

Organic Farming



FAO TCP/MAR/3502: Support for the development of organic farming and institutional capacity building in Mauritius

• Impacts of Intensive Agriculture

L'express: 17 Janvier 2016

Enquête
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PESTICIDES

QUE DONNONS-NOUS À MANGER À NOS ENFANTS?



20% DE NOS ÉCHANTILLONS AU-DELÀ DES NORMES CEE!

LES CONCLUSIONS PRINCIPALES À DÉDUIRE DE CE PREMIER TABLEAU CI-CONTRE SONT LES SUIVANTES:

Le chiffre est brutal : un échantillon sur cinq de ce que nous avons acheté à travers l'île affiche des taux de pesticides à un niveau qui est «au-delà des Limites Maximales de Résidus (LMR)» établies par la CEE. Les tests conduits selon les méthodes éprouvées de QuantiLAB, partenaire de Mérieux NutriSciences, utilise la méthode standard BS EN 15662 : 2008 pour quantifier 250 ingrédients actifs de pesticides volatils et environ 200 de pesticides non volatils. Le tableau ci-contre résume les premiers résultats sur 45 items collectés à travers le pays de manière aléatoire.

atteignant même 92 fois la dose prescrite de 0,01mg/kg ! Eh oui ! Quatre-vingt-douze fois la dose prescrite ! Qu'est-ce qui peut bien expliquer cela ? Un excès de zèle ? Une réaction violente du planteur dont la récolte préalable a été décimée ? Un employé frustré qui a exagéré la dose pour ruiner son patron ? On ne sait pas ! Nous ne savons pas non plus si des consommateurs de piments ont été malades dans cette région, ces jours-là, mais ce qui est sûr, c'est que, à ce tarif-là, les insectes ont dû bien mourir et que les oiseaux et même les humains y couraient quelques risques sérieux...

Item 1 : six pesticides dans de la laitue ? Est-ce bien nécessaire ? (un seul s'affichant au-delà des limites)

Item 7 : six pesticides dans des piments ? Est-ce vraiment utile ? (quatre étant au-delà des limites)

Items 16 et 17 : huit pesticides dans des oranges et des mandarines ? Pourquoi ? (chacun étant, individuellement, sous les limites prescrites)

Item 42 : cinq pesticides dans du riz basmati ? Inquiétant ? (dont deux sont au-delà des limites)

Le consommateur moyen n'a pas de raison de s'inquiéter de ces «cocktails» ? Aurait-il totalement le courage de raisonner de manière arithmétique

45 food products (Fruits & vegetables) 8 above EU regulation Limit:

- **Lettuce**- Hexaconazole
- **Carrots**- Profenofos
- **Chilli**-Formetanate, Imidacloprid, Profenofos, Cypermethrin
- **Pineapple**- Diuron
- **Lady's finger**- Flonicamid
- **Pipengailles**-Cypermethrin
- **Red beans**: Cypermethrin
- **Basmati white rice**

• Pesticides situation in Mauritius

PESTICIDES

Taux plus élevé en quatre ans sur les fruits et légumes

Le ministère de l'Agro-industrie le confirme : en quatre ans, le pourcentage de fruits et légumes présentant un taux plus élevé de pesticides que le seuil autorisé, est passé de 2,3 % à 10 %. Un taux qui ne reflète pas la réalité, selon des planteurs.

Chaque année, un échantillonnage de quelque 500 fruits et légumes est analysé. Des échantillons sont collectés auprès des planteurs par des employés du 'Food and Agricultural Research & Extension Institute' et analysés au 'Food Tech Lab' du ministère de l'Agro-industrie, à Réduit. Ainsi, selon les résultats, en 2010, 2,3 % des produits contenaient un taux de pesticides supérieur au 'Maximum Residue Level' (Ndlr : la quantité autorisée de pesticide dans les fruits et légumes, qui est calculée selon des normes internationales).

En 2011, ce taux est passé à 2,7 %. En 2012, il a grimpé à 6 % et en 2013, il a atteint 7,2 %. Si le dernier rapport disponible sur l'utilisation des pesticides fait mention de pourcentages entre 2010 et 2013, le chiffre pour 2014, soit 10 %, publié dans un quotidien, n'a pas été contesté. La situation est d'autant plus inquiétante que jusqu'à présent, il n'y a aucune agence qui s'occupe du contrôle de pesticide, d'insecticide ou de fertilisant dans le pays.

De plus, la 'Consumer Advocacy Platform' (CAP) déplore que les résultats de ces analyses ne soient pas rendus publiques, ignorant le droit des consommateurs à l'information. Il est un fait que, dans bien des cas, surtout lorsque ces planteurs ne patientent pas le temps qu'il faut pour la récolte, le taux de pesticide autorisé dans les fruits et légumes est supérieur au 'Maximum Residue Level'.



Le Defi Quotidien : 9/12/15

2011: 2,7% ○

2012: 6%

2013: 7,2%

2014: 10% ○

Above:

'Maximum Residue Level'
(MRL)

- **Why we need to reflect on the way we farm?**



Continuous use and abuse of [chemical pesticides](#) and [fertilizers](#) to achieve better yields, triggers many negative impact in the natural environment (biodiversity, natural enemies/ predators, pollinators , soil microbes , birds, aquatic life)



- **Current Agricultural Production Systems and its Impacts**



Environmental Pollution

Conventional/intensive Production Systems

52 000 t chemical fertilizers & 2 200 t of pesticides/year (average of last 10 years)

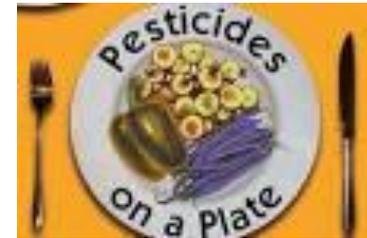
Loss in biodiversity and ecosystem services



Land degradation



Soil erosion, nutrient leaching, organic matter depletion, compaction



Risk of pesticides residue



FROM - COLEACP - Mauritius: Ethephon Residue
Dear Stakeholder,

Please find hereunder some information regarding pine

EU Alert – Ethephon Residue on Pineapples

We have been informed that on 4 June there was notification

- **Animal welfare**



- **Workers safety & welfare**



- **Alternative Sustainable Production Systems**

- **Conservation Agriculture**
- **Natural Farming**
- **Good Agricultural Practices (GAP)**
(l'agriculture raisonnée)



- ✓ **Organic / Agriculture Biologique**
Farming systems: Biodynamic Farming,
Permaculture



- ✓ **Ban toxic inputs that affect the environment and consumers**
- ✓ **Feed the world sustainably without compromising the needs of future generations to feed themselves**



1. **Organic agriculture** is an integrated production management system which promotes and enhances agro-ecosystem health, including biodiversity, biological cycles and soil biological activity (*FAO/WHO Codex Alimentarius Commission, 1999*).

A system of agricultural production that

- Prohibits use of genetically modified organisms / products & Sewage sludge
- Largely excludes use of
 - Synthetic fertilizers
 - Synthetic pesticides
 - Synthetic growth regulators
 - Antibiotics



- **Organic agriculture**

- Use of the term *Organic Agriculture* is globally regulated by international bodies IFOAM (regulations and standards)
- It is certified by a third party / accredited body (e.g. ECOCERT, Soil Association ,...)



- **Organic production system**

OA is designed to:

- Increase soil biological activity
- Maintain long term soil fertility and health
- Recycle wastes of plant and animal origin / return nutrients to the soil
- Minimize use of non-renewable resources
- Rely on local renewable inputs and limits off -farm inputs
- Promote the healthy use of soil, water and air as well as minimize all forms of pollution
- Enhance biological diversity within the whole system



- **Principles of Organic Agriculture (IFAOM,2007)**



Health

Health of soil, plants, animals, humans

Produce high quality and nutritious food free of harmful chemicals



Ecology

Imitating and sustaining natural systems/ Promote reuse, recycling and efficient management of resources



Fairness

Equity, respect and justice for all living things

Ensure fair share of all parties



Care

Take preventive measures to protect and conserve natural resources for all generations to come

ORGANIC FARMING

Agricultural system that works in harmony with nature.

right SOIL
cultivation
at the right time



careful use of
WATER
resources



good animal
HUSBANDRY



recycled
CROP Wastes



using NATURAL
pesticides



green MANURES
and legumes



increasing
GENETIC DIVERSITY



use of
RESISTANT
crops



- **Organic agriculture**

Good For The Planet

- ✓ Preserve the environment : doesn't produce polluting chemical pesticide run-off.
- ✓ Support diversity
- ✓ Bee-friendly
- ✓ Care for soil health and fertility
- ✓ Less prone to erosion
- ✓ Can potentially cut greenhouse gas emissions
- ✓ Sequester carbon in soil



- An Organic farm has a higher diversity of plants, insects and animals, including essential soil organisms
Studies demonstrated – wild plants that act as habitat for native species
50 % more pollinators than in conventional



- **Benefits of Organic Production**

- ✓ Safer food/ reduced risk of pesticides residue in food
- ✓ Workers welfare - No exposure harmful pesticides /chemicals.
- ✓ Diversity of crops and also integrate livestock – ensuring stable yield
- ✓ Reduces dependency on costly external inputs
- ✓ Products from certified farms can be sold at premium prices
- ✓ Improve long term land productivity (more fertile /drought resistant)
- ✓ Provide opportunity for improve farm revenue and farmers ‘ livelihood(premium price)



- **Organic Farming Practices**

Biodiversity-friendly practices

- Use of tolerant varieties
- Growing the right crop on the right soil, climate and at the right time
- Mixed cropping/Intercropping / use of trap crop, repellent crops & companion crops
- **Crop rotation** to enhance balanced soil nutrients
- **Mulching /cover cropping** to improve water infiltration, prevent runoff , erosion, add organic matter to soil and conserve moisture
- **Fertilization with compost or manure**
- Mixed crop and livestock production on one farm
- Diverse habitat (strips of native vegetation to act a breeding and feeding site)



**Soil & water
conservation**



Soil fertility management



**Integrated Nutrient
Management**

**Integrated Crop
Management**



**Residue management/
recycling**



**Integrated Pest Disease and
Weed Management**



**Crop Rotation
/Genetic diversity**

**Use of local inputs, traditional
knowledge & modern organic practices**

- **Soil fertility management in Organic**

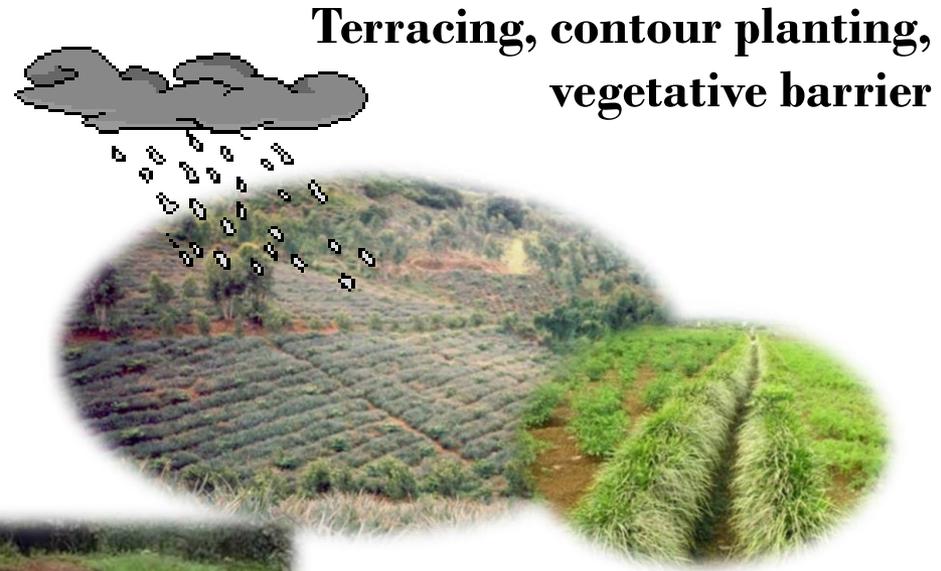
Soil and water conservation

To minimise soil erosion, improve infiltration and water retention



Mulching /Green manure/cover crop / crop residue / Minimum tillage **Conserve moisture**

- **Increase infiltration**
- **Reduce runoff**
- **Suppress weeds**



Terracing, contour planting, vegetative barrier



Rainwater harvesting and storage

Efficient irrigation system

Mulching (paillage)



- **Drip irrigation:** *prevent spread of diseases*



- **Mixed cropping / Good soil cover**



Strips of native vegetation between crops : habitat for pests and natural enemies

• **Potential species for use as green manure crops under local conditions**

- *Mucuna puriens* - **Mucuna**
- *Pueraria phaseoloides* - **Pueraria**
- *Dolichos lablab*
- *Vigna unguiculata* (Cowpea)
- *Canavalia ensiformis* (Jackbean)
- *Leucaena (Acacia)* (for alley cropping)
- *Calliandra* (for hedgerow cropping)



cowpea

Jackbean

Calliandra



Mucuna



Pueraria



Leucaena



- **Diversity of crops /Crop rotation**



Benefits – help to minimise pests and diseases, weeds and maintain soil fertility

- **Which crop to grow and Cropping system?**

- Choose crops based location / susceptibility to pests & diseases / market
Herbs, salad crops, leafy greens, root crops, beans, groundnut, creepers, crucifers, eggplant,
- Opt for locally adapted /tolerant crops - less challenging
- **Grow in the right planting season** to escape pest and diseases
- Develop a cropping plan and rotation - / *green manure /cover crop*



- **Mixed /Multiple Cropping V/S Monocropping**

Include a wide genetic variety

- **Cash crops**
- **Companion crops**
e.g Carrot and onion or garlic
Maize or cabbage and bean
- **Green manure and cover crops**
- **Trap crop : *Marigold***
- **Repellant crop : *Tulsi, Basilic, Mint,***
Coriander,
Citronelle
- **Trees, shrubs & fodder (Agroforestry)**

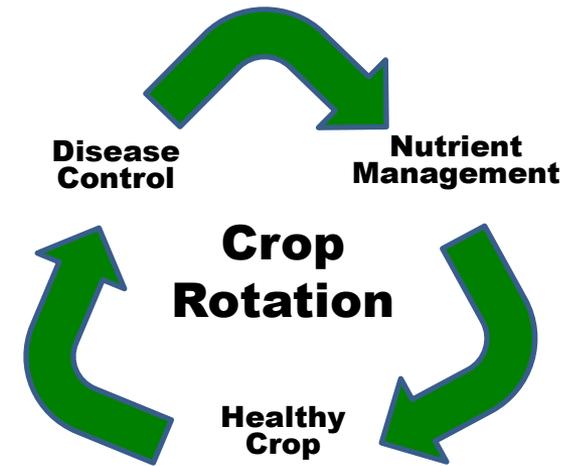
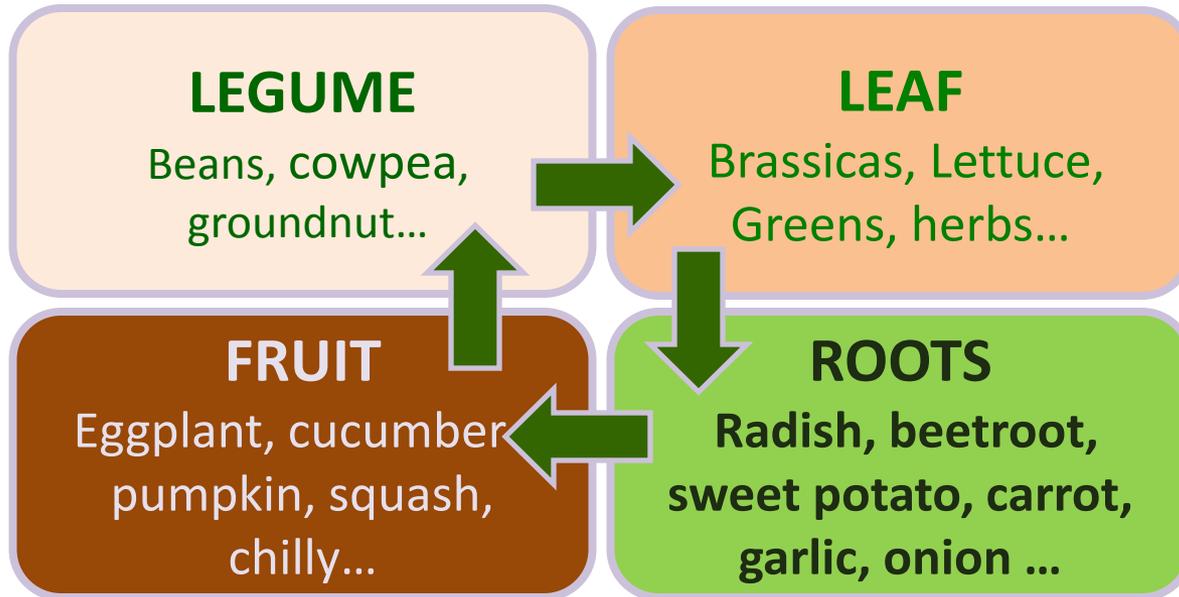


BENEFITS:

- **Enhance nutrient recycling**
- **Foster habitat to host beneficial insects**
- **Minimise risk and stabilise yield**
- **Improve resilience to climate change**

- **Crop Rotation**

Growing of crops of different species in succession on the same plot



Tactic

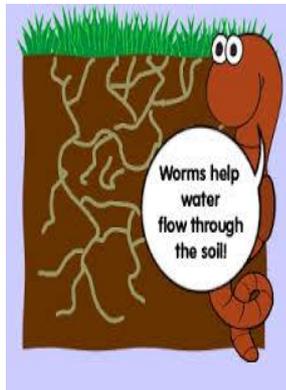
- **avoid build up of pest and pathogens and crop infestation**
- **make better use of nutrients in the soil**

- **Soil fertility management in Organic**

Regular application of organic matter

(Manure, compost and crop residue)

- Improve soil structure and water holding capacity
- Enhance microbial activity and nutrients mobilisation
- Mineralise and provide nutrients



*It increases
microbial activity*

- ***Focus on feeding the soil not the plant***

Soil physical properties

Nutrient recycling

Nutrient availability



- **Contour planting on slopes for soil conservation**



• Soil fertility supplement

Soil conditioner to amend soil pH
(Lime, compost)



Approved organic inputs

- Mineral fertilizer
- Fish and bone meal, woodash
- Seaweed extracts



Microbial fertiliser (biofertilisers)



Legumes N- fixing crops in crop rotation/
intercrop



Legume crops fix atmospheric N in the soil
(*bean, pea, cowpea, groundnut, soybean, pulses*)

- **Integrated pest, disease and weed management**
 - i. **Preventative methods:** Balanced nutrient and crop habitat management to produce healthy plants that are better able to resist disease and insect predation(organic farmers' primary strategy in controlling pests and diseases /
 - ii. **Cultural control** – use of resistant varieties, sanitation , appropriate cultivation techniques
 - iii. **Physical control** – insect traps, pheromone lure and attractants, barriers, light and sound, solarisation
 - iv. **Biological control** – use of natural enemies (predators , parasites , parasitoids)
 - v. **Chemical control** - using approved organic pesticides as per organic standards.



- **Integrated Pest and Disease Management**

Mixed cropping /intercropping / crop rotation/use of trap/ repellent crop



**Cultural and Physical methods
sanitation , traps, baits**



Pheromone trap

Integrated Pest and Disease Management

Botanical and microbial pesticides



Biological control (use of predators and parasitoids)



Whitefly

- **Pest and Disease Management - Approach on Biofarms**

Provide good growing conditions
Grow tolerant crops / respect the season / Mixed cropping / Rotation



Manipulate crop habitat to encourage beneficials and repel insect pests

Adopt cultural and physical measures to reduce pest and disease
(sanitation, traps)

Use Biopesticides
(natural or botanical pesticides)



Biological control
(parasitoids & predators)

- **Weed Management**

Maintain permanent vegetative soil cover & reduced tillage

- Manual or mechanical weeding
- Keep weeds from going to seed
- Use of mulch: preferably organic materials
- Burn weeds using a flame gun
- Use of organic herbicides
- Biological control: use of grazing animals



Use of organic mulch



Use of legume cover crop to suppress weeds in orchards



- **Natural pesticides allowed in organic Farming: Disease control**

1. Sulphur- against fungal disease
2. Copper- against fungal disease (only 2 application per crop cycle as it gets accumulated in the soil and may harms soil organisms),
3. Ashes- against soil-borne disease,
4. Slaked lime- against soil-borne diseases
5. Baking soda- against fungal diseases

- **How to Start Organic Production ?**

Switching from conventional to organic is not simply to replace synthetic fertilizers or toxic pesticides by botanical pesticides

- *What are the advantages and challenges ?*



- **The procedure of conversion of a farm commonly consists of three steps.**
- 1. In a first step,** it is recommended to collect information on appropriate organic farming practices.
 - 2. In a second step,** the most promising organic practices should be tried out on selected plots or fields to get familiar with.
 - 3. In a third step,** only organic procedures should be implemented in the entire farm. Support from an experienced extension officer or a farmer is usually very helpful to give guidance in the process.



- **Conversion to organic**
- ✓ **Introduce farm animals** - provide valuable manure and diversify farm income through additional animal products.
- ✓ **Grow cover or green manure crops** /or lay out **mulches** in perennial crops provide protection to the soil
- ✓ Take additional measures to **control soil erosion**
- ✓ Use **seeds without pesticide** -treatments, if available. Get familiar with non-chemical ways of treating seeds.
- ✓ Get familiar with approaches and methods of **natural pest and disease control.**
- ✓ Learn about **beneficial insects** and observe population dynamics of pests through regular monitoring during crop growth.
- ✓ Further diversify the farming system to increase productivity of the land and **provide habitats for beneficial insects and spiders**

- **Success factors in the conversion process**

- Adequate training in organic agriculture and organic production methods
- Develop strategies to cope with initial drop in yields and higher labor requirement
- Competent and timely advise on organic crop management
- Regular exchanges with experienced organic
- Selling of produce during transition : “*Produce in conversion to organic*”

Adapting the production systems :-

- Try out organic technologies on small plots to gain experience
- Identify suitable crop rotation and intercrops
- Ensure sufficient input of organic manure

- **Organic standards**

Various organic standards : private, national, regional and international level.

The **IFOAM Basic Standards** and **Codex standards** provide a frame work for certification bodies and standard setting organizations worldwide to develop their own certification standards

Republic of Mauritius

Presently developing a national organic standard for organic foodcrop production under TCP/MAR/3502

- **Organic standards**

Organic standards address various aspects of organic production, namely:

- ✓ general farm production requirements and conversion periods
- ✓ crop production requirements
- ✓ processing and handling requirements
- ✓ Record keeping of production and sales records
- ✓ social justice requirements
- ✓ labeling requirements
- ✓ Undergoing periodic on-site inspections

✓ Permitted substances for production of organic foods

- **Organic certification**

Organic certification is a system that confirm that a product is produced and processed according to specific organic standards.

Certification body assesses a farm and assures in writing that it meets the requirements of the organic standards. The inspector transmits his findings to the certification body as a written report. The certification body compares the results of the inspection with the requirements of the organic standards. A certification committee decides whether certification may be granted or not.

- **Organic certification Labels** help the consumer to recognize trustworthy organic products easily.

- **Organic certification systems**

Certification most commonly happens via:

- ✓ **Individual third party certification** by an **independent certification body** e.g Soil Association, ECOCERT or public certification bodies
- ✓ **Group certification**, whereby a group of farmers implement an Internal Control System (ICS) and are certified collectively by a third party certification body, which assesses the performance of this system.

- **Importance of adopting an organic standard and certification**

1. To **protect consumers** of organic produce against misrepresentation and fraud
2. To **protect producers** of organic produce against misrepresentation of other agricultural produce as being organic
3. To ensure that **all stages of production**, preparation, storage, transport and marketing **are subject to inspection and comply with the standards**
4. Provides the consumer **an assurance/ confidence** of organic products integrity
5. Enable product to be **trace back** to source

Organic
Good for nature
Good for you



THANK YOU

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