

Small Holder Farmers' Preferences in Feeding cattle In ECER Region, Malaysia

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Abstract: This study was conducted in ECER region Malaysia, which included, Kelantan, Pahang, Terengganu and part of Johor. The objective of this study was to identify the farmers' preferences in feeding their cattle in this region. Data were collected by door to door survey using structured questionnaire as a tool for this study. A total of 289 small holder cattle farm families from 4 states of ECER were surveyed. From the result it appeared that number of beef cattle farm dominates over dairy in all states but there is regional difference in the ratio of beef to dairy farm. Highest proportion of dairy units are found in Johor (35.03%) and lowest in Terengganu (2.60%). Almost 52% farmers practice pasture grazing in main for feeding their cattle in Kelantan, 50% in Pahang, 44% in Kelantan and only 22% in Johor. An overall 6.57% farmers graze their cattle on road side. Very small % of farmers use treated or untreated straw to feed their cattle which indicate huge wastage of this kind of roughage. Feeding of silage is practised mainly in Johor (32.81%). Around 4-5% small holder farmers in Kelantan, Pahang and Terengganu provide green oil palm frond (OPF) as the main roughage feed to their cattle although it is the main cattle feed in large scale or integrated farming. Nearly 49% farmers in Kelantan maintain their animals without any concentrate feed. This % in Pahang, Johor and Terengganu is 35, 11 and 6 respectively. Of different types of grain, pellet or oil cakes palm kernel cake (PKC) occupied the first place because of its abundance not because of its price. Improved microbial, silage making or NPN technology is a potent ruminant feeding technology particularly in developing countries but these technology is only in practice in farmers of Johor in ECER region. This might be because of trained farmers in that area and because of abundance of dairy cattle.

Keyword: ECER region, roughage feed, concentrate feed, cattle, feeding practices, farmer.

I. Introduction

Demand for meat and milk is increasing day by day in Malaysia, but the supply of the cattle products are not increasing at the same rate (Abdullah, 2012; Jamaludin et al., 2014; Latif and Mamat, 2002). The estimated local beef and milk supply figure 53,841 M. Ton and 79.35 million liters respectively in 2013. Malaysian self-sufficiency indices for beef and milk figure at 30% and 6% respectively (DVS, 2015) which highlights the dominance of beef cattle industry over dairy. Malaysia imports 70% beef from India and Australia. Small and medium traditional beef cattle farmers own 60% of total beef enterprise in Malaysia (Serinet et al., 2010). Feed resources are the central components of bovine industry and considered as driver of production systems, whose efficient use dictates to a very large extent the economic animal production. Although Malaysia is gifted with huge land resources, it does not possess large pasture area to graze livestock. Most of the lands are occupied by rain forests and cultivable lands are being used for either oil palm (1.8 million ha) or rubber (2.8 million ha) production. Because of abundance of oil palm trees there are so many by products such as oil palm fronds (OPF) and trunks, palm press fibers, palm kernel cake and palm oil meal effluent used to feed cattle in the country. About 30 million Tons of OPF DM is produced as cattle feed during the pruning and replanting activities (Zahari and Farid, 2012). Farmers mostly depend on oil palm by products particularly OPF to feed their cattle. Besides, oil palm-cattle integration system is a well adopted cattle farming system in Malaysia. Apart from the Federal Land administration Authority (FELDA) settlers, FELDA Farm Products Sdn. Bhd. and the ESPEK division of RISDA are the two organizations with substantial cattle rearing under oil palm-cattle integration (Rosli, 1998). Oil palm-cattle integration system for beef cattle farming predominates in some regions. One ha of immature oil palm plantation contains 5.5-9.5 ton DM of green grasses which may be a potent niche for beef cattle production (Chen, 2012). In spite of that ruminant production is far below in the country than other tropical countries and the main reason behind the slow growth of the ruminant industry in Malaysia is the poor utilization of available feed resources. Serin and Hashim (2010) identified that feed and nutrition technology is the most demanded technology among the cattle rearers in the country. Malaysia possesses 900,000 heads of cattle, with large populations in the northern state of Kelantan (141,502) and in the southern state of Johor (111,000). Latif and Mamat (2002) reviewed that cattle population of peninsular Malaysia increased by 86% from 1980 to 1997. Roughage feed mainly fed to cattle in Malaysia. Considering one cattle per ha, 1.8 million more cattle can be kept by crop-livestock integrated farming which is just double of the

current bovine population. Besides oil palm coconut orchards occupied a very large part of the country surface that deserves also enormous potential to raise cattle, buffalo, sheep, goat and deer. ECER is regarded as underdeveloped region in Malaysia but has potential to grow. ECER encompasses states of Pahang, Terengganu, Kelantan and Mersing District of Johorexpanded over 51% area in peninsular Malaysia (Fig 1) with 2 billion human populations. Among many development projects, beef and dairy cattle improvement programme lies in the top priority (East Coast Economic Region, 2010). The exact size of cattle population in ECER is not available in literature. However, cattle population constitutes 132740 heads in Kelantan, 169312 heads in Pahang, 128907 in Johor and 109695 heads in Terengganu in the year 2011 (DVS, 2015). Some 85% cattle belong to Kedah Kelantan – a native breed to Malaysia (Johari and Yasmi, 2009). Feeds and feeding of cattle is considered to be the biggest concern in cattle industry. Khan and Mokhtar (2011) emphasized need of informal education for the livestock farmers in Malaysia. This study is, therefore, designed to investigate constraints associated with feeds and feeding of cattle by identifying farmers' problems, to measure farmers' knowledge and to study their preferences in this context.

II. Materials And Methods

The study was conducted in ECER region Malaysia, covering random and representative farm families from four states such as Kelantan, Terengganu, Pahang and part of Johor (Fig 1). Number of cattle farmers interviewed, heads of cattle they possess (separate count was made for dairy and beef cattle) and the rank of dairy or beef farming are presented in Table 1.

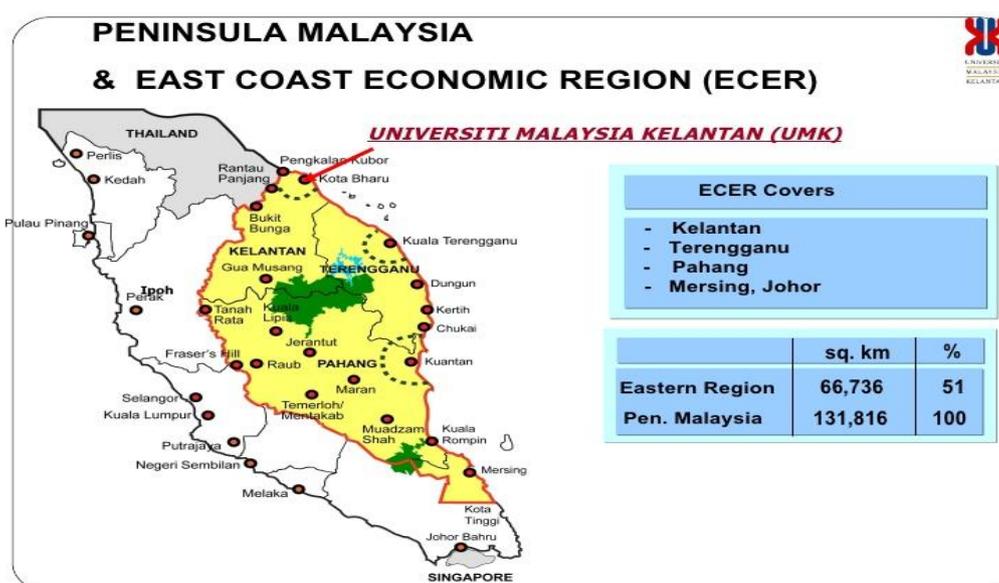


Fig 1. Map of peninsular Malaysia projecting ECER (yellow)

Table 1. Number of cattle farmers and cattle heads surveyed in ECER Malaysia

ECER States	Respondent		Cattle			Ranking	
	Number	%	Beef type	Dairy type	Total	Beef type	Dairy type
Kelantan	141	48.79	2530 (93.19)	185 (6.81)	2715 (100)	1	2
Pahang	34	11.76	1270 (78.40)	350 (21.60)	1620 (100)	1	2
Terengganu	50	17.30	643 (97.40)	17 (2.60)	660	1	2
Johor	64	22.15	3201 (64.96)	1726 (35.03)	4927 (100)	1	2
Total	289	100	7644	2278	9922		

Each respondent was interviewed directly with a structured questionnaire. A total of 289 house holds from different states under ECER region were surveyed. Number of respondent in Kelantan, Pahang, Terengganu and Johor were 141, 34, 50 and 64 respectively. In all the study zones proportion of beef cattle farmers predominated over dairy cattle. It shows that beef type cattle are reared by more than 93% farmers in Kelantan, 78.4% in Pahang, 97.4% in Terengganu and lowest in Johor (64.96%) (Table 1). Data obtained from the respondents were expressed in percentage of total and categories were ranked according to magnitude.

III. Results And Discussion

Roughage feeding practices

Table 2 shows the % of farms used different types of roughage as the principal feed for feeding their cattle. Some 51.77% farmers in Kelantan feed their cattle mainly on grazing on pasture. Cattle are allowed to eat road side grass and fed grass using 'cut and carry' method both separately remain at 7.8%. Around 5% farms use green oil palm frond (OPF) as the main roughage feed for feeding their cattle. This makes the great difference of feeding cattle in small holder farm and large scale or oil palm-cattle integrated farming. In large farm or in integrated farm OPF is the main roughage fed to cattle (Alimon and Zahari, 2015; Zahari and Farid, 2012). Small holder farmers utilize local forage resources that grow naturally on the idle land. Kum and Zahari (2011) recommended that although OPF has been widely used in feeding ruminants in Malaysia but optimum level should not be more than 30% because its high fiber content. A combination of roughages fed to cattle by 22% farmers in Kelantan. In that a combination of road side grass, grazing on pasture, OPF and 'cut and carry' grass satisfy the hunger of cattle. Use of silage, treated or untreated straw and hay is very limited as main feed for cattle in Kelantan. This finding corresponds well with that of Zahari et al, (2000). The results indicate that cattle farmers in Kelantan did not yet adopted improved feeding technology. Half of the cattle population in Pahang lives on grazing on pasture. This figure is little lower than half in Terengganu. Some 5.88% farmers use OPF as the main feed for feeding their cattle in Pahang. Same proportion of farmers practice feeding hay and treated/untreated straw to feed their bovine animals. No farmer in Terengganu feed cattle with road side grass, treated or untreated straw, silage or hay. Almost a quarter of farmers feed their cattle in combination of grazing and 'cut and carry' method. It indicates that cattle farmers in Terengganu use cattle feeding practice mostly in traditional way. The extent of farmers in Johor that graze cattle on pasture is only 21.87% but the figure for farmers use silage in feeding their cattle is 32.81%. Only 8% farmers in Johor practice 'cut and carry' method. It can be explained by their relatively larger proportion of dairy cattle (35.03%) maintained in intensive system. In Terengganu not a single farmer was found to feed their cattle on road side grass, straw, silage or hay. 'Cut and carry' feeding practiced by 28% farmers. Combination of roughages is a practice of feeding cattle in almost a quarter of farmers in all states except in Pahang.

Table 2. Cattle feeding practices with roughage feed by the farmers in ECER Malaysia

Name of the state	No. of respondent	Numbers and % of farmers feeding roughages to their cattle							Combination of roughages
		Grazing on pasture	Road side grass	Straw treated/ untreated	Cut and carry grass	Silage	Hay	Oil palm frond (green)	
Kelantan	141	73 (51.77)	11 (7.80)	3 (2.13)	11 (7.80)	4 (2.84)	1 (0.70)	7 (4.96)	31 (21.99)
Pahang	34	17 (50)	5 (14.71)	2 (5.88)	3 (8.82)	0 (0)	2 (5.88)	2 (5.88)	3 (8.82)
Terengganu	50	22 (44.0)	0 (0)	0 (0)	14 (28.0)	0 (0)	0 (0)	2 (4)	12 (24.0)
Johor	64	14 (21.87)	2 (3.13)	2 (3.13)	8 (12.5)	21 (32.81)	2 (3.13)	2 (1.56)	13 (20.31)
Pooled	289	126 (43.59)	19 (6.57)	7 (2.42)	36 (12.45)	25 (8.65)	5 (1.70)	13 (4.49)	59 (20.41)

Figure in the parentheses indicate %.

Table 3. Ranking the roughage feeding practices to cattle by the farmers in ECER Malaysia

Type of Cattle feeding	Kelantan	Pahang	Terengganu	Johor	Pooled
Grazing on pasture	1	1	1	2	1
Road side grass	3	2	3		
Straw treated/ untreated					
Cut and carry grass	3	3	2	4	3
Silage				1	4
Hay		4			
Oil palm frond (green)	4	4	4		
Combine of roughages	2	3	3	3	2

Table 3 dictates that as a practice of feeding roughage to cattle 'grazing' ranks first in all states except in Johor. Silage feeding ranked highest in order as the roughage feed in Johor which secured 4th position when states were combined. Beef cattle need less attention than dairy cattle. That might be a reason of preferring 'grazing' over other practices in states where beef type cattle are the main component of cattle farming. Roughage feeding practice differed from state to state. This might be because of type of cattle, availability of feed resources and farmers' preference for a particular type of roughage over others. OPF ranked 4th position among the roughage feed in every states. It may be attributed by the farmers selected for this study who were mostly sampled from small holders but not from the large scale commercial producers like FELDA settlers.

Farmers' preference for combination type of feeding roughage feed ranked 2nd in Kelantan and 3rd in other states. Therefore, training need for farmers of Pahang and Terengganu on preparation and feeding of silage, hay and treated straw may be emphasized in the cattle development policy. These results correspond with the findings of (Serin and Hashim,2010) who demonstrated that 65% cattle farmers in Peninsular Malaysia practise manual feeding and pasture grazing in feeding their cattle although farmers were selected from traditional feedlots, integrated and semi-intensive beef cattle rearing system. This figure might be inflated if only small holder farming system were included in this study.

Concentrate feeding practices

From the survey it came out that varying percent of farmers in ECER used to feed concentrate like corn, soybean, PKC, formulated commercial pellet, coconut oil cake or any combination of concentrates to their cattle. Overall 31.5% farmers do not feed their cattle with any concentrate. Nearly half (48.94%) of the cattle farmers in Kelantan rear their cattle without providing any concentrate to their cattle (Table 4). The solvent extracted PKC have a lower oil content ranging from 1.2% - 5.0% while the expeller pressed PKC has 4.5% - 17.3% oil (Tang, 2000). PKC can be classified as an energy-feed and its chemical composition is similar to copra meal, rice bran or corn gluten feed is the first choice concentrate in all states except in Kelantan where 'no concentrate' is the first choice (Table 5). (Kum and zahari, 2011) reported that Malaysia produces 2358.73 MT expeller pressed PKC/year of which 95.6% is exported.

Table4. Numbers of farmers with percentage and type of concentrate feed

Name of the states	Type of concentrate feed					Combination of concentrate	No concentrate feed
	Corn	Soy bean	PKC	Pellet	Coconut oil cake		
Kelantan (N=141)	6 (4.25)	3 (2.13)	36 (25.53)	4 (2.84)	1 (.07)	22 (15.60)	69 (48.94)
Pahang (N= 34)	3 (8.82)	2 (5.88)	13 (38.23)	2 (5.88)	0 (0)	2 (5.88)	12 (35.29)
Terengganu (N=50)	2 (4)	0 (0)	40 (80)	3 (6)	2 (4)	0 (0)	3 (6)
Johor (N=64)	5 (7.81)	7 (10.93)	16 (25)	12 (18.75)	3 (4.7)	14 (21.88)	7 (10.93)
Pooled (N=289)	16 (5.53)	12 (4.15)	105 (36.33)	21 (7.26)	6 (2.08)	38 (13.15)	91 (31.5)

() Indicate %

It might be happened due to the high price of these type concentrates feed. Farmers of states other than Kelantan prioritized PKC as the number 1 concentrate of their choice. Commercial pellet have the order like Terengganu>Johor>Pahang.It is a common practice in Malaysia to produce complete feed based on PKC, either in the form of pellet, cube or as total mixed ration (Zahari and Farid, 2012).Very negligible proportion of cattle rearers feed soybean, coconut oil cake to their cattle. Use of concentrate in the cattle diet depends on local availability, price, animal's performance reflected in profit.

Table5.Ranking the concentratesfeeding practices by the farmers in ECER Malaysia

Type ofconcentrate	Kelantan	Pahang	Terengganu	Johor	Pooled
Corn	4	3	3		
Soy bean		4		4	
PKC	2	1	1	1	1
Commercial pellet		4	2	3	4
Coconut oil cake	3			3	
Combination of concentrates	3	4		2	3
Didn't use concentrate	1	2	2	4	2

Good feeding practices on cattle farming in ECER Malaysia

The data presented in Table 6 states that 36% farmers practice good husbandry practices (GHP) in roughage feeding in Terengganu followed by Kelantan (16.4%), Johor (12.6%) and Pahang (8.85) respectively. The farmers who practice concentrate feeding to their cattle can be ranked as Terengganu>Johor>Kelantan>Pahang based on GHP.

Table6. Good feeding practices on cattle farming in ECER Malaysia

A good feeding practices	Farmers practicing good feeding practices				Pooled (N=289)
	Kelantan (N=141)	Pahang (N=34)	Terengganu (N=50)	Johor (N=64)	
Roughage feed	21 (16.4)	3 (8.8)	18 (36)	10 (12.6)	52 (17.99)
Concentrate feed	52 (36.88)	12 (35.3)	40 (80)	41 (64.06)	145 (50.17)
Use of microbes in feeding	0 (0)	0 (0)	0 (0)	4 (6.3)	4 (1.38)
Feeding NPN*	0 (0)	0 (0)	0 (0)	6 (9.4)	6 (2.07)
Consider nutritive requirement	34 (26.6)	20 (58.8)	13 (26)	40 (62.5)	107 (37.02)
Supply drinking water	84 (65.6)	16 (47.0)	8 (16)	28 (43.8)	136 (47.05)

NPN = Non-protein nitrogenous substance. Figure in the parentheses indicate %

Exploitation of microbial technology and utilization of Non Protein Nitrogenous (NPN) substances in feeding ruminants proved to be very efficient in economic term. No farmer in Pahang, Terengganu and Kelantan was found to utilize these technologies in feeding their cattle. Only 9.4% of farmers in Johor have been using these technologies (Table 6). A large % of farmers do not consider nutritive value of feed or nutritional requirement of cattle during their feed preparation. Farmers in Johor are better educated than in other states in this regard. Percentage of farmers supply drinking water to their animals varies from state to state. They may be ranked in order like Kelantan>Pahang>Johor>Terengganu. Not enough literature was found to compare results of the current investigation. In a study conducted in Ethiopia it came out that inadequate and poor quality animal feed is the most prioritized constraints in cattle production (Belay et al, 2013). Same is true in ECER, Malaysia. This happens not only because of unavailability of feed resources but to a large extent due to lack of farmers perception.

Table7. Perception ranking of farmers on good feeding practices (GFP) in cattle farming in ECER Malaysia

Good feeding practices	Kelantan	Pahang	Terengganu	Johor	Pooled
Roughage feed	4	4	2	4	4
Concentrates feed	2	3	1	1	1
Microbial technology				6	6
Feeding NPN				5	5
Consideration of Nutritive requirement	3	1	3	2	3
Supply drinking water	1	2	4	3	2

Table 7 presents perception ranking of farmers on good feeding practices in cattle farming in ECER Malaysia. Farmers awareness about safe drinking water supply ranked highest in Kelantan followed by Pahang, Johor and Terengganu respectively. This might not be because of farmers perception only, rather natural abundance of surface water possibly prevented farmers of Terengganu not to provide good quality drinking water to their cattle by their own. According to (Serin and Hashim, 2010) 45% cattle farmers in Penninsular Malaysia use wells or pools as drinking water source for their cattle. Some 32% use cotainers/barrels and 13% have proper piping system.

Table8. Drinking water supply practices to cattle in ECER, Malaysia

ECER States	Farmers supply drinking water	
	Free access	Provide some time
Kelantan(N=141)	94 (66.6)	47 (33.4)
Pahang(N=34)	16 (47.05)	18 34.4
Terengganu(N=50)	8 (16.0)	42 (84.0)
Johor(N=64)	28 (43.75)	36 (56.25)
Pooled(289)	146 (50.51)	143 (49.49)

() Indicate %

Supplying drinking water practices

Results revealed that percentage of farmers allow their cattle to free access drinking water ranged from 66.6 to 16 with a pooled average of 50.51 (Table 8). It is imperative that cattle should be provided drinking water by the farmers in the farm to ensure safety and it is considered as good practice. Farmers that perform good farming practice at least some time ranked highest in Terengganu followed by Johor, Pahang and Kelantan respectively (Table 9). Grazing cattle have little access to supplied drinking water which means that animals feed solely on grazing are paid little attention by the cattle owners.

Table 9. Ranking of drinking water supply practices to cattle by farmers in ECER in Malaysia

Supply drinking water practices	ECER State			
	Kelantan	Pahang	Terengganu	Johor
Free access	1	2	4	3
Provided some time	4	3	1	2

Sharing of concentrate feed cost to total production expenditure

Table 10. depicts that farmers expend money to buy concentrate feed vary from state to state. Some 62% farmers in Kelantan pay less than 10% of total production cost in buying concentrate feed. Percentage of farmers for the same in Pahang, Terengganu and Johor are 25.8, 17.3 and 30 respectively. Percentage of farmers spent more than 36% of total production cost to buy concentrate feed for their cattle in Kelantan, Pahang, Terengganu and Johor

Table 10. Expenditure share of concentrate feed purchase to total production cost

ECER state	Respondent		% of total expenditure			
	Number	%	<10	10-25	26-36	>36
Kelantan	200	41.5	124 (62%)	43 (21.5%)	10 (5%)	23 (11.5%)
Pahang	97	201	25 (25.8%)	18 (18.6%)	34 (35%)	20 (20.6%)
Terengganu	75	15.6	13 (17.3%)	24 (34%)	7 (9.3)	31 (41.3)
Johor	110	22.8	33 (30%)	34 (30.9%)	12 (10.9%)	31 (28.2%)
Total	482	100	195 (40.46%)	119 (24.69%)	63 (13.07%)	105 (21.78%)

are 11.5, 20.6, 41.3 and 28.2 respectively. It means that farmers of Kelantan do not bother nutritional requirement of their cattle but farmers of Terengganu spent lot of money for feeding concentrate to their animals. In Pahang 35% farmers' concentrate feed cost lies between 26 and 36% of total cost. It rationalizes cost distribution in cattle rearing under extensive production system. It also shows that an overall 65.15% farmers spent $\geq 25\%$ money from total farm expenditure in purchasing concentrate cattle feed from the market. Devendra and Leng (2011) stressed on utilization of locally produced crop residues and by products to feed cattle in small holder farming in Asian countries in order to reduce feed cost.

I. Conclusion

It appeared that ECER cattle husbandry is dominated by beef type rather than dairy type cattle although both are of equal importance. Small holder cattle rearing in this region is not received much attention. Attempts for providing food to the cattle on the consideration of nutritive requirement and endeavor for lowering feed cost by applying modern technology have been found to be rarely practiced by farmers. However, state to state difference in practice does exist. In overall consideration, farmers of Johor and Terengganu were found to be better perceived than those of Pahang and Kelantan. Cattle raisers of these two states need to be educated indifferent technical aspects of feeding cattle.

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