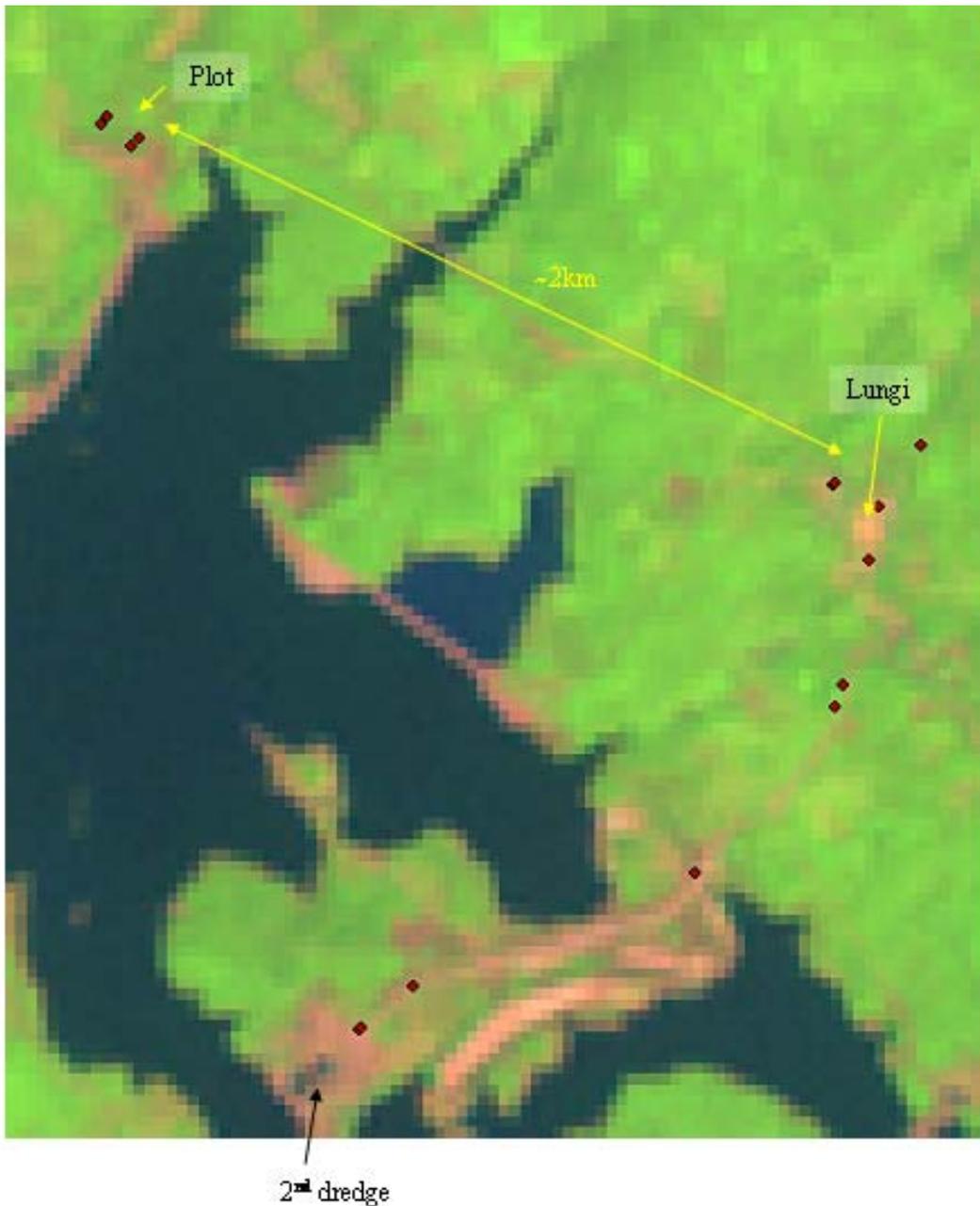


Plot 2 (end point)

Figure 6 the Bonjema Dry Mining Plots

Lungi – the site is very new (~1 year) so the latterite is very fresh. The “top soil” and vegetation has been pushed into windrows adjacent to the latterite bench. Unfortunately the upper bench is only wide enough for one plot and the lower bench looks to be in active use at the moment. There is a very slight slope across the bench. This site is also about 2km from the main village, but it is very accessible by road.

Figure 7 provides the location of the Lungi Plot.



Note that in January 2003 the plot was still under farm bush vegetation but that the lower bench is much older although it has been reworked in recent years.

Figure 7 Location of the Lungi Plot.

2.3 Seedling Production Workshops

The seedling production workshops all went very well. In Freetown we had purchased several dozen packages of clear plastic bags with a capacity of ~300ml. These bags are usually used to sell water in at markets and truck stops but when punctured to allow drainage are adequate for seedling production. The great advantage of these bags is that they are one twentieth the cost of horticultural seedling bags. We used at least one pack (of 100 bags) at each workshop so that each participant could take 1 or 2 examples away with them. We also left ~4 packs at each village.

Yangatoke - Very successful training in seedling production. Figure 8 shows Kabbie Kanu explaining the finer points of preparing the seed bags.



Figure 8. young, old, male, female everybody wants to take part.

Mokoba - we did a cut down version of last month's workshops but we had quite a few drift away over time. I hadn't realized how large Mokoba was (it is in fact 3 villages, two of which were relocated there). Kabbie's training in seedling production went very well; but the chairman of the landowners group kept talking about "community effort" and I think we'll get better results with individual enterprise.

Bonjema – unfortunately the village chief was taken seriously ill the day before and so many of the people who would have attended our workshop were not available. The chief returned half way through the workshop but certainly too ill to talk to us. However, we did manage to train some people and purchased some good quality compost.

Kpetema – unfortunately the message of when we would be arriving was garbled in transmission, however, we had a reasonable crowd.

Bamba - discovered that the community has not been informed of our visit so we have had to cancel that workshop.

Lungi - Training went well and was over much quicker than any of the previous workshops.

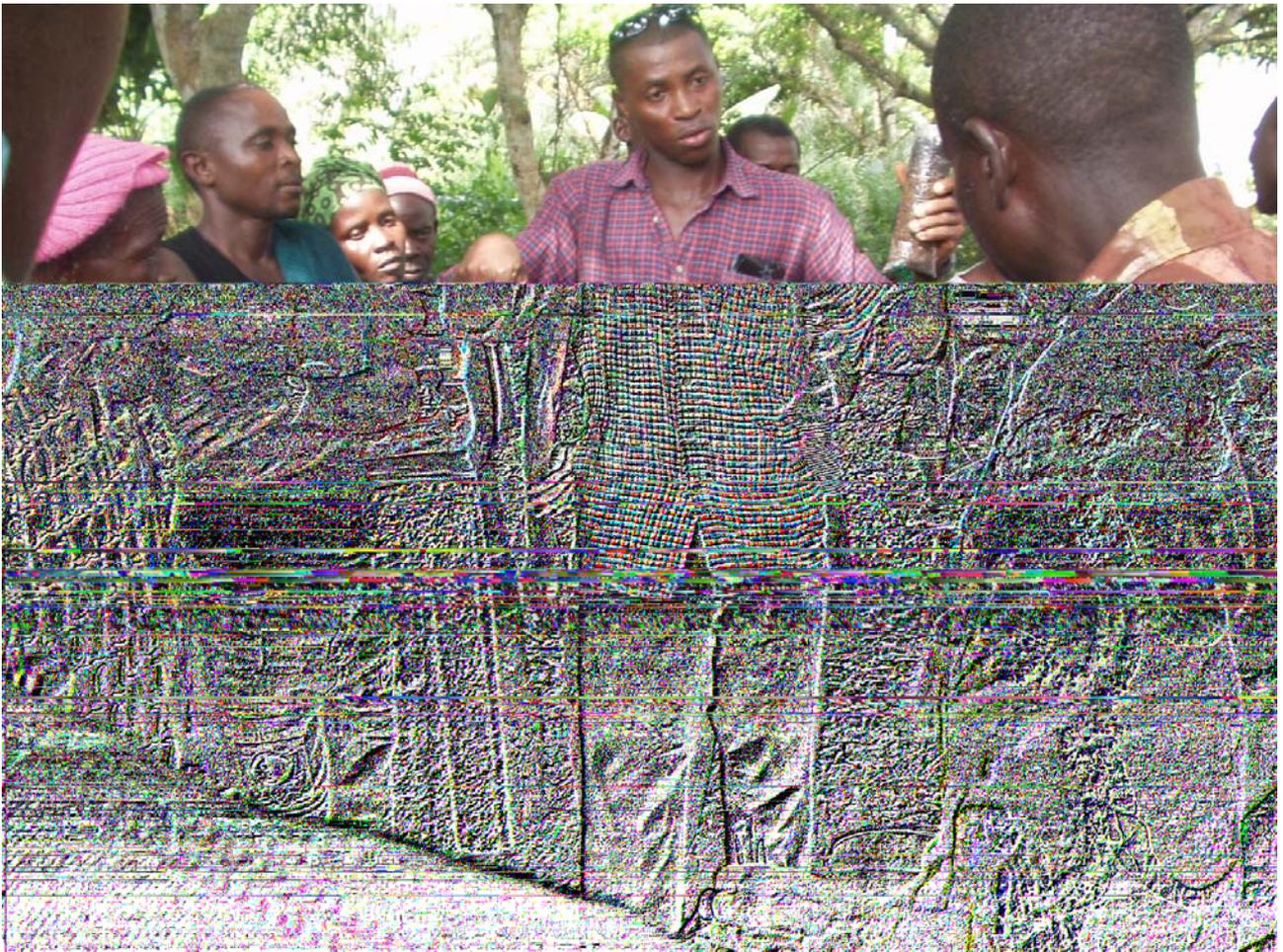


Figure 9 discussing the importance of drainage and watering



Figure 10. after the training taking the seed bags home.

2.4 Market Research into value of compost

Most waste produced by households is organic in nature and is deposited behind the houses where it accumulates until sufficiently rich to support very demanding crops particularly bananas and yams. It is therefore possible to purchase locally produced compost from these informal heaps. A few individuals produce additional compost for use on vegetable gardens but we did not purchase any compost from those producers.

The main aim of this exercise was to see how the actual price when money was on offer differed from the suggested price at the workshops held the previous month. We were also interested in being able to show the local communities what we meant when we talked about “good quality” compost.

In Freetown we had constructed 4 sieves each of which used a double layer of 15mm grade chicken wire as the base. These proved successful in removing plastic and coarse material from the compost. The sieves were left in the villages.

Some care should be taken when extrapolating these figures as the communities were aware that we would be using the compost in the seedling production demonstration. The communities were also aware that we were not from SRL.

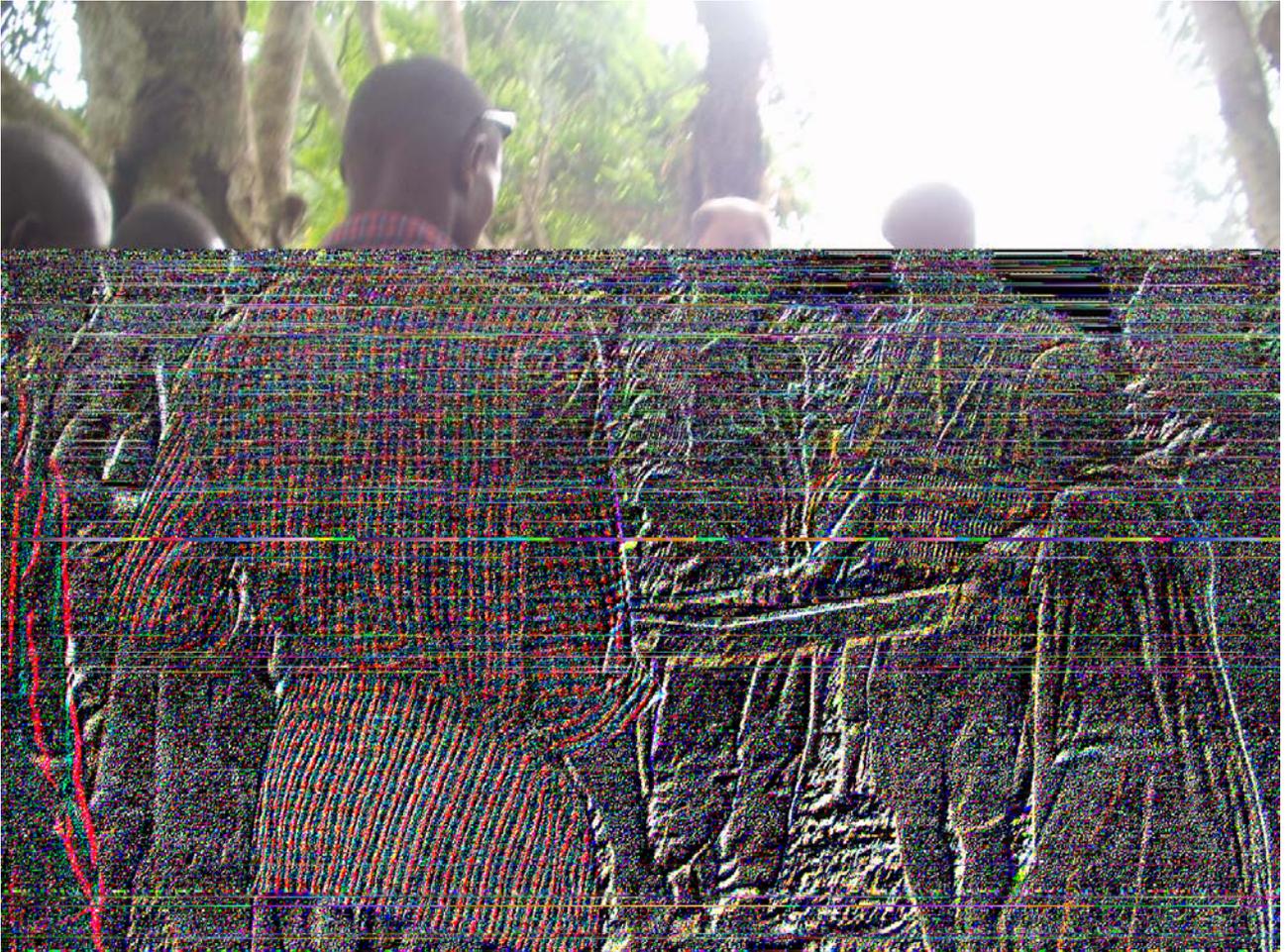


Figure 11. a sieve in action – discussing the quality of the compost



Figure 12. local production of compost (note bananas in the background).

Yangatoke - a bucket of good quality compost was purchased from the chief for Le 8,000 and everyone seemed very happy about the price (they started at Le 10,000 but were happy to give me a “last last price” of Le 8,000. The number of people participating increased during the training and probably ended up about 50-50 men and women.

Mokoba - a bucket of compost cost Le 12,000 and they were less happy about the price (they started at Le 20,000 and were reluctant to go as low as Le 12,000). The first compost we were shown we refused to buy – in our opinion it was so old it was just soil; the second lot was better but not as good as at Yangatoke. We had to walk through a lot of the village to find any compost so my impression is that they do not produce as much.

Bonjema - The initial price they asked for was Le 100,000 per sack (the same as they had said in the first workshop), this they translated as Le 70,000 per bucket even though a sack should hold 2 to 3 buckets. After some time they accepted Le 10,000 but this is a concessionary price which I think we only got after it was explained that the compost would be used for training purposes.

Kpetema - Purchased a bucket of compost for Le 8,000 this was the first we have purchased that was completely stone free so the compost was mixed with a little soil to provide some “grit” and improve the drainage. The woman we purchased the compost from has started two compost pits, one for goat (and fowl?) droppings the other for green material.

Lungi - Their initial price was Le 60,000 per bucket we eventually bought for Le 10,000 but I'm not convinced it was a properly negotiated price. The compost was of reasonable quality although a lot of the material had not fully decomposed. The Chief had already started to dig a compost pit.

2.5 Setting out the plots

Lanti North – plots 1 & 2. With only a 20m tape it took about an hour to set out each plot, however, the residual errors of 5 cm and 25cm respectively are relatively good. In view of the number of plots needed we decided to construct a rope template to set out 25m x 25m blocks (ie blocks to a plot). The template is constructed from nylon rope thin rope is used for the edges and a thicker rope for the two diagonals. As the ropes are nylon there is some stretch and the security of the knots is questionable.

Bonjema – plots 1 & 2. Set out two rectangular plots at Bonjema although the site is close to the main road it is a long way from the village. The plots are separated by a seasonal stream that has eroded down into the bedrock up to half a meter. The plots are almost completely level but the latterite is distinctly different colored (one yellow one red). It was difficult to get a wooden stake into the ground.

Lanti North plots 3 & 4. Plot 3 is rectangular and plot 4 square. They are slightly further from the road than the previous two plots but are clearly visible from the view point on the road.

Lungi plot 1 – A rectangular plot on the upper terrace, like Bonjema it is a considerable distance from the main village. The “bench” proved too narrow at the far end to fit two plots on and the lower bench looked as if it were still active.

3.0 CONCLUSIONS AND RECOMMENDATIONS

As might be expected in predominantly farming communities the concept of growing seedlings for sale was readily accepted, as was the need for quality control. It is also an activity that fits in well with the standard economic unit of a household.

In the initial workshops the local communities suggested a price for compost of between 3,000 and 40,000 Le per 34cm bucket. When faced with a real cash offer we were able to purchase for between 8,000 and 12,000, but, two points should be born in mind, first that we were clearly not SRL and secondly that in most cases they were aware that we compost wasn't actually leaving the village. We hope that the example of buying compost fixes in their minds that compost is a commodity just like seedlings that can be traded. The sieves were effective in allowing us to approximately indicate what constituted good quality, there remains an issue in how to convey the need for freshness in the compost. The quantity and quality of the available local compost varied greatly and although we have been informed that some people deliberately make compost we did not actually see that happen.

The 25m x 25m template allows a plot to be set out quickly and easily (provided you have four people). As the existing sites are distant from the villages we do need to start discussing where the other plots should be located.

Appendix 1
Location of Trial Plots

Site	Substrate	Location (GPS coordinates on WGS84)			
		North		West	
		Degrees	Minutes	Degrees	Minutes
Lanti North #1	White sand	7	40.908	12	17.102
			40.923		17.079
			40.944		17.096
			40.926		17.117
Lanti North #2	Brown sand	7	40.993	12	17.116
			41.000		17.089
			41.026		17.097
			41.019		17.123
Lanti North #3	White sand	7	41.060	12	17.340
			41.052		17.352
			41.098		17.381
			41.106		17.370
Lanti North #4	Brown sand	7	41.117	12	17.353
			41.132		17.329
			41.108		17.315
			41.094		17.338
Bonjema #1	Latterite (20 years exposed)	7	43.122	12	16.397
			43.091		16.372
			43.100		16.361
			43.131		16.386
Bonjema #2	Latterite (20 years exposed)	7	43.150	12	16.329
			43.148		16.405
			43.203		16.412
			43.205		16.399
Lungi #1	Latterite (<2 years exposed)	7	44.808	12	21.478
			44.838		21.519
			44.849		21.511
			44.817		21.466