Journal of Plantation Crops 18 (Supplement) : 356-358

EVALUATION OF LER AND ADVANTAGES IN COCONUT/ ARECANUT BASED SYSTEMS

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ABSTRACT

Advantages in coconut and arecanut based mixed cropping systems are studied using Land Equivalent Ratio (LER), Monetary Advantage (MA), Aggressivity Index (A) and Competition Ratio (CR). Under the irrigated system, arecanut and cacao combination gave a monetary advantage of Rs. 19,193 per ha per year with an LER of 2.18. Arecanut and pepper combination gave a monetary advantage of Rs. 18,402 per ha per year with an LER of 1.50. Coconut and cacao combination recorded a monetary advantage of Rs. 14,920 per ha per year with an LER of 1.46. Under rainfed system, coconut and ginger gave a monetary advantage of Rs. 29,683 per ha per year with a corresponding LER of 1.56. Coconut and turmeric recorded a monetary advantage of Rs. 16,483 per ha per year with an LER of 1.41.

INTRODUCTION

It has been increasingly felt these days that mixed cropping (growing two or more crops on same area of land) can produce more yields than growing the same crops as sole crops. However, because of the complexities involved in mixed cropping situations it becomes difficult to assess the real advantages of the systems. This paper discusses some of the ratios and indices like Land Equivalent Ratio (LER), Monetary Advantage (MA), Aggressivity Index (A), and Competition Ratio (CR) which can be utilised to evaluate different mixed cropping situations.

METHODOLOGY

Relevant data for the studies were collected from the experimental records of Central Plantation Crops Research Institute, Kasaragod and Central Plantation Crops Research Institute, Regional Station, Vittal. The criteria suggested by Willey (1979) an Mead and Willey (1980) have been adopted.

1. Land Equivalent Ratio (LER)

$$LER = \sum_{i=1}^{m} \frac{yi}{yii}$$

Where yi is yield of the i th crop in mixed cropping, yii is the yield of that crop grown as sole crop over an equal area and m is the no. of crops grown

2. Monetary Advantage (MA)

$$MA = \text{Value of the combined intercrop} \times \frac{LER-1}{LER}$$

3. Aggressivity (A)

$$Aab = \frac{Yab}{Yaa \times Zba} - \frac{Yba}{Ybb \times Zba}$$

Where Yab is the yield of the crop in a mixed cropping

Yaa is the yield of the crop grown as sole crop, *Z*ab is the proportion of the crop ('a' grown in combination with crop 'b' and Zba is *vice versa*

4. Competition Ratio (CR)

Competition ratio of crop 'a' with crop 'b' is given by

$$CRa = \frac{LERa}{LERb} \times \frac{Zba}{Zab}$$

With usual meaning for notations

RESULTS

Rainfed systems in coconut

The estimated LER and other advantages in coconut based systems are presented in Table I.

Coconut + cassava: The total LER was 1.15, and to produce the combined mixture yield by growing pure stands would require 15 per cent more land. Thus mixed system gave a 15 per cent yield increase. The monetary advantage in this system over the coconut monocrop was Rs. 3861/ha/yr. Coconut was found to be dominant over cassava and 9.74 times competitive.

Coconut + ginger: The total LER was 1.56 and the MA was Rs. 29683/ha/yer. Coconut was the dominant partner. The CR between coconut and ginger was 4.16 by which it could be inferred that coconut was 4.16 times competitive.

Coconut + turmeric: The total LER computed was 1.41 and the MA was Rs. 16483/ha/yr. The AI showed that

Table I. *LER and other advantages in coconut based systems*

	Yield/ha	LER	Total LER	Proportion of area	Monetary advantage (Rs.)	Aggressivity (A)	Competition Ratio (CR)
Rainfed							
1. Coconut + Cassava	8913 Nuts	0.9328	1.1562	0.30	3861	+2.7903	9.7428
	6.3t	0.2234		0.70		—2.7903	0.1023
2. Coconut + Ginger	9555 Nuts	1.0000	1.5600	0.30	29683	+2.5333	4.1667
	8.4t	0.5600		0.70		—2.5333	0.2400
3. Coconut + Turmeric	9555 Nuts	1.0000	1.4100	0.30	16483	+1.9660	5.6911
	8.2t	0.4100		0.70		—1.9660	0.1757
4. Coconut + E F Yam	9555 Nuts	1.000	1.4292	0.30	13360	+2.7202	5.4365
	10.3t	0.4292		0.70		—2.7202	0.1839
Irrigated							
1. Coconut + Cacao	17540 Nuts	1.0178	1.4626	0.30	14920	+2.7571	5.3010
	0.415t	0.4448		0.70		—2.7571	0.1873
2. Coconut + Banana	17234 Nuts	1.0000	1.2100	0.30	10210	+1.1286	11.1100
	6.3t	0.2100		0.70		—1.1286	0.0900

The average yield per ha of coconut, cassava, ginger, turmeric and EF Yam while raised as monocrop under rainfed condition are 9555 nuts, 28.2 t, 15 t, 20 t, and 24 t respectively. The yield of coconut, cacao and banana while raised as monocrop under irrigated condition are 17234 nuts, 933 Kg dry beans and 30 t respectively.

The prices were coconut Rs. 2.50/nut; Turmeric Rs. 4/Kg; Elephant Foot Yam Rs. 2/Kg; Cassava Rs. 1/Kg; Ginger Rs. 7/Kg; Cacao Rs. 8/Kg and Banana Rs. 2.50/Kg.

Table II. *LER and other advantages in arecanut based system*

	Yield/ha	LER	Total LER	Proportion of area	Monetary Advantage (Rs)	Aggressivity (A)	Competition ratio (CR)
Arecanut	1573	0.8062	2.1814	0.5	19193	—1.1380	0.5900
+ Cacao	1284	1.3752		0.5		+1.1380	1.7000
Arecanut	2432	1.2468	1.4468	0.5	16648	+2.0936	6.2300
+ Banana	6000	0.2000		0.5		—2.0936	0.1600
Arecanut	1950	1.0000	1.5000	0.8	18402	—1.2500	0.5000
+ Pepper	600	0.5000		0.2		+1.2500	2.0000

The average yield of arecanut, cacao, banana and pepper were 1.95 t; 0.93 t; 30 t and 1.2 t respectively, when raised as monocrops. The prices: Arecanut Rs. 16/Kg; Cacao Rs. 8/Kg; Banana Rs. 2.50/Kg and Pepper Rs. 40/Kg.

coconut was the dominant partner and was 5.69 times competitive.

Coconut + elephant foot yam: The total LER was 1.42. The MA of this combination was Rs. 13360/ha/yr. Coconut was the dominant partner and was 5.43 times competitive.

Irrigated systems in coconut

Coconut + cacao: The total LER worked was 1.46 which means that the mixture gave a 46 per cent yield increase. The MA of this combination was estimated at Rs. 14920/ha/yr. Coconut was the dominant partner and was 5.30 times competitive.

Coconut + banana: The total LER worked was 1.21 and the MA was Rs. 10210/ha/yr. The AI revealed that coconut was the dominant partner and the CR indicated that coconut was 11.11 times competitive in this system.

Irrigated systems in arecanut

Table II presents the estimated LER and other advantages in arecanut based systems.

Arecanut + cacao : Total LER computed was 2.18 which was very high. The monetary advantage was Rs. 19193/ha/yr. Cacao was found to be the dominant partner with arecanut and was found 1.7 times competitive.

Arecanut + banana: The total LER was 1.45. The monetary advantage was about Rs. 16650/ha/yr. Arecanut was the dominant partner and was 6.23 times competitive.

Arecanut + pepper: The total LER computed was 1.50 and the monetary advantage Rs. 18402/ha/yr. Pepper was found to be dominant and was two times competitive.

This study clearly brought out the relative advantage of palm based cropping systems over the coconut/arecanut sole crop.

REFERENCES

MEAD, R and WILLY, R. W. 1980. The concept of a land equivalent ratio and advantages in yield from intercropping. *Exptl. Argic.* **16** : 217–278

WILLY, R. W. 1979. Intercropping - It's importance and research needs-Part-I. Competition and yield advantage. *Field Crop Abstracts* **32**(1) : 1–10