TECHNICAL DETAILS ON THE MICROGARDENING PRODUCTION SYSTEM

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1. Justification of the technology

The Microgardening technology is mainly based on 1 or 0.5 m^2 wood tables and therefore, can be installed everywhere. Land is an issue in peri-urban/urban and even in some rural areas. The technology can be installed everywhere in household compounds (even in terraces and balconies) to replace land. In addition, the reduced area of the tables (a few m^2) is compensated by the high yield expected. Other materials can also be used (recuperated tyres, pipes, etc.). This is a crucial advantage in built-up areas where already limited space is under rising pressure as urban and periurban populations continue to grow. This can also sometimes be an issue in rural areas where farmers (particularly women) have not yet secured ownership rights over the land they cultivate, and so remain reluctant to invest in inputs and plant crops whilst there remains a risk of their land being taken away from them (See plate).

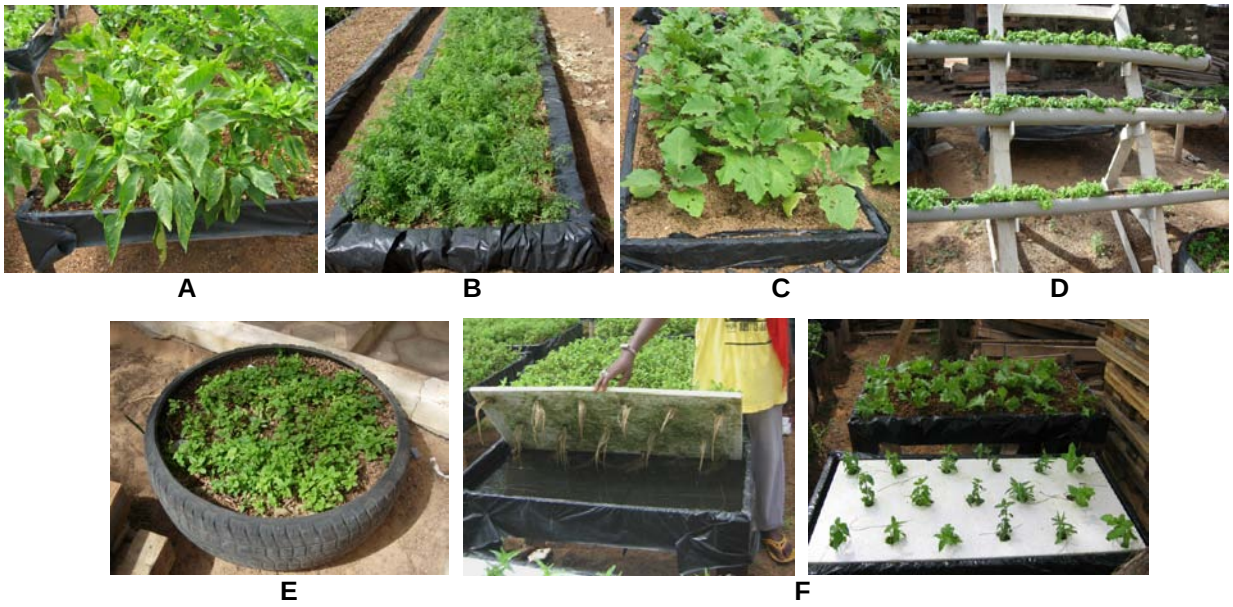

Plate 1: Different types of stands used : Solid substrate in 1 or ½ m^2 wood tables (A), dug beds with a cement brick (B) or wood (C) frame, recuperated pipes (D) and tyres (E) and hydroponie on wood stands.

Microgardening involves far less physical labour than conventional gardening due to the process involved. As a result, people with different handicaps (disabled and old persons, PLHIVs) can be involved in it.

2. Tools and accessories needed

The technology is first based on the beneficiary making his (her) tables. Accordingly, he (she) needs to be trained for this purpose. As a result, the main carpentry tools (hammer, nails, saw, nails, pins, wood, tapeline, etc.) in addition to accessories like plastic, sponge sheets, drainage pipes, etc., should be available. In particular, recuperated wood palettes and solid substrate components (rice husks, groundnut shells and gravels) should be available (see plate 2).

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Plate 2 : From left to right, views of recuperated wood palettes, rice husks, groundnut shells and gravels

3. Main principle and advantages

The principle is based on the use of locally available and affordable resources like recuperated wood, but also used car tyres, pipes, etc. In addition, given its soilless characteristic, special substrates are used [solid substrate made of groundnut shells (60%), rice hulls and gravels (20% each) and hydroponie]. As a result:

- It doesn't require soil preparation (only adding of more groundnut shells/rice hulls when needed);
- It does not need weeding;
- It requires less physical effort for other crop husbandry techniques.

4. Plant species involved

As many vegetable species can be grown as in case of standard beds (between 25 and 30 including root and tubers). As a result planting material is as diverse as compared to standard bed: seeds (direct sowing, nursery seedlings), cuttings, tubers, etc.). As it relates to nursery seedlings, they can be obtained from a normal bed nursery, or tray sowing, or even a post-nursery consisting of a floating nursery (hydroponie) whereby 2 true-leaf plantlets from a normal bed or a tray are transplanted to shorten the nursery duration.

5. production seasons

Microgardening is adapted to all growing seasons. In rainy season, the excess of water caused by heavy rains can be easily evacuated by a draining pipe (See below).

6. Plant nutrition

Crops are fertilized on a daily basis with special soluble solutions (ready-made easy-to-use ones). 2 main solutions used being:

- A macronutrient solution, providing N (nitrogen), P_2O_5 (phosphorous) and potassium (K_2O) with main sources as follows: potassium nitrate, calcium nitrate and mono ammonium phosphate;
- A micronutrient solution providing the main oligoelements (manganese, zinc, boron, molybdenum, iron) and 2 secondary elements (Magnesium and sulphur) from different sources.

Plate 3: Aspect of micro and microelements solutions

Irrigation is carried out with small quantities of water (2 litres/m^2 daily), and the drainage pipe inserted in the solid substrate throughout the wood frame, allows for elimination of water excess to maintain the substrate at field capacity.

7. Crop protection

The end result of microgardening production is to obtain a semi-organic produce, through the minimum use of inorganic pesticides. As a result, as many organic pesticides as possible will be used [neem products (against caterpillars, flies, spidermites, etc), *Jatropha* oil (spidermites), Eucalyptus leaves (aphids and other sucking pests), etc.].

8. Plant lifecycles and yields

- *Plant lifecycles and yield*

  Under normal growing conditions, crop duration is observed to be shorter as compared to conventional production, as a result of more effective plant nutrition (e.g.: lettuce can develop faster and mature after about 28 days after transplanting.

- *Produce quality*: Vegetables produced are considered semi-organic as the chemicals used in the process are minimised in favour or organic inputs. The better quality (external aspect, taste, etc.) is recognised by all.

- *Production costs*: The level of productivity of correctly managed crop is normally higher. For example, lettuce can produce 35 heads per 1.2 m^2 table in 28-30 days vs. 35 days and 20 heads expected from a standard bed.

Broccoli **Cauliflower** **Lettuce** **Sweet pepper**

Plate 4: Examples of organic produce from microgardening

9. Production cost and potential income (See table below)

Production costs and expected income of 1 or ½ m^2 table for different vegetable species (in D)

Items	Lifecycle (days)	Production (kg/m^2)	Tables (total cost)	Input coSts	Actual cost /crop	Estimated turnover $(GMD)^2$
Tomato	85	20	300	34.24	76.74	240
Cabbage	90	24	300	34.84	79.84	240
Lettuce	30	30 (2)	300	43.4	60.9	525
Sweet pep	90	20	300	39.4	84.4	480
Hot pep	150	4.5	300	45.7	120.7	157.5
Eggplant	110	24	300	35.83	90.83	240
Mint (1)	365	400 (3)	300	97.1	279.6	600
Courgette	90	24	300	24.64	69.64	360
Cucumber	90	24	300	28.6	73.6	240

(1): ½ table (hydroponie); (2): heads; (3): bundles
(2): GMD: Gambian Dalasi: Exchange rate : $1 = GMD 26-30.