Market garden production systems in periurban area of Mahajanga. Determinants of agricultural practices of organic fertilizer for technical innovation

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Context of the study

- Urbanization in developing country and food demand growth
- Importance of market gardening to insure the food security and incomes

Constraints
- Scarcity of land
- Socio-economical: land tenure, investment capacity, costs of inputs (fertilizers, pesticides)
Fertilization constraints and alternatives

- Valorisation of urban wastes from urban livestock, from agro-industries, or domestic wastes.

It is necessary to assess

- The traditional fertilization practices
- The available urban organic matters and their agronomic characteristics
Materials and methods
Materials & Methods

- The study site: Mahajanga
  - Dry tropical climate
  - Main plant production: leafy vegetables

- Conceptual model of technical decision
  - Samples of market gardening farms (12)
  - Record weekly cultural operations during two years
  - Verify on a larger sample (30)
Results and discussion
Farming systems of market production systems

- Unit of crop management: plot of 12-14m²
  - Lake: 120 beds (1680 m²)
  - Depressions: 400-1200 m²
- Crops dominated by Brassicaceae family
Farming systems of market production systems

- Labor force: mainly manual and familial

- Vegetables sold in the urban markets of Mahajanga
  - sold through female retailers, chemical fertilizers suppliers
  - exclusive source of vegetables supply
Planning fertilization of «Anantsonga» (short cycle species)

- Soil tillage
- Transplantation or sowing
- Fertilization
- Harvest
- Fertilization
- Fertilization
- Harvest

Day
1 5 10 15 21 5 10 15 21

- Organic matter
- Urea

And Urea
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<table>
<thead>
<tr>
<th></th>
<th>Urea</th>
<th>Cattle</th>
<th>Pig</th>
<th>Poultry</th>
<th>Sheep</th>
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</thead>
<tbody>
<tr>
<td>460mg.g⁻¹</td>
<td>16 mg.g⁻¹</td>
<td>12 mg.g⁻¹</td>
<td>29 mg.g⁻¹</td>
<td>21 mg.g⁻¹</td>
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<td>100 kg N ha⁻¹</td>
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Organic and mineral fertilizers functions according to farmers

Manure application
- Fertilizer for the current cycle: growing vegetables in width
- Mulch effect (fundamental): water limited, irrigation entirely manual,
- Amendment for the rice crops

Urea application
- First supply: plant growth in high
- Second supply: green color
Farmers determinants

- Availability on the local market of these fertilizers:
  - Frequently lacking during the season
  - Organic matters: lacking in the main months (June to August): demand > offer

- Capacity of farmers to buy and/or to apply it:
  - No investment capacity: vegetables cycles in April: money/fertilizers for following cycles.
  - Work organization = no time to look for organic matter and depend to go-between mens
Conclusions
Conclusion

- Complexity of the role of fertilizers
  - Fertilizer, amendment and soil water conservation
  - Role or mineral fertilizer: plant growth and plant quality (green color)
- Importance of livestock

- Alternatives
  - Inventory of other organic resources from domestic urban waste, Agro industries wastes, Fisheries wastes
  - Assessment of their capacity to substitute all the functions of mineral and organic fertilizers