

*Use of biotechnology for  
sustainable intensification  
of sheep rearing on the  
Deccan plateau in India*

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# *Outline of presentation*

- Introduction to NARI and the AH Division
- Deccani sheep production system and constraints
- Causes and procedure of FecB gene introduction and dissemination
- Management and advantages
- Conclusions





- Established in 1968 by Mr. B.V. Nimbkar
- Registered Public Trust (NGO)
- Non-profit Research and Development Institute
- Governed by
  - Board of Trustees
  - Governing Council
- Three main areas of work
  - Crops
  - Livestock (sheep and goats)
  - Renewable energy
- About 90 funded projects undertaken so far

# *Animal Husbandry Division*

- Established 1990.
- Small ruminant development to improve efficiency of resource use and incomes
  - A centre for help and information to goat and sheep rearers: AI, veterinary care, nutrition, management
  - Introduction of the Boer goat breed from southern Africa into India and crossbreeding with local village goats
  - Sustainable internal parasite control research
  - Introgression of the FecB gene into Deccani sheep: CSIR 2007 Award for 'Science and Technology Innovations for Rural Development'
  - Research on new nutritious fodder plants and trees

# *Setting the scene: Deccani sheep*

- Maintained by smallholders in 3 south Indian States
- Deccani sheep population 20 million
- Grazed on crop residues, fallow lands, road verges, range lands: supervised grazing
- Housed in open sheds at night
- Sale of lambs major source of income
- 2% of ewes have twins
- Lambs sold at 3.5 months at 10-15 kg
- First genetic improvement initiative to increase prolificacy and efficiency

# *Changing environment faced by sheep rearers*

- Declining grazing resources and reduced productivity of existing grazing areas
- Increasing difficulties in migration
- Increasing demand for and price of live sheep and sheep meat
- Need to fulfill protein nutrition requirements of a growing population
- Sheep rearing still a profitable livelihood option
- Need to increase productivity and efficiency of resource use







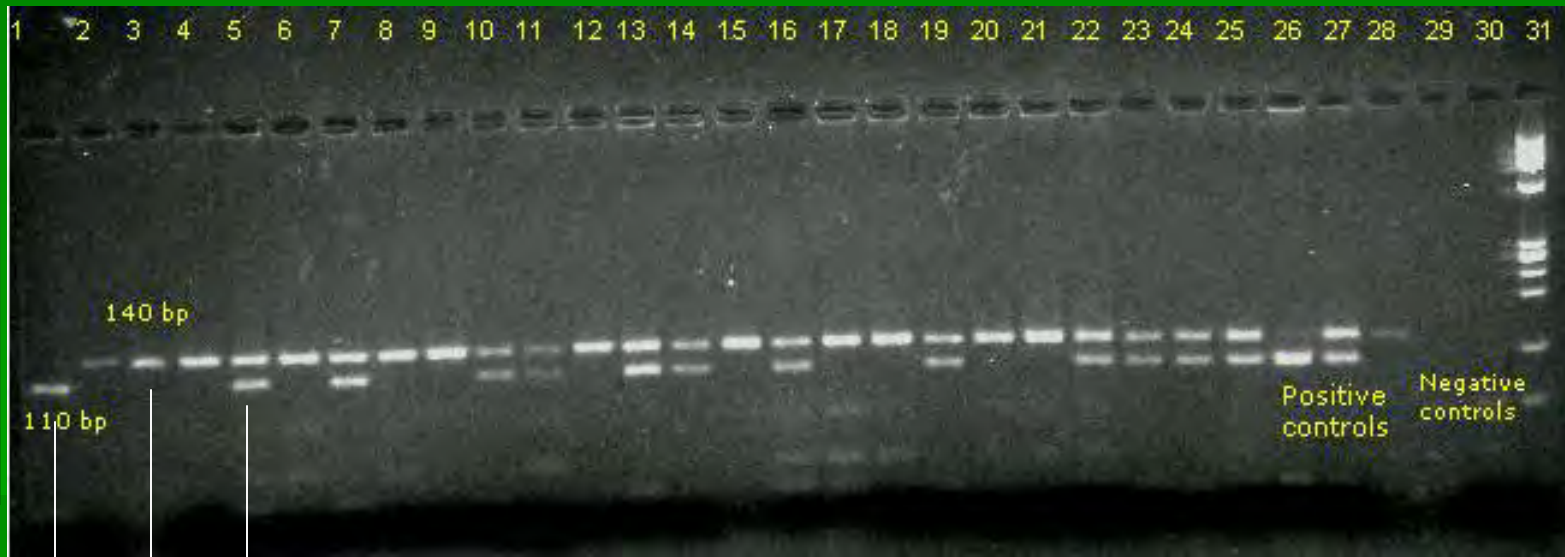
# *Why prolificacy improvement?*

- 95% income comes from sale of lambs
- Increasing demand and price for lambs
- Personal supervision and management
- Cross fostering of lambs common practice
- Moderate increase in litter size would be profitable

# *Introduction of FecB mutation from Garole sheep*

- FecB: Single base mutation
- Increases ovulation rate and therefore litter size by about 60%
- Mutation introduced through crossbreeding
- Two generations of backcrossing needed to reduce other undesirable features of Garole
- Use of DNA test for detection of mutation
- Five years preparation, ten years breeding, five years publicity, extension and dissemination

# *Gel photo for detecting the FecB mutation*



BB

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B+



Garole ewe



NARI Suwarna



NARI Composite

# *Dissemination*

- Introduction of rams into local flocks
- Two years to see results
- Resistance to change
- Now 250 FecB carrier ewes in 10 flocks
- Shepherds' ingenious solutions to problems



# *Dissemination of 100 B+ ewes to smallholder sheep owners - 13 January 2010*



**Loans from State Bank of India**

# *Advantages of FecB introduction*

- FecB carrier ewes adapted to local harsh conditions of grazing
- 30-50% increase in
  - number of lambs available for sale
  - total weight of lambs produced per ewe
- can maximize benefit with a little expenditure on supplementary feeding
- Therefore 30-50% increase in net income





**Lamb management in local flocks**

# *Conclusion*

- Increase in litter size moderate, manageable and profitable in smallholder flocks
- Genetic improvement is permanent.
- New strain needs to be registered.
- Approach should be cautious and considered.







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