EGERTON UNIVERSITY

TEGEMEO INSTITUTE OF AGRICULTURAL POLICY AND DEVELOPMENT

Economic Viability of Irrigated Maize Production.

Otieno D. Kirimi L. and Odhiambo N.

Tegemeo Conference 2015:
Transforming Smallholder Agriculture in Kenya
Kenya School of Monetary Studies, NAIROBI

INTRODUCTION

- Introduction
- Methodology
- Results
- Political Economy Issues
- Lessons From Irrigation
- Policy Recommendations

Status of irrigation in Kenya

- Irrigation potential of 3 million acres & only 13% of this has been developed. The growth rate is 0.5 %
- Categories
  - public, private and smallholder
- Challenges
  - Wrong perception
  - Lack of a national policy legal and institutional framework
  - Inadequate public-private sector participation in the sector
  - Inadequate irrigation infrastructure and water storage
  - Weak WUAs
  - Inadequate support services

Rationale

- The government of Kenya is supporting irrigation development and its expansion into the ASAL areas.

- The past history of irrigation schemes were associated with project
  - failure in the 80's- 90's and
  - inadequate information

  These led to
  - low engagement and
  - Investment in irrigation

Research Questions

- A study was carried out to answer the following questions.
  - Is irrigated maize production profitable?
  - Are farmers willing to accept and pay for irrigated maize production?
  - What are the lessons from irrigated maize productions for other similar projects?
- We postulated that irrigation development for food production can only be sustainable if economic value of water exceeded the operations and management costs

Methodology

- The areas covered were Lower Kuja, Bunyala, Nandi, Lower Nzoia, Perkerra, Mwea, Bura, Hola and Galana Ranch.

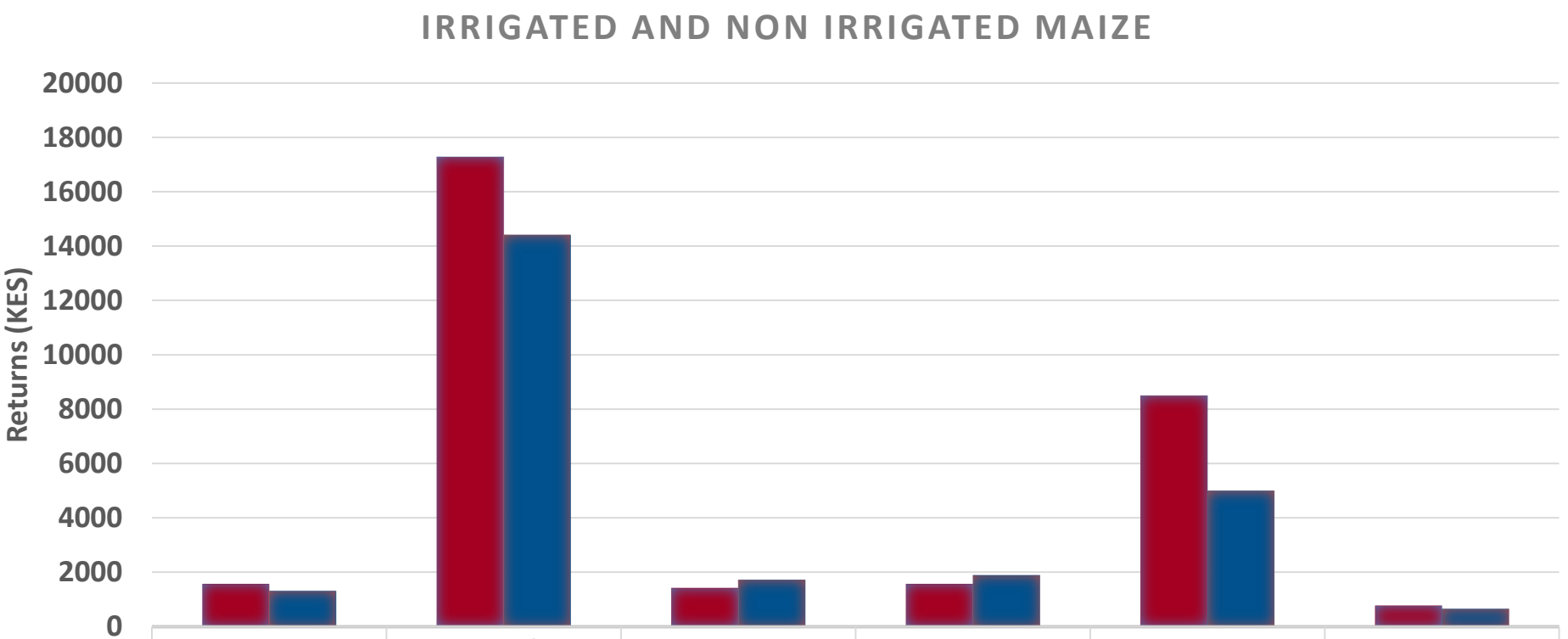
- Data sources
  - 2014 TAPRA II data
  - Cost of production data
  - HH interviews, FGDs, Key informant interviews
  - Published materials were the main source of secondary data

- **Data Analysis**
  - Description. The analysis was based on GM, O&MI, FPI and RI
  - A production and profit function
  - Willingness to pay modeled for selection and outcome.

Budgeting results

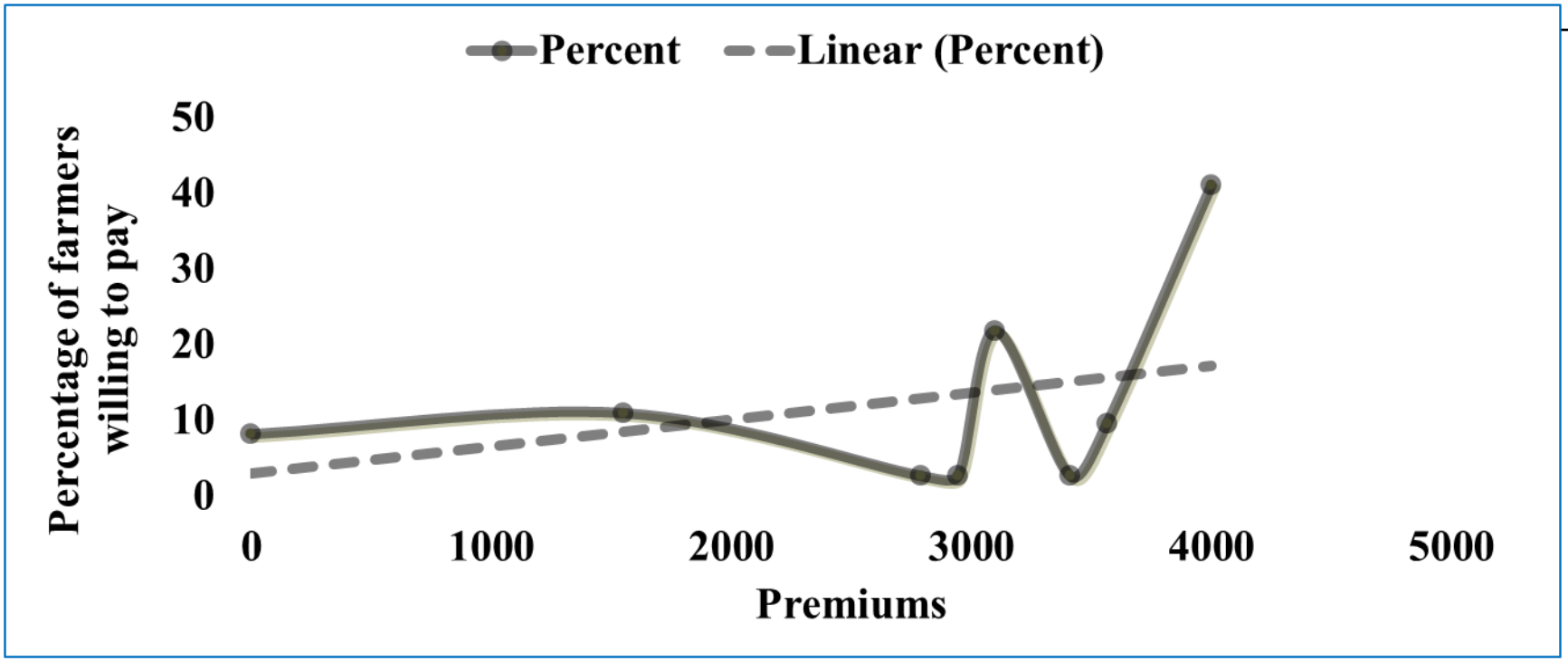
	Irrigated	Non irrigated	Simulated
Maize yield (bags/acre)	11	7.6	11
Sale price per 90kg bag	2,200	2,382	2,382
Sold to	Traders	Traders	Traders
Total revenue	**24,200**	**18,103**	**26,202**
Water	3,086		3,086
Total production costs (TC)	15,705	13,100	15,705
Profit=TR-TC (per acre)	**8,495**	**5,003**	**8,927**
Breakeven yield (90kg bags)	7.14	5.5	6.59
Margin per bag (Ksh) w/o WC	772.3	658.3	954.3
Margin per bag as % of cost w/o	**54%**	**38%**	**67%**
O&MI	**1.9**		
FPI	**1.7**		
BI	**0.78**		

Comparative margins



	Working capital (WC) 10%	Total production costs (TC) with wc	Cost per bag w/o WC	Cost per bag with WC	Profit=TR-TC (per acre)	Margin per bag (Ksh) w/o WC
irr	1571	17,276	1,428	1,571	8,495	772.3
non irr	1310	14,410	1,724	1,896	5,003	658.3

Willingness to pay



- About 73.4% were willing to pay for irrigation services with an odds ratio of 1.772 in favour of paying for irrigation.

- The mean willingness to pay for irrigation water and services was KES 2,952/acre/season were paying KES 3,082.

Willingness to pay

- Scheme level factors which affect production and these are
  - Availability of sufficient water (+)
  - Enforcement of rules and regulations within the schemes (+)
  - Efficient fertilizer use (+)
  - Quality of produce (-)

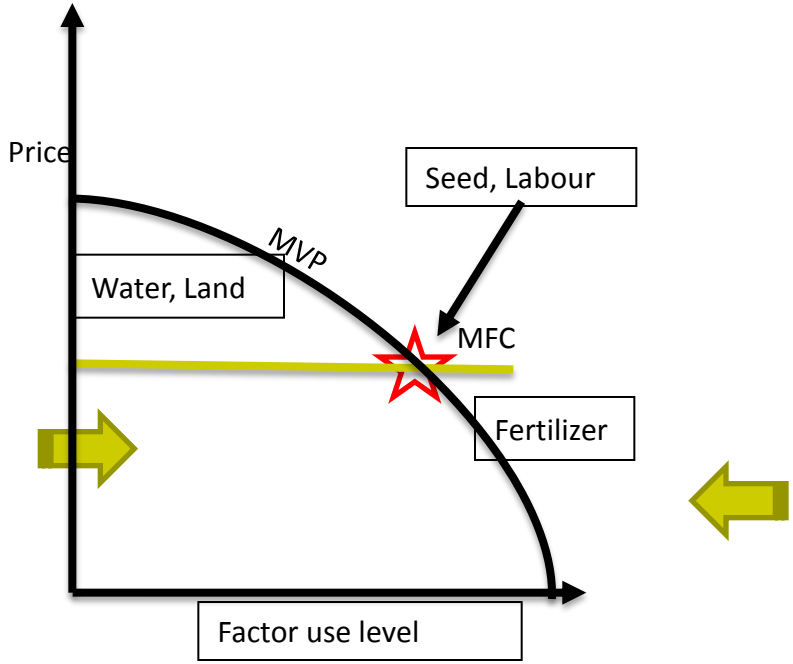
- Plot level factors affecting maize labour
  - Water (+)
  - Seed (+)
  - Land (+)
  - Fertilizer (+)

Allocative Efficiency Test

Factor	GM MVP	Price	Ratio	Decision	Action
Water	16,852.13	4911	3.43	Under	Use more
Labor	25.56	312.61	0.08	Optimal	
Land	5,977.48	3000	1.99	Under	intensification
Seed	3,365.74	3750	0.9	Optimal	
Fertilizer	1,078.08	2400	0.45	Excess	Reduce rates

Allocative Efficiency

Input Use



Allocative Efficiency

- We establish that irrigated maize production
  - Produces 45% more maize than non irrigated maize
  - It has a 71 % production gap.
  - Every production season here is a loss of 9 bags per acre.
  - Implying that the potential output is 20 bags/acre/season.

- The EVW per season per acre was ranged from KES 9,252 at the current production technology to KES 21,432 at the most efficient allocation.

- Irrigate maize production has the potential to increase maize output by 163 % over non irrigated maize.

ALLOCATIVE EFFICIENCY

	CURRENT TECHNOLOGY		EFFICIENT TECHNOLOGY	
	SEASON	ANNUAL	SEASON	ANNUAL
Efficiency	29%		100%	
Output	5.5	16.5	10	30
Losses	4.5	13.5		
EVW	9,252	27,706	21,432	64,264
Potential Output	163%			

Political economy – Issues

- **Conflicting government roles**
  - Changing project costs
  - Institutions and bureaucracy
- **Producer policies on water use**
  - Value Chain development/absorption of surplus output
  - Changing land and water use rights
- **Competition for resources**
  - Prioritization of the enterprise and interest groups guiding the process

Lessons from Irrigated maize Prodn

Strengths

- High returns , high profit, High O&MI, FPI.
- Farmers high willing to pay for irrigation

Weaknesses

- The land sizes are small
- Low yields
- Inefficient factor use

SWOT

Opportunities

- Through R&D,
- Training
- Availability of irrigable land

Threats

- Climate change
- High irrigation premium rates
- Long payback period / RI

Policy recommendations

- Irrigated maize production sustainable
- ***Policy Options***
  - **Formulating policies that favour**
    - Empower the WUAs.
    - R&D to improve field level productivity
    - Training farmers for better skills in irrigation management.
    - Clear definition of the roles of the National and County governments
    - Participatory prioritization of resource use for irrigation development in Kenya

Thank you