Greenhouse gas mitigation in the rice-based Mekong Delta agricultural system

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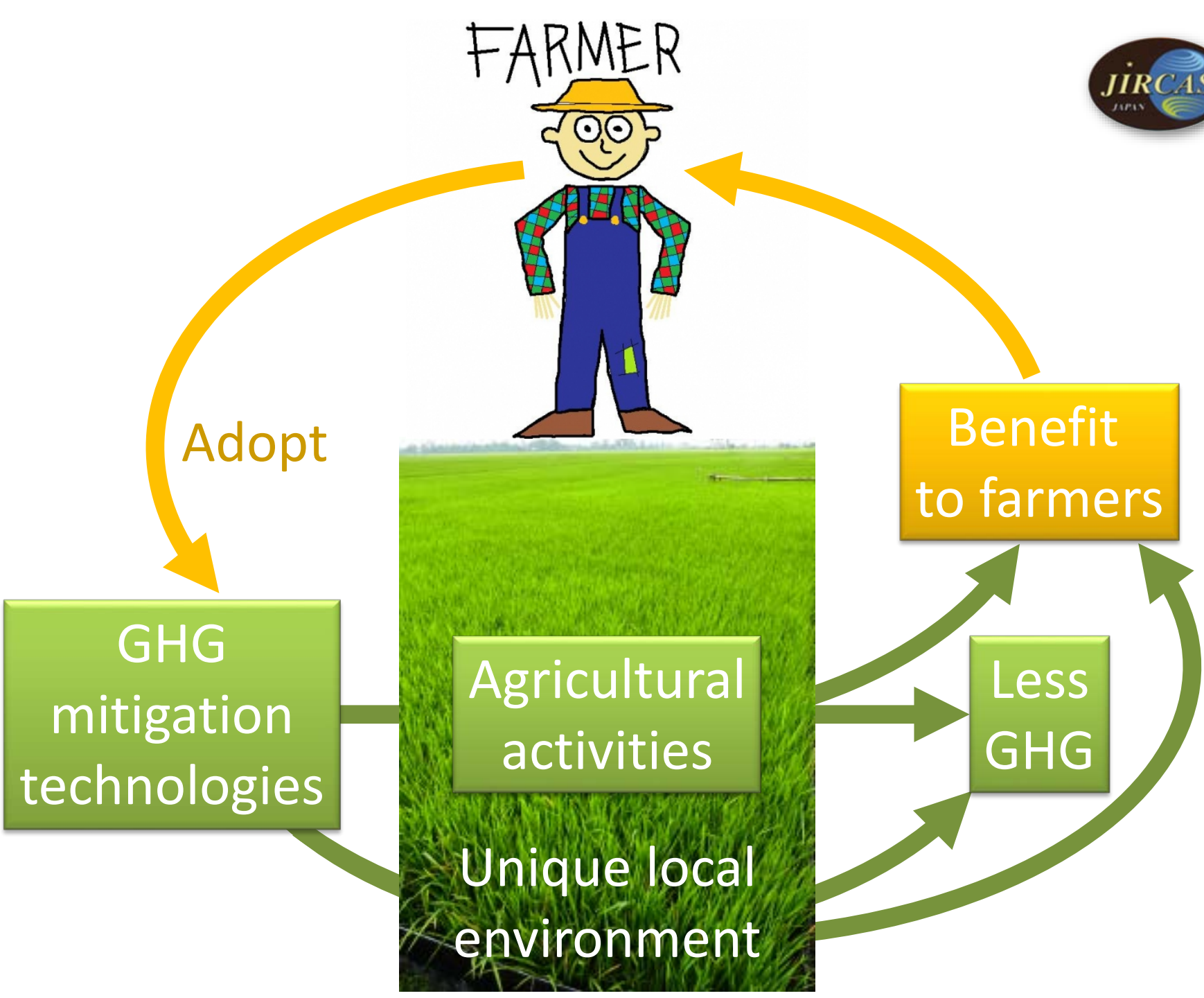

FARMER
Adopt
GHG mitigation technologies
Agricultural activities
Unique local environment
Less GHG
Benefit to farmers

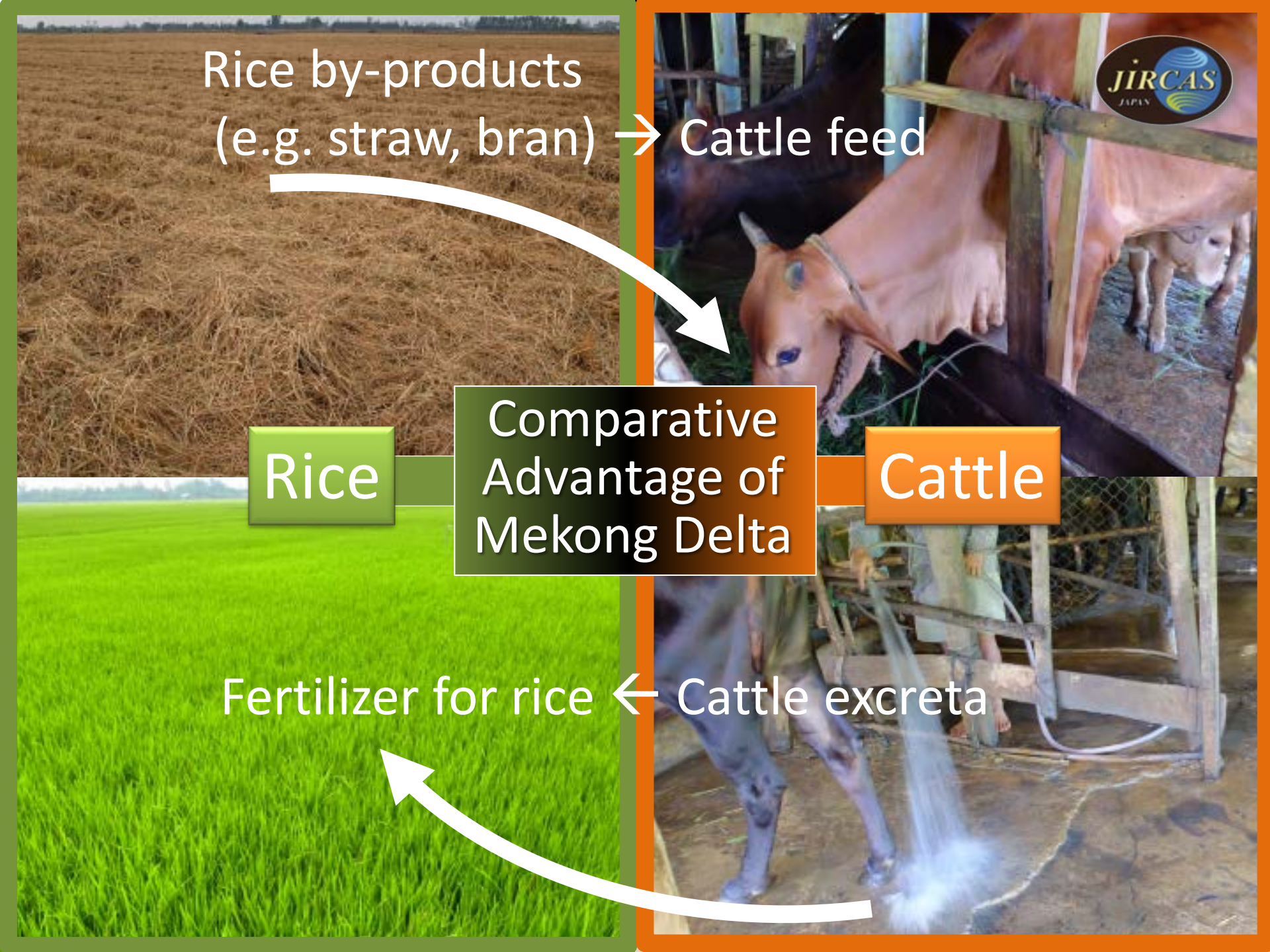
Mekong Delta

11% of the **land**
in Vietnam

57% of **rice** (in 2013)
produced in Vietnam (5th largest rice producing country)

Rice: the major agricultural activity

Livestock: expected to develop rapidly


Rice by-products
(e.g. straw, bran) → Cattle feed
Rice
Comparative Advantage of Mekong Delta
Cattle
Fertilizer for rice ← Cattle excreta

At present

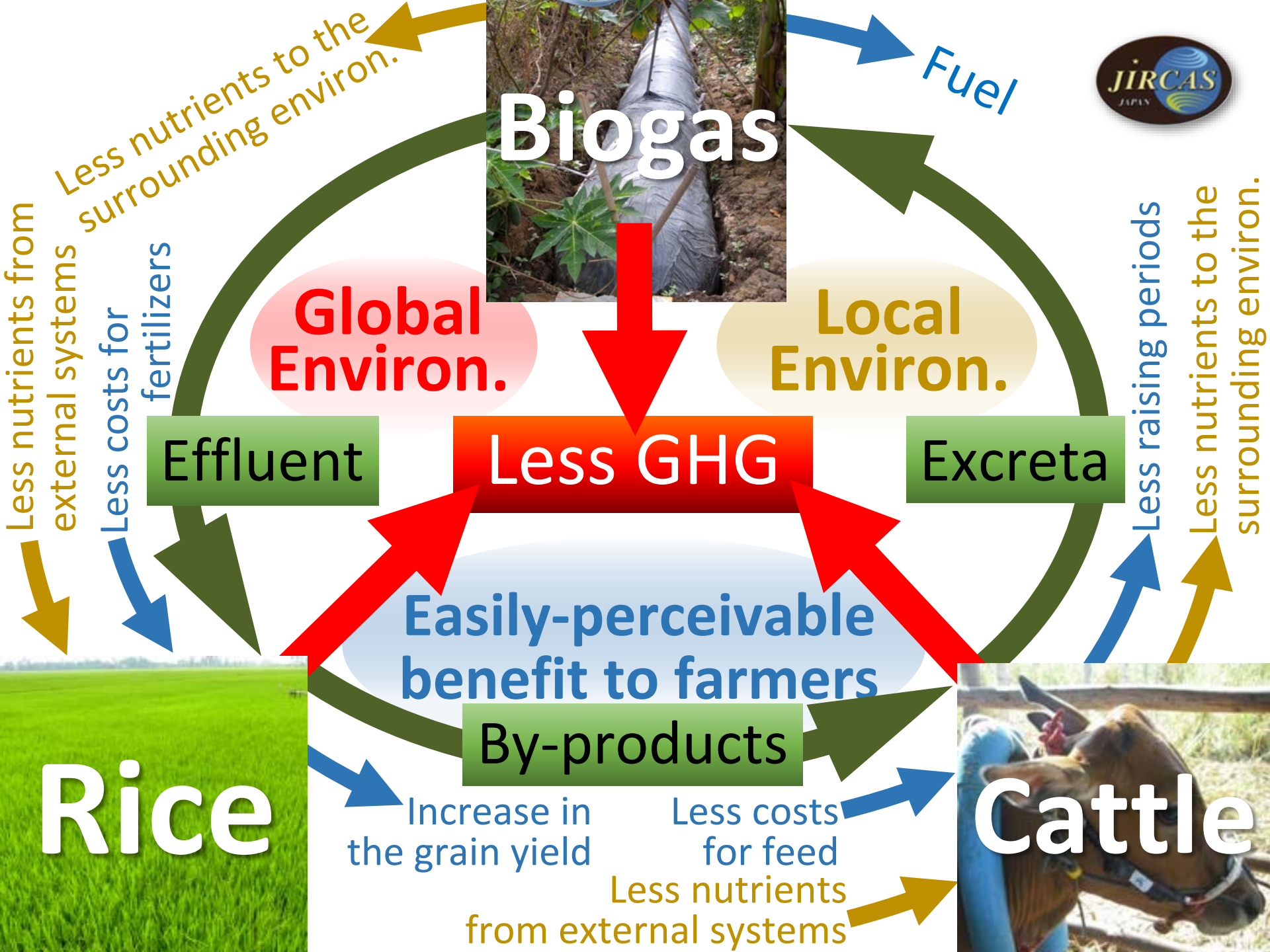
Rice

Not linked

Cattle

Only 20% of rice straw was positively utilized (one of our survey results at a hamlet of Can Tho City (Hon Van et al., 2014)).

At least its liquid waste looks just discharged into the surrounding environment.


Biogas
Fuel
Less nutrients to the surrounding environ.
Less nutrients from external systems
Less costs for fertilizers
Global Environ.
Local Environ.
Less raising periods
Less nutrients to the surrounding environ.
Effluent
Less GHG
Excreta
Easily-perceivable benefit to farmers
By-products
Rice
Cattle
Increase in the grain yield
Less costs for feed
Less nutrients from external systems

Less GHG

Increase in the grain yield, too ?

Less water ← AWD

Cropping calendar

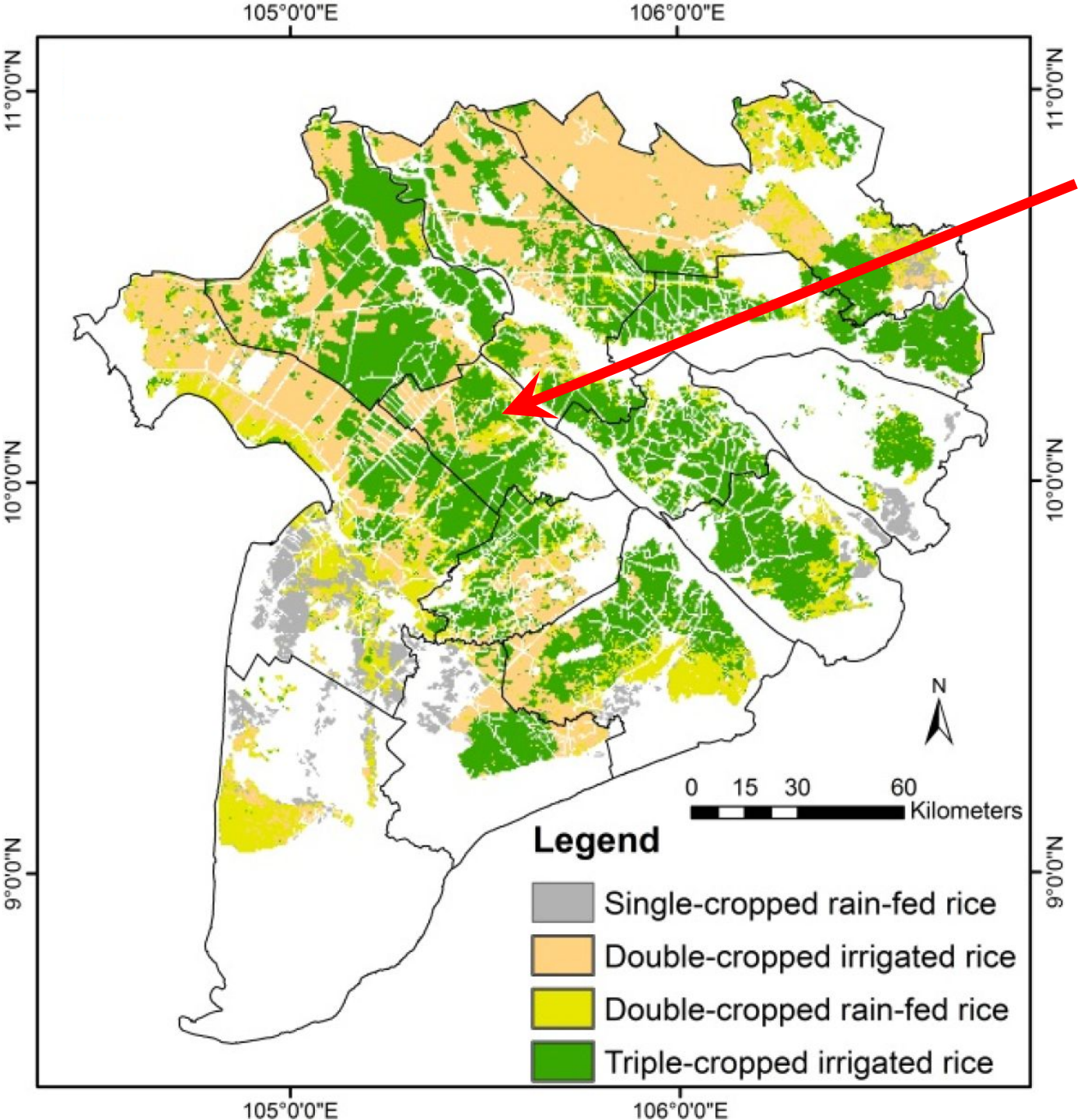
of Tan Loi 2 Hamlet, Can Tho City

Winter-Spring Cropping	Spring-Summer Cropping	Summer-Autumn Cropping	Flooding

Nov. Feb. May. Sep.

Submerged nearly throughout the year.

Less water treatment during cropping seasons may become **good aeration for rice**.

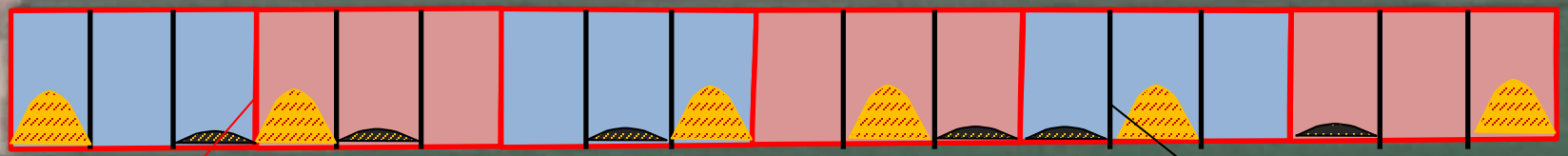


Location at which we conducted a field experiment for over 5 years, a farmer's triple-rice-cropping alluvial paddy, Tan Loi 2 Hamlet, Can Tho City.

Spatial distributions of rice cropping systems in the Vietnamese Mekong Delta in 2012, estimated with remote sensing techniques by Nguyen-Thanh Son, et al. (2014).


JIRCAS
JAPAN
Experimental site
Image © 2017 DigitalGlobe
910 m

Experimental site
433 m^2 x 18 plots



Surrounded by 0.5-mm thick hard PVC sheets
(from 50-cm deep soil to 10-cm above soil surface)

PP-sheet-inserted soil ridges between plots (from 40-cm deep soil to 10-cm above soil surface)

Water treatment

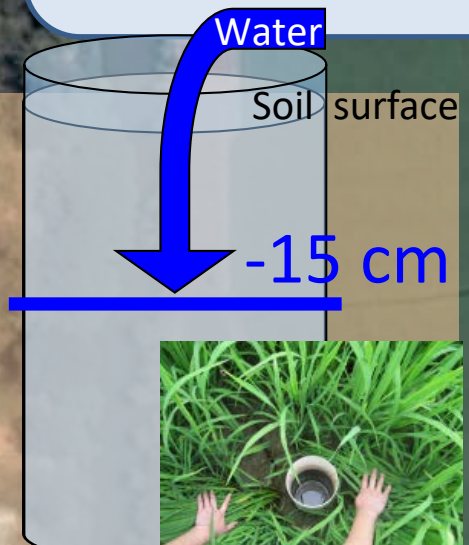
- Continuously flooding
- AWD water saving

X

Rice straw treatment

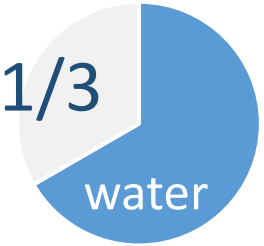
- Rice straw returned
- Rice straw **ash** returned
- No icon — Rice straw taken out

= 6 treatments
(x triplicates)



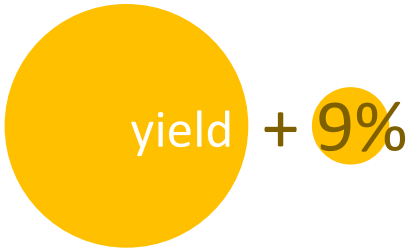
Points of the obtained results

1/3 less irrigation water use

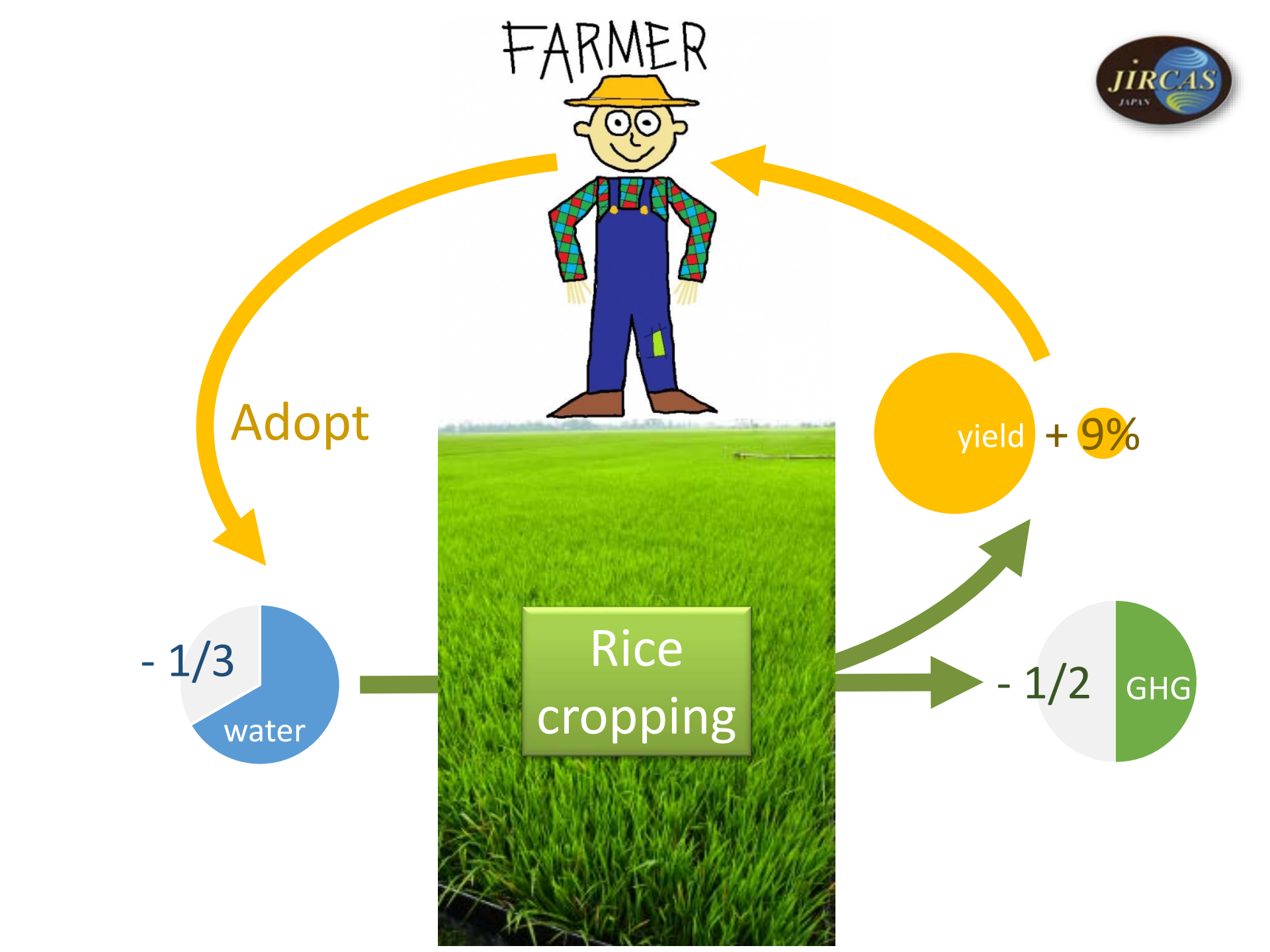


50% less GHG emission

9% higher grain yield



*Despite rice straw treatments


FARMER
Adopt
yield + 9%
- 1/3
water
Rice cropping
- 1/2
GHG

Biogas

Effluent

Less GHG

Excreta

Increase in the grain yield

Rice

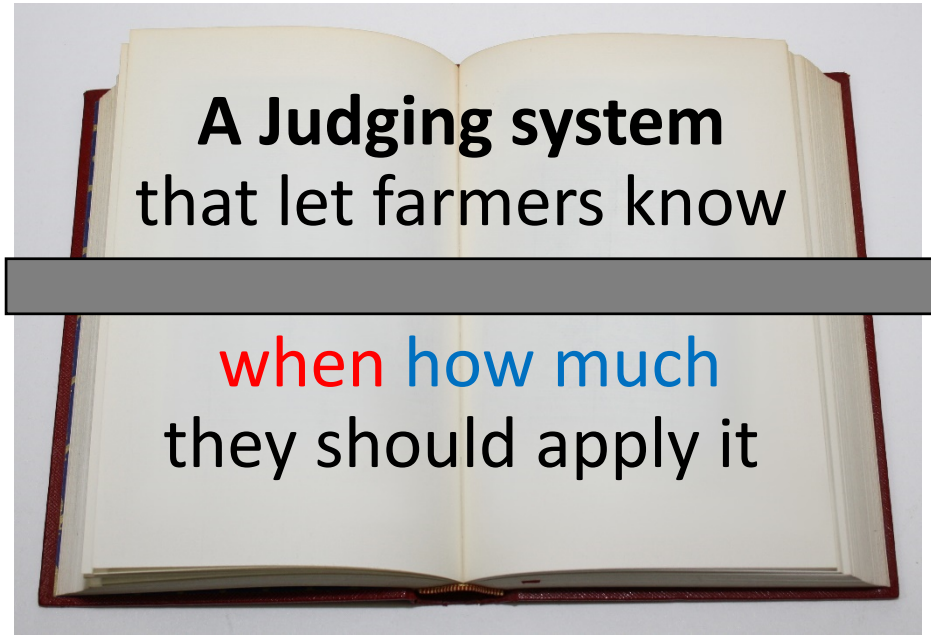
Less water ← AWD

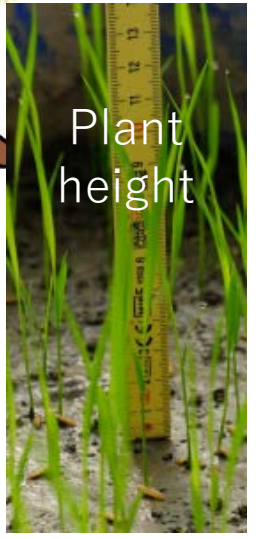
Cattle

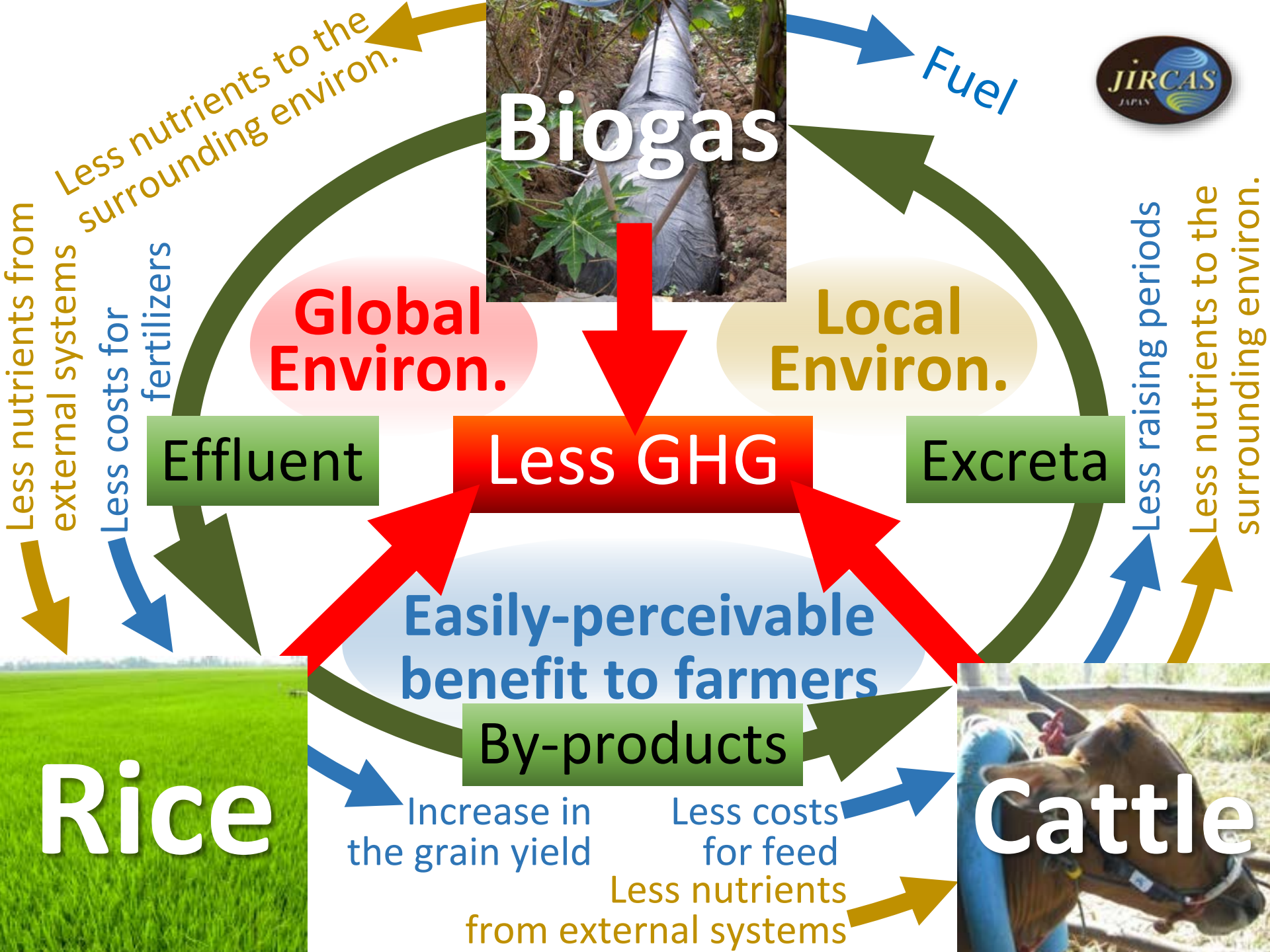
To replace 

with 

?



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