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# New urban geographies of West Bengal, East India

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**ABSTRACT**
This article is part of a larger research project on new urban geographies in India. Between the population censuses of 2001 and 2011, India witnessed a record increase of 2,532 new Census Towns, small settlements that meet the country's criteria to be considered 'urban'. This steep increase is intricately linked with decreases in agricultural jobs, but we know very little about the spatiality of these urban geographies, alternative local employment, or the nature of the local economies of Census Towns. Based on a tailored geodatabase, our Main Map visualizes the geography of these heretofore uncharted Census Towns in the state of West Bengal. We then draw on reconnaissance fieldwork to zoom in on a cluster of Census Towns in central Bengal where we find evidence of urban growth that appears linked to road infrastructure, what we described in earlier conceptual work as "emergent highway urbanization". The Main Map and reconnaissance fieldwork contribute to a better, albeit early-stage, understanding of the rapidly changing spatiality of contemporary urbanization in this region.

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GIS; urbanization; emergent highway urbanization; Census Towns; geodatabase; West Bengal; India

## 1. Introduction

This article contributes to a better understanding of the rapidly changing spatiality of contemporary urbanization in India, with a geographical emphasis on the state of West Bengal, East India. It is part of a larger research project aimed at investigating new urban geographies that emerge far away from India's major cities, in areas that used to be predominantly rural. In the overall project we examine how and why this is happening, the economic drivers of these new urbanization trends and processes, and the socio-cultural changes that accompany these processes (Van Duijne, 2019; Van Duijne & Nijman, 2019).

Our contribution and focus in this article is threefold. First, we provide a high quality map and deep spatial reading of the West Bengal region, one that spatially examines these new urban geographies. Second, we present a more in-depth exploration of the local economy of one such geography in central Bengal. Third, we draw the attention of the Journal of Maps readers to a geodatabase that will be made publicly available through a trusted repository. This database will make an important contribution to guide further geographical research of this kind.[1]

In the latest Indian population census of 2011, India witnessed an unexpected increase in the number of so-called new Census Towns. These are small settlements that meet the strict statistical criteria of India's census agency to be labeled 'urban': they have a population of over 5,000; density of at least 400 people per square kilometer; and, importantly, more than 75% percent of the male working population is engaged in *non*-agrarian employment (Government of India, 2017a).[2] It is worthy of note that these settlements are not 'new' in the sense that they usually have long agrarian histories. These places can be considered as villages turning urban, as livelihoods transition away from agriculture.

Between the 1950s and 2000s, India witnessed the gradual emergence of a few hundred of these new urban settlements according to the census, but in population totals this did not amount to substantive urbanization (see Indian Census, 2011; Van Duijne & Nijman, 2019). However, in the period 2001–2011, a total of 2,532 new Census Towns suddenly emerged across the country's vast rural landscapes, an unprecedented and unexpected rise in the number of these small urban geographies (Pradhan, 2013). India's total urban population increased by 91 million people over that period and a third of this growth is attributed to Census Towns. It is a sea change from India's historical urbanization experience, which up until recently had predominantly been characterized by megacity growth (Chakraborty, 2017; Van Duijne, 2017).

Within India, there are vast regional differences in Census Town proliferation. One of the regions that

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show a steep increase in their numbers is East India, and specifically the state of West Bengal over 500 new Census Towns emerged throughout the state, accounting for most urban growth in the inter-census period.[3] In this article we examine the spatiality of these urban geographies through our Main Map, explore economic change that occurs in a cluster of Census Towns called Sujapur in Maldah district, and present our geodatabase on these geographies.

Besides this introduction, the article has three more sections, following the standard article structure of this journal. The next section provides a brief backdrop to the urbanization processes that we witness in agrarian parts of the country through a literature review. Section 3 elaborates on our study design and methods, and pays specific attention to how we systematically and carefully crafted our geodatabase of West Bengal. Section 4 presents our Main Map, main findings, the exploration of Sujapur, and sets out a research agenda for urgently required geographical research of this kind.

## 2. Background

Over the past 10–15 years, more than 40 million people have lost their agrarian jobs, close to 10,000 every day. This momentous outflow out of agricultural employment is well-documented by the Ministry of Agriculture (Government of India, 2016), the International Labour Origination (ILO, 2019), and independent research (e.g. Abraham, 2017; Mehrotra et al., 2014). In India, agriculture still employs the largest share of people, but there is a growing body of writing on agrarian distress, farmer's indebtedness, crop failure due to flooding or droughts, destitution and precarity among farmers, and rising rates of farmer's suicides (Government of India, 2016; Khasnabis, 2008; Niti Aayog, 2015; Patnaik, 2003; Pritchard & Thielemans, 2014; Sainath, 2011).

In India's post-independence urbanization experience, especially in the 1970s, rural dwellers who lost their farm-based livelihoods engaged in one-way, permanent rural-to-urban migration to Mumbai, Delhi, Kolkata or Chennai. Early urbanization in India was, therefore, mega-city centric. However, this has changed in recent times. A growing body of evidence shows that large cities since the 1990s have become increasingly "exclusionary", preventing opportunities for rural households to migrate to these places and settle there on a permanent basis (Kundu, 2014; Kundu & Saraswati, 2012). Research shows that these cities have become increasingly expensive, living space is hard to come by, gaining access to basic services is difficult, and there are few job opportunities to eke out a living (Bollard et al., 2013; Chandrasekhar, 2017; Heller et al., 2015; Kannan & Raveendran, 2009; Mukherji, 2011; Thomas, 2012; Turok & McGranahan, 2013). It has been suggested that these cities have an inbuilt 'screening system' which only picks up on 'people from relatively higher economic and social strata' (Kundu & Saraswati, 2012, p. 226), thereby denying a right to the city to the lower skilled rural migrant. Writing about East India, Datta (2016) found that permanent rural-to-urban migration, in which the entire household moves from the countryside to the city, is now relatively restrained.

Nonetheless, the push out of agricultural employment continues relentlessly, with millions losing or opting out of their traditional farm-based livelihood every year. Where do these ex agrarian workers go, and what is the nature of their new employment. Recent studies and economic survey data seem to suggest that rural populations now find alternative employment opportunities at shorter distances from their home village, in newly forming urban settlements that are located in what used to be predominantly agrarian zones (Datta et al., 2014; Denis et al., 2012; Gibson et al., 2017; Jodhka & Kumar, 2017; Mukhopadhyay et al., 2017; Pradhan, 2017). The recent rise in Census Towns, where employment is over 75% non-farm-based, is an expression of this latest trend.

Thus, employment in Census Towns has shifted gears toward secondary and tertiary economic sectors, but other than that we know very little about the workforce profile of these settlements. Millions of people are affected in their daily existence due to these sociospatial changes, and they have to adapt to a shifting context, but empirical studies on Census Towns remain scant.

Most of the existing literature on these geographies relies on secondary data, usually the census. In debates on urbanizing India it has therefore been suggested that these urbanization processes are highly overlooked, both in academic and policy circles, and remain poorly understood (Denis & Marius-Gnanou, 2011; Denis & Zérah, 2019; Denis et al., 2012; Onda et al., 2019; Van Duijne, 2019), with a few notable exceptions.

Using West Bengal as a case study, Guin and Das (2015a) find that agrarian distress is indeed key to an understanding of Census Town proliferation. The authors argue that for many households it has become increasingly problematic to rely on agriculture as a main livelihood strategy, and that especially small and marginal farmers – 85% of farmers in India today (Government of India, 2016, 2018b; Lowder et al., 2016) – are hit the hardest. They are forced to quit farming, and pushed to take on alternative livelihoods in the rural nonfarm economy (also see Khasnabis, 2008). However, as Guin (2016) argues, many of these small urban spaces have a weak economic base and generally lack industrial sectors of any significance, making it difficult for former agrarian laborers to find suitable alternative employment.

Other studies, most notably by Denis et al. (2012), and Denis and Zérah (2019), seem to underline the

autonomy, economic vitality and regional importance of Census Towns. In small scale qualitative studies on such settlements in the states of Bihar, Orissa, Jharkhand and West Bengal, Mukhopadhyay and Zérah (2015) find that the local economy in these settlements can feature diverse (albeit small) autonomous sectors such as retail, construction, health care, or education.

## 3. Design and methods

A key characteristic of the study design is our dual methodological approach to investigate Census Towns: a mixed-methods design that observes these new urban geographies from a macro and micro perspective. This approach relies on an advanced Geographical Information System (for a macro-state perspective) and on local reconnaissance fieldwork (for a micro perspective). Our GIS, which incorporates all settlements that have recently been reclassified from rural-to-urban, tells us where to look. Local reconnaissance fieldwork in a carefully selected field site is subsequently critical to an understanding of the urbanization processes that are taking shape on the ground.

The research is divided into three stages: a geodatabase building stage, a mapping and analysis stage, and a reconnaissance fieldwork stage. In the first stage, our main aim was to collect demographic and economic data as well as the geolocation of all 'urban' Census Towns of West Bengal. Through population enumeration data of the 2001 and 2011 Indian censuses, the census town directory, primary census abstract data tables, and West Bengal's nineteen district census handbooks, we tracked the anatomy of 252 Census Towns in 2001 and 780 in 2011 (Government of India, 2001, 2011a).

We systematically collected population size and population density data on all these Census Towns using the district census handbooks (filed in the census under 'Town Amenities'), and stored them in a database. The primary census tables also provided employment data, with which we calculated economic profiles for each of these settlements. The Indian census makes a distinction between four types of employment: cultivator (people engaged in cultivation of their own lands); agricultural laborer (wage laborers working on another person's land); household industry worker (people working at nonfarm firms operated from home); and 'other worker' (workers other than cultivators, agricultural laborers, or those employed in the household industry). This latter group includes a wide range of nonfarm workers from teachers and governmental officials, to hawkers, construction workers, factory workers, or those working in small-scale production, crafts, retail, healthcare, hospitality and tourism, trade and repair (although the census groups all these under the category 'other workers'). Following census metadata, the non-agricultural economic profile for each Census Town was calculated by adding up all 'household industry workers' and 'other workers', divided by the total number of workers per settlement (Government of India, 2017a). The result is a unique database that includes the demographic and economic profiles of *each* old (2001) and new (2011) Census Town in West Bengal.

The last step in the database building stage is to pinpoint the location of all these settlements. Researchers from the France-based *Centre national de la recherche scientifique* (CNRS) provided us with a digital boundary file that includes the boundaries of all of West Bengal's administrative settlements (polygons for all villages and towns, see Denis & Marius-Gnanou, 2011). This boundary file includes a total of 41,000 units, which can subsequently be matched with the census through a unique six-digit settlement identifier, denoted in the census as 'Town/Village Code'. Using this identifier, we joined the Census Towns database with the corresponding boundaries of the correct census unit.

In the second stage of the research, we geolocated all Census Towns using the ArcGIS software (version 10.6). Because we used data from the Indian censuses of 2001 and 2011, we could distinguish between settlements that were already classified as Census Towns back in 2001 (indicated on the Main Map as 'Existing Census Town 2001') and those Census Towns that complied with all three 'urban' criteria for the first time in 2011 (indicated on the Main Map as 'New Census Town 2011'). Centroids were displayed in each polygon corresponding to one Census Town, creating an overview of their spatial patterning across West Bengal.

We extended our geodatabase by including all existing large, medium and small cities (i.e. established cities other than Census Towns, these are denoted in the Indian census as 'Statutory Towns') (Government of India, 2017a). Using high resolution satellite imagery basemaps from DigitalGlobe 2017, we also digitized built-up area of Kolkata agglomeration. Finally, we digitized West Bengal's highways using road maps from the National Highways Authority of India (Government of India, 2019). To improve cartographic quality, highways were smoothed out by creating Bezier curves to match the original input lines (Fitter et al., 2014). We used the Bezier interpolation smoothing algorithm without smoothing tolerance, and made sure no topological errors occurred after the smoothing operation. Overall, this geodatabase provides an overview of the state's urban system, the spatial patterning and trends in Census Town emergence, a spatial understanding of the relationship between established cities and existing and new Census Towns, and the role of road infrastructure in the occurrence of Census Towns.

In the third stage of the research, the focus shifted from geodatabase building, map making and analysis to fieldwork. The purpose of fieldwork was to take the pulse of some of these Census Towns, to be able to interpret and get a better understanding of what

was happening on the ground in these settlements. During fieldwork, our focus was on the changing economic geography of these places: on the kinds of firms found here, on employment opportunities, and the nature of the local economy.

We conducted reconnaissance work in Maldah district, along National Highway 12, just north of where the state is at its narrowest point. In this remote area of West Bengal, our geodatabase picked up the emergence of a substantial cluster of new Census Towns. This urban cluster consists of five amalgamating CTs and three villages: Chhota Sujapur CT, Bara Sujapur CT, Chaspara CT, Nazipur CT, Bamangram CT, Bakharpur, Gayesbari and Masimpur.[4] In the remainder of the article, we will refer to this cluster of settlements as 'Sujapur', since this is how the area is known locally. We conducted reconnaissance fieldwork in April 2019. The bulk of our data gathering efforts focused on the central areas of the Sujapur cluster (Chhota Sujapur CT and Bara Sujapur CT), where almost all economic activity is concentrated. Reconnaissance mainly consisted of gathering observational data (field notes, photos, videos), and conducting conversations with workers and (small) firm owners.

## 4. Results and conclusions

### 4.1. Macro perspective: reading the map

The emergence of new Census Towns accounted for almost 70% of West Bengal's urban growth in the 2001–2011 period, and the state's total Census Town count added up to 780. Figure 1 shows a frequency distribution of the population sizes of these settlements. Most Census Towns have an official population of around 10,000 people. Very few – just 16 in total – have populations over 30,000 people. However, the Main Map (Figure 2) shows that some of these Census Towns spatially amalgamate, creating urbanizing clusters that are much bigger than the census implies. This clustering goes unseen because the counting of populations stops at the fixed administrative boundary of each distinct settlement (Van Duijne, 2019).

Another spatial observation is that the majority (66%) of new Census Towns emerged within a 10 km radius of existing Census Towns. It seems that these urban geographies have a critical node function in certain rural regions, and set in motion an ongoing process of urban expansion, propelled by employment shifts away from farming. Statutory Towns (i.e. the more established cities) also appear to play a key role in Census Town emergence. Many Census Towns materialize in close vicinity to established cities, creating some form of suburban/peri-urban Census Town growth (Guin & Das, 2015b; Van Duijne & Nijman, 2019). Yet, as mentioned before, there remains a paucity of studies on the relationship between Census Towns and Statutory Towns. We can hypothesize that in terms of nonfarm livelihoods, many residents of the new urban spaces make a daily commute to bigger cities in their vicinity. The implication of this hypothesis is that the shift toward nonfarm work in some Census Towns is not taking place locally, but that new 'urban' livelihoods are in fact found somewhere else.

Over 50% of Census Towns emerged within a 50 km radius of Kolkata; the districts of Haora, Hugli and South 24-Parganas (marked on the Main Map) all show rapid Census Town growth. This growth is likely due to the prompt expansion of unorganized and informal manufacturing activities around Kolkata agglomeration. Studies have shown that large numbers of

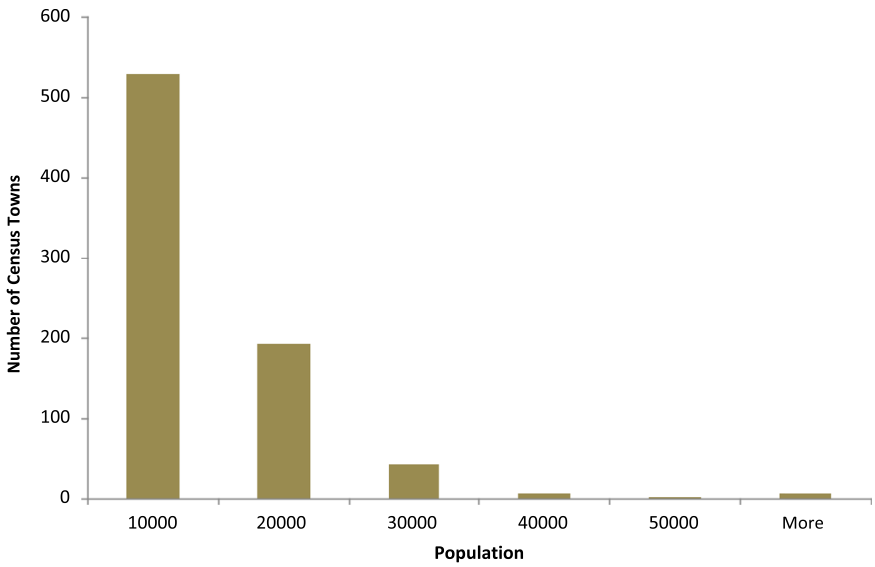


**Figure 1.** Frequency distribution of population size of the Census Towns of West Bengal. Source: Indian census, 2011; calculations by authors.

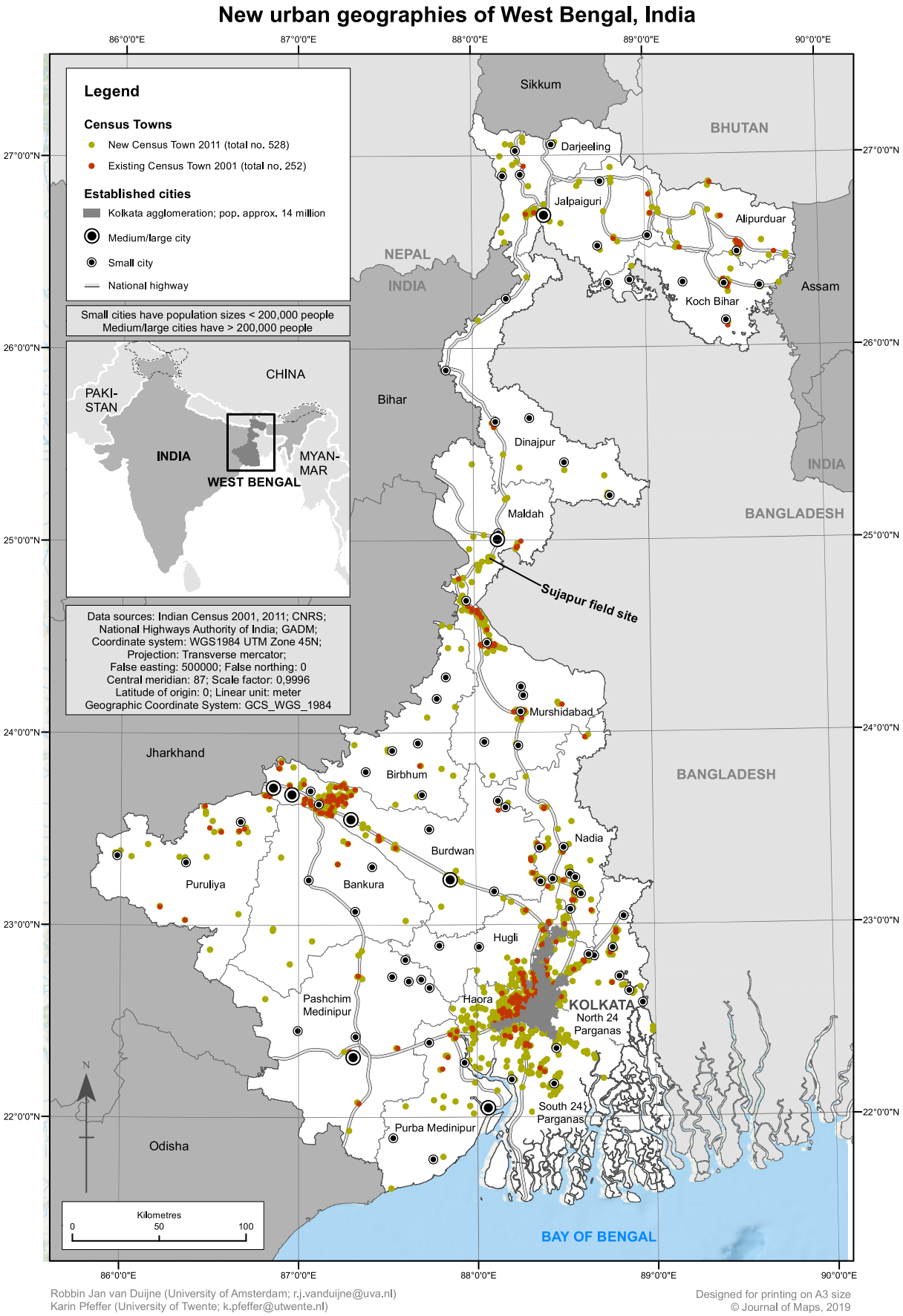


**Figure 2.** Main Map, new urban geographies of West Bengal, East India.

small firms now provide nonfarm employment opportunities in hitherto agrarian areas around the megacity (Chattaraj, 2015; Khasnabis, 2008; Sarkar, 2006).

A total of 365 Census Towns (47%) emerged at a distance of at least 50 km from Kolkata. It is worth noting that even the most rural northern districts of West

Bengal – Maldah, Dinajpur, Darjeeling, Jalpaiguri, Koch Bihar and Alipurduar – show 85 new Census Towns. This type of urban growth in remote rural regions of the state, and the accompanied livelihood changes away from farming, demands attention. These districts are known to be highly flood and drought prone (e.g. Bhattacharya, 2016; Economic Times, 2016a, 2016b, 2017; Ghosh, 2016), leading to frequent crop failure and pressure on already precarious livelihoods and living conditions. Half of these districts receive funds from India's national emergency Backward Regions Grant Fund (BRGF) (Government of India, 2011b).

A final spatial observation, and one particularly pertinent to the rest of this paper, is that infrastructure corridors appear to play a key role in Census Town emergence, with 118 of these geographies located within 3 km of a national highway. Illustrative is the string of new Census Towns that sprung up in the middle of the Main Map, creating what has been coined "emergent highway urbanization" (Balakrishnan, 2013; Van Duijne & Nijman, 2019). This type of urbanization is likely to take on a more significant hue in the following years with India's plans to build an additional 84,000 km of highway under the *Bharatmala Pariyojana Scheme* (Government of India, 2017b, 2018a; Sood, 2018; Sural, 2018).

### 4.2. Micro perspective: economic geography of Sujapur

Our reconnaissance field site Sujapur is located approximately 330 km north of Kolkata, in the remote district of Maldah, central West Bengal. In 2011, a total of 24 Census Towns emerged in this overwhelmingly rural district (in 2001 there were just three Census Towns in Maldah, see Main Map). Sujapur is an interesting cluster because eight settlements have spatially amalgamated – five Census Towns and three villages – creating a much larger urban formation than the census initially detects. Figure 3 is extracted from our geodatabase and shows this spatial formation: built environment (displayed in greyish hue) is contiguous across the yellow administrative boundary lines.

Table 1 provides an overview of relevant demographic and socioeconomic characteristics of the eight settlements that make up the Sujapur cluster. The cluster has a combined population of around 90,000 people, and analysis of its economic profile shows that the percentage of workers engaged in nonfarm work is at 84%. Average population densities reach over 8,000 people per square kilometer, twenty times higher than the statistical threshold of 400 to be considered 'urban'. These demographics of the Sujapur cluster indicate that

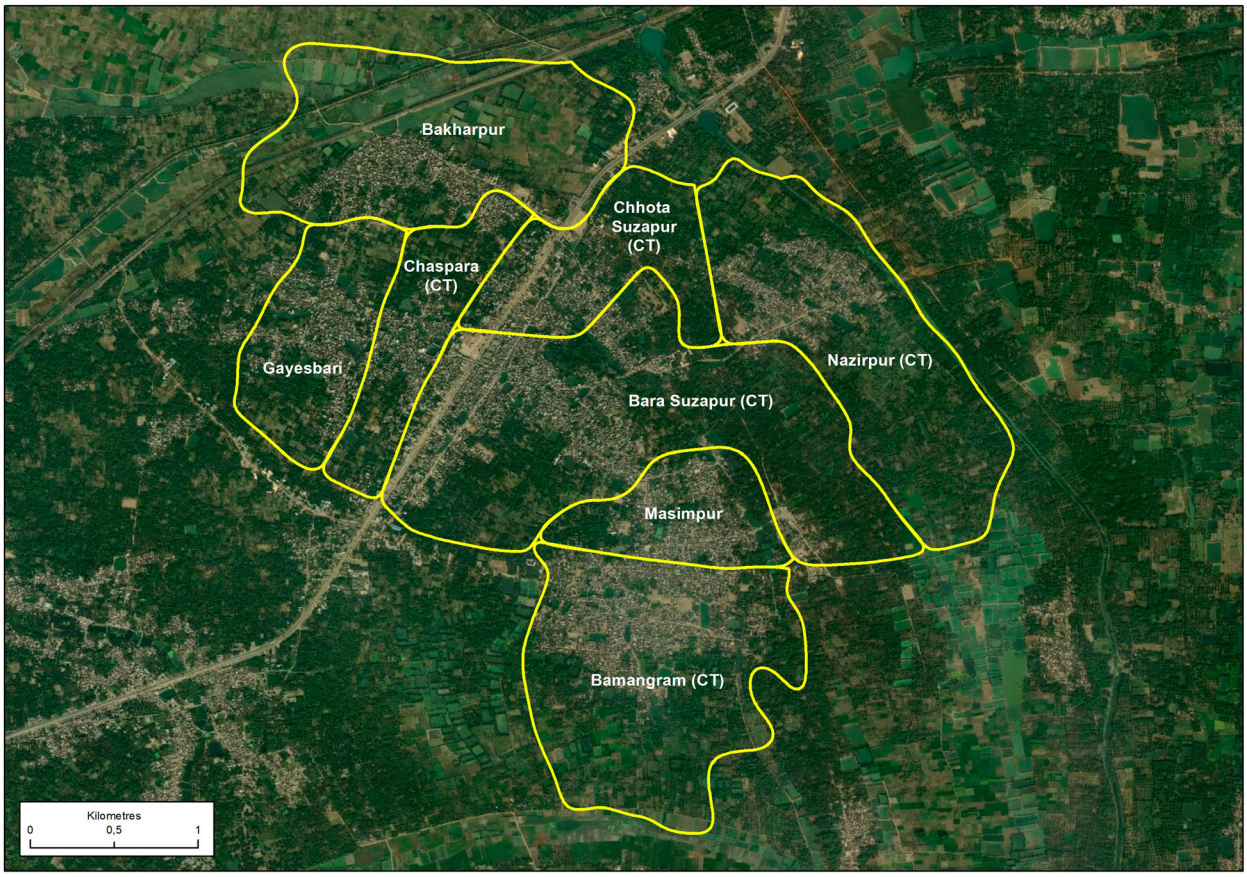


**Figure 3.** Map of reconnaissance field site Sujapur. Yellow lines indicate administrative boundaries, built environment is displayed in greyish hue, and National Highway 12 zigzags through the area. Source: Copernicus Open Access Hub (n.d.); Indian census, 2011.

**Table 1.** Selected characteristics of the eight settlements that make up the Sujapur cluster.

| | | Chaspara (CT) | Chhota Suzapur (CT) | Bara Suzapur (CT) | Nazirpur (CT) | Bamangram (CT) | Bakharpur | Gayesbari | Masimpur | Total/ Avg. |
|---|---|---|---|---|---|---|---|---|---|---|
| Demographics | Population | 7.731 | 11.216 | 15.808 | 8.778 | 13.550 | 12.148 | 9.745 | 9.279 | 88.255 |
| | Households | 1.665 | 2.290 | 3.306 | 1.744 | 3.004 | 2.610 | 2.026 | 2.024 | 18.669 |
| | Avg. household size | 4,6 | 4,9 | 4,8 | 5,0 | 4,5 | 4,7 | 4,8 | 4,6 | 4,7 |
| | Area in km2 | 0,68 | 0,91 | 2,40 | 1,96 | 1,90 | 1,70 | 0,77 | 0,53 | 10,85 |
| | Population density (ppl/sq km) | 11.401 | 12.391 | 6.577 | 4.471 | 7.126 | 7.146 | 12.656 | 17.508 | 8.133 |
| | Male nonfarm work (%) | 90,6 | 91,0 | 89,1 | 78,8 | 76,2 | 86,7 | 88,2 | 69,0 | 83,7 |
| Quality of the home | % of households with mud flooring | 59,3 | 61,7 | 58,4 | 81,2 | 80,7 | 73,3 | 74,4 | 68,4 | 69,7 |
| | % of households with concrete roofing | 39,5 | 44,9 | 37,8 | 23,3 | 24,3 | 36,1 | 28,7 | 26,7 | 32,7 |
| | % of households with mud walls | 7,2 | 9,8 | 6,7 | 23,3 | 17,7 | 11,1 | 10,6 | 10,2 | 12,1 |
| | % of homes with one room | 48,7 | 40,6 | 40 | 42,1 | 48 | 46,4 | 47,5 | 37,5 | 43,9 |
| | % of homes with electricity | 76,5 | 79,4 | 80,9 | 65,2 | 50,8 | 59,9 | 62,9 | 71,6 | 68,4 |
| | % of households with toilet facilities inside the home | 71,5 | 80 | 70,5 | 59 | 56 | 60,5 | 57 | 77,2 | 66,5 |
| | % of households with drinking water inside the home | 77,4 | 67,5 | 56,1 | 68,5 | 61,3 | 64 | 60,2 | 63,8 | 64,9 |
| | % of households using crop residue as main fuel for cooking | 30,7 | 20,2 | 5,4 | 26,4 | 26,7 | 35,5 | 16,5 | 13,2 | 21,8 |
| Assets | % of households with a television | 24,1 | 26,5 | 31,6 | 15,5 | 11,5 | 17,3 | 19,2 | 21,1 | 20,9 |
| | % of households with a mobile phone | 45,2 | 50,5 | 50,6 | 39,7 | 35,6 | 32,1 | 34,1 | 49,5 | 42,2 |
| | % of households with a car | 1,5 | 0,8 | 0,9 | 0,6 | 0,2 | 0,3 | 0,5 | 0,3 | 0,6 |
| | % of households with a motor/scooter/moped | 4,5 | 4,3 | 4,5 | 4 | 2,4 | 2,6 | 3,6 | 5,6 | 3,9 |
| | % of households with a bicycle | 43,3 | 54,4 | 44,2 | 57,7 | 32,4 | 51,3 | 44,6 | 57,8 | 48,2 |
| | % of households with access to formal banking services | 18,3 | 31 | 34,9 | 19,7 | 11,5 | 15,1 | 14,7 | 25,1 | 21,3 |

Source: Indian census, 2011.

some kind of urbanization is taking shape here (i.e. population size and growth, densification, changes in occupational structures away from agriculture, clustering of built environments). However, the table also shows that this urbanization does not lead to a swift upgrading of the built environment, which raises continued concerns about general levels of wellbeing and precarity. A majority of households lives in dwellings that have mud flooring (in certain parts of the cluster up to 80% of households), and most of the dwellings have a thatched roof (associated with so called *kutcha* housing, which is generally of lower quality compared to more formal *pucca* housing). More than 30% of the homes in the cluster lack electricity, and 35% of households do not have latrine facilities inside the home. Furthermore, the average household size in the cluster is 4.7 people, but over 40% of the homes have just one room. In terms of assets, it becomes clear that very few households own a motor or scooter (less than 4%), and even fewer own a car (less than 1%). Finally, just one in five households in the cluster have access to formal banking services, which again raises concerns that these sociospatial transformations do not lead to a fast formalization of the local economy. Yet, it must be noted that the Sujapur cluster does substantially better on most of these indicators when compared to areas classified as 'rural' within the district of Maldah, or, more generally, when compared to 'rural' classified areas within the state of West Bengal (Indian Census, 2011).

During reconnaissance, we found that the economic geography of Sujapur centers on an informal plastic waste recycling industry. Piles and piles of plastic waste could be observed in the streets and along the highway: plastic water bottles, bottle caps, pipes, toys, plastic car parts, shampoo bottles, used oil bottles, door handles, old plastic tables and chairs, etc. (Photos 1 and 2). These plastics are color sorted, cleaned and processed by over 100 small and medium-sized waste processing firms that are located here (Photos 3 and 4). An estimated 20% of Sujapur's working population is engaged in one way or another in this recycling industry,[5] and the cluster is backed by a government scheme for micro, small and medium-sized enterprises (known as MSME) through tax benefits and other favorable economic incentives (Government of West Bengal, 2019). Workers in Sujapur's recycling industry are predominantly daily wage laborers; it is casual work,

**Photos 1–4.** Clockwise from top left: (1) Sujapur's economic geography centers on an informal plastic waste recycling industry. (2) Piles of plastic waste can be observed along the highway and in the streets of the cluster. These plastics are sorted, cleaned and recycled. (3) Workers color sorting junk plastics. (4) Worker at a small waste processing firm, operating a machine to crush sorted plastic water bottles into compressed bundles (Photos by authors).

precarious in terms of job security and income (workers reported daily wages of around Rs. 180, or 2.5 USD). These findings are in line with the socioeconomic characteristics of Sujapur presented in Table One.

In our conversations with owners, it became clear that Sujapur is well-connected, both with its hinterlands and with faraway places. Plastic waste is both regionally collected from across the state of West Bengal as well as from other Indian states such as Odisha in the south. Interestingly, Sujapur's recycling firms reported to also receive plastic waste from the remote seven northeastern Indian states – Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland and Tripura – hundreds of kilometers away from Sujapur. National Highway 12 plays a key role in the development of the cluster, giving further credibility to conceptual notions of "emergent highway urbanization" (Photo 5). Depending on the type of waste, some of the sorted and cleaned junk plastics go to Delhi or Kolkata, but most of it goes to a factory in Umarpur in Murshidabad district, 70 kilometers south of Sujapur (Photos 6 and 7), where the sorted plastic is shredded, melted and processed into new plastic materials, like the buckets found in many shops in and around the Maldah region (Photo 8).

Besides work in the recycling industry, the people of Sujapur have also built livelihoods in a variety of other ways. Many have set up own-account, small firms that service not just the Sujapur cluster, but also the villages and settlements much further away. Due to its connectivity, the cluster now harbors a substantial retail sector: a type of bazaar economy with shoe stores, small bookstalls, mobile phone shops, jewelers, garment shops (sari's, t-shirts, wedding dresses), fruit stalls, shops for electronics, bidi stalls, beauty parlors, bicycle and medical stores, etc. Other livelihoods found in the cluster center on (private) education, study centers, wood work / crafts, hawking, or construction work.

### 4.3. Concluding remarks

The Sujapur cluster along National Highway 12 is just one case of a new urban geography that emerged in rural West Bengal, and one where we have evidence that some kind of urbanization is taking shape: increased population size, higher densities, livelihood and

**Photos 5–8.** Clockwise from top left: (5) A stream of lorries on National Highway 12 near Sujapur. The highway is essential in the supply of plastic waste from all over the region. (6) These cleaned and sorted plastics will go either to Delhi or Kolkata, or to a factory in Umarpur, 70 km south of Sujapur for further processing. (7) One of the owners of a plastic waste recycling unit at Sujapur. In the background, a pile of color-sorted plastics. (8) New buckets made out of recycled plastics as found in many shops all over the region (Photos by authors).

employment shifts away from farm work and toward secondary and tertiary sectors. However, in general we know very little about this type of urbanization and there remains a paucity of empirical studies on this topic. Research and policy making still tend to focus on the bigger cities and often overlook smaller urbanizing environs (Bell & Jayne, 2009). In addition, most of these Census Towns are hard to reach and provide challenging environments for fieldwork. The urbanization of Sujapur signals a clear shift away from farm work, in this case mainly driven by the development of road infrastructure, but it remains unclear how sustainable new 'urban' lives and livelihoods are in this area, or whether the urbanization process delivers in terms of higher levels of wellbeing (see Glaeser, 2012). This type of small scale urbanization of hitherto rural settlements also raises many more questions on other economic and social features traditionally associated with urbanization: changing gender relations, access to basic services, social and spatial mobility, changes in communal identity (from village life to city life), questions of caste, etc. As a substantial part of Indian urbanization is shaping up in rural areas, far beyond the big cities, new urban geographies like Sujapur warrant much more attention. The Main Map presented in this article, and our geodatabase can be used to guide further field research and investigation of this kind.

## Software

ESRI's ArcGIS 10.6 was used to compile a geodatabase in GIS format, map the emergence of new Census Towns, and design the Main Map.

## Geolocation information

West Bengal (coordinates: N 22.34; E 88.22), in East India, borders Bangladesh to the east, Nepal and the Kingdom of Bhutan to the north and the Indian states of Odisha (what used to be Orissa), Jharkhand, Bihar, Sikkim and Assam. West Bengal stretches out from the Himalayas in the north, to the Rarh region, the Ganges delta and the coastal Sundarbans in the south. The state has an estimated total population of

91 million, and measures 88,000 square kilometers in size. Bengal's level of urbanization stands at 32%, but its urban system is highly uneven with just one major urban agglomeration, Kolkata, that accounts for approximately 14 million of the state's urban inhabitants. Annual incomes (measured in GDP per capita) are in line with the national average (around Rs. 1,08,000 [1,500 USD]), but there are vast income differences between Bengal's districts and poverty is still widespread. Most remote rural districts in the north – Dakshin Dinajpur, Uttar Dinajpur, Maldah, Jalpaiguri, Alipurduar and Koch Bihar – are on India's national list of severely disadvantaged regions, and received support from the Backward Regions Grant Fund. This support is highly needed as many still depend on agricultural work as their main livelihoods, but increasingly erratic weather patterns lead to frequent crop failure, and push these households into destitution.

## Notes

1. The geospatial data will be made available through a trusted repository at the end of this project. Readers interested in these data can contact the corresponding author.
2. We are keenly aware that India's urban definition and its seemingly arbitrary thresholds (5,000, 400 and 75) is a simplistic representation of what constitutes 'the urban' or urbanization. The subsequent action of labeling settlements as either 'rural' or 'urban' based on these thresholds is in and of itself not particularly interesting to studies of urbanization, and such urban definitions have been critiqued for a long time (e.g. Brenner & Schmid, 2015). However, what we are much more interested in is urbanization as a process, and to investigate the nature of that process. What the Indian census is handing us with this definition, which has been uniformly and consistently applied across the country since the census of 1961, is a major process of social reorganization happening in India's countryside. These processes of sociospatial change are intricately linked with the monumental decreases in agricultural employment and the forging of new, alternative livelihoods in areas that used to be agrarian, as thousands of settlements cross the 75% non-agricultural workforce profile criterion.
3. The emergence of new Census Towns accounted for almost 70% of West Bengal's total urban growth in the 2001–2011 period, while the growth of existing cities accounted for the remaining 30% of growth.
4. The three villages that are also morphologically connected to the Sujapur cluster (Bakharpur, Gayesbari and Masimpur) all have a very high percentage of male nonfarm work (87, 88 and 69% respectively). Due to their high nonfarm economic profiles, and contiguous built-up area with the Sujapur cluster, these villages are included in the total population count of the cluster even though they did not (yet) have Census Town status in the 2011 Indian census.
5. This is an estimate, derived from two sources, with different time stamps. For the Sujapur plastic waste recycling industry, the employment figures as noted in the 'Activity wise cluster in West Bengal' (Government of West Bengal, 2019) is estimated to be around 3,000 (see entry 114 on http://msmetfc.in/cluster-activity/). In the Indian census of 2011, the combined main male working population for Chaspara, Chhota Suzapur, Bara Suzapur, Nazipur, Bamangram, Gayesbari and Bakharpur is around 17,000. This puts the percentage of main workers that is engaged in one way or another in the plastic waste recycling industry between 15 and 20%. This estimate is also based on the assumption that most of the 3,000 workers live in the cluster.

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