

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

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Tropical pastures workshop
CATIE, Turrialba
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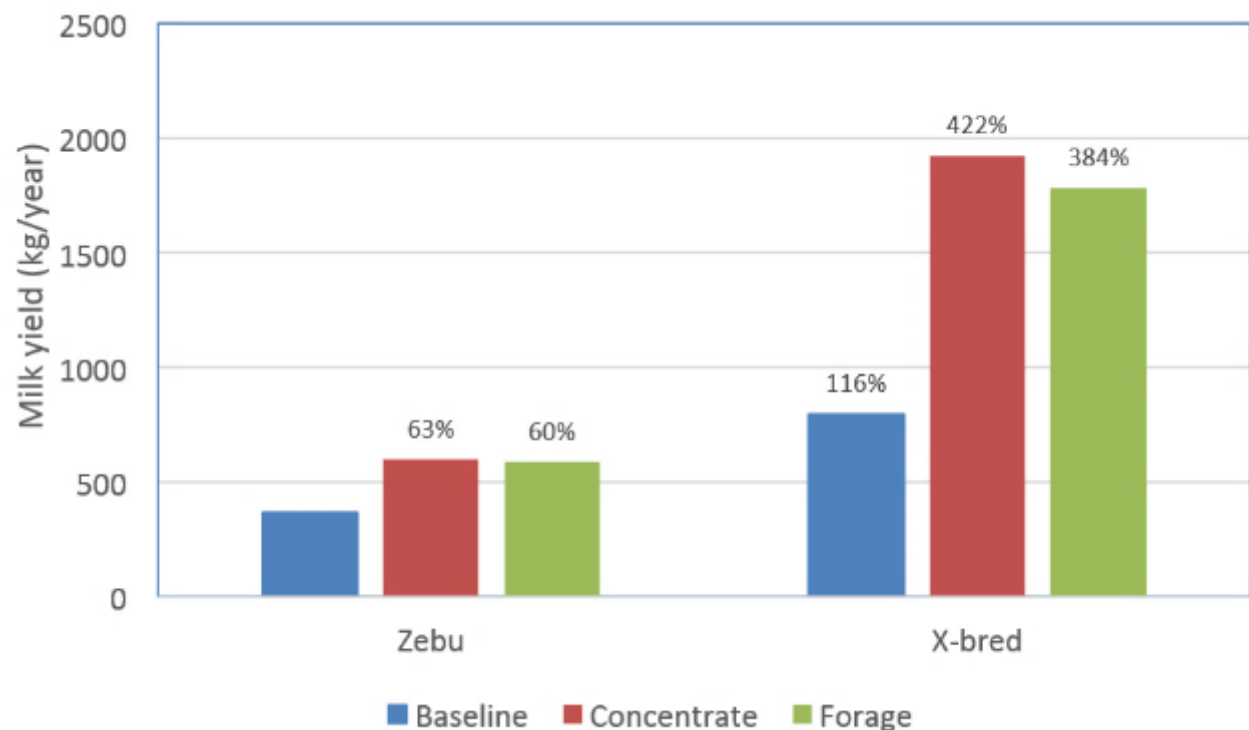


The role of planted forages

- 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

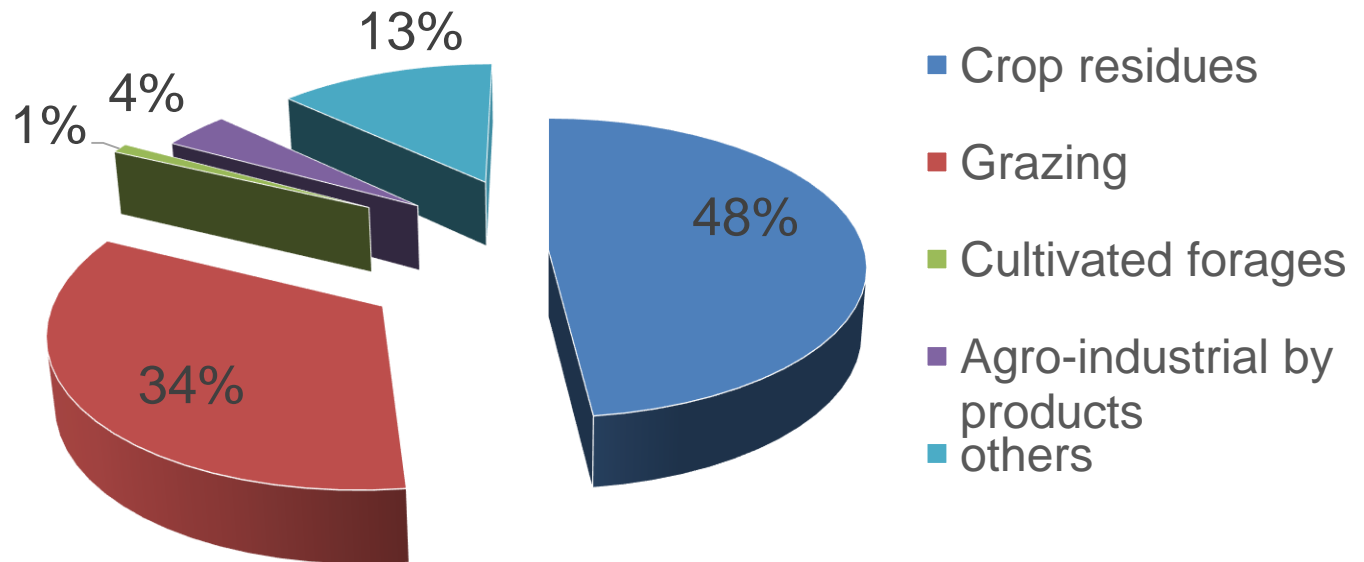
- Widely employed in Latin America
- Less so in the rest of the global tropics
- Some reports of success including:
 - Intensive grass plots in SE Asia (mainly *P. maximum* and *Brachiaria* (CIAT));
 - Fodder banks in West Africa (mainly *Stylosanthes hamata*)
 - In East and Central Africa:
 - Brachiaria/Urochloa 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

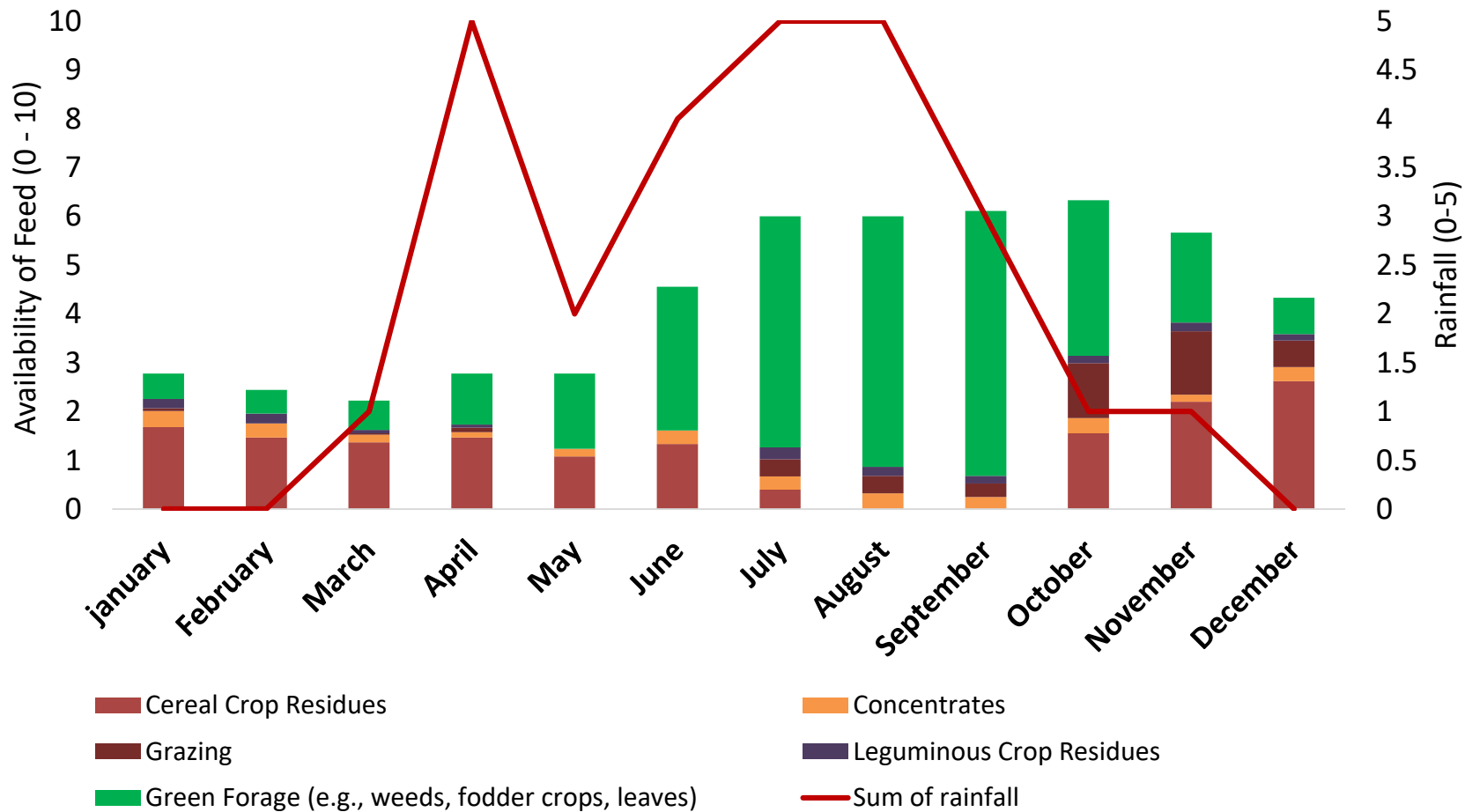
| Feed resource | Contribution to overall feed resources (%) |
|--|--|
| Greens from CRP, forests, grazing | 8.0 |
| Planted forages | 15.1 |
| Crop residues | 70.6 |
| Concentrates | 6.3 |
| Deficit: feed availability versus feed requirement (%) | |
| Dry matter (i.e. quantity) | -6 |
| Digestible crude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

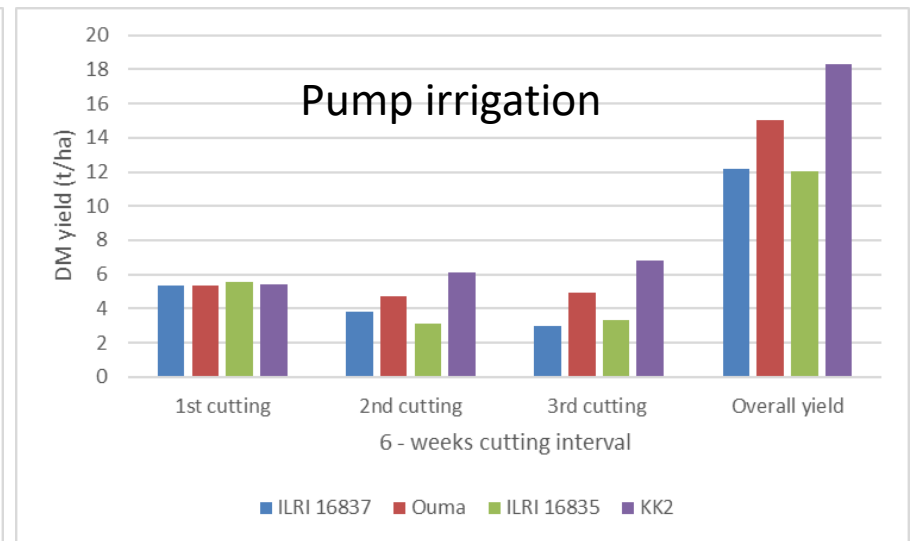
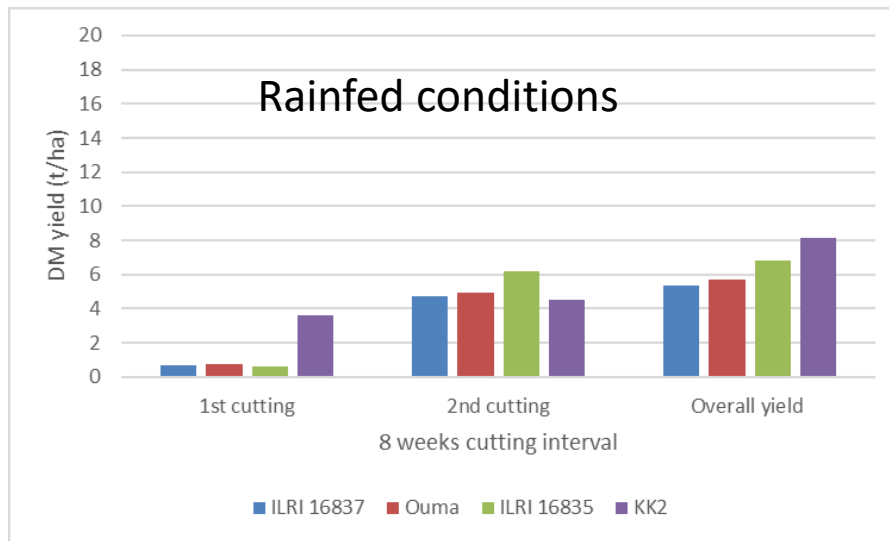
- The major forage species for smallholder dairy in East Africa
 - High yielding lines produce 5 times more biomass than natural pastures in Tanzania¹
 - Yield shown to increase by intercropping with legumes and can be harvested 6 to 9 times per year under irrigation in Ethiopia²
 - Smut and stunt disease resistant lines identified from the in trust collection at ILRI and being adopted by farmers



¹Lukuyu 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.

²Adie 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 - 17th 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

- Megathyrus 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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Patron: Professor Peter C Doherty AC, FAA, FRS

Animal scientist, Nobel Prize Laureate for Physiology or Medicine—1996

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