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Extract Resource Balancing
from
Open Footprint Puzzle Process

A holistic approach to collect, compare and combine footprint information

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Presentation

This paper is based on the PowerPoint presentation for the conference with the same title. Most of the slides are embedded in this document. They can be opened by click in the electronic Version. On the last page you can find links to download actual versions of this paper, presentation and background information.

Version

This is an extract of version 1.0 of the entire document

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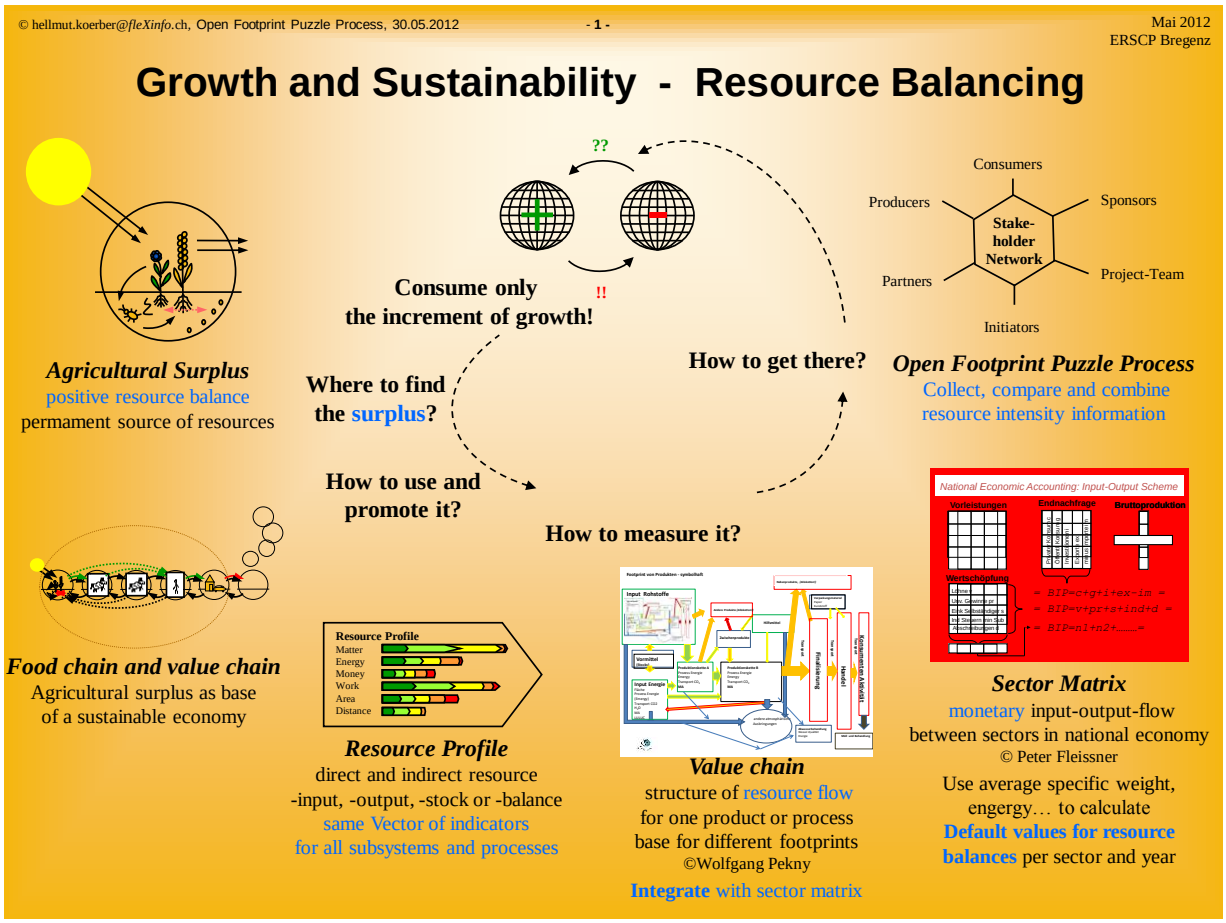
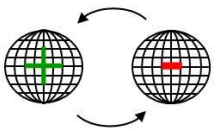
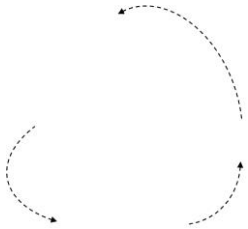
1 Growth and Sustainability - Resource Balancing



Slide 2 Growth and Sustainability - Resource Balancing



The Global Challenge



Essential Questions

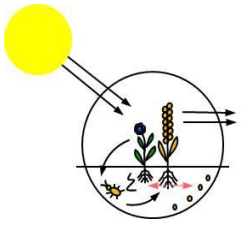
Evolution is a **big growing process**. Live in all its biotic, social and ecological forms generated a huge amount of living, fossil and mineral resources. The global problem is that the consumption of resources *grows* much faster than their regeneration: overconsumption or **overshoot**.

How can we get back to **a positive resource balance** as it happened for the most time in evolution?

The simple solution is to **consume only the increment of growth** (sustainability as it was initially defined in forestry).

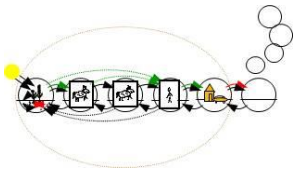
We may only achieve this goal by finding and promoting subsystems with a positive resource balance. These **surplus-systems** produce what may be consumed by the other subsystems. We have to look for these surplus-systems regarding *all* important resources. To fail in only one essential resource, would mean to risk the goal.

The question "*How to measure it?"* leads to the area of footprinting or eco-accounting and to the question of how a better understanding and measuring of resource flow may contribute to a future-proof earth with positive resource balance.



Plant-Soil-Surplus-System

Background_Agro_HvK.ppt



Food- and Value-Chain in Nature and Economy

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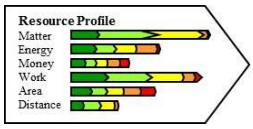
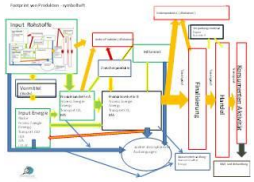


Resource Profile



Structured Value Chain

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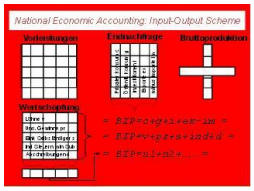
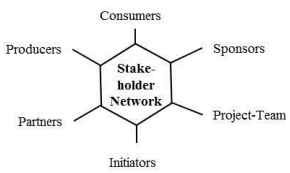


Input-Output-Matrix
in national economy



Stakeholder Network

There are very interesting approaches with the goal of **agricultural surplus-systems**. Same as in evolution plants assimilate solar energy by photosynthesis building biomass from air, water and soil. Plants (together with their soil) can feed, defend and reproduce themself. At the same time they feed and stimulate microorganisms to fix nitrogen from the air and to actively mobilize nutrient minerals from the soil. An external input is not necessary.

Parts of the plants go back to soil for recycling. Another part may leave the system as surplus for feed or food.

Avoiding losses - by erosion, greenhouse gas emission and polluting the water with nutrients - results in a surplus of energy, carbon, nitrogen and biomass in soil and plants. The **surplus** may be extracted without damage for the **plant-soil-system**. The extraction may even exceed the surplus if the reintegration of organic residues in the processes succeeds with minimal new losses.

The surplus of plant-soil-systems is the basis of the **food chain** in ecology and of the **value chain** in economy. See link for details.

Herbivore animals (2) consume the surplus of plants (1), carnivore (3) animals the surplus of herbivores. Humans (4) consume the surplus of plants, herbivores and carnivores.

As humans may produce more than they consume a surplus product is build. Culture and civilization (real economy, 5) comes up accumulating products, knowledge, productive and financial capital. This is the evolution of society.

In time of overshoot real economy seems to grow because of unpaid resource use and damages. Financial market (6) seems to grow faster than the real economy because of the well-known bubbles.

The resource flow is measured with a **resource profile**, a vector of indicators such as matter, energy, area, distance, work, money. **Resource-Profiles** are used in the same way for all subsystems to indicate input, output, stock and balance of the resource flow.

The structure of the value chain is shown in a slide by Wolfgang Pekny (Footprint Austria). He uses a set of 40 sectors of economy with their specific relations and footprints.

The footprint of a company or a product can be calculated by analyzing the resource flow for the company/product and accounting the inputs and outputs with the default values of their respective sectors. These default values may be refined for important inputs or outputs.

Todo: Peknys 40 sectors have to be integrated with the sectors of national economy:

The structure of the value chain is also described by input-output-matrices (Leontieff). National economy uses i-o-matrices to describe the monetary flow between the different sectors (e.g. 47 for Austria) and to calculate the BNP. They are already in use to describe resource flows, too.

Todo: Using average specific factors for weight, energy, land requirements e.g. **default values for resource profiles** have be calculated per sector, year and product unit. This seems to be already done by hybrid-LCA (hint of a participant).

The over-all-task can't be completed in a single project. Even a very big project could not deal with all the different aspects, data, methods, tools, ways of implementation and the lack of information.

In an **open network process** footprint information from different sources is collected, translated, compared and combined.

Stakeholders with different roles contribute to this process.

6 Network Process - Summary

To **integrate footprint-information** from different sources and to facilitate footprints for a wide range of regions and processes, a **network process** is proposed. This process is characterized by

- **A Common basic model** defined for transparent and extendable description of footprint information in a common terminology.
- **A Common Coordinate System** for regions, periods, sectors, processes, products, units and indicators.
- **Resource-Profiles** for all subsystems with vector of indicators (such as matter, energy, area, distance, work, money…).
- **Interfaces** to existing footprinting methods and tools and economic data from BNP.
- **Background models** with default resource-profiles for regions, sectors and time periods. Thus footprinting may concentrate to the system in the foreground changing background values only when necessary.
- **Generic Tools** to support the integration process and dynamic analysis.
- In an **open network process** footprint information from different sources is collected, translated, compared and combined. At this the content stays unchanged and may be presented in **common and original terminology**. To avoid double counting and lacks a **consistent selection** of this data is created and used as the **base for calculations**.
- **Workshops** to instruct network members, how to integrate small or big puzzle pieces into a footprint data collection.
- **Common servers** accessible via WEB for sharing the same consistent environment of data and tools.
- The development may **start** with existing methods, tools and data, adding **step by step** new puzzle pieces or bundling several steps into one project.
- The aim is a **Wikipedia like information collection process** for footprinting data – open, transparent, comfortable and highly consistent.
- Zip-file with this document **www.flexinfo.ch/Footprinting/Demo/OpenFootprintPuzzleProcess_Paper_HvK.zip**
- Zip-file with the presentation **www.flexinfo.ch/Footprinting/Demo/OpenFootprintPuzzleProcess_Demo_HvK.zip**
- Zip-file with presentation, document and background **www.flexinfo.ch/Footprinting/Demo/OpenFootprintPuzzleProcess_HvK.zip**