

National Brucellosis Control Program - Progress, Lessons learned, Challenges, and Way Forward

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Brucellosis Control in the Asia Pacific Region
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WORLD ORGANISATION FOR ANIMAL HEALTH
Protecting animals. preserving our future

Brief background of brucellosis situation in India

❖ Livestock population (20th Livestock census 2019):

- Total: 536.76 million
- Cattle: 193.46 million,
- Buffaloes: 109.85 million
- Goats: 148.88 million
- Sheep: 74.26 million
- Pigs: 9.06 million) -

❖ About 80.83 million households are dependent upon either Cattle or Buffalo

❖ High Brucella seropositivity states

- Punjab
- Karnataka
- Gujarat
- Maharashtra
- Rajasthan
- Uttar Pradesh
- Andhra Pradesh

Species	Sero-positivity
Sheep	11.55%
Cattle	8.3%
Goats	5.37%
Pigs	4.3%
Buffalo	3.6%

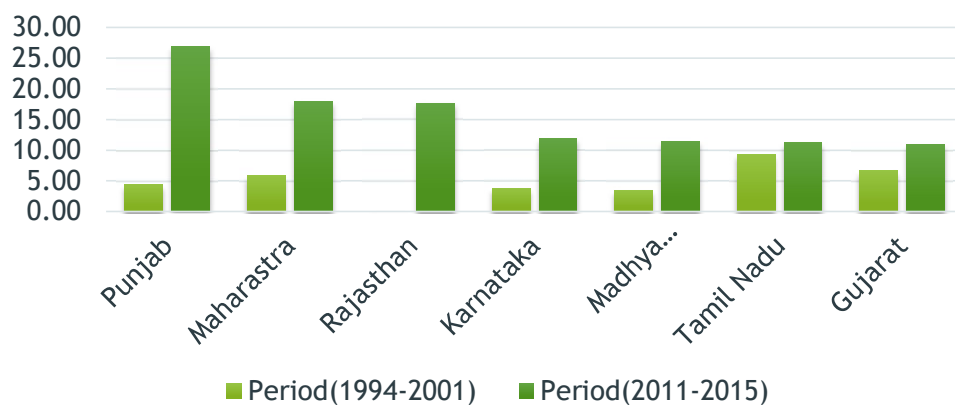
- 117 *Brucella* isolates analysed by MLST, five known sequence types (ST) were detected: *B. abortus*: ST1 and ST5, *B. melitensis*: ST7 and ST8 and *B. suis*: ST14

Brucellosis in Cattle in India

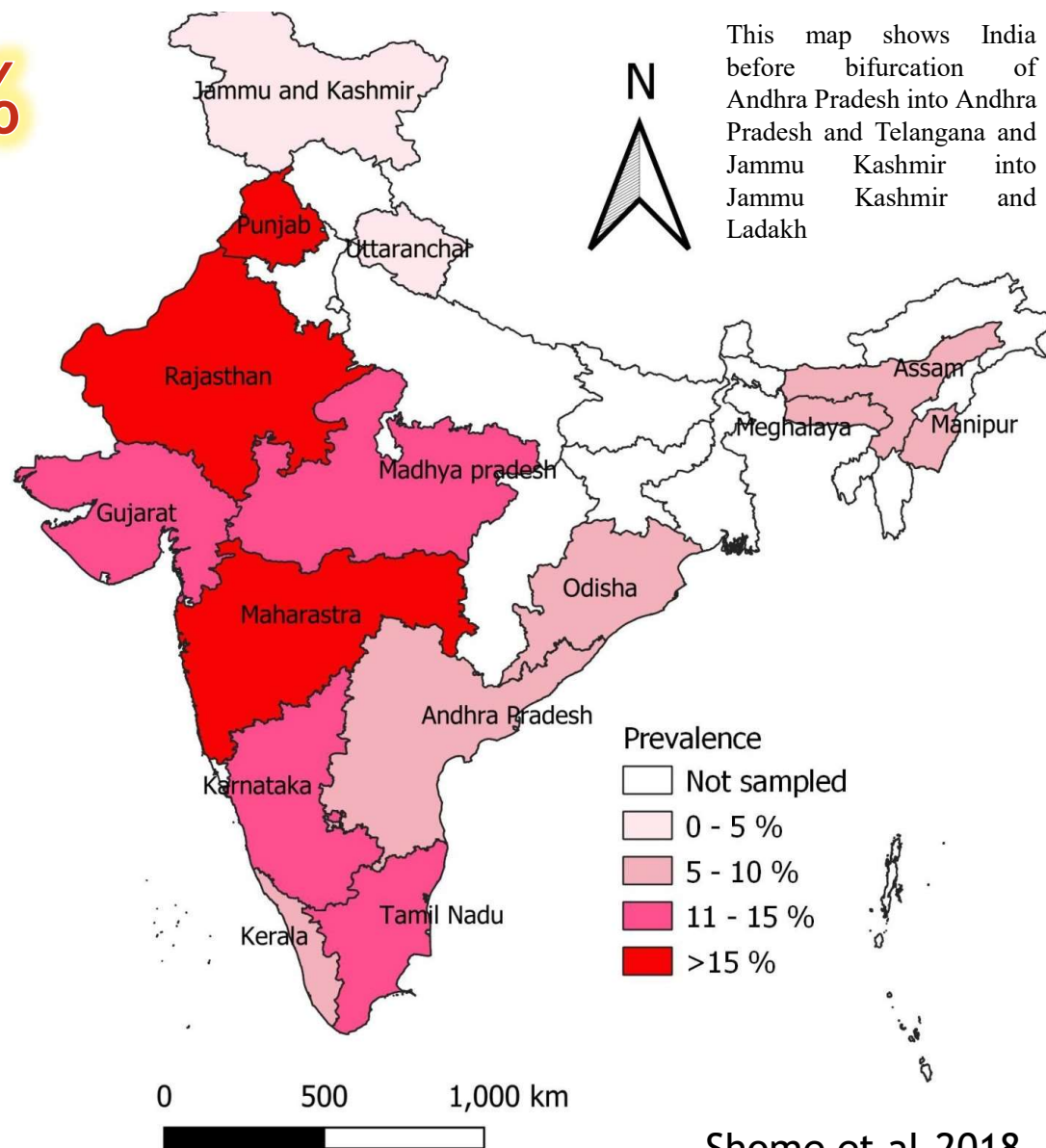
States with high Sero-Positivity

States	Sero-Positivity
Punjab	26.86
Maharashtra	17.95
Rajasthan	17.65
Karnataka	11.86
Madhya Pradesh	11.44
Tamil Nadu	11.18
Gujarat	10.96

Trend of Brucellosis in Cattle



8.3 %



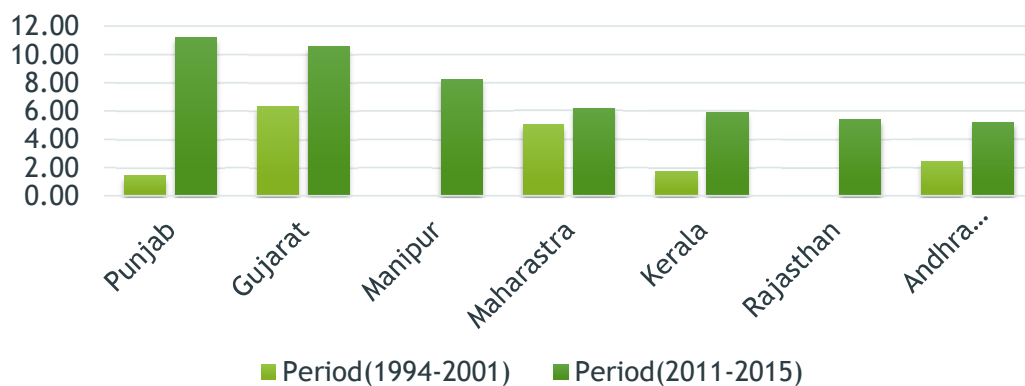
Shome et al.2018

Brucellosis in Buffaloes in India

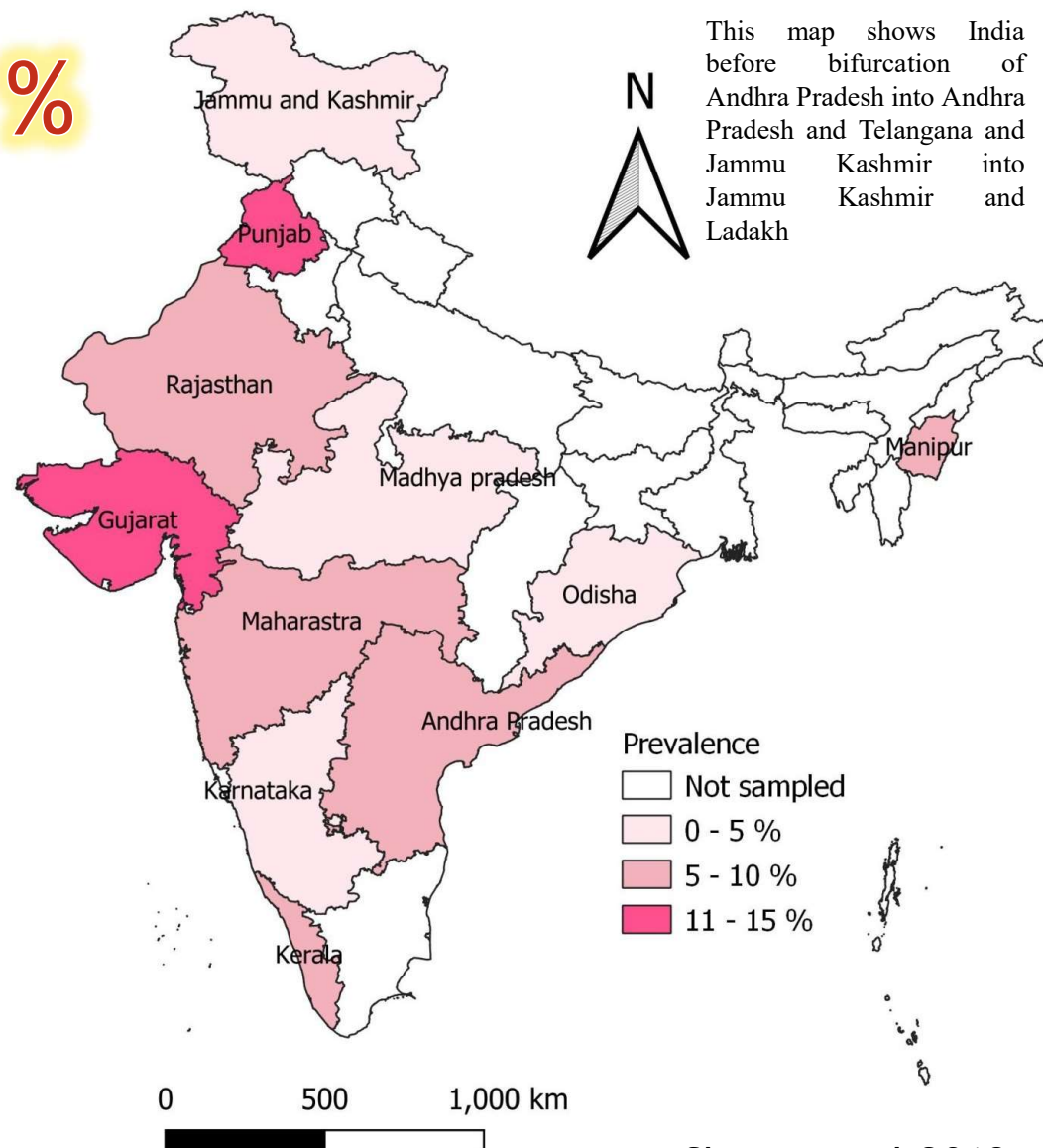
States with high Sero-Positivity

States	Sero-Positivity
Punjab	11.18
Gujarat	10.55
Manipur	8.22
Maharashtra	6.21
Kerala	5.88
Rajasthan	5.36
Andhra Pradesh	5.17

Trend of Brucellosis in Buffaloes



3.6 %



This map shows India before bifurcation of Andhra Pradesh into Andhra Pradesh and Telangana and Jammu Kashmir into Jammu Kashmir and Ladakh

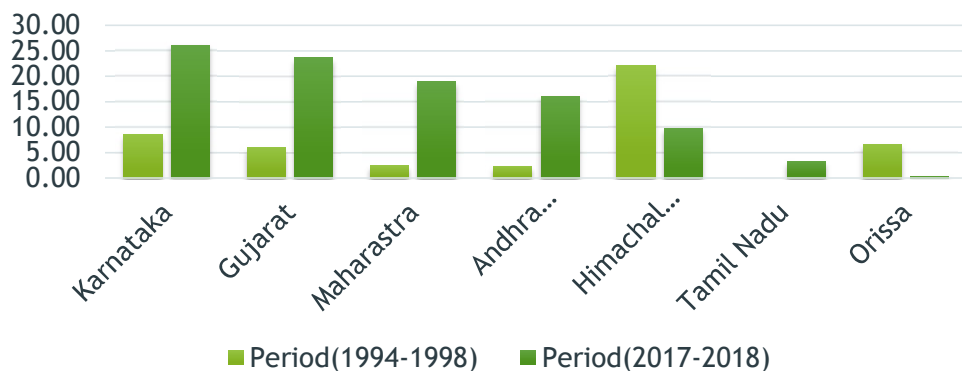
Shome et al.2018

Brucellosis in Sheep in India

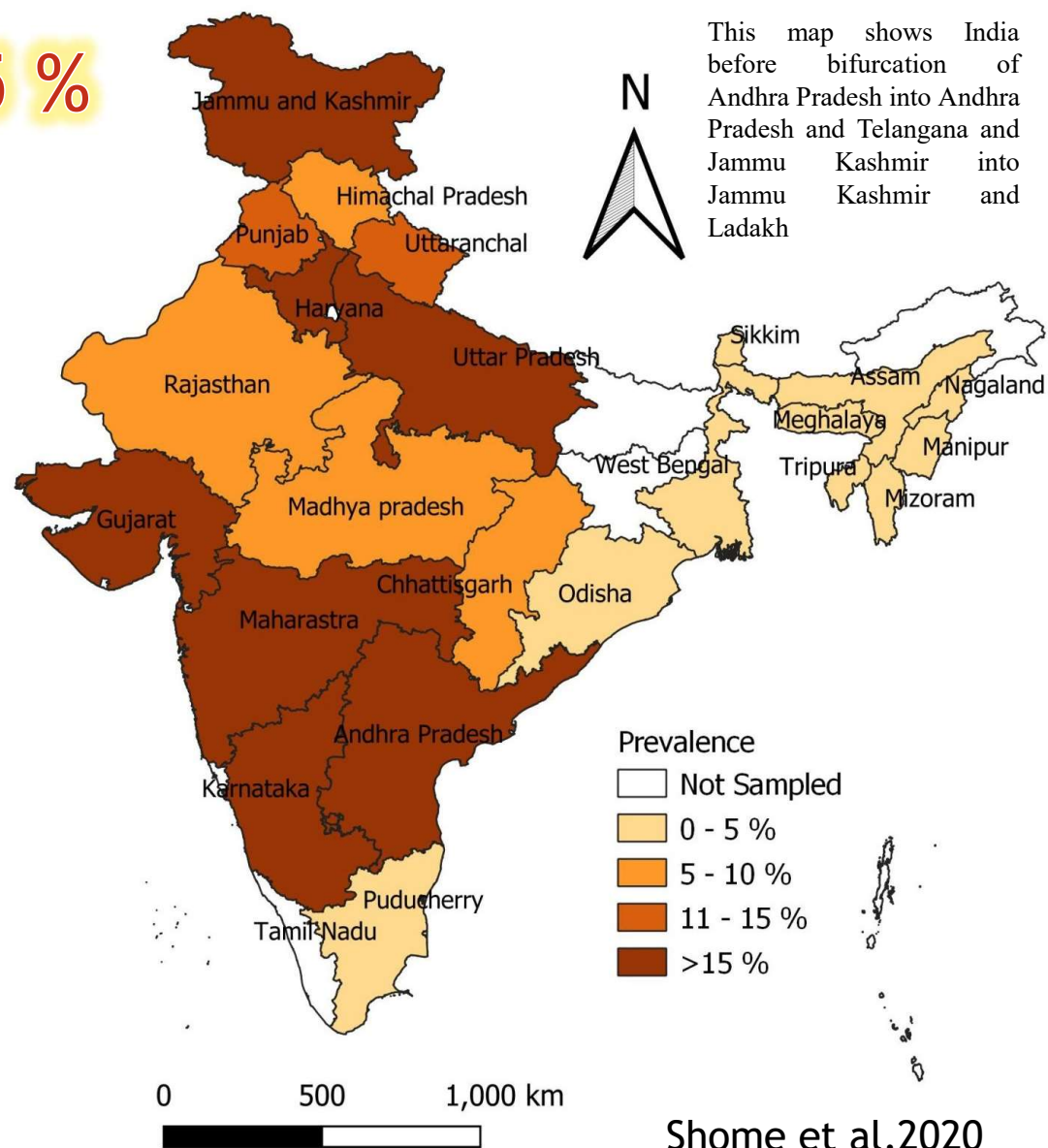
States with high Sero-Positivity

States	Sero-Positivity
Karnataka	26.12
Gujarat	23.57
Maharashtra	18.83
Uttar pradesh	16.79
Haryana	16.72
Andhra Pradesh	16.10
Jammu and Kashmir	15.04
Uttaranchal	13.73
Punjab	12.16

Trend of Brucellosis in sheep



11.55 %



Shome et al.2020

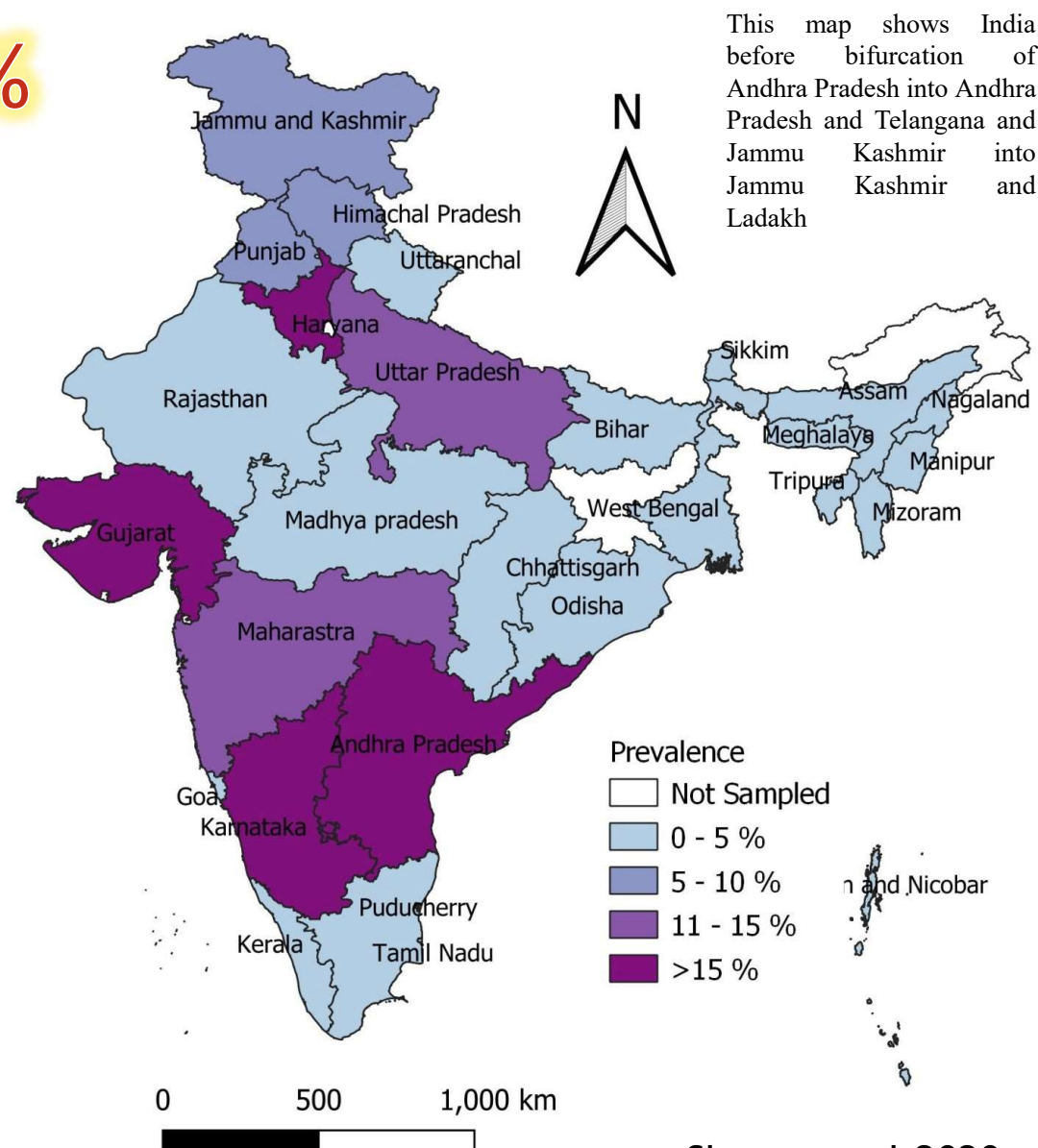
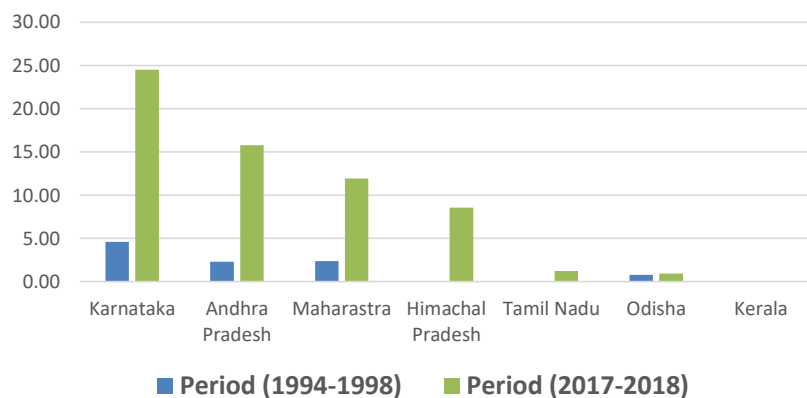
Brucellosis in Goat in India

5.37 %

States with high Sero-Positivity

States	Sero-Positivity
Karnataka	24.51
Haryana	17.18
Gujarat	17.11
Andhra Pradesh	15.79
Uttar Pradesh	12.41
Maharashtra	11.92

Trend of Brucellosis in goats



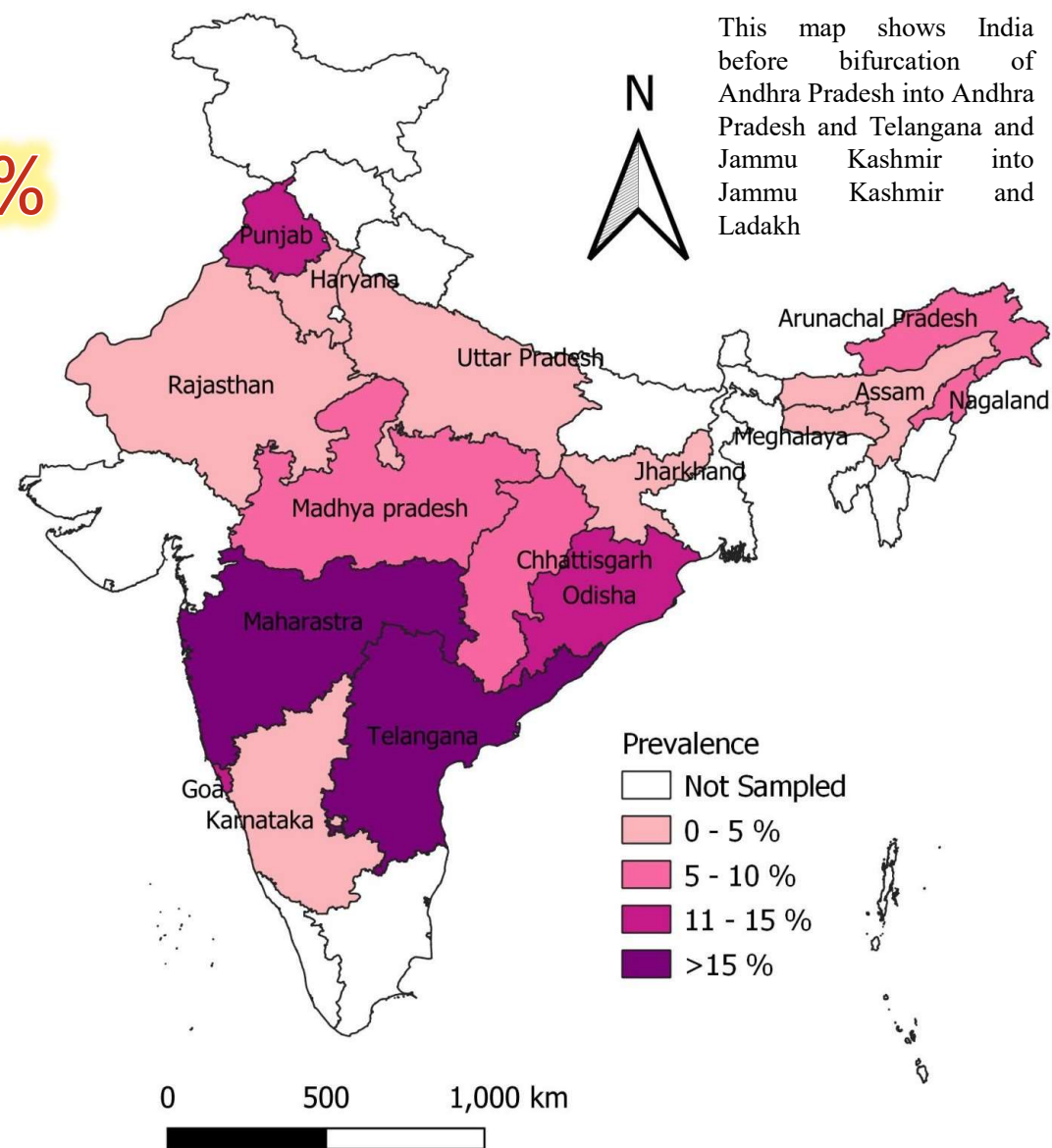
Shome et al.2020

Brucellosis in Pigs in India

4.3 %

States with high Sero-Positivity

States	Sero-Positivity
Karnataka	24.51
Haryana	17.18
Gujarat	17.11
Andhra Pradesh	15.79
Uttar Pradesh	12.41
Maharashtra	11.92



ICAR-NIVEDI Annual report 2019

Human brucellosis in India

- Reported from almost all states
- Prevalence: 1.8% in non-occupational & 2.2
- Farmers, animal handlers, veterinarians, para-veterinarians, abattoir workers at risk
- In a study of 90 cases, 12 cases were diagnosed as neuro-brucellosis

Economic Implications of Brucellosis in India

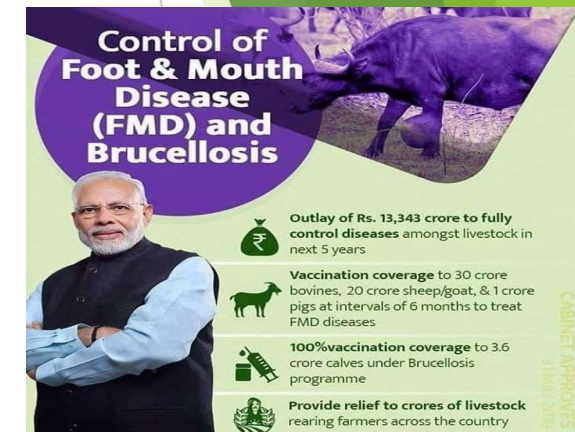
- ❖ Total economic losses - US \$3.4 billion, of which 95.6% is constituted by Cattle and Buffaloes
- ❖ Abortions - Prevention of abortions can add 2.63 million new female calves and increase milk production by 5% per annum (valued at US \$ 387.4 and US \$ 1162.3 million, respectively)
- ❖ Reproductive problems - Annual economic cost of INR 3,963 (USD 59.0) million in Assam and INR 30,500.0 (USD 453) million in Bihar with average cost per animal at INR 2,425 (USD 36) in a year.
- ❖ Human brucellosis - US \$ 9.06 million, loss of 0.29 and 0.13 DALY*/1000/year for occupational and nonoccupational respectively

*DALY - Disability-adjusted life years

**Singh *et al*, 2018

Key components of India's National Brucellosis Control Program

- ❖ Brucellosis Control Program (B-CP) since 2012 in endemic areas (15 states)
- ❖ Vaccination of 4-8-months old female calves with Brucella S19 vaccine
- ❖ Sero-positivity ~ 49.11% (2015-19)
- ❖ Need to increase vaccination coverage to achieve herd immunity
- ❖ National Animal Disease Control Programme (NADCP) for control of FMD and Brucellosis in 2019 - 100% vaccination - launched in 2019



National Animal Disease Control Programme for Brucellosis (NADCP-Brucellosis)

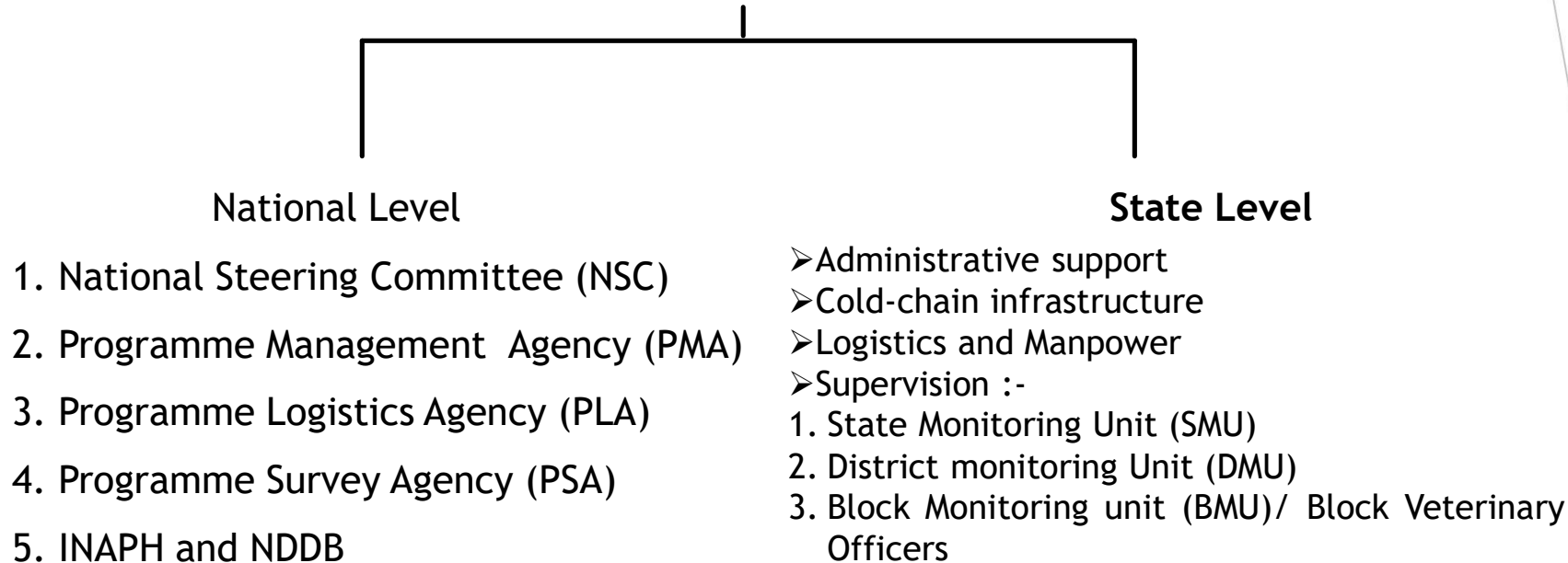
- ❖ Control Brucellosis by 2025
- ❖ 100% Funding from Govt of India

Key Features

- Mass Vaccination of bovine calves
- Once in lifetime vaccination of all female calves (4-8 months)
- *B. abortus S-19 strain* vaccine
- Grant to strengthen laboratories and remuneration for vaccinations
- Publicity and awareness campaigns till block level
- Post vaccination Seromonitoring by two stage sampling scheme
- Recording in Central database with unique ID eartags

Programme Implementation and Monitoring

Different agencies involved in program implementation and their roles



EVALUATION: At the end of two years (2021-22) and five years (2023-24) by an independent third-party agency.

Key Achievements of Brucella Control Programme

- ❖ India developed “*Brucella abortus* S19Δ per vaccine” for cattle and buffaloes.
- ❖ It is a modified strain of *B. abortus* S19 developed by altering lipopolysaccharide (LPS) structure of the organism through deletion mutation.
- ❖ Has several advantages over the conventional S19 vaccine in terms of safety, potency and DIVA capability (ability to differentiate between naturally infected and vaccinated animals).
- ❖ Technology transferred.
- ❖ The vaccine could be critically important in the years to come.

Lessons Learnt from Brucella Control Programme

- ❖ 49.11% sero-positivity among cattle and buffaloes from 15 states
- ❖ ICAR -NIVEDI - National level surveillance and reporting
- ❖ Surveillance of Human brucellosis at human-animal interface to be proactively undertaken.
- ❖ KAP studies indicate - Good knowledge amongst dairy farmers about Brucellosis (96.6%,) and its zoonotic importance (99.2%)
- ❖ Less knowledge amongst small ruminant farmers.
- ❖ Awareness creation among the farmers will play a key role in control of brucellosis.
- ❖ Strengthening of Infrastructure for diagnosis of brucellosis is critical

Way Forward in Accelerating Brucellosis Control

- ❖ Brucellosis OIE referral center for India
- ❖ Collaboration between the human and veterinary research facilities
- ❖ Knowledge and capacity building of all relevant stakeholders/ medical doctors/ Vets/ farmers/ public
- ❖ Through awareness and adopting hygiene animal handling practices
Improved surveillance and reporting in human and animal population

Way Forward in Accelerating Brucellosis Control

- ❖ Brucellosis Control in small ruminants, pigs and other species
- ❖ Vaccine for small ruminants and pigs
- ❖ Notification and investigation of all Abortions in animals
- ❖ Strengthening of diagnostic and lab Testing capabilities
- ❖ Accreditation of Labs for Brucellosis research and diagnosis.

Acknowledgements

- ▶ Indian Council of Agricultural Research - Division of Animal Science
- ▶ NIVEDI - National Institute of Veterinary Epidemiology and Disease Informatics