FRUIT & VEGETABLES
FOR SUSTAINABLE HEALTHY DIETS
SCIENCE
MEETING
DECEMBER 06, 2024
COLOMBO, SRI LANKA

Good agronomic practices for safe and sustainable vegetable cultivation in Sri Lanka: Experiences of farmer participatory trials

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Background

- The yields of the major vegetables are three and twice less than in several countries.
- Current commercial production is comparatively unsustainable than the traditional cropping systems (Weerakkody et al., 2000; Suriyagoda et al., 2012).
- High use of external chemical input and the overuse of natural resources, leaving people's health at risk
- Overuse, misuse, and abuse of agrochemicals in vegetable cultivation have been reported in many studies
- Elevated levels of Cd, Ni, Cu, Pb and Zn in the topsoil of up-country vegetable growing areas

Major constraints for safe, sustainable and year-round vegetable production

- Poor soil fertility conditions
- poor plant health management
- Mismanagement of inputs
- Increasing extreme climatic events
- Extension gaps
- Market Uncertainty
- Improper pre-harvest and post-harvest practices triggering food waste and losses, lack of conducive policies
- Damages caused by wild animal pests
- capacity constraints of farmers and extension officers

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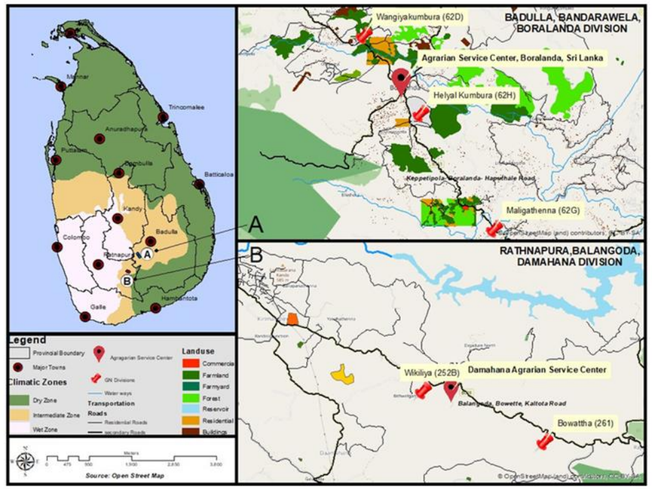
Farmer participatory trials

- Locations: Two production hubs
- Year: 2023/2024
- No. of farmers: 2023- 60
  2024- 75
- Area of trial field-250 M^2 each
- Crops: Carrot, cabbage, pole bean and tomato
- Collaborations: Department of Agriculture-Sri Lanka, and World Vegetable Center
- Protocols with a package of good practices developed by World Veg and contextualized by DoA



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Good practices introduced for safe and sustainable production

- Soil testing for pH adjustment and fertilizer recommendation
- Production of healthy seedlings using nursery trays- E.g. Cabbage
- Selection of good seed variety and chemical seed treatment
- Recommended spacing and thinning out of plants
- Soil health-Straight fertilizers and IPNM
- Plant health- Use of biopesticides, recommended cultural practices, and recommended dose of synthetic pesticides (IPM)

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Differences in input use-Pole bean cultivation

Trial field

- Soil amelioration- Liming based on determined pH
- Seed treatment-Homai (Thiophanate methyl), Cruiser (Thiamethoxam)
- Seeds-1-2 seeds per hole
- Fertilizer- Urea, TSP, MOP, and organic fertilizers (poultry manure)
- Pesticides-Policar (Filter Tebuconazole), Chess (Metro pymetrozine), Corogen (Chlorantraniliprole)
- No growth regulators, minerals, and hormones were used

Conventional field (control)

- Lime was added without knowing the pH.
- Seed treatment is not a common practice
- Farmers used multiple seeds per hole
- Fertilizers- Vegetable Mixture, Potato mixture, Nitrophoska,
- Pesticides- Policar, Coragen, Deconil (Chlorothalonil), Chess (Metro pymetrozine), Profenophos, Abamectin
- Application of growth regulators, minerals, and hormones is very common

Cost and return of Bean cultivation(Partial budget analysis)

Cost component (LKR/ha)	Trial field	Conventional field	% difference
Cost of soil amelioration	26,680	32,838	+19
Seed cost	128,000	205,200	-38
Cost of organic inputs (fertilizers, biopesticides, yellow sticks, etc.)	184,000	73,633	+150
Inorganic fertilizer cost	172,840	683,333	-75
Inorganic pesticides cost	263,200	924,063	-72
Total average purchased input cost	748,040	1,886,229	-60
Average yield (kg/ha)	5935	4120	+44
Gross return (LKR/ha)	2,252,425	1,743,983	+29

Cost and return of Cabbage cultivation(Partial budget analysis)

Cost component	Trial field (LKR/ha)	Conventional field (LKR/ha)	% difference
Cost of soil amelioration	45,550	49,989	-9
Seed cost	184,000	320,000	-43
Cost of organic inputs (fertilizers, Bio pesticides, yellow sticks, etc.)	184,000	100,125	+84
Inorganic fertilizer cost	195,910	963,197	-80
Inorganic pesticides cost	309,600	548,633	-44
Total average purchased input cost	873,510	1,931,955	-55
Average yield (kg/ha)	20157	15754	+28
Gross return (LKR/ha)	3,500,786	2,759,100	+27

Cost and return of Carrot cultivation(Partial budget analysis)

Cost component	Trial field (LKR/ha)	Conventional field (LKR/ha)	% difference
Cost of soil amelioration	49,324	25,530	+93
Seed cost	248,000	221,000	+12
Cost of organic inputs (fertilizers, Bio pesticides, yellow sticks, etc.)	130,000	71,550	+82
Inorganic fertilizer cost	251,840	782,209	-68
Inorganic pesticides cost	86,941	859,453	-90
Total average purchased input cost	716,781	1,934,212	-63
Average yield (kg/ha)	13179	9758	+35
Gross return (LKR/ha)	4,033,859	3,027,341	+33

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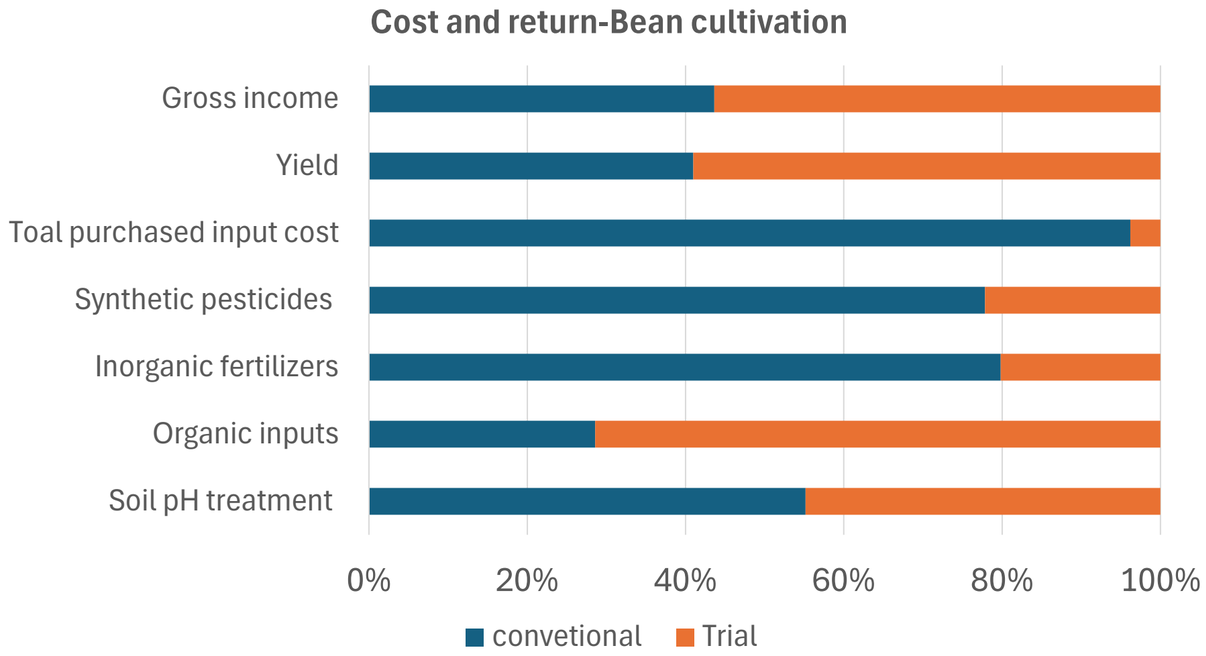
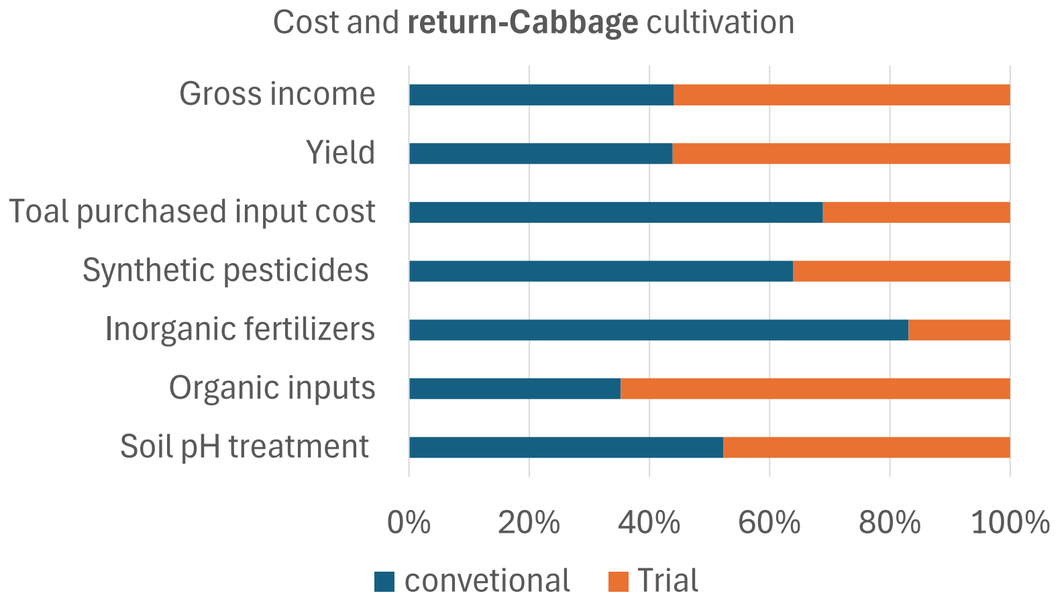

Cost and return-Bean cultivation
Gross income
Yield
Toal purchased input cost
Synthetic pesticides
Inorganic fertilizers
Organic inputs
Soil pH treatment
0%
20%
40%
60%
80%
100%
convetional
Trial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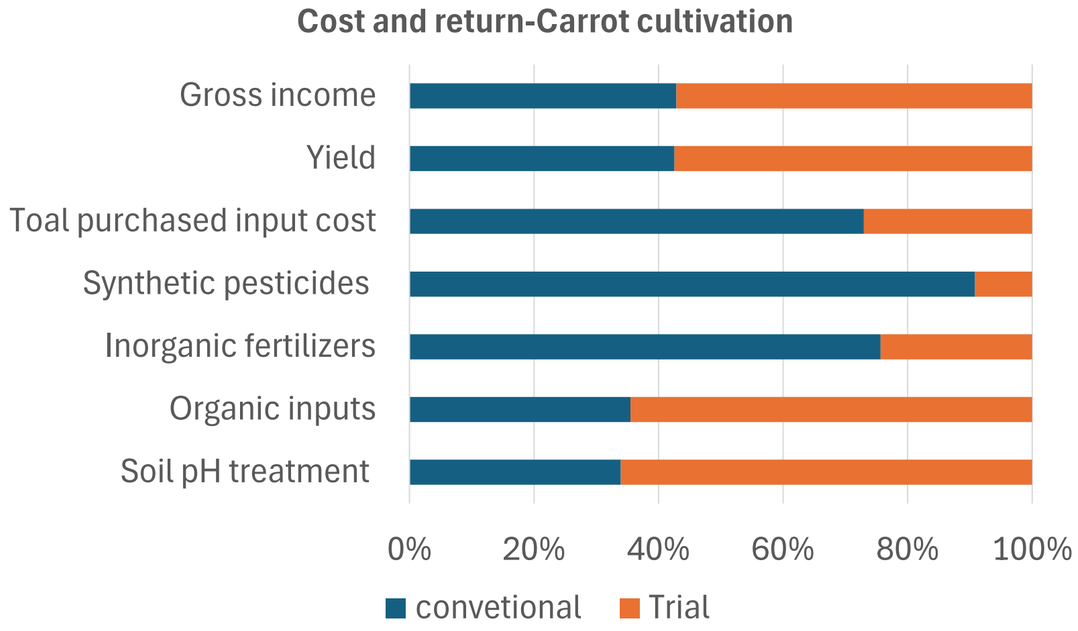
Cost and return-Carrot cultivation
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Yield
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Synthetic pesticides
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Soil pH treatment
0%
20%
40%
60%
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100%
convetional
Trial

Summary of the findings

- Reduction in inorganic fertilizer use- 12-42%
- Reduction in inorganic pesticide use - 41-96%
- Increase of crop yield- 22-44%
- Increase of gross income- 21-33%

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Concluding remarks

- The good agronomic practices promoted by the project have increased input use efficiency.
- Side-by-side trials and control plots in the farmers' fields provided clear evidence of overdosing chemicals and other resources
- Promoting simple technologies - soil testing to decide the soil pH and fertilizer recommendation, IPNM, IPM, etc., can convert the conventional farming system into a more sustainable way of cultivation.
- However, changing the farmers' traditional behaviors, beliefs, and attitudes requires continuous guidance and interventions for long-lasting change.

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Thank You

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