Better lives through livestock

Processed Rice Straw (PRS)

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INTERNATIONAL LIVESTOCK RESEARCH INSTITUTE

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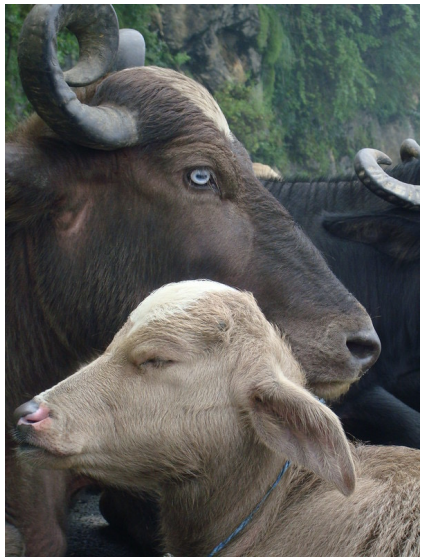
CGIAR | Sustainable Animal Productivity for Livelihoods, Nutrition and Gender Inclusion

SAPLING



SAPLING:
Sustainable Animal Productivity for Livelihoods, Nutrition and Gender inclusion

Co-designing

Problem	Vision	Outputs/Outcomes (2032)
Low economic and non-economic returns (benefits) limit livelihood opportunities of buffalo keepers and other value chain actors	By 2032, sustainable, competitive, inclusive and resilient buffalo value chains drive improved livelihood, enhanced food and nutritional security, and promote equitable growth of men and women	1. Buffalo productivity increase 30-40% 2. Buff milk consumption increase 15% 3. Livelihoods of buffalo hh improve 20%

Feeding regime (Nepal-Terai)

Low breeding season

High breeding season

Months	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Current feeding practice	Straw											Straw
Nutrient status			Acute Nutrient Stress Heat stress									
Possible interventions to reduce the nutrient stress									Seed supply		Multi cut Lucern/Berseem	
										Winter Forage Maize		

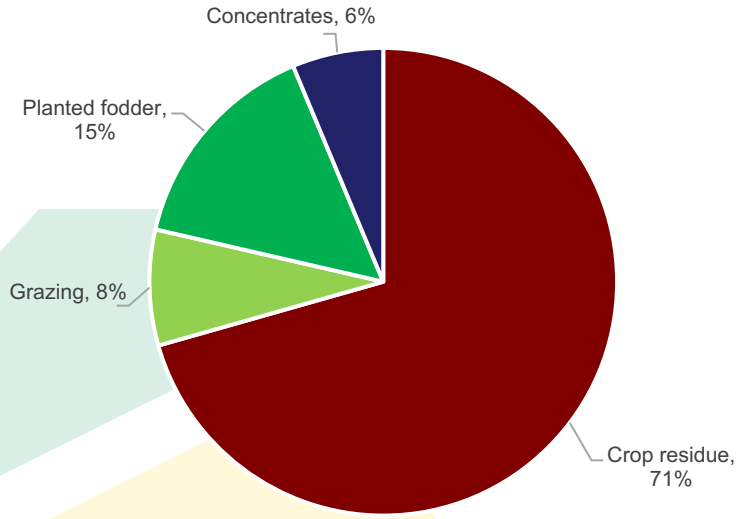
Lucern forage

Maize silage

Upgraded rice straw (PES)

- *Silage (moisture 65%)*
- *Haylage (moisture 50%)*
- *Rhizobium & seed lab (DLS)*
- *CIMMYT-Maize seeds*

Improvement of animal performance-the feed pathway



Therefore, the focus shall be improvement of the diet quality and intake

Israeli cows produce 10,000 LPL

Nepali buffalo:
500 kg⇢ DMI 12 kgDM/day
Avg. ME/kg diet is 8 MJ⇢ 96 MJ - 59MJ (Maint.)=37MJ /6=6 LPD x 300=1800 lit

Nepali buffalo:
400 kg⇢ DMI 13 kgDM/day
If ME/kg diet is 9 MJ⇢ 117 MJ - 59MJ (Maint.) = 58MJ /6 = 9LPD x 300= 2700 lit

Innovations to address nutritional constraints to improve productivity

Why productivity is low?

Nutrient density in the diet is low (7-8 Mj/kg DM)
DMI is below optimum

Why nutrient density is low?

1. Inclusion of roughages having low digestibility is high (70%)
2. Inclusion of forages with higher digestibility is low (15%) due to land, water, labour constraints
3. Availability and affordability of concentartes to supplement is a challenge
4. Supplementation with concentrates is not based on the nutritional gap
5. Knowledge on improved feeding is limited

What innovations can be tested to address the above challenges?

1. Support farmers to utilize the dry roughage to produce a more balanced 60/50:40/50 TMR on-farm (use OFA, chopper, trough) and institute mechanisms (VLP model) to facilitate the process
2. Promotion of nutrient dense forages for on-farm production, wherever possible

On-farm (Short-Term)

3. Off-farm production of forages through fodder coops (Business model)
4. Off-farm production of TMR with buy back arrangement (Business model)
5. Improve fodder quality of popular varieties of the major crops (breeding)
6. Improve digestibility of roughages (pelletisation, oxidation, biofermentation, Nitrate+Sulphur supplementation, all at industry level through buyback arrangement-Business model)

Off-farm (Long-Term)

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About the innovation

As a first step, rice straw is procured /supplied to processing unit after harvest, which is then shredded using a shredding machine

Straw in rice harvested field

Shredding machine

Shredded rice straw

About the innovation

Sustainable Animal Productivity for Livelihoods, Nutrition and Gender Inclusion

The shredded straw is then sprayed with molasses and minerals in a mixer and bagged* for sale

Supplementation with molasses and minerals

Packing

Packed Processed Rice Straw

* Bagged as mash (for local sale) or blocks (for long distance transportation)

Expected impact on quality and productivity

Parameters	Untreated	Treated (expected)
Price (NPR/Kg DM)	8.00*	12.00*
ME (MJ/Kg DM)	6.00	9.0
CP (g/Kg DM)	40	68
Milk productivity (Kg/day)	TBC	TBC

TBC To be checked after performance trial

* At the marketing season (December to May). Procurement price in the harvesting season will be as low as 2.00

WP-1 Genetic, Reproductive, Feed interventions: Trade-off analysis

Scores:
-2=large -ve impact
-1=small -ve impact
0=no change
1=small improvement,
2=large improvement

Innovation Package	Innovation	PR	EC	EN	HC	SO
IP1. Integrated solution to improve productivity through a set of production technologies and enablers		1.53	1.49	1.05	1.28	1.17
TB1: Genetic improvement through selection of superior bulls using ICT and genomic tools along with historic data.	1	1.61	1.39	0.83	1.28	1.11
TB2: Fertility management using different techniques (oestrous detection, pharmaceutical /hormonal intervention for improved conception) and mineral nutrition.	2	1.56	1.56	0.83	1.44	1.33
TB3: Diet improvement through processing & enrichment of rice straw, nutrient balancing, supplementation, nutrient dense forages and silage	3,4,5,6	1.57	1.46	1.15	1.13	1.03
EB4: Coop based village livestock promoters (VLP), Capacity devpt. of value chain actors and value chain supporters	8,10	1.42	1.50	1.10	1.50	1.43
EB5: Competitive & inclusive VC through business models	9	1.50	1.61	1.00	1.22	1.17

PR= Productivity EC=Economic. **EN=Environmental.** HC=Human Condition. SO=Social

Processed Rice Straw: Impact on gender

- Reduced work load (straw handling, feeding)
- Additional income (from improved productivity)
- Improved capacities (women focused training on feeding)

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