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**RESEARCH PAPER**

# Exploring the Nexus Between Prison Ecology and Behavioral Adaptations Among Convicted Individuals: A Case Study in Sheger City of Oromia Region, Ethiopia

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## Abstract

*This mixed-methods study explores the relationship between prison ecology and behavioral adaptations among convicted individuals in the Sheger City correctional system, Oromia Region, Ethiopia, addressing a critical empirical gap in localized carceral settings. A Convergent Parallel Mixed-Methods Design incorporating a cross-sectional survey was employed, utilizing a structured questionnaire with 341 convicted individuals (proportionally stratified across 120 cell units within 6 blocks across three municipal facilities) and supplemented by semi-structured key informant interviews and focus group discussions (2 sessions) for empirical triangulation. Quantitative survey results revealed that an overwhelming combined 86.3% of respondents agreed or strongly agreed that spatial overcrowding directly heightened interpersonal aggression, while 80.9% reported that severely restricted access to proper sanitation facilities compromised personal dignity. Furthermore, 66.8% rated institutional educational and vocational programs as ineffective or non-existent, and 47.8% attributed behavioral rebellion or emotional withdrawal to negative, security-centric staff interactions. Qualitative thematic analysis supported these trends, showing that inmates adapt through a dual mechanism: predominantly pro-social coping (90.3%, primarily spiritual practices and peer networks) and localized anti-social tactics (9.7%, including social isolation and defensive group affiliations). The study concludes that the current carceral ecology remains overly punitive, and recommends urgent administrative policy shifts toward infrastructural expansion, staff rehabilitative training, and structured inmate development programs.*

**Keywords:** Prison ecology, behavioral adaptations, correctional facilities, Sheger City, rehabilitation, mixed-methods

## Introduction

The concept of 'prison ecology' is defined in this study as an integrated tripartite framework encompassing physical infrastructure (housing, sanitation, and spatial density), the social environment (peer dynamics and staff-inmate relations), and institutional policies (governance, security protocols, and rehabilitation access). This comprehensive definition ensures that physical, social, and administrative environmental factors are systematically examined as interconnected determinants of inmate behavioral adaptations (Festa and Lancia, 2024). By treating these three dimensions as a unified ecological system, this framework examines how physical space, social interactions, and institutional governance jointly drive inmate behavioral adaptations, framing adaptation through the depth, weight, and tightness of modern imprisonment (Crewe, 2021; Festa and Lancia, 2024). Behavioral adaptations represent the functional and psychological coping mechanisms inmates employ to navigate these carceral pressures (Crewe, 2021).

Globally, carceral overcapacity triggers psychological distress and acute behavioral adaptations (World Prison Brief, 2024). In East Africa, rapid urbanization intensifies these pressures, with Ethiopian correctional facilities operating at average occupancy rates exceeding 140% (Ethiopian Ministry of Justice, 2022). Crucially, an explicit ecological-behavioral nexus exists: physical infrastructure deficits, social dynamics, and institutional policies directly dictate whether inmate adaptations manifest as constructive pro-social coping mechanisms or defensive anti-social survival tactics.

While international scholarship explores prison ecology (Pellow, 2020; Festa and Lancia, 2024), these insights stem predominantly from Western contexts and lack direct transferability to developing regions facing distinct socioeconomic constraints. Furthermore, literature frequently fragments carceral environments by examining physical overcrowding separately from institutional policies or social dynamics.

In Ethiopia, prior research has addressed isolated variables such as mental health distress or general facility overviews without applying a comprehensive ecological framework that bridges physical, social, and institutional dimensions (Alemayehu, 2022; Habtamu and Desalegn, 2022). Specifically, existing literature frequently examines physical overcapacity in isolation from administrative security policies and informal social networks, obscuring the combined institutional pressure on inmate adaptation. Regionally, studies in Oromia have overlooked the unique municipal pressures of newly established urban centers like Sheger City. Unless explicitly conceptualized as an integrated system, 'prison ecology' risks fragmented interpretation. In this study, prison ecology is operationalized as a unified system where physical spatial density, social peer-staff dynamics, and institutional governance interact continuously to shape individual inmate behavior. This study aimed to addresses this empirical gap through a mixed-methods case analysis in Sheger City, evaluating how integrated ecological pressures drive both pro-social coping mechanisms and anti-social survival strategies.

# Materials and Methods

## Research Design

A convergent parallel mixed-methods design incorporating a cross-sectional survey was employed. A cross-sectional approach was specifically chosen because it allows for the simultaneous assessment of institutional environmental stressors and inmate behavioral adaptations across diverse prison blocks at a single point in time. In volatile carceral settings characterized by sentence variations and potential inmate transfers, this design minimizes participant attrition, avoids ethical issues associated with longitudinal tracking in high-security facilities, and delivers an accurate snapshot of institutional conditions (Creswell and Creswell, 2018). Quantitative survey data and qualitative narrative accounts were collected concurrently and integrated during analysis for empirical triangulation.

## Study Area and Population

The study was conducted in Sheger City, an administrative urban center surrounding Addis Ababa in the Oromia Region, Ethiopia. The Sheger City Correctional Administration governs three municipal correctional facilities: Facility A (Koye Feche Wing), Facility B (Burayu Wing), and Facility C (Sebata/Sheger Central Wing). At the time of data collection in early 2026, the target population comprised 3,000 officially convicted inmates serving sentences across three municipal facilities: Facility A (Koye Feche Wing, 1,100 inmates), Facility B (Burayu Wing, 1,000 inmates), and Facility C (Sebata/Sheger Central Wing, 900 inmates).

## Sample Size Determination and Sampling Techniques

Utilizing Yamane's formula at a 95% confidence interval and a 5% margin of error, an initial base sample size of 353 was calculated from the target population of 3,000.

Adjusting for a potential 5% non-response rate yielded a targeted sample of 370 respondents, of which 341 questionnaires were fully completed and analyzed (92.2% response rate).

A multi-stage proportional stratified sampling technique was implemented using official correctional registers as the sampling frame. The Sheger City carceral system comprises 3 facilities containing 6 residential blocks and 120 standardized cell units (averaging 25 inmates per cell). The sample of 341 respondents was allocated across facilities, blocks, and cell units using proportional stratified sampling:

Facility A (Koye Feche Wing): Block 1 (Cell Units 1–20); Block 2 (Cell Units 21–40).

Facility B (Burayu Wing): Block 1 (Cell Units 1–20); Block 2 (Cell Units 21–40).

Facility C (Sebata/Central Wing): Block 1 (Cell Units 1–20); Block 2 (Cell Units 21–40).

Systematic random sampling was then applied within each designated cell unit to select individual survey participants."

For qualitative inquiry, criterion-based purposive sampling selected 18 Key Informants (12 convicted inmates with sentence lengths to ensure deep institutional familiarity, and 6 senior correctional administrators). Additionally, 16 inmates participated in two gender-disaggregated Focus Group Discussions (FGD 1: 8 males; FGD 2: 8 females) to reach theoretical saturation regarding shared carceral experiences.

## Data Collection Instruments and Procedures

*Structured Questionnaire*: Administered to 341 inmates, featuring sections on socio-demographics, carceral environmental conditions, and Likert-scale items measuring behavioral coping strategies.

Semi-Structured Interviews: Conducted with purposively selected inmates and staff to capture rich personal narratives regarding institutional culture and survival strategies.

*Focus Group Discussions (FGDs):* Two sessions held in secure facility rooms to explore collective experiences of overcrowding, staff dynamics, and peer socialization.

*Non-Participant Observation*: Systematic observation of common areas (courtyards, dining halls) to record unscripted staff-inmate interactions.

## Validity and Reliability

Instrument reliability was evaluated through a pilot study of 35 inmates (excluded from the primary analysis). Scale internal consistency was confirmed with Cronbach's alpha () coefficients of 0.84 for the overall prison ecology scale, 0.82 for the pro-social adaptation subscale, and 0.79 for the anti-social adaptation subscale, all exceeding the acceptable 0.70 threshold. Content validity was verified by a panel of four criminologists at Ambo University, and construct validity was established through exploratory factor analysis (EFA), where all retained items demonstrated factor loadings above 0.65.

## Data Analysis Procedures

Quantitative survey data were coded, entered, and analyzed using the Statistical Package for the Social Sciences (SPSS version 26). Descriptive statistics (frequencies, percentages, means, and standard deviations) were calculated and presented in standardized thematic tables. Qualitative data from interviews and FGDs were audio-recorded, transcribed verbatim, translated into English, and subjected to inductive thematic analysis (Braun and Clarke, 2021). Data were coded iteratively to generate core thematic clusters (e.g., structural neglect, security-driven containment, dual coping mechanisms), which were subsequently triangulated with the quantitative survey results.

## Ethical Considerations

Ethical clearance was officially granted by the Ambo University Institutional Review Board Written institutional permission was secured from the Sheger City Correctional Administration prior to field entry. Informed consent was obtained from all participating inmates and correctional officers. Participants were explicitly informed of voluntary participation, complete anonymity, data confidentiality, and the right to withdraw at any stage without penalty.

# Results

## Ecological Characteristics of Sheger City Correctional Facility

Inmates perceive the physical and material environment of Sheger City Correctional Facility as severely deficient, with basic material deprivation (food, sanitation) and spatial overcrowding emerging as the primary environmental drivers of interpersonal aggression and loss of personal dignity.

Table 1. Inmate Perceptions of Prison Ecology by Thematic Clusters

| Ecological Dimension & Variable Items | Strongly Disagree (%) | Disagree | Neutral (%) | Agree | Strongly Agree (%) | Mean | SD \| |
|---|---|---|---|---|---|---|---|
| **Basic Needs & Physical Infrastructure** | | | | | | | |
| Insufficient food quantity and quality | 5 (1.50) | 7 (2.10) | 11 (3.20) | 121 (35.50) | 197 (57.70) | 4.46 | 0.78 |
| Inadequate and untimely medical care | 19 (5.50) | 25 (7.30) | 39 (11.50) | 83 (24.40) | 175 (51.30) | 4.09 | 1.19 |
| Unclean and poorly maintained sanitation facilities | 13 (3.80) | 28 (8.20) | 45 (13.20) | 87 (25.50) | 168 (49.30) | 4.08 | 1.14 |
| Limited access to proper hygiene impacts dignity | 9 (2.60) | 18 (5.30) | 38 (11.20) | 128 (37.50) | 148 (43.40) | 4.14 | 0.99 |
| **Safety, Governance & Staff Relations** | | | | | | | |
| Overcrowding leads to increased aggression | 9 (2.60) | 15 (4.40) | 23 (6.70) | 123 (36.10) | 171 (50.20) | 4.27 | 0.96 |
| Safety & Fairness | 130 (38.10) | 95 (27.80) | 65 (19.10) | 38 (11.20) | 13 (3.80) | 2.15 | 1.16 |
| Inmates feel safe from violence and threats | | | | | | | |
| Unfair and nontransparent administration of rules | 155 (45.50) | 92 (26.90) | 50 (14.70) | 25 (7.30) | 19 (5.60) | 2.01 | 1.18 |
| Relationships with prison staff lack respect | 90 (26.40) | 85 (24.90) | 78 (22.90) | 62 (18.20) | 26 (7.60) | 2.56 | 1.27 |
| **Rehabilitation & Programs** | | | | | | | |
| Effective educational and vocational training options | 133 (39.00) | 95 (27.80) | 58 (17.10) | 37 (10.80) | 18 (5.30) | 2.16 | 1.20 |
| Lack of opportunities for recreation and exercise | 45 (13.20) | 112 (32.80) | 89 (26.10) | 65 (19.10) | 30 (8.80) | 2.77 | 1.18 |

Note: SD = Strongly Disagree, D = Disagree, N = Neutral, A = Agree, SA = Strongly Agree.

Quantitative survey results in Table 1 indicate an overwhelmingly negative appraisal of physical and infrastructural conditions. A combined 86.3% of respondents agreed or strongly agreed that spatial overcrowding directly heightens interpersonal aggression (Mean = 4.27, SD = 0.96), while 80.9% reported that restricted sanitation compromises personal dignity (Mean = 4.14, SD = 0.99). Furthermore, 66.8% of respondents indicated that effective rehabilitative and vocational programs were lacking (Mean = 2.16, SD = 1.20).

Qualitative thematic analysis strongly reinforced these statistical findings. Themes of physical compression and systemic neglect were prominent during interviews:

"The sleeping blocks are so packed that people sleep shoulder-to-shoulder, and tension over space sparks fights almost every night. Staff view us as security risks rather than human beings undergoing reform." (Inmate Interviewee 04, Male, Age 42, Facility A).

## Nature of Staff-Inmate Interactions and Behavioral Influences

Table 2. Perceived Influence of Staff-Inmate Interactions on Behavioral Adaptations

| Perceived Nature and Impact of Staff Interactions | Frequency | Percentage (%) |
|---|---|---|
| Staff treated us with respect and humanity (Positive) | 31 | 9.10 |
| Negative interactions, like constant harassment, made me more rebellious | 26 | 7.60 |
| The staff's focus on security over rehabilitation | 131 | 38.40 |
| The guards were often abusive and didn't care about our well-being | 65 | 19.10 |
| We were often ignored by staff | 72 | 21.10 |
| Staff-led programs and constructive dialogue helped me learn new skills | 16 | 4.70 |
| **Total** | **341** | **100.0** |

As presented in Table 2, institutional operations are dominated by security containment (38.4%). Cumulative negative custodial experiences comprising emotional detachment (21.1%), abusive treatment (19.1%), and harassment-driven rebellion (7.6%) account for 47.8% of inmate responses. Positive rehabilitative engagement accounted for only 13.8% combined. Qualitative accounts corroborated these metrics, highlighting how custodial hostility fosters alienation and behavioral withdrawal:

"*When I first came here, I thought they were supposed to help us change. But all they talk about is security. If you try to ask for help, they say you're trying to breach security protocols. It makes you feel like a number... Honestly, that lack of trust makes some of us think, 'Why bother changing?*'" (Inmate Interviewee 12, Male, Age 42, Facility B).

## Integrated Structure of Inmate Behavioral Coping Mechanisms

Convicted individuals display a dual adaptation model: while 90.3% adopt pro-social coping mechanisms primarily spiritual engagement and peer networks a distinct minority (9.7%) resort to anti-social survival strategies such as social withdrawal, aggressive postures, or protection group affiliations.

To operationalize these coping dynamics clearly, survey distributions were categorized into primary thematic clusters as detailed below (Table 3).

Table 3. Integrated Behavioral Coping Strategies Among Inmates

| Adaptation Category | Specific Strategy | Frequency | Percentage (%) | Combined Category % |
|---|---|---|---|---|
| **Pro-Social / Positive** | | | | **90.30%** |
| | Spiritual & Religious Engagement | 121 | 35.40 | |
| | Peer Support Networks & Friendships | 87 | 25.50 | |
| | Family Contact Maintenance | 53 | 15.60 | |
| | Physical Fitness & Recreation | 29 | 8.40 | |
| | Personal Reading & Development | 18 | 5.40 | |
| **Anti-Social / Defensive** | | | | **9.70%** |
| | Social Withdrawal & Isolation | 18 | 5.40 | |
| | Aggressive Defensive Posture | 8 | 2.40 | |
| | Protection Group /Gang Association | 7 | 2.00 | |
| **Total** | | **341** | **100.00** | **100.00** |

As displayed in Table 3, behavioral adaptations divide into two primary pathways: dominant pro-social coping mechanisms and defensive anti-social survival strategies.

The high prevalence of pro-social adaptations indicates that inmates primarily rely on internal resilience structures. Faith-based participation serves as the primary psychological buffer. As one participant noted during an FGD:

'*Faith and mutual sharing inside the cell are what keep us sane. When food runs low or space becomes unbearable, we rely on our prayer groups and share whatever small items we receive from family visits.' (FGD 1, Participant 03, Male, Facility A*)

Conversely, defensive anti-social mechanisms, though less common, represent essential survival tactics in overcrowded spaces. An interviewee highlighted this dynamic:

'If you appear weak in the cell, you risk being exploited. Some guys isolate themselves completely, while others join informal cell groups just to make sure no one takes their sleeping space or provisions.' (Inmate Interviewee 09, Male, Age 31, Facility C)".

# Discussion

## Theoretical Integration of Carceral Stressors and Behavioral Adaptations

The empirical findings confirm that the carceral environment in Sheger City acts as a key determinant of inmate behavioral adaptation, supporting the tenets of prison ecology theory (Festa and Lancia, 2024; Pellow, 2020). These results align with carceral deprivation frameworks (Crewe, 2021) and modern reformulations of General Strain Theory in institutional settings (Agnew, 2022; van den Brink *et al*., 2023), demonstrating that physical and administrative stressors function as chronic institutional strains. Taken together, these findings suggest that Sheger City prisons replicate broader regional carceral challenges in Ethiopia, but with intensified behavioral effects due to rapid municipal urban expansion, acute resource constraints, and spatial overcrowding.

In Sheger City, severe overcrowding (86.3%) and material deficits generate environmental pressures that lead to peer conflict. The observed relationship between overcrowding (Mean = 4.27) and interpersonal aggression illustrates how spatial compression heightens emotional distress within residential blocks. The observed predominance of pro-social mechanisms (90.3%) highlights inmates' psychological resilience, whereas the persistence of anti-social survival tactics (9.7%) underscores the necessity of defensive coping where institutional governance is security-centric.

Furthermore, the finding that 66.8% of respondents view rehabilitation programs as ineffective directly aligns with the 38.4% rate of security-driven containment. When custodial institutions prioritize static security over human development, inmates lose faith in formal reform mechanisms, turning instead to informal peer networks and spiritual coping. To improve behavioral outcomes, institutional policies must transition from purely containment-based mandates to structured rehabilitative environments.

## Determinants of Coping Adaptation Choice

The findings explain why inmates adopt specific pro-social or anti-social coping strategies. Spiritual engagement serves as a primary pro-social coping mechanism (35.4%) because it provides an internal locus of control and psychological resilience amid material deprivation. Conversely, anti-social adaptations such as defensive postures (2.4%) or protection group affiliations (1.8%) occur primarily when institutional governance fails to ensure physical safety, making collective defense a functional strategy for spatial survival. Where institutional security does not prevent peer victimization, defensive anti-social behaviors emerge as survival mechanisms to secure personal space.

## Depth on Coping Mechanisms and Policy Implications

Inmates chose spirituality (35.4%) and peer networks (25.5%) primarily because institutional avenues for personal growth were lacking (66.8% reported ineffective programs). Spiritual practices serve as internal

psychological buffers, restoring a sense of agency and personal dignity within an environment characterized by institutional deprivation. Conversely, anti-social tactics such as gang affiliation (1.9%) or defensive aggression (2.4%) emerge directly from structural insecurity and fear of victimization. When custodial governance is perceived as purely security-driven and punitive, informal cell hierarchies form to fill the administrative void, forcing vulnerable inmates to adopt aggressive postures for self-preservation.

### Limitations of the Study

This study has several methodological limitations. First, its cross-sectional design captures inmate perceptions and behavioral adaptations at a single point in time, preventing causal inferences regarding how carceral adaptation evolves over prolonged sentences. Second, reliance on self-reported survey data introduces potential response biases, such as social desirability or fear of custodial retaliation, though anonymity protocols were strictly maintained. Third, the empirical focus was restricted to municipal facilities in Sheger City, which may limit the generalizability of findings to rural Ethiopian correctional facilities operating under different institutional dynamics.

## Conclusion

This study establishes a clear empirical link between prison ecology and inmate behavioral adaptation within the Sheger City carceral system. Physical overcapacity, severe sanitation deficits, and security-heavy administrative policies create an environment characterized by systemic stress. In response, convicted individuals demonstrate notable psychological resilience, relying overwhelmingly on pro-social coping mechanisms such as spiritual practice and peer support. However, custodial hostility (47.8% negative custodial interactions) and a pronounced lack of rehabilitative programming (66.8% rating programs as non-existent or ineffective) force a subset of inmates into defensive anti-social survival tactics (9.7%). Transforming these carceral spaces from punitive holding facilities into genuine centers for rehabilitation requires immediate infrastructural expansion, administrative policy shifts, and institutionalized human rights training for correctional personnel.

## Recommendations

1. Infrastructural Decompression & Facility Expansion: To mitigate the 86.3% rate of

overcrowding-induced aggression and severe sanitation deficits (80.9%), regional justice bureaus should prioritize expanding residential block capacities and upgrading sanitation facilities.

2. Custodial Staff Training Reform: Addressing the 47.8% negative custodial interaction rate requires shifting staff training from static security containment (38.4%) toward dynamic security, human rights principles, and rehabilitative communication strategies.

3. Structured Vocational & Educational Programs: To counter the 66.8% perceived insufficiency of reformative programs, municipal correctional administration should partner with local TVET institutes and NGOs to establish certified skill-building options.

4. Institutional Integration of Pro-Social Support Networks: Given that 90.3% of inmates adapt through pro-social mechanisms—predominantly spiritual engagement (35.4%) and peer networks (25.5%)—facility management should formally accommodate faith-based and peer-mentorship initiatives as core rehabilitative frameworks

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## Declaration of conflict of interest

The author declares that there is no potential conflict of interest with respect to the research, authorship, and/or publication of this article.

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