Small Ruminant Rearing: Nutritional Input Targeting Profitability

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20th Livestock Census (2019)

GOAT Population (millions)

Major States	2012	2019
Rajasthan	21.7	20.8
West Bengal	11.5	16.3
UP	15.6	14.5
Bihar	12.2	12.8
MP	8.0	11.1
Maharashtra	8.4	10.6
Tamil Nadu	8.1	9.9
Jharkhand	6.6	9.1
Odisha	6.5	6.4
Karnataka	4.8	6.2

SHEEP Population (millions)

Major States	2012	2019
Telengana	12.8	19.1
AP	13.6	17.6
Karnataka	9.6	11.1
Rajasthan	9.1	7.9
Tamil Nadu	4.8	4.5
J&K	3.4	3.2
Maharastra	2.6	2.7

Avg Carcass Wt (kg)

Year	Sheep	Goat
2009-10	12.65	10.24
2010-11	12.75	10.28
2011-12	13.00	10.24
2012-13	12.91	10.18
2013-14	13.36	10.26
2014-15	12.98	10.22
2015-16	13.20	10.20
2016-17	13.16	10.24
2017-18	13.25	10.32
2018-19	13.30	10.28
2019-20	13.20	10.26

West Bengal, Bihar, Maharashtra, Rajasthan & Karnataka account for 61.06% of the country's goat meat production

Telangana, Andhra Pradesh, Karnataka, Tamil Nadu & Rajasthan account for 88.77% of the country's mutton production

The carcass yield of sheep is 13 vs. 17 kg and goat 10 vs. 12 kg compared to international average

Animals that we eat thrive, others not doing quite so well

20th Livestock census (2019)

- India ranks 3rd in sheep and 2nd in goat population.
- Total sheep in the country is 74.26 million, an increase of 14.1% over 19th census
- Sheep in rural area (72.23) increased by 13.25% vs Urban area (2.03) 57.28%
- Total goat population also increased by 10.1% to 148.88 million.
- Goat in rural area (142.44) increased by 10.35% vs Urban area (6.44) 5.78%

Top five goat and sheep meat-producing states in India

Sheep			Goat		
State	Meat Prod. (million kg)	% Contribution	State	Meat Prod. (million kg)	% Contribution
Telangana	329.30	34.30	West Bengal	361.76	28.57
AP	266.32	27.74	Bihar	124.33	9.82
Karnataka	136.25	14.19	Maharastra	114.93	9.08
Tamil Nadu	68.08	7.09	Rajasthan	88.23	6.97
Rajasthan	52.31	5.45	Karnataka	83.84	6.62
Total of 5 States	852.26	88.77	Total of 5 States	773.09	61.06
All India	960.10	100.00	All India	1266.06	100.00

- ~65% of sheep in southern states (Mutton type; hairy wool),
- 20% in Rajasthan, Gujarat and UP (Carpet type wool & mutton)
- 6% in J&K, HP (fine wool & mutton)

Changes in grazing resources in India (m ha)

Directorate of Economics & Statistics-2022

Resources	2000-01	2010-11	2020-21
Forests	69.72	71.59	71.98
Permanent pastures and grazing lands	10.52	10.3	10.33
Cultivable waste lands	13.52	12.65	11.91
Current Fallow land	14.78	14.28	13.26
Fallow land other than current fallows	10.27	10.32	10.92
Barren uncultivable waste lands	17.41	17.18	16.68
Total Cropped area	185.34	195.55	216.11
Fodder crops	8.70	7.53	7.57

Agricultural systems involving

Sheep & Goat rearing

Based on input + management

- Extensive
- Semi-intensive
- Intensive

Based on management + feed resources

- Sedentary
- Transhumance
- Nomadic

FACTORS AND TOOLS FOR PRODUCTIVITY IMPROVEMENT

FACTORS

- Production rate
- Reproduction rates
- Weaning weights
- Adult weights
- Survival rates
- Dressing %

TOOLS

- ✓ Feeding
- ✓ Breeding
- ✓ Health Care
- ✓ Management

SMALL RUMINANT PRODUCTION SYSTEM

Extensive production system

Most dominant system of production where the small ruminants are reared on community rangeland or common property resources (CPR) during the monsoon and later on stubble grazing on cropped land or forest land

Migratory or transhumance system

Mixed extensive system

Semi-extensive /Semi-intensive system

Animals grazed in CPR or cultivable/fallow land during day-time and supplemented with additional available resources (e.g. concentrates, stored feeds, supplements)

Intensive system

Mixed crop-livestock system

Adequate grazing on cultivated pasture plus stall feeding as per requirement
Or complete stall feeding with both forages and concentrates

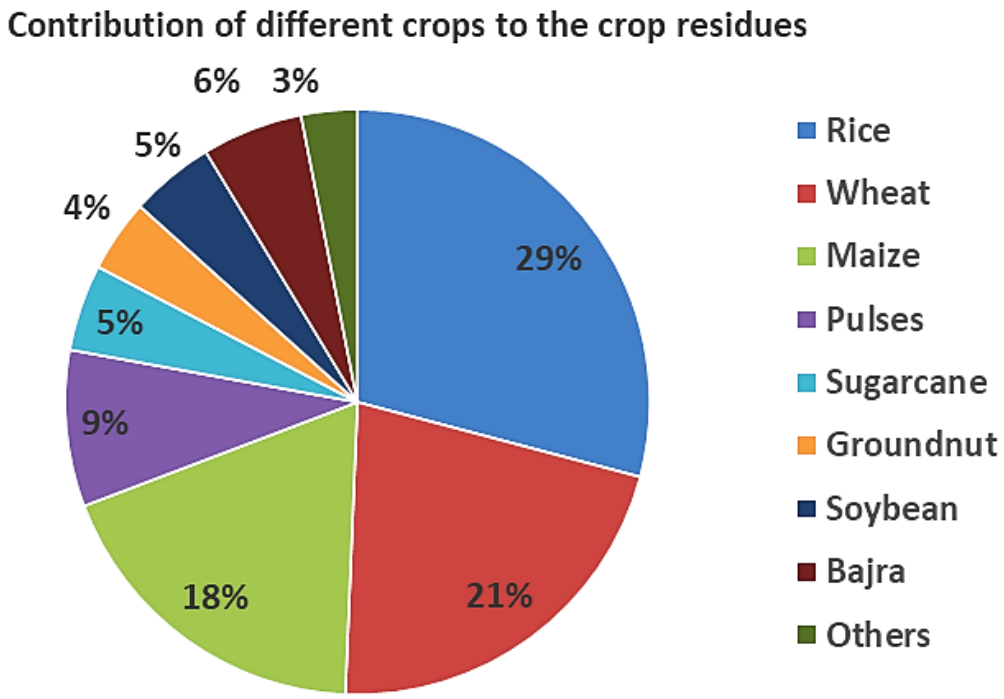
Distribution of sheep and goats under different production systems

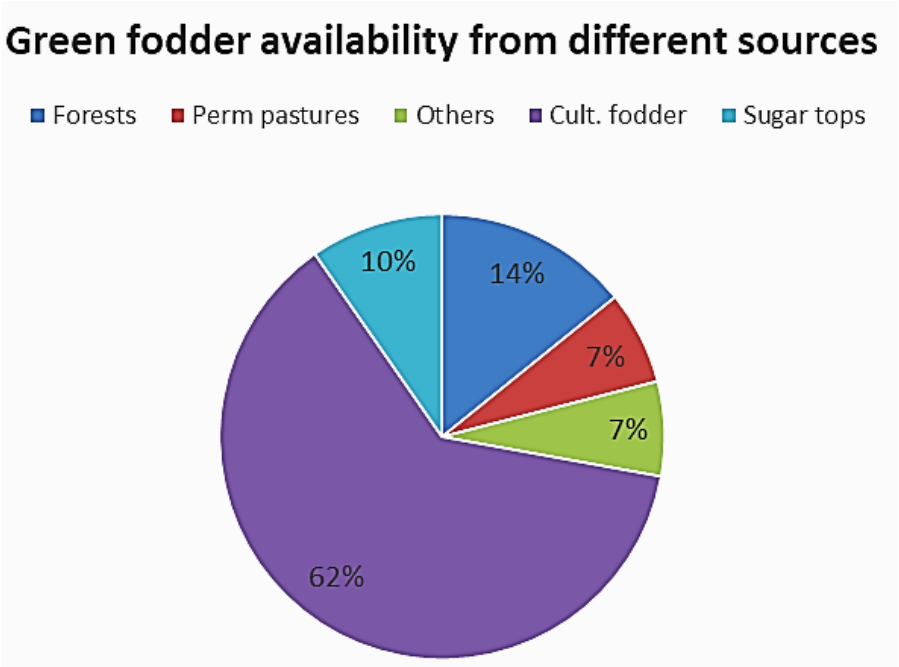
	Extensive (%)	Mixed-extensive (%)	Mixed crop livestock (%)	Intensive (%)
Sheep	75	11	9	5
Goats	75	13	8	4

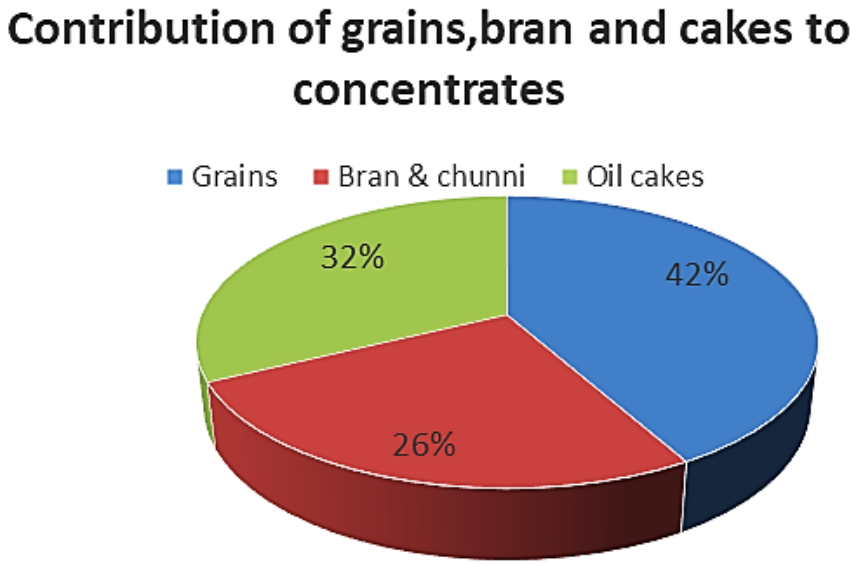
Estimated demand of feed for sheep & goats under different production systems

Attributes	Sheep				Goats			Total
	Exotic/Graded		Local					
	<1 yr	>1yr	< 1yr	>1yr	<1 yr	>1yr milk	> 1 yr others	
Population (no.)								
Total	1445040	2643093	24684700	45487782	57669773	41828845	49386168	
Extensive	1083780	1982320	18513525	34115837	43252330	31371634	37039626	
Semi extensive	303458	555050	5183787	9552434	11533955	8365769	9877234	
Intensive	57802	105724	987388	1819511	2883489	2091442	2469308	
DMI (tons/annum)								
Extensive	118674	470305	1689359	6693101	4341453	8015452	8449665	29778009
Semi extensive	39874	158023	1220393	1150591	3157420	2564945	2703893	10995138
Intensive	8861	35116	138753	581106	1013006	748109	788635	3313586
Total	**167409**	**663444**	**3048505**	**8424798**	**8511879**	**11328506**	**11942193**	**44086733**
Concentrate (tons/annum)								
Extensive (0%)	0	0	0	0	0	0	0	0
Semi extensive (10%)	3987	15802	122039	115059	315742	256494	270389	1099514
Intensive (30%)	2658	10535	41626	174332	303902	224433	236591	994076
Total	**26337**	**163665**	**289391**	**619644**	**480927**	**506980**	**26337**	**2093590**
Roughage (tons/annum)								
Extensive (100%)	118674	470305	1689359	6693101	4341453	8015452	8449665	29778009
Semi extensive (90%)	35887	142220	1098354	1035532	2841678	2308450	2433503	9895625
Intensive (70%)	6203	24581	97127	406774	709104	523676	552045	2319510

Status and utilization of feed resources





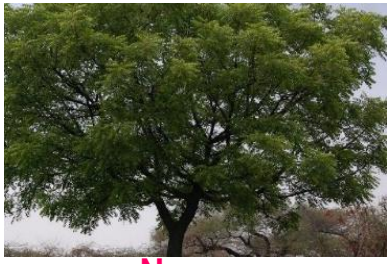


Cumin

Dil

Khejri

Pala



Neem

Promising unconventional/alternate feed resources

- ✓ Spices straws (Coriander and Dill @ 20%, Ajwain @ 10%, fennel @ 15% and fenugreek and cumin @ 5% level holds promise to be part of ruminant ration with potential to modulate rumen fermentation)
- ✓ Tree leaves

Coriander

Senjana

Ajwain

Fennel

Fenugreek

Jatropha

Steps to ensure year-round nutritional security

Expanding feed resource base

- Exploration of alternate feed resources
- Use of locally available feeds and fodder
- Physical and chemical treatment to enhance usability

Ration balancing & strategic feeding

- Economization with appropriate mix and strategic feeding
- Optimization to increase nutrient-use efficiency
- Total mixed ration (TMR) to reduce feed wastage
- Strategic mineral supplementation for sustaining early growth
- Micro-nutrient supplementation to correct reproductive anomalies
- Strategic feeding to minimize loss of productive life-span

Bypass protein & bypass fat for higher growth

- Feeding of NPN and bypass protein
- Feeding of rumen protected fat or full-fat oil seeds

Feed processing & banking

- Participatory surplus forage harvesting during monsoon and available seasons
- Chaffing: A simple intervention to save 40% forage scarcity
- Total mixed ration (TMR): Optimizing nutrient input- CFB, pellet
- Application of complete feed technology
- Silage and hay making

FEED BANKING : A CONCEPTUAL MODEL

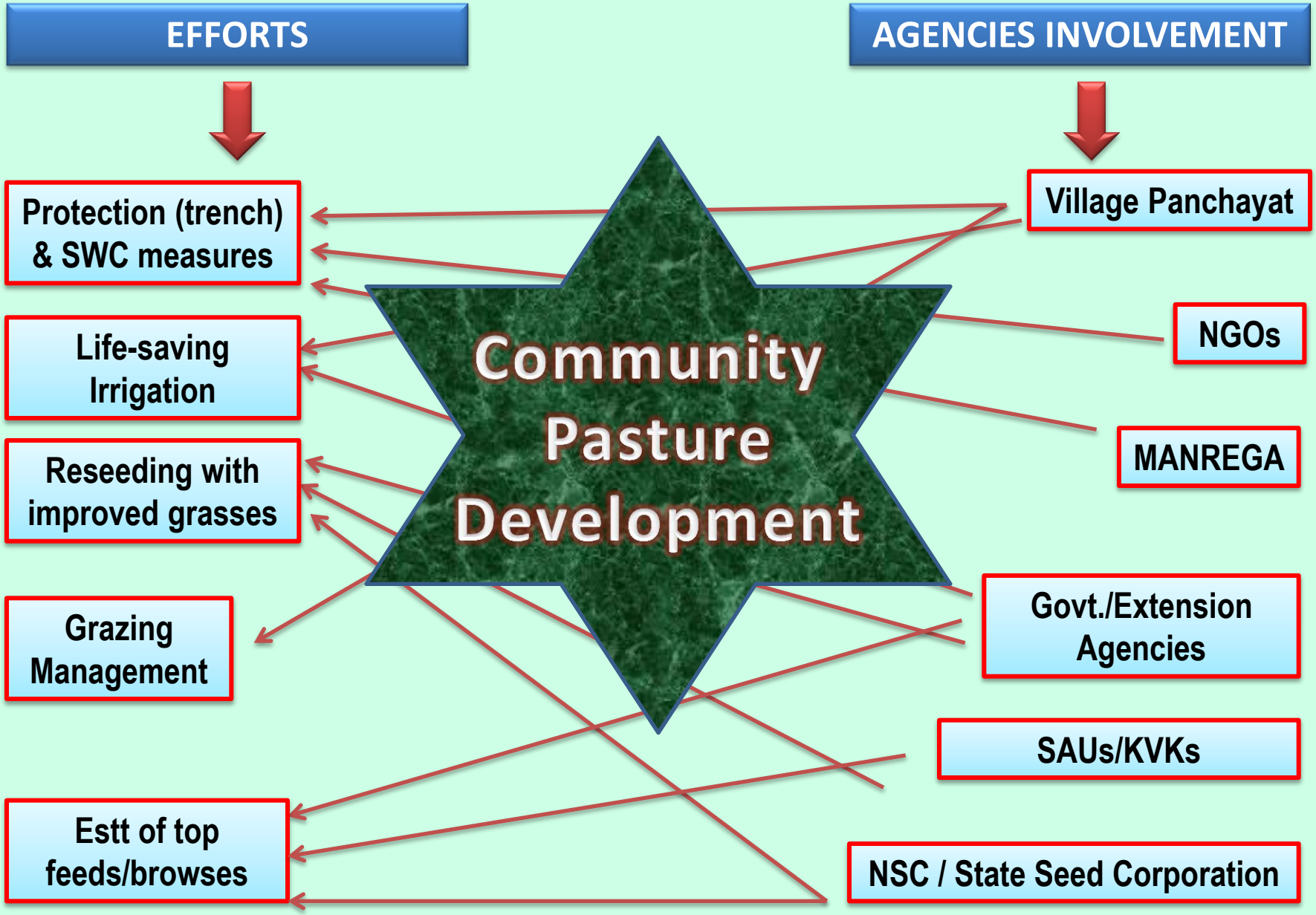
Think for the future!

Farmers to bring his available feed resources to feed bank
e.g. forages only or forage, grain, grain byproducts, oil seeds/cakes, and other agricultural produce for animal use

FEED BANK

Processing Unit	Feed Store	Office
Grinder, Feed mixer, Pulverizer Block making machine, Pelleting unit	Collection unit, Distribution unit	Record keeping, Transaction/Cash counter

Distribution of TMR or CFB to Farmers on feed/forage value or production cost basis


EFFORTS
AGENCIES INVOLVEMENT
Protection (trench) & SWC measures
Life-saving Irrigation
Reseeding with improved grasses
Grazing Management
Estt of top feeds/browses
Community Pasture Development
Village Panchayat
NGOs
MANREGA
Govt./Extension Agencies
SAUs/KVKs
NSC / State Seed Corporation

Small Ruminant Production & Output

Items	World		India		% of world population	
	Sheep	Goat	Sheep	Goat	Sheep	Goat
Population (in millions)	1285	1111	74.3	148.7	5.78	13.38
Producing animals/slaughtered (in millions)	617.3	500.9	23.03	54.78	3.73	10.94
Meat (Thousand tonnes)	9960	6398	276	548	2.77	8.56
Edible offal (Thousand tonnes)	1769	1268	34.8	82.7	1.97	6.52
Unrendered fat (Thousand tonnes)	550.9	258.1	117.7	21.9	**21.4**	8.49
Raw hides and skins (Thousand tonnes)	1917	1275	42.0	99.6	2.19	7.81
Milk animals (in millions)	259.2	220.0	9.37	32.75	3.61	**14.90**
Milk yield (Thousand tonnes)	10504	20725	224	6070	2.13	**29.29**
Wool (thousand tonnes)	1763	-	40.0	-	2.27	-

Biomass yield, carrying capacity and production performance of sheep on different types of pastures

Pastures	Biomass Yield (q DM/ha)	Carrying capacity (sheep/ha)	Growth rate (g/day)	Carcass yield (%)	Annual fleece yield (g /head)
Degraded range land	4.0-4.5	1	35-45	35-37	800-900
Protected rangeland	8.0-10.0	2	50-60	40	950-1050
Cenchrus/Sewan pastures	16-20	4	70-80	42.5	1200-1300
Grass-legume pastures	22-25	6	90-100	45	1500
2-Tier silvipastures	22-25	6	90-100	45	1500
3-Tier silvipastures	30-35	7-8	100-120	47.5	1500-1600
Cenchrus/Sewan pasture + Concentrate Suppl.	Grazing		66	40	620
	25%of adlib		90	43	800
	50%of adlib		100	48	900
	75%of adlib		110	49	1200
	Ad lib		125	51	1250

SCOPE

MORE (SHEEP/GOATS) PER LESS

A practical and possible approach to meet food (Animal protein) and fiber demand and sheep production for the future.

An example of mathematical calculation showing enhanced sheep production

Approach 1

Harnessing 3 crops in 2 year ⇒ 1.5 times production

Approach 2

Shifting to a prolific flock (50 % twinning and 50% singlet ⇒ 70%×2+30%×1=1.7) ⇒ 1.7 times production

Approach 3

Maximizing pre and post-weaning weight gain to prepare finishing lamb (6 mo age) for marketing (from 15-18 kg live weight in conventional rearing to 30-36 kg in stall feeding protocol) ⇒ 2.0 times

Final calculation

Expected output 1.5×1.7×2.0= 5.1 times the present production

- How efficient are the animal?
- How do we know if our animals are efficient?
- Have we achieved increased yield of produce at the expense of efficiency?
- Is it feed efficiency or the animal itself that determines output?
- How to select the most efficient and profitable animal(s) from a divergent population?

Module 1

Intensive feeding for broiler lamb/kid production and marketing

(All-in-all-out System)

- Feeding of liquid milk formula (LMF)
- Adoption to solid feed (Creep mixture)
- Spare of ewe milk by allowing suckling after evening milking and replenishment *vide* LMF
- Weaning at 10 wk + LMF (up to 3 m)
- Shift to finishing diet
- Marketing at 4.5-5 months (depending on breed & body size and consumer preference
- Sale of meat and spared milk
- Strategic marketing for quality meat
- Preparation & sale of meat products for more profit (e.g. Nuggets)
- Preparation & sale of milk products from spared milk (e.g. Cheese)

Pre-weaning growth manipulation

Post-weaning growth manipulation

Dynamic Lamb Production System for commercial farmers/entrepreneurs

- Less pressure on land and livestock population
- Market driven
- Maximum profit (Input: Output ratio- 1 : 2.5)


मेमनाप्राश
जीवन सुरक्षा, वृद्धि और तंदुरुस्ती का आधार
भा.कृ.अ.प.-केंद्रीय भेड़ एवं ऊन अनुसंधान संस्थान

Nutritional interventions aimed at maximizing mutton production

Attributes	Control	Nutritional intervention
15-90d (up to 3m)		
Live weight	13.2-17.2	17.5-19.8
ADG	89-155	154-185
FCR	2.48-4.60	2.44-3.73
91-180d(3-6m)		
Live weight	**25.6-30.3**	**30.4-35.1**
ADG	88-135	152-186
FCR	5.61-6.43	4.94-5.17
Up to 6m		
ADG	102-140	147-176
FCR	3.86-5.60	3.67-4.95

Module 2

Semi-intensive feeding for lamb production and marketing

Limited grazing + Stall feeding

Pre-weaning management same as Module 1

Post-weaning

Morning grazing for 2-4 h + Stall feeding of finisher ration

Marketing after 5 m

Strategic marketing for quality meat rich in CLA/W_3 FA

This is also a commercial farming module but involves more land for grazing and browsing

- Strategic marketing may fetch more price than module 1.

Module 3

Semi-intensive feeding for lamb production and marketing

Grazing with ewe + Stall feeding

Pre-weaning

Suckling + creep mixture up to 3 m

Post-weaning

Day grazing (8-10 h) + Evening stall feeding of finisher ration

Marketing after 5-6 m

Strategic marketing for quality meat rich in CLA/W_3 FA

Progressive/resource-rich farmers with enough land or community grazing on CPR

Organic meat production, strategic marketing may fetch more price

Evolving a module simulating commercial sheep production involving two and three tier agro forestry production system.

- Fodder maximization and quality improvement adopting environment friendly agronomic practices and its effect on nutrient utilization in sheep.
- Exploring newer feed resources for sheep feeding and evolving farmers' friendly conservation techniques

In this line, we can assess a module for semi-intensive/intensive/commercial sheep production with following assumptions:

- Say, a farmer has 5 ha area of land
- Possible number of sheep that can be reared on complete grazing (say 10 hours/d) based feeding system in multi-tier agroforestry system = 8 no/ha
- So, total number of sheep that can be reared: 8 no × 5 ha = 40
- If we restrict grazing to 2-4 h + supplementary feeding (semi-intensive)
- 5 ha area with 2h grazing can accommodate 40 × 4 = 160 sheep (multiple 4 in place of 5 to accommodate grazing intensity during first 2 h)
- 5 ha area with 4h grazing can accommodate 40 × 2.25 = 90 sheep (similar consideration of grazing pressure)
- Now, composition of **160 sheep: 90 lambs + 60 ewes + 10 rams**
- Lambs (0-3 m) are usually not dependent on grazing

a) So, rest 70 adult on 4 h grazing for 365 days: 70no × 4h × 365d = 102200 h grazing

b) + 90 lambs (during 3 to 5/6 mo) for 2-3 mo grazing for 2 h = 90no × 2h × 60 or 90d = 10800 or 16200 h grazing

c) **a** + b = 113000h or 118400h grazing

Now, **available grazing hours for 160 sheep × 2h × 365 = 116800h**

Balance grazing hours in this module of commercial sheep rearing: 116800 – 113000 = 3800 h, which can further accommodate

i) one extra month of rearing, i.e. up to 6 mo of age for finisher lamb/lamb for marketing or

ii) 3800 ÷ (2h × 60d) 32 extra lambs in the 5 mo finishing plan

Thus, comfortably a flock of 160 sheep including 90 finisher lamb can be reared on limited hour grazing + supplementary feeding schedule in an area of 5 ha land.

Further, grazing with supplementation based feeding system will have following advantages:

- Economic: lamb rearing for mutton production
- Quality mutton: designer meat with fatty acids
- Possibility of manipulating mutton quality with agronomic practices
- Possibility of producing Organic meat & meat products with better keeping quality
- Production of breeding ram/ewes & augmenting whole farm productivity

Module 4

Extensive feeding for lamb/kid production and marketing

Low-input-low output production system

Grazing with ewe/do + limited supplementation on farm /kitchen surplus

Pre-weaning

Suckling + grain flour + Gram chuni/oil meal up to 3 m

Post-weaning

Day grazing (8-10 h) + Evening limited supplementation

Marketing as per suitability

Sale of live animals for slaughter

Strategic marketing for quality meat

Resource-poor rural farmers with enough land or community grazing on CPR

- Involves family labour & thus minimal input cost
- Organic meat production,
- Strategic marketing may fetch more price

Others

- ❖ Rearing for lamb/kid production
- ❖ Rearing for Ram/buck production
- ❖ Whole-Farm concept
- ❖ Dairy-Sheep/goat concept

Share of nutritional factors in modulating livestock production system can be partitioned as

1. Quality feed	~20%
2. Feed quality improvement	5-10%
3. Feed optimization	~10%
4. Feed processing	10-15%
5. Ensuring year-round nutrition	10-20%
6. Feed plan	10-20%
7. Catalytic supplements	up to 10%
8. Additives & modulators	5-10%
9. Other factors influencing efficiency of nutrient utilization	10-15%

Approaches

- **Adequate nutrition through gestation and lactation**
- **Identification and selection of efficient animals**
- **Harnessing maximum weaning weight**

Sheep- Muzafarnagari, Patanwadi, Malpura, Marwari, Nellore, Decani, Madras red, Mecheri

Goat- Jamunapari, Jakhrana, Sirohi, Beetal, Boer, Osmanabadi, Malabari, Mehsana

Augmenting meat production

Birth weight	say x
Weaning wt	5x
Finishing wt	10x
Breedable age & wt	1 yr & 8x

Commercial farming

'Maximizing Flock'

Heavy breeds of sheep & goats that promises maximum weaning weight

Sheep:

Muzafarnagari, Patanwadi, Malpura, Marwari, Nellore, Decani, Madras red, Mecheri

Goat:

Jamunapari, Jakhrana, Sirohi, Beetal, Boer, Osmanabadi, Malabari, Mehsana

'Multiplier Flock'

Breeds of sheep & goats that promises maximum twinning/ triplets/quadruplets

Sheep:

Garole, Kendrapara, Strain developed by CSWRI, Avikanagar- Avishaan, NARI Suwarna

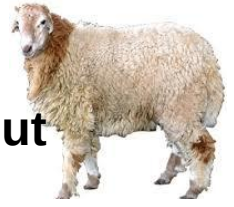
Goat:

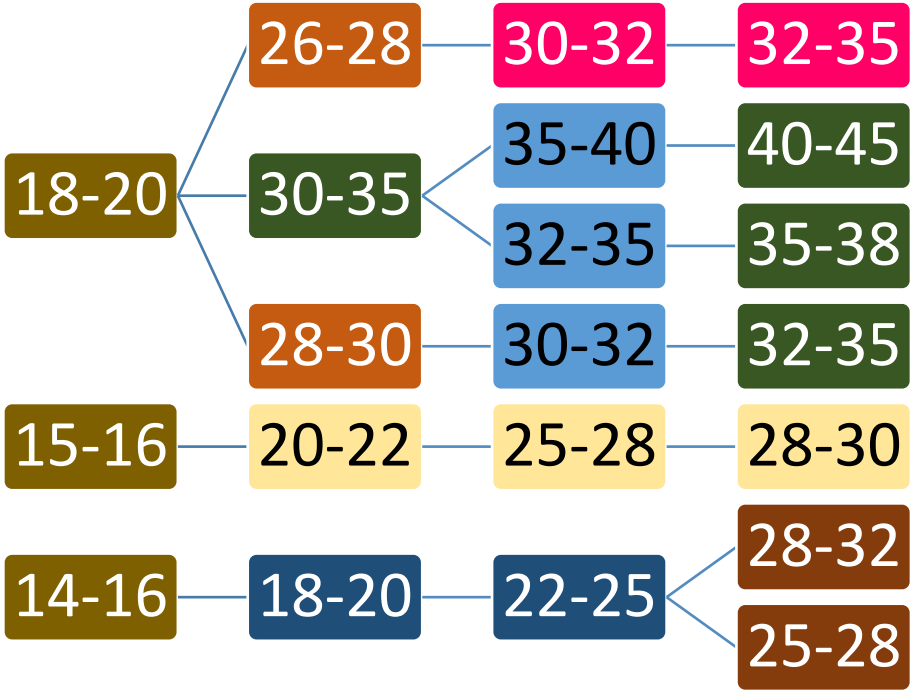
Black Bengal, Barbari, Osmanabadi, Kanni addu, Zalawadi, Pantja

- Adequate nutrition through gestation and lactation
- Identification and selection of efficient animals
- Harnessing maximum weaning weight

Various nutritional strategies for target weight at breeding/ma

W at Birth	W at weaning	W at 6 m	W at 9m	W at 1yr	Mature W
3.0	12-14	16-18	20-22	25-28	30-35
2.5	10-12	13-15	15-18	18-22	28-32





Breeding

High input

Moderate input

Marketing at 1yr

Low input

Marketing at 1 yr

Breeding

Goat kids are more suitable for quality and quantity meat production slaughtered at 9 m of age under intensive system and 12 m of age under semi-intensive system

Nutritional intervention to maximize quality production

1. Foraging
2. Feeding of lipids
3. Plant secondary metabolites
4. Additives (antioxidants etc)
5. Pre and probiotics feeding
6. Restructuring of culled animals for quality meat production

It is emphasized to focus on

1) **feeding of pre-weaning stock;**
2) **feeding of post-weaning stock;**
3) **developing feeder kids or lambs;**
4) **market-driven feeder lamb/kid production;**
5) **feeding of male and female lambs/kids for early sexual maturity with desired weight;**
6) **feeding of breeding stock;**
7) **feeding during gestation and lactation**
8) **economizing the feeding protocol.**

Nutrigenomics

- **Selection for animals that respond to specific nutrients in a desired fashion**
- **Ability of a large size animal to fully express its genetic potential for yield was more severely impacted by limiting feed availability than for a smaller size animal**
- A faster-growing animal is usually of larger mature size, which increases its maintenance requirements
- Animals with increased digestive efficiency, or lower maintenance costs at similar BW, are therefore selected for higher profitability
- A higher weaning weight often correlated with improved reproductive efficiency, milk production traits, birth weight, and thus overall production efficiency
- **COMMERCIAL FEEDING** protocol helps achieving higher weaning weight in lambs (20 kg) & kids (16 kg)

Precision Nutrition: Role of RESIDUAL FEED INTAKE (RFI)

- For residual feed intake to reflect true biological efficiency in growing animals, it is important that feed intake and liveweight are accurately measured.
- Accounting for growth and body composition would significantly help in revealing between-animal variation in feed utilization.
- Random regression models to indicate variation in FE over growth trajectory
- Improvements in the efficiency of use of MEm either through selection, nutritional considerations and/or through management strategies should result in an increase in total livestock production for a given amount of feed
- **Limit Feeding:** Restricting DMI without compromising ADG & thereby improving feed: gain ratio has been defined as limit-feed, also known as **programmed or prescriptive feeding**

Increased FE by limit feeding is postulated to be effected through

i) more efficient utilization of nutrients and/or

ii) increased supply/digestibility of nutrients

- Rationale of improved digestibility: a 4% decrease in OMD for each unit increase in intake above maintenance,
- Increase in ME content of diet

- Reduction in MEm possibly due to decreases in weight & activity of the GI organs & the liver associated with reduced feed intake,
- Reductions in HI is associated with digestion, passage, protein/fat accretion in the body tissues,

  i.e. perceived increase in lean tissue accretion relative to fat gain

AI in small ruminant farming

Artificial Intelligence (AI)

- Better decision-making
- remotely monitoring livestock health
- Keeping track of animal vital signs & behaviour
- AI-based diagnostics for efficient parasite detection and control

Practices

sky-shepherding
virtual fencing
advanced parasite detection
automated counting and behaviour tracking
anomaly detection
precision nutrition
breeding support
Mobile-Aap-based management applications

- *Application of AI in meat production system will help meat-based companies to increase their revenue by speeding up the production process, reducing maintenance time /production downtime, decreasing the chances of failure by automating almost every process*
- *Delivering an excellent customer experience by predicting their likes, dislikes, and desires*
- *Production of clean, hygienic & wholesome meat for consumers, and also for export market - increase the revenue in entrepreneurship.*

The concept of RFI-based selection, real-time intervention in health management, strategic feeding and nutritional manipulation to immune the animals against production decline, intelligent body scoring system can be implemented in profitable small ruminant production.

Intensive feeding/Commercial farming

Farmers need to follow some guidelines to harness maximum profit from the intensive feeding protocol & to develop it as a commercial venture.

- Feeding of milk replacers
- Adoption to solid feed (Creep mixture)
- Spare of ewe milk by allowing suckling after evening milking and replenishment *vide* milk replacer
- Weaning at 10 wk + LMF (up to 3 m)
- Shift to finishing diet
- Marketing at finishing weight with economic FCR
- Marketing of stock at different age groups depending on breed & costumer preference
- Sale of meat and spared milk
- Strategic marketing for quality meat
- Preparation & sale of meat products for more profit (e.g. Nuggets)

There are numerous achievable possibilities which can attract the educated and unemployed youth for small to large entrepreneurship:

- Maintaining a dynamic population without direct load on land and livestock population pressure
- All in-all out system and sustained supply of meat vis-à-vis demand
- Strategic rearing targeting demand in religious and cultural function
- Quality meat and milk production addressing human health
- Designer and functional animal produce, meat as well as milk & their products
- Cafeteria feeding practice targeting more meat per sheep/goat
- Stall feeding targeting 'Farm to Fork'

Farmer/entrepreneur can focus on following 3 principal objectives:

- Targeting optimization of input, i.e. improvement in FCR

(achieving FCR 1:4 to 1:5 with economic input: output ratio of 1:2.8-3.2)

- Maintaining a **Dynamic Finished Population** for sustained market supply
- Expanding marketing avenues and enhancing profitability and revenue through **Demand-driven Pricing** of the produce and products.

Commercial Small Ruminant Farming: Model Housing

Channels for marketing of Goat

Channel - 1	Goat farmer 50.00%	Butcher 48.69%	Consumer Rs 400-450/kg		
Channel - 2	Goat farmer 46.73%	Trader 18.69%	Butcher 34.58%	Consumer Rs 400-450/kg	
Channel - 3	Goat farmer 40.18%	Commission agent 13.39%	Trader 24.11%	Butcher 22.32%	Consumer Rs 400-450 / kg
Channel - 4	Goat farmer 46.73%	Neighbouring farmer 8.33%	Butcher 34.23%	Consumer Rs 400-450/kg	
Channel - 5	Goat farmer 85.00%	Goat Producers Com 15.00%	Consumer Rs 390-430/kg		

Sheep/Goat Producer Company/Cooperative Society/ Producer Association Model

Commercial small ruminant rearing: a reality

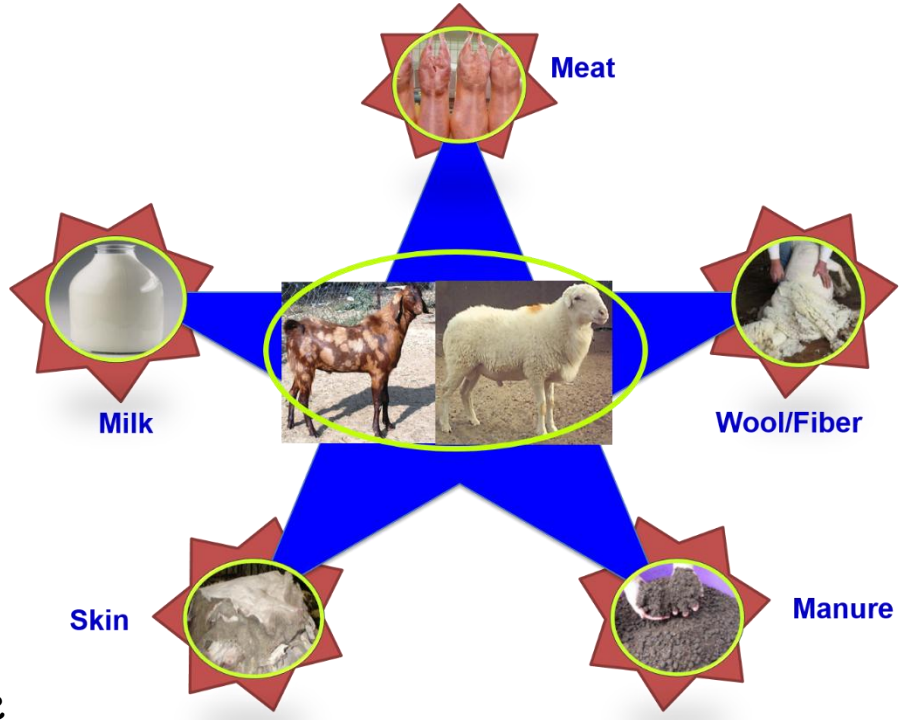
To bridge the gap in demand and supply, there is need for augmenting the quantity and quality of meat production through scientific methods of organized livestock production by utilizing various locally available feed resources and by improving meat animal germplasm.

Major goals for the meat industry to grow in India at par with many developed countries would be

- Switching to high-input high-output intensive feeding system from traditional low-input system
- Sustaining livestock population pressure by maintain a dynamic population through adoption of 'All-in and All-out' system focussing on country's animal protein demand

There are four options in stall feeding protocol to rear either under

1) semi-intensive,
2) intensive,
3) complete stall feeding or
4) strategic feeding with an eye on whole farm productivity or market-demand



Sheep & Goat- A '5-Star' animal

CONCLUSION

Inflow of commerce in to SMALL RUMINANT industry will open up establishment of small to large scale sheep/goat units at village or panchayat level thereby creating job opportunity to rural youth.

There is scope of collateral expansion through

- Harnessing quality & consumer trait-specific meat and value addition with technological manipulation for manufacturing ready-to-eat meat products
- Improving the current status of meat production, handling and marketing.
- Providing research & development and marketing support to the export meat trade.

Whole farm nutritional model aimed at

i) reducing age at puberty/sexual maturity/conception,
ii) increasing rate of conception,
iii) increasing litter size,
iv) reducing number of empty days,
v) increasing productive year and per animal reproductive efficiency.

will certainly help in attaining '**MORE SHEEP PER SHEEP**' or '**MORE GOATS PER GOAT**' thereby increasing **input: output ratio** and profitability


Thanks