Experience in Organic Agriculture Projects Implementation

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Ministry of Agriculture

Organic Agriculture

Organic Agriculture is holistic production management systems which promotes and enhances agro ecosystems, health including bio diversity, biological cycles and soil biological activity.

Government Policies

- “Minimize the use of synthetic pesticides through promoting bio-pesticides and IPM”

- “Promote production and utilization of organic and bio-fertilizers and gradually reduce the use of chemical fertilizer”

Government Supporting Areas

- Financial assistance
- Coordination
- Popularization
- Technology development and dissemination

Government Involvement

Policies

Support

To increase the organic crop production in Sri Lanka

Government support on OF should be further extended

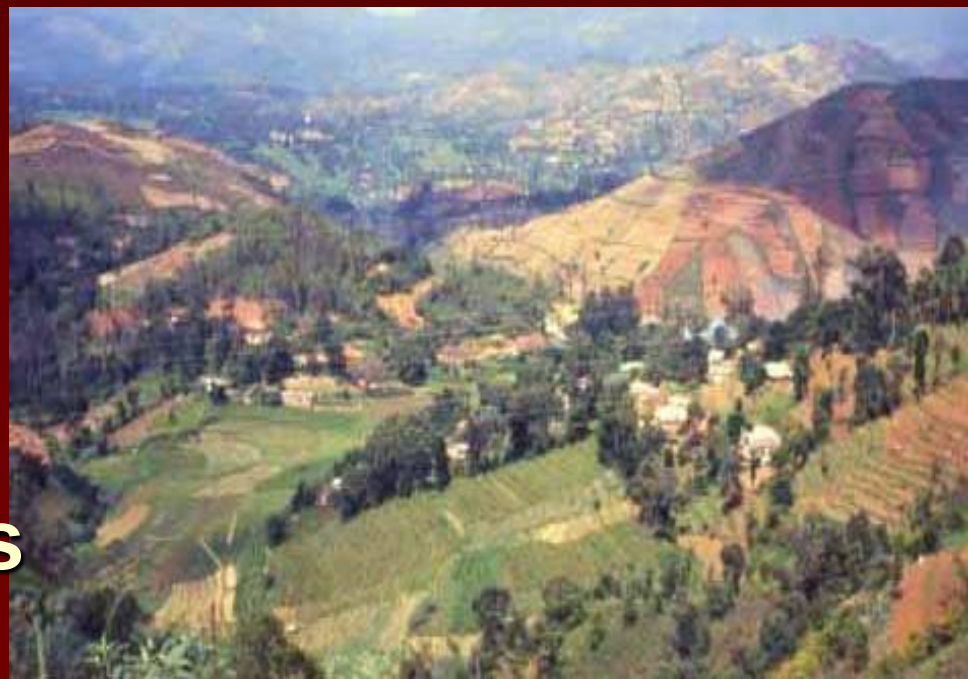
Challenges for Organic Crop Production in Sri Lanka

Soil Constraints

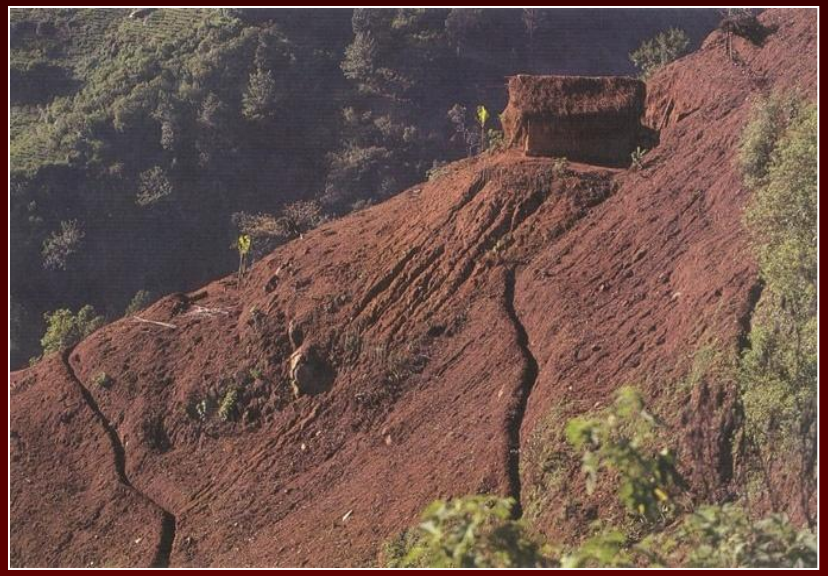
- Low soil OM
- Low soil fertility
- High soil acidity
- High soil erosion
- Soil compaction
- Low microorganisms

Problems Associated with Sri Lankan Soils

- Low organic matter content
- Low soil fertility
- Low plant nutrient content (low P)
- High acidity
- Salinity
- Fe toxicity
- Poor physical and biological properties



Soils



Low Soil Fertility

- Physical
- Chemical
- Biological

Available Soil P (mg/kg) in Different Cropping Systems in the LCWZ

Rice*		Vegetable**		Fruits**	
Soil P	No of Sites(%)	Soil P	No of Sites(%)	Soil P	No of Sites(%)
<5	33	<10	43	<5	41
5-10	36	10-20	30	5-10	28
10-20	26	20-30	03	10-20	17
>20	05	>30	24	>20	14

(Source: Wijewardana *et al* ., 1998*, 1999a, 1999b***)**

Application of Eppawala RP

Low Organic Matter in Soil

Majority soils are Low in Organic Matter

Importance of Soil Organic Matter in Crop Production

- Chemically active portion of the soil
- Reservoir for various essential elements
- Increase CEC
- Promotes good soil structure
- Buffers soil pH
- Promotes good air and water retention in soil

Importance of Soil Organic Matter Cont.…

- Increase physical, chemical and biological properties
- Supply plant nutrients.
- Energy for microorganisms
- Breakdowns herbicides and pesticides

Suitable Organic Manure Sources

Compost

Green Manure

Poultry Litter

Cattle Manure

Effect of Poultry Manure on Pod Size of Okra

Soil Acidity in Different Areas

Rice*- LCWZ		Vege.** - LCWZ		Vege***.- UCIZ	
pH	No of sites (%)	pH	No of sites (%)	pH	No of sites (%)
< 4	9	< 4	2	< 4	8
4 - 5	47	4 - 5	38	4 - 5	66
> 5	44	5 - 6	43	5 – 6	22
		> 6	17	> 6	4

(Source: Wijewardena *et al*., *1999a, **1999b, ***1996)

Problems Associated with High Acidity

- P Fixation (with Fe and Al)
- Low availability of some nutrients
- Toxicity of some nutrients (Fe and Al)

Correction of Soil Acidity in Organic Vegetable Production

Every year application of 2 t/ha

- Lime

or

- Dolomite

Application of liming materials in vegetable cultivation

Major Components of Organic Farming

- Organic manures/ Organic fertilizers.
- Bio-fertilizers.
- Soil amendments.

Type of Fertilizers Use in Organic Agriculture

- Organic Manures/Organic fertilizers (Main input)

- Natural Products (RP, Dolomite, lime etc.)

- Foliar fertilizers (Natural or organic base)

Understand the Characteristics of growing Crops

Vegetable Crops

- Short duration
- High nutrient removal
- More sensitive to available nutrients
- Shallow rooted (Limited soil volume)
- Fast growing
- Susceptible to diseases

Nutrients Removal of Vegetables

Crop	Dry matter yield	NPK removed
Bean	6.5	327
Beet	11.6	560
Cabbage	5.3	371
Carrot	12.9	509
Leeks	14.6	465
Lettuce	2.2	138
Raddish	1.0	80

(Source :Greenwood *et al.*, 1980)

Importance of Organic Vegetable Cultivation in Sri Lanka

- High use of chemical fertilizers in conventional farming (2-3 times recommended)
- Indiscriminate use of agrochemicals
- Consumption of vegetables in raw form
- Daily consumption
- Consumption of high quantity

Special Features in Vegetable Cultivations

Low country vegetables	Up country vegetables
• Low intensive	High intensive
• Low inputs	High inputs
• Low price	High price
• Low demand	High demand
(High potential for OF)	(Low potential for OF)


Effect of different levels of cattle manure on mixed cropping of vegetables in organic farming systems.
R1
R2
R3
R4
15 t/ha
60 t/ha
45 t/ha
30 t/ha
15 t/ha
Effect of different levels of cattle manure on vegetable cultivation in organic farming systems
R2
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Adoption of Technologies in Organic Vegetable Cultivation

Level of cattle manure on mixed cropping of vegetables

Effect of different levels of compost on yield of crops (t/ha)

Rate of Compost (t/ha)	2006/2007 Okra	2007 Brinjal	2007/2008 Cabbage	2008 Bushita	2008/2009 Okra
0	1.77	2.58	1.03	2.45	1.27
10	1.87	4.65	4.13	3.71	3.88
20	1.94	5.8	0.67	4.46	2.41
40	2.32	7.14	12.02	5.23	5.35
80	1.77	8.05	10.6	4.06	5.67

Effect of different sources of compost on yield crops (t/ha)

Type of Compost	2006/2007 Capsicum	2007 Okra	2007/2008 Brinjal	2008 Okra	2008/2009 Melon
No manure	2.29	1.12	0.89	0.05	2.63
Commercial compost	3.78	3.61	2.16	1.18	18.95
Green manure compost	3.34	2.69	2.21	0.61	17.55
Salvinia compost	2.68	2.56	1.05	0.51	15.5
Broiler litter compost	3.91	3.21	2.03	1.56	17.42

Suitable Fertilizer Materials

Most Suitable Organic Manure Source in Organic Vegetable Production Systems

Importance of compost in Organic Vegetable Production

- All nutrients are readily available
- No harmful effects
- Can be used even in top dressings
- Similar to chemical fertilizer (in terms of nutrient availability)
- Contain all plant nutrients
- Increase soil fertility
- Environmental friendly
- High adoptability by growers
- High microbial activity
- Free from pathogens

Important Practices in Organic Vegetable Cultivation- Mulching

- Control weeds
- Increase moisture conservation
- Increase organic matter content
- Increase micro organisms in soil
- Loosened soil

Pest & Disease management

Use different methods and tricks except artificial chemical application to control pests

- **Biological Control**
- **Agronomic methods**
- **Use pest repellents**

Biological Control

- Maintain balanced system
- Encourage multiplication of predators of pests
- Destroy the pests by predators

Pest Problems in Organic Vegetable Production


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Remedies

Diseases in Organic Vegetable Cultivation

Pest and Disease Management

Mechanical control methods

- Bird net
- paper bags

Modification of the physical environment

- Light traps
- Sticky traps
- Birds scaring devices

Suitable Plant Extracts

- Neem
- Garlic
- Onions
- Tobacco
- Chilli
- Ginger
- Gliricidia
- Lantana
- Tithonia
- Wild plants

Commercial preparation of Bio Pesticides should be available

Suitable Cropping Systems

Mixed cropping systems

Home Garden

Most Successful Organic Vegetable Production System in Sri Lanka

Organic Garden at Makandura

Important Agronomic Practices

- Proper land preparation
- Management of seedlings at nursery
- Good sanitary conditions
- Mix cropping with pest repellents
- Grow pest repellent plants
- Crop diversification
- Crop rotation

Selection of Crops

- Suitable crops for climatic conditions of the region
- High demand crops by consumers
- Economically viable
- Tolerant for common diseases
- Responsive to organic fertilizers

Advantages in Organic Farming

- Quality products
- Keeping Quality
- High nutrient contents
- Safe food

Keeping Quality of Organic Vegetables

Challenges in OF

- Low yield particularly at the beginning
- Marketing
- Price of organic products
- Low technology development
- Chemical fertilizer subsidy
- Balance plant nutrition supply

Effect of different fertilizer application systems on yield of cabbage

Treatment	Yield (t/ha)
No fertilizer	10.4
NPK	55.0
PM	58.0
PM + NPK	88.1

NPK - Recommended levels

PM - Poultry manure (10 t/ha)

(Source: Wijewardena, 1993)

Nutrient deficiencies

K deficiency

Present Problems in Expansion

- Less Awareness
- Problems in organic certification
- Farmer attitudes
- Limited research findings
- Marketing and reasonable price


Thank You