

# Senegal Dairy Genetics / Sénégal Génétique Laitière



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FoodAfrica annual workshop,  
23<sup>rd</sup> & 24<sup>th</sup> February 2015,  
Nairobi, Kenya

# The importance of dairy



## Food security

- milk = high-quality food which supplies protein, energy & essential micronutrients
- consumption of even small amounts of milk can significantly increase nutritional security

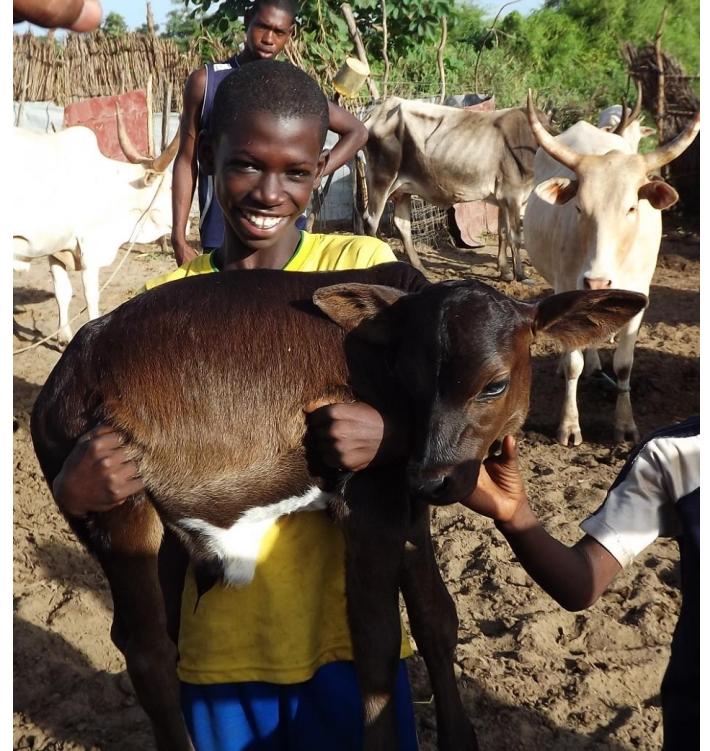


## Livelihoods

- cattle keeping / dairy is an important livelihood activity to rural households in Senegal

# Work package objectives

To identify and promote utilisation of the most appropriate dairy breed-types for more productive and profitable dairy enterprises in selected production systems in Senegal



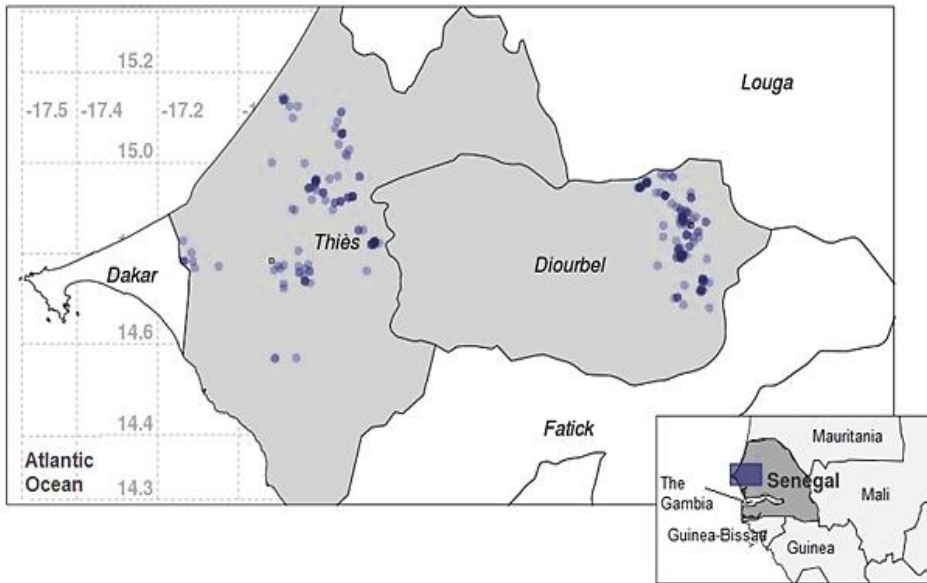


2014 key  
achievements:

breed  
comparison



# Longitudinal survey



239 households with ~3500 dairy animals  
in two sites

6 field staff each assigned to ~40 dairy  
households each, visit each household  
about every 5-6 weeks

Collect socio-economic data (gendered) +  
animal-level data (including milk yield)



# Longitudinal survey - 2013

J	F	M	A	M	J	J	A	S	O	N	D
	Field staff recruited										
	Project launch events										
	Recruitment survey										
		Recruitment dairy households into project; field staff & farmer training									
				Baseline surveys x 2 (household head & adult female)							
						Longitudinal survey 1 (focus on on-off socio-economics + animal history) - animal ear-tagging					
								Longitudinal survey 2 – milk recording initiated			
										Longitudinal survey 3	
											Long. survey 4
						Transhumant survey					

# Longitudinal survey - 2014

J	F	M	A	M	J	J	A	S	O	N	D
Long. survey 4											
	Longitudinal survey 5										
		Longitudinal survey 6									
				Longitudinal survey 7							
					Longitudinal survey 8						
						Longitudinal survey 9					
									Longitudinal survey 10		
										Longitudinal survey 11	

Transhumant survey

# Project database

The screenshot displays the ILRI Datasets Portal interface. At the top, there is a navigation bar with links for 'Log in' and 'Request a publisher account'. Below this, a search bar contains the text 'sdg'. The main content area shows '4 datasets found for "sdg"' and lists three datasets: 'SDG - Longitudinal Monitoring Survey', 'SDG - Adult Female Survey', and 'SDG - Baseline Survey'. Each dataset entry includes a brief description and a list of available resources (CSV, STATA, SPSS, XML, JSON, SQL) with a lock icon indicating access status. The left sidebar contains filters for Organizations, Groups, Tags, Formats, and Licenses.

ILRI Datasets Portal

Log in Request a publisher account

Datasets Organizations Groups Open Data Policy About Search datasets...

/ Datasets

Organizations

International Lives... (4)

Show More Organizations

Groups

CGIAR Research Prog... (3)

Animal Bioscience (3)

Show More Groups

Tags

production (4)

livestock (4)

cattle (4)

breeding (4)

Show More Tags

Formats

getdata (4)

Show More Formats

Licenses

Creative Commons At... (4)

Show More Licenses

sdg

4 datasets found for "sdg" Order by: Relevance

**SDG - Longitudinal Monitoring Survey**

The project "Improved food and nutritional security from better utilisation of dairy cattle breed-types types in Senegal" (SDG), is led by the International Livestock Research...

**Resources**

Longitudinal Monitoring Survey Database (Cycle 2 to 9) CSV STATA SPSS XML JSON SQL 66

**SDG - Adult Female Survey**

The project "Improved food and nutritional security from better utilisation of dairy cattle breed-types types in Senegal" (SDG), is led by the International Livestock Research...

**Resources**

Adult Female Survey Database CSV STATA SPSS XML JSON SQL 18

**SDG - Baseline Survey**

The project "Improved food and nutritional security from better utilisation of dairy cattle breed-types types in Senegal" (SDG), is led by the International Livestock Research...

**Resources**

Household Survey Database CSV STATA SPSS XML JSON SQL 24

Data managed by a customised project database

- internet accessible
- in use by people in Senegal, Kenya, Finland, United Kingdom, Tanzania



# Other field activities

- Animal weights and body measurements on 860 project animals
- Hair samples collected for DNA animals on 759 project + 23 reference animals
- Feed and milk samples collected from 259 households for aflatoxin analysis with **WP5**
- 2<sup>nd</sup> season milk quality measurements (fat, protein) on 241 animals
- Survey implemented on farmer recall milk yield



Animal body measurements



Collection hair samples for DNA analysis

# Varied analysis underway

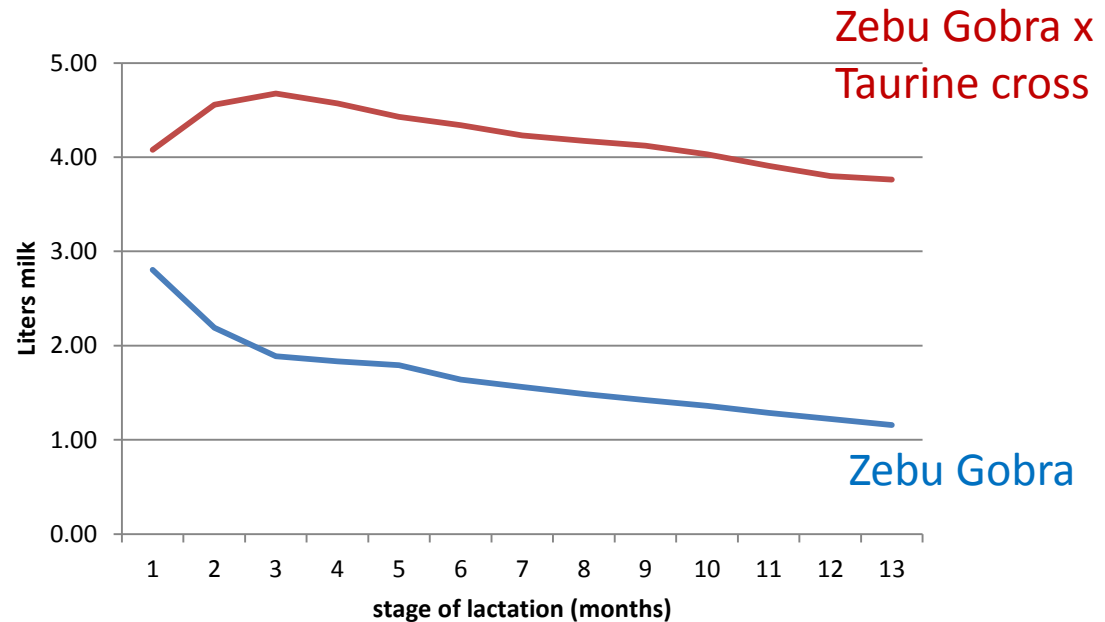
- System characteristics
- Milk yields & milk composition (protein / fat)
- Animal demographics, including reproductive
- Breed composition from genotype data
- Farm household typology
- Farmer perceptions of dairy cattle diseases
- Relationship between animal body weights & body measurements
- Accuracy recall versus monitored milk yield



# Analysis highlight – milk yields

Breed	305 day milk yield
Zebu Gobra	747 litres
Zebu Gobra x Taurine cross	1885 litres

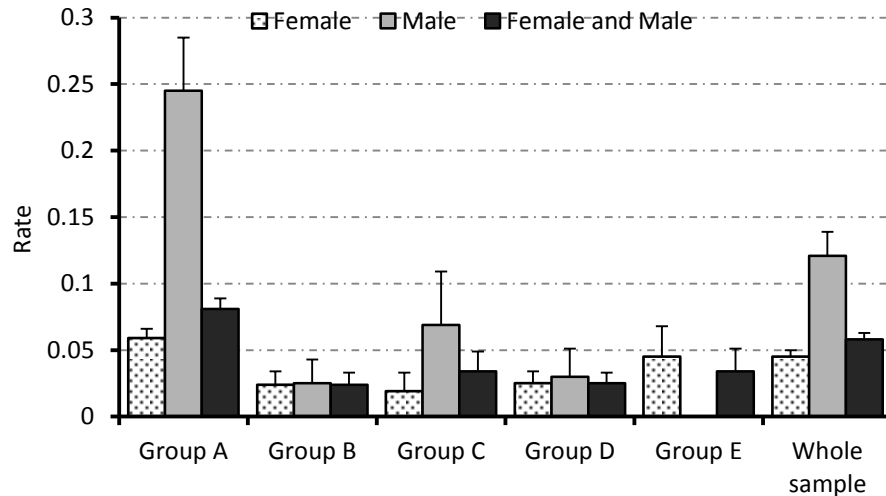
Versus ~8000 litres in Finland



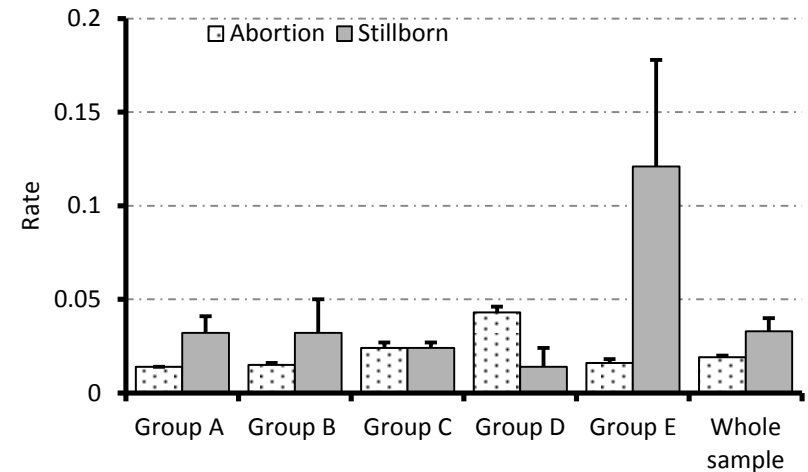
*Based on 4 rounds of longitudinal monitoring,  
analysis currently being repeated using full data-set*

# Analysis highlight – animal demographics

## Mortality rates



## Abortion & still birth rates



Breed group	Definition	Common project examples
A	100% Ancient Zebu	Zebu Gobra (ZG)
B	75% Ancient Zebu; 25% Recent Zebu	75% ZG, 25% Guzerat
C	50% Ancient Zebu; 50% Recent Zebu	50% ZG, 50% Guzerat
D	50% Ancient Zebu; 50% Recent Taurine	50% ZG, 50% Holstein-Freisian / Montbeliard
E	100% Recent Taurine	100% Holstein-Freisian / Montbeliard

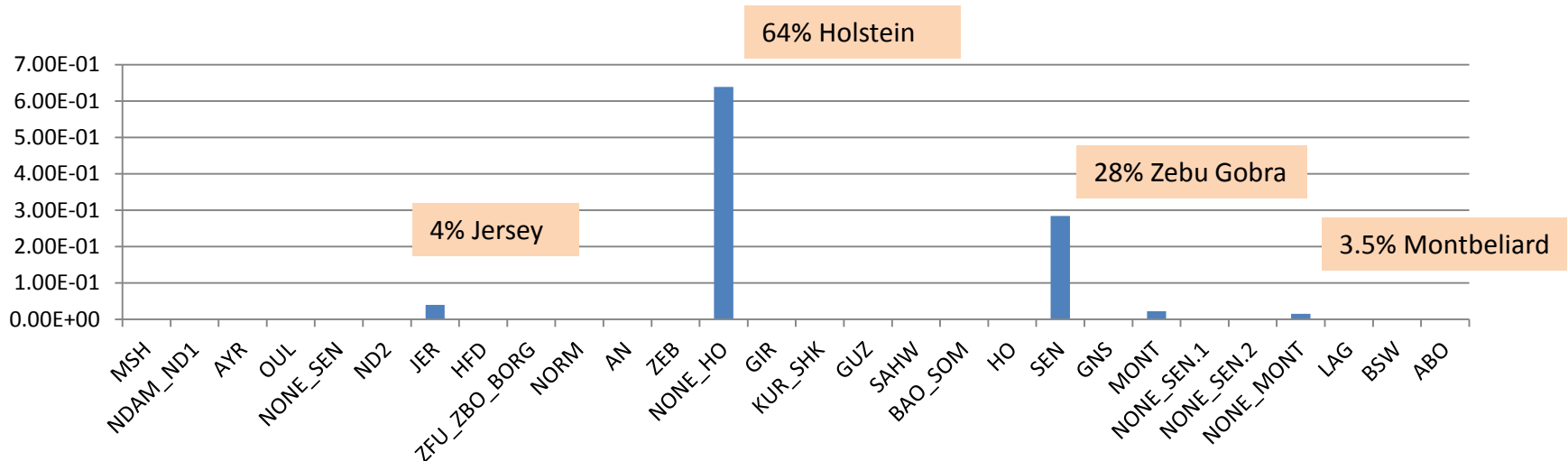


# Analysis highlight – breed composition from genetic data



Farmer stated breed =  
Normande x Zebu Gobra

Genetically (SNP) derived breed-types for animal 0575



# Analysis highlight – gendered intrahousehold labour on dairy

Gender	Who	Average hours per week on dairy	Main activities
Male	Household adult	30	Herding / animal care / milking
	Hired adult	55	
	Household boy	21	
Female	Household adult	7	Processing & sale of milk
	Hired female	7	
	Household girl	2	



2014 key  
achievements:

analysis of the  
dairy germplasm  
production and  
delivery system



# Strengthening the dairy germplasm production and delivery systems: process

Policy review on Senegal dairy with focus on AnGR use  
(2014 report)

Analysis of drivers of uptake of non-indigenous breeds and artificial insemination  
(2014 conference paper)

Assessment of the germplasm production & delivery value chain, in partnership with ISRA  
(stakeholder workshops + key informant interviews completed 2014)

Willingness to pay for improved dairy genetics

With stakeholders → recommendations on strengthened dairy germplasm production & delivery systems

Disseminated messages e.g. policy briefs





# Policy review

## Policy framework for Dairy Development in Senegal (72pp report)

### Main sections:

- Global trends of dairy industry
- The dairy sector in Senegal
- Germplasm supply chain in Senegal
- Dairy policy framework in Senegal
- Recommendations on: (1) restructuring dairy institutions,  
(2) implementing guidelines for dairy germplasm development

In English, translation to French planned

2014 key  
achievements:  
capacity building

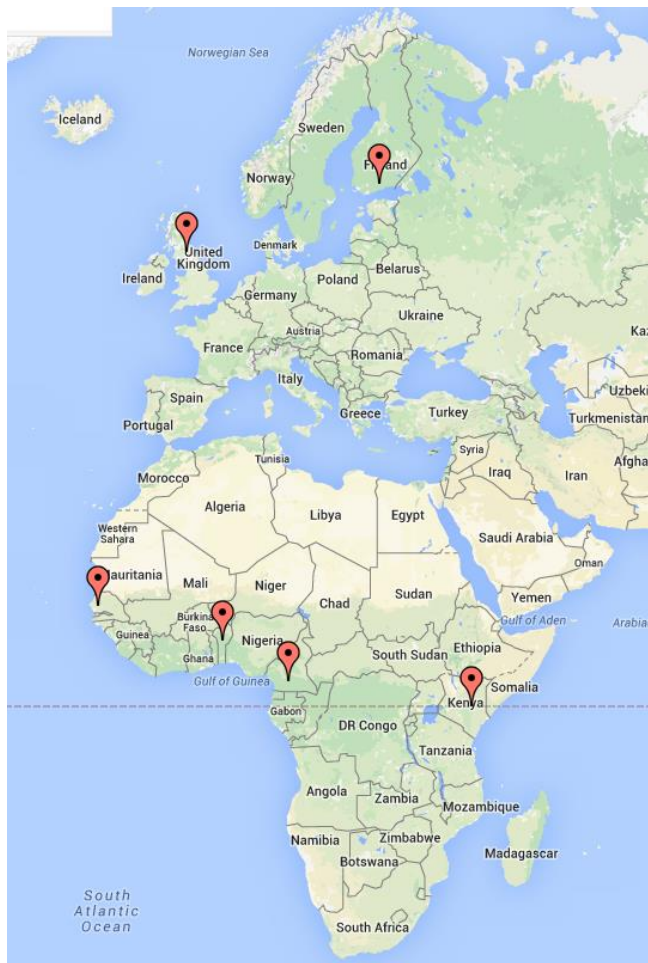


# Farmer training + project feedback sessions

Training topic	Number farmers
2) Fodder preservation – treatment of hay with urea (8 workshops, May 2014)	403 (36% female)
3) Fodder conservation – grass collection & storage	371 (34% female)
4) Improving AI success rates (8 workshop, Nov. 2014)	



# Students 2014



Program	Study area	Nationality
PhD	Livestock science / dairy	Cameroon
Masters	Livestock science / animal weight prediction	Benin
Masters	Livestock science / lactation modelling	Finland
Masters	Statistics / cluster analysis	Kenya
DMV thesis component	Livestock science / animal health	Senegal
PhD	Climate change / livestock interventions for mitigation of GHG	United Kingdom



# Training videos

Production of three farmer training videos underway with **WP7**

Topics:

- 1) fodder conservation and hay treatment with urea
- 2) how to prepare a cow for artificial insemination
- 3) management of non-indigenous cattle breeds



# Activities to project end



# 2015 activities

1. Cost-benefit analysis based on longitudinal data
  - use of International Farm Comparison Network (IFCN) model
  - output per cow, liter milk, unit labour etc.
2. Recommendations, with stakeholders, on strengthening the dairy germplasm delivery system
3. Capacity building
  - support to project students
  - learning lessons from project
4. Project sustainability
  - implementation of dissemination plan
  - this projects leads to a 'phase 2' project on business model development

# Cost:benefit analysis

## All costs:

health-care, feed,  
animal housing,  
replacement animals,  
labour, marketing etc.

## All benefits:

milk consumed, milk  
sold, calf sale etc.

Breed group	Household type	
	Non-market orientated	Market orientated
A	X	
B	X	X
C	X	X
D		X
E		X

Estimate input parameters for each household x breed combinations



Cost:benefit analysis for each household x breed combinations



Socio-economic comparison of breeds / cross-breeds  
within & across 'household types'



# Dissemination

Led by key local partner - Interstate School of Veterinary Science and Medicine of Dakar (EISMV)

## Types of dissemination activities

- Policy briefs / policy dialogue
- Via NGOs / farmer groups:
  - Heifer International Senegal
  - ANCAR
  - DIFREL
- Veterinary curricula of EISMV
- National & regional media releases
- Stakeholder workshops
- Farmer training videos
- IPG – tools / database
- Scientific articles



Policy maker on dairy attending project launch event

# Thank-you



Making of videos for mid-term seminar 2014

Video link is <https://www.youtube.com/watch?v=L1dvxWadgYs>

