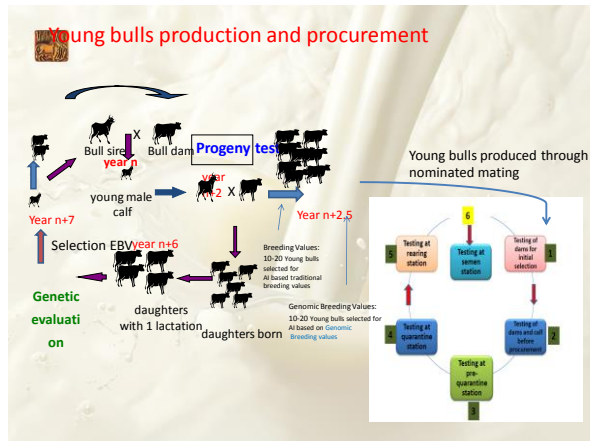


Dissemination of Genetics

Dissemination of Genetics

- Bull calves for semen production
- Quality frozen semen production
- AI
- Sexed Semen
- Exploiting elite cows – ET and OPU-IVF

Young bulls production and procurement



Minimum standards for male calves

- All bull calves selected through nominated mating should have confirmed parentage through DNA testing.
- Both bull calves that are procured and their dams should be free from TB, JD, Brucellosis, and any physical deformities.



Pre-quarantine

If calf picked up before 3 months of age, it goes to pre-quarantine station; should be away from quarantine and main semen station; pure HF and Jersey and crossbreds could be picked up within two weeks after birth.

At pre-quarantine station:

- Inject Oxytetracycline on day of arrival and once repeat after one week
- Inject Ivermectine on arrival and once after a month or De-worm orally after 7-10 days, repeat dose every month till 6 months
- Coccidiostat daily in water during first 21 days
- After two months, test for TB, JD, brucellosis and IBR, cull if +ve
- If IBR & brucella antibody titres go down after seven months, animals go to quarantine station.
- Monitor Growth of calves
- General calf management



1/3/2019

NDOB

5



Quarantine

(preferably 5 km away from main semen station)

Duration of quarantine: 120 days

- Test for TB & JD; if +ve cull
- Test for brucellosis by serum ELISA, if +ve cull
- Vaccinate against FMD, HS, BQ, Anthrax in endemic areas, and theileriosis for CB and exotic cattle
- De-worm



1/3/2019

NDOB

6



Rearing

Rearing till maturity

- Six monthly testing till maturity against TB, JD, and brucellosis; cull if +ve
- Vaccination against FMD, HS, BQ etc. as per protocol
- Other minimum standard protocol measures as described in the manual prepared by GoI (CMU)



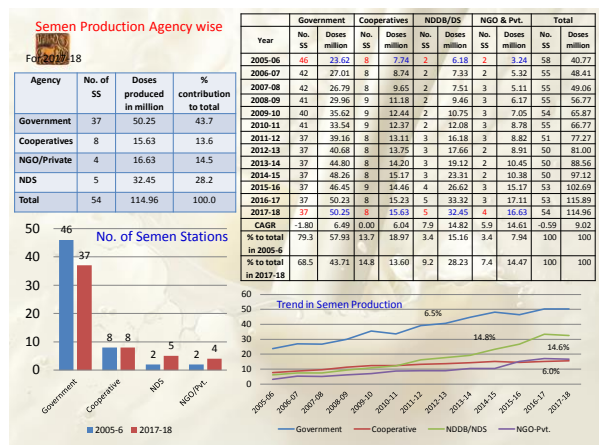
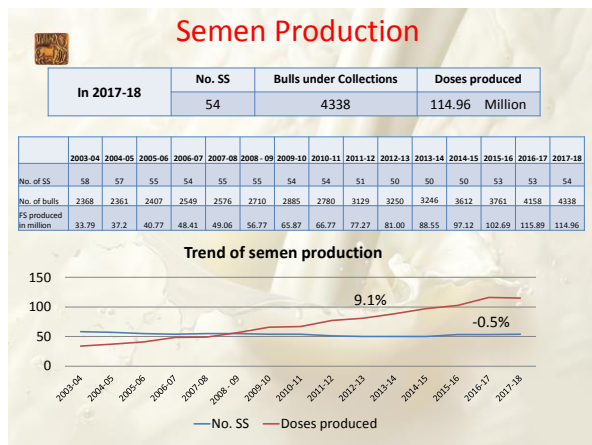
1/3/2019

NDOB

7

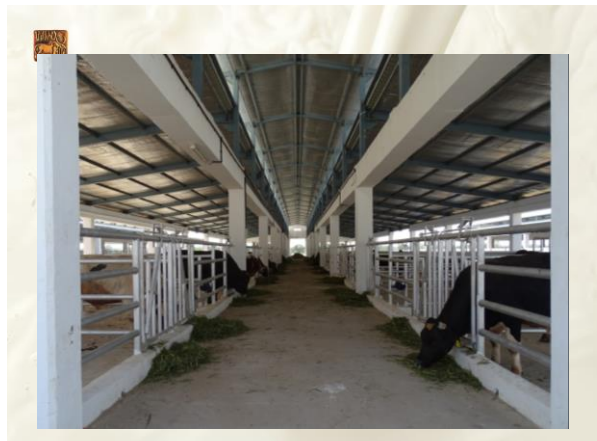


Semen Production and Processing



Semen Station Strengthening under NDP

- 28 Semen Stations supported for:
 - Bull Housing Facilities
 - Semen production and Processing Facilities
 - Strengthening Biosecurity:
 - Establishing quarantine facilities
 - Establishing bull rearing facilities
 - Made core area of bull sheds and semen production and processing more secured
 - Modernizing fodder production facilities
- These 28 semen station produced 84 million diseases free semen doses in 2017-18, which constitutes about 73% of the total semen doses produced in the country
- Mega Semen Stations are being established







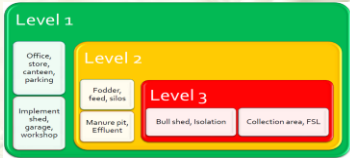
Quarantine Station



January 3, 2019

20

Risk levels in Semen Station – Core area of bull sheds and semen production have been made more secured



Evaluation of Semen Stations by CMU



Evaluation of Semen stations

- Country has a good system of semen station evaluation and grading for commercial semen production units.
- Scoring method is decided by group of experts in semen production and evaluation teams are formed by DADF, GoI.
- This system is not legally binding but many advisories talk about using semen from only A and B graded semen stations. Most of the semen stations take part in these evaluations.
- Minimum Standard Protocol (MSP) for semen production are notified by DADF- **Latest revised in 2012**



Scoring for evaluation

Sl. No.	Name of the Section	Max. Marks allotted	% Weightage of the Section
1	Animal Management and Health	100	30
	Genetic merit of bull (in terms of dam yield cutoff)	40	12%
2	Laboratory Management	100	15
3	Quality Control	100	20
4	CMU Team Assessment	100	20
5	General	100	15
	TOTAL	500	



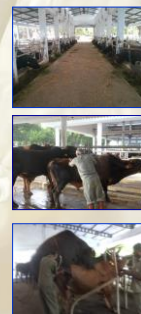
Minimum Standard Protocols

- Genetic merit of Breeding bulls
- Physical examination - BSE
- Karyotyping & testing for genetically transmitted diseases
- Quarantine



Minimum Standard Protocols

- Disease testing of bulls
- Vaccination of the bulls
- Proper housing of bulls
- Management of Bulls
- Semen Collection





Minimum Standard Protocols

- **Handling, processing & freezing of semen**
 - Premise maintenance
 - Equipment management
 - Personnel Hygiene
 - Diluents preparation
 - Evaluation & Processing



Minimum Standard Protocols

- Colour specification of straws
- Printing of Straws
- Post thaw motility
- Quality Checks for frozen semen
- Semen Storage



Minimum Standard Protocols

- Information system
- Cleaning and Sterilisation
- Biosecurity
- **Quality Control of Consumables (Chemicals, Straws, Water etc.)**
- **Manpower Requirement for semen production**



Grading of semen stations by CMU, Gol

Grade	2004-5	2008-9	2010-11	2012-13	2015-16
A	2	12	20	30	37
B	12	15	17	15	14
C	12	7	3	-	-
Not graded	33	13	7	5	2
Not evaluated	-	2	2	2	5
Total	59	49	49	52	58

Source: Annual report 2017-18, DADF, Gol.

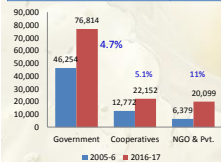
- Evaluation of semen stations started by NDDB in 1998-99.
- NDDB prepared a Minimum Standard Protocol (MSP) and evaluated and graded the semen stations in the cooperative sector in 1998-99 first time
- Continued its annual evaluation in subsequent five years.
- Based on the experience of NDDB and other agencies in the country, in 2004-5 Gol modified the MSP and established a Central Monitoring Unit (CMU).
- CMU then carried out an evaluation of all semen stations biannually and offered recommendations for improvement



Infrastructure of AI

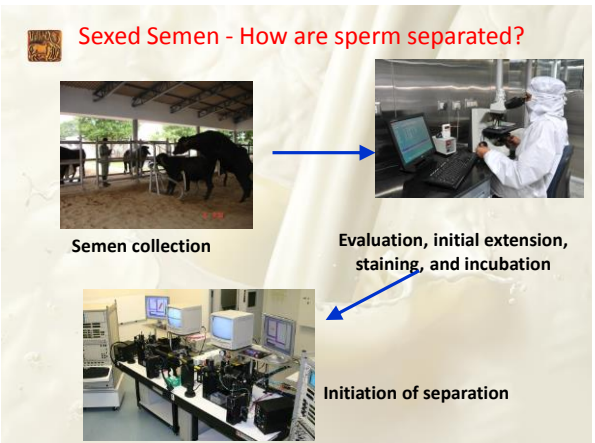
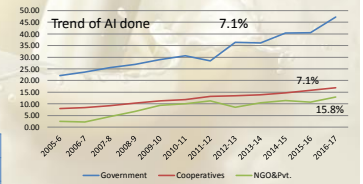
2016-17

Agency	No. of AI Centres	AI carried out in million
1 Government	76,814	47.22
2 Cooperatives	22,152	16.89
3 NGOs and Pvt.	20,099	12.91
Total	1,19,065	77.02

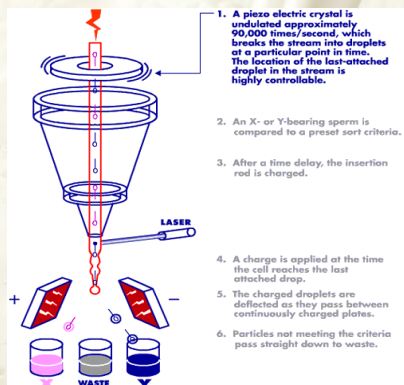


	CR%	No. Obs.
Cattle	42	23.7 lakh
Buffalo	38.3	17.4 lakh

Year	No. of AI Centres				No. of AI done in million			
	Government	Cooperatives	NGOs & Pvt.	Total	Government	Cooperatives	NGOs & Pvt.	Total
2005-6	46,254	12,772	6,379	65,405	22.11	7.06	2.57	32.64
2006-7	44,703	13,451	9,279	67,433	23.68	8.17	2.18	34.03
2007-8	45,027	13,965	11,787	70,779	25.61	9.36	4.53	39.50
2008-9	46,534	15,576	15,324	77,434	26.96	10.36	6.76	44.08
2009-10	46,191	16,025	18,438	82,254	29.03	11.27	9.40	49.70
2010-11	50,844	16,911	14,608	82,400	30.57	11.85	10.00	52.42
2011-12	52,718	17,530	15,159	85,407	28.47	13.24	11.34	53.05
2012-13	56,674	18,062	14,843	89,579	36.33	13.40	8.53	58.27
2013-14	70,475	19,277	18,758	108,471	36.07	13.85	10.45	60.37
2014-15	67,592	19,624	19,982	107,198	40.30	14.71	11.38	66.39
2015-16	68,218	20,982	20,817	109,955	40.49	15.18	10.14	67.05
2016-17	76,814	22,152	20,099	119,065	47.22	16.89	12.91	77.02
Growth %	4.72	5.33	11.00	6.60	7.14	7.08	15.80	8.12
Share 2005-6	70.72	19.33	9.75	100.00	67.74	24.39	7.87	100.00
Share 2016-17	64.51	18.60	16.88	100.00	61.21	21.93	16.76	100.00



Working principle of sex sorting by flow cytometry



Commercial Availability of Sexed Semen

- Sexing Technology, USA, and ABS, USA have patented sperm sorting technology.
- Sexing Technology machine separates out X and Y sperms, whereas that of ABS kills undesired sperm X or Y.
- Flow cytometry is the only reliable sexed semen technology available today.
- Purity of sexed semen can reach 95%, but industry standard is 90%.
- Current machine of ST can produce about 10-14 doses of sexed semen of each sex per hour or about 300 doses per day or 1 lakh doses per year.
- Sexed sorted semen dose typically contain 2 million sperms against around 20 million sperms in a conventional dose.
- The conception rate with sex sorted semen is 10-15% less than the conventional semen.
- At present, both ST and ABS machines commercially produce sex sorted semen in many countries of Europe, USA, Canada, Mexico, Brazil, etc.



Sexed Semen availability in India

- **BAIF:**
 - Three sexed sorting machines of ST have been installed at BAIF at their office in Pune with the assistance of Bill Gate Foundation. Total semen dose production: about 2400 per day.
 - BAIF has started production of sexed semen and selling at Rs. 1200-1500 per dose.
 - Preliminary results suggest no cause of concern on both conception rate and sex of progenies born.
- **Mehsana Union:**
 - An ABS sexed sorted machine has been installed at Mehnsana Union in Mehnsana, Gujarat.
 - Selling sexed sorted semen at Rs. 200 per dose to members and at Rs. 500 per dose to non-members.
- **ULDB:**
 - Planned to install sexed sorted machines of ST with the assistance of GoI at semen station of ULDB near Rishikesh.
- **Present constraints** (i) speed of processing – one machine can produce 10-14 doses per hour or 300 doses per day (ii) high cost – Rs. 1200-1500 per dose against Rs. 25 for the conventional dose.

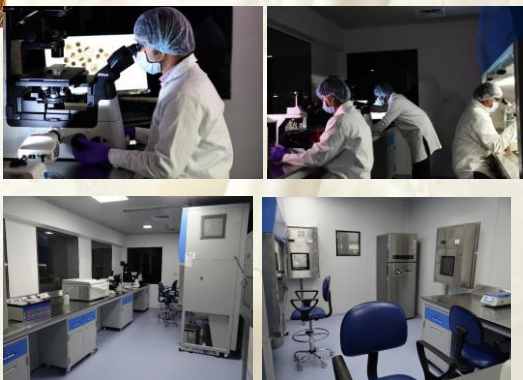


IVF and ET

Ovum Pick-up area NDDB's Lab



Laboratory NDDB



Glimpses of embryos from NDDB's lab

