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Implementation cost of sheep & goat electronic ID & registration systems in Spain according to EU regulations

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Objectives

Electronic identification & registration of all sheep & goats born in Spain is mandatory from 2006 (RD 947/2005).

A study on implementation costs for the sheep & goats national population of Spain was previously published (Saa et al., 2005; J. Anim. Sci. 83:1215-1225)



The aim of this work was:

To update the cost evaluation of implementing the EU regulation for the identification and registration of sheep & goats in Spain

Strategies analyzed

- **Visual identification (VID)** by 2 officially ear tags (plastic ear tags)
- **Electronic identification (EID)** by 1 bolus & 1 ear tag
- **Mixed VID and EID strategy (MID)**, consisting of VID for fattening stock & EID for breeding stock

Complete & simplified implementation of the regulation also were considered as options



Materials and methods (1/4)

Key data

■ ID losses:

- Conventional ear tags: 6.0% (Rinaldi, 2009)
- Electronic bolus: 0.97%

■ Unitary prices of ID devices & Re-ID:

- Conventional ear tag: ID = 0.15 or 0.24 € & Re-ID = 0.15, 0.24 (new) or 3.22 (same no.) €
- Electronic bolus: ID = 1.30 € & Re-ID = 6.40 €



Materials and methods (2/4)

■ Operational times (min/anim):

| | VID | EID | MID |
|-------------------------------------|-------------|--------------|--------------|
| ID & register | 2.7 | 1.5 | 2.7 or 1.5 |
| ReID | 2.0 | 2.0 | 2.0 |
| Reading & register in the holding | 0.07 or 1.5 | 0.07 or 0.08 | 0.07 or 0.08 |
| Recovery & register in the abattoir | 0.07 or 1.0 | 0.67 | 0.07 or 0.67 |

■ Labor cost: 0.3 €/min

Materials and methods (3/4)

■ Equipment investment:

| Equipment | Units per | | Price (€) |
|-------------------|-----------|----------|-----------|
| | Holding | Abattoir | |
| Ear tag pliers | 1 | 0 | 10 |
| Ruminal bolus gun | 1 | 0 | 36 |
| Handheld reader | 1 | 0 | 450 |
| Stationary reader | 1/50 | 3 | 1,200 |
| Personal computer | 1/50 | 1 | 1,300 |

■ Amortization of equipment:

- General equipment: 5 yr
- Computers: 3 yr

Materials and methods (4/4)

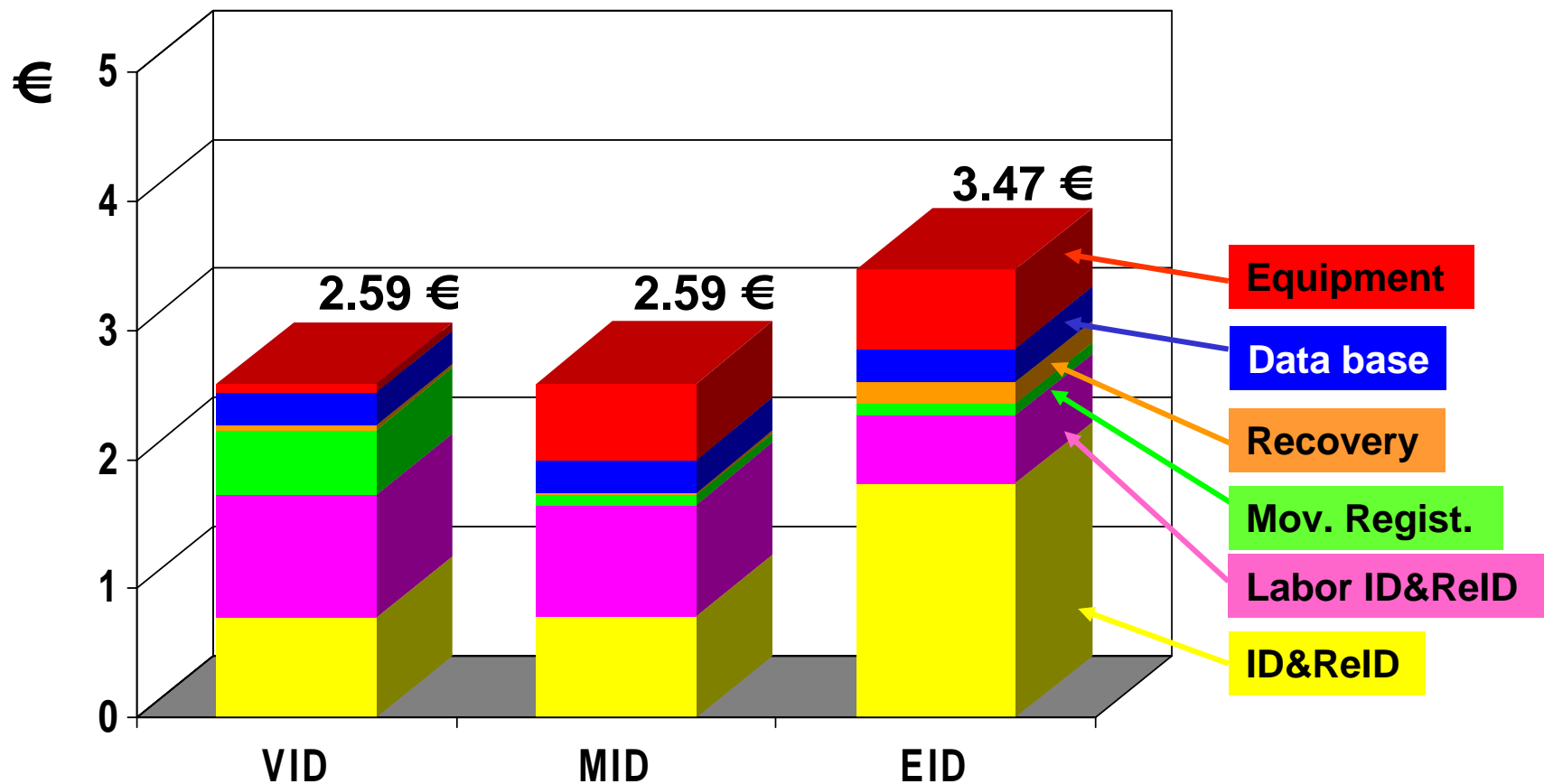
■ Sheep & goat scenario in Spain:

| | |
|--|--|
| Animals to be tagged ($\times 10^3$) | 22,097 |
| Breeding ewes & goats ($\times 10^3$) | 20,428 |
| Annual culling rate (%) | 15.4% |
| No. farms | 115,113 |
| Farm size (animals/farm) | 183 |
| Annual movements or readings in the holdings ($\times 10^3$) | 38,338 |
| Annual readings in the abattoirs ($\times 10^3$) | VID: 36,840 EID: 55,261 MID: 48,049 |
| No. abattoirs | 408 |

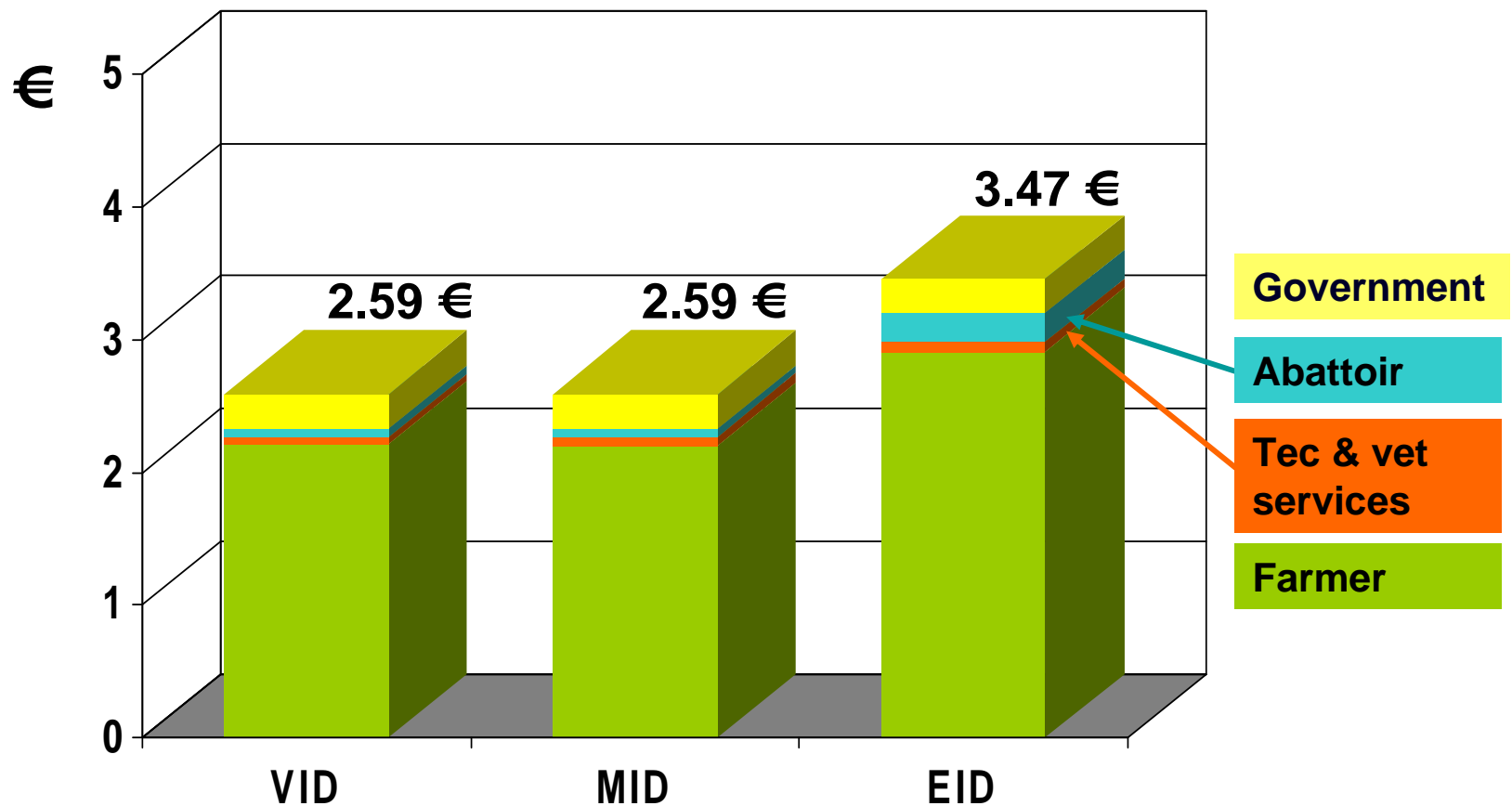
Annual cost structure in sheep & goat in Spain:

| Cost ($\times 10^3$ €/year) | VID | MID | EID |
|---|--------|--------|--------|
| ID devices | 7,232 | 10,779 | 32,342 |
| Re-ID devices | 9,752 | 6,557 | 7,552 |
| Labor for ID, Re-ID & registration | 21,003 | 19,063 | 11,747 |
| Movement-reading registration | 11,277 | 1,598 | 2,073 |
| Recovery & reading of devices in abattoir | 609 | 530 | 3,702 |
| Data base | 5,855 | 5,855 | 5,855 |
| Equipment | 1,405 | 12,950 | 13,440 |
| Total ($\times 10^3$ €) | 57,131 | 57,332 | 76,712 |
| Total (€/ID animal) | 2.59 | 2.59 | 3.47 |
| Total (€/kg carcass) | 0.28 | 0.28 | 0.37 |

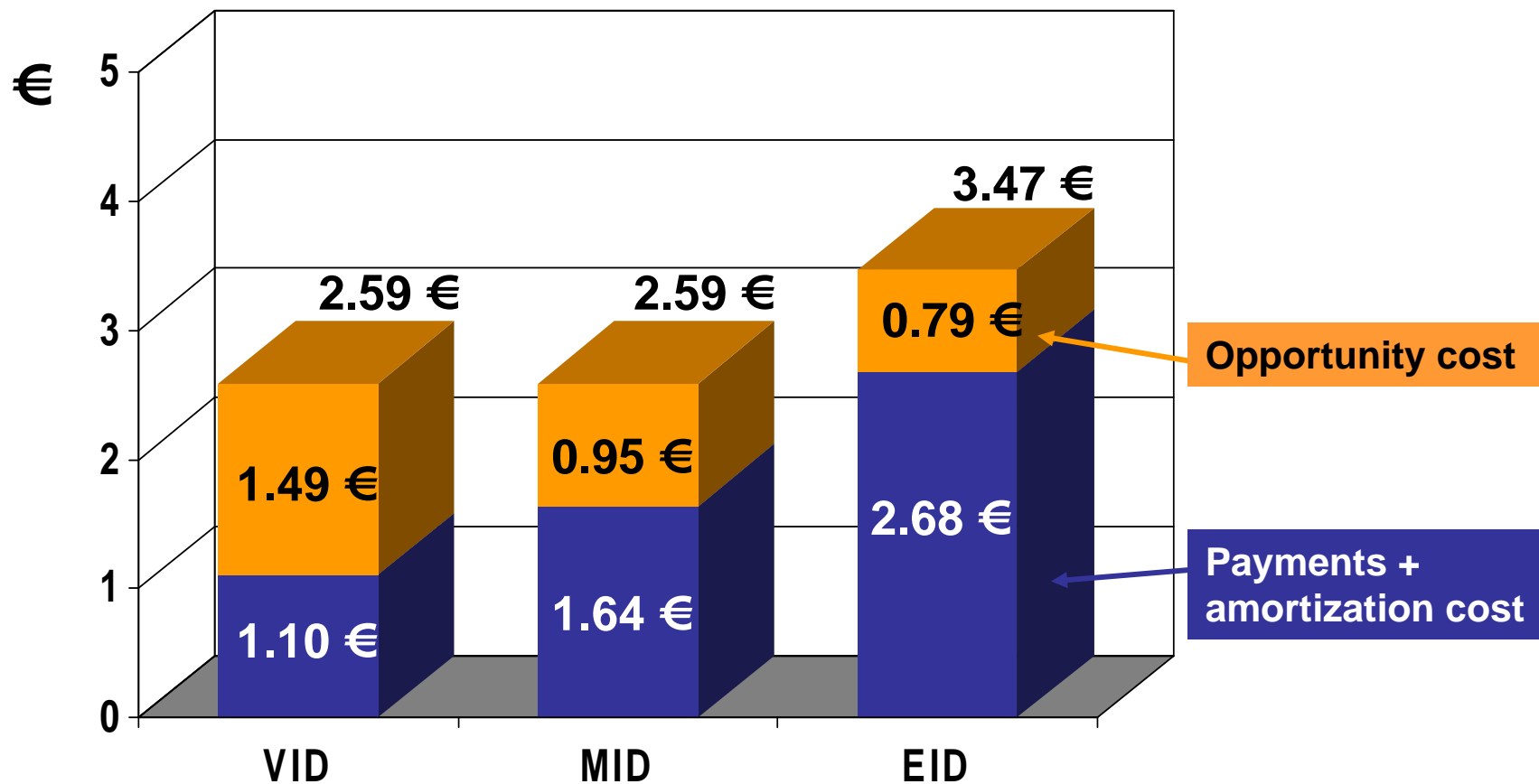
Annual cost per sheep & goat identified in Spain (€/animal identified & yr):



Cost assignation to different agents involved in Spain (€/animal identified & yr):



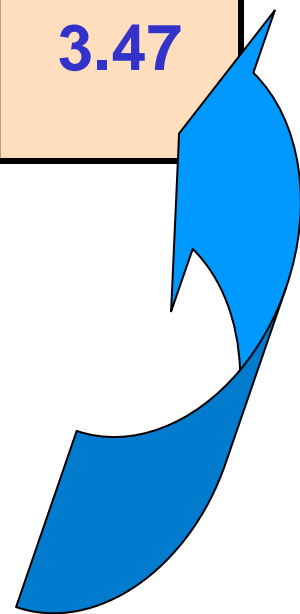
Cost assignation in payments and opportunity cost (€/animal identified/yr):



Comparison of annual cost of different options (€/animal identified & yr):

| Implementation options | VID | MID | EID |
|--|------|------|------|
| Complete according to EC 21/2004 | 2.59 | 2.59 | 3.47 |
| Considering exception of Article 4 (3), Harvesting lambs | 2.30 | 2.31 | 3.47 |

Regulation authorize the use of a **simplified method** of identification that consist in 1 tamper proof and non reusable ear-tag for **animals intended for slaughter before the age of 12 mo.**



Comparison of annual cost of different options (€/animal identified & yr):

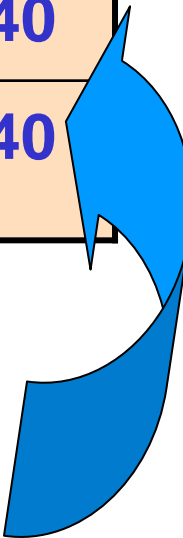
| Implementation options | VID | MID | EID |
|---|------|------|------|
| Complete according to EC 21/2004 | 2.59 | 2.59 | 3.47 |
| Considering exception of Article 4 (3), Harvested lambs | 2.30 | 2.31 | 3.47 |

For **MID** and **EID**, an new implementation option was proposed consisting on the use of **2 ear tags & 1 bolus**, at the initial identification of the breeding stock animals

Comparison of annual cost of different options (€/animal identified & yr):

| Implementation options | VID | MID | EID |
|---|------|------|------|
| Complete according to EC 21/2004 | 2.59 | 2.59 | 3.47 |
| Considering exception of Article 4 (3), Harvested lambs | 2.30 | 2.31 | 3.47 |
| Double ear tagging, MID & EID | 2.59 | 2.46 | 3.40 |
| Both options (exception of article 4, and double ear tagging) | 2.30 | 2.18 | 3.40 |

For **MID** and **EID**, an new implementation option was proposed consiting on the use of **2 ear tags & 1 bolus**, at the initial identification of the breeding stock animals



Comparison of annual cost of different options (€/animal identified & yr):

| Implementation options | VID | MID | EID |
|---|---------------------------|---------------------------|---------------------------|
| Complete according to EC 21/2004 | 2.59 | 2.59 | 3.47 |
| Considering exception of Article 4 (3), Harvested lambs | 2.30 1.91 ¹ | 2.31 2.06 ¹ | 3.47 3.18 ¹ |
| Double ear tagging, MID & EID | 2.59 | 2.46 | 3.40 |
| Both options (exception of article 4, and double ear tagging) | 2.30 1.91 ¹ | 2.18 2.07 ¹ | 3.40 3.30 ¹ |

¹ When simplified retagging was used

Effect of bolus price, % losses and labor cost in total annual cost of ID & Re:

Option 2 (€/animal identified & yr)

Losses %

Labor cost

Losses x
Labor cost

$$\text{VID} = 0.53 + 0.00 B + 7.10 L + 4.23 W + 4.41 L \times W$$

$$\text{EID} = 1.08 + 1.06 B + 3.68 L + 2.41 W + 3.90 L \times W$$

$$\text{MID} = 1.04 + 0.18 B + 3.55 L + 2.60 W + 2.20 L \times W$$

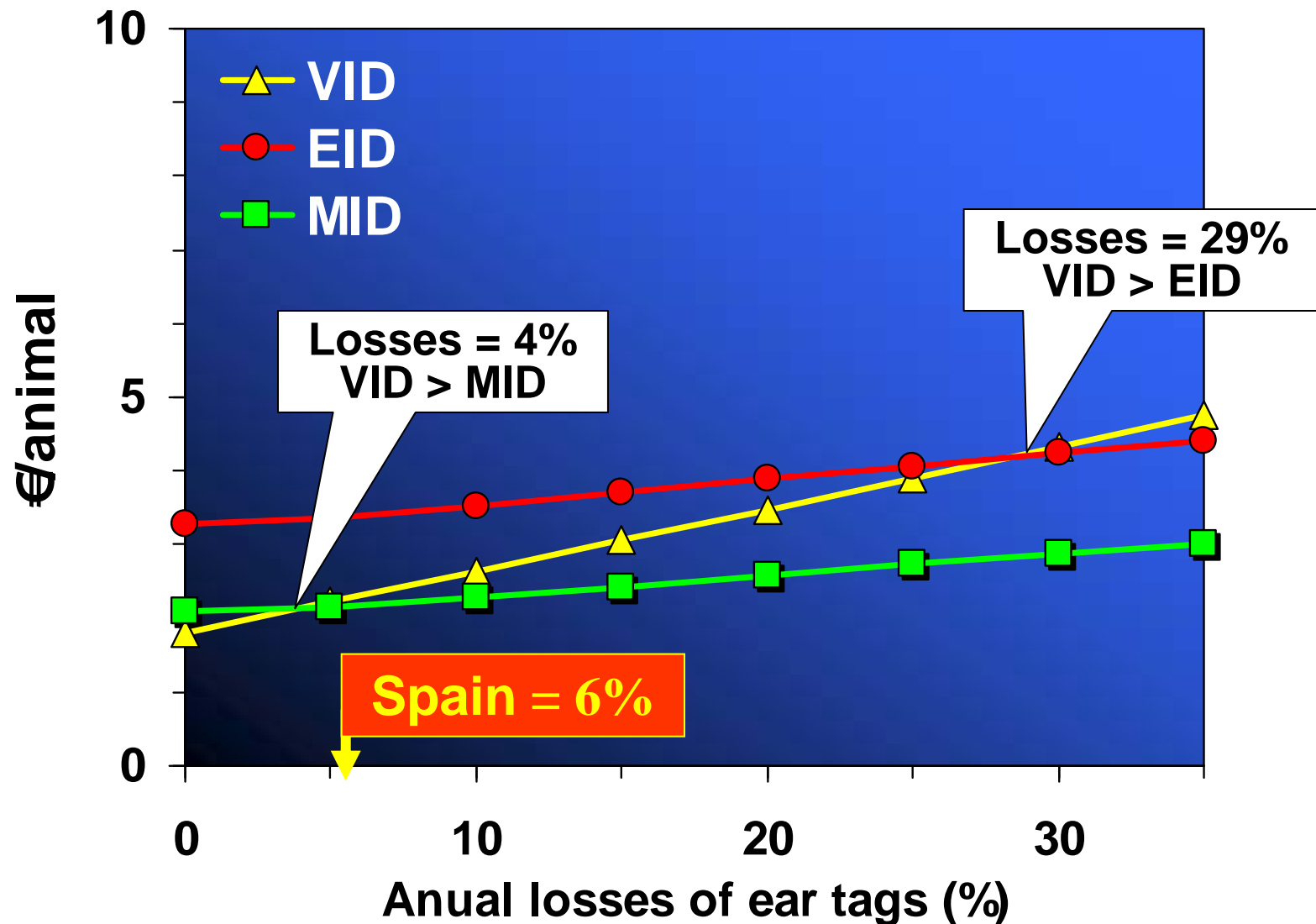
Equipment
+ Data Base

Bolus price

L: losses of visual ear tags (%)
W: Labor cost (€/min)
B: electronic bolus price (€)

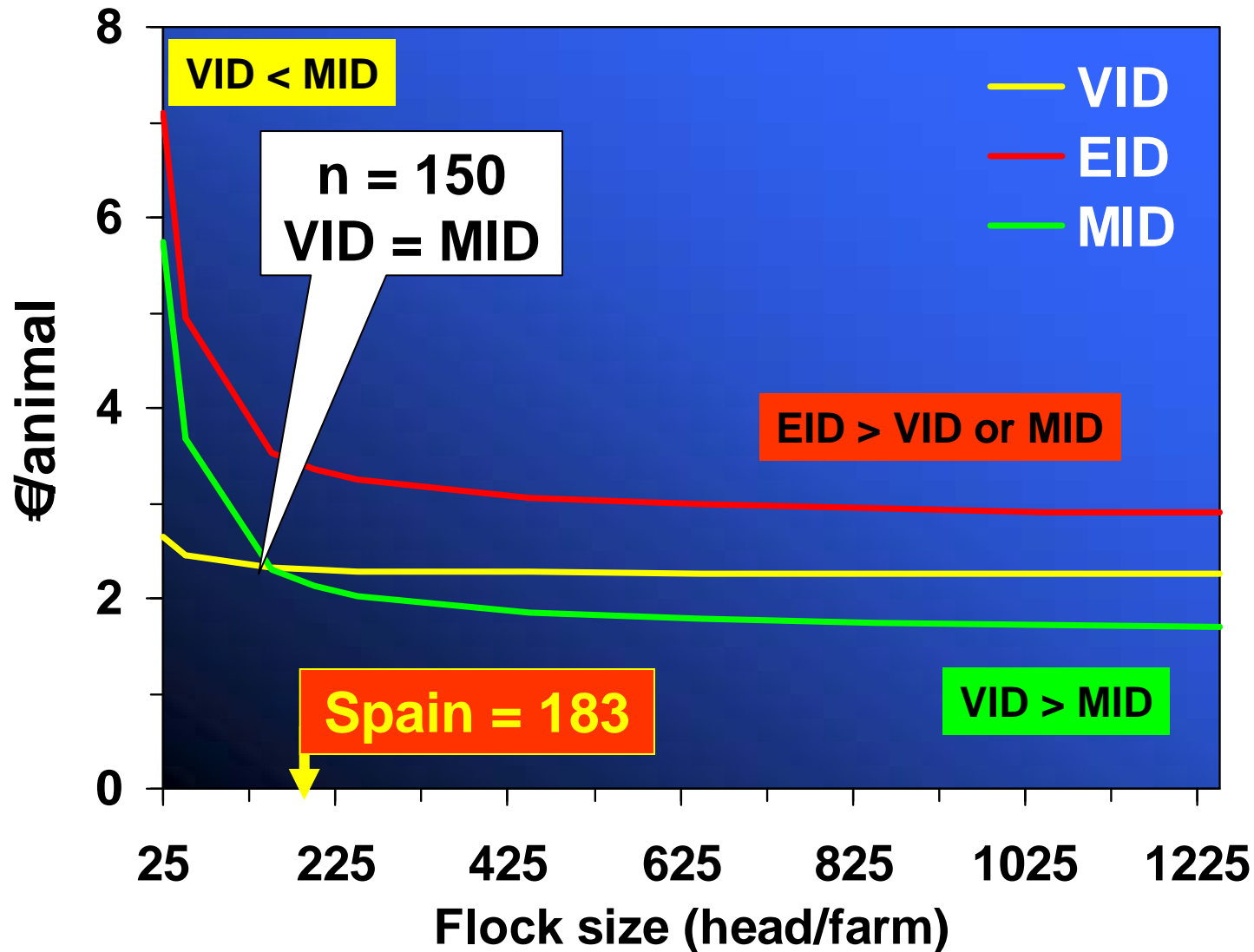
Effect of ear tag losses in total annual cost:

Opt. 4: exception of art. 4, double ear tagging



Effect of ear tag losses in total annual cost:

Opt. 4: exception of art. 4, double ear tagging



Conclusions (1/2):

- The cost of ID & Re ranged (per animal identified) between:
 - **2.18** to **3.47 €** or
 - **1.91** to **3.18 €** when simplified retagging was used
 - These values increased the production costs from **0.20** to **0.37 €** per kg of carcass
- **VID** & **MID** with **simplified retagging** are the cheapest options (**1.91** & **2.06**) but animal and meat traceability is not enough warranted
- For ear tag losses greater than:
 - 4%**: MID was less expensive than VID
 - 29%**: EID was less expensive than VID

Conclusions (2/2):

- For flock sizes smaller than **150 head**, EID was considerably more expensive than VID, however, for greater farm sizes the total cost steadied, the effect of flock size being less important.
- For the current price of devices and equipment it may be concluded that:

When the ID&R system of is used for warranting traceability, the MID strategy (using the exception of article 4 or the double ear tagging) are the most convenient options to fulfill the EC Regulation for the identification of sheep & goats in the current conditions of Spain

A large flock of sheep is gathered on a grassy hillside. In the foreground, a single sheep with a brown and white face and a black collar is looking towards the camera. A speech bubble originates from the sheep's head, containing the text "Thanks for your attention!". The background shows a vast number of other sheep scattered across the slope under bright sunlight.

Thanks for your attention!