

HAYVAN HASTALIKLARINDAN KAYNAKLANAN EKONOMİK KAYIPLAR

BÖLÜM

4

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İÇİNDEKİLER

- » Basit ekonomik analiz yöntemler
- » Kısmi bütçeleme
- » Maliyet-fayda analizi
- » Karar analizleri
- » Hastalıklardan kaynaklanan ekonomik kayıplar



HEDEFLER

- » Bu bölümde;
 - » Hayvan sağlığı ekonomisi alanında kullanılan basit ekonomik analiz yöntemlerinin önemini aktarılması
 - » Kısmi bütçe analizi uygulamaları
 - » Maliyet-fayda analizi uygulamaları
 - » Karar analizi uygulamalarının hayvan sağlığı ekonomisi özelinde kullanım alanlarının kavranması
 - » Hastalıklardan kaynaklanan kayıplar ile bunların yol açtığı ekonomik kayıpların aktarılması amaçlanmaktadır.

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hayvansal üretimin sürdürülebilir bir yapıda devam etmesi bu hastalıklara bağlı ortaya çıkacak maliyet ve masraf unsurlarının minimize edilmesi ile mümkündür. Günümüz hayvancılığının üretim yapısının aile işletmeciliğinden büyük ölçekli işletmelere evrilmesi de hayvan hastalıkları ile mücadelede birim hayvan- dan uzaklaşarak işletme bazlı düşünmeyi ön plana çıkarmaktadır. Bu bağlamda hayvancılık işletmelerinin var oluş amacı olan ekonomik getiri sağlama çabası bu işletmelerde alınacak her türlü kararın (aşılama, ilaçlama, yemleme, kesim, itilaf vb.) rasyonellik ilkesi doğrultusunda alınmasını gerektirmektedir. Bu nedenle gerek işletme gerekse ulusal boyutta hayvan hastalıklar ile mücadelede veteriner hekimlik ve ekonomi bilimleri (Hayvan Sağlığı Ekonomisi) ışığında uygulamak hayvan hastalıklarının ekonomik etkilerini en aza indirmede önemli ve büyük katkılar sağlayacaktır.

KAYNAKLAR

- Aghamohammadi M, Haine D, Kelton DF, Barkema HW, Hogewege H, Keefe GP, Dufour S, 2018. Herd-level mastitis-associated costs on Canadian dairy farms. *Frontiers in veterinary science*, 100.
- Akin AC, Sipahi C, 2019. Economic Losses Due to Fertility Disorders in Dairy Cattle Enterprises: Burdur Province Sample. 3rd International Congress on Advances in Bioscience and Biotechnology (ICABB), July 10-14, 2019 Kiev, Ukraine
- Alexandersen S, Zhang Z, Donaldson AI, Garland AJM, 2003. The pathogenesis and diagnosis of foot-and-mouth disease. *J Comp Pathol.* 129:1-36.
- Alves AJS, Rocha F, Amaku M, Ferreira F, et al., 2015. Economic analysis of vaccination to control bovine brucellosis in the States of São Paulo and Mato Grosso, Brazil. *Preventive Veterinary Medicine*, 118(4), 351-358.
- Anderson I, 2008. Foot and Mouth Disease 2007: A Review and Lessons Learned. Report to the Prime Minister and the Secretary of State for Environment Food and Rural Affairs, London, UK
- Aral Y, Arıkan MS, 2019. Süt çiftliği iyi uygulama rehberi, süt sigircılığı işletmelerinde kârlılık ve ekonomik sürü yönetimi'ne ilişkin genel prensip ve uygulamalar. Pınar Enstitüsü. ISBN 146, 978-605-83006-3-7.
- Ashley C, 2015. Peste des petits ruminants virus (Vol. 1). Munir, M. (Ed.). Heidelberg, Germany: Springer. Banyard and Satya Parida Molecular Epidemiology of Peste des Petits Ruminants Virus
- Bamaiyi PH, 2015. The economic impact attributable to brucellosis among goat farms in Peninsula Malaysia and cost benefit analysis. *Res Opin Anim Vet Sci.* 5:57–64.
- Bamaiyi PH, Abd-Razak NS, Zainal MA, 2012. Seroprevalence and economic impact of eradicating zoonotic brucellosis in Malaysia. A case study of Melaka state of Malaysia. *Vet. World.* 5, 398–404.
- Barasa M, Catley A, Machachu D, Laqua H, et al., 2008. Foot-and-mouth disease vaccination in South Sudan: benefit-cost analysis and livelihoods impact. *Transbound. Emerg. Dis.* 55, 339–351.
- Bardhan D, Kumar S, Anandsekaran G, Chaudhury JK, et al., 2017. The economic impact of peste

- des petits ruminants in India. *Rev. Sci. Tech.*, 36, 245-263.
- Bartlett PC, Kirk JH, Wilke MA, Kaneene JB, et al., 1986. Metritis complex in Michigan Holstein-Friesian cattle: incidence, descriptive epidemiology and estimated economic impact. *Preventive veterinary medicine*, 4(3), 235-248.
- Baştan A, 2019. İneklerde meme sağlığı ve sorunları. 3. Baskı, Kardelen Ofset Matbacılık, Ankara, Turkey.
- Bayissa B, Ayelet G, Kyule M, Jibril Y, et al., 2011. Study on seroprevalence, risk factors, and economic impact of foot-and mouth disease in Borena pastoral and agro-pastoral system, southern Ethiopia. *Trop. Anim. Health Prod.* 43, 759-766.
- Bernués A, Manrique E, Maza MT, 1997. Economic evaluation of bovine brucellosis and tuberculosis eradication programmes in a mountain area of Spain. *Prev. Vet. Med.* 30 (2)
- Bittner A, 2004. An overview and the economic impacts associated with mandatory brucellosis testing in Wyoming cattle. Department of Administration and Information, Economic Analysis Division. <http://eadiv.state.wy.us>.
- Can MF, 2007. Hayvan Sağlığı Ekonomisi Alanındaki Modelleme Teknikleri. Hayvan Sağlığı Ekonomisi Anabilim Dalı Doktora Seminer, Ankara
- Can MF, 2009. Hayvan Sağlığı Ekonomisi alanında kullanılan modelleme teknikleri ve çeşitli modelleme çalışmaları. *Veteriner Hekimler Derneği Dergisi*. 80(3): 7-12.
- Can MF, 2010. Türkiye'de Brusella abortus ve Brusella melitensis enfeksiyonlarından kaynaklanan finansal kayıplar ve alternatif Brusella kontrol stratejilerinin maliyet-fayda analizi. Ankara Üniversitesi Sağlık Bilimleri Enstitüsü Doktora Tezi, Ankara.
- Carpenter TE, O'Brien JM, Hagerman AD, McCarl BA, 2011. Epidemic and economic impacts of delayed detection of foot-and-mouth disease: a case study of a simulated outbreak in California. *J. Vet. Diagn. Invest.* 23, 26-33.
- Çevrimli MB, 2020. Hayvan Sağlığı ve Ekonomisinde Karar Verme Süreci. Sürü Sağlığı Yönetimi ve Ekonomisi Atatürk Üniversitesi Açıköğretim Fakültesi Yayıncılık, Erzurum
- Charypkhan D, Sultanov AA, Ivanov NP, Baramova SA, et al., 2019. Economic and health burden of brucellosis in Kazakhstan. *Zoonoses Public Health*. 66:487-494
- Çiçek H, Çiçek H, Şenkul Ç, Tandoğan M, 2008. Paraziter hastalıkların kontrolünde coğrafi bilgi sistemlerinin kullanım olanakları ve hayvan sağlığı ekonomisi açısından önemi. *Türkiye Parazitoloji Dergisi*, 32(3), 288-294.
- Çiçek H, Tandoğan M, 2014. Hayvansal Üretimde Kısmi Bütçe Uygulamaları. *Kocatepe Vet J* 7(2): 33-36
- Dadar M, Tiwari R, Sharun K, Dhama K, 2021. Importance of brucellosis control programs of livestock on the improvement of one health, *Veterinary Quarterly*, 41:1, 137-151, DOI: 10.1080/01652176.2021.1894501
- De Haan NC, Kimani T, Rushton J, Lubroth J, 2015. Why is small ruminant health important-peste des petits ruminants and its impact on poverty and economics? In: Munir M. (eds) *Peste des Petits Ruminants Virus*. Springer, Berlin, Heidelberg. https://doi.org/10.1007/978-3-662-45165-6_12.
- De Oliveira EB, Cunha F, Daetzer R, Figueiredo CC, et al., 2020. Using chitosan microparticles to treat metritis in lactating dairy cows. *Journal of dairy science*, 103(8), 7377-7391.
- De Vries A, Conlin BJ, 2003. Economic Value of Timely Determination of Unexpected Decreases in Detection of Estrus Using Control Charts. *Journal of Dairy Science*, 86: 3516-3526
- Dijkhuizen AA, Morris RS, 1997, Animal Health Economics Principles and Applications. Published by Post Graduate Foundation in Veterinary Science, University of Sydney
- Dubuc J, Duffield T, Leslie KE, Walton JS, et al., 2011. Effects of postpartum uterine diseases on milk production and culling in dairy cows. *Journal of dairy science*, 94(3), 1339-1346.
- Ellis PR, Putt S NH, 1981. The Epidemiological and Economic Implications of the Foot and

- Mouth Disease Vaccination Programme in Kenya. Pan Livestock Services. Reading, UK.
- Enting H, Kooij D, Dijkhuizen AA, Huirne RBM, et al., 1997. Economic Losses Due to Clinical Lameness in Dairy Cattle. *Livestock Production Sci.*, 49 (1997): 256-267.
- Esslemont RJ, Kossaibati MA, Allcock J, 2001. Economics of Fertility in Dairy Cows. Recording and Evaluation of Fertility Traits in UK Dairy Cattle, Proceedings of a Workshop held in Edinburg, pp. 5-14, 19- 20 November 2001
- Faria JF, 1984. Situac, ão da Brucelose no Brasil. In: Comunicac, ão Científica da Faculdade de Medicina Veterinária e Zootecnia da Universidade de São Paulo 8, pp. 161-175.
- Fathelrahman EM, Reeves A, Mohamed MS, Ali YME, et al., 2021. Epidemiology and Cost of Peste des Petits Ruminants (PPR) Eradication in Small Ruminants in the United Arab Emirates—Disease Spread and Control Strategies Simulations. *Animals*, 11(9), 2649.
- FAO, 2010. Study on the socioeconomic impacts of peste de petits ruminants in Kenya. Food and Agriculture Organization, Rome, Italy
- Gajanayake S, De Alwis MCL, Wijewardana TG, Jayaruban MG, 2000. Bovine brucellosis in Sri Lanka: an economic evaluation of losses and proposed eradication program. *Sri Lanka Vet. J.*, 47(1A), 13-20.
- Gonzáles-Recio O, Pérez-Cabal MA, Alenda R, 2004. Economic Value of Female Fertility and its Relationship with Profit in Spanish Dairy Cattle. *J Dairy Sci*, 87, 3053- 3061.
- Halasa T, Huijps K, Østerås O, Hogeweegen H, 2007. Economic effects of bovine mastitis and mastitis management: A review. *Veterinary Quarterly* 29, 18–31.
- Havelaar A, Grace D, Wu F, 2019. Foodborne diseases from dairy products in developing countries: hazards and health implications.
- Herrera E, Palomares G, Díaz-Aparicio E, 2008. Milk production increase in a dairy farm under a six-year brucellosis control program. *Annals of the New York Academy of Sciences*, 1149(1), 296-299.
- Hogeweegen H, & Østerås O, 2005. Mastitis management in an economic framework. In *Mastitis in Dairy Production*. Proceedings of the 4th IDF International Conference (H. Hogeweegen, editor). pp. 41-52.
- Hogeweegen H, Huijps K, Lam TJ, 2011. Economic aspects of mastitis: new developments. *New Zealand veterinary journal*, 59(1), 16-23.
- Huijps K, Lam TJ, Hogeweegen H, 2008. Costs of mastitis: facts and perception. *Journal of Dairy Research*, 75(1), 113-120.
- Idoga E, Arsmson B, Alafiatayo R, Ogwuche A, et al., 2020. A review of the current status of peste des petits ruminants epidemiology in small ruminants in Tanzania. *Frontiers in Veterinary Science*, 7, 592662. <https://doi.org/10.3389/fvets.2020.592662>
- Jemberu WT, Knight-Jones TJ, Gebru A, Mekonnen SA, et al., 2022. Economic impact of a peste des petits ruminants outbreak and vaccination cost in northwest Ethiopia. *Transboundary and Emerging Diseases*.
- Jemberu WT, Mourits MC, Woldehanna T, Hogeweegen H, 2014. Economic impact of foot and mouth disease outbreaks on smallholder farmers in Ethiopia. *Preventive veterinary medicine*, 116(1-2), 26-36.
- Jones BA, Rich KM, Mariner JC, Anderson J, et al., 2016. The Economic Impact of Eradicating Peste des Petits Ruminants: A Benefit-Cost Analysis. *PLoS ONE* 11 (2): e0149982. doi:10.1371/journal.pone.0149982
- Kihu SM, Gitao GC, Bebora LC, John NM, et al., 2015. Economic losses associated with Peste des petits ruminants in Turkana County Kenya. *Pastoralism*, 5(1), 1-8.
- Knight-Jones TJD, Rushton J, 2013. The economic impacts of foot and mouth disease – what are they, how big are they and where do they occur. *Prev Vet Med*. 112:161–73.
- Koçak, O, Ekiz B, 2006. The Effect of Lameness on Milk Yield in Dairy Cows. *Acta Vet. Brno*, 75:

- 79-84.
- Kossaibati MA, Esslemont RJ, 1997. The Costs of Production Diseases in Dairy Herds in England. *The Veterinary Journal*, 154, 41-51
- Kossaibati MA, Esslemont RJ, 1999. The incidence of lameness in a group of dairy herds in England. In Proceedings of the British Society of Animal Science (Vol. 1999, pp. 221-221). Cambridge University Press.
- Laven RA, Peters AR, 1996. Bovine retained placenta: aetiology, pathogenesis and economic loss. *Veterinary Record*, 139(19), 465-471.
- Lima FS, Vieira-Neto A, Snodgrass JA, De Vries A, et al., 2019. Economic comparison of systemic antimicrobial therapies for metritis in dairy cows. *Journal of dairy science*, 102(8), 7345-7358.
- Mahnani A, Sadeghi-Sefidmazgi A, Cabrera VE, 2015. Consequences and economics of metritis in Iranian Holstein dairy farms. *Journal of dairy science*, 98(9), 6048-6057.
- Marsh W, 1999. The economics of animal health in farmed livestock at the herd level. *Rev. sci. tech. Off. int. Epiz.*, 18 (2), 357-366
- McCarthy MC, Mee JF, McAloon CG, O'Grady L, 2022. A comparison of the age at first calving of contract-reared versus home-reared replacement dairy heifers. *Theriogenology*, 181, 105-112.
- McDermott J, Grace D, Zinsstag J, 2013. Economics of brucellosis impact and control in low-income countries. *Revue scientifique et technique (International Office of Epizootics)*, 32(1), 249-261.
- McInerney JP, Howe KS, Schepers JA, 1992. A framework for the economic analysis of disease in farm livestock. *Preventive Veterinary Medicine*, 13(2), 137-154.
- Mellado M, Garcia AM, Arellano-Reynoso B, Diaz-Aparicio E, et al., 2014. Milk yield and reproductive performance of brucellosis-vaccinated but seropositive Holstein cows. *Trop Anim Health Prod.* 46(2):391-397.
- Overton M, Fetrow J, 2008. Economics of postpartum uterine health. Proc Dairy Cattle Reproduction Council, 39-44.
- Paarlberg PL, Lee JG, Seitzinger AH, 2002. Potential revenue impact of an outbreak of foot-and-mouth disease in the United States, *Journal of the American Veterinary Medical Association*, 220(7), 988-992.
- Pacheco G, Mello MT, 1956. Brucellose. Distribuidora Livraria Ateneu, Rio de Janeiro
- Pal M, Kerorsa GB, Desalegn C, Kandi V, 2020. Human and Animal Brucellosis: A Comprehensive Review of Biology, Pathogenesis, Epidemiology, Risk Factors, Clinical Signs, Laboratory Diagnosis. *American Journal of Infectious Diseases*, 8(4), 118-126.
- Peck D, Bruce M, 2017. The economic efficiency and equity of government policies on brucellosis: comparative insights from Albania and the United States of America. *Rev Sci Tech*. 36(1):291-302. doi: 10.20506/rst.36.1.2629. PMID: 28926008., 137-149
- Pérez-Báez J, Silva TV, Risco CA, Chebel RC, et al., 2021. The economic cost of metritis in dairy herds. *Journal of Dairy Science*, 104(3), 3158-3168.
- Petrovski KR, Trajcev M, Buneski G, 2006. A review of the factors affecting the costs of bovine mastitis. *Journal of the South African Veterinary Association*, 77(2), 52-60.
- Pickering KE, 1995. Decision Analysis as an Aid for Monitoring Mastitis. MSc Thesis. University of Aberdeen, Department of Agriculture.
- Rollin E, Dhuyvetter KC, Overton MW, 2015. The cost of clinical mastitis in the first 30 days of lactation: An economic modeling tool. *Preventive veterinary medicine*, 122(3), 257-264.
- Rufael T, Catley A, Bogale A, Sahle M, et al., 2008. Foot and mouth disease in the Borana pastoral system, southern Ethiopia and implications for livelihoods and international trade. *Trop. Anim. Health Prod.* 40, 29-38.
- Safiullah AM, Prabaharan R, Sadasivam P, 2001. Economic Analysis of Calving Interval of Hungarian Dairy Cattle. *Journal of Applied Animal Research*, 19 (2): 237-246.

- Samartino LE, 2002. Brucellosis in Argentina. *Vet Microbiol.* 90(1–4):71–80
- Santos RL, Martins TM, Borges AM, Paixão TA, 2013. Economic losses due to bovine brucellosis in Brazil. *Pesq. Vet. Bras.* 33 (6), 759–764
- Sarıözkan S, Aral Y, Murat H, Aydin E, et al., 2012. Süt sigirciliği işletmelerinde fertilité bozukluklarından kaynaklanan finansal kayıpların hesaplanması. Ankara Üniversitesi Veteriner Fakültesi Dergisi 59, 55–60.
- Seegers H, 2006. Economics of The Reproductive Performance of Dairy Herds. Proceedings of the 24th World Buiatrics Congress, pp. 292-304, Nice, France, 15- 19 October 2006.
- Şentürk B, 2004. Türkiye'de şap hastalığı kontrol stratejilerinin ekonomik analizi. Ankara Üniversitesi Sağlık Bilimleri Enstitüsü, Doktora Tezi, Ankara.
- Şentürk B, Yalçın C, 2008. Production losses due to endemic foot-and-mouth disease in cattle in Turkey. *Turkish Journal of Veterinary and Animal Sciences*, 32(6), 433-440.
- Şentürk B, Yalçın, C. 2005. Financial impact of foot-and-mouth disease in Turkey: acquisition of required data via Delphi expert opinion survey. *Vet. Med.-Czech.*, 50: 451-460.
- Sheperd AA, Simpsom BH, Davidson RM, 1980. An economic evaluation of the New Zealand bovine brucellosis eradication. In: Proceedings of the Second International Symposium on Veterinary Epidemiology and Economics, pp. 443–447.
- Singh B, Dhand, NK, Gill JPS, 2015. Economic losses occurring due to brucellosis in Indian livestock populations. *Preventive veterinary medicine*, 119(3-4), 211–215.
- Singh B, Bardhan D, Verma MR, Prasad S, et al., 2014. Estimation of economic losses due to Peste de Petits Ruminants in small ruminants in India. *Veterinary World*, 7(4).
- Singh RP, 2011. Control strategies for peste des petits ruminants in small ruminants of India. *Revue Scientifique et Technique-OIE*, 30(3), 879.
- Souleye Kouato B, Thys E, Renault V, Abatih E, et al., 2018. Spatio-temporal patterns of foot-and-mouth disease transmission in cattle between 2007 and 2015 and quantitative assessment of the economic impact of the disease in Niger. *Transboundary and emerging diseases*, 65(4), 1049-1066.
- Sriranganathan N, Seleem MN, Olsen SC, Samartino LE, et al., 2009. Genome mapping and genomics in animal-associated microbes. In: Nene V, Kole C (Eds.), *Brucella*. Springer; (Chapter 1), p. 1-64, Berlin, Heidelberg.
- Stem C, 1993. An economic analysis of the prevention of peste des petits ruminants in Nigerien goats. *Preventive veterinary medicine*, 16(2), 141-150.
- Thompson D, Muriel P, Russell D, Osborne P, et al., 2002. Economic costs of the foot and mouth disease outbreak in the United Kingdom in 2001. *Rev Sci Tech.* 21(3):675-87. doi: 10.20506/rst.21.3.1353. PMID: 12523706.
- Topcu İ, 2022. Karar Analizleri. İlkler Topcu Ders Notları, İstanbul
- Turiello MP, Vissio C, Heinrichs AJ, Issaly LC, et al., 2020. Impact of age at first calving on performance and economics in commercial dairy herds in Argentina. *Livestock Science*, 240, 104108.
- Yalçın C, 2007. Hayvan sağlığı ekonomisinde kullanılan kantitatif modeller. *Hayvan Sağlığı Ekonomisi Ders Notları*, Ankara
- Yalçın C, Sarıözkan S, Yıldız AŞ, Günlü A, 2012. Incidence and financial losses due to retentio secundinarum in dairy herds selected provinces in different regions of Turkey. *Erciyes Üniversitesi Veteriner Fakültesi Dergisi*, 9(1), 1-6.
- Yalçın C, Sarıözkan S, Yıldız AŞ, Günlü A, 2006. Türkiye Damızlık Sığır Yetiştiricileri Merkez Birliği'ne Bağlı Süt Sigircilik İşletmelerinde Endemik Hastalıklar ve İşletme Düzeyinde Meydana Getirdiği Ekonomik Kayıplar. Ankara Üniversitesi Bilimsel Araştırma Projesi Kesin Raporu. Ankara Üniversitesi.
- Yang PC, Chu RM, Chung WB, Sung HT, 1999. Epidemiological characteristics and financial costs

- of the 1997 foot-and-mouth disease epidemic in Taiwan. *Vet. Record* 145, 731–734.
- Yıldız AŞ, 2008. Ankara İli Damızlık Sığır Yetiştiricileri Birliği'ne Bağlı Süt Sığrcılığı İşletmelerinde Bazı Endemik Hastalıkların İşletme Düzeyinde Meydana Getirdiği Ekonomik Kayıplar, Ankara Üniversitesi Sağlık Bilimleri Enstitüsü Doktora Tez.
- Yurtalan S, 1999. Türkiye'de brucella abortus hastalığı kontrolünün ekonomik önemi. Pendik Veteriner Mikrobiyoloji Dergisi., 30: 35-41
- Zavadilová L, Kašná E, Krupová Z, Klímová A, 2021. Health traits in current dairy cattle breeding: A review. *Czech Journal of Animal Science*. 66(7); 235-250.