Effects of the Fukushima nuclear disaster on hunting desertion

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What has happened on 3.11, 2011?
What has happened on 3.11, 2011?

A building overturned and moved by tsunami
What has happened on 3.11, 2011?

Fukushima Daiichi nuclear power plant
Radioactive contamination of game meat

Fig. Contamination level of wild boar in Fukushima
Our focus is…

To analyze RAC’s effect on wildlife management in Japan, and suggest measures to address the problem.

Our first action is…

Broad wide questionnaire survey for active hunters

22,000 respondents, presented in TWS 2012 and 2013 annual congress
Effects of nuclear disaster to hunters’ attitude and behavior

Hunters concerned about game meat RAC

Decline of hunters’ activities due to RAC

Ueda & Takahashi (2013)
In some villages, majority of the hunters did not renew their licenses in 2012 at eastern Japan.

More than 20% of hunters did not renew their hunting licenses in 2012 at eastern Japan.

How does RAC affect hunter desertion?
Again, our focus is…

What are the effects of RAC on wildlife management and what should we do?

Our second action is…

- Broad wide questionnaire survey for **active hunters**
  - 22,000 respondents, presented in TWS 2012 and 2013 annual congress

- Broad wide questionnaire survey for **retired hunters**
8 Prefectures which are affected by RAC

Big game species live in all Pref., however the distribution differs among species.

Mail Survey, 4,331 mailed, 1,932 respondents, and response rate was 44.6%

After eliminating trappers, 1,638 samples used for analysis.
What we asked?

- **Reasons for quit hunting**
  - 23 items (7 point scale) based on previous research and hypothesis

  - ✔ Personal condition: health, economy, time, & family
  - ✔ Legal regulation: gun & black powder
  - ✔ Hunting environment: number of hunting ground & game
  - ✔ Earthquake: RAC, evacuation, etc.

- **Hunting activities & characteristics**
  - Attitudes, targeted species, hunting career & behavior, age

- **Intention & conditions to restart hunting**
Result A. Reasons for quit hunting

- Concern about hunting ground contamination
- Concern about game meat contamination
- Difficulty of contamination measurement
- Difficulties to dispose contaminated game
- Aging and/or illness
- Lack of hunting ground
- Decrease of game population
- Poorness of game harvest
- Gun restriction
- Gun license renewal is complicated
- Hunting fee is expensive
- Running cost for hunting is high
- Not enough time to go hunting

Effect of RAC
- Economic problem
- Legal restriction
- Hunting environment
- Health
- Time

Effect of earthquake disaster

CFI = 0.93
**Result B. Spatial effect of RAC on small game hunting desertion**

\[ y = 8.07 + -1.12 \ln(x) \]

\[ R^2 = 0.18, \: P < 0.0001 \]

RAC had effects on small game hunters who lived within 200km from nuclear plant, and it got serious within 40km.
Result B.  *Spatial effect of RAC on big game hunting desertion*

\[ y = 9.16 + -1.30 \ln(x) \]

\[ R^2 = 0.17, \ P < 0.0001 \]

RAC had effects on big game hunters who lived within 200km from nuclear plant, and it got serious within 50km.
Result C. How old did hunters retire?

- Small game hunters retired earlier than big game hunters.
- Difference between SG and BG on retiring before 70 years old is 11.5%.
### Result D. Factors affected on retiring age

- Multi regression analysis, $R^2=0.37$
- Sample; Small game hunter live within 200km from nuclear plant

<table>
<thead>
<tr>
<th>Category</th>
<th>Variables</th>
<th>β</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reasons</td>
<td>RAC</td>
<td>-0.04</td>
<td>0.20</td>
</tr>
<tr>
<td></td>
<td>Legal restriction</td>
<td>-0.02</td>
<td>0.68</td>
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<td></td>
<td>Hunting environment</td>
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<td>0.18</td>
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<td></td>
<td>Economic problem</td>
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<td></td>
<td>Time</td>
<td>-0.23</td>
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<td>Health</td>
<td>0.40</td>
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<tr>
<td>Motivation</td>
<td>Personal enjoyment</td>
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<td></td>
<td>Community interest</td>
<td>0.14</td>
<td>&lt;0.01</td>
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<tr>
<td>Activities</td>
<td>Explored new hunting ground</td>
<td>0.09</td>
<td>&lt;0.01</td>
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<tr>
<td></td>
<td>Hunted on same place</td>
<td>-0.10</td>
<td>&lt;0.01</td>
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<tr>
<td></td>
<td>Fostering younger hunters</td>
<td>0.19</td>
<td>&lt;0.0001</td>
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</table>
**Result D. Factors affected on retired age**

- Multi regression analysis, $R^2 = 0.36$
- Sample: Big game hunter live within 200km from nuclear plant

<table>
<thead>
<tr>
<th>Category</th>
<th>Variables</th>
<th>$\beta$</th>
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<tbody>
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<td>Time</td>
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<td>Health</td>
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<td></td>
<td>Hunted on same place</td>
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<td>Fostering younger hunters</td>
<td>0.31</td>
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Effects of RAC on hunting desertion

◆ Spatial effect has spread within 200km from nuclear plant.

◆ Effects has increased drastically within 40 or 50km from the plant.

◆ Effect on retirement age for both small and big game hunters was very small and not significant.
What should we do?

Intention to restart hunting those who lived within 200km from the plant (n=1,009)

<table>
<thead>
<tr>
<th>On what condition</th>
<th>Av. Value (Max 7.0)</th>
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<tr>
<td>Relaxing regulation on gun license renewal</td>
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<td>Relaxing gun control</td>
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<td>Financial support from government</td>
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<td>Increase of wildlife damage</td>
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<td>More information on RAC</td>
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<td>More RA monitoring</td>
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Thank you for your attention

Acknowledgement; Fuji Film Green Fund, KAKENHI(No.23530124), Wildlife and Human Society, Ministry of the Environment, Prefectural Wildlife Agencies, Japan Hunter Association, etc.