



## Economic losses from hides and skins utilization: A case study of Sabon Gari and Zaria local government areas, Kaduna state

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### ABSTRACT

*Economic losses from hides and skins utilization in Zaria municipal slaughterhouses were investigated from the point of view of the raw skin availability and qualities that were recovered and lost due to human consumption as ponmo. Using 2014 slaughter figures, the several grades analysis were carried out based on grading, and estimated values of the qualities; the graphical plots of the recovered and lost hides and skins, and the added-values were estimated. The relatively moderate recovery rate at Zango abattoir for cattle hides and Dogarawa slaughter slab could not justify optimized recovery and utilization for the domestic tanning and leather products industries. The added-value showed that there exist high potentials for diversification of the leather sectorial economy, however, the quality of the hides and the losses in the production of goat and sheep skins are drawbacks to a sustainable domestic tanning industry.*

**Keywords**— Hides and skins laws and regulations, Quality, Trade, Added-value, Gross Domestic Product (GDP), Economic losses

### 1. INTRODUCTION

The colonial enactment and subsequent amendments of the Nigerian Hides and Skins law (Ordinance 14, 1942); the Hides and Skins Act, Cap. 79, 1958, gave birth to two sets of regulations, namely: The Federal Hides and Skins Regulations, page 680, Vol. VII of Federal Laws, 1958, and Northern Regional Hides and Skins Regulations, NNLN, 89, 1958. The cardinal aims of the law were for improving and maintaining the quality of Nigerian hides and skins and controlling and regulating the trade in raw hides and skins. These laws enabled the appointments of hides and skins field officers, which to some extent was being enforced but have sadly declined in implementation over the years. At the points when this was reasonably enforced, it could be observed that there were economic benefits from the foreign export earnings. It is important to note that the Federal Hides and Skins Regulations is the legal basis for the establishment and operation of the Hides and Skins Unit under the Federal Livestock and Pest Control Services (FLPCS) and the respective state's hides and skins divisions and units. The federal government has after independence banned the export of raw hides and skins in 1978 so as to redirect them for diversification of the domestic tanning industries.

The quality of raw hides and skins is largely dependent on the extent of antemortem and postmortem defects. Among the postmortem defects, those arising from faulty methods of flaying are very important for safeguarding the quality of hides and skins intended for conversion to leather (Habib *et al.*, 2015). Human consumption of raw hides and skins is a serious threat to the above objective and has reached an epidemic proportion. Several actors are involved in processing and marketing of hides and skins into leather and "pomo" in Nigeria (Yusuf *et al.*, 2016). The consumption of cow skin as ponmo in Nigeria is believed to have originated from among the poor and un-educated Yorubas of the South Western part of the country who could not afford the price of lean meat (Joseph, 2006). Ponmo has been customized, hence the product could be recognized in any of the following forms: 1) Dried ponmo, 2) Fried ponmo, 3) White ponmo, 4) Brown ponmo made from air dried skins, 5) Bokoto or cow leg, 6) Iru, which is prepared from fresh skin of the tail attached to the muscle.

Animal skins during their preparation for ponmo are contaminated with chemicals during the burning or singeing process. Combusting woods, gas, or chemicals emit compounds known as poly aromatic hydrocarbons (PAHS). Exposure to PAHS is known to cause skin, liver, stomach diseases and several other types of cancers in laboratory animals. The scarcity of wood for traditional singeing has resulted into the use of discarded tyres in most times (Obiri-Danso, *et al.*, 2008), spent engine oils, plastics mixed with refuse and tyres (Okiel, *et al.*, 2009). These fuel sources may contain potentially toxic substances such as furans and benzene which could contaminate the hides and make them unfit for human consumption (USFA, 1999; Obiri-Danso *et al.*, 2008).

Tyres often contain contaminants such as lead, mercury, cadmium, chromium, zinc and arsenic (Pechan, 1977; IAFC, 2000; OECD, 2004). It has been reported by some workers that the consumption of such potentially contaminated meat products can be a great source of health risk to the ultimate consumers (Leita, *et al.*, 1991; Jayasekara, *et al.*, 1192; Costa, 2000). The processing method of ponmo has effects on the nutrient composition of cattle hides as the heat intensity applied from singeing degrades the essential amino acids of protein (Girard, 1992; Akwetey, *et al.*, 2013). High levels of lead can cause lead encephalopathy in adults. Early symptoms include dullness, headache muscular tremor, loss of memory and hallucination. This may develop into delirium, convulsion, paralysis, coma and death (Kumar, *et al.*, 1985). The toxic metal contaminations in ponmo can bio-accumulate in the various organs in the body and may eventually lead to health impairments and premature death.

The analytical report of this work showed that out of the total of 140,895 animals that were slaughtered, only a total of 54,180 pieces of hides and skins were recovered, which represent a 61.5% loss. Further diagnostic analysis of the causative reasons for the loss attributed it to 88.2% human consumption of hides ('ponmo') and skins as 'bokoto'. These estimates were used for this case study to establish the impact of financial losses to the local governments and by extension to the gross domestic product (GDP) of Nigeria. The internal control and regulation of raw hides and skins trade would thereafter be taken more seriously to avert further economic losses.

**2. METHODOLOGY**

Economic losses from hides and skins production and utilization in Zaria municipal slaughterhouses in 2014 were investigated using the following parameters:

**2.1 Quality of recovered and lost hides and skins**

Records were kept of the grades of cattle hides, goat skins and sheep skins in all the slaughterhouses for both recovered and lost hides and skins. Appendix presents the grading reckoner for the trends of grades that prevailed at the two local government slaughterhouses grading reckoner for cattle hides, goat skins and sheep skins was developed from the recovered articles in Sabon Gari and Zaria city slaughterhouses. The grades were factored into the estimated values of hides and skins by multiplying the recovered and lost figures expressed in percentage.

$$Estimated\ values = Grade \times \% \text{ values of hides and skins}$$

**2.2 Current prices of raw hides and skins**

The current prices of the raw hides and skins were obtained from the Kaduna State Hides and Skins Dealers' Association, Tudun Wada, Zaria. The cost for the recovered and lost hides and skins were determined using the formula:

$$Estimated\ values = Recovered\ or\ lost\ figures \times Grade \times Current\ price$$

**2.3 Added-value**

The ratio used to estimate the added-value was 1:3:5:7:12 for raw hides and skins, semi-tanned, tanned, finished leather, and finished leather articles respectively.

**2.4 Graphical plots**

Clustered column chart was used to represent the values in graphical forms for hides and skins off-take numbers, qualities of hides and skins recovered and lost, estimated monetary values of recovered and lost hides and skins, and the added-values.

**3. RESULTS AND DISCUSSIONS**

**Table 1: Livestock slaughter figures in Sabon Gari and Zaria Local Government Areas, Kaduna State (January–December 2014)**

| S. no. | Abattoir/Slaughter slabs | Cattle (Pcs)      | Goats (Pcs) | Sheep (Pcs) |
|--------|--------------------------|-------------------|-------------|-------------|
| 1.     | Zango abattoir           | 12,704            | 119         | -           |
| 2.     | Dogarawa †               | -                 | 55,530      | 12,244      |
| 3.     | Tudun Wada †             | 7,642             | 12,034      | 2,626       |
| 4.     | Zaria city †             | 3,864             | 12,034      | 2,626       |
| 5.     | Dandaurawa †             | 3,662             | 17          | 22          |
| 6.     | Angwan Jaba †            | 6                 | 7,162       | 138         |
| 7.     | Dan Magaji †             | 22                | 4,059       | 776         |
| 8.     | Samaru †                 | 14                | 1,357       | 237         |
| 9.     | Basawa †                 | 8                 | 860         | 213         |
| 10.    | Bomo †                   | 6                 | 772         | 141         |
| Total  |                          | 27,928            | 94,412      | 20,285      |
|        |                          | $\Sigma = 42,625$ |             |             |

Nb: † = Slaughter slab.

**Table 2: Profiles of hides and skins production, recovery and losses**

| Profile  | Types  | Figures (Pcs) | Total (Pcs) |
|----------|--------|---------------|-------------|
| Off-take | Cattle | 27,928        | 142,625     |
|          | Goat   | 94,412        |             |
|          | Sheep  | 20,285        |             |

|          |        |        |        |
|----------|--------|--------|--------|
| Recovery | Cattle | 8,900  | 54,180 |
|          | Goat   | 36,792 |        |
|          | Sheep  | 8,488  |        |
| Loss     | Cattle | 17,317 | 88,431 |
|          | Goat   | 58,536 |        |
|          | Sheep  | 12,592 |        |

Table 3: Estimated figures of recovered and lost hides and skins.

| Profile                   | Type   | Grade 1 (Pcs) | Grade 2 (Pcs) | Grade 3 (Pcs) | Grade 4 (Pcs) | Reject (Pcs) | Total (Pcs) |
|---------------------------|--------|---------------|---------------|---------------|---------------|--------------|-------------|
| Recovered hides and skins | Cattle | -             | -             | 8,900         | -             | -            | 8,900       |
|                           | Goat   | 23,754        | 9,198         | 1,104         | 368           | 368          | 36,792      |
|                           | Sheep  | 5,942         | 2,122         | 254           | 85            | 85           | 8,488       |
| Lost hides and skins      | Cattle | 17,317        | -             | -             | -             | -            | 17,317      |
|                           | Goat   | 40,975        | 14,634        | 1,756         | 585           | 585          | 58,536      |
|                           | Sheep  | 8,814         | 3,148         | 378           | -             | 126          | 12,592      |

Table 4: Estimated values of recovered and lost hides and skins.

| Profile                   | Type   | Grade 1 (N) | Grade 2 (N) | Grade 3 (N) | Grade 4 (N) | Reject (N) | Total (N)  |
|---------------------------|--------|-------------|-------------|-------------|-------------|------------|------------|
| Recovered hides and skins | Cattle | -           | -           | 40,050,000  | -           | -          | 40,050,000 |
|                           | Goat   | 23,178,600  | 5,518,800   | 386,400     | 19,250      | 54,750     | 29,229,800 |
|                           | Sheep  | 5,942,000   | 1,485,400   | 1,697,600   | 12,750      | 12,750     | 9,150,500  |
| Lost hides and skins      | Cattle | -           | -           | 77,926,500  | -           | -          | 77,926,500 |
|                           | Goat   | 36,877,500  | 8,780,400   | 614,600     | 146,250     | 67,750     | 46,506,500 |
|                           | Sheep  | 8,814,000   | 2,518,400   | 189,000     | -           | 18,900     | 1,540,300  |

Table 5: Added-values to Raw Hides and Skins.

| Profile                   | Type   | Raw (N)     | Semi-Tanned (N) | Tanned Finished (N) | Finished Leathers/leather articles (N) | (N)         |
|---------------------------|--------|-------------|-----------------|---------------------|--|-------------|
| Recovered hides and skins | Cattle | 40,050,000  | 120,150,000     | 200,250,000         | 280,350,000                            | 480,600,000 |
|                           | Goat   | 33,112,800  | 99,338,400      | 165,564,000         | 231,789,600                            | 397,353,600 |
|                           | Sheep  | 8,488,000   | 25,464,000      | 42,440,000          | 59,416,000                             | 101,856,000 |
| Lost hides and skins      | Cattle | 77,926,500  | 233,779,500     | 389,632,500         | 545,485,500                            | 935,118,000 |
|                           | Goat   | 526,824,400 | 158,047,200     | 263,412,000         | 368,776,800                            | 632,188,800 |
|                           | Sheep  | 12,592,000  | 37,776,000      | 62,960,000          | 88,144,000                             | 151,104,000 |

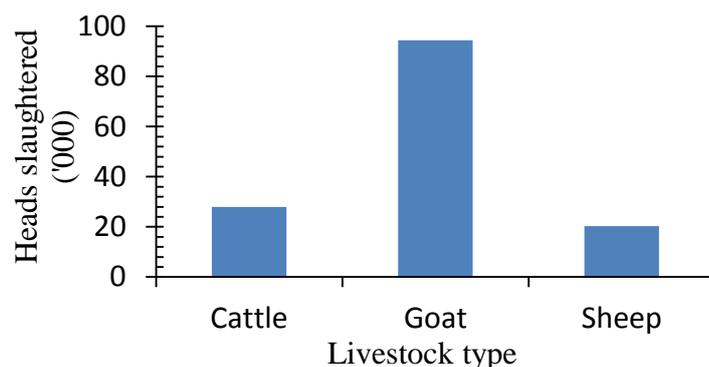


Fig. 1: Numbers of livestock slaughtered in Sabon Gari and Zaria local government slaughterhouses.

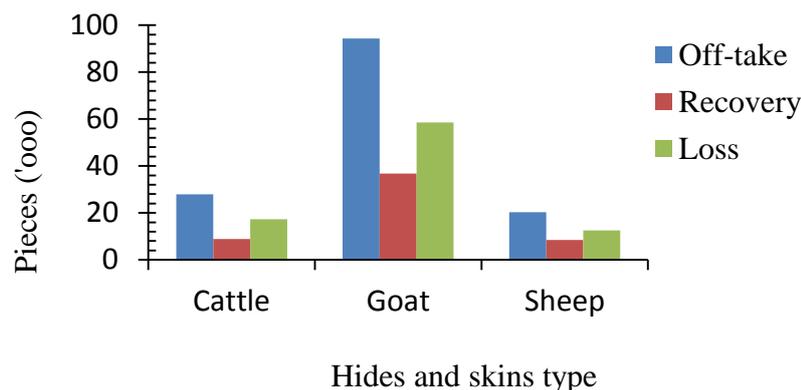


Fig. 2: Hides and skins production in Sabon Gari and Zaria local government slaughterhouses.

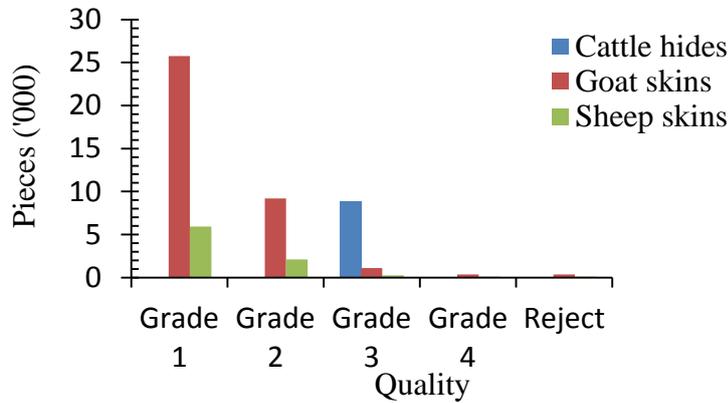


Fig. 3: Numbers and qualities of recovered hides and skins in Sabon Gari and Zaria local government slaughterhouses

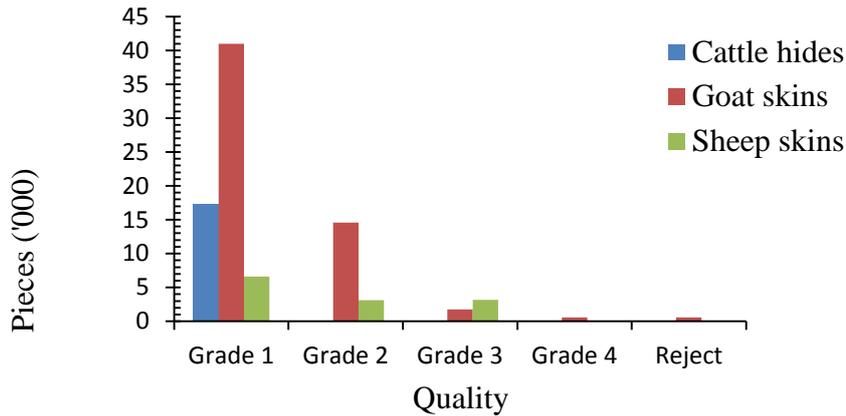


Fig. 4: Numbers and qualities of lost hides and skins in Sabon Gari and Zaria local Government slaughterhouses

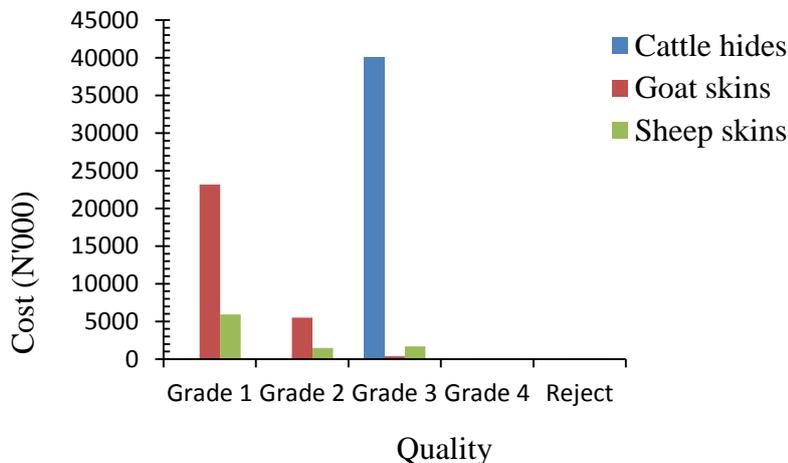


Fig. 5: Estimated monetary values of recovered hides and skins in Sabon Gari and Zaria local government slaughterhouses

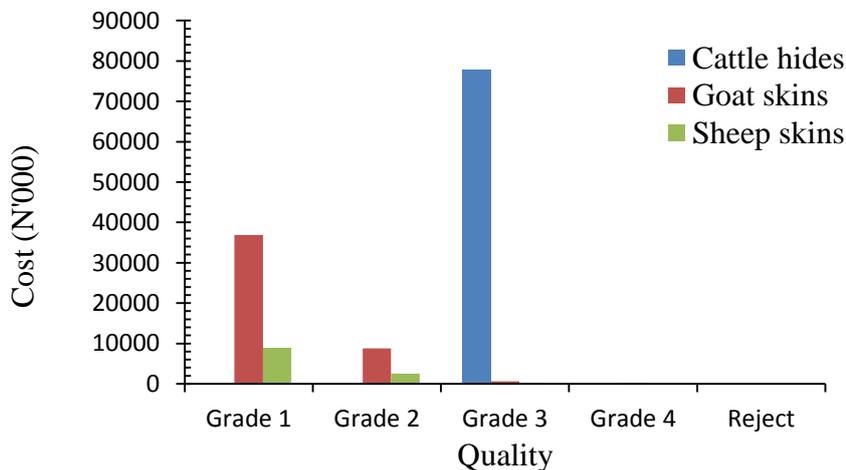


Fig. 6: Estimated monetary losses of hides and skins in Sabon Gari and Zaria local government slaughter houses.

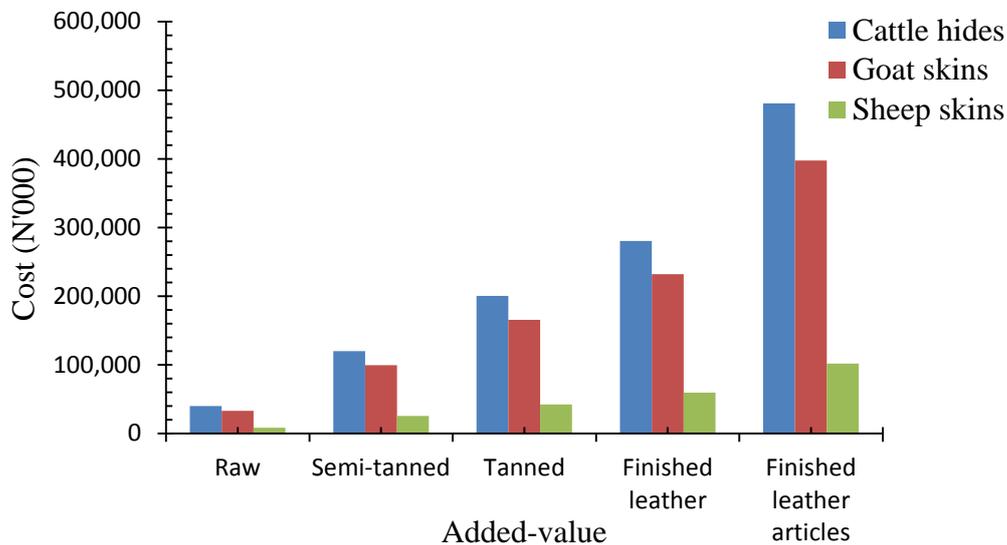


Fig. 7: Estimated value-added for recovered hides and skins in Sabon Gari and Zaria local government slaughter houses

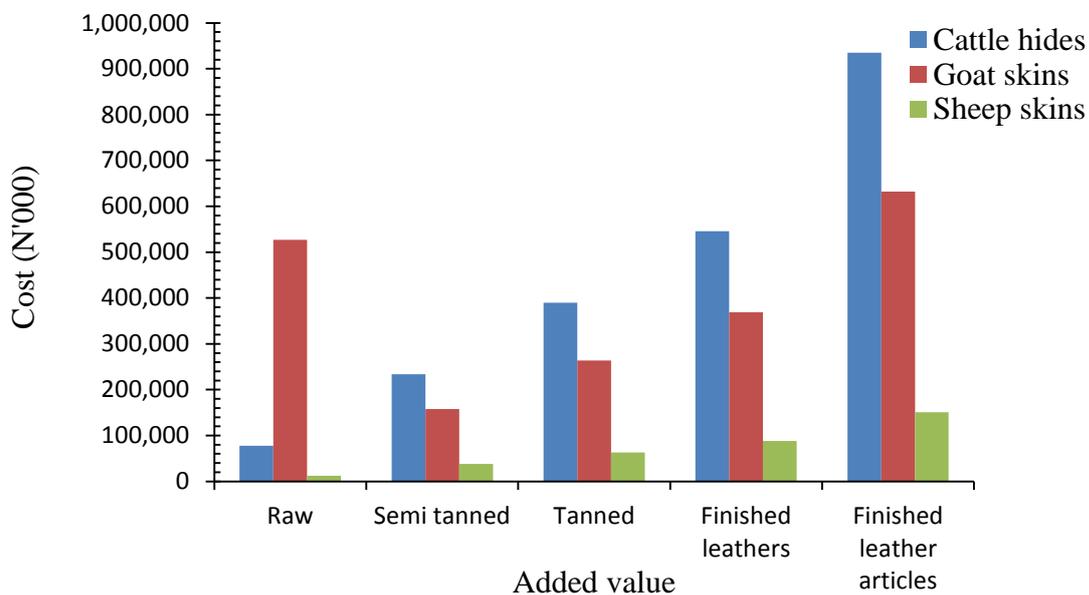


Fig. 8: Estimated added-value for lost hides and skins in Sabon Gari and Zaria local government slaughter houses

#### 4. DISCUSSION

##### 4.1 Losses due to human consumption

The profile of livestock slaughter figures in Sabon Gari and Zaria local government areas are presented in Table 1, which indicates that the total numbers of cattle slaughtered were 27,928, while goats were 94,412 and sheep 20,285. The production figures for cattle hides in Zango abattoir ranks highest, whereas, slaughtering at Dogarawa slaughter slab ranks highest for goat and sheep skins. The off-take profile is presented in Table 2, indicating that 142,625 pieces of hides and skins were produced; 54,180 pieces of hides and skins were recovered and 88,445 pieces of hides and skins were lost. In Figures 1 and 2, the slaughter figures for goats are graphically twice more than the total numbers of cattle hides and sheep skins. Just as the figures are high, so also were the high quality and numbers of them in grade 1 (Figure 3); and high numbers of grade 1 were not recovered in the slaughter houses (Figure 4) representing over N50,000;00 loss. The overall estimated monetary losses are presented in Figures 5 and 6 for cattle hides, goats and sheep skins. The numbers of recovered hides and skins do not really indicate that they were utilized in the tanning industry but for human consumption as ponmo!

Estimated figures of raw hides and skins that were recovered and lost are presented in Table 3. The figures indicate that out of the 54,180 pieces of hides and skins that were recovered, over 90% of hides were in grade 3, while goats and sheep skins were approximately 70% in grade 1. The estimated monetary values of the recovered and lost hides and skins are presented in Table 4. It could be seen from the above values that N135,973,300.00 was lost, while N78,430,300.00 was the value for recovered hides and skins. Ideally what could be seen as recovered from the slaughter houses were lost in the market due to human consumption. The high estimated cost of recovered and lost cattle hides were highest in both, indicating the high cost of hides due to competition between the hides and skins dealers and the market women who purchase the hides for human consumption as ponmo. The astronomical rise in the figures is also because of the size and weight of the hides over the skins. It is also interesting to note that the qualities of the hides were in the third grades, which was an indication that the butchers paid less attention to the quality of production of the raw hides by not minding the aggravated incidences of flay cuts and preservation defects. Hence the relatively poor quality could be blamed on failure to enforce the provisions of the relevant hides and skins laws and regulations in the abattoir and slaughter houses in Zaria municipal.

#### **4.2 Added-value**

Added-value to the raw hides and skins from the recovered and lost profiles are presented in Tables 5 and 6. These tables indicate the total monetary values in the ratio of 1:3:5:7:12 for raw, semi-tanned, tanned, finished leathers and finished leather articles respectively. The added-value is a projected estimate of diversification of the leather and leather products sub-sector of the national economy to generate more income, and create more jobs. This is what makes the hides and skins' value chain most unique and important among all agricultural value chains. The monetary added-value from hides and skins production in Zaria municipal slaughter houses for both recovered and lost skins are issues of major concern that affects the GDP. In the case of increased incomes, employment generation and diversification of the economy, the recovered cattle hides have greater potentials to add-value with about half the overall impact of the lost values. The monetary values of the lost hides and skins showed that goat skins command more prominence than all, however, to bring more impetus to diversification, etc., of the sector, cattle hides were more prominent.

The figures show that cattle hides that were lost monetarily were in grade 3, followed by goat skins in grade 1. Though the sheep skins were in grades 1 and 2, they represented the least raw products. The monetary values for hides were high because of the size (large area), and weight. The fact that quality of the cattle hides produced at Zango abattoir were mainly in the third grade was an indication that there was little or no attention paid to the enforcement of the Nigerian hides and skins laws and regulations. To enhance the gross domestic product (GDP) the law and regulations provide that certain conditions must be in place so as to improve the quality of raw hides and skins; regulate and control the trade in raw hides and skins.

#### **5. CONCLUSION**

This study is an evaluation of the statutory and commercial thresholds on which the optimal use of raw hides and skins are premised. The production of raw hides and skins can only be relevant to the GDP if the raw materials are salvaged for the sustenance of the domestic tanning and leather products industries, in other words the quality of the raw hides and skins should be high and maintained (sustained), while the trade is regulated and controlled. The relatively modest slaughter figures in Zaria municipal local governments slaughter houses shows that hides and skins production could be harnessed from Zango abattoir for cattle hides and Dogarawa slaughter slab for goat and sheep skins.

Records of the recovery and loss rates have shown that the qualities of hides produced from Zango abattoir after recovery were of the third grade, thereby adversely causing an economic loss. Though the estimated value of the hides earned more income due to the high unit cost per piece and weight than the skins, it is regrettable that the quality of the production was average due to the negligence of the best production best practices. This was encouraged by its consumption for food as ponmo there was no attention paid to the quality. The losses encountered in the goat and sheep skins were attributable to neglect for quality of flaying at the expense of roasting of the whole carcass in most cases. The added-value to raw hides, though expected to be high could not be optimized due to poor recovery.

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**APPENDIX**

**Table 6: Grading reckoner for hides and skins in Sabon Gari and Zaria local government areas.**

| S/N | Cattle |     | Goat   |    | Sheep  |    |
|-----|--------|-----|--------|----|--------|----|
|     | Grade  | %   | Grade  | %  | Grade  | %  |
| 1   | 1      |     | 1      | 70 | 1      | 70 |
| 2   | 2      |     | 2      | 25 | 2      | 25 |
| 3   | 3      | >90 | 3      | 3  | 3      | 4  |
| 4   | 4      |     | 4      | 1  | Reject | 1  |
| 5   | Reject |     | Reject | 1  |        |    |

**Table 7: Current prices of hides and skins per grade**

| S/N | Cattle |           | Goat   |        | Sheep  |          |
|-----|--------|-----------|--------|--------|--------|----------|
|     | Grade  | N         | Grade  | N      | Grade  | N        |
| 1   | 1      | 10,000.00 | 1      | 900.00 | 1      | 1,000.00 |
| 2   | 2      | 7,000.00  | 2      | 600.00 | 2      | 800.00   |
| 3   | 3      | 4,500.00  | 3      | 350.00 | 3      | 500.00   |
| 4   | 4      | 3,500.00  | 4      | 250.00 | Reject | 350.00   |
| 5   | Reject | 2,500.00  | Reject | -      |        |          |