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# Added Values of Dairy Cattle Breeds

**Martino Cassandro**

Department of Animal Science

Agripolis - University of Padova - ITALY

Dipartimento DiSA Scienze Animali

EAAP European Federation of Animal Science

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# Outline

- Introduction
- Added Value for Dairy Chain
- Added Value for Environmental Chain
- Conclusions

# INTRODUCTION

*“Over the next 50 years, the world’s farmers and ranchers will be called upon to produce more food than has been produced in the past 10,000 years combined, and to do so in environmentally sustainable ways.”*

Jacques Diouf, FAO Director General, 2007

# INTRODUCTION

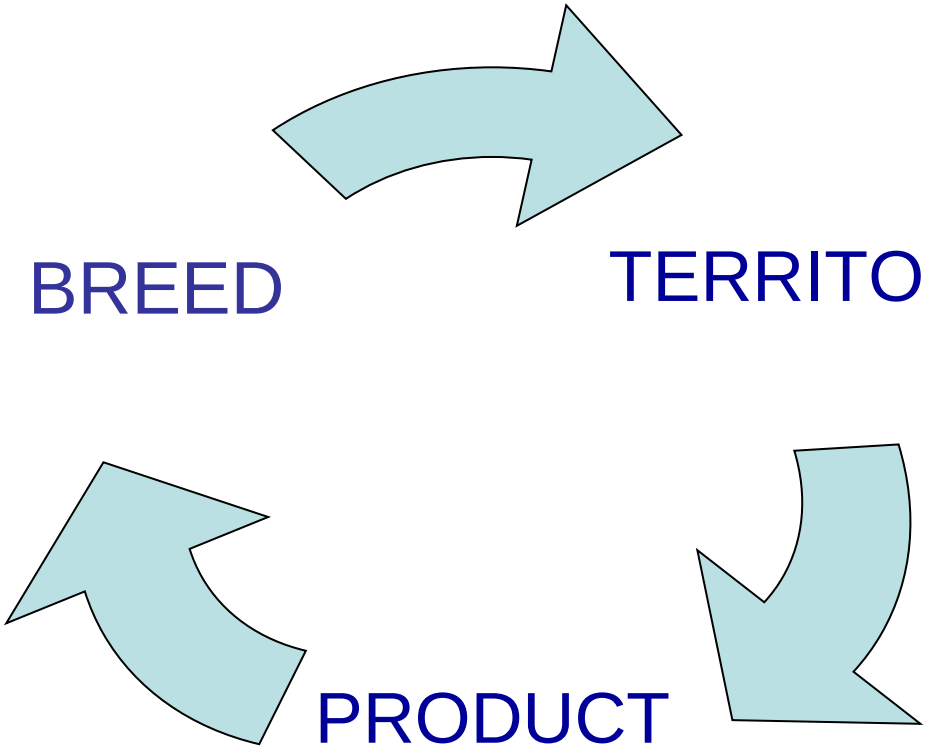
An important strategy

to INCREASE Added Value for Animal Products

to PRESERVE Environment and Biodiversity

to ORIENTATE Tourism & Food Consumptions

would be based on “PROMOTION” of the LINK among



# LINKs of Italian BREED-PRODUCT

Reggiana

Parmigiano Reggiano

Rendena


Rendena Cheese

Valdostana


Fontina Cheese

Burlina


Morlacco Cheese

Italian Brown


Cheese of only Italian Brown

Pezzata Rossa


Cheese of only Pezzata Rossa

# INTRODUCTION

## Definition # 1 (broad sense): Added Value (AV)

The AV in a productive process is the difference between

**Value of a final product**
**and the**
**Value of products used**
**to produce it**

The AV is a measurement of increment of *Gross Value* for a product made by a specific process

The AV is a measure of potential production specialization

# Definition # 1: Added Value (AV):

The AV formula:

$$AV = V - K$$

where:

***V*** is the price value of final product
*(e.g. Value of Cheese produced by 1 kg of milk)*

***K*** is the price value of input
*(e.g. Value of 1 Kg of milk used as milk fluid)*

If AV is positive (+), the product has added value
If AV is negative (-), the product has destroyed value

If AV > Cost of gain = Profitable
If AV < Cost of gain = Not profitable

## Definition # 2: Added Value (AV):

The AV in environmental chain may be defined as the

**Minimum Production of Air Pollution,**
**as enteric $CH_4$ emissions**

(e.g. GHG emission x 1 kg of Milk Yield or Metabolic Weight)

The AV is a measurement of an *Environmental Mitigation* and might be used as a *New Brand* of the breed for a valorization project

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- **Added Value for Environmental Chain**
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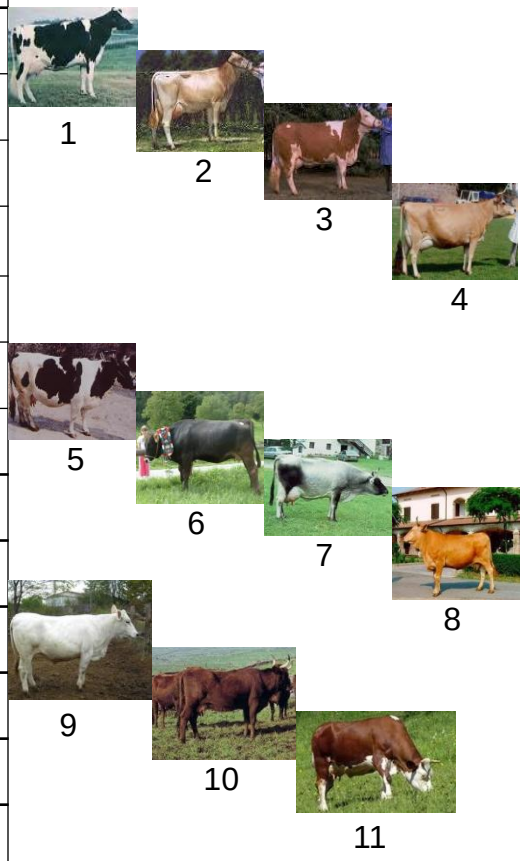
# Milk Yield & Composition, Live Weight
## of 11 Cattle Breeds (4 Cosmopolitan and 7 Local Breeds)

| Breed | Milk yield kg/d | Fat % | Prt % | SCS Score | Live Weight Kg |
|---|---|---|---|---|---|
| **Cosmopolitan** | | | | | |
| 1 Holstein Friesian | **29.2** | 3.70 | 3.31 | 4.37 | 750 |
| 2 Brown Swiss | **21.3** | **4.01** | **3.51** | 4.30 | 650 |
| 3 Simmental | **20.8** | **3.97** | **3.43** | **3.52** | 700 |
| 4 Jersey | 18.7 | **5.37** | **4.00** | n.a. | 400 |
| **Local** | | | | | |
| 5 Burlina | 14.5 | 3.65 | 3.22 | **3.66** | 450 |
| 6 Rendena | 15.6 | 3.56 | 3.28 | 4.45 | 500 |
| 7 Alpine Grey | 16.3 | 3.83 | 3.40 | **4.00** | 550 |
| 8 Reggiana | 16.9 | 3.61 | 3.40 | 4.32 | 550 |
| 9 Modenese (BVP) | 14.0 | 3.34 | 3.43 | 4.26 | 550 |
| 10 Modicana | 10.8 | 3.53 | 3.45 | n.a. | 600 |
| 11 Valdostana P.R. | 11.4 | 3.44 | 3.22 | n.a. | 450 |
| **Average** | ***17.2*** | ***3.82*** | ***3.42*** | ***3.82*** | ***560*** |




AIA, 2007, AA.VV

# Added Values per kg of Milk Yield
## of 11 Cattle Breeds (4 Cosmopolitan and 7 Local Breeds)

| Breed | Value of Cheese €/kg | Value of Milk Yield €/kg | A.V. €/kg | A.V. Dev. by HF % |
|---|---|---|---|---|
| **Cosmopolitan** | | | | |
| 1 Holstein Friesian | 0.502 | 0.399 | **0.103** | **-** |
| 2 Brown Swiss | 0.569 | 0.423 | **0.146** | **+ 42** |
| 3 Simmental | 0.553 | 0.425 | **0.128** | **+ 24** |
| 4 Jersey | 0.638 | 0.477 | **0.161** | **+ 56** |
| **Local** | | | | |
| 5 Burlina | 0.552 | 0.393 | **0.159** | **+ 54** |
| 6 Rendena | 0.565 | 0.393 | **0.173** | **+ 68** |
| 7 Alpine Grey | 0.544 | 0.410 | **0.134** | **+ 30** |
| 8 Reggiana | 0.574 | 0.411 | **0.162** | **+ 57** |
| 9 Modenese (BVP) | 0.547 | 0.412 | **0.135** | **+ 31** |
| 10 Modicana | 0.650 | 0.408 | **0.242** | **+ 134** |
| 11 Valdostana P.R. | 0.576 | 0.387 | **0.189** | **+ 83** |
| **Average** | ***0.570*** | ***0.413*** | ***0.157*** | ***+ 53*** |

0.135 €/Kg

**-21%**

0.171 €/Kg

# Added Value per Lactation Yield
## of 11 Cattle Breeds (4 Cosmopolitan and 7 Local Breeds)

| Breed | Value of Cheese €/305d | Value of Lactation €/305d | A.V. €/305d | A.V. Dev. by HF % | Lactation yield kg/305d | Δ kg of Milk Yield to = AV of HF |
|---|---|---|---|---|---|---|
| **Cosmopolitan** | | | | | | |
| 1 Holstein Friesian | 4472 | 3553 | **918** | **-** | 8901 | - |
| 2 Brown Swiss | 3698 | 2748 | **950** | **+4** | 6500 | -221 |
| 3 Simmental | 3510 | 2700 | **810** | **-12** | 6349 | +851 |
| 4 Jersey | 3641 | 2720 | **921** | **=** | 5706 | -15 |
| **Local** | | | | | | |
| 5 Burlina | 2449 | 1743 | **706** | **-23** | 4439 | +1337 |
| 6 Rendena | 2690 | 1867 | **822** | **-10** | 4757 | +554 |
| 7 Alpine Grey | 2708 | 2042 | **666** | **-27** | 4977 | +1886 |
| 8 Reggiana | 2951 | 2116 | **835** | **-9** | 5143 | +512 |
| 9 Modenese (BVP) | 2340 | 1760 | **579** | **-37** | 4277 | +2501 |
| 10 Modicana | 2133 | 1340 | **793** | **-14** | 3283 | +518 |
| 11 Valdostana P.R. | 1996 | 1343 | **654** | **-29** | 3466 | +1401 |
| **Average** | ***2062*** | ***2176*** | ***787*** | ***-14*** | ***5254*** | ***+932*** ***(local: +1244)*** |

**But this Added Value is PROFITABLE ?**

# Morlacco Cheese of Burlina Cattle Breed

## “BURLACCO” PROJECT

Associazione Provinciale Allevatori Treviso

A.P.A. di Treviso

A.Pro.La.V.

Associazione Regionale Produttori Latte del Veneto

A.PRO.La.V.

dSA

Dipartimento di Scienze Animali
Università di Padova


- Herd with 100% Burlina cows reared & < 400.000 ml somatic cells count
- Herds multibreed guarantee milk separation & <400.000 ml somatic cells count
- Population of 300 Burlina lactating cows
- 904.000 kg of milk yield/year -> about 900 tons of milk/year
- 81 ton /year of Morlacco of Burlina cow (11% cheese yield)
- 10.314 wheels of Morlacco of Burlina cow per year (8 kg/ wheel)

Funds by Veneto Region, PSR (2007-2013) mis. 124

# Morlacco Market Products

Price, €/kg

Morlacco of Burlina by Alpin Pasture

- Slow Food Protected
- Traditional process
- Crude Milk
- Chain/Genetic Traceability

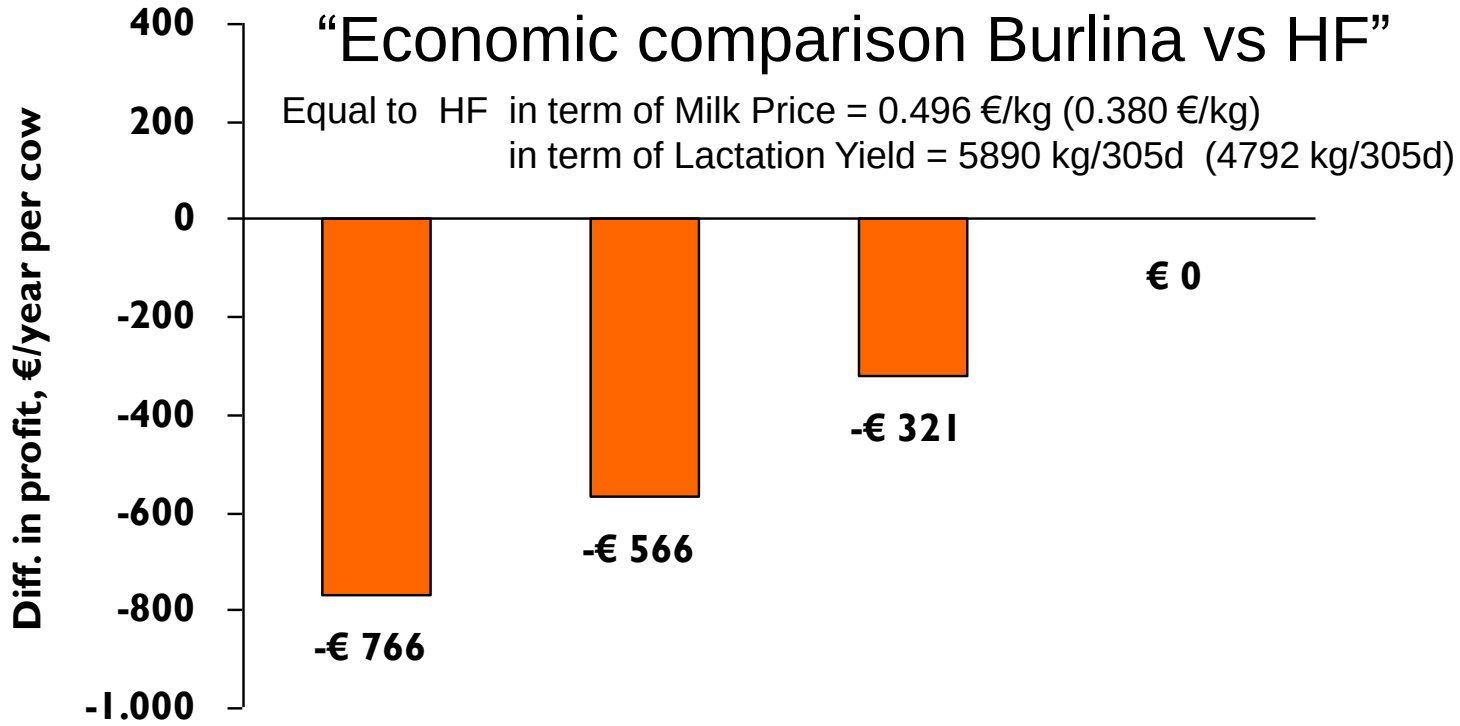

**Morlacco of Burlina cow**

- **Traditional process**
- **Crude Milk**
- **Chain/Genetic Traceability**

Morlacco “standard”

Yield

# Economic Comparison: Burlina vs HF




| | | | | |
|---|---|---|---|---|
| Regional Incentive | no | 200 €/cow | 200 €/cow | 200 €/cow |
| Milk valorization | no | no | + 0,05 €/kg | + 0,05 €/kg |
| Holstein Friesian yield | 9079 kg | 9079 kg | 9079 kg | 7706 kg |

Pretto D., de Marchi M., Dalvit C., Cassandro M. 2009, Italian Journal of Animal Science (SUPPL. 3), pp. 65-67

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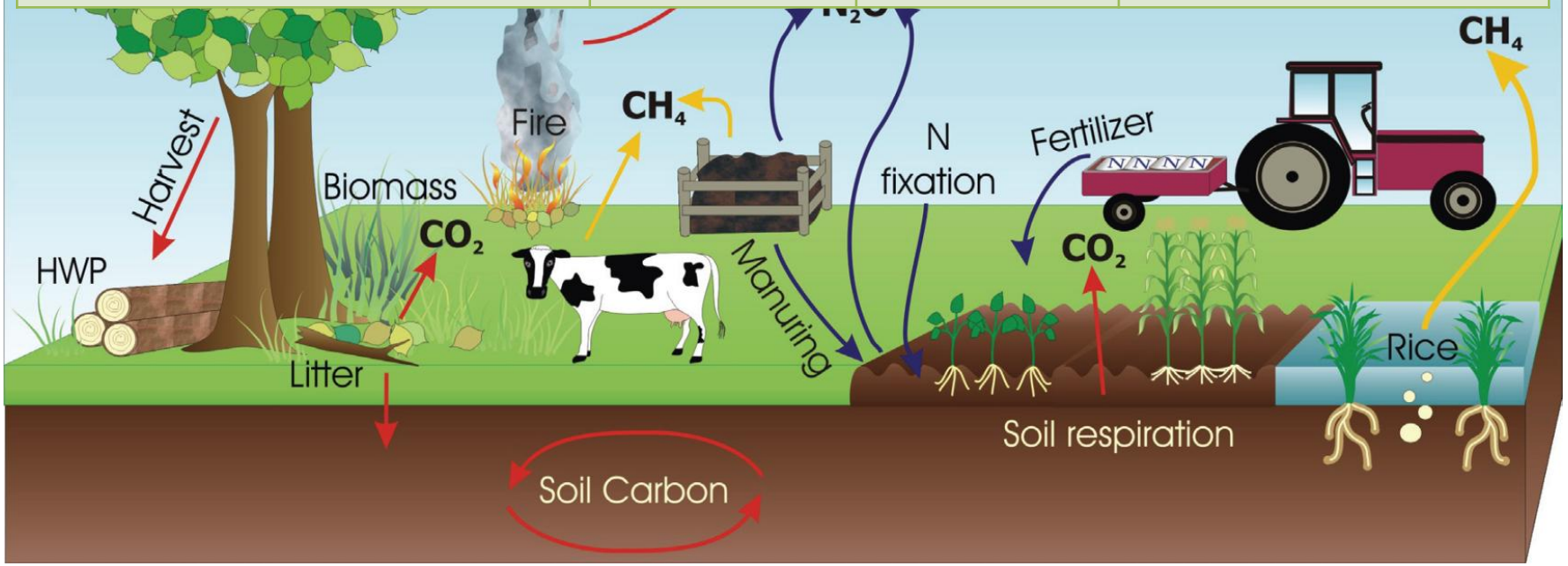
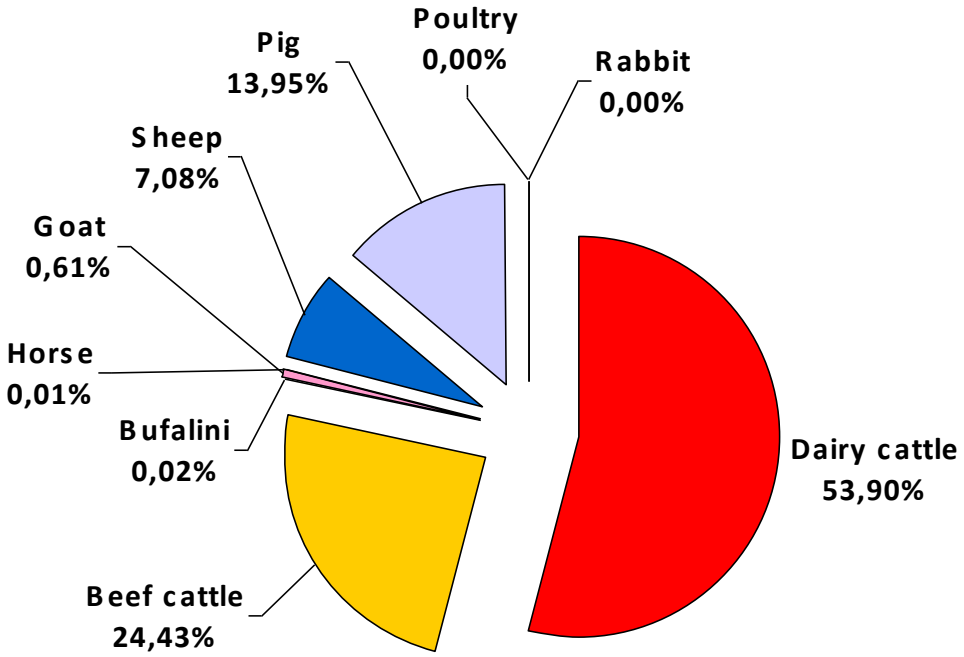
# Agriculture – Animal Production Contribution to GHGs

| | Agriculture | Livestock Production | Source |
|---|---|---|---|
| USA, % total country | 5.8 | 3 | EPA, 2007 |
| Canada, % total country | 8.0 | 4 | Kebreab e coll., 2006 |
| UK, % total country | 6.5 | 2 | Gill e coll., 2010 |
| Italy, % total country | 6.6 | 3 | ISPRA 2010 |
| **Global World** % total sector | **22.0** | **18** | **FAO, 2006** |



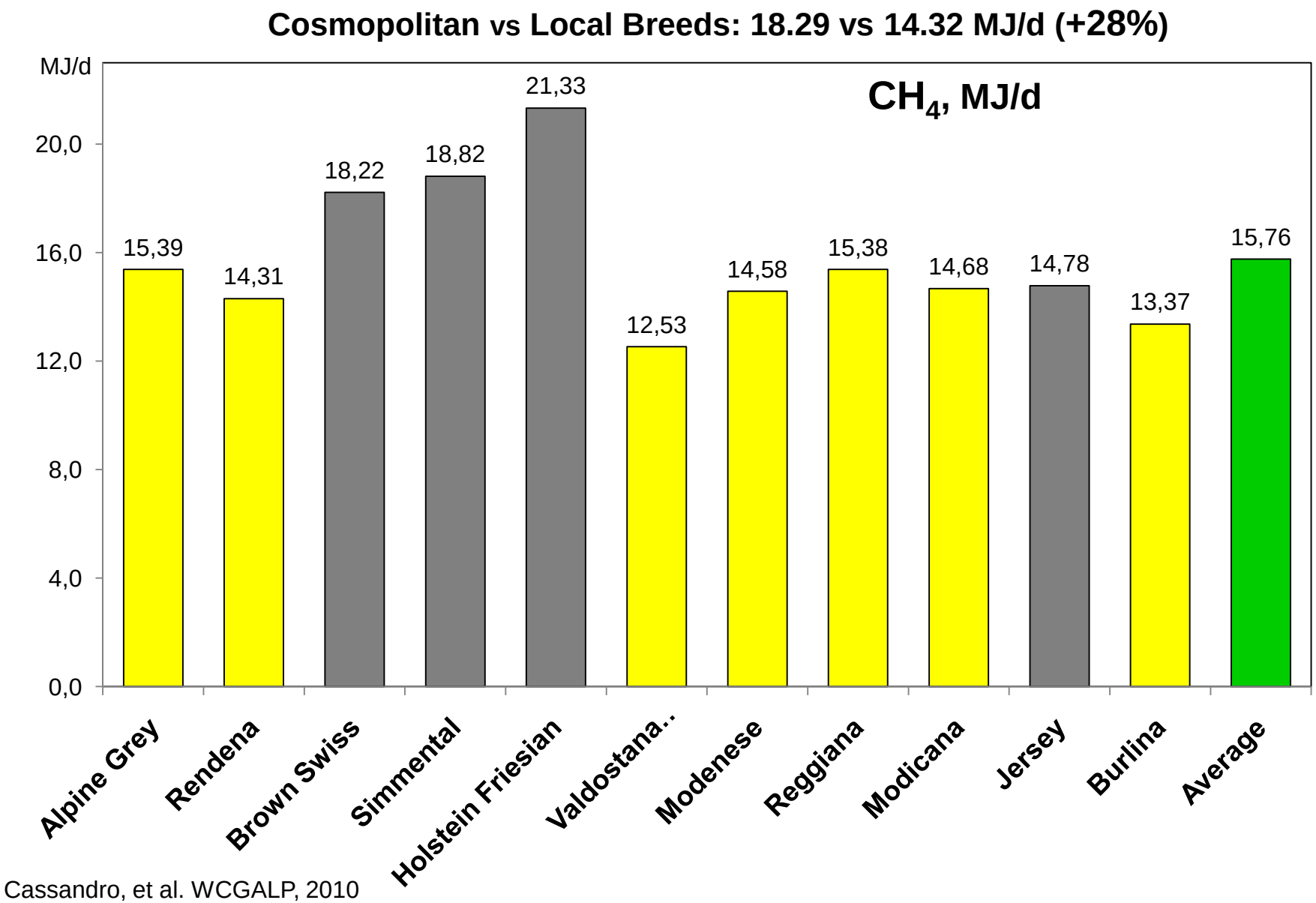
# Animal Production Contribution to GHGs

Contribution of total emissions of GHG in livestock sector by single species and categories in ITALY




*Atzori, Mele, Pulina, 2010*

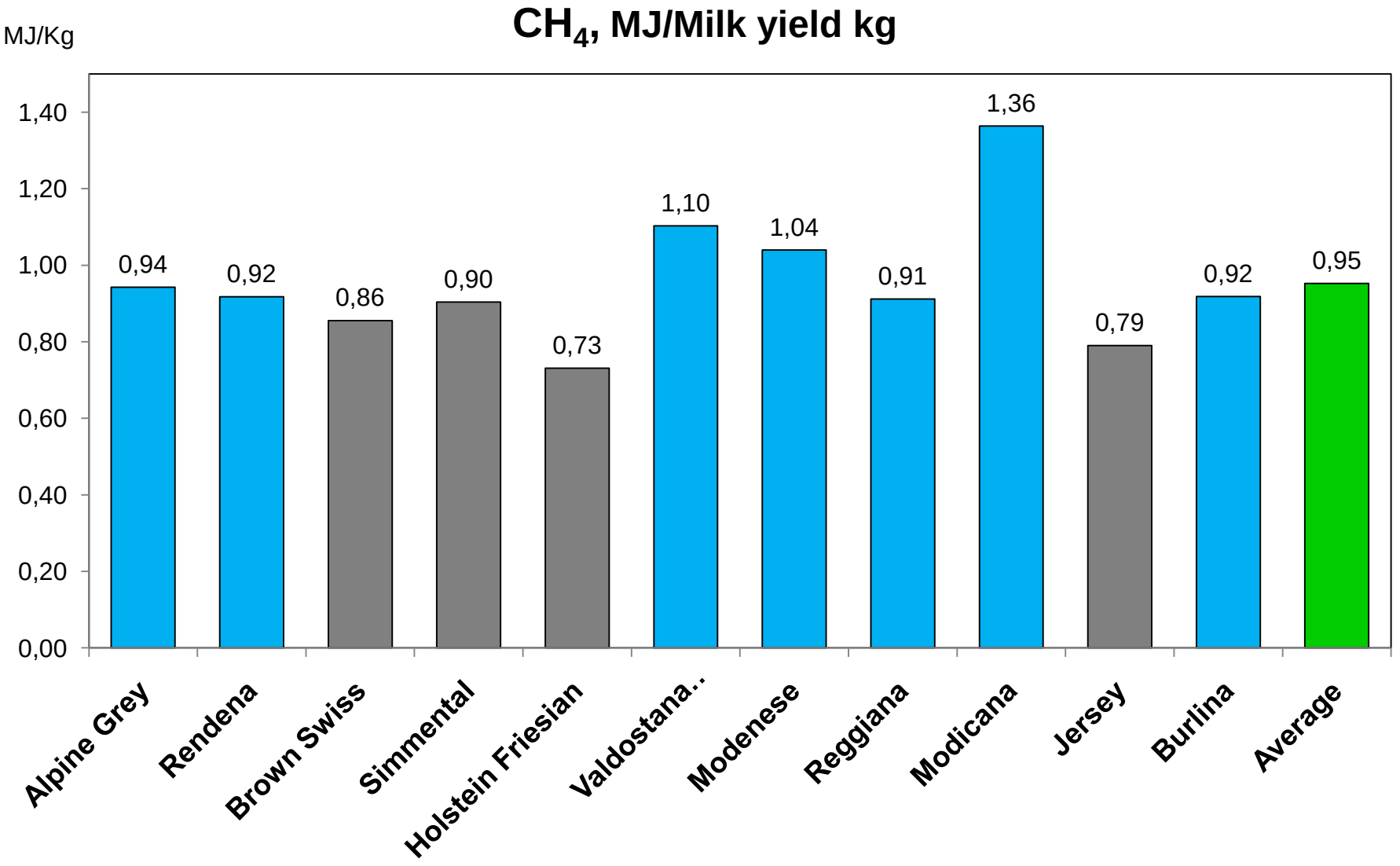
# Predicted Methane Production MJ/d




Cassandro, et al. WCGALP, 2010

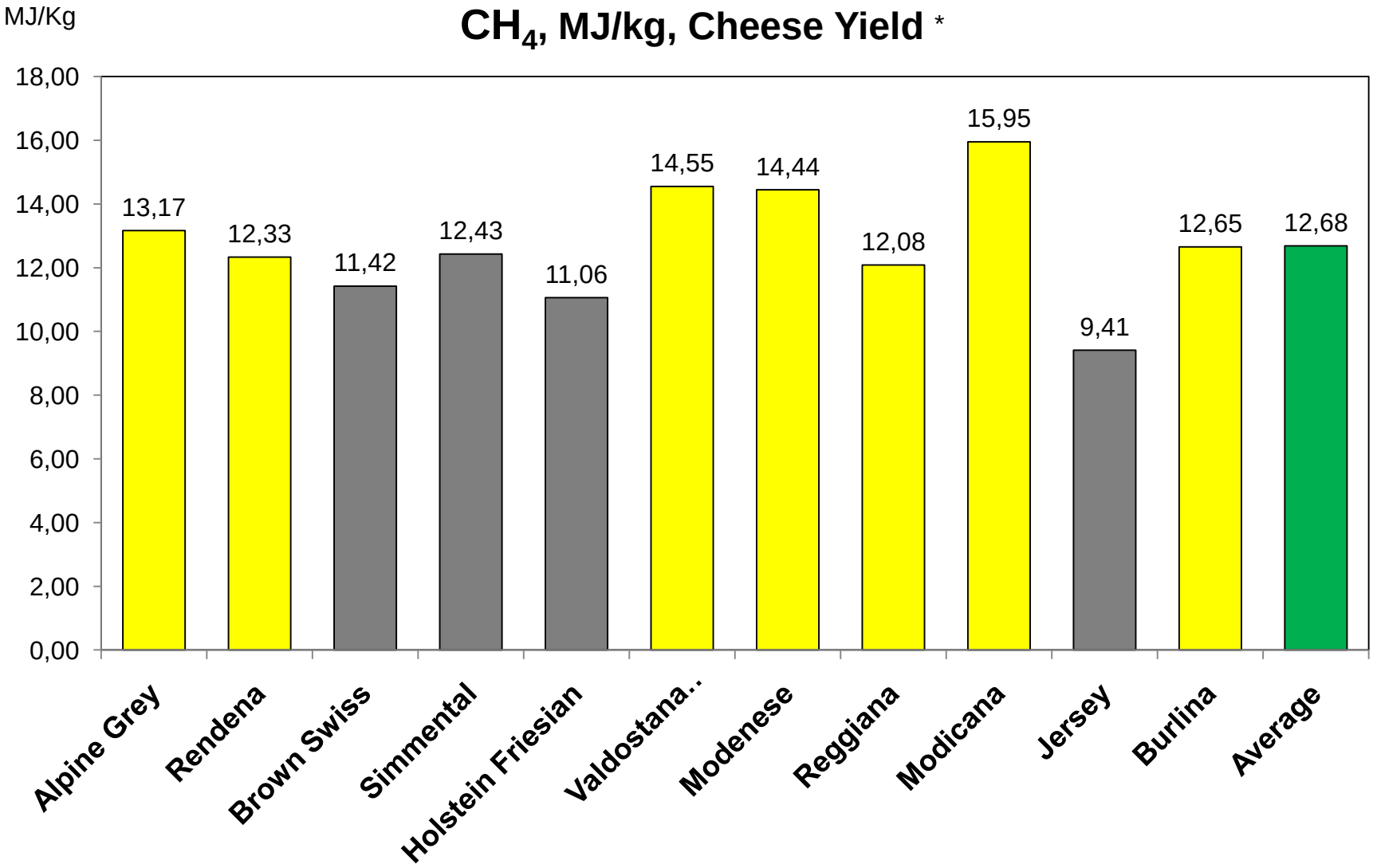
# Predicted Methane Production / unit of output

**Cosmopolitan vs Local Breeds: 0.82 vs 1.03 MJ/ Milk yield, kg (-20 %)**



# Predicted Methane Production / unit of output

**Cosmopolitan vs Local Breeds: 11.08 vs 13.06 MJ/ Milk yield, kg (-18 %)**

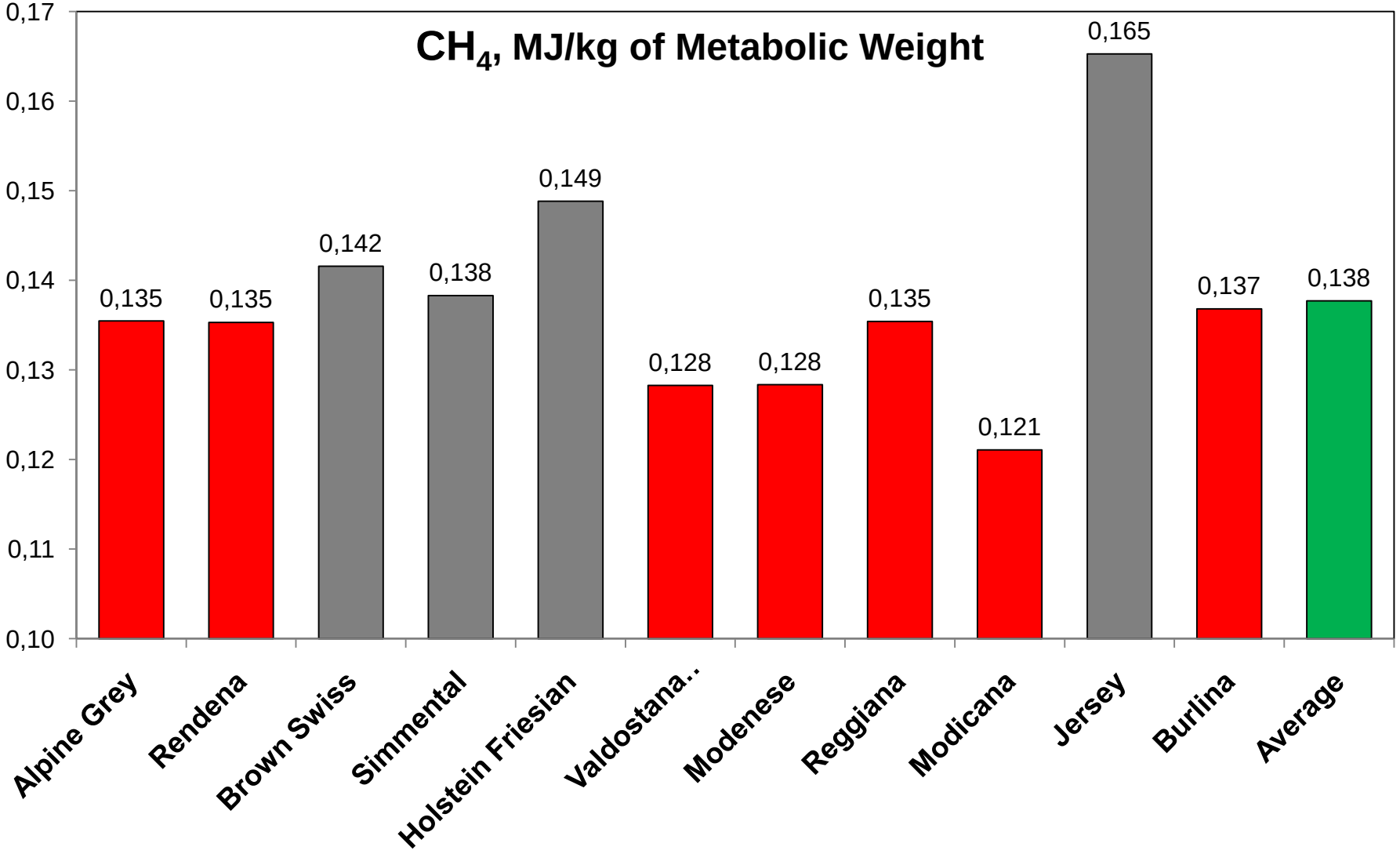



* Parmigiano Reggiano

# Predicted Methane Production / Metabolic Weight

MJ/Kg$^{0.75}$

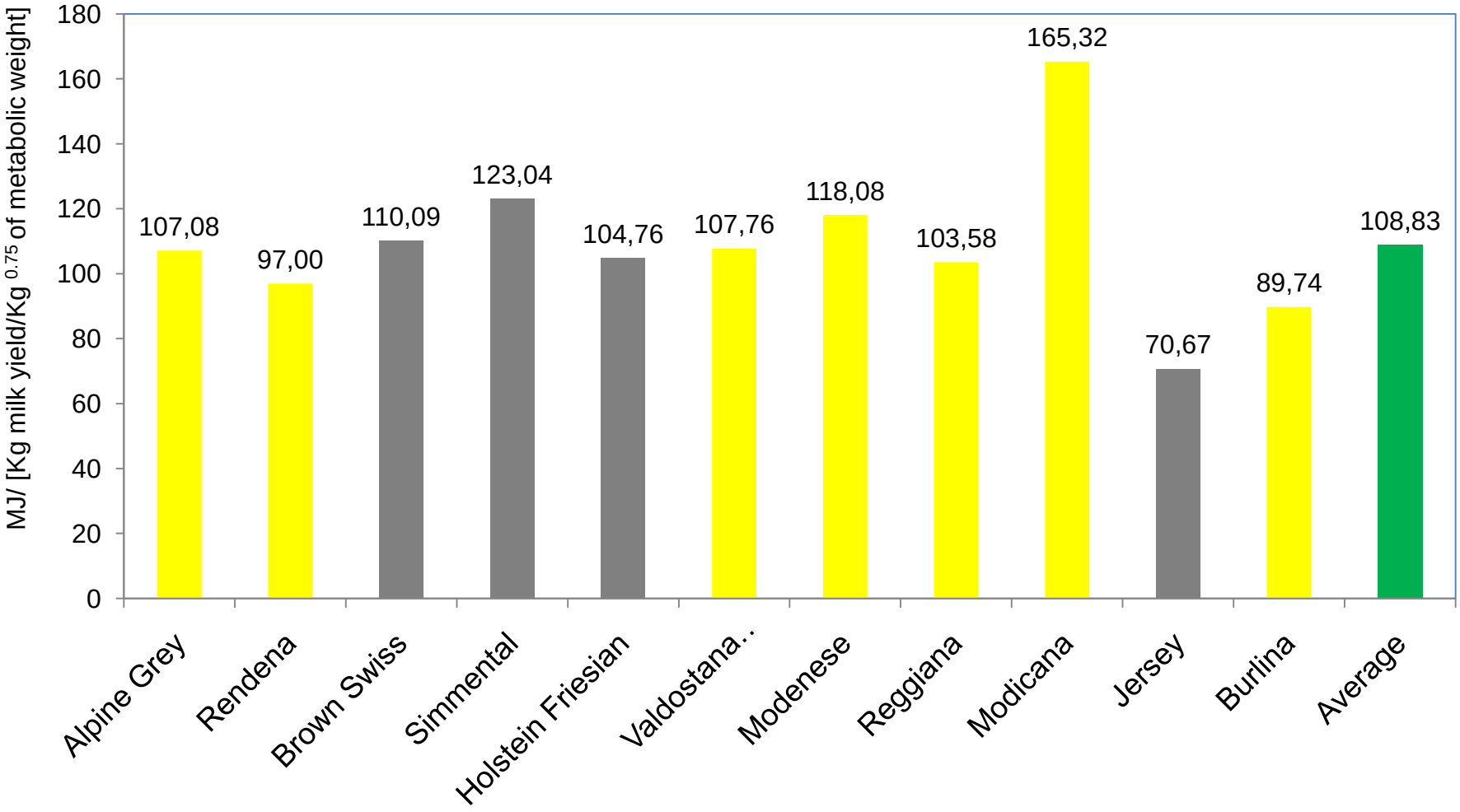
**Cosmopolitan vs Local Breeds: 0.15 vs 0.13 MJ/ Metabolic Weight, kg (+13 %)**



# Predicted Methane Production / Metabolic Weight

**Cosmopolitan vs Local Breeds: 102.14 vs 112.65 MJ/ Metabolic Weight, kg (-9 %)**

**CH4, MJ/ [kg milk yield/kg metabolic weight]**



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# CONCLUSIONS

Analyses on Added Value (AV) for Dairy Chain,

showed that AV for dairy breeds is around 0.16 €/kg

some breeds showed to be better for cheese yield than for milk fluid production:

- ✓ + 21% per kg of milk of Local vs Cosmopolitan breeds
- ✓ + 65% per kg of milk of Local vs HF breed

- ✓ - 25% per lactation yield of Local vs Cosmopolitan breeds
- ✓ - 21% per lactation yield of Local vs HF breed

but, Local breeds with an average increment of 1,244 kg/305d showed to be at the same AV per lactation yield of the HF (with only ~ +500 kg/305d per Rendena, Modicana e Reggiana).

# CONCLUSIONS

Analyses on AV for Environmental Chain,

showed that AV for dairy breeds is around 15.76 MJ/d

some breeds showed to cope better with mitigation of predicted $CH_4$ emission per unit of metabolic weight than for unit of milk:

- ✓ - 13% per kg of metabolic weight of Local vs Cosmopolitan breeds
- ✓ - 12% per kg of metabolic weight of Local vs HF breed

- ✓ + 20% per kg of milk yield of Local vs Cosmopolitan breeds
- ✓ + 41% per kg of milk yield of Local vs HF breed

P.S.

$CH_4$ emission per unit of metabolic weight is a measure at net of the Selection effect

$CH_4$ emission per unit of milk yield is a measure at gross of the Selection effect

# CONCLUSIONS

**AnGR** have a dual role not only in food production, but also in the provision of public good objectives including, biodiversity and landscape values and diffuse pollution to air and water.

Hence, AnGR should be evaluated in term of environmental efficiency and not only in term of economic efficiency.

*Some AnGR showed to produce more food in an environmentally sustainable way.*

*These breeds in the next 50 years (Diouf, 2007) have good chance to improve own profitable*

# CONCLUSIONS

**AnGR need to be evaluated** not only **per unit of** output but for others direct and indirect units of **output related to social and human returns,**

but, with valorization projects based on added values:

- for cheese yield and environment mitigation;
- and for other social and public goods, as territory preservation, consumer habits, turists requests, and history and cultural aspects of link between breed and food

# Thank You for Your Attention

*A FUTURE OF MORE VALORIZATION*
*TO GUARANTEE THE BEST CONSERVATION*