

# Pan-tropical perspective of recent developments in pasture research and development

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Tropical pastures workshop  
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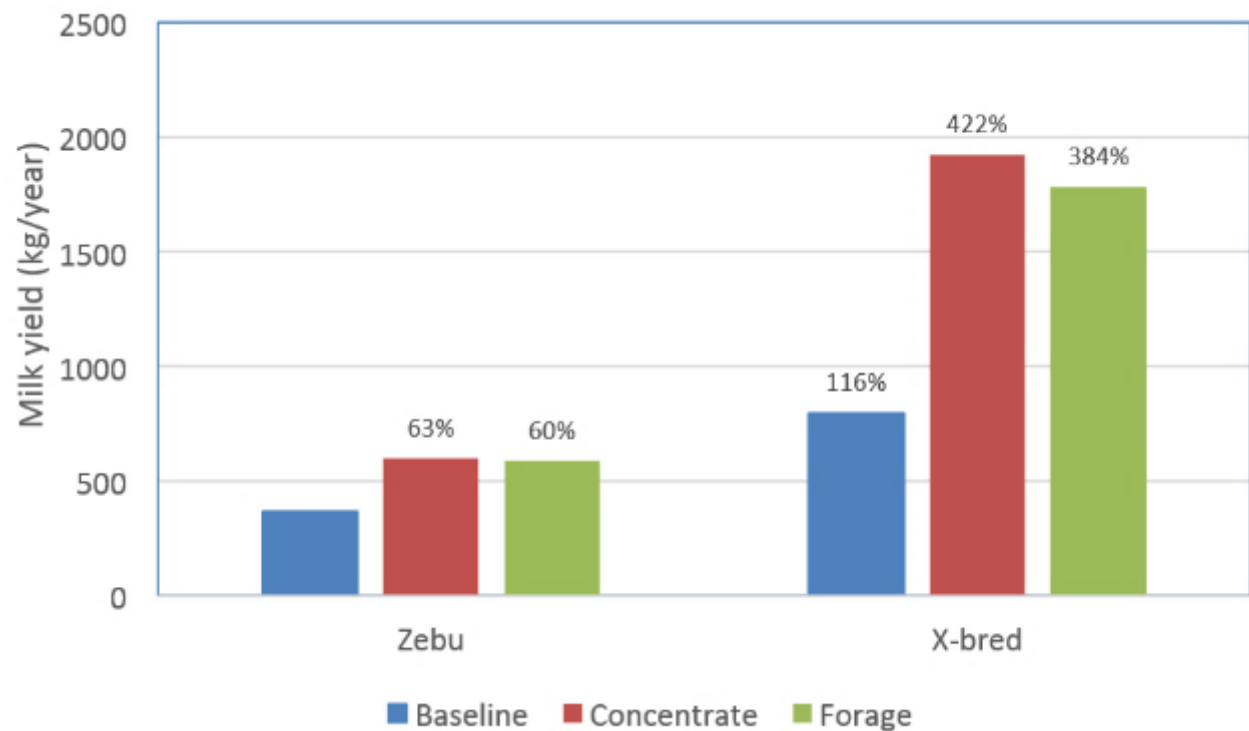


# The role of planted forages

- Increase livestock production by alleviating feed constraints/shortages
- Improve soil fertility through nitrogen fixation/leaf drop and biological nitrification inhibition (BNI)
- Reduce erosion through increased ground cover, especially on slopes
- Help control insect pests
- Provide environmental services - carbon sequestration, enhanced system water productivity
- Improve system resilience - alternative land use strategy for marginal lands and steep slopes

# Livestock production benefits

- Modelling increases in milk yields in response to different interventions in Ethiopia



(Herrero et al., 2016)

# Extent of forage cultivation

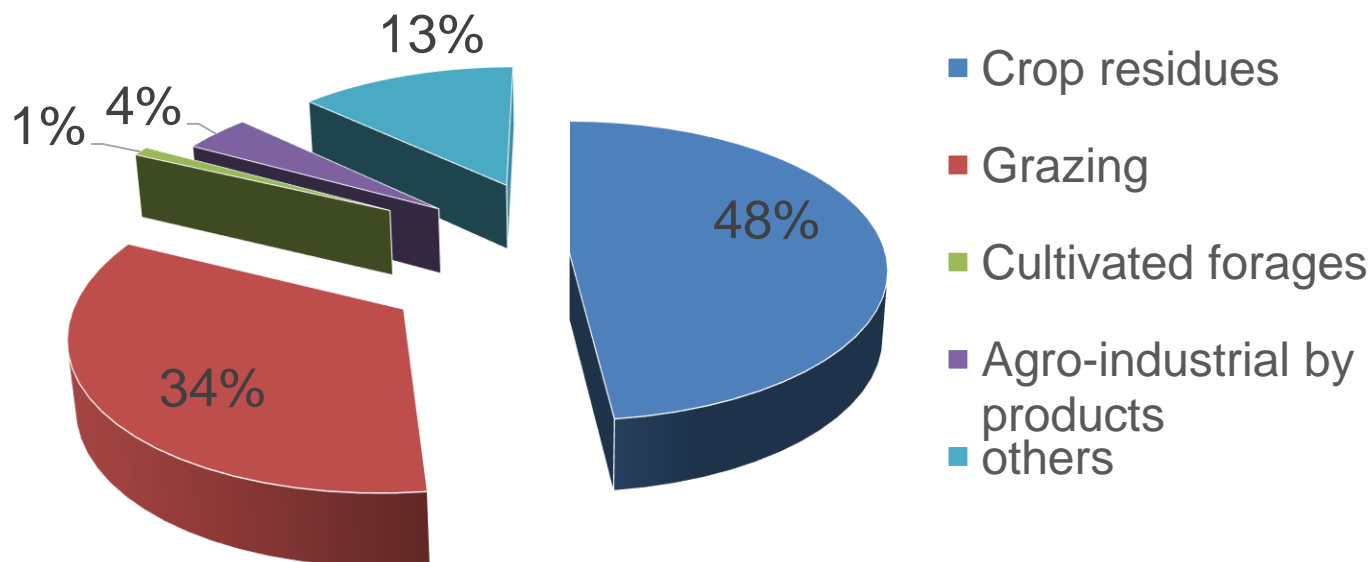
- Widely employed in Latin America
- Less so in the rest of the global tropics
- Some reports of success including:
  - Intensive grass plots in SE Asia (mainly *P. maximum* and *Brachiaria* (CIAT));
  - Fodder banks in West Africa (mainly *Stylosanthes hamata*)
  - In East and Central Africa:
    - Brachiaria/Urochloa and hybrids;
    - Napier grass;
    - Desho grass;
    - Push-Pull technology (ICRPE and Rothamsted ), and;
    - Multi-purpose trees (*Calliandra*, *Sesbania* and *Leucaena*) (ICRAF))

# Feed resource supply/demand in India

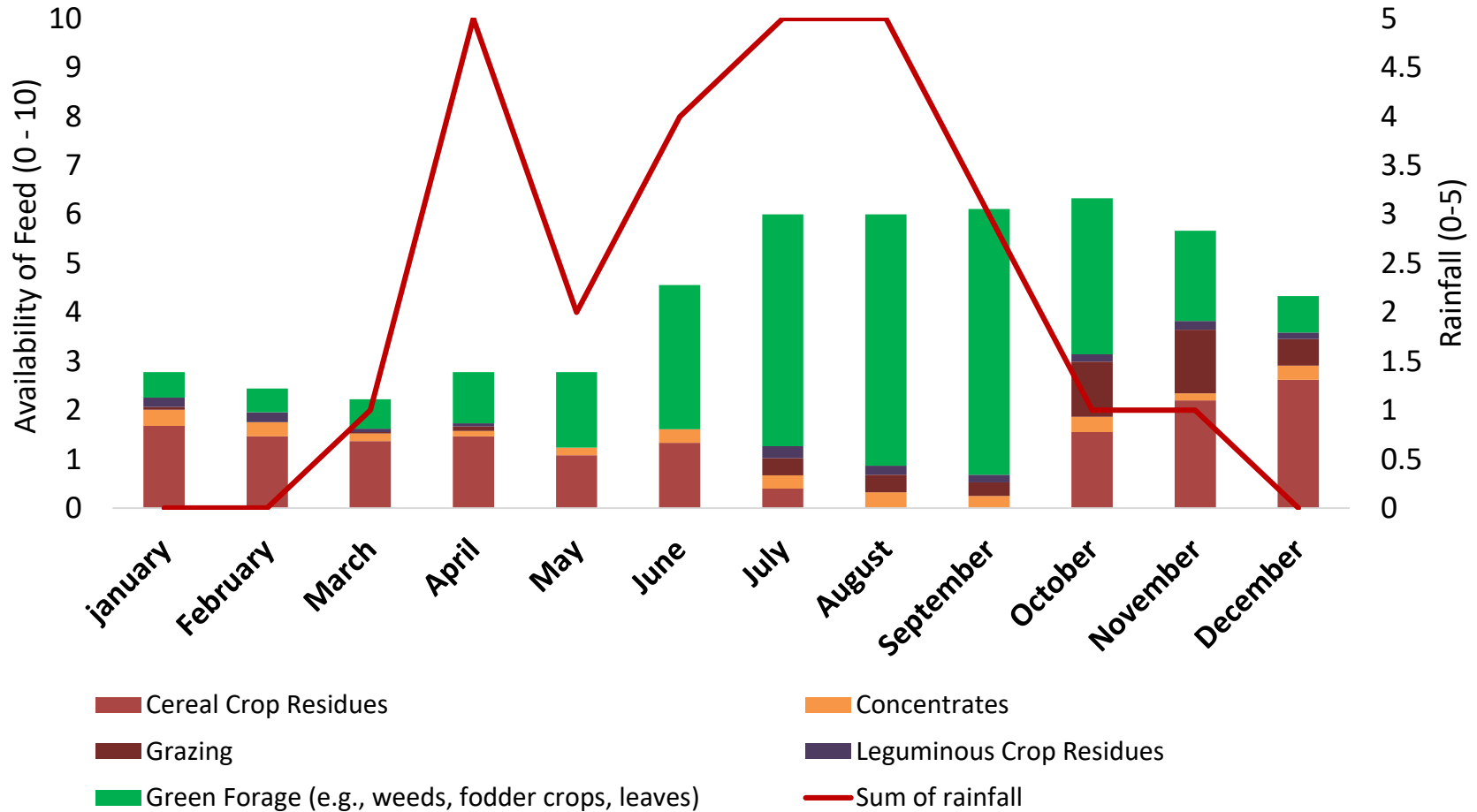
Feed resource	Contribution to overall feed resources (%)
Greens from CRP, forests, grazing	8.0
Planted forages	15.1
Crop residues	70.6
Concentrates	6.3
Deficit: feed availability versus feed requirement (%)	
Dry matter (i.e. quantity)	-6
Digestible crude protein	-61
Total digestible nutrients	-50

(NIANP 2012; Blümmel et al. 2014)

# Major feed resources in Ethiopia



# Seasonality of feed resources, Ethiopia



(Hawassa Zuria district)

# Successes: *Brachiaria/Urochloa* spp.

- Big impact in Latin America
  - 99 million hectares in Brazil alone
- Identified lines adapted to East Africa
- Integrated into crop-livestock system & hay production
  - >30,000 farmers from 15 countries adopted the technology by 2018
  - Some beneficiaries now able to bridge the perennial feed gap and selling surplus hay



Climate-smart Brachiaria Initiative (2013 – 2022)



# Successes: Napier grass (*Cenchrus purpureus*)

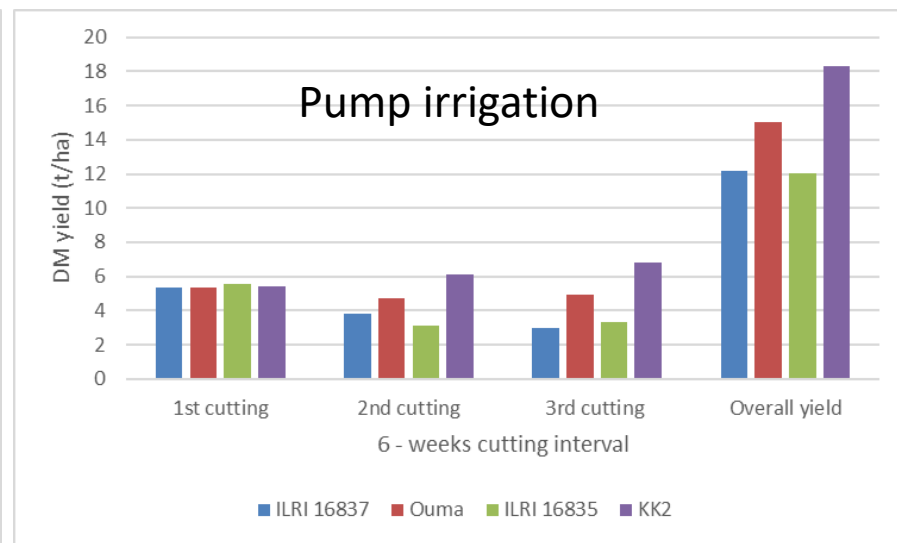
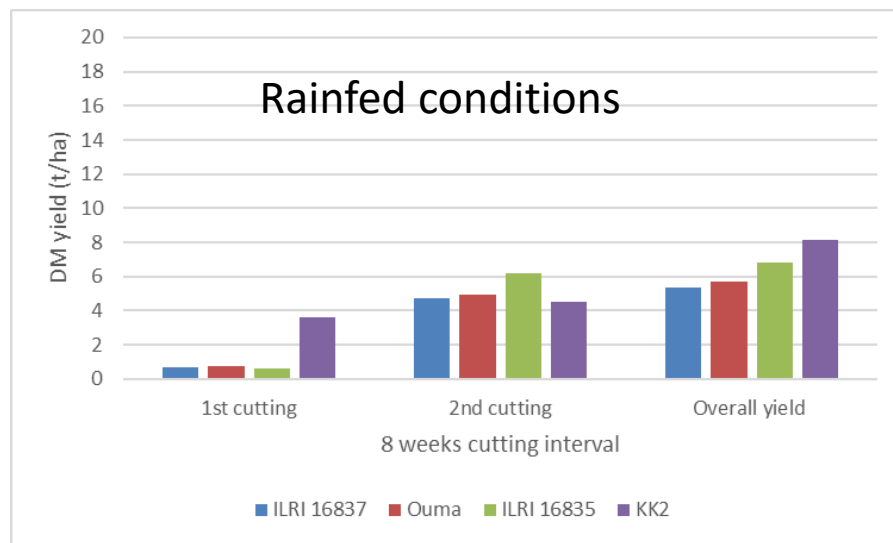
- The major forage species for smallholder dairy in East Africa
  - High yielding lines produce 5 times more biomass than natural pastures in Tanzania<sup>1</sup>
  - Yield shown to increase by intercropping with legumes and can be harvested 6 to 9 times per year under irrigation in Ethiopia<sup>2</sup>
  - Smut and stunt disease resistant lines identified from the in trust collection at ILRI and being adopted by farmers



<sup>1</sup>Lukuyu et al. High yielding improved forages. 7th Multi-Stakeholder Partnership Meeting of the Global Agenda for Sustainable Livestock, Addis Ababa, Ethiopia, 8–12 May 2017.

<sup>2</sup>Adie et al. Lessons from pilot trials with small-scale irrigated forage production in the Amhara Region: potential of integrating the perennial forage Napier grass with Desmodium and Pigeon Pea in cropping systems. The second Amhara Agricultural Forum. 16 January 2018, Bahir Dar.

# Napier grass dry season performance in Mawemairo village, Tanzania



- Harvested twice in 24 weeks under rainfed conditions and three times in 18 weeks with irrigation
- Overall farmers realized three times more yield in 18 weeks

Ref: Lukuyu. Entry points for scaling: Strengthening fodder markets and testing forages under different irrigation technologies in Tanzania. Feed the Future Innovation Lab on Small Scale Irrigation (ILSSI) Stakeholder Consultation – Dar es Salaam - 17<sup>th</sup> May 2018. <https://ilssi.tamu.edu/media/1458/presentation-ilssi-stakeholder-consultation-tanzania-ilri.pdf>.

# Successes: Desho grass (*Pennisetum pedicellatum*)

- Well adapted and widely used in the highlands Ethiopia along with natural resource management practices
- Roots splits and forage biomass traded as a source of cash



# Successes: CoFS-29 a multicut perennial- Adoption by Mulkanoor Women Dairy

- 298 adopters in a year, mainly farmer to farmer dissemination
- Milk yield 5.41kg/d (3.85 in older forage adopters and 3.06 in non adopters)
- Net income >twice that of rice cropping
- Womens labour requirement, feed resourcing and feeding, reduced by more than 30%
- Forage traits do matter! 45 day interval instead of 75, no cuts/bruising when harvesting, higher intake less refusals



# Alternative options – Improved water use efficiency

- Megathyrsus vs. Chloris and Cenchrus



# Lessons learnt on forage adoption

- Forage adoption and use has been slow
- Adoption is improved when:
  - Use of improved feeds linked to market opportunities, with multiple on-farm benefits
  - Good match to production system niche
  - Easy to manage and matches skills of farmers
  - Strong partnerships between farmers and extension
  - Supported by innovation platforms, enabling policies and environment



# Ways forward

- Significant opportunities to improve the feed resource base in smallholder systems
- Adoption of improved forage technologies can be accelerated if the right type of approach and technology is presented
- Integrating improved forages with NRM efforts creates synergies
- Strong public and private investment in the feed sector and enabling policies are needed to meet feed demands
- Breeding solutions: livestock, forages and crops

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