The Potential for Socially-Inclusive Development Models for Bio-Fuel Crops in Mozambique:

Institutional Arrangements and Poverty Reduction Effects

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Outline

- Why care about socially inclusive models for Bio-fuel Crops?
- Alternative institutional arrangements with Smallholders
- Institutional arrangements, inclusiveness and poverty reduction
- Examples from Mozambique
- Conclusions for Inclusiveness and Poverty Reduction
- Implications for bio-fuel crops

Why Care about Socially-inclusive Models for Bio-fuel Crops?

- Smallholder dominated agriculture
- Bio-fuel crops generally well suited for plantation models:
  - Capital intensive
  - Weak linkages to smallholders
- In spite of relative abundance of land, smallholder displacement is a real threat
  - Food security
  - Rural livelihoods/poverty
- There is room for alternative models that are more inclusive and can generate stronger poverty reduction effects, while ensuring profitability in marketing/processing

Alternative Institutional Arrangements

- Spot market trading: Processors/traders with independent farmers
- Contract coordination/Interlinked Transactions: Processors/traders with contract farmers
- Vertical Integration: Plantation agriculture

Spot market trading:
Processors/traders with independent farmers (IP)

- Production and supply of crop by independent producers
- Favorable for crops and areas with
  - Low transaction costs
  - Efficient product and factor markets, and effective service delivery
- Actors flexible to respond to market conditions
- In Africa, where transaction costs are high, and markets fail/missing, NOT reliable for many high value crops due to reliability of supply, and inconsistent quality.
- Sub-sectors in Mozambique: Maize, cashew, mango, etc.

Interlinked Transactions:
Processors/traders with contract farmers (CF)

- Contracting between two levels in the supply chain
  - Processors/traders supply inputs/assistance on credit
  - Farmers agree to use inputs as instructed and supply all output at agreed price (minus input costs)
- Response to weak/missing input and credit markets
- Government gives firms regional monopsony rights
- Limitations:
  - Barriers to entry due to selectivity
  - Price instability/distortion in residual market
  - Monopsonic power => assymetric negociations
- Sub-sectors in Mozambique: Cotton, tobacco, etc

Vertical Integration:
Plantation agriculture (PA)

- Production and marketing/processing stages combined under common management/ownership
- Firms engage in direct production of crops
  - Saves logistical and information costs associated with procurement of raw materials and sales of outputs
  - Eliminates uncertainty/risks regarding volumes and quality
  - Can be an effective response to market failure
- Problems with vertical integration:
  - Social costs due to market concentration and reduced tax revenue
  - Scale incompatibility between internalized stages of production
  - "Bias" towards internal supply while external supply may be available at better quality and/or lower prices
- Sub-sectors in Mozambique: Sugar, Tea.

Organization of Production and Trade:
A Conceptual Framework (1)

Model of contractual preferences:

$$Y = [\, X (Z) \,]$$

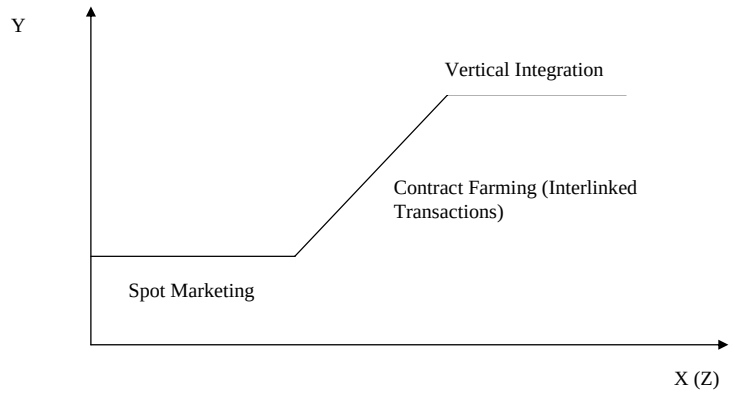
Y – Vector of alternative arrengements (IP/CF/PA)

X – Vector transaction characteristics:

- Conditions of asset specificity
- Degree and type of uncertainty
- Complexity and frequency

Z – Vector of determinants of transaction characteristics

Organization of Production and trade:
A Conceptual Framework (2)



Y – Alternative Institutional Arrangements/Forms of Organization
X – Transaction characteristics: asset specificity, uncertainty, complexity and frequency.

Organization of Production and Trade:
A Conceptual Framework (3)

Determinants (Z) of Transaction Characteristics (X)

Production Characteristics (Z_1)	Processing/Marketing Characteristics (Z_2)	Economic and Political Factors (Z_3)
• Labor intensity • Economies of scale • Input intensity • Perinial vs annual crops	• Economies of scale • Quality standards • Degree of perishibility • Value/weight/volume • Exportability • Multiplicy of local buyers • Domestic processing	• Land availability • Market development • Communication infrastru. • Level of skills/education • Strenght of legal system • Stenght of local govt

Institutional Arrangements, Inclusiveness and Poverty Reduction

- Impact of arrangements on inclusiveness and poverty reduction is an empirical question
- Some key concepts to consider:
  - Linkages: Production (forward/backward), consumption
  - Direct effects: wages and smallholder profits
  - Indirect effects: wages from secondary employment and re-spending in non-farm goods
- For either direct or indirect effects to be felt and sustained, activities must be profitable for both the firm involved and smallholders alike

Examples from Mozambique

Tobacco – Contract Farming (1)

Why contract farming predominates?

- Product quality and farm yields depend on intensive input use (knowledge), but input/credit markets weak => Independent producers not viable => Need for vertical coordination
- Plantation not attractive due to high labor intensity => high supervision costs
- Disperse production by smallholder possible due to high value/weight => low transport costs
- Raw output that needs processing before final sale => limited number of buyers => low risk of default => Contract farming e

Examples from Mozambique
Tobacco (Contract Farming) (2)

Links to Inclusion/Poverty Reduction

- Profitable to promoter/firms
- High cash benefits to participating farmers
- Wage Employment to non-growers (labor intensive)
- Technology spillovers
  - Input use in food crops
  - Rotation/residual fertilizer for food crops
  - Adoption by non-growers
  - Local Re-spending
    - Vibrant non-farm economy
- Strong economy-wide effects of expansion and sector policies

Examples from Mozambique
Sugar Cane – Plantation Agriculture

Why plantation predominates?

- Needs high investment in equipment (e.g., irrigation, etc)
- Dispersed production (IP and CF) not viable due to:
  - Need of abundant land, water and railroad access
  - Low value/weight of sugar cane => high transport costs
- Needs high economies of scale in production to be compatible in scale with processing capacity
- Needs raw material of consistent quality
- All these factors favor Plantation agriculture
  - BUT more inclusive coordination mechanisms possible
- Under current models relatively Limited inclusion of smallholders and linkage effects weak for broad-based poverty reduction effects

Conclusions for Inclusiveness and Poverty Reduction

- Under ideal conditions, IP is highly inclusive with potential for poverty reduction,
  - But under current conditions it does not support high value crops
- PA generates only one direct effect (wages) and tends to use capital intensive technologies.
  - It will generally be less inclusive and
  - Due to weak linkages, generates less poverty reduction than successful CF
- In our context sustainable inclusion and poverty reduction can be achieved by
  - Making contract based relationships (CF) successful. i.e., financially attractive to firms and profitable to smallholder; and
  - Relying on indirect effects as well (local farm employment, and re-spending)

Implications for Promotion of Bio-fuel Crops (Jatropha, coco, etc)

- A successful development model for bio-fuel crops has to promote growth, employment and broad-based poverty reduction effects
  - Maximize direct and/or indirect effects on smallholders
  - Secure profitability to value chain actors
- New initiatives need to be structured in a way that smallholders are included and not crowded out
  - Balanced coordination mechanisms in production/marketing
  - Promote hybrid Plantation + Contract Farming arrangements
  - Aim at high yielding varieties/larger areas per farmer
- Government needs to facilitate private investors initiatives, through
  - Undertaking public investments in infra-structure
  - Adequate land allocation policy
  - Creating a better/healthier business environment
  - Giving added incentives to pro-poor (socially-inclusive) initiatives

Source Papers (by author):

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  http://www.aec.msu.edu/agecon/fs2/mozambique/flash33e.pdf

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- *Interlinked Transactions in Cash Cropping Economies: The Determinants of Farmer Participation and Performance in the Zambezi River Valley of Mozambique, by Rui Benfica, D. Tschirley, and D. Boughton. Contributed paper for the 2006 Annual Conference of the IAAE, Queensland -Australia.*
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- *An Analysis of Income Poverty Effects in Cash Cropping Economies in Rural Mozambique: Blending Econometric and Economy-Wide Models*, Ph.D. Dissertation, by Rui Benfica, Department of Agricultural Economics, Michigan State University, East Lansing, MI, 2006.
  http://www.aec.msu.edu/fs2/mozambique/dissertation_benfica.pdf