Gendered Impacts of Conservation Agriculture among Smallholder Farmers in Zambia

Progress H Nyanga

(progress.nyanga@umb.no or pnyanga@yahoo.co.uk)
1.0 Introduction

- Women and men participate differently in development (Momsen 2010:2).
- Women and men have differentiated pathways out of poverty (FAO et al. 2010)
- Gender as a mediating factor - gender roles and responsibilities, access and ownership of assets
- If women farmers were given same access to resources and opportunities as men, yields on their farm would increase by 20-30% & improve food security by 12-17% in terms of reduction in people facing hunger (FAO 2011:5)
- Conservation agriculture as a sustainable development options claiming balance between socio-economic and environmental goals

1.1 Core Principles of Conservation Agriculture (CA)

- Three interrelated core principles: (FAO 2008).
  - Minimum soil disturbance
  - Permanent residue soil cover
  - Diversified crop rotation

- Zambian CA variants
  - CA basins

Overarching question:

What are the impacts of adoption of CA basins among men and women smallholder farmers in Zambia?

Specific research questions:

1. What are the differential effects of crop residue retention in CA basins on labour among men and women farmers?

2. What are the differential effects of minimum tillage, digging of CA planting basins on labour among men and women farmers?

3. What is the effect of the type of crop chosen for crop rotation in CA basins on men and women?
2.0 Methods
2.1 Data collection and analysis

- 640 households were randomly sampled in 2007. The sample size reduced to 535 in 2008, 486 in 2009 and 440 in 2010 due to deaths, migration, declining and absenteeism.

- Same households/farmers were interviewed each season

- Questionnaire, focus group discussions, key informant interviews, informal interviews, direct observation, and review of literature.

- Descriptive statistics, Pearson Chi-Square ($\chi^2$) test, Student t-test and Z-test

- Qualitative analysis of information was a continuous process starting during data collection with identification of major themes and ending with an in-depth description of the results.
3.0 Results and Discussion

- Decreased labour time use during the pre-tillage phase (cutting, racking and heaping of vegetative debrise and crop residues) for women and children because of crop residue retention principle
- Increased labour time use during digging of basins for women and children
- Increase in labour intensity - Chaka hoe too heavy and start digging during dry season
  - Person days per hectare 2007/8 agricultural season
    ✓ 68.5 (n=161) Conventional hand hoe tillage
    ✓ 78.5 (n=218) CA basin digging
  - Person days per hectare 2008/9 agricultural season
    ✓ 77.1 (n=70) Conventional hand hoe tillage
    ✓ 89.1 (n=253) CA basin digging
  - Person days per hectare 2009/10 agricultural season
    ✓ 77.5 (n=102) Conventional hand hoe tillage
    ✓ 70.3 (n=223) CA basin digging
- Possible coping strategies and experience in 2009/10
Increased labour time use for women and children in hand weeding in CA basins

- Person days per hectare 2007/8
  - 77.5 (n=142) Conventional hand weeding
  - 88.3 (n=218) CA basin hand weeding

- Person days per hectare 2008/9
  - 92.2 (n=60) Conventional hand weeding
  - 102.9 (n=247) CA basin hand weeding

- Person days per hectare 2009/10
  - 64.0 (n=102) Conventional hand weeding
  - 81.7 (n=240) CA basin hand weeding

- Use of herbicides - reduction in labour time use from 50-70 person days per hectare to 10-20 person days per hectare. Haggblade & Tembo (2003)

- Increased labour for men due to spraying of herbicides
3.0 continued…

- Gender and paradoxical position of women regarding use of herbicides

- The use of herbicides especially atrazine presents a potential paradox among women than men.
  - Herbicide reduce labour demand but women fear increased food insecurity
  - Disrupting crop rotation and the traditional mixed cropping that is essential for household food security.
  - Often plant maize or cotton together with other crops like Okra, sweet-stalks, pumpkins, watermelons, makwaambala (African horned cucumber), makowa (cream-white-yellow cucumber) and green vegetables (usually planted on hill tops within the fields).
  - Women explained that some of the weeds such as Bondwe a member of the Amaranthus genus vital vegetables during peak hunger periods.
- Farmers are very sceptical about use of herbicides for various reasons
3.0 continued…

- Potential increase in herbicide use and potential long term effects
  - Steady increase in the adoption of herbicides from 7 (1.1%) households in 2006/7, 9 (1.7%) in 2007/8, 31 (6.4%) in 2008/9 to 36 (8.2%) in 2009/10 seasons.

- Strong synergies in support for herbicide use
  - International development agencies-electronic voucher system enlisted herbicides
  - Local synergies of agro-chemical dealers and CFU
  - Agro-chemical companies targeting smallholder farmers on the increase
  - No clear guidelines for atrazine use in the South yet banned in most of the North (e.g. European Union and Norway)
3.0 continued...

- Potential long term effect of Atrazine
  - Atrazine is associated with reduced birth weight, birth defects, menstrual problems, abortion, breast cancer and “chemical castration” and prostate cancer (Pocar et al., 2003; Kettles 1997; Swan, et al. 2003)

- Some unanswered questions from smallholder farmers
  - What is the effect of herbicides to our health and children?
  - What is the effect of herbicides to our livestock?

- Precautionary principle could be necessary in CA projects


3.0 continued…

- Association of type crop chosen in rotation and gender
  - Significant association* (p-value<0.05) of pure cash crops to type of household
  - Proportion of male headed household significantly higher than that of female headed households in all seasons

<table>
<thead>
<tr>
<th>Seasons</th>
<th>Type of household</th>
<th>Main crops used in rotation</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>Maize</td>
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<tr>
<td>2007/8</td>
<td>Female headed (%) (n=64)</td>
<td>73.44</td>
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<tr>
<td></td>
<td>Male headed (%) (n=471)</td>
<td>74.73</td>
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<td></td>
<td>Chi-Square</td>
<td>0.05</td>
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<tr>
<td>2008/9</td>
<td>Female headed (%) (n=72)</td>
<td>59.72</td>
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<tr>
<td></td>
<td>Male headed (%) (n=412)</td>
<td>69.66</td>
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<tr>
<td></td>
<td>Chi-Square</td>
<td>2.79</td>
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<tr>
<td>2009/10</td>
<td>Female headed (%) (n=72)</td>
<td>86.15</td>
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<tr>
<td></td>
<td>Male headed (%) (n=366)</td>
<td>88.89</td>
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<tr>
<td></td>
<td>Chi-Square</td>
<td>0.39</td>
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</tbody>
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* Significant at 0.05
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- Association of type crop chosen in rotation and gender
  - More of private use of income from cotton by men
  - Use of groundnuts for food security and income for women and children
  - Significant increase (p-value=0.001) in area under groundnuts 0.25ha in 2007/8 to 0.39 ha in 2009/10
  - No significant change for cotton from 0.43 ha in 2007/8 to 0.37 ha in 2019/10
4.0 Implications:

- Interventions in CA need to be both gender sensitive and minimise trade-offs between socio-economic benefits and environmental sustainability.
  - Herbicides are a necessary evil that need to be handled with extra caution.
  - Health concerns and environmental footprints *vis-a-vis* herbicides are important factors worthy considering by both donors and CA project implementers.

Thank you