ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/IJISRT24OCT536

Resilience of Space: Application of Text Driven Emotion in Urban Planning

Ahmed Akhtaruzzaman*[1]; Yearunnessa Khanam[2]; Md. Saifur Rahman[3]; Sakhawat Hossen Saikat[4]; Md. Tawshif Islam[5]
[1]Senior Planner & Project Director; [2]Assistant Planner & Project Manager; [3]Planner & Project Manager; [4,5]Junior Consultant
Meherpur District Development Plan, Urban Development Directorate, 82, Segunbagicha, Dhaka-1000.

Abstract:- This study explores the spatial distribution of adaptive cycle phases in Meherpur District, with a particular focus on the rhythm of emotions within the community. By analyzing settlement patterns and incident distribution taken from newspaper, the study identifies key phases of the adaptive cycle—Release (Ω), Reorganization (α), Growth (r), and Conservation (K)—across the unions and paurashavas of Meherpur District. A GIS-based approach was used to map buffer zones and observe how each phase manifests within varying distances from the settlement center. The findings highlight significant fluctuations between release and reorganization phases, suggesting that the region is in a constant state of transformation and recovery. The study also reflects on how these spatial patterns affect resilience, with a particular emphasis on the emotional and psychological landscape of the local population. This comprehensive analysis provides valuable insights into adaptive management and regional development strategies in Meherpur, contributing to a more resilient and emotionally stable community.

Keywords:- *Spatial Analysis, Rhythm of Emotion, Adaptive Cycle, Resilience.*

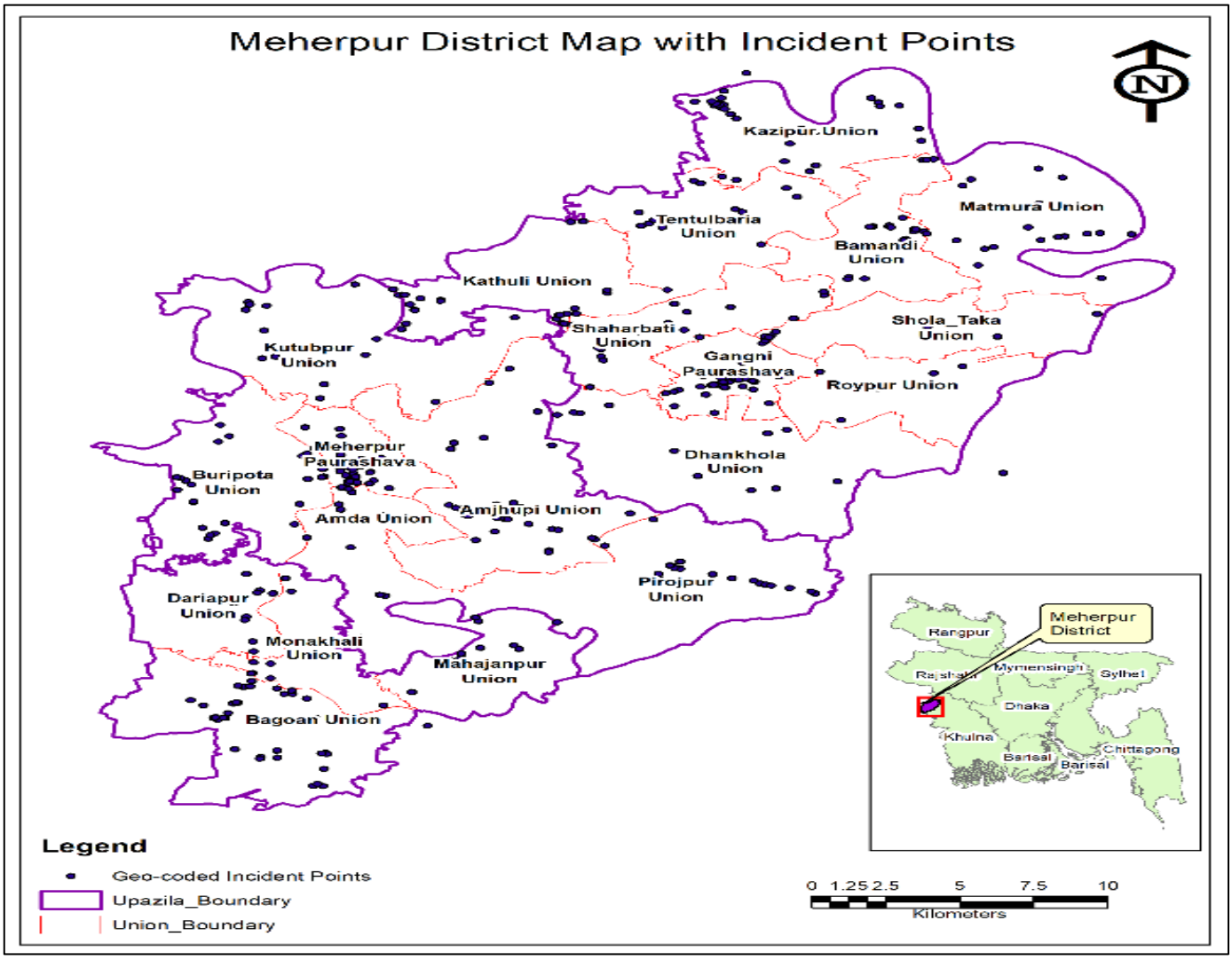
I. INTRODUCTION

The adaptive cycle framework offers a dynamic model for understanding the various phases that ecosystems, communities, and socio-economic systems undergo in response to change. The four phases—Release (Ω), Reorganization (α), Growth (r), and Conservation (K)—represent a cycle of transformation and recovery, often driven by disturbances that disrupt stability. While the adaptive cycle has been applied to a wide array of fields, its spatial application, particularly in the context of socio-economic resilience, remains underexplored. This study focuses on Meherpur District, a region historically significant yet economically vulnerable, to investigate how different phases of the adaptive cycle spatially manifest within the district's landscape. Utilizing GIS technology, we mapped buffer zones around key settlements and analyzed the distribution of each adaptive cycle phase. By focusing on how these phases relate to the "rhythm of emotions"—a concept that reflects the psychological and emotional states of communities in transition—the study aims to provide a comprehensive view of Meherpur's adaptive capacity and resilience. The results will offer critical insights for policymakers and planners working to enhance socio-spatial stability in the region.

II. STUDY AREA

Meherpur District, located in southwestern Bangladesh, lies between 23°38'N to 23°59'N latitude and 88°34'E to 88°53'E longitude. Bordered by the Indian state of West Bengal to the west, Chuadanga to the south, and Kushtia to the east, the district spans around 716 sq. km. there are 3 Upazilas, 18 Unions and 2 Paurashavas in Meherpur District. The district is historically significant for being the site of the Provisional Government during the 1971 Bangladesh Liberation War. The study considered newspaper articles to investigate emotional status of the region. Newspaper collected Incident locations are positioned on the study area map (See Map 1). In Bangladesh, physical planning is dominated only by physical dimension of space ignoring the emotional dimension of space (Akhtaruzzaman & Kabir, 2024). As a result, the plan is basically based on rational, logical and technical approach that makes the plan an abstract one. Considering the fact, in Meherpur District Development Plan, emotional dimension has been considered alongside the physical dimension to make the plan a robust one. This study defines that approach of integrating impact of emotion on physical dimension in plan making.

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/IJISRT24OCT536



Map 1: Study Area Map

III. ADAPTIVE CYCLE

The adaptive cycle is a widely recognized model used to explain the dynamic nature of complex systems, particularly in social-ecological contexts, as they evolve through four phases: exploitation, conservation, release, and reorganization. Gunderson and Holling (2002) describe the exploitation or growth phase as the period where resources are plentiful, and systems experience rapid development. This phase is characterized by the exploration of new opportunities and an emphasis on growth, often seen in social and economic contexts. The conservation phase follows, where systems stabilize, accumulating capital or resources. However, according to Walker et al. (2004), during this phase, the system also becomes less flexible and adaptive, leading to reduced resilience in the face of external shocks.

The release or collapse phase signifies a breakdown, usually caused by internal stress or external pressures, resulting in a swift release of energy or resources (Holling, 2001). This phase represents a decline in the system's structure, as seen in crises or resource depletion. Finally, the reorganization phase marks the period where the system restructures itself in response to its environment, often leading to new opportunities and adaptations that may give rise to a new cycle of growth (Gunderson & Holling, 2002). The adaptive cycle model has been extensively applied in fields such as urban development and environmental systems, providing insight into how systems manage disturbances and evolve over time (Holling, 2001; Walker et al., 2004).

A. Public Emotion in Different Urban Scenarios

Public emotion refers to the collective emotional responses of communities to changes within their urban environment. Urban dynamics significantly impact people's emotions, especially when planning decisions affect daily life, livelihoods, and social interactions. According to Evans (2003), public emotion is deeply intertwined with urban growth and development, where improved infrastructure such as new roads or public spaces often elicits positive emotions like optimism and excitement. Conversely, rapid urbanization or gentrification can induce negative emotions such as anxiety, fear of displacement, and resentment due to the disruption of traditional neighborhoods (Gifford, 2007).

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/IJISRT24OCT536

During environmental crises, such as floods or pollution, fear, and anxiety are common emotional responses, especially when such events threaten public safety or well-being (Harlan et al., 2006). However, crises may also foster a sense of solidarity and resilience, as communities unite to support one another and advocate for change (Cox & Perry, 2011). In transportation and mobility, efficient systems enhance public satisfaction and confidence, while congestion and inefficiency contribute to frustration and anger (Litman, 2013). Finally, in terms of social equity and inclusivity, cities that adopt inclusive urban planning often evoke feelings of fairness and contentment within communities. However, exclusionary practices that favor one group over others can lead to isolation and dissatisfaction (Fainstein, 2010). These emotional responses underscore the importance of urban planning that considers the socio-emotional needs of the population to foster more resilient and inclusive communities.

IV. RELATIONSHIP WITH URBAN PLANNING

The interrelationship between the adaptive cycle, public emotion in various urban scenarios, and urban planning can be understood as an integrated framework that explains how cities evolve, how people emotionally respond to these changes, and how urban planning can influence and adapt to these dynamics.

A. Adaptive Cycle and Urban Development

Urban environments, much like ecosystems, undergo cyclical phases of growth, conservation, collapse, and reorganization, as described by the adaptive cycle (Gunderson & Holling, 2002). These phases reflect the life cycle of a city, encompassing its expansion, consolidation of infrastructure, periods of stress or collapse, and subsequent renewal or transformation.

- Exploitation (Growth): During urban growth periods, cities experience a surge in development characterized by new infrastructure, businesses, and opportunities. This leads to optimism among residents, fostering positive public emotions such as hope and excitement (Fainstein, 2010). However, rapid growth without careful planning can also raise concerns about overcrowding and unequal development (Florida, 2002).
- Conservation: As a city stabilizes and becomes more established, public emotions may include contentment or pride in its successes. Yet, as the system grows more rigid and less adaptable, rising costs and inflexible urban systems can lead to anxiety or frustration among residents (Pelling, 2011).
- Release (Collapse): In the face of crises—such as economic downturns, environmental disasters, or social unrest—public emotions can shift dramatically towards fear, anger, or frustration (Holling, 2001). The release phase often involves the collapse of outdated infrastructure or economic instability, challenging urban planners to respond quickly and effectively to rebuild public trust (Walker et al., 2004).
- Reorganization (Renewal): Following a collapse, cities may reorganize through innovative solutions or policy changes. Public emotions during this phase often exhibit a mix of hope and caution (Newman & Kenworthy, 1999). Urban planning plays a crucial role in guiding this renewal by integrating lessons learned from previous failures and addressing public concerns to foster a more resilient urban environment (Banister, 2008).

B. Public Emotion as Feedback in the Adaptive Cycle

Public emotion acts as a real-time indicator of how effectively a city navigates its adaptive cycle (Gehl, 2010). Emotional responses from the population can provide critical feedback for urban planners, who must be sensitive to shifts in public sentiment throughout the various phases.

In the Growth Phase, public emotion may initially reflect excitement about new developments; however, if this growth is poorly managed—such as through a lack of affordable housing or increasing congestion—emotions can quickly shift to discontent (Harvey, 2008). Planners should aim for inclusive and sustainable growth to maintain public confidence.

During the Conservation Phase, while stability can generate satisfaction, complacency in planning may lead to rigid structures that could foster negative emotions due to rising costs and inequalities (O'Brien et al., 2010). Anticipating these emotions requires planners to introduce flexible and adaptive policies.

In the Release Phase, emotional responses often fluctuate from anger and fear to despair as systems fail (Gunderson & Holling, 2002). This emotional feedback necessitates immediate planning measures, such as disaster relief and social support initiatives, to help communities cope and recover (Pelling, 2011).

In the Reorganization Phase, emotions such as hope and cautious optimism provide planners with an opportunity to rebuild urban areas more resiliently, sustainably, and equitably (Walker et al., 2004). Community engagement is vital to ensure that renewal efforts reflect public desires and needs.

C. An Integrated Perspective: Adaptive Urban Planning

The integration of the adaptive cycle, public emotion, and urban planning suggests a model of adaptive urban planning, where planners:

- Recognize the cyclical nature of cities and anticipate different phases of growth, stability, collapse, and renewal (Banister, 2008).
- Monitor public emotion as a critical input, using it to dynamically adjust plans and policies. For instance, increasing dissatisfaction with transportation may indicate a need for investment in alternative mobility solutions (Fainstein, 2010).

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/IJISRT24OCT536

- Design urban environments to be resilient—both socially and physically—to withstand and adapt to shocks, creating flexible infrastructure and systems that can evolve with changing needs and emotions (Newman & Kenworthy, 1999).

The adaptive cycle provides a framework for understanding urban evolution, with public emotion serving as essential feedback to refine and adjust plans. Urban planning acts as the tool for managing and guiding these dynamics over time. Effective urban development relies on the ability to balance this interaction, ensuring that cities remain resilient and responsive to both the emotional and practical needs of their residents.

V. RESILIENCE AND THE ADAPTIVE CYCLE

Resilience is crucial in navigating the adaptive cycle's stages especially in urban planning and public emotion. The following outlines the correlation between resilience and each stage of the adaptive cycle, with a focus on urban planning, public emotion, and societal responses:

A. Exploitation (Growth) Phase: Building Flexibility and Public Trust

In the growth phase, cities expand rapidly, requiring urban planners to foster resilience through flexible, inclusive development (Ahern, 2011). Public emotion is generally optimistic, but unchecked growth can strain resources, leading to frustration. Planners must manage expectations and engage communities to ensure equitable benefits (Jabareen, 2013).

B. Conservation Phase: Maintaining Flexibility Amid Stability

As cities mature, they enter the conservation phase, focusing on maintaining established systems (Holling, 2001). While stability is perceived positively, over-consolidation can lead to stagnation. Planners should ensure adaptability through regular upgrades and community engagement to address emerging needs (Pelling, 2011).

C. Release (Collapse) Phase: Managing Crisis and Emotional Volatility

The release phase signifies a crisis, often triggered by external shocks or internal contradictions (Gunderson & Holling, 2002). Public emotion is volatile, marked by fear and frustration. Planners must provide clear communication and responsive interventions to restore public trust and maintain essential city functions (Pelling, 2011).

D. Reorganization Phase: Fostering Innovation and Emotional Renewal

In the reorganization phase, cities rebuild by learning from past failures, creating opportunities for innovation (Ahern, 2011). Public emotion often mixes hope with caution. Planners can foster resilience by ensuring community involvement in the renewal process, emphasizing transparency and equitable development (Jabareen, 2013).

VI. METHODOLOGY

Newspapers are considered the mirror of the society as daily incidents happening within the society finds their way to people's doorsteps through it. Those news triggers different sorts of emotions among people based on the types, for example good news triggers positive emotion. Therefore, newspaper articles can be regarded as a significant source of information about any given geographic space. This study involved a multi-step process to analyze emotional dynamics in spatial contexts, employing newspaper article surveys from local and regional newspapers and a structured workflow (see Figure 1) as outlined below:

- **Step 1: Article Survey from Newspapers**: Relevant topics and incidents were identified by systematically screening newspaper articles. The selection focused on events that had a significant social impact, whether positive or negative. A total of 418 sample were collected within a timeframe of January 2022- December 2023. Photo 1-4 represents example newspaper articles of both negative and positive end. Since all the source newspapers were Bangladeshi local newspapers, articles were published in Bengali language therefore translated into English after selection.

Photo 1: Newspaper Article Triggering Anger Emotion (**Translated News Title:** People of Three Villages are Suffering for Only Two Kilometers of Road in Meherpur) (Jaijaidinbd, 2023)

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/IJISRT24OCT536

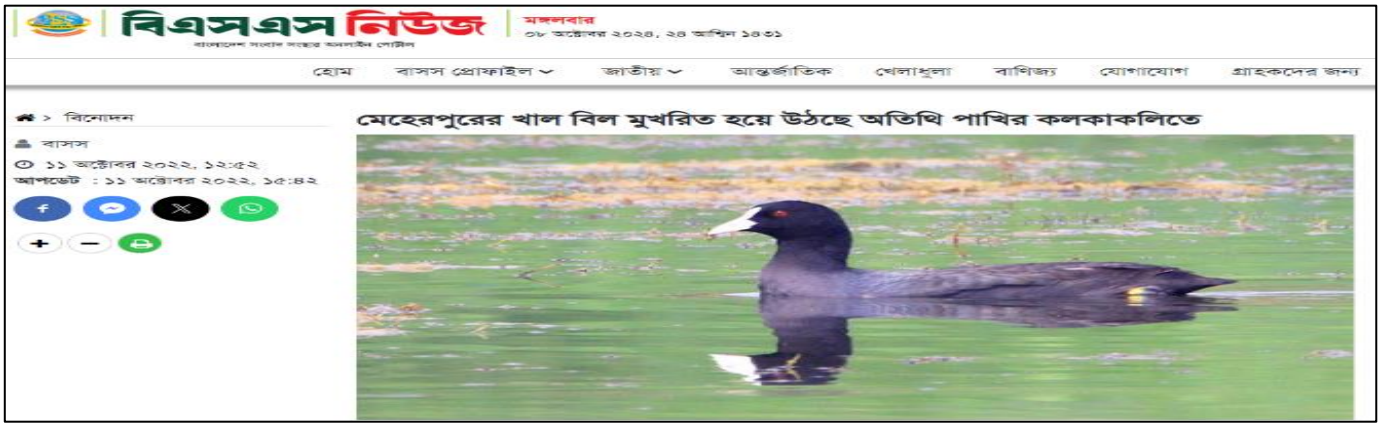


Photo 2: Newspaper Article triggering Happiness Emotion (**Translated News Title:** Meherpur's canals and beels are buzzing with the chirping of visiting birds) (Source: BSSnews, 2023)

Photo 3: Newspaper Article Triggering Fear Emotion (**Translated News Title**: Fresh Water Shortage in Villages) (Source: Prothomalo, 2023)

Photo 4: Newspaper Article Triggering Love Emotion (**Translated News Title:** Kathuli Monastery, the Witness of Time) (Source: Meherpurpratidin, 2023)

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/IJISRT24OCT536

- **Step 2: Emotional Mapping**: The selected topics or incidents were then classified using an emotion wheel, converting qualitative descriptions into quantitative emotion data. This enabled the classification of events based on emotional polarity, ranging from positive to negative (See Figure 2).
- **Step 3: Spatial Geocoding**: The emotion data was geocoded, assigning spatial coordinates to each event, allowing for the representation of incidents geographically. This spatial mapping of emotional events helped in understanding their distribution in relation to specific settlements.
- **Step 4: Weightage Assignment**: Each event was assigned a weighted score of 1 to 7 based on its relative emotional polarization—whether it leaned more towards positivity or negativity. These scores reflected the relative emotional impact of each event, with higher scores for more polarized events. The weighted scores were as follows; Disgust 1, Fear 2, Sadness 3, Anger 4, Surprise 5, Happiness 6 and Love 7.
- **Step 5: Rhythm of Emotion Graph**: A rhythm of emotion graph was generated by plotting the distances of the incidents from the settlement center against their weighted emotional polarization. This graph visualized emotional fluctuations across the space, providing a dynamic representation of the emotional landscape (See Figure 26 –Figure 45).
- **Step 6: Adaptive Cycle Mapping**: The trends observed in the emotion graph were interpreted using the four phases of the adaptive cycle (see Figure 3 and Figure 4):
  - ✓ **Expansion (Growth Phase)**: Represented by the upward trend in the graph, where emotional impact increases.
  - ✓ **Peak (Conservation Phase)**: The highest points in the graph, indicating emotional stability or conservation.
  - ✓ **Recession (Release Phase)**: The downward trend following the peak, showing a release or decline in emotional intensity.
  - ✓ **Trough (Reorganization Phase)**: The lowest points in the graph, indicating reorganization or renewal of emotional dynamics.
- **Step 7: Phase Buffer Zones**: Using the distances represented by each phase in the graph, buffer zones were created around the settlement to spatially demarcate these phases on the ground. This spatial modeling allowed for the visualization of different emotional phases in physical space.
- **Step 8: Area Calculation**: The areas covered by the buffer zones representing each phase were calculated to quantify the spatial extent of each phase of the adaptive cycle.

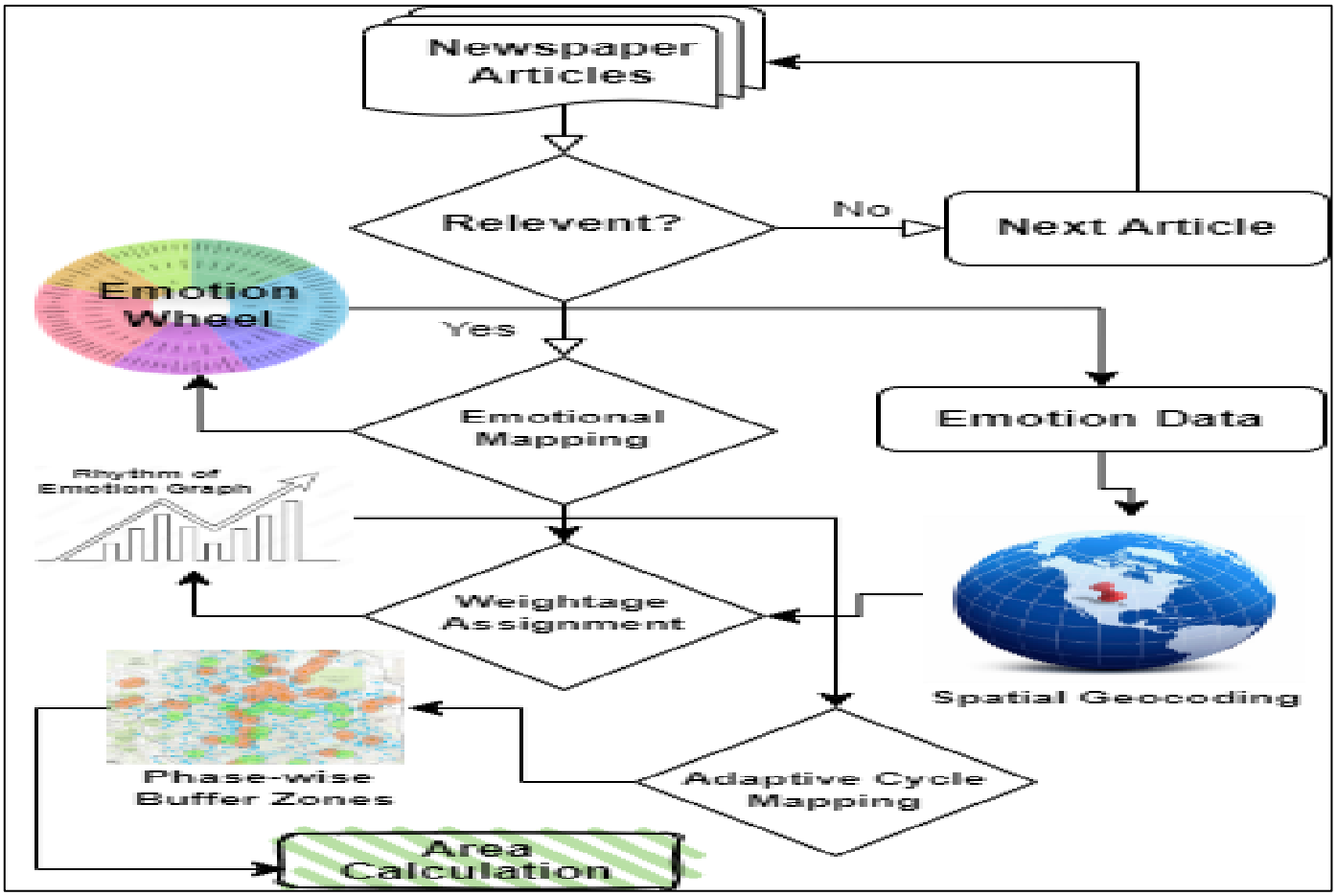


Fig 2: Methodological Flow Diagram

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/IJISRT24OCT536

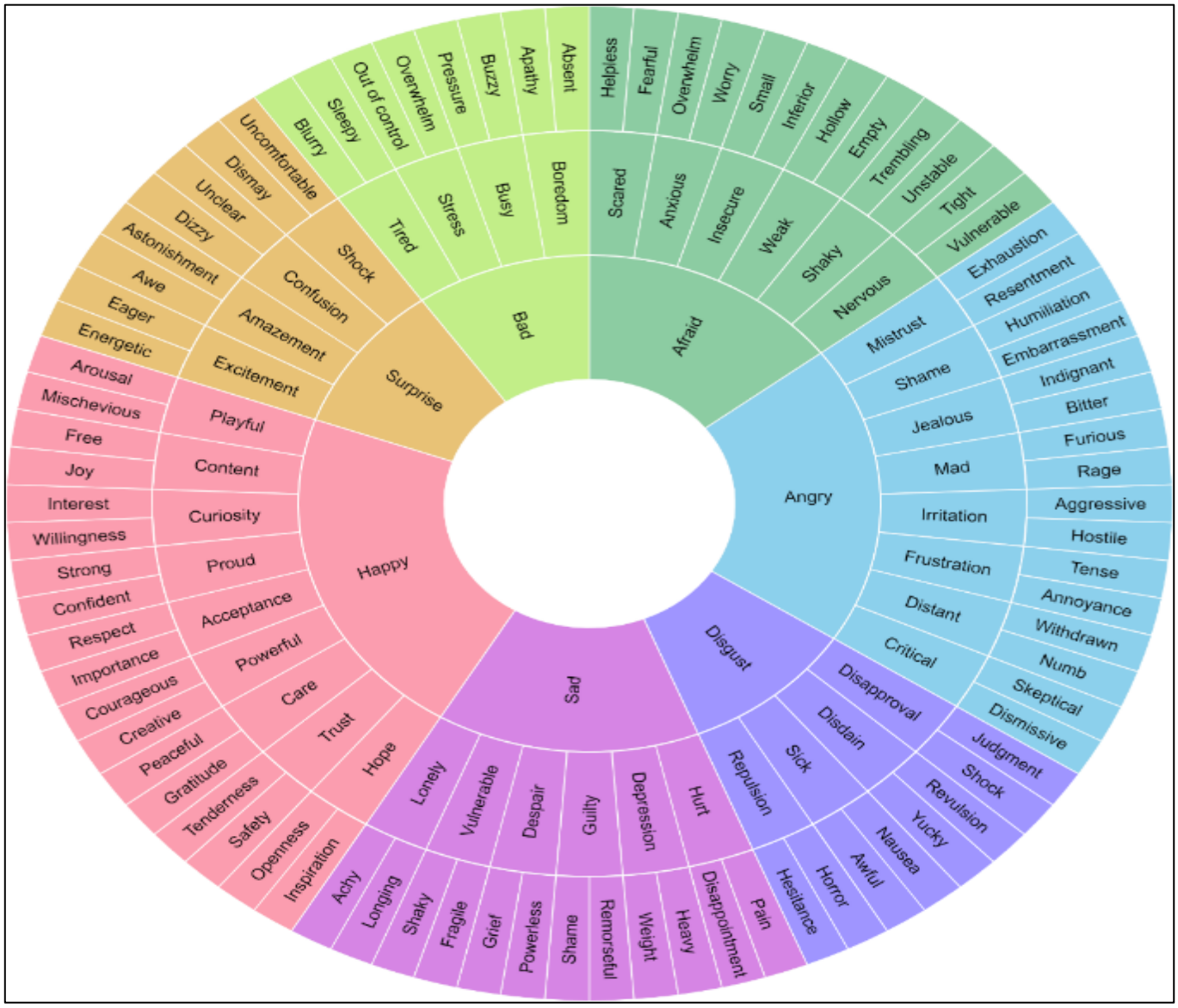


Fig 3: Wheel of Emotion (Stimulating Stone, 2022)

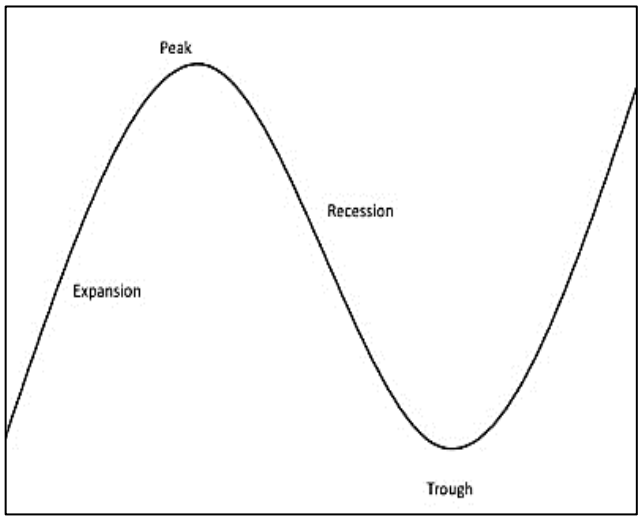


Fig 4: Stages of Trend Line Graph (Reynisson, 2017)

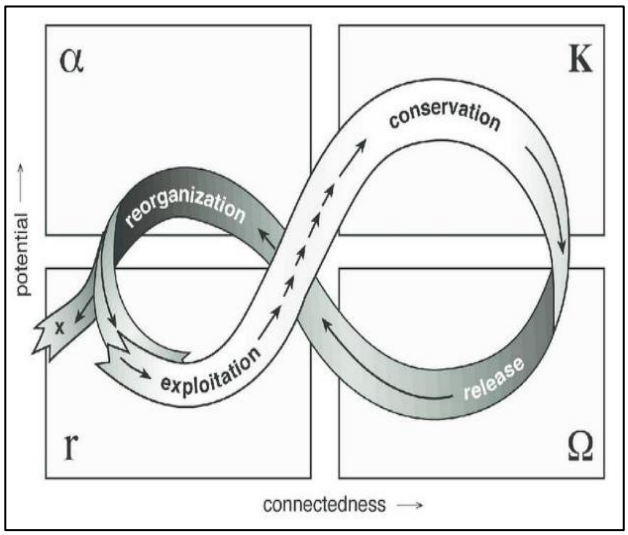


Fig 5: Phases of Adaptive Cycle (Resilience Alliance, n.d.)

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/IJISRT24OCT536

VII. UNION-WISE DISTRIBUTION OF ADAPTIVE CYCLE PHASES

A. Amada Union:

All the major settlements of the Amada union Starts with release phase as major disturbances occurs in the center of those settlements. No positive emotions were found within 1200 meters of the settlement center. But, as the spectrum of emotion has been categorized in 1 to 7 scale based on their relative polarization, there are fluctuations within that range. Therefore, phases of adaptive cycle are taking place. From 1200 meters to 2500 meters however, all the emotions are within positive spectrum. Again, fluctuations are visible as they differ within the weightage scale. Please see Map 2 for details.

Different phases of adaptive cycle have been linked to space as situation buildup with distance. In Amada Union, the adaptive cycle is dominated by the reorganization (α) phase, which spans 845.69 acres, accounting for 63.17% of the total land area. This indicates substantial efforts to restructure and adapt in response to disruptions, showcasing a community deeply engaged in recovery and renewal. The growth (r) phase follows, covering 229.14 acres (17.11%), reflecting moderate levels of development and expansion efforts. The release (Ω) phase, occurring in two segments, first covers 189.06 acres (14.12%) and a smaller portion of 46.88 acres (3.50%), collectively pointing to moderate disturbances and transformative challenges. Conservation (K), the least influential phase, occupies only 28.07 acres (2.10%), suggesting minimal focus on maintaining stability and preserving resources. The adaptive cycle in Amada Union underscores a community primarily focused on reorganization and adaptation while managing moderate growth and periodic disruptions, with limited emphasis on conservation. Please see Table 1 & Figure 5 for details.

Table 1: Adaptive Cycle of Amada Union

Adaptive Cycle	Percentage	Area in acre
Release (Ω)	14.12%	189.06
Reorganization (α)	63.17%	845.69
Growth (r)	17.11%	229.14
Conservation (K)	2.10%	28.07
Release (Ω)	3.50%	46.88

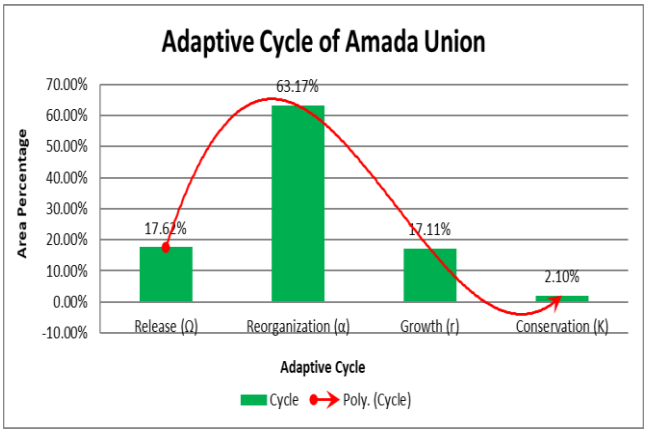


Fig 6: Adaptive Cycle of Amada Union

B. Amjhupi Union:

Most of the prominent settlement centers start with release phase and spans around 250-meter buffer area. Beyond that the phases of Adaptive cycle were distributed like this, Within 250-500 Meters Reorganization Phase, Within 500-1000 Meters Growth Phase, Within 1000-1250 Meters Conservation Phase, Within 1250-2500 Meters Release Phase, Within 2500-3000 Meters Reorganization Phase, and Within 3000-3500 Meters Growth Phase. Please see Map 3 for details.

In Amjhupi Union, the adaptive cycle reveals a dynamic pattern, with the release (Ω) phase taking on a significant role, covering 718.40 acres, or 30.01% of the total land area. This suggests the community is experiencing considerable disturbances. A smaller release phase also exists, spanning 210.49 acres (8.79%), further underscoring the presence of challenges and disruptions. Following this, the growth (r) phase occupies 459.24 acres (19.18%), indicating ongoing expansion and development efforts, though a secondary growth phase, covering 121.89 acres (5.09%), suggests that growth is happening at different paces across the union. The reorganization (α) phase is similarly prominent, covering 401.34 acres (16.76%) and an additional 352.90 acres (14.74%), highlighting significant efforts to adapt and rebuild in response to disruptions. Lastly, the conservation (K) phase is the least influential, covering only 129.75 acres (5.42%), reflecting minimal emphasis on stability and preservation of resources. The adaptive cycle in Amjhupi Union showcases a community actively navigating through periods of disruption, with considerable focus on reorganization and growth, though the multiple instances of the release phase suggest ongoing challenges. Please see Table 2 and Figure 6 for details.

Table 2: Adaptive Cycle of Amjhupi Union

Cycle	Percentage	Area Acre
Release (Ω)	8.79%	210.49
Reorganization (α)	16.76%	401.34
Growth (r)	19.18%	459.24
Conservation (K)	5.42%	129.75
Release (Ω)	30.01%	718.40
Reorganization (α)	14.74%	352.90
Growth (r)	5.09%	121.89

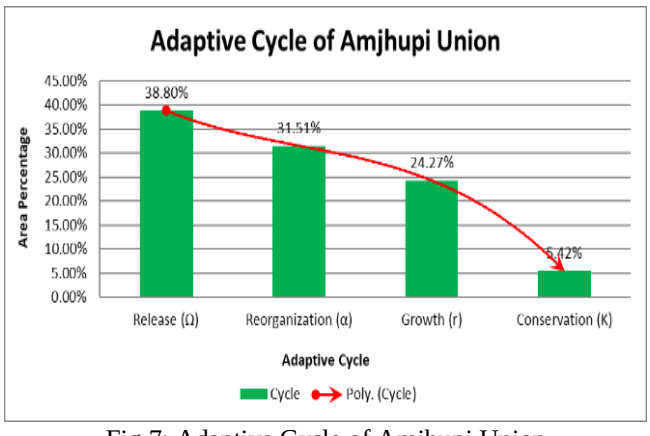


Fig 7: Adaptive Cycle of Amjhupi Union

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/IJISRT24OCT536

C. Bagoan Union:

In Bagoan Union, Adaptive cycle started with Release phase spanning a buffer zone of 250 meters from the settlement center. Beyond that the phases of Adaptive cycle were distributed like this, Within 250-500 Meters Reorganization Phase, Within 500-750 Meters Growth Phase, Within 750-1250 Meters Conservation Phase, Within 1250-1600 Meters Release Phase, Within 1600-1750 Meters Reorganization Phase. Please see Map 4 for details.

In Bagoan Union, the adaptive cycle begins with the release (Ω) phase, which covers an area of 268.51 acres, making up 17.79% of the total land area. The release phase, while not dominant, signifies a considerable impact on the settlement. Following this, the reorganization (α) phase emerges as the most prominent, encompassing 438.34 acres (29.05%), indicating a significant level of restoration and rebuilding efforts in the union. The growth (r) phase, which represents expansion and development, spans 294.73 acres, accounting for 19.53% of the area, showing an upward trend in progress. Lastly, the conservation (K) phase is also noticeable, covering 260.37 acres, or 17.25% of the total area, symbolizing stability and preservation. The pattern in Bagoan Union suggests a moderate dominance of the reorganization phase, pointing to a hopeful trajectory with steady rebuilding efforts, while the release phase continues to hold a considerable influence, reflecting ongoing challenges and disruptions. Please see Table 3 and Figure 7 for details.

Table 3: Adaptive Cycle of Bagoan Union

Cycle	Percentage	Area in acre
Release (Ω)	17.79%	268.51
Reorganization (α)	29.05%	438.34
Growth (r)	19.53%	294.73
Conservation (K)	17.25%	260.37
Release (Ω)	11.41%	172.10
Reorganization (α)	4.96%	74.91

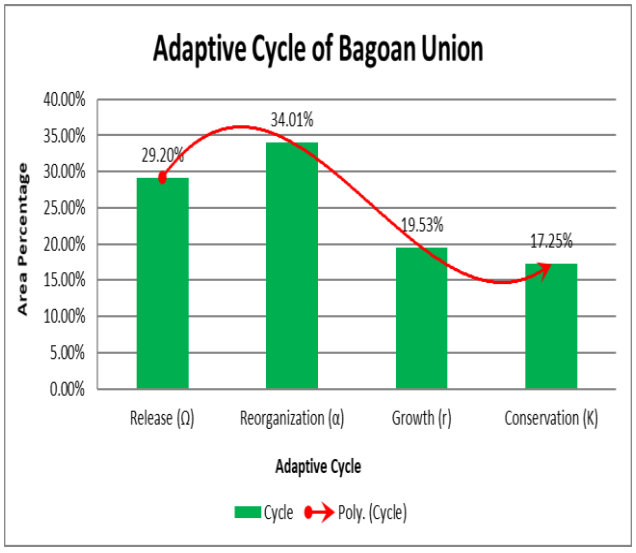


Fig 8: Adaptive Cycle of Bagoan Union

D. Bamandi Union:

In Bamandi Union, the adaptive cycle starts with reorganization phase spanning from the settlement center to 250-meter buffer zone. Beyond that the phases of Adaptive cycle were distributed like this, Within 250-500 Meters Growth Phase, Within 500-1000 Meters Conservation Phase, Within 1000-1500 Meters Release Phase. Please see Map 5 for details.

In Bamandi Union, the adaptive cycle initiates with the reorganization (α) phase, which covers 169.98 acres, representing 20.31% of the total land area. This phase reflects efforts to rebuild and adapt, marking the union's resilience. The most prominent phase in Bamandi is the growth (r) phase, which spans 263.09 acres, accounting for 31.44% of the area, highlighting active development and expansion. Following this, the conservation (K) phase covers 219.66 acres, making up 26.25% of the total land, emphasizing stability of existing systems. The release (Ω) phase, encompassing 184.03 acres (21.99%), indicates a significant presence of disturbances and transformations within the union. The adaptive cycle pattern in Bamandi Union suggests a notable focus on growth, balanced with reorganization and conservation efforts, while still contending with the challenges posed by the release phase. Please see Table 4 and Figure 8 for details.

Table 4: Adaptive Cycle of Bamandi Union

Cycle	Percentage	Area in Acre
Reorganization (α)	20.31%	169.98
Growth (r)	31.44%	263.09
Conservation (K)	26.25%	219.66
Release (Ω)	21.99%	184.03

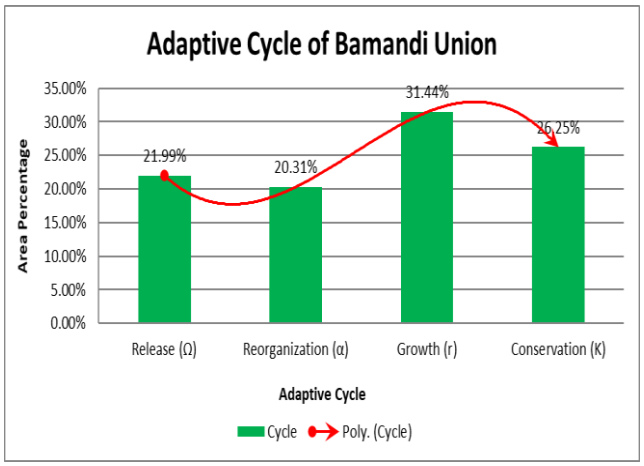


Fig 9: Adaptive Cycle of Bamandi Union

E. Burirpota Union

Adaptive cycle of Burirpota union also starts with reorganization phase spanning 250-meter buffer area. Beyond that the phases of Adaptive cycle were distributed like this, Within 250-750 Meters Growth Phase, Within 750-1100 Meters Conservation Phase, Within 1100-1500 Meters Release Phase, and Within 1500- 1750 Meters Reorganization Phase. Please see Map 6 for details.

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/IJISRT24OCT536

In Burirpota Union, the adaptive cycle is primarily dominated by the growth (r) phase, which covers a substantial 955.30 acres, representing 55.78% of the total land area. This dominance indicates a strong focus on development and expansion, showcasing Burirpota Union's drive towards progress. Following this, the reorganization (α) phase is split into two segments, with the larger portion covering 294.33 acres (17.19%) and a smaller section occupying 57.70 acres (3.37%), together reflecting ongoing adaptive measures and rebuilding efforts. The conservation (K) phase accounts for 16.71% of the area, spanning 286.12 acres, indicating a steady growth and preservation. The release (Ω) phase is the least influential, covering only 119.03 acres, or 6.95% of the total area, suggesting fewer disruptions compared to other phases. The adaptive cycle pattern in Burirpota Union suggests a community heavily devoted to growth and reorganization, with relatively low disturbance, allowing for a strong emphasis on forward momentum and stability. Please see Table 5 and Figure 9 for details.

Table 5: Adaptive Cycle of Burirpota Union

Cycle	Percentage	Area in Acre
Reorganization (α)	17.19%	294.33
Growth (r)	55.78%	955.30
Conservation (K)	16.71%	286.12
Release (Ω)	6.95%	119.03
Reorganization (α)	3.37%	57.70

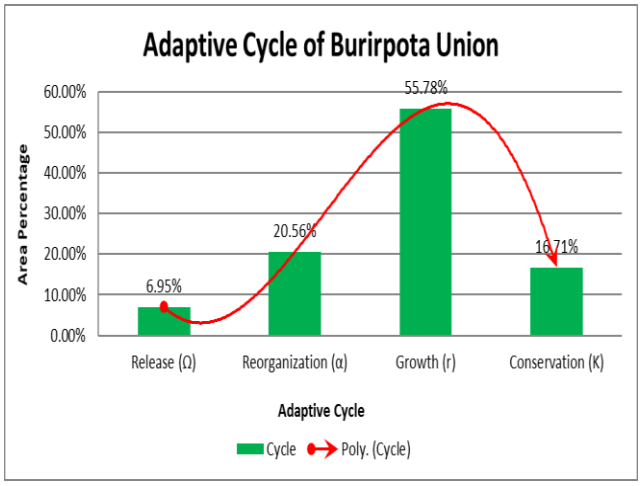


Fig 10: Adaptive Cycle of Burirpota Union

F. Dariapur Union:

Like majority of the unions, Dariapur's adaptive cycle starts with release phase with 250-meter buffer area from settlement center. Beyond that the phases of Adaptive cycle were distributed like this, 250-500 Reorganization Phase, Within 500-750 Meters Growth Phase, Within 750-1000 Meters Conservation Phase, and Within 1000-1600 Meters Release Phase. Please see Map 7 for details.

In Dariapur Union, the adaptive cycle prominently features the release (Ω) phase, which appears in two distinct segments. The larger release phase covers 348.32 acres, accounting for 33.06% of the total land area, while the smaller portion spans 90.08 acres (8.55%). This significant presence of the release phase highlights ongoing challenges, disruptions, and the potential for breakdowns within the union. Following this, the growth (r) phase emerges, covering 223.73 acres, or 21.23%, reflecting areas of active expansion and development. The conservation (K) phase follows closely, encompassing 205.39 acres (19.49%), indicating efforts towards stability and the preservation of resources. The reorganization (α) phase accounts for 17.67% of the area, spanning 186.21 acres, showing that adaptive measures and restructuring efforts are actively at play. The adaptive cycle in Dariapur Union suggests a community heavily influenced by the release phase, with significant efforts in growth, conservation, and reorganization, highlighting a dynamic environment marked by both challenges and adaptive potential. Please see Table 6 and Fig for details.

Table 6: Adaptive Cycle of Dariapur Union

Cycle	Percentage	Area in Acre
Release (Ω)	8.55%	90.08
Reorganization (α)	17.67%	186.21
Growth (r)	21.23%	223.73
Conservation (K)	19.49%	205.39
Release (Ω)	33.06%	348.32

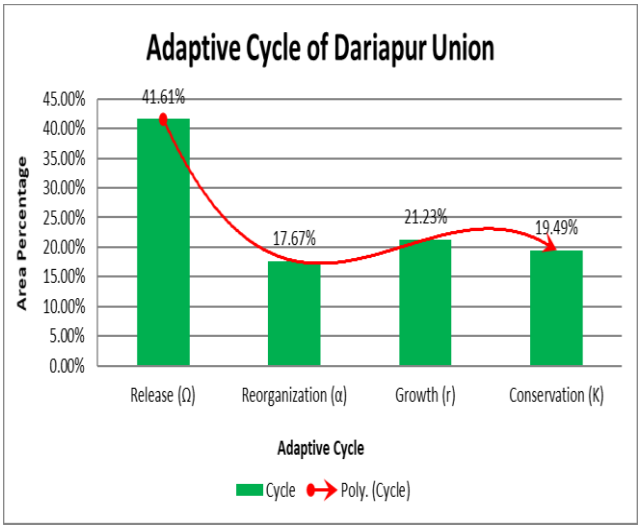


Fig 11: Adaptive Cycle of Dariapur Union

G. Dhankhola Union:

Adaptive cycle of Dariapur Union starts with a mixed pattern of reorganization, release and growth phase. From that point of view, Dhankhola has its unique characteristics. Majority of the settlements here are in a zigzag pattern. Settlements with good road connectivity are starting with either reorganization or growth phase. But settlements with primary road are starting with release phase. See Map 8 for details.

In Dhankhola Union, the adaptive cycle is predominantly shaped by the growth (r) phase, which covers a vast area of 1,527.55 acres, accounting for 56.21% of the total land area. This overwhelming focus on growth highlights Dhankhola Union's commitment to development, expansion, and forward momentum. The release (Ω) phase is also significant, appearing in two segments: the major

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/IJISRT24OCT536

segment spans 755.21 acres (27.79%), indicating considerable disruptions and transformative changes, while a minor portion covers just 4.30 acres (0.16%), suggesting minimal localized disturbances. The reorganization (α) phase, covering 241.41 acres or 8.88%, reflects efforts at rebuilding and adaptation, albeit less prominently. Conservation (K) has the least influence, encompassing 188.99 acres, or 6.95%, indicating limited focus on maintaining stability and preserving existing systems. The adaptive cycle pattern in Dhankhola Union suggests a dynamic environment, highly driven by growth with significant but controlled disturbances, while reorganization and conservation play smaller yet crucial roles in sustaining the union's overall adaptive capacity. See Table 7 and Figure 11 for details.

Table 7: Adaptive Cycle of Dhankhola Union

Cycle	Percentage	Area in acre
Release (Ω)	27.79%	755.21
Reorganization (α)	8.88%	241.41
Growth (r)	56.21%	1527.55
Conservation (K)	6.95%	188.99
Release (Ω)	0.16%	4.30

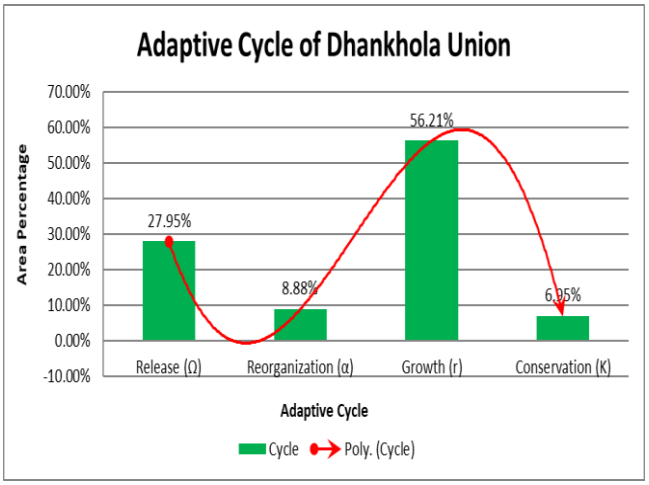


Fig 12: Adaptive Cycle of Dhankhola Union

H. Kathuli Union:

In Kathuli Union, small settlements are clustered around two major roads and starts with release phase. The journey from release to conservation phase follows a steep downward trend (See Figure 12). Release phase covers the first 500 meters. Beyond that the phases of Adaptive cycle were distributed like this, Within 500-1250 meters Reorganization Phase, within 1250-1750 meters Growth Phase, within 1750-2250 meters Conservation Phase. See Map 9 for details.

In Kathuli Union, the adaptive cycle is largely driven by the release (Ω) phase, which dominates with an area of 341.75 acres, representing 41.28% of the total land area. This strong presence indicates that Kathuli Union is heavily influenced by disturbances and transformative events, which may bring about significant changes and challenges. The reorganization (α) phase follows, covering 259.22 acres (31.31%), highlighting substantial efforts towards adaptation, signifying a community striving to recover from ongoing disruptions. The growth (r) phase occupies 160.69 acres, accounting for 19.41% of the area, reflecting moderate levels of expansion and development within the union. Conservation (K), the least prominent phase, covers only 66.27 acres, or 8.00% of the land, indicating limited efforts in maintaining stability. The adaptive cycle pattern in Kathuli Union suggests a landscape highly prone to the release phase, with significant but slightly less reorganization efforts, while growth and conservation play smaller roles, underscoring a community in constant flux and adaptation. See Table 8 and Figure 12 for details.

Table 8: Adaptive Cycle of Kathuli Union

Cycle	Percentage	Area in Acre
Release (Ω)	41.28%	341.75
Reorganization (α)	31.31%	259.22
Growth (r)	19.41%	160.69
Conservation (K)	8.00%	66.27

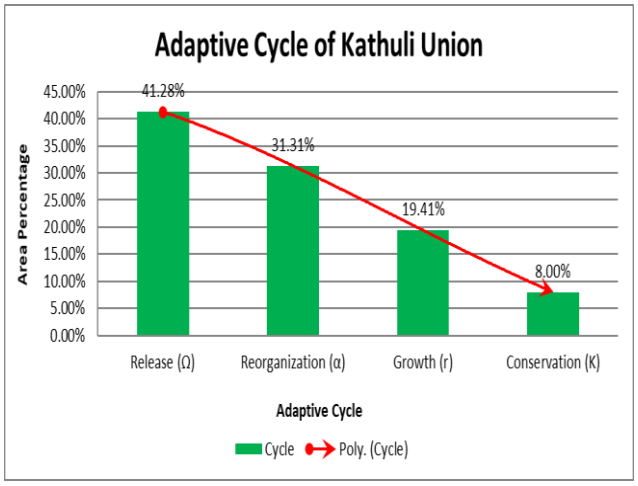


Fig13: Adaptive Cycle of Kathuli Union

I. Kazipur Union:

In Kazipur, there is no complete adaptive cycle because it lacks conservation phase. Although, started with release phase, reorganization phase is dominant here, spanning 500–1750-meter buffer and release phase covers the first 500-meter buffer. Growth phase covers the rest. See Map 10 for details.

In Kazipur Union, the adaptive cycle is prominently characterized by the reorganization (α) phase, which covers a substantial area of 1,106.61 acres, accounting for 54.43% of the total land area. This strong focus on reorganization indicates significant efforts towards adaptation, recovery, and the restructuring of the community in response to previous challenges. The release (Ω) phase also holds a considerable influence, spanning 774.70 acres (38.11%), reflecting ongoing disturbances and transformative changes that the union faces. The growth (r) phase is the least prominent, covering only 151.71 acres, or 7.46% of the area, suggesting limited expansion and development activities in comparison to the other phases. The adaptive cycle pattern in Kazipur Union reveals a community deeply engaged in reorganization and adaptation while contending with

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/IJISRT24OCT536

substantial disruptions, highlighting a resilient environment focused on rebuilding and renewal amongst challenges. See Table 9 and Figure 13 for details.

Table 9: Adaptive Cycle of Kazipur Union

Cycle	Percentage	Area in Acre
Release (Ω)	38.11%	774.70
Reorganization (α)	54.43%	1106.61
Growth (r)	7.46%	151.71

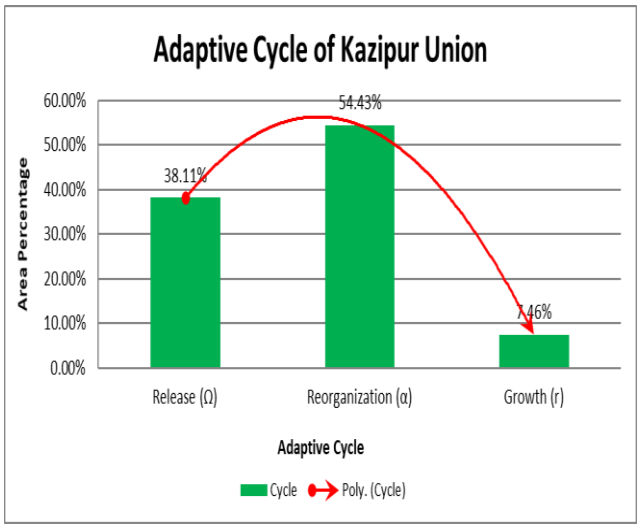


Fig 14: Adaptive Cycle of Kazipur Union

J. Kutubpur Union:

In Kutubpur union, adaptive cycle starts with release phase and spans up to 600-meter buffer area. Beyond that the phases of Adaptive cycle were distributed like this, Within 600-1500 meters Reorganization phase, within 1500-3400 meters Growth phase, within 3400–4100-meter Conservation phase. See Map 11 for details.

In Kutubpur Union, the adaptive cycle exhibits a nearly balanced dynamic between the release (Ω) and reorganization (α) phases. The release phase spans 685.09 acres, accounting for 37.33% of the total land area, indicating significant disturbances and transformative pressures affecting the community. Close behind, the reorganization phase covers 670.30 acres (36.53%), reflecting considerable efforts towards adaptation, recovery, and restructuring in response to these challenges. The growth (r) phase represents a moderate portion of the cycle, covering 313.82 acres (17.10%), suggesting ongoing but limited expansion and development activities. Meanwhile, the conservation (K) phase, encompassing 165.92 acres (9.04%), indicates a lesser emphasis on maintaining stability. The adaptive cycle pattern in Kutubpur Union highlights a community navigating through substantial disruptions while actively engaging in reorganization, with moderate growth and conservation efforts, signifying resilience and adaptability in a changing scenario. See Table 10 and Figure 14 for details.

Table 10: Adaptive Cycle of Kutubpur Union

Cycle	Percentage	Area in Acre
Release (Ω)	37.33%	685.09
Reorganization (α)	36.53%	670.30
Growth (r)	17.10%	313.82
Conservation (K)	9.04%	165.92

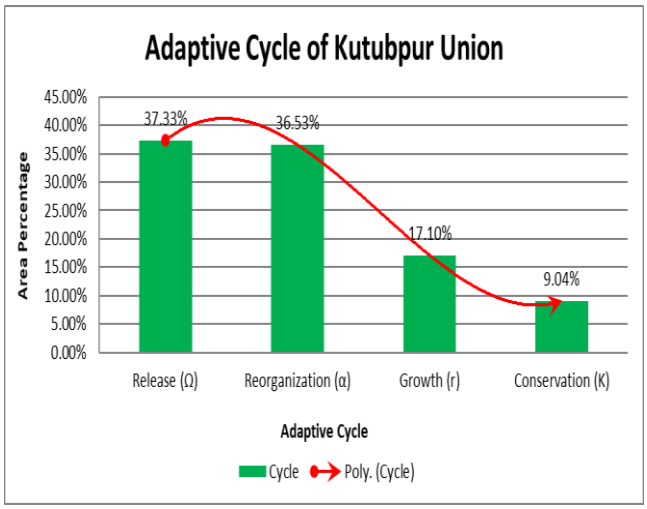


Fig 15: Adaptive Cycle of Kutubpur Union

K. Mahajanpur Union:

Mahajanpur has a unique geographical feature that the two major settlements are separated by the river here. Those inner settlements have only reorganization, growth and conservation phase but release phase is not present. The complete opposite picture can be seen in the boundary areas, where only release phase is prominent. The phases are allocated like this within settlements, within 250-meter buffer Reorganization phase, beyond that, 250–750-meter Growth phase, 750–1750-meter Conservation phase, 1750–3100-meter Release phase. See Map 12 for details.

In Mahajanpur Union, the adaptive cycle is significantly influenced by the release (Ω) phase, which covers 363.05 acres, accounting for 48.75% of the total land area. This substantial presence of the release phase highlights ongoing challenges and disruptions that the community is facing, suggesting a period of considerable transformation and instability. Following this, the growth (r) phase occupies 222.11 acres (29.82%), reflecting moderate levels of expansion and development efforts within the prevailing disruptions. The reorganization (α) phase is relatively modest, covering 78.49 acres (10.54%), indicating some adaptive events are being commenced, but at a lesser intensity. Conservation (K) also plays a minor role, encompassing 81.08 acres (10.89%), suggesting limited focus on maintaining stability. The adaptive cycle pattern in Mahajanpur Union reveals a community heavily impacted by disturbances, with growth efforts ongoing, while reorganization and conservation initiatives remain minimal, underscoring the need for resilience in navigating current challenges. See Table 11 and Figure 15 for details.

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/IJISRT24OCT536

Table 11: Adaptive Cycle of Mahajanpur Union

Cycle	Percentage	Area in Acre
Reorganization (α)	10.54%	78.49
Growth (r)	29.82%	222.11
Conservation (K)	10.89%	81.08
Release (Ω)	48.75%	363.05

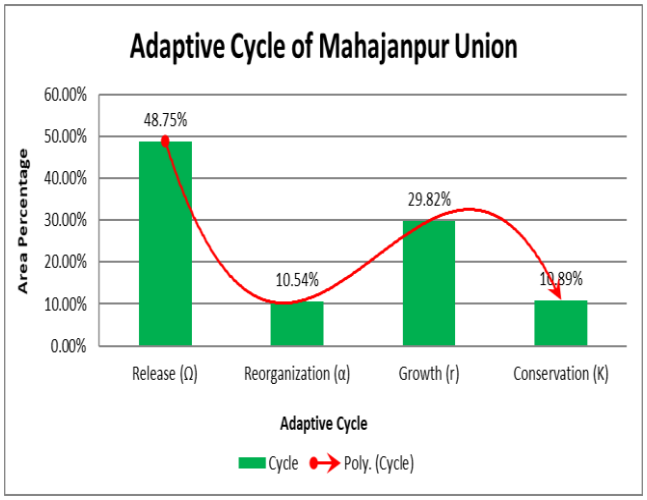


Fig 16: Adaptive Cycle of Mahajanpur Union

L. Matmura Union:

In Matmura, release phase covers the first 500 meters of the settlements and gradually approaches toward other phases with distance as within 500–1000-meter Reorganization phase, within 1000–1750-meter Growth phase, Within 1750-2050 Conservation phase. See Map 13 for details.

In Matmura Union, the adaptive cycle is predominantly characterized by the growth (r) phase, which covers an impressive 964.96 acres, accounting for 44.56% of the total land area. This significant focus on growth highlights active development and expansion initiatives, suggesting a community that is moving forward with progress and opportunity. Following this, the reorganization (α) phase encompasses 500.70 acres (23.12%), indicating substantial efforts towards adaptation and restructuring in response to previous challenges. The release (Ω) phase covers 406.47 acres (18.77%), reflecting a notable presence of disturbances within the union. Finally, the conservation (K) phase is the least influential, covering 293.49 acres (13.55%), suggesting limited emphasis on maintaining stability. The adaptive cycle pattern in Matmura Union reveals a community actively engaged in growth and reorganization, while also navigating disruptions, highlighting a resilient environment committed to development and adaptation. See Table 12 and Figure 16 for details.

Table 12: Adaptive Cycle of Matmura Union

Cycle	Percentage	Area in acre
Release (Ω)	18.77%	406.47
Reorganization (α)	23.12%	500.70
Growth (r)	44.56%	964.96
Conservation (K)	13.55%	293.49

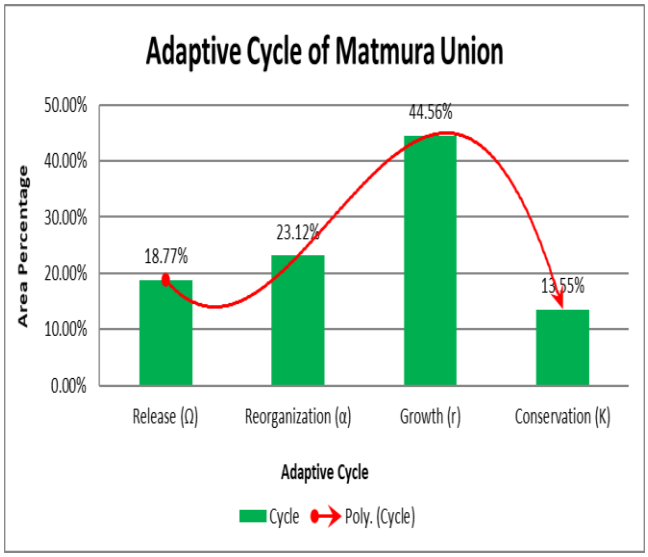


Fig 17: Adaptive Cycle of Matmura Union

M. Monakhali Union:

In Monakhali, the central settlement is not in a good situation as the first 900-meter buffer area is in release phase. Reorganization follows up to 2750 meter. Growth and conservation phases are not seen in the centre rather the two poles. See for details.

In Monakhali Union, the adaptive cycle is significantly influenced by the release (Ω) phase, which encompasses 402.73 acres, accounting for 41.95% of the total land area. This substantial presence indicates that the community is grappling with considerable disturbances. Following the release phase, the growth (r) phase covers 338.54 acres (35.26%), reflecting ongoing efforts toward development and expansion, suggesting a commitment to progress despite existing challenges. The reorganization (α) phase is less promin ent, occupying 152.60 acres (15.90%), indicating some adaptive actions are in place, although at a lower intensity. Finally, the conservation (K) phase, covering only 66.16 acres (6.89%), indicates minimal focus on maintaining stability. The adaptive cycle pattern in Monakhali Union highlights a community primarily affected by disruptions, with ongoing growth efforts and limited reorganization and conservation initiatives, underscoring the need for resilience in navigating these challenges. See Table 13 and Figure 17 for details.

Table 13: Adaptive Cycle of Monakhali Union

Cycle	Percentage	Area in acre
Release (Ω)	41.95%	402.73
Reorganization (α)	15.90%	152.60
Growth (r)	35.26%	338.54
Conservation (K)	6.89%	66.16

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/IJISRT24OCT536

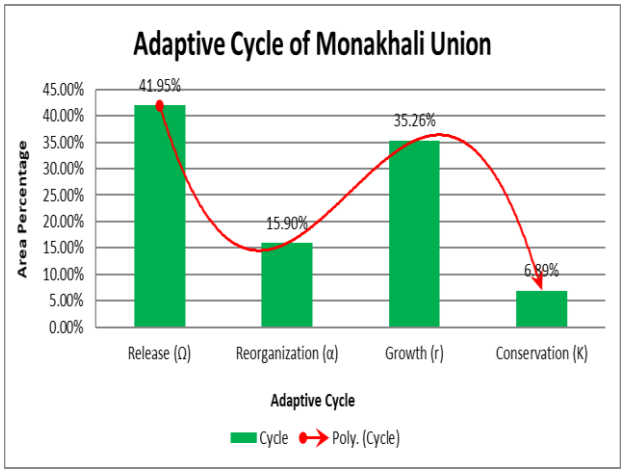


Fig 18: Adaptive Cycle of Monakhali Union

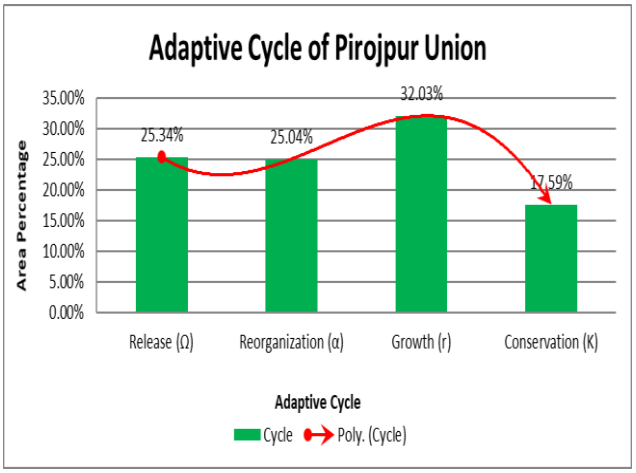


Fig 19: Adaptive Cycle of Pirojpur Union

N. Pirojpur Union:

In pirojpur union, majority of the incidents within 900 meters are negative in nature therefore, it was obvious that release phase will come first. But since, the broad emotions were categorized as per their relative importance, there are some undulations found within those negative scenario as some of them are relatively good in comparison. So, the overall adaptive cycle is oriented like this, within 350 meters Release phase, Within 350–1250-meter Reorganization phase, Within 1250–2500-meter Growth phase, Within 2500–3500-meter Conservation phase, And within 3500–4000-meter Release phase again. See Map 15 for details.

In Pirojpur Union, the adaptive cycle exhibits a balanced interplay among its phases, with a notable emphasis on the growth (r) phase, which spans 519.89 acres, accounting for 32.03% of the total land area. This focus on growth reflects ongoing development and expansion efforts within the community. Following this, the reorganization (α) phase covers 406.50 acres (25.04%), indicating significant adaptive measures and restructuring activities intended at enhancing resilience in response to previous challenges. The release (Ω) phase appears in two segments, with the larger portion covering 266.50 acres (16.42%) and a smaller section occupying 144.92 acres (8.93%), collectively indicating a moderate level of disturbances and pressures affecting the union. Finally, the conservation (K) phase encompasses 285.54 acres (17.59%), suggesting efforts to maintain stability. The adaptive cycle pattern in Pirojpur Union highlights a community actively engaged in growth and reorganization while also navigating disruptions, underscoring a balanced approach to development and adaptation.

Table 141: Adaptive Cycle of Pirojpur Union

Cycle	Percentage	Area in Acre
Release (Ω)	16.42%	266.50
Reorganization (α)	25.04%	406.50
Growth (r)	32.03%	519.89
Conservation (K)	17.59%	285.54
Release (Ω)	8.93%	144.92

O. Roypur Union:

In Roypur union, there are only a few numbers of incidents found but those are distributed all across the settlement boundary. As a result, a complete adaptive cycle is formed. The different phases of the adaptive cycle were distributed like this, within 350-meter Release phase, Within 350–900-meter Reorganization phase, Within 900–1500-meter Growth phase, and Within 1500–1700-meter Conservation phase. See Map 16 for details.

In Roypur Union, the adaptive cycle reflects a dynamic interplay among its phases, with a notable focus on the growth (r) phase, which encompasses 201.97 acres, accounting for 30.41% of the total land area. This significant emphasis on growth indicates ongoing development and expansion efforts within the community. Following closely, the release (Ω) phase covers 179.10 acres (26.96%), highlighting a substantial presence of disturbances and transformative changes that the union is experiencing. The reorganization (α) phase accounts for 146.71 acres (22.09%), indicating important adaptive measures and less disturbance aimed at enhancing resilience in the face of challenges. Finally, the conservation (K) phase occupies 136.41 acres (20.54%), suggesting efforts to maintain stability. The adaptive cycle pattern in Roypur Union illustrates a community actively pursuing growth while effectively managing disruptions and engaging in reorganization a nd conservation efforts, showcasing a balanced approach to development and adaptation. See Table 15 and Figure 19 for details.

Table 15: Adaptive Cycle of Roypur Union

Cycle	Percentage	Area in acre
Release (Ω)	26.96%	179.10
Reorganization (α)	22.09%	146.71
Growth (r)	30.41%	201.97
Conservation (K)	20.54%	136.41

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/IJISRT24OCT536

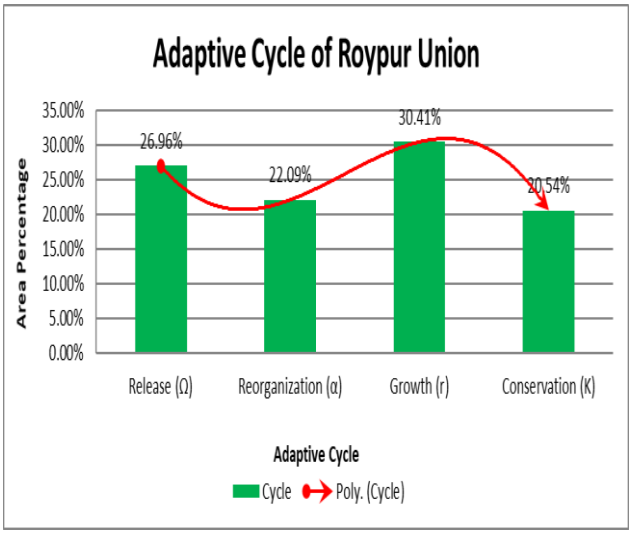


Fig 20: Adaptive Cycle of Roypur Union

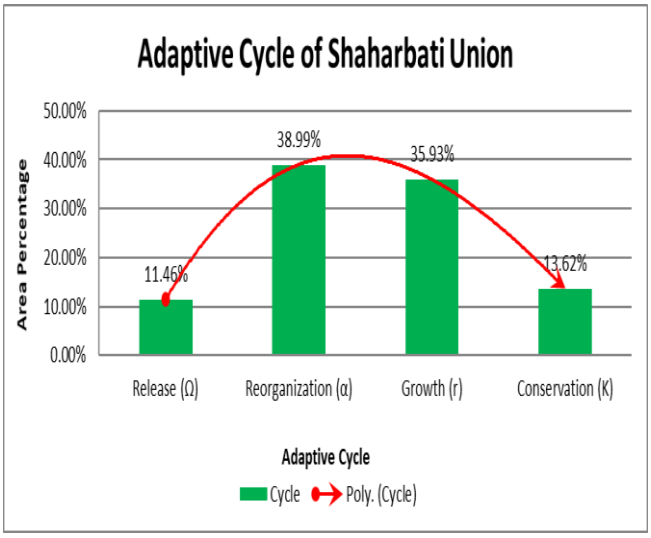


Fig 21: Adaptive Cycle of Shaharbati Union

P. Shaharbati Union:

In Sharbati union, all the phases of adaptive cycle found, starting with release phase within 250-meter buffer from the settlement center. Afterward continued as, within 250–750-meter Reorganization phase, within 750–2050-meter Growth phase and Within 2050–3200-meter Conservation phase. See Map 17 for details.

In Shaharbati Union, the adaptive cycle is characterized by a strong emphasis on the reorganization (α) phase, which covers 590.56 acres, accounting for 38.99% of the total land area. This substantial focus on reorganization indicates significant efforts to adapt and restructure in response to previous growth (r) phase, which encompasses 544.19 acres (35.93%), highlighting ongoing development and expansion initiatives aimed at fostering progress. The release (Ω) phase, while present, is relatively minor, covering 173.66 acres (11.46%), suggesting limited disturbances and transformative pressures affecting the union. Finally, the conservation (K) phase spans 206.38 acres (13.62%), indicating efforts to maintain stability. The adaptive cycle pattern in Shaharbati Union illustrates a community actively engaged in reorganization and growth while effectively managing minimal disruptions, showcasing a proactive approach to adaptation and development. See Table 16 and Figure 20 for details.

Table 16: Adaptive Cycle of Shaharbati Union

Cycle	Percentage	Area in Acre
Release (Ω)	11.46%	173.66
Reorganization (α)	38.99%	590.56
Growth (r)	35.93%	544.19
Conservation (K)	13.62%	206.38

Q. Shola Taka Union:

In Shola taka union, majority of the incidents are clustered within 500 meters from the settlement center and the trend leaned downward, therefore release phase is present there. Rest of the phases follows as, within 500–1250-meter Reorganization phase, within 4000-meter Growth phase, and within 400–4800-meter Conservation phase. See Map 18 for details.

In Shola Taka Union, the adaptive cycle is predominantly defined by the growth (r) phase, which covers an impressive 735.70 acres, accounting for 64.95% of the total land area. This significant emphasis on growth underscores the community's active pursuit of development and expansion, reflecting a strong momentum toward progress. Following this, the reorganization (α) phase encompasses 216.66 acres (19.13%), indicating ongoing adaptive measures and restructuring efforts aimed at enhancing resilience and responding to past challenges. The release (Ω) phase is relatively minor, spanning 71.22 acres (6.29%), suggesting limited disturbances and pressures within the union. Finally, the conservation (K) phase covers 109.10 acres (9.63%), reflecting efforts to maintain stability. The adaptive cycle pattern in Shola Taka Union highlights a community focused primarily on growth while engaging in reorganization, with minimal disruptions and a balanced approach to resource conservation, showcasing a proactive and forward-looking environment. See Table 17 and Figure 21 for details.

Table 17: Adaptive Cycle of Shola Taka Union

Cycle	Percentage	Area in acre
Release (Ω)	6.29%	71.22
Reorganization (α)	19.13%	216.66
Growth (r)	64.95%	735.70
Conservation (K)	9.63%	109.10

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/IJISRT24OCT536

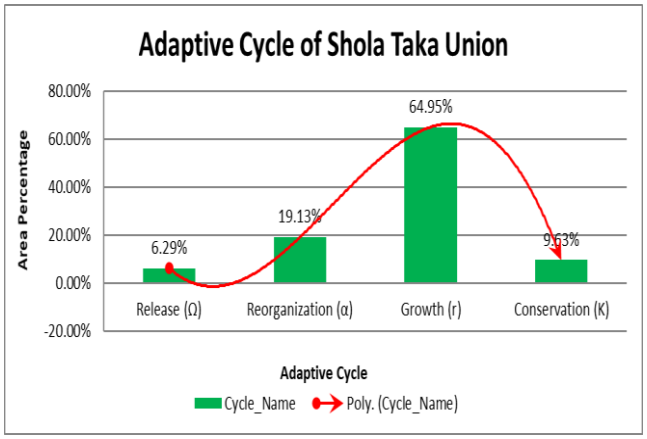


Fig 22: Adaptive Cycle of Shola Taka Union

R. Tentulbaria Union:

In tentulbaria union, things are a bit different from other unions. Within 750 meters from the settlement center, all incidents were positive but takes sharp downward turn. Only two phases are active there. See Map 19 for details.

In Tentulbaria Union, the adaptive cycle is overwhelmingly dominated by the release (Ω) phase, which spans a staggering 1944.33 acres, accounting for 95.39% of the total land area. This significant presence of the release phase indicates profound disturbances affecting the community's stability and highlighting a period of substantial transformation. In contrast, the conservation (K) phase, covering only 95.08 acres (4.61%), signifies a minimal focus on maintaining stability and preserving resources amidst these challenges. The absence of a substantial reorganization (α) or growth (r) phase further underscores the union's struggle to adapt and develop in response to ongoing disruptions. Overall, the adaptive cycle in Tentulbaria Union reflects a community deeply entrenched in release, grappling with profound changes while exhibiting little emphasis on reorganization or conservation. See Table 18 and Figure 22 for details.

Table 18: Adaptive Cycle of Tentulbaria Union

Cycle	Percentage	Area in Acre
Conservation (K)	4.61%	95.08
Release (Ω)	95.39%	1944.33

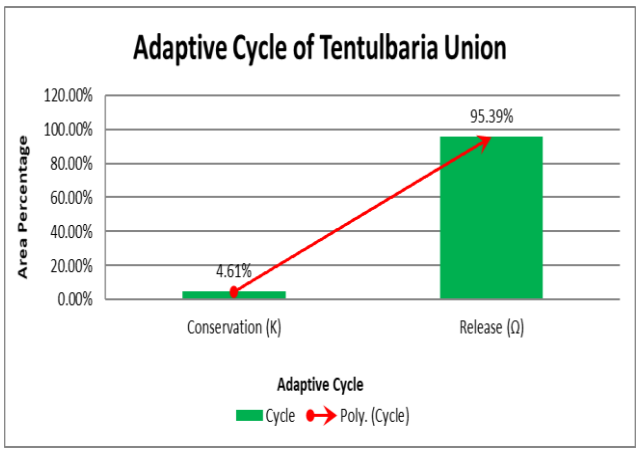


Fig 23: Adaptive Cycle of Tentulbaria Union

S. Overall Judgement for 18 Unions for Meherpur District:

The adaptive cycles across the 18 unions exhibit distinct patterns that can be grouped based on their developmental stages and challenges, revealing critical insights into their respective dynamics.

➢ *High Disruption with Limited Growth*

Unions such as **Amjhupi**, **Mahajanpur**, **Kathuli**, **Tentulbaria** and **Kazipur** face substantial challenges, characterized by a predominant release phase, indicating frequent disruptions. In these unions, the release phases are significant (ranging from 30% to 48.75%), suggesting underlying issues that continually hinder progress. While they experience some level of reorganization, their capacity for sustainable growth remains limited. This scenario highlights a critical need for interventions to address weaknesses and foster resilience. Please see Table 2, Table 8, Table 9, Table 11, Table 18; Figure 6, Figure 12, Figure 13, Figure 15, Figure 22 and Map 3, Map 9, Map 10, Map 12, Map 19 for details.

➢ *Recovery and Growth Focus*

Unions like **Bagoan**, **Bamandi**, **Roypur**, and **Pirojpur** illustrate a more balanced approach, combining recovery and growth phases effectively. These unions exhibit a moderate presence of the release phase (around 20% to 30%), while showcasing notable growth percentages (between 30% and 44.56%). Their ability to manage recovery while pursuing growth reflects a more stable environment, suggesting that these unions are better positioned for sustainable development, though they still require careful management of disruptions. Please see Table 3, Table 4, Table 14, Table 15; Figure 7, Figure 8, Figure 18, Figure 19 and Map 4, Map 5, Map 15, Map 16 for details.

➢ *Dominant Growth with Emerging Challenges*

The unions of **Burirpota**, **Matmura**, and **Dhankhola** present a picture of strong growth, with over 55% of land there dedicated to this phase. However, they also contend with substantial levels of release, indicating potential vulnerabilities. This dynamic suggests that while these unions are experiencing rapid expansion, the underlying challenges could jeopardize their progress if not adequately addressed. The significant growth accompanied by lower conservation rates indicates a critical need for balancing expansion with sustainability efforts. Please see Table 5, Table 7, Table 12; Figure 9, Figure 11, Figure 16 and Map 6, Map 8, Map 13 for details.

➢ *Balanced Stability and Progress*

Unions such as **Shaharbati**, **Amada**, and **Shola Taka** illustrate an effective balance of reorganization, growth, and moderate conservation efforts. These unions have robust recovery strategies that facilitate growth while maintaining a level of conservation (ranging from 9% to 13.62%). Their adaptive cycles reflect development without sacrificing long-term stability, making them models for sustainable practices. In **Kutubpur** however growth and reorganization return almost similar (Release 37.33% and Reorganization 36.53%) leaving less room for actual growth. Good side is, not much negative growth as well. Please see Table 1, Table

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/IJISRT24OCT536

10, Table 16, Table 17; Figure 5, Figure 14, Figure 20, Figure 21 and Map 2, Map 11, Map 17, Map 18 see for details.

➢ *High Reorganization with Growth Potential*

Unions like **Dariapur**, and **Monakhali** highlight the ongoing reorganization process, suggesting these regions are in a state of transition. With significant percentages dedicated to reorganization (around 45% to 63.17%), they show potential for recovery but are still heavily influenced by disruptions. The presence of substantial growth phases indicates that these unions are on the brink of more sustainable practices, pending further stabilization. Please see Table 6, Table 13; Figure 10, Figure 17 and Map 7, Map 14 for details.

VIII. ADAPTIVE CYCLE IN URBAN AREAS

A. Meherpur Paurashava:

In Meherpur Paurashava, the adaptive cycle is marked by significant fluctuations across its phases, particularly reflecting periods of disruption and recovery. The most substantial release (Ω) phase occurs with 24.24% (301.7 acres) of the total area, indicating notable disturbances that have affected the community's stability. This is complemented by a smaller release phase covering 48.5 acres (3.90%), suggesting ongoing but less intense transformative challenges. Following these disruptions, the reorganization (α) phase emerges prominently, particularly at 20.63% (256.8 acres), highlighting the community's active engagement in restructuring and adapting to the changes. The growth (r) phase, occupies a modest 15.00% (186.7 acres) of the land area, reflecting some development efforts but indicating that growth is not the primary focus. Conservation (K) holds a significant portion at 19.49% (242.6 acres) in one instance, but drops to a mere 3.73% (46.5 acres) in another, suggesting an inconsistent emphasis on maintaining stability. Overall, the adaptive cycle in Meherpur Paurashava illustrates a community grappling with substantial disruptions and actively seeking to reorganize, although with limited growth and fluctuating conservation priorities. See Map 20, Table 19 and Figure 23 for details.

Table 19: Adaptive Cycle of Meherpur Paurashava

Cycle	Percentage	Area in Acre
Release (Ω)	3.90%	48.5
Reorganization (α)	3.74%	46.6
Growth (r)	7.95%	99.0
Conservation (K)	19.49%	242.6
Release (Ω)	24.24%	301.7
Reorganization (α)	20.63%	256.8
Growth (r)	15.00%	186.7
Conservation (K)	3.73%	46.5
Release (Ω)	1.20%	14.9
Reorganization (α)	0.10%	1.3

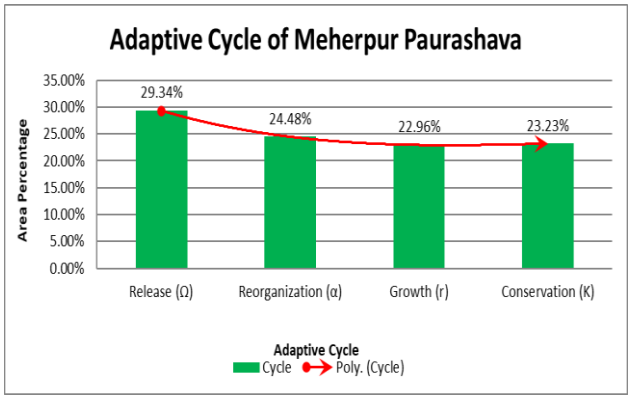


Fig 24: Adaptive Cycle of Meherpur Paurashava

B. Gangni Paurashava:

In Gangni Paurashava, the adaptive cycle is characterized by a complex interplay of growth and recovery phases amongst notable disturbances. The dominant growth (r) phase occupies 36.49% (408.78 acres) of the total area, indicating a robust focus on development and expansion. This growth is accompanied by a significant release (Ω) phase, which occurs in two parts: the larger segment accounts for 22.92% (256.81 acres) and reflects considerable disruptions that have challenged the community's stability, while a smaller release phase at 8.38% (93.87 acres) signifies ongoing transformative encounters. The reorganization (α) phase is marked by a notable 12.24% (137.14 acres), showcasing the community's efforts to adapt and restructure, though it lessens significantly to just 2.75% (30.77 acres) in the later part of the cycle. Conservation (K) holds a steady position at 17.23% (193.02 acres), indicating a moderate focus on maintaining stability. Overall, the adaptive cycle in Gangni Paurashava highlights a community deeply engaged in growth while navigating substantial disturbances and fluctuating adaptation efforts. See Map 21, Table 20 and Figure 24 for details.

Table 20: Adaptive Cycle of Gangni Paurashava

Cycle	Percentage	Area in Acre
Release (Ω)	8.38%	93.87
Reorganization (α)	12.24%	137.14
Growth (r)	36.49%	408.78
Conservation (K)	17.23%	193.02
Release (Ω)	22.92%	256.81
Reorganization (α)	2.75%	30.77

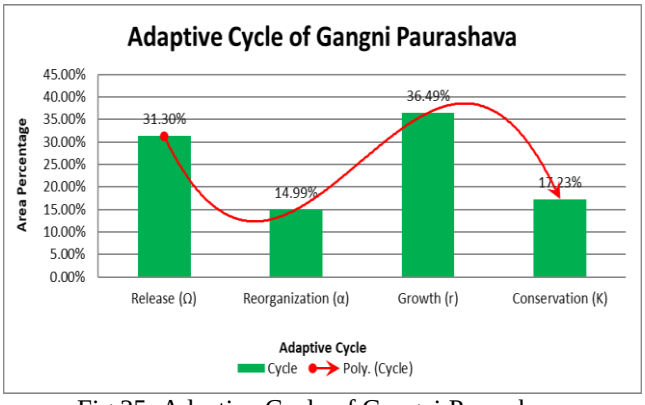


Fig 25: Adaptive Cycle of Gangni Paurashava

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/IJISRT24OCT536

C. Overall Perspective of both Paurashava:

In comparing the adaptive cycles of Meherpur and Gangni Paurashava, distinct patterns emerge in their responses to disturbances and their developmental focus. Meherpur exhibits a significant release phase at 24.24% (301.7 acres), highlighting notable disruptions, complemented by a smaller release at 3.90% (48.5 acres). In contrast, Gangni's release phases are marked by 22.92% (256.81 acres) and 8.38% (93.87 acres), indicating substantial but slightly lower disturbances compared to Meherpur. The reorganization phase in Meherpur stands out at 20.63% (256.8 acres), reflecting a strong community effort to restructure and adapt, whereas Gangni's reorganization starts robustly at 12.24% (137.14 acres) but decreases to 2.75% (30.77 acres) later, suggesting diminished ongoing adaptation efforts. Notably, Gangni's growth phase is the most pronounced at 36.49% (408.78 acres), showcasing a clear focus on development, while Meherpur's growth remains modest at 15.00% (186.7 acres). In Gangni, Areas linked to growth phase stands in single buffer area, on the other hand, Meherpur has two distinct buffer areas for growth. As Gangni has clear advantage on growth phase than Me herepur. Conservation efforts in Meherpur fluctuate significantly, with one instance at 19.49% (242.6 acres) dropping to 3.73% (46.5 acres), whereas Gangni maintains a more stable conservation focus at 17.23% (193.02 acres). Overall, while Meherpur prioritizes reorganization in response to substantial disturbances, Gangni leans towards aggressive growth phase, indicating differing developmental priorities and community resilience in the face of challenges. See Figure 25 for details.

Both the Paurashava has their unique characteristics. Despite being situated within the same district, their situation doesn't match due to their specific circumstances. From the incident analysis acquired from Newspapers, it seems majority of the incidents are occurring within 250 meters buffer area of settlement center. Majority of these incidents were pessimistic in nature therefore rhythm of emotion leans downward. This scenario is the same for both the Paurashava. But actual difference starts from here between the two. Peaks and valleys wavelength of rhythm of emotion in Meherpur Paurashava seems shorter than that of Gangni Paurashava. As a result, Gangni has larger areas within each adaptive cycle and seems to be less diverse than Meherpur. In Meherpur however, many smaller buffer zoners are created representing different adaptive cycle. So, the difference is in consistency and harmony.

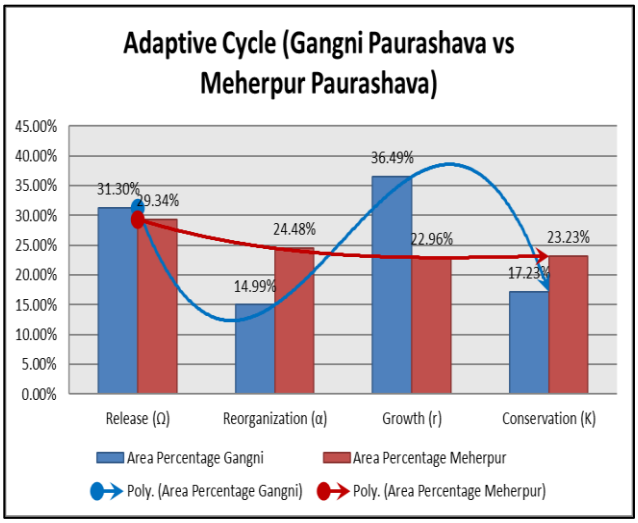


Fig 26: Adaptive Cycle Gangni Paurashava vs Meherpur Paurashava

IX. RECOMMENDATIONS TO IMPROVE RESILIENCE THROUGH YOUTH ENGAGEMENT

Newspaper articles can act as an effective tool to ensure participation in planning process as it reflects public emotion on different aspects of the society and community. Although not widely practiced in Bangladeshi planning arena, integration of newspaper driven people's emotional aspect will revolutionize the sector as people will engage more with the plan in which their opinions and emotions are reflected. Therefore, this study recommends to integrate text and its associated emotional image in plan making.

X. CONCLUSION

This study on the adaptive cycle in Meherpur District reveals that the region is predominantly shaped by fluctuations between the release and reorganization phases, which dominate much of the land area across various unions and the Paurashava. These findings suggest a community in constant transition, responding to both internal and external disruptions with an active reorganization and recovery process. While the growth phase does appear, it is more sporadic and often secondary to reorganization efforts, indicating that development is happening but not at a rate sufficient to offset the recurring disruptions. Conservation, the final stage of stability, remains minimal across the district, which highlights a lack of long-term sustainability. From an emotional and psychological perspective, the community appears to be in a delicate balance between fear of instability and hope for recovery. For policymakers, this underscores the need for more focused efforts on fostering growth and conservation to break the cyclical nature of disruption and recovery, and to promote a more stable and resilient socio-economic environment in Meherpur.

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/IJISRT24OCT536

REFERENCES

[1]. Ahern, J. (2011). From fail-safe to safe-to-fail: Sustainability and resilience in the new urban world. *Landscape and Urban Planning, 100*(4), 341-343.

[2]. Akhtaruzzaman, A.; Kabir, M.A.. "Application of Social Space as a Tool for Physical Planning: Case Study of Mymensingh Town." Volume. 9 Issue.7, July - 2024 International Journal of Innovative Science and Research Technology (IJISRT), www.ijisrt.com. ISSN - 2456-2165, PP :428-449:- https://doi.org/10.38124/ijisrt/IJISRT24JUL480

[3]. Banister, D. (2008). The sustainable mobility paradigm. *Transport Policy, 15*(2), 73-78.

[4]. Bssnews. (2023, December 21). *মেহেরপুরের খাল বিল মুখরিত হয়ে উঠছে অতিথি পাখির কলকাকলিতে.* Retrieved from Bssnews: https://www.bssnews.net/bangla/entertainment/61728

[5]. Cox, R. S., & Perry, K. M. E. (2011). Like a fish out of water: Reconsidering disaster recovery and the role of place and social capital in community disaster resilience. *American Journal of Community Psychology, 48*(3-4), 395-411.

[6]. Evans, G. W. (2003). The built environment and mental health. *Journal of Urban Health, 80*(4), 536-555.

[7]. Fainstein, S. S. (2010). *The just city*. Cornell University Press.

[8]. Florida, R. (2002). *The rise of the creative class: And how it's transforming work, leisure, community, and everyday life*. Basic Books.

[9]. Folke, C. (2006). Resilience: The emergence of a perspective for social-ecological systems analyses. *Global Environmental Change, 16*(3), 253-267.

[10]. Gehl, J. (2010). *Cities for people*. Island Press.

[11]. Gifford, R. (2007). *Environmental psychology: Principles and practice*. Optimal Books.

[12]. Gunderson, L. H., & Holling, C. S. (2002). *Panarchy: Understanding transformations in human and natural systems*. Island Press.

[13]. Harlan, S. L., Brazel, A. J., Prashad, L., Stefanov, W. L., & Larsen, L. (2006). Neighborhood microclimates and vulnerability to heat stress. *Social Science & Medicine, 63*(11), 2847-2863.

[14]. Holling, C. S. (2001). Understanding the complexity of economic, ecological, and social systems. *Ecosystems, 4*(5), 390-405.

[15]. Jabareen, Y. (2013). Planning the resilient city: Concepts and strategies for coping with climate change and environmental risk. *Cities, 31*, 220-229.

[16]. Jaijaidinbd. (2023, December 20). *মেহেরপুরে মাত্র দুই কিলোমিটার রাস্তার জন্য তিন গ্রামের মানুষের চরম দুর্ভোগ.* Retrieved from Jaijaidinbd: https://www.jaijaidinbd.com/wholecountry/356520

[17]. Kellett, P., & Tipple, G. (2000). The home as workplace: A study of income-generating activities within the domestic setting. *Environment and Urbanization, 12*(1), 203-213.

[18]. Levine, P. (2007). *The future of democracy: Developing the next generation of American citizens*. Tufts University Press.

[19]. Litman, T. (2013). Transportation and public health. *Annual Review of Public Health, 34*, 217-233.

[20]. Meherpurpratidin. (2023, December 21). *কালের সাক্ষী কাথুলির মঠ.* Retrieved from Meherpurpratidin: https://www.meherpurpratidin.com https://www.meherpurpratidin.com/কালের-সাক্ষী-কাথুলির-মঠ/

[21]. Newman, P., & Kenworthy, J. (1999). *Sustainability and cities: Overcoming automobile dependence*. Island Press.

[22]. O'Brien, K., St. Clair, A. L., & Kristoffersen, B. (Eds.). (2010). *Climate change, ethics, and human security*. Cambridge University Press.

[23]. Pelling, M. (2011). *Adaptation to climate change: From resilience to transformation*. Routledge.

[24]. Prothomalo. (2023, December 21). *গ্রামে গ্রামে সুপেয় পানির সংকট.* Retrieved from Prothomalo: https://www.prothomalo.com/bangladesh/district/9ynd6vq3wp

[25]. Resilience Alliance. (n.d.). Adaptive cycle. Retrieved September 6, 2024, from https://www.resalliance.org/adaptive-cycle

[26]. Reynisson, S. (2017). A business cycle analysis with large factor model. Semantic Scholar. Retrieved September 6, 2024, from https://www.semanticscholar.org/paper/A-Business-Cycle-Analysis-with-Large-Factor-Model.-Reynisson/c66ea21904ea4d4fe1e9c2da984e1f0e8deb1d90/figure/0

[27]. Stimulating Stone. (2022). *Emotions wheel* [Image]. Retrieved October 6, 2024, from https://stimulatingstone.wordpress.com/wp-content/uploads/2022/01/emotions-wheel.png

[28]. Walker, B., Holling, C. S., Carpenter, S. R., & Kinzig, A. (2004). Resilience, adaptability and transformability in social-ecological systems. *Ecology and Society, 9*(2), 5.

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/IJISRT24OCT536

ANNEXURE I: RHYTHM OF EMOTION GRAPH

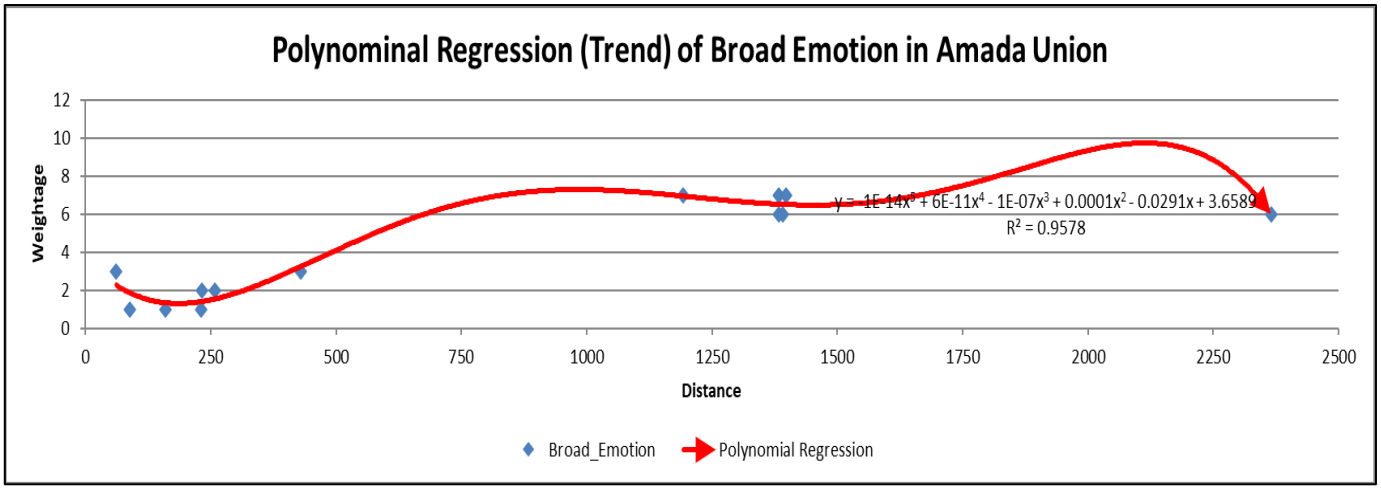


Fig 27: Rhythm of Emotion Graph of Amada Union

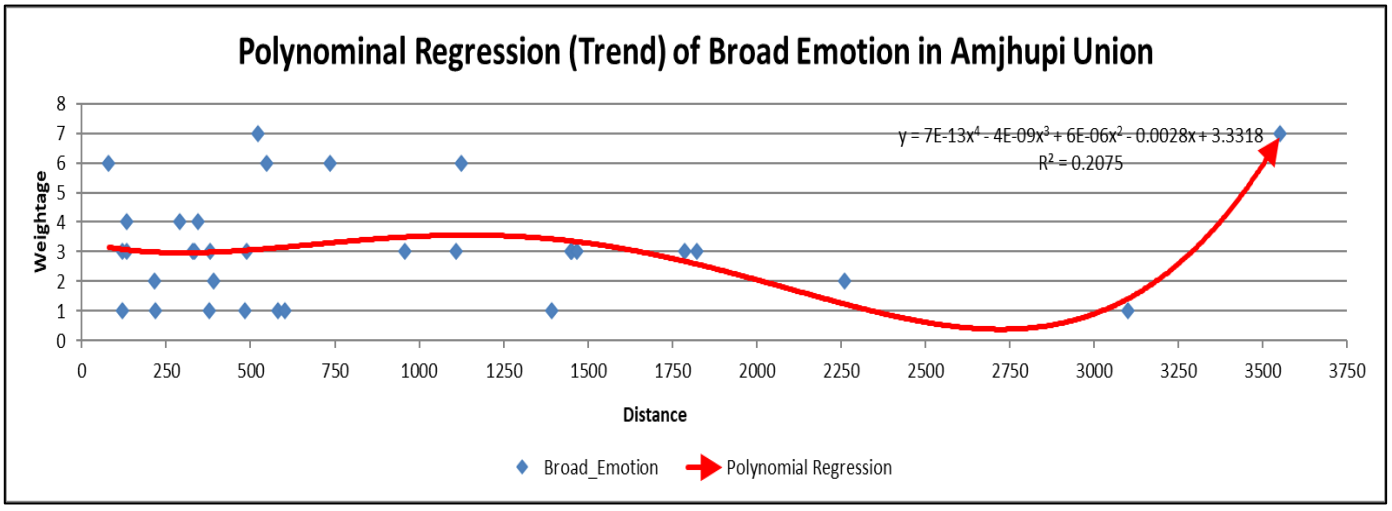


Fig 28: Rhythm of Emotion Graph of Amjhupi Union

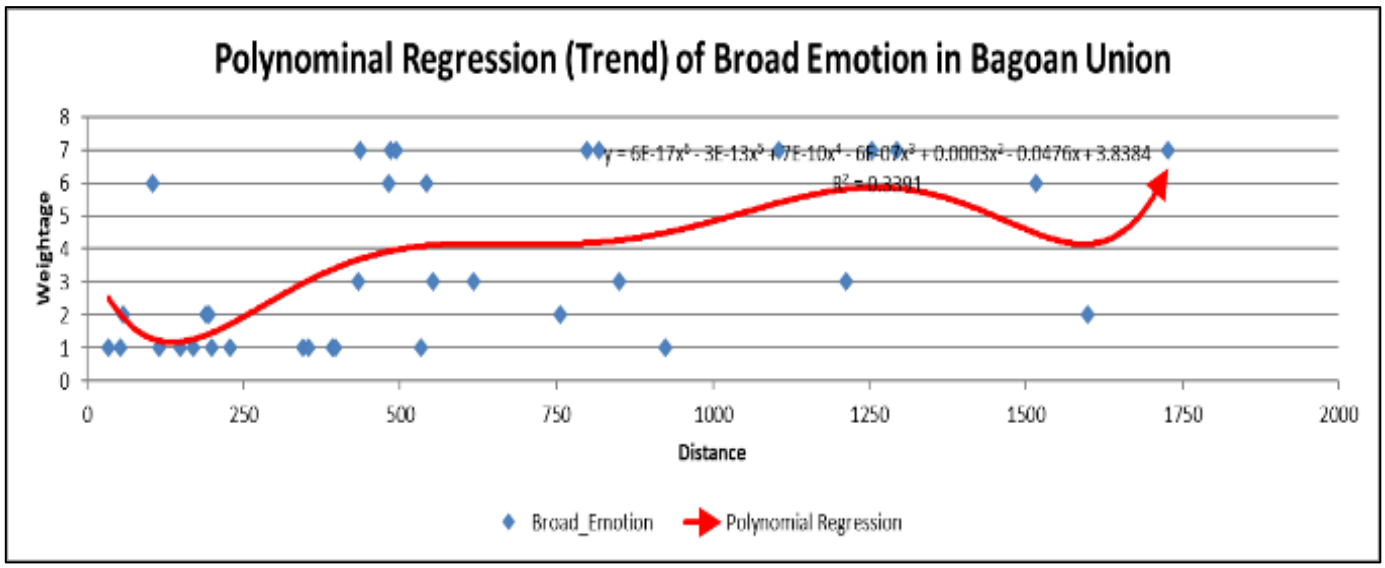


Fig 29: Rhythm of Emotion Graph of Bagoan Union

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/IJISRT24OCT536

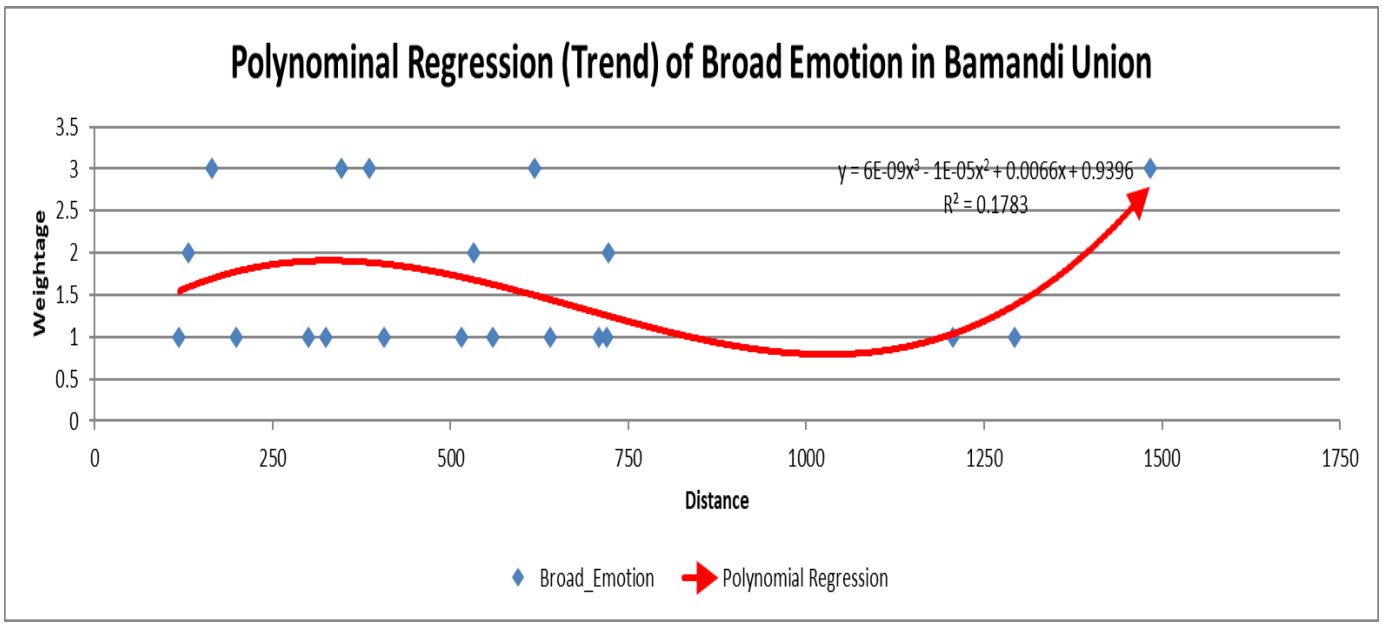


Fig 30: Rhythm of Emotion Graph of Bamandi Union

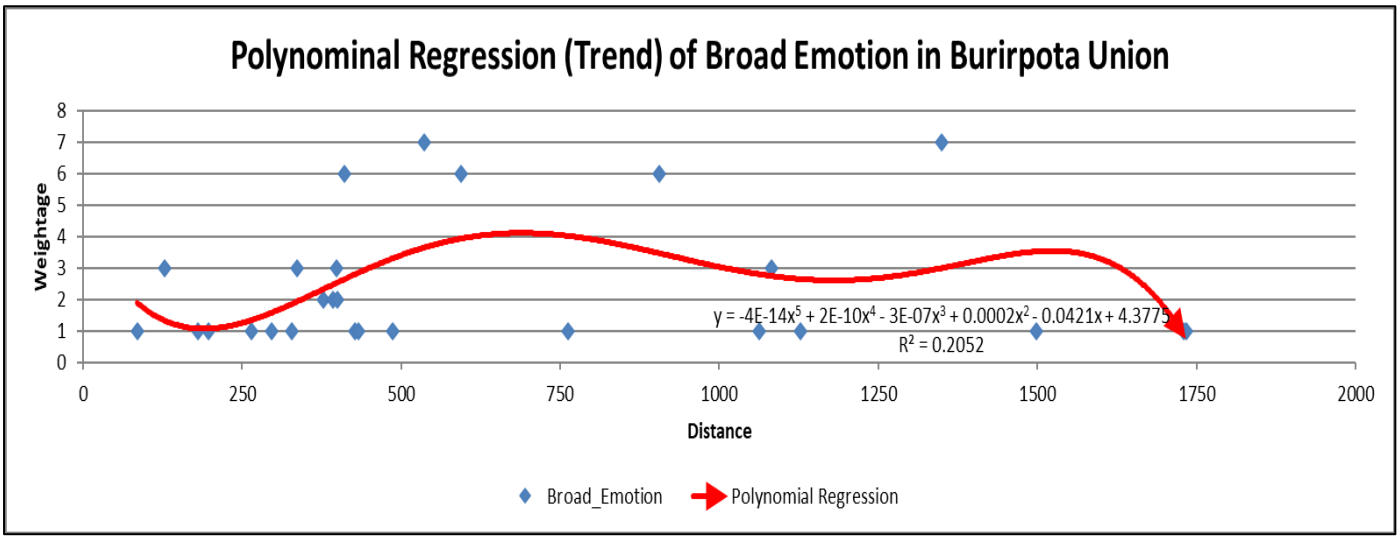


Fig 31: Rhythm of Emotion Graph of Burirpota Union

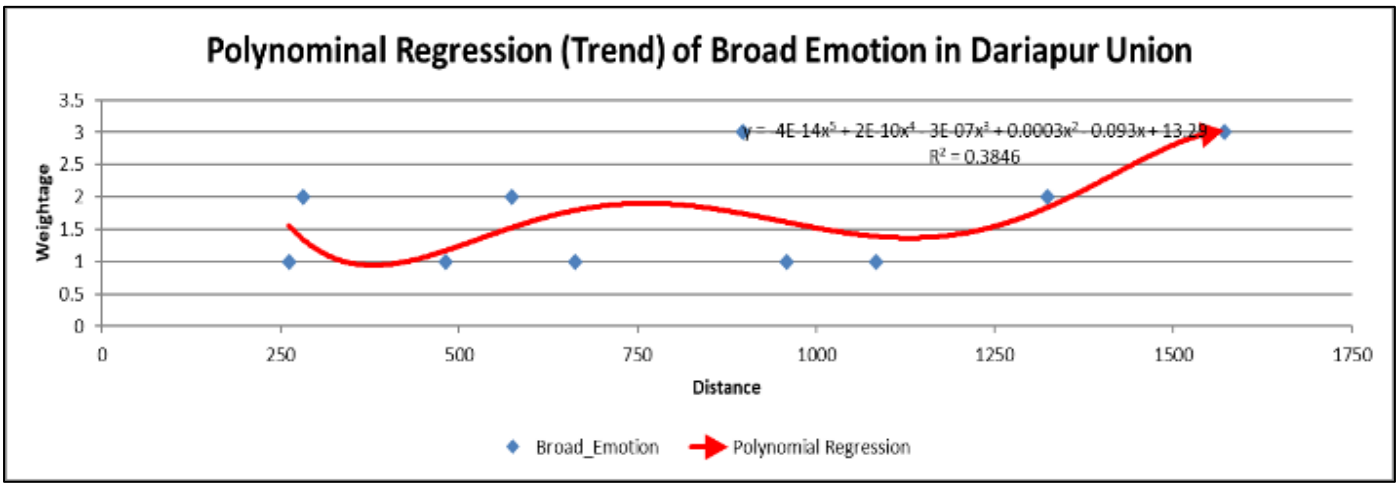


Fig 32: Rhythm of Emotion Graph of Dariapur Union

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/IJISRT24OCT536

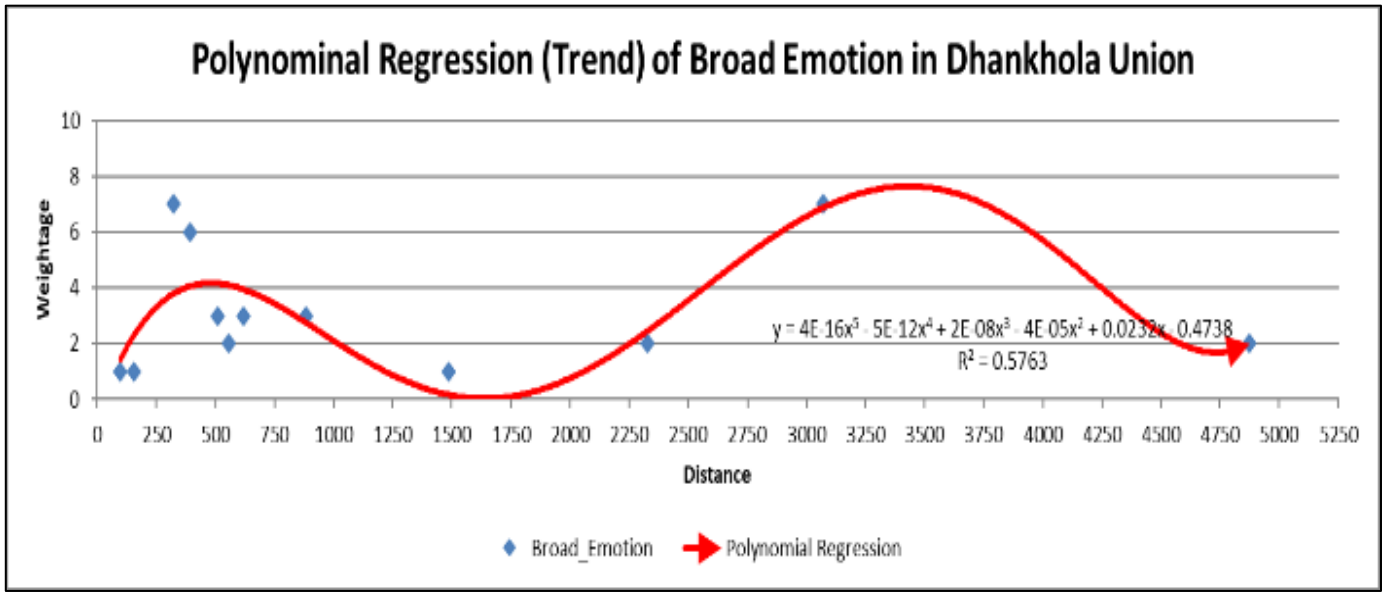


Fig 33: Rhythm of Emotion Graph of Dhankhola Union

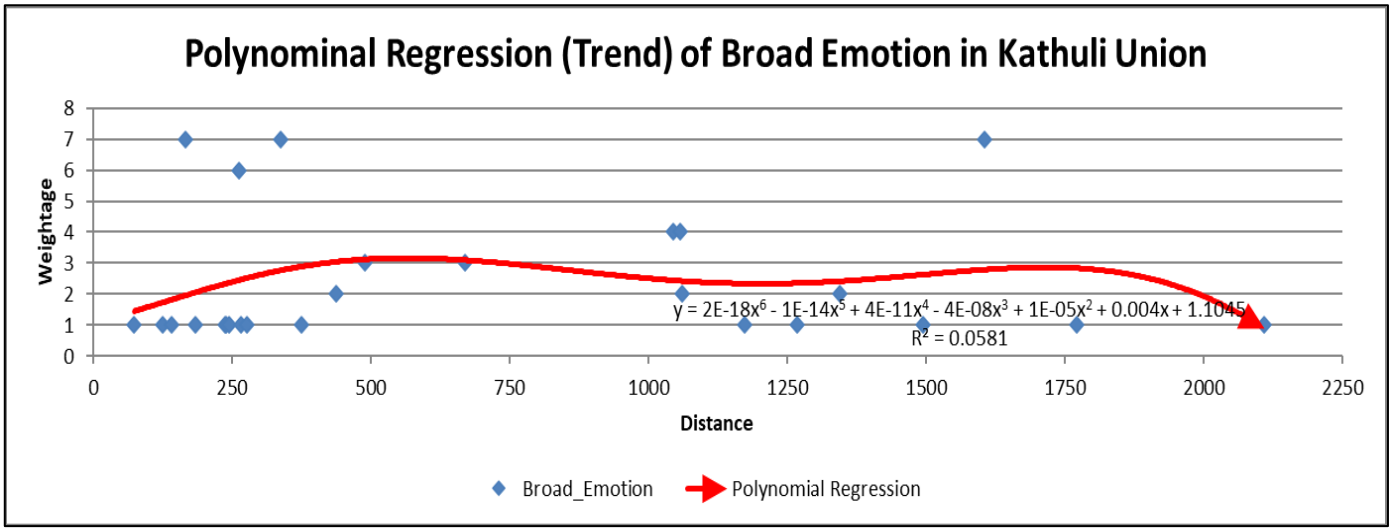


Fig 34: Rhythm of Emotion Graph of Kathuli Union

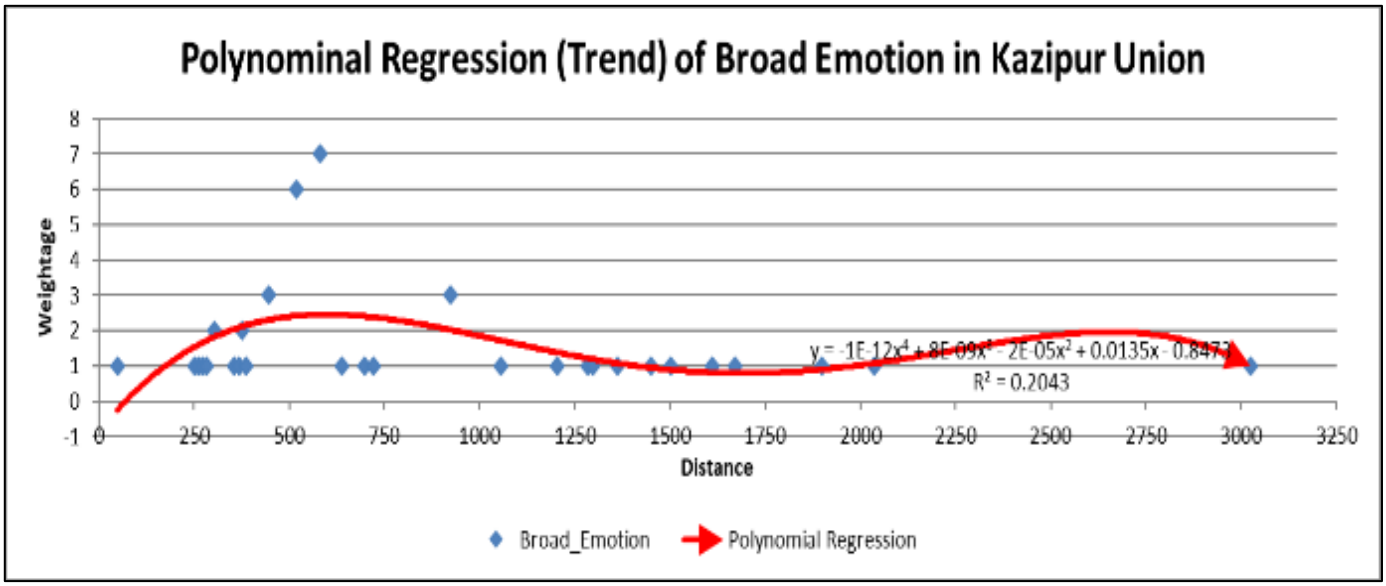


Fig 35: Rhythm of Emotion Graph of Kazipur Union

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/IJISRT24OCT536

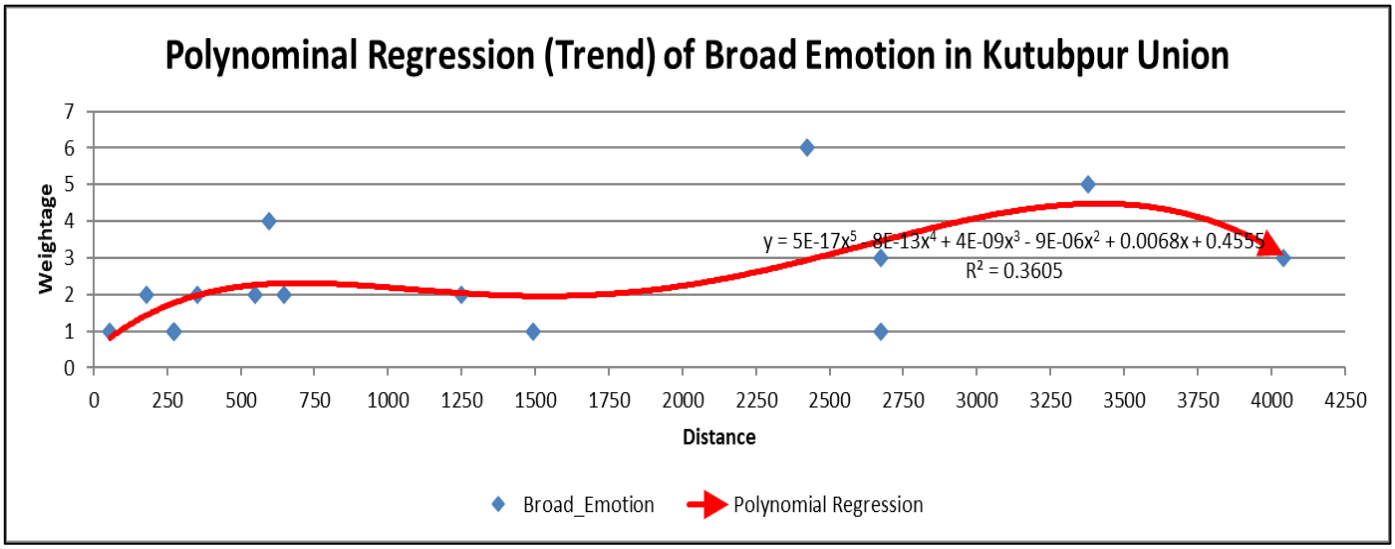


Fig 36: Rhythm of Emotion Graph of Kutubpur Union

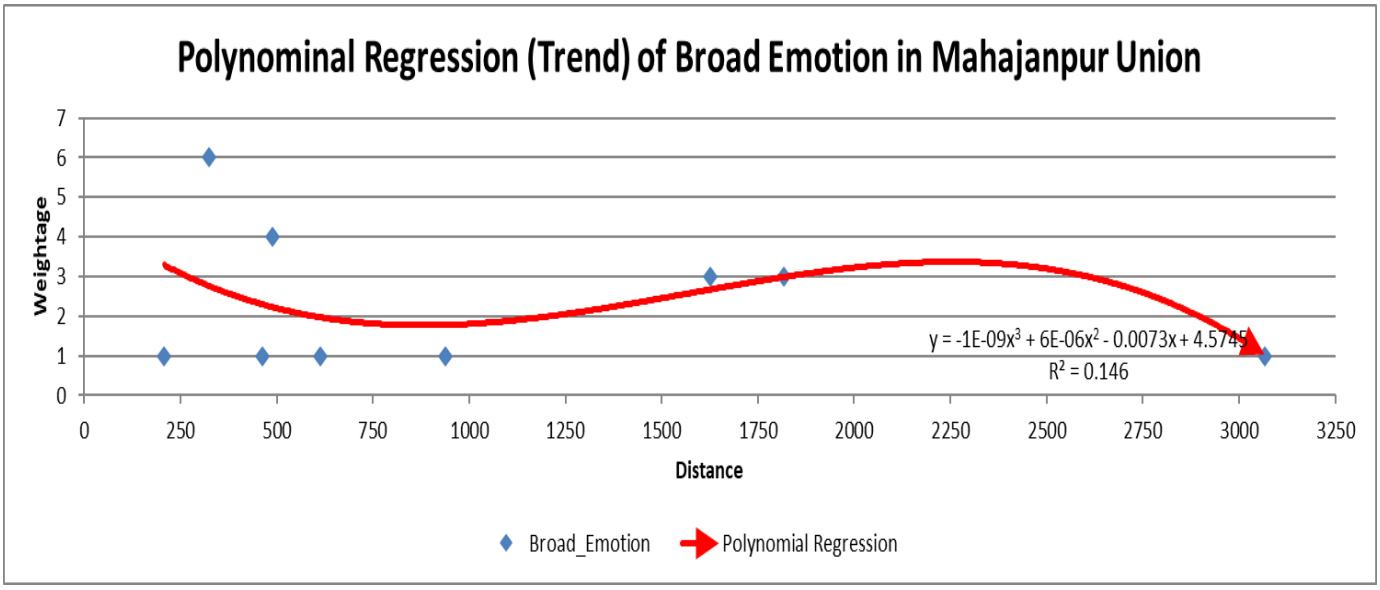


Fig 37: Rhythm of Emotion Graph of Mahajanpur Union

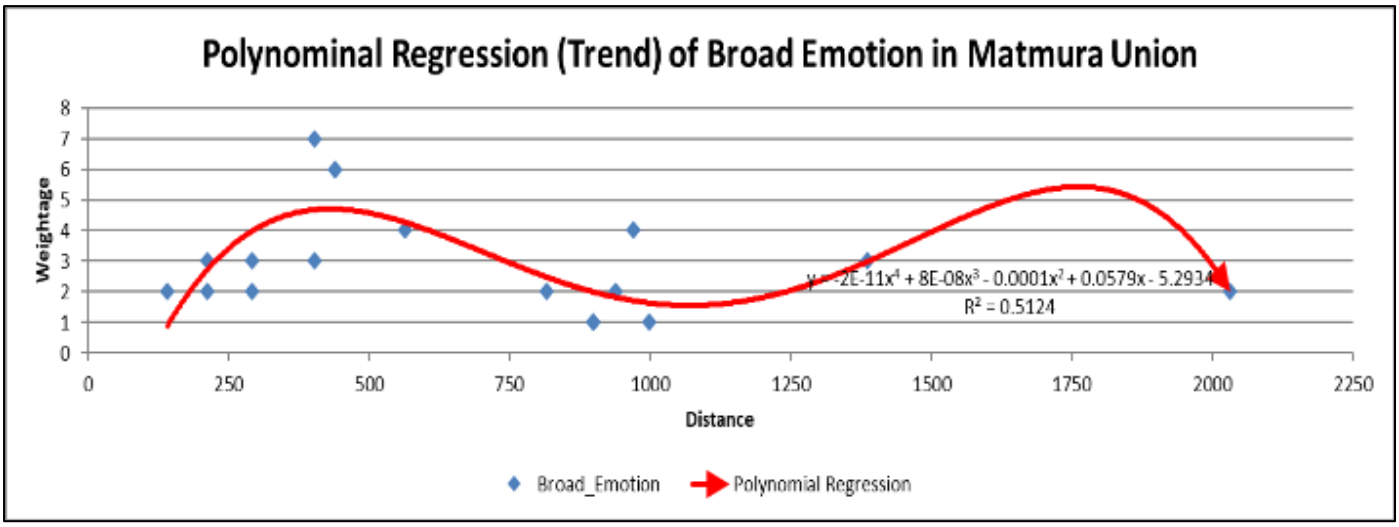


Fig 38: Rhythm of Emotion Graph of Matmura Union

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/IJISRT24OCT536

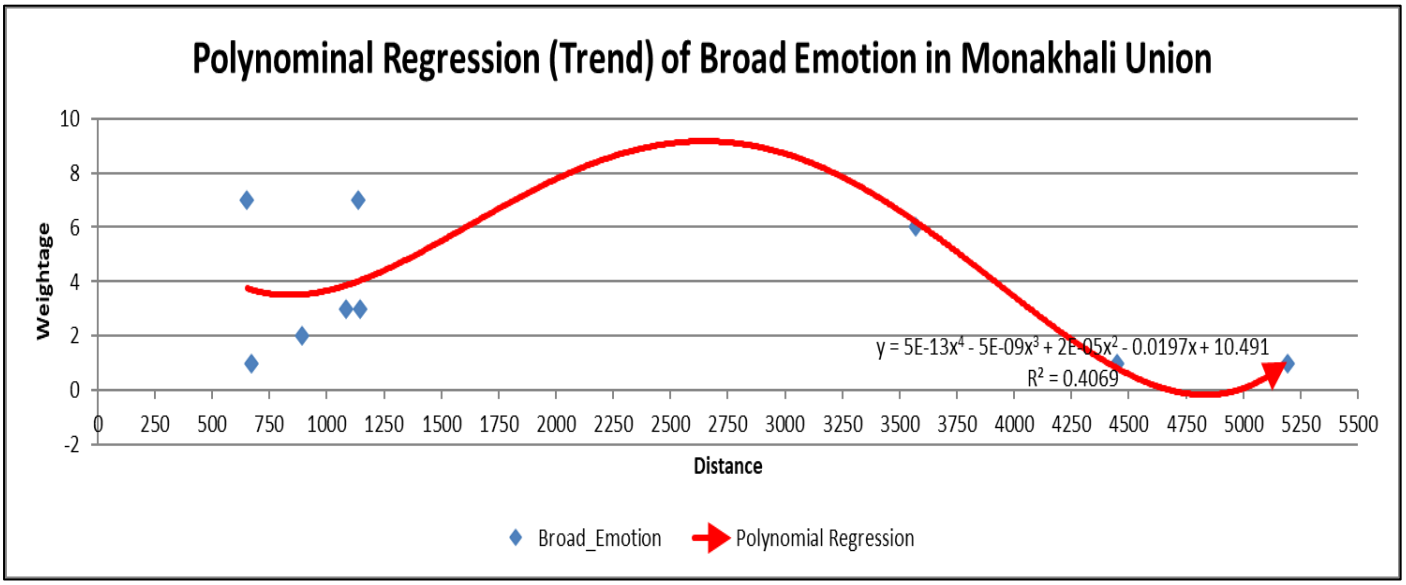


Fig 39: Rhythm of Emotion Graph of Monakhali Union

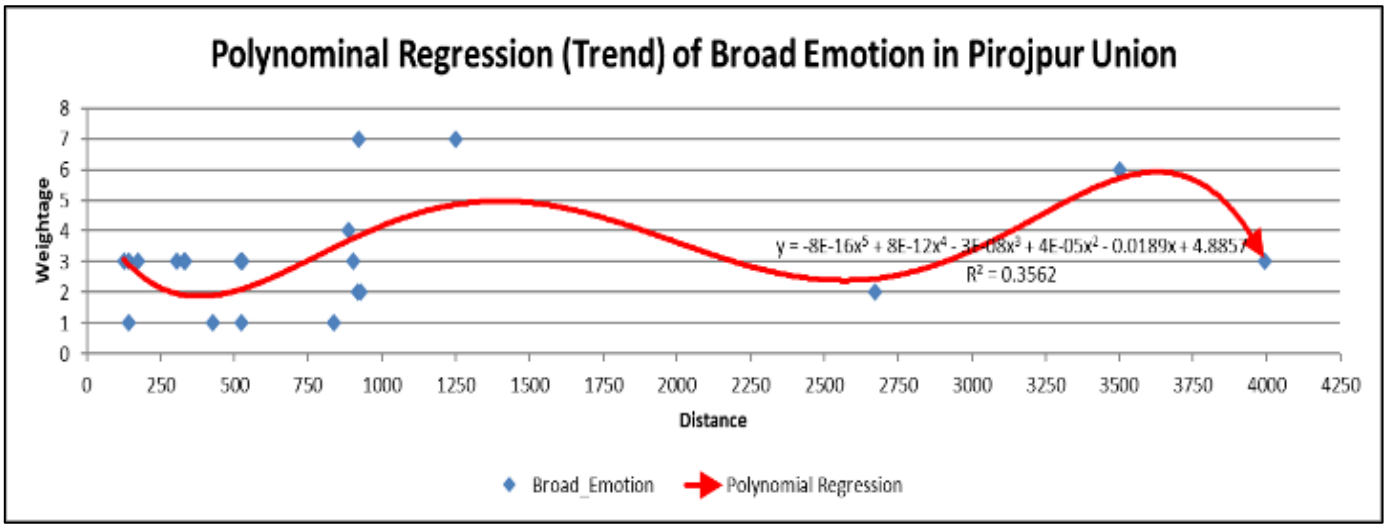


Fig 40: Rhythm of Emotion Graph of Pirojpur Union

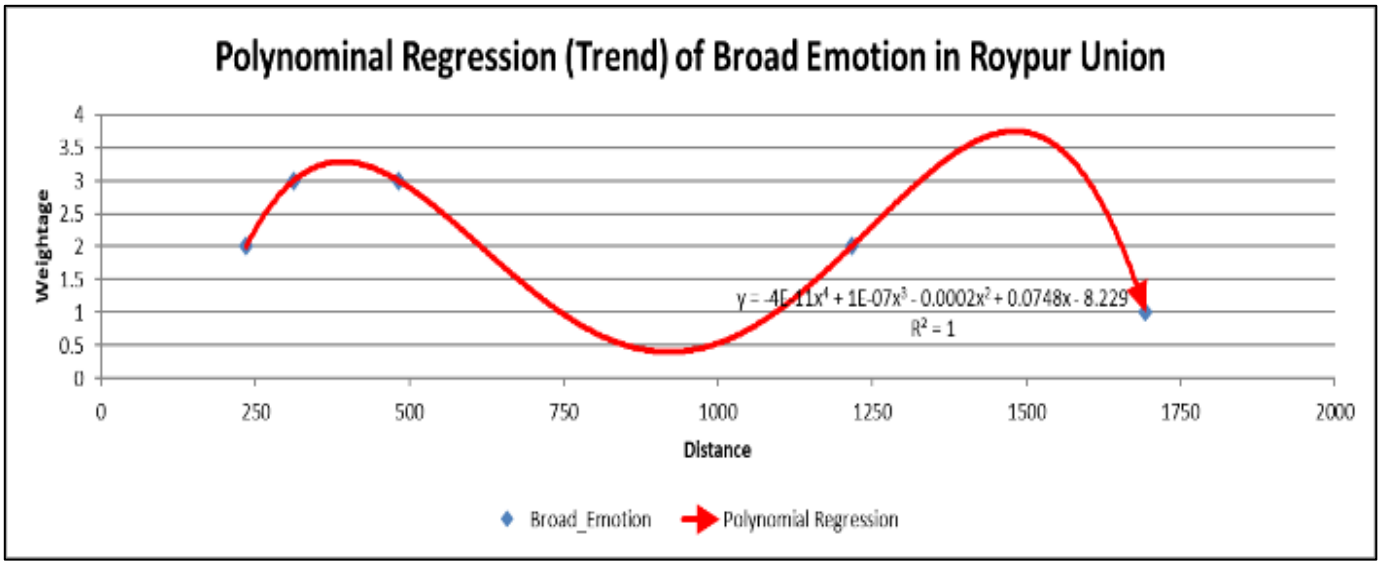


Fig 41: Rhythm of Emotion Graph of Roypur Union

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/IJISRT24OCT536

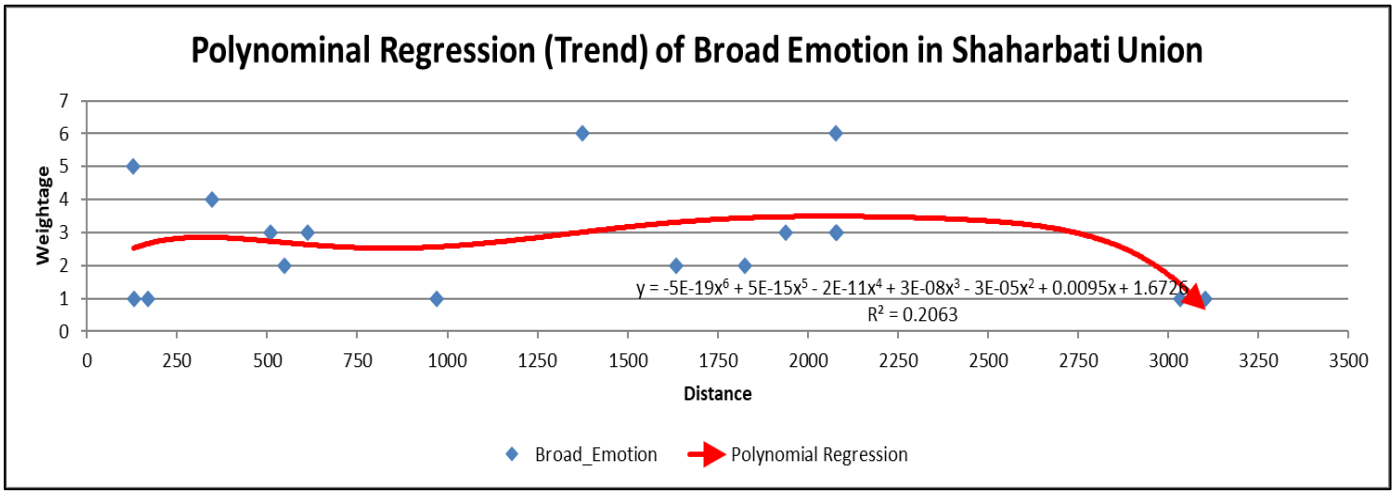


Fig 42: Rhythm of Emotion Graph of Shaharbati Union

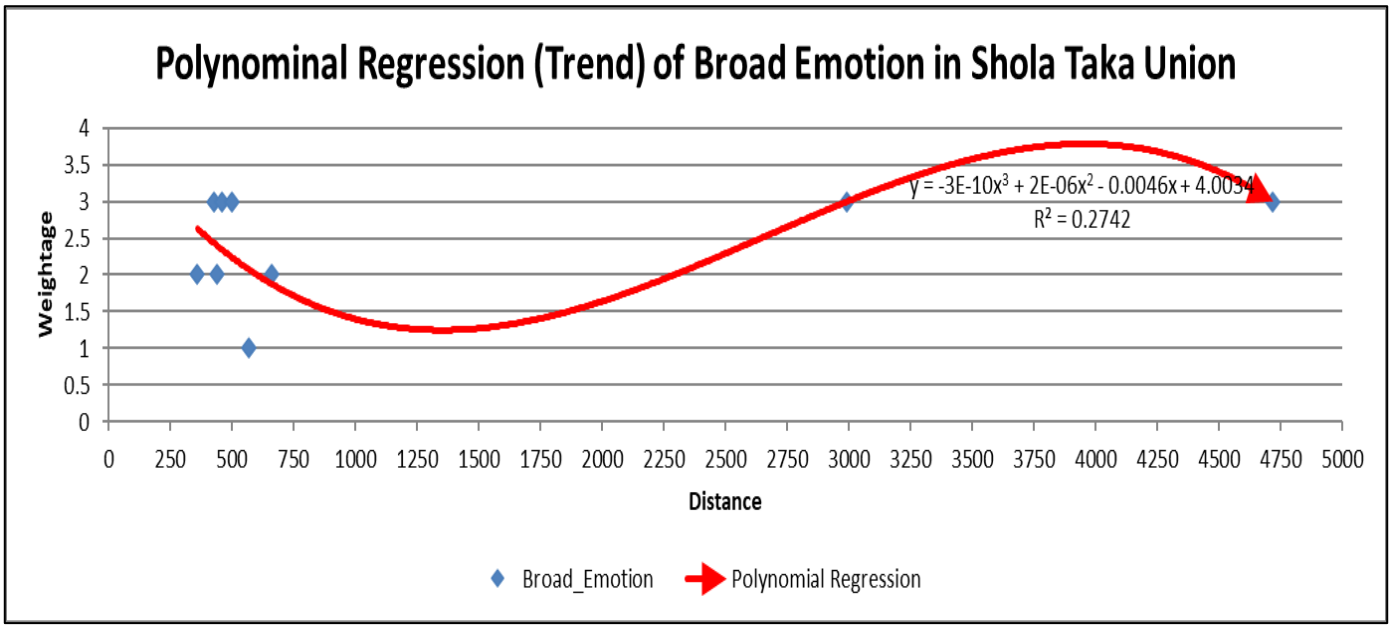


Fig 43: Rhythm of Emotion Graph of Shola Taka Union

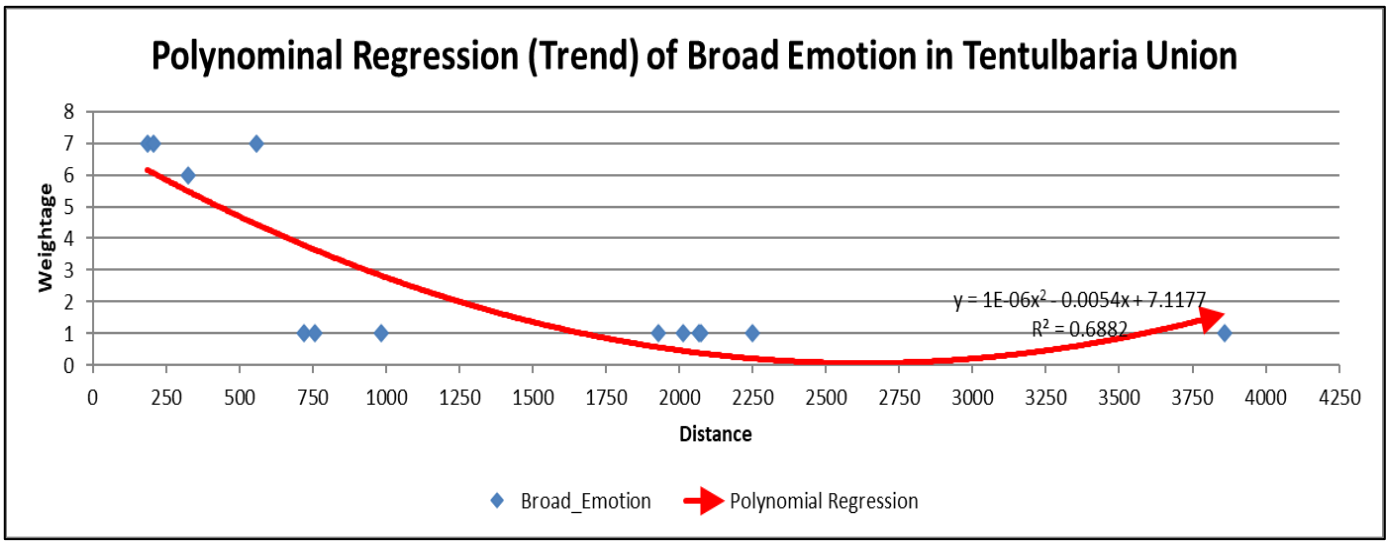


Fig 44: Rhythm of Emotion Graph of Tentulbaria Union

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/IJISRT24OCT536

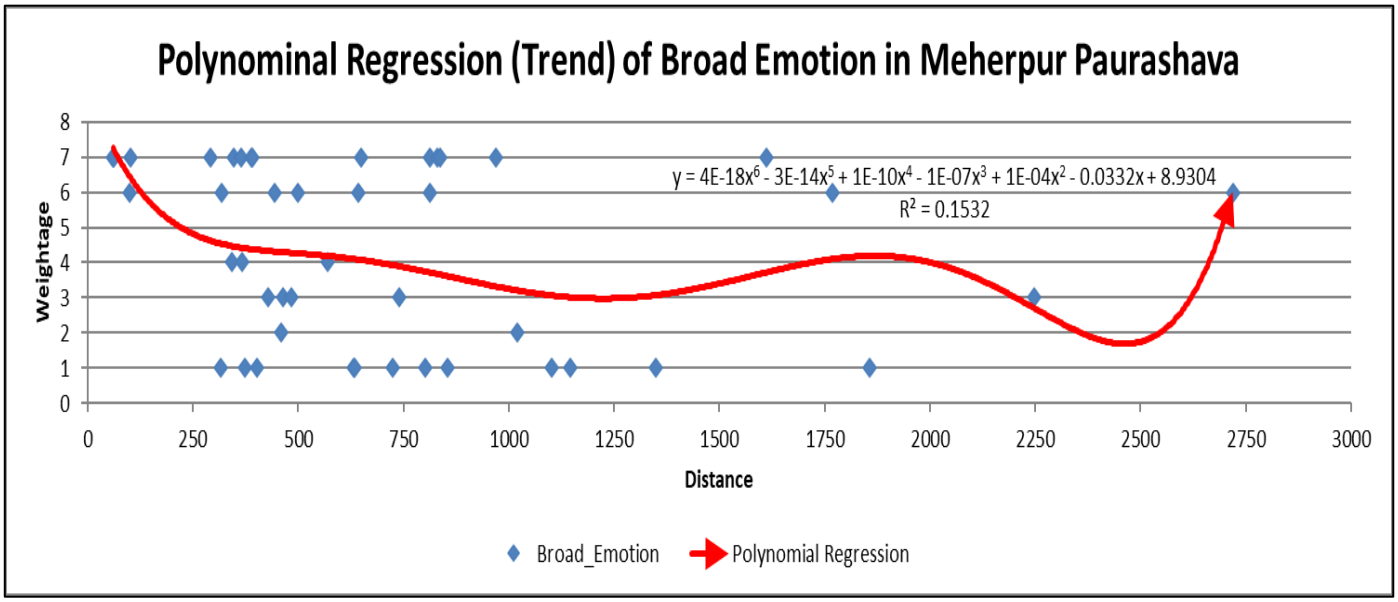


Fig 45: Rhythm of Emotion Graph of Meherpur Paurashava

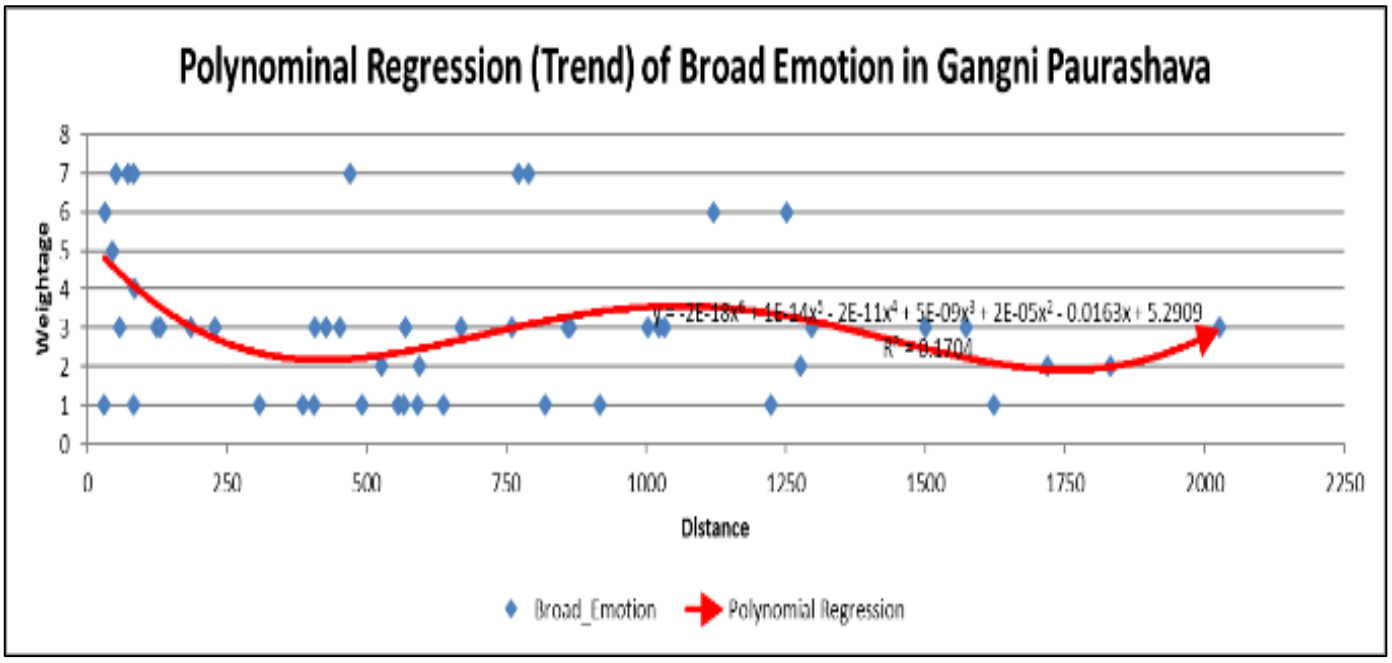
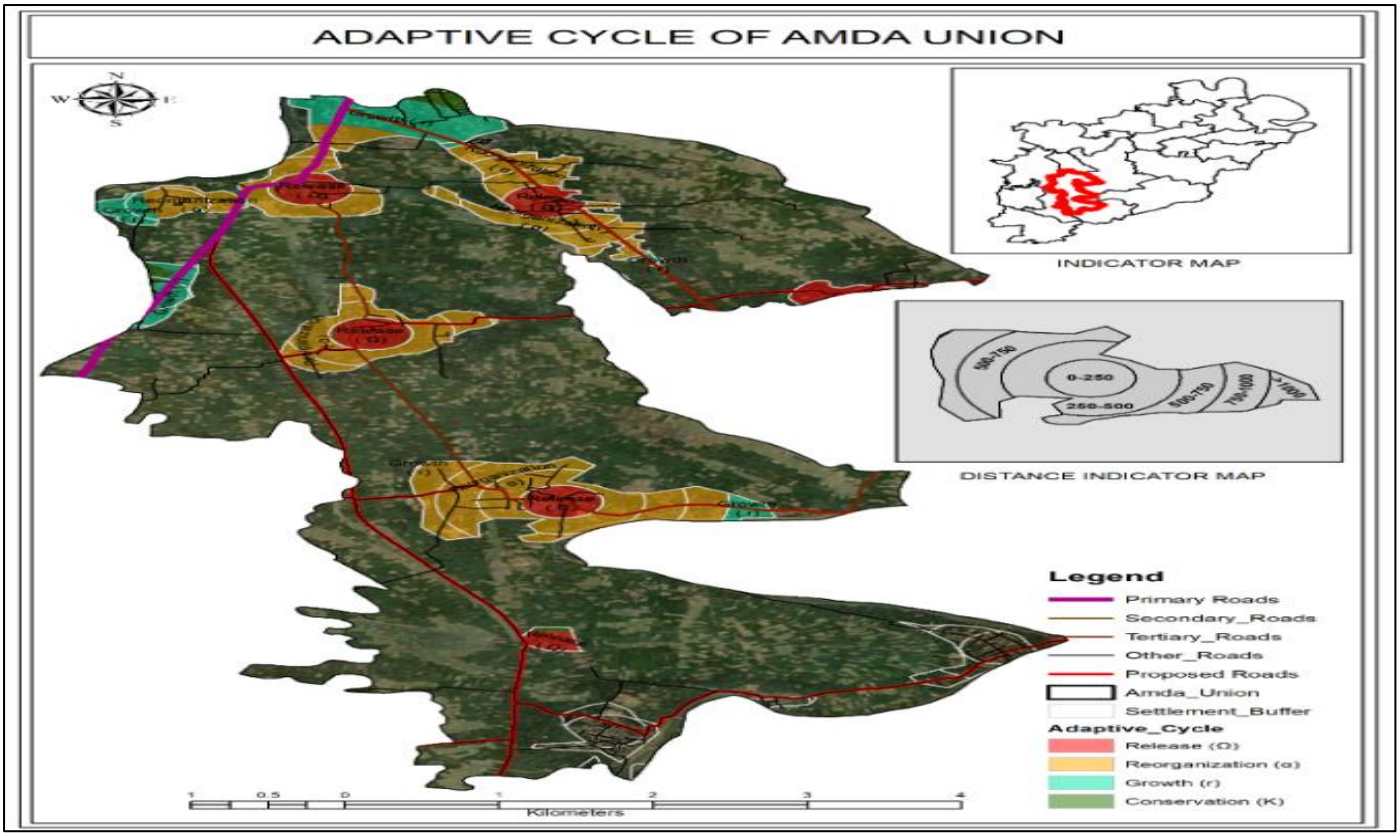


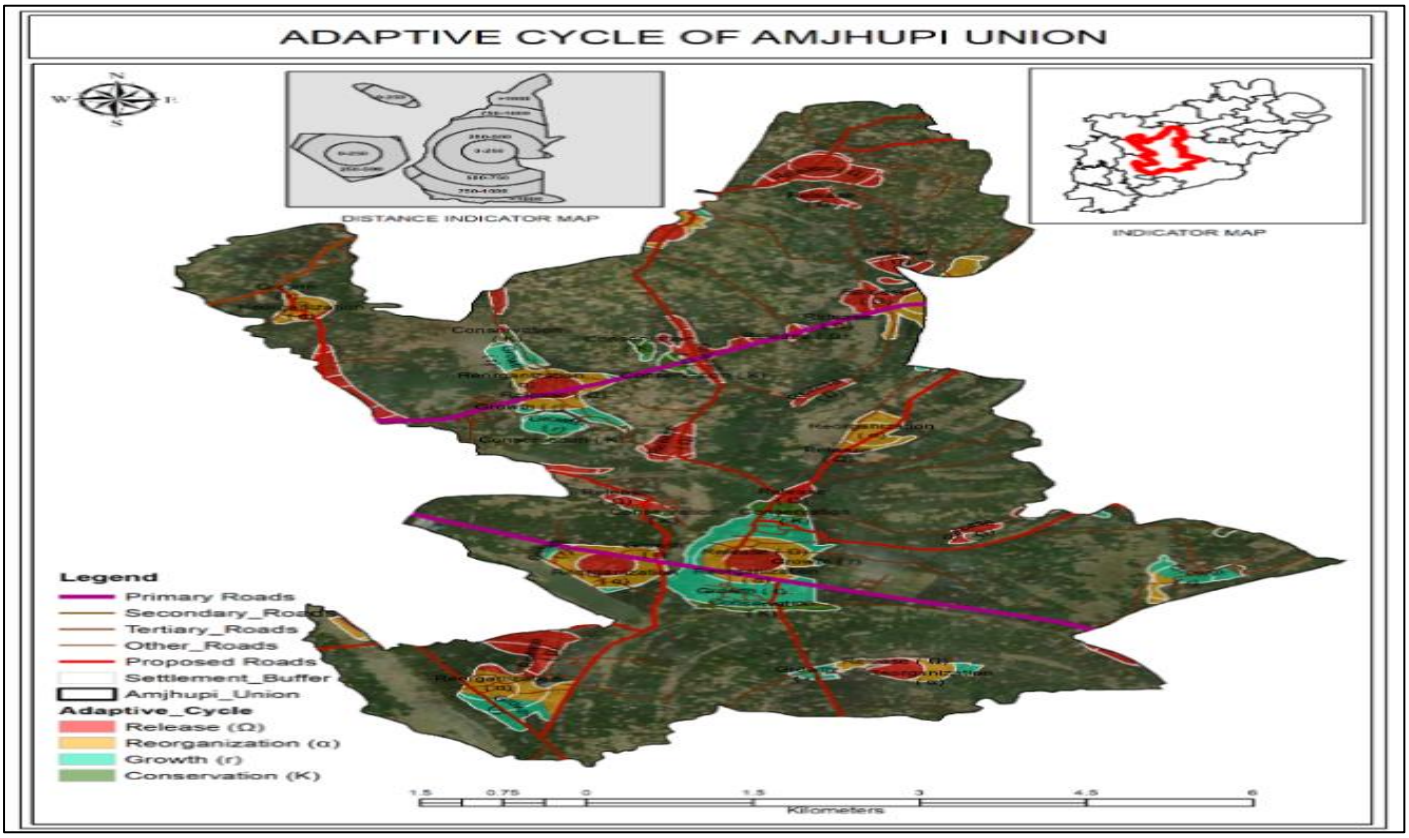
Fig 46: Rhythm of Emotion Graph of Gangni Paurashava

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/IJISRT24OCT536

ANNEXURE II: ADAPTIVE CYCLE MAPS

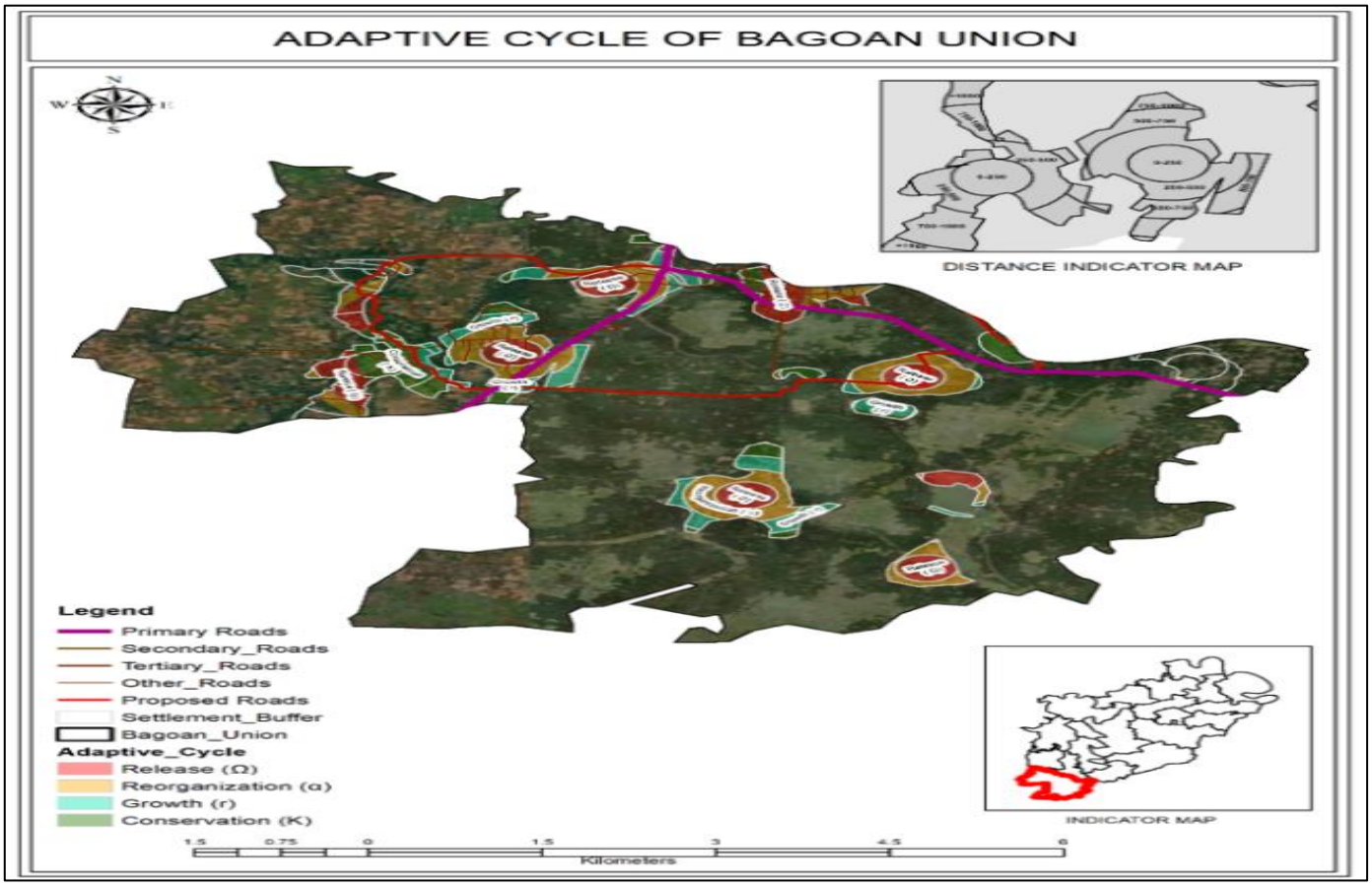


Map 2: Adaptive Cycle of Amada Union

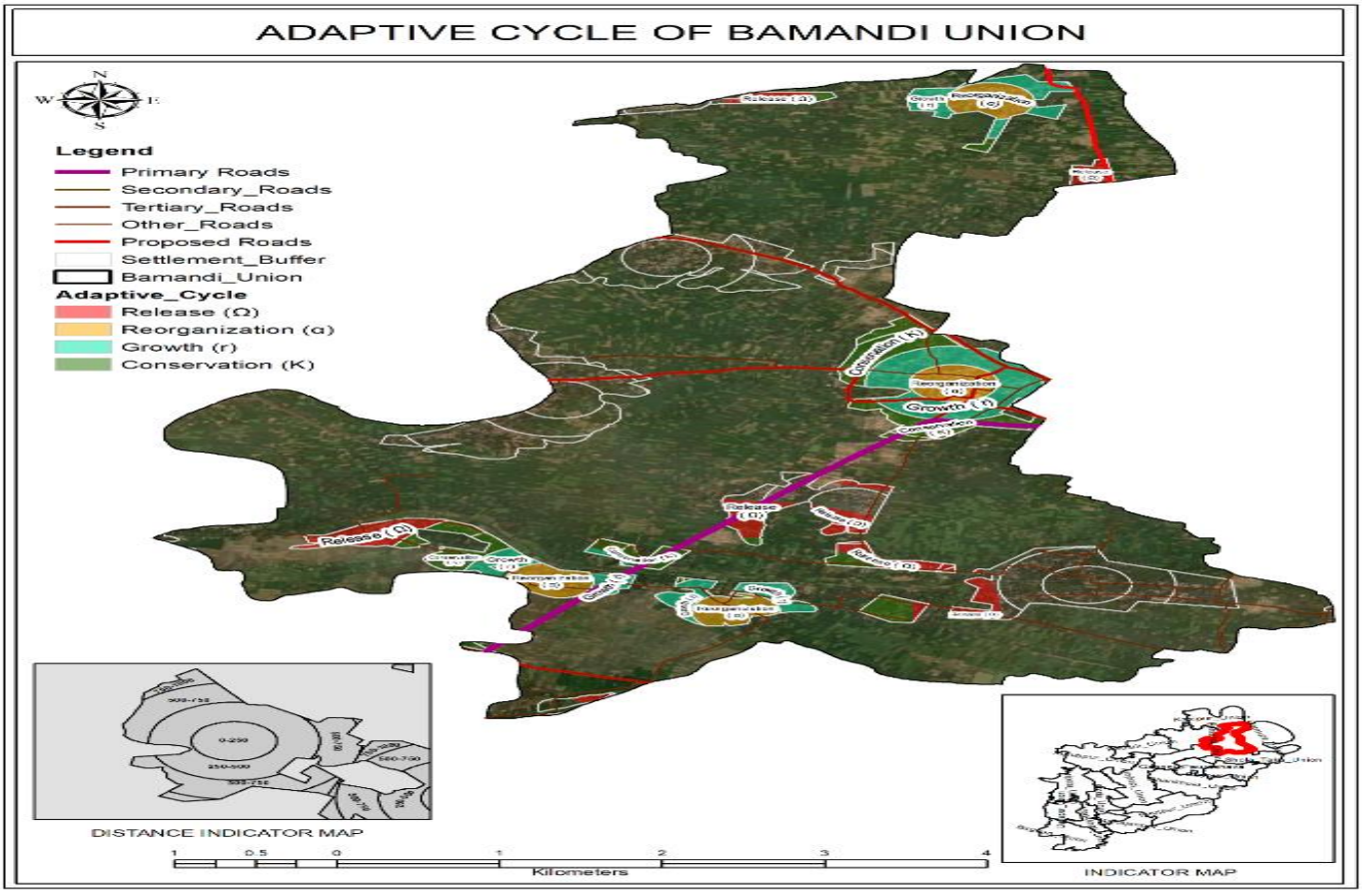


Map 3: Adaptive Cycle of Amjhupi Union

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/IJISRT24OCT536

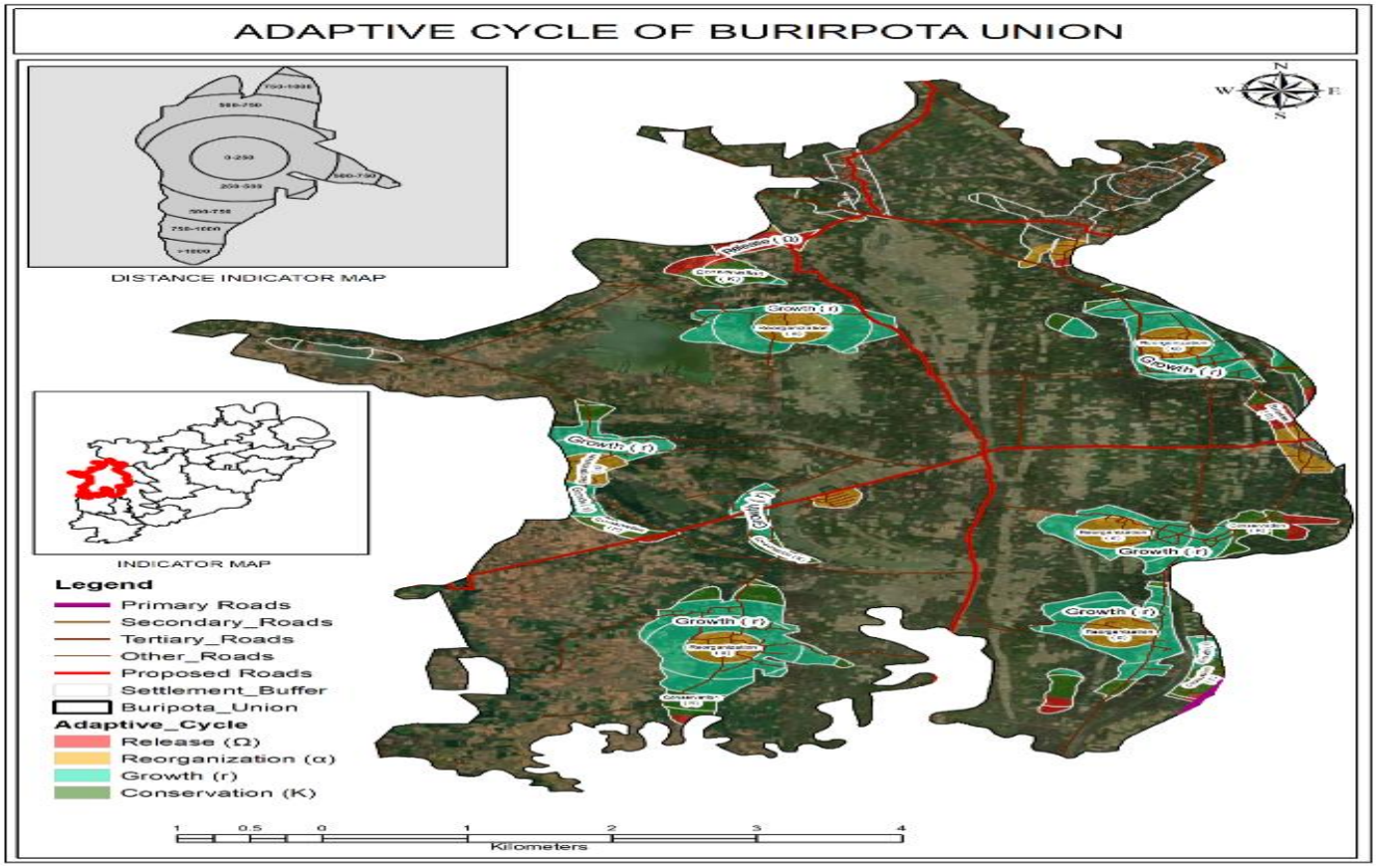


Map 4: Adaptive Cycle of Bagoan Union

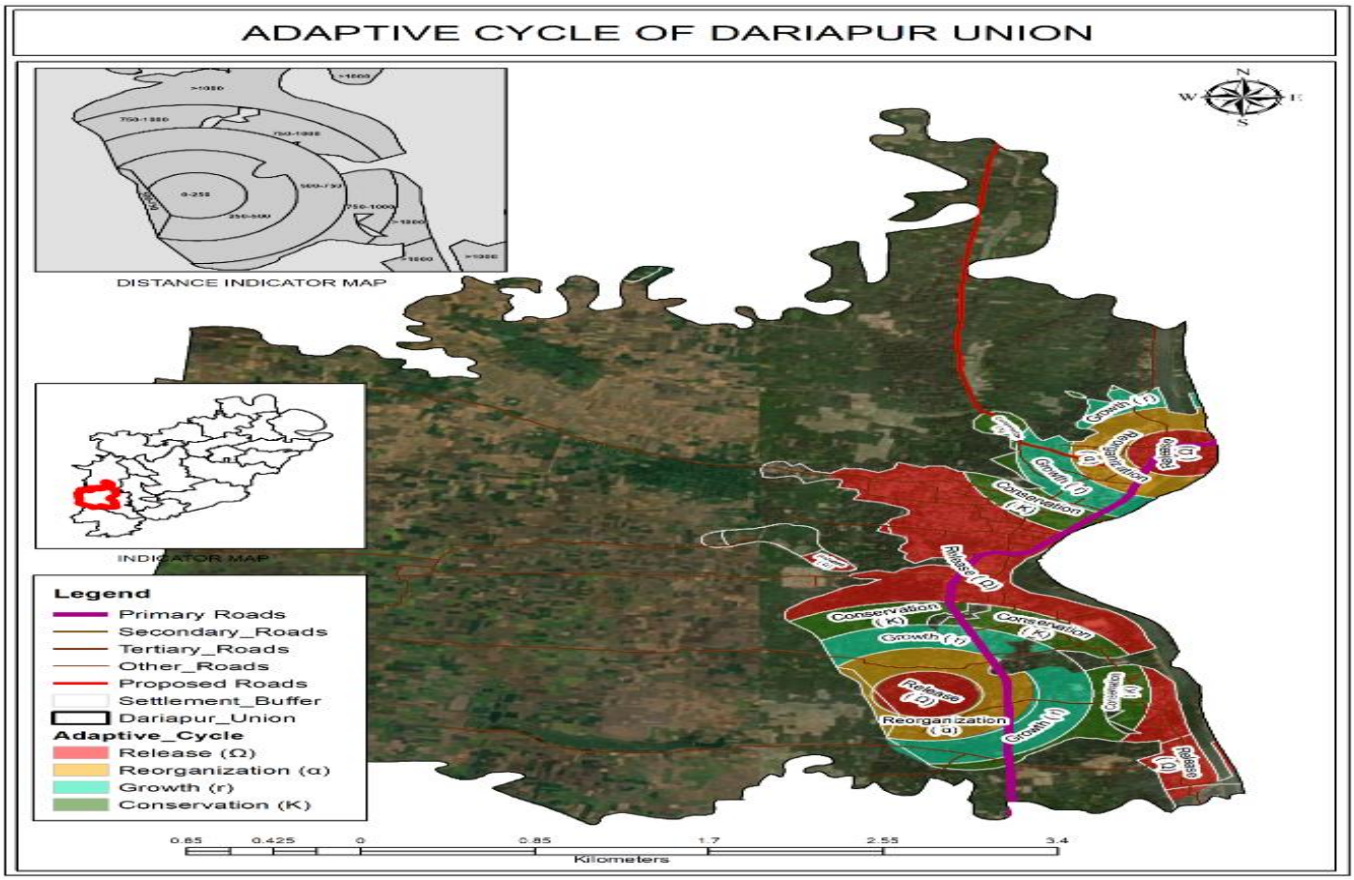


Map 5: Adaptive Cycle of Bamandi Union

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/IJISRT24OCT536

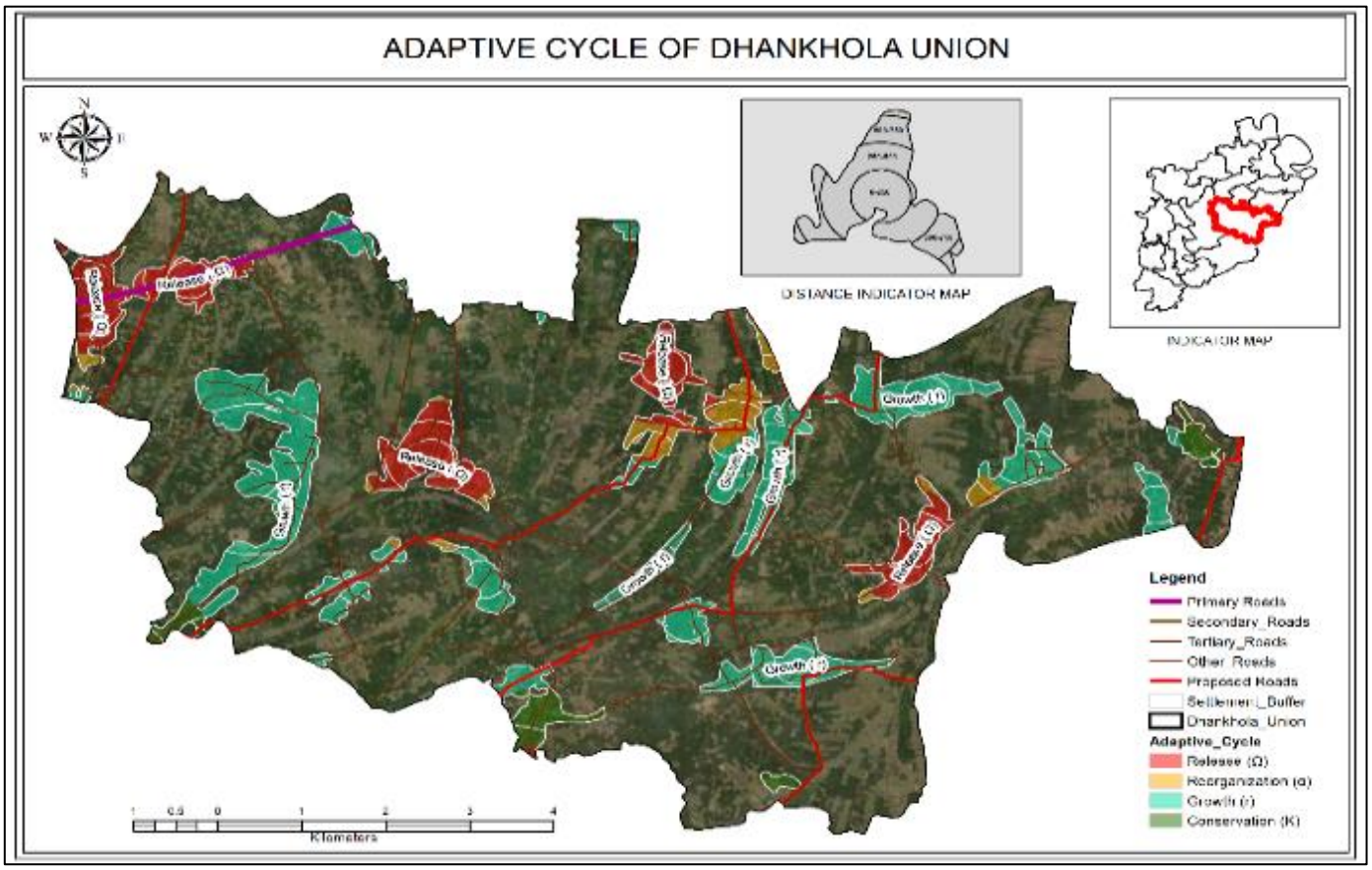


Map 6: Adaptive Cycle of Burirpota Union

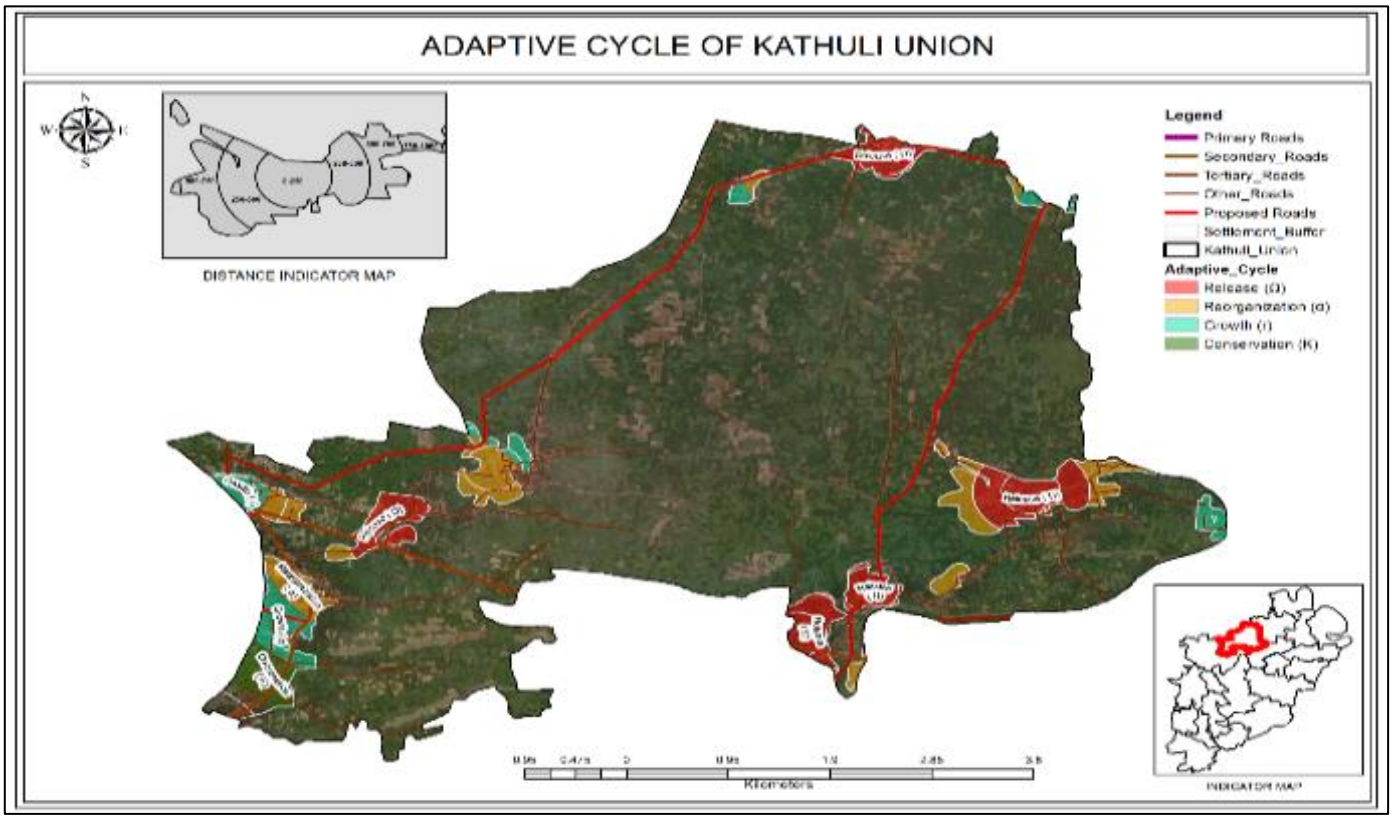


Map 7: Adaptive Cycle of Dariapur Union

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/IJISRT24OCT536

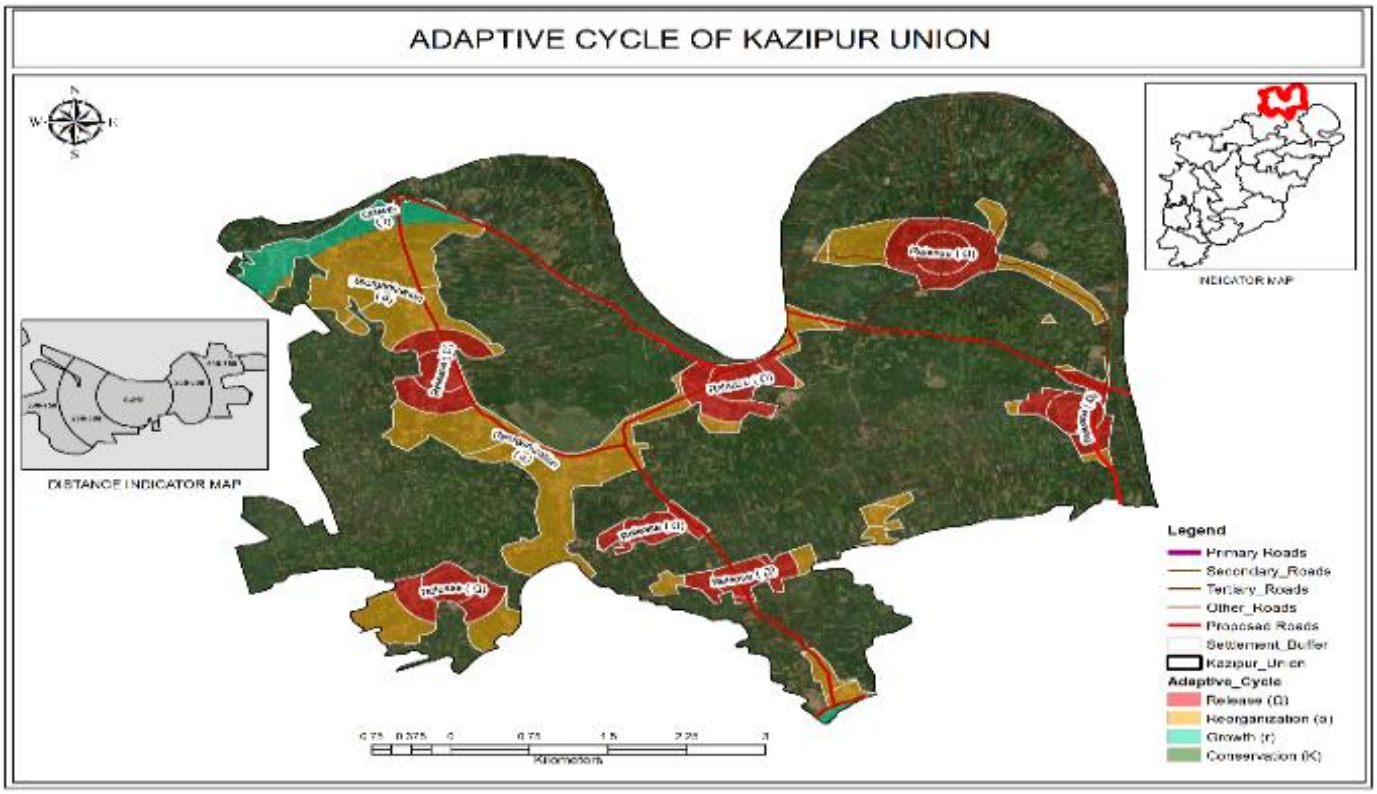


Map 8: Adaptive Cycle of Dhankhola Union

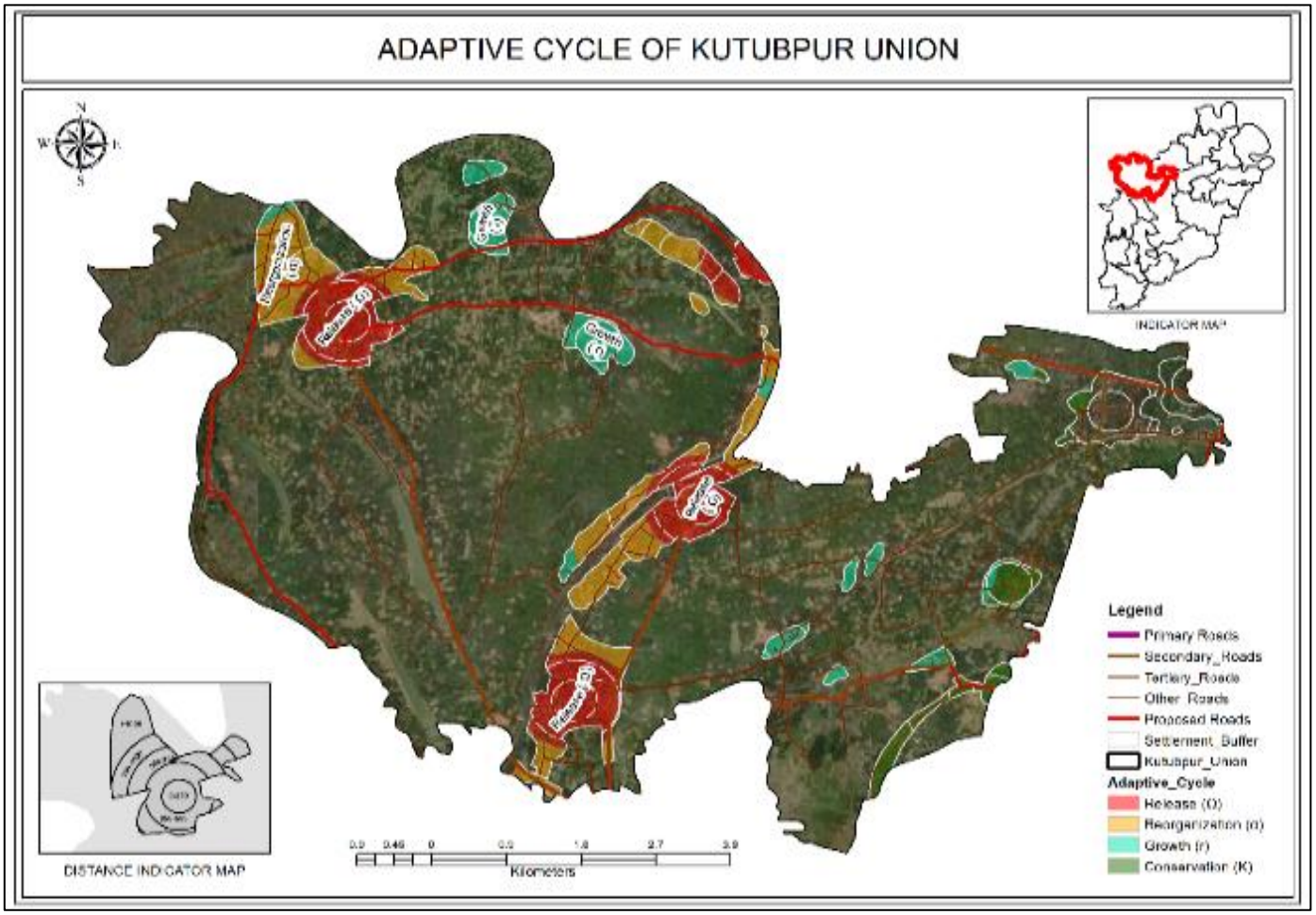


Map 9: Adaptive Cycle of Kathuli Union

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/IJISRT24OCT536

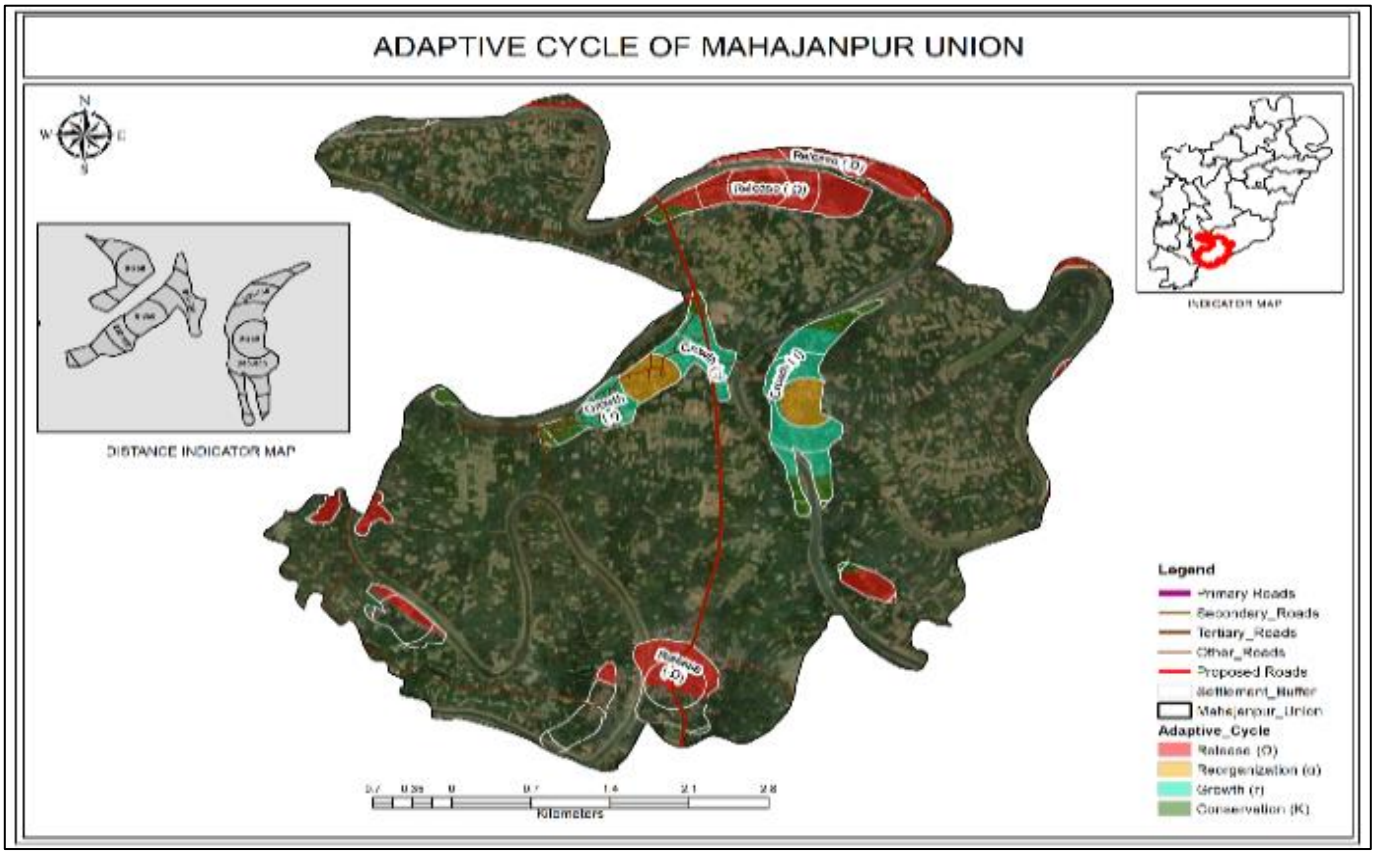


Map 10: Adaptive Cycle of Kazipur Union

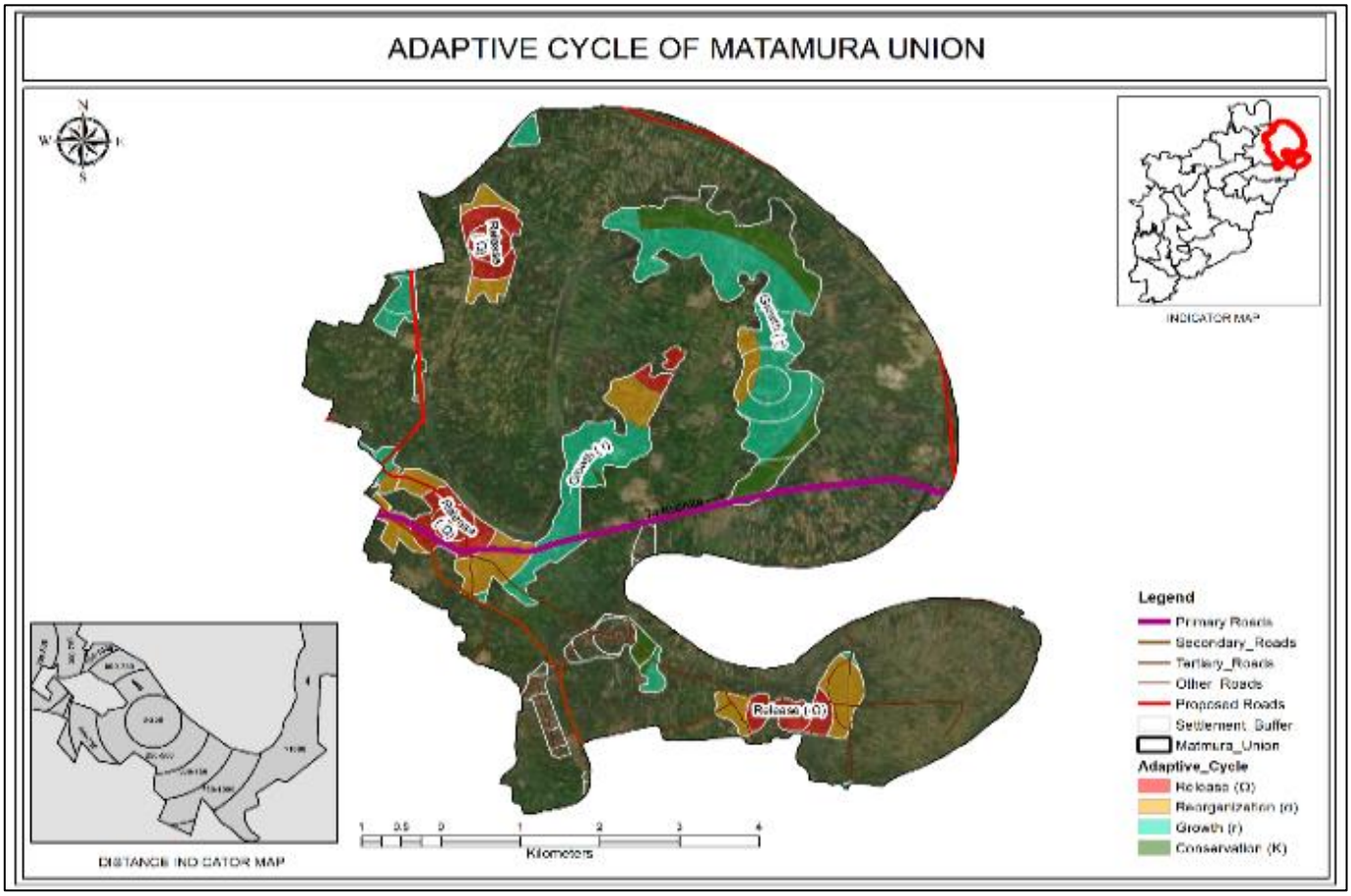


Map 11: Adaptive Cycle of Kutubpur Union

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/IJISRT24OCT536

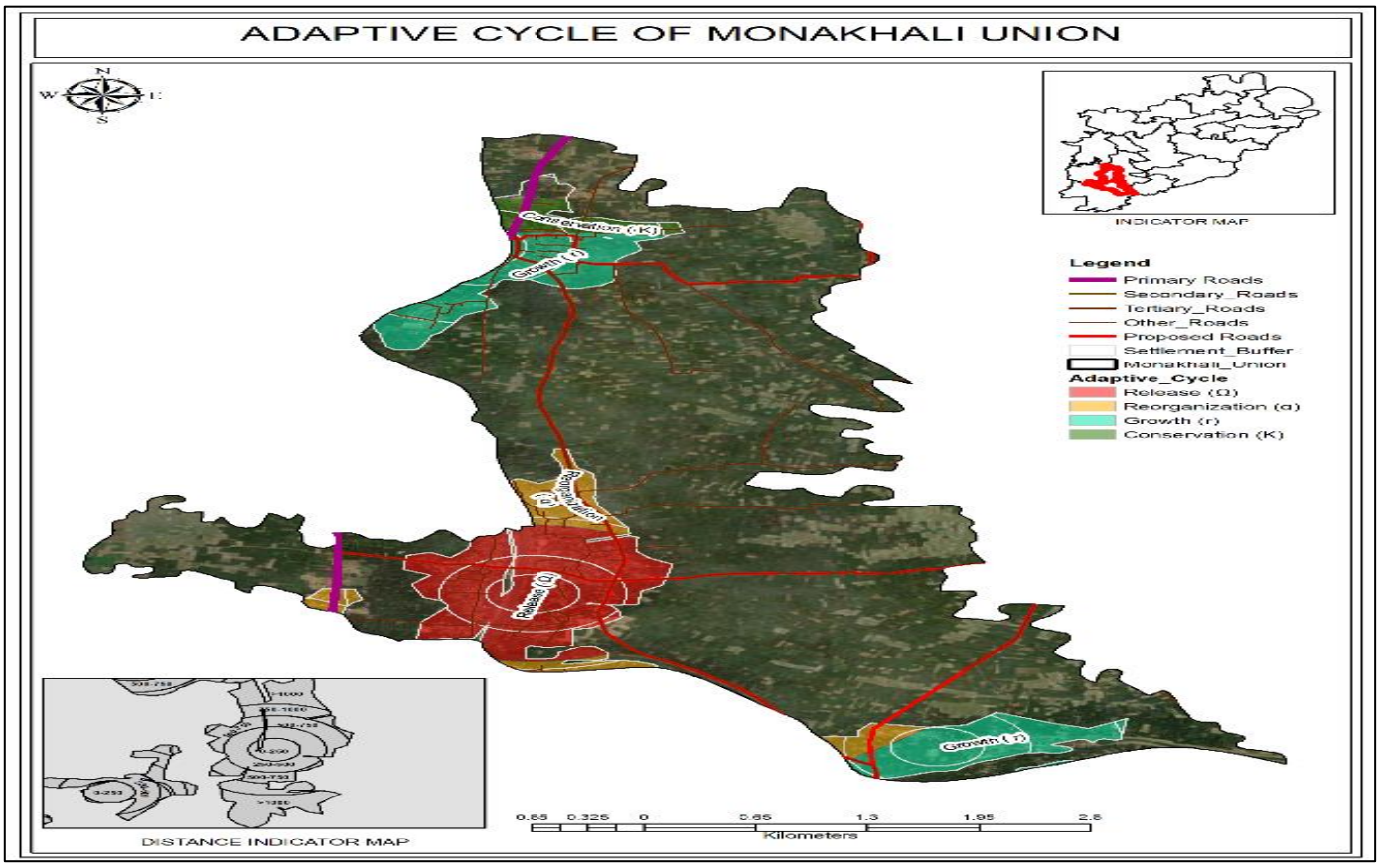


Map 12: Adaptive Cycle of Mahajanpur Union

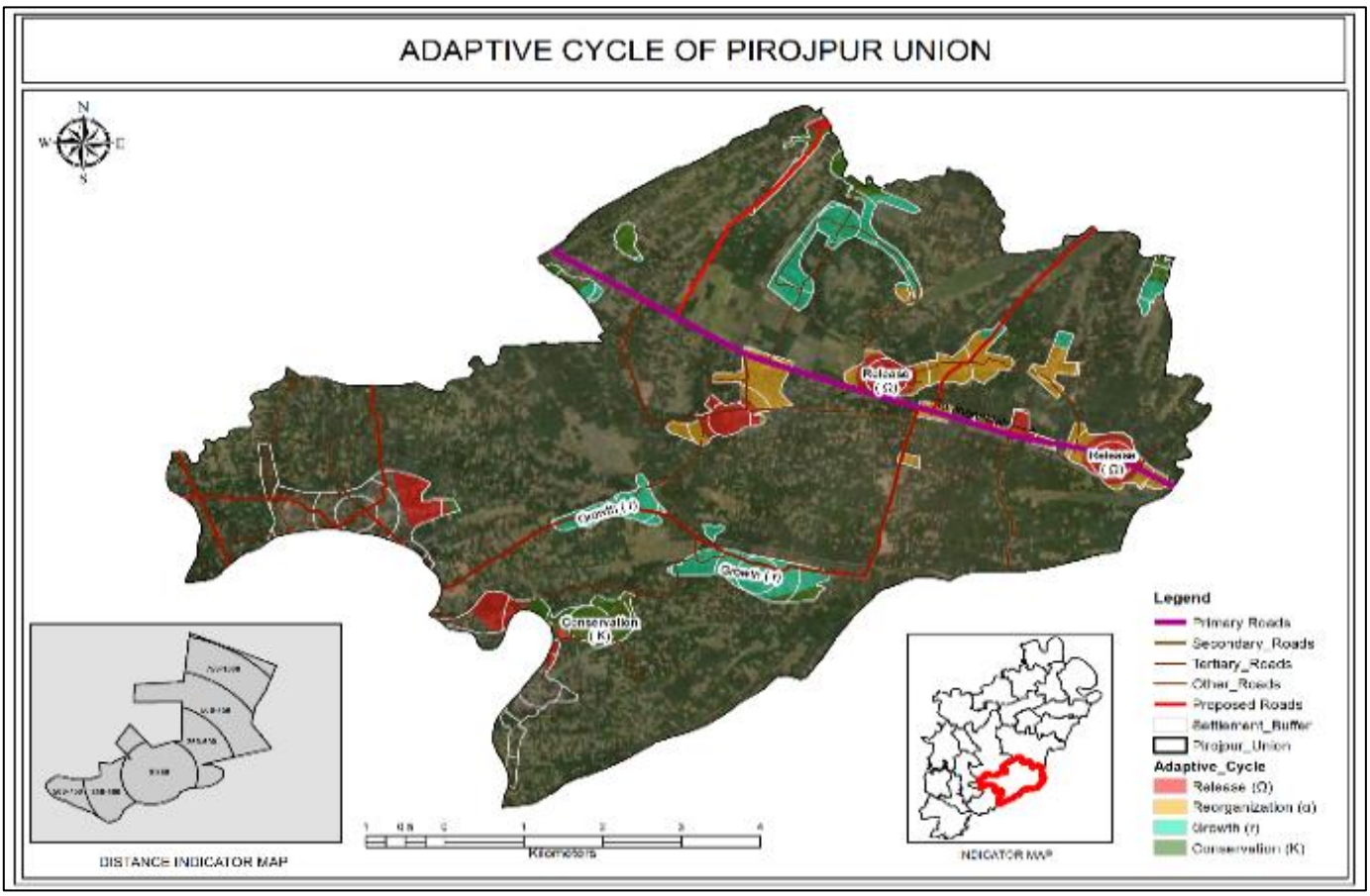


Map 13: Adaptive Cycle of Matmura Union

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/IJISRT24OCT536

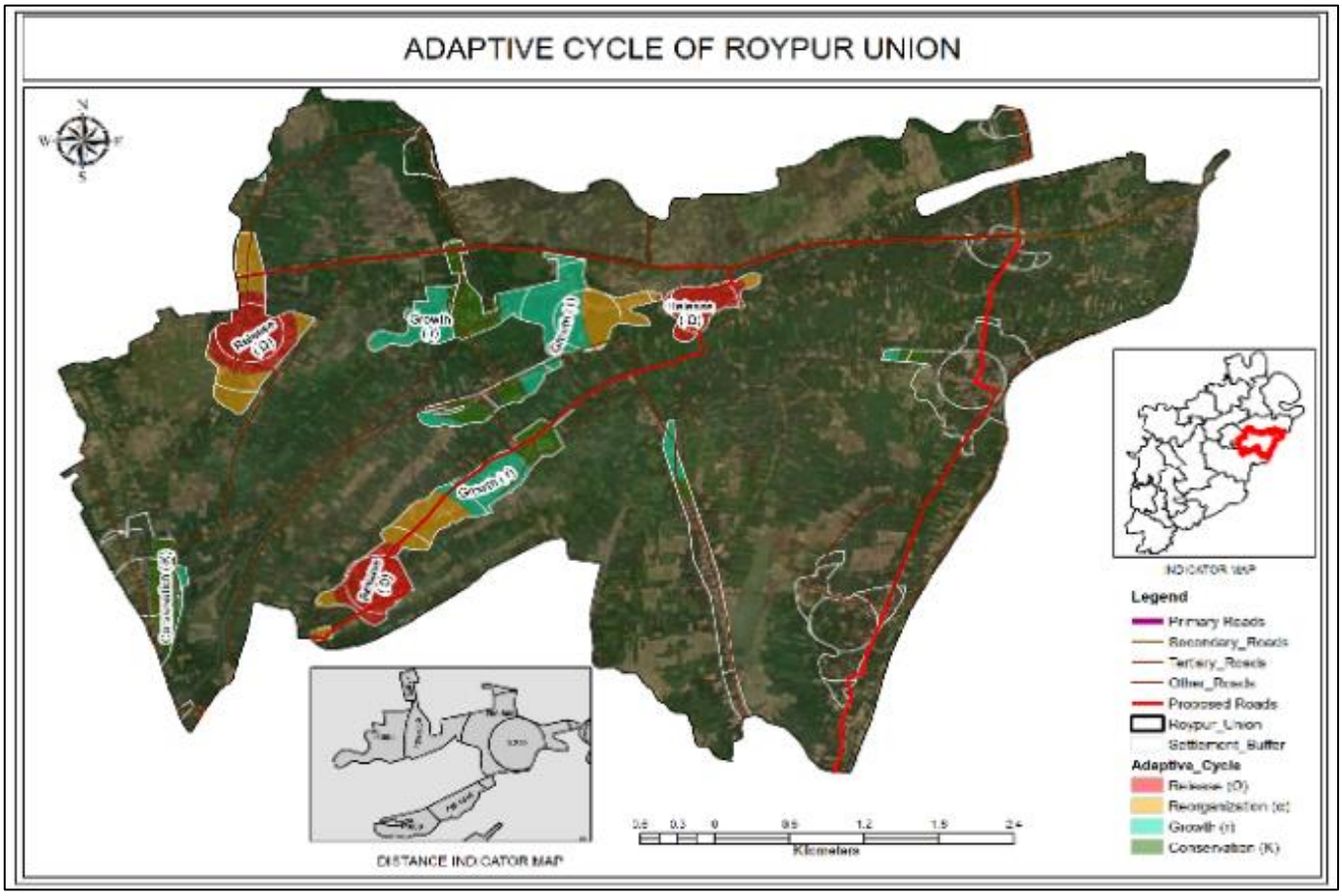


Map 14: Adaptive Cycle of Monakhali Union

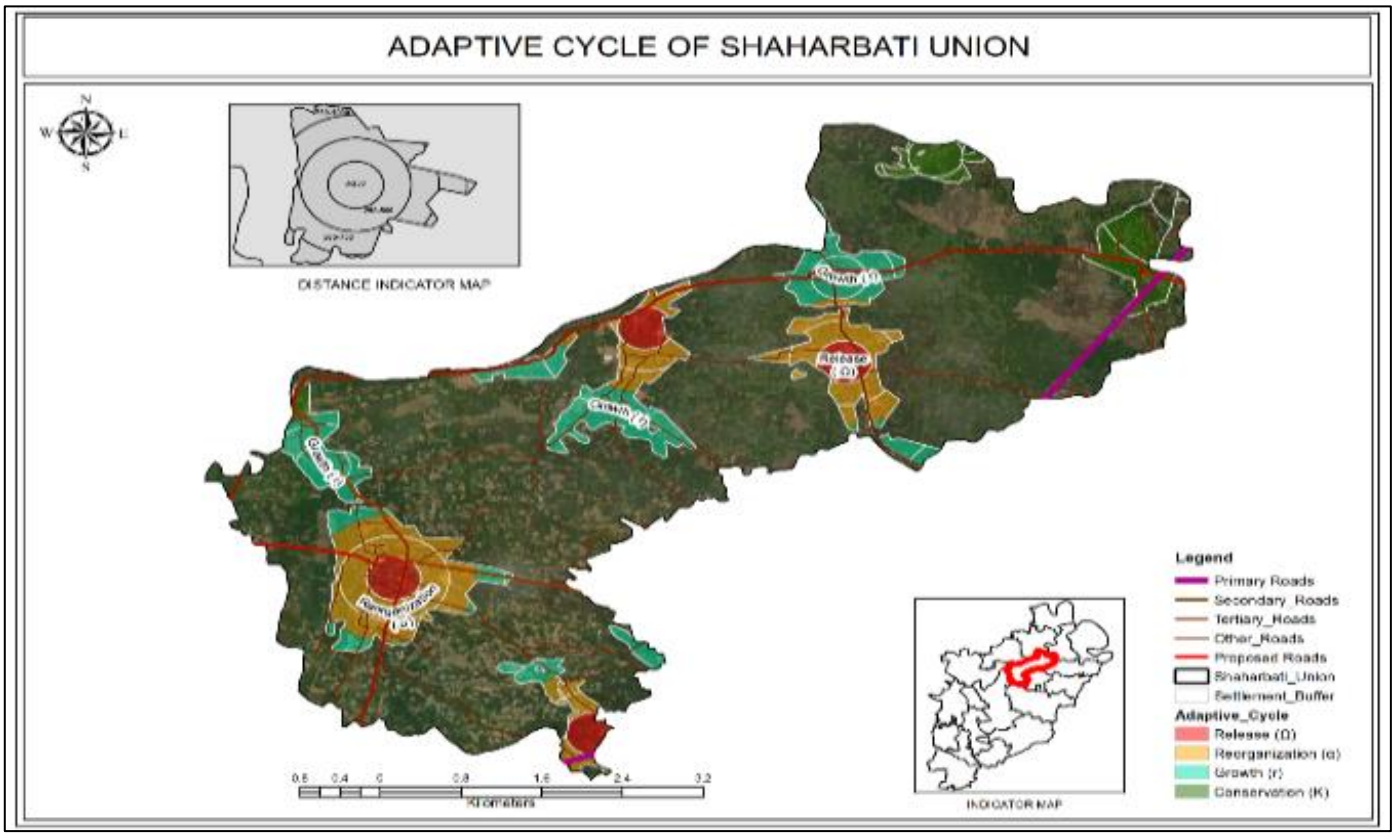


Map 15: Adaptive Cycle of Pirojpur Union

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/IJISRT24OCT536

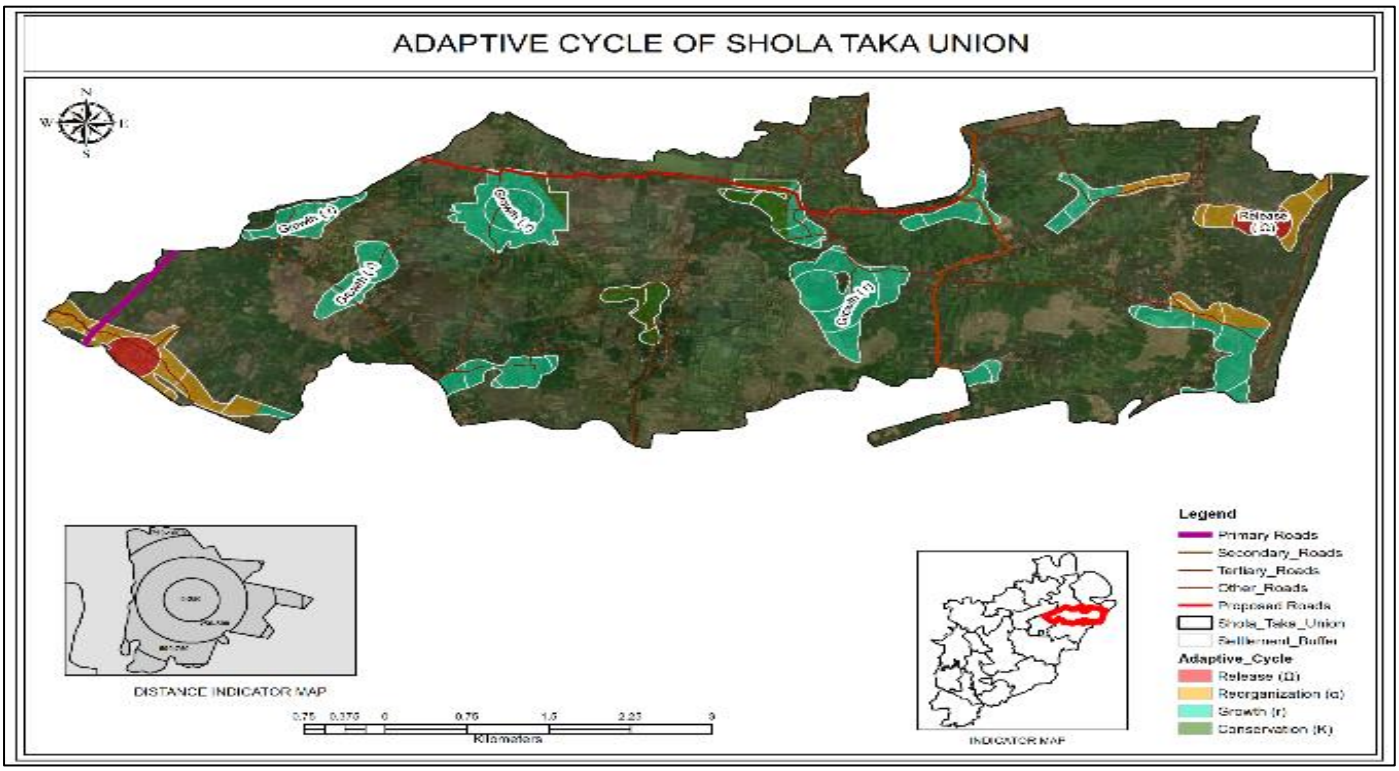


Map 16: Adaptive Cycle of Roypur Union

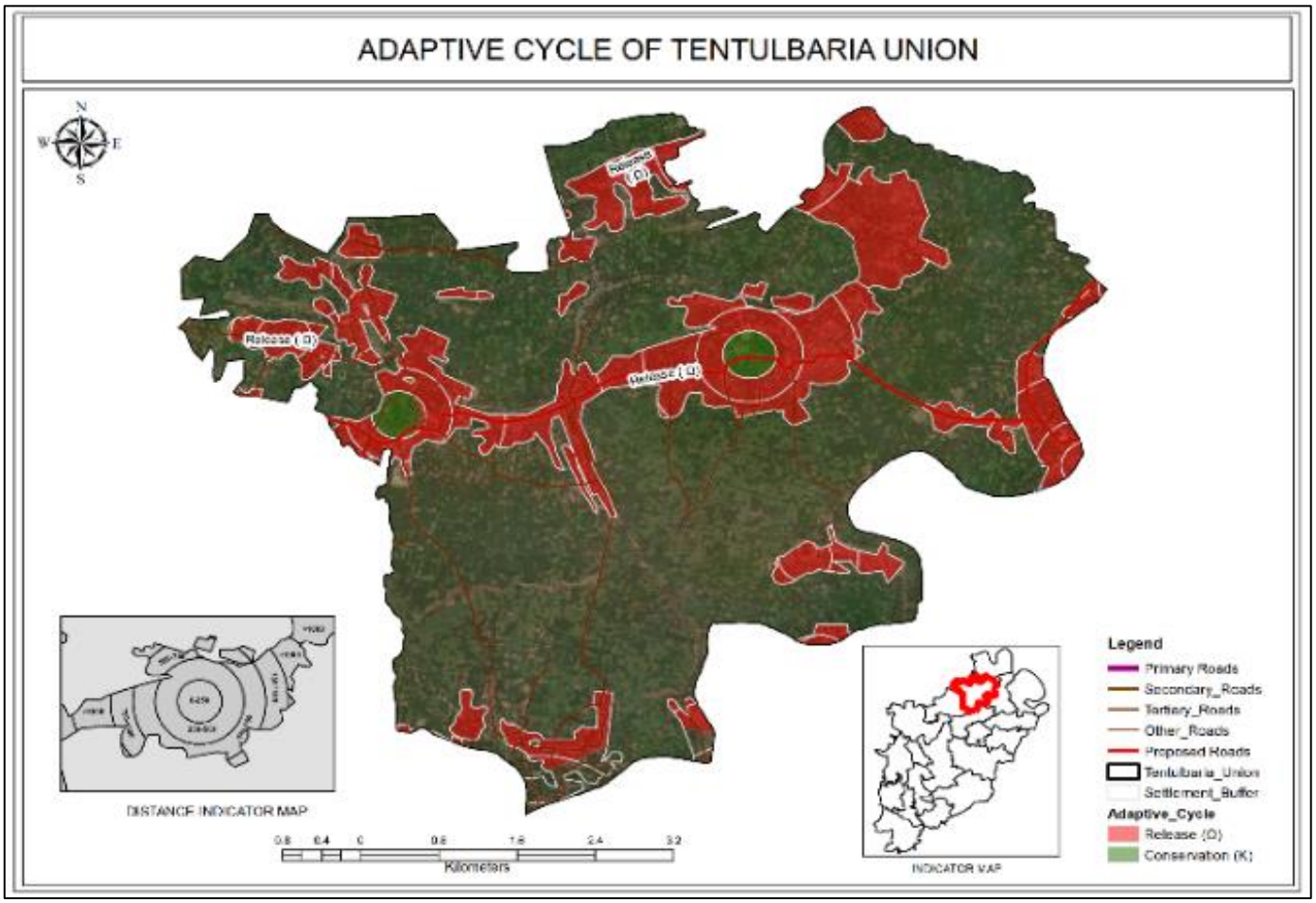


Map 17: Adaptive Cycle of Shaharbati Union

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/IJISRT24OCT536

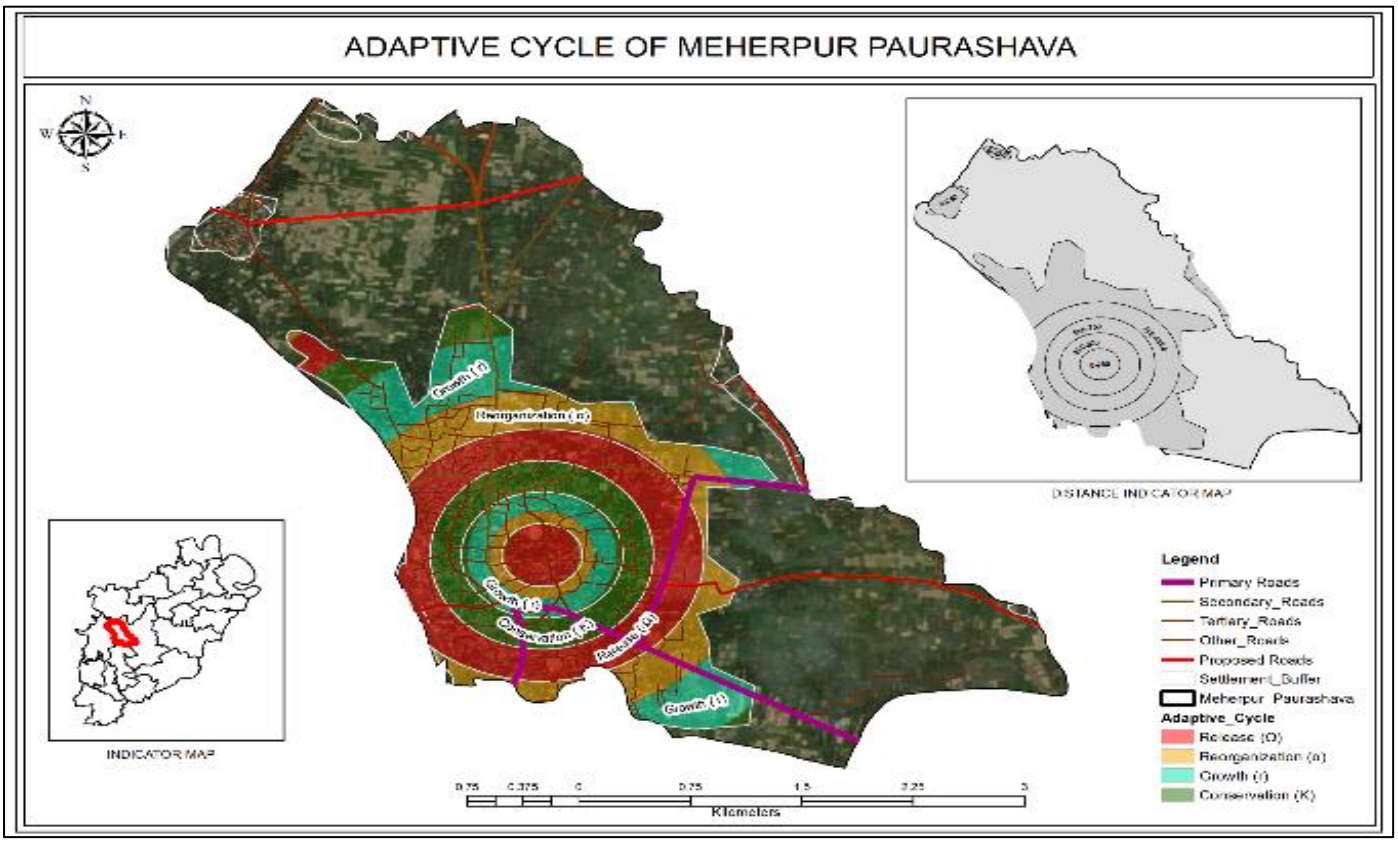


Map 18: Adaptive Cycle of Shola Taka Union

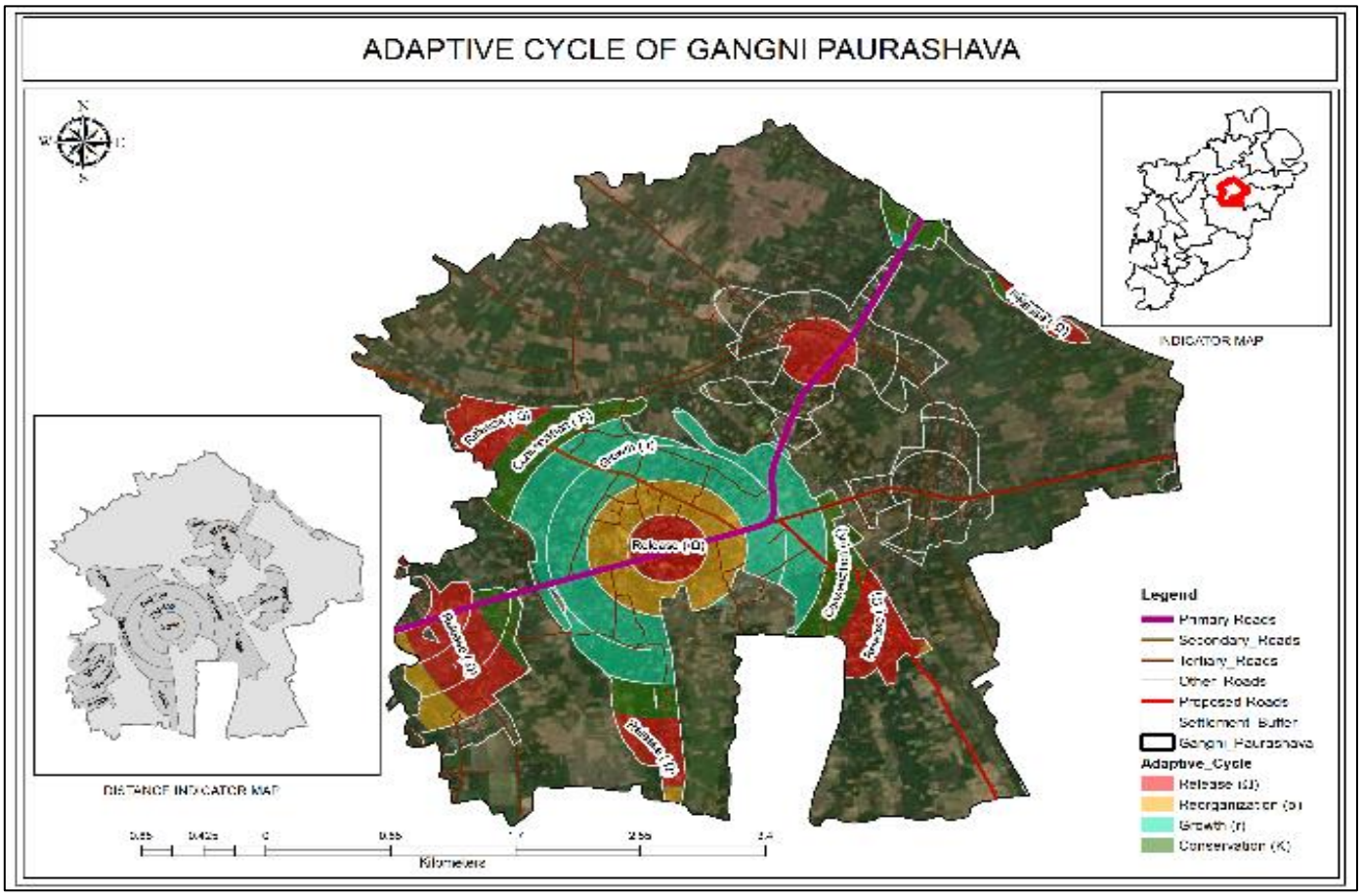


Map 19: Adaptive Cycle of Tentulbaria Union

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/IJISRT24OCT536



Map 20: Adaptive Cycle of Meherpur Paurashava



Map 1: Adaptive Cycle of Gangni Paurashava