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Built Morphology and the Impact of Planning Policies: Case of Small Towns in Karnataka, India

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Abstract

The morphology of a city undergoes transformation over time due to a variety of factors. One such factor is the master plan. The master plan is a powerful legal tool, the implementation of which has a lasting impact on the morphology of a town both built and unbuilt. The template for the master plans in India is the same be it a metropolitan city or a class III town. The resultant triggers and impact of this master plan are questionable more so in the case of smaller cities and towns. This paper investigates one such small city in the hinterland of Karnataka through a descriptive analysis of the compact historic city and the new developments; the impact of the master plan and the resulting changes. Through the analysis and arguments presented in the study for the reading of small towns and non metropolitan cities we support alternative readings of these towns and cities. Additionally through the analysis of compact city planning methodologies both historical and current we understand how the two aspects; that is small town urbanization and compact planning methodologies can be enmeshed to create new templates for master planning for small towns and cities. Our study is limited to the master planning exercise in the context of Karnataka and Gadag-Betageri in particular and needs to be further explored with respect to other urban development policies in order to be applicable to small towns and cities in general in India.

Keywords

Built morphology;master plan; urban compactness; sustainable urban form;

1. Introduction

Historically cities evolved for a variety of reasons. The making of a acity and the pattern of urban form has been the subject of much discussion by many renowned theorists. Kevin Lynch proposed the three categories or models of city forms, the cosmic model, the practical model, and the organic model in the Good City Form (Kevin Lynch. 1981). Spiro Kostof talks about the planned cities and the unplanned cities wherein the first type is a created city, its pattern determined once and for all by some overseeing authority (Spiro Kostof, 1999, p 43) and the other kind is the spontaneous city which develops and grows due to the passage of time, the lay of the land and the daily life of the citizens (Spiro Kostof, 1999, p 43). Edmund Bacon talks of the city as an act of will (Edmund Bacon, 1967). Irrespective of their origins, cities grow and expand over a period of time. While historically this expansion evolved with and in answer to the needs and requirements of the city and its people especially in India, in many of tier II and tier III cities this expansion was slow and organic in nature. All this changed with the introduction of the JNNURM scheme in 2005 by the Government of India. The Jawaharlal Nehru National Urban Renewal Mission (JNNRUM) was launched in May 2005 with four key objectives in mind: namely; the urban services, inner-city regeneration

through services, housing for the urban poor, and implementation of the 74th amendment of the constitution which enabled urban local bodies with more powers in the decision making aspects of the cities. The first beneficiaries of the scheme were 65 cities identified by the GoI and subsequently more cities were added to the scheme so as to accelerate the development of small towns and cities in India. In order to be a beneficiary of this mission, the cities or towns had to draft a CDP (Comprehensive Development Plan) that outlined the vision for the city and identified the funds required for the implementation of the same. Since this envisioned the future development of the city, the development plans invariably laid out a scheme that parceled the city into zones and converted agricultural lands to plotted developments in anticipation of housing and commercial needs, industrial zones, and so on. Thus the city which was originally compact and contained was now given permission to sprawl. Unfortunately the resultant development pattern; in the built environment, material usage, scale, and many other dimensions are neither sustainable nor critical to that particular region.

Gadag also known historically by the names of Karthu, Karduga, Gaduga traces its history to the Rashtrakutas from the 8th century. It is a city municipal council as well as the administrative headquarters of the new Gadag District in the state of Karnataka, India with a population of 172,813 and a density of 229 per sq km. Gadag is famous for printing, handlooms and is also an important seat of Hindustani music in north Karnataka. Gadag is also an important junction for the South Western Railways with the railway line bifurcating Gadag from Betagiri. Historically Gadag was the center for printing and literature and Betagiri was known for its handlooms. Together the twin cities were the second largest urban center in the undivided district of Dharwad as well as the market center for the surrounding towns and villages. Gadag is also an important part of the Jain pilgrimage circuit since the first Jain temple complexes that came up around the 10th century in Lakkundi. The planning exercises that have been in practice since the late '80s have been conservative in their outlook faithfully following the principles of colour coding and zoning and separating the various functions as per the traditional planning rules. This approach to master planning while serving some functions like allocation of resources, finances, infrastructure, and so on fails to look at the unique aspects that are prevalent in that context. Should all planning exercises be looked at through the same lens? The planning methods for a metropolitan city like Bengaluru should be different from that of tier two cities like Gadag, yet the documents differ only in terms of geography and contextual requirements but not the approach itself. This paper investigates one such small city in the hinterland of Karnataka through a descriptive analysis of the compact historic city and the new developments and the impact of the Master plan and the resulting changes. It questions the singular approach to master planning and investigates other approaches with the intention of finding a new perspective to master planning of small towns and cities that can be tailored to the individual city especially in the context of Karnataka.

2. Literature Review

2.1. Sustainability and historic planning

Historic town planning in India can be traced back to the Indus valley civilization which followed the grid iron pattern with a citadel and fortification. Evidence suggests a good road network with wide arterial roads and excellent drainage system. The second type was during the vedic period when texts like the Manasaram, Mayamata and the Shilpashatra were written that based town planning on cosmic theory. These texts give elaborate descriptions on the type of planning required based on the topography, location, function and so on. There are few surviving examples of this kind of planning, Madurai in South India being one such temple town. Here the town/city is planned as a series of enclosures that follow a clockwise direction of movement with preordained spatial designations The third category is the numerous towns scattered across India that came into being for a variety of reasons from as early as the 5th century AD until the 19th century with some intent on planning that were based on the vedic principles. These are administrative capitals, defence towns, commercial towns, religious towns and centres of learning. In the context of Karnataka we have historical towns that range from capital cities, administrative cities, defence towns, temple towns, port towns and so on. Examples for the various types include, the capital cities or towns like Badami, Vijayapura; religious towns like Sringeri, Gokarna; defence towns like Anegundi, Chitradurga; trading towns like Bengaluru, Hubballi and administrative capitals like Mysore, Hampi and so on. Eventually all these towns have grown, and transformed into present day towns and cities with the historic districts merging into the town fabric. While there is no evidence to prove that the cosmic theories were applied in the town planning of these towns and cities, we can see

evidence of intent in the planning and the zoning of the city and the circulation networks with respect to the cardinal directions. The settlements were planned around or in close proximity to a water body either natural or man made with the place of work and stay linked by a pedestrian network. The cadastral patterns respected the topography with the settlements at the higher elevation and the water bodies at a lower elevation. Examples for this kind of planning include the pete area of Bangalore the old town of Badami and many more as also the old town of Gadag. This aspect of planning has been intuitively followed in the organic growth of these towns and settlements where the central spines have mixed use and the place of work and stay are closely linked and built form responds to the climatic aspects of the place. Thus the tropical sun and the heat generated is countered by narrow lanes that are shaded by the buildings abutting them, a verandah or jagali as it is termed colloquially which acts as a shaded seating area and as a transitional element between the public street and the private house, courtyards and narrow openings with thick walls and skylights in the utility areas like the kitchen and wash area. Main streets that were also the commercial spines usually have their own typical mixed use typology which houses the shop on the ground floor at the street level and the residence at the top. Throughout Karnataka we find such settleforms that have survived for centuries with very little change. The introduction of RCC and the increase in vehicle ownership as well as change in lifestyles is transforming these settlement morphologies that are losing the pedestrian scale as well as the advantage of climate friendly construction. Compounding this issue is the planning methods currently followed that are exacerbating and incentivising the move away from traditional which should be translated as sustainable methods to borrowed models of planning.

2.2. Analysis of literature on planning methodology of compact cities

Compact city as a policy became popular in Europe in the 1990s as a way of finding sustainable solutions for city planning. First coined by George B Dantzig and Thomas L Satty in 1973, it was a notion that existed prior to that in the form of high-density compact city as proposed by Le Corbusier in the radiant city concept and Jane Jacobs's ideas of mixed-use, high density, and pedestrian-oriented living. The ideas gained traction in the 1990s in Europe as an answer to the automobile-driven planning that led to sprawl in cities which were increasingly seen as unsustainable. Catalyzed by the global sustainability goals as outlined in the Brundtland Commission Report (WCED, 1987) and the UNCED Agenda 21 proposals (1993) the theories diverged from the earlier ideas of environmentalism as proposed in the garden city and regional planning theories of Howard (1898) and Geddes (1968) in the sense that their focus is about the consequences of energy production and consumption and how this is influenced by the urban form. The rationale for this concept stems, according to Tadashi Matsumoto, "*from the fact that urban spatial form may substantially influence the economic, social, and environmental performance of cities*" (Matsumoto, 2012, p 01) For example, a compact urban form with an efficient transportation system can reduce intra-urban trip distances, which reduces the cost of transporting goods and services as well as the consumption of gasoline (Matsumoto, 2012). The literature on compact city concepts is extensive as are the definitions of the compact city. Over time the compact city model has found favour with the green and sustainable urban form models as high densities combined with mass transit models are seen as an answer to suburban sprawl. Some of the key characteristics of a compact city as defined by many of the definitions are Contiguous development patterns, dense built-up areas with mass-transit linkages, Accessibility to diverse local services and jobs (Matsumoto, 2012) decreasing car dependency; lowering per capita rates of energy use; limiting the consumption of building and infrastructure materials; mitigating pollution; maintaining the diversity for choice among workplaces, service facilities, and social contacts; and limiting the loss of green and natural areas (Bibri et al., 2020) Increasingly a lot of the research is looking into how urban forms can be more sustainable and a compact form along with good transport and linkages is seen as a sustainable urban form. The world over there is a renewed interest in reading and understanding of historical urban forms as scholarly studies have shown that historical settlements have compact urban forms that are climate and context sensitive. The historical cities of the middle east too followed a compact urban form where the city consisted of mixed use communities with clusters of residential communities with their own urban facilities together formed an urban agglomeration. According to Shirazi and Falahat (2015) this type of urban form persisted almost until the pre-modern times after which the new developments were a poor imitation of western urban planning patterns. Thus the historic cores of cities like Tehran, Cairo and many others have compact urban forms that are well suited to the climate and culture of the place and new

developments that surround and in some cases superimposed on the older forms that are more Haussmanian are decidedly not compact in their urban structure.

The OECD report 2012 lists the benefits of the compact city that include environmental benefits due to reduced automobile dependency thus reducing carbon emissions, economic benefits due to efficient infrastructure, easier access to a diversity of local jobs and services as well as the impetus to new technological innovations and finally social benefits due to lower cost of living and a better quality of life. Many models have been tried to achieve the compact urban form; the high rise high-density redevelopment model with mass transit and self-contained new towns; second is the concentrated decentralization where a polycentric model is preferred over the monocentric model where development corridors and transportation networks act as connectors; third is the linear transport oriented development as explore in Curitiba very successfully; fourth is the urban regeneration models that explore regeneration of core areas, historic centers, and disused industrial and other lands (Burton et al., 1996). According to the latest literature on compact cities from around the world "*compact cities emphasize the intensification of development and activities, create limits to urban growth, encourage land use and social mixes, and focus on the importance of public transportation and the quality of urban design*" (Bibri et al., 2020). While a huge body of empirical work is available on the compact cities in the form of case studies, these perspectives range from planning theory, planning practice, design practice, urban theory, spatial analysis, regenerative design, economics, and discursive theories (Bibri et al., 2020) this study approaches the topic of compact planning from the perspective of historic cities in Karnataka and how these can aid us in achieving the three goals of sustainability namely the social, economic and environmental aspects of the city..

2.3. Analysis of literature on small town planning in India

The Indian definition of Urban has three criteria that need to be fulfilled, first is a population density of 400 people per sq kilometer, the second that at least 75% of the male working population are in nonagricultural pursuits, and third, a population of at least 5000. The Indian definition of Urban has three criteria that need to be fulfilled, first is a population density of 400 people per sq kilometer, the second that at least 75% of the male working population are in nonagricultural pursuits, and third, a population of at least 5000. The classification of towns in India is based on the census data and is thus based on the population statistics. Therefore, Class I towns are those with a population of 1,00,000 and above, Class II towns are those with a population of 50,000 to 99,999, Class III being 20,000 to 49,999; Class IV: 10,000 to 19,999; Class V 5000 to 9,999 and Class VI: less than 5000. Thus all towns with a population of 1 lakh and above are placed in the category of Class I cities. Therefore, both Gadag-Betageri with a population of 1,72,813 and Bangalore with a population 8 million plus are classified as Class I cities. While Bangalore is acknowledged as a metropolitan and megacity the census classification does not consider this nomenclature. Mukhopadhyay et al. (2000) have come up with a classification where Class IA is above 5 million, Class IB is between 1 and 5 million, Class IC is between 100,000 and 1 million, Class II towns are between 50,000 and 100,000, Class III between 20,000 and 50,000. As per this list they classify all towns in class II and below category as small towns. Apart from this a town can be declared a statutory town or a census town. A statutory town will be a town that will have a local body and a census town will not require an urban local body and thus will be declared a village. These classifications are important as they affect the performance aspects of the said town or village. As per the 74th amendment of the constitution of India the urban local bodies and the panchayat raj are given a lot of powers to enable better participation at the grassroots level thus strengthening the democratic process. This coupled with many central government schemes that are aimed at the betterment of villages results in a lot of funds allocated to the panchayats vis a vis town municipal corporations. Due to this, there are instances in states where a town has reversed its status from a statutory town to that of a village. In this background the argument of planetary urbanization as espoused by Brenner and Schmid where they question the boundaries of rural and urban and call for new epistemologies where urban and rural are not geographically defined does not hold much ground as Denis et al posit in their theory of subaltern urbanization that "the urban-rural nomenclature remains performative, even as the relevance and the frontier of these binaries are questioned" (Denis et al, 2012, 14). In India thus a large part of small-town urbanization is caused due to an increase in the population of a town or village rather than migration, termed as Insitu urbanization by Mukhopadhyay (Mukhopadhyay, 2020). The theory of subaltern urbanization in India demands that small towns

in India cannot be seen through the lens of megacities or metropolitan cities and be studied for their own autonomous economic linkages and performance. District headquarters like Gadag-Betageri, Badami, Kampli, Sirsi to name a few in Karnataka are the produce markets for the surrounding villages. The huge APMC yards in these cities are where all the surrounding village farmers sell their produce, cattle, buy necessary equipment, and farm necessities. Concomitantly, towns like Badami with their historical significance have developed a tourist economy that is slowly gaining traction and envied by other towns such as Gadag that cannot claim a similar share. Mukhopadhayay et al. (2000) have classified the small towns in India under four categories; the first is an influenced town which is in close proximity to a metropolitan town and is thus influenced by it. Malpe near Udupi is an example for this. The second is an entrepreneurial town that is composed of entrepreneurs and skilled workers and forms industrial clusters. Tiruchengod in Tamilnadu with its drilling rig industry is a good example for this category. The third category consists of market or administrative towns that have historically been centers of commerce and or administration and governed by urban local bodies. Kampli in Karnataka is a good example for this category. The fourth category is the emerging small towns that are either large census towns or large urbanizing villages which have a significant portion of their working population moving away from the farm sector. Gopalpur in west bengal with its yoghurt industry is given as an example for this category. To this list, I would like to add a fifth category of towns that have a strong historical layer and thus become a part of the tourist circuit which has a significant impact on their growth and development (Shastri and Subrahmanian, 2021, p. 321). While the population statistics by the Census of India classifies Gadag-Betageri as a Class I city, for the purpose of this study we will view Gadag-Betageri from the perspective of a small town. we will consider the parameters of density, economic diversity and transport to strengthen the argument of why Gadag-Betageri needs to be seen from the perspective of a small town. Gadag-Betageri has a density of 3,200 per square kilometre for an area of 54 square kilometres which translates to 32 pph.Thus the density parameter shows that Gadag-Betageri has a density on the lower side compared to the other class I cities which have a density >50pph. The economic mainstay of Gadag-Betageri is the agro based industries, the APMC yard and other agricultural and administrative related services due to it being the district headquarters. This suggests that the economy of Gadag-Betageri is not very diverse but mainly dependent on and related to agricultural and administrative functions. The third point is about the transport system of Gadag-Betageri. The old city area which comprises districts 2 and 4 is mostly pedestrian with private and paratransit vehicles supplementing the foot traffic. The city does not have a transit oriented development where transport nodes attract higher densities and development. Apart from the city bus station and the railway station there are no transport nodes in the city and of these the railway station only caters to intercity and interstate traffic and not to the city itself. Thus in view of all the above stated factors it is more prudent to view Gadag-Betageri from a small town perspective rather than a Class I city perspective. The above-stated analysis about small towns in India helps us draw two sets of conclusions; the first that small towns are not always dependent on big metropolitan cities for their growth and commerce and second that while boundaries between urban and rural are getting blurred increasingly, the nomenclatures matter in the performative and governance aspects. Thus we need to look at small towns away from our current understanding of cities and deepen our understanding of them so that it can lead us to a planning process that is more nuanced and discerning than the current processes that only differ in scale but not approach.

3. Historical planning in the context of Gadag

Gadag district has many structural temples from the Badami Chalukya's reign between the 6th and 8th centuries. Historical evidence shows the existence of Gadag and its twin city Betageri since the Rashtakutas rein in the 8th century in the form of stone inscriptions found in the area. Ruled as a part of the Belavolu Three Hundred (Belavolu Munnuru in Kannada) administrative area (Fig 1), the place was a fortified settlement with learning centers for scholarly pursuit as well as warfare and martial arts. Established as an Argraharam or Brahminical settlement with a royal grant from the Kalyani Chalukyas the Trikuteshwara temple was a walled enclosure within the fort. Lakkundi, situated about twelve kilometers from Gadag as well as Gadag were both known for these Argraharams where scholars of both the Jain and Hindu traditions were engaged in scholarly pursuits. Bhisma tank situated towards the south of the fort wall fulfilled the water requirements of the settlement (Fig 1). The presence of more than sixteen Hero stones or Veeragallus dating back to the Rashtrakuta period which narrate the battle fought by the hero and his profession as well as the details of the battle tell us that the Betagiri area may have had a battlefield in its surrounding and

probably housed an army contingent as well to protect the settlement. In the 12th century, another walled enclosure was added within the fort with the building of the Veeranarayana temple during the Hoysala rule. This was an Agraharanm as well and the famous Kannada version of Mahabharatha by the writer/poet Kumaravyasa is said to have been composed in the presence of the deity Veeranarayana in the 15th century during the Vijayanagara rule when the temple was expanded with a larger enclosure. With the change in regimes in the region, Gadag-Betageri too came under various rules until it was won over by the British in 1818. During the British era Gadag was a part of the Dharwad region which in turn was part of the Bombay presidency and continued to remain a historical town.The establishment of the railway line in 1882 gave impetus to the modernization of Gadag. The railway line which first linked Gadag to Hotagi in Maharashtra was later linked to the Hubli line (Fig 2). Gadag with its black soil was a cotton growing region and the establishment of the first mill in Gulbarga in 1884 was soon followed by setting up of Mills in the Gadag region. These mills were set up outside of the old town area towards the North adjacent to the railway line and towards the east beyond the Trikuteshwara temple walled enclosure. The setting up of cotton mills led to the first expansion of Gadag and its transformation from a historical town into an urban centre. The mills attracted workers and labourers and this led to the densification of the old town between the Veeranarayana and the Trikuteshwara temple enclosures. The mills attracted ancillary industries of oil extraction and the handloom industry. Thus a weaving community was established across the railway tracks to the north in the Betagiri area by the early 1910's. The new burgeoning urban centre attracted businessmen from Bombay and the Javeri bazaar or the jewellers street came up to cater to the new clientele. The introduction of printing presses during the colonial rule and the existing learning and scholarly tradition of Gadag from historic times helped set up a strong print and publishing culture which meant the presence of many printing presses in the old Gadag area in around the Tontadarya Matha and the Javeri bazaar.While there is no evidence of any specific planning policies applied to the town during the British regime, the railway line and the subsequent establishment of mills impacted the layout of the settlement from an organic form to that of a planned development. While the town did spread due to the interventions during the British rule, it still retained a pedestrian scale. Post-Independence with the setting up of the taluk offices and other administrative buildings the town gradually expanded East (Fig 2). Planned residential plots with services started to appear to the east of the Hubli - Bellari Highway in Gadag and around the Missionary Hospital in Betageri. This was the extent of the town until the 1990's when the first master plan exercise was mooted and the new district of Gadag was carved out of Dharwad district in 1997

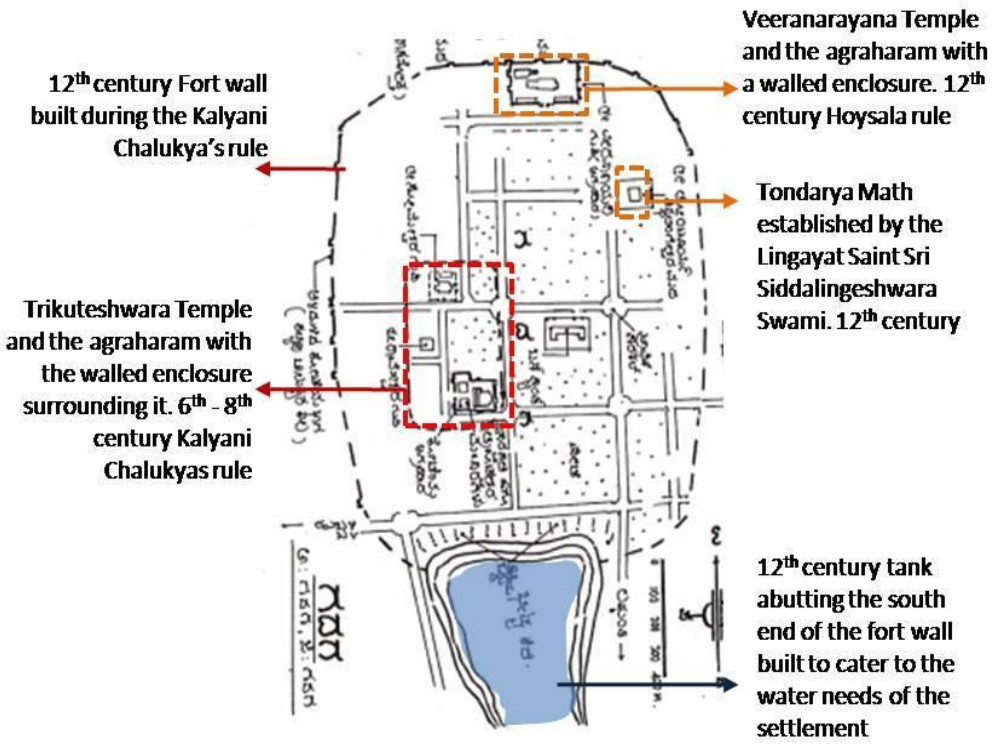

Figure 1. Historic map showing the walled enclosures of the Veeranarayana and Trikuteshwara temple precincts and the Bhishma tank to the south of the Fort. Source: Joshi, R. 2005

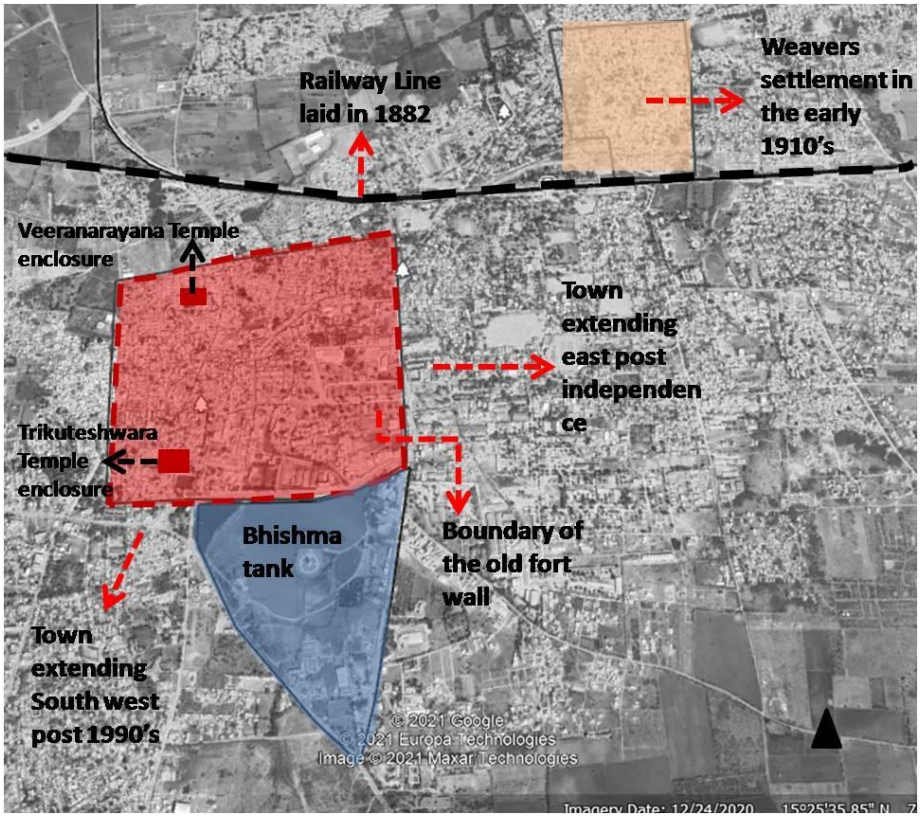

Figure 2. Map showing the old town of Gadag and the subsequent developments

4. Master plan for Gadag and its impact on the town

The first Comprehensive Development Plan (CDP) for Gadag was approved in the year 1991 for the horizon year 2001 and was deemed to be valid for 10 years. Accordingly, a fresh survey was taken up in the year 2001 and a new CDP for the horizon year 2021 was drawn (Fig 3). The old town has a compact arrangement with the bus stand at the center with the tank and the railway line forming its boundaries. With a radius of 1.5 kilometers, the town has a very pedestrian scale to it that is slowly getting eroded with every new master plan proposal that keeps expanding the city limits. Since Gadag-Betageri is the district headquarters it is the seat of the government, thus the Municipal buildings and the district courts are situated in Gadag. Old Gadag had cotton mills and printing presses and Betageri had the looms that provided employment to the townspeople and this was possible due to the cotton fields that surrounded the town which grew the cotton required for the mills. Over time the number of farmers who grew cotton diminished as many second-generation farmers chose to migrate to the city to make a livelihood instead of farming; gradually this led to a decline in cotton production which further led to the closure of the mills. The boom in the internet and technology meant that fewer books were getting printed, thus the once-thriving printing industry got hit too. Therefore, the two major employment opportunities in Gadag gradually became obsolete and the land occupied by the now defunct mills also became obsolete (Fig 4) The forming of a new district meant that new government institutions had to be set up in Gadag and the fact that this was the town center for all the surrounding villages meant that the government appointed agricultural market yard is situated here as well. The government became the major employment generator in the town and a new kind of planning was required that could house all the employees that were to work in the government offices. Thus the planning exercises carried out for Gadag had new extensions planned in a sprawl around the old city such that plotted developments to house individual housing units for the expected government employees to stay. As a result of this, the two master plans of Gadag thus far have spread Gadag farther and farther out into the countryside in anticipation of the expected housing demand. This has resulted in a development that is very sparse and removed from the city center with very poor connectivity and completely at odds with the original pedestrian scale and formation of the city. It has also resulted in huge tracts of land in the city center that are lying waste or underutilized due to the presence of the now-defunct mills. The APMC yard that occupies more than three huge city blocks is also functioning below par as are the newly identified industrial areas in the outskirts of the city. The new farm reforms proposed by the government of India may result in the obsolescence of

the present way of functioning of the APMC. The city on the other hand continues to grow with new residential extensions sprouting along the highways towards the West and South-West and in the North towards the North-East.

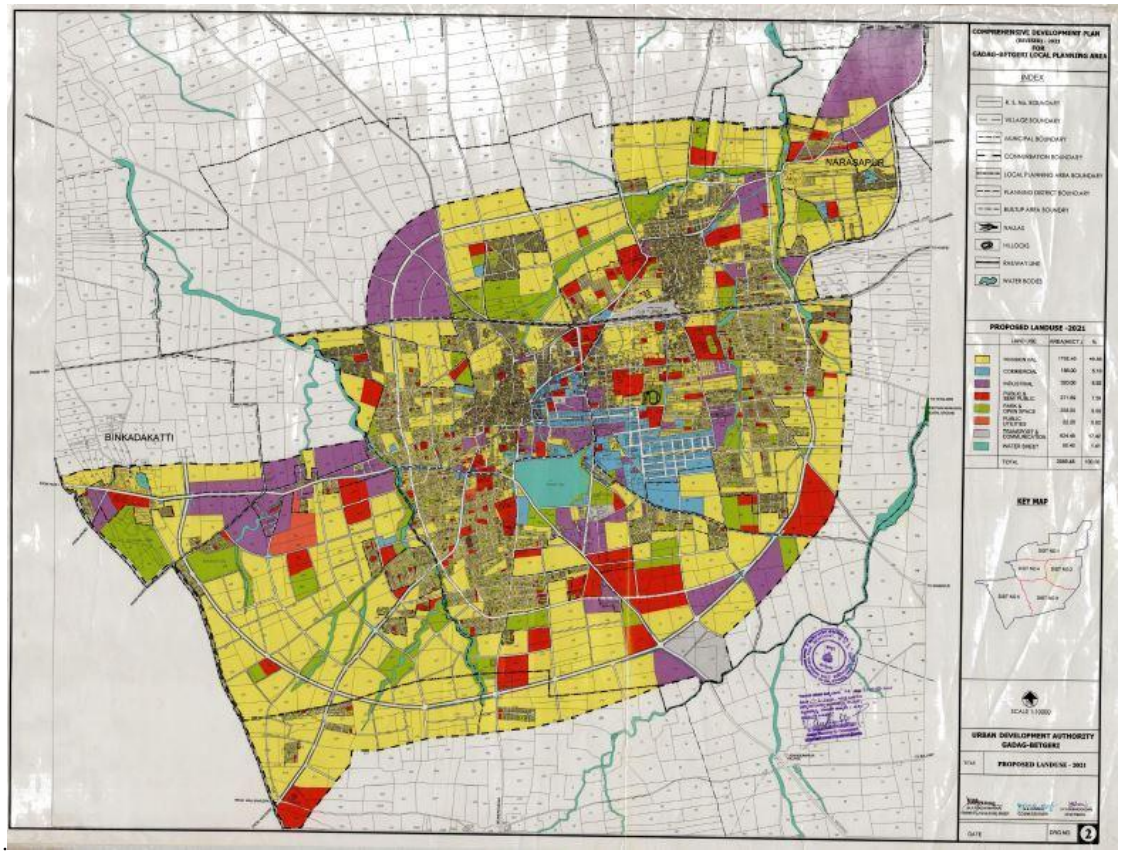

Figure 3. Comprehensive Development plan of Gadag-Betageri. Source: Department of Town and Country Planning, Gadag

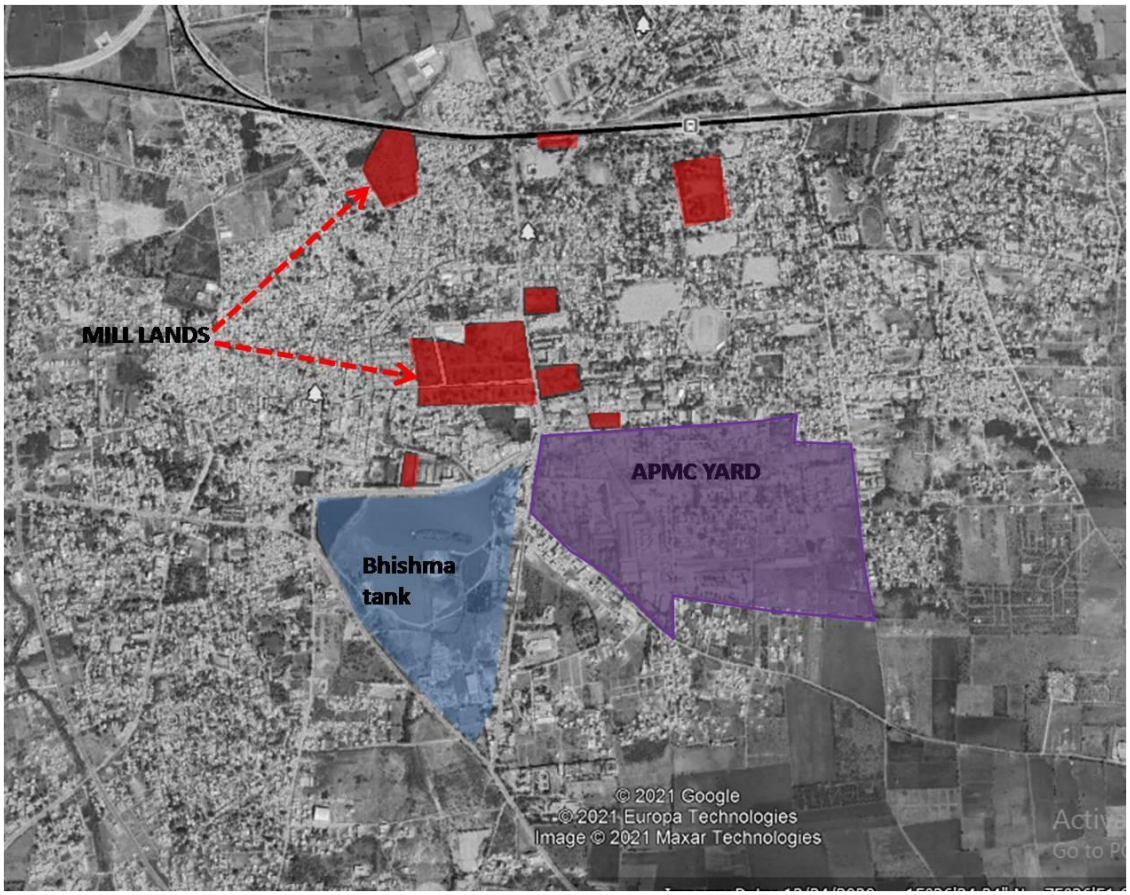

Figure 4. Map showing the APMC Yard and the Mill areas

While master plans are obvious requirements and give much needed direction and vision to the growth of the city as well as the allocation of funds the end result is not always right for the city in question. The Comprehensive Development Plan for Gadag 2021 divides the city into five planning districts and proposes a slew of infrastructural plans and zoning regulations for the city. The central core of the city falls under District 2 and 4 where in District 4 is the old city and District 2 has all the commercial areas including the APMC yard, while District 5 and 3 form the outlying residential areas. The key areas of focus as per the Comprehensive Development Plan are the population projections for the horizon year 2021, a comprehensive zoning of land use for the planning area together with zoning regulations, traffic circulation pattern for meeting immediate and future requirements, areas for new housing, new areas earmarked for future development and expansion and the stage by which the plan is to be carried out. The CDP which was formulated for a population projection of 15% increase based on the growth rate between 1991 and 2001 but there has been a decline in the growth rate from 2001 to 2011 to 11%. This means the expected land use projections as outlined in the CDP may not be required. Further the land use map identifies the existing mill areas and the other light industries in the central district 2 as industrial land use and the now reclaimed land from the squatters in the central district adjacent to the old bus stand as commercial land use. The proposed residential land use is relegated to the outer rings of the city with new industrial land use zoning also proposed at the far edges of the city in all quadrants. This archaic method of zoning the residential separately from the industrial and commercial land uses is resulting in unnecessary spread of the city. The CDP notes that 253.75 hectares of land is vacant within the developed area, which works out to 17.62 % of the total developed area and this could be available for residential development. Yet, it does not specify how this can be made possible. Mixed land use zoning is completely missing from the proposed land use. A new bus terminus is planned and is already partially operational towards the southeast of the Bhisma Tank. Although this caters to city bus service as well, this terminus is meant for intercity buses and is operated by the State road transport corporation. This is supposed to divest the existing main city bus terminus in the old city of intercity bus traffic and cater exclusively to intra-city bus traffic. Two ancillary bus stations at Betageri and the Pala Badami road complete the public traffic infrastructure for the city. These are highly inadequate to cater to the newer extensions of the city which have no other mode of transportation. The CDP does not propose any other means of public transport for the city. With respect to water, the main water source for Gadag is the Tungabhadra River at a distance of 54 kilometers downhill from the city. During the summer months when Tungabhadra has a reduced flow many parts of the city face water shortage. A proposal to increase the water pumped to Gadag Betageri from Tungabhadra by building a new higher capacity pipeline has been approved, which is meant to solve the water problems of the city. The CDP does not propose any alternative methods of augmenting water supply.

5. Discussion and strategies on how compact and sustainable planning principles can be integrated into urban planning in the context of small towns in Karnataka

Compact city models as discussed previously in the literature review have innumerable benefits and our historic cities were compact and revolved around the idea of people work and place as suggested by Geddes [after Munshi, 2000] whose argument that geography, economics and anthropology are closely related and essential to the understanding of cities was substantiated by his studies of cities in India. Hence it begs to be reiterated that the social, economic, and environmental aspects of the city are very important for the development of a city. In the backdrop of this our cities continue to reject the benefits of the existing historical planning tools and methodologies while choosing to adapt the global north approach of planning cities that do not resonate in the context of the cities of the global south. The climatic condition of Gadag that falls in the arid hot and dry belt of Northern Karnataka encourages a compact dense built development than a sparsely built spread out city. A similar model can be explored for future city development where the climatic conditions of the city, the lifestyle and the environmental impact of development needs to be assessed. Plotted developments that encourage single housing units are a model that has been eschewed of late as unsustainable. The colonial hangover of an idyllic bungalow like setting in the countryside is resulting in master plans that are unsustainable in the present context. In the context of Gadag Betageri the master plan fails to address how the defunct industrial spaces will be reutilized. The sustainable dimensions of the old city are its pedestrian scale, dense built form and compact arrangement. Comparing this with the dimension of compactness and sustainability as inferred from the literature reviews we can look at formulating strategies that would help in Gadag retaining its compactness and thus its inherent sustainability in the city structure.

5.1. Strategy 1: The land use dimension

Strategies to enable a compact city development must look at mixed-use zoning that will prevent sprawl and compact the development within the city limits. The proposed industrial park at the western end of the town on the Huballi highway which is functioning below par is a failure of the planning and zoning principles that are borrowed from metropolitan city planning. Cotton Mills and the other attendant industries associated with it can continue to work within the city center and need to be revived with a component of housing added to it. The Industrial park which is currently working below capacity at the city outskirts can house agro-related industries like medicinal herbs, food and fruit processing units, and so on. Cotton farming is on the wane due to the non-availability of labour at the harvest time, the seasonal labor that is required to pick the cotton has to be incentivized with the job and housing security. By realigning the land use of the industrial land in the core of the city, affordable housing can be made available for the migrants and the laborers. About 86 acres of land (Fig 4) is available in the core of the city that is either lying vacant or is housing defunct mills. Even a quarter of the land used for housing and related amenities could make a staggering difference to what the city can offer to attract and retain labour. The proposed master plan allocates a good portion of the land in the city center to commercial use. Mixed-use should be given priority over single-use at city centers so that these prime areas are equally accessible to all.

5.2. Strategy 2: Intensification of activities

In the Economy of Cities (Jacobs, 1961) Jane Jacobs talks about how cities grow and the reason for a few cities to continue to grow and thrive while a few perish. Jacobs gives the example of cities like Birmingham (Jacobs 1961, pp 87-89) having smaller businesses that support the bigger businesses and gradually developing their own competencies leading in turn to a new cycle of innovation that triggers further growth and diversification. Similarly, Bengaluru in Karnataka is a good example where the PSU's in the 80's encouraged higher education institutes in the city which in turn attracted MNC's to set up a base in the city due to the availability of a qualified workforce. This resulted in many homegrown software companies. The millennium turn saw the start-up culture taking off in a big way, again due to the presence of a highly motivated and qualified workforce. Thus the core strength of the city is being leveraged enabling growth and diversification while intensifying the core competencies. Identifying the existing and inherent strengths of Gadag-Betagiri, which include its cotton and handloom industry could diversify into cotton baling; thread making, cotton textile, and cottonseed oil industries. Oil press industries for cottonseed and sunflower seed and groundnut can be encouraged as small-scale industries. Gadag houses the APMC yard for the entire district; this asset is currently not optimized to the full extent. Infrastructure that can augment the APMC activities like rest houses and truck parking and driver resting facilities need to be bolstered. Training centers and skill up-gradation centers need to become a part of APMC yards. Strengthening and reviving existing capacities in agriculture, industry, and services would be a sustainable way of planning rather than bringing in a new typology of industries that may not be a good fit for the existing capacities.

5.3. Strategy 3: Urban Form

In her essay on urban informality Ananya Roy argues for a new epistemology of planning that raises three crucial issues about distributive justice, the object of development, and questioning of the best practice model. Roy's critique of the best practices model, termed as blueprint utopias are their inability to provide a more realistic sense of politics and conflicts (Roy, 2005, pp 156) The old mill areas of Gadag are being converted to residential use and this conversion is gradually leading to the displacement of the labor force that was formerly housed close to the mills, especially the DC mill and the old bus station road area. By applying the model planning blueprint, the master plan is proposing a cleanup drive that is already in motion which is relocating the informal settlements to the peripheral areas of the city. Thus the poor are relegated to the outskirts away from their source of livelihood and forced to depend on public transport for their travel while they once could sustain all their needs in a walkable radius. This injustice of spatiality as Edward Soja terms is as much a social evil as a spatial fact. Described as a socio-spatial dialect with social processes shaping spatiality at the same time sociality being shaped by it Soja calls for a new spatial consciousness that makes us aware of the geographies we live in, as these can intensify our experiences in all aspects of living (Soja, 2010, pp 18-19). The urban form and structure of the city cannot just be based on the visual sense and

be about the aesthetics as described by Jaques Rancier but has to take into consideration the quality of life for all its citizens in terms of livability, walkability, and other dimensions of sustainability. A compact urban form that ensures the poor and marginalized are not displaced or pushed out to the peripheries will not only continue the historical form of the city with the pedestrian scale retained but also fulfill the sustainability goals as well.

5.4. Strategy 4: Transport and urban structure

Sustainable city examples from Curitiba to Bogota, to the smart city initiatives by the Government of India all talk about an urban structure that revolves around an affordable, efficient and accessible transport system. A pedestrian friendly city that allows people to access all their immediate needs in a walkable radius is increasingly seen as the ideal blueprint for city development. Yet cities like Gadag are moving away from their original model of pedestrian scale planning to unsustainable sprawls. Cities do expand and grow, but this need not have to come at the expense of losing their inherent advantages. Strengthening the public transport reach and accessibility and planning clusters of development around it could be one way of ensuring spatial justice. The new bus stand located on the south eastern edge of the Bhisma tank suffers from poor connectivity from the rest of the city. More nodes of public transport, which can be multi modal to include the local favorite, the three wheeled auto rickshaw, need to be included in the master plan. A comprehensive walkability report that can link the various transport nodes to residential clusters is essential to develop a sustainable transport and connectivity plan. The urban structure should facilitate such a plan with pedestrian friendly neighborhoods and dense clusters of development that are connected through transport corridors.

5.5. Strategy 5: Climatic considerations

Climatic strategies could be explored in the following aspects. First in the architectural form; the old city of Gadag has narrow lanes which vary between 3 to 6 meters and a dense built form configuration that is typical of hot and dry climates in Karnataka. Thick walls with recessed narrow openings and a verandah or jagali in the front are typical architectural responses to the climatic conditions. The bigger residences have an inner courtyard with a passage or breezeway around it and the rooms opening off it. The verandah is another architectural element that is common in the older residences of the city. This is both a climatic and a cultural response of the built form. The verandah or jagali as its known colloquially acts as a transitory space between the public and the private, allows for social interaction without having to cross over one's property as well as offers a place of rest for travellers weary from the hot sun; a street thus lined with veranda's becomes a community space that is vibrant and cohesive. These house forms are slowly getting eroded with the introduction of plotted development. Plotted developments were introduced to India during colonial rule and have now become the norm in all master plans to accommodate residential development. Row housing and walk ups that adhere to the health and safety norms with the incorporation of climatic responses like verandahs and breezeways could be provided in the land now made available in the old city. The planning should distinctly earmark areas that are designated for plotted developments and those that are designated for high density housing. Second, with respect to water harvesting; old Gadag and its surrounding areas had tanks and step wells that would store and supply water to the settlement around. The average precipitation for Gadag-Betageri is 668 mm. This suggests that a harvesting system could be explored for the city. Third would be with respect to the green networks of the city, the terrain of Gadag-Betageri is fairly flat with adequate soil fertility levels as per the department of agriculture report, urban forestry could thus be explored in the reclaimed mill lands along with rain water harvesting. Clusters of green with water harvesting could be the nodes around which dense built up area could be planned. This would result in a master plan that is more contextual and climate responsive and thus more sustainable.

6. Conclusion

Space is a socially produced construct according to Henry Lefebvre. He talks of the perceived city that is lived by the people who occupy it and the conceived city as that which is conceived by the planners, urbanists, bureaucrats, and social scientists which is the dominant space and the dominated or the representational space that is the lived space which connects the perceived and the conceived spaces (Lefebvre, 1975). The Urban Revolution theory by Lefebvre

contends that nonurban life ceased to exist in a way that globalization was prevalent everywhere. Thus according to Lefebvre, the term urban takes on a new meaning where it is not just about a spatial aspect but about a way of life. The twentieth-century urban studies largely debated the categorization of the socio-spatial terrain based on a certain type of settlement units, be it the city, the metropolis, megacity, conurbation, and so on. This epistemological assumption was the base on which most of the urban theory was built upon. The dawn of the new century has brought with it a change in the way we look at urban and the associated epistemological frameworks in the wake of new spatial restructuring that is taking place all around us. New scholarly discourses are questioning these epistemological assumptions [Soja, 2010, see also Brenner and Schmidt, 2015, Roy 2005] and as per the United Nations World Urbanization Prospects 2018 report; more than 50% of the population will be residing in urban areas not just in India, but also the world by 2050. Urban settlements will thus increase throwing up challenges to house the increasing population and the accompanying amenities. More than a century ago, long before sustainability goals were raised and discussed, Patrick Geddes suggested that regional studies were important in order to understand the historical evolution of cities and stressed the need for ecological and sociological studies prior to any planning exercise. We need new epistemologies in the planning of cities in India that look at the smaller cities in the hinterlands with respect to the larger regions they are situated in and reimagine the way settlements are planned. Master plans are more than spatial plans as they foreground the spatial aspects of the city with the economic, infrastructure, and social aspects. But we may need to move away from viewing and planning for settlements that are geographically contained as cities or urban and rural and return to a more holistic way of planning that includes the natural ecosystems, the terrain and the landscape, and the inherent uniqueness of the place and do away with the rubberstamp approach of planning our cities. In this context, this study proposes a new template for the planning of smaller cities in the context of Karnataka and maybe across India. This study demonstrates how small towns and cities differ from large metropolitan cities and how small towns need to be read independently and not understood through the economic and social processes of the large towns. The arguments stated here also clarify a few key takeaways about the planning of small towns. First compact and sustainable planning principles were evident in the earlier morphologies of these settlements and new planning policies are moving away from this. Second, the horizontal linkages between these cities and their hinterland and the larger engagement with the national and global economy are autonomous and independent of the larger cities. These needs are strengthened further with the intensification of existing activities and policies to incentivize this. Third cities like Gadag are complex having banal everyday economic activities that are very settlement specific like the weaving and handloom industry of Betageri and the cotton mills and printing industry of Gadag which are linked to the natural and human resources that are available locally. Fourth private education and tourism and the related hospitality industry are the new employment generation activities that suggest a shift away from agrarian activities preferred by the next generation. The theoretical frameworks suggested here may help in a more complete understanding of cities like Gadag such that the planning exercises can be more specific to the town or city and its requirements as the existing generic planning methods have not proved fruitful.

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