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CONTENTS

DEVELOPING AN APPROACH IN CALCULATING THE NEED OF COWS REACHING BEEF SELF-SUFFICIENCY IN WEST PAPUA PROVINCE

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ABSTRACT

The objectives of this study was to develop an alternative approach to calculate the cows need to produce the condition of beef self-sufficiency in the West Papua Province. Data were analyzed by using the mathematics and econometrics equation models, specially the Partial Adjustment Model (PAM) and Ordinary Least Sqaure (OLS) i.e. simple and multiple linear regression. The population of this study was farmers with the sample number of 189 respondens. Manokwari was choosen as the sample area of this study. The results of this study showed that we could develop an approach to estimate the number of invested cows in order reaching beef self-sufficiency . This approach was consisted of three steps: (1) to estimate number of beef consumption (Animal Unit) as a function of people population in the region, (2) to develop an estimator equation of the variables of number of cows and number of bulls produced, (3) to use the developed estimator equation of the second step to calculate the number of need invested of cows to reach beef self-sufficency in the study area. In West Papua, to get one Animal Unit of ready slaughtered Bull in year t, we have to invest 2.262 Cows Animal Unit on the previous two years.

Keywords: beef, self-sufficiency; Partial Adjustment Model (PAM).

INTRODUCTION

The national beef self-sufficiency by 2010 in Indonesia has been failed, and be prepared to re-program the same objectives in the year 2014. This failure indicates that the strategies and efforts to achieve self-sufficiency measures of beef in 2010 still need improvement and refinement. According to the results of some studies, the failure of beef self-sufficiency program planning in 2010 due to the lack of computation approach. The basic weakness of the calculation is that the data of cattle population in specific area has not sufficient as the sole information for planning. This opinion was relevant to the statement Yusja and Ilham (2004), namely that one of the weaknesses of the management of livestock sector in Indonesia is the lack of population data. Associated with beef self-sufficiency planning, data that existed for most of the cattle population data is only general without the details of the age and sex. There are some important things that required for planning self-sufficiency in beef, such as (a) the number of cow that can be used to calculate the capacity of a particular production area to produce a calf, and (b) the number of bull that will be sold or slaughtered output (the part that will be consumed) from the population.

MATERIALS AND METHODS

The study was conducted in Manokwari ,West Papua Province, an area of beef cattle production center. In this study used primary data include the number of calf aged 0-1 years, 1-2 years, ≥ 2 years and cows from 189 respondents. Secondary data include the beef consumption (expressed by number of cow slaughtered) during 19 years, the people population during 19 years and the people population predicted in the year 2014.

Data Analysis Model

To obtain self sufficiency in beef calculations there are three stages of the calculation.

Data Analysis Model

To obtain self sufficiency in beef

calculations there are three phase of the calculation to be done.

Stage 1:

Estimating the amount of beef that must be provided / produced each year adjusted for people population growth is through the model equations Partial Adjustment Model (PAM) as follows.

$$Y_{beef\ prod(t)} = \delta\alpha_0 + \delta\alpha_1 X_{people\ popt)} + (1-\delta)Y_{beef\ prod(t-1)} + (\delta\mu_t + v_t)$$

Describe : $\hat{Y}_{beef\ prod_{(t)}}$ = Level of beef production is expected in year t (kg); $X_{people\ population(t)}$ = total people population of the province in year t; $Y_{beef\ prod(t)}$ = Actual level of beef production year t (kg); $Y_{beef\ prod(t-1)}$ = Actual level of beef production year (t-1) (kg); δ = Coefficient of change (adjustment) of short-term; v_t = Disturbance error). (Pindyck & Rubinfield, 1976; Nerlove, 1972; Widarjono 2007)

Stage 2.

Knowing the breeding capacity of the national cattle population. To determine the capacity of the national cattle population is to look at the relationship between the number of cows as a production machine and the amount of output produced in one year that we found in every farmers household . Relationship between Bull under one year old with Cows:

$$Y_{bull\ n\ years} = \beta_0 + \beta_1 Cow + \upsilon$$

Describe : $Y_{bull\ n\ years}$ = amount of bull by age stage (aged 0-1 years, aged 1-2 aged ≥ 2 years), Cow= Amount of cow be found in farmers.

Stage 3

Calculating the size of the investment needs of the cows based on the amount of beef needs to be produced in five years.

RESULTS AND DISCUSSION

Stage 1.

Estimating the amount of beef that must be provided /produced each year adjusted for people population growth is through the model equations Partial Adjustment Model (PAM) and

Tabel 1. Prediction of Beef Consumption and Cows Investment Requirement Every Years

Prediction of meat consumption (AU-Animal Unit)	Needs cows investment (AU)
Beef consumption year t	Needs cows investment year t

statistical analys was obtained on Table 2.

$$Y_{beef\ prod(t)} = \delta\alpha_0 + \delta\alpha_1 X_{pop.pddk(t)} + (1-\delta)Y_{beef\ prod(t-1)} + (\delta\mu_t + v_t)$$

So that can be calculated and the value δ, α_0 as follows:

$(1-\delta)$ =0.686; δ =0.308; α_0 = -2330.091/0.308= -7565.23051; α_1 =0.007/0.308 = 0.022727

Value α_0, and α_1 used as the coefficient in the equation:

$$\hat{Y}_{beef\ prod_{(t)}} = -7565.23 + 0.022727 X_{people\ pop(t)}$$

After the value of X which is the value of population trends 2009 s / d in 2014 is obtained, then enter in the equation, we will get the following results:

Stage 2

Knowing the relationship between amount of cows should be invested and the output generated using simple regression. Obtained the following results.

From the regression results in Table 6. It appears that the best statistical value is the regression relationship between parent bull <1 years age and cows. Marked with the highest value of 0.821. From these facts related to the interests of the calculation of self-sufficiency in the production relations Cows and Bull should be given priority generated by looking at the cows and bull relationship at the age of less than one year.

Stage 3

Having obtained the coefficient of parent and child (Cows and Bull) relationship equations are used to measure the amount of the cows which should be invested. Therefore, the Cows and Bull relationship

Table 2. Results of regression equations PAM

Statistic parameter	Value	Explanation	Statistic parameter	Value	Explanation
$\delta \alpha_0$	-2330.09	B_0	R^2adj	0.83	
$\delta \alpha_1$	0.01	B_1	Ftest (sig.)	0.000**	Significant 0.05
(1 - δ)	0.69	B_2	T test	0.000**	Significant 0.05
R^2	0.84		DW test	1.72	

Table 3. People Population Estimated 2009 s / d in 2014 and predicted needsof beef each year (Livestock Unit)

Year	People Population In West Papua	Predicted Needs of beef each year (Animal Unit)	Year	People Population In West Papua	Predicted Needs of beef each year (Animal Unit)
2009	742536	9310.39	2012	780258	10167.69
2010	755110	9596.16	2013	792832	10453.46
2011	767684	9881.92	2014	805406	10739.23

Table 4. Regression Results of Cows and Bull Relationships

No.	Correlation	Koefisien		*R*	*R^2adj*	F
		B_0	B_1			
1	Bull < 1 year age -- Cow	-0.13	0.44	0.82	0.82	0.000**
2	Bull 1-2 years age-- Cow	0.81	0.26	0.56	0.56	0.000**
3	Bull >2 years age -- Cow	0.44	0.11	0.14	0.13	0.000**

Table 5.Estimates of Beef Supplies (Animal Unit) and The Cows which must be invested every t-2

Year t	Predicted amount of Bull for Beef supplay in (t) in Animal Unit Y(t)	Need invested cows in (t-2) Cow (t-2) = (Y(t) +0,134)/0,442	Cows(t-2)/Y(t)
2009	9310.39	21064.52	2.26
2010	9596.16	21711.06	2.26
2011	9881.92	22357.6	2.26
2012	10167.69	23004.13	2.26
2013	10453.46	23650.67	2.26
2014	10739.23	24297.2	2.26

resulting from the number of calves aged <1 year, we can conclude that:
Bull<1 years (t) = Bull >2 years (t+2)

Can be said: $Y_{bull\ under1\ year} = \beta_0 + \beta_1 Cow + \upsilon$

eqivalen with,

$Y_{bull>2\ years(t+2)} = \beta_0 + \beta_1 Cow_{(t)} + \upsilon$

eqivalen with,

$Y_{bull>2\ years(t)} = \beta_0 + \beta_1 Cow_{(t-2)} + \upsilon$

Can be said that the large number of cattle aged> 2 years at year t, is influenced by a large cows investment in the two previous years.

From the table 5, shows that to get 1

(one) Animal Unit of Bull which ready slaughtered (more than 2 years old) in year t, we have to invest 2,262 Animal Unit of cows on the previous two year.

CONCLUSION

The results of this study showed that we could develop an approach to estimate the number of cows to be invested in order reaching beef self-sufficiency through three (3) steps of calculation : (a) to estimate number of consumption of beef (in animal unit) as base on people population. (b) to develop an estimator equation of the variables of number of cows and bulls, (c) to use the developed estimator equation of the second step to calculate the number of need invested of cows to reach beef self sufficency in the study area. In West Papua case study: to get 1(one) Animal Unit of ready slaughtered Bull in year t, we have to invest 2,262 Cows Animal Unit at two years before.

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