

# Pesticides and impacts on human and environmental health: limitations of science and regulation

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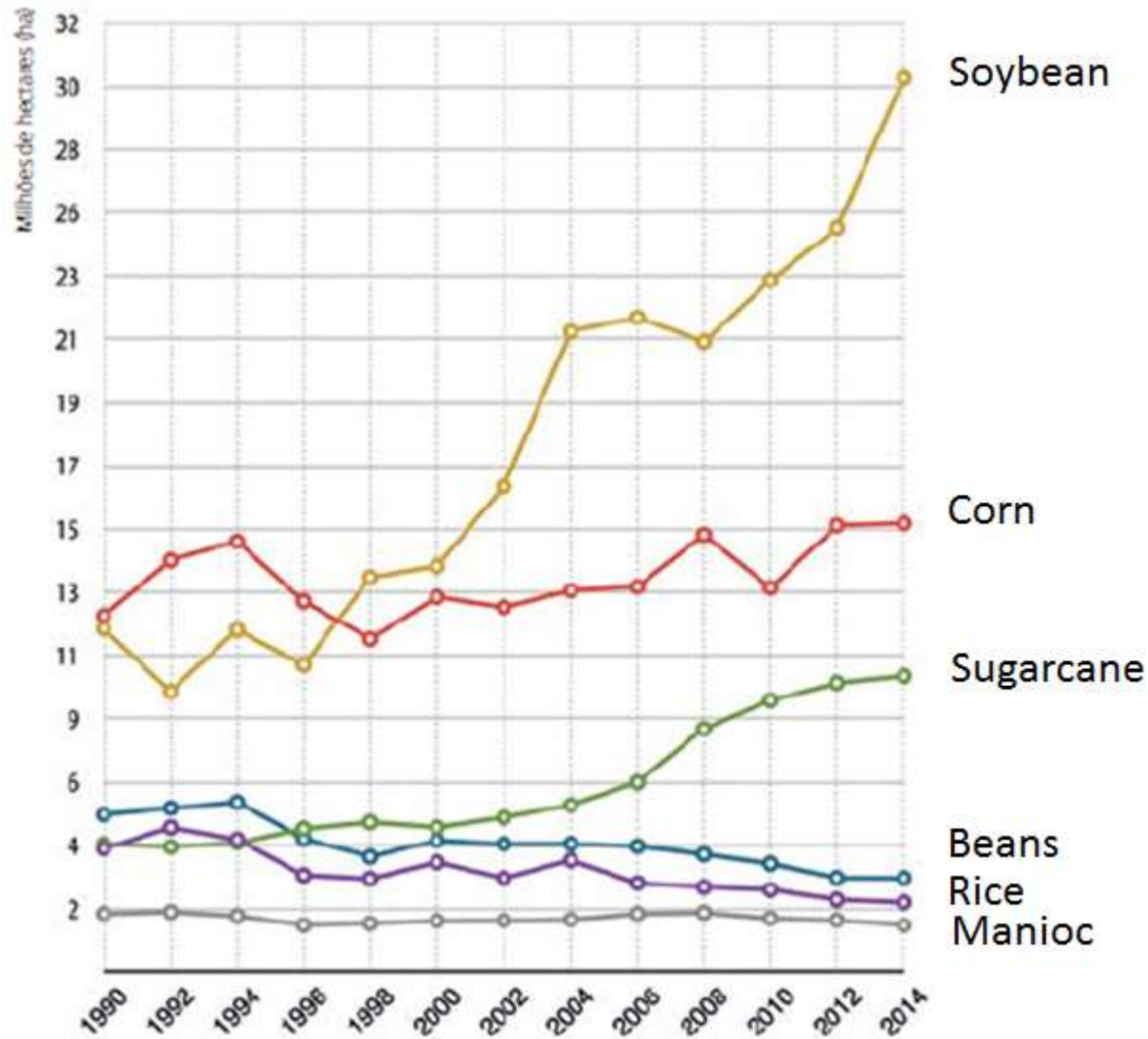
Rio de Janeiro, Brazil

September, 2015

# Summary

1. Reasons of using pesticides in Brazil
2. Impacts of pesticides
3. Limits of science
4. Limits of regulation
5. Conclusions

# LAND INTENDED FOR PLANTING COMMODITIES AND FOOD IN BRAZIL




Source: Carneiro et al, 2015. Dossie ABRASCO. <http://www.abrasco.org/dossieabrasco/>

Monoculturas de soja, milho, algodão, ...

Soybean, corn, cotton



 Lucas do Rio Verde

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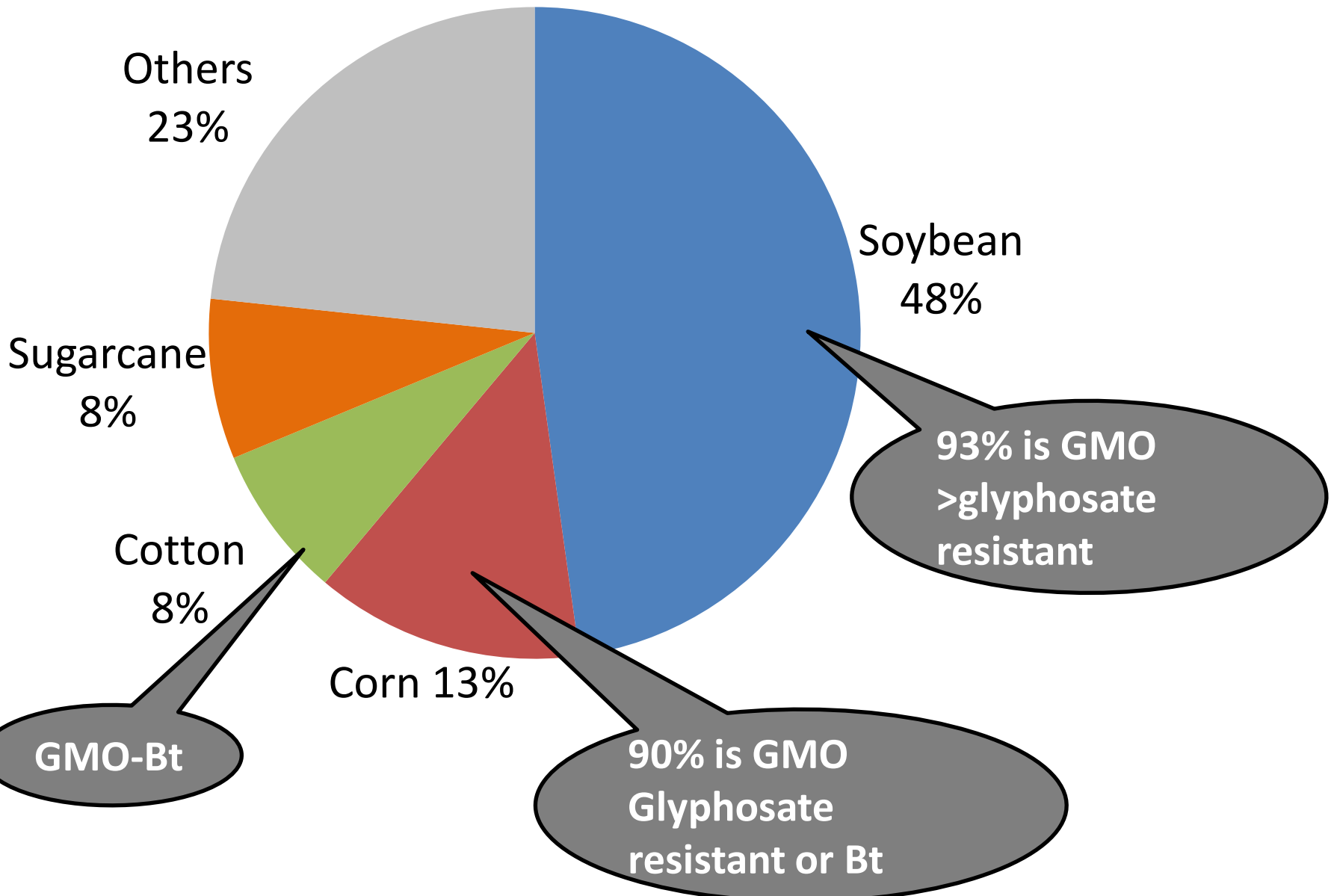
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Pointer 13°03'02.68" S 55°55'45.53" W elev 1292 ft

Streaming ||||| 100%

Eye alt 34359 ft

# AVERAGE CONSUMPTION OF PESTICIDES PER CROP BETWEEN 2008 AND 2012 IN BRAZIL



# USE OF PESTICIDES

- Commodities production and agribusiness
- Financial support of government
- GMO seeds
- Loss of biodiversity

# USE OF PESTICIDES

## Environment

### Biota

Ecological disturbance

Biomagnification

### Air, water and soil

Local/distant contamination

Superficial and underground contamination

## Human health

### Workers/bystanders

Acute effects

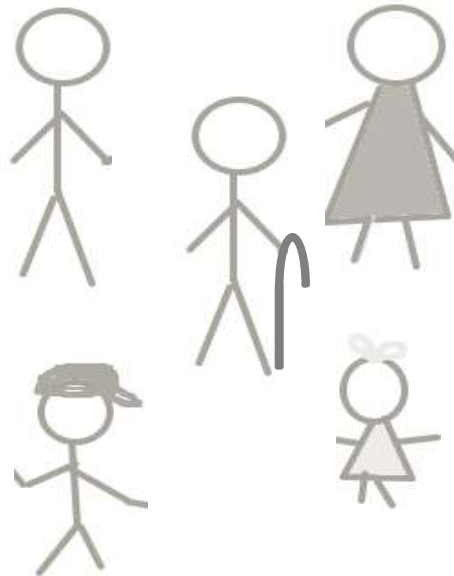
Chronic effects

### Consumers

## Acute effects

(IMMEDIATE)

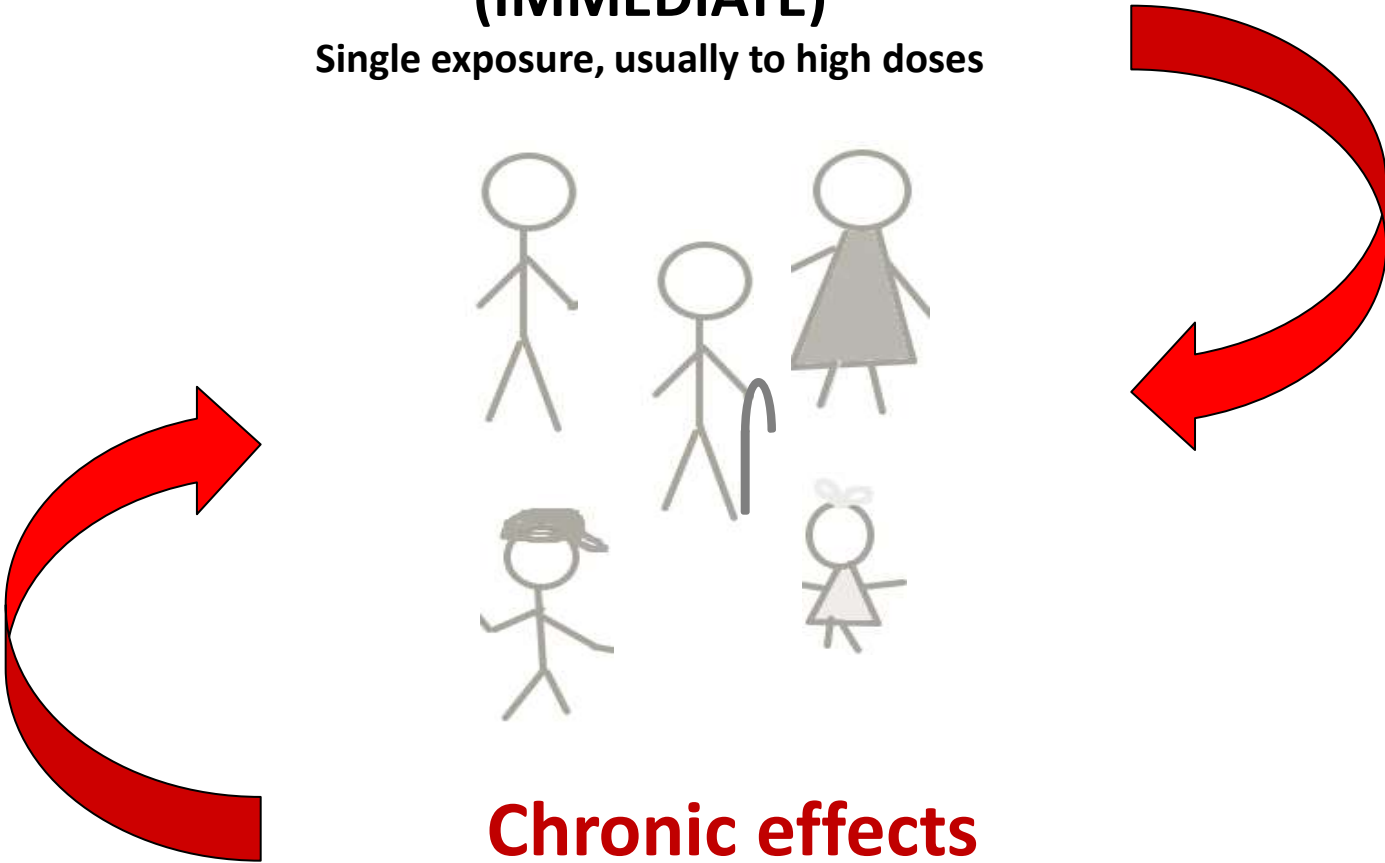
Single exposure, usually to high doses



## Chronic effects

(LATE)

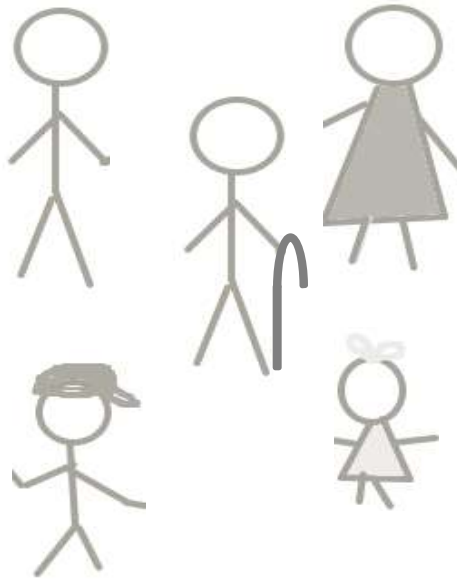
Multiple exposure, usually to low doses





# Acute effects (IMMEDIATE)

Single exposure, usually to high doses



# Chronic effects (LATE)

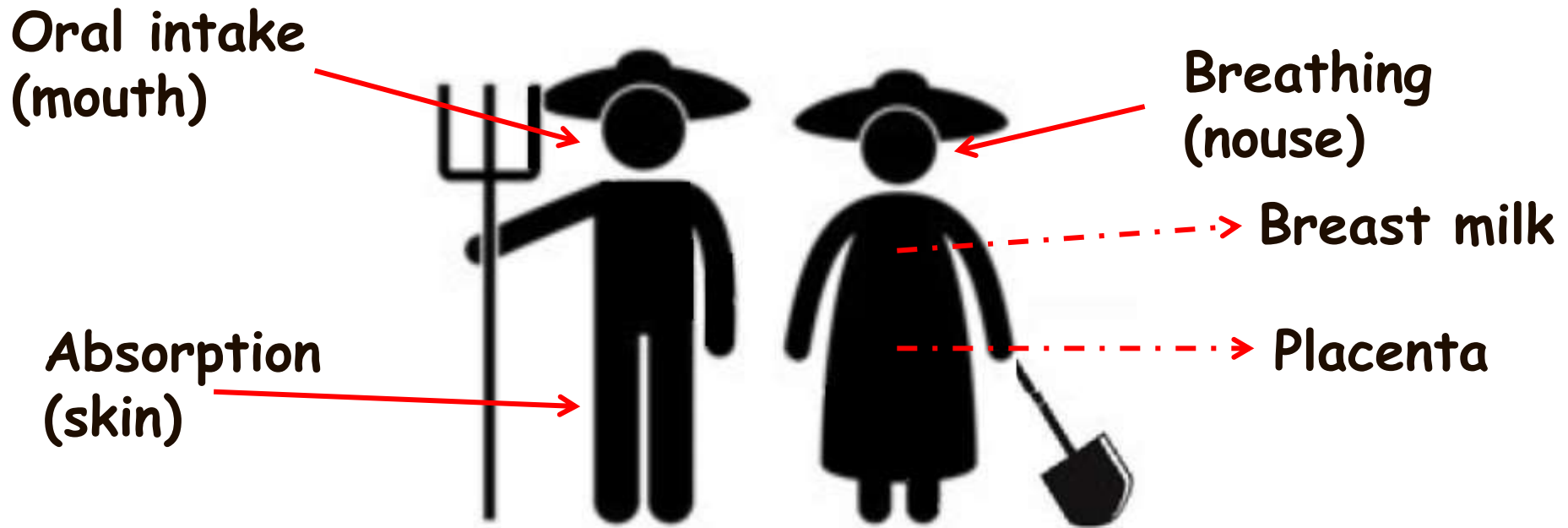
Multiple exposure, usually to low doses

Eye and skin irritation,  
rash, vomit, diarrhea,  
cramps, breathing  
problems, seizures, death  
etc.

Infertility, impotence,  
miscarriages,  
malformations, endocrine  
disruption, immunotoxicity,  
cancer etc

# Exposure to pesticides

## How pesticides entries in human body



Diseases, deaths, suicides

# HEALTH IMPACTS ON HEALTH DUE TO MULTIPLE USES OF PESTICIDES

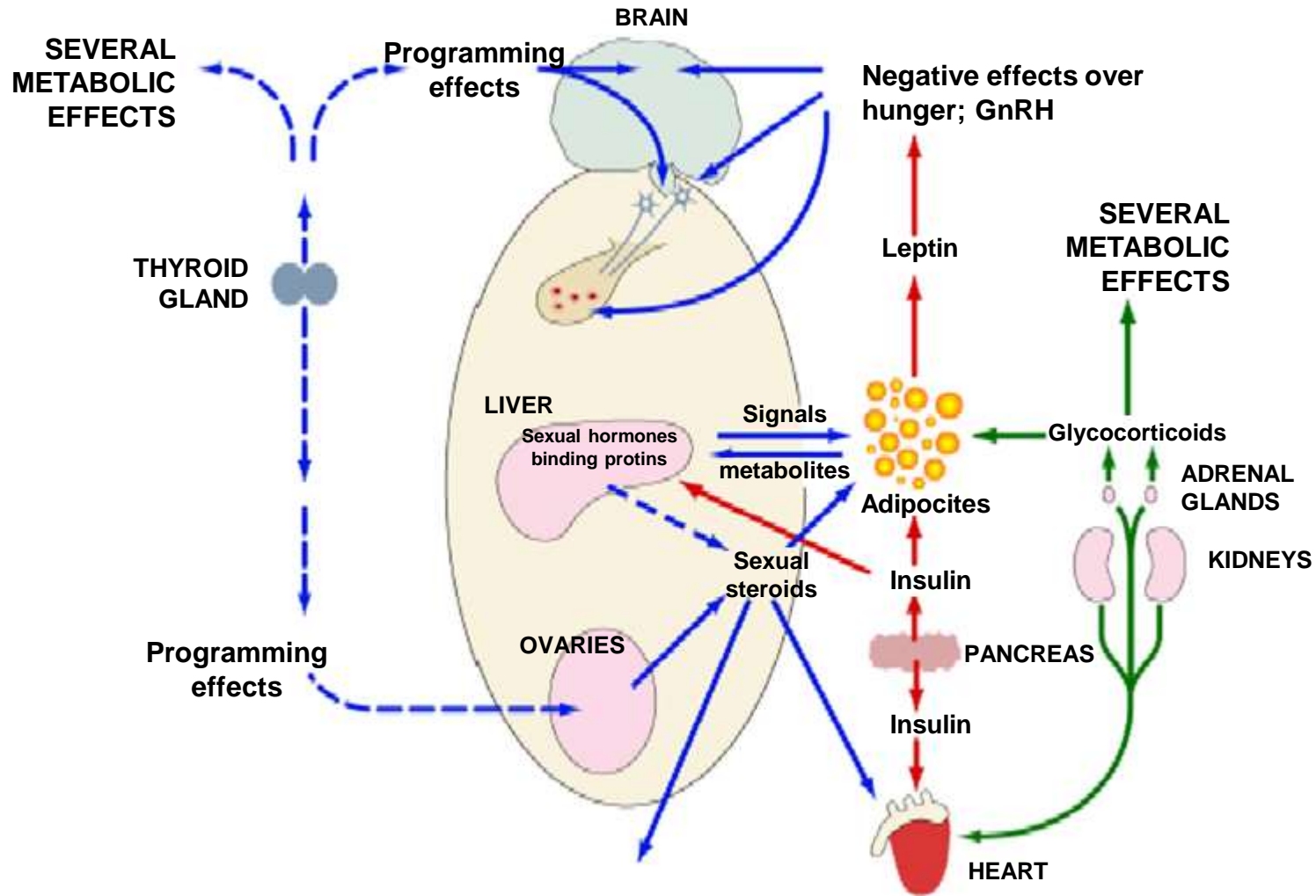
## Agriculture usage



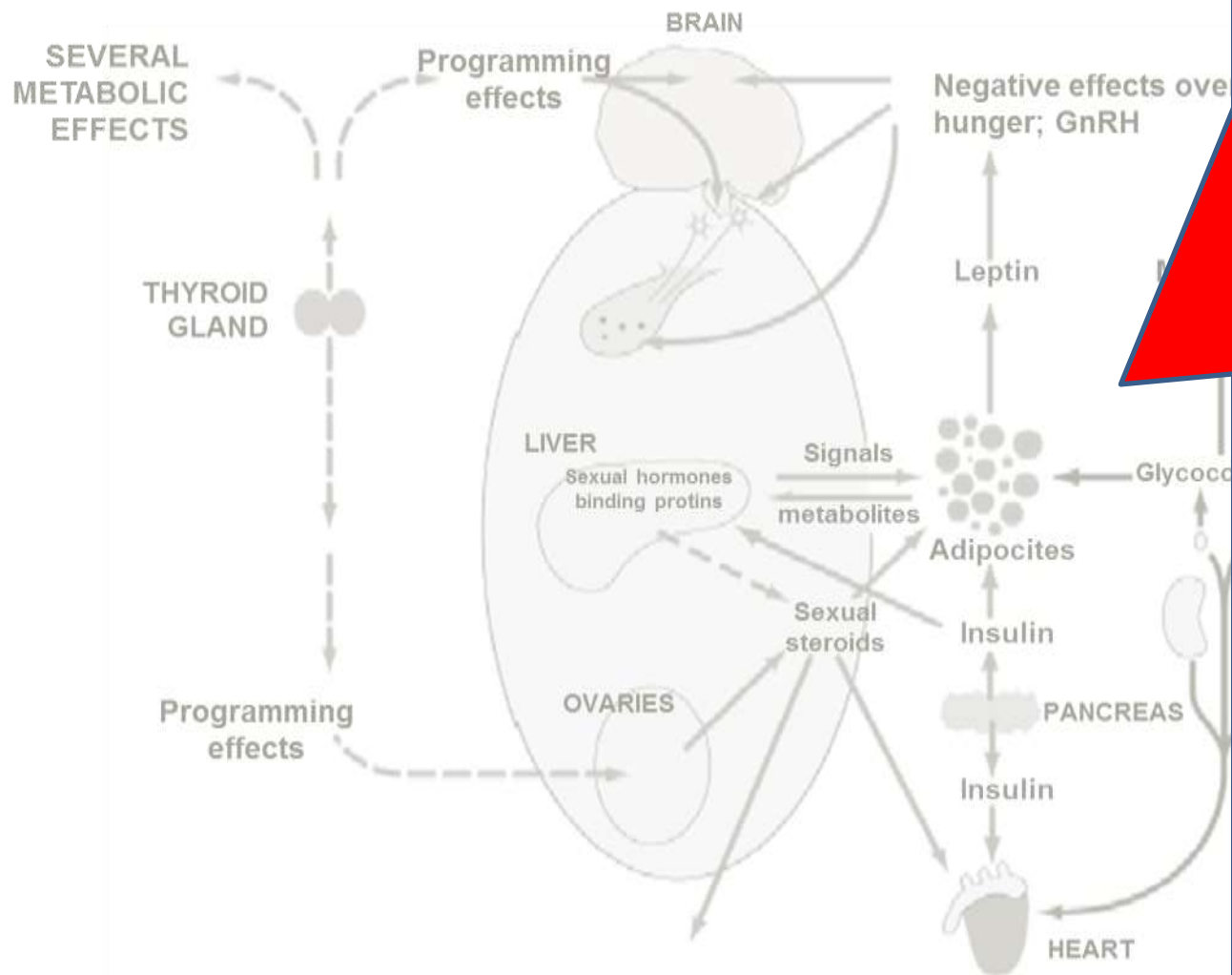
## Non-agriculture usage



## HIPOTALAMUS-PITUITARY



# ENDOCRINE DISRUPTION DUE TO PESTICIDES



**Infertility,  
miscarriage,  
depression,  
diabetes, obesity,  
breast and thyroid  
cancer etc**

**PREGNANCY AND  
LACTATION:  
Damage to babies  
(mental and  
physical disorders)  
which may  
perseverate until  
adult life  
Cancer**

# IMPACTS OF PESTICIDES IN BRAZIL

## Case studies



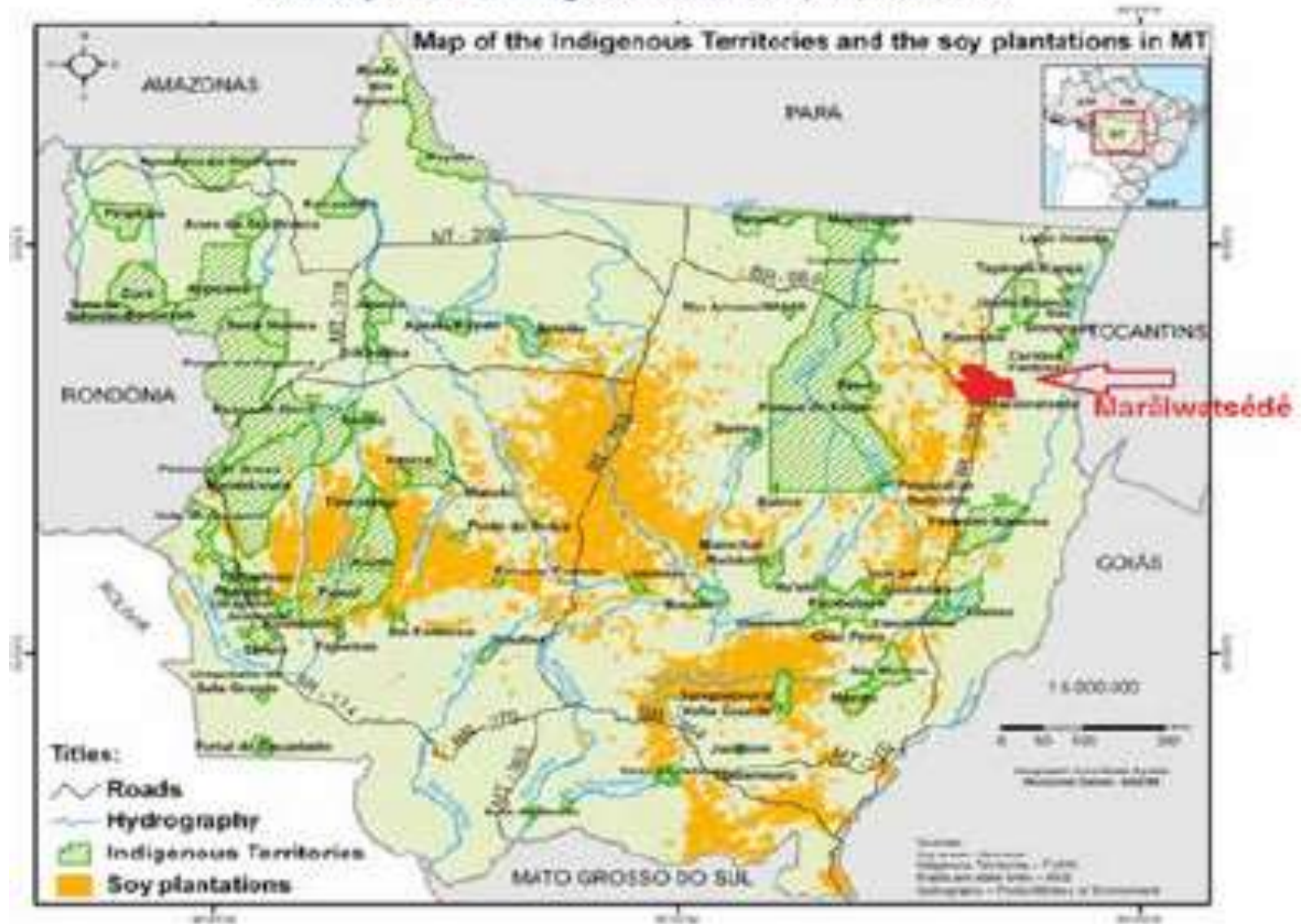
# Aerial drift of pesticides in soybean

## Indigenous Xavante, MT, December, 2012



# Map of state of MT

Localização da terra Indígena Marãiwatsédé, MT, Brasil, 2012






Monoculturas de soja, milho, algodão, ...

Soybean, corn, cotton



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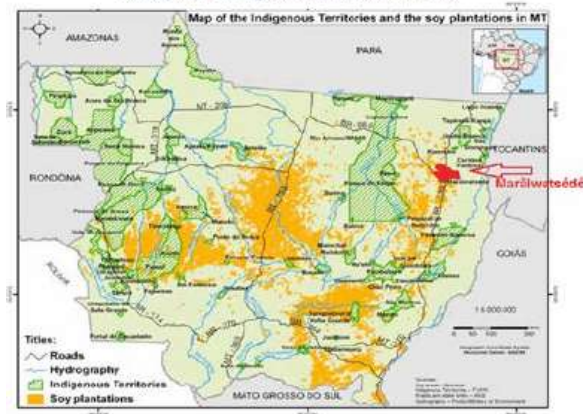
# IMPACTS ON PANTANAL MATO GROSSE



Pantanal Mato-Grossense, Brazil



Localização da terra indígena Maráwatsédé, MT, Brasil, 2012





# Aerial drift of pesticides in corn over a Rural school

## Rio Verde, GO, May, 2013

Contiguidade da Escola Rural com a lavoura onde é realizada pulverização aérea de agrotóxicos: a escola vista de dentro da lavoura e pátio da escola, 2013



- 93 cases of intoxication (students, teachers)
- seizures, rash, vomit



Fotos: Murilo Souza.

# Escola Municipal São José do Pontal, Rio Verde, Goiás,

03/05/2013, 9:00





# Escola Municipal São José do Pontal, Rio Verde, Goiás,

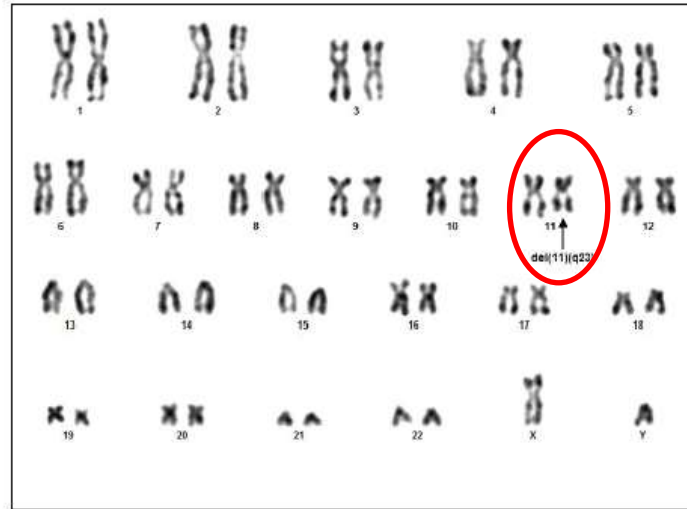
03/05/2013, 9:00



# Fruit production to exportation, Chapada do Apodi, CE, 2013



Damage to genetic material (13/43 cases)



Pesticides cited by workers:

metamidophos, parathion, monocrotofos,  
propanil, 2,4-D



# Fruit production to export, Limoeiro do Norte, CE, 2008



- Death of a worker (VMS)
- Male, 31 years old
- Preparation of pesticides, 10 hours/day working hours, 60 hours/week
- Chronic hepatic disease due to pesticides



Source: Article in submission. Raquel Maria Rigotto , Ada Cristina Pontes Aguiar. Hepatopatia crônica com desfecho letal em trabalhador do agronegócio na região do Baixo Jaguaribe (CE)

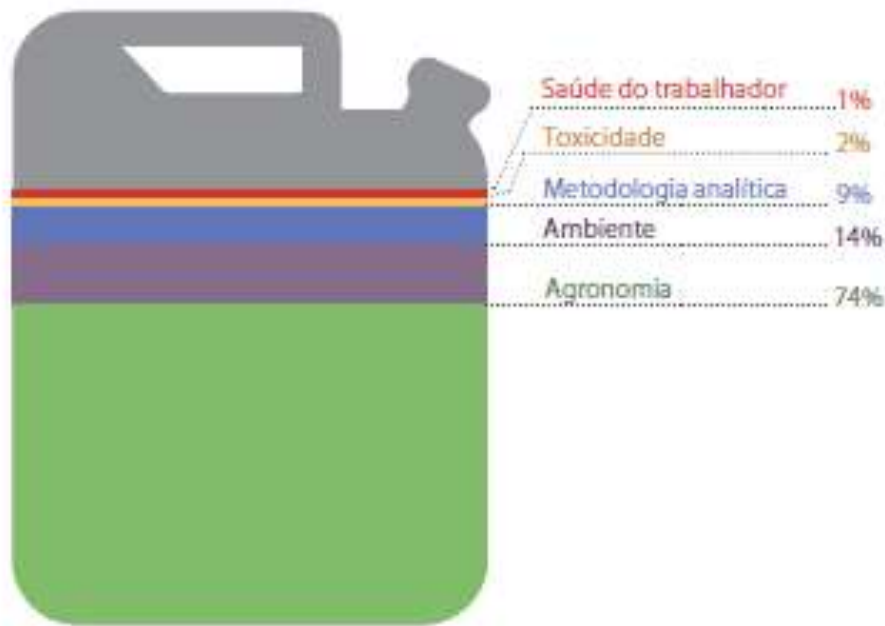




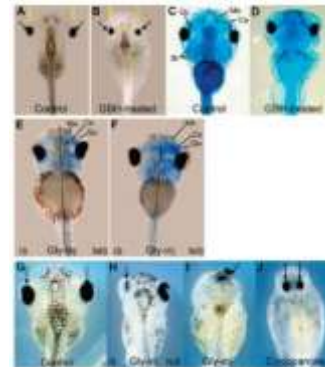
# Limits of science

Types of studies about glyphosate performed in Brazil (2007-2012)

Figura 3.8 - Categorias dos estudos utilizando o glifosato no Brasil (%)



Fonte: SERALINI et al. (2014b).



Uma verdade cientificamente comprovada: os agrotóxicos fazem mal à saúde das pessoas e ao meio ambiente

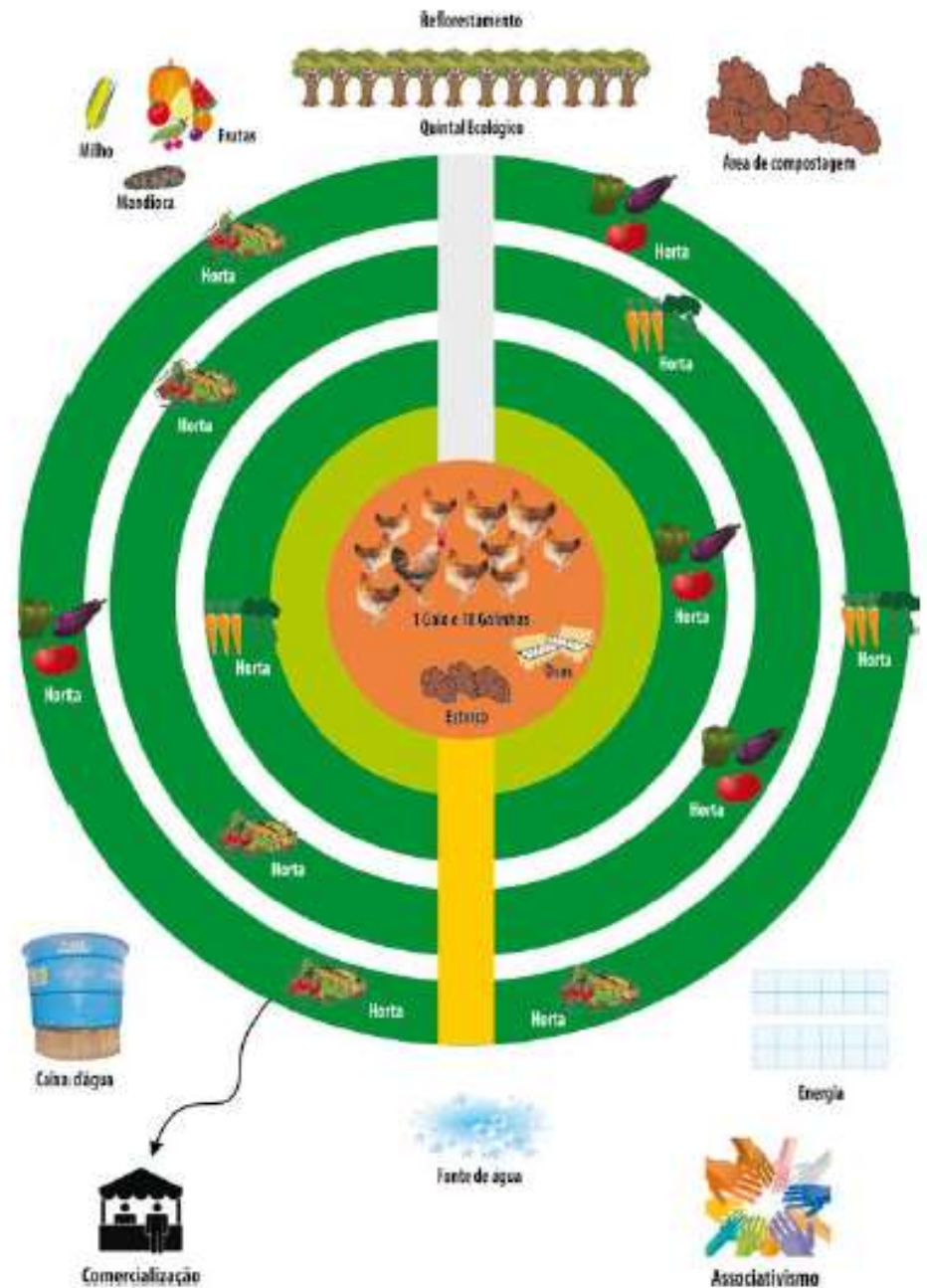
Historicamente, o papel da Fundação Oswaldo Cruz (FioCruz), do Instituto Nacional de Câncer (Instituto Nacional de Câncer) e da Associação Brasileira de Saúde Coletiva (Abrasco) é de produção de conhecimento científico pautado pela ética e pelo compromisso com a sociedade e em defesa da saúde, do ambiente e da vida. Essas instituições tiveram e têm contribuição fundamental na construção e no fortalecimento do Sistema Único de Saúde.

Quando pesquisas desenvolvidas nas referidas instituições contrariam interesses de negócios poderosos, incluindo o mercado de agrotóxicos, que movimentam anualmente bilhões de reais, eventualmente elas sofrem ataques ofensivos que, transcendendo o legítimo debate público e científico, visam confundir o espírito público utilizando subterfúgios e difamações para a defesa e manutenção do uso de substâncias perigosas à saúde e ao meio ambiente.





# CICLO PRODUTIVO DA TECNOLOGIA SOCIAL PAIS



# Limits of regulation

- Experimental tests don't predict the diversity of effects that can happen in real life
- Use of mixtures and presence of adjuvants and other components may increase toxicity
- Industry and civil society asymmetrical forces over regulatory agencies

## RISK ASSESSMENT (OR RE-ASSESSMENT)

1st: Studies performed by industry (according to GLP)

- *in vitro studies* (cells, tissues)
- *in vivo studies* (laboratory animals)

2nd: Newly published studies

- Epidemiological studies
- Wild animal studies

**PROHIBITION**

**RESTRICTION**

**MAINTAIN**



### CIPERMETHRINA

- **Male reproductive system**

**impairment in rats** (Mani et al, 2002; Elbetieha et al, 2001; Wang et Al, 2010; Ahmad et al, 2009)

- **Neurobehavioral diseases in rats**

(McDaniel; Moser, 1993; Soderlund et al, 2002; Wolansky; Harrill, 2008)

### PROFENOFOS

- **Genetic damage** (Prabhavathy et al, 2006; Fahmy; Abdalla, 1998)

- **Male reproductive system impairments in rats**

(Moustafa et al, 2007)

### CHLORPYRIFOS

- **Thyroid hormones impairments in mice after in utero exposure** (Haviland et al, 2010; De Angelis et al, 2009)

- **Intereference on male reproductive system**

(Joshi, Mathur, Gulati, 2007)

### PERMETHRIN

- **Association with multiple myeloma in man**

(Rusiecki et al, 2009) **and possible carcinogen** (US EPA)

- **Neurobehavioral (rats)** (Abdel-Rahman et al, 2004)

*Com a palavra,  
os territórios*



*Cartas das comunidades*

Ilustrações: Alessandra de Sá (cartões) e Mariana Venturini (dúvidas e glóbo)



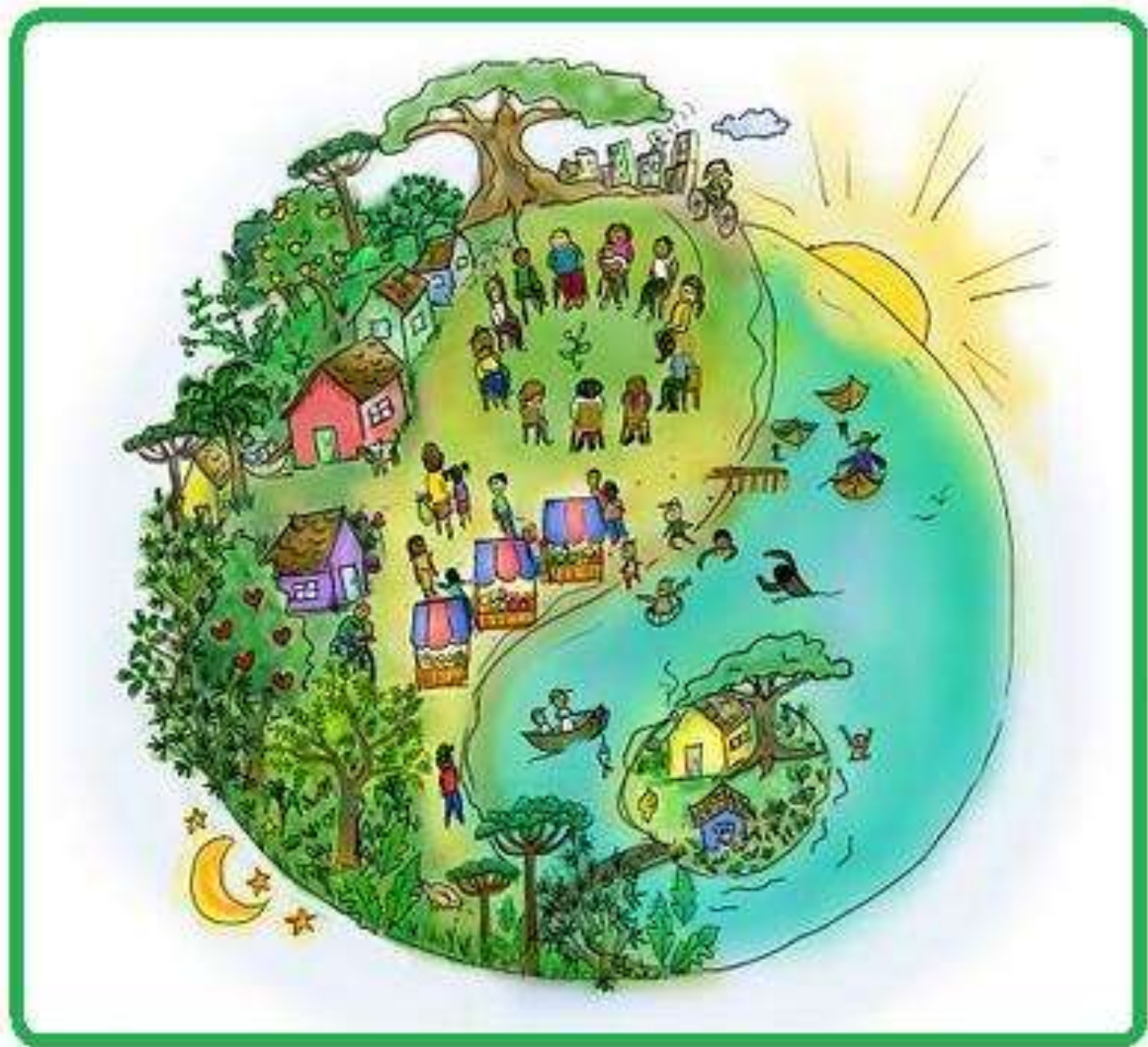
# CONCLUSIONS



Source: Almanaque do Baixo Jaguaribe, Grupo Tramas, Universidade Federal do Ceará, 2012

- From a public health and a toxicological point of view **ALL** kind of pesticide use should be condemned
- There are alternative ways of producing **FOOD** which should be sponsored by governments
- Economic interests never should overlap **HEALTH AND ENVIRONMENTAL** protection





Source: Almanaque do Baixo Jaguaribe, Grupo Tramas, Universidade Federal do Ceará, 2012