

M.Sc. Integrated Natural Resource Management
Module "Ecosystems of Agricultural Landscapes and – Sustainable Land Use:
Livestock Systems"
Winter Semester 2016/17

Prof. Dr. H.J .Schwartz

05 Livestock Environment Interactions: Lecture Review

05-1 Introduction

- The global land use problem
- How to measure the wealth of nations
- The footprint concept: Ecological , carbon and water footprints
- The concept of energy efficiency in livestock production

05-2 The ecological footprint

- Footprint definitions , bio-capacity and footprint accounting
- Population growth and food production
- Expanding livestock industries
- Biophysical limits to growth
- Global carrying capacity
- Global lifestyle, human development and poverty

05-3 The carbon footprint

- Global warming and suspected causes
- Contribution of livestock systems to global warming
- Animal performance and impact intensity
- Potential controls to emissions from livestock systems

05-4 The water footprint

- Global water cycle
- Importance of water to livestock
- The concept of virtual water and water use efficiency
- Impacts of livestock water use on the environment
- Example: Water footprint of beef production
- Approaches to improving water use efficiency in livestock production

05-5 Functional biodiversity in natural and agricultural eco-systems

- Diversity of species, genes and habitats
- The effects of modern livestock farming on eco-systems

Study questions

1. What are the four main types of ecosystem services?
2. What does the "Club of Rome" do?
3. Who was Garrett Hardin, and what are "lifeboat ethics"?

4. What is the 2nd law of thermodynamics all about? Is it relevant to tropical agriculture ?
5. What is meant by “carrying capacity”. Is there such a thing as human carrying capacity?
6. What is your (family’s) “ecological footprint” on the planet?
7. What is meant by “strong sustainability”?
8. What is meant by “overshoot” in an ecological context?
9. Livestock production and greenhouse gases - intensive vs. extensive systems.
10. The conflict between maximising productivity and sustainable resource use in livestock production
11. How does the “greenhouse effect” work?
12. Name some of the greenhouse gases, and explain the processes by which they are released.
13. How are the effects of global warming affecting the different eco-climatic zones on the globe?
14. Give an outline of the ecological CO₂-cycle.
15. Categorise measures to reduce agricultural gas emissions.
16. Livestock production and greenhouse gases - intensive vs. extensive systems.
17. What are the components of water use by livestock?
18. What are the dimensions of global fresh water stress?
19. Water is a renewable resource. Formulate the most important rule for its prudent use.