Pigeonpea in Mozambique: An Emerging Success Story of Crop Expansion in Small-holder Agriculture

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1. Strengths and weaknesses of pigeonpea as a small-holder crop
2. Evidence for expansion from the TIA and IAI national agriculture surveys from 2002-12
3. Key elements conditioning expansion
4. Preliminary estimates of economic and poverty effects
5. Prospects for the future
6. Plausible scenario and points for discussion

1. Strengths and weaknesses of pigeonpea as a small-holder crop

- Strengths
  - Plasticity in duration: wide adaptation to differing growing seasons
  - Ease of intercropping with shorter duration cereals
  - Drought tolerance
  - Difficult to mechanize
  - Strong market demand
  - Commercial production of hybrids

Helicoverpa armigera eating pigeonpea pods

1. Strengths and weaknesses of pigeonpea as a small-holder crop

- Weaknesses
  - Highly susceptible to pod borer damage
  - No natural varietal resistance to pod borer
  - Difficult to intensify
  - Lacks versatility in consumption compared to other grain legumes
  - High rate of outcrossing

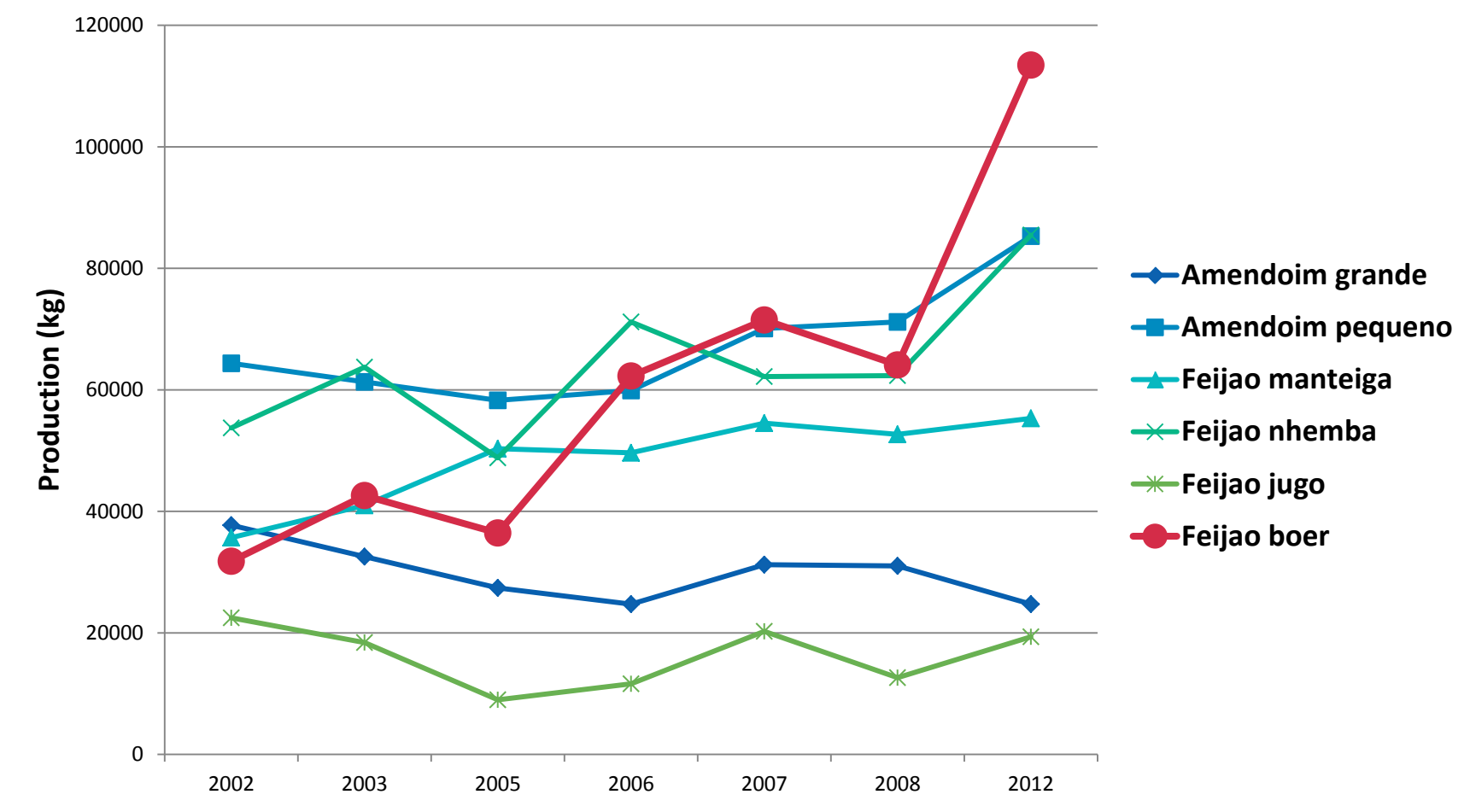
Global production of pigeonpea in metric tonnes by country in 2012

Rank	Country	Production
1	India	2650000
2	Myanmar	900000
3	Malawi	237210
4	Tanzania	206057
5	Kenya	89390
6	Uganda	84200
7	Dominican Republic	27997
8	Nepal	14082
9	Burundi	8135
10	DRC	6800

Source: http://faostat.fao.org/site/339/default.aspx

2. Evidence for expansion from the TIA and IAI national agriculture surveys from 2002-12

Production of grain legumes in Mozambique by cropping year

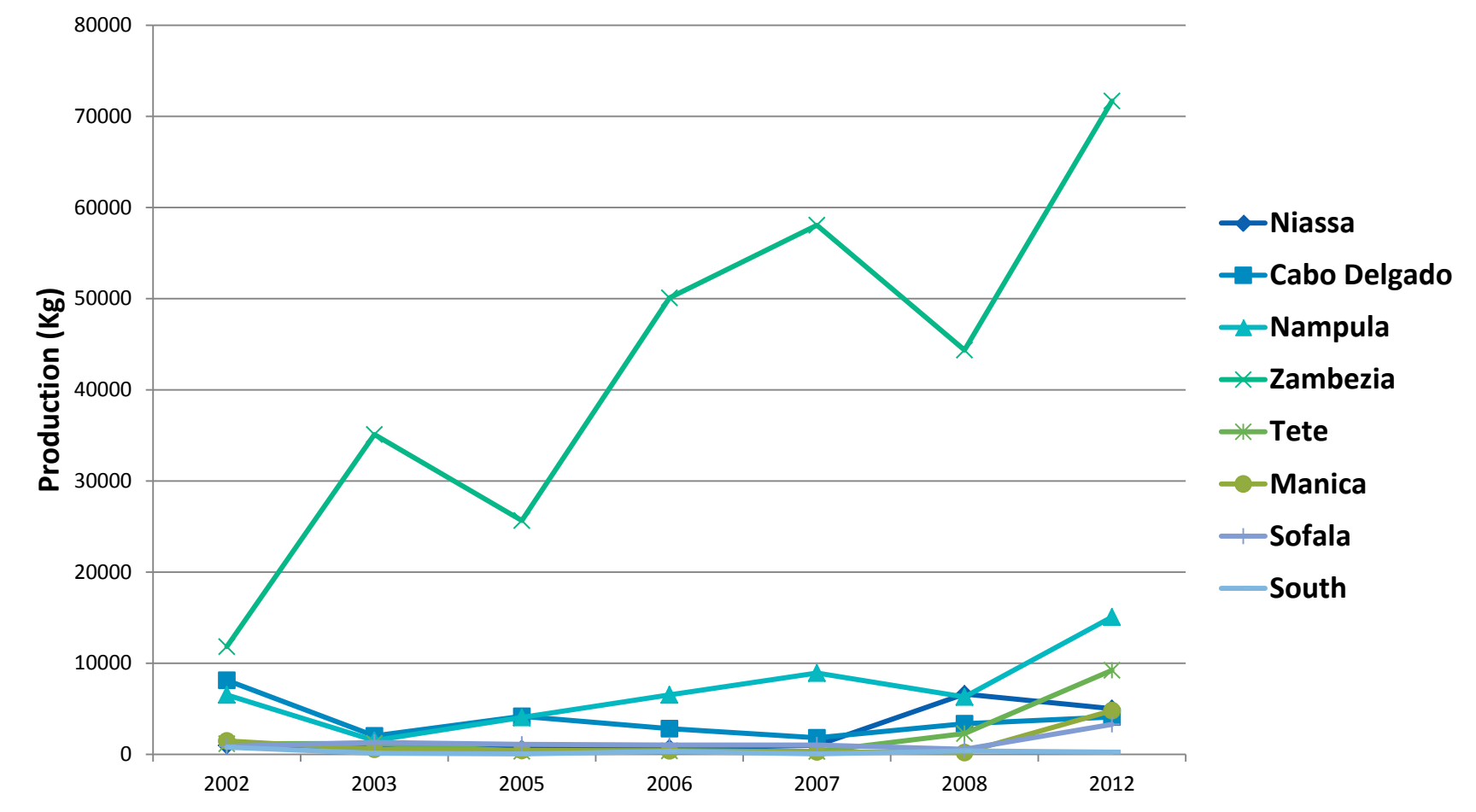


Trend in the production of grain legumes in Mozambique from 2002-2012 by crop

Crop	Trend in '000 t. and rate (%)	
	Coefficient	Rate
Feijao boer	7.9	7
Feijao manteiga	1.9	3.4
Feijao nhemba	2.7	3.2
Amendoim pequeno	2.5	2.8
Feijao jugo	-0.1	ns
Amendoim grande	-1	ns

ns = not significant

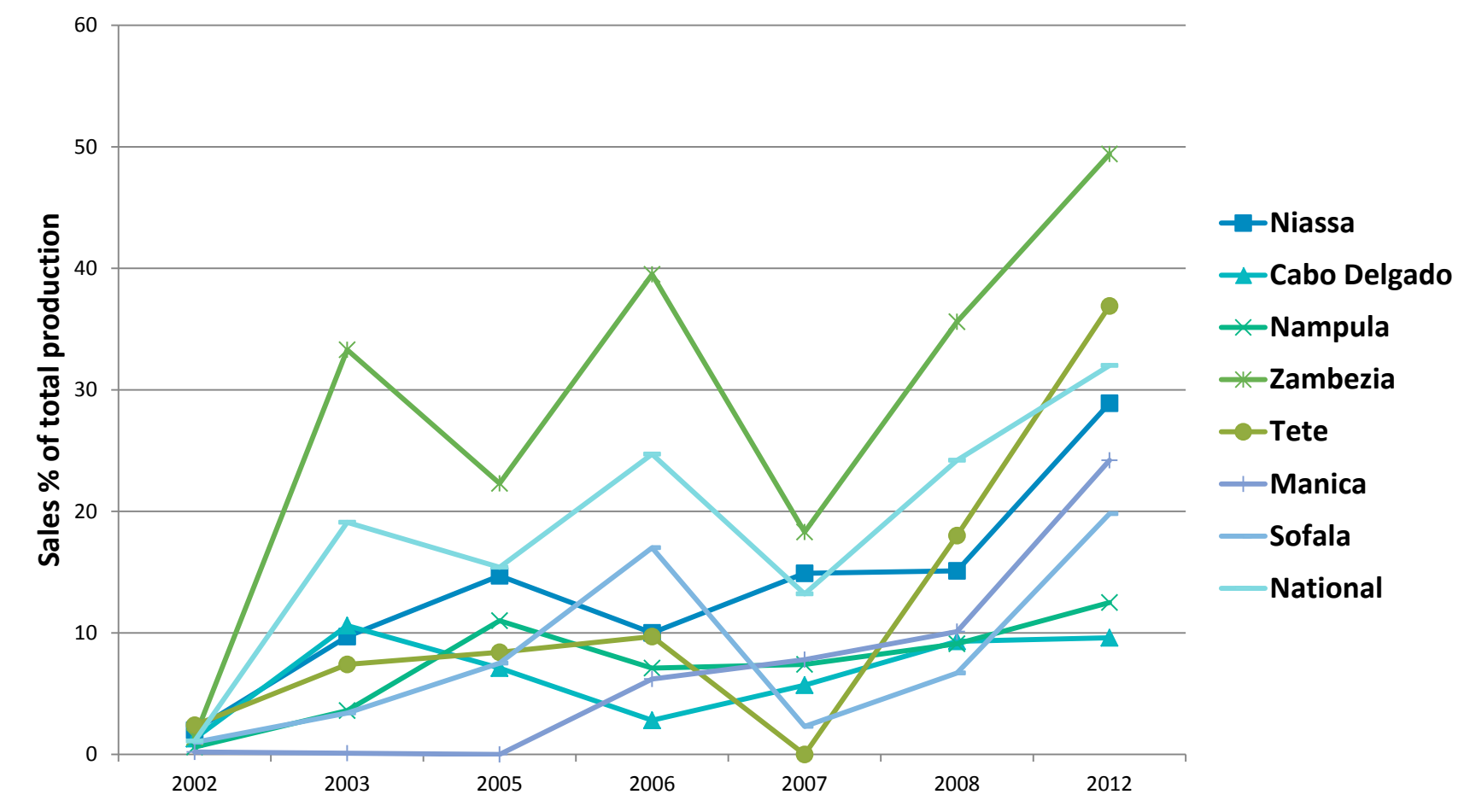
Production of pigeonpea in Mozambique by province and cropping year



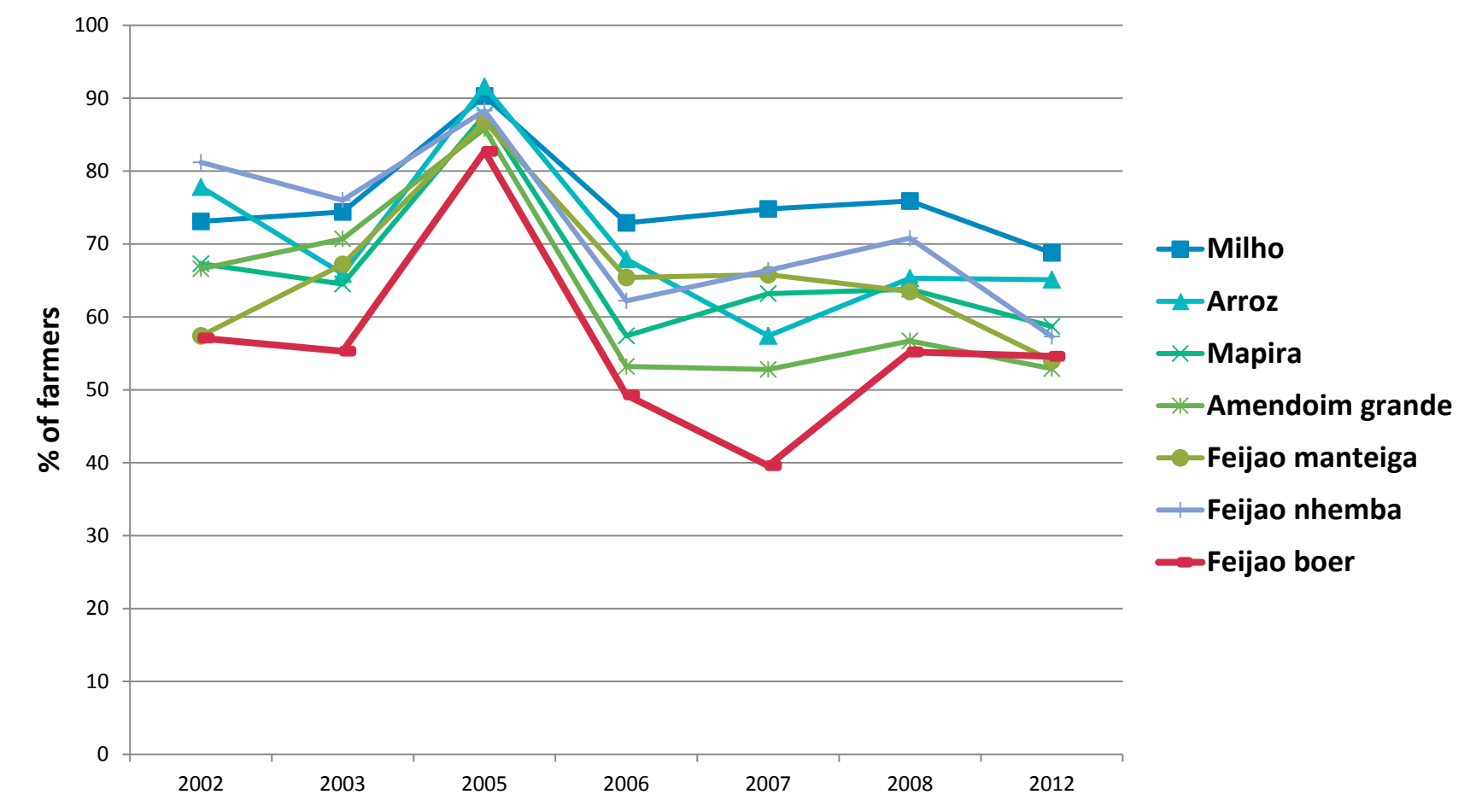
Diversification of pigeonpea production by district in 2011/12

Provincia	Distrito	Freq.	Percent
Zambezia	Milange	107	7.29
Zambezia	Morrumbala	66	4.5
Zambezia	Ile	61	4.16
Nampula	Mogovolas	55	3.75
Manica	Gondola	54	3.68
Zambezia	Mocuba	53	3.61
Niassa	Mecanhelas	50	3.41
Zambezia	Alto Molocue	46	3.14
Nampula	Moma	45	3.07
Acima de 1%	27 distritos>1%	639	43.56
Abaixo de 1%	62 distritos<1%	291	19.86

Sales of pigeonpea in Mozambique in % of total production by province and year



Frequency (%) of Mozambican farmers who perceived production losses by crop and year



Area growth in pigeonpea production in Mozambique

Year	Total producers	Area per producing household (ha)	Pigeonpea area (ha)
2002	695,286	0.10	68,814
2005	723,228	0.22	157,804
2006	727,142	0.23	170,252
2007	738,142	0.27	198,868
2008	748,593	0.25	190,368
2012	1,079,636	0.23	248,929

Yield growth in pigeonpea production in Mozambique

Year	Yield (kg/ha)	Yield(kg/ha)> 0.2 ha	Incidence of yield=0
2002	616	266	0.27
2005	291	204	0.33
2006	457	324	0.06
2007	445	292	0.06
2008	425	337	0.09
2012	486	356	0.06

The most important crop in the machamba where pigeonpea was grown in 2012

Crop	Frequency	Percent
Maize	887	48
Manioca	378	20
Pigeonpea	213	11
Groundnut	153	8
Sorghum	67	4
Cowpea	53	3
Cotton	28	2
Others	68	4
TOTAL	1847	100

Evidence from the Partial Panel 2008/2011

			Pigeonpea area (ha) in	
Groups	Freq.	%	2008	2011
Never adopted	708	59.70	0.00	0.00
New adopters	241	20.32	0.00	0.32
Disadopters	45	3.79	0.20	0.00
Adopted in both ye	192	16.19	0.35	0.42

3. Key elements conditioning expansion

- Strong market demand: the Export Trading Group (ETG) and processing investment
- Intensive technology transfer: DNEA and World Vision
- Well-adapted improved varieties: IIAM and ICRISAT
- Stable funding from USAID

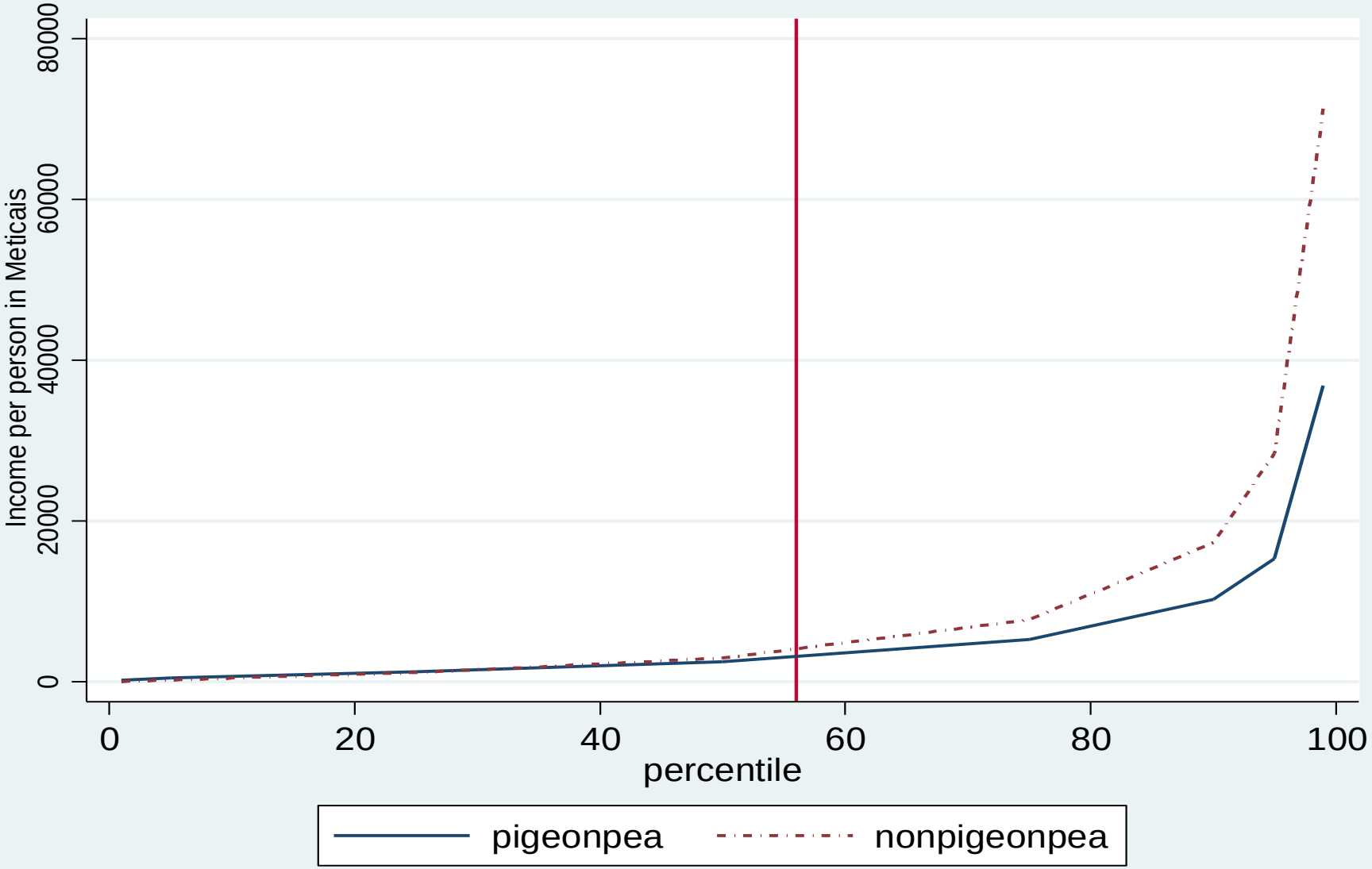
Improved varieties of pigeonpea

- ICEAP 00040
- ICEAP 00020
- ICEAP 00554
- ICEAP 00557

4. Preliminary benefit analysis

- Major components: Research and Extension
- The without scenario: Base production with a 2.5% growth rate
- Annual benefit in 2012: U.S.$ 22 million
- Reduction in the Head Count Index of Poverty from 57.0 to 56.7%
- Equivalent to about 10,000 families crossing the poverty line in 2012

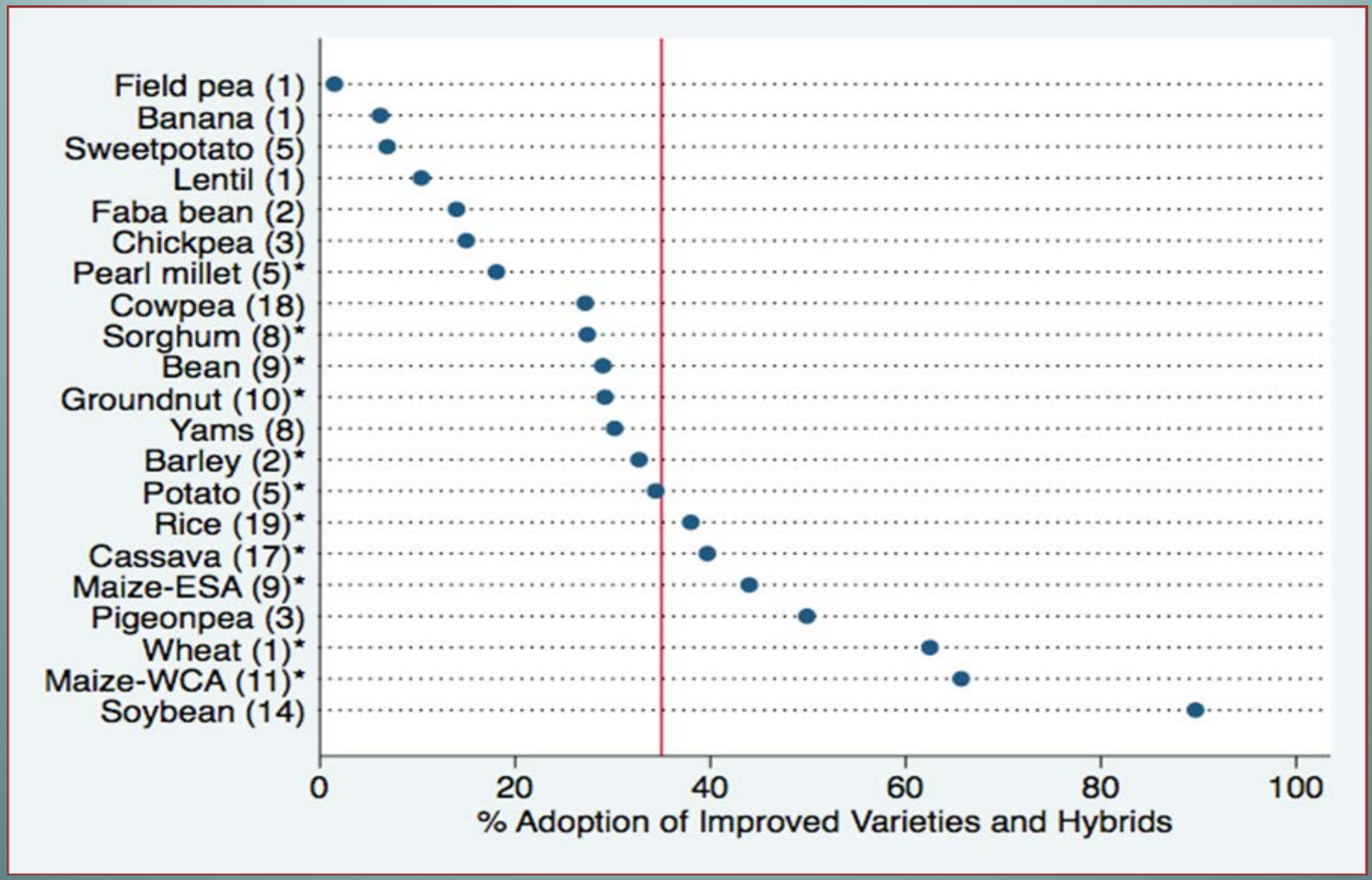
Comparing per capita income distributions 2012



5. Prospects for the future

- Bright for further “extensification”
  - Simple strategy
    - Expansion of quality seed production
    - Substitution of ICEAP 00554 and 00557 for 00040
    - Potential for expansion not limited by mid-elevation areas in the medium term
    - Not constrained by adverse policy at this time
    - Porous borders with high regional demand

Adoption of improved varieties in SSA in 2010



5. Prospects for the future (ctd).

- Threats:
  - Technological change in India that makes intensification possible:
    - Deployment of hybrids
    - BT pigeonpea
  - Increasing competitiveness from Myanmar
  - Pressure for export taxes and protection from processors

6. Points for discussion and a plausible scenario

a) The uniqueness of pigeonpea : You sow it, harvest it, and sell it.

- Hard to intensify except for varietal change
- The private sector and technology transfer

b) A plausible scenario: The driving forces in the medium term

- From 100,000 to 150,000 tonnes: Expansion fueled by more producing households
- From 150,000 to 200,000 tonnes: Increasing area from 0.25 ha to 0.50 ha
- From 200,000 to 300,000 tonnes: Intensifying yield from 500 to 1000 kg/ha

c) Scope for agronomic intensification

- Row intercropping
- P