# Management application of activity monitoring in grazing beef cows



## Rachel Gabrieli,  Extension service, Ministry of agriculture & rural development, Israel

# Beef production

**Developing countries**

- 75% of world cattle population
- Meat production under 45%
- High sensitivity to environmental conditions

**Developed countries**

- 25% of world cattle population
- Meat production over 55%
- Lower sensitivity to environmental conditions
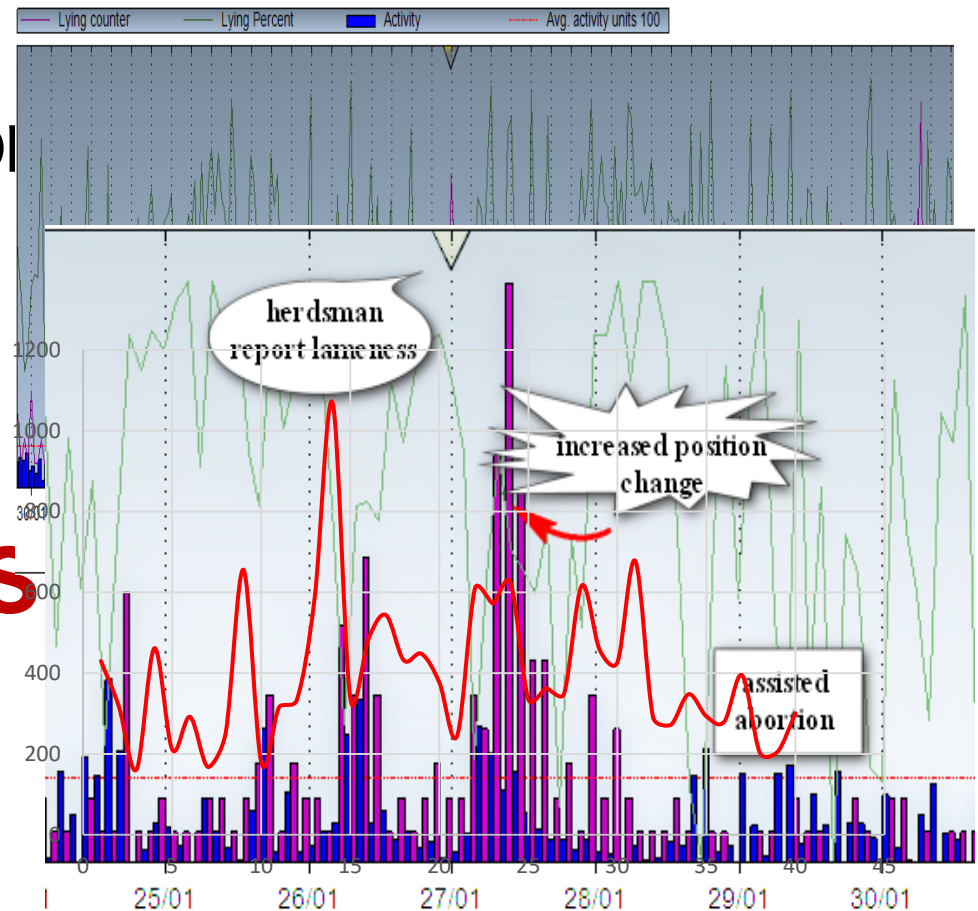
Low inputs

# Beef cattle in Israel

➢ NS in world population and production

➢ Transition zone

➢ Semi intensive management:

    ✓ Food additives

    ✓ Health management

    ✓ Control

    ✓ Field studies – Technology development

High inputs

# Long range activity monitoring in pasture:

➢Estrous detection

➢Calf distress

➢ Lameness

➢**Social status**

# Social research hypothesis:

Activity patterns reflect the measure of freedom each cow has to choose her individual behaviour within the herd

# Research goal

**Apply activity monitoring as a management tool addressing the individual cow's social needs**

## Materials & methods

❖ Animals:
- ❖ 140 cows: 78 primiparous, 62 multiparous
- ❖ 44 kins (mothers and daughters), 96 non kins

❖ Tracking system:
- ❖ Track A))) cow system
- ❖ Long range transmitting tags range: 200-1000m appx.
- ❖ Real-time data transfer
- ❖ Data: Activity, posture, change of posture (bouts)
- ❖ Day & night observations
- ❖ Positive interactions: Proximity, grooming

# Results

- **Observed herd behavior seemed repetitive**
- **Data analysis showed highly variable activity**

| | Average | SD | CV |
|---|---|---|---|
| Daily activity | 145 | 80 | 55% |
| 6:00-7:00 Activity | 217 | 41 | 20% |
| Range of 22 hrs | 19 - 267 | | 41% - 190% |

- **Non routine individual behaviours passed unobserved (excluding heat and health)**

# Comparative data analysis

| # | Average non kins | Average kins | Average young | Average adult |
|---|---|---|---|---|
| **N** | 96 | 44 | 78 | 62 |
| **Positive interactions** | 45 d | 97 c | 47 b | 80 a |
| **Average 6-7 am activity** | 252 c | 290 c | 320 b | 194 a |
| **Average noon rest activity** | 132 c | 138 c | 163 b | 97 a |
| **ADG weaning calf** | 1.09 b | 1.21 a | 1.04 b | 1.19 a |

# Refining…

| # | Young and non kins | Young and kins | Adult and non kins | Adult and kins |
|---|---|---|---|---|
| N | 58 | 20 | 38 | 24 |
| **Positive interactions** | 35 d | **83 c** | **61 b** | 110 a |
| **Average 6-7 am activity** | 258 b | 267 b | 191 a | 198 a |
| **Average noon rest activity** | 143 b | 146 b | 94 a | 101.2 a |
| **ADG weaning calf** | 1.00 b | **1.22 a** | **1.18 a** | **1.2 a** |

# Activity effect on production
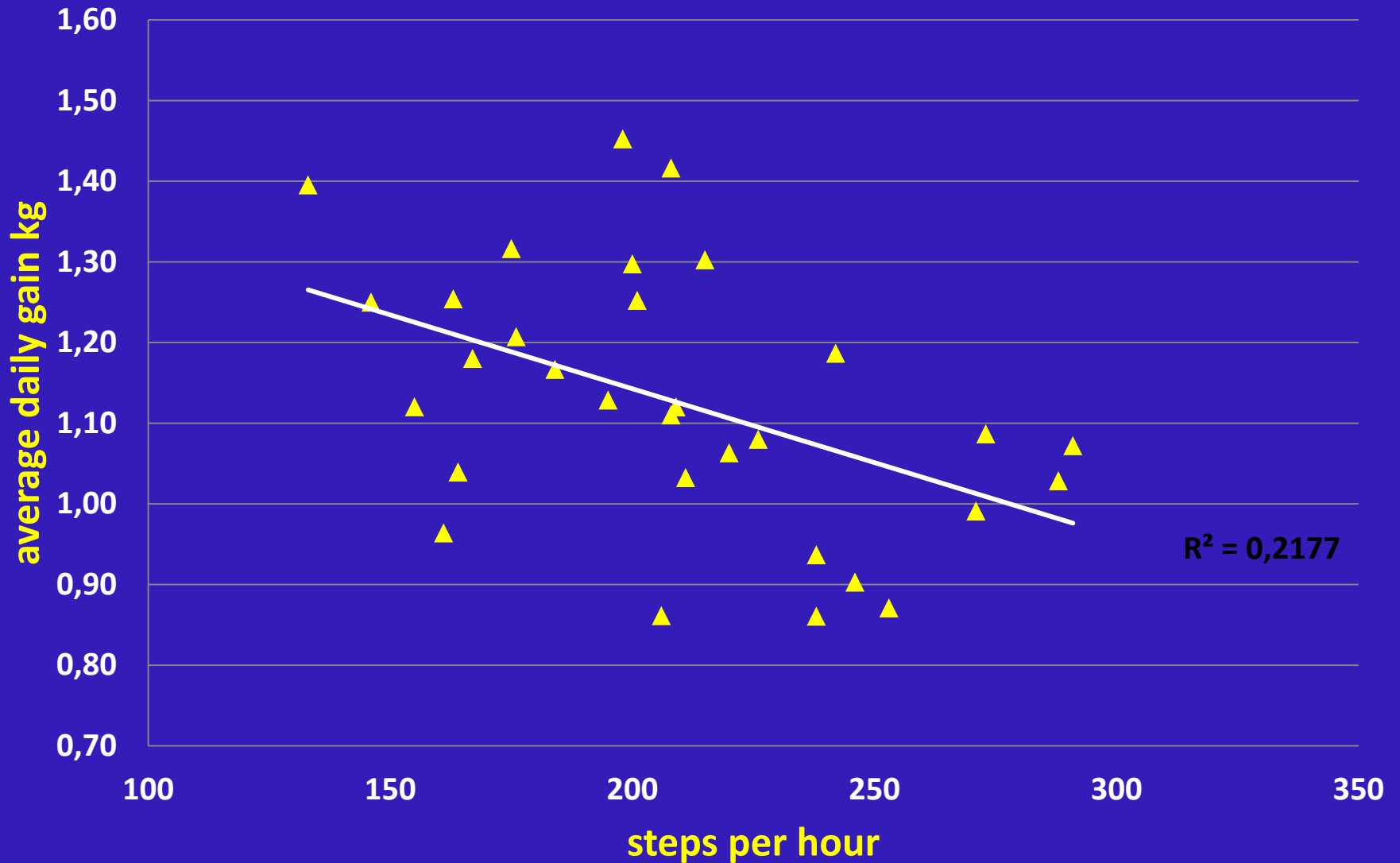
# Regrouping
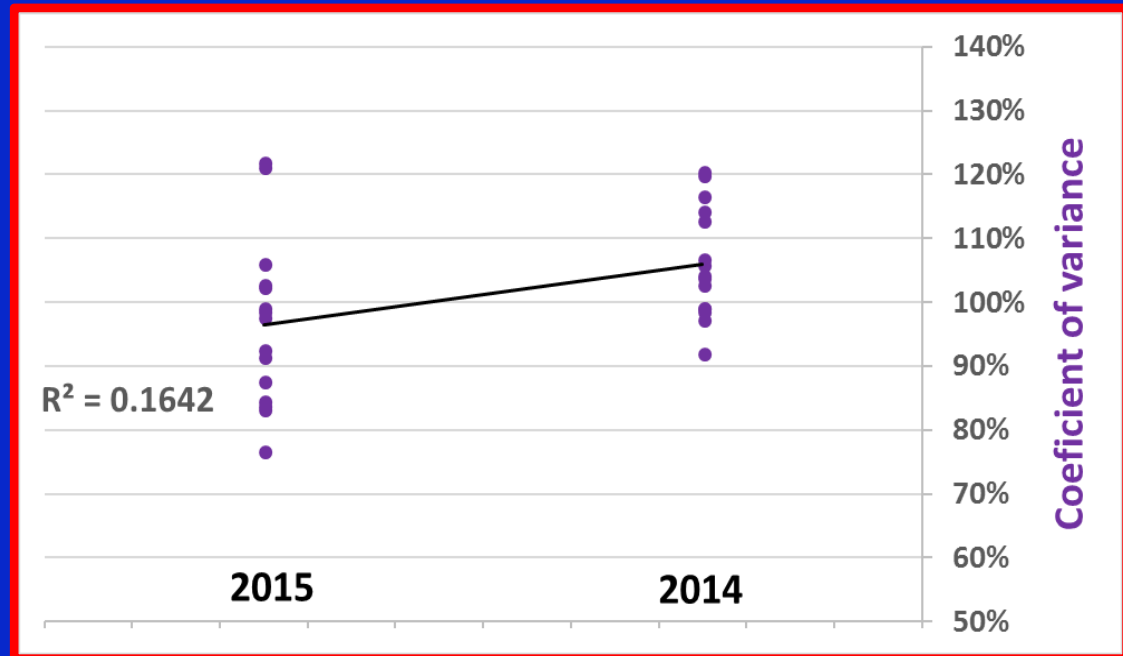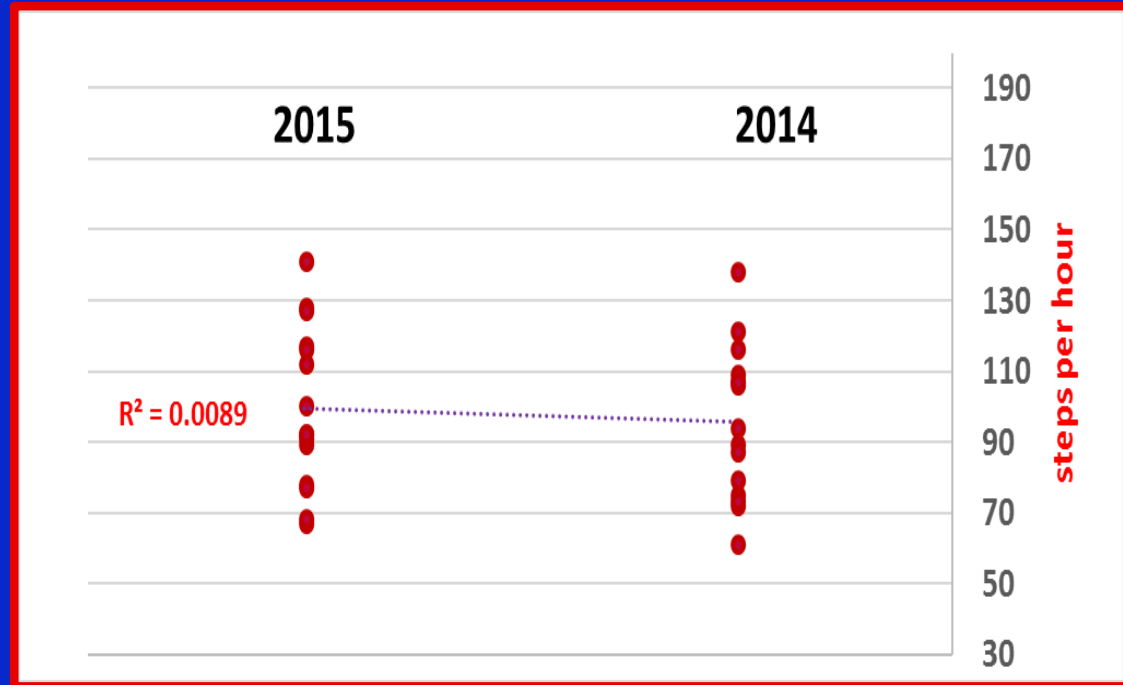
# Distance and activity

| cv | stdv | av | hour |
|---|---|---|---|
| 65% | 60 | 92 | 0:00 |
| 109% | 77 | 70 | 1:00 |
| 146% | 42 | 29 | 2:00 |
| **190%** | **36** | **19** | **3:00** |
| 137% | 38 | 28 | 4:00 |
| 52% | 76 | 148 | 5:00 |
| **41%** | **107** | **260** | **6:00** |
| **39%** | **103** | **267** | **7:00** |
| **37%** | **91** | **244** | **8:00** |
| **36%** | **84** | **233** | **9:00** |
| 44% | 83 | 189 | 10:00 |
| 69% | 99 | 143 | 11:00 |
| 85% | 72 | 85 | 12:00 |
| 90% | 57 | 63 | 13:00 |
| 82% | 66 | 80 | 14:00 |
| 76% | 123 | 161 | 15:00 |
| 55% | 116 | 210 | 16:00 |
| 55% | 132 | 239 | 17:00 |
| 49% | 127 | 262 | 18:00 |
| 44% | 106 | 238 | 19:00 |
| 70% | 80 | 114 | 20:00 |
| 120% | 63 | 52 | 21:00 |
| 105% | 92 | 88 | 22:00 |
| 85% | 84 | 98 | 23:00 |

**Median – distance between samples**
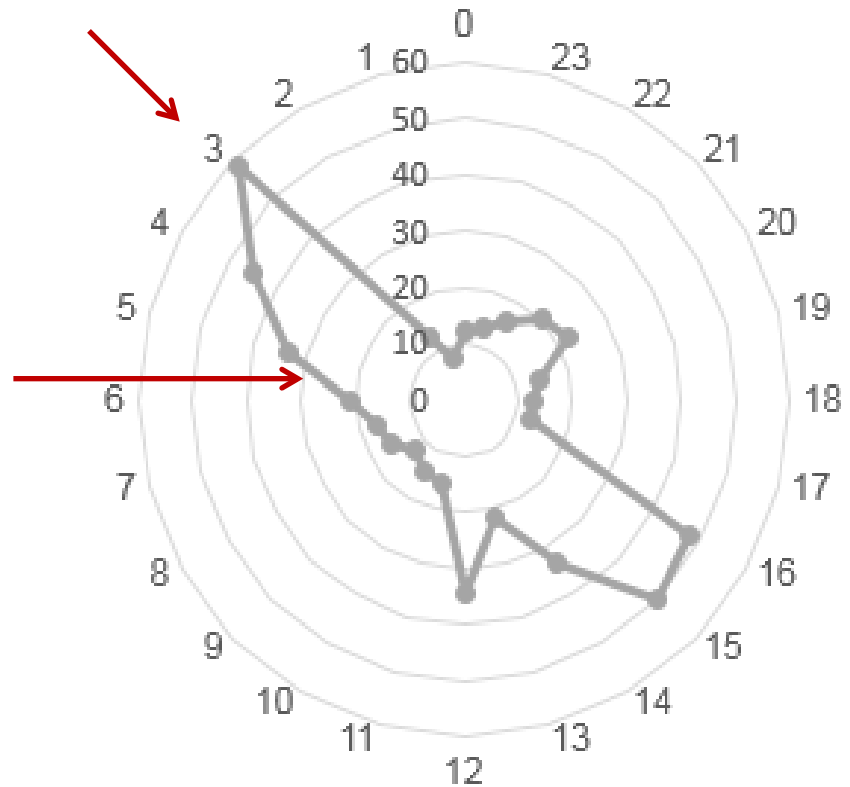
# Conclusions

- High variability in most activity parameters – individual continuous monitoring is essential
- Conservative patterns express essential needs in time and space
- Fluctuations in them suggest constraints
- Kinship has a significant effect on welfare and production
- Location monitoring may shed more light on the essence of activity (idle or directional walking, grazing, dispersing or crowding etc.)
- Regrouping low ranking cows can serve as a management solution

# Acknowledgements

- The Israeli extension service
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- ENGS systems
- All creatures – high and low ranking

# Thank you!

**Rachel Gabrieli**
**ragav@shaham.moag.gov.il**