Evaluating participatory wildlife damage prevention program in Japan

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Human-wildlife conflicts in Tochigi

- Total amount of wildlife damage = 2,902 ton, about $3.9 million (Ministry of Agriculture 2010)
- Third highest amount of agricultural damage in 2007
- Depopulation, aging, decrease of hunters, increase of some wildlife species
Agricultural damage mainly caused by,,,
Model District Program

• Launched by Nature Preservation Division of Tochigi Prefecture in 2010
• Participatory activities; seminars to learn about wildlife issues & methods to prevent damage, field trips, practicing interventions
• Seven model districts in 2013
Objectives

– Most of projects conducted by local government to prevent wildlife damage were not evaluated in detail

• To understand the impact of the model district program; influence on residents’ attitudes and behaviors

Qualitatively and quantitatively
Today, I will explain, BRIEFLY, results of three studies

• **Study 1**: “Overview of the Model District Program for reducing human-wildlife conflicts in Tochigi Prefecture” (Sakurai et al. 2013; *Wildlife and Human Society*)

• **Study 2**: “Assessing the impact of a wildlife education program on Japanese attitudes and behavioral intentions” (Sakurai et al. 2014; *Environmental Education Research*)

• **Study 3**: “Quantitative evaluation of the model district program for preventing wildlife damage: association between residents’ evaluation of agency and their behavioral intentions” (Sakurai et al.; currently writing a manuscript)
Study 1

• Study sites
  • Three model districts: Momurahonden, Myojin, Fukahodo

• Methods
  • Interviews to district leaders and farmers
  • Survey and interviews to participants of seminars/field trips
  • First time at the seminar, second time one month after the seminar
<table>
<thead>
<tr>
<th>Study 1</th>
<th>Momurahonden, Nasushiobara</th>
<th>Myojin, Nikko</th>
<th>Fukahodo, Kanuma</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of households</td>
<td>57</td>
<td>538</td>
<td>189</td>
</tr>
<tr>
<td>Average age</td>
<td>42*</td>
<td>50</td>
<td>56**</td>
</tr>
<tr>
<td>Primal wildlife that cause damage</td>
<td>monkey, bear, boar</td>
<td>boar, monkey, deer</td>
<td>boar, monkey, deer</td>
</tr>
<tr>
<td>Primal crops been damaged</td>
<td>persimmon, eggplant, pumpkin, potato</td>
<td>rice, corn, potato, sweet potato</td>
<td>potato, rice, buckwheat, potato</td>
</tr>
<tr>
<td>Year the Model District Program started</td>
<td>2010</td>
<td>2011</td>
<td>2010</td>
</tr>
<tr>
<td>Activities implemented as the Model District Program</td>
<td>2010</td>
<td>2011</td>
<td>2010</td>
</tr>
<tr>
<td>Organization responsible for damage prevention activities</td>
<td>Residents’ association/ forest control association</td>
<td>Committee for preventing boar damage</td>
<td>Fukahodo association for preserving Satoyama</td>
</tr>
<tr>
<td>Outcome of the Model District Program***</td>
<td>Providing good opportunity for residents to implement intervention/ decrease of appearance and damage by monkeys</td>
<td>Checking the methods to increase the effectiveness of the interventions</td>
<td>Fostering non-farmers’ awareness toward wildlife issues</td>
</tr>
<tr>
<td>Issues regarding the Model District Program***</td>
<td>Sustainability of the activity/ lack of organization and personnel who take initiative in activities</td>
<td>Fostering interventions in the east area where most of residents are not farmers</td>
<td>Letting local residents take more initiative in conducting interventions</td>
</tr>
</tbody>
</table>

*Average age of Nasushiobara City (Nasushiobara City 2010)

**Results of survey toward all households conducted in 2011

***From results of interviews to residents
Momurahonden
(From survey and interviews with participants)

• Out of 17 participants, 54% were not engaged in interventions to prevent damage
  → All the respondents answered they will conduct interventions after the seminar
• Results of interviews conducted a month after the seminar
  “I understand that cutting the bush is the best solution, but it requires a lot of work.”
“\textit{I haven’t started} to implement any new interventions after the seminar”

Evaluation of the model district program
“\textit{We could engage in damage prevention activities because the officers of prefectural government came to help us. Once they stopped visiting us, we won’t be able to continue} our activities.”
Myojin
(From survey and interviews with participants)

- Out of 19 participants, 90% were engaged in interventions to prevent damage
  → 75% answered they will conduct interventions after the seminar
- Results of interviews conducted a month after the seminar
  “We have been already engaged in interventions including erecting electronic fence”

Evaluation of the model district program

“We are not sure how to foster residents’ intention to conduct interventions in the east part of the district where most of residents are non-farmers.”
Two primary issues that the Model District Program faces

Sustainability of the activity

• Existence of the district’s expert association who deals the wildlife damage prevention activities

  Myojin: Committee for preventing boar damage, Fukahodo: Association for preserving Satoyama

  Momurahonden: No specific association who deals wildlife issues/ president of the residents association changes every year

• Possibility of Satoyama Wildlife Technicians and Agricultural Outreach Professionals to engage in community activities

Fostering the participation of broad residents

• Letting residents realize that the activity is not for specific people but it is what all residents should be responsible of and therefore participate
Study 2

- **Objectives**
  - Compare residents cognitive factors between model district (Fukahodo) and comparison district (Kuno)

- **Methods**
  - Mail survey in Fukahodo (n=198, every household registered in residents’ organization) and Kuno (n=225, all households listed in telephone book) in 2011

- **Fukahodo (264 households)**
  - Designated as Model District in 2010
  - Eight activities including field trip and seminars were conducted

- **Kuno (274 households)**
  - No educational activities have been conducted by government

- **Both districts adjoin each other and have similar characteristics (number of residents, amount of damage caused by wildlife)**
Results

• Fukahodo: 99 responses (response rate=52%)、Kuno:99 responses (response rate=44%)
• Fukahodo: Male=75%/ Female=25%, Kuno: Male=91%/ Female=9% (X²=7.415、p<0.01)
• Residents who experienced damage by wildlife: Fukahodo=56%, Kuno=46% (p=0.17)
• Boars, monkeys, and deer mainly caused damage in both districts
<table>
<thead>
<tr>
<th>Attitudes toward behaviors*</th>
<th>Fukahodo</th>
<th>Kuno</th>
<th>Significance test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean score (sample size)</td>
<td>4.55 (96)</td>
<td>4.66 (98)</td>
<td></td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>0.74</td>
<td>0.69</td>
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<tr>
<td>$F$-value</td>
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<td>0.28</td>
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<tr>
<td>$P$-value</td>
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<tr>
<td>Social norm*</td>
<td>2.73 (97)</td>
<td>2.70 (98)</td>
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<td>Mean score (sample size)</td>
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<td>Perceived behavioral control*</td>
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<td>1.98 (99)</td>
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<td>Mean score (sample size)</td>
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<td>Risk perception*</td>
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<td>Social trust*</td>
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<td>Behavioral intention*</td>
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<td>Knowledge level**</td>
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<td>Mean score (sample size)</td>
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<tr>
<td>$P$-value</td>
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</tbody>
</table>

*1=Disagree, 2=Slightly disagree, 3=Neither option, 4=Slightly agree, 5=Agree
**1=Correct, 2=Wrong/ Don’t know
Study 2

Discussion

• Model district program might influenced residents’ perceived behavioral control and knowledge regarding wildlife damage prevention

• No significant differences in other variables
  → One year program is not enough to change residents’ attitudes?
  → Possibility of sampling bias

• Fukahodo: employees, housewives
  Kuno: agriculture (stakeholders of wildlife issues)
Study 3

Brief results of Study 3 (still working)

• Results of survey in five model districts and six comparison districts (n=757)

• Hypothesis

Model district $\rightarrow$ Evaluation of government performance
  $\rightarrow$ Attitudes toward wildlife damage prevention
  $\rightarrow$ Perceived behavioral control regarding conducting damage prevention intervention
  $\rightarrow$ Knowledge regarding damage prevention intervention
  $\rightarrow$ Sense of responsibility toward conducting damage prevention intervention
  $\rightarrow$ Social norm regarding conducting damage prevention intervention

$\rightarrow$ Willingness to conduct damage prevention intervention

• Path analysis
Study 3

Model district $\rightarrow$ Evaluation of government performance

City provided enough information
Prefecture provided enough information

Evaluation of government performance $\rightarrow$

Perceived behavioral control
Social norm
Sense of responsibility
Attitudes toward behavior
Knowledge

I will conduct intervention to prevent wildlife damage

GFI = 0.868, CFI = 0.725, RMSEA = 0.155, $X^2 = 294.5117$
• Model district program might have influence on various variables through affecting residents’ evaluation of government performance

• Necessity of revealing factors that worked well and failed by using logic model and path analysis
Study 1: Various factors affecting success of the program

Study 2: Potential effects and limitation of the program

Study 3: Potential relationship among cognitive factors

• Model district program has not yet achieved full engagement among residents
• Results of our studies help to guide program improvement and modification of the activities
Thank you for your attention
GFI=0.868, CFI=0.725, RMSEA=0.155.

$X^2=294.5117$
GFI=0.861, CFI=0.701, RMSEA=0.156.
X2=320.882