

## CHARACTERIZATION OF BUFFALO VEAL SUPPLY CHAIN IN VILLAGES AROUND CAIRO

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### SUMMARY

This study aims to characterize buffalo veal supply chain in 5 villages around Cairo. Value chain approach was applied to analyze veal supply chain using the data of 82 farmers, 4 traders and 4 butchers. Economic analysis was applied to different scenarios of raising calves using buffalo milk, cow milk or milk replacer. Survey analysis showed that 65% of farmers sold veal as early as possible. However, 61% of farmers sold their calves for economic reasons, 14 % for technical reasons and 25 % for both economic and technical reasons. Survey analysis showed the high demand on veal meat due to its unique quality. Technical and economic pressures on farmers motivate them to sell veal. Buffalo veal chain provides farmers with money to cover their needs, offers jobs through the whole year. Many butchers and traders prefer to slaughter veal due to the low price of veal compared with older or heavier cattle. Economic analysis of different alternatives to raise calves proved the feasibility of using milk replacer compared with cow or buffalo milk. Slaughtering veal, lack of finance and training programs to raise buffalo calves decreased the contribution of buffaloes in Egyptian meat market. High demand of veal meat and veal selling decision sustain the veal supply chain around Cairo. This study confirms that all chain actors and the related enterprises should be considered to set new regulations for the current veal chain.

**Keywords:** Veal, supply chain, buffalo, Cairo.

### INTRODUCTION

Buffaloes play a vital socio-economic role in many countries through milk, meat, draft and leather supply (Sarwar *et al.*, 2009). The world buffalo meat production was about 3.7 million tons in 2013. Egypt ranked the fifth with 390 thousand tons of buffalo meat production (FAOSTAT, 2015). Veal could be defined as male or female calf aged less than 4 weeks with a live weight up to 70 kg (Ngapo and Gariépy, 2006). Singh *et al.* (2013) reported that buffalo meat value chain consists of a network of stakeholders, value chain included livestock producers, traders, butchers, wholesale meat dealers and retailers. Khoi and Dung (2014) divided value chain into five operational points: inputs, production activities, processing, distribution, and consumption. Buffalo calves consume a significant amount of milk which decreases the available milk for home consumptions or for selling (Radwan *et al.*, 2016). Feeding buffalo calves on cow milk or milk replacer reduced the feeding costs by 73.6 and 71 % compared with classical buffalo milk feeding. Veal with 6 months age had lower dry mater, lower fat and more attractive color compared with young bulls with 16 months age (Infascelli *et al.*, 2004). Giuffrida-Mendoza *et al.* (2015) found that fat content and cholesterol level in buffalo meat were increased by age. No documented data are available about veal supply chain and how it works in relation with farmers and consumers preference. The main objective of this study was to characterize the buffalo veal supply chain in villages near by Cairo to provide better plans for this sector.

### MATERIALS AND METHODS

Survey analysis was conducted in five villages (Elemam Malik, Wardan, Elatf, Elsaf and Elreka) using a semi-open questionnaire. Survey included meeting 82 farmers, four traders and four butchers based on the French filière approach (Raikes *et al.*, 2000). Traders and butchers interviews directly reflected their opinions about the veal chain and indirectly reflected the consumers' preferences. Economic analysis was applied to different scenarios of raising calves based on technical starting points. Technical coefficients used for feeding cost calculation were based on data collected from interviewed farmers through 2014 to 2015. where, the amount of buffalo milk consumed through 40 days = 285 kg, the amount of buffalo milk consumed through 90 days = 448 kg, the price of one kg of buffalo milk = EGP 5, the price of one kg of cow milk = EGP 3 and the price of one kg of milk replacer (equivalent liquid milk) = EGP 2.6. To understand the intervention between dairy and veal chains, data were collected from farmers to identify the main reasons of selling veal. Data collected were classified into technical or economic reasons for selling young calves by farmers.

### RESULTS

#### *Veal chain factors overview:*

Veal chain started with farmers at village level and ended by consumers in villages or urban areas. Traders and butchers collected veal directly from farmers or indirectly from local farm livestock markets. Butchers tended to slaughter veal in or out

of slaughterhouses. Traders and butchers were working to deliver the veal from villages to cities.

#### Farmers:

According to survey analysis, 65 % of farmers sold veal and 35 % kept them for fattening or for raising female buffaloes. A percentage of 62% of farmers who sold their calves tended to sell males and females, the rest (38 %) sold only male calves. Figure (1) shows the expected cost of suckling calves in each scenario depending on the market price at the year of study 2013/2014. Through farmers' interview, 65 % of the sample tended to sell veal for different reasons which was classified into: economic and technical reasons as shown in Table (1).

The average veal selling age was 40.6 days and the average selling price was 1934 EGP/head (Table 2).

Three farms were identified in the target villages raised female calves till reaching pregnancy stage or milk production stage. This kind of breeders purchased veal from livestock markets or traders. Milk replacer achieved the lowest cost compared to using cow milk or buffalo milk assuming stability of veterinary costs and mortality rate for all scenarios, which could be minimized if a tight prevention measures were applied at farm level (Figure 1).

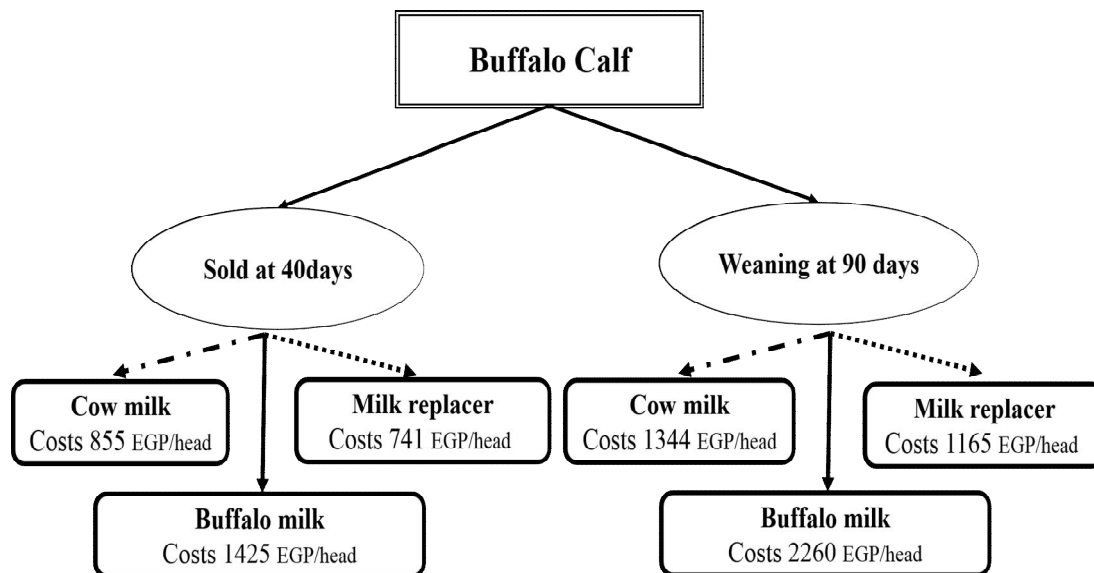
**Table 1. Technical and economic reasons responsible for farmers' decision to sell veal.**

Economic	Technical
<ul style="list-style-type: none"> <li>Family financial needs</li> <li>Saving milk for selling and family consumption.</li> <li>Higher price at veal stage compared to weaned calf price.</li> <li>Covering feedstuffs and chemical fertilizers costs.</li> </ul>	<ul style="list-style-type: none"> <li>Fattening calves needs long time till marketing weight.</li> <li>Risk of missing calves (death: diseases, weaning shock, low growth rate after weaning ...etc.).</li> <li>Low milk productivity of buffalo</li> <li>Land limitation to cover animal's feed requirements.</li> <li>No enough space available for rearing calves</li> </ul>

**Table 2. Means  $\pm$ SE of veal calves age (day) and price of veal (EGP/head) at selling on- farm.**

Items	No.	Means	SE	C.V %
Selling age (day)	54	40.6	$\pm 1.6$	29.0
On- farm Price (EGP/head)	54	1934	$\pm 72.9$	27.7

SE: Standard Error, C.V: Coefficient of Variability.



**Figure 1. Cost of feeding veal calves on buffalo milk, cow milk and milk replacer as different scenarios that Egyptian farmers used.**

#### Traders:

Farmers on livestock market are the main sources of veal supply, where most buffaloes raised by small farmers. Based on our visits, there were some traders who used slaughterhouse as a livestock market to select good body conformation calves for fattening farms. Regarding to survey analysis, the main criteria

that used to estimate individual veal price was the expected carcass weight for each individual.

Traders reported that there is a seasonality of veal production, where the largest numbers of veal calves are appeared in the market from October to April with lower price that ranged between 1200 and 3500 EGP/head. While, during the period from May to

August, lower numbers of veal are available with higher market price ranged from 2500 to 5000 EGP/head.

Unique grading and pricing system of veal were identified in livestock markets. Traders are able to predict carcass weight depending on body conformation and calculate the value based on the common price which changed based on the demand and the availability of veal.

**Butchers and meat shops owners:**

Butchers or owners of meat shops in villages could purchase veal directly from farmers at village or at livestock market. Veal could be indirectly sold through traders. Butchers in cities purchased veal from slaughterhouses or meat traders. The veal carcasses are sold to consumers and/or restaurants. Grading veal carcasses were done based on local standards.

Carcasses are classified into grade “A” and grade “B”. Hind quarters and fore ribs were classified as “A”, while fore-quarters are classified as “B”. Restaurants pay 21% higher prices in grade “A”. All butchers interviewed reported that, the demand was higher in summer compared to winter season. Figure (2) shows the different stakeholders along the veal chain including producers (farmers), mediators, retailers and consumers.

Figure (3) shows the main drives for supply and demand of veal at local market. Based on collected data, improving the current system should not neglect beneficiaries of current system to avoid short term socio-economic negative impact. Figure 4 exhibits the suggested model to maximize the contribution of buffalo at national level taking into account all actors along the chain.

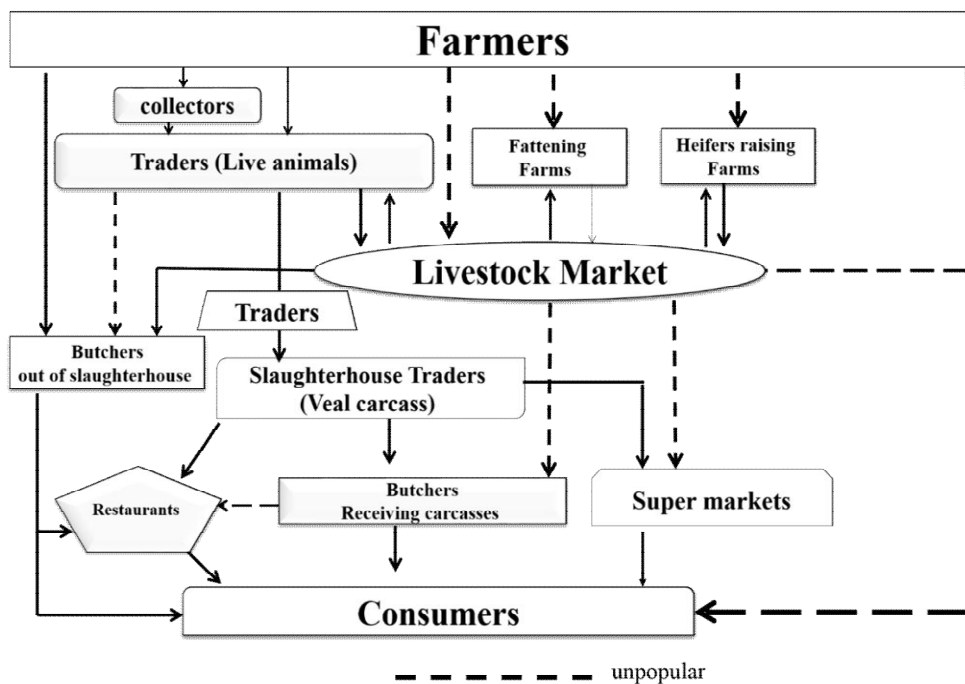


Figure 2. Map of different stakeholders along veal chain

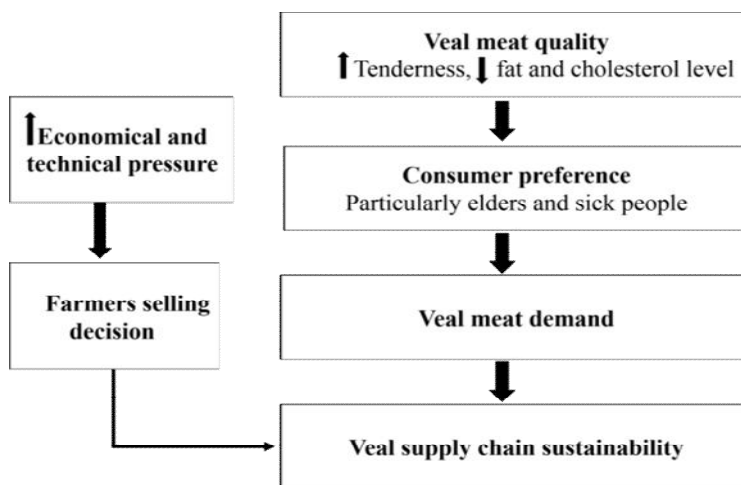


Figure 3. A summarization of different drives of traditional veal supply chain

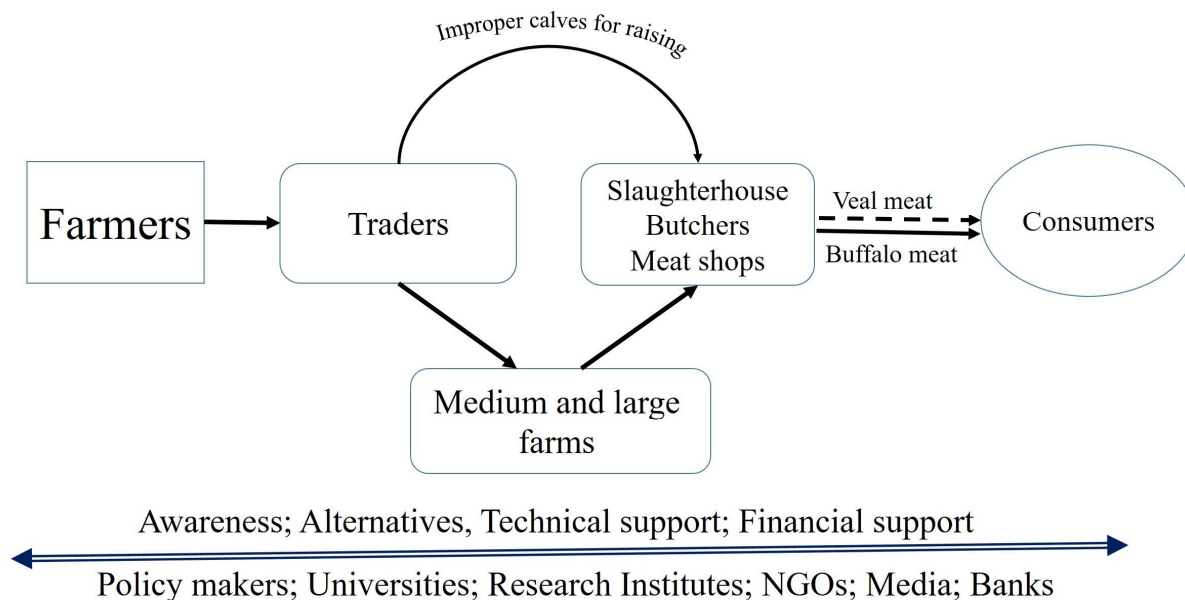


Figure 4. A suggested model to maximize buffalo contribution at national scale

## DISCUSSION

In Egypt, small scale farmers raise buffaloes for milk production to provide daily cash money or to cover the family milk consumption. Results indicated that most of farmers tend to sell calves as early as possible to save milk and to provide money for covering family needs.

The majority of farmers sold veal calves due to economic reasons. Figure 1 shows different scenarios of raising calves using buffalo milk, cow milk and milk replacer. Using milk replacer for suckling calves could reduce the cost by 48 % relative to buffalo milk and by 13 % compared with cow milk. Also, farmers could need some training to apply artificial milk feeding for calves in an efficient way and to avoid artificial feeding risks.

The veal price was affected by season of calving and veal demand. The price decreased in winter by 20-40% compared to summer season, where most of buffaloes calved in winter season.

In summer, a high demand of grill meat was reported by some butchers due to low fat content in veal meat compared to alternative grilled meat like lamb's meat or beef that prepared by restaurants.

Data collected from farmers proved that, the economic pressure on farmers derived them to sell male and female calves due to the financial need to support the rent of land, the feed costs for the whole herd, the chemical fertilizers and the family needs.

Also, the high consumption of buffalo milk during suckling period was one important factor that motivated farmers to sell calves.

From technical point of view, small farmers in the sample indicated the difficulty of raising weaned buffalo calves due to lack of skills and finance to use artificial feeding, while large farmers indicated feasibility of setting such new systems to raise buffalo calves.

Based on interviews data, buffalo veal chain has many strengths such as: a) veal provides farmers with money to cover their needs, b) veal chain offers a lot of jobs along the chain, c) there is a demand of veal meat along the year d) veal meat contains low fat and cholesterol level that cover the need of specific category of consumers and e) selling veal at young age helped farmers to save the high value buffalo milk.

Also, traders prefer trading in veal particularly in financial crisis, where no liquid money available to sell and buy large weight carcasses.

Butchers reported the economic advantage of selling veal, where the cycle of investment is one day for veal. Butchers can buy, slaughter and sell one head or many heads of veal on one day with low risk.

Many weaknesses of the current system were identified: a) slaughtering veal led to decrease the contribution of buffaloes in meat market, b) difficult of controlling veal slaughtering, butchers can slaughter veal outside the slaughterhouse and c) No training programs for producers to learn about raising buffalo calves with lower costs.

Interviewing with farmers confirmed that farmers tend to sell veal to cover the cost of rented land and to produce milk to sell, so collecting veal from farmers and raising them in medium and large farms could help to satisfy both the national and farmer's needs.

It is clear that, veal system is a stable system that benefits many stalk holders along the chain. Veal chain is a sustainable system due to consumers demand to this type of meat and farmers' need to sell young calves.

Based on value chain approach, improving one point of the whole chain and neglecting other points could lead to failing the whole modified system. The same attention should be introduced for all actors along the chain.

Importation of buffalo veal could help to satisfy the consumer needs (Figure 4). Also, producing high weight veal using milk replacer and starter feed with average weight of 250 could be a transition step to satisfy market needs and national plans.

It is vital to include traders and butchers in the new modified system to decrease their resistance to the new system. Also, awareness is important for consumers who can consume alternative meat type with low cholesterol instead of veal.

## CONCLUSION

Veal supply chain in Egypt included many beneficiaries such as farmers, traders, butchers and consumers. Technical and financial reasons motivate farmers to sell veal, while the unique veal meat quality raises the demand. Neglecting some enterprises along the veal chain could affect the sustainability of new regulations of current stable system.

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## توصيف سلسلة إنتاج البتلو من الجاموسى فى القرى المحيطة بالقاهرة الكبرى

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تهدف هذه الدراسة الى توصيف سلسلة إنتاج البتلو فى خمس قرى حول القاهرة الكبرى. باستخدام أسلوب سلاسل الإنتاج لتحليل سلسلة إنتاج البتلو باستخدام بيانات ٨٢ فلاح، ٤ تجار، ٤ مشغليين بمهنة الجزارة. تم إجراء التحليل الاقتصادي لعدة بدائل لتربية العجول الجاموس الرضيعة باستخدام اللبن الجاموسى، اللبن البقرى و بديل اللبن. أشارت النتائج إلى أن ٦٥% من الفلاحين المصريين يقومون ببيع العجول البتلو فى عمر صغير (٤٠ يوم)، ٦١% من هؤلاء الفلاحين يبيعون حيواناتهم لأسباب اقتصادية، و ١٤% لأسباب فنية و ٢٥% لكلا السببين معاً. وقد لوحظ أن أسعار العجول البتلو تتأثر بالموسم، حيث سجلت أقل سعر فى فصل الشتاء مقارنة مع فصل الصيف. اوضحت الدراسة أن هناك طلب زائد على لحوم البتلو بسبب تفرداها بجودة عالية. وكان للضغوط الاقتصادية و الفنية دور هام فى دفع صغار المزارعين الى بيع البتلو. كان لسلسلة إنتاج البتلو دور لدعم صغار المزارعين مالياً لتغطية احتياجاتهم، وكذلك توفير فرص عمل خلال العام. الكثير من العاملين بمهنة الجزارة والتجار يفضلون تداول البتلو بسبب انخفاض سعر الرأس مقارنة بالعجول الاثقل وزناً والاكثر عمراً. اوضحت الدراسات الاقتصادية للبدائل المقترحة لتربية العجول البتلو جدوى استخدام بدائل الألبان مقارنة باللبن البقرى و الجاموسى. يرجع قلة مساهمة لحوم الجاموس على المستوى القومى كنتيجة لذبح البتلو وعدم توفير الدعم المالى و البرامج التدريبية لتربية العجول الجاموسى. يمكن ارجاع استدامة سلسلة إنتاج البتلو الى ارتفاع الطلب على لحوم البتلو ورغبة المربين فى بيع البتلو. تؤكد هذه الدراسة على أهمية الاخذ فى الاعتبار كل اصحاب المصالح والانشطة الاقتصادية ذات الصلة عند وضع قواعد منظمة جديدة لسلسلة إنتاج البتلو.