Review on Agriculture and Rural Development 2016 vol. 5 (1-2) ISSN 2063-4803

MAXIMAL SUSTAINABLE HARVESTING, AS A METHOD OF RAISING THE WILDLIFE MANAGEMENT'S INCOMES

MIHALIK BENDEGÚZ

Szent István University
Institute for Wildlife Conservation
2100 Gödöllő, Páter Károly u. 1
mihalik.bendeguz@gmail.com

ABSTRACT
It is essential for wildlife management, as a sector of economy, to cover its own expenses and gain profit as well. Due to its special nature – since its resources are reviving, but limited – maximalizing the profit must be in line with sustainability of the management. The purpose of my research is the survey of its activities and analyzing the effect of different changes on the income. My calculations are based on data from the Hungarian Game Management Database (basic data from the yearly publications, and more detailed data used with special permit) and questionnaires.
Using the data I calculated whether the raised harvest rate were biologically sustainable, and what the amount of the additional income would be. My results are the following: the suggested harvest rates don't pass the maximal sustainable rate, so it can be used without lowering the populations, and almost 10% more income can be reached from game meat selling.

Keywords: game meat, game management, economical finances

INTRODUCTION

Nowadays money is one of the most important resources. The wildlife managers have to raise funds for their own running and management. They should harvest at the maximal sustainable rate so they obtain maximal income from the wildlife without damaging the populations (*Figure 1*).

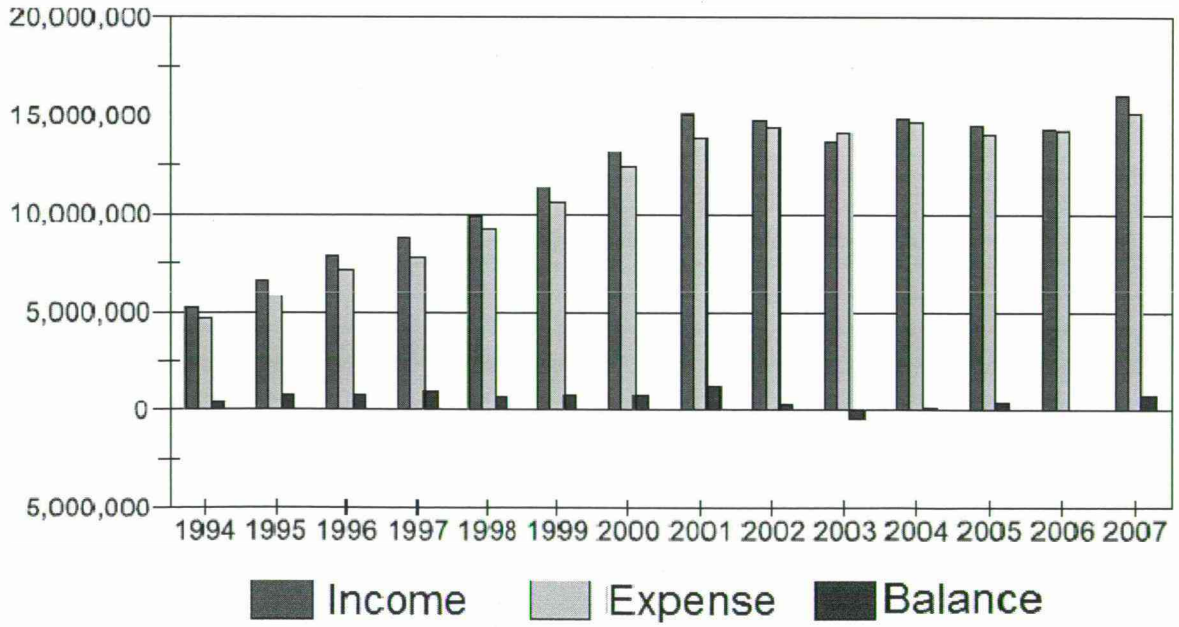

Figure 1. Wildlife management's incomes, expenses and balances between 1994 and 2007 (CSÁNYI ET AL., 2008)

The wildlife management's economic results can be tracked by its finances. Although the incomes are rising year by year, the expenses are rising at almost the same pace, so the profit isn't growing significantly.
The tendency hasn't changed since 2007. In 2013 the income is almost reaching the 20 billion Ft line, but the expenses are over 19 billion Ft, so the yearly profit is only 600 million Ft (CSÁNYI ET AL, 2014).
In this essay I search the answers to what kind of extra profits we can obtain from game meat using the maximal sustainable harvest rates.
My intention is making simple, illustrative models to analyse the extra profit's effects to the wildlife management's finances.

MATERIAL AND METHOD

I collected most of the data from the Hungarian Game Management Database. I gathered the yearly average game meat prices back to 1996 from the Öreglaki Game Meat Processor.
I systematized the data in Microsot Excel, and used the GraphPad InStat3 and InStat+ programs for the statistical analysis. I calculated the maximal sustainable harvest numbers for each year by adding the yearly bagged number and the difference of the following year's and the given year's estimated population size (can be a negative number).
I calculated with the extra game meat quantity of the females only because usually the females are under-harvested. The rates are the following by their natural biology: red deer: 50% hind and 50% fawn, wild boar: 25% piglet, 50% pig and 25% sow, roe deer: 33% doe and 67% fawn. The yearly average bodyweights are calculated from the Hungarian Game Management Database's data from each county. Finally, I multiplied the extra baggable numbers by the percentages shown above and by the yearly average game meat prices.

RESULTS

Red deer

The average maximal sustainable harvest rate of the red deer is 47,36% between 1996 and 2013. Between 2000 and 2013 this rate is 49,13%, and in the last 5 years it is 51,98%. So the harvestable number is increasing by number and by rate too.

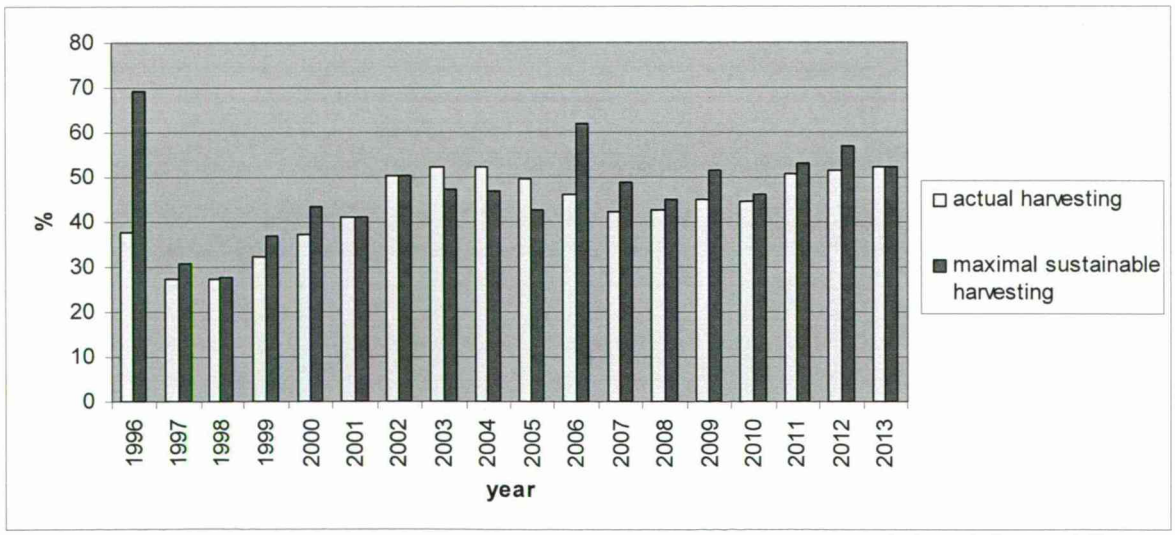

Figure 2. Red deer harvesting rates compared to the maximal sustainable harvesting rates between 1996 and 2013

I made the comparison of the actual harvesting rate and the maximal sustainable harvesting rate in *Figure 2.*

Red deer populations were under-harvested in 13 years, so the wildlife management units misses potential incomes. In the rest (5 years) they over-harvest the populations, so the number of individuals was reduced. The greatest reduction happened between 2004 and 2006, when the yearly over-harvesting number was almost 4500 specimen. However within only 2 years the population regenerated from this over-harvesting, and overran the previous maximal number.

Wild boar

The average maximal sustainable harvest rate of the wild boar is 106,23% between 1996 and 2013. Between 2000 and 2013 this rate is 110,28%, and in the last 5 years it is 122,14%. So the harvestable number and rate are both increasing. I made the comparison of the actual harvesting rate and the maximal sustainable harvesting rate in the following diagram (*Figure 3*).

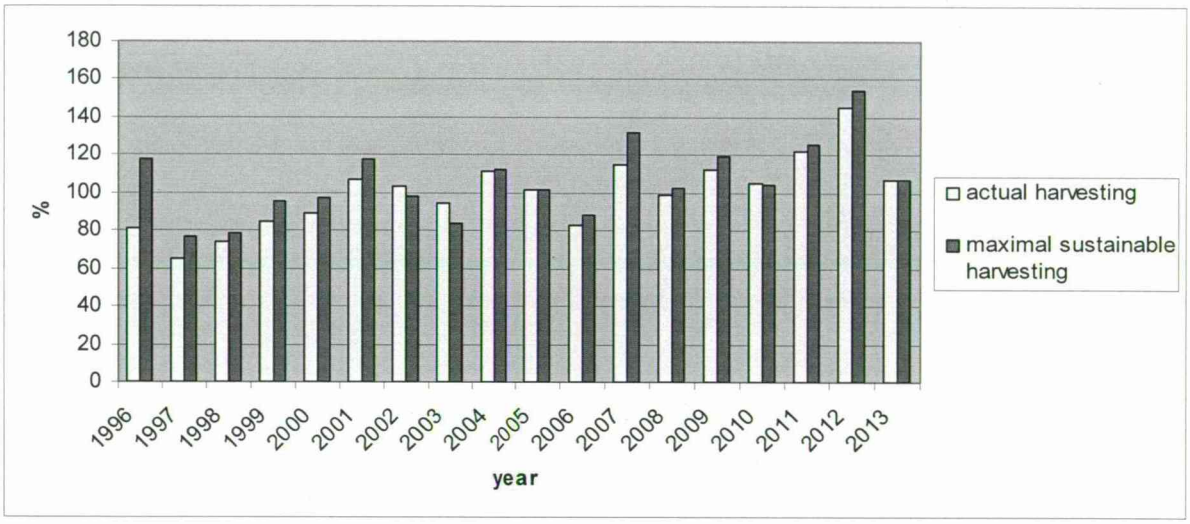

Figure 3. Wild boar harvesting rates compared to the maximal sustainable harvesting rates between 1996 and 2013

Wild boar populations were under-harvested in 14 years, and over-harvested in 4 years. The greatest reduction happened between 2003 and 2006, when the base population was reduced by 13410 individuals. However within 2 years the population regenerated from this over-harvesting, and so they estimated more boars for 2008 than for 2002.

Roe deer

The average maximal sustainable harvest rate of the roe deer is 25,34% between 1996 and 2013. Between 2000 and 2013 this rate is 26,85%, and in the last 5 years it is 27,73%. So, just like in the case of the red deer and the wild boar, the harvestable number and rate are both increasing.

I made the comparison of the actual harvesting rate and the maximal sustainable harvesting rate in the following diagram (*Figure 4*).

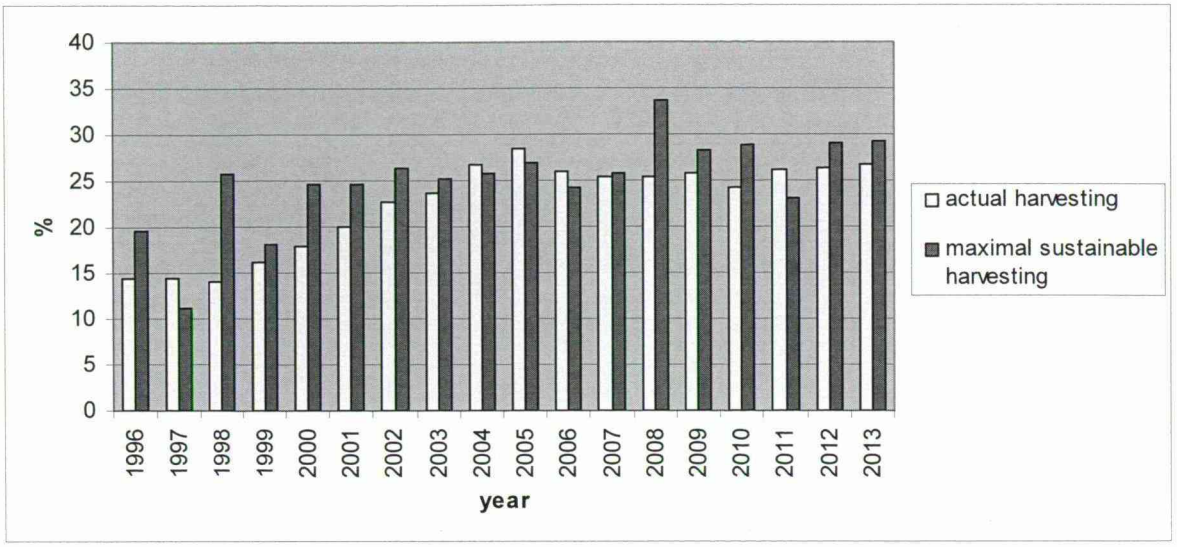

Figure 4. Roe deer harvesting rates compared to the maximal sustainable harvesting rates between 1996 and 2013

Roe deer poulations were under-harvested in 13 years, and over-harvested in 5 years. The greatest reduction happened between 2003 and 2006 (similar to the red deer's and the wild boar's case), when the base population was reduced by 4500 individuals each year. Further similarity is that the roe deer populations regenerated from this over-harvesting within 2 years as well.

POSSIBLE EXTRA PROFITS USING THE MAXIMAL SUSTAINABLE HARVEST RATES

After the establishment of the maximal sustainable harvest rates I calculated the highest possible extra profits by game meat. The following diagrams (*Figures 5-7*) should be examined year-to-year, because watching it by a simple cronologic line causes overestimation. Reaching maximal sustainable harvest rate in a year causes minor decrease in the following year's population (there is a constant number of the population instead of an increasing number)

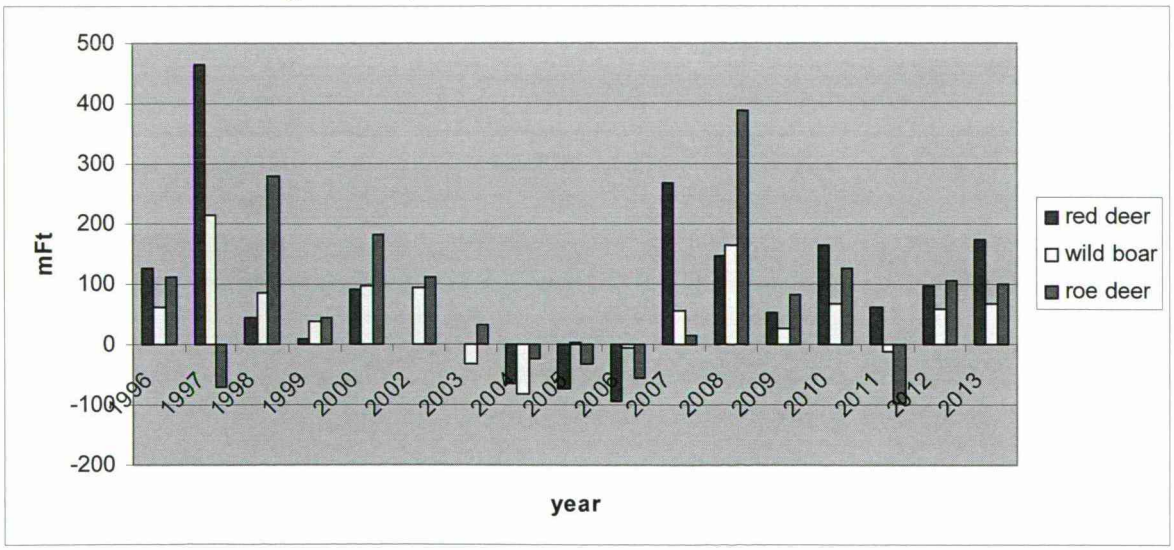

Figure 5. The differences of incomes with maximal sustainable harvest rates

As the previous analyses show, the populations can regenerate really fast from minor overharvesting, therefore I calculated the incomes without the loss of the overharvesting too. Finally I compared both versions with the incomes from game meat and the wildlife management's yearly balances.

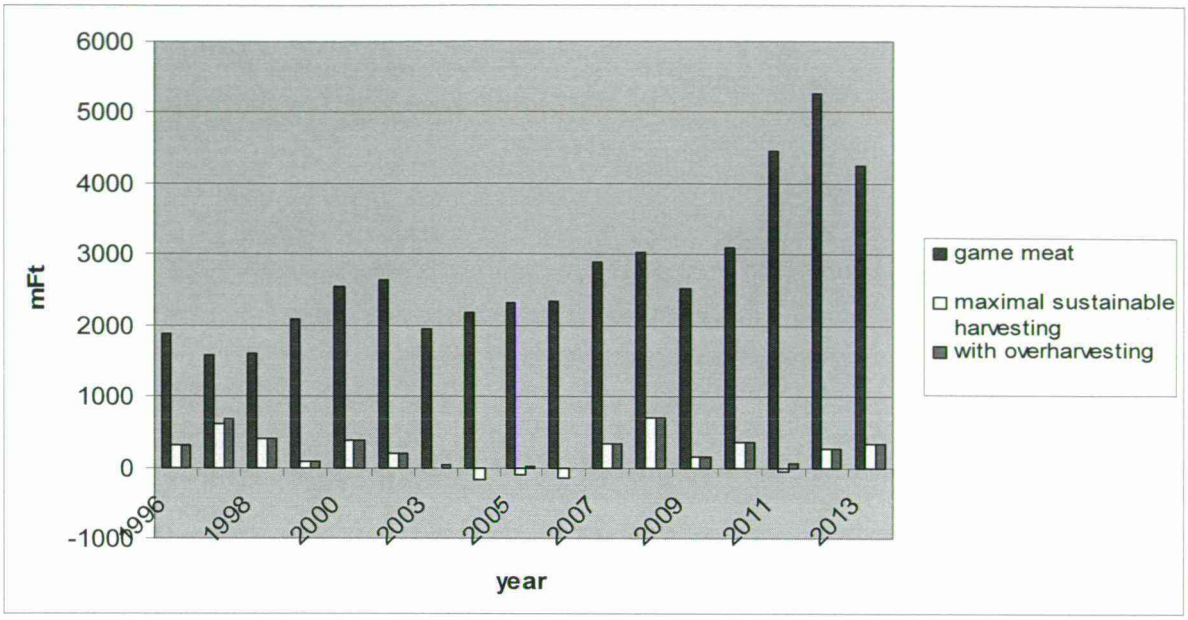

Figure 6. Relations of incomes from game meat and the extra incomes with and without income loss of overharvesting

Annual average of the incomes from game meat would have increased by 8,97% in the overharvested years with reduced incomes, and 10,6% without it. The minimum is 7,86% decreasing, maximum is 38,57% increasing, and the median is 7,88% increasing with maximal sustainable harvest rates. Without the overharvesting's yearly income reduction its minimum is not changing balances, maximum is 38,57% increasing, and the median is 7,88% increasing.

The most important question is: how does this affect the balances of the wildlife management?

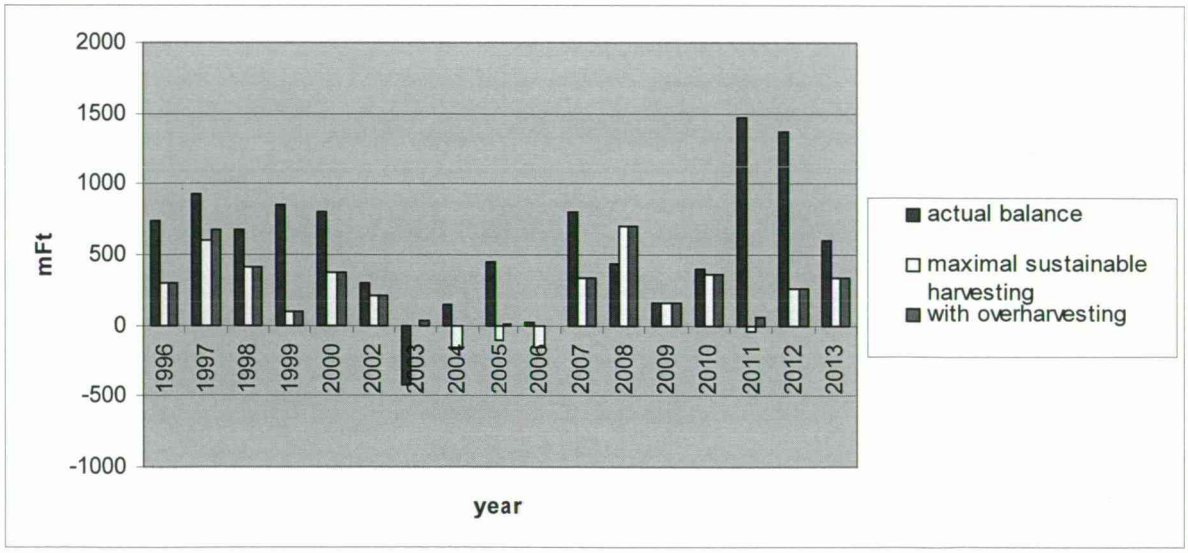

Figure 7. Relations of the yearly finances of the wildlife management and the extra incomes with and without income loss of overharvesting

Annual average of the finances is 8,83% decreasing with maximal sustainable harvest rates and 45,91% increasing without the income loss of overharvesting. The reason of the decreasing is the outstanding data of the year 2006, when the profit was only 20 million Ft, with overharvesting. Without that it would have been 135 million Ft less, so the ratio is -767%. Excluding 2006 data the yearly average is 38,58% increasing with maximal sustainable harvesting.
The minimum is 767,17% decreasing (in year 2006, because of the reason I described above), the maximum is 157,68% increasing, and the median is 41,92% increasing with maximal sustainable harvest rates. Without the overharvesting years income reduction its minimum is not changing balances, the maximum is 157,68% increasing, and the median is 41,92% increasing.

CONCLUSIONS

When increasing harvest rate, excess amount of game meat results excess incomes, which is one of the most important factors in every economical sector. At the same time, the maximal sustainable harvest rate model fits for the sustainability factor. The minor overharvesting model doesn't decrease the populations significantly, if they get overharvested only for 2-3 years in only a few percents.
The increase of incomes could be considerable with only a small extra input, in some years it could be more than 500 million Ft (the maximum was 700 million Ft in a year between 1996 and 2013). This extra income affects the incomes from game meat selling significantly, and in certain cases can raise the wildlife management's yearly balance by 250%. The 38,58% raising median in the modul is a result that is worth thinking about.
However, my model doesn't take into consideration whether the raised hunting pressure requires new professional hunters, and other additional costs. Because of this, the profit might be less than what I calculated. At the same time, the income from trophies of the males was not applied to the model either, so the incomes could be greater than the model's predictions.

REFERENCES

CSÁNYI S., LEHOCZKI R. & SONKOLY K. (2008): Vadgazdálkodási adattár – 2007/2008. vadászati év. Országos Vadgazdálkodási Adattár, Gödöllő. 64 pp.
CSÁNYI S., TÓTH K., KOVÁCS I. & SCHALLY. G. (2014): Vadgazdálkodási Adattár2013/2014. vadászati év. Országos Vadgazdálkodási Adattár, Gödöllő. 48 pp.

Non-publicated data from the Hungarian Game Management Database between 1996 and 2013