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Cost of Production for Maize & Rice in Kenya, 2017

Presented by Tim Njagi

Fairveiw Hotel, 5th October, 2017

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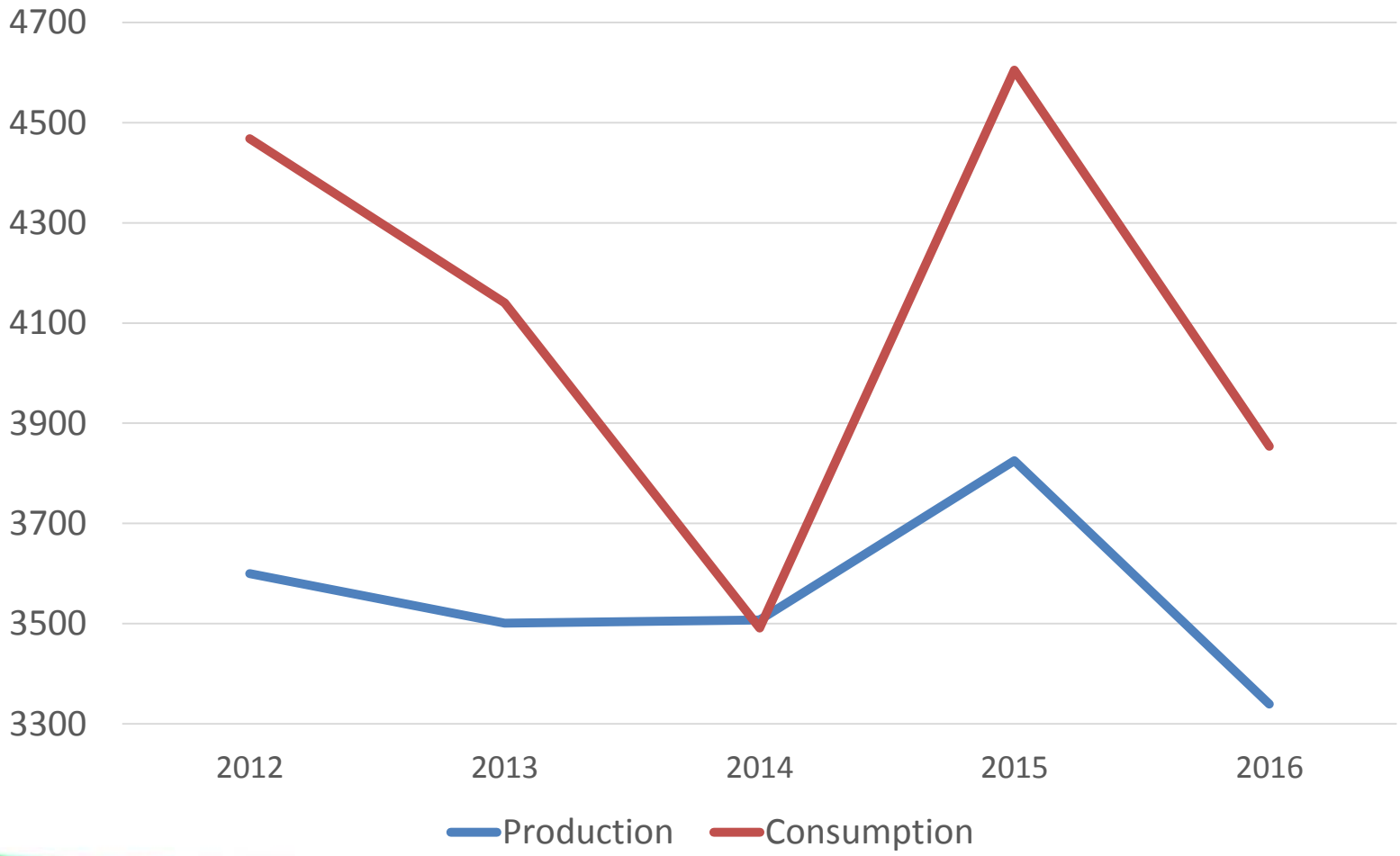
Maize production

- Maize is the most important cereal grain in the country
  - 65% of staple food calories (Mohajan, 2014)
  - 40% of total crop area in Kenya (ERA, 2015)
  - Produced by a large majority of smallholder farmers



Source: KNBS

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Key points

- Kenya is a net importer of major cereals
- Challenges in production include:
  - Low productivity
  - Declining soil quality
  - Crop diseases
  - Weak linkages btw research-extension-farmers
  - Low technology uptake
  - **High production costs**
  - Limited access to affordable credit
  - Low market participation
  - Declining land sizes
  - Limited access to water for irrigation
  - Climate change

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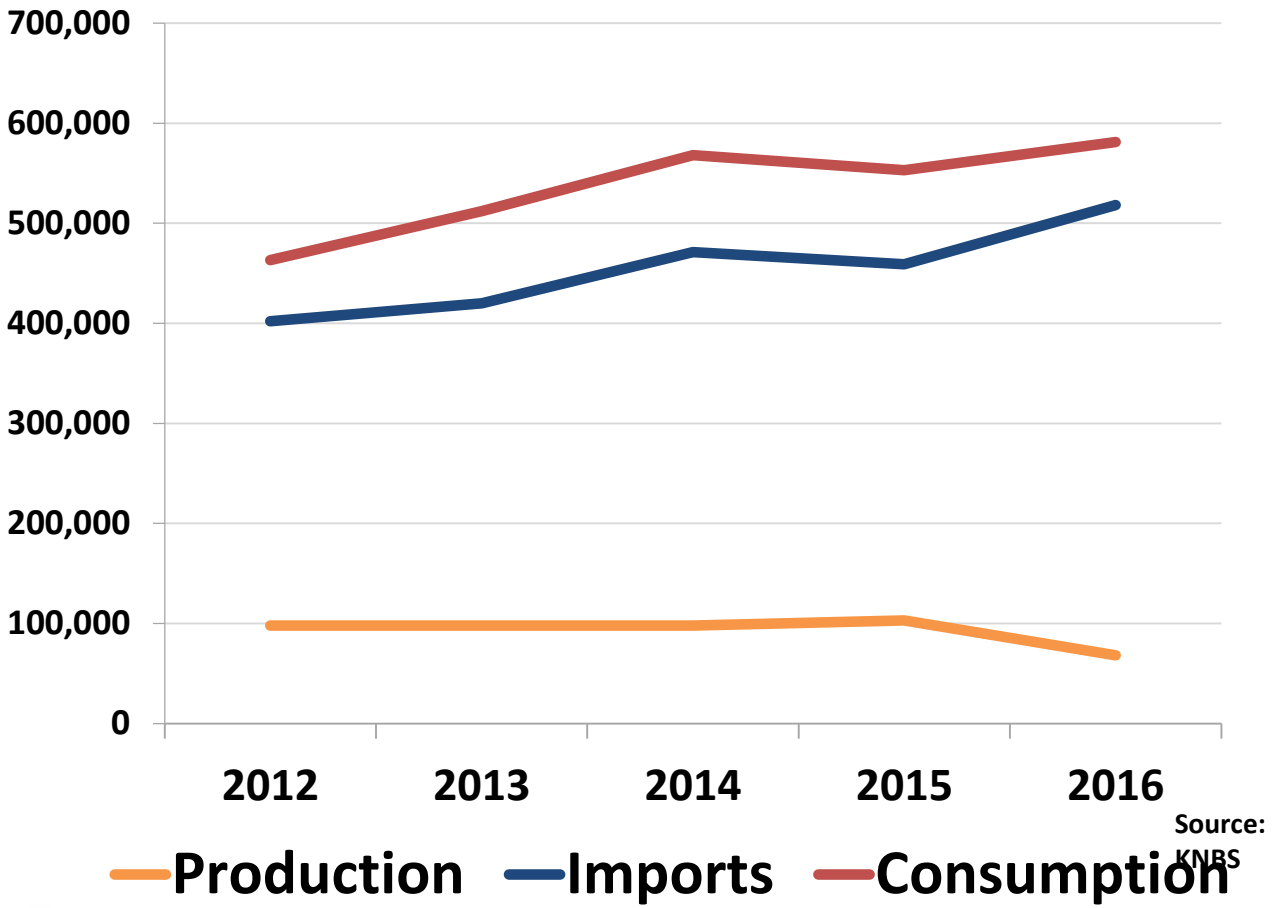
Rice Production

- About 80% of rice is produced under irrigation in public irrigation schemes
- However, about 80% of total consumption is imported
- Key constraints include:
  - Restricted investment in irrigation infrastructure & area under rice
  - Low uptake of upland rice
  - High capital requirement and high costs of credit



Source: KNBS

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Research Questions

- What is the cost of maize and rice production in 2017?
- What explains these costs?
  - What opportunities exist for improving competitiveness and incomes for maize and rice producers?
- What are the policy options for the government?

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Methodology

- The survey was carried out in six counties, purposively selected because of their importance in the production of maize & rice in the country.
- Data collection
  - Individual maize farmers
  - FGDs
  - Key informant interviews

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Maize Production Systems and Areas

Small-scale Maize Farmers	Large-scale Maize Farmers
• Cultivate less than 10 acres of maize • Have monocrop and two seasons a year • Average of 83% level of commercialization • Main buyers are traders • Source of fertilizer is mainly commercial	• Cultivate above 50 acres of maize • Have a monocrop and one season a year • Average of 99% level of commercialization • Main buyers are NCPB and millers • Source of fertilizer is mainly subsidy
• Areas of study; Kakamega, Trans Nzoia, Uasin Gishu, Nakuru	Areas of study; Trans Nzoia, Uasin Gishu and Nakuru

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Findings

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Large-scale Maize Farmers

	Trans Nzoia	Uasin-Gishu	Nakuru	Overall
Maize Yields (90 Kg-bags/acre)	19	20	20	19.7
Sale price (Ksh/90 Kg-bag)	2,700	2,400	2,500	2,533.3
Land preparation	5,800	5,500	3,000	4,767
Planting	2,000	1,510	1,500	1,670
Seed	1,810	1,810	1,810	1,810
Fertilizer	6,800	6,200	4,250	5,750
Pesticides	2,100	1,100	1,260	1,487
Weeding (including herbicide costs & labour)	2,700	3,500	1,800	2,667
Harvesting and handling	8,073	8,102	5,184	7,120
Working capital	2,050	1,941	1,316	1,769
Productions costs	**31,332**	**29,662**	**20,120**	**27,038**
Production costs per bag	1,649	1,483	1,006	1,375
Production cost plus 30% margin	2,144	1,928	1,308	1,787
Breakeven yield	12	12	8	11
Profit /bag	1,051	917	1,494	1,158
Production cost/bag as % of sale price	79	80	52	71
ROI	0.64	0.62	1.49	0.84

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Harvesting and handling	8,073	8,102	5,184	7,120
Working capital	2,050	1,941	1,316	1,769
Productions costs	31,332	29,662	20,120	27,038
Land rent	12,000	12,000	10,000	11,333
Total production costs (with land rent)	43,332	41,662	30,120	38,371
Total production costs per bag (with land rent)	2,281	2,083	1,506	1,957
Total production cost plus 30% margin	2,965	2,708	1,958	2,544
Breakeven yield	16	17	12	15
Profit /bag	419	317	994	576
Production cost/bag as % of sale price	110	113	78	100
ROI	0.18	0.15	0.66	0.29

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What affects the cost of production?

- Productivity
- Inputs
- Farming technology

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Simulation: Good year harvest & prevailing prices

	Trans Nzoia	Uasin-Gishu	Nakuru	Overall
Maize Yields (90 Kg-bags/acre)	24	25	30	26.3
Sale price (Ksh/90 Kg-bag)	2,600	2,600	2,600	2,600
Productions costs	31,332	29,662	20,120	27,038
Production costs per bag	1,306	1,186	671	1,027
Production cost plus 30% margin	1,697	1,542	872	1,335
Land rent	12,000	12,000	10,000	11333
Total production costs (with land rent)	43,332	41,662	30,120	38371
Total production costs per bag (with land rent)	1,806	1,666	1,004	1492
Total production cost per bag plus 30% margin	2,347	2,166	1,305	1,940

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Simulation: Without fertilizer subsidy

	With Fert Subsidy	Without Fert Subsidy
Maize Yields (90 Kg-bags/acre)	19.7	19.7
Sale price (Ksh/90 Kg-bag)	2,533.3	2,533.3
Land preparation	4,767	4,767
Planting	1,670	1,670
Seed	1,810	1,810
Fertilizer	5,750	8,916
Pesticides	1,487	1,487
Weeding (including herbicide costs & labour)	2,667	2,667
Harvesting and handling	7,120	7,120
Working capital	1,769	1,990
Productions costs	27,038	30,425
Land rent	11,333	11,333
Total production costs (with land rent)	38,371	41,759
Total production costs per bag (with land rent)	1,957	2,123
Total production cost plus 30% margin	2,544	2,760
Breakeven yield	15	16
Profit /bag	576	410
Production cost/bag as % of sale price	1.00	1.09
ROI	0.29	0.19

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Breakdown of cost components

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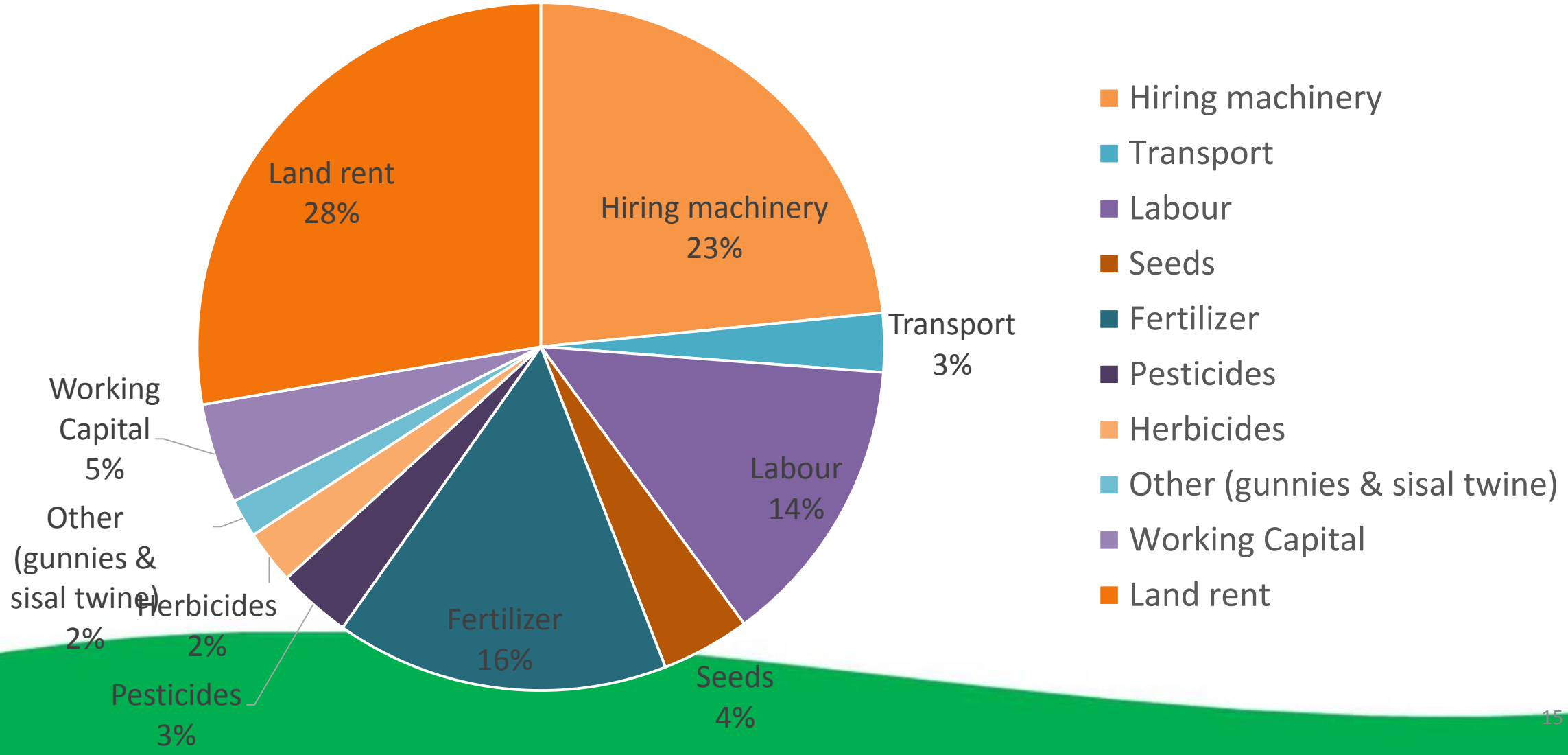
Trans Nzoia



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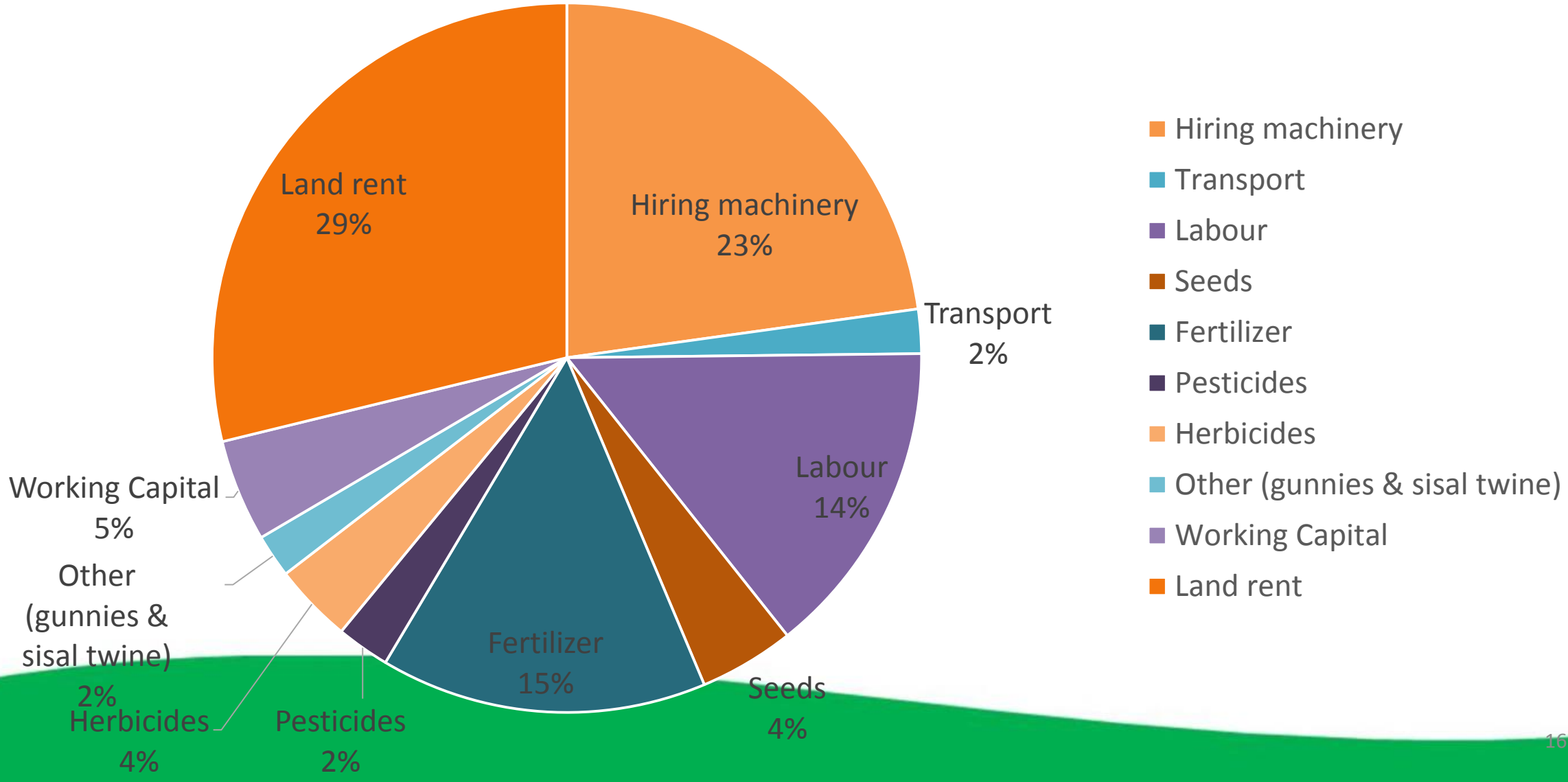
Uasin Gishu



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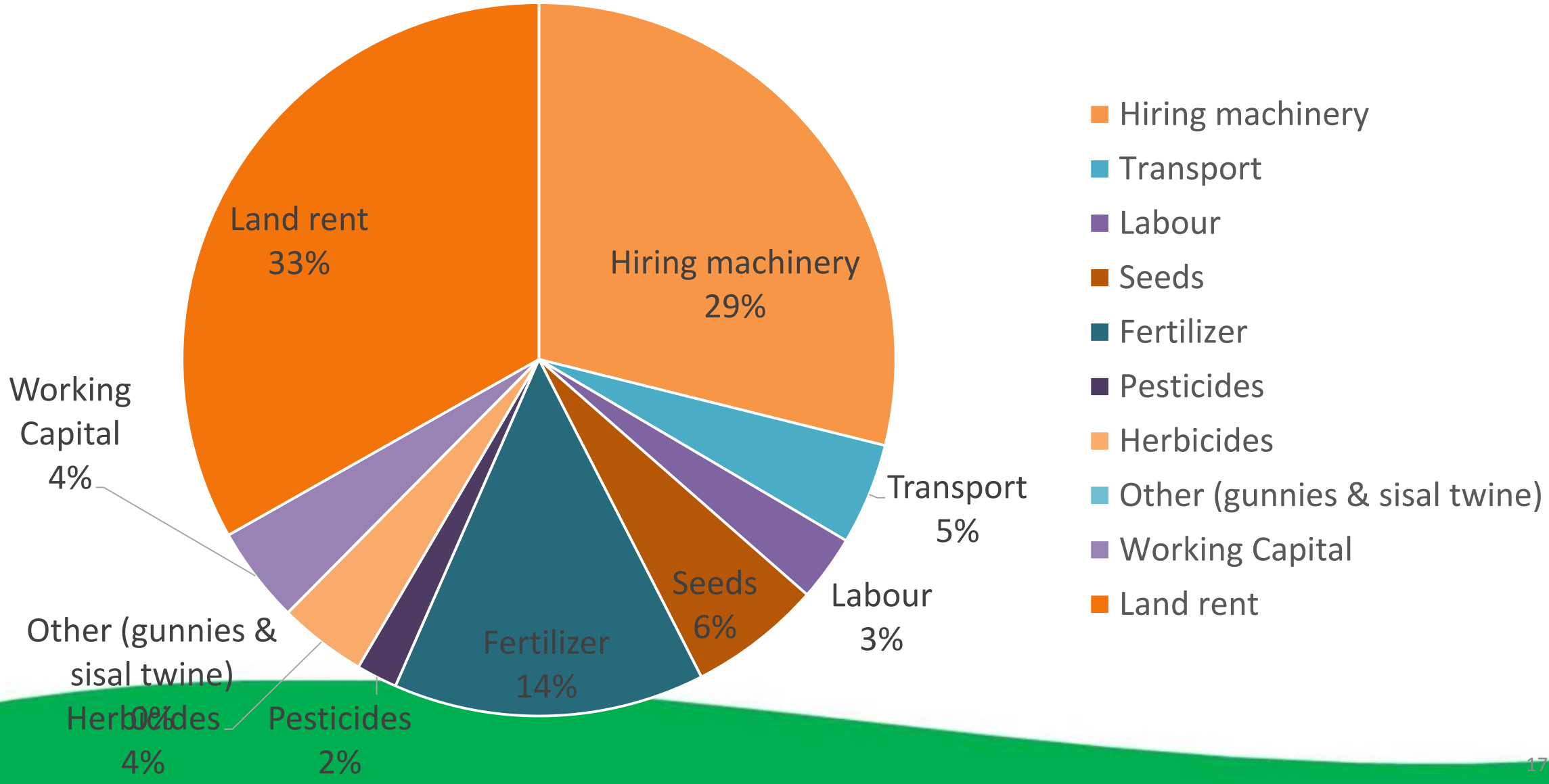
Nakuru



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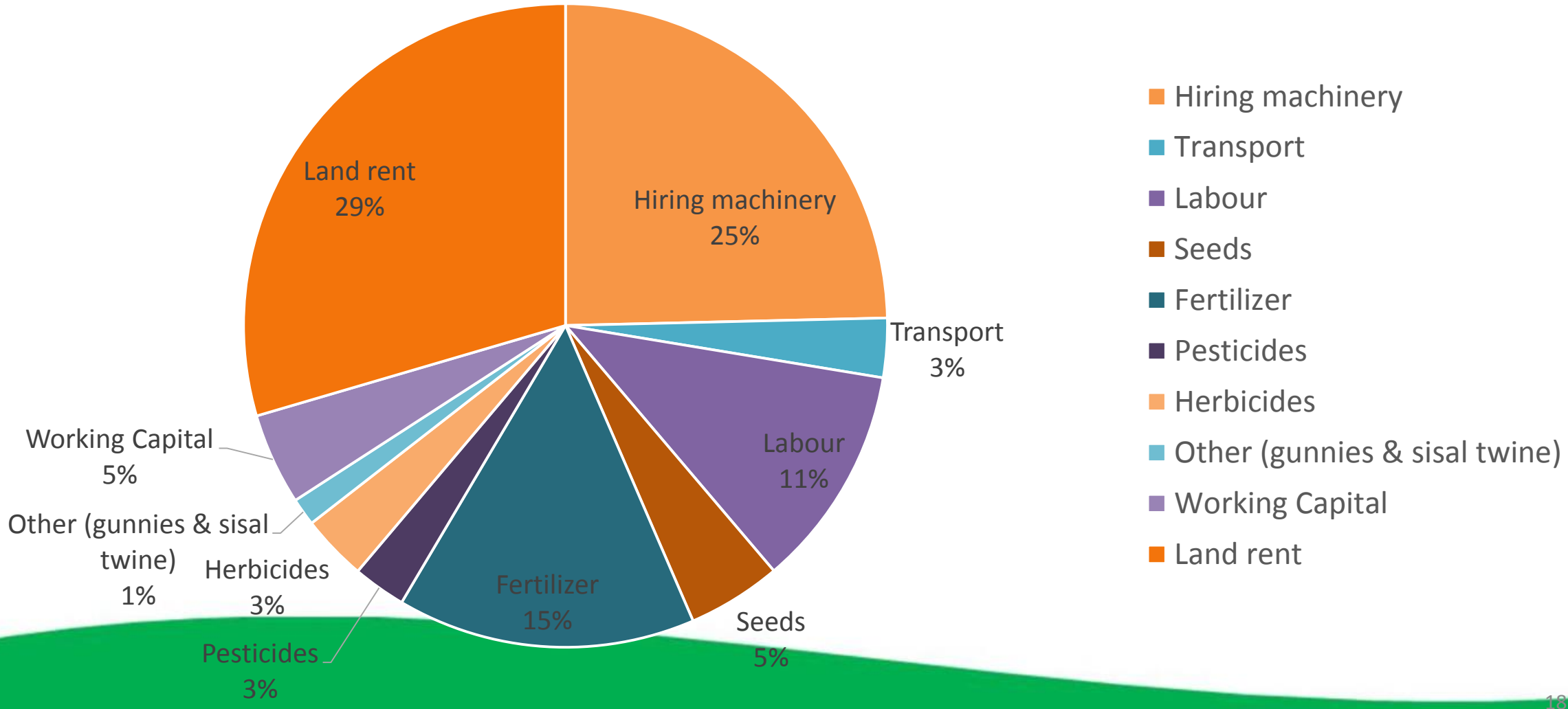
Overall



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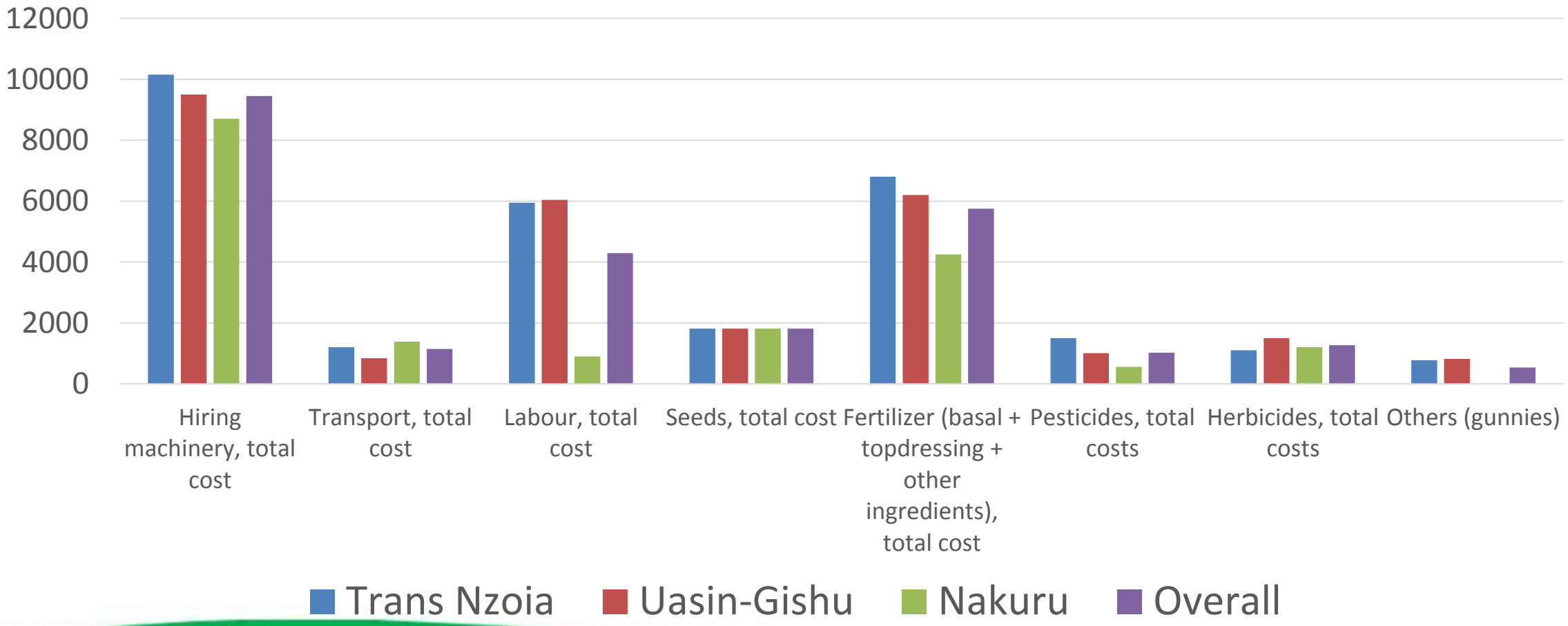
Cost components comparison



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Small-Scale Farmers

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Small-scale

	Kakamega	Trans Nzoia	Uasin Gishu	Nakuru	Overall
Maize Yields (90 Kg-bags/acre)	14	17	14	20	16.3
Sale price (Ksh/90 Kg-bag)	2,000	2,400	2,200	2,200	2200.0
Land preparation	2,400	4,500	5,000	2,600	3625
Planting	750	2,000	1,500	2,400	1663
Seed	1,800	1,850	1,830	1,800	1820
Fertilizer	5,600	6,800	6,800	4,550	5938
Pesticides	3,200	1,600	1,000	1,450	1813
Weeding (including herbicide costs & labour)	2,700	3,200	2,200	4,800	3225
Harvesting and handling	4,850	6,383	6,450	5,252	5,734
Working capital	1,491	1,843	1,735	1,600	1,667
Productions costs	22,791	28,176	26,515	24,451	25483
Production costs per bag	1,590	1,657	1,894	1,223	1560
Production cost plus 30% margin	2,067	2,155	2,462	1,589	2,028
Breakeven yield	11.4	11.7	12.1	11.1	11.6
Profit /bag	410	743	306	977	640
Production cost/bag as % of sale price	1.03	0.90	1.12	0.72	0.92
ROI	0.26	0.45	0.16	0.80	0.41

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Small-scale

	Kakamega	Trans Nzoia	Uasin Gishu	Nakuru	Overall
Maize Yields (90 Kg-bags/acre)	14	17	14	20	16.3
Sale price (Ksh/90 Kg-bag)	2,000	2,400	2,200	2,200	2200.0
Land preparation	2,400	4,500	5,000	2,600	3625
Planting	750	2,000	1,500	2,400	1663
Seed	1,800	1,850	1,830	1,800	1820
Fertilizer	5,600	6,800	6,800	4,550	5938
Pesticides	3,200	1,600	1,000	1,450	1813
Weeding (including herbicide costs & labour)	2,700	3,200	2,200	4,800	3225
Harvesting and handling	4,850	6,383	6,450	5,252	5,734
Working capital	1,491	1,843	1,735	1,600	1,667
Productions costs	22,791	28,176	26,515	24,451	25483
Land rent	5,000	10,000	10,000	8,000	8250
Total production costs (with land rent)	28,141	38,876	37,215	33,011	33733
Total production costs per bag (with land rent)	1,963	2,287	2,658	1,651	2,065
Total production cost plus 30% margin	2,552	2,973	3,456	2,146	2,685
Breakeven yield	14.1	16.2	16.9	15.0	15.3
Profit /bag	37	113	-458	549	135
Production cost/bag as % of sale price	1.28	1.24	1.57	0.98	1.22
ROI	0.02	0.05	-0.17	0.33	0.07

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Comparison with/without fert subsidy

	Without Fert Subsidy	With Subsidy
Maize Yields (90 Kg-bags/acre)	16	16
Sale price (Ksh/90 Kg-bag)	2,200	2,200
Land preparation	3,625	3,625
Planting	1,663	1,663
Seed	1,820	1,820
Fertilizer	7,800	4,950
Pesticides	1,813	1,813
Weeding (including herbicide costs & labour)	3,225	3,225
Harvesting and handling	5,734	5,734
Production costs	26,021	23,171
Working capital	1,821	1,622
Production costs	27,842	24,793
Production costs/ bag	1,740	1,550
Land rent	8,250	8,250
Total Production costs (with land rent)	36,092	33,043
Total Production costs per bag (with land rent)	2,256	2,065

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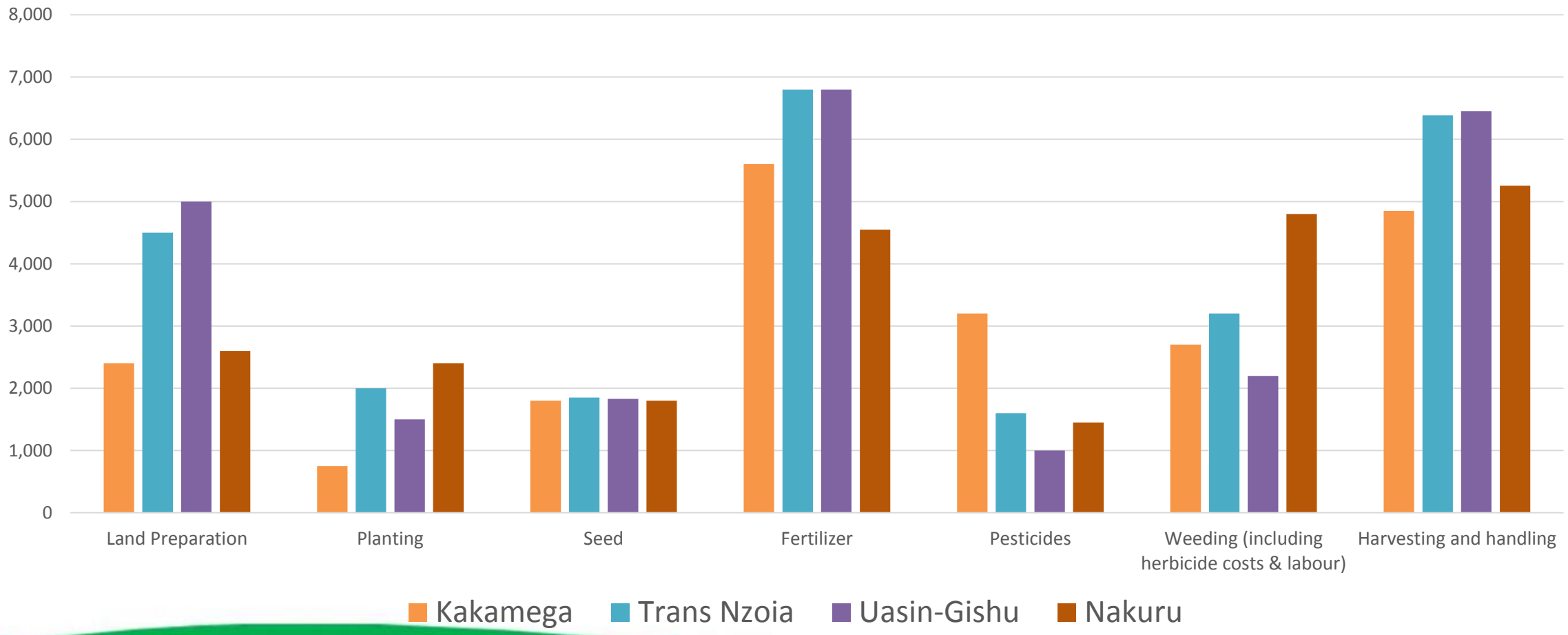
Cost comparison by activity



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Findings

- Production costs have increased slightly from 2016 costs
- Production costs affected by
  - Declining yields
  - Input costs (subsidized vs commercial fertilizer)
  - Technology choices (manual labour vs mechanization)
- Low response to fertilizer application
- Costs are still high and so production not competitive

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Recommendations for policy

- To reduce costs and improve competitiveness:
  - Improve productivity
  - Lower cost of inputs
    - Fertilizer cost reduction programme
  - Use labor-saving technologies/mechanization
- Fertilizer use to be guided by soil nutrient requirements
  - Soil testing
  - ISFM and good agricultural practices
  - Information on soil quality & required nutrients
  - Agronomic practices
  - Revamp extension systems

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Findings

Rice

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Rice Production Systems and Areas

Rice production	Out grower/non-scheme farmers	Irrigation scheme farmers
Acreage under rice	2	2
Seeds kg/acre	100	75
Variety	IR	Basmati
Fertilizer source	NAIAAP	Commercial
Planting fertilizer kg/acre	100	75
Top dress fertilizer kg/acre	100	150
Level of commercialization	93%	96%
Areas of study	Ahero	Mwea

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Non-scheme farmers

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Cost of production

Rice yields (Kg/acre)	1440
Sale price (Ksh per kg)	40
Total revenue (per acre)	57,600
Nursery	500
Land preparation	10,900
Planting	3,000
Planting fertilizer + additives	0
Topdressing fertilizer	0
Seed	1,600
Weeding	3,500
Pesticides & fungicides	350
Harvesting	7,200
Post-harvest	2,760
Other labor	4,000
Working capital	2,367
Production costs	36,177
Production costs per kg	25
Land rent	10,000
Total production costs (with land rent)	46,177
Total production costs per kg (with land rent)	32

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Profit analysis

Profit analysis	Without land rent	With land rent
Breakeven yield (90kg bags)	10	13
Profit per bag	1,339	714
Profit per kg	15	8
Prod cost/bag as % of sale price	63%	80%
ROI	59%	25%

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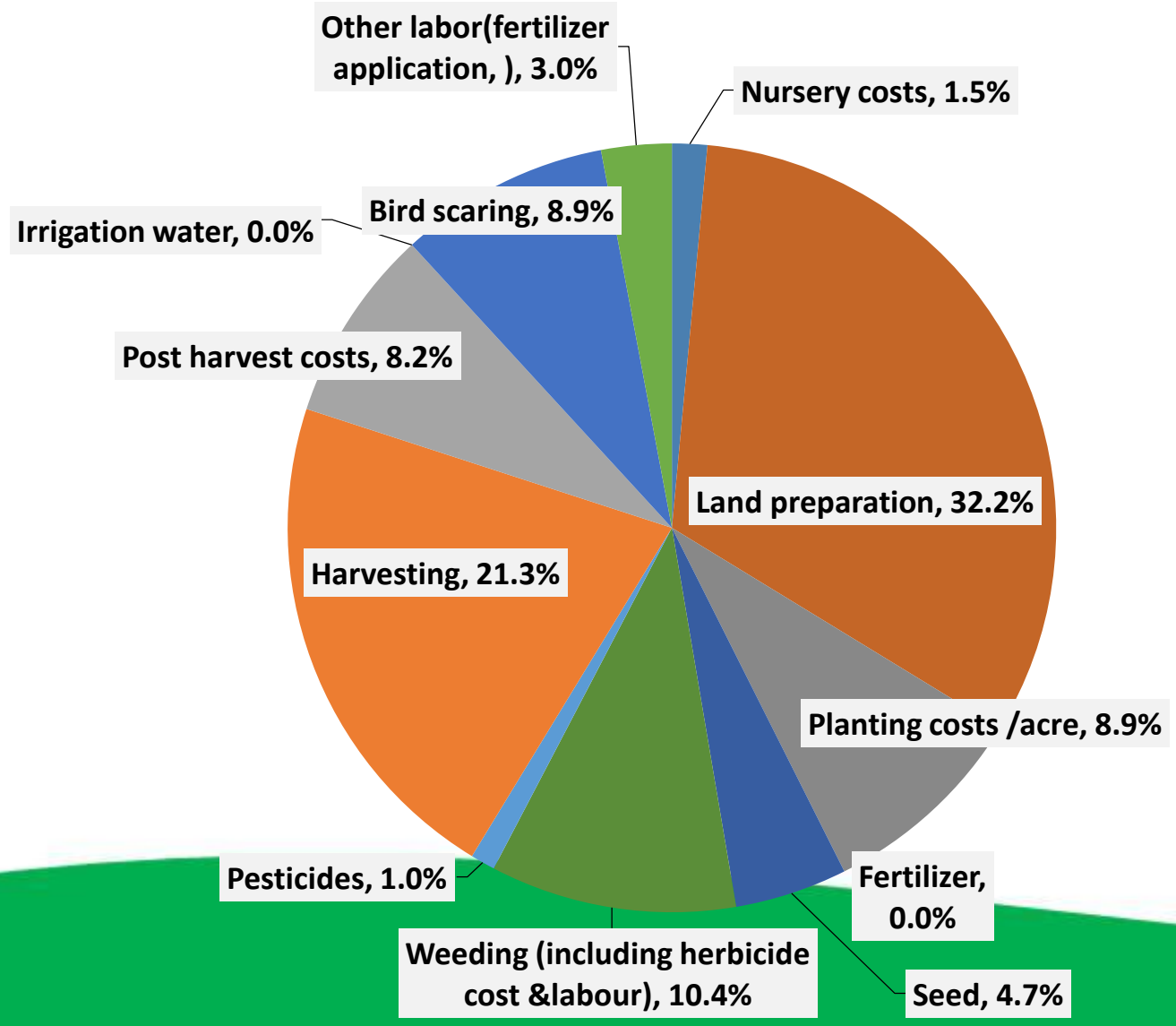
Costs per activity



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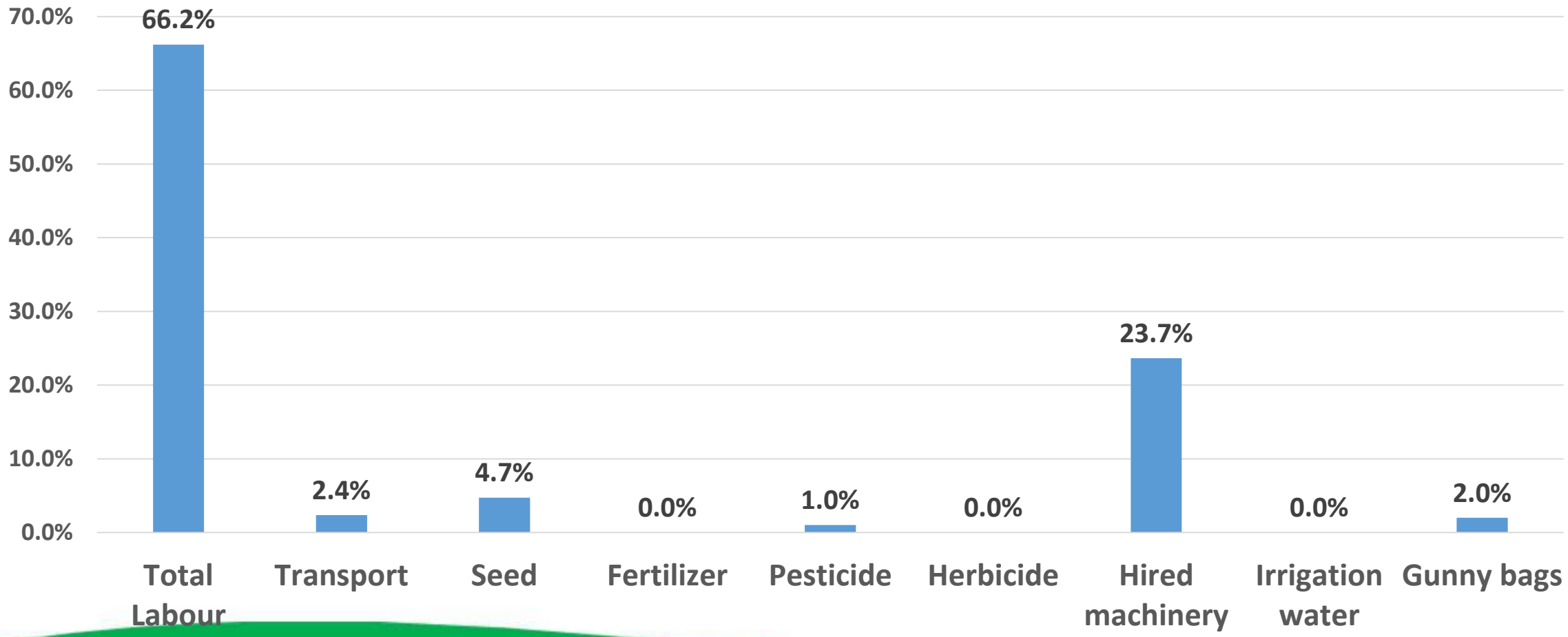
Cost components



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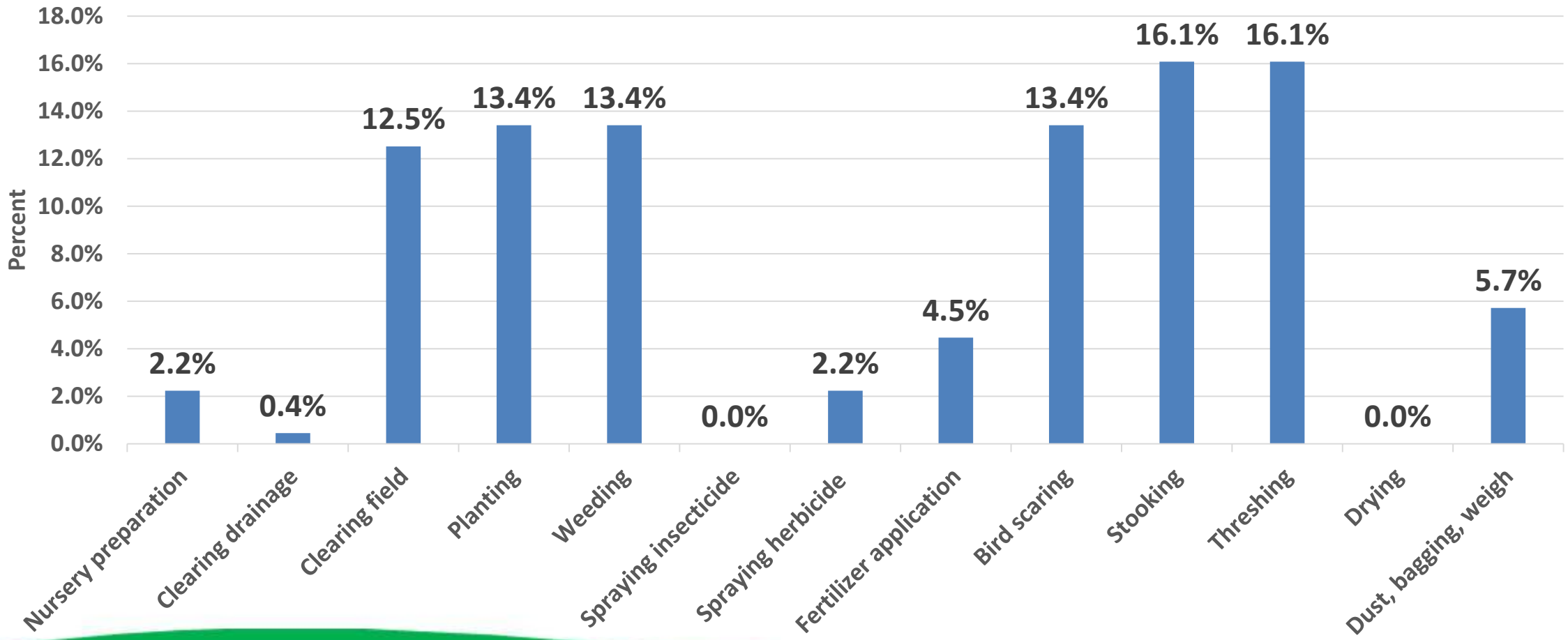
Labour components



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Scheme farmers

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Cost of production

Rice yields (Kg per acre)	2,250
Sale price Ksh per kg	60
Total revenue	135,000
Nursery costs	500
Land preparation	8,200
Planting costs	4,900
Planting fertilizer + additives cost /acre	2,370
Topdressing fertilizer	5,400
Seed	1,500
Weeding	6,250
Pesticides & fungicides	600
Harvesting	7,000
Post-harvest	4,875
Other labor	9,250
Other intermediate	3,200
Working capital	3,783
Production costs per acre	57,828
Production costs per kg	26
Land rent	50,000
Total production costs (with land rent)	107,828
Total production costs per kg (with land rent)	48

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Profit analysis

Profit analysis	Without land rent	With land rent
Breakeven yield (90 kg bags)	11	20
Breakeven yield (kgs)	990	1800
Profit per bag	3,087	1,087
Profit per kg	34	12
Prod cost/bag as % of sale price	43%	80%
ROI	133%	25%

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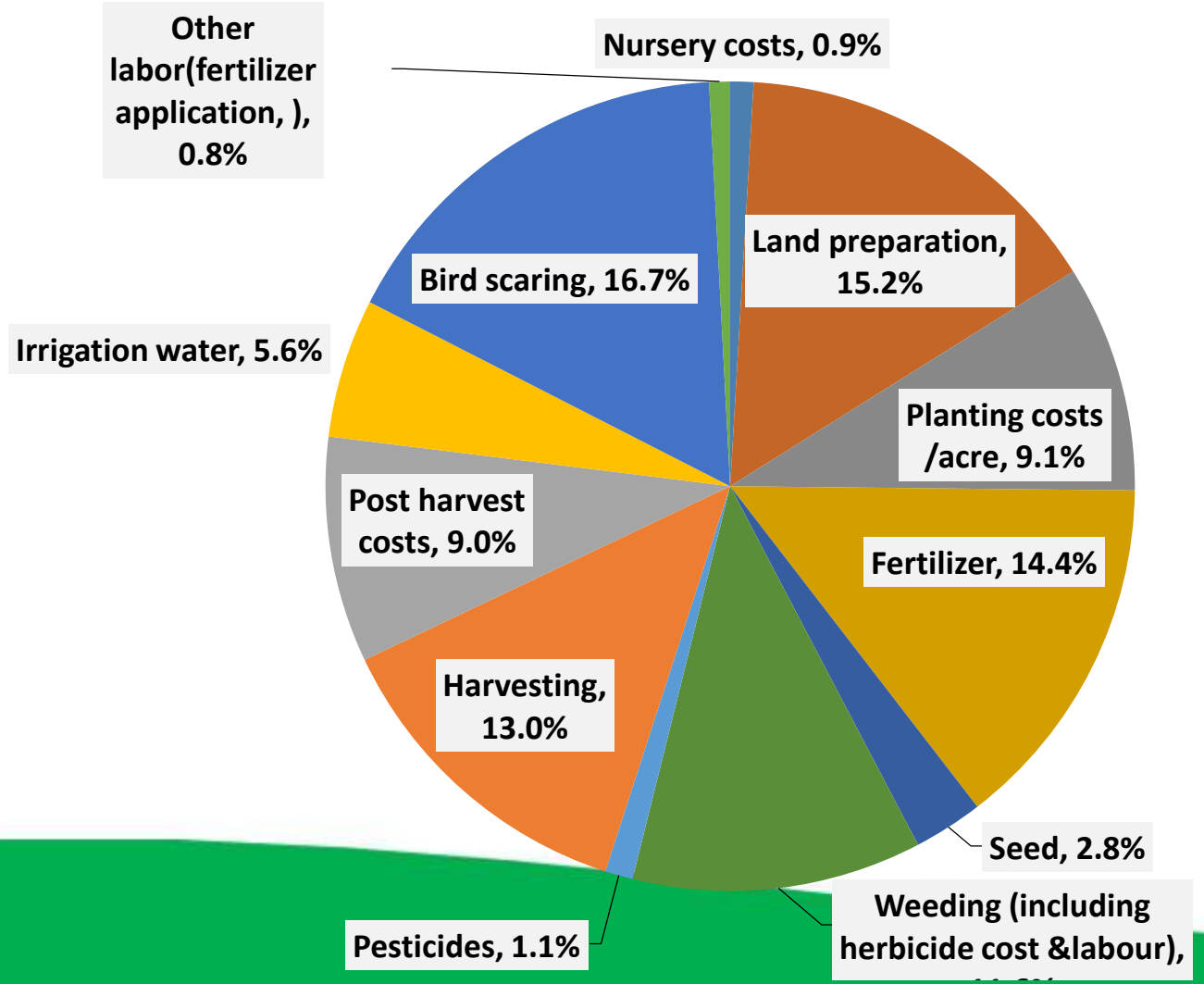
Costs by activity



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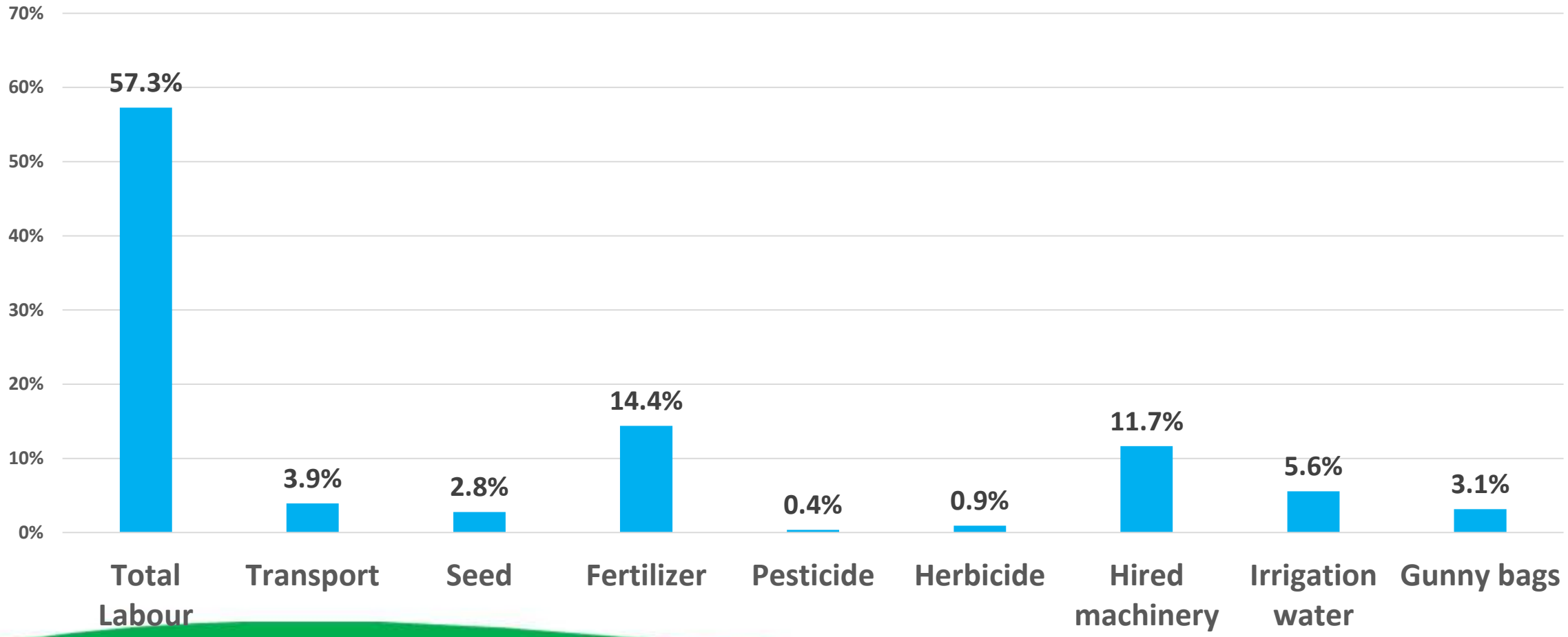
Cost components, scheme..



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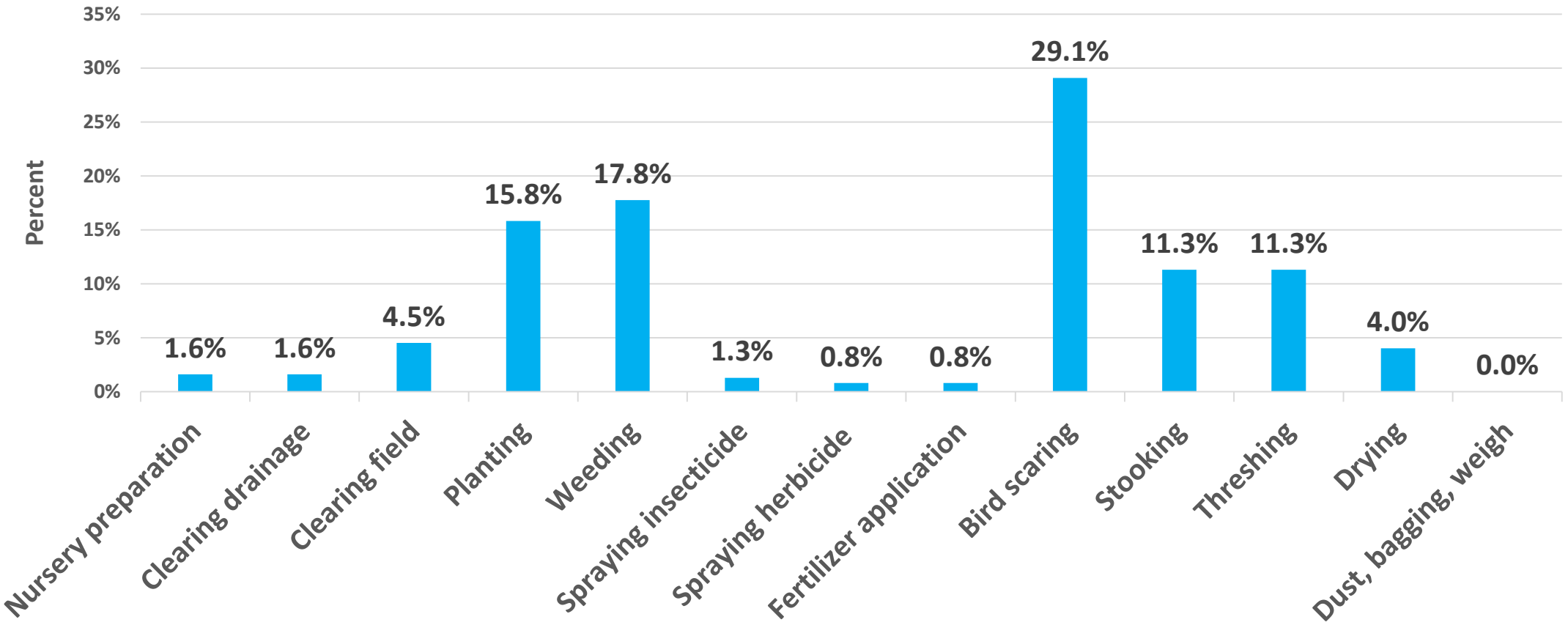
Labour components



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Findings

- Production systems and costs are different in the two study areas
- Large difference between producer and consumer prices (eg. Ksh 85 vs 200/kg for Pishori)
- Labour contributes the highest proportion of cost
  - There are still opportunities of saving costs by mechanization
- Bird scaring is an expensive activity in rice production
- Rice production is a profitable enterprise even where land is hired despite high land rates
- Possibility of improving irrigation infrastructure to non-scheme rice farmers in view of the difference between non-scheme and scheme rice farmers

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Recommendations for policy

- There is an increasing demand for rice but costs of production are high
- Enhance uptake of innovations to reduce costs
    - System of rice intensification
    - Use nets for bird control
- Enhance bird surveillance and control
- Increase rice production & productivity
    - Expand area under irrigated rice
    - Explore opportunities for upland rice
    - System of rice intensification
- Explore credit facilities for farmers/youth if they are to engage in rice production-high capital requirement