



**Mid season Evaluation of on-farm verification and promotion
of Green manure for enhancing upland rice productivity on
Striga infested fields:
Matombo - Kyela, Project, 2005**



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Mid-season Evaluation of on-farm demonstration and review progress

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The team was joined during field visits by the village extension worker in each of the participating villages/communities.

Cover Phptos

Farmers and the Research team evaluating Marejea at early growth stage (left) and fully grown Marejea with good soil cover (right).

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Preface:

Striga species, the parasitic witchweeds, are wide spread in small holder crops in semi-arid and sub-tropical regions of Eastern and Southern Africa. These weeds attack and reduce the yield of maize, sorghum, upland rice and finger millet in these regions. In many areas it is the crops of resource-poor households, which are particularly affected. They impose additional stress with which farmers, who have little resources for investments in crop production, have to cope in an environment characterized by marginal rainfall for cropping and declining soil fertility.

Since 1996 staff from the Department of Agricultural Research Development, Sokoine University of Agriculture and Extension in Tanzania and, Natural Resources Institute in UK have collaborated to develop integrated *Striga* management practices for rice crop. Studies have been undertaken with groups of rice farmers in Kyela district, in the Southern Highlands of Tanzania.

Through on-farm trials farmers came to appreciate that *Striga* infestation and poor rice production are associated with and indicators of low soil fertility. This in turn is a consequence of continuous rice cultivation in the absence of using any fertilizer or manure. While the field trials demonstrated that up to a 60% reduction in *Striga* numbers and a 40% increase in rice yield is achieved by using urea fertilizer, farmers decided they did not wish to invest scarce cash in fertilizer. Instead they became interested in the opportunity, also observed from the field trials, to improve rice productivity on *Striga* infested soils by introducing the green manure crop *Crotalaria*.

The current project is on “On-farm verification and promotion of green manure for enhancing upland rice productivity on *Striga* infested fields in Tanzania”. It is operating from April 2005 to March 2006 as a second phase of the project R8194 with aims to scale up the demonstration of using the green manure in rotation with rice in

both Kyela (Mbeya Region) and Matambo (Morogoro Region).

This report examines the farmers acceptance of the technology of using green manure in rotation with cereals and the adoption of the technology to other farmer in the rice and maize farming communities in Kyela and Morogoro rural districts in Mbeya and Morogoro regions respectively.

Further information on the project or further copies of this report is obtainable from:

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Matombo Ward

Konde village

Farmer	Plots	Comments
Henry Mbena	Marejea planted in early March between rows of pineapple – good stand plants \pm 20 cm high.	A very steep slope; started planting pineapple in 2004 as a UMADEP participant. First saw Marejea at primary school and then attended project seminar. This field has much <i>Striga</i> ; after Marejea he will plant maize. Also planted beans on a portion as at seminar he learnt these were good for soil fertility.
Leya Kadogonda	Marejea planted in February but it emerged in march after drought on field previously in rice – poor stand and very weedy, especially <i>Rottboellia</i> .	Heard about Marejea at project seminar; field had much <i>Striga</i> in rice last season although it was only second year after fallow. Field about 1 hour walk from village on steep slopes. Spoke with a group of farmers: Generally after fallow of 5-10 years fields are planted to rice for 2 years then sorghum for 3 years and then cassava before returning to fallow. Land here is relatively available, not the case near to the village. Many farmers here are young as there is little out migration. Hunger is rare with hand outs of food needed only by old people. Cassava is now the main crop. Black pepper, cloves, banana, cardamon and sorghum are regularly sold – rice production is insufficient to be marketed. Coffee has not been sold for some time.
Konde Primary school	Marejea planted 10/03 now knee high approx. 20 x 20 m plot; also continuous maize. Pigeon pea did not germinate.	School has 556 pupils. Good location for plot by the side of school buildings. This are has been heavily infested by <i>Striga</i> in past. Pupils have worked on plots and some have taken seed home to parents. No weeding has been needed in Marejea which will be maintained for seed. A number of local farmers have already requested seed for next year.

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Kiswira village

Farmer	Plots	Comments
Otto Mzeru	Maize after Marejea Marejea planted in 02/05 1 acre Pigeon pea	In previous masika seasons maize here had been very stunted, now after Marejea it looks vigorous with good size cobs. Was no vuli crop here. Pigeon pea at good plant population to improve soil fertility, mostly farmer saved seed of Mali variety but mixed with local so some plants dead from wilt. Very vigorous.
Group Chairman	Two plots Marejea planted late February Pigeon pea, Mali, from saved seed Maize after pigeon pea Maize after Marejea	Were no vuli crops here. Marejea excellent stands now at head high. Maize stands poor although vigorous and green – had been grazed by cows! Farmers indicated that the area was heavily infested in past by <i>Striga</i> but after Marejea he sees little. On an area he had previously harvested only 1 kg maize last year produced 6.5 kg after a crop of Marejea. <i>“I had almost given up maize here thinking I could only grow cassava. Now I can see there is a chance to rehabilitate the land for maize”</i>
Veronica Dominic (New participant)	Marejea planted 02/05 12 x 25 m Pigeon pea 10 x 8 (seed from other farmers)	A lot of <i>Striga</i> here on grass weeds. TMV1 maize poor and stunted. She pulled big weeds from Marejea which is now waist high.
Paulo Mathew (Matei)	Maize after Marejea Maize after pigeon pea Continuous maize	Joined group in 2004 and planted Marejea and pigeon pea. Following maize is now at waist high and clear response to Marejea – taller and greener than continuous maize. <i>“Before with continuous maize I was in form 1 but now with better maize after Marejea I am making progress and am in form 4”</i> .
Plots at Church	Maze after Marejea Maize after pigeon pea Continuous maize Marejea Pigeon pea	Good response of maize to legume, maize after Marejea most vigorous. This seasons plot of Marejea is waist high. Need sign boards here.

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Isdori Malini	Maze after Marejea Maize after pigeon pea Continuous maize Marejea	Best, greenest maize is crop after legumes with largest cobs after Marejea. However even continuous maize is quite good here, probably soil is relatively fertile. New Marejea excellent stand, good size plot.
Filipina Jacob	Marejea planted 04/02 Pigeon pea Maize after Marejea + relay Marejea Maize after pigeon pea + relay Marejea	A valley bottom site with generally good crop growth in surrounding fields. Maize after Marejea very vigorous with large cobs. Relay planted Marejea now about waist high, has not affected maize according to farmer as she planted at weeding. Sole crop Marejea now head high. Here there was no continuous maize as farmer did not want this. She has not seen any <i>Striga</i> this season as in past while maize cobs are much bigger than before she used green manure.
Lydia John	Marejea 20 x 15 m Pigeon pea Mali	Marejea now head high. She had a maize crop in vuli season planted after Marejea grown in previous masika season. Reported that maize had produced a good yield. Area now planted again to Marejea.
Germania Peter	Maize after Marejea Maize after pigeon pea Continuous maize	Maize after the legumes have thickest stems, tallest plants and largest cobs.
Matombo Primary school	Marejea – excellent stand 20 x 15 m Cowpea – poor stand Maize	515 pupils at this school. Excellent plot of Marejea next to school buildings and by the road through the village. Has been <i>Striga</i> problem here in previous seasons – maize growth is poor. Standards 5 to 7 are involved with plots and lessons about soil fertility/ <i>Striga</i> . Some parents have asked about the plots but the teachers indicated that because of the project people here are already exposed to the concept of green manure.

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Kibangile village

In this village 13 plots were visited as follows

Farmer	Plots	Comments
Kibangile primary School	<p><i>The plot had poor established crotalaria and pigeon pea died completely;</i> Grown at the valley bottom Affected by water lodging Late weeding</p>	<p>The school to reorganise and develop good plats like that of the last year</p>
Mzeru Mbaruku A teacher at Kibangile pr. School	<p>She has a research plots of crotalaria, pigeon peas, rice and control of 30m x 6m She has also three plots of rice that followed maize grown after crotalaria, another one of rice grown following pigeon peas and the last one as a control. Plot under rice following crotalaria yielded 12kg of maize, under pigeon peas 16 and control only 8kg. (5m by 5m plots)</p>	<p>There was poor establishment of crotalaria causing poor performance after pigeon peas. Want to expand next season to 1.25 acres with half of it Other 10 farmers have planted MALI Pigeon peas March is a good time to grow crotalaria as it is not too wet nor dry Other farmers wan pigeon peas seeds Other farmers still don't know crotalaria as some call it a weed.</p>
Kibangile primary school choir group	<p>Sang three sons one on control of Striga "Sani laleta umasikini" meaning sani brings poverys, the second one on eradicating Striga "Tuangamize sani" and another local song on Striga is a witch "Salonga Mhghawi" Stressed only control by weeding, forgetting others like use of resistant varieties</p>	<p>After thanking on the good song the following were reactions Complement songs with posters Songs did not give complete message; they have to include all the hows. Song should contain all control techniques and should be well elaborated</p>
Abudul Ali	<p>Has a plot of crotalaria and of maize sown in February 2005. Noted; Is a 1st season trial Late sowing of maize in Feb 2005.</p>	<p>Best time to saw maize on valley bottom is October to avoid wetter soils Expect to expand next season a crotalaria plot</p>

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	Maize was poorly established	
Roman Filbert	<p>He is a group chairman. Has three plots on maize grown following crotalaria and pigeon peas and last one as a control.</p> <p>Maize under crotalaria had better performances as compared to other plots.</p>	<p>Noted that it is very difficult to establish crotalaria</p> <p>There was a dry spell just after germination that contributed into poor performance</p> <p>Expect to expand area under crotalaria.</p>
Veronica William	<p>A new group member and a 1st season trial having three plots one of crotalaria, another pigeon peas and a control.</p> <p>Next season to try with rice.</p>	<p>If she had seen to others, need no to confirm, just expand production</p>
Peter Roman	<p>In his second season of a research. Had three plots on maize following crotalaria, pigeon pea and last as a control-cereal after cereal</p> <p>Maize after crotalaria performed the best</p> <p>Established trash lines reinforced by cassava plants</p> <p>Has also a p[lot of corporals for seed production of 40m by 18m size.</p>	<p>Noted a serious problem of lack of crotalaria seeds.</p> <p>Crotalaria did the best and expect to expand more next year.</p> <p>Trash lines did their job, but cassava need to be planted down stream the lines</p>
Anjelika	<p>Had a 1st season trial having three plots one of crotalaria, pigeon pea and a control.</p> <p>Had also a 2nd season plot where she had three plots on maize following crotalaria, pigeon pea and a control</p> <p>Maize after crotalaria, pigeon pea and a control yielded 11kg/25m², 7kg/25m² and 5kg/25m² respectively</p> <p>Established trash contours, reinforced by cassava plants</p>	<p>It is very difficult to establish crotalaria</p> <p>Crotalaria did the best and expect to expand more next year.</p>
Salvatory	<p>A new group member and a 1st season trial having a crotalaria plots.</p>	<p>Expect to grow rice next season</p>
Stephania John	<p>This was his 2nd season trial where he had three plots on maize following crotalaria, pigeon pea and a control</p>	<p>Expect to expand area under crotalaria where there was poor maize next season</p>

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	Maize after crotalaria yielded 11kg/25m ² plot, after pigeon pea yielded 10kg/25m ² plot and a control 6kg/25m ² plot Established trash contours reinforced by cassava plants	Has also a new plot of matured crotalaria for seed multiplication. Has also a new plot of young crotalaria for seed multiplication.
Pili Mohamed	An old member of the group and a 2nd season trial having three plots one of crotalaria, another pigeon pea and a control. Next season will be planted with rice. Has also a second season trial of rice following crotalaria and another following pigeon peas	Rice under crotalaria performed better than the rest Soils were relatively fertility. Less weeding experienced were rice planted followed green manure.
Josephina Amosi	Had a second season trial of rice following crotalaria and another following pigeon peas	Rice under crotalaria performed better than the rest Has a plot also of crotalaria for seed multiplication
Mr Mkude	Planted crotalaria and pigeon pea last season and performed well. He has SWC component	Wanted to buy 20kg of crotalaria seeds from farmers but could not get as there was shortage of seed and is a challenge to all farmers to produce more Crotalaria seed.

Mtombozi village:

In this village 4 plots were visited as follows. This is the new village into which the technology is spilling over. It is their first year of planting and evaluating the benefits of growing green manuring to control striga and improve soil fertility. We met Haruna Kunambe the WEO of Mtombozi Ward

Farmer	Plots	Comments
Venas Victor (He is the farmer group secretary)	A plot had good established crotalaria of an area of 15 m x 5 m. the plot is at a steep slope Expect to grow maize next season Other farmers are asking him why is he growing weeds that are of no importance	Has a good start. Himself and other farmers are keenly waiting to see the results
Godfrey paschal	We saw a very small plot of germinating crotalaria at his home yard for seed multiplication.	Has a good start. Himself and other farmers are keenly waiting to see the results

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	He has another plot of an area of about 30m x 30m in the neighbouring village	
Evarest Mpagwa	We saw a small plot of germinating crotalaria near his home for seed multiplication. He has another plot of an area of about 20m x 15m in the neighbouring village	Has a good start. Himself and other farmers are keenly waiting to see the results
Edita John (She is also a group chairperson)	Has three plot of crotalaria, pigeon peas mix with finger millet. Noted; crotalaria plot was good Sown early at the right time. Rice performance has been very poor due to infertile soils and Striga infestation	Has a good start. Himself and other farmers are keenly waiting to see the results

Discussion with Kiswira farmer group

Six members of group were available for the discussion.

How do farmers rate progress?

- On continuous maize plots yield is around 2 to 3 bags per acre. This has increased to 6 to 7 bags where green manure has been used. Farmers think that yields after Marejea would have been higher if rain had not been erratic;
- Now time to increase size of plots to 0.3 to 0.5 acre as Marejea works well.
- Farmers impressed by relay planting of Marejea at weeding in maize as this saves a season. Agreed this is a good idea unless rains are poor in which case there may be too much competition between Marejea and maize.

Is knowledge moving in the community?

- Chairman indicated that various group members have told other farmers about using the rotations and have given out seed of Marejea. Problem is they do not keep records of this nor have they made follow-ups.
- Others agreed that they had been asked for seed – farmers tend to want seed but do not want to join the group.
- It was suggested that good plots should be maintained at the church with sign boards.

Need for improved seed:

- Farmers requested more seed of TMV1 and Marejea. Was suggested that the group establishes a seed plot. A lady offered land and group agreed to discuss this for next season and asked Ilonga staff for TMV1 seed. They want to sell seed for a reasonable price to others as compensation for their efforts.

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Discussion with Mtombozi farmers after the site visits.

- Although it is their first year they made a good start and they need to be encouraged.
- They were advised to visit the villages those had started previous years to evaluate the technology so that they can learn on their achievements.
- Farmers appreciated that industrial fertilizers are too expensive for them to buy while growing crotalaria is within farmer's capacity and have received initial seeds free of charge.
- They informed us that they are working in collaboration with 7 other farmer groups in other 7 villages with who together have formed an association that they are in the process of registration. They were sensitised to spill over the technology to them and form a network of their all groups for smooth communication.

Edita John, the chairperson closed the discussion by thanking researcher's team to remember them as they are still young in the process.

Review of activities in each village

1. *Kibangile:* Now 35 farmers in the group

- Big change observed compared to 2004. Previously cereal crops were stunted but now after use of green manure or pigeon pea maize and rice is vigorous with higher yield.
- Marejea being planted in February to March to avoid problems with insect pests associated with early establishment. Pigeon pea needs to be planted earlier, in December if possible.
- Increasing demand for seed – indeed rate of adoption is limited by seed availability at present.
- In contrast some non-participant farmers still have view that growing Marejea is a waste of land.
- Poor relationship between group and the village government. Village leaders need to attend group meetings. WARD level staffs are aware of this and will try to provide support.

2. *Kiswira:*

- Big improvement in participation and large expansion of area planted to Marejea and pigeon pea on individual farms. As elsewhere pigeon pea provided by Ilonga for this season did not germinate but some farmers used seed saved from 2004.
- Good responses by maize to Marejea observed with farmers reporting increased yields over continuous maize.
- There is a very good plot at the school but more effort needed at the church as this is visited by many people coming from a long way off on Sundays. Sign boards needed here.
- Village leadership very supportive of group and the need to spread knowledge to others.
- Many reported to be asking for seed but do not necessarily want to join the group. This raises questions about follow-up.

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- Poor awareness about improved maize varieties. However the group asked for more TMV1. Possibility of the group establishing a seed plot was discussed.

3. *Mtombozi:*

- This is the first season that farmers here have been evaluating the legume-cereal rotations. 35 farmers are involved in 7 sub-villages.
- Farmers generally are well aware of the soil fertility problem and are very happy with green manure. Marejea was growing well on large plots visited by the team.
- Group is strong with a constitution – an existing farmers association. Now being encouraged to form a network with members from 7 sub-villages in this steep mountain area.
- Some history of Marejea as it was planted at the school 10 years ago.
- As well as green manure there is a need for soil and water conservation on the steep slopes here.

4. *Konde:* Also a new village in the project programme – in an area of steep slopes. There are a total of 7 demo sites here.

- Farmers are keen to obtain higher rice yields as currently they do not harvest enough to feed families for a whole year. Cassava is the major crop.
- Plots are very distant from the village which may reduce demonstration effect, but there is a good plot of Marejea at the school.
- Village chairman and secretary in group.

5. *Gozo:* There are 14 plots in total in the village which joined the programme for the 2005 season.

- Plots are far from the village.
- Farmers very positive about opportunity to grow Marejea as they saw effect on subsequent crops elsewhere. This year Marejea plots are growing well.
- Farmers indicated that with out green manure crops will not give good yields. Indeed the team saw many fields with stunted rice and maize.
- The previous Village Executive Officer has a good relationship with the farmers. Now there is a new VEO. The group here is well organised and in process of registration.

Visit to Kibungo Juu:

The village of 273 households lies within high mountain slopes about 20 km from Matombo. Various observations were made by the team visiting here and discussions undertaken with Ward staff and farmers.

- Rice, grown on very steep slopes is major crop. Populations are generally sparse, plants are stunted and nutrient deficient. *Striga* is widespread. Rice

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yields are very low. One farmer said “*I planted two tins of seed and harvested one tin of rice*”.

- Fields are planted for rice for two or more seasons and then return to fallow. Fallow is dominated by the fern bracken (*Pteridium acquilinum*). This is also a major weed in subsequent rice. As bracken has a stout rhizome system it probably has an important role in binding soil on otherwise exposed hillsides. Before planting farmers clear vegetation and then dibble in seed with no tillage. *Striga* is a problem in the first season of planting after fallow.
- Bananas and pineapples are cash crops here.
- *Striga* problem has been discussed at division meetings. Idea was to use farmers from Kiswira to train farmers from Kibungo juu.
- CARE is beginning work to form farmer groups here as part of the “*Conservation and Management of the Eastern Arc Mountain Forests Project*”.

Activities at Primary schools:

Kibangile: Seen as “model school” in 2004 when there was excellent set of field plots and very good presentation of drama, songs and poems by pupils. This year the plot has not been so well managed and content of the songs not as impressive.

Matombo: very well sited and managed plot of Marejea. The teacher responsible has provided close supervision and communicated well with school head since seminar with project to plan activities. Pupils provided good poems.

Gozo: Good plots seen of Marejea, pigeon pea and maize. A very clear response of maize to Marejea was seen in 2004 despite \pm stemborer damage. Teachers well motivated. School has requested seed of maize TMV1 for multiplication and then distribution to farmers in village.

The Ward set up a schools M&E team for these activities comprising Ward Executive Officer, Agricultural Extension Officer, Ward Education officer and Ward primary school co-ordinator. This has visited farmer groups and schools. Problems have included transfer of teachers responsible for *Striga* work in curriculum e.g. from Matombo, so M&E team identified replacement from school staff. It was agreed that the ward primary school co-ordinator should play lead role in back-stopping activities at schools and ensuring appropriate teachers are involved. Particularly important to ensure commitment of head teachers follows that from district and ward level.

Way forward:

There was considerable discussion on how to accelerate scaling-up. Ward level staff are keen to see expansion of activities to all 33 villages in the division – this consists of 6 wards. There are now groups in all 11 villages of Matombo ward (including 7 sub-villages of Mtombozi. Suggested way forward is to first increase awareness in ward leadership prior to formation of farmer groups. Experienced farmers from existing

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villages with groups could be used for training in new villages. Also important to make use of any existing farmer groups for scaling-up e.g. CARE groups in Kibungu Ju. The following process was agreed:

1. Training workshop for Ward staff, village agricultural extension officers and lead farmers from all wards in July. This will cover soil fertility and *Striga*, new maize varieties, seed multiplication.
2. Meeting for primary school heads attended by ward primary school co-ordinators and district education officer. Co-ordinator to visit all schools in ward to distribute posters and leaflets and arrange for Marejea seed supply.
3. Ward seminars for lead farmers to be encouraged to form groups. School head teachers and agricultural teachers should also attend.

Key will be access to sufficient Marejea seed for this process to operate. It is expected that this will come from various plots in Matombo this season. The project will need to monitor this and if necessary investigate obtaining more from outside area.

Exploratory meeting with CARE in Morogoro:

The team met with CARE staff at their HQ to introduce the work on soil fertility in Matambo to them and to identify possibilities for co-operation. CARE will operate in the Ulugurus until 2009 on current funding.

We met –Mr Sosten Siluhenza

Work ultimately aimed at forest conservation is now co-ordinated by the Eastern Arc Mountains Conservation Endowment Fund, supported by the UN Global Environment Facility. CARE is aiming to work in 32 villages in Ulugulu south area (includes Kibungu Ju) while Ulugulu north is responsibility of Ulugulu Mountains Agricultural Development Project (UMADEP) implemented by SUA. UMADEP is working in Kiswira on fruit production. CARE has just initiated an agricultural component in three villages including at one site in Matombo ward. A diagnostic study was undertaken and listed priorities included soil fertility and *Striga*. Initially project plans to work on maize, bananas, pineapple, poultry/pigs/goats and then vegetables. In Kibungu Juu ward one group has been recently formed for work on each of maize, banana, and livestock. Emphasis for soil fertility will be organic fertilisers so clear opportunity for using CPP project outputs. Indeed at the meeting CARE asked for seed of Marejea. Even though they are working with DALDO from Morogoro Rural they were unaware of the work on Marejea undertaken by the CPP project. We suggested best way forward is for CARE staff to attend the project workshop planned for June when results will be presented to district level policy makers from Matombo, Kyela and other areas. Several methods of soil conservation will be promoted including contour ridges, fanu ju etc.

CARE mentioned that farmers use a shrub called “dugutu” as a soil amendment. A handful of leaves are placed under maize seeds at planting.

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Kyela district

Konjula village

Farmer	Plots	Comments
Andwele Mwakasege	Rice after Marejea 2 nd rice after Marejea Rice after pigeon pea Marejea 20 x 20 m planted 17/2	Rice after Marejea vigorous and green – plot boundaries clear. Marejea had been cur prior to flowering and left on ground for a month prior to incorporation. New Marejea plot not weeded but good stand on area said to be infested by <i>Striga</i> . Gave two others Marejea seed and both planted (one is now in the group).
Sauli Mwanjokolo	Marejea 10 x 20 m	New in group, obtained seed from Andwele. Marejea stand patchy (drought after sowing), ankle to knee high.
Jacob Mwaijobele	Rice ex Marejea Marejea 7 x 25 plan 10/03 Marejea 7 x 25 now emerging	Rice excellent, tall and green after Marejea. Weeded only once. Marejea had been ploughed in last July. At start of rains in January land was harrowed and planted. Gave seed to one other farmer.
Edon Mwangosi	Marejea 10 x 20 m	New to group – this area on edge of flooded land has no <i>Striga</i> but farmer wants to improve soil fertility.
Isiakwisa Mwakijolelo	Mareja 50 x 20 m	Obtained seed from a neighbour. Excellent stand will be much seed here.

Wrap-up

Group has 25 members many did not get seed to plant this year so are waiting for seed from Marejea plots planted this year. Two members of village government are members of the group. New, young chairman and secretary now lead the group.

- More seed is need to scale up the number of farmers involved.
- Group requested leaflets so others can read about use of green manures.
- Bwana shamba advised members to increase size of plots to produce more seed.
- RYMV also a problem here and the group requested assistance to solve the problem.

Mbula school

Very good Marejea plot 35 x 35 m. planted 10/02/05. It is expected plenty of seed here to be harvested. After last season seed was given to 4 teachers and 3 parents. Teachers again plan to give away seed this year but we suggested they make a nominal charge.

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Rice after Marejea excellent although had been flooded recently after an earlier drought. Was only weeded once, compared to adjacent plot which despite being weeded 3 times is still weedy.

Itope village

Farmer	Plots	Comments
Laisoni Kayuni	Marejea 35 x 20 m Rice ex Marejea	Rice suffered during the drought but is still green compared with continuous rice. Some patches of <i>Striga</i> on edge of area where Marejea was grown previously.
Samson Mwakanyamale	Rice after Marejea Small area Marejea	Drought has confounded performance of rice but looks greener and taller than continuous rice. Marejea now seeding
Edward Mwang'onda	Marejea 10 x 70 m Rice after Marejea	Rice looked very green after emergence but then suffered from drought at seedling stage. Marejea excellent stand. Gave seed to 3 other farmers after last season.
Amulike Mbukwa	Large area Marejea Rice ex Marejea Rice after pigeon pea	Rice taller and greener after Marejea than continuous rice. Similar response to pigeon pea but still some severe patches of <i>Striga</i> with stunted rice. Gave seed to 2 others after last season, one in the village and one elsewhere
Rehema Mwalaba	Marejea plant 06/01 20 x 40 m Small area pigeon pea	Excellent stand of Marejea flowering. Grew Marejea last year but owner of field heard that this was good for the soil so he took the field back. Paid Sh. 15,000 as compensation for fertility improvement. She sold 3.5 kg seed on local market at Sh. 500 per kg.
Yusufu Kayuwi	Rice after Marejea plant 15/02	Rice taller and greener after Marejea than continuous rice. Gave Marejea seed to two other farmers after last harvest.
Jimi Mwakibinga	Rice after Marejea Rice after pigeon pea Marejea 10 x 30 m	Rice after Marejea taller, greener and more tillers than continuous rice, weeded once. Continuous rice weeded twice. Gave seed to two farmers from Kandete.
Victoria Andengeny Mwantwango	Marejea 40 x 20 m plant 02/05 Pigeon pea	Excellent plot of Marejea – pigeon pea patchy stand as poor germination of seed provided by project. Only had small plot of Marejea last season but gave seed to two other farmers.

Mid-season Evaluation of on-farm demonstration and review progress

Sinyanga village

Farmer	Plots	Comments
Nkoko primary school	Has a big plot had good maturing crotalaria at an area of about one and half of an acre. There was also a plot of rice following crotalaria and noted that a dry spell resulted into poor performance at the start of the season Striga was very much reduced	• Distortion due to dry spell, but good performance in reducing Striga.
Peter Gondwe. A new group member	Has a big plot had good established crotalaria of an area of about 40 m x 20 m. Adjacent to this plot he has a heavily infested plot with Striga and rice completely destroyed. He got information from Mlowo Church who grows and train church follower on crotalaria. The team topped up on what he knew and shown nitrogen fixed nodules. Expect to grow maize next season on this plot. Has a good plot of matured rice and has installed a bears scaring structure of ropes passing over 7 bamboo posts on which used dry banana leaves hangs to act as flags. Shaking one post makes all posts to shake and flags to sway hence birds run away. Striga was very much reduced	He has a good expectation to reduce Striga which before he thought it was impossible He thanked very much for learning much on the goods of crotalaria.
Lyson Kalenga	A new group member and is his first season Has a big plot had good established pigeon peas of an area of about 55 m x 20 m. Has a big plot had good established crotalaria of an area of about 55 m x 10 m. for seed multiplication He got information on green manure from farmer researcher group of Sinyanga	He will continue expanding crotalaria field to improve his farm and reduce Striga
Wiliam Saiba	A new group member and is his first season Has a big plot had good established pigeon peas of an area of about 55 m x 20 m. Has a big plot had good established crotalaria of an area of about 35 m x 10 m. for seed multiplication He got information on green manure from the radio	He has a good expectation to reduce Striga which before he thought it was impossible He thanked very much for learning much on the goods of crotalaria.
Peter Michael Kiwila	Hi is a primary school teacher and is his first season of growing crotalaria. Has a big plot of good established crotalaria of an area of about 55 m x 10 m. for seed multiplication He got information on green manure from the radio Next season he will grow rice where there is crotalaria now	His objective is to multiply crotalaria seeds, grow it and plant to his all plots to improve soil fertility status and reduce notorious Striga

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Lusekelo Kawilo	A new group member and is his first season Has a big plot of poorly established crotalaria of about quarter an acre due to water logging. He got information on green manure from the radio	He has a good expectation to reduce Striga which before he thought it was impossible He thanked very much for learning much on the goods of crotalaria.
Shaban Njetile	<i>Has a big plot had good maturing crotalaria at an area of about one and half of an acre. This is his second season.</i> There was also a plot of rice following crotalaria and noted that a dry spell resulted into poor performance at the start of the season Striga was very much reduced under rice following crotalaria (No Striga was found) as compared that following pigeon peas. Has also another plot of one and half quarter an acre of matured crotalaria sown very early in December/2004	Hw will grow rice where there is crotalaria now His main interest is increasing soil fertility status Advices to sow crotalaria in February as he will have problem in harvesting crotalaria now under rains. Some have germinated while still in their pods. Informed that in Matombo crotalaria is now grown as relay crop during second weeding in maize. There were also many Striga in his plots not under green manure.
Joseph Panja	Has a plot of 1/6 of an acre of crotalaria at an area of about one and half of an acre. This is his second season. Where he had crotalaria last season he has grown poorly managed finger millet and simsim	He has destroyed the trial and one can't follow the performance of green manuring.
Bosco Njetile	Has a plot of young poorly established crotalaria sown on 20 th March 2005 crotalaria at an area of about one and half of an acre? This is his second season. Where he had crotalaria last season he has rice that was greener and taller than where there was no crotalaria.	Confirms that crotalaria does better, but he started late the trial.
Israel Mwaijande	He is a village executive officer (VEO). This is his 2 nd season Has a new plot of matured crotalaria plot on about 80m by 13m Had another plot of maize following crotalaria with a much better performance as compared with where there was no crotalaria before.	Confirms that crotalaria does better, but he started late the trial.
Abraham Mwakalinga	This is his 2 nd season Maize following crotalaria showed improvements Has a small plot of young established crotalaria.	He sold all his seeds harvested last season 21 kg at 600/= T.Shs @ and

Mid-season Evaluation of on-farm demonstration and review progress

		got 12,600 and forgot to keep his seeds. When he went to those who bought from him, they could not help him. It was a good lesson each to keep enough seeds for his plots as they are still scarce.
Adanson	Has a very small plot	

Wrap-up meeting with farmers

Itope

Group now has 28 members of who 22 are very active.

- Group works well together but is a labour problem for the group rice plot. They requested assistance from DALDO to purchase a plough (Sh. 75,000).
- Farmer observed that where pigeon pea had been grown *Striga* is still seen in following rice crop. Noted that pigeon pea stands are rather sparse and variable compared to dense planting and therefore high root volumes of Marejea. Another farmer confirmed that where he had a dense stand of pigeon pea *Striga* in following rice had been less and the rice had produced a good yield.
- Group wants to increase size of individual plots of Marejea so they can provide seed to other farmers. Not sure if they should give seed away or sell it. Some farmers think that some will buy at \pm Sh. 500 per Kg. Others doubt this saying that “*Only Dr Mbwaga will pay this for seed*”.

Kandete village

This is the first year of research to this village

Famer	Plots	Comments
Andalwisye Kabuka	Has a plot of Crotalaria and another of Pigeon peas mixed with bambara nuts He got information after joining the Kandete Farmer researcher group during training conducted by the project Had also an exchange visit to Kilasilo The objective now is to multiply seeds as are not enough	Pigeon peas (Mali variety) were planted more widely There is striga in his plots Soils are very poor infertility and structure
Boniface Kajuni	Has a plot of Crotalaria about 1/4 an acre. He got information after joining the Kandete Farmer researcher group during training conducted by the project	There is striga in his plots Soils are very poor infertility and structure
Evelina Mpangalwa	Has a plot of Crotalaria for seed multiplication and another of Pigeon pea.	There is striga in his plots

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	He got information after joining the Kandete Farmer researcher group during training conducted by the project Has a plot nearby of rice affected with striga	Soils are very poor infertility and structure
Asimbile Kabuye	Has a plot of <i>Crotalaria</i> near his house for seed multiplication. Has another plot of matured <i>Crotalaria</i> where part of it was chewed by termites in their young age. He got information after joining the Kandete Farmer researcher group during training conducted by the project Had also an exchange visit to Kilasilo The objective now is to multiply seeds as are not enough	There is striga in his plots Soils are very poor infertility and structure
George Kafukwe	Has a big plot of <i>crotalaria</i> at three stages of growth of about 1/3 of an acre; this was due to the reason that other group member did not come to take their allocated seeds and he decided to save them Has also a plot of maize of 1/5 of an acre Has also a big plot of rice highly affected by Striga	They are few in group need to be at least 10. There is striga in his plots Soils are very poor infertility and structure

Ushirika village

It is the first season for farmers to work with the project. Most of plots are on gardens among houses in cashew, cassava, maize area. *Striga* infested rice fields on poor, eroded thin soils on slopes below village.

Farmer	Plots	Comments
Witness Na Mbwaga	Marejea plant 01/05 30 x 5 m Pigeon pea	Excellent Marejea now with pods on a dark soil. Is said to be infested by <i>Striga</i> . Farmer plans to plant maize here next season. Poor stand of pigeon pea, low planting density and very weedy.
Ketson Mbwaga	Marejea 25 x 10 m Pigeon pea	Very good stand with few weeds despite no weeding. Choose this area as it has poor soil fertility but no <i>Striga</i> . Rice and maize have not performed well here in past. Pigeon pea stand poor, slow growth and weedy.
Saidi Mwakasala	Marejea 10 x 15 m Pigeon pea	February planted Marejea now with pods. Next season plot will be planted to rice. Farmer plans 1 acre Marejea next season if seed is enough. Pigeon pea better here (\pm 60% stand), planted early March and weeded.

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Lydia Kalinga	Marejea 10 x 5 plant 03/05	Marejea now at chest high – good stand but small plot.
Watson Kalagho	Marejea 18 x 18 m	On lower slope from village, stony ground with nutrient stressed, <i>Striga</i> infested rice. Marejea vigorous and seeding. Will plant rice next season.
Moses Mwamango	Marejea 30 x 20 m plant 01/05	Good stand now seeding. Will plant rice next season – previously rice and maize performed poorly here. Pigeon pea did not emerge.
Zabron Kyamba	Marejea 10 x 20 m plant 18/03/05	Marejea excellent stand mixed with local pigeon pea with plants lost to wily. Marejea seed produced here will be used on rice fields lower down slope. This plot then to be planted to maize as there is <i>Striga</i> . Farmer plants early to avoid <i>Striga</i> on maize.
Wilfred Shimwela	Marejea 25 x 10 m	Good population of Marejea now flowering will be planted to maize next season on this upland area near to house.
Adam Makese	Marejea 5 x 15 m. Pigeon pea	Small hillside plot of Marejea among cassava, rice and maize gardens. Pigeon pea planted late.

Ibanda village

This is the first year of research to this village

Farmer	Plots	Comments
Daudi Hosiana	Has a plot of pigeon peas	Not yet to realise how effective is green manuring.
Fanta Mwanjara	Has a good plot of matured crotalaria sown on 5 th November 2005. He also “grown nyalu” a local green manure He got information after joining the Ibanda Farmer researcher group during training conducted by the project	He should not grow crotalaria early. Best time to grow crotalaria is February so as matures at cessation of rains.
Sande Mwanjara	He is a village chairman Has a good plot of matured crotalaria about 1/7 of an acre He got information after joining the Ibanda Farmer researcher group during training conducted by the project	He expect to; Improve his soil fertility Reduce striga Multiply seeds
Enoch Paschal Mwandemi	Has a good plot of matured crotalaria at about ½ an acre in area sown on	He should not grow crotalaria early. Best time to grow

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	28 th November 2005. He got information after joining the Ibanda Farmer researcher group during training conducted by the project	crotalaria is February so as matures at cessation of rains. He will grow rice where there is crotalaria next season He will leave crotalaria to maturity to harvest badly needed seeds
Atuganile Mwambugu	Has a small plot of crotalaria sown in January 2005. He got information after joining the Ibanda Farmer researcher group during training conducted by the project	Advised to have bigger plot He will leave crotalaria to maturity to harvest badly needed seeds He will grow rice where there is crotalaria next season

Ngana village

Farmer	Plots	Comments
Tungapesia ga Mulungu	Has a plot of crotalaria 4m x 65 m Has another plot of pigeon peas with rice inter crop SWD March 2005	Noted no weeds and soil become smooth in the plot under crotalaria.
Mizwel Kanyika & Ozbon Kanyika	Has a plot of crotalaria SD 3/2005 Area 35 x 10m Others what do they say and have requested	Good time for rice in December Grown for seed multiplication
Ambilikile Aswile	Has a plot of crotalaria of 30m x 30m about ½ an acre Learned how to cut and incorporate it into the soil	You can grow crotalaria as a relay crop to maize during second weeding.
Subira Mkumbwa	has a plot of crotalaria of size 25m x 7m grow for seeds	The team informed him that crotalaria also controls striga Informed that Striga also affect finger millet, sorghum and maize
Asha Kifangwe	Has a very small plot of a crotalaria	Commented also that they could have started ourselves
Mkisa Andodile	Has a plot of young crotalaria of an area of 45m x 4m For seed production then to improve striga affected plots (striga)	Neighboring farmers demand seeds to improve also their plots.
Emanuel Mbalwa	Has a plot of crotalaria of an area of 25 x 15 m ² Kandete quarter (sub-village)	
Others Zawadi	It is the 1 st season and have appreciated reduced notorious weed	There were 10 farmers and all planted but split into two new

Mid-season Evaluation of on-farm demonstration and review progress

Shimwela Maki Shimwela Mangson Kandoga (VEO)	Can grow crotalaria as a relay crop	villages They have a traditional Social Cohesion
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Kasumulu Primary school

Plot of Marejea 10 x 10 fenced to keep out cattle. Good stand but rather distant from school buildings. A plot had been planted near to school earlier in season but had suffered from drought. Last year there was a good plot of Marejea here and seed was given to 5 farmers, including a teacher and all planted (in Ushirika village). Std 6 (12-13 year olds) is involved in work on soil fertility in class room activities.

Nkuyu Primary school

About 2.5 acre planted to Marejea on flooded land on edge of flood plain. Was initially dry but has flooded over past few days. Rice here generally poor and nutrient stressed so plan was to improved fertility. Last season only 1.25 bags per acre were harvested. Marejea is probably not the most appropriate legume to plant here due to water logging.

Kandete Primary school

Six teachers and 326 pupils. Very good plot of Marejea (15 x 40 m) well located near school in heart of village. Many local people have seen the plot and asked what Marejea is for. This will be a good source of seed.

Mbako Primary school

Twelve teachers and 602 pupils here. Excellent school fields near to buildings. Marejea 62 x 42 m, now flowering and seeding. Also a later planted plot of Marejea (12 x 80 m now waist high). Planted cowpea where pigeon pea failed and also a good plot of Cannavalia, and small area of Soya bean. The teacher responsible for the plots is also a member of the Kilasilo farmers' group.

Kilasilo village

Farmer	Plots	Comments
Kibatika Mwandenuka	Rice after Marejea Marejea 1 acre Marejea 1.5 acres	Rice after Marejea clearly taller, greener and more tillers than continuous rice. Weeded twice while continuous rice weeded 3 times. Total farm size is 5 acres i.e. 50% planted to Marejea this season. This is the third season that the farmer has been using it. He sold seed to 7 other farmers after last harvest. Rice also good after pigeon pea.

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Sanki Kandonga	Marejea 10 x 83 m Cannavalia 7 x 26 m Pigeon pea + sweet potato Rice after Marejea Rice after Cannavalia	Total farm size 2 acres. Marejea excellent stand now seeding. Rice after Cannavalia or after Marejea very vigorous and with many heads. Clearly higher yield than continuous rice which is stunted with <i>Striga</i> . Farmers indicated that Marejea is easier to incorporate than Cannavalia – he cut the latter at ground level first before ploughing under. Other issue is that Cannavalia needs to be weeded once in seedling stage while it is not necessary to weed Marejea. Gave seed of Marejea to 3 farmers and Cannavalia to one other.
Laison Syola	Marejea 25 x 60 m Rice after Marejea	New Marejea on area that is infested by <i>Striga</i> . Obtained seed from group chairman. Plots of rice after Marejea much greener than continuous rice and weeded once – still some <i>Striga</i> . Continuous rice weeded twice and is stunted.
Jail Mwakatage – upland field	Rice after Marejea 9 x 35m Rice after pigeon pea 9 x 35 m Marejea 38 x 15 May 2005 Cannavalia 20 x 10 m	Rice after legumes (planted 31 st January, weeded 5 th March) very green and flowering – no comparison with continuous rice.
Jail Mwakatage – floodplain field	Marejea 31 x 54 m plant 19/01/05 Rice after Marejea	Rice after Marejea (planted 14/01/05 and weeded 15/02/05) really green, tall, tillered vigorously.

Kilasilo village continued

Farmer	Plots	Comments
Erasto Mwaipopo	Rice after Marejea 90 x 6 m Rice after pigeon pea 90 x 6 m Rice after rice 90 x 6 m Rice variety 2 60 x 6 m Marejea 90 x 10 m Pigeon pea 90 x 10 m	Excellent rice after pigeon pea, possibly better than after Marejea here. Was good pigeon pea population (30 x 15 cm) last season. Rice variety 2 looks very promising; good vigour and many heads with little <i>Striga</i> compared to adjacent Kilombero. Marejea planted 27/12/04 now seeding and was not weeded. Cannavalia now flowering, was not weeded.
Kibatika	Rice variety 5	Very poor stony soil on flood plain with

Mid-season Evaluation of on-farm demonstration and review progress

Mwandenuka	planted early January	extremely nutrient stressed rice. A poor choice of site for seed multiplication of variety 5. Will be very poor yield.
Staford N'Dongwe (teacher at Mbako school)	1.25 acres Marejea	First season growing Marejea; excellent stand and growth.
Albert Mwakanyasi	Rice after Marejea Rice variety 2 Marejea 5 x 20 plant late March	Less <i>Striga</i> in rice after Marejea but response of crop poor. Variety 2 planted 15 th February and now at grain filling so early maturing.

Kilasilo village continue

Famer	Plots	Comments
Bosile Kalinga	He had 10 x 15m rice alter pigeon peas 10 x 15m rice after crotalaria and did only one weeding ore striga in plots of rice following crotalaria this was facilitated by dry spell during the onset of rains.	Crotalaria in doing better than pp and control
Oscar Mbonge	His plots were established as if it was a research stations and were all having description labels has labeled all plots as follows A plot of rice after pigeon peas (10x20m) had Twice weeding A plot of rice after canavalia (10 x 10) had one weeding A plot of rice after Nyalu (10 x 30) had one weeding A plot of rice after intra (10 x 40) had one weeding A plot of rice after rock plus (10 x 10) had 2 weddings A plot of crotalaria of 1½ acres and it was a good crop stand	Canavalia had best performance Village government. chairman Sowed late due to weeds
Bernard Mwakalinga	Had big plot of crotalaria of an area of 103m by 22m A plot Rice after crotalaria of an area of 70m by 35m	
Eliasi Mangomba	did not grow due to his personal problems accompanied by too much drinking of local beer,	
Saidia	Had a plot of crotalaria at and area of 1½ acre.	He could distinguish

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mwakafyuju	He experiments manuring by canavalia, pigeon peas, and crotalaria. Had another plot of 40 x 10 m. of crotalaria for seed multiplication He has a plot of rice (Variety No. 1) which was by mistake mixed with Kilombero variety.	rice no 1 and Kilombero. No 1 was short and early maturing.
Tusajigwe Isumo	Had plots of rice after crotalaria and pigeon pea Weeded once after crotalaria and pigeon peas where as twice in control rice plot. Has a big plot of crotalaria about one acre.	More crotalaria is for seed multiplication and improving fertility and controlling striga
Asegelisye Mwaseba	Has A big plot of are alternating with another one of rice sowed on 16/02/2005	Late sowing and drought made poor results showed little tolerance to striga. Requested a research on..... (If you took note of that, I could not remember PL)
Rusto Katuma	Has two plot one of rice following crotalaria and another following pigeon peas and has demarcated them by open space between two plots	Grew rice crop in row not grown crotalaria this season.
Agrey Aliko	Has a plot of pigeon peas 70 x 50 (next year to grow rice) another plot of crotalaria ¾ of an acre Has three rice plot grown following control, canavalia, pigeon peas and crotalaria respectively	Crotalaria did best in reducing striga followed by canavalia and pigeon peas
Mwandela Alfred	Has: a plot of pigeon peas of an area of ¼ acre Has a plot of crotalaria of one acre sowed on 16/01/05	Next season he will grow rice after laughing under these green manure

Wrap-up meeting with farmer group

The group started with 9 members and now has 26 participating, including two teachers from Mbako school.

Rice varieties: In 2004 the following were harvested.

- Variety 1 – 11.5 kg
- Variety 2 – 15 kg
- Variety 4 – 6 kg
- Variety 5 – 4.5 kg
- Variety 6 – 7 kg

Mid-season Evaluation of on-farm demonstration and review progress

Farmers report that these mature early and support few *Striga*. Some indication that the rice of some may be a little sticky when cooked. Suggested that the group cooks and tastes all varieties. Juma Kayeke to visit all plots prior to harvest to ensure farmers do not harvest off types. Seed need to be distributed to more farmers.

Rhamphicarpa:

Farmers mentioned that while the project has made good progress on the upland little has been done on the *Rhamphicarpa* problem in lowland rice. Requested DALDO and Uyole to undertake more research.

Chairmans report:

Marejea is working very well with increasing adoption. Even if *Striga* could be controlled in another way he stressed that farmers will continue to grow Marejea to maintain soil fertility. They requested:

- Leaflets to educate other farmers
- Exchange visits to look at other areas where farmers have adopted new ideas to improve livelihoods