Importance of light

It is a common knowledge that sunlight is important in the manufacture of food through the process called photosynthesis. By this, carbon dioxide, in the presence of water and light is converted into plant food as follows:

$$6\,CO_2 + 6\,H_2O \longrightarrow C_6H_{12}O_6 + 6O_2$$

Light Measurement at Varying coconut distances and ages

Knowing the amount of sunlight transmitted at varying coconut stands (*different distances ages and planting design)* would be very helpful in maximizing intercropping activities. However, to measure this in actual field is very tedious, hence, computer modeling was resorted to. Coconut plantations at varying distances and ages were created in the computer where the amount of transmitted sunlight was calculated.

Practical Applications

Since the level of light transmitted under different coconut stands is already determined (Table 1) and light requirement of some crops had been established (Table 2), two most important applications are possible:

1. *On existing palms* - Farmers can be guided in choosing the appropriate intercrop to plant under his coconut palms. All he has to do is to determine the distance of planting and the estimated age of his coconut palms and refer to Table 1 for the amount of light under this stand. Then turn to Table 2 for the kind of intercrop whose light requirement matches the amount of light available in his particular coconut cover.
2. *For new coconut plantings* - Farmers can be guided in choosing the distance of coconut planting he should adopt that will provide the required level of light needed by the intercrop he has in mind. He should consult Table 2 for the light requirement of that particular intercrop then turn to Table 1 for the appropriate distance of planting coconut which can provide the level of light the intercrop needs.

Table 1. Simulated light transmission according to distance (density) and crop suitability.

Distance / System of Planting*	20 years old		40 years old	
	% Light	Suitable crop**	% Light	Suitable crop**
7 x 7 m sq. (204)	-	-	22	A
7.5 X 7.5 m sq. (178)	11	A	30	A
7.5 X 7.5 m tri (205)	1	-	22	A
8 x 8 m sq. (156)	20	A	37	A,B
8 x 8 m tri (180)	10	A	30	A
8.5 x 8.5 m sq (138)	27	A	43	B
8.5 x 8.5 m tri (160)	18	A	36	A,B
9 x9 m sq (123)	32	A	47	B
9 x9 m tri (143)	25	A	41	B
10 x 10 m sq. (100)	41	B	55	B
10 x 10 m tri. (115)	36	A,B	50	B
11 x 11 m sq (83)	48	B	60	B
11 x 11 m tri (95)	43	B	56	B
12 x 12 m sq (69)	53	B	64	B
12 x 12 m tri (80)	49	B	61	B
7 x 8 m rec (178)	11	A	30	A,B
7 x 9 m rec (159)	19	A	36	A,B
7 x 10 m rec (143)	25	A	41	B
7 x 11 m rec (139)	26	A	42	B
7 x 12 m rec (119)	34	A	49	B
7 x 13 m rec (110)	38	B	51	B
7 x 14 m rec (102)	41	B	54	B
7 x 15 m rec (95)	43	B	56	B

Table 1 continued...

Distance /System of Planting	20 years old		40 years old	
	% Light	Suitable crop	% Light	Suitable crop
8 x 9 m rec (139)	26	A	42	B
8 x 10 m rec (125)	32	A	47	B
8 x 11 m rec (114)	36	A,B	50	B
8 x 12 m rec (104)	40	B	53	B
8 x 13 m rec (96)	43	B	56	B
8 x 14 m rec (89)	46	B	58	B
8 x 15 m rec (83)	48	B	60	B
9 x 10 m rec (111)	37	A,B	51	B
9 x 11 m rec (101)	41	B	54	B
9 x 12 m rec (92)	44	B	57	B
9 x 13 m rec (85)	47	B	59	B
9 x 14 m rec (79)	49	B	61	B
9 x 15 m rec (74)	51	B	63	B
10 x 11 m rec (91)	45	B	57	B
10 x 12 m rec (83)	48	B	60	B
10 x 13 m rec (77)	50	B	62	B
10 x 14 m rec (71)	53	B	64	B,C
10 x 15 m rec (67)	54	B	65	B,C

* Figures in parenthesis are the number of coconut trees per hectare

** A,B and C are the particular kinds of intercrops (see Table 2).

Note:

Crop suitability is based mainly on light requirement. Farmers have to consider other factors like market potential of crop, food security and other soil and climatic requirements of particular intercrop.

Table 2. Light requirements of selected crops.	
Group A - Crops with low light requirements (37%)	
Blackpepper, Cacao, Coffee, Tomato	12-36
Cabbage, Cowpea, Ginger	24-36
Vanilla	12-37
Strap-leaf vandas	6-10
Begonia	6-13
Dendrobium, Semi-terete vandas	12-36
African Violets, Ferns (most species), Philodendron	6-12
Group B. Crops with wide range of light requirements (36-95%)	
Banana, Pineapple, Papaya	Cucurbits
Cashew, Citrus,Mangosteen	Sweet potato, Potato
Corn, Rice,Cotton, Tobacco	Eggplant, Sweet pepper
Coconut	Chrysanthemum,Gladiolus
Winged bean, Lima Bean	Terete vandas, Poinsettia
Grapes, Muskmelon	Rose
Peanut(24-95)	Pigeon pea
Group C. Crops with very high light requirements (63-100%)	
Sugarcane	72-100
Wheat	63-100

For more information

a) Refer to:

Dauzat, J. and M.N. Eroy. 1997. Simulating light regime and intercrop yields in CBFS. European Journal of Agronomy. 7:1-12

Magat,S.S. 1994. Light Requirements of Selected Intercrops. Technology Note No. 2. PCA-ARDB.

Margate, R.. Z., M.N. Eroy, J-F. Julia, G. Benard, C. Daniel and M.B. Claveria. 1998. Response of corn to varying levels of sunlight transmitted in a coconut-based farming system and subsequent corn yield prediction. Paper presented at the 9th DA-BAR National Research Symposium. Soil Research and Development Center, Diliman, Quezon City, Sept. 15-18,1998.

Margate, R.. Z., M.N. Eroy, J-F. Julia, G. Benard, C. Daniel and M.B. Claveria. 1998. Forecasting corn yields under different coconut densities and ages through computer modeling. Proc. 11th R and D Symposium, SMARRDEC, July 28-29,1998, Davao City

b.) Call write or visit:

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