Success and failure of a stakeholder based approach mitigating human-wild boar conflicts in rural areas in Bavaria (South East Germany)

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Wildlife under human influence
What can we do?
Growth in population density

Introduction
Materials & Methods
Results
Discussion
Conclusion
Expansion in distribution range

Expansion in distribution range

Distribution based on annual hunting bags per regional hunting units in the season 1987/88

Borders of regional hunting units

Harvested wild boar per unit

- none
- 1 - 10
- 11 - 20
- 21 - 30
- 31 - 40
- 41 - 50
- > 50

http://www.stmell.bayern.de/wald/jagd/index.php
Expansion in distribution range

Distribution based on annually hunting bags per regional hunting unit in the season 2012/13
Manifold conflicts lower the wildlife acceptance capacity

- Agricultural damage
- Conservation problems
- Health risks
- Traffic accidents
- Urban environments
## Context of our approach

Within the legal framework of each country the management of Wild Boar (WB) is complex and driven by the interaction of:

- biological dynamic and plasticity of the species
- stakeholders’ attitudes and decisions.

**Influence on WB population trends!**

Context of our approach

For many years various
- research results,
- management recommendations,
- technical methods,
- practical experiences
are available to reduce the WB population.

2004 The Bavarian Hunters Association (BJV), the Bavarian Forest Owner Association (WBV) and the Bavarian Farmers Association (BBV) under the guidance of the Bavarian State Ministry for Food, Agriculture and Forestry (StMELF) developed Common recommendations to reduce the excessive wild boar population in Bavaria which were incorporated the Big Game Directive.

2015 The Bavarian State Ministry for Food, Agriculture and Forestry (StMELF) published a Measures package for the sustainable reduction of the Wild Boar population.

No noticeable effect to limit or even reverse the WB population growth!
Context of our approach

In 2007 an evaluation of the Bavarian hunting recommendations showed that

- population reduction efforts by hunters are insufficient,
- management recommendations are not implemented adequately,
- management goals between relevant stakeholders are indifferent and not consensual.

Potential for improvement!
Effective management actions?

Stakeholders’ responsibility
Stimulation of engagement “bottom up”

Expert authority
Implementation of solutions “top-down”

"Focus on Wild Boar -
Project to develop innovative regional concepts“
project period: 2010-2013
Study sites

Aschaffenburg/Main-Spessart
net hunting area: 2024 km²

Kulmbach
net hunting area: 754 km²

Pottenstein/Schnabelwaid
net hunting area: 142 km²

Nittenau
net hunting area: 277 km²
Bottom-up approach

The project approach was innovative because

- all relevant regional stakeholders were involved within a participative process,
- workshops were used as a starting points of that process,
- objectives and consensual management measures were identified by the stakeholders,
- everyone was open-minded to test and implement new techniques.
Stakeholder-defined project principles

1. Regional problems require regional solutions!
   Strategies for solutions and action are to be formulated at initial workshops by those involved locally on their own responsibility.

2. No action or activities dictated by others!
   Integration of all regional stakeholders (hunters, rural landowners, farmers, foresters, veterinarians, competent authorities and politicians).

3. Participative process from the very beginning!
   Development of solution strategies and action packages with moderated workshops. Implementation of management measures by “coordination teams” which are equally represent all stakeholders. Coordination team members are in permanent mutual exchange with members of their respective interest group.
Stakeholder-defined project principles

4. Commitment to a stringent “bottom-up process” and transparent working procedures!
   Bottom-up versus top-down secures the most possible acceptance of management measures as the persons concerned will be made to participants. The participants decide on the how and when!

5. An external moderator and mediator leads through the process!
   Moderator comes with a sound theoretical and practical background in wildlife management, skills in organizing, supervising, etc.

We hypothesized that such a stakeholder-based and self-reliant bottom-up process will result in significant higher efforts to reduce regional WB populations efficiently.
Evaluation

**SWOT analysis** *(not presented here)*

- Assessment of strengths/weaknesses and opportunities/threads by interviewing the project participants at the end of the project

**Hunting bag analysis**

- Harvest data (hunting statistics) are used as reliable indices of the relative WB population


- Modeling the annual growth (GR) rate of the hunting bag for the pre-project -, the project - and the post-project period using the expression:

\[
GR = \frac{1}{n} \sum_{i=1}^{n} \frac{N_{i+1} - N_i}{N_i} \times 100
\]

with \((n = \text{hunting years}, N_1 = \text{WB harvest in the first year}, N_n = \text{WB harvest in the last year.})\)
Examples for improved population control measures / implemented new techniques

Regional coordination teams with equally represented stakeholders

Setting-up a web-based WB information system with access of registered regional participants, developed to “Wildtiere in Bayern” (WiTiB) “Wildlife in Bavaria” (www.wiltib.bayern.de; http://www.wildtierportal.bayern.de/)
Examples for improved control measures / implemented new techniques

**Implementation, Education and Training**

- about damage mitigation, rebuilding damaged pasture land, pros and cons of hunting lanes in maize fields etc.

**Transfer of knowledge** by the development of information sheets and flyers (about damage prevention, wise baiting concepts, organization of battues), TV spots etc.
Examples for improved control measures / implemented new techniques

Implementation of improved regional concepts for driven hunts involving several hunting districts

Information about and implementation efforts of alternative hunting methods (e.g. trapping)
Examples for improved control measures / implemented new techniques

Practicability test of night vision devices and artificial light sources (flashlights) for night hunting. Licenses for the use of night vision technique can now be approved by the Bavarian hunting authorities.
Population control by recreational hunting?
Effect of the project?

Study area "Kulmbach"

Wild Boar harvested / km²

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<tbody>
<tr>
<td>0.36</td>
<td>0.97</td>
<td>1.16</td>
<td>0.73</td>
<td>1.01</td>
<td>0.96</td>
<td>1.42</td>
<td>1.53</td>
<td>1.41</td>
<td>1.50</td>
<td>1.77</td>
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$y = 0.096x + 0.52$

$R^2 = 0.7508$
Effect of the project?

Study area "Pottenstein/Schnabelwaid"

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<tbody>
<tr>
<td>Pre-project period</td>
<td>0.31</td>
<td>0.87</td>
<td>0.79</td>
<td>1.03</td>
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<td>Project period</td>
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<td>1.32</td>
<td>0.97</td>
<td>1.51</td>
<td>1.33</td>
<td>1.38</td>
<td>1.60</td>
<td>1.67</td>
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<td>Post-project period</td>
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\[ y = 0.0895x + 0.5417 \]
\[ R^2 = 0.8044 \]
Effect of the project?

Study area "Nittenau"

<table>
<thead>
<tr>
<th>Year</th>
<th>Wild Boar harvested / km²</th>
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<tbody>
<tr>
<td>2006</td>
<td>0.58</td>
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<td>2007</td>
<td>2.11</td>
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<td>2008</td>
<td>1.89</td>
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<td>2009</td>
<td>1.12</td>
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<td>2010</td>
<td>1.80</td>
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<tr>
<td>2011</td>
<td>1.23</td>
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<tr>
<td>2012</td>
<td>2.09</td>
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<tr>
<td>2013</td>
<td>2.33</td>
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<tr>
<td>2014</td>
<td>1.88</td>
</tr>
<tr>
<td>2015</td>
<td>2.46</td>
</tr>
<tr>
<td>2016</td>
<td>1.40</td>
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\[ y = 0.0585x + 1.3142 \]
\[ R^2 = 0.1776 \]
Effect of the project?

![Graph showing the change in wild boar population over time.](image)

- **Study area "Aschaffenburg/Main-Spessart"**
- **Equation:** $y = 0.0895x + 2.502$
- **$R^2 = 0.2042$**

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<td><strong>PRE-PROJECT PERIOD</strong></td>
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<td><strong>PROJECT PERIOD</strong></td>
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<td><strong>POST-PROJECT PERIOD</strong></td>
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Effect of the project?

Annual growth rate of Wild Boar hunting bags

<table>
<thead>
<tr>
<th>Location</th>
<th>Growth Rate (%)</th>
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<tbody>
<tr>
<td>Bavaria</td>
<td>27.03</td>
</tr>
<tr>
<td>Kulmbach</td>
<td>37.32</td>
</tr>
<tr>
<td>Pottenstein/Schnabelwaid</td>
<td>50.76</td>
</tr>
<tr>
<td>Nittenau</td>
<td>52.56</td>
</tr>
<tr>
<td>Aschaffenburg/Main-Spessart</td>
<td>17.22</td>
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</tbody>
</table>

-4.84, 8.62, 4.24, 7.11, -8.51, -5.69

- pre-project period 2006-09
- project period 2010-14
- post-project period 2014-16

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Population control by recreational hunting in case of ASF

(Guberti 2014, Depner, 2016, FLI 2017)
Further increase of the harvest rates?

Battues/driven hunts

< 50% in state forest hunting areas due to a limitation by time and manpower.

Baiting/supplemental feeding

To shot one WB at bait in average 10 single night hunts lasting 3,6 hours are needed.

(Linderoth 2008; Pegel & Linderoth 2009)

Recreational hunters’ acceptance to use additional / alternative methods?

- Trapping
- Night-vison-techniques
- Immunocontraception
Success or failure?

1. The cooperation between the stakeholders due to the bottom-up project approach was a great success. To continue the started cooperation an external support, guidance and motivation seems to be essential. The overall success or failure to achieve a significant WB population reduction is difficult to prove as the project ended three years ago and implemented measures need more time to make an impact.

2. The total wild boar hunting bag increased in Bavaria before, during and decreased slightly after the project period. This indicates a still high population level without any trend reversal.

3. Hunters’ efficiency depends on the landscape structure, weather etc. and is mainly related to the hunting effort.
Success or failure?

4. The awareness to reduce the WB population is not reflected in the hunting bags yet. The mean annual harvest rates were declining only in two of four study areas in the last three years.

5. The WB population trend in the past showed that annual declines in the hunting bag do not result in a sustainable limitation, reduction or even depopulation. Mostly the reduced hunting efficiency depends on unfavorable weather conditions or stand-still tactics of recreational hunters.

6. The role of recreational hunting to control the WB populations on regional levels seems to be very limited. The insufficient input of recreational hunting to limit or reduce a WB population sustainably needs both further research and the implementation of alternative methods.
Many thanks to …

All participating stakeholders
Regional coordination teams for their active cooperation
Bavarian State Office of Criminal Investigations for support and borrowing the NVD’s
Bavarian farmers association for initiating the project
Bavarian Ministry for Food, Agriculture and Forestry for funding
Thank you for your attention!
Any questions?
Appendix

Hunting bags in detail per study area

(not shown in the presentation)
Population control by recreational hunting?

Study area "Kulmbach"

<table>
<thead>
<tr>
<th>Year</th>
<th>Annual Wild Boar Hunting Bag</th>
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<tbody>
<tr>
<td>2006</td>
<td>275</td>
</tr>
<tr>
<td>2007</td>
<td>734</td>
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<tr>
<td>2008</td>
<td>976</td>
</tr>
<tr>
<td>2009</td>
<td>552</td>
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<tr>
<td>2010</td>
<td>765</td>
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<tr>
<td>2011</td>
<td>647</td>
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<tr>
<td>2012</td>
<td>1107</td>
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<tr>
<td>2013</td>
<td>1039</td>
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<tr>
<td>2014</td>
<td>1060</td>
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<tr>
<td>2015</td>
<td>1432</td>
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<tr>
<td>2016</td>
<td>1334</td>
</tr>
</tbody>
</table>
Population control by recreational hunting?

Study area "Pottenstein/Schnabelwaid"

Annual Wild Boar hunting bag


44 113 197 188 136 216 188 197 219 239
Population control by recreational hunting?

![Graph showing wild boar hunting bag numbers in Study area "Nittenau" from 2006 to 2016.](image)
Population control by recreational hunting?

Study area "Aschaffenburg/Main-Spessart"

Annual Wild Boar hunting bag

0 1000 2000 3000 4000 5000 6000 7000 8000 9000 10000

3439 6235 7989 7050 6105 7830 7115 8747 5900
Success and failure of a stakeholder-based approach mitigating human-wild boar conflicts in rural areas in Bavaria (South East Germany)
Study area "Nittenau"

**Pre-Project Period**

- 2006: 0.15
- 2007: 0.18
- 2008: 0.20
- 2009: 0.22

Linear equation: $y = 0.137x + 1.0827$

**R-squared:** 0.0635

**Project Period**

- 2010: 0.14
- 2011: 0.16
- 2012: 0.20
- 2013: 0.22

Linear equation: $y = 0.2429x + 1.2578$

**R-squared:** 0.4417

**Post-Project Period**

- 2014: 0.16
- 2015: 0.18
- 2016: 0.20

Linear equation: $y = -0.24x + 2.3928$

**R-squared:** 0.2055
Success and failure of a stakeholder based approach mitigating human-wild boar conflicts in rural areas in Bavaria (South East Germany)