

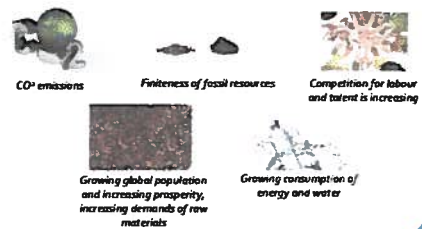


WHAT IS A LIVING LAB?

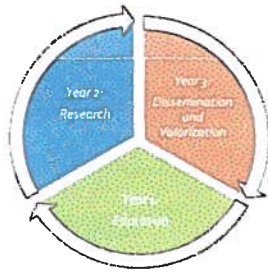
- *Bilateral collaboration between higher education institutions, governments and enterprises*
- *Specific knowledge industry*
- *Real-life research challenges*
- *Stimulates innovation by enabling and developing competencies of people*
- *Sustainable contribution to innovation*



COOPERATION IS NEEDED BECAUSE...



EDUCATION, RESEARCH AND INNOVATION



COOPERATION BETWEEN MINAS GERAIS AND BIOBASED DELTA (NOORD-BRABANT AND ZEELAND)

- *Bilateral collaboration between (South) Netherlands and Minas Gerais*
- *Biobased Chemistry, Economy and Society*
- *Initiative by Higher Education*
- *Collaboration with Triple-Helix partners (Universities, Enterprises and Government)*
- *Sustainable contribution to innovation*



WHAT IS AN BIOBASED ECONOMY OR CIRCULAR ECONOMY?

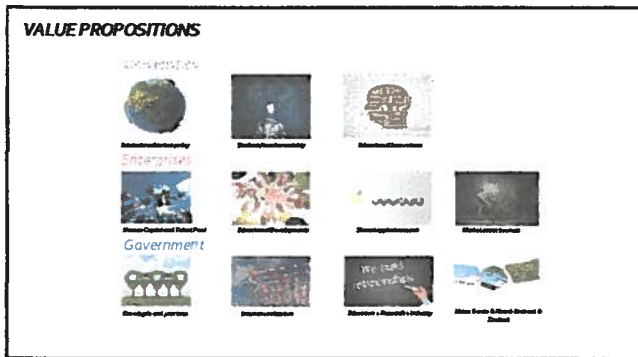
"The Biobased Economy is based on production paradigms that rely on biological processes and, as with natural ecosystems, use natural inputs, expend minimum amounts of energy and do not produce waste as all materials discarded by one process are inputs for another process and are reused in the ecosystem."





(FOUNDING) PARTNERS



** Have not definitively committed themselves in contribution to the Living Lab Biobased Brazil but initial consultations with them are promising.*



- EDUCATION**
- *Internationalization of Higher Education*
 - *Triple-Helix*
 - *Education and Business*
 - *Practices based experience for undergraduate students*
 - *Human capital*
 - *Massive Online Open Course (MOOC)*
- 

- RESEARCH**
- *Associate Professorship Biobased Energy*
 - *Associate Professorship Biobased Products*
 - *Associate Professorship Biobased Product Development*
 - *Associate Professorship Water Technology*
 - *Associate Professorship Sustainable Business*
 - *Applied research*
- 

INNOVATION

- *Developments costs of new products and services are lower*
- *Risks are shared*
- *Time-to-market is reduced*
- *Insight in human capital*
- *Access to a (global) network within the Biobased Economy*
- *Access to educational developments*



WHAT DO WE MEAN WITH (GRADUATING) INTERNSHIP?

- *Undergraduate students*
- *BioBased Tech, Chemistry or Chemical Engineering student*
- *Economics, Environmental Science student*
- *20 weeks of unpaid work at a company/university or institution*
- *Student learns from practice experience*
- *Student have a company related research assignment*
- *Student is paired with a Brazilian student from UFMG, PUCMINAS or UFV*



JOIN WITHIN THE LIVING LAB ON THE FIELDS OF

 EDUCATION
 RESEARCH
 INNOVATION

**WORKING TOGETHER
FOR SUSTAINABLE
WORLD**



BIOBASED ENERGY

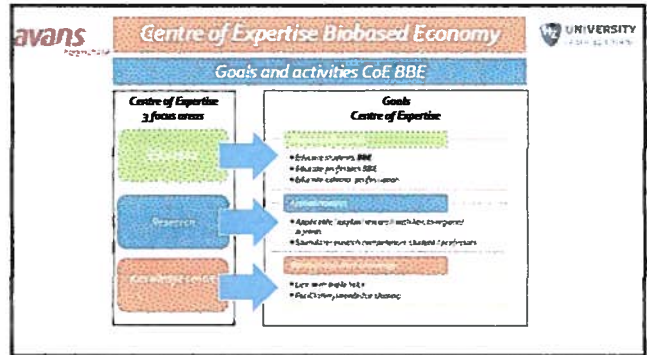
*Ing. Johan Raay, Associate Professor Biobased Energy,
Avans University of Applied Science*

avans
hogeschool



SPECIALISATIONS AVANS UNIVERSITY OF APPLIED SCIENCES

- Environmental consultancy
- Sustainable energy
- Forensic laboratory research
- Forensic chemical science
- Forensic DNA science
- Medical Research
- Medical Diagnostics
- Bio-Informatics
- Test animal practice
- Sustainable technology
- Biotechnology
- Analytical chemistry
- Organic & Polymer Chemistry
- Biopolymers

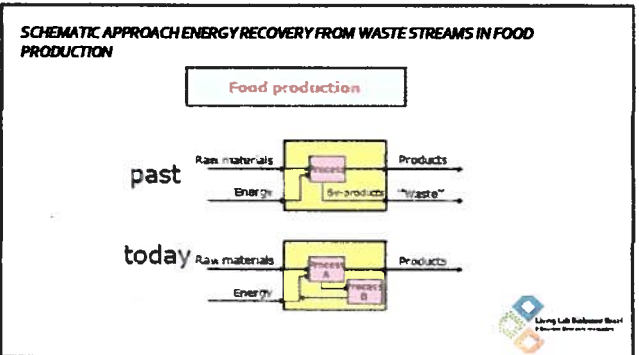
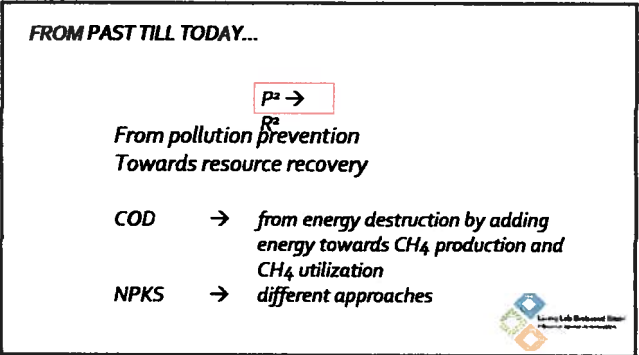
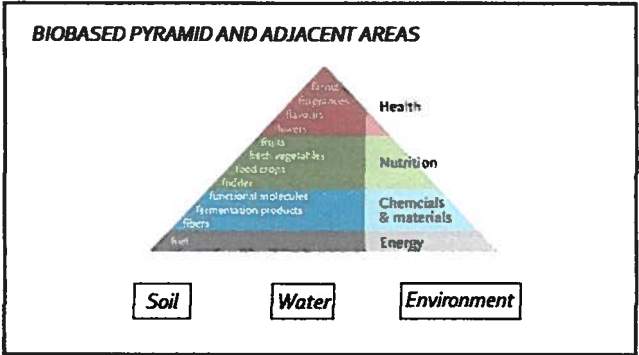
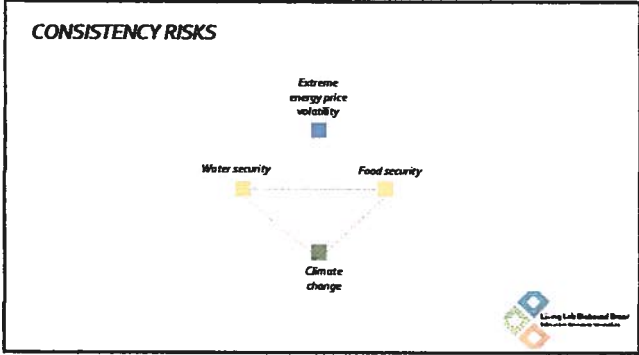


"Fossil fuels are depleting. Moreover, they have an impact on the environment. An economy that is largely based on fossil fuels is not sustainable."

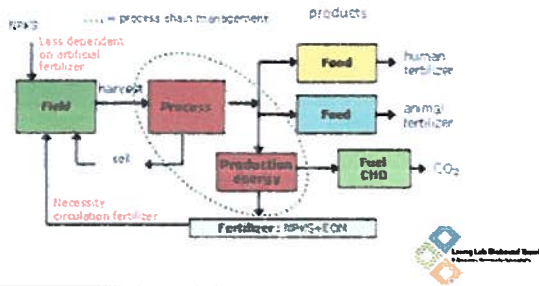


WORLD ECONOMIC FORUM AND THE WATER-FOOD-ENERGY NEXUS

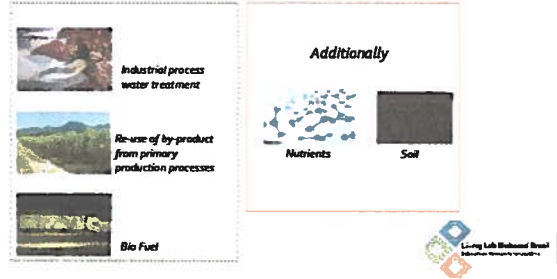




PREVENT LOSS OF VALUABLE NUTRIENTS



WHAT DO WE MEAN BY ASSOCIATE PROFESSORSHIP BIOBASED ENERGY



PROJECT WITHIN ASSOCIATE PROFESSORSHIP BIOBASED ENERGY

(1) Refining and use of duckweed purifying water

- Saving to outside and from 100% to 100%
- From linear to circular

(2) CO₂ and CH₄ as carries for regional development

- Total biogas 2000,000 EUR, but 100,000 EUR for 100,000 t CO₂ (2003-05 FBR 2004)

(3) Soil under the Biobased Economy

(4) Biobased Container Units

- Wood system - nutrients from field

(5) Pyrolysis

(6) Enzymes for increased biogas production



*"Coming together is a beginning,
staying together is progress,
and working together is success"*

Henry Ford

