

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

Brazilian Agriculture Ministry (MAPA)

Brazilian Agriculture Research Corporation (EMBRAPA)

Presenter: Ana Paula Turetta
Embrapa's researcher

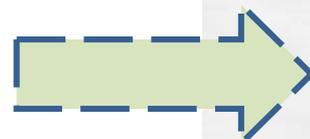
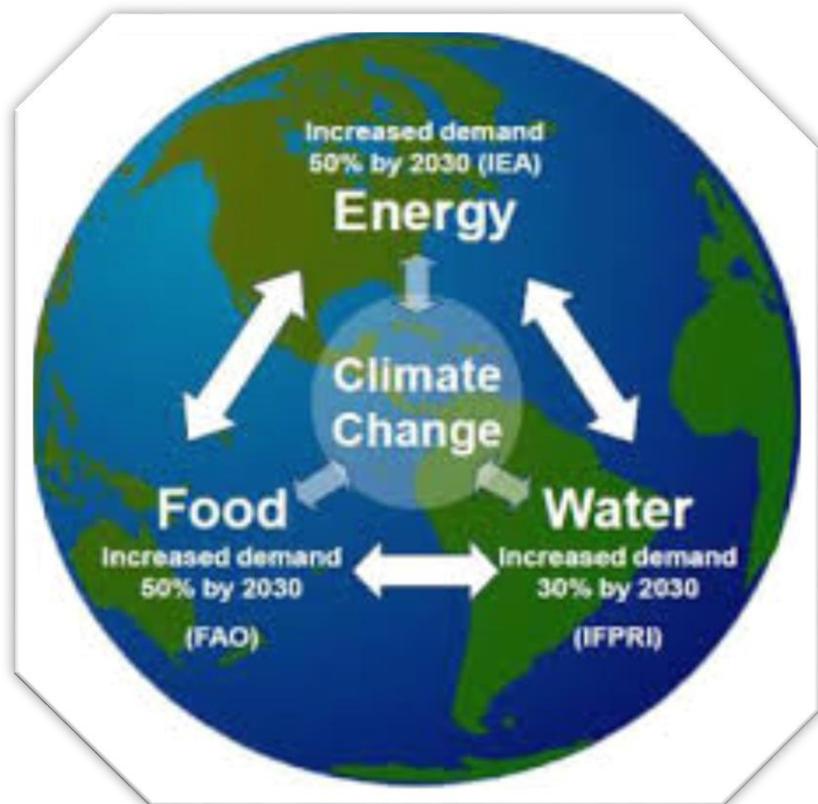


G20 Operations Virtual

August, 31st 2020



□ The motivation



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

<http://waternexussolutions.org/284/the-perfect-storm-scenario-and-nexus-thinking-to-meet-increasing-demand-for-energy-food-water.html>

□ The proposed solution

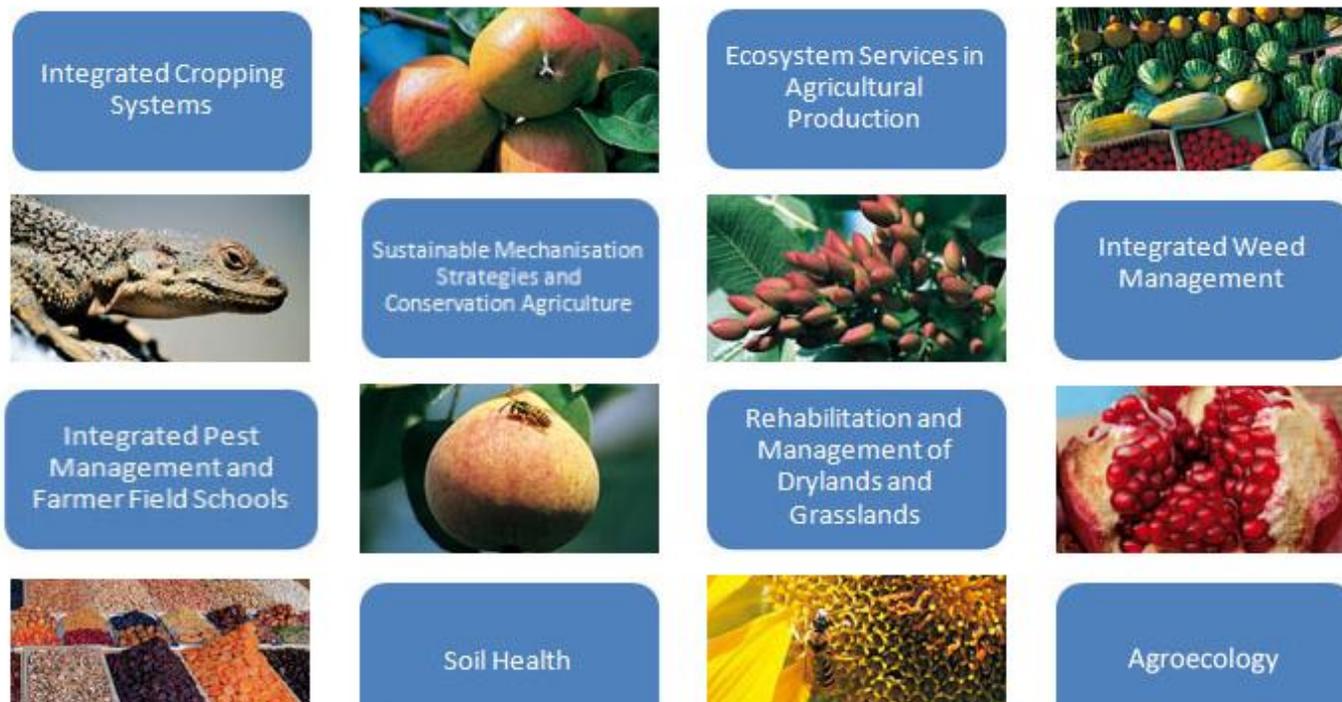
To enhance ecosystem services provide from agriculture...



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).

Conservation Agriculture is based on three main principles adapted to reflect local conditions and needs:

- 

1

Minimum mechanical soil disturbance (i.e. no tillage) through direct seed and/or fertilizer placement. This reduces soil erosion and preserves soil organic matter.
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2

Permanent soil organic cover (at least 30 percent) with crop residues and/or cover crops. Maintaining a protective layer of vegetation on the soil surface suppresses weeds, protects the soil from the impact of extreme weather patterns, help to preserve soil moisture, and avoids compaction of the soil.
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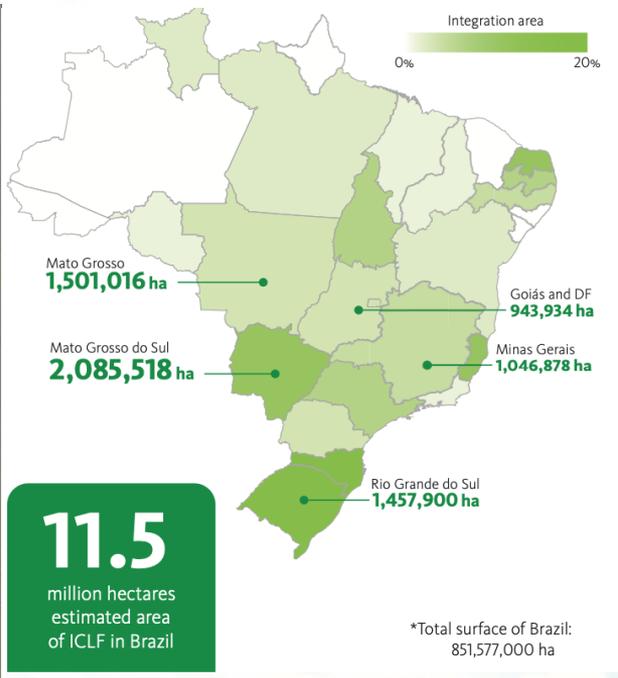
3

Species diversification through varied crop sequences and associations involving at least three different crops. A well-designed crop rotation promotes good soil structure, fosters a diverse range of soil flora and fauna that contributes to nutrient cycling and improved plant nutrition, and helps to prevent pests and diseases.

Source: FAO, 2017.

□ And Brazil is promoting this practices!

✓ Integrated crop-livestock-forest (ICLF)



https://www.redeilpf.org.br/arquivos/folderweb_EN_atual.pdf



✓ No tillage system



Expansion of no tillage system in Brazil



<https://febrapdp.org.br/download/34024evolucao-do-sistema-plantio-dibeto-1972a2018-jpg.jpg>

□ 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)

Analysis and data
consolidation from de 1st
Workshop

Generation of LU scenarios

Decision makers consultation

Analysis and consolidation of
the results of the 2nd
Workshop and final product
preparation



**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

Rio de Janeiro



Obrigada!
Thank you!

EMBRAPA's Ecosystem Services Group

ana.turetta@embrapa.br

rachel.prado@embrapa.br

