Using ethno veterinary medicines (EVM) to reduce antibiotic usage in bovines

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Presentation overview

- About NDDB
- Dairying in India
- EVM: The rationale
- NDDB's experience
- Achievements and outcomes
- Acknowledgements

National Dairy Development Board

Registered as society in September 1965, declared as an Institute of National Importance in 1987 by an Act of Parliament

Objectives:

- To promote Anand Model of Cooperatives across the country
- To promote, finance and support producer-owned and controlled organizations
- To strengthen farmer cooperatives and support national policies that are favorable to the growth of such institutions

Operation Flood and other programmes by NDDB

- Operation Flood (1970-1996): the dairy development programme undertaken by NDDB, made India self sufficient in milk and brought lasting changes in the socio-economic development of millions of small and marginal farmers involved in dairying business.

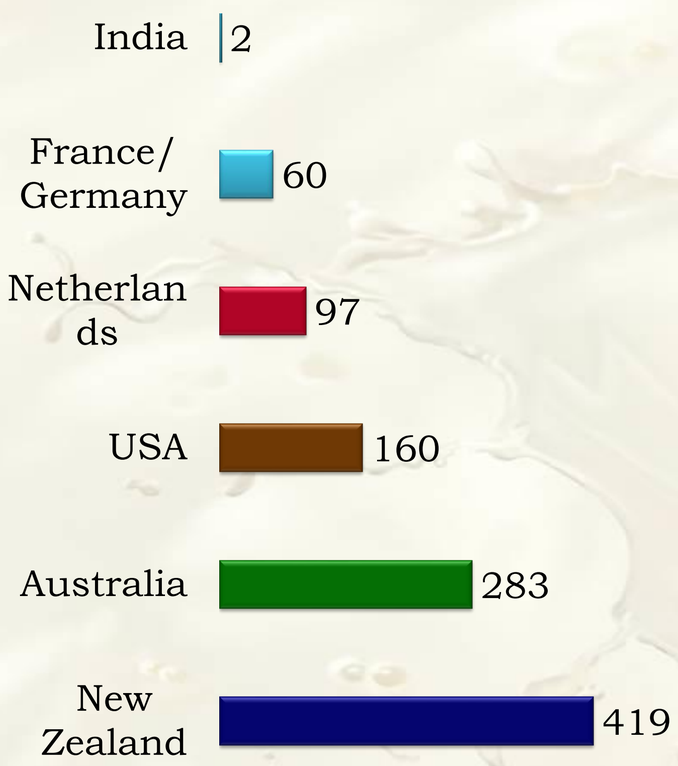
"A twenty-year experiment confirming the Rural Development Vision" : World Bank Report 1997c.

- Perspective plan
- National Dairy Plan : 2011-12 to 2018-19

Year	1970	1996	2018-19
Milk production in Million MT	**21.2**	**66.2**	**187.7**

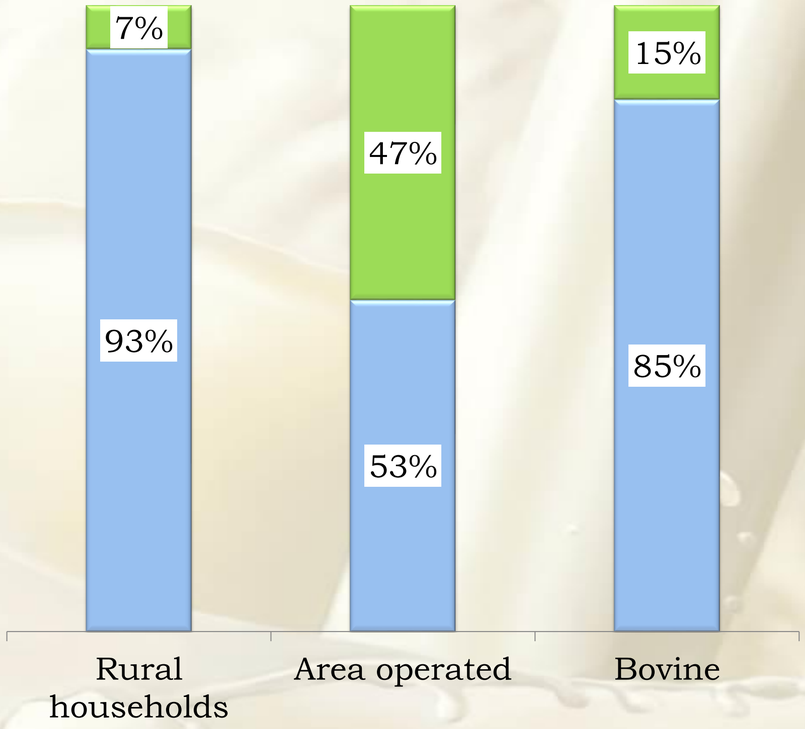
Dairying in India

Herd size per holding



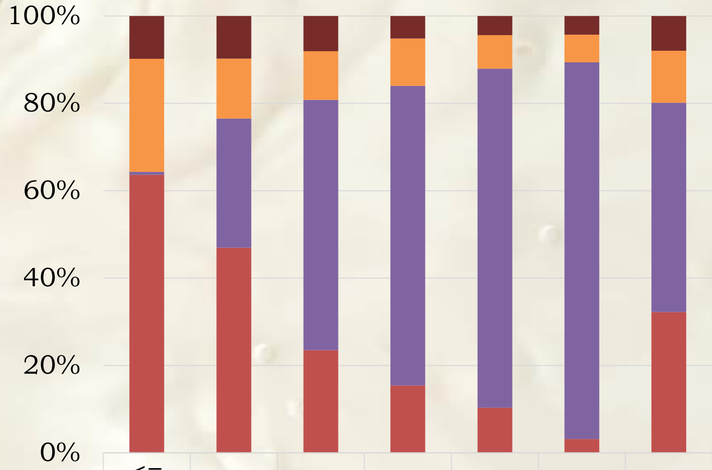
Source: IFCN Dairy Report

Bovine holding



Source: Land & Livestock Survey, National Sample Survey Office, 2012-13

Rural income source



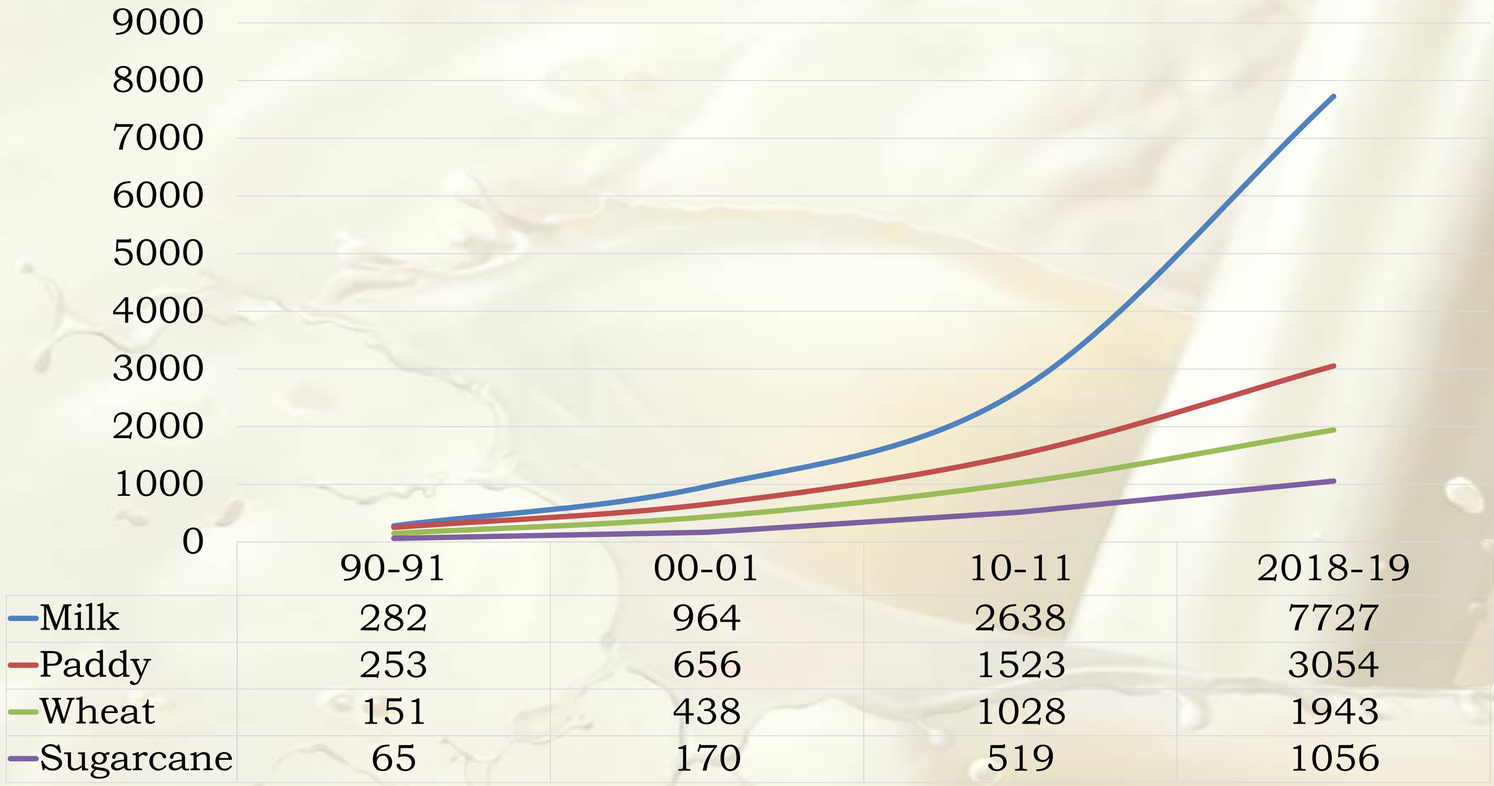
	<= 0.01 (ha)	Upto 1	1.01-2.0	2.01-4.0	4.01-10.0	10+ (ha)	All sizes
Non-farm business	10	10	8	5	4	4	8
Animal farming	26	14	11	11	8	6	12
Cultivation	1	30	57	69	78	86	48
Wages/ Salaries	64	47	24	15	10	3	32

Situation Assessment Survey : The livestock sector contributes significantly to rural income

- About 26 % in case of the poorest households
- Overall it contributes to about 12% of rural income

Contribution of milk in Indian Economy

Value of output : ₹ billion at current prices



	90-91	00-01	10-11	2018-19
Milk	282	964	2638	7727
Paddy	253	656	1523	3054
Wheat	151	438	1028	1943
Sugarcane	65	170	519	1056

- Value of milk output is more than the combined value of paddy, wheat & sugarcane
- Milk accounts for about 67% of total value of output from livestock

Source : SAS Group, NDDB

- Generates 5-6% of total rural employment
- Major source of rural employment, especially women employment
- Subsidiary income- contributes about 12% of rural household income
- Dairying an instrument for rural prosperity & change with gender inclusion

EVM: The rationale

Farmer

- Cost-effective
- Easy to prepare & administer
- Ingredients easily available at home
- Efficacious and revitalising
- Non-invasive
- No milk withdrawal
- Provides an immediate option in remote areas

Consumer

- Reduced antibiotic residues/other drugs in milk.
- Better product quality
- Reduced food allergies
- Better health

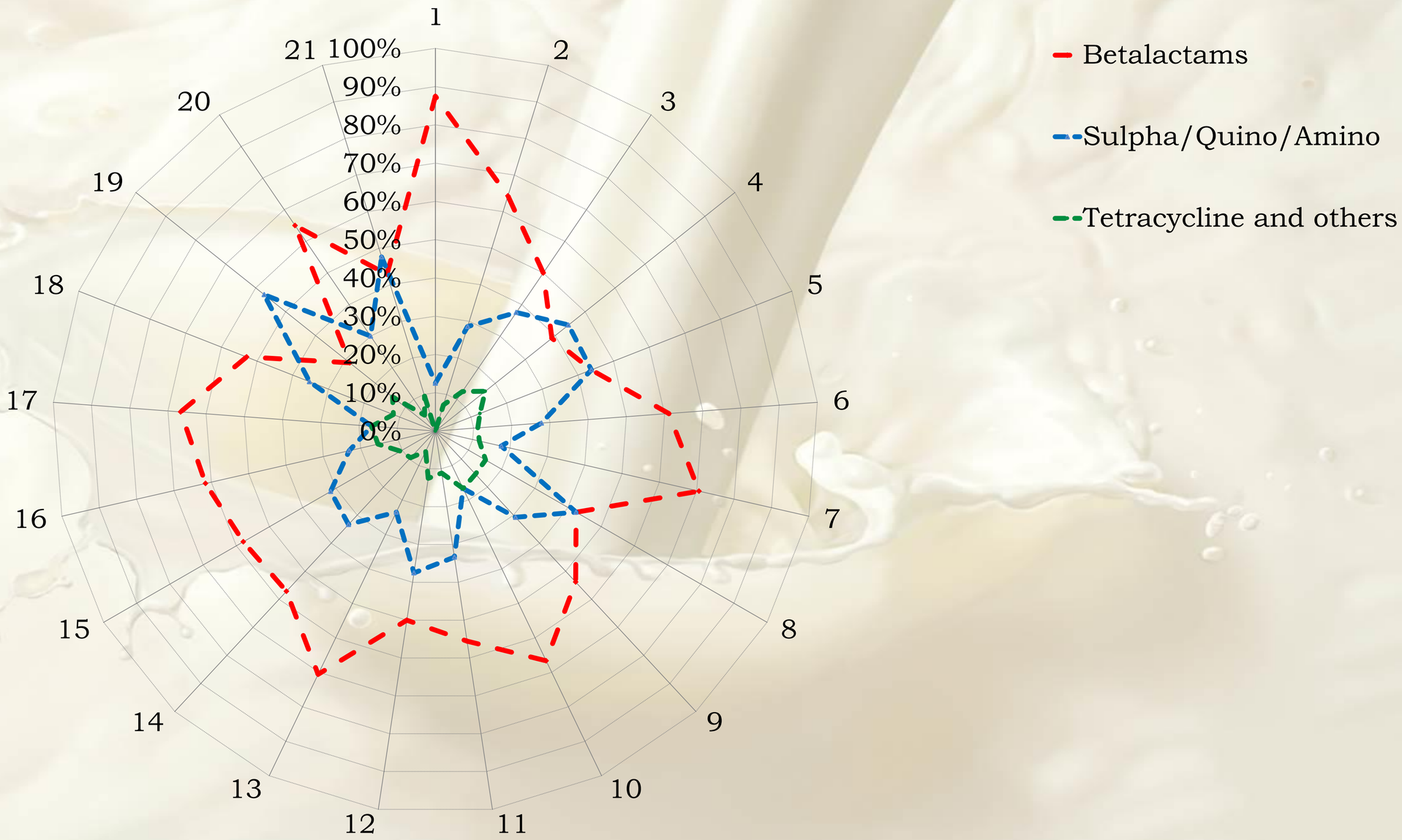
Country

- Implementation of regulatory agency (FSSAI) norms
- International recognition of Indian Traditional systems
- Better prospects in international market
- Help to tackle AMR

Climate

- Antibiotic free dung improves carbon sequestration of the soil by almost double. (Soil stores twice as much carbon as the atmosphere does)

Antibiotic usage in various milk producing organisations



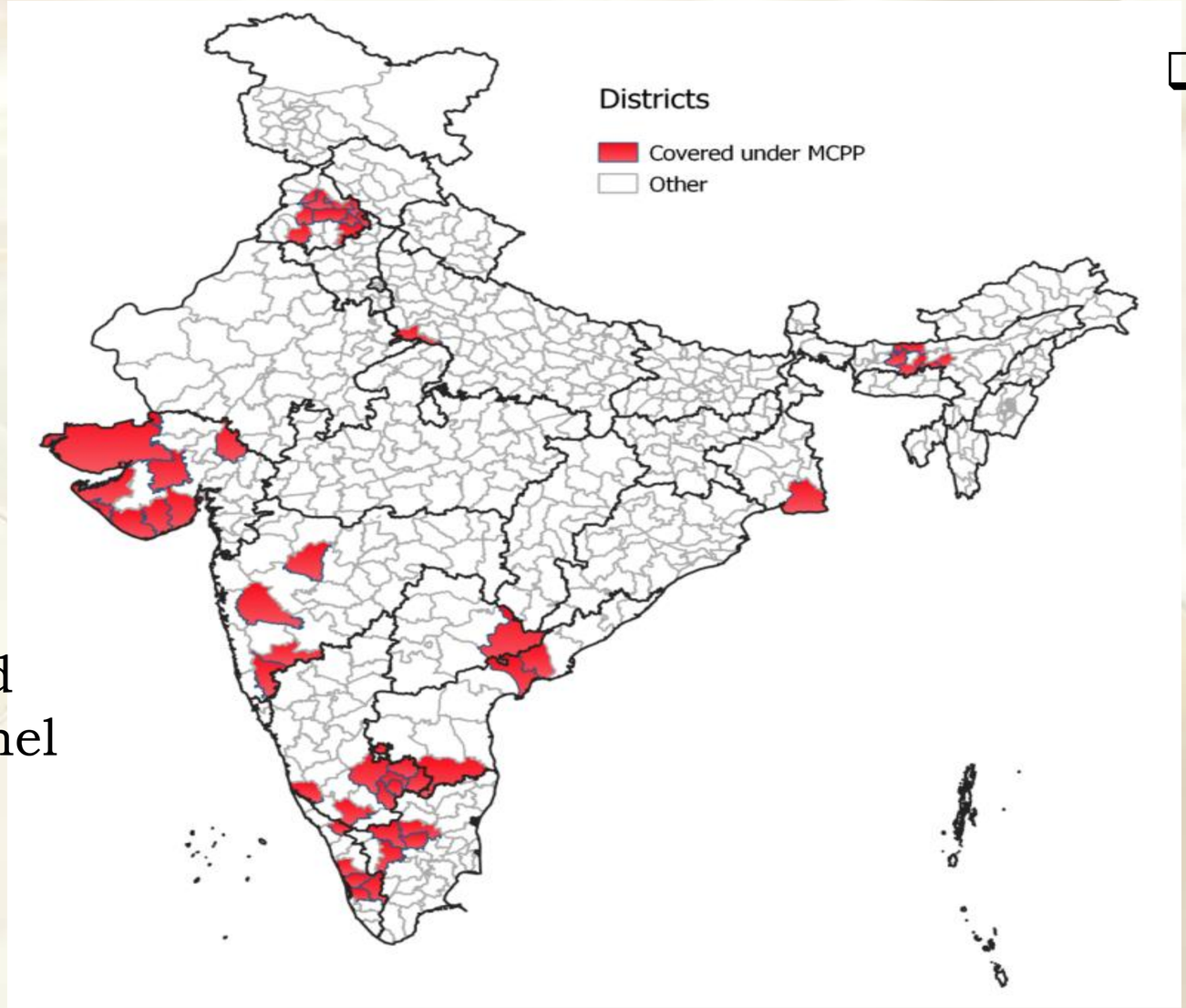
EVM propagation

Project coverage

- ~1000 DCSs
- >16 Milk Unions
- 9 States

Training on EVM

- 1084 vets trained
- 7691 AH personnel



Period

- Since 2017-18

Case records

- 5.73 lakh cases recorded for various ailments

Demo plots

- 570 demo plots established

Ailments
Mastitis
Bloat
Blood in milk
Deworming
Diarrhoea
Downer
Ectoparasites
Fever
FMD foot lesion
Prolapse
Repeat breeder
Teat obstruction
Udder Oedema
Wart
Wound

Ailments
Retention of placenta
Swelling of joints
Leucoderma
Anoestrus
Endometritis
Milk fever
Joint ill
Teilitis
Metritis
Pyometra
Cystic ovary
Poisoning
Indigestion
Agalactia

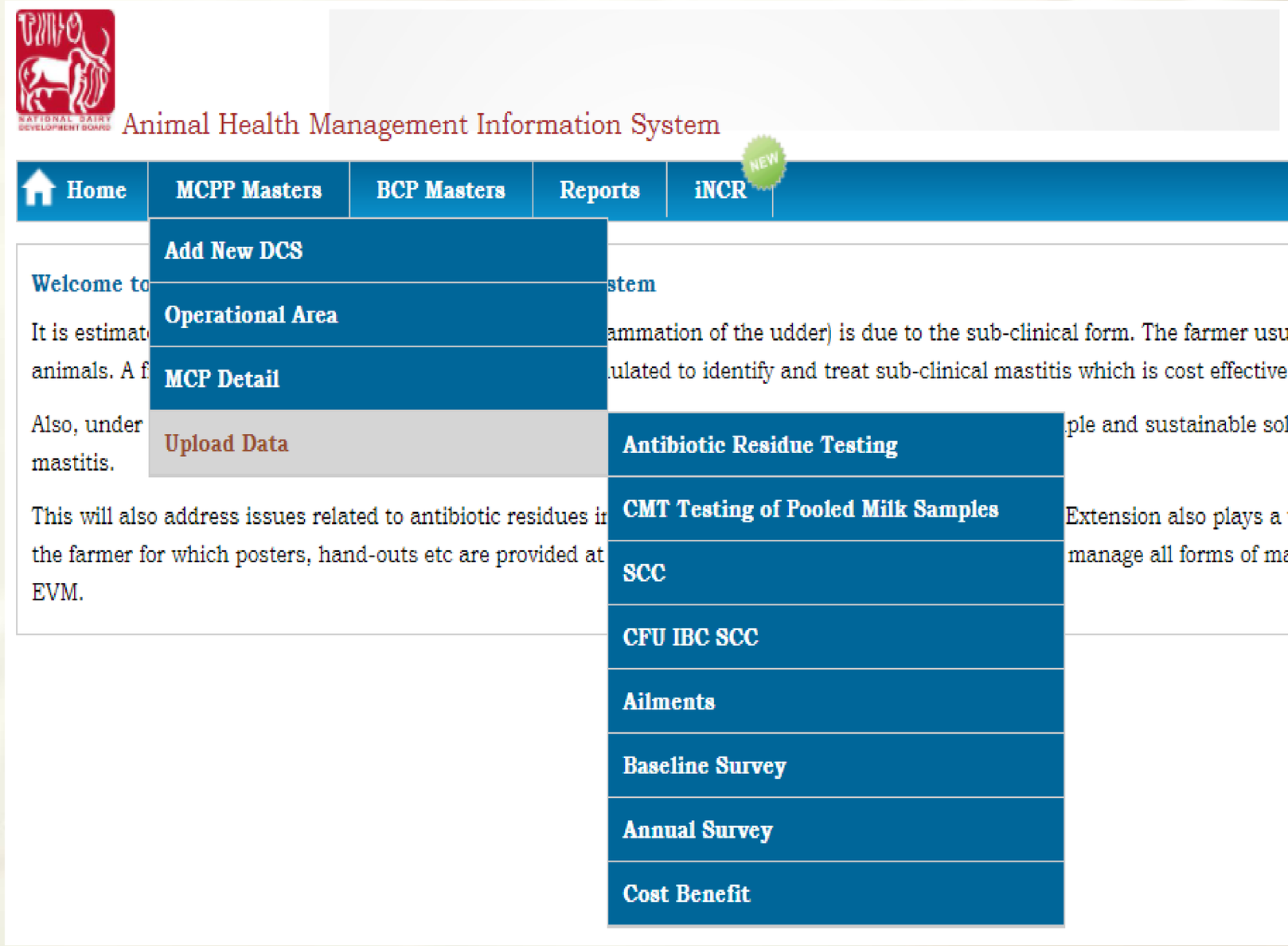
PROGRESS OF EVM

>5,73,000 cases with 81% cure rate at present

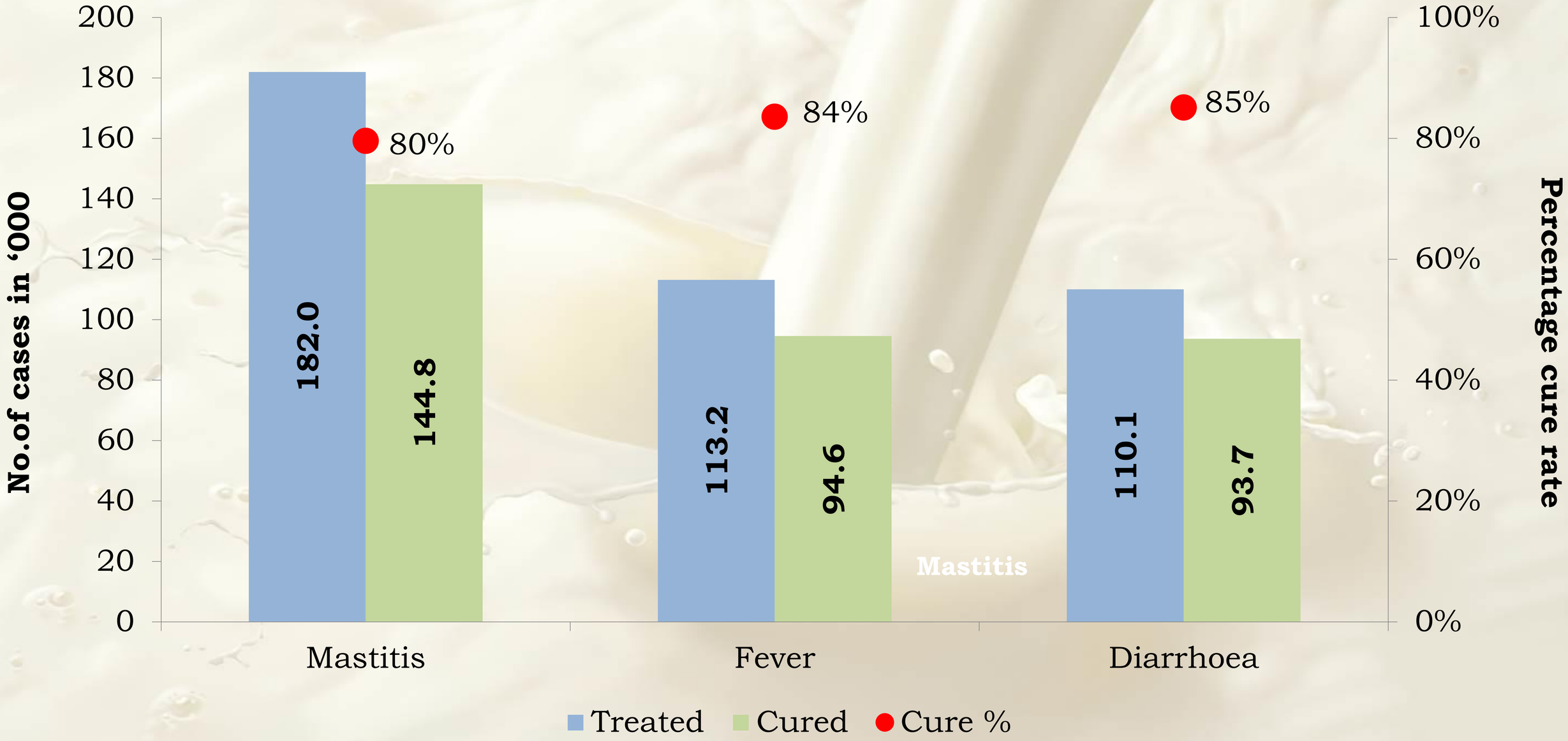
8100 cases with 78% cure rate in 2017-18

Data captured through an online system

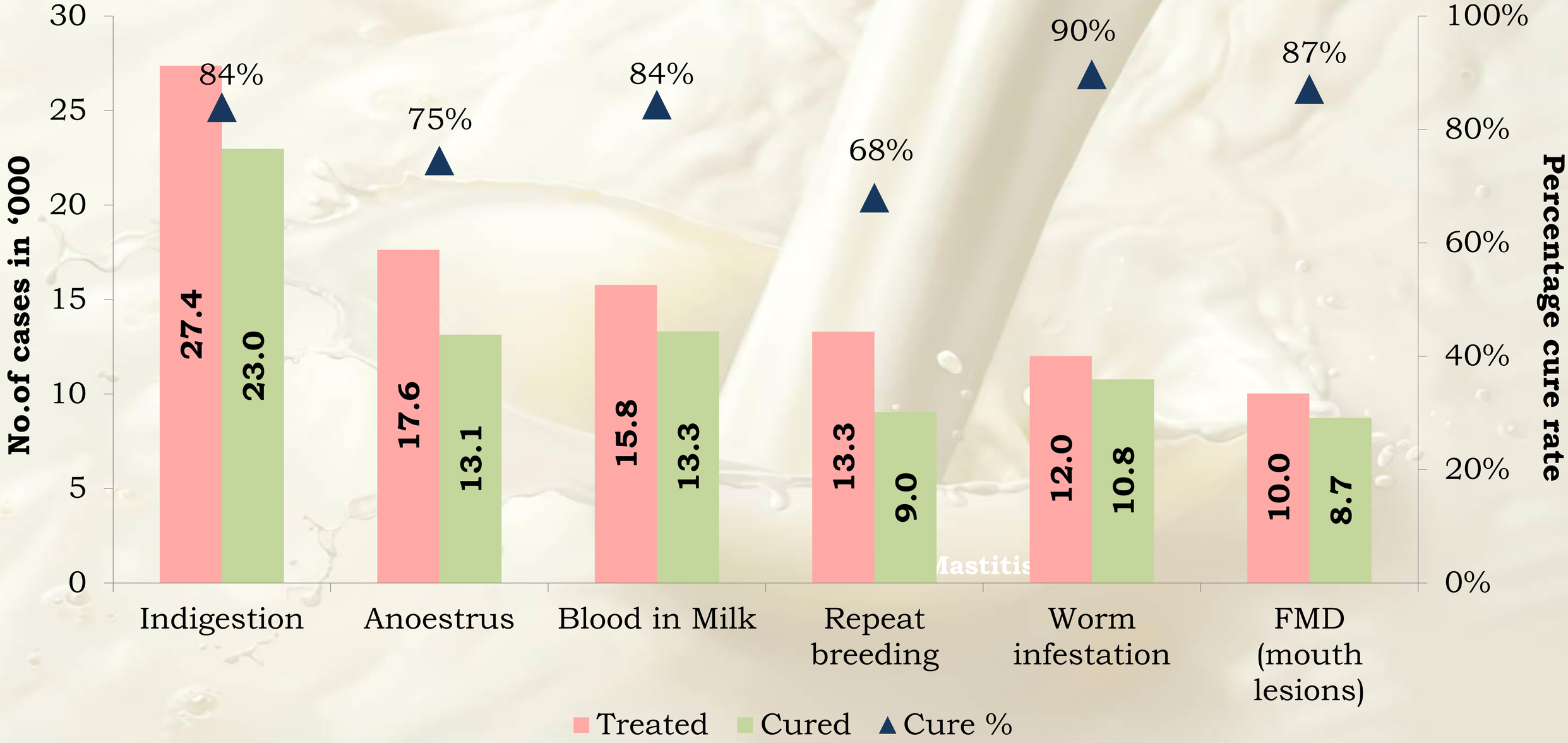
On-line data capture



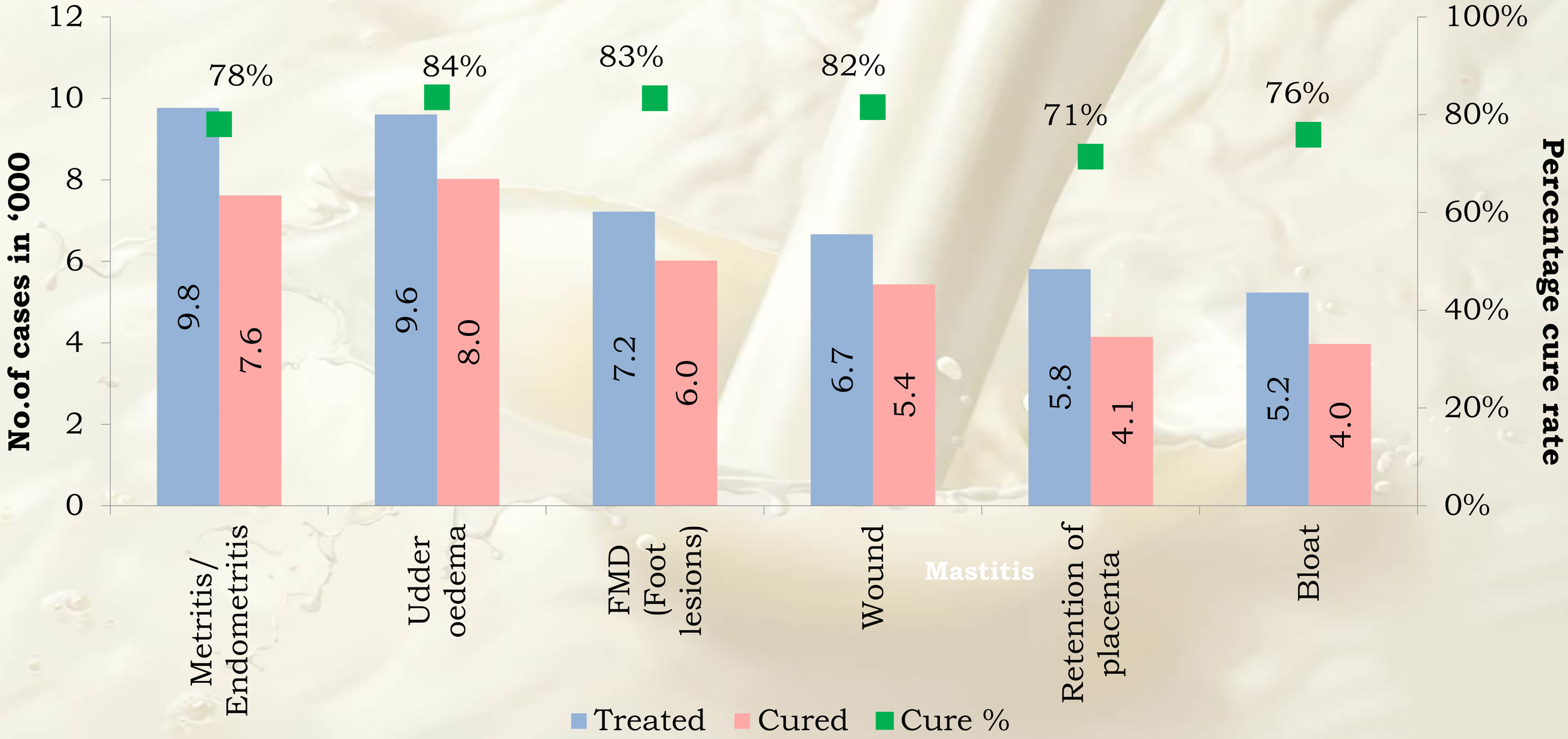
Ailments managed by EVM with >100,000 empirical data



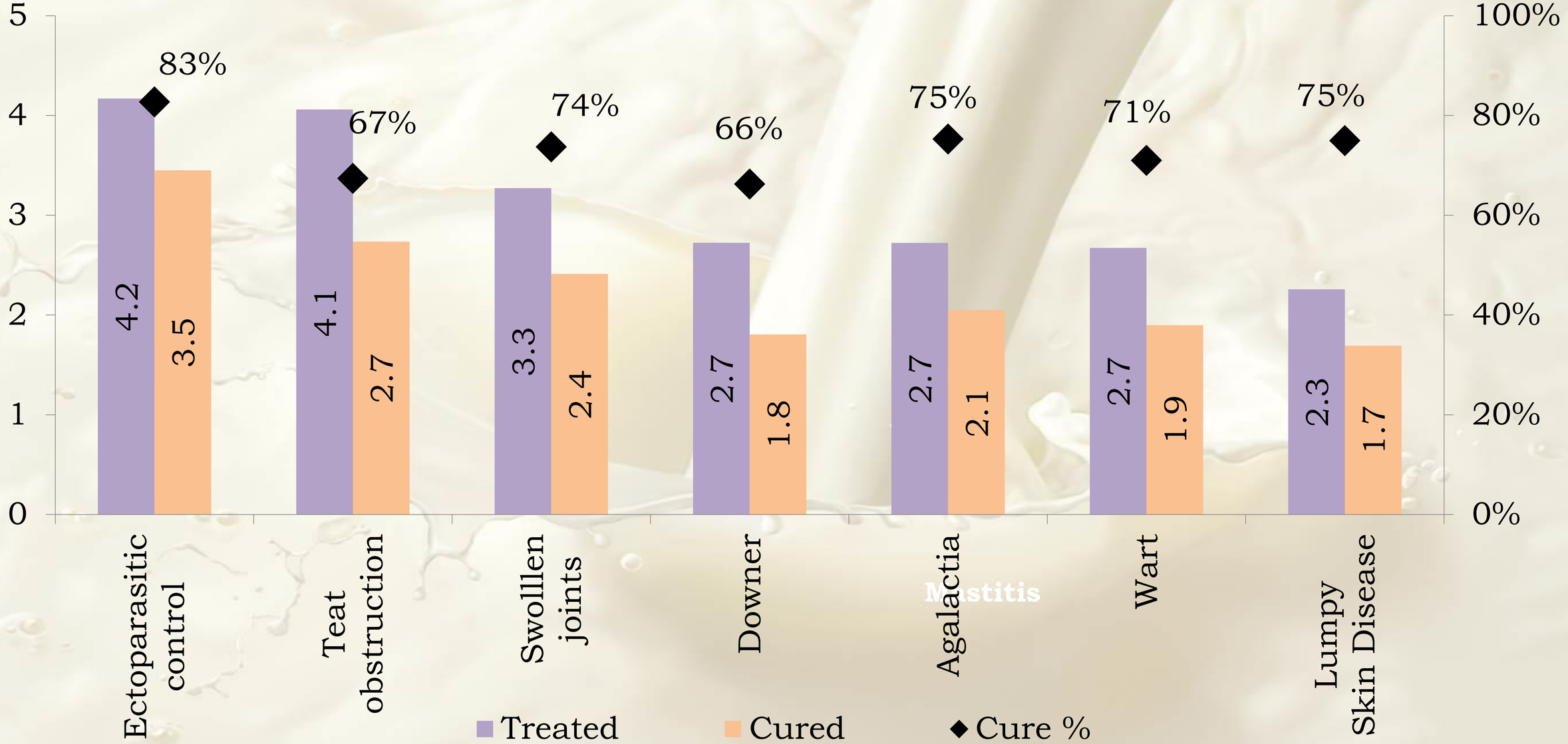
Ailments managed by EVM with >10,000 empirical data



Ailments managed by EVM with >5000 to <10,000 empirical data



Ailments managed by EVM with >2000 to <5,000 empirical data



Achievements and outcomes

Extension and awareness creation (11 vernacular languages and English)

- Brochures, Posters, e Gopala application (Play Store), farmer training, farmer exhibition
- Facebook page to document success stories
- **276** videos on EVM preparation and application methods for various ailments
- IDF Health report, various journals
- Access Agriculture – EcoAgTube

Increase in awareness levels on EVM and antibiotic residues in milk

- Six fold reduction in antibiotic preference for mastitis treatment
- Double fold increase in awareness on antibiotic residues in milk

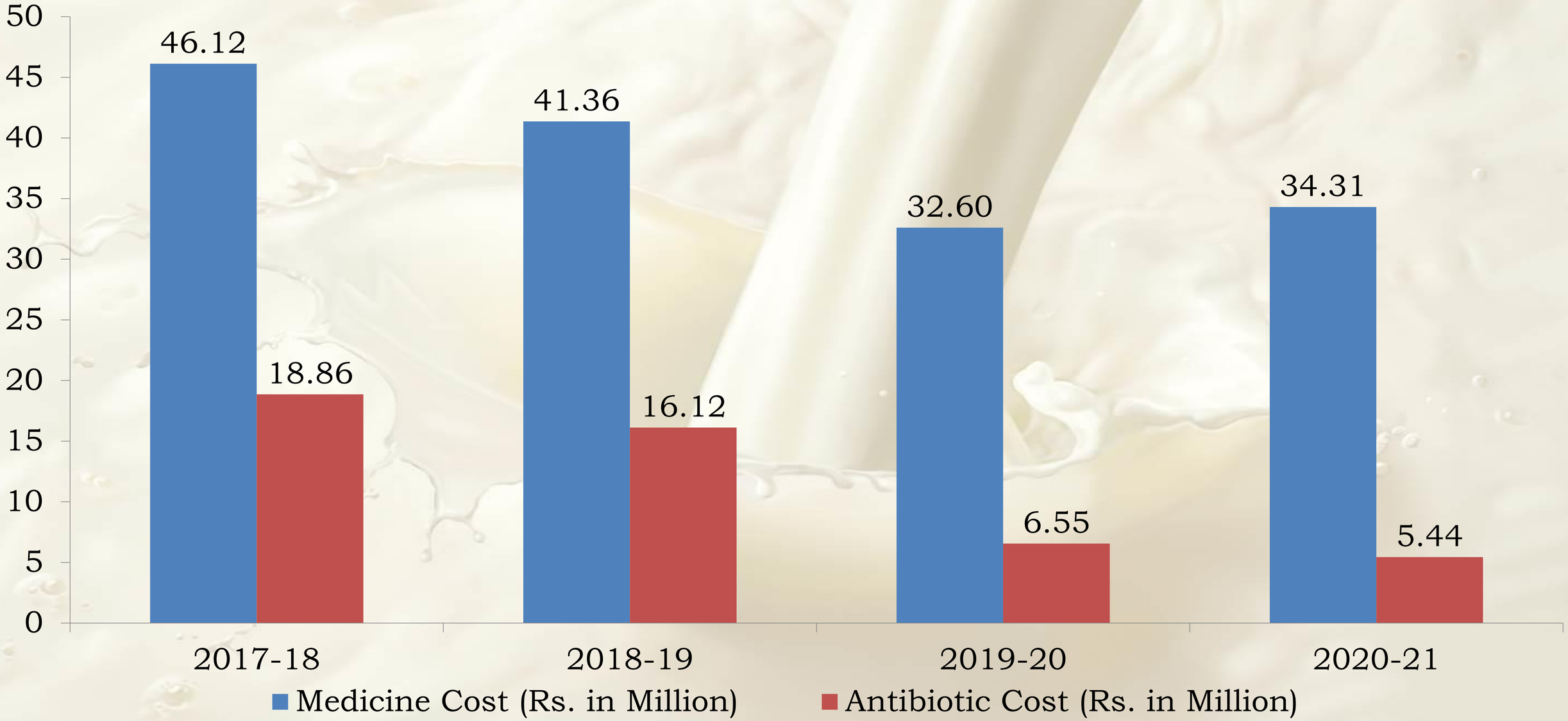
Training

- **~260** core group veterinarians
- **>750** veterinarians trained by core group locally
- **>160 EVM demo plots** at MU/PC level; **392** at MCC

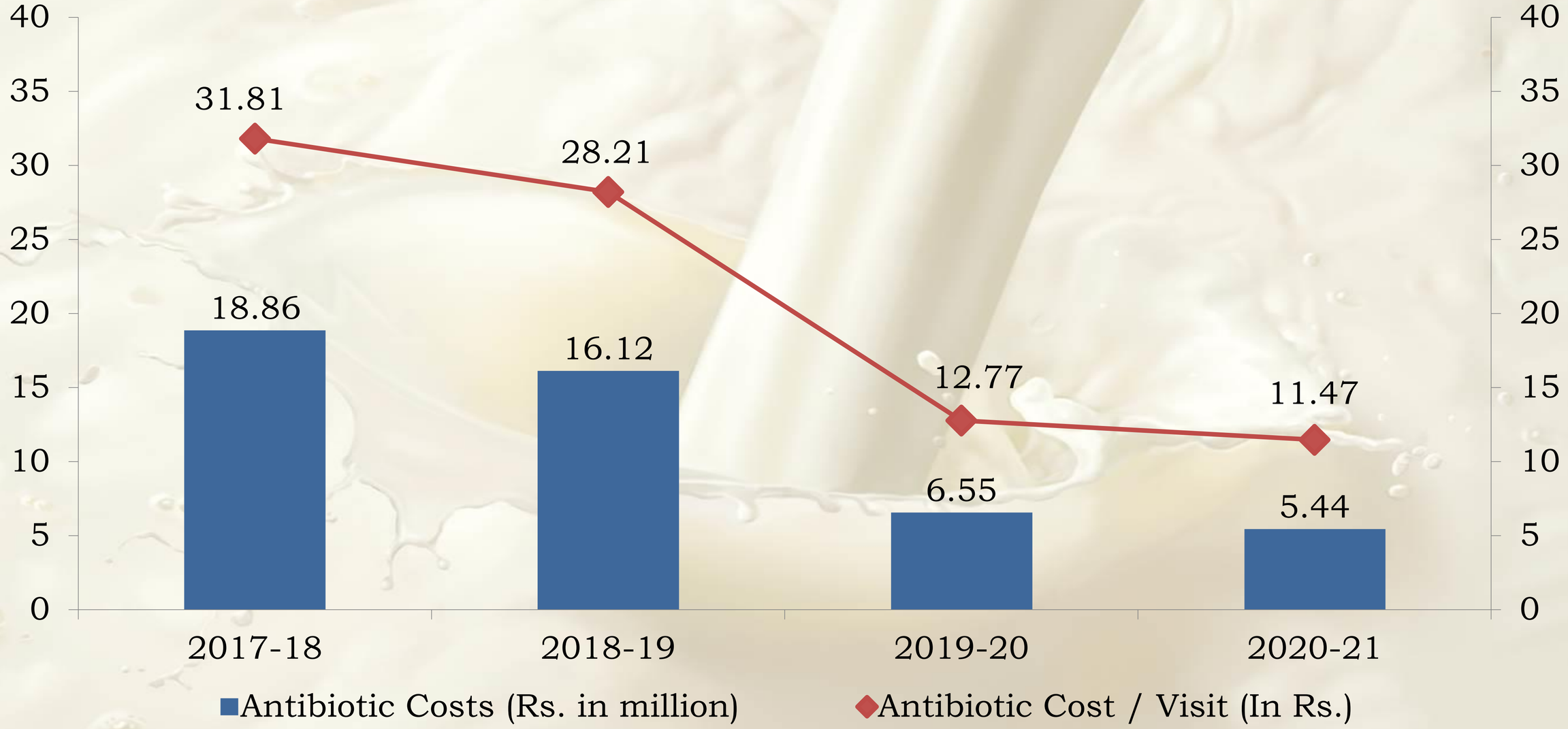
Seminars& conferences

- International seminar
- IDF Conferences: Nantes, Dublin, Copenhagen
- OIE Conference, Marrakesh

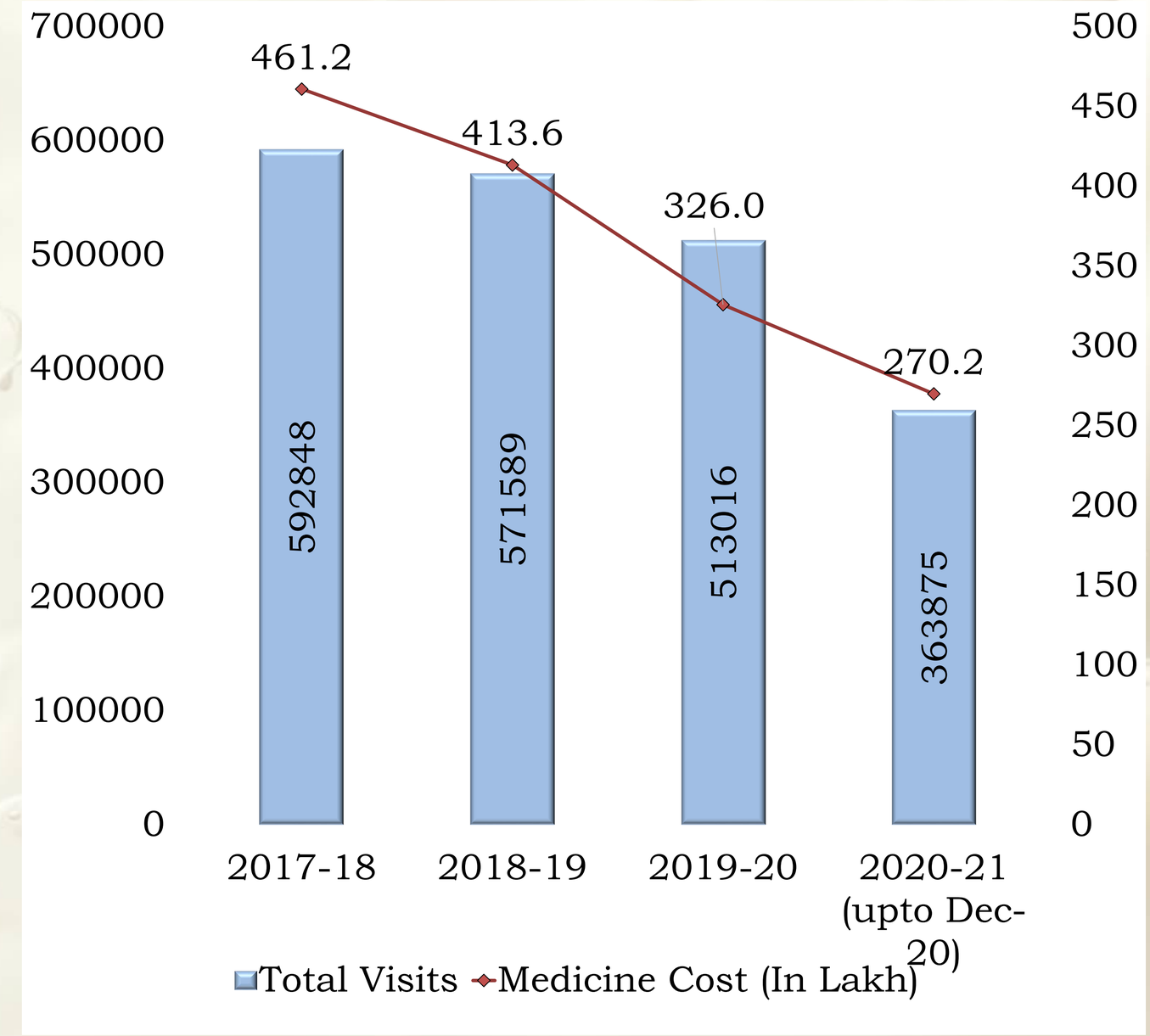
Cost reduction due to extensive use of EVM in a milk union



Impact of extensive use of EVM in a milk union



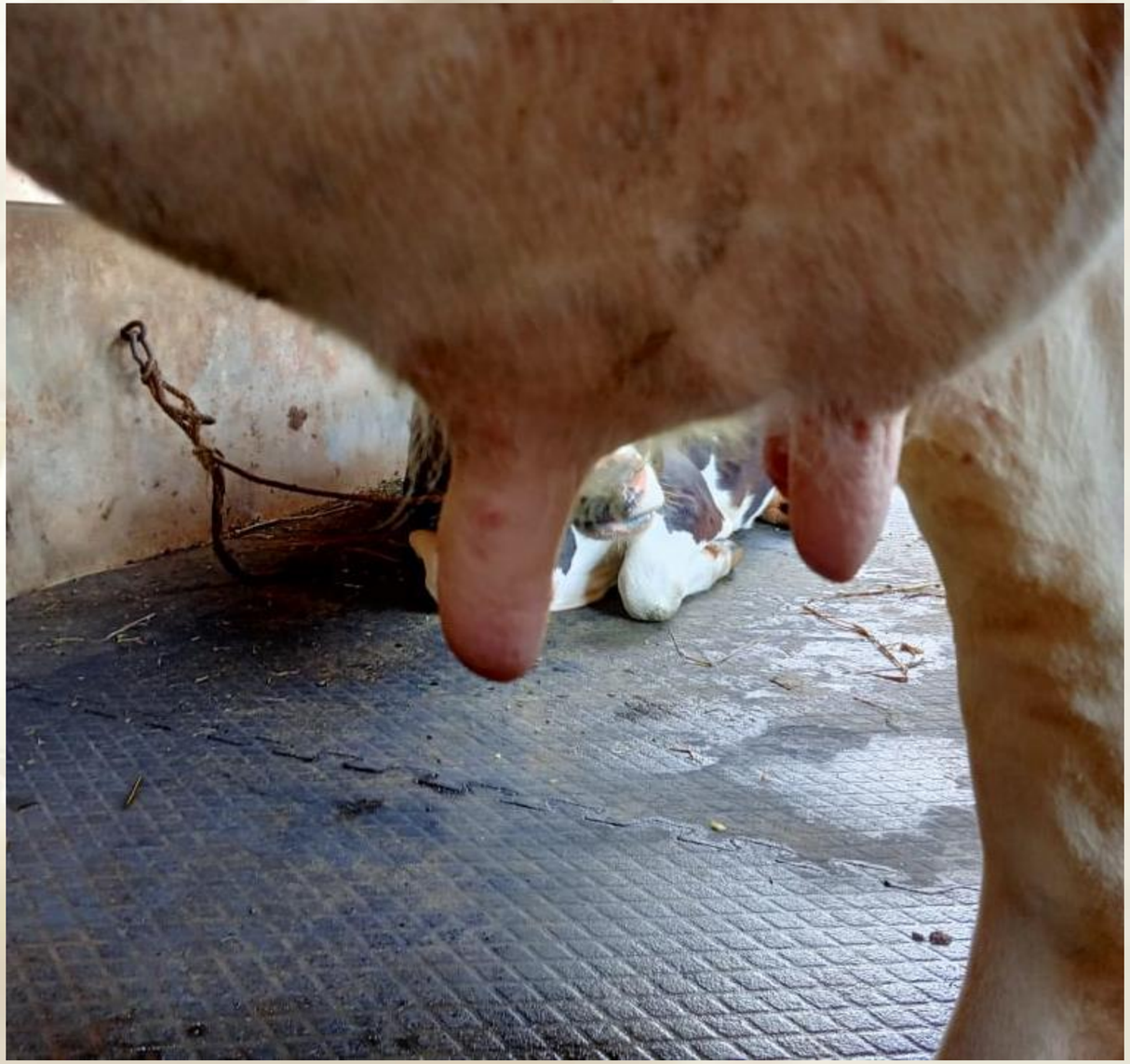
EVM impact in a milk union



- The medicine costs (antibiotics, NSAID and other supplements) are reducing at the compounded annual rate of around **16%** over the last 3 years.
  - *Over 191 lakh saved*
- A total of **79,832 veterinary calls** have reduced in 2019-20 compared to 2017-18.
  - *Percolation of the EVM concept to the farmers*
  - *More focus on field activities like infertility/health camps etc by vets.*

Wart- Before & after EVM

Wart- Before & after EVM



AMR profiling: Mastitis samples

Milk samples

Sub clinical mastitis

Clinical mastitis

Isolation & Identification of Organism

Culture & PCR Repository

Antibacterial Sensitivity

Phenotypic

Disc Diffusion
BD System

Advisory to MU/States Surveillance of AMR

Genotypic

Identification of Resistance Gene by WGS and PCR

AMR profiling: Salient findings

- *Staphylococcus sp., Streptococcus sp., E. Coli and Klebsiella sp., mostly* associate with mastitis
- Isolates exhibited variable pattern of resistance mainly to β-lactam, aminoglycosides, tetracyclines & sulfanomides
- S aureus : high proportion MRSA, categorized in 6 spa, 8 MLST types & 2 agr types (I&III)
- No specific pattern of geographical distribution could be observed in respect to above characterization
- Results also indicated likelihood of inter-species infection with the same types

Acknowledgements

aavin

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milma

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verka

TDU
INSTITUTE OF TRANSDISCIPLINARY
HEALTH SCIENCES & TECHNOLOGY

Purabi

maaHI

Gokul

Thank you for your kind attention

Please visit us at :

1. ***NDDB Facebook***
2. ***NDDB Dairy Knowledge portal***
3. ***Traditional Herbal Formulations for cattle and buffaloes FB page***

ECOLOGY LETTERS

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Letter

Prolonged exposure to manure from livestock-administered antibiotics decreases ecosystem carbon-use efficiency and alters nitrogen cycling

Carl Wepking, Brian Badgley, John E. Barrett, Katharine F. Knowlton, Jane M. Lucas, Kevan J. Minick, Partha P. Ray, Sarah E. Shawver, Michael S. Strickland

First published: 08 October 2019 | https://doi.org/10.1111/ele.13390 | Citations: 10

Abstract

Microbial communities drive soil ecosystem function but are also susceptible to environmental disturbances. We investigated whether exposure to manure sourced from cattle either administered or not administered antibiotics affected microbially mediated terrestrial ecosystem function. We quantified changes in microbial community composition via amplicon sequencing, and terrestrial elemental cycling via a stable isotope pulse-chase. Exposure to manure from antibiotic-treated cattle caused: (i) changes in microbial community structure; and (ii) alterations in elemental cycling throughout the terrestrial system. This exposure caused changes in fungal : bacterial ratios, as well as changes in bacterial community structure. Additionally, exposure to manure from cattle treated with pirlimycin resulted in an approximate two-fold increase in ecosystem respiration of recently fixed-carbon, and a greater proportion of recently added nitrogen in plant and soil pools compared to the control manure. Manure from antibiotic-treated cattle therefore affects terrestrial ecosystem function via the soil microbiome, causing decreased ecosystem carbon use efficiency, and altered nitrogen cycling.

Popularisation measures- Brochures

Popularisation measures- Posters

NATIONAL DAIRY DEVELOPMENT BOARD

ETHNOVETERINARY FORMULATIONS FOR IMPORTANT AILMENTS IN BOVINES

The common plants, spices and other materials mentioned here are generally regarded as safe and these are only suggestive. Nearby veterinarian may be consulted for proper disease diagnosis and management.

Prepared with technical inputs from Prof. N. Punniamurthy (profpunniya@gmail.com), For further information contact: anand@nddb.coop

Mastitis (all types)

Water based Preparation

Ingredients: For one day
a) Aloe vera - 250 g; b) Turmeric powder - 50 g; c) Calcium Hydroxide (lime)-15 g; d) Lemon - 6 nos.

Preparation:
(i) Cut Aloe vera whole leaf into small pieces (after removing the thorns).(ii) Blend along with turmeric powder and lime to form a reddish paste.

Application:
(i) Wash, clean and completely milk out all quarters (including unaffected).(ii) Take a handful of the paste and add 200ml of water to make it thin.(iii) Apply the paste diluted in water ten times a day for 5 days each time after following the step (i) above. (iv) Last application of the day should be oil based preparation. (v) Feed two lemons at a time orally (cut into halves) thrice a day for 3 days.

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Mastitis (all types)

Oil based Preparation

Ingredients : For one day
Aloe vera (whole leaf) - 250 g; Turmeric powder - 50 g; Calcium hydroxide (lime) - 15 g; Lemon - 6 no.s ; Mustard or Gingelly oil - 600 ml.

Preparation:
(i) Cut Aloe vera whole leaf into small pieces (after removing the thorns).(ii) Blend along with turmeric powder and lime to form a reddish paste.

Application:
(i) Wash, clean and completely milk out all quarters (including unaffected) and dry the udder.(ii) Take a handful of the paste and add 200ml of mustard or gingelly oil to make it thin.(iii) Apply the paste diluted in oil three times a day for 5 days each time after following the step (i) above. (iv) Feed two lemons orally at a time (cut into halves) thrice a day for 3 days.

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Teat obstruction

Ingredients:
Freshly plucked & clean neem leafstalk-1; Turmeric powder; Butter or Ghee

Preparation:
(i) Nip the neem leafstalk from the top at the required length based on teat length, leaving the base intact. (ii) Coat the turmeric powder & butter/ghee mixture thoroughly on the neem leafstalk. (iii) Clean the affected teat opening thoroughly.

Application:
(i) Insert the coated neem leafstalk with cut end up, base down into the affected teat in an anti-clockwise direction.(ii) Replace with fresh neemstalk after each milking.

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Udder Oedema

Ingredients: For one time
Sesame or mustard oil - 200 ml; Turmeric powder- 1 handful; Garlic-2 pearls.

Preparation:
(i) Heat oil, add turmeric powder and sliced garlic. (ii) Mix well and remove from flame just as the flavour develops (no need to boil). (iii) Allow to cool.

Application:
(i) Apply in a circular manner with force over the entire oedematous region and udder. (ii) Apply 4 times a day for 3 days.

Note: Rule out mastitis before using the formulation.

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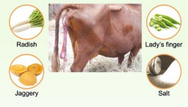
Retention of Placenta



Ingredients:
White radish -1 full tuber; Lady's finger - 1.5 kg; Jaggery - as required; Salt - as required

Preparation:
(i) Cut each lady's finger into 2 pieces.

Application:
(i) Feed one full tuber radish within two hours of calving. (ii) Feed 1.5 Kg of fresh lady's finger with jaggery and salt if ROP persists after 8 hours of calving. (iii) In case ROP persists even after 12 hours of calving, tie a knot very close to the base and cut 2 inches below the knot and leave it. The knot will go in. (iv) Do not try to remove the retained placenta by hand. (v) Feed one full tuber of radish once a week for four weeks.

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Repeat breeding

Application:
(i) Start treatment on 1st or 2nd day of heat. (ii) Feed orally in fresh form in the following order once a day along with jaggery and salt:
(a)1 white radish daily for 5 days (b) 1 Aloe vera leaf daily for 4 days.(c) 4 handfuls of moringa leaves for 4 days. (d) 4 handfuls of cissus stem for 4 days. (e) 4 handfuls of curry leaves with 5 gram turmeric powder for 4 days. (f) Repeat the treatment once again if the animal has not conceived.

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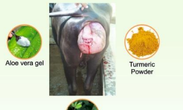
Prolapse



Ingredients:
Aloe vera gel - from one full leaf; Turmeric powder - one pinch; Mimosa pudica leaves - 2 handfuls.

Preparation:
(i) Remove the gel from a whole leaf. (ii) Wash it multiple times till the sliminess is reduced. (iii) Make volume upto 1 litre by adding water. (iv) Add a pinch of turmeric powder and boil to half the original volume and allow to cool (v) Prepare a paste of M. pudica leaves separately.

Application:
(i) Clean the prolapsed mass (ii) Sprinkle the gel on the prolapsed mass. (iii) Apply M.pudica paste after the gel dries. (iv) Repeat the process as frequently as possible till the condition improves.

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FMD mouth lesions

Ingredients: For one dose
Cumin seeds - 10 g; Fenugreek seeds - 10 g; Black pepper - 10 g; Turmeric powder - 10 g; Garlic - 4 pearls; Coconut - 1; Jaggery- 120 g

Preparation:
(i) Soak cumin, fenugreek and black pepper seeds in water for 20-30 mts. (ii) Blend all ingredients to a fine paste. (iii) Add 1 full grated coconut to the paste and mix by hand only. (iv) Prepare dose freshly for each application.

Application:
(i) Apply gently inside the mouth, tongue and palate. (ii) Give the preparation thrice a day for 3 to 5 days.

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FMD foot lesions/wound

Ingredients:
Acalypha indica leaves - 1 handful; Garlic-10 pearls; Neem leaves - 1 handful; Coconut or Sesame oil - 500 ml; Turmeric powder - 20 g; Mehndi leaves - 1 handful; Tulsi leaves - 1 handful.

Preparation:
(i) Blend all the ingredients thoroughly. (ii) Mix with 500 ml coconut or sesame oil and boil and bring to cool.

Application:
(i) Clean the wound and apply directly or bandage with a medicated cloth. (ii) Apply Anona leaf paste or camphorated coconut oil for the first day only if maggots are present.

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Fever

Ingredients: For one day
Garlic - 2 pearls; Coriander- 10 g; Cumin -10 g; Tulsi - 1 handful; Dry cinnamon leaves - 10 g; Black pepper - 10 g; Betel leaves - 5 no.s; Shallots/Onion - 2 bulbs; Turmeric powder - 10 g; Chirata leaf powder - 20 g; Sweet basil - 1 handful; Neem leaves - 1 handful; Jaggery - 100 g.

Preparation:
(i) Soak cumin, pepper and coriander seeds in water for 15 mts. (ii) Blend and mix all ingredients to form a paste.

Application:
(i) Administer orally in small portions in the morning and evening.

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Diarrhoea

Ingredients: For one day
Fenugreek seeds - 10 g; Onion - 1 no.; Garlic - 1 pearl; Cumin seeds - 10 g; Turmeric Powder - 10 g; Curry leaves - 1 handful; Poppy seeds - 5 g; Pepper- 10 g ; Jaggery - 100 g; Asafoetida - 5 g.

Preparation:
(i) Dry fry cumin seeds, asafoetida, poppy seeds and fenugreek seeds till arroke emanates.(ii) Cool and powder the fried seeds.(iii) Blend it with rest of the ingredients to form a paste.

Application:
(i) Roll the paste into small balls. (ii) Administer orally in small portions once daily for 1-3 days till condition cures.

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Bloat and Indigestion

Ingredients: For one day
Onion - 100 g; Garlic-10 pearls; Dry Chilly - 2; Cumin seeds - 10 g; Turmeric Powder -10 g; Jaggery- 100 g; Pepper - 10 g; Betel leaves - 10 no.s; Ginger - 100 g

Preparation:
(i) Soak pepper and cumin seeds for 30 mts. (ii) Blend along with other ingredients to form a paste.

Application:
(i) Roll the paste into small balls. (ii) Administer orally in small portions with salt 3-4 times a day for 3 days.

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Worms

Ingredients: For one day
Onion- 1 no; Garlic-5 pearls; Mustard seeds - 10 g; Neem leaves - 1 handful; Cumin - 10 g; Bitter gourd - 50 g; Turmeric Powder - 5 g; Pepper- 5 g; Banana stem - 100 g; Common leucas -1 handful; Jaggery - 100 g.

Preparation:
(i) Soak pepper , cumin and mustard seeds for 30 mts. (ii) Blend along with other ingredients to form a paste.

Application:
(i) Roll the paste into small balls. (ii) Administer in small portions with salt once daily for 3 days.

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Tick/Ectoparasites

Ingredients:
Garlic - 10 pearls; Neem leaves - 1 handful; Neem fruit - 1handful; Accorus rhizome - 10 g; Turmeric powder - 20 g; Lantana leaves - 1 handful; Tulsi leaves - 1 handful.

Preparation:
(i) Blend all the ingredients. (ii) Add one litre of clean water. (iii) Strain with a fine sieve or muslin cloth.(iv) Transfer to a bottle attached to a sprayer.

Application:
(i) Spray on the entire body of the animal. (ii) Also spray on any cracks and crevices in the cattle shed.(iii) Application can also be done using a cloth dipped in the solution.(iv) Repeat once a week till the condition resolves. (v) Do the application only during sunny part of the day.

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Pox/wart/cracks

Ingredients:
Garlic-5 pearls; Turmeric powder - 10 g; Cumin seeds - 15 g; Sweet basil - 1 handful; Neem leaves - 1 handful; Butter(preferred) or ghee - 50 g.

Preparation:
(i) Soak cumin seeds in water for 15 mts. (ii) Blend all ingredients to a fine paste. (iii) Add butter and mix well.

Application:
(i) Apply on affected part as many times as possible till condition resolves. (ii) Apply after drying the skin surface.

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Allergy/Poisoning/Venomous sting/bite

Ingredients: For one dose
(Three Kings: as per Tamil traditional Siddha lore)
Betel leaves -10 no.s; Black pepper - 10 g; Salt - 10 g; Jaggery - as required.

Preparation:
(i) Blend the ingredients to form a paste. (ii) Mix with jaggery.

Application:
(i) Feed the dose in small portions (ii) Administer 3 doses daily for 2 weeks.

Note : Alternatively 2-3 drops may be instilled in eye every one hour in critical conditions (without jaggery).

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Hygroma (swelling of joints)

Ingredients:
Aloe vera - 100 g; Lime (Calcium hydroxide) - 10 g; Cissus quadrangularis stem - 100g; Turmeric Powder - 15 g; Garlic - 5 cloves; Gingelly oil - 1litre.

Preparation:
(i) Blend all the ingredients to a paste (ii) Boil in 1 litre gingelly oil and allow to cool.

Application:
(i) Apply four or five times a day on affected part. (ii) Give hot water fomentation twice daily.

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Cough

Ingredients: For one day
Adhathoda (Adusa) - 1 leaf; Tulsi - 1 handful; Garlic - 5 cloves; Turmeric Powder - 10 g; Pepper - 10 g; Jaggery - as required.

Preparation:
(i) Soak pepper for 15-20 minutes and grind separately (ii) Blend all the ingredients together to form a paste with jaggery.

Application:
Feed orally 2-3 times daily till the condition resolves.

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Downer (not able to get up)

Ingredients: For one dose
Desi chicken eggs - 2; Moringa leaves - 4 handfuls; Cissus quadrangularis - 4 handfuls; Jaggery - as required.

Preparation:
(i) Take fresh unboiled eggs (ii) Make a paste of Moringa and Cissus stem separately with jaggery.

Application:
(i) Feed 2 eggs (including shell) at a time, three times a day (make a small hole in the shell before feeding the egg). (ii) Feed moringa and cissus stem paste alternatively every 2 hours (four handfuls at a time) (iii) Do not attempt to lift the animal till the 4th day.

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Toxicity (Pesticide/HCN/Mycotoxin)

Ingredients:
Three kings : For one dose
Betel leaves - 10 nos; Black pepper - 10 g; Salt - 10 g; Jaggery - as required.
Other preparation: For one day
Tamarind - 1 Kg; Water - 1 Litre; Moringa extract from 1 Kg leaves.

Preparation:
Three kings preparation
(i) Blend Betel leaves, Black pepper and salt to form a paste (ii) Mix with jaggery.
Other ingredients preparation
(i) Soak tamarind pulp for 15 minutes. (ii) Extract the juice from the pulp (iii) Add water, moringa leaf extract and jaggery (iv) Mix it thoroughly.

Application:
(i) Give the first dose of three kings (ii) Feed 200 ml of the tamarind-moringa-jaggery as a thick slimy mixture every 2 hours (iii) Feed doses of three kings mixture in between.

Scan this QR code to view the video on YouTube

Blood in Milk

Ingredients: For one day
Curry leaves - 2 handfuls; Moringa leaves - 2 handfuls; Jaggery - 100 g; Lemon - 6 no.s

Preparation:
Blend curry and moringa leaves to a paste along with jaggery. Cut the lemon in two halves.

Application:
(i) Feed the paste twice daily till the condition resolves.
(ii) Feed two lemons at a time orally (cut in two halves) thrice a day for 3 days.

Note: Carry out EVM treatment for mastitis also.

Scan this QR code to view the video on YouTube

Anoestrus

Application:
Feed orally in fresh form in the following order along with jaggery and salt: (i) One white radish twice a day for 5 days (ii) One Aloe vera whole leaf twice a day for 4 days.(iii) Four handfuls of moringa leaves twice a day for 4 days. (iv) Four handfuls of cissus stem twice a day for 4 days. (v) Four handfuls of curry leaves with 5 gram turmeric Powder twice a day for 4 days.

Note: Carry out deworming 15 days prior to start of treatment.

Scan this QR code to view the video on YouTube

Lumpy Skin Disease

A For oral administrations
(to be fed alternatively at a gap of at least one hour)

1 First Preparation

Ingredients: (For one dose)
Betel leaves -10 nos.; Black pepper -10 g; Salt - 10 g; Jaggery - as required

Preparation:
- Blend to form a paste and mix with jaggery
- Feed the dose in small portions orally
- Feed one dose every three hours for the first day (Day 1)
- Feed three doses daily from the second day onwards for 2 weeks (Day 2 onwards)
- Each dose to be prepared freshly

B For external application
(if there are wounds)

Ingredients:
Acalypha indica leaves -1 handful; Garlic - 10 pearls; Neem leaves - 1 handful; Coconut or Sesame oil - 500 ml; Turmeric powder - 20 g; Mehndi leaves - 1 handful; Tulsi leaves - 1 handful.

2 Second Preparation

Ingredients: (For 2 doses)
Garlic - 2 pearls; Coriander - 10 g; Cumin - 10 g; Tulsi - 1 handful; Bay leaves - 10 g; Black pepper - 10 g; Betel leaves - 5 nos; Shallots - 2 bulbs; Turmeric powder - 10 g; Chirata leaf powder - 20 g; Sweet basil - 1 handful; Neem leaves - 1 handful; Aegle marmalos (Bell) leaves - 1 handful; Jaggery - 100 g

Preparation:
- Blend to form a paste and mix with jaggery
- Feed the dose in small portions orally
- Feed one dose every three hours for the first day (Day 1)
- Feed two doses daily (One in the morning and other in the evening) from the second day till condition resolves (Day 2 onwards)
- Prepare doses freshly daily

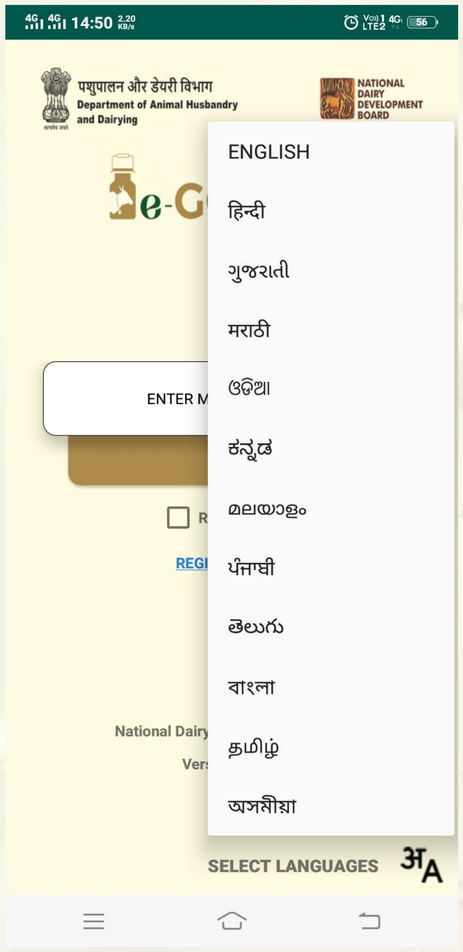
Preparation:
(i) Blend all the ingredients thoroughly. (ii) Mix with 500 ml coconut or sesame oil and boil and bring to cool.

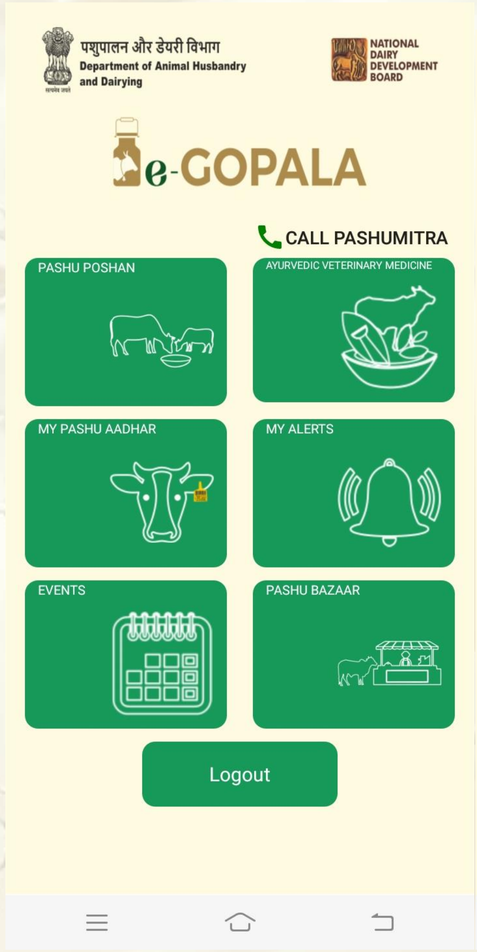
Application:
Clean the wound and apply directly.

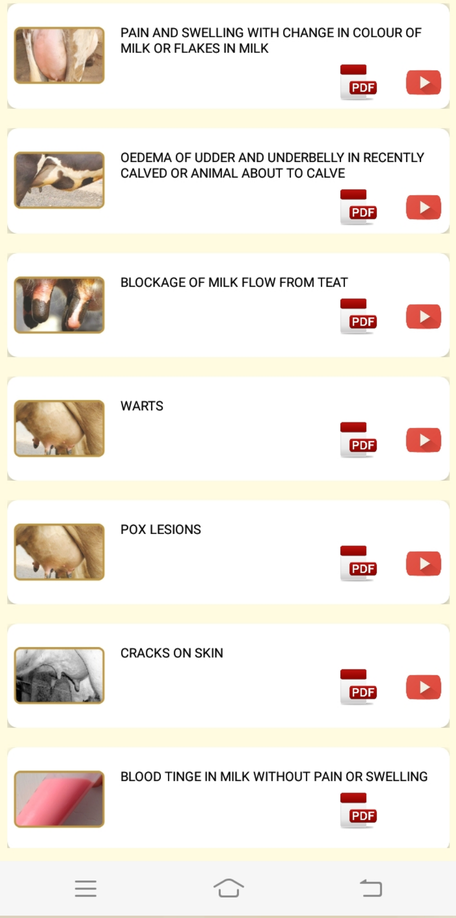
If maggots are seen:
Apply Anona leaf paste or camphorated coconut oil for the first day only if maggots are present.

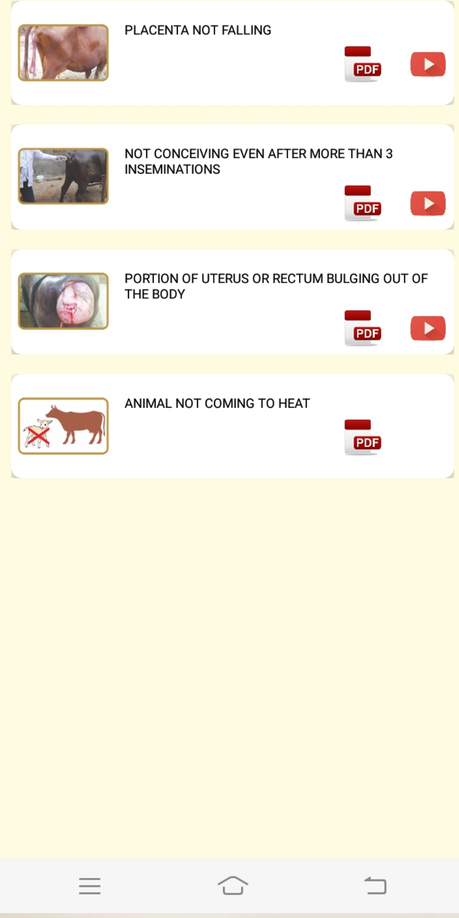
Scan this QR code to view the video on YouTube

Popularisation measures- eGopala





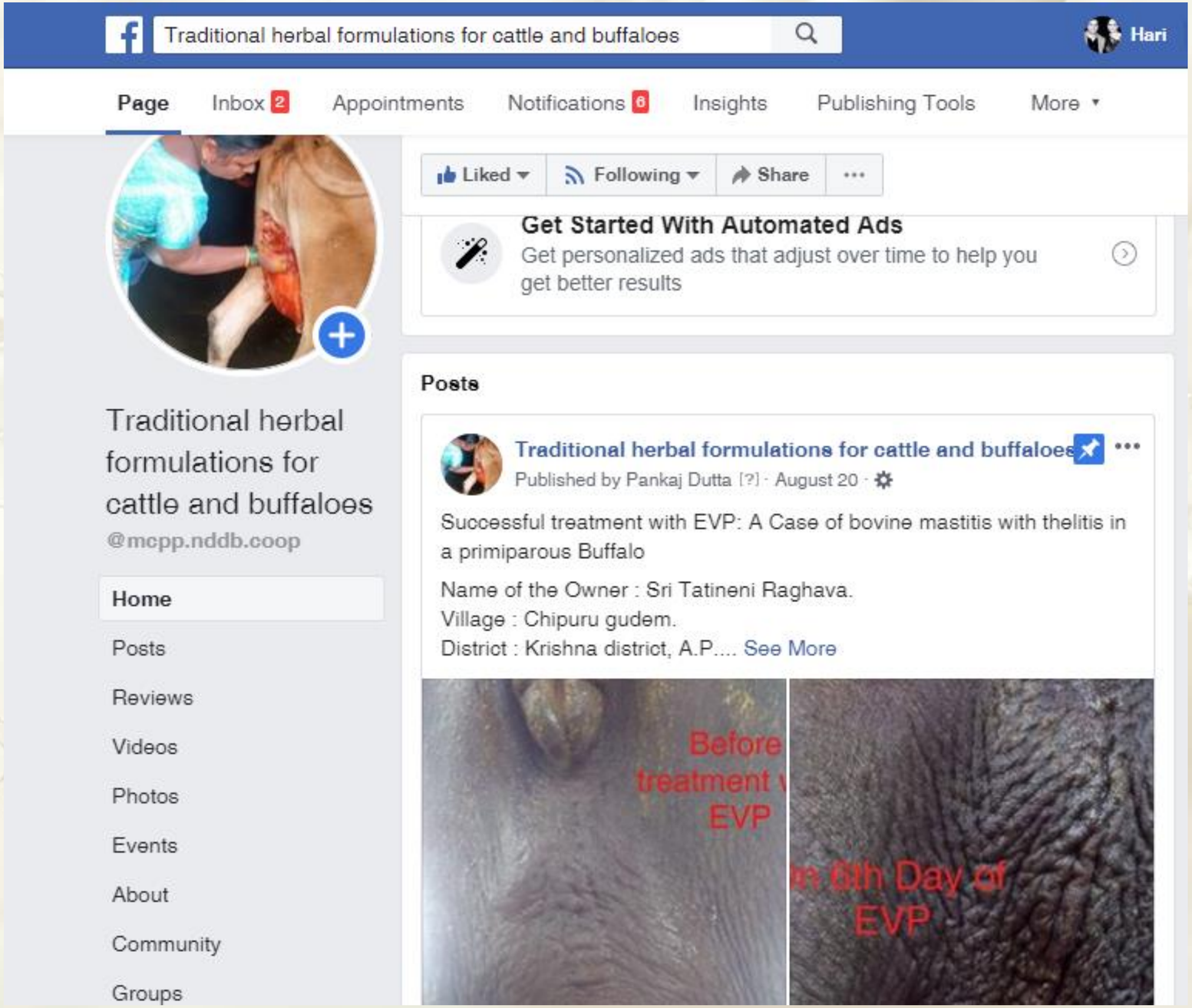




Farmer training (saplings provided)

Farmer exhibitions

Popularisation measures - Facebook page on success stories



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Management of common ailments of dairy animals with ethno-veterinary herbal preparations in Gujarat

P Dutta, AV Hari Kumar, SK Rana, SB Patel, DD Patel, KR Patel, N Punniamurthy, MNB Nair and GK Shrama

HEALTH – MASTITIS

Mastitis control: a sustainable model for the developing world

AUTHOR
S K Rana, A V Hari Kumar, Pankaj Dutta, K S N Leela Surendra, Vijay S Bahekar, Ponnanna N M, G K Sharma
National Dairy Development Board (NDDB) • India
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UN SDGs

SUMMARY

- Location: National Dairy Development Board's (NDDB) model for control of bovine mastitis titled Mastitis Control Popularisation Project (MCPP) is being implemented in more than 1500 dairy cooperative societies (DCS) across nine states in India (Figure 1) focusing on a simple, cost-effective, efficacious, environmentally friendly and sustainable approach.
- IDF Welfare Action Area: Animal Health management
- Resource based measures: (i) Reduction in treatment costs in bovine mastitis (ii) Dissemination of knowledge to the farmers, especially ethno-veterinary medicine (EVM) (iii) Management of many other common bovine ailments (other than mastitis) by EVM.
- Animal based measures: i) Increase in milk production (ii) High cure rates (iii) Non-invasive and therefore painless.

Indian J Dairy Sci 73(5): 383-391
https://doi.org/10.33785/IJDS.2020.v73i05.001

INVITED REVIEW

Ethnoveterinary medicine for responsible dairying

Dilip Rath[1], Girish Kumar Sharma[1] and Yogesh C Joshi[2]

Received: 17 September 2020 / Accepted: 23 September 2020 / Published online: 27 October 2020

GLOBAL AGENDA FOR SUSTAINABLE LIVESTOCK

Good practices for responsible use of antibiotics

Testing of pooled milk samples by California Mastitis Test (CMT) at Dairy Cooperative Societies

System 3. Mastitis prevention in effective and sustainable dairy production system

Mastitis is the most important disease in dairy production. It has been responsible for up to 85% of the antibiotics used. During the last decades, a successfully large improvement in udder health has taken place. Udder health mismanagement can threaten human health due to zoonotic or antimicrobial resistant pathogens adapting different environment. High quality milk with low somatic cell counts is crucial for product quality and better organoleptic quality for consumers. Good prevention, management and excellent animal welfare will reduce food loss in the whole chain from barn to table. A tailored plan for each country and herd should be applied.

Diminishing mastitis to limit antibiotic use

The Pharma Innovation Journal 2022; SP-11(1): 236-239

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Dr. Pankaj Dutta
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Case reports on management of LSD like conditions with ethno-veterinary practices

Dr. Pankaj Dutta, AV Hari Kumar, AC Mahajan, S Shroff, SK Rana, PJ Sahariah, P Gogoi, D Borah, N Punniamurthy and MNB Nair

Indian J. Comp. Microbiol. Immunol. Infect. Dis.
Vol. 42 (Special Issue) November, 2021: 83-87

Technical Article

USE OF ETHNOVETERINARY MEDICINE FOR MANAGEMENT OF COMMON AILMENTS OF DAIRY ANIMALS

S.K. Rana[1]*; A.V. Harikumar[1], P. Dutta[2], S. Shroff[1], S.K. Dash[1], N. Punniamurthy[1], M.N.B. Nair[2]

[1]National Dairy Development Board, PB No. 40, Anand-388001, Gujarat, India
[2]The University of Trans-Disciplinary Health Sciences and Technology, #74/2, Jarakabande Kaval, Post Attur via Yelahanka, Bengaluru-560064, Karnataka, India

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Dr. Pankaj Dutta
Manager (Animal Health),

Management of repeat breeding in bovine by herbal combination

Dr. Pankaj Dutta, Harikumar AV, Shroff SI, Rana SK, Mogale UV, Magare V, Punniamurthy N, Nair MNB and Gorhe SB

AccessAgriculture

Access Agriculture Panorama
No. 21 - April 2022

EcoAgtube

www.ecoagtube.org

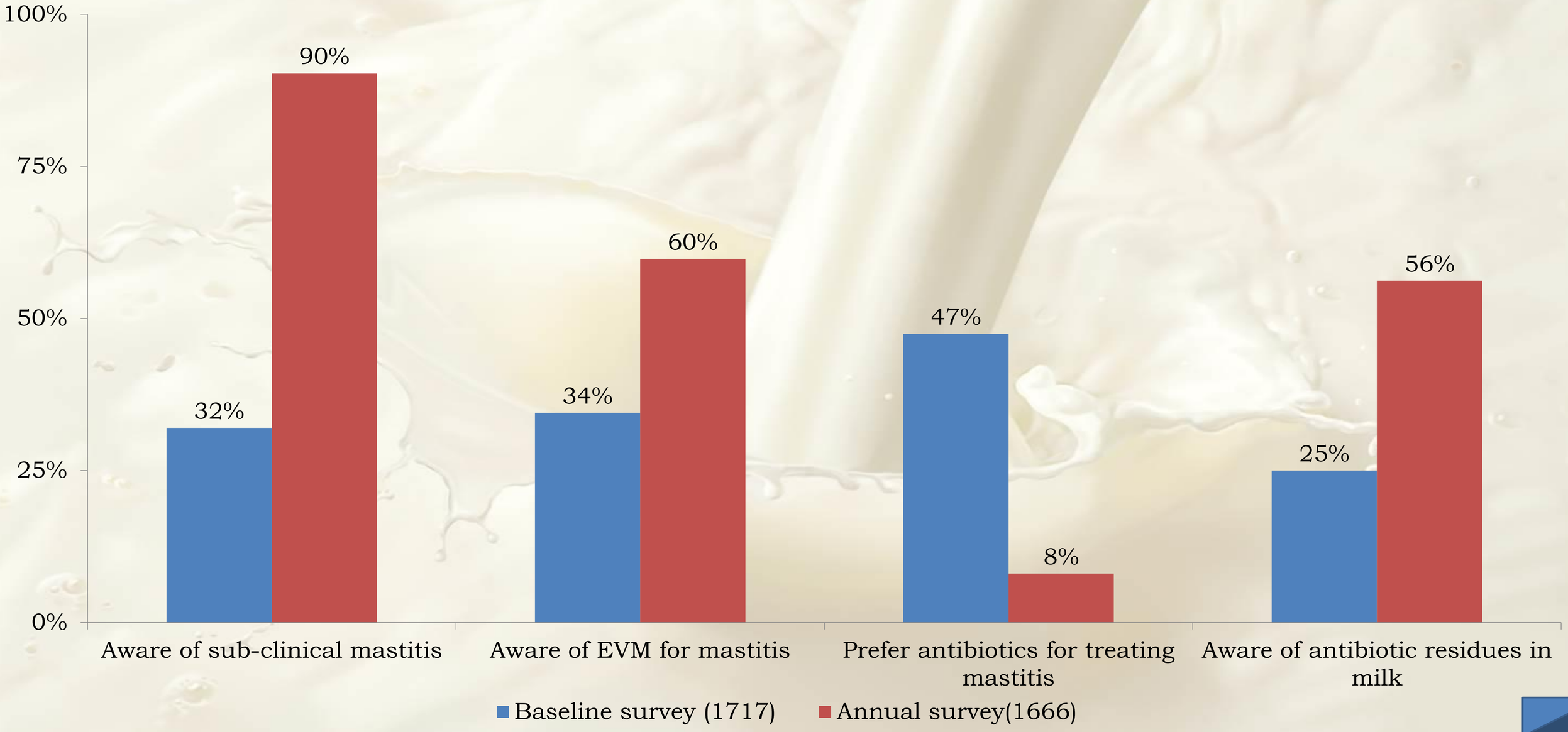
राष्ट्रीय डेरी विकास बोर्ड
NATIONAL DAIRY DEVELOPMENT BOARD

NDDB becomes EcoAgtube superstar

We are proud to announce that the organisation with the most video uploads on EcoAgtube currently is India's National Dairy Development Board (NDDB), with over 100 videos on a range of topics relating to dairy farming. The efforts of NDDB transformed India's rural economy by making dairying a viable and profitable economic activity for millions of milk producers.

If your Project relates to ecology and you want to create a Project video page on EcoAgtube, please send your request with details (Project name, description) to: support@ecoagtube.org.

Effect of field model on awareness levels



Training of vets from 34 MU/PCs on EVM



4 day training of vets at TDU, Bangalore on EVM and antibiotic residue field testing in 5 batches- May-Jun'17

Erode

Bangalore

Kolhapur

Vijayawada

Mehsana

Mysore

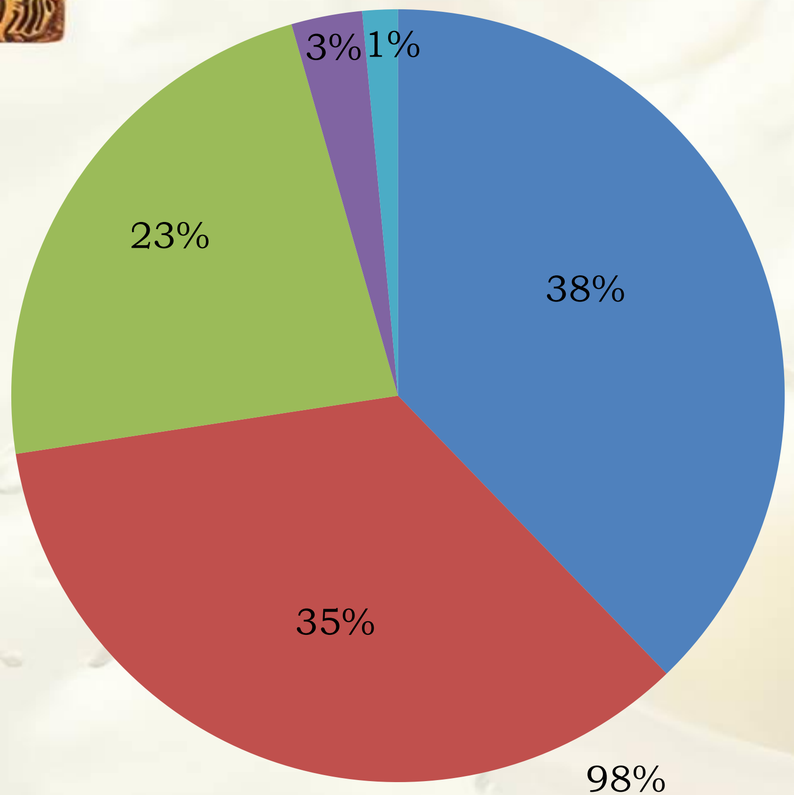
Mohali

The 4 day training at TDU followed by a 3 day field training at 7 locations across the country clubbing the unions as per regions for convenience – Aug-Sept'17

Training on monitoring antibiotic residues and other parameters in bulk milk

International Seminar on Veterinary Ayurveda – 17th December, 2018

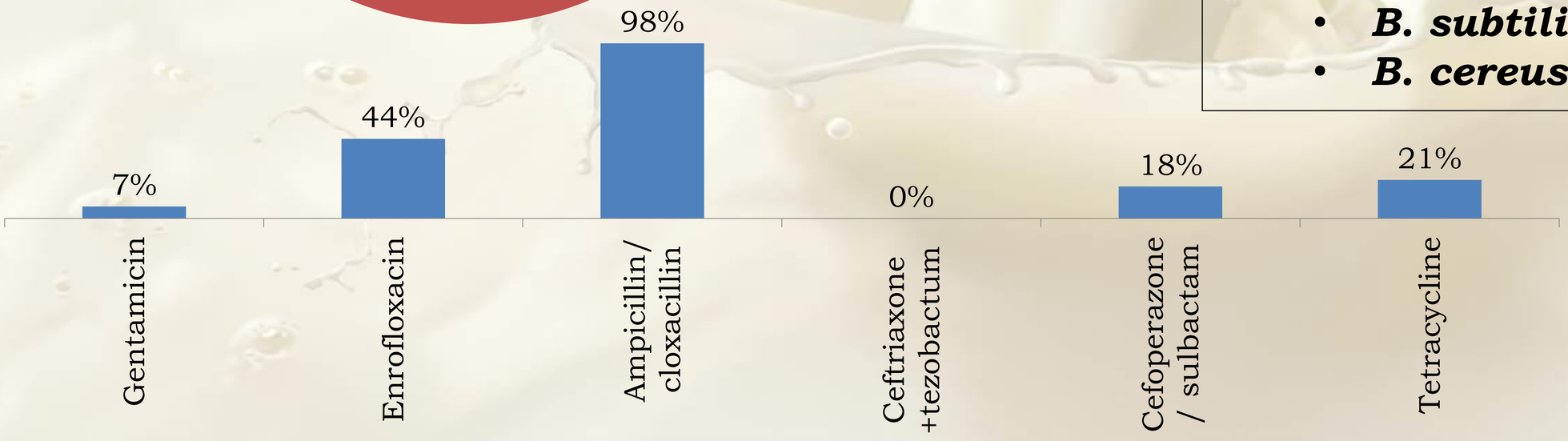
AMR pattern from clinical mastitis



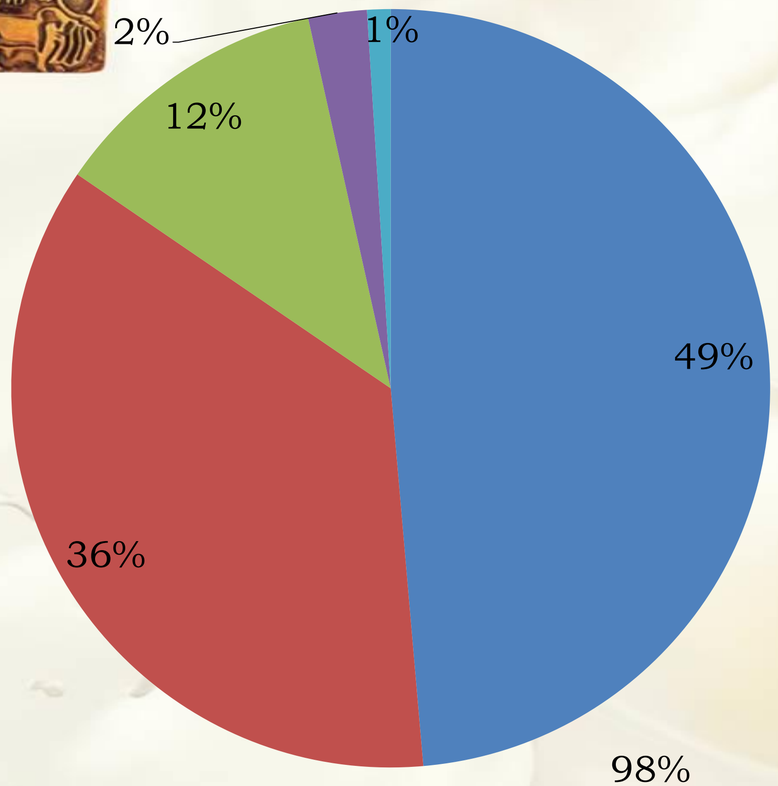
Resistant to :

- 1 antibiotic
- 2 antibiotics
- 3 antibiotics
- 4 antibiotics
- Sensitive to all antibiotics

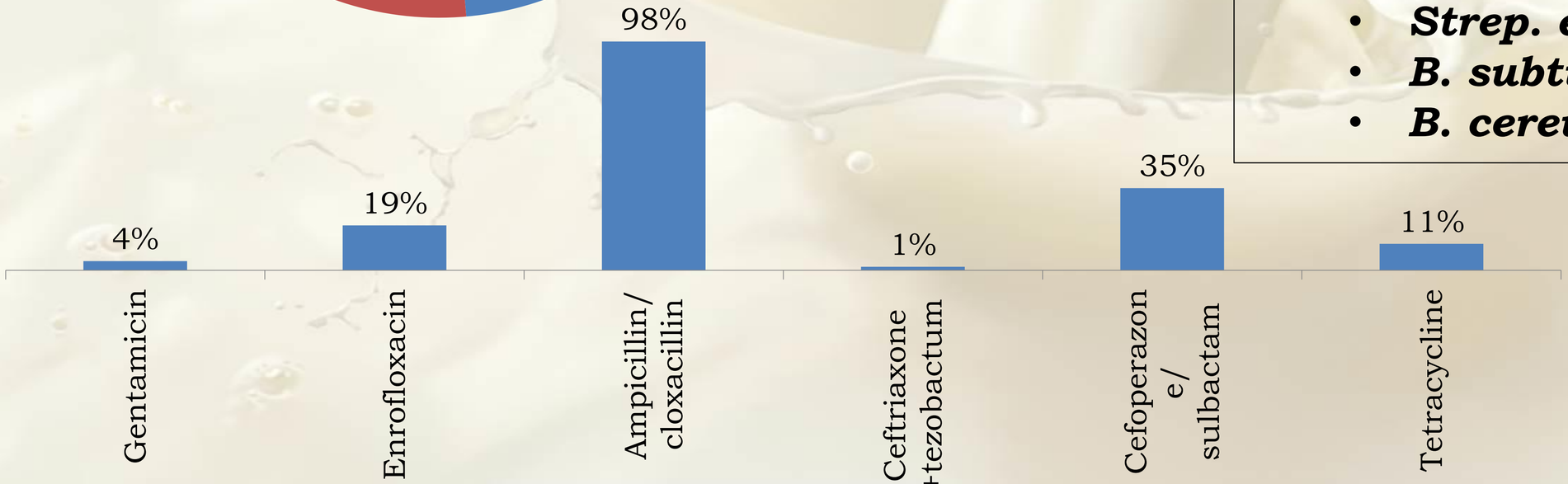
- **47 CM cases from 23 villages**
- **135 isolates**
- **11 types of bacteria:**
  - ***S. aureus***
  - ***Strep agalactiae***
  - ***Enterobacter.***
  - ***E. coli***
  - ***Klebsiella***
  - ***Strep. dysgalactiae***
  - ***S. intermedius***
  - ***S. epidermidis***
  - ***Strep. enterofaecalis***
  - ***B. subtilis***
  - ***B. cereus***



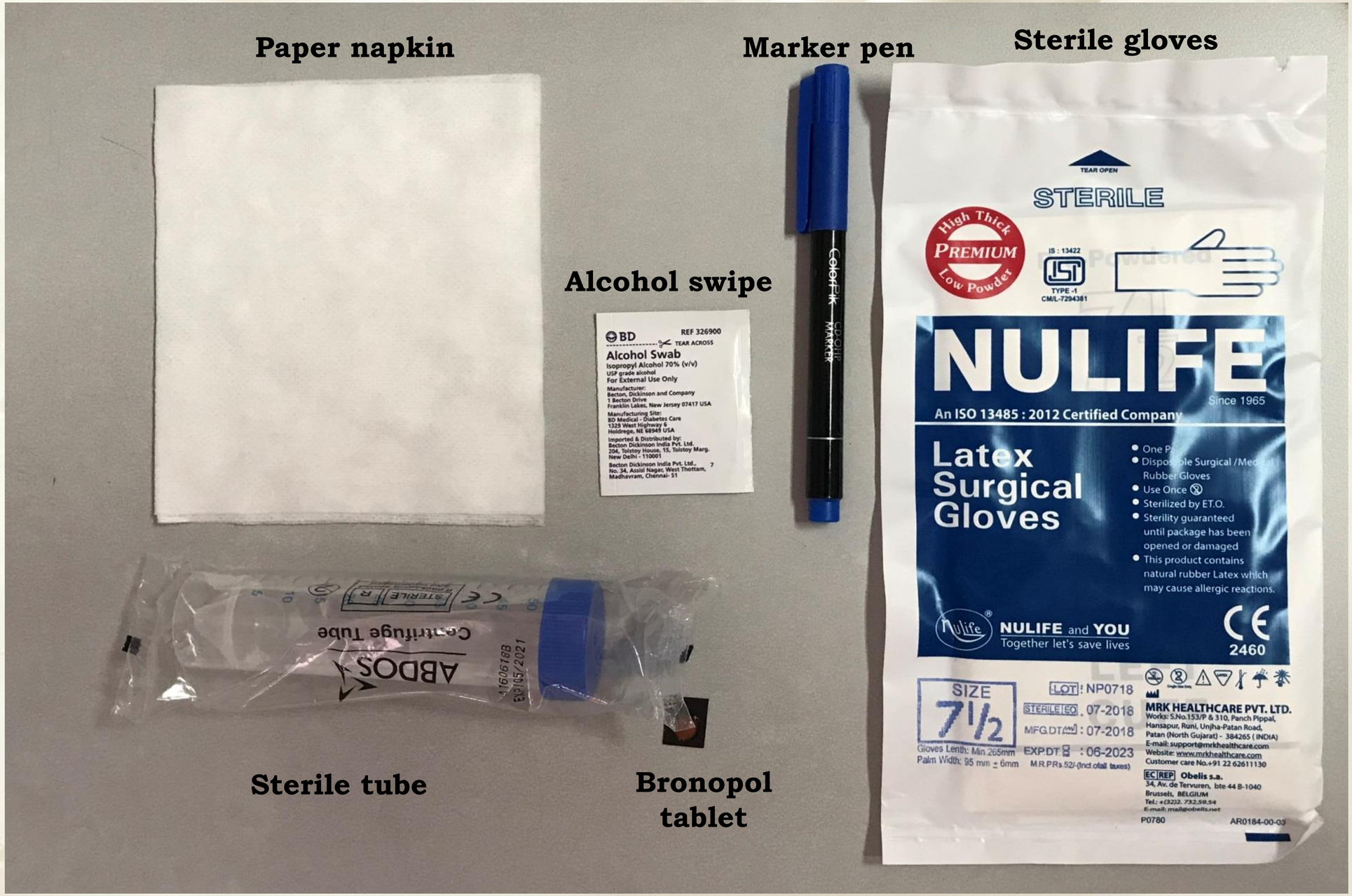
AMR pattern from sub clinical mastitis



- **115 SCM cases from 23 villages**
- **401 isolates**
- **11 types of bacteria:**
  - ***S. aureus***
  - ***Strep agalactiae***
  - ***Enterobacter.***
  - ***E. coli***
  - ***Klebsiella***
  - ***Strep. dysgalactiae***
  - ***S. intermedius***
  - ***S. epidermidis***
  - ***Strep. enterofaecalis***
  - ***B. subtilis***
  - ***B. cereus***



AMR surveillance – An AMR sampling kit contents



AMR surveillance - Instruction manual

Instruction for milk sample collection from mastitis cases	
Step 1: Wipe udder with napkin	Step 2 : Disinfect with swipe
	
Step 3: Open vial (wear gloves)	Step 4 : Secure the lid of vial
	
Step 5 : Add tablet into vial	Step 6: Collect milk (40 ml)
 Bronopol tablet 	
Step 7: Close lid tightly & mix	Step 8 : Label sample (dry area)
	
Please read the MCPP SOP document for further details	

Transport & Storage and, description of label content along with example given over leaf

Transport and storage

- Transport sample in **cold chain** (2-8°C).
- **Freeze** the sample once it reaches the centralized location.
- **Intimate** the courier agency on the same day on the mobile number provided by NDDB.

Label Description
Date of Collection (DD/MM/YY)
Unique DCS code (As provided in MCPP reporting system)
Species: C- Cattle B-Buffalo
Farmer member code at society (from whose animal sample is collected)
Quarter from which collected (as applicable): LF (Left Fore); LH (Left Hind); RF (Right Fore); Right Hind (RH) and Composite (C) if from more than one quarter.
Precaution: Use only a marker pen for labelling

Label Example
04/07/18
SAB01
C
3256
LF

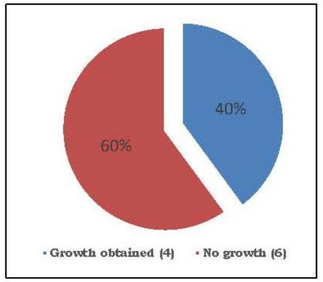
AMR Studies- Reports

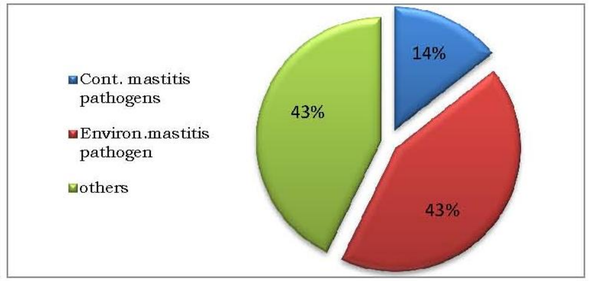
No.of samples dispatched : 10 No.of samples tested: 10

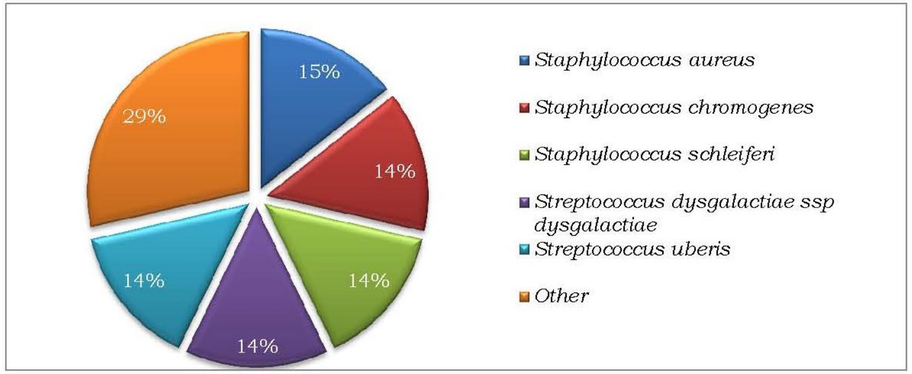
Tested at : NDDB R & D Laboratory, Hyderabad

Result

1. Isolates







2. Antibiogram

Bacterial isolates (Gram +ve)	Penicillin G [P]*	Ampicillin [AMP]*	Amoxicillin [AMX]*	Cloxacillin [COX]*	Methicillin *	Oxacillin#	Cefazolin#	Cefoxitin#	Cefotaxime [CTX]*	Ceftriaxone [CTR]*	Clindamycin#	Linezolid#	Daptomycin#	Erythromycin#	Gentamicin#	Levofloxacin#	Moxifloxacin#	Nitrofurantoin#	Norfloxacin #	Rifampin#	Teicoplanin#	Tetracycline [TE]*	Oxytetracycline [O]*	Chloramphenicol [C]*	Ciprofloxacin [CIP]*	Ofloxacin [OF]*	Enrofloxacin [EX]*	Sulphadimidine [SZ]*	Vancomycin#	Ceftazidime/clavulanic acid[CAC]*	Cefriaxone + Sulbactum [CIS]*	Ceftriaxone + Tazobactam [CTT]*	Trimethoprim-Sulfamethoxazole*	Quinupristin-dalfopristin#
Staphylococcus aureus	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Staphylococcus chromogenes	S	S	S	I	I	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	R	I	S	S	-
Staphylococcus schleiferi	S	S	S	S	R	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	I	S	S	S	-

Name of antibiotic	Penicillin G */#	Ampicillin [AMP]*	Amoxicillin	Cefepime#	Cefotaxime #	Cefotaxime [CTX]	Ceftriaxone	Chloramphenicol#	Clindamycin#	Erythromycin#	Levofloxacin#	Linezolid#	Meropenem#	Tetracycline	Oxytetracycline	Chloramphenicol	Ofloxacin [OF]*	Vancomycin #
Streptococcus dysgalactiae ssp dysgalactiae	S	S	S	S	S	S	S	S	S	S	S	S	S	I	S	S	S	S
Streptococcus uberis	S	S	S	-	-	R	R	-	-	-	-	-	-	R	R	S	S	-

AST by MIC method

* AST by disc diffsion method

Resistant Sensitive Intermediate

Note: The results are only indicative since the sample size is very small. Continuous sampling would be required to generate meaningful data.