Economic evaluation of "Animal Health and Welfare Planning" on organic pig farms in Austria

Evaluierung der ökonomischen Auswirkungen von Betriebsentwicklungs-plänen auf Bioschweinebetrieben in Österreich

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Summary

During the "BEP Bioschwein" project, Animal health and Welfare Planning (AHWP) was implemented on 50 organic pig farms in Austria (29 breeding and 21 fattening farms). Farmers choose farm individual goals in the areas "economic performance" ("E"), "feeding" ("F"), "husbandry" ("H") and "health and welfare" ("A"). 17 farms pursued the goal "E" measured as increase of gross margin.

Across all farms gross margins increased during the project year by € 62.7 per sow on breeding farms and by € 4.1 per fattening place on fattening farms, however not significantly. Comparing farms pursuing the goal "E" with farms pursuing one of the other goals ("F, H, A") no significant changes in gross margins was found.

Keywords: animal health and welfare planning, gross margin, organic farming, pigs

Zusammenfassung

Im Rahmen des Projektes „BEP Bioschwein" wurden Betriebsent-wicklungspläne für Gesundheit und Wohlbefinden von Bioschweinen (AHWP) auf 50 Biobetrieben (29 Zucht- und 21 Mastbetriebe) in Österreich eingeführt. Anhand der Ausgangssituation wurden von LandwirtInnen betriebsindividuelle Ziele in den Bereichen

„ökonomische   Leistung",   „Fütterung",   „Haltung"   und
„Tiergesundheit" gesetzt und Maßnahmen entwickelt. Das Ziel, die
„ökonomische Leistung" – gemessen an einer Steigerung des
Deckungsbeitrages (DB) – zu verbessern, setzten sich insgesamt 17
Betriebe.
Über alle Betriebe hinweg nahmen die DB im Projektjahr – nicht
signifikant - bei Züchtern um € 62,7 pro Sau und bei Mästern um € 4,1
pro Mastplatz zu. Die Änderung des DB unterschied sich auch
zwischen Betrieben mit dem Ziel „ökonomische Leistung" und
Betrieben   mit   den   anderen   Zielen   („Fütterung",   „Haltung",
„Tiergesundheit") nicht signifikant.
Schlagworte: Biologische Landwirtschaft, Deckungsbeitrag, Schweine,
Tiergesundheitspläne

1. Introduction

Animal Health and Welfare Planning (AHWP) aims to improve health
and welfare of livestock whilst contributing to farm profitability and
product quality. AHWP consists of a written document ("plan")
describing the present situation (e.g. husbandry, feeding regime, health
and welfare). Based on the AHWP during a yearly monitoring
("planning"), new farm individual goals and management strategies to
achieve those are agreed and documented as an updated AHWP. Over
the past 10 years, AHWP has been discussed and implemented for
different species (e.g. HOVI et al., 2003; BRINKMANN and MARCH, 2011).
Great Britain introduced AHWP into organic farming in 2000 as an
obligatory requirement (UKROFS, 1999; SIBLEY, 2002). As AHWP relies
on measurable data, farmers can perceive additional record keeping
and data analysis as additional work (MORRIS, 1999). However, this
must be compared with the economic benefits of effective AHWP
(YOUNG et al., 1985), which so far has been investigated only by few
studies (RUSHTON, 2009). Preconditions for an exact evaluation of the
impact of AHWP are a precise definition of goals and a documentation
of the implementation of measures to achieve these goals
(BIEDERMANN, 2009).

The effect of introducing the AHWP concept was so far mainly
assessed using health and welfare outcomes (BRINKMANN and MARCH,
2011). Although the socio-economic evaluation of health improvement

measures is an important criterion, only few studies focused on specific health problems (BELL, 2006). HANSSON et al. (2011) monitored the effect of single preventive measures, BRUIJNIS et al. (2010) used a modelling approach. To our knowledge the economic efficiency of AHWP has not been investigated so far.

Within the project "BEP Bioschwein - Introduction and monitoring of animal health and welfare plans on organic pig farms in Austria", farm specific AHWPs were introduced on organic pig farms in Austria. This was a unique opportunity to measure the impact of AHWP on economic data (gross margin) as well as potential effects on other areas such as animal health, welfare and farmers' perceptions (LEEB et al., 2010).

2. Farms, data and methods

The present study was carried out from 2008 to 2010 on 50 organic pig farms in Austria keeping conventional breeds (Large White x Landrace (=F1) x Pietrain). On 46 farms pigs, were housed indoors with a concrete outside run. On 4 breeding farms pigs were housed (partly) outdoors. All farms kept on average 47 sows (range: 8 - 500), 123 fatteners (0 - 800), and 10 gilts (0 - 70).

Each farm was visited four times (LEEB et al., 2010). During the first visit data regarding management, animal based parameters and productivity were collected. Based on these, a farm specific AHWP was developed as a written document and discussed with the farmer. During the implementation visit (second visit) of the AHWP each farmer was encouraged by experts to define one to three specific goals out of the four areas "economic performance" ("E"), "feeding" ("F"), "housing" ("H") and "health and welfare" ("A"). Additionally appropriate measures to achieve them were identified (Tab. 1). 17 out of the 50 farms (eight piglet producers and nine fattening farms) set the specific goal to improve the "economic performance" ("E"). They kept on average 67 sows (10 - 500), 224 fatteners (40 - 800) and 13 gilts (0 - 70). Farms with the goal "E" chose on average 1.1 measures of different categories (Tab. 1): feeding (n=13) management (n=5), and husbandry (n=1).

During visit three (six months after visit one), the process was monitored and farmers supported in farm specific topics. During visit

four (one year after visit one) the degree of implementation of measures was assessed and the AHWP was updated.

Tab. 1: Categories of measures agreed between farmer and advisor to achieve goal "E" in breeding (n=8) and fattening farms (n=9)

Type of measures (n = number of measures)	measures in breeding farms (n = number of farms)	measures in fattening farms (n = number of farms)
feeding (13)	- investing more time in feeding management (2) - adaption on existing feedstuff (1) - providing protein according to requirements (1) - automation of feeding system (1)	- investing more time in feeding management (4) - providing protein according to requirements (2) - provision of roughage (1)
management (5)	- change from routine to individual medicine treatment (1) - better record keeping (1) - take decision about production planning (1)	- better record keeping (1)
husbandry (1)		- built and use hospital pens (1)

Source: Own presentation

Gross margins were calculated per sow or fattening place. Productivity data, animal sales volume (number of sold gilts, sows, piglets, fatteners, boars), feed costs, veterinary care costs and water and electricity costs were collected over a period of two years (one year before the first farm visit = "pre BEP period" vs. the project year = "BEP period"). For home grown feeding components current market prices were used. Highly fluctuating feed and pig prices during the project year were kept constant (price level of visit one) to make the effects of AHWP more visible. Investments of two breeding farms which could be linked to AHWP goal "E" (new feeding system: € 22.5 resp. € 288.4 per sow) were also considered in the calculation of gross margins.

The quality and quantity of implementation was used to define three categories of farms:

- measures fully implemented (complete and ongoing implementation),
- measures partially implemented (incomplete, qualitatively poor or only short implementation),
- measures not implemented (no implementation at all).

Data were evaluated using the statistics program SPSS, version 18. Gross margins were compared using a non-parametric test for independent observations (Mann Whitney U Test; α=0.05):

1. over all farms,
2. farms with "F, H, A" goals vs. farms with goal "E",
3. farms within goal "E": fully implemented measures, partially implemented measures, not implemented measures.

3. Results

Gross margins of breeding farms in the "pre_BEP period" year were € 625.0 (range € 495.6 - € 713.9) per sow and in fattening farms € 65.2 (€ 28.0 - € 89.0) Euro per fattening place.

Across all farms the gross margin - not significantly - increased in breeding farms (Δ € 62.7), and fattening farms (Δ € 4.1) comparing "pre BEP period" and "BEP period" (Tab. 2). Also, in both breeding and fattening farms gross margins did not significantly differ at the level of farm groups "E" and "F, H, A".

However, the gross margin of breeding farms with goals "F, H, A" nominally increased during the BEP period by € 83.5 and on farms with the goal "E" by € 8.1. Furthermore, results from breeding farms with the goal "E" depended on the degree of implementation of measures with full implementation show the highest increases (Δ € 45.5) followed by partially implemented measures (Δ € 3.8). The gross margin of the only farm which had not implemented measures decreased.

Fattening farms with the goals "F, H, A" had a higher gross margin than farms with the goal "E" in both periods (€ 73.4 vs. € 71.5), and the margin on average decreased slightly (Δ € -1.9). In fattening farms with goal "E" the average increase of gross margin was € 11.3, but the highest increase was found on farms with fully implemented measures (Δ € 30.0). On farms with partially implemented measures an increase of € 12.3 was found and on farms with not implemented measures the gross margin decreased by € 8.4.

Tab. 2: Mean gross margin of breeding and fattening farms during "pre BEP period" and "BEP period" and their change (Δ) in Euro per animal (breeders) and Euro per fattening place (fatteners) (Standard deviation, SD)

	Gross margin of breeding farms (SD)				**Gross margin of fattening farms (SD)**			
	n	pre BEP	BEP	Δ	n	pre BEP	BEP	Δ
all farms	29	625.0 (186.2)	687.6 (219.0)	62.7	21	65.2 (43.3)	69.3 (44.0)	4.1
farms with goals "F, H, A"	21	630.5 (201.9)	713.9 (226.0)	83.5	12	73.4 (45.5)	71.5 (45.6)	-1.9
farms with goal "E"	8	610.5 (148.2)	618.5 (195.7)	8.1	9	58.4 (41.8)	69.7 (44.4)	11.3
fully implemented m.	4	618.8 (179.8)	664.3 (227.0)	45.5	3	58.2 (50.6)	88.2 (56.4)	30.0
partially imple-mented measures	3	594.7 (166.7)	598.5 (210.7)	3.8	3	28.0 (30.1)	40.4 (36.4)	12.3
not implemented measures	1	624.3	495.6	-128.7	3	89.0 (27.3)	80.5 (37.2)	-8.4

Source: Own calculation

4. Discussion

This project gave an important insight into the potential economic effects of AHWP on a rather large number of farms. Interestingly a substantial number of farmers explicitly chose to focus on the goal "E". These breeding and fattening farms kept more animals and their gross margin during the "pre_BEP period" was lower compared to the other farms.

The observation period was one year, which appears to be sufficient for fattening farms, since they have a faster turnover than breeding farms. This may be one reason why a more pronounced change of gross margin was found in fattening farms (e.g. when adapting the feeding ration). Long-term effects of the AHWPs (e.g. changes in vaccination regimes) are less likely to be observed during such a relatively short period. Furthermore, many farms had only begun keeping more accurate records during the project year. Therefore a longer monitoring period would be beneficial to evaluate the economic influence of AHWP more precisely.

Many measures regarding feeding were targeted at improving the gross margin. Many of these measures were actually implemented, as they are relatively simple to introduce (e.g. phase feeding, change of ration) and do not require major changes of e.g. housing or management routines.

The presented gross margins are comparable with other studies of organic pig farms (WEIß and UHL, 2012). However, the maximum increase of gross margin (i.e. Δ+ € 83.5 per sow in "F, A, H" farms; Δ+ € 30 per fattening place in "E" farms which had fully implemented the measures) shows the potential for improvement in organic pig production in Austria.

Gross margins of "pre_BEP" and "BEP" period were statistically not different in breeding and fattening farms but nominally increased on average. This is still relevant for some farmers since any increase in gross margin leads in the case of unaltered fixed costs to higher earnings. This effect plays an important role because of the high building costs in Austria (OMELKO and SCHNEEBERGER, 2004).

Breeding farms with goal "E" had a lower increase of gross margin than farms with goals "F, H, A". This was not expected, and yet, it can be explained by the example of two farms which invested into new feeding systems during the BEP period (one of their measures). Therefore, their gross margin decreased because they had higher fixed costs directly assignable to their gross margin. When not including these two farms, the gross margins from farms with the goal "E" are on a similar level as farms with the goals "F, H, A".

Fattening farms with the goal "E" achieved a higher increase of gross margin than fattening farms with goals "F, H, A". Measures are more likely implemented in fattening farms with lower gross margin than in fattening farms which were already on a higher level in the "pre_ BEP period". This can be explained by a stronger motivation and scope for improvement which can be achieved by simple measures such as a change of ration. Breeding and fattening farms with fully implemented measures tend to gain a higher gross margin than breeding and fattening farms with partially or not implemented measures.

The concept of AHWP has a high potential to improve the economic situation, even when the effect was statistically not significant. This could derive from the strategic approach following the "health belief model" (ROSENSTOCK et al., 1988). In this model, intervention takes

place under the presence of three classes of factors: (1) recognition of a problem, (2) a perceived economic benefit of taking a particular action and (3) incentives to take an action. The review of existing records did support the recognition of a problem, as most farmers had not calculated their gross margin before. Implemented measures could be objectively evaluated and the experienced increase of gross margin will act as incentive to take further actions.

5. Conclusion

The concept of AHWP seems promising: The results show that economic goals can be achieved even within a relatively short period of time, provided that the agreed measures are actually implemented.
Regarding future application of AHWP continuous implementation is necessary which will also allow long term improvements not only on economy, but also on animal health and welfare.

Acknowledgement

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