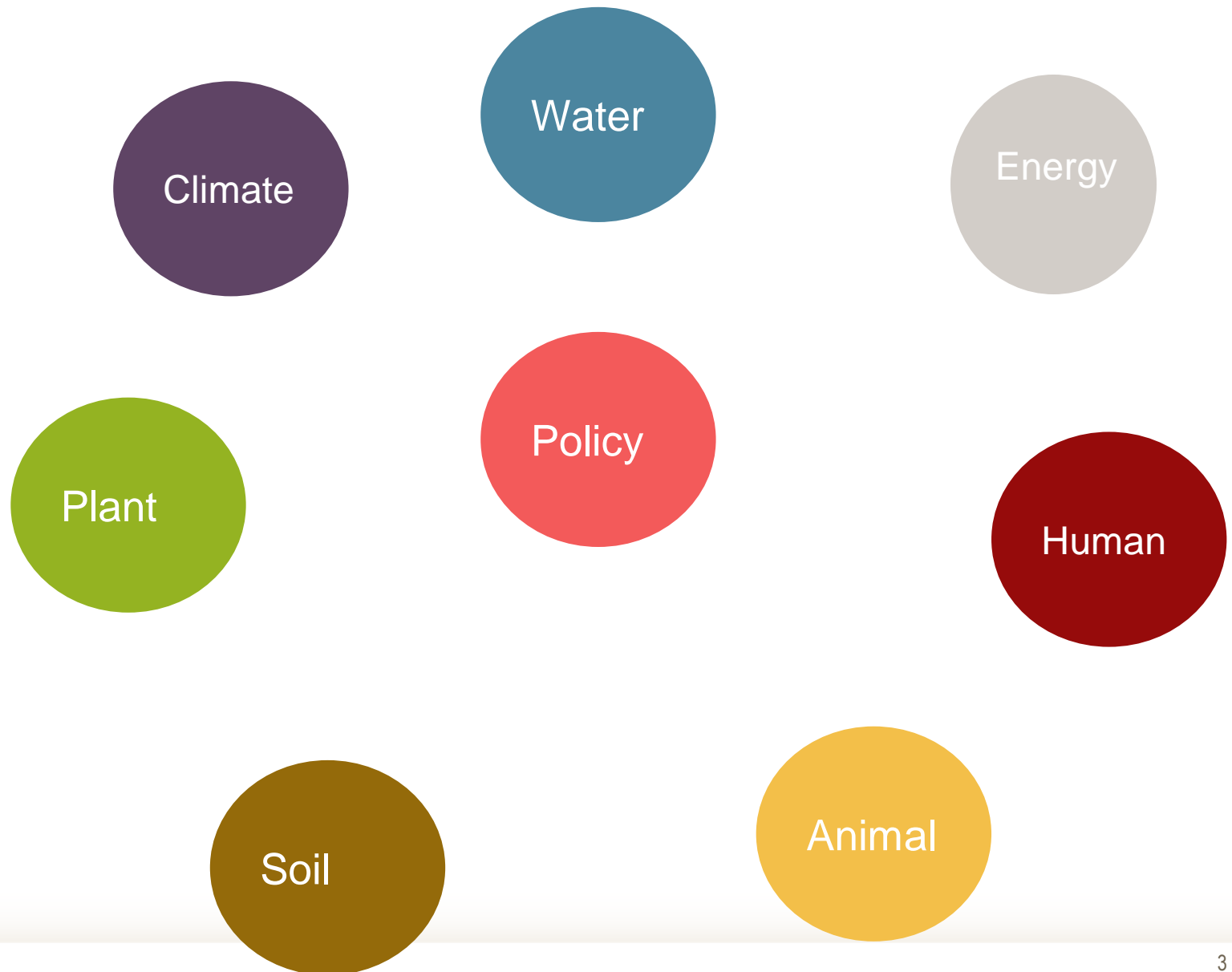


# Elements of Sustainable Agriculture

For Sustainable Food systems

# Main factors that affect farming activities



- **Integrated and diversified production**
- **Crops, trees, animals**
- **Closed system/ few losses**
- **Low human resource efficiency**
- **Short value chains**



Source:

L'école de Grignon (Seine-et-Oise) : le verger. - Cl. Albert Justin



- **Specialized production less diversified**
- **Strong inputs dependency (fertilizer, improved varieties , pesticides, mechanisation)**
- **Open system with strong exportation**
- **Strong work efficiency**
- **Long global value chain**

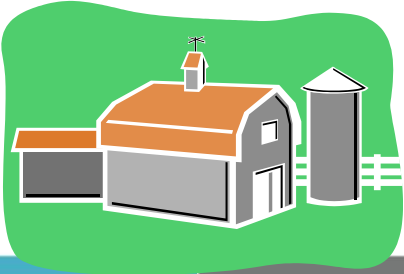




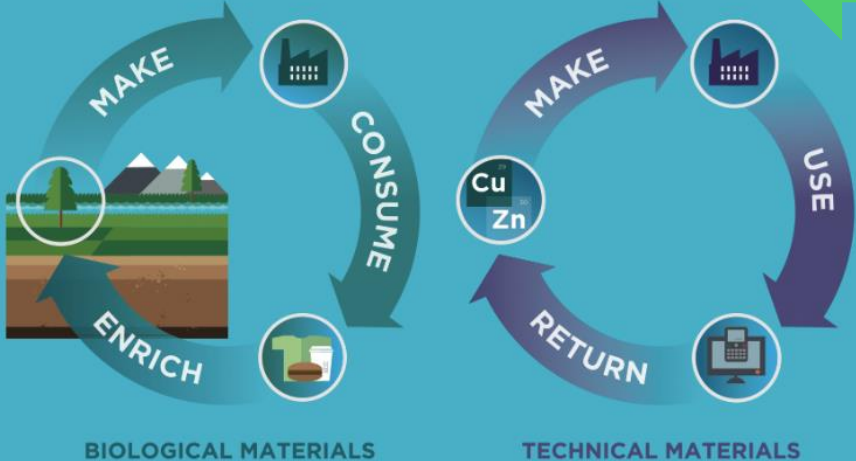
# Animal husbandry in ASEAN Countries



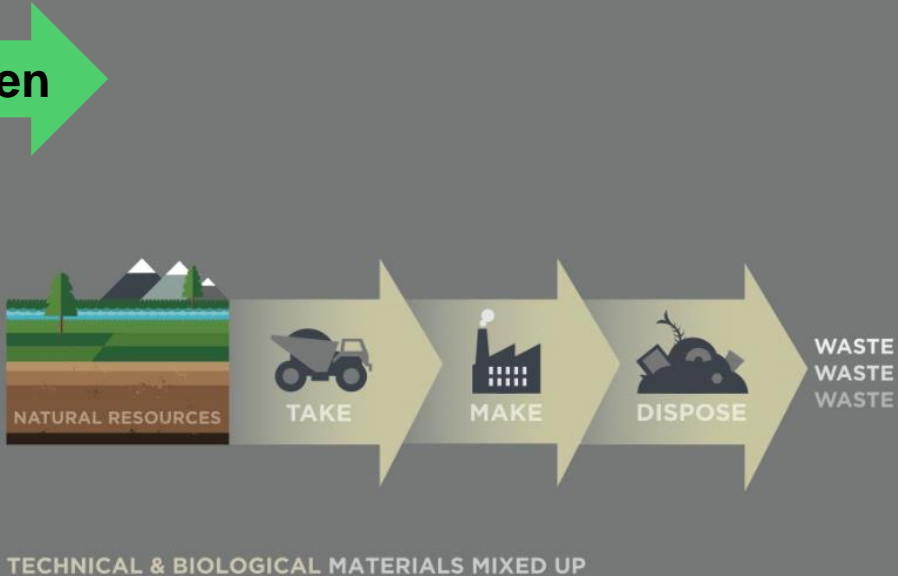
# Economic Models in Agriculture:



## CIRCULAR ECONOMY



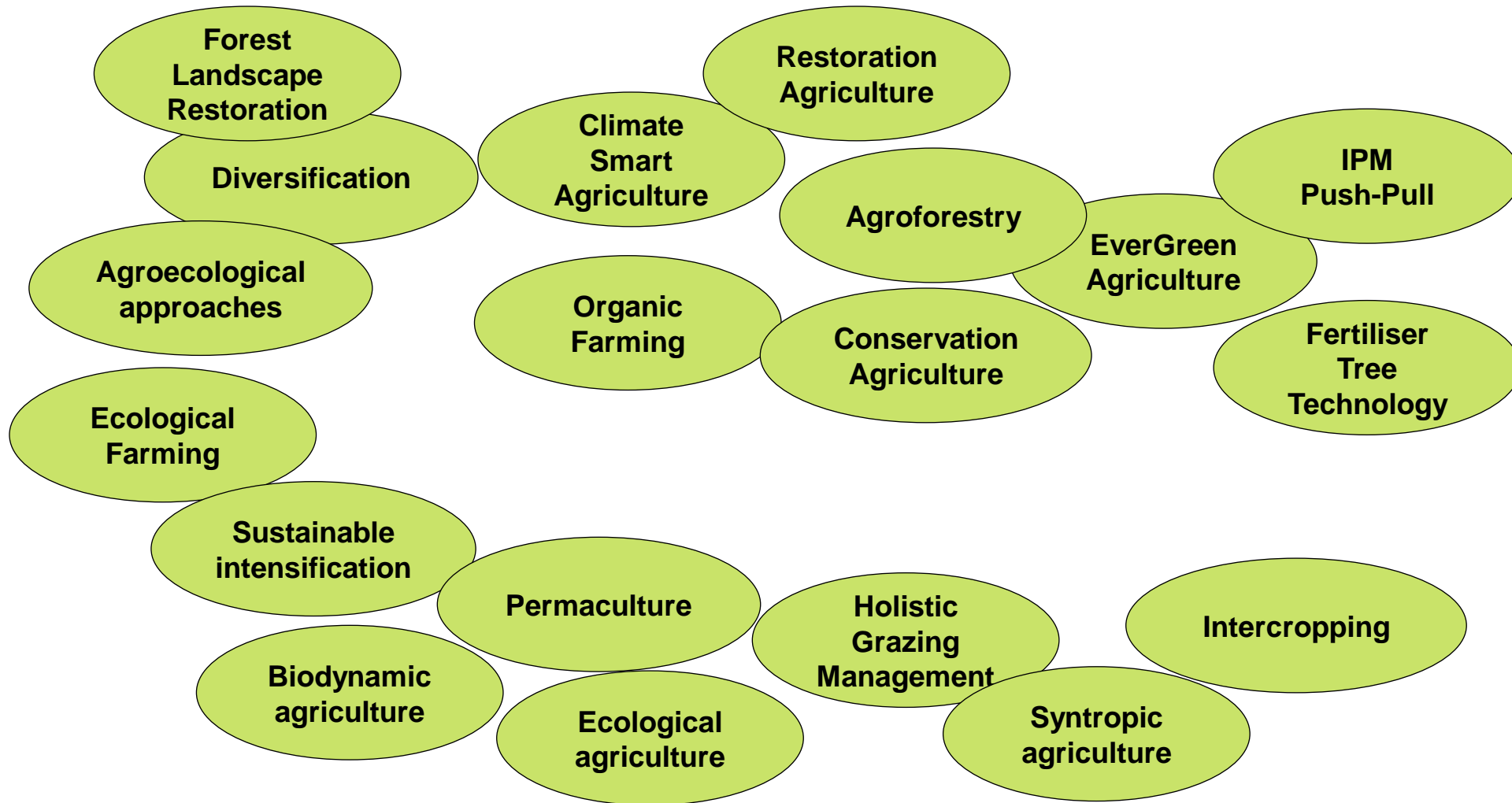
## LINEAR ECONOMY



Source : Fondation Ellen MacArthur. <http://www.ellenmacarthurfoundation.org/education>



# Sustainable agriculture - many terms



# Conservation Agriculture

- crop rotation, covering the soil, agriculture without tillage



-> monoculture, roundup, GMOs?



# Organic Agriculture

-> biodiversity, animal integration, less inputs



tillage, erosion, « fewer » productivity, transport



# Agroforestry



**complexity, difficulties for mechanisation**



# LANDSCAPE APPROACH

- passage from farm to landscape scale
- Take into account the different ecosystems and their services
- Smart utilisation of ensemble





# But what exactly is sustainable agriculture?



Source: <http://ecx.images-amazon.com/images/I/31ewGX52qqL.jpg>

Source: <http://www.fao.org/docrep/u8480e/u8480e01.htm>





# Two selected definitions on sustainable agriculture

FAO in 1988 has defined sustainable agricultural development as

“the management and conservation of the natural resource base, and the orientation of technological change in such a manner as to ensure the attainment of continued satisfaction of human needs for present and future generations. Sustainable agriculture conserves land, water, and plant and animal genetic resources, and is environmentally non-degrading, technically appropriate, economically viable and socially acceptable”



# Two selected definitions on sustainable agriculture

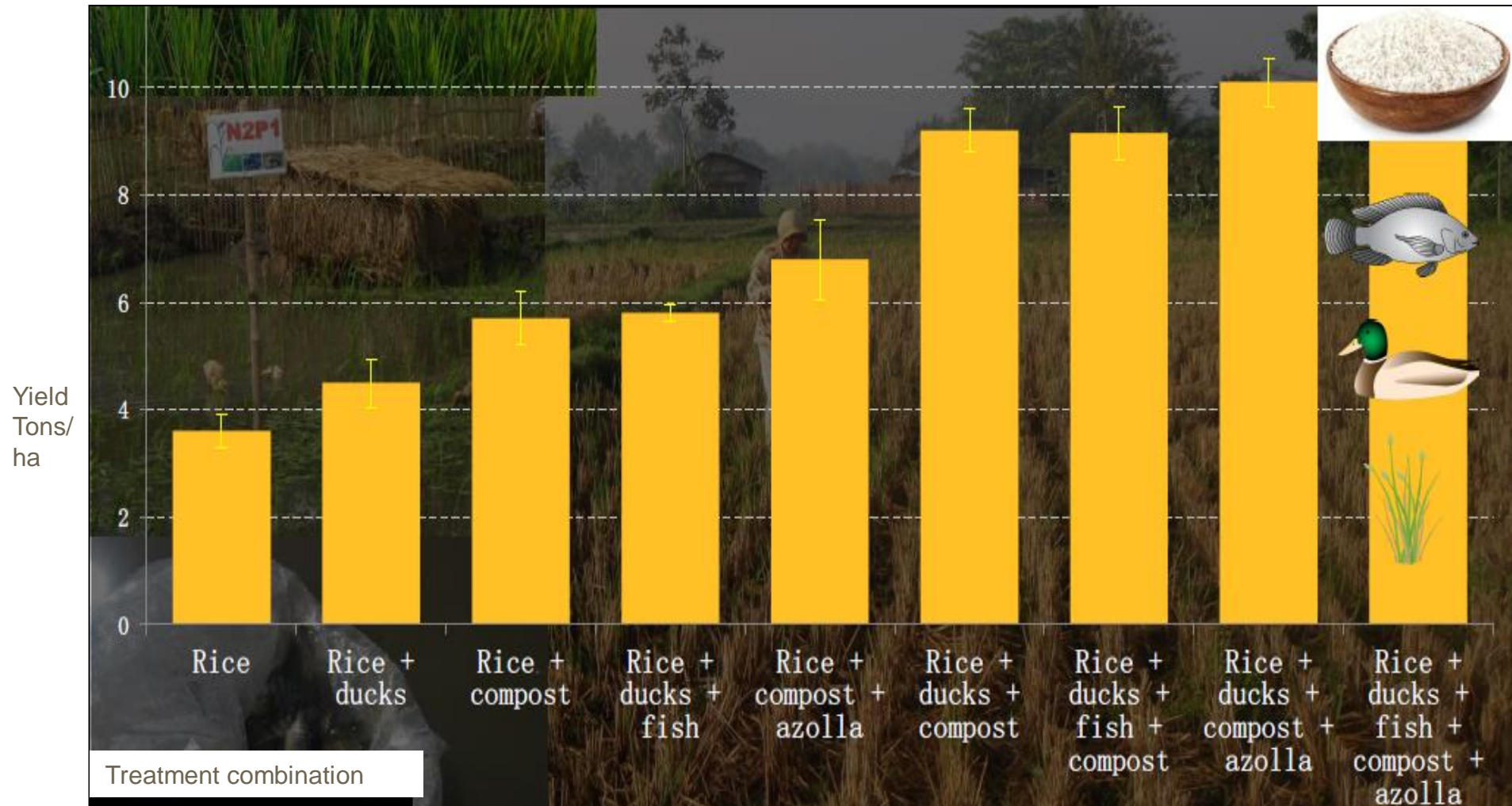
“Sustainable agriculture is an integrated system of plant and animal production practices (...) that will, over the long term:

- satisfy human food and fiber needs
- enhance environmental quality (...)
- sustain the economic viability of farm operations
- and enhance the quality of life for farming families and society as a whole.”

(Western Sustainable Agriculture Research & Education: <http://www.westernsare.org/About-Us/What-is-Sustainable-Agriculture>)



# Complex-adaptive rice systems: more rice results from more treatment combinations



Sources : Khumairoh et al., 2012 and Organic 3.0 Pablo Titonelli

# Sloping Agricultural Land Technology (SALT)

A sustainable farming options for the uplands



*“Treat the earth well.  
It was not given to you  
by your parents. It was  
lent to you by your  
children”*

Kenyan proverb:



**Mindanao Baptist Rural Life Center Foundation, Inc.**

Kinuskusan, Bansalan, Davao Del Sur, Philippines

Website: <http://www2.mozcom.com/~mbrlc> E mail: [mbrlc@mozcom.com](mailto:mbrlc@mozcom.com)

Phone:



**20% Forestry to include trees and hedgerows**

**40% Cash crops**

**40% Livestock (Goats & Forages)**



# Different legumes and forage species as animal feed in Bansalan, Davao del sur



**Calliandra (white flower)  
annil**

***Calliandra tetragona*  
20-21% CP**



**Flemengia and Napier**

***Flemengia Congesta*  
18-20% CP**



**Indigofera**

**20-21% CP**



## What is sustainable agriculture?

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Broschure of the GIZ  
sectoral project  
Sustainable  
Agriculture





# **The role of government, academia and private sector – How to support sustainable agricultural development?**

Creating an environment that supports the long term adoption of sustainable farming practices and that values the true costs and benefits of production:

- **Policy**
- **Commands, prohibitions, guidelines, directives**
- **Taxes, subsidies**
- **Payments for environmental services**
- **Education & extension**
- **Infrastructure**
- **Access to finance**
- **Access to resources & land tenure, social inclusion**
- **Research support**
- **.....**



**The term “agro ecology” is used in different contexts and historical perspectives as a:**

Science behind sustainable agriculture

Transition process towards sustainable agriculture

Social movement towards food sovereignty

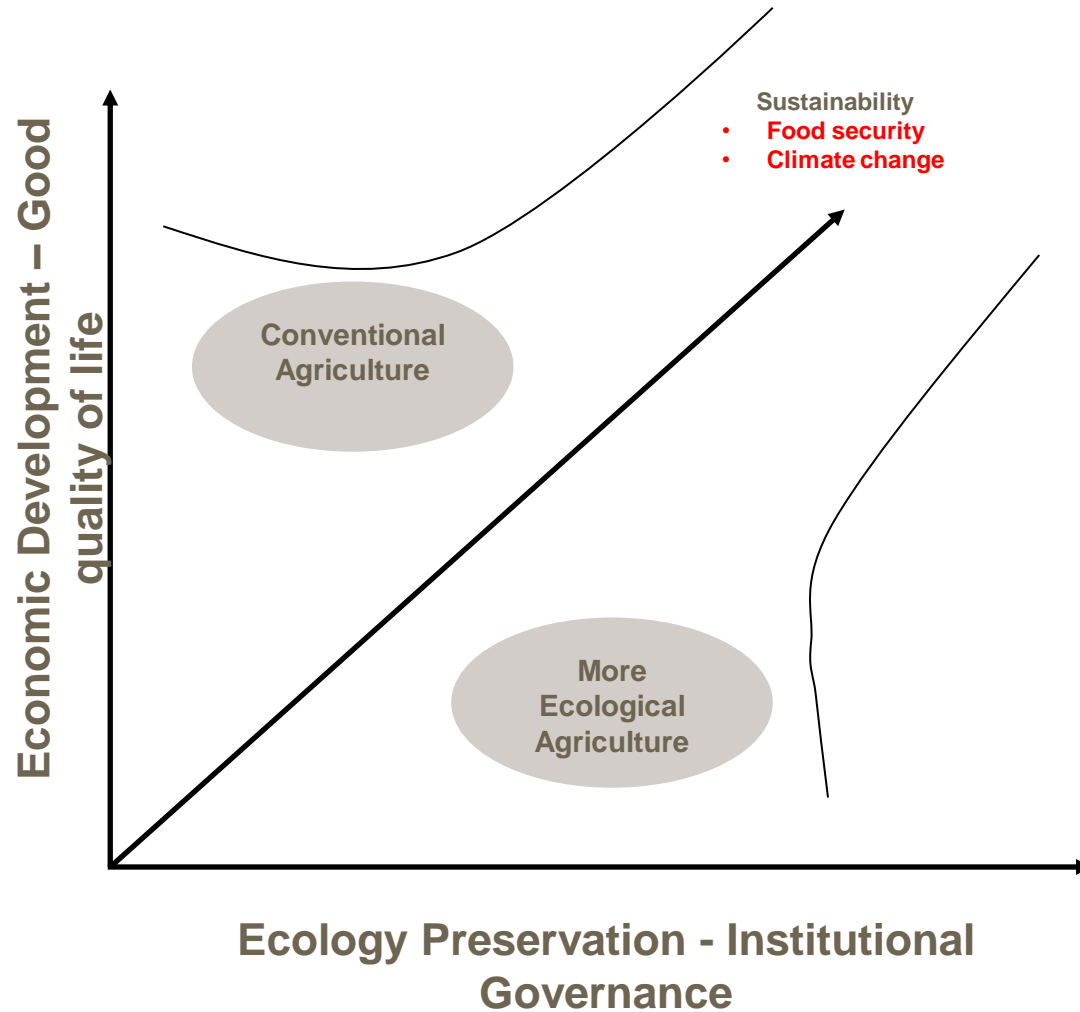




# Agro ecology as a process of transition means:

- Designing and applying a strategy for managing the transition towards sustainability
- Implies a comprehensive diagnosis of sustainability challenges and conditions specific to the given context
- Agroecology farming is knowledge-intensive: participatory experimentation, innovation and extension
- Minimize the use of non renewable inputs that cause harm to the environment and to the health of farmers and consumers
- Does not exclude the use of chemical inputs -> It rather seeks to reduce the use of all off-farm inputs to an absolute minimum

# A transition towards more sustainability

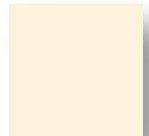




# Take home messages:

## Summarizing Elements of Sustainable Agriculture

- PUTS THE **EMPHASIS ON METHODS AND PROCESSES** THAT IMPROVE SOIL PRODUCTIVITY WHILE MINIMISING HARMFUL EFFECTS ON THE CLIMATE, SOIL, WATER, AIR, BIODIVERSITY AND HUMAN HEALTH
- AIMS AT **MINIMISING THE USE OF INPUTS** FROM NON-RENEWABLE SOURCES AND REPLACING THEM WITH THOSE FROM RENEWABLE RESOURCES
- **FOCUSES ON LOCAL PEOPLE** AND THEIR KNOWLEDGE, SKILLS, SOCIO-CULTURAL VALUES AND INSTITUTIONAL STRUCTURES
- **ENSURES THAT THE BASIC NUTRITIONAL REQUIREMENTS** OF CURRENT AND FUTURE (QUANTITY AND QUALITY)



# Take home messages:

## Summarizing Elements of Sustainable Agriculture

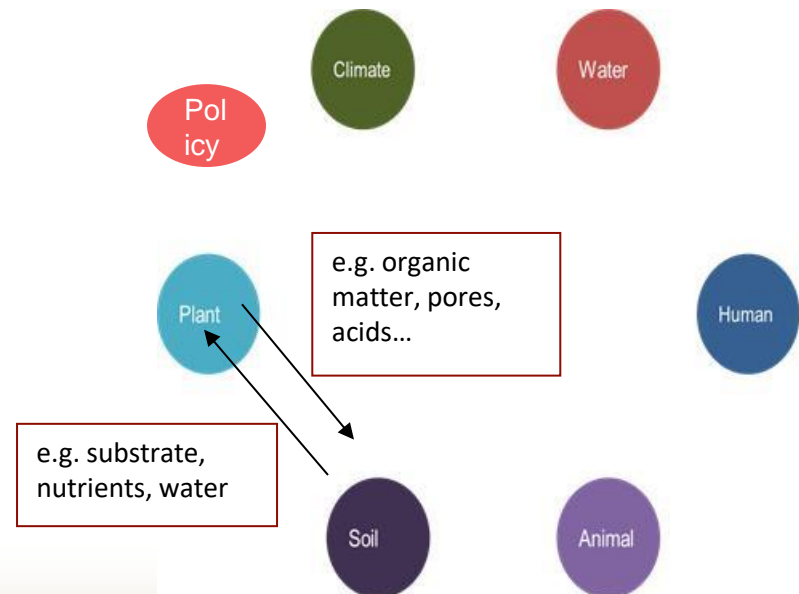
- **PROVIDES LONG-TERM JOBS, ADEQUATE INCOME AND DIGNIFIED AND EQUAL WORKING AND LIVING CONDITIONS FOR EVERYBODY INVOLVED IN AGRICULTURAL VALUE CHAINS**
- **REDUCES THE AGRICULTURAL SECTOR'S VULNERABILITY TO ADVERSE NATURAL CONDITIONS (E. G. CLIMATIC) AND SOCIO-ECONOMIC FACTORS (E.G. STRONG PRICE FLUCTUATIONS) AND TO OTHER RISKS**
- **DISTINGUISH BETWEEN DIFFERENT SEX AND AGE GROUPS**
- **IS KNOWLEDGE INTENSIVE (MORE KNOWLEDGE/HA IS NEEDED)  
KNOWLEDGE IS BETTER TRANSLATED**





## EXERCICE

Find in group work, interactions between plants, animals, soil, water, energy, climate and humans. Present the results in plenum in a graphic form.





## Lessons learned:

- Factor interactions vary in their temporal and spatial dimensions.
- Factor interactions do not only affect the farming system but also have positive or negative effects beyond the farm scale. Especially biotic factors are common goods, that all members of the community benefit from. In an optimal case the farmer should therefore not only consider his own goals but also community interest.
- Factor interactions can be manipulated
- Management influences whether, when, in which direction and how intensive interactions occur





# Lessons learned:

- **Management intensity is key for sustainability**
- Quantity/quality/timing of inputs and extraction of outputs, speed/quality of material turnover
  - takes advantage of positive interactions
  - tries to minimize/overcome negative interactions
  - seeks to identify the optimal intensity level of management in the long run!



# Thank you!

**giz** Deutsche Gesellschaft  
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Zusammenarbeit (GIZ) GmbH

On behalf of



Federal Ministry  
for Economic Cooperation  
and Development





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On behalf of



Federal Ministry  
for Economic Cooperation  
and Development