

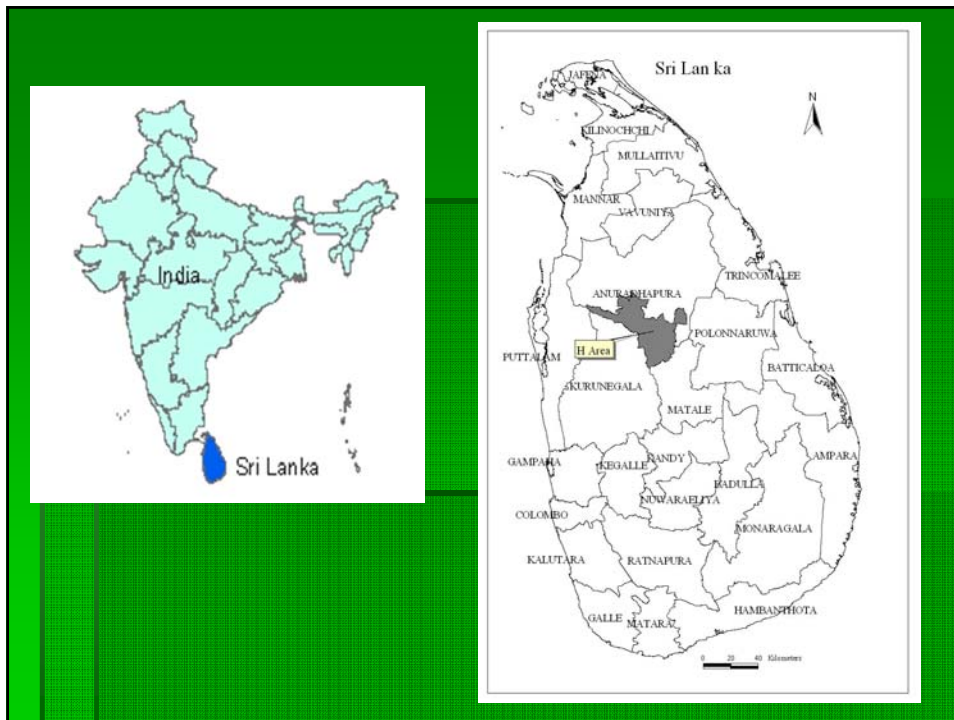
Multiple Crop Diversification and Intensification; A Case Study of Sri Lanka.

by
R.K. Lal Mervin Dharmasiri
Department of Geography
University of Kelaniya
Sri Lanka

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Agricultural Sector of Sri Lanka

- 32.2% employed in Agricultural sector
- 13.4 % sharing GDP of the economy
- Rice/ paddy is the staple food of the Sri Lankan
- Agricultural sector sharing 11.1% for the national economy



Paddy sector of the economy

- Cultivated area
(Yala – 319,000 -Maha – 591,000 ha)
- Direct and indirect employment opportunities - more than 50%
- Average paddy yield 4,070 kg's per ha.
- Maximum average paddy yield was 5303 kg's per ha at *Mahaweli* 'H' area
- Highest recorded total paddy production MTM 3.3 in 2006

Problems of the Agricultural Sector

- High cost of production
- Risk aversion (natural hazards, social uncertainty, state action etc.,)
- Market failure/ fluctuation
- Externalities (demand and market price of the substitutes)
- Negligible growth rate (first quarter of 2007 was 0%)

Crop Diversification

- Crop diversification is defined as the strategy of shifting from less profitable to more profitable crops, changing of variety and cropping system, increasing exports and competitiveness in both domestic and international markets, protecting the environment, and making conditions favorable for combining Agriculture-Fishery-Forestry-Livestock

(Nguyen Van Luat).

Crop Diversification

- **Horizontal diversification / MCD**

more crops to the existing cropping system, which could be referred to as horizontal diversification

simply adding more crops to the existing cropping system is called MCD

- **Vertical diversification**

various other downstream activities, which could be referred to as vertical diversification

Agricultural Intensification

- Agricultural intensification has been defined as the use of an “increased average inputs of labour or capital on smallholding, either cultivated land alone or on cultivated and grazing land, for the purpose of increasing the value of output per ha”
- (Tiffen *et al.*, 1994: 29).

Objectives

- Whether traditional farmers are moving from the subsistence paddy farming to market oriented agriculture (Other Field Crops),
- Whether farmers who cultivate other field crops can be minimized the risk aversions,
- Whether all farmers who cultivate other field crops would be able to achieve better prospects other than paddy cultivation,
- Whether the crop diversification are causing higher farm income (Gross Margin) than traditional paddy cultivation.
- Whether MCD is a sustainable practice?

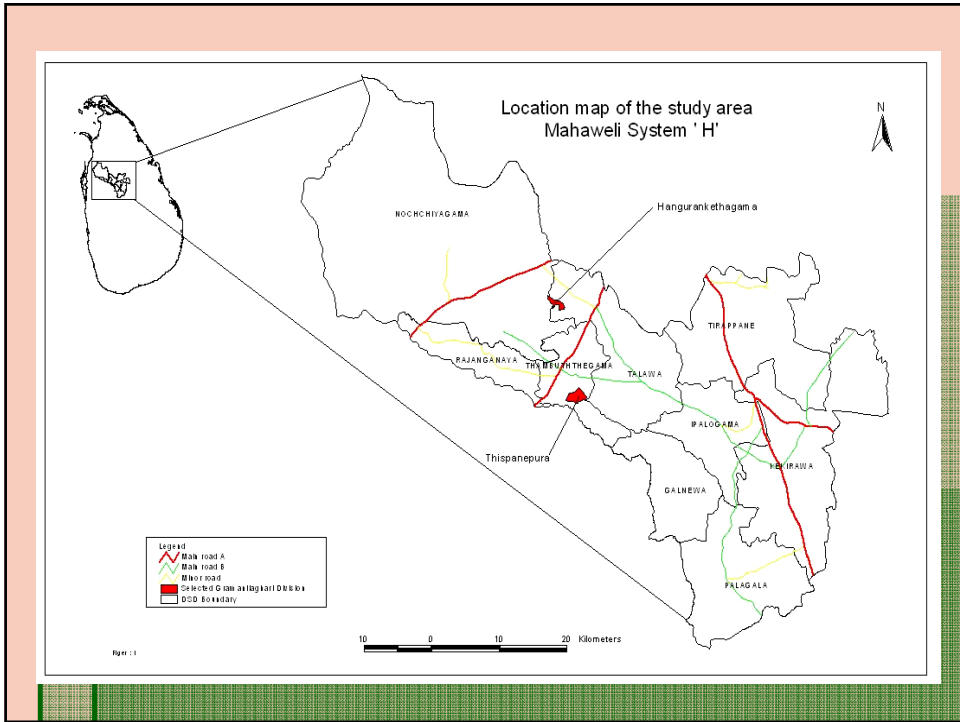
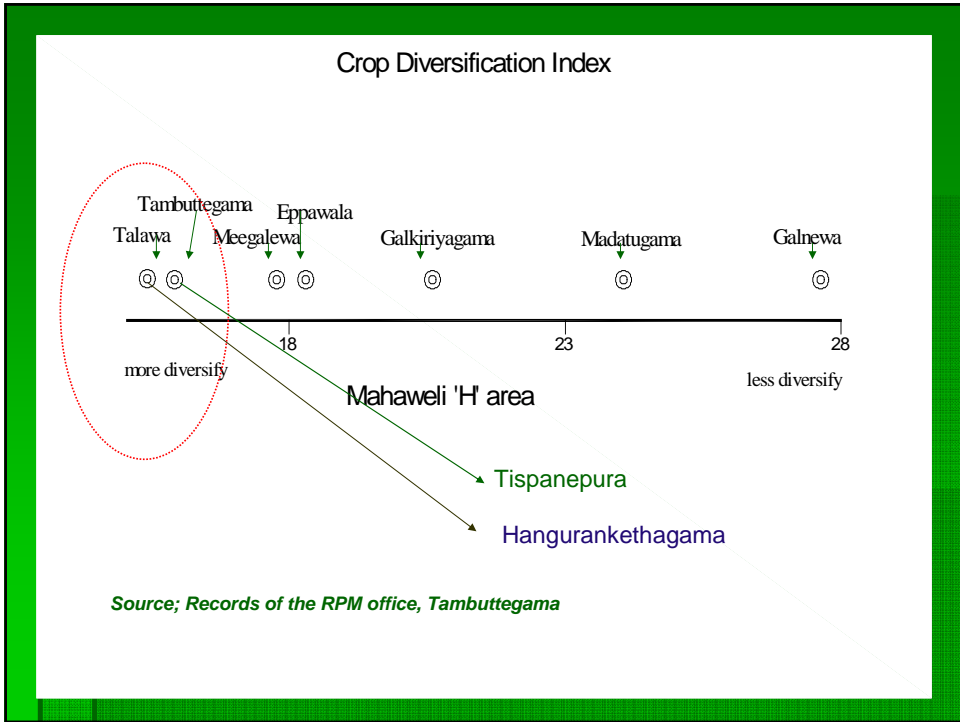
Methodology

▪ Index of Crop Diversification (ICD)

$$\text{ICD} = \frac{\text{Percentage of total harvested area under 'n' crops}}{\text{Number of 'n' crops}}$$

Where 'x' is the percentage of total cropped area occupied by each crop, or hecterage under an individual crop.

(Gibbs Martin, 1962; Bhatiya, 1965; Singh and Dhillon, 2000)



Methodology

Primary Data

Sample of the Study

Village	Number of households	Sample size	Percentage
Tispanepura	266	30	11.27
Hungurankethagama	474	45	9.49
Total	740	75	10.13

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Methodology; Profitability

- **Gross Margin (GM)**
- $GM = \text{Gross Income} - \text{Variable Cost}$
- **Gross Income** = Cash sale, cash income from off farm employment, the market value of the farm product consumed by the households and payments in kind.
- **Variable cost** = (Direct cost) Seeds, fertilizers, additional labor, hired machinery or repair and maintenance of machineries, spraying, transporting, selling cost etc,
- (Abbott and Makeham, 1986)

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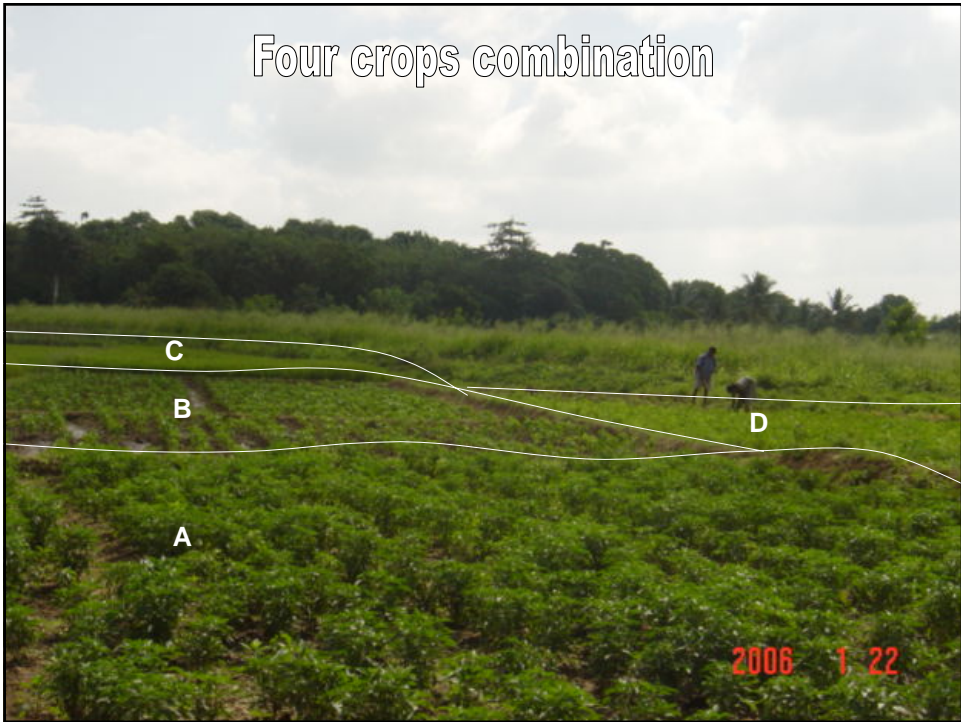
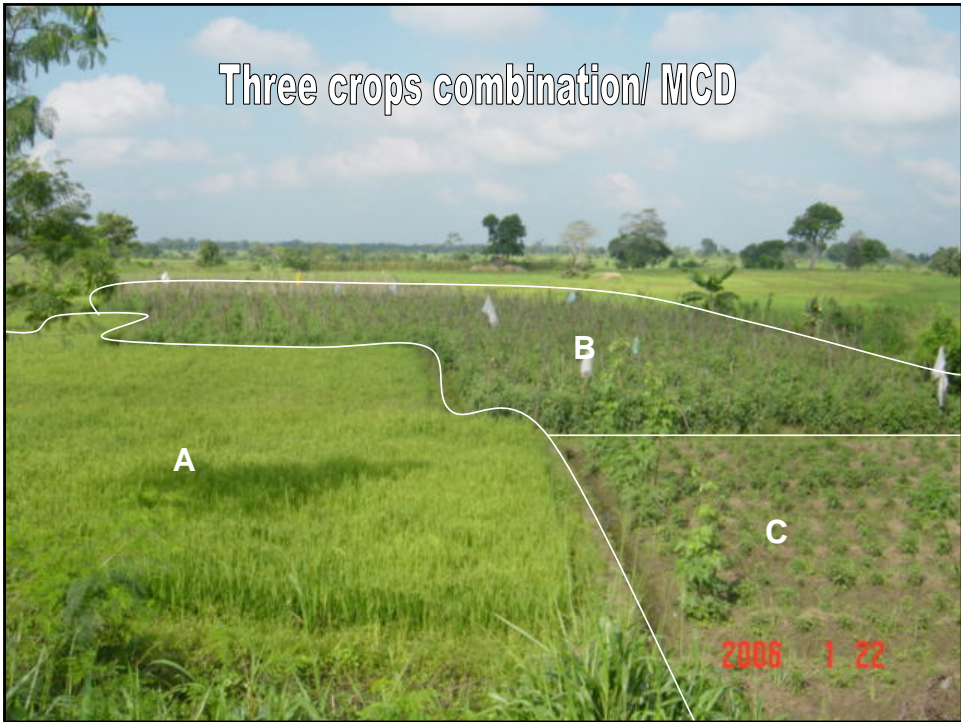
Alternative strategy

- The Mahaweli Authority has introduced a new cropping system to overcome the constraints
- Crop diversification / MCD
 - Maha – Paddy
 - Yala - Other Field Crops (OFC)

Alternative strategy (OFC)

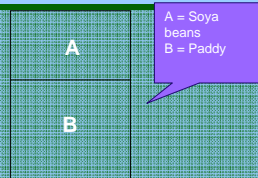






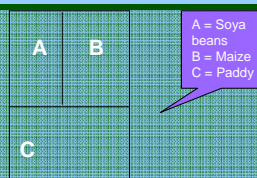
Model of Crop Combination

Two crop combination



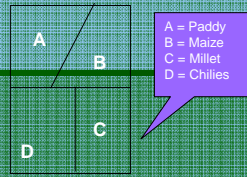
A = Soya beans
B = Paddy

Three crop combination



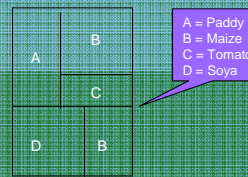
A = Soya beans
B = Maize
C = Paddy

Four crop combination



A = Paddy
B = Maize
C = Millet
D = Chillies

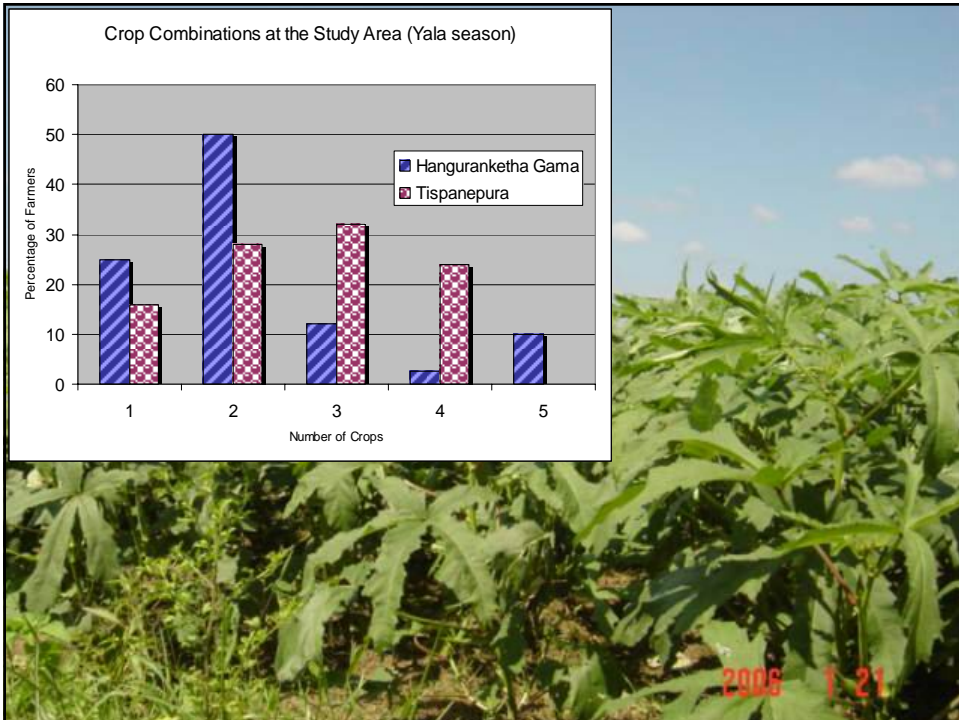
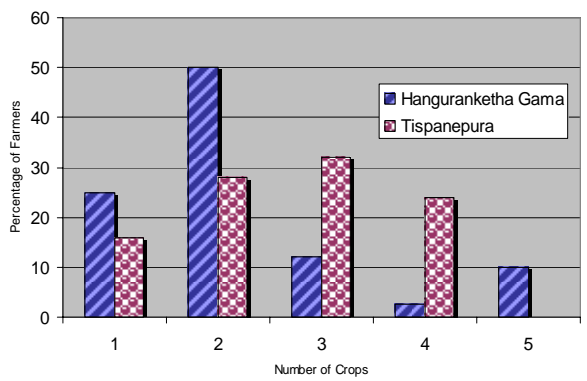
Four crop combination with double cropping



A = Paddy
B = Maize
C = Tomato
D = Soya

Size of the land area = 2 acres

Crop Combinations at the Study Area (Yala season)



Profitability of Agriculture (GM)

Crops	Average yield Kg's per 2 acres	Cost of production	Gross farm income	Average off farm income per family/season	Total farm & non-farm income	Gross Margin
Paddy	4,347	31,880.00	52,160.00	6000.00	58,160.00	26,280.00
Chilies	1,385	88,560.00	131,570.00	6000.00	137,570.00	47,010.00
Big onion	7,850	68,760.00	141,300.00	6000.00	147,300.00	78,540.00
Soya beans	2,575	23,800.00	90,125.00	6000.00	96,125.00	72,325.00
Maize (seeds)	4,750	24,000.00	47,500.00	6000.00	53,500.00	29,500.00
Maize (pods)	30,400	21,600.00	91,200.00	6000.00	97,200.00	75,600.00
Breen gram	1,155	16,000.00	40,400.00	6000.00	46,400.00	30,400.00
Cowpea	1,185	16,650.00	33,200.00	6000.00	39,200.00	22,550.00
Manioc	22,000	48,800.00	154,000.00	6000.00	160,000.00	111,200.00

Source; Field data, 2006


Three crops combination



Crops	Land area (acres)	Gross profit	GM
Paddy	1	10,140.00	
Soya beans	1/2	16,582.00	(6000.00)
Chilies	1/2	10,753.00	
Total	2	37,475.00	43,475.00

Gross profit from 2 acres of Paddy = 20,280.00

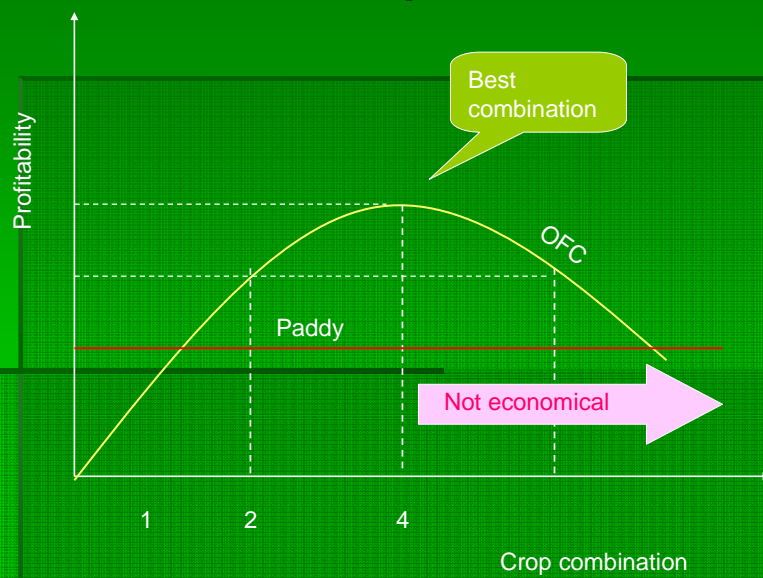
Four crops combination



Crop	Land area (Acre)	Gross profit	GM
Paddy	1/2	5070.00	6000.00
Soya	1/2	16582.00	
Chiles	1/2	10753.00	
B. onion	1/2	17190.00	
	2	49595.00	55595.00

Gross profit from 2 acres of Paddy = 20,280.00

Profitability with MCD



Findings

- 1. Stability of yield
- 2. Comparatively high net returns from crops
- 3. Reduced potential pest and fungal invasion
- 4. Reduced need of chemicals to control pests
- 5. Higher net returns per unit of labor
- 6. Optimization of resources use
- 7. Higher land utilization efficiency;
- 8. Increase employment opportunities
- 9. Crop specialization with economic factors
- 10. Sustainability

Conclusion

- The study found that the MCD with intensification is profitable under certain conditions. The strategy is useful to avoid some constraints and enhance GM of the farmers. Therefore it is further needed to formulate a new agricultural policy framework to impart and practice MCD with rotating and use of more legumes crops for enhances sustainability. MCD is not a perfect strategy for agricultural sustainability but it can develop further to achieve the goals.



Thank you