Connecting the Brazilian agriculture to ecosystem services and Nexus food-water-energy security

Brazilian Agriculture Ministry (MAPA)

Brazilian Agriculture Research Corporation (EMBRAPA)

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The motivation

Immediate need to adopt interventions that can minimize impacts and meet the demand of a growing world.

The proposed solution

To enhance ecosystem services provide from agriculture…

Healthy ecosystems deliver various types of ecosystem services

Agriculture also relies on the delivery of critical regulating services, such as soil formation, erosion control, nutrient cycling and others

Productivity tends to increase the rate of provisioning services to the detriment of regulating services

When regulating and supporting ecosystem services are disrupted, food, water and energy security are seriously affected

+ Food, Water, Energy Security -

Source: the authors
The proposed solution

...thorough agriculture sustainable practices that enhance multifunctionality in the agriculture

The goal of research line

To evaluate the impact of rural practices on Nexus F – W – E security
Conservation Agriculture is a farming system that promotes minimum soil disturbance (i.e. no tillage), maintenance of a permanent soil cover, and diversification of plant species. It enhances biodiversity and natural biological processes above and below the ground surface, which contribute to increased water and nutrient use efficiency and to improved and sustained crop production (FAO, 2017).

And Brazil is promoting this practices!

Integrated crop-livestock-forest (ICLF)

No tillage system

Expansion of no tillage system in Brazil

The case study

**Financed by** Brazilian National Council for Scientific and Technological Development (CNPq) - 441313/2017-5

**Executed by** EMBRAPA

**Duration:** Dec. 2017 – Jun. 2021

- Watershed Guandu in Rio de Janeiro – Brazil;
- Atlantic forest domain;
- Important area for water supply for many cities, including Rio de Janeiro (second biggest city in BR).
The methodological framework

- Bibliographic survey; Data base organization (natural, social and economic aspects of the study area)
- Definition, in a participatory process, the impact of agricultural practices on F – W – E security, considering the landscape attributes and indicators
- Experts workshop (Apr. 2019)
- Generation of LU scenarios
- Decision makers consultation
- Analysis and data consolidation from the 1st Workshop
- To develop a portfolio of best agriculture practices related to F – W – E sustainability, validated in a participatory manner
Main outcomes

- Data base (spatial data; environmental and socio-economic indicators; public policies; bibliographic survey)
- Participatory workshops: experts and decision makers
- Integrated data analysis
- Nexus F – W – E scenarios
- Portfolio of best agriculture practices related to F – W – E sustainability

To offer a framework that connects agriculture practices, ecosystem services and F-W-E Nexus able to support decision making in multiple levels.
Obrigada!
Thank you!
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