

Opportunities for Cottonseed by-products in Dairy Feed

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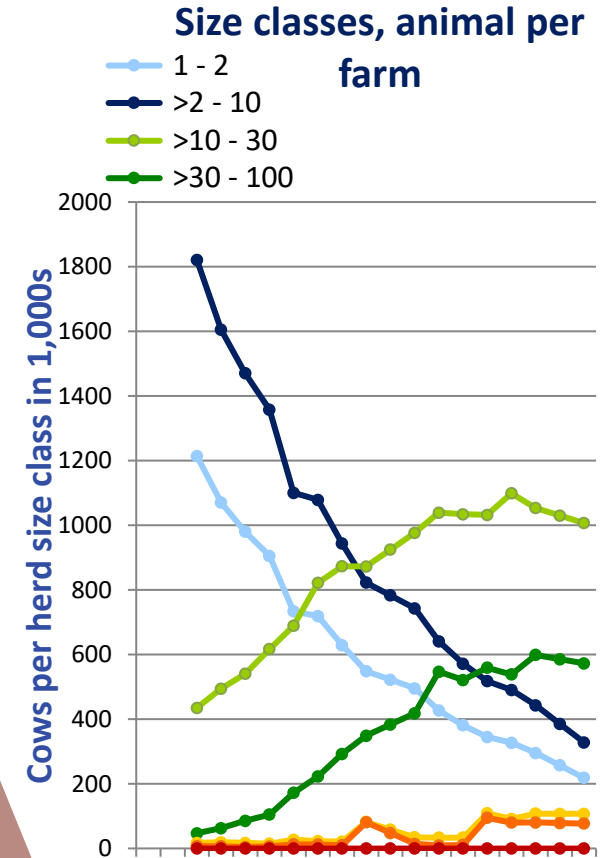
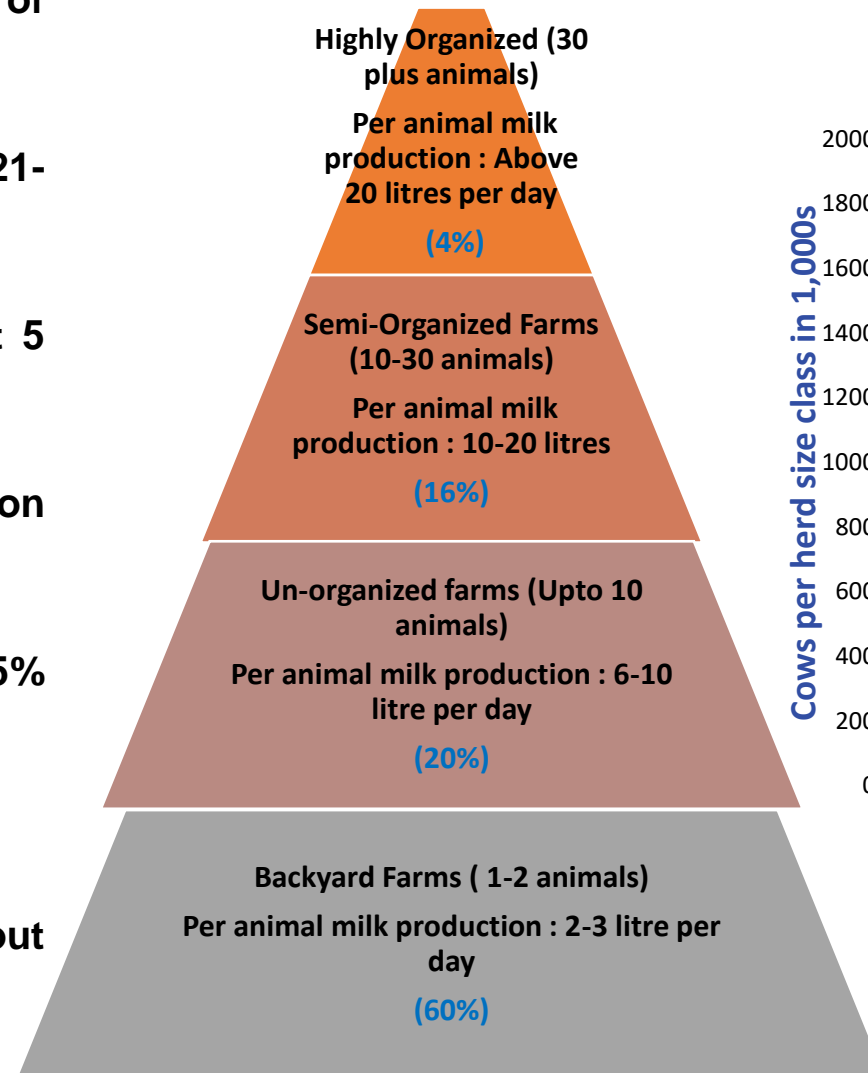
SEA-AICOSCA Conclave, 8 July

Agenda

- **Dairy Industry, Farm structure, & Transformation**
- **Dairy Compound Feed & protein sources**
- **Cottonseed & byproducts in dairy diets**
- **Regulatory changes in compound feed (impact on ingredient processing value chain)**
- **Summary**

Dairy Industry & Dairy Farm structure

- India has the largest bovine population: 300+ Mn of which 130 Mn are milking cows
- India is the highest milk producer – 221 Mn tons in 2021-2022 – 24% of global milk production
- Milk production is growing over 6% CAGR over last 5 years
- Growth is driven by increasing per capita consumption and increased demand for value added dairy products
- Dairy is single largest agri commodity contributing to 5% of national economy
- 80+ Million people employed, \$300+ billion
- Opportunities in infrastructure developments throughout the value chain



2-10 cow farms are decreasing; 10-30 cow farms are increasing... Market is changing fast

Transformation in Dairy farming

- Changes in dairy farming in last 10 years:
 - Breed (sex sorted imported semen)
 - Infrastructure / mechanization
 - Forage/ silage – next big thing
 - Improved feeding (TMR) & Management practices
 - Digital tools on farms – upcoming revolution
- Increase in productivity – lactation yields of 8000+ liters
- Punjab is leading the way & very soon most of other states will be at Punjab levels
- Still long way to go & opportunity for all the value chain stakeholders



Compound Feed Industry – opportunities for oilseed byproducts

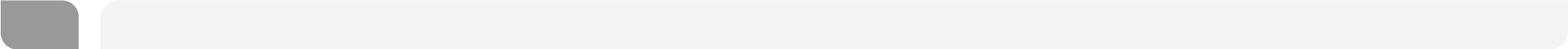
- Compound Dairy feed production in India estimated at 14 million tons, growing @ ~7%
- Includes private (8Mn tons) & cooperative players (6Mn tons)
- Compound dairy feed potential in India – 110 million tons
- Penetration of compound feed is less than 15%
- Reach, awareness, prices of compound feed, milk, farmer profitability, ingredient prices (corn, wheat bran & cottonseed cake)
- Regulation IS 2052:2023 – push farmers to use compound feed

	Economy	Standard	Premium
Grain	0 to 5	10 to 15	35
Meal/cake	20	30	35
Rice byproducts	60	30 to 40	20
Molasses	12	10	5
Others*	3	5	5
*includes urea, bypass fat, buffer, mineral mix, vitamin, toxin binder			

- Product differentiation driven by % of Protein & Energy
- Reflects in price & performance of product
- Share of standard & premium compound feed products growing
- As productivity of cow going up coupled with better milk prices -- farmers prefers premium products

Comparison of different protein sources:

		Cottonseed Cake	Cottonseed meal-Low pro	Cottonseed meal-Hipro	Mustard Cake	RSM	SBM	DDGS
Ex-Price, Rs/kg		28.5	34	39	25	23	45.5	26
PROTEIN	%	22	36	44	35	35	47	45
FAT	%	9-10	1-2	0.6	7-8	0.5-1.5	0.5-1	2-5
ASH	%	3-4	6-7	6-7	5-7	5-9	5-7	5-8
NDF	%	45	28.5	16	20	20	12	12
ADF	%	32	18	10	16	15	7	5
MOISTURE	%	9	10	8.5	10	10	11	9
FIBER	%	25 -28	13 -18	8 -12	7-10	6-10	3-6	3-7
Rs/unit Protein		1.3	0.94	0.89	0.71	0.66	0.98	0.58



Cottonseed & byproducts in Dairy animal diets

Cottonseed Hulls:

- Fiber source – can replace roughages in diet @ 1 to 2kg
- Goes well in TMR,
- can be added to compound feed @5 to 10%



Whole cottonseed (linted / delinted)

- Concentrations of protein, energy, fat, fiber
- Can be fed as such (max upto 3.5kg per day) or through pellet compound feed max 15%
- Mostly used in mash feed
- Strong +ive impact on rumen health
- Smaller seeds pass in dung

Cottonseed cake

- Most commonly fed ingredient by small & mid sized farms @ 3 to 4kg per day
- High in fat
- Limited use by pellet compound feed users but used in mash feed
- Can be added upto 10%
- Aflatoxin concern



- Cottonseed Meal –
- Available high pro & low pro
- Good palatable protein source
- RDP at 60%

Overall total feeding of cottonseed byproducts should not exceed 20% of total animal diet -- gossypol

Regulatory Changes

Table 1 Requirements for Compounded Feeds for Cattle
(Clauses 4.3, 7.1 and D-5.1)

Sl No.	Characteristic	Requirement		Method of Test Ref to
		Type I	Type II	
(1)	(2)	(3)	(4)	(5)
i)	Moisture, percent by mass, <i>Max</i>	11	11	4 of IS 7874 (Part 1)
ii)	Crude protein ($N \times 6.25$), percent by mass, <i>Min</i>	22	20	IS/ISO 5983 (Part 1)* or IS 5983 (Part 2) or ISO 16634-1
iii)	Crude fat, percent by mass, <i>Min</i>	4.0	3.0	IS/ISO 6492
iv)	Crude fibre, percent by mass, <i>Max</i>	10	12	IS/ISO 6865
v)	Acid insoluble ash, percent by mass, <i>Max</i>	2.5	3.0	Annex A of IS 1712 or IS 14826*
vi)	Salt (as NaCl based on Na or Cl), percent by mass, <i>Max</i>	1.0	1.0	4 of IS 7874 (Part 2)
vii)	Calcium (as Ca), percent by mass, <i>Min</i>	0.8	0.8	IS 13433 (Part 1) or IS 15121* or EN 15621
viii)	Total phosphorus, percent by mass, <i>Min</i>	0.5	0.5	IS 14828* or EN 15621
ix)	Available phosphorus, percent by mass, <i>Min</i>	0.25	0.25	Annex F of IS 1374
x)	Urea, percent by mass, <i>Max</i>	1.0	1.0	IS 7874 (Part 1) or AOAC 967.07*
xi)	Vitamin A, IU/kg, <i>Min</i>	7 000	7 000	IS 15120
xii)	Vitamin D ₃ , IU/kg, <i>Min</i>	1 200	1 200	Annex C * or <i>J. AOAC Int.</i> 2012, Vol. 95, No. 5, Pages 1487–1494
xiii)	Vitamin E, IU/kg, <i>Min</i>	30	30	IS 15948
xiv)	Aflatoxin B ₁ , µg/kg, <i>Max</i>	20	20	IS/ISO 14718* or ISO 17375 or AOAC 2003.02
xv)	Cadmium, mg/kg, <i>Max</i>	0.5	0.5	EN 17053

- **IS 2052 : 2023 Compounded Feeds for Cattle — Specification (Fifth Revision)**
- **Aflatoxin – feed & most of the ingredients at 20 ppb**
- **Grains, rice byproducts (rice bran hifat, de-oiled rice bran) at 50ppb**
- **Milk – 0.5ppb**
- **Challenging for dairy compound feed manufacturers in maintaining feed at 20 ppb levels under Indian environmental conditions**
- **Out of oil seed cakes/meals -- cottonseed & cottonseed cake & ground cake/ meal potentially with high aflatoxins**
- **Support required from important stakeholder in value chain to maintain less than 20ppb levels**

Summary

- **Opportunity to be part of transforming dairy industry**
- **Growing Dairy Compound feed industry will require meal / cakes to be in sync with demand**
- **Cottonseed processors have to overcome Aflatoxin challenge & be price competitive with other oil meals**

Thank-you

