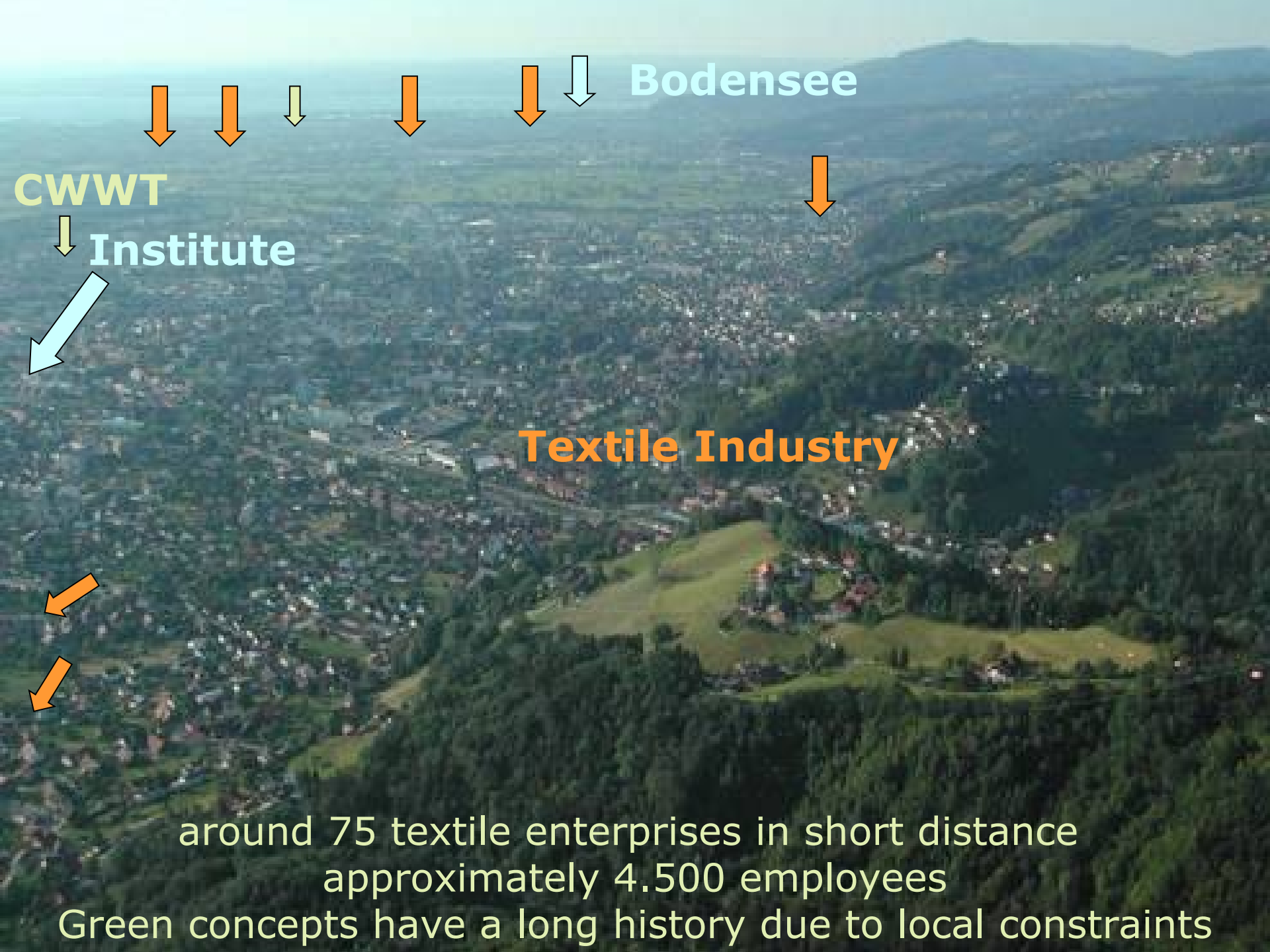


## **Natural dyes in textile dyeing – New interpretation of an old concept**

Mahmud-Ali A., Fitz-Binder C., Bechtold T.

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Bodensee

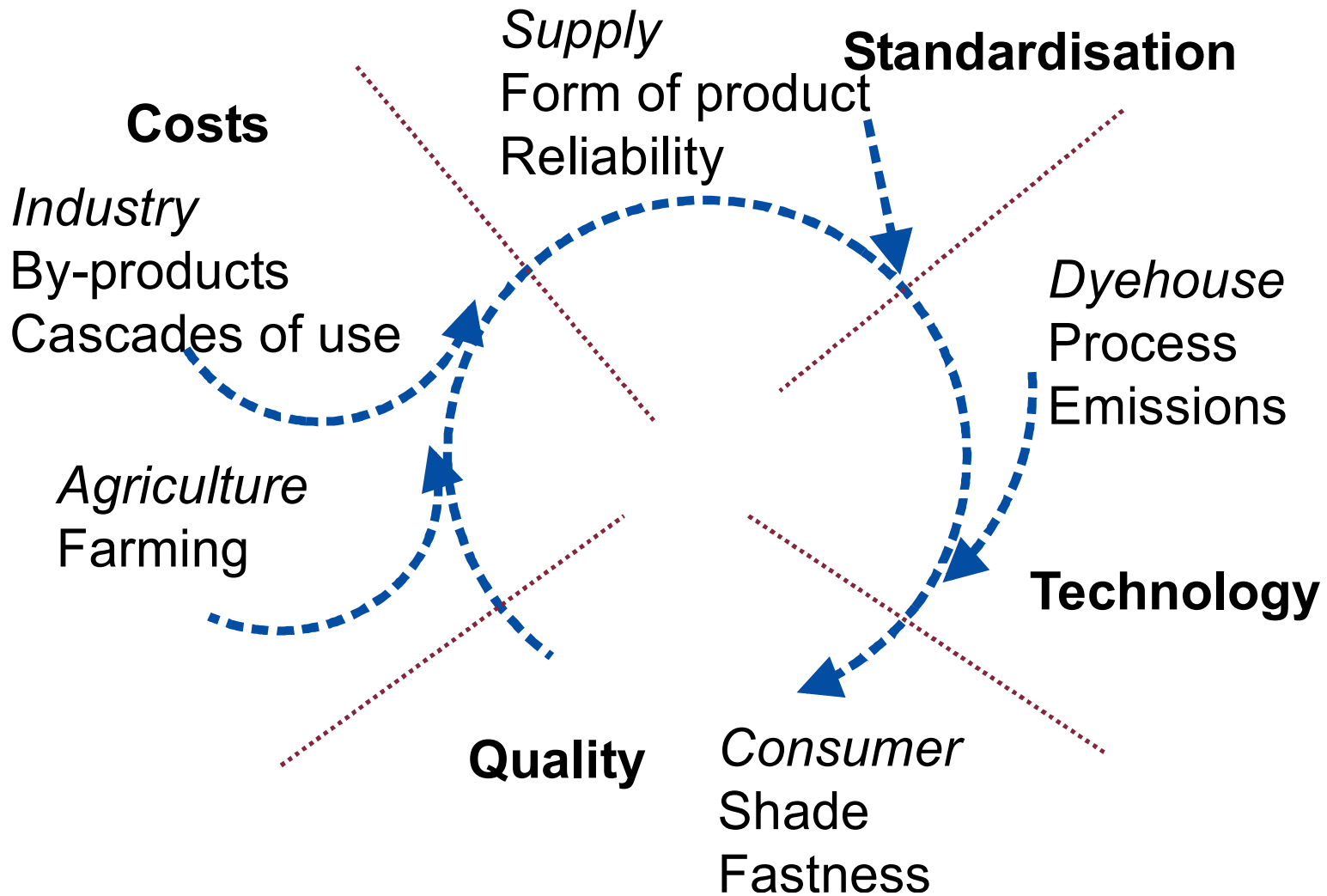
CWWT

Institute

Textile Industry

around 75 textile enterprises in short distance  
approximately 4.500 employees

Green concepts have a long history due to local constraints



## Farming

1. Simple farming procedures (standard equipment, easy accessible sources e.g. forestry, food industry)
2. Low consumption of energy, fertiliser, chemicals, during farming, handling, transport and storage

20 aspects to  
be considered,  
..at least



Agricultural production of dye plants result in high costs,  
Examples are: madder, weld, indigo

Screening for cheap sources:

- **direct farming** for selected important plants (expensive)
- use of **by-products** form agricultural activities e.g. bark form timber industry (cheap)
- use of high quality **wastes** released form food and beverage industry e.g. pressed berries, tea, onion peels (very cheap)

As a result a group of dyestuff sources is formed which offers improved ecological profile at lowered costs!

Harvesting Onion 110.000 t/a

Drying, storage

Preparation for packing

Removal of roots, dirt, stem

Removal of loose peels by vacuum

**Onion peel**



### **Dyestuff preparation**

3. Easy handling of plant matter
4. High dyestuff content in plant material
5. Standardised raw products
6. Optimised balances (energy, water / solvents, wastes) in dyestuff extraction
7. Database describing properties of the plants, products, dyes and dyed goods
8. Information about toxicological properties
9. Formation of a supplier organisation collecting the materials and providing dyehouses with standardised qualities

Design a product: (copy a dyestuff manufacturer)

Dyehouses need a commercial product in standardised form.  
- need for **standardisation procedures** with simple!  
techniques (colour strength, reproducibility, ..)

Storage: wet, dry, frozen state (consider energy)

Which form of product is preferable?

Extract the natural dye and supply dyehouses with the  
extracts (liquid, solid dyestuff)?

The problem: the content of natural dye in the plant  
material is low.



## Handling



Prototyps:  
Plant material handling  
Textile bag



Prototyps  
Plant material handling  
Paper bag

### **Dyeing processes**

10. Application for a broad range of textile fibres (cellulose, protein, synthetic fibres)
11. Complete colour gamut: yellow, red, blue, black
12. Application in a set of dyes with common application (direct dye, iron-, alum-mordant)
13. Acceptable level of fastness properties: light fastness, wet fastness, wash fastness
14. Robust design of dyeing processes
15. Application of existing equipment with minimal modification
16. Optimised consumption of energy, water, chemicals



Dyestuff products – Natural pigments – A „new-old“ solution



Continuous pad  
batch dyeing process  
of linen fabric

(JM Fussenegger,  
Vieböck, Newtex, B.  
Reichl)

## Use - Consumer expectations

17. Added value products, clear definition of advantages and environmental aspects
18. Serious argumentation of sustainability and chemical and energy balances
19. Sustainability at reasonable price and with acceptable quality level

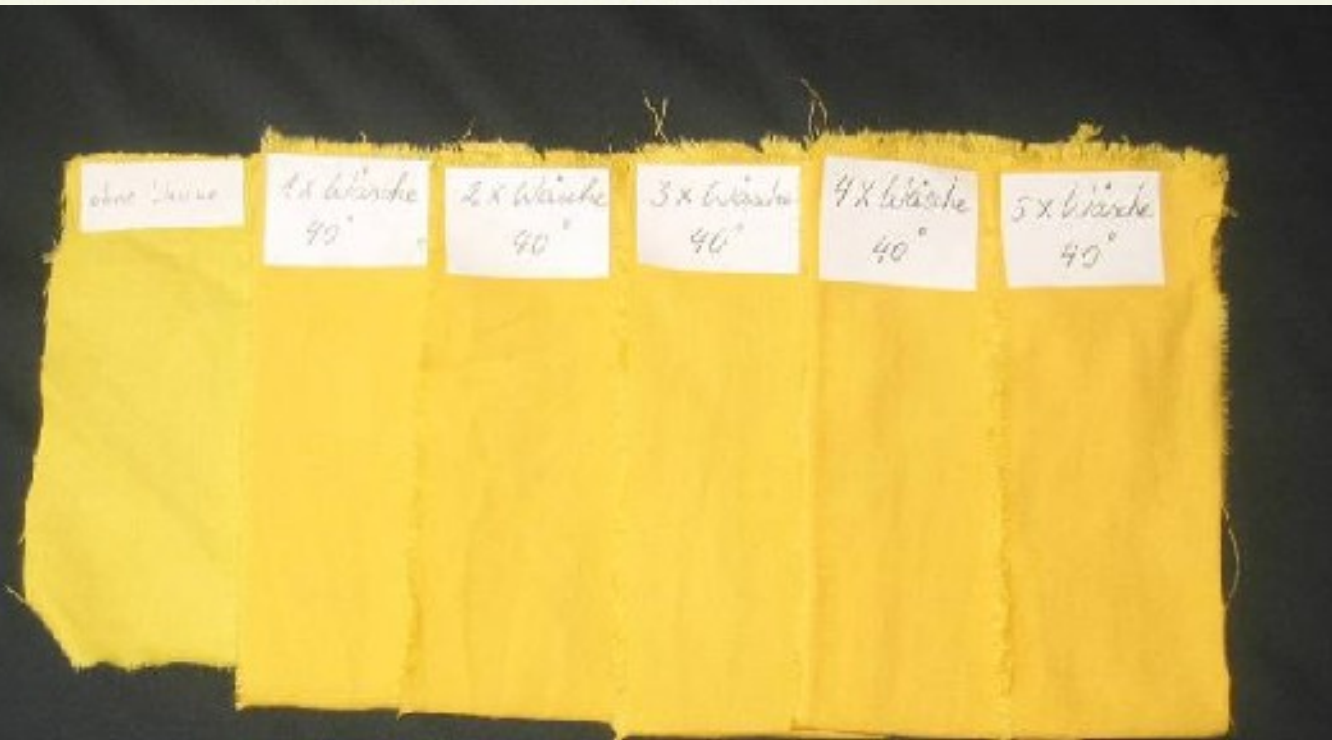


Onions



Privet berries

Polyamide filament  
dyed with natural dyes  
(Onion peel, Privet  
berries)



40°C  
Detergent type?

Definition of an adequate quality conception





Introduction of Natural dyes requires:

- formation of a mixed structure of sources
- introduction of „technical“ procedures
- careful consideration of resources and balances
- introduction of an appropriate quality level
- serious argumentation and qualified marketing

Many thanks your for your attention

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