Lampiran 8. Perhitungan kebutuhan bahan baku pellet dengan regresi secara manual

Tahun	Produksi (X)	Pemakaian (Y)	XY	X^2	Y^2
1	2	3	4 = 2 x 3	5	5
1991	1,351,494	2,120,726	2,866,148,464,644	1,826,536,032,036	4,497,478,767,076
1992	1,294,963	2,012,789	2,606,487,281,807	1,676,929,171,369	4,051,319,558,521
1993	1,426,893	2,214,537	3,159,907,343,541	2,036,023,633,449	4,904,174,124,369
1994	1,363,933	2,127,735	2,902,087,981,755	1,860,313,228,489	4,527,256,230,225
1995	1,708,565	2,650,307	4,528,221,779,455	2,919,194,359,225	7,024,127,194,249
1996	1,682,072	2,574,155	4,329,914,049,160	2,829,366,213,184	6,626,273,964,025
1997	1,534,809	2,377,419	3,648,884,294,379	2,355,638,666,481	5,652,121,771,993
1998	1,552,487	2,406,355	3,735,834,622,012	2,410,215,885,169	5,790,543,664,119
1999	1,699,283	2,632,189	4,472,834,020,487	2,887,562,714,089	6,928,418,931,721
2000	1,735,875	2,681,927	4,655,489,814,141	3,013,262,015,625	7,192,731,762,847
Total	15,350,374	23,798,139	36,905,809,651,381	23,815,041,919,116	57,194,445,969,145

$\overline{X}$ = 1,535,037

$\overline{Y}$ = 2,379,814

$\overline{Y}^2$ = 5,663,514,134,854

$\overline{X}^2$ = 2,356,339,819,339

$\overline{XY}$ = 3,653,103,320,970

$Y = a + bX$

$$a = \overline{Y} - b\overline{X}$$

$$b = \frac{\sum XY - n\overline{XY}}{\sum X^2 - n\overline{X}^2}$$

$$b = \frac{36,905,809,651,381 - 10(3,653,103,320,970)}{23,815,041,919,116 - 10(2,356,339,819,339)} = 1.4893137$$

$$a = 2,362,309 - 1.4893137(1,535,037) = 93,661.6913$$

$$Y = a + bX = 93,661 + 1.4893137(1,800,000) = 2,774,426$$

Lampiran 8. Perhitungan kebutuhan bahan baku pellet dengan regresi secara manual

$$S_e = \sqrt{\frac{\sum Y^2 - a\sum Y - b\sum XY}{n-2}}$$

$$S_e = \sqrt{\frac{\sum 57{,}194{,}445{,}969{,}145 - 93{,}662\sum 23{,}798{,}139 - 1.4893\sum 36{,}905{,}809{,}651{,}381}{10-2}}$$

$$S_e = 11{,}963.1728$$

$$S_b = \frac{Se}{\sqrt{\sum X^2 - n\overline{X}^2}}$$

$$S_b = \frac{11{,}963.1728}{\sqrt{\sum 23{,}815{,}041{,}919{,}116 - 10(2{,}356{,}339{,}819{,}339)}}$$

$$S_b = 0.023848$$

$$r^2 = \frac{a\sum Y + b\sum XY - n\overline{Y}^2}{\sum Y^2 - n\overline{Y}^2}$$

$$r^2 = \frac{93{,}661.69(23{,}798{,}139) + (1.4893)36{,}905{,}809{,}651{,}381 - 10(5{,}663{,}514{,}134{,}854)}{57{,}194{,}445{,}969{,}145 - 10(5{,}663{,}514{,}134{,}854)}$$

$$r^2 = 0.99795292 \rightarrow r = \sqrt{0.99795292} \rightarrow r = 0.9989$$

$$t = \frac{b}{S_b} \rightarrow t = \frac{1.4893137}{0.023848} \rightarrow t = 62.45$$