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

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

• Lettuce- Hexaconazole
• Carrots- Profenofos
• Chilli- Formetanate, Imidacloprid, Profenofos, Cypermethrin
• Pineapple- Dìuron
• Lady’s finger- Flonicamid
• Pipengailles- Cypermethrin
• Red beans: Cypermethrin
• Basmati white rice
La situation des pesticides en Mauricius

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

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
- Environmental Pollution
- 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 produce image](image1)

![Field image](image2)
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 to 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, repellant 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)
Integrated Crop Management

- Soil & water conservation
- Residue management/recycling
- Soil fertility management
- Integrated Nutrient Management
- Crop Rotation/Genetic diversity
- Integrated Pest Disease and Weed Management

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 ungingulata* (Cowpea)
- *Canavalia ensiformis* (Jackbean)
- *Leucaena* (*Acacia*) (for alley cropping)
- *Calliandra* (for hedgerow cropping)
• 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 on location/susceptibility to pests & diseases / market
  Herbs, salad crops, leafy greens, root crops, beans, groundnut, creepers, cruciferae, 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

**LEGUME**
Beans, cowpea, groundnut...

**LEAF**
Brassicas, Lettuce, Greens, herbs...

**FRUIT**
Eggplant, cucumber, pumpkin, squash, chilly...

**ROOTS**
Radish, beetroot, sweet potato, carrot, garlic, onion ...

**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
• 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 / repellant crop

Cultural and Physical methods
sanitation, traps, baits

Botanical and microbial pesticides

Biological control (use of predators and parasitoids)

Integrated Pest and Disease Management

Pheromone trap

Encarsia sp.

Eretmocerus sp.

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 by manure 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 framework 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.
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/conficence of organic products integrity

5. Enable product to be trace back to source
THANK YOU

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