

## INFORMATION PRESERVATION AND SECURITY PRACTICES FOR LIVESTOCK TRACEABILITY BY MARKET OFFICIALS IN KATSINA STATE LIVESTOCK MARKETS, NIGERIA

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### Abstract

*This study investigated information preservation and security practices for livestock traceability by market officials in Katsina State. A quantitative research methodology was employed, utilizing a cross-sectional survey design to achieve this objective. A proportionate sampling technique was used to sample 198 market officials from a population of 539 across eighteen livestock markets in Katsina State. The data collected for the study were analyzed using frequency and mean. The findings revealed that, the preservation methods employed by market officials include cleaning, dusting, and photocopying. To ensure information security, market officials utilized measures such as stamping, signing, and employing security guards. Recommendations arising from this study include developing a disaster recovery plan and adopting modern preservation methods, such as digital scanning and acid-free storage, to protect and ensure the long-term preservation of documented information. Additionally, implementing a file tracking or barcode system, along with CCTV surveillance and secure storage solutions, will enhance the security of documented information by preventing unauthorized access and theft. In conclusion, implementing these recommendations will protect documented information from environmental hazards, reduce the risk of physical damage, and ensure long-term preservation, thereby enhancing the longevity and security of the documented information and the traceability of animal transactions.*

**Keywords:** Documented Information, Market Officials, Katsina State, Livestock Traceability. Preservation and Security

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### Introduction

The livestock sector is a crucial component of Nigeria's agricultural economy, particularly in northern states like Katsina, where livestock farming is a primary source of livelihood. The sector contributes significantly to food security, employment, and income generation. However, the efficient management of this sector faces several challenges,

including the traceability of livestock sources and movement, which is essential for minimizing inefficiencies, fraud, potential circulation of rustled livestock, disease control, market access, and the overall integrity of the livestock markets. Livestock traceability refers to the ability to track livestock sources, ownership, movement or animal products in livestock markets (Alemayehu and Haile, 2020).

Effective livestock traceability is vital for monitoring the risk of trading rustled or illegally sourced animals and responding to outbreaks of diseases in livestock markets (Thompson and Grace, 2018). In Katsina State, Nigeria, the need for robust livestock traceability by market officials has become increasingly apparent, particularly in the wake of growing concerns over increasing trading rustled or illegally sourced animals (Bello, Mohammed, and Hassan, 2018). Market officials are tasked with documenting information about livestock transactions, including the origin, health status, and ownership of animals. This documented information is crucial for maintaining traceability, yet its preservation and security are often compromised due to inadequate infrastructure, lack of awareness, and limited access to modern technologies. Preservation and security of documented information refer to the processes and practices used to maintain the integrity, accessibility, and protection of information over time, ensuring that it remains accurate, reliable, and safeguarded against loss, damage, or unauthorized access.

Ensuring the preservation and security of documented information in livestock markets is, therefore, critical for enhancing the reliability of traceability of animals in livestock markets. Proper preservation and security of documented information ensures that accurate information about livestock transactions is maintained over time and accessible for as long as needed, even decades later allowing for the efficient tracking of animals in livestock markets. Secure documented information also protects against fraud and ensures the integrity of information, which is essential for making informed decisions and maintaining consumer trust. More so, securing documented information through encryption, access controls, and other security measures prevents unauthorized access, reducing the risk of data breaches and fraud.

This study focuses on understanding the current practices of market officials in Katsina State regarding the preservation and security of documented information. It aims to identify the methods they use, and the potential areas for improvement. By addressing these issues, the study seeks to contribute to the development of more robust and secure traceability of animals in Nigeria's livestock markets, ultimately supporting better market practices, disease control, and food safety.

### **Statement of the Problem**

The success of livestock markets is critically dependent on the effective preservation and security of documented information related to animal check-in, check-out, sales, slaughter, and any associated offenses. Such documentation is essential for tracking animal

transactions, verifying sources and ownership, and monitoring movements within and between markets. In an environment where large numbers of animals are frequently traded and swiftly moved to various destinations, the preservation and security of this information become even more crucial to prevent unauthorized alterations, ensure accuracy, and maintain trust among stakeholders.

In Katsina State, Nigeria, the challenges associated with preserving and securing documented information have become particularly pronounced. The rapid and often unregulated nature of livestock trading complicates the efforts of market officials to generate, store, preserve, and secure documented information, thereby increasing the risk of trading rustled or illegally sourced animals. This issue was starkly highlighted in September 2021, when the Katsina State Government was compelled to close 14 major livestock markets due to the inability of market officials to adequately trace the sources and movements of animals being traded (Bashir, 2021). This closure, while necessary to address the immediate problem, resulted in significant economic hardship for those reliant on the livestock industry.

Despite these challenges, the State Government reopened the livestock markets in 2022 without implementing comprehensive strategies to improve the preservation and security of documented information (Oyelude, 2022). This oversight has left the markets vulnerable to continued inefficiencies, fraud, and the potential circulation of rustled livestock. The inadequate preservation and security practices undermine the integrity of the documented information and erode the trust of stakeholders, including buyers, sellers, and the public. Given these circumstances, there is an urgent need to investigate the current practices of market officials in Katsina State concerning the preservation and security of documented information. This study aims to explore how officials in Katsina State livestock markets preserve and secure documented information for tracking the sources and movements of livestock within their markets.

### **Objectives of the Study**

The study was designed to achieve the following objectives:

1. Identify the information preservation methods for livestock traceability by the market officials in Katsina State.
2. Reveal the information security measures for livestock traceability by the market officials in Katsina State

### **Literature Review**

Livestock traceability provides a means to track the movement of animals from their point of origin to the final destination, thereby ensuring transparency and accountability in the supply chain. Effective traceability of animals in livestock markets rely on accurate, preserve and secure information, which serves as the backbone of livestock traceability, particularly in regions where livestock is a critical economic resource (González-Bernal,

Perea-Pérez and Gómez, 2020). Documented information is crucial for maintaining a comprehensive record of livestock movement, ownership and health status. In the context of livestock markets, particularly in regions like Katsina State, Nigeria, market officials play a pivotal role in preserving and securing this information. Preservation of documented information involves maintaining information in its original, usable state or desired state, in a way that ensures its accuracy, integrity, and accessibility over time, safeguarding it from physical degradation, loss, or unauthorized access (Okoli and Okoli, 2019). Preservation ensures the longevity of records, particularly in environments where physical records are susceptible to damage or loss (Gartner, 2023).

Osunride and Adetunla (2017) stated that the life span of an information resource can be sustained using the following methods of photocopying using photocopying machines, controlling pollution using air filter systems so as to save images of materials from fading or dirtying by pollutants, controlling light using devices like lighting with bulbs removed or filters over lights and using a camera to measure light levels, controlling temperature and relative humidity using various monitoring equipment such as thermometers, testing of PH using testing paper and PH pen so as to find the acidity of the information material for its storage, avoiding bad management habits like underlining, fumigation that is treating documents with toxic chemicals to prevent insect monitoring light levels, digital reproduction using digital media, such as optical disks, diskettes, CD-ROM disks, reprography using devices like reader-printer, rewind bench, splicer microfilm, microfiche, microfilm readers, having tight security in records centers and using various security devices, including locks, bars on windows, alarms and CCTV cameras.

By and large, Information preservation refers to the act of maintaining information in its original, usable state or desired state over time. The goal of information preservation is to ensure that valuable data remains accessible, authentic, and usable for as long as needed, often spanning decades or even centuries. Information preservation such as cleaning and dusting, binding, fumigation, installation of air conditioners, regular shelf-reading, lamination, photocopying, de-acidification, reprography, digital reproduction using CD-ROM, controlling light and controlling pollution allows livestock market to keep information alive, whole and available for use so that the information can be authoritatively used for the longest time possible. Livestock market deals with local communities who may not necessarily know the importance of the information generated during livestock transaction, which they can easily mishandle it or temper with it, therefore it has become necessary to preserve information in livestock markets for future use.

Security of documented information is a critical concern, especially in regions where livestock is a major economic asset. Market officials in Katsina State, like in many other parts of Nigeria, face significant challenges in ensuring the security of documented information. These challenges include risks of theft, tampering, and unauthorized access to

sensitive information. The literature suggests that the implementation of secure information systems, along with strict access controls and regular audits, can mitigate these risks (Okoli and Okoli, 2019). Documented information needs to be protected against lost or temporary misplacement. Adewumi and Ojo (2021) argue that to ensure their integrity, appropriate measures must be also taken to protect information from unauthorized alteration and theft by implementing effective tracking protocols such as bar codes and radio frequency identification devices.

According to Adewumi and Ojo (2021) documented information must be protected from all hazards, improper access, accidental loss, theft, damage and unwanted destruction. They further mention that there are some security measures that are used to protect documented information which include fire detectors, fire extinguishers, fire alarms and use of security guards. In summary, information security refers to the practice of protecting information and data from unauthorized access, use, disclosure, disruption, modification, or destruction. It involves implementing a set of measures, policies, procedures, and technologies designed to safeguard information assets against a wide range of threats and vulnerabilities. One of the major aspects with information management is on the safeguarding recorded information from loss, theft and destruction, to ensure integrity, appropriate measures must be also taken to protect information from unauthorised alteration and theft by implementing effective tracking protocols such as bar coding, radio frequency technology, stamp, user IDs/Passwords, Signature, fire detectors/fire extinguishers/fire alarms, Security guards.

### **Methodology**

The type of Survey research design adopted was Cross Sectional Survey. The population of this study consisted of market officials from eighteen (18) livestock markets spread across sixteen (16) Local Government Areas in Katsina State amounted to five hundred and thirty-nine (539) respondents. The population of market officials in the livestock markets studied in Katsina State was divided into three (3) locations representing the senatorial zones in the state: Daura, Funtua and Katsina zone. The researcher opted for a proportionate sampling method, selecting 30% of the livestock markets using simple random sampling technique from each smaller zone, with the final sample consisting of all. One (1) livestock market was proportionately selected from locations one and two, and three livestock markets from location three, constituting of all the one hundred and ninety-eight (198) market officials, were selected as the sample for this study. Questionnaire was used as the research instrument for data collection in this study. The data collected for the study was analyzed using descriptive statistics with a bench mark of 0.50.

### **Findings and Discussion**

The researcher distributed 198 copies of the questionnaire to market officials in various livestock markets. Of these, 142 questionnaires (71.8%) were returned, completed,

and deemed useful for the analysis. The data collected with respect to the study's objectives were analyzed and discussed using the mean, with interpretations to clarify the findings. A benchmark of 0.50 was used for acceptance, as the data collected were binary, with values represented as "yes" or "no" (or 1 and 0). The benchmark was determined by averaging these binary values ( $1+0 \div 2 = 0.50$ ). The following analysis and discussions are based on this approach.

### Information Preservation Methods for Livestock Traceability by the Market Officials in Katsina State

The market officials were provided with list of information preservation methods to indicate the methods they mostly applied in preserving the information for livestock traceability in Katsina State. The table 1 presents the findings.

**Table 1. Information Preservation Methods for Livestock Traceability by the Market Officials in Katsina State**

| S/no | Information Preservation Techniques | Mai'adua Livestock Market |      | Sheme Livestock Market |      | Kagadama Livestock Market |      | Charanchi Livestock Market |      | Dankama Livestock Market |      | Total Mean | Std  |
|------|-------------------------------------|---------------------------|------|------------------------|------|---------------------------|------|----------------------------|------|--------------------------|------|------------|------|
|      |                                     | F                         | Mean | F                      | Mean | F                         | Mean | F                          | Mean | F                        | Mean |            |      |
| 1    | Cleaning/dusting                    | 30                        | 0.94 | 28                     | 0.93 | 18                        | 0.78 | 32                         | 0.97 | 20                       | 0.83 | 0.90       | 0.29 |
| 2    | Photocopying                        | 17                        | 0.53 | 16                     | 0.53 | 12                        | 0.52 | 17                         | 0.52 | 12                       | 0.50 | 0.52       | 0.50 |
| 3    | Fumigation                          | 01                        | 0.03 | 02                     | 0.06 | 01                        | 0.04 | 01                         | 0.03 | 00                       | 0.00 | 0.04       | 0.18 |
| 4    | Installation of air conditioners    | 01                        | 0.03 | 02                     | 0.06 | 01                        | 0.04 | 01                         | 0.03 | 00                       | 0.00 | 0.04       | 0.18 |
| 5    | Regular shelf-reading               | 01                        | 0.03 | 02                     | 0.06 | 01                        | 0.04 | 01                         | 0.03 | 00                       | 0.00 | 0.04       | 0.18 |
| 6    | Lamination                          | 01                        | 0.03 | 02                     | 0.06 | 01                        | 0.04 | 01                         | 0.03 | 00                       | 0.00 | 0.04       | 0.18 |
| 7    | Binding                             | 01                        | 0.03 | 02                     | 0.06 | 01                        | 0.04 | 01                         | 0.03 | 00                       | 0.00 | 0.04       | 0.18 |
| 8    | De-acidification                    | 01                        | 0.03 | 02                     | 0.06 | 01                        | 0.04 | 01                         | 0.03 | 00                       | 0.00 | 0.04       | 0.18 |
| 9    | Reprography                         | 02                        | 0.06 | 05                     | 0.17 | 03                        | 0.13 | 06                         | 0.18 | 02                       | 0.08 | 0.13       | 0.33 |
| 10   | Digital reproduction using CD-ROM   | 01                        | 0.03 | 02                     | 0.06 | 01                        | 0.04 | 01                         | 0.03 | 00                       | 0.00 | 0.04       | 0.18 |
| 11   | Controlling Light                   | 02                        | 0.06 | 12                     | 0.40 | 04                        | 0.17 | 04                         | 0.12 | 06                       | 0.25 | 0.20       | 0.39 |
| 12   | Controlling pollution               | 01                        | 0.03 | 02                     | 0.06 | 01                        | 0.04 | 01                         | 0.03 | 00                       | 0.00 | 0.04       | 0.18 |

Table 1 shows that in Katsina State, the primary preservation method for documented information is cleaning and dusting, with a mean score of 0.90, followed by photocopying at 0.52. Other methods like binding, fumigation, installation of air conditioners, lamination, de-acidification, reprography, controlling light, and controlling pollution are not commonly used, as their mean scores range from 0.04 to 0.20, indicating low acceptance among market officials. The preference for cleaning and dusting in Katsina State is due to its simplicity, low

cost, and ease of integration into regular maintenance routines, making it a practical option in resource-limited settings. Photocopying is also valued for creating backup copies of important documents, reducing wear and tear on originals, and aligning with cost-effective preservation practices.

The high preference for cleaning and dusting may be attributed to its familiarity and ease of integration into regular maintenance routines with minimal resources and materials. This method is quick and can be performed regularly with minimal costs. This finding aligns with the practicality and cost-effectiveness of cleaning and dusting as highlighted by Osunride and Adetunla (2017). Photocopying of information is favored for its ability to create duplicate copies in case of damage or loss of the originals. Unfortunately, the rejection of other preservation methods may jeopardize the long-term preservation of documents. These findings underscore the importance of implementing comprehensive preservation strategies to ensure the longevity and accessibility of information, as highlighted by Osunride and Adetunla (2017).

### Information Security Measures for Livestock Traceability by the Market Officials in Katsina State

The market officials were requested to indicate the measures they mostly employ to secure information in their livestock markets in Katsina State. Table 2 present the result.

**Table 2. Information Security Measures for livestock Traceability by the Market Officials in Katsina State**

| S/<br>no | Information Security<br>Measures | Mai'adua<br>Livestock<br>Market |      | Sheme Livestock<br>Market |      | Kagadama<br>Livestock<br>Market |      | Charanchi<br>Livestock<br>Market |      | Dankama<br>Livestock<br>Market |      | Total<br>Mean | Std  |
|----------|----------------------------------|---------------------------------|------|---------------------------|------|---------------------------------|------|----------------------------------|------|--------------------------------|------|---------------|------|
|          |                                  | F                               | Mean | F                         | Mean | F                               | Mean | F                                | Mean | F                              | Mean |               |      |
| 1        | Security guards                  | 19                              | 0.59 | 26                        | 0.87 | 14                              | 0.61 | 19                               | 0.58 | 15                             | 0.63 | 0.65          | 0.47 |
| 2        | Signature                        | 18                              | 0.56 | 25                        | 0.80 | 12                              | 0.52 | 26                               | 0.79 | 16                             | 0.67 | 0.68          | 0.46 |
| 3        | Stamp                            | 17                              | 0.56 | 16                        | 0.53 | 15                              | 0.65 | 21                               | 0.64 | 13                             | 0.54 | 0.59          | 0.49 |
| 4        | Passwords                        | 01                              | 0.03 | 04                        | 0.13 | 01                              | 0.04 | 02                               | 0.03 | 01                             | 0.04 | 0.06          | 0.24 |
| 5        | Bar coding                       | 00                              | 0.00 | 00                        | 0.00 | 00                              | 0.00 | 00                               | 0.00 | 00                             | 0.00 | 0.00          | 0.00 |
| 6        | Radio frequency<br>technology    | 00                              | 0.00 | 00                        | 0.00 | 00                              | 0.00 | 00                               | 0.00 | 00                             | 0.00 | 0.00          | 0.00 |

Table 2 shows that signatures, with a mean score of 0.68, are the most common security measure used by market officials in Katsina State to protect documented information. Their popularity is due to their low cost and ability to verify the identity of document authors. A study by Katarzyna and Martin (2018) confirms that handwritten signatures can be forged or copied, potentially compromising document security. However, signatures alone may be insufficient for security, as they can be forged. Stamps, with a mean

score of 0.59, are also used to confirm the authenticity and approval of documents, helping to prevent unauthorized changes or forgeries.

Moreover, Security guards, with a mean score of 0.65, are used to protect documented information in Katsina State. Their presence deters unauthorized access to sensitive areas, reduces the risk of theft, and enhances the overall safety of market participants. This aligns with the role of security guards in providing physical protection and surveillance to prevent security threats, as noted by Alzahrani and Seth (2021).

Unfortunately, barcoding, radio frequency technology, and passwords are not among the security measures employed by market officials to secure information for in Katsina State, with mean scores below the average benchmark for acceptance. The findings suggest a need for market officials to adopt more advanced security measures such as passwords, barcoding, and radio frequency technology to enhance the security of documented information. These technologies offer stronger protection against unauthorized access and manipulation of information, aligning with the recommendations of experts in information security. Alzahrani and Seth (2021) emphasize the importance of implementing a comprehensive information security strategy.

## **Conclusion**

The study reveals that in Katsina State, market officials primarily rely on basic information preservation and security measures, such as cleaning and dusting, photocopying, signatures, and stamps, due to their low cost, simplicity, and ease of implementation. While these methods offer practical benefits, they fall short in ensuring the long-term preservation and robust security of documented information. The rejection of more advanced preservation techniques and security measures, such as binding, fumigation, barcoding, and radio frequency technology, poses significant risks to the integrity and longevity of the documents. To address these concerns, it is crucial for market officials to adopt comprehensive preservation and security strategies, incorporating advanced technologies that offer stronger protection against unauthorized access and potential degradation of documented information.

## **Recommendations**

Based on the findings of the study, the following recommendations were made:

- There is a need to develop a disaster recovery plan for restoring preserved records after catastrophic events. Additionally, adopting modern information preservation methods, such as acid-free storage materials and scanning documents into digital formats, will protect records from environmental hazards, reduce the risk of physical damage, and ensure long-term preservation.
- To enhance the security of valuable information, a file tracking or barcode system should be implemented for easy tracking. Installing CCTV surveillance in areas where information is stored can deter unauthorized access and provide evidence of security

breaches. Additionally, using secured cabinets, safes, or locked storage rooms for physical documents will prevent theft and unauthorized access.

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