

# Magoye Ripper: An Evaluation of Benefits and Problems

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## Outline

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- Introduction
- Benefits & Problems of Magoye ripper:
  - Farmer perspective
- Profitability Analysis
  - Factors that affected Yield for Maize & Cotton
  - Income and cost estimations
  - Profitability results
- Implications/recommendations

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## Introduction

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- ❑ Introduction of the ripping technology in Zambia (mid and late 1990s)
- ❑ On station and on farm trials were staged.
- ❑ Scaling up the ripping technology GART distributed about 2000 Magoye Rippers to CP, CBP, SP and EP
- ❑ On farm research to understand how farmers use Magoye Ripper

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## Area of the Study and Sample

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- ❑ Study Locations:
  - Eastern Province: Chipata, Katete, Lundazi
  - Southern Province: Choma, Mazabuka, Monze, Namwala
- ❑ Population: All farmers who bought the ripper
- ❑ Sample:
  - Farmers stratified by zone, then randomly selected,
    - ❑ EP 84 farmers
    - ❑ SP 94 farmers
- ❑ Crops and fields
  - ❑ Crops: maize and cotton
  - ❑ Ripped fields
  - ❑ Ploughed fields

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## Definition of “Ripper Farmers”

- All farmers owned rippers
- “Ripper farmers” used ripper for minimum tillage land preparation, 2004/2005 season
  - Ripper farmers may have had both ripped and ploughed fields for each crop
- “Non ripper farmers” used traditional animal traction ploughing in land preparation, 2004/05
  - Non ripper farmers only had ploughed fields for each crop

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## Fields in survey by crop and tillage method in 2004/2005

| Tillage type          | Number | Eastern     | Southern |
|-----------------------|--------|-------------|----------|
|                       |        | % of fields |          |
| Maize Ripped field    | 55     | 40          | 60       |
| Maize Ploughed field  | 143    | 52          | 48       |
| Cotton Ripped field   | 61     | 34          | 66       |
| Cotton ploughed field | 125    | 56          | 44       |
| Total fields surveyed | 384    | 49          | 51       |

Source: FSRP/GART Magoye ripper survey 2005

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## Cropping Year 2004/2005

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- Poor rainfall – used district averages
- The survey was done only for 1 year
- Weed pressure:
  - => higher yield if weeds are managed well
  - => lower yield if weeds are not managed well
  - Number of weedings does not tell us if weeds are managed well

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## Institutions involved in training farmers how & when to use ripper

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- Major institutions involved in training farmers in Southern Province:
  - GART, Dunavant and MACO
- Major Institutions involved in training farmers in Eastern Province:
  - Clark Cotton, MACO and fellow farmers

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## What were the major benefits identified?

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- ❑ Ripped lines harvested and conserved water (27%)
- ❑ Early land preparation (20%)
- ❑ Early planting (18%)
- ❑ Good seed emergence (13%)
- ❑ Observed higher yield (7%)

*By all farmers who had used the ripper at least once; farmers may have more than 1 response*

## What were the major problems identified?

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- ❑ Too many weeds (32%)
- ❑ Blunt tine (26%)
- ❑ Lack of spare parts (16%)
- ❑ Insufficient draught animals (12%)



*By all farmers who had used the ripper at least once; farmers may have more than 1 response*

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## Why did farmers not use the ripper in 2004/05?

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- Lack of sufficient draught power
  - No animals
  - Immature animals
- Blunt tine
- Lack of spare parts
- Insufficient training
  
- Weeds were the major problem in ripped fields but did not prevent farmers from ripping



*By all non ripper farmers in 2004/2005*

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## General Practices

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- 11% of farmers used the ripper in other farmers fields as well as their own, but only 1% farmers indicated revenues from it
- About 9% of plots used hired animals for either ploughing or ripping (spread across both types)
- Only 13% of ripper farmers sharpened the tines prior to the season, at a cost of 5,000 – 10,000 kwacha
- Ripped fields were more likely to be on medium soils than ploughed fields

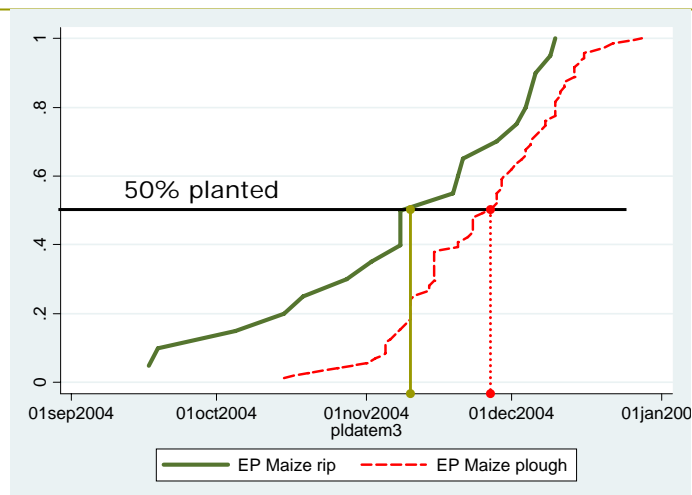
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## What are the mean area of fields?

- Maize ripped field: 1.08 ha  
 ( Maximum: 3.65 Minimum: 0.11)
  
- Maize ploughed field: 1.78 ha  
 ( Maximum: 8.0 Minimum: 0.20)
  
- Cotton ripped field: 1.24 ha  
 ( Maximum: 6.37 Minimum: 0.24)
  
- Cotton ploughed field: 1.94 ha  
 ( Maximum: 6.37 Minimum: 0.28)

*Areas based on actual measurements*<sup>13</sup>

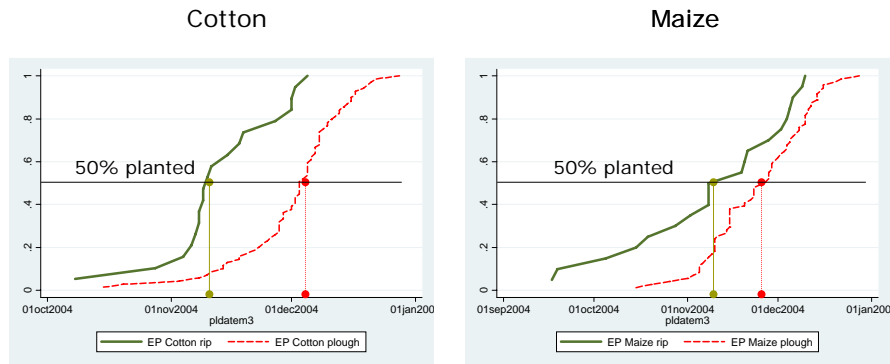
## Planting dates: Maize in Eastern Province



Graphs show frequency distribution: Green solid line to the left means that ripping farmers planted earlier

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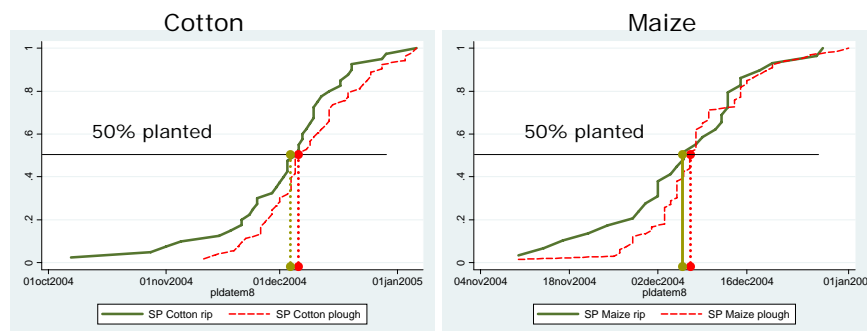
## Planting dates: Eastern Province



Graphs show frequency distribution: Green solid line to the left means that ripping farmers planted earlier

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## Planting dates: Southern Province



Graphs show frequency distribution: Green solid line to the left means that ripping farmers planted earlier

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## Profitability Analysis

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- Key factors affecting yield
  - Plot size, fertilizer (nitrogen) or chemical packets (herbicides), soil texture, days late in planting
  - Values and quantities
    - Income
    - Costs
- Crop budgets were used to understand the financial benefits of the technology

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## Key factors affecting yield of maize

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- Plot sizes
- Fertilizers (Nitrogen)
- Combination of fertilizer and use of ripper
- Coarse soils
- Planting days late
  - Higher rainfall strongly associated with early planting, so cannot measure effect separately

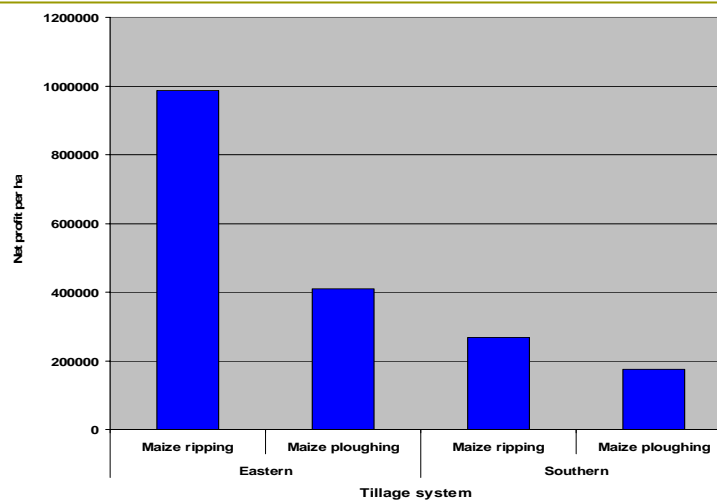
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## Maize Regression Highlights

- The ripper had positive impact on yield:
  - Combination of ripping and nitrogen application=>higher yield
  - Indicates that ripper makes fertilizer more efficient
- Smaller plots => higher yields
- Nitrogen application => higher yields
- Planting days late=> lower yield (18kg/ha maize loss)
  - Also related to lower rainfall
- Coarse soils => lower yields
- Namwala => higher yields

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## Net Income per hectare: Maize



Source: FSRP/GART Magoye ripper survey 2005

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## Maize Profitability Highlights

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- Ripped fields had higher Net Profit than Ploughed fields in Eastern Province by more than half due to
  - Ripper use which improved
    - Fertilizer uptake
    - Water retention by ripped lines
  - Planting days late w/low rainfall (farmer losses 18kg/ha of maize)
  - Small plots
- Ripped fields had relatively higher Net Profit than Ploughed fields in Southern Province due to
  - Better uptake of fertilizer
  - Small plots

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## Key factors affecting cotton yield

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- Plot size
- Chemical application
  - Farmers were using more chemicals per hectare
  - Lumpiness of packets
- Eastern Province

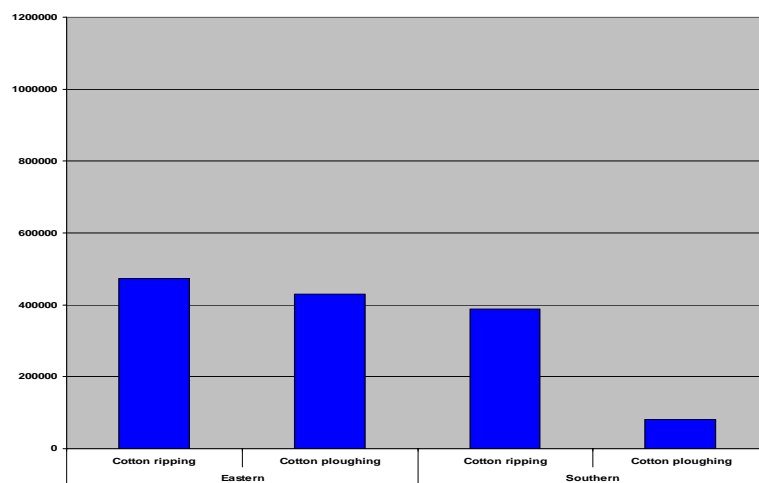
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## Cotton Regression Highlights

- Smaller plots => higher yields
- Higher chemical application => higher yields
- The ripper has no significant effect of tillage on yields
  - No direct effect
  - No interaction effect
- Eastern Province => higher yield

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## Net Income per hectare: Cotton



Source: FSRP/GART Magoye ripper survey 2005

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## Cotton Profitability Highlights

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- Ripped fields had relatively higher yield than ploughed field in Eastern Province
  - Smaller plots
  - Higher chemical application

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## Key results

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- Maize
  - The ripper => Higher yield because of
    - Efficient application of fertilizer
    - Water harvesting
  - Planting days late => Lower Yields
- Cotton
  - The Ripper did not find significant effect on the cotton yield, however,
  - Smaller plots => higher cotton yield
  - Higher chemical application => higher cotton yield
- Net Income from Ripped fields for both maize and cotton was higher than Net Income from ploughed fields

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## Implications

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The results from the ripper study look promising:

- Ripper can mitigate the impact of the drought
  - Improved rainfall retention by furrows
  - Good seed emergence
  - Improved fertilizer uptake
  
- Enable the farmer do early land preparation
  - Spread demand for human & animal labour
  - Plant early

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## Implications/Recommendations

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- More extension to farmers on how and when to use the technology is needed
- Need to evaluate the wearing down of the tine as that was a complaint from farmers
- Enhance public private partnership to ensure access to spare parts (tine, bolts, wings)
- Improve access to animals and services (distribution campaigns, etc.)
- Continue collaborative work with private sector in spreading the technology eg. Cargill Cotton, Continental, Dunavant

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## Source of information

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- ❑ Food Security Research Project (FSRP)
  - ❑ Contact person: Stephen Kabwe
    - ❑ Email: [skabwe@coppernet.zm](mailto:skabwe@coppernet.zm)
  - ❑ Website:
    - <http://www.aec.msu/agecon/fs2/zambia/index.htm>
  - ❑ Google – Zambia Food Security Research Project
  
- ❑ Golden Valley Agricultural Research Trust (GART)
  - ❑ Contact person: David Samazaka
    - ❑ Email: [gartmgy@yahoo.com](mailto:gartmgy@yahoo.com)
  
- ❑ Conservation Farming Unit (CFU)
  - ❑ Contact person: Peter Aagaard
    - ❑ Email: [cfu@zamnet.zm](mailto:cfu@zamnet.zm)

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## Thank you

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