



## Neonicotinoids and their impact on ecosystem services in Tanzania

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Special workshop on Neonicotinoids and their impact on Ecosystem Services for Agriculture in Africa  
 14-16 November 2018.

## Neonicotinoids affects Bees more adversely than others insects



- Neonicotinoids are systemic insecticides
- Thus they target the nervous system of insects, blocking an acetylcholine receptor
- Bees have a particular genetic vulnerability to Neonics because:
  - they have more of these receptors than other insects,
  - have more learning and memory genes for their highly evolved system of social communication and organization,
  - unlike many insect pest species which are able to detoxify harmful chemicals, bees possess fewer genes for detoxification.
- Mega studies on the use of Neonicotinoids pesticides by the European Food Safety Authority (EFSA) has concluded they pose a risk to wild bees and honeybees.

Source: [http://www.pan-uk.org/about\\_neonicotinoids/](http://www.pan-uk.org/about_neonicotinoids/)

## Routes of Neonicotinoids exposure to Bees



- There about eight routes of exposure:
- Direct Contact
  - Contaminated Pollen and Nectar
  - Residue Contact
  - Particles Released During the Planting of Coated Seeds,
  - Contaminated Nesting Areas
  - Contaminated Nesting Material
  - Contaminated Water
  - Guttation Fluid

## How the world will look like in absence of bees



Your dairy choices *with* bees



Your dairy choices *without* bees

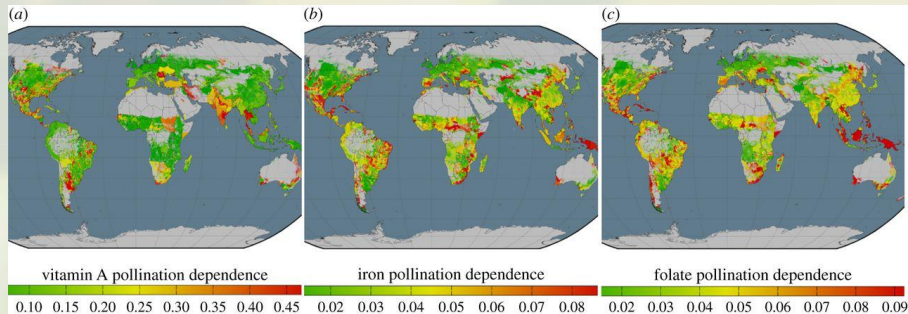
**Hypothetical view**



Photos : Effect of Shrinking Bee Populations in rural China, humans pollinate flowers by hand.

Hanyuan county the "world's pear capital," now viability of hand pollination is being challenged by rising labor costs and declining fruit yields

## Micronutrients availability depend on Pollination







Source:

[Chaplin-Kramer](#) 2014. Global malnutrition overlaps with pollinator-dependent micronutrient production

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## Use of Pesticides in Tanzania



-  Is regulated by the Plant Protection Acts of 1997 and its Regulation of 1998
-  "Every person importing pesticides shall obtain a permit for importing that pesticide, from the Registrar".
-  "All pesticides manufactured, formulated or compounded for disposal in any way for use in Tanzania, shall be registered in accordance with the Act and Regulations".
-  "Every application for pesticide registration or renewal of registration shall be accompanied details information"







## Information required



- 
 “A dossier containing additional information to determine the **suitability of the pesticide** as to its use and including technical data sheet and direction on how to detect and quantify the active ingredient;”
- 
 “A **written declaration** that the pesticide **has or has not been banned or restricted** in the country of origin”.
- 
 “Present a representative **sample and a certificate of analysis** if available”
- 
 “Every pesticide submitted for registration shall be submitted for analysis to Tropical Pesticide Research Institute (TPRI) that carry out **field tests** within three cropping seasons and **laboratory analysis** as are necessary to determine its suitability”.

## What is not done and what have been observed by Beekeepers!



- 
 However, impacts to non target organisms (pollinators and natural enemies of pests) **is not adequately** studied in Tanzania
- 
 Beekeepers observation:
  - 
 Size of colonies small now than before
  - 
 Fewer colonies exhibited by empty hives
  - 
 Thus Low productivity of honey and beeswax
- 
 However there no studies have linked these observation to use of Neonicotinoids or other pests in Tanzania

## Disqualified pesticides



- In cases where a pesticide:-
- is subject to Prior Informed Consent; (PIC) procedure; or;
  - is highly toxic, persistent and biologically cumulative; or
  - causes poisoning effects to human and animals of which no effective antidote is available, the Registrar shall not register that pesticide

## Neonicotinoids registered in Tanzania in 2018



FAMILY	Number of Products registered	%	Formulation and Crops
Imidacloprid	63	47.4	<ul style="list-style-type: none"> <li>Used in different <b>Formulations</b></li> <li>They of different <b>length</b> of residues toxicity</li> <li>Control pests of <b>Flowering</b> and non Flowering crops</li> <li>Used at different <b>stages</b> of crop development</li> </ul>
Thiacloprid	23	17.3	
Thiamethoxam	23	17.3	
Acetamiprid	21	15.8	
Clothianidin	2	1.5	
Nitenpyram	1	0.8	
Nithiazine	0	0.0	
TOTAL	133		

Dust, wettable powder, flowable, and microencapsulated formulations can cause severe losses of both foraging bees and hive bees as toxicity effects may remain in a hive for months preventing recovery

## In Tanzania honey bees are important

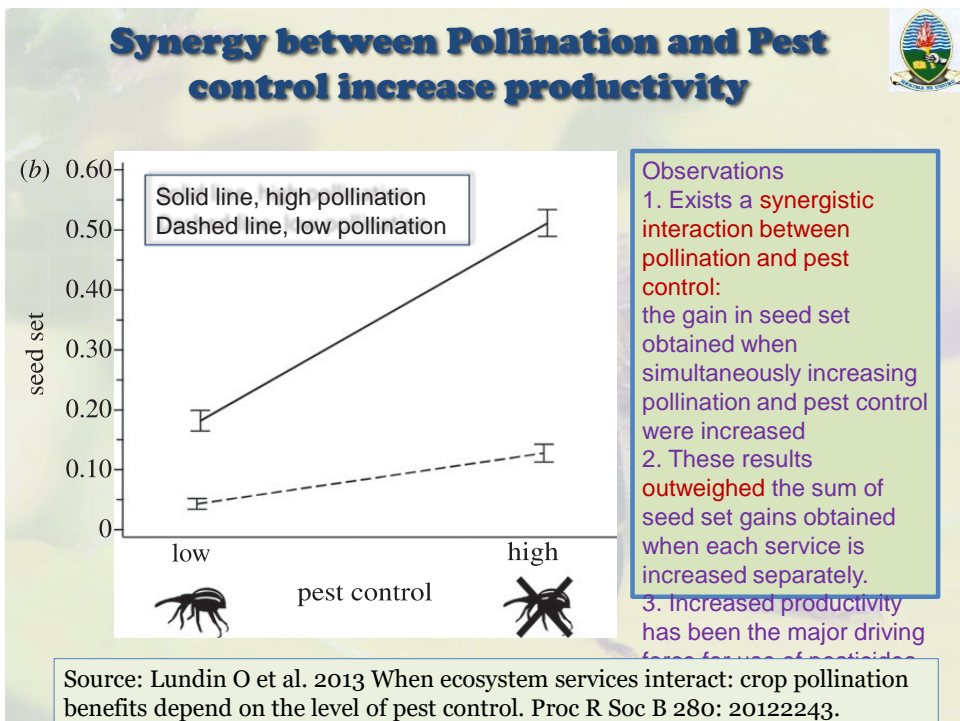
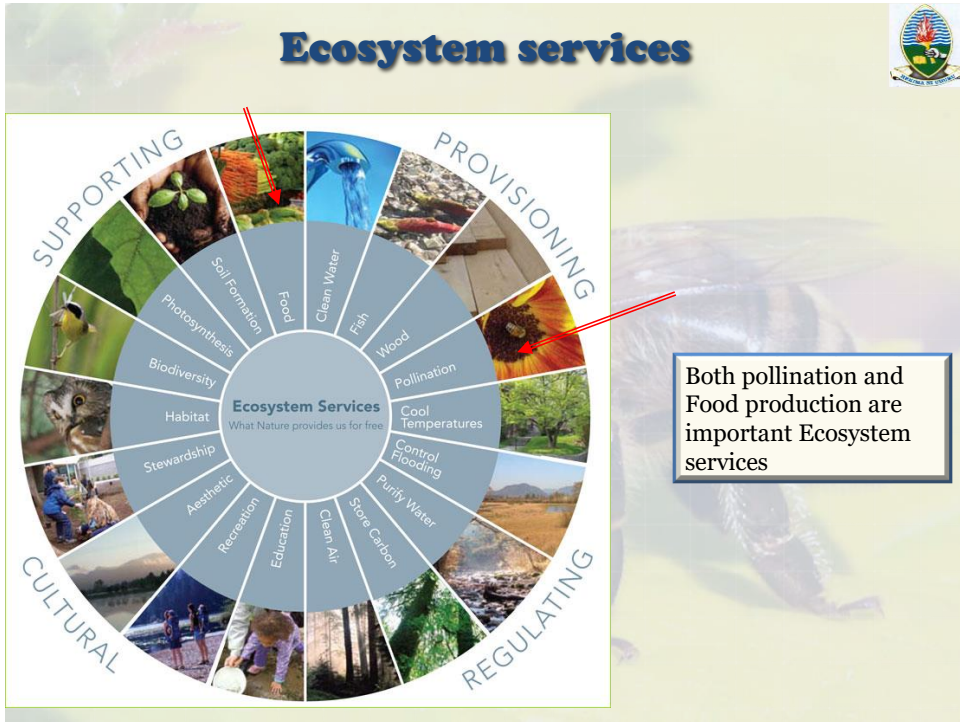


- National Beekeeping Policy was enacted in 1998
- Beekeeping Act was established 2002
- Beekeeping employs about 2 million Tanzanian
- Tanzania is second in production of Bee products (Honey and Beeswax) in Africa after Ethiopia
- The University of Dar es Salaam runs a BSc. in Beekeeping Science and Technology)
- It is a source of food (e.g. honey, pollen and brood)
- Provides raw materials for beeswax candles and lubricants industries

## Issues still hanging around globally on the ban of Nicotinoids

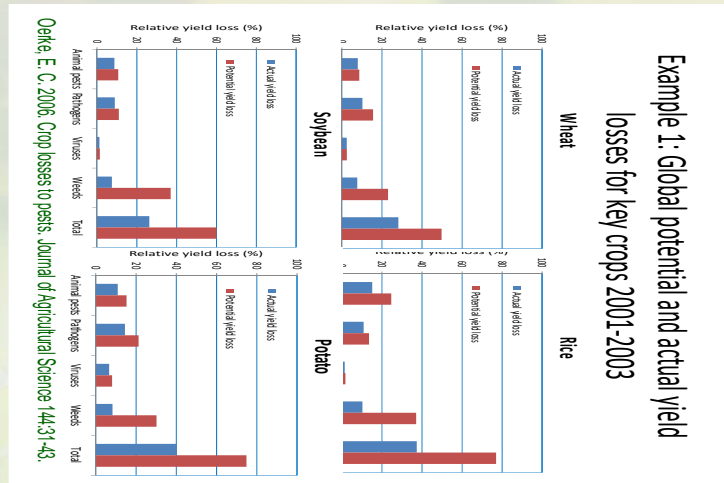


There are issues that require scientific sound explanations in relation to use of pesticides in agricultural production and food security:





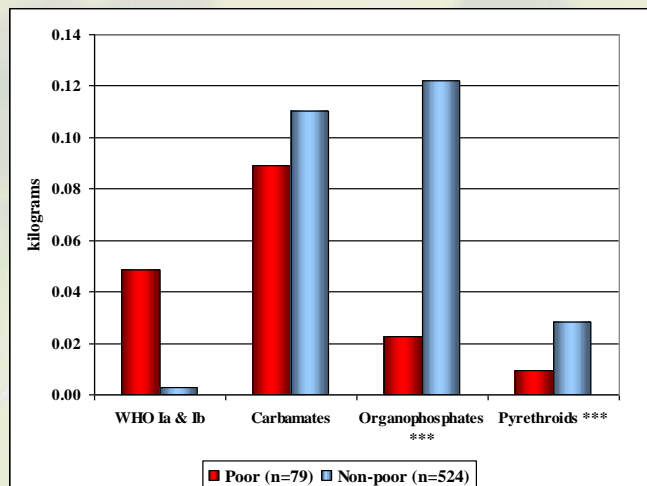
## Crop loss to pests is a major problem for farmers



Source: Willocquet et al. 2017 a presentation made to International Conferences on Crop Loss –Paris 16-18 Oct. 2017



## Choice of pesticide to use is determined by farmers income

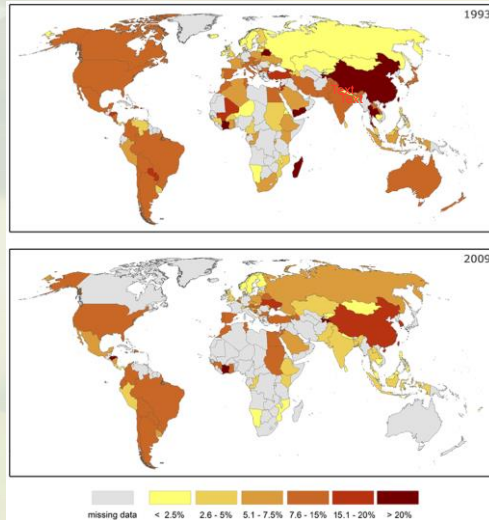


Farmers with lower income use pesticides regardless of their effects to the agricultural ecosystem services provisioning

**POVERTY-ENVIRONMENT REPORT:  
PESTICIDE USE IN THE MEKONG DELTA, VIETNAM-Craig Meisner, DECRG-IE  
2005**



## No data for Pollination for agricultural dependence -African economies



No data for most of African countries  
While Most African economies are Agricultural dependent

Figure 6. Spatial pattern of vulnerability. The maps show the national dependency of the agricultural GDP on pollination for the years 1993 and 2009 as an indicator of the vulnerability of agriculture in the different countries.  
doi:10.1371/journal.pone.0035954.g006

## The ban on Neonicotinoids is challenged by some



- European Union expands ban of three neonicotinoid pesticides

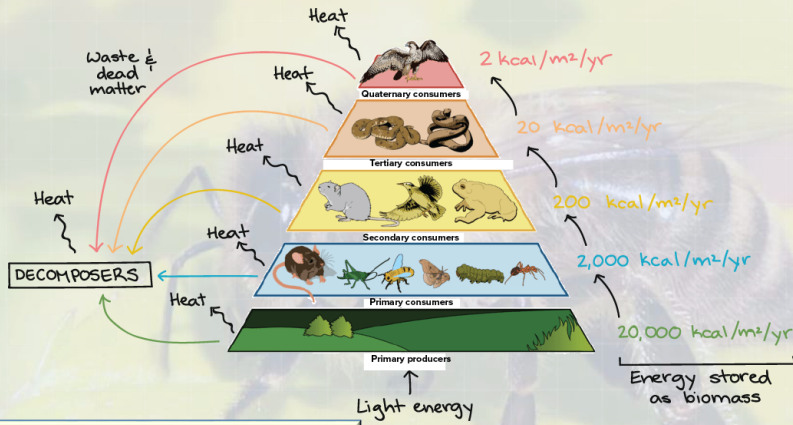
- By [Erik Stokstad](#) Apr. 27, 2018 , 2:45 PM

Source: <https://www.sciencemag.org/news/2018/04/european-union-expands-ban-three-neonicotinoid-pesticides>

- The European Union today **expanded** a controversial ban of neonicotinoid pesticides, based on the threat they pose to pollinators. The decision **pleased** environmental groups and was greeted with trepidation by farming associations, which fear economic harm.

- Only France has banned the five neonicotinoid pesticides but not the other EU countries

## Maintaining the Components of a ecosystem for its health is important



A healthier ecosystem will allow:

- Energy flow between trophic levels
- Nutrients cycling
- Biogeochemical cycles

Thank you

