

**Out scaling of community-based breeding programs in goats: attractive and innovative approach to improving the lives of smallholder producers in low input systems of Ethiopia and Tanzania**

**Reproductive options for a more efficient system delivery of improved genetics from the communities to the communities**

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**CGIAR**

Science for a food secure future



**ICARDA**

Science for Better Livelihoods in Dry Areas

# Low Reproductive Performance: Low Profitability and Handicap to Genetic Progress

- Local breeds have been little selected for improved productivity including reproduction
- Delayed puberty and sexual maturity; tendency for a stronger seasonality
- High prevalence of diseases
- Variable kidding rates and overall tendency to be low (increased carbon footprint)
- Take-off of the best performing animals
- Slaughter of pregnant animals

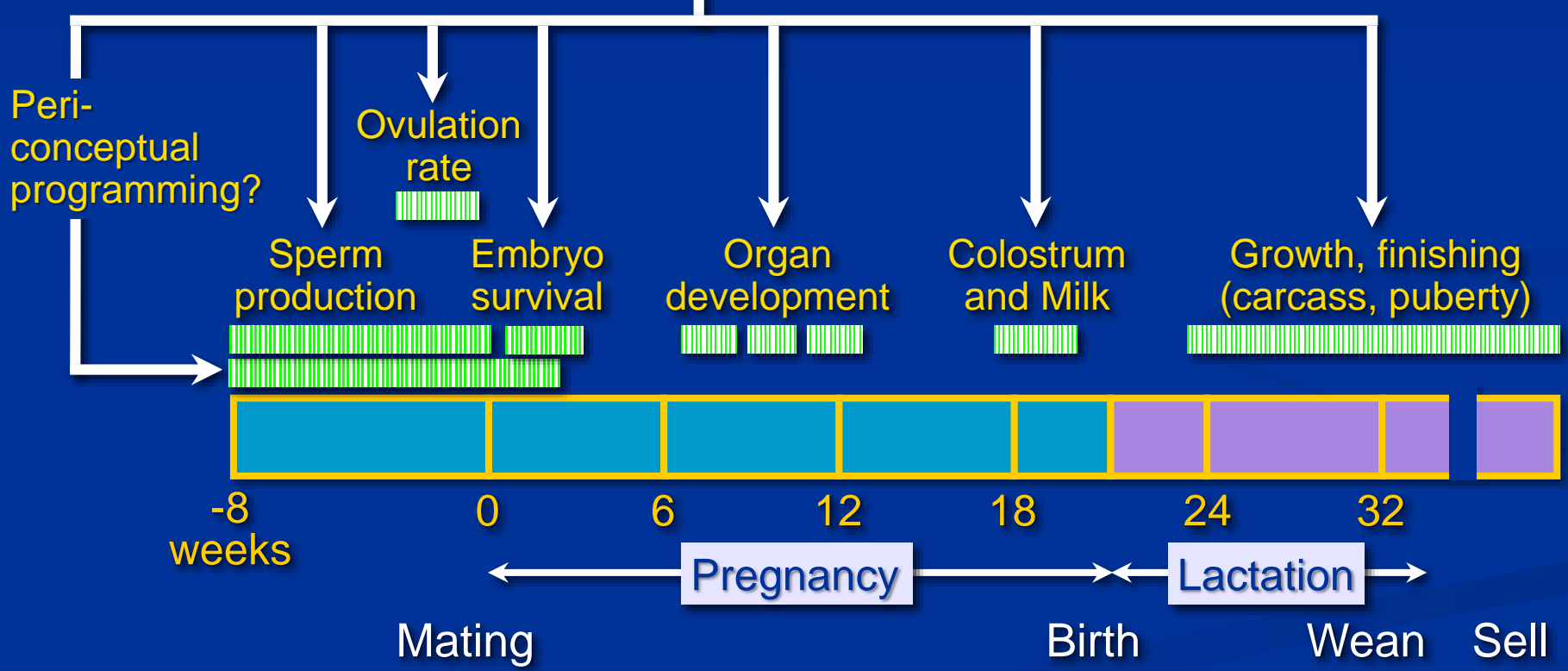
# Integrated reproductive interventions in support of a more efficient delivery system of selected animals in CBBP's

- **Health certification of improved bucks**
- Focus on major reproductive diseases:
  - ❖ **Toxoplasmosis,**
  - ❖ **Q Fever,**
  - ❖ **Border Disease,**
  - ❖ **Brucellosis**
  - ❖ **Chlamydiosis**
- **Large scale delivery system of improved bucks**
- Improvement of the nutritional management to guarantee satisfactory reproductive outcome
- Systematic screening of improved bucks for breeding soundness
- Ultrasound-aided approach to increase fertility
- Development of efficient, not costly synchronization protocols and field AI solutions
- Training core autonomous teams and setting-up functional goat AI laboratories in both countries

# When is it important?



## Nutrition



Accurate Timing is Critical

# Fit bucks for successful reproduction

- General clinical exam
- Body condition
- Detailed exam of the integrity of the reproductive organs
- **Semen and libido assessment**



# Meat and milk depend on reproduction

Need to increase reproductive efficiency

... but using **Simple**, **Affordable**, **Accessible** practices



**Promising Approach? Ultrasound diagnosis as tool to manage sheep and goat reproduction**

# Higher Reproductive Efficiency

Ultrasound Pregnancy Diagnosis

Culling of  
Sterile  
Animals

Screening  
for the  
number  
of fetuses

Calculation  
of the age  
of the fetuses

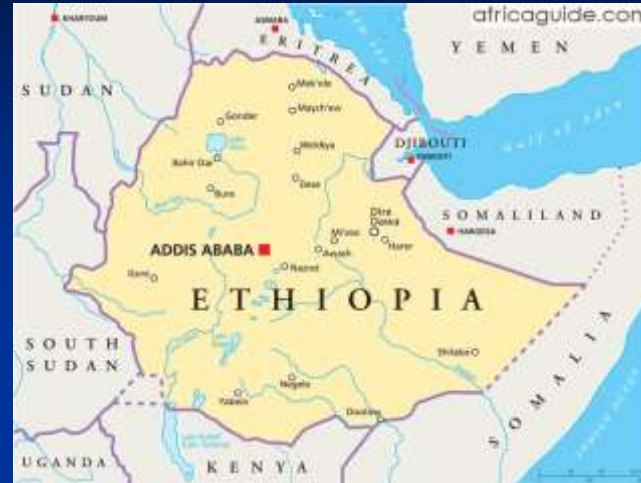
Timely planning of conditions of birth and  
rational use of feed resources

# Ultrasound machines

- May not seem to fit with preconceived ideas for use in extensive, low input systems;
- But the technology has become cheaper and more accessible;
- Do not contravene environmental priorities;
- Non invasive and non hormonal;
- Availability of a whole generation of easy-use, high resolution, portable machines;
- Reliability of diagnosis as early as 30 days.



# ICARDA is promoting field solutions for sheep and goats pregnancy diagnosis: ultrasound service provision



# Other services provided

- Checking on repeat breeders;
- Checking on females with recent pathologies;
- Discarding pregnant females prior to synchronization and AI;
- Prevent slaughter of pregnant females (70% in Ethiopia).



*Mobile ultrasound pregnancy unit  
in the Badia - Jordan*

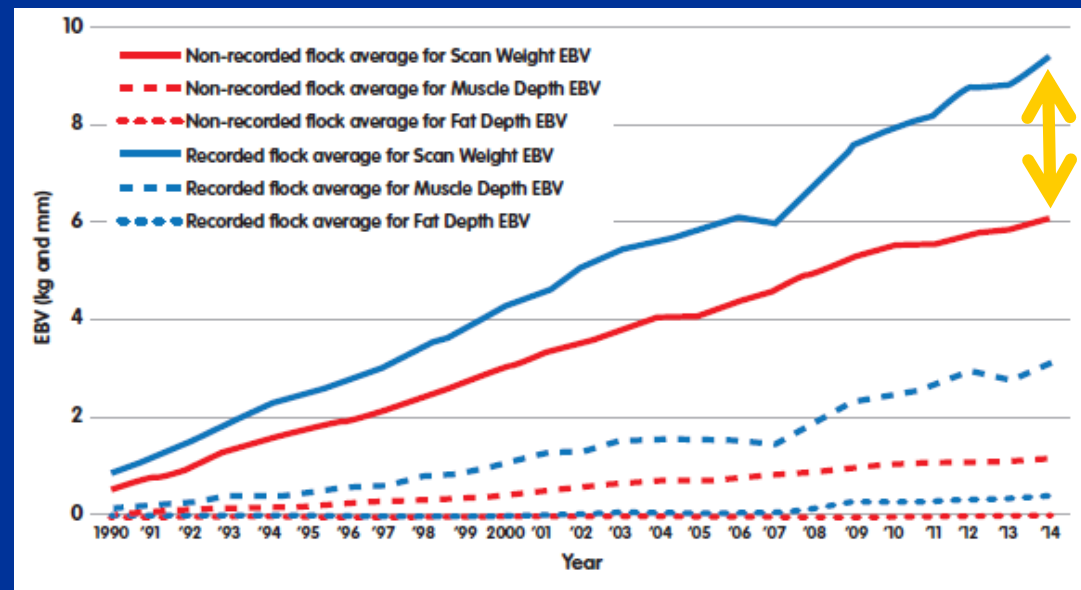


*The goat obstetric and gynecology  
clinic in Kordofan - Sudan*

# Artificial insemination: additional resource to support genetic progress

$$\text{(Rate of gain)} = \frac{\text{Intensity of selection} \times \text{Heritability of the trait} \times \text{Variation in the population}}{\text{Generation interval}}$$

Artificial  
insemination



- Performance recording

- Intensive use of top 10% sires via artificial insemination

Genetic gain for live weight in recorded and unrecorded Suffolk sheep flock

# Field solution for goat insemination: Towards up/out-scaling the delivery system of CBBP's

- Bucks' selection and training;
- Synchronization preceded by ultrasound pregnancy diagnosis in small-mixed flocks to discard pregnant females;
- Different synchronization options;
- Use of fresh semen, collected, assessed, diluted and used at 35 °C;
- Cervical/uterine AI of goats after synchronization;
- Basic equipment needed: electricity generator, thermos flask, microscope (mass and individual motility), field spectrophotometer for the determination of semen concentration;
- Simple manual straw filling devices.

# Field semen assessment and processing

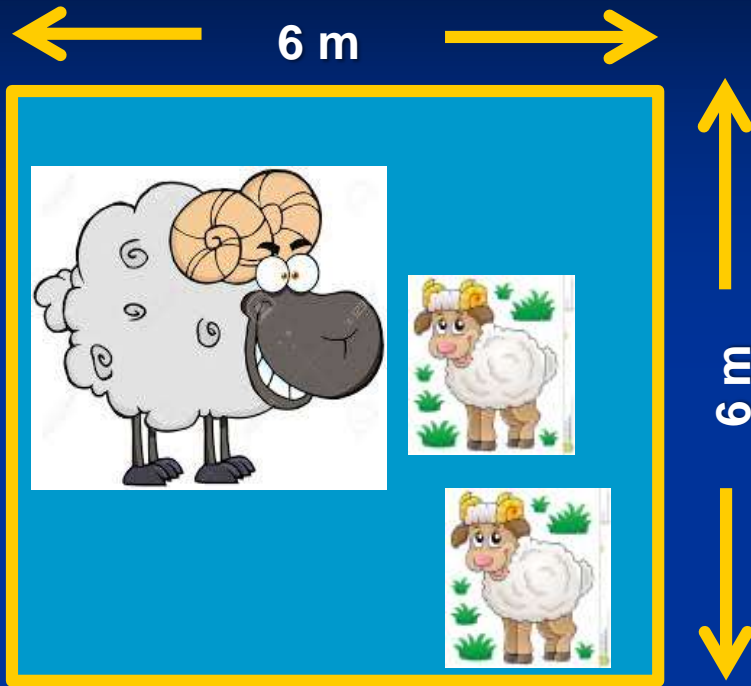


# Bucks' selection and training

- Selected best-ranked bucks and yearling bucks on the basis of their breeding value and preferred by the communities;
- General clinical and body condition examination;
- Detailed exam of the integrity of the reproductive organs;
- Semen and libido assessment;
- Training on ejaculating in an artificial vagina 2 times per week for at least a month prior to artificial insemination.



# Bucks' selection and training



**Libido test**

*In the presence of 2 estrous females  
record during 10 minutes:*

- Latency to first reaction (s)
- Total activity time (min)
- Vulva sniffing
- Flehmen
- Lateral approaches
- Mount attempts



**Training on  
semen collection  
in artificial  
vagina**



# Goats' selection for synchronization

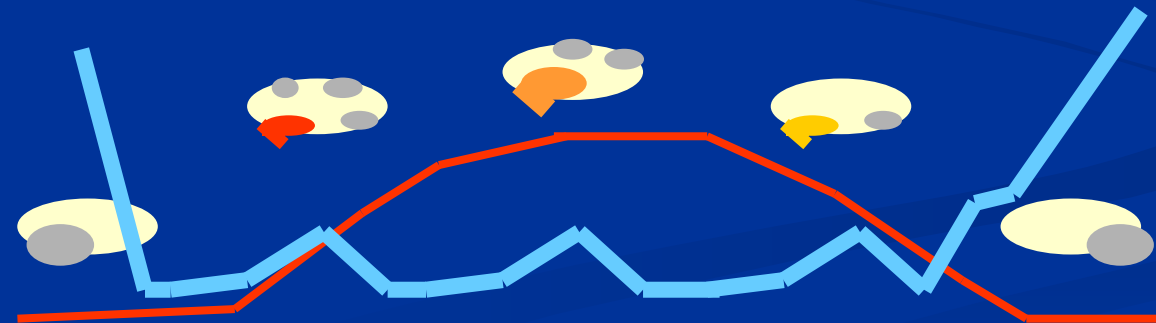
- Selection of adult goats;
- No maiden goats;
- Successfully lambed previous season;
- Not suckling;
- Body condition score  $> 2.5$ ;
- Synchronization preceded by ultrasound pregnancy diagnosis in small-mixed flocks to discard pregnant females.





# **INDUCTION AND SYNCHRONIZATION OF OESTRUS AND OVULATION**

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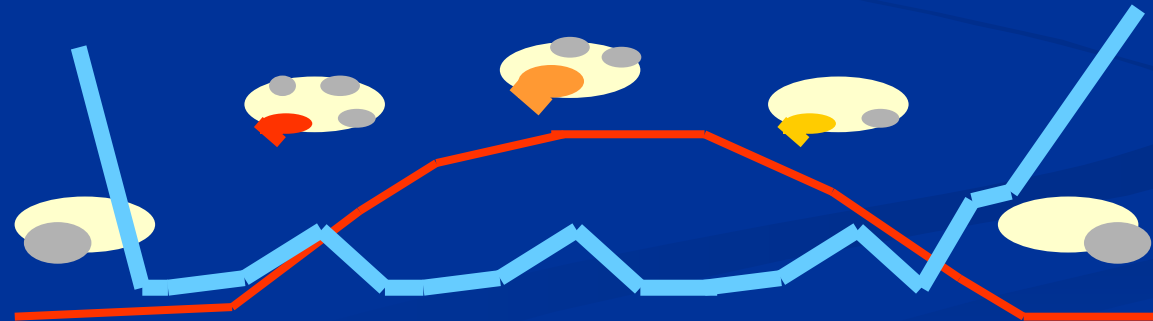
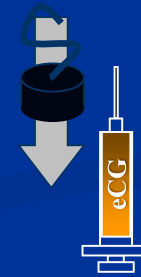
# PROGESTAGENS

Days

0

16

18



# PROGESTAGENS

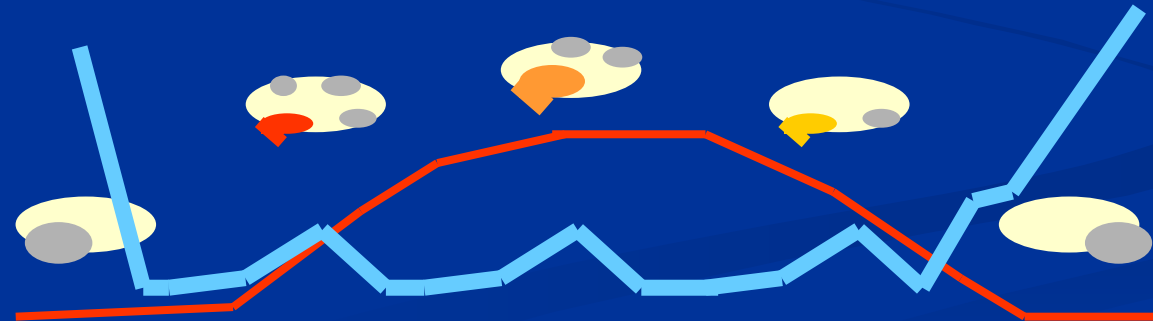
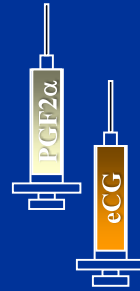
Days

0

9

11

13



# **PROGESTAGENS**

## **LIMITING FACTORS**

### **EXOGENOUS**

**Origin of the hormone**  
**Protocol of administration**

### **ENDOGENOUS**

**Age**  
**Nutritional status**  
**Season**  
**Reproductive status**

# PROSTAGLANDINS

Days

0

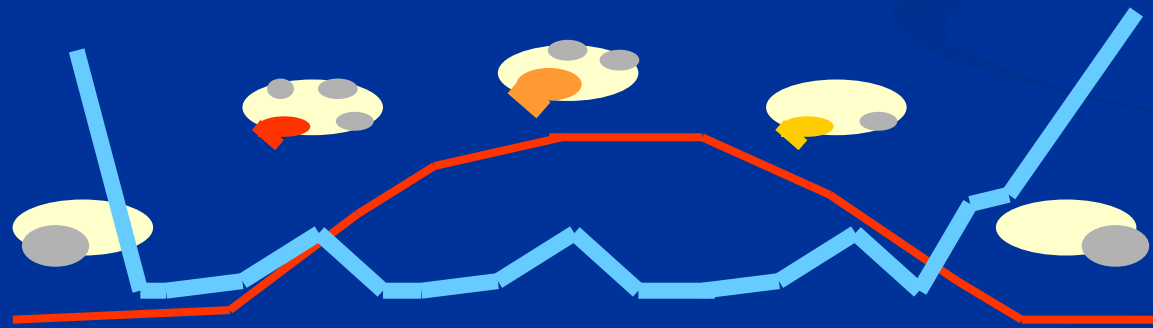
PGF<sub>2α</sub>

7



9

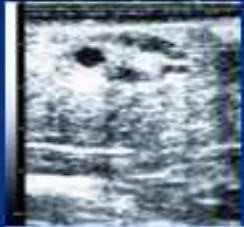
A.I.



# Post-insemination management

- Inseminated goats should remain isolated from community bucks;
- Reintroduce bucks 10 days after insemination to ensure return estrus and guarantee flock fertility;
- No sharp change in the diet during the 2 weeks after insemination;
- Perform an ultrasound pregnancy diagnosis 30-35 days after insemination for preliminary conception rate;
- Goats kidding between  $150 \pm 5$  days after the date of insemination will be considered as conceiving to insemination.

# ICARDA Sheep and Goats Reproduction Range



Alternative Feed Resources to Boost Reproduction



Field Solution for Sheep and Goats Artificial Insemination



Ultrasound Diagnosis for Better Reproductive Management



Rams' breeding soundness evaluation



*Year round management for rams that are fit for successful reproduction*

For more information:

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Clean, Smart Oestrus Synchronisation

