

<http://www.pjbs.org>

PJBS

ISSN 1028-8880

**Pakistan
Journal of Biological Sciences**

ANSI*net*

Asian Network for Scientific Information
308 Lasani Town, Sargodha Road, Faisalabad - Pakistan

Government Investment Cost Analysis for Beef Importation in Malaysia

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Abstract: Due to rising trend of imported beef from abroad in Malaysia, it is necessary to find out the source of economic beef production with lower government investment cost for beef importation (GICI). In this study, system simulation modeling and cost-benefit analysis have been used. The result showed 5-7% slaughter rate of female breeding stock (FBS) is economic and more effective input for beef production as well as for government investment cost for importation. However, average 58% self-sufficiency rate for beef can be achieved in future at 5-7% slaughter rate, 75-80% calving rate, 1-2% mortality rate.

Key words: Beef importation cost, simulation matrix model, cost-benefit analysis

INTRODUCTION

Due to slower growth of beef production Malaysia imported approximately 88% of its beef requirement from various countries in the form of fresh chilled and frozen meat and live animals to meet the local beef demand.

Beef importation has increased from 14% in 1960 to 88% in 2000. The amount of imported beef increased from 919 metric tonnes in 1960 to 117800 metric tonnes in 2000. Fresh/chilled and frozen beef has been imported either in the form of bone in or boneless. The amount of total frozen imported beef increased from 25006 metric tonnes in 1988 to 53946 metric tonnes in 1996. According to New National Agricultural Policy (NAP), government has put emphasis on the increase of local beef production by lesser beef import (NAP, 1999). Local beef production can be increased by increasing the number of beef population through female breeding stock at lower slaughter rate, mortality rate and higher calving rate but there is a need to maintain lower government importation cost which needs to estimate how much cost, how much benefit and profit will come from the management. Benefit-cost analysis used for economic analysis. The appropriate beef production policy for decision maker at the lowest government investment cost needs to be determined in order to increase beef production at lower investment cost for beef import and female breeding stock import. The objective of this study is to determine imported beef and economic beef production in terms of government investment cost.

Fauzia *et al.* (2000) have reported if the beef cattle female breeding stock import is increased up to 30 thousand heads/year at 15% slaughter can increase self-sufficiency rate up to more than 30% by the year 2015. The impact of 30 thousand imported female breeding stock at 10% slaughter rate can increase the self-sufficiency rate up to more than 40% by the year 2015. The overall simulated results from Simulation Matrix (SIMM) model indicate that beef production can be increased by higher number of cattle population through higher female breeding stock beef population. Eusof *et al.* (1999) have reported that increasing the percent calf-crop up to 80% can more than double the self-sufficiency rate by the year 2020. Reducing heifer culled to 10% can increase the self-sufficiency rate to more than 15% but no body considered the government investment cost for beef importation (GICI).

MATERIALS AND METHODS

The overall Simulation Matrix (SIMM) model for beef, dairy and buffalo for the period 1960 to 2015 used according to population distribution component, slaughter component, beef production and consumption component, decision making component under five scenarios. Beef price for 1997 to 2015 calculated by putting different amount of local production under ex-ante analysis was estimated. Cost-benefit analysis is used to calculate cost and benefit for beef production in the study. This required monetary effects on cost, revenue,

profit and investment. This information is used in two different ways, firstly, the on going management process required information about simulated values to calculate profit and secondly the lower investment cost at what time period for the highest beef self-sufficiency level in Peninsular Malaysia. These tasks were carried out by a benefit-cost analysis after getting different simulated data up to 2015 by using SIMM model. Simulated data are analyzed economically to find out the lowest investment cost for appropriate beef production policy. The total cost of beef is the sum of beef animal population rearing cost, female breeding stock importation cost and beef production cost. Benefit calculated by multiplying beef price with total beef production. When cost and benefits have been identified, priced and valued, it is ready to determine which among various projects to accept, which to reject. The common discounted measures like Net Present Worth (NPW) and Benefit Cost Ratio (BCR) were used.

Different management strategies

Scenario 1:

- No importation of female breeding stock at slaughter rate 10-27%, calving rate 70-75% and mortality rate 5-10% for beef cattle
- No importation of female breeding stock at slaughter rate 10-15%, calving rate 70-75% and mortality rate 5-10% for dairy cattle
- No importation of female breeding stock at slaughter rate 15-20%, calving rate 70-75% and mortality rate 5-10% for buffalo

Scenario 2:

- Importation of 10000 heads female breeding stock/year at slaughter rate 30-35%, calving rate 76-80% and mortality rate 1-2% for beef cattle
- Importation of 5000 heads female breeding stock/year at slaughter rate 20-25%, calving rate 76-80% and mortality rate 1-2% for dairy cattle
- Importation of 500 heads female breeding stock/year at slaughter rate 25-30%, calving rate 76-80% and mortality rate 1-2% for buffalo

Scenario 3:

- Importation of 10000 heads female breeding stock/year at slaughter rate 5-7%, calving rate 76-80% and mortality rate 1-2% for beef cattle
- Importation of 5000 heads female breeding stock/year at slaughter rate 5-7%, calving rate 76-80% and mortality rate 1-2% for dairy cattle
- Importation of 500 heads female breeding stock/year at slaughter rate 5-7%, calving rate 76-80% and mortality rate 1-2% for buffalo

Scenario 4:

- Importation of 10000 heads female breeding stock/year up to 5 years at slaughter rate 15-20%, calving rate 55-60% and mortality rate 5-10% for beef cattle
- Importation of 5000 heads female breeding stock/ year at slaughter rate 15-20%, calving rate 55-60% and mortality rate 5-10% for dairy cattle
- Importation of 500 heads female breeding stock/ year at slaughter rate 15-20%, calving rate 55-60% and mortality rate 5-10% for buffalo

Scenario 5:

- Importation of 10000 heads female breeding stock per every 5 years at slaughter rate 15-20%, calving rate 55-60% and mortality rate 5-10% for beef cattle
- Importation of 5000 heads female breeding stock /year up to 5 years at slaughter rate 15-20%, calving rate 55-60% and mortality rate 5-10% for dairy cattle
- Importation of 500 heads female breeding stock/ year at slaughter rate 15-20%, calving rate 55-60% and mortality rate 5-10% for buffalo

RESULTS AND DISCUSSION

Beef importation cost: Under the scenario 3, beef importation cost (BIC) is expected to decrease from RM241 million in 1997 to RM194 million in 2011. It will be dropped in 2012 (Fig. 1) due to beef production is expected to increase from 12 thousand metric tonnes in 1997 to 127 thousand metric tonnes in 2011 (Table 1) but under 1, 2, 4 and 5 scenario BIC is expected to be increased rather than decreased.

Female breeding stock importation cost (FBSIC): Table 1 shows no FBSIC in the case of scenario 1. Scenario 2 and 3 show the same investment cost for FBS. It is greater in scenario 4 than scenario 5. In case of scenario 3, FBSIC will be increased from RM 19 million in 1997 to RM 284 million in 2011.

Total government investment cost for importation (TGICI): Scenario 3 shows the lowest TGICI in 2011. It is expected to increase RM 260 million in 1997 to RM 478 million in 2011 (Table 1). Table 2 shows the lowest BIC (RM 194 million) found in 2011 that is why, the TGICI also the lowest (RM 478 million). There will be no BIC in 2012 due to the impact of sufficient beef production, it indicates 100% beef self-sufficiency can possible.

Table 1: Investment cost of importation for beef production in Peninsular Malaysia (RM Million)

Year	BI1	TI1	BI2	FBI2/3	TI3	BI3	TI3	BI4	FBI4	TI4	BI5	FBI5	TI5
1997	220	220	198	19	217	241	260	223	19	242	246	19	227
1998	248	248	205	38	243	240	278	245	37	282	270	25	245
1999	259	259	241	57	298	263	320	270	57	327	305	32	273
2000	277	277	227	76	303	256	332	270	75	345	311	38	273
2001	292	292	263	95	358	277	372	299	95	394	348	46	302
2002	320	320	295	113	408	292	405	320	102	422	391	57	324
2003	317	317	306	132	438	274	406	338	108	446	401	59	342
2004	346	346	324	151	475	266	417	356	115	471	420	60	360
2005	371	371	338	170	508	241	411	374	122	496	446	61	385
2006	421	421	382	189	571	284	473	425	127	552	493	61	432
2007	450	450	407	208	615	274	482	443	135	578	529	75	454
2008	482	482	428	227	655	270	497	475	141	616	557	75	482
2009	493	493	443	246	689	126	372	490	148	638	580	76	504
2010	503	503	475	265	740	90	355	529	155	684	621	77	544
2011	576	576	526	284	810	194	478	580	160	740	668	78	590
2012	598	598	533	303	836	-	303	608	169	777	714	91	623
2013	608	608	572	321	893	-	321	652	175	837	753	91	662
2014	691	691	612	340	952	-	340	702	182	884	812	92	720
2015	734	734	630	359	989	-	359	734	189	923	845	93	752

(Note: BI1/BI2/BI3/BI4/BI5 = Beef import cost under scenario 1, 2, 3, 4, 5, respectively TI1/TI2/TI3/TI4/TI5 = Total (beef + FBS) import cost under scenario 1, 2, 3, 4, 5, respectively FBI2/3/FBI4/FBI5 = FBS import cost under scenario 2/3, 4, 5, respectively)

Table 2: Government investment cost of importation in 2011 and 2012 (RM Million)

BIC (2012)	BIC (2011)	FBSIC (2011)	TGICI (2011)	Scenario
598	576	-	576	1
533	526	284	810	2
-	194	284	478	3
608	580	160	740	4
714	668	78	590	5

Table 3: Total cost and total benefit for beef production under different Management strategies in Peninsular Malaysia (RM Million)

Year	Cost1	Benefit1	Cost2	Benefit2	Cost3	Benefit3	Cost4	Benefit4	Cost5	Benefit5
1997	282	112	376	336	249	84	284	112	274	112
1998	252	105	425	432	341	204	292	112	280	112
1999	259	136	396	264	377	176	296	84	260	65
2000	281	136	461	390	501	414	370	190	320	162
2001	309	190	494	432	547	374	373	136	310	112
2002	296	136	487	336	645	375	387	190	335	112
2003	383	375	553	476	848	888	419	252	331	162
2004	374	336	597	540	1027	1426	449	322	373	220
2005	375	336	653	693	1267	2520	478	136	374	220
2006	315	162	379	522	1341	2184	424	252	322	90
2007	337	190	687	589	1602	3332	479	220	370	162
2008	329	162	739	693	1859	4212	479	442	372	162
2009	410	375	826	702	2131	7620	553	400	416	286
2010	480	589	866	840	2970	9555	262	286	415	252
2011	405	299	869	740	3046	8772	540	400	397	190
2012	464	476	996	1012	4261	11718	587	400	433	252
2013	565	888	1040	1034	4777	14274	607	360	445	286
2014	462	594	1096	1127	5397	16445	604	360	422	190
2015	515	589	1213	1425	6878	26100	664	432	471	322

Table 4: The Values of BCR and NPW for Beef Production

Item	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 4
BCR	0.73	0.92	1.96	0.52	0.46
NPW	-646	-348	8423	-1334	-1329

Cost and benefit of beef production: Total cost will be the highest in the case of 5-7% slaughter rate of FBS under scenario 3 due to the rearing cost of highest beef population. FBS importation cost and production cost, the benefit will be the highest for the highest beef animal

population and beef production compared to scenario 1, 2, 4 and 5 (Table 3). In Table 4, the result of BCR (1.96) and positive NPW show that beef production can be increased economically and 100% self-sufficiency can be achieved in the period 2011-2012 at lowest government

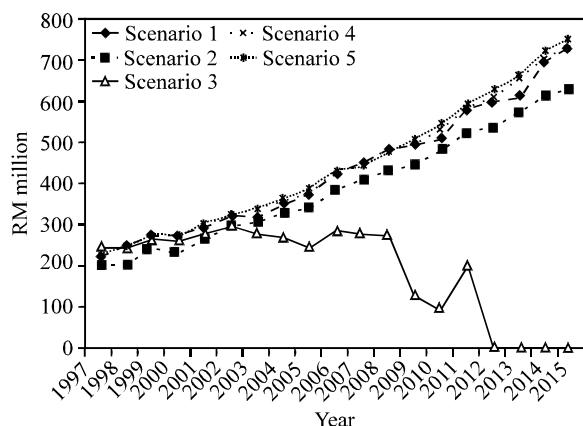


Fig 1: Ex-ante simulation analysis for beef import cost in peninsular Malaysia, RM million, 1997-2015, all scenarios

investment cost for importation whereas scenario 1, 2, 4 and 5, the negative NPW, less than 1 BCR and 17, 25, 15 and 14% self-sufficiency rate respectively indicates that these are not economically accepted due to lower calving rate and female breeding stock importation and higher slaughter rate under different management strategies.

This study has discussed that in order to maintain the lowest government investment cost for beef importation. That is why, the rate of mortality, slaughter will have to be reduced and the rates of calving will have to be increased.

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