

EKONOMI PRODUKSI

Kode PTE-4103

PERTEMUAN KEDUALAS:

Two Output-Two Inputs

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Sub-Pokok Bahasan:

- 1. Introduction*
- 2. Two Input and Two Output: A Basic Presentation*
- 3. Some General Principles*
- 4. The Constrained Maximization Problem*

1. Introduction

Problem alokasi

Satu input – satu output

Satu input – dua output

Dua input – satu output

Solusi alokasi

Pedekatan grafik
& matematik

Tdk lebih dr 3 dimensi

Petani menggunakan berbagai input yg berbeda u/
memproduksi berbagai output yg berbeda → tdk bisa
diilustrasikan dg grafik

Problem alokasi

Model:

• *Factor – product*

• *Factor – factor*

• *Product – product*

Aturan (*rule*) max & min

Many inputs in the production of many different output



General rule

2. Two Input and Two Output: A Basic Presentation

Asumsi:

- Input: posphat (x_1) & potash (x_2)
- Output: jagung (y_1) & kedele (y_2)
- Harga input: $v_1 = v_2 = \$ 10.00$
- Harga output: $p_1 = \$ 4.00$ & $p_2 = \$ 8.00$

Berbagai kombinasi penggunaan input & produksi disajikan pd tabel berikut:

Unit pupuk	x_1 u/ y_1	VMP _{x1} y_1	x_1 u/ y_2	VMP _{x1} y_2	x_2 u/ y_1	VMP _{x2} y_1	x_2 u/ y_2	VMP _{x2} y_2
0	70		30		80		20	
1	90	80	35	40	95	60	30	80
2	105	60	40	40	110	60	38	64
3	115	40	43	24	120	40	44	48
4	120	20	45	16	125	20	47	24
5	122	8	47	16	128	12	48	8
6	122	0	49	16	130	8	48	0
7	120	-8	50	8	131	4	47	-8
8	118	-8	49	-8	131	0	45	-16
9	114	-16	47	-16	130	-4	42	-24
10	109	-20	44	-24	128	-8	38	-32

$$p_1 MPP_{x_1 y_1} / v_1 = p_2 MPP_{x_2 y_2} / v_1 = p_1 MPP_{x_2 y_1} / v_2 \\ = p_2 MPP_{x_2 y_2} / v_2 = K$$

VMP dr masing-masing input dlm proses produksi masing-masing output akan sama dan setara dg K (mulplier Lagrang); yakni

Suatu nilai tambahan dolar yg tersedia u/ pembelian pupuk yg digunakan dlm produksi jagung atau kelede.

$$K = \$40/\$10 = \$40/\$10 = \$40/\$10 = 4$$

Formula umum:

$$p_1 MPP_{x_1 y_1} / v_1 = p_2 MPP_{x_2 y_2} / v_1 = p_1 MPP_{x_2 y_1} / v_2 \\ = p_2 MPP_{x_2 y_2} / v_2 = 1$$

dari sisi input:

$$MRS_{x_1 x_2} = v_1 / v_2$$

dari sisi output:

$$RPT_{y_1 / y_2} = p_1 / p_2$$

3. Some General Principles

Fungsi produksi: $y_1 = b(x_{11}, x_{21})$

$$y_2 = j(x_{12}, x_{22})$$

Total input: $x_1 = x_{11} + x_{12}$

$$x_2 = x_{21} + x_{22}$$

Total revenue: $R = p_1 y_1 + p_2 y_2$

$$= p_1 b(x_1, x_2) + p_2 j(x_1, x_2)$$

Total cost: $C = v_1 x_1 + v_2 x_2$

$$= v_1(x_{11} + x_{12}) + v_2(x_{21} + x_{22})$$

Profit: $\pi = R - C$

$$\pi = p_1 y_1 + p_2 y_2 - v_1 x_1 - v_2 x_2$$

$$= p_1 b(x_1, x_2) + p_2 j(x_1, x_2)$$

$$- v_1(x_{11} + x_{12}) - v_2(x_{21} + x_{22})$$

$$b_1 = \partial b / \partial x_{11}$$

$$b_2 = \partial b / \partial x_{21}$$

$$j_1 = \partial j / \partial x_{12}$$

$$j_2 = \partial j / \partial x_{22}$$

⇒ FOC

$$\left\{ \begin{array}{l} \partial \pi / \partial x_{11} = p_1 b_1 - v_1 = 0 \\ \partial \pi / \partial x_{21} = p_1 b_2 - v_2 = 0 \\ \partial \pi / \partial x_{12} = p_2 j_1 - v_1 = 0 \\ \partial \pi / \partial x_{22} = p_2 j_2 - v_2 = 0 \end{array} \right.$$

$$p_1 b_1 / v_1 = p_2 j_1 / v_1 = p_1 b_2 / v_2 = p_2 j_2 / v_2 = 1$$

$$p_1 MPP_{x_1 y_1} / v_1 = p_2 MPP_{x_1 y_2} / v_1 = p_1 MPP_{x_2 y_1} / v_2 =$$

$$p_2 MPP_{x_2 y_2} / v_2 = 1$$

$$\partial \pi / \partial x_{11} = p_1 b_1 - v_1 = 0$$

$$\partial \pi / \partial x_{21} = p_1 b_2 - v_2 = 0$$

$$\partial \pi / \partial x_{12} = p_2 j_1 - v_1 = 0$$

$$\partial \pi / \partial x_{22} = p_2 j_2 - v_2 = 0$$



$$b_1 = v_1 / p_1$$

$$b_2 = v_2 / p_1$$

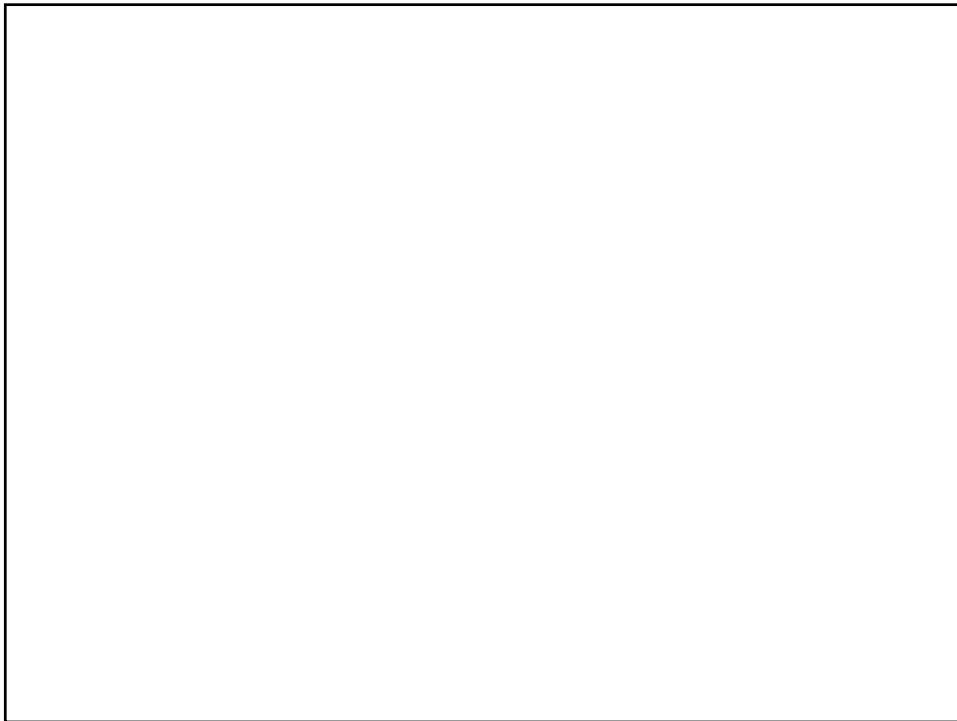
$$j_1 = v_1 / p_2$$

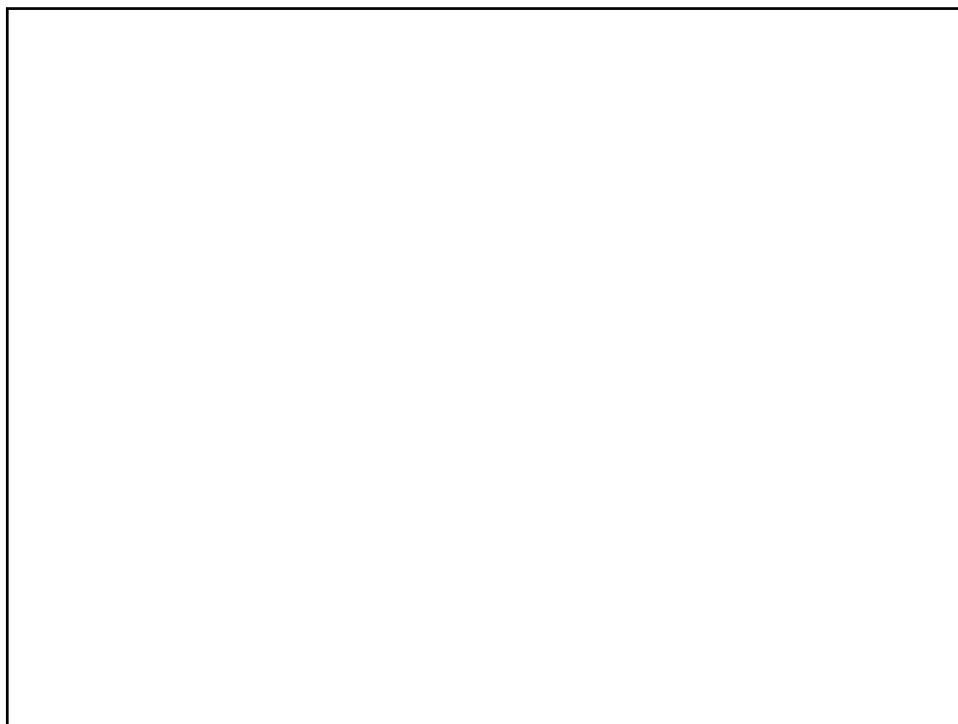
$$j_2 = v_2 / p_2$$

$$b_1 = dy_1 / dx_1$$

$$b_2 = dy_2 / dx_1$$

4. The Constrained Maximization Problem





Referensi

Debertin.1986. *Agricultural Production Economics*. Macmillan. New York:
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