Hunters in regal hunting system: case of Serbia

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Content

- Introduction
- Problem statement
- Aim of the study
- Methodology
- Results
- Discussion
• Regal hunting system
• Game belongs to the State
• Ministry establishes a hunting ground and gives it to users for 10 year period
• 323 hunting grounds in the country, approx. 98% of the territory
• Most of the stakeholders are representatives of the State
• Hunters required to be members of the Hunting Association
Introduction

Problem statement

Aim of the study

Methodology

Results

Discussion

Forest state enterprises

Hunting Association of Serbia

National parks

Army University
• Serbia is a country in transition
• New Law on Game and Hunting(2010)
• New stakeholders, power re-distribution, new regulations, new hunting practices, new organization, new hunting grounds...
• Not all expectations fulfilled
• Inadequate research, focused on traditional studies
• No data and knowledge of hunters
• No transparency and hunters’ participation in decision making
• Role of hunting has changed
• Anti-hunting pressure
• Traditional conflict with forestry
• Conflict with agriculture
• Conflict with recreational use of forest and wilderness
• Hunters’ recruitment and retention
• Aging population of hunters
• Biodiversity loss
• Habitat degradation and fragmentation
Introduction

Problem statement

Aim of the study

Methodology

Results

Discussion

70 000 – 80 000
Introduction

Problem statement

Aim of the study

Methodology

Results

Discussion
HUNTING SECTOR IN SERBIA

Aim of the study

Introduction

Problem statement

Methodology

Results

Discussion

Hunters’ characteristics
Attitudes
Opinions
Motivations
Problems

Hunting participation
Hunting grounds
Game abundance
Bag limits
Investment
“Average Serbian hunter”

Socio-economic characteristics
Hunters’ characteristics
Hunting preferences
Wildlife value orientations
Opinions
Attitudes

Motivations to hunt
Behavior
Research questions

• Do hunters’ socio-economic characteristics shape their motivations to hunt and wildlife value orientations?

• Could Manfredo’s Wildlife Value Orientation model be implemented in Serbian hunting/wildlife management arena?
Research design

- Deductive
- Quantitative
- Descriptive-explanatory characteristics
- Face to face interviews
- Questionnaire 50 items
- Questions in several groups:
  - Hunters’ characteristics
  - Hunters’ opinions
  - Cognitive hierarchy
  - Socio-economic questions
Methodology

Determine Sample Size

Confidence Level: 95% 99%
Confidence Interval: 5
Population: 80000
Sample size needed: 382

Find Confidence Interval

Confidence Level: 95% 99%
Sample Size: 390
Population: 80000
Percentage: 50
Confidence Interval: 4.95
**Introduction**

**Problem statement**

**Aim of the study**

**Methodology**

- **Theoretical population**
  - (All hunters in Serbia)
  - 80,000

**Sampling frame**

- Registered hunters with hunting licenses
  - Simple random sample

**Discussion**
Response rate 376/390
Average Serbian hunter

- 48 years old (19-87)
- 23 years of participation
- Starts at 25!?!?
- High school education - 70%
  (College - 8%; University – 8%)
- Married
- Rural (80%)
- “Farmers” (55%) avg. property 6 ha (15 acres)
- Rarely members in other clubs/fellowships
- 75% earn up to 7750 USD/year
Average Serbian hunter

- 12% consider to stop hunting
- Reasons:
  - Finances – 38%
  - Policy issues – 20%
  - Health issues – 18%
  - Lack of game – 11%
- Only 23% of hunters are satisfied with the new legislation
- Less than 6% of hunters have any knowledge of legislation
Average Serbian hunter

- **69%** had hunters in the family
  - **69%** father
  - **16.4%** grandfather
- **94%** own shotgun
  - **80%** have 1, **18%** have 2
- **55%** own rifle
  - **86%** have 1, **12%** have 2
- **15%** own a gun
  - **91%** have 1, **7%** have 2
- **50%** have bird dogs
Average Serbian hunter

Motivations to hunt:
Socialization/comradeship – 98%
Recreation – 95%
Leisure – 67%
Tradition – 59%
Shooting – 43%
Meat – 8.9%
Dog training – 2.5%
Health/exercise – 0.5%
## Average Serbian hunter

### Motivations to hunt:

<table>
<thead>
<tr>
<th>Activity</th>
<th>Amusement</th>
<th>Prime</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recreation</td>
<td>.822</td>
<td></td>
</tr>
<tr>
<td>Socialization</td>
<td>.788</td>
<td>.347</td>
</tr>
<tr>
<td>Leisure activity</td>
<td>.614</td>
<td></td>
</tr>
<tr>
<td>Shooting</td>
<td></td>
<td>.763</td>
</tr>
<tr>
<td>Meat</td>
<td></td>
<td>.694</td>
</tr>
<tr>
<td>Tradition</td>
<td></td>
<td>.584</td>
</tr>
</tbody>
</table>
Wildlife Value orientations

Wildlife Value orientation

- Domination
  - Extensive colonization
  - Functional basis

- Mutualism
  - Influence of egalitarian ideology in cognitive hierarchy

Source: Manfredo et al., 2009
### Wildlife Value orientations

#### Scale: Appropriate use beliefs

<table>
<thead>
<tr>
<th>Summary Item Statistics</th>
<th>Mean</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Range</th>
<th>Maximum / Minimum</th>
<th>Variance</th>
<th>N of Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inter-Item Correlations</td>
<td>.236</td>
<td>.014</td>
<td>.400</td>
<td>.386</td>
<td>28.784</td>
<td>.010</td>
<td>6</td>
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</tbody>
</table>

#### Scale: Hunting beliefs

<table>
<thead>
<tr>
<th>Summary Item Statistics</th>
<th>Mean</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Range</th>
<th>Maximum / Minimum</th>
<th>Variance</th>
<th>N of Items</th>
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</thead>
<tbody>
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<td>Inter-Item Correlations</td>
<td>.117</td>
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</tbody>
</table>

#### Scale: Social affiliation beliefs

<table>
<thead>
<tr>
<th>Summary Item Statistics</th>
<th>Mean</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Range</th>
<th>Maximum / Minimum</th>
<th>Variance</th>
<th>N of Items</th>
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</thead>
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<tr>
<td>Inter-Item Correlations</td>
<td>.384</td>
<td>.336</td>
<td>.560</td>
<td>.224</td>
<td>1.667</td>
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</tbody>
</table>

#### Scale: Caring beliefs

<table>
<thead>
<tr>
<th>Summary Item Statistics</th>
<th>Mean</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Range</th>
<th>Maximum / Minimum</th>
<th>Variance</th>
<th>N of Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inter-Item Correlations</td>
<td>.379</td>
<td>.222</td>
<td>.588</td>
<td>.365</td>
<td>2.644</td>
<td>.011</td>
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</tbody>
</table>
### Wildlife Value orientations

#### Scale: Domination

<table>
<thead>
<tr>
<th>Summary Item Statistics</th>
<th>Mean</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Range</th>
<th>Maximum / Minimum</th>
<th>Variance</th>
<th>N of Items</th>
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</thead>
<tbody>
<tr>
<td>Inter-Item Correlations</td>
<td>.114</td>
<td>-.137</td>
<td>.726</td>
<td>.864</td>
<td>-5.291</td>
<td>.025</td>
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</table>

#### Scale: Mutualism

<table>
<thead>
<tr>
<th>Summary Item Statistics</th>
<th>Mean</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Range</th>
<th>Maximum / Minimum</th>
<th>Variance</th>
<th>N of Items</th>
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</thead>
<tbody>
<tr>
<td>Inter-Item Correlations</td>
<td>.346</td>
<td>.119</td>
<td>.589</td>
<td>.470</td>
<td>4.957</td>
<td>.013</td>
<td>9</td>
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</tbody>
</table>
## Wildlife Value orientations

### TwoStep Cluster

<table>
<thead>
<tr>
<th>Number of Clusters</th>
<th>Schwarz's Bayesian Criterion (BIC)</th>
<th>BIC Change&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Ratio of BIC Changes&lt;sup&gt;b&lt;/sup&gt;</th>
<th>Ratio of Distance Measures&lt;sup&gt;c&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4995,117</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>4676,335</td>
<td>-318,782</td>
<td>1,000</td>
<td>2,619</td>
</tr>
<tr>
<td>3</td>
<td>4693,086</td>
<td>16,751</td>
<td>-.053</td>
<td>1,088</td>
</tr>
<tr>
<td>4</td>
<td>4726,521</td>
<td>33,435</td>
<td>-.105</td>
<td>1,117</td>
</tr>
<tr>
<td>5</td>
<td>4779,921</td>
<td>53,400</td>
<td>-.168</td>
<td>1,162</td>
</tr>
<tr>
<td>6</td>
<td>4857,161</td>
<td>77,240</td>
<td>-.242</td>
<td>1,354</td>
</tr>
<tr>
<td>7</td>
<td>4972,765</td>
<td>115,604</td>
<td>-.363</td>
<td>1,284</td>
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<tr>
<td>8</td>
<td>5112,309</td>
<td>139,544</td>
<td>-.438</td>
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<tr>
<td>9</td>
<td>5254,124</td>
<td>141,815</td>
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<td>1,014</td>
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<tr>
<td>10</td>
<td>5397,094</td>
<td>142,970</td>
<td>-.448</td>
<td>1,163</td>
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<tr>
<td>11</td>
<td>5551,425</td>
<td>154,331</td>
<td>-.484</td>
<td>1,030</td>
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<tr>
<td>12</td>
<td>5707,787</td>
<td>156,363</td>
<td>-.491</td>
<td>1,004</td>
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<tr>
<td>13</td>
<td>5864,416</td>
<td>156,628</td>
<td>-.491</td>
<td>1,253</td>
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<tr>
<td>14</td>
<td>6034,650</td>
<td>170,234</td>
<td>-.534</td>
<td>1,117</td>
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<tr>
<td>15</td>
<td>6210,517</td>
<td>175,867</td>
<td>-.552</td>
<td>1,013</td>
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</tbody>
</table>

<sup>a</sup> The changes are from the previous number of clusters in the table.

<sup>b</sup> The ratios of changes are relative to the change for the two cluster solution.

<sup>c</sup> The ratios of distance measures are based on the current number of clusters against the previous number of clusters.

### Cluster Quality

- **Silhouette measure of cohesion and separation**

  - **Poor**
  - **Fair**
  - **Good**
# Wildlife Value orientations

## Cluster Profiles

<table>
<thead>
<tr>
<th>Mean</th>
<th>Centroids</th>
<th>Cluster</th>
<th>Combined</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Nacin_gazdovanja_sa_divljaci</td>
<td>2,40</td>
<td>4,79</td>
<td>3,75</td>
</tr>
<tr>
<td>Zastita_divljaci</td>
<td>2,31</td>
<td>3,87</td>
<td>3,19</td>
</tr>
<tr>
<td>Odstrel_divljaci_ako_ugrozava_zivot</td>
<td>1,19</td>
<td>2,29</td>
<td>1,81</td>
</tr>
<tr>
<td>Odstrel_divljaci_ako_ugrozava_imovinu</td>
<td>2,72</td>
<td>5,16</td>
<td>4,10</td>
</tr>
<tr>
<td>Zivotinje_u_eksperimentima</td>
<td>5,41</td>
<td>6,56</td>
<td>6,06</td>
</tr>
</tbody>
</table>

### Independent Samples Test

<table>
<thead>
<tr>
<th>Scale: Hunting beliefs</th>
<th>Levene's Test for Equality of Variances</th>
<th>t-test for Equality of Means</th>
<th>95% Confidence Interval of the Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>F</td>
<td>Sig.</td>
<td>t</td>
</tr>
<tr>
<td>Appropriate_use_beliefs</td>
<td>Equal variances assumed</td>
<td>1,252</td>
<td>.264</td>
</tr>
<tr>
<td></td>
<td>Equal variances not assumed</td>
<td>-15,942</td>
<td>316,052</td>
</tr>
<tr>
<td>Hunting_beliefs</td>
<td>Equal variances assumed</td>
<td>25,399</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>Equal variances not assumed</td>
<td>-4,697</td>
<td>360,711</td>
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<tr>
<td>Domination</td>
<td>Equal variances assumed</td>
<td>.450</td>
<td>.503</td>
</tr>
<tr>
<td></td>
<td>Equal variances not assumed</td>
<td>-16,602</td>
<td>326,993</td>
</tr>
<tr>
<td>Social_affiliation_beliefs</td>
<td>Equal variances assumed</td>
<td>.434</td>
<td>.510</td>
</tr>
<tr>
<td></td>
<td>Equal variances not assumed</td>
<td>14,652</td>
<td>348,240</td>
</tr>
<tr>
<td>Caring_beliefs</td>
<td>Equal variances assumed</td>
<td>1,291</td>
<td>.257</td>
</tr>
<tr>
<td></td>
<td>Equal variances not assumed</td>
<td>14,126</td>
<td>346,525</td>
</tr>
<tr>
<td>Mutualism</td>
<td>Equal variances assumed</td>
<td>2,296</td>
<td>.131</td>
</tr>
<tr>
<td></td>
<td>Equal variances not assumed</td>
<td>17,256</td>
<td>354,430</td>
</tr>
</tbody>
</table>
## Wildlife Value Orientations

<table>
<thead>
<tr>
<th>Centroids / Mean</th>
<th>Cluster 1</th>
<th>Cluster 2</th>
<th>Combined</th>
</tr>
</thead>
<tbody>
<tr>
<td>Humans should manage wildlife to benefit</td>
<td>2.40</td>
<td>4.79</td>
<td>3.75</td>
</tr>
<tr>
<td>Human needs have priority over wildlife</td>
<td>2.31</td>
<td>3.87</td>
<td>3.19</td>
</tr>
<tr>
<td>Acceptable to kill wildlife if threats their life</td>
<td>1.19</td>
<td>2.29</td>
<td>1.81</td>
</tr>
<tr>
<td>Acceptable to kill wildlife if threats their property</td>
<td>2.72</td>
<td>5.16</td>
<td>4.10</td>
</tr>
<tr>
<td>Use wildlife in research</td>
<td>5.41</td>
<td>6.56</td>
<td>6.06</td>
</tr>
<tr>
<td>Wildlife on earth for human use</td>
<td>3.89</td>
<td>6.31</td>
<td>5.26</td>
</tr>
<tr>
<td>Strive for world abundant with wildlife for hunt</td>
<td>1.68</td>
<td>1.67</td>
<td>1.67</td>
</tr>
<tr>
<td>Hunting is cruel and inhuman to the animals</td>
<td>1.44</td>
<td>2.30</td>
<td>1.93</td>
</tr>
<tr>
<td>Hunting do not respect the lives of animals</td>
<td>1.63</td>
<td>2.47</td>
<td>2.11</td>
</tr>
<tr>
<td>Opportunity for people who want to hunt</td>
<td>1.34</td>
<td>1.57</td>
<td>1.47</td>
</tr>
<tr>
<td>World where humans and wildlife live no fear</td>
<td>4.35</td>
<td>2.62</td>
<td>3.37</td>
</tr>
<tr>
<td>Animals should have right like humans</td>
<td>6.58</td>
<td>4.78</td>
<td>5.56</td>
</tr>
<tr>
<td>Wildlife are like my family</td>
<td>5.76</td>
<td>3.37</td>
<td>4.41</td>
</tr>
<tr>
<td>I view all living things as one big family</td>
<td>4.99</td>
<td>2.83</td>
<td>3.77</td>
</tr>
<tr>
<td>I care about animals like other people</td>
<td>6.08</td>
<td>3.33</td>
<td>4.53</td>
</tr>
<tr>
<td>More rewarding when I help animals</td>
<td>6.05</td>
<td>4.55</td>
<td>5.20</td>
</tr>
<tr>
<td>Great comfort in relationship with animals</td>
<td>4.48</td>
<td>2.89</td>
<td>3.58</td>
</tr>
<tr>
<td>Strong emotional bond with animals</td>
<td>5.07</td>
<td>3.05</td>
<td>3.93</td>
</tr>
<tr>
<td>I value companionship received from animals</td>
<td>2.75</td>
<td>1.56</td>
<td>2.08</td>
</tr>
</tbody>
</table>
## Wildlife Value orientations

<table>
<thead>
<tr>
<th>Domination</th>
<th>Mutualism</th>
</tr>
</thead>
<tbody>
<tr>
<td>158 hunters</td>
<td>205 hunters</td>
</tr>
<tr>
<td>43.52%</td>
<td>56.48%</td>
</tr>
</tbody>
</table>

Response rate 376/390
13 hunters without complete responses
• Wildlife Value orientations are shaped by:
  1. Hunting frequency
  2. Motivations to hunt
  3. Number of hunting rifles
  4. Employment
  5. Profession
  6. Type of preferred hunted game
• Motivations to hunt are shaped by:
  – Hunters’ participation
  – Number of rifles
  – Age

• Amusement hunting:
  – Hunters’ participations, number of rifles and age - 5%

• Prime hunting:
  – Hunters’ participation and age – 8.6%
• Serbian hunters fit rural profile

• Threats:
  – Old
  – Poor
  – Ilinformed

• Two motivations to hunt:
  – Primal
  – Amusement

• Hunting has a social function
• Answers to research questions:
  – Socio/economic characteristics influence both motivations to hunt and wildlife value orientation, but poorly explained
  – Manfredo’s WVO model works, but with unexpected results
  – Modified for Serbian hunters
Thanks for your attention