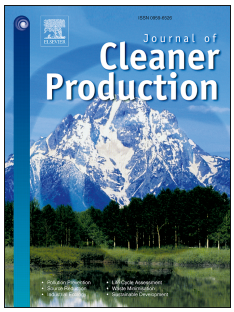
Accepted Manuscript



Multi-stage farm management optimization under environmental and crop rotation constraints

F. Capitanescu, A. Marvuglia, T. Navarrete Gutiérrez, E. Benetto

PII: S0959-6526(17)30083-5

DOI: 10.1016/j.jclepro.2017.01.076

Reference: JCLP 8823

To appear in: *Journal of Cleaner Production*

Received Date: 11 August 2016

Revised Date: 13 January 2017

Accepted Date: 14 January 2017

Please cite this article as: Capitanescu F, Marvuglia A, Navarrete Gutiérrez T, Benetto E, Multi-stage farm management optimization under environmental and crop rotation constraints, *Journal of Cleaner Production* (2017), doi: 10.1016/j.jclepro.2017.01.076.

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

ACCEPTED MANUSCRIPT

Multi-stage farm management optimization under environmental and crop rotation constraints

F. Capitanescu[a,*], A. Marvuglia[a], T. Navarrete Gutiérrez[a], E. Benetto[a]

[a] *Luxembourg Institute of Science and Technology (LIST), Environmental Research and Innovation (ERIN) Department, 41 rue du Brill, L-4422, Belvaux, Luxembourg*

Abstract

This paper presents a novel multi-stage optimization model for farm management during a certain planning time horizon. The salient features of this optimization model are the proper incorporation of crop rotation schemes and the consideration of crop impacts on the environment via linear environmental constraints. This decision support tool produces an optimal crop rotation plan (i.e. which crop to cultivate each year and their area) which maximizes farmer' profit while satisfying specified environmental constraints and crop rotation schemes requirements. The optimization model is formulated as a mixed-integer linear programming (MILP) problem for which sound and powerful solvers exist. The paper thoroughly investigates the impact of various types of environmental constraints, which aim at maintaining the environmental impacts of farm activities below specified levels either *overall*, i.e. over the entire planning horizon, or *tight*, i.e. after each crop rotation. The environmental constraints are derived by adopting a Life Cycle Assessment (LCA) approach. The proposed approach is illustrated, without

*Corresponding author
Email address: florin.capitanescu@list.lu (F. Capitanescu)

Download English Version:

https://daneshyari.com/en/article/5481471

Download Persian Version:

https://daneshyari.com/article/5481471

Daneshyari.com