



Research paper

Urban Problems of Kohima, Dimapur, and Mokokchung Towns of Nagaland, India

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Abstract: Urbanization brings along several impacts by touching the realms of every aspect of human settlement. It affects both the rural and urban livelihood by creating an interrelationship. The development of a particular town or a city cannot be accomplished without economy, education, science and technology, communication, transportation etc. These are the basic necessities for the growth of any particular urban area. Hence, while carrying out and implementing all these developmental activities and advancements, and giving it as prime importance, hindrances begin to arise all due to the careless negligence of the consequences ahead which is being brought about during the process of development. This hindrance all together accumulates and creates into a heap of problems leading to the emergence of negative impacts. An attempt has been made in order to carry out a comparative study and understand the people's perception and satisfaction of the prevailing urban problems of three towns in the state of Nagaland namely; Kohima town, Dimapur town and Mokokchung town. This study was carried out by applying both primary and secondary data collection. The

primary data was collected by setting up questionnaire using google forms. Likert scale was applied for the scores and for analysis Cronbach's alpha was applied for the reliability test using SPSS. The Cronbach's alpha of reliability analysis of internal consistency for the Perception on Air Pollution (PAP) of all the three towns revealed that the questionnaire for Mokokchung town reached the highest acceptable reliability of, $\alpha = 0.823$ as compared to Kohima and Dimapur town. In the case of Perception on Water Pollution (PWP), Dimapur town reached the highest acceptable reliability with $\alpha = 0.753$, while the Satisfaction on Traffic, Drainage and Waste Management (STDWM) revealed that Mokokchung town again reached the highest acceptable reliability with $\alpha = 0.740$.

Keywords: Air and water pollution; Dimapur; Kohima; Mokokchung; Perception; Satisfaction; Urban problems.

Introduction:

Urban spread has witnessed several unforeseen situations like excessive population pressure associated with

unplanned economic development, industrialisation and vehicular emissions which are mainly responsible for the unwarranted urban pollution which in many places has assumed serious dimension. Urban problems are rising up in various forms in almost every urban centre today, and though many steps have been taken up in order to meet the urgent requirements, more problems are yet left behind. Keeping this in view, this paper is an attempt primarily focused on the existing urban problems in the three selected urban towns in Nagaland namely; Kohima town, Dimapur town and Mokokchung town, wherein, the existing urban problems are being addressed and considered for further urban planning implementation. Scholars and researchers from all over the world have started giving importance on the problems and issues brought about by urbanization.

The cities in India according to Nath (2007) experiences an alarming rate of housing shortages, environmental pollution, water and power shortages, crowded inefficient transport networks, food insecurity which makes the rural and urban ecosystems at high cost. Bhattacharya (2006) made a clear statement that consolidation of British Power in India created a better atmosphere for urban functions but not necessarily for a greater urban development, this is so, because he further mentioned that according to the available earlier estimates of cities it provides instances of both development and degradation. Urbanisation and industrialisation, the twin necessary evils, go hand in hand with economic growth and development to provide goods and services, but often produce in large quantity the substances which pollute the land, water and air so much so that they have become synonyms to pollution. Due to increasing number of employment opportunities, unhygienic conditions have been created Vishwakarma and Shukla (2011).

Urbanization means phenomenal increase in the human population concentration in limited space which results to increase of buildings, roads and streets, sewage and storm drains, pucca surface area, vehicle population, number of factories, urban wastes, aerosols, smokes and dusts, sewage etc which causes environmental problems such as air and water pollution and garbage hazard Singh (2008). Sadashivam and Tabassu (2016) stated that the process of urbanization comes with a number of problems due to unmanageable population growth in urban areas with special reference to provision of basic service and facilities. Population growth becomes difficult to control when there exist urbanization in any urban area. Meanwhile, Sandhu (1996) rightly reaffirms that the phenomenon of urbanization has arrived to a point where the positive impacts has been overshadowed by the alarming growth of negative impacts which is evident due to the vast deterioration of the physical environment and quality of life in urban areas such as; air pollution, water pollution, noise pollution, traffic problems, scarcity of housing, slums, drainage and sewerage facility etc. Similarly, Uttara *et.al.*(2012) remarks that due to the lack of absence of control over urbanization, it has led to the rapid increase of environmental degradation causing problems such as land insecurity, worsening water quality, waste disposal, air and noise pollution. It was further mentioned that in order to bring about solutions and measures, it is important to examine problems through the social-economic-cultural system. Also, Prasanna (2017) in her study on the problems of urbanization – A sociological study, highlighted seven crucial urban problems namely; (i) housing and slums, (ii) crowding and depersonalization, (iii) water supply and drainage, (iv) transportation and traffic, (v) power shortage, (vi) sanitation and (vii) pollution. It was further stated that the main causes of all these highlighted

urban problems were mainly due to migration, industrial growth, apathy of the government, defective town planning and vested-interest forces. On the other hand, Patel and Paneria (2021) noted that uncontrolled urbanization and haphazard development enabled the development of slums, environmental degradation, air and noise pollution, insufficiency in public utilities and as well as problems relating to waste disposal.

Bhargava (2001) points out that due to the growth of alarming population concentration in few big urban centres in India the environmental problems such as industrialization, traffic and transportation bottlenecks, slum and squatter settlements and acute shortage of housing, medical and educational facilities has risen drastically. Mohanty (1993) listed the effects of urban explosion such as the teeming slums, shanty habitats mushrooming, shocking malnutrition which is a consequence of urban poverty syndrome, the basic poverty continuum demonstrates in low incomes, inadequate nutrition level and basic services, limited or no education and low skills, the environmental poverty continuum manifesting in inadequate services and housing or the inability to pay for them, overcrowding, pollution, exposure to disease and low productivity, the psychological dimensions such as insecurity, stress, depression, deviant social behaviour, lack of ambition or aspirations, lack of opportunity to demonstrate one's productivity and the consequent inability to ensure family security. According to Okmen and Bastan (2011) industrialization and urbanization is one of the most important factors of ecological deterioration threatening the common future of the world on a global basis mainly due to the rapid acceleration of its growth since the beginning of second half of the twentieth century. Nadarajah and Yamamoto (2007) in their description on urbanization and city formation cleverly cited Ernest

Callenbach's argument on the rules of market driven society, that: on waste - goods are cheap and disposable; on costs - trust the market, everything has its monetary price; on population - go forth and multiply; on energy - always do the cheapest thing, no matter what the consequences; on happiness - focus on accumulating material possessions; on relationships with other species - only humans matter; and on the future - let the future worry about the future. According to them these were the guiding rules that has bind the people's behaviour today that has created a number of problems as far as urbanization is concerned. Gupta (2006) clearly identifies the impacts of urbanization by pointing out that urbanization usually brings along regional, economic, cultural, political and social deprivation such as the urban slums which gives out a negative impact as they have not reaped the rewards of urbanization and regional development. Bose (1976) notifies that the problems of urban development are no more viewed in the narrow context of rural-urban dichotomy today but rather in the broader framework of human environment and human settlement. Chakraborty *et.al*, (2013) stated that disposing of waste in water breaks down the concentration of dissolved oxygen due to the presence of bacteria and other micro organisms that combines together with oxygen which is further carried away by run-off from rains, floods and storms leading to disturbance and danger to aquatic life.

According to Chauhan (2013) the most important factor that creates problems of urbanization is due to non-cooperation of the city people, non-cooperation with the urban local bodies, lack of coordination between various State and Central Government departments such as; the Public Health Engineering Department, Telephone Department, Municipal bodies, Town Planning Department although all the

bodies are under the administrative control of Urban Development Department of the State Government. Sinha (2011) was of the view that urbanization being a dynamic force involves urban elements that suffer considerable temporal and spatial variations. Chowdhury (2007) also mentioned about the positive and negative impacts of urbanization by stating that in order to look at the attraction of cities influencing the pace of urbanization and the consequent effects on the urban areas is by taking assessment of the advantages and disadvantages produced by the functioning of specific cities keeping in mind the needs and demands of people living and working in the city. Abebe and Singh (2013) clearly mentioned that due to unreliability and unavailability of safe and sufficient water supply and adequate sanitation facilities, majority of the urban population has been suffering for decades and that planning for water has become an imperative for government and urban planning authorities all over the world.

Jacobs *et al* (1990) strongly believes that urban growth in Nagaland has been rapid and this has brought along with it familiar problems such as unemployment and drug addiction. Bhatia (2004) clearly stated that sustained migration to urban areas like Dimapur and Kohima has brought about impacts to these towns as it has put a strain on the available and limited urban services and infrastructure resulting to increased urban poverty and unemployment levels. He further noted that the absence of adequate investment and finances from the government has led to deterioration of urban amenities and as a result the state experiences serious urban issues such as traffic congestion, pollution, inadequacy of water and sanitation facilities, sewerage systems, drainage and solid waste management. Sharma (2004) also pointed out that Naga villages are in a continuous state of change and this has led to migration from the rural areas to the urban centres like

Kohima, Dimapur and Mokokchung. Kikhi (2009) made a study on the educated youth in Nagaland wherein it was found out that the unemployed youths have remained without any remunerative job for many years and they blame the government for not getting a job.

De (2016) made an attempt to study the public perception regarding pollution of the river Ganga, a case study conducted at Dakhineswar, where it was found out that local residents and pilgrims of Dakhineswar had a good knowledge about the water quality of the river Ganga and the respondents agreed that the river Ganges was polluted due to rapid human developmental activities. Gardner and Singh (2006) also stressed on the importance of public participation in enforcing regulations relating to environmental impact assessment. Tah and Ghosh (2015) made a study focussing on the impact of urbanization on the environment of Durgapur city by taking into consideration the perceptions of the urban dwellers regarding the environmental issues. It was concluded in their study that people's perception and availability of infrastructure are equally very important for the process of developmental activities because these perceptions depicts the level of use of the available amenities on one hand and reflects the satisfaction levels on the other. Cori *et.al*, (2020) attempted a study where their main purpose of the study was to explore and analyze the studies being carried out on the people's perception and measurement of air pollution and the relationship that lies between them, where it was found out that most of the studies established a relationship between risk perception measurement. Kumar *et.al*, (2020) evaluated the air quality of different sites in Agra by conducting a public opinion survey on the causes, impacts and solutions on air pollution where it was concluded that making people

environmentally conscious through value-based education can control the air pollution by implementing nature-based solutions. Saksena (2011) highlighted the particular characteristics of urban areas in developing countries in regards to the perceptions on air pollution where it was concluded that public perceptions needs greater research attention because risks can be communicated, participation can be streamlined and responses can be more effectively crafted only through a better understanding of the existing issues. Cronbach (1951) developed the Alpha in the year 1951. Bonett and Wright (2015) stated that in the field of social and organizational sciences, Cronbach's alpha is the most commonly and widely used research tool in measuring the reliability. Tavakol and Dennick (2011) reassures that before running test for research or examination purposes, the internal consistency in Cronbach's alpha should be determined first in order to ensure its validity and to estimate the amount of measurement error in a test. Ameen and Mourshed (2017) examined the perception of stakeholders on the urban environmental challenges by taking into consideration the level of importance and how it was prioritized in the Iraqi context by applying Cronbach's alpha where it was found out that the reliability estimates for all the components generated were greater than 0.60 which indicates a strong internal reliability. Hosseini and Hajilou (2019) made an attempt to analyze the urban sprawl in the cities of Iran where the driving forces that intensifies the urban sprawl were given prime importance. This was attempted by applying Cronbach's alpha which was used as a research tool to measure the reliability where it was found that the result showed suitable result with 0.726.

Study areas

Kohima, Dimapur, and Mokokchung towns are located in the state of Nagaland,

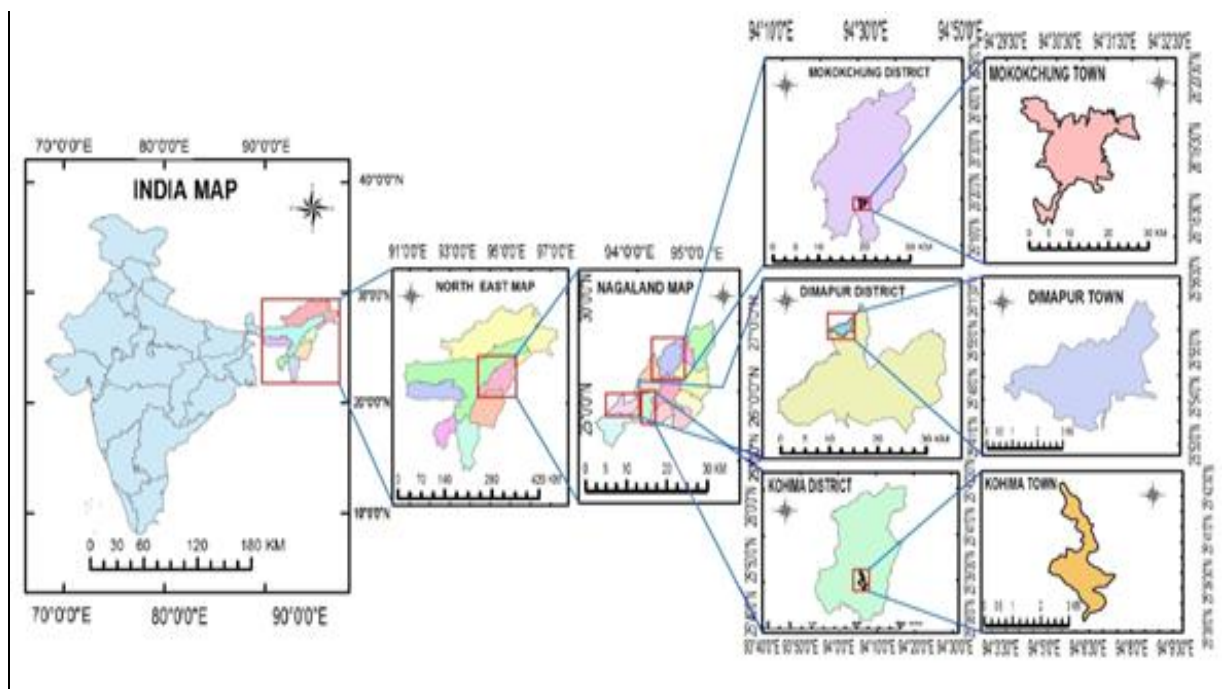
Northeast India. Kohima town is located between 25°38' 0" N to 25°42' 30" N latitude and 94°4' 30" E to 94°8' 30" E longitude (**Fig. 01**). The physiographic feature comprises of irregular plateau, elevated ridges, hilly, rugged and steep slopes having an average altitude of 1444 meters above mean sea level. The temperature varies from 5°C in winter to 35°C in summer which results to a moderate type of climate. Annual average rainfall varies from 800-2000 mm. Angami Nagas and Rengma Nagas are the dominant tribal community inhabitants of Kohima town. The town has a total population of 99039 according to 2011 census. Kohima town attained its first municipality in the year 2005 under the provision of the Nagaland Municipal Act, 2001. The total population of Kohima town according to 2011 census is 99039, with 51626 male and 47413 female. Kohima town is no exception; and experiences various urban problems today. Following are the present scenario of the key prevailing urban problems in Kohima town.

Dimapur town is located in Dimapur district in the state of Nagaland, Northeast India. It is located between 25°53' 30" N to 25°56' 0" N latitude and 93°41' 0" E to 93°45' 0" E longitude. The physiographic feature of the town is plain and it is the only plain sub-micro region in Nagaland having a mean elevation of 260 meters above sea level. The temperature varies from 7°C in winter to 40°C in summer. Annual average rainfall varies from 1504.7 mm-1800 mm. Semas are the dominant tribal community inhabitants of Dimapur town. The town has a total population of 122834 according to 2011 census. The Dimapur Municipal Council was constituted in the year 2005, under the provision of the Nagaland Municipal Act, 2001. The total population of Dimapur town according to 2011 census is 122834 persons, with 64300 male and 58534 female. The gender ratio accounts to 910 female per thousand male. Dimapur town is considered as the main commercial

centre in Nagaland. It is well connected by roadways, airways and railways. The present scenario of Dimapur town in regards to urban problems is listed below.

Mokokchung town is located in Mokokchung district in the state of Nagaland, Northeast India. It is located between 26°18' 0" N to 26°21' 0" N latitude and 94° 30' 0" E to 94° 32' 0" E longitude. The physiographic feature comprises of hill ranges and steep slopes having an average altitude of 1325 meters above mean sea level. The temperature varies from 5°C in winter to 35°C in summer. Annual average rainfall varies from 1800 mm-2200mm. Aos are the dominant tribal community inhabitants of Mokokchung town. The town has a total population of 35913 according to

2011 census. The Mokokchung Municipal Council was constituted in the year 2003, under the provision of the Nagaland Municipal Act, 2001. The total population of Mokokchung town according to 2011 census is 35913, with 18898 male and 14033 female. There exists rural-urban migration mainly due to better educational facilities, health facilities, commercial facilities, job opportunities and job postings. This gave rise to the demand of more housing, water, electricity and all the basic civic amenities which became difficult to meet the requirement of the growing population demand. Hence, urban problems began to emerge. The present scenarios of urban problems in Mokokchung town are listed below.



Source: Nagaland Remote Sensing and GIS Centre

Fig. 01: Location map of Mokokchung, Dimapur, and Kohima town

Air quality in Kohima, and Dimapur town

The Nagaland Pollution Control Board has been monitoring the ambient air quality of Kohima, and Dimapur towns under the National Air Monitoring Programme (NAMP) from 2011 to 2018. There are two

monitoring stations selected each town i.e., opposite NST office with the station code (609) falls under residential type and PWD Junction which lies along the National Highway-29 with the station code (610) falls under commercial type in Kohima town, and two stations Bank colony (317)

and Dhobinala (448) in Dimapur town. The given table shows the annual average concentration of RSPM for four stations. Through their analysis it was found that in four stations the concentration of Respirable Suspended Particulate Matter (RSPM) values exceeded the prescribed National Ambient Air Quality Standards (NAAQS) limits of 60 ($\mu\text{g}/\text{m}^3$). The monitored parameters are Respirable Suspended Particulate Matter PM10 (RSPM), Nitrogen Dioxide (NO_2), and Sulphur dioxide (SO_2). The Nagaland pollution control Board (NPCB) has still not yet monitored the air pollution status of Mokokchung town.

Water pollution in Kohima, Dimapur and Mokokchung town

The Nagaland Pollution Control Board in collaboration with the Central Pollution Control Board under the National Water Quality Monitoring Programme (NWMP) monitors one station in Kohima (station code: 1930), six stations in Dimapur (station codes: 1796, 1797, 1798, 1799, 1800 and 1928), two stations in Mokokchung (station codes: 2894 and 2895) from 2013 to 2019. In Kohima, the Chemical Oxygen Demand (COD) value was very low in the year 2017 as compared to 2013. The COD value in the year 2013 was 155 mg/l which dropped down at a considerable rate in the year 2017 to 12.58 mg/l. The Biochemical Oxygen Demand (BOD) was found to be highest in the year 2013 with a value of 11.0 mg/l which declined drastically to 2.7 mg/l in the year 2017. In Dimapur, the Chemical Oxygen Demand (COD) value was highest in the station (1800) with a value of 64.7 mg/l and the lowest was recorded in station (1799) with 29.8 mg/l. The Biochemical Oxygen Demand (BOD) was found to be highest in the station (1800) with 8.15 mg/l while the lowest was recorded in the station (1796) with a value of 1.76 mg/l. It is to be noted that the suggested criteria for BOD should be below 3mg/l. In Mokokchung, it was

found that the pH value was higher in station (2894) with 7.72 as compared to station code (2895) with 7.45. Turbidity on the other hand was higher in station code (2895) with 85.03 NTU compared to station code (2894) with 54.24NTU. In the case of Dissolved Oxygen (DO) station code (2894) had a higher value of 5.53mg/l. The Biochemical Oxygen Demand (BOD) and Chemical Oxygen Demand (COD) were within the permissible limits.

Traffic congestion in Kohima, Dimapur and Mokokchung town

Traffic congestion is one of the worst problems of Kohima town. The one issue uttered by each and every citizen of Kohima town. Some call it as the planner's horror. The roads are too small and narrow, while the number of vehicles keeps growing. The commercial and residential buildings are being constructed without following any regulations in regards to encroachments which hampers the movement of vehicles. The lack of parking lots and parking areas for private vehicles, educational centres, health centres, departmental office and commercial areas greatly disturbs the flow of traffic creating heavy congestions. Also, the congestion problem rises due to absence of alternate arterial road, ring roads or circular roads. There is only one main road passing through the heart of the town which causes the traffic jams. The traffic in Kohima town is managed manually without implementing any advanced technology let alone the use of traffic lights. The lack of public awareness on driving regulations, road safety and civic sense also adds up further problems. Dimapur town is no exception when it comes to traffic congestion owing to the presence of various small and large commercial establishments the town experiences congestion especially during the peak hours. The number of vehicles rises up every year while the roads remain small and narrow, the street vendors, auto rickshaws, bikes and scotty etc on the other

hand occupies the limited space, this further creates the congestion and commotion. Also, the lack of proper parking lot by the business establishments, departmental offices and residential areas adds up further to the problem. Since the National Highway 129 and 29 that leads to Manipur and Assam crosses the centre of Dimapur town, the road gets congested due to the heavy commercial vehicles carrying goods, passengers etc. Mokokchung town is slowly facing traffic congestions today due to the growth in the number of vehicles. The town experiences heavy traffic during the peak hours. This is mainly due to the local vegetable vendors that comes from nearby villages to sell vegetables and fruits, the unloading of truck carrying goods from Assam and other nearby states that takes place in the morning hours or sometimes at noon when it arrives late due to bad road condition, taxis and buses that transit on a daily basis for school duties, passengers etc and the daily needs shoppers within the town area. In addition to all these activities, the lack of proper parking area and the lack of diversion roads accumulates further to the problem. The roads are too narrow while the numbers of vehicles are high. The parking systems along the commercial stretches are haphazard and public disobedience and ignorance with basic traffic rules and regulations creates the congestion and makes it even worst. The commercial areas, educational institutions and departmental offices, residential buildings lack proper parking space which disturbs the flow of traffic.

The poor drainage system in Kohima, Dimapur and Mokokchung town

The drainage system in Kohima town is very poor. Most of the drains are not properly constructed in one hand and on the other, the few existing drains are not even properly maintained either, which deteriorates the condition of roads to a large extent. There is also lack of routine or timely maintenance or cleaning of the

drains by the concerned authority. During the rainy seasons the drains starts to overflow over the roads and highways, leaving the surface of the road with full of garbage and solid wastes which were being accumulated on the drains causing it to clog and thus block the drains from flowing smoothly. Improper sewerage facility also to a great extent disturbs the drainage system. Most of the public and private sewers are being directly connected to the drains without any proper precautions or without following any regulations as set by the concerned department. This causes a very foul and unhygienic condition for the people residing in the nearby areas. Most of the drains are open drains without any proper elevation and alignment. There should be an outlet point such as a river or a stream for a good drainage, which is missing in most of the drainage system of Kohima town. Lastly, due to lack of civic sense the problem grows bigger and becomes difficult to manage. Drainage system in Dimapur town is another problematic issue. There is lack of proper drainage network which leads to difficulty in the flow of drain water. The dumping of garbage in the drains creates another issue as it clogs the drains and let the drain water overflow over the roads and highways causing serious flood at times. This is another reason for the destruction of roads and disturbance in the flow of drain water. The drains in Dimapur are mostly uncovered drains, which release foul smells, an excellent breeding ground for mosquitoes and also constitute danger to pedestrians. There are only few covered drains in Mokokchung town; most of the drains are uncovered. According to the study conducted by Lyndem and Imtimakla (2019), where they studied on the management of drainage system in Mokokchung, it was found that the drainage system of Mokokchung town contains both domestic and commercial wastes. Disposal of both solid and liquid waste into the

drains were being continued by the public despite provision of repeated notices by the Mokokchung Municipal Council. This disturbs the flow of drain water on one hand and on the other hand, these solid wastes are hard to decompose and thus degrade the aquatic life. Moreover, the size of drains in Mokokchung town are too small for carrying storm water especially during the rainy season which leads to overflowing of contaminated drain water on the surface of the road and pedestrians.

Solid waste in Kohima, Dimapur and Mokokchung town

According to Nagaland Pollution Control Board reports most of the solid waste generated within Kohima town were mostly from domestic waste 31.49%, 27.41% and 23.37% respectively from the commercial and institutional waste, other sources of municipal solid wastes generates from hotels and restaurants, markets, streets, hospitals and nursing homes, drain, construction and debris waste etc. These solid wastes consisted mostly of paper, plastic, metal and glasses. The table shows the statement of segregated Dry waste collected from Meriema Dumping site under the Pilot Project for ward no. 13 and 14 from October 2014 to March 2015 (for six months). The Dimapur Municipal Council covers 23 wards for the collection of municipal solid waste. According to the reports from Dimapur Municipal Council (DMC) the total amount of waste generated in one day from Dimapur town excluding NST colony and Neisatou colony was 111124.56 kgs/111.12 TPD*(tonnes per day). The total dry waste generated was 1124.84 kgs, wet waste accounted to 14982.45 kgs and mixed waste accounted to 27029.16 kgs. The dry waste consisted of non-bio-degradable waste which includes biomedical waste, sanitary waste, e-waste, shoes, clothes, demolition and construction waste, inert etc the wet waste on the other hand consisted of biodegradable waste which includes garden waste, poultry waste,

slaughter waste, kitchen waste and hair while the mix waste consisted of those waste where segregation is not possible either in dry or wet waste. According to the Mokokchung Municipal Council, the estimated quantity of solid waste generated within the municipal town area per day accounted to 110 tonnes per day in the year 2016 which increased to 125 tonnes per day in the year 2017, however it declined at a considerable rate in the year 2019 to 42 tonnes per day. Meanwhile, in the case of quantity of solid waste collected per day, it was found that in the year 2016 it accounted to 90 tonnes per day which increased to 100 tonnes per day, however in the year 2019 it declined at a considerable rate to 35 tonnes per day. The per capita of waste collected per year accounted to 1080 gram per day, while in the year 2017 it was nil; however, it further accounted to 0.79 grams per day in the year 2019. Lastly, the quantity of solid waste disposed at dumpsite or landfill accounted to 90 tonnes per day in the year 2016 which increased to 100 tonnes per day in the year 2017 and declined again in the year 2019 to 35 tonnes per day. The overall quantity of waste generated per day in Mokokchung town seems to have a drastic change by the year 2019 by showing a huge decrease in the quantity of waste being generated in a day.

The main objective of the study

The main objective of the study is to carry out a comparative study by identifying the problems of urban towns during the process of urbanisation through people's perception and satisfaction on the prevailing urban problems in these three municipal towns of Nagaland; namely, Kohima town, Dimapur town and Mokokchung town.

Data and Methodology

This study was carried out by applying both primary and secondary data collection. The primary data was collected by setting up questionnaire using google forms. Likert scale was applied for the scores and for analysis Cronbach's alpha was applied for

the reliability test using SPSS. Cronbach's alpha is a statistical tool used to estimate the internal consistency between items in a scale. The word internal here means how a respondent is responding across all items. So, in simple words Cronbach's alpha can be defined as an indicator of consistency.

In order to analyze the people's perception and satisfaction on the urban problem of Dimapur town, three un-weighted elements on the urban problem of Dimapur town were computed using the people's perception and satisfaction levels. These three un-weighted elements were namely; Perception on Air Pollution (PAP), Perception on Water Pollution (PWP) and Satisfaction on Traffic, Drainage and Waste Management (STDWM).

For computing the Perception on Air Pollution (PAP) perception information on air quality before the lockdown period were collected and the variable values assigned were '1.00' for 'Very Poor', '2.00' for 'Poor', '3.00' for 'Fair', '4.00' for 'Better' and '5.00' for 'Good'. On the other hand the variable values assigned for air quality during the lockdown period were '1.00' for 'No improvement', '2.00' for 'Slight improvement', '3.00' for 'Moderate improvement', '4.00' for 'Significant improvement' and '5.00' for 'Don't know'. A five point Likert scale was applied for both the items.

For the second element Perception on Water Pollution (PWP), perception information on the main source of water pollution and the perception on the water quality as compared to ten (10) years ago for Dimapur town were collected. In order to compute, a five point Likert scale was applied for both the items and the assigned variable values for the main source of water pollution were '1.00' for 'Municipal waste', '2.00' for 'Car wash/servicing', '3.00' for 'Domestic waste water from kitchen, toilet etc.', '4.00' for 'Garbage dumping' and '5.00' for 'Pesticides/fertilizers' and for the personal observation of water quality

compared to ten (10) years ago the variables values for 'Don't know', 'Same', 'Worse', 'Better' and 'Good' were '1.00', '2.00', '3.00', '4.00' and '5.00' respectively.

Lastly, for the third element on Satisfaction on Traffic, Drainage and Waste Management (STDWM), satisfaction information on traffic system, drainage system and waste management were collected using three point Likert scale for all the three items. The variable values assigned for all the three items were '1.00' for 'Satisfied', '2.00' for 'Not-satisfied' and '3.00' for 'Don't know'. Respondents were asked to choose their answers according to their perceptions for all the three towns.

The secondary data were collected from departments such as municipal council, District Transport Office, Nagaland Pollution Control Board and State Investment Program Management and Implementation Unit (SIPMIU), Kohima, National Air Monitoring Programme (NAMP), National Water Quality Monitoring Programme (NWMP), etc.

Results and discussions

People's perception and satisfaction on the urban problems of Kohima, Dimapur and Mokokchung town

In order to carry out this study, questionnaires were set up on the people's perception and satisfaction of the prevailing urban problems in Kohima, Dimapur, and Mokokchung town. The random sampling technique would be chosen for the selection of respondents equally in each town 155 for Kohima, Dimapur and Mokokchung. The total number of respondents is 465. As per the profile of respondents that Fig.02 shows that females participated more than males in Mokokchung and Dimapur towns compare to Kohima town. Age-wise analysis reveals in fig. 03 that less than 35 years are more respondents in all three towns, followed by the 35-44 years group, etc. The background

characteristics of the respondents are shown in the given figure (Fig. 02 & 03).

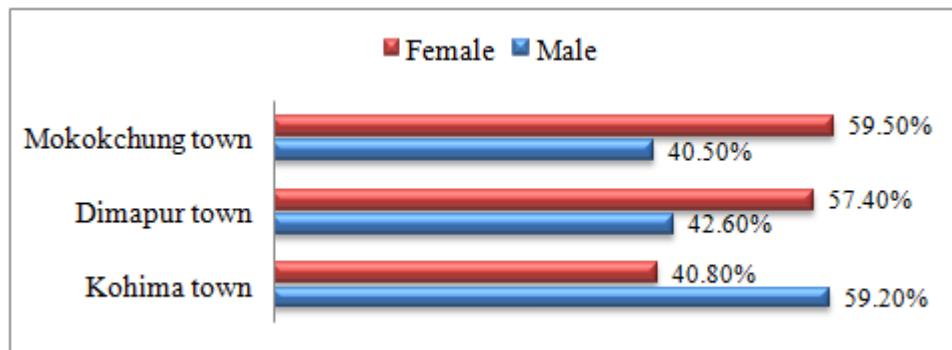


Fig. 02: Gender-wise respondents

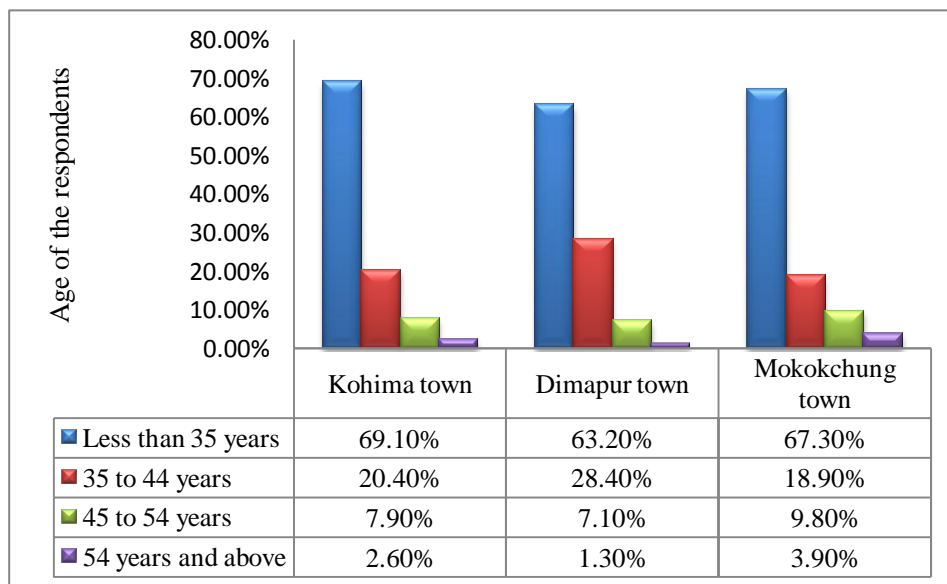


Fig. 03: Age-wise respondents'

Cronbach's alpha analysis

The reliability analysis carried out for Kohima town for all the three un-weighted elements comprising of three (3) items for Perception on Air Pollution (PAP) and four (4) items for both Perception on Water Pollution (PWP) and Satisfaction of Traffic, Drainage and Waste Management (STDWM) revealed that the questionnaire reached acceptable reliability, $\alpha = 0.705$ for PAP, $\alpha = 0.725$ for PWP, and $\alpha = 0.714$ for STDWM (Table 01). The reliability analysis of internal consistency for Dimapur town for the three un-weighted elements reached acceptable reliability, $\alpha = 0.788$ for Perception on Air Pollution (PAP)

with three (3) items, $\alpha = 0.753$ for Perception on Water Pollution (PWP) with three (3) items, and $\alpha = 0.715$ for Satisfaction of Traffic, Drainage and Waste Management (STDWM) with four (4) items. While, the reliability analysis of internal consistency for Mokokchung town for all the three un-weighted elements reached acceptable reliability, $\alpha = 0.823$ for Perception on Air Pollution (PAP) having three (3) items, $\alpha = 0.751$ for Perception on Water Pollution (PWP) having three (3) items, and $\alpha = 0.740$ for Satisfaction of Traffic, Drainage and Waste Management (STDWM) having four (4) items. It is to be noted that in all the items, the total was

considered and included as an item. A Cronbach's alpha is denoted by the small

Greek letter alpha: α

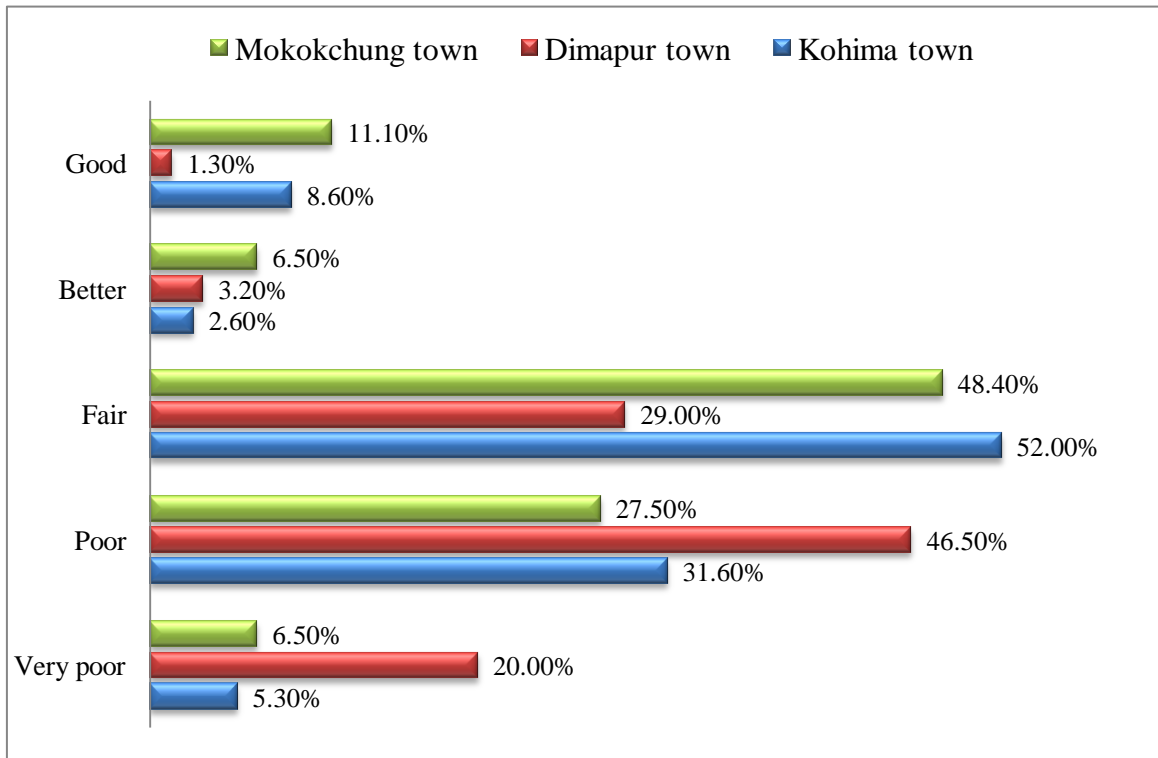
Table 01: Cronbach's Alpha for the three un-weighted elements of Kohima, Dimapur and Mokokchung town

Sl. No	Name of items	Reliability Statistics								
		Kohima town			Dimapur town			Mokokchung town		
		Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	No. of Items	Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	No. of Items	Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	No. of Items
1.	PAP (Perception on Air Pollution)	0.705	0.701	3	0.788	0.775	3	0.823	0.822	3
2.	PWP (Perception on Water Pollution)	0.725	0.713	4	0.753	0.729	3	0.751	0.729	3
3.	STDWM (Satisfaction of Traffic, Drainage and Waste Management)	0.714	0.686	4	0.715	0.652	4	0.740	0.728	4

Perception on Air Quality before the lockdown period in Kohima, Dimapur and Mokokchung town

The perception analysis on the air quality before the lockdown period in Kohima town revealed that 52 percent of the respondents perceived that the air quality before the lockdown period was fair, while 31.60 percent of the respondents perceived the air quality to be poor and interestingly 8.60 percent of the respondents perceived the air quality to be good before the lockdown period and 2.60 percent of the respondents perceived the air quality to be better. However, only 5.30 percent of the respondents perceived the air quality to be very poor before the lockdown period (Fig. 04). The perception analysis on the air quality before the lockdown period in Dimapur town revealed that in the case of

air quality before the lockdown period 46.50 percent of the respondents perceived the air quality to be poor, while 29 percent of the respondents perceived the air quality to be fair, 20 percent of the respondent perceived the air quality to be very poor, 3.20 percent of the respondents perceived the air quality to be better and 1.30 percent of the respondents perceived it to be good. While, the perception analysis on the air quality before the lockdown period in Mokokchung town revealed that the first item that is, 48.4 percent of the respondents perceived the air quality to be fair, while 27.5 percent of the respondents perceived the air quality to be poor, however, 11.1 percent of the respondents perceived the air quality to be good, 6.5 percent of the respondents perceived it to be better, while another 6.5 percent of the respondents perceived the air quality to be very poor.



Source: Primary survey

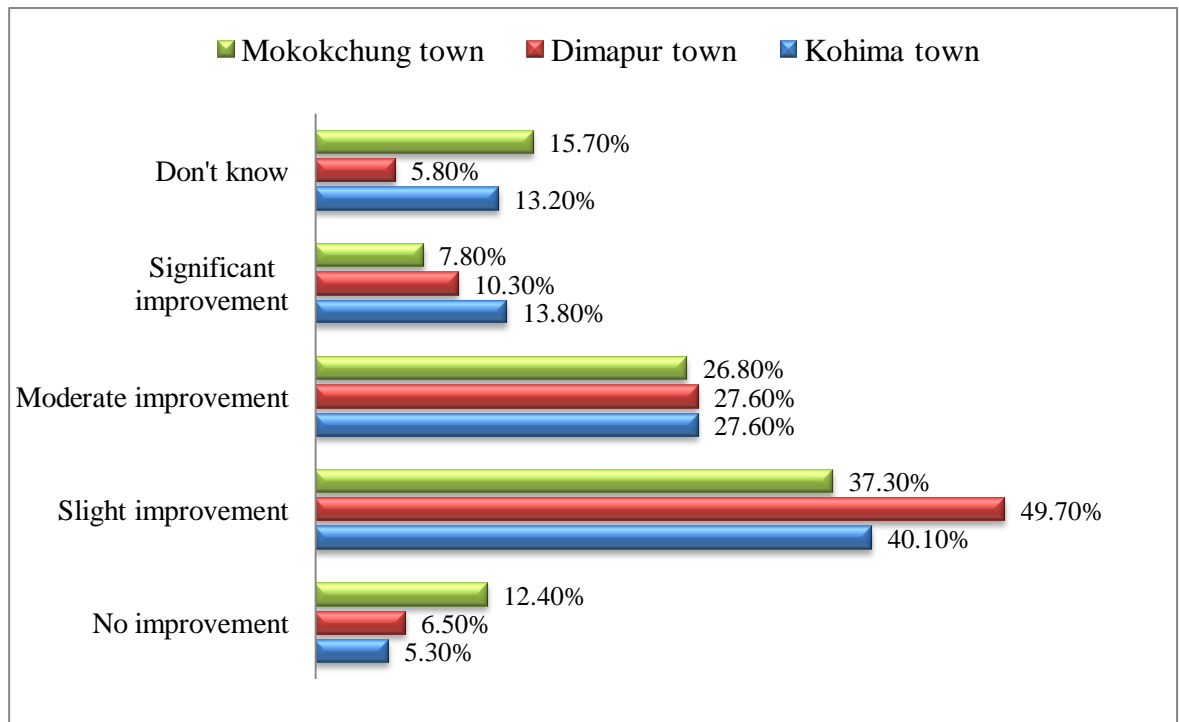
Fig. 04: Perception of Air Quality before the lockdown period

Perception on Air Quality during the lockdown period in Kohima, Dimapur and Mokokchung town

The perception analysis on the air quality during the lockdown period in Kohima town revealed that 40.10 percent of the respondents perceived to have a slight improvement in the air quality during the lockdown period, while 27.60 percent of the respondents perceived to have a moderate improvement in the air quality. Whereas, 13.80 percent of the respondents were confident enough to perceive that the air quality had significantly improved. It was interesting to find out that 13.20 percent of the respondents who were very close to the ones perceiving significant improvement still don't know or have no knowledge about the air quality. The remaining 5.30 percent of the respondents clearly were of the view that there has been no improvement in the air quality during the lockdown period (**Fig. 05**). In the case of Dimapur town, the air quality during the

lockdown period revealed that, 49.70 percent of the respondents perceived the air quality to have a slight improvement, 27.60 percent of the respondents perceived the air quality to have a moderate improvement, 10.30 percent of the respondents perceived the air quality to have a significant improvement, while only 6.50 percent of the respondents perceived the air quality to have no improvement and 5.80 percent of the respondents does not know or were unaware about the air quality improvement. While, the air quality during the lockdown period for Mokokchung town revealed that, 37.3 percent of the respondents perceived the air quality to have a slight improvement, while 26.8 percent perceived the air quality to have a moderate improvement. However, 15.7 percent of the respondents does not know or were unaware about the air quality, which was followed by 12.4 percent who perceived the air quality to have no improvement and only 7.8 percent perceived the air quality to have significant

improvement during the lockdown period in Mokokchung town.



Source: Primary survey

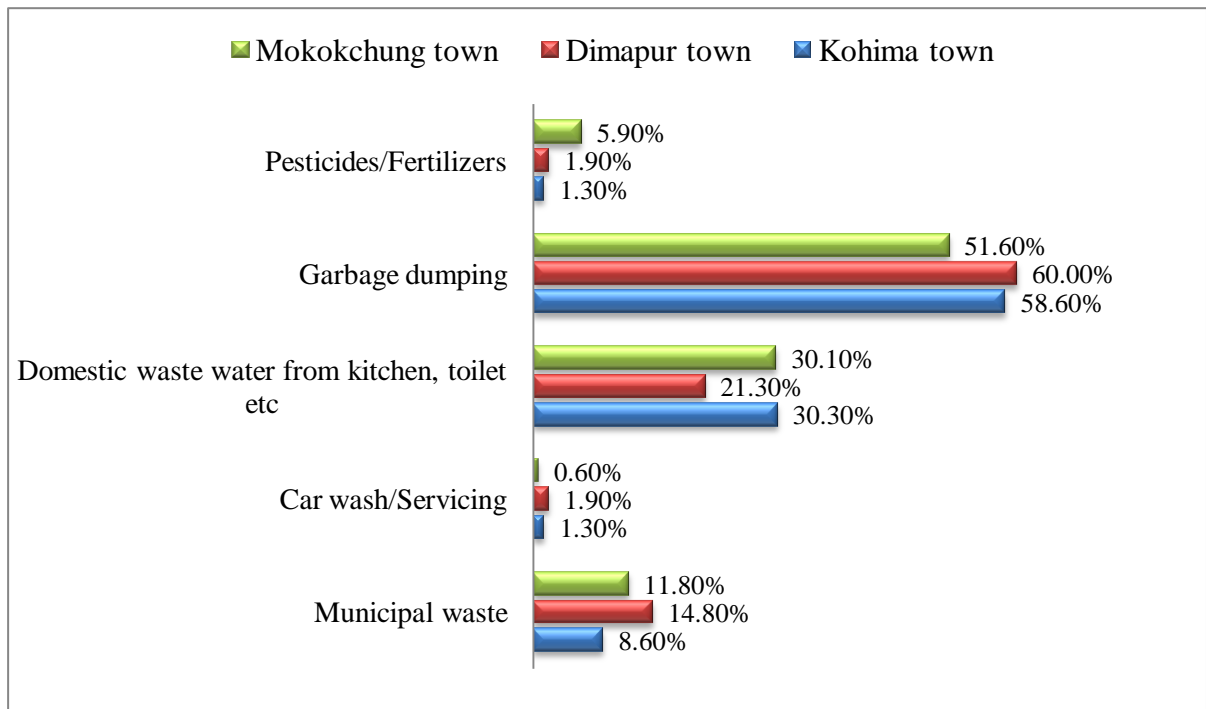
Fig. 05: Perception of Air Quality during the lockdown period

Perception of main sources of water pollution in Kohima, Dimapur and Mokokchung town

The perception analysis regarding the source of water pollution in Kohima town revealed that 58.60 percent of the respondents perceived that the main source of water pollution in Kohima town is due to garbage dumping, while 30.30 percent of the respondents perceived that the source of water pollution is due to domestic waste water from kitchen, toilet etc and 8.60 percent of the respondents perceived it to be due to municipal waste. The remaining respondents who perceived the main source of water pollution to be due to car wash/servicing and pesticides/fertilizers accounted to 1.30 percent each (**Fig. 06**). On the other hand, the perception analysis on the main source of water pollution in Dimapur town revealed that, 60 percent out of the total respondents perceived the main source of water pollution to be from

garbage dumping, and 21.3 percent of the respondents perceived the main source of water pollution to be from domestic waste water from kitchen, toilet etc, 14.8 percent of the respondents perceived it to be from municipal waste while the sources such as from car wash/servicing and pesticides/fertilizers accounted to 1.9 percent each. While, the perception analysis on the main source of water pollution in Mokokchung town revealed that, a majority of 51.6 percent of the respondents perceived the main source of water pollution to be from garbage dumping while 30.1 percent of the respondents perceived the main source of water pollution to be from the domestic waste water from kitchen, toilet etc, followed by 11.8 percent of the respondents who perceived it to be from municipal waste, 5.9 percent of the respondents perceived it to be due to pesticides/fertilizers and only 0.6 percent of the respondents perceived it to be due to car

wash/servicing as the main source of water pollution.



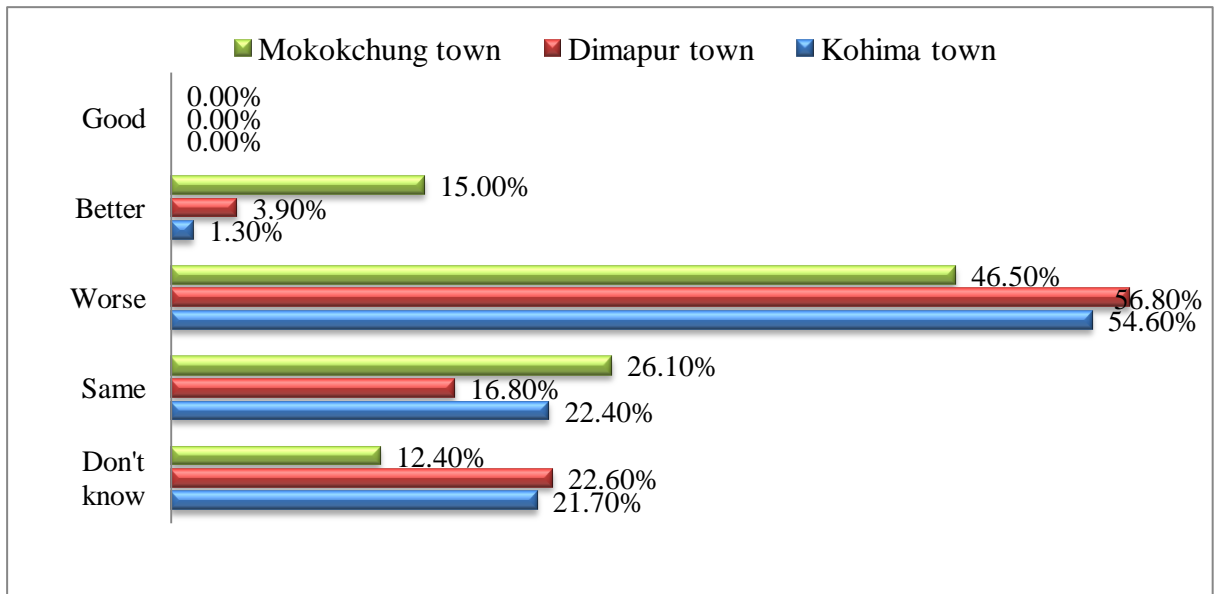
Source: Primary Survey

Fig. 06: Perception of Main Sources of Water Pollution

Perception on water quality in Kohima, Dimapur and Mokokchung town

In the case of Kohima town, the perception analysis on the water quality as compared to ten (10) years ago, it was found out that 54.60 percent of the respondents perceived the water quality to be at the worse, while 22.40 percent of the respondents perceived the water quality to be at the same state as compared to ten (10) years ago. However, 21.70 percent of the respondents still don't know and are unaware of the water quality and only 1.30 percent of the respondents perceived the water quality of Kohima town to be better (Fig. 07). For Dimapur town, the perception analysis revealed that, 56.8 percent of the respondents perceived that the water quality was at the worse state, while 22.6 percent of respondents does not

know or were unaware about the water quality, whereas, 16.8 percent of the respondents perceived the water quality to be at the same state as compared to ten (10) years ago and only 3.9 percent of the respondents perceived the water quality to be at a better state. While, the perception of water quality as compared to ten years ago in the case of Mokokchung town revealed that, 46.5 percent of the respondents perceived the water quality to be at the worst state, 26.1 percent of the respondents perceived the water quality to be at the same state. However, 12.4 percent of the respondents does not know or were unaware about the water quality and only 15 percent of the respondents perceived the water quality to be better.



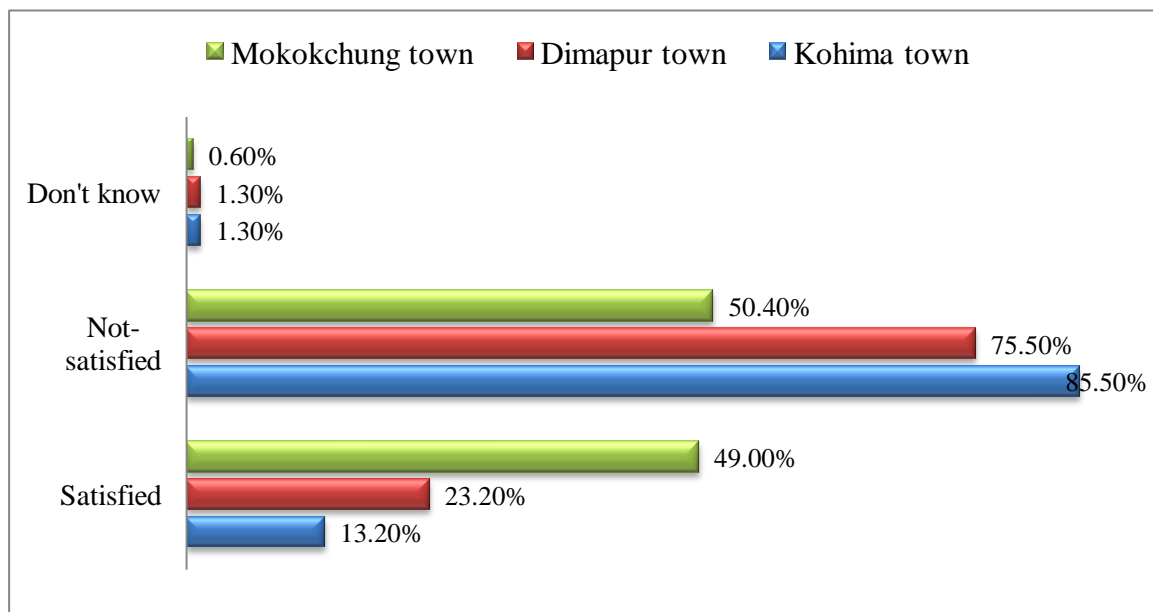
Source: Primary survey

Fig. 07: Perception on Water Quality

Satisfaction with the Traffic system in Kohima, Dimapur and Mokokchung town

The satisfaction analysis on the traffic system in Kohima town revealed that 85.50 percent of the respondents were not satisfied at all with the traffic system, while 13.20 percent of the respondents were satisfied. The remaining 1.30 percent of the

respondents doesn't know or were unaware of the situation (Fig. 08). In the case of the satisfaction of traffic system in Dimapur town, 75.50 percent of the respondents were not at all satisfied with the traffic system, while 23.20 percent of the respondents were satisfied, and the remaining 1.30 percent does not know or were unaware about their satisfaction.



Source: Primary survey

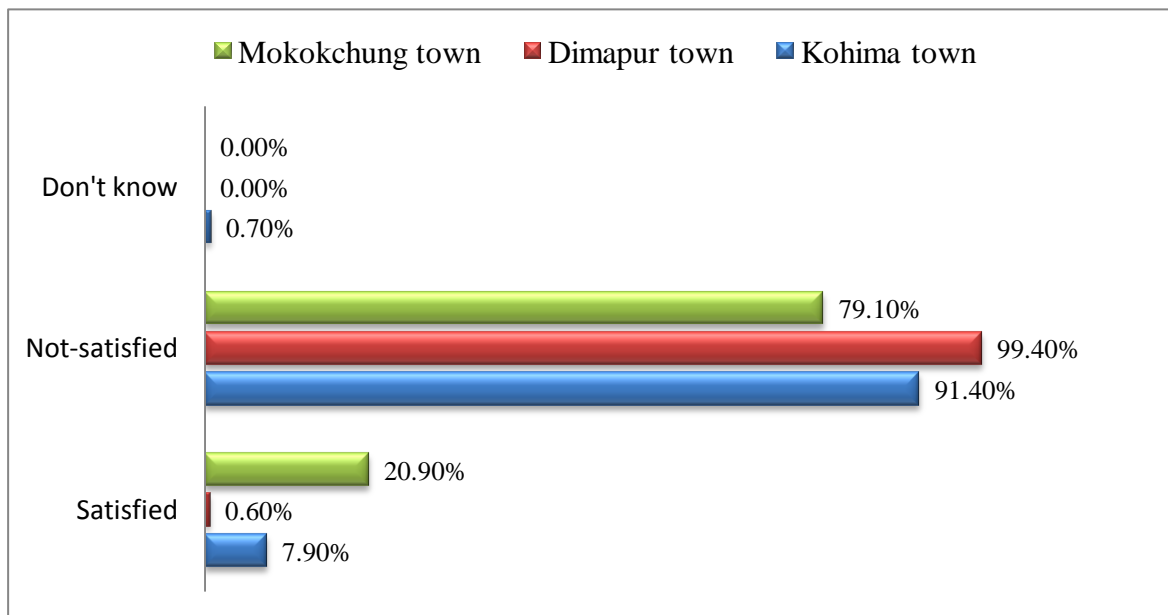
Fig. 08: Satisfaction with Traffic System

The satisfaction analysis on the traffic system, revealed that in the case of the satisfaction on the traffic system of Mokokchung town, there was a complete distinction of perception between the respondents who were satisfied and the respondents who were not satisfied, as 50.4 percent of the respondents were not satisfied with the traffic system and 49 percent of the respondents showed complete satisfaction with the traffic system in Mokokchung town and only 0.6 percent of the respondents does not know or were unaware about the traffic system.

Satisfaction with drainage system in Kohima, Dimapur and Mokokchung town

On the other hand, the satisfaction analysis on the drainage system in Kohima town

revealed that 91.40 percent of the respondents were not satisfied with the drainage system, while 7.90 percent of the respondents were satisfied and the remaining 0.70 percent of the respondents doesn't know or were unaware of the situation (Fig. 09). Similarly, in the case of the drainage system in Dimapur town, 99.4 percent of the respondents were completely dissatisfied and 0.6 percent was satisfied with the drainage system in Dimapur town. Meanwhile, in the case of the satisfaction on the drainage system in Mokokchung town, a majority of 79.1 percent of the respondents were not satisfied with the drainage system and 20.9 percent of the respondents were satisfied.



Source: Primary survey

Fig. 09: Satisfaction with Drainage System

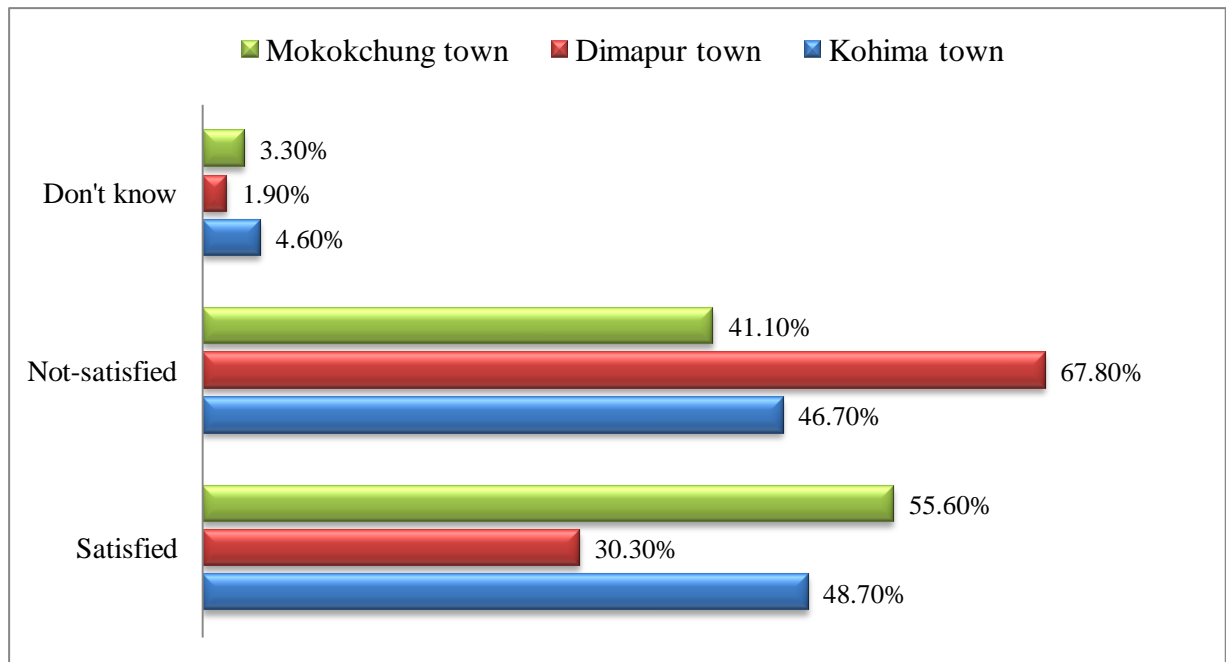
Satisfaction on waste management in Kohima, Dimapur and Mokokchung town

In the case of the satisfaction analysis on the waste management in Kohima town, it was enlightening to find out that 48.70 percent of the respondents which on the other hand was the majority of the

respondents, showed complete satisfaction with the waste management in Kohima town, while 46.70 percent of the respondents were not satisfied and the remaining 4.60 percent of the respondents doesn't know or were unaware of the situation (Fig. 10). In regards to the waste management of Dimapur town, 67.80

percent of the respondents were not satisfied, 30.3 percent of the respondents were satisfied and 1.9 percent of the respondents does not know or were unaware about their satisfaction on the waste management of Dimapur town. Interestingly again, in the case of the satisfaction on waste management in

Mokokchung town, 55.6 percent of the respondents showed complete satisfaction while 41.1 percent of the respondents were not satisfied with the waste management but however 3.3 percent of the respondents does not know or were unaware about the situation.



Source: Primary survey

Fig. 10: Satisfaction on Waste Management

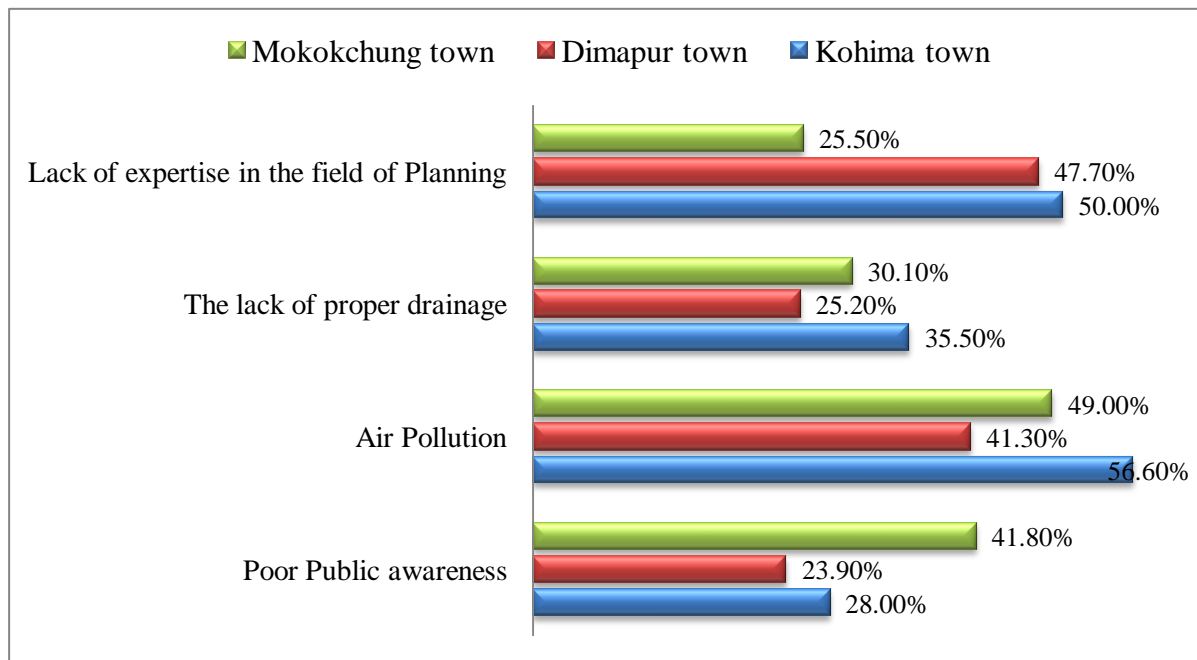
Perception of the main problems of urbanization in Kohima, Dimapur and Mokokchung town

A perception analysis was made on the main problem of urbanization in Kohima, Dimapur and Mokokchung town. It is to be noted that, this item or the question was not included in Cronbach's analysis. This was a separate question prepared for the respondents. According to the overall perception analysis on the main problem of urbanization in Kohima town, it was found that the majority of the respondents 56.6 percent chose air pollution as the main problem, which was followed by the lack of expertise in the field of planning with 50 percent of the respondents, the lack of proper drainage came in the third place with

35.5 percent of the respondents and lastly poor public awareness with 28 percent (Fig. 11). The overall perception analysis on the main problem of urbanization in Dimapur town revealed that a majority of 47.70 percent of the respondents perceived the lack of expertise in the field of planning as the main problem of urbanization, while 41.30 percent of the respondents perceived it to be due to air pollution, followed by 25.20 percent of the respondents who perceives it to be due to the lack of proper drainage and 23.9 percent of the respondents perceived it to be due to poor public awareness. In the case of Mokokchung town, it was found that a majority of 49 percent of the respondents perceived air pollution to be the main

problem of urbanization, which was followed by 41.8 percent of the respondents who perceived the main problem of urbanization was due to poor public awareness, while 30.1 percent of the respondents perceived it to be due to the

lack of proper drainage and 25.5 percent of the respondents perceived the main problem of urbanization in Mokokchung town was due to lack of expertise in the field of planning.



Source: Primary survey

Fig. 11: Perception on the Main Problems of Urbanization

Findings

The reliability analysis which was carried out for Perception on Air Pollution (PAP) for all the three towns revealed that Mokokchung town attained the highest reliability with, $\alpha = 0.823$ as compared to Kohima and Dimapur town. The reliability analysis for Perception on Water Pollution (PWP) of all three towns revealed that Dimapur town attained the highest reliability with, $\alpha = 0.753$ as compared to Kohima and Mokokchung town. In the case of the reliability analysis on the Satisfaction on Traffic, Drainage and Waste Management (STDWM) of all the three towns, Mokokchung town once again attained the highest reliability with, $\alpha = 0.740$ as compared to Kohima and Dimapur town. The perception analysis on the air

quality before the lockdown period revealed that a majority of 52 percent of respondents of Kohima town perceived the air quality to be fair as compared to Mokokchung and Dimapur town with 48.4 and 29.5 percent. While on the other hand 46.5 percent of respondents of Dimapur town still perceives the air quality to be poor even before the lockdown period as compared to Kohima and Mokokchung town. The perception analysis on the air quality during the lockdown period interestingly revealed that the respondents of Dimapur town attained the highest number of respondents with 49.7 percent who perceived the air quality to have a slight improvement during the lockdown period in comparison to Kohima and Mokokchung town. The perception analysis on the water pollution concerns of

Kohima town revealed that majority of the respondents perceived that water pollution in Kohima town is extremely a serious matter with 33.6 percent respondents, 32.2 percent of the respondents perceived it to be a serious matter and 29.6 percent of the respondents perceived it to be a very serious matter. The perception analysis revealed that according to the overall perception of the respondents in Kohima town, water pollution seemed to be given more importance as compared to air pollution. Garbage dumping seemed to be the main source of water pollution according to the perceptions of the respondents of all three towns, with 60 percent of respondents from Dimapur town, 58.6 percent of respondents from Kohima town and 51.6 percent of respondents from Mokokchung town. Dimapur town attained the highest percentage of respondents who perceived the main source of water pollution as due to garbage dumping with 60 percent as compared to Kohima and Mokokchung town. Again, 56.8 percent of the respondents from Dimapur town perceived the water quality of Dimapur town as compared to ten (10) years ago to be worse as compared to Kohima and Mokokchung town with 54.6 and 46.5 percent respectively.

The satisfaction analysis on traffic system revealed that majority of responses from all three towns were not satisfied with the traffic system, where Kohima town had the highest respondents with 85.5 percent of the respondents who were not at all satisfied with the traffic system as compared to Dimapur and Mokokchung town. Also, Kohima town had the least number of respondents who were satisfied with the traffic system at 13.2 percent only as compared to Mokokchung and Dimapur town with 49 and 23.2 percent. The satisfaction analysis on the drainage system revealed that majority of respondents from all three towns were not satisfied with the drainage system with, 99.4 percent of

respondents from Dimapur town, 91.4 percent from Kohima town and 79.1 percent from Mokokchung town. Dimapur town attained the highest percentage of respondents with 99.4 percent who were not at all satisfied with the drainage system as compared to Kohima and Mokokchung town. Dimapur town again had the highest percentage of respondents who were not satisfied with the waste management with 67.8 percent as compared to Kohima and Mokokchung town. It was interesting to find out that a majority of 55.6 percent of the respondents from Mokokchung town showed complete satisfaction with the waste management as compared to Kohima and Dimapur town with 48.7 and 30.3 percent respectively.

The perception analysis on the main problem of urbanization revealed that the highest percentage of 56.6 percent of respondents from Kohima town perceived air pollution to be the main problem of urbanization as compared to Kohima and Mokokchung town. Also, a majority of 41.8 percent of respondents which was also the highest percentage of respondents from Mokokchung town perceived poor public awareness to be the main problem of urbanization as compared to Kohima and Dimapur town with 28 and 23.9 percent respectively. In all the items used for analysis, the dissatisfaction levels seemed to be remarkably at higher rate from Dimapur town respondents which indicates that the level of the urban problem seemed to be at a higher rate as compared to Kohima and Mokokchung town.

Conclusion:

In the case of Nagaland, the main factors that paved the way for urbanization were mainly due to the growth of education, transport and communication, migration, commercialization and small-scale industries. These were the thriving factors that led to the beginning of an urbanization era. As these developmental gateways

began to emerge and prime focuses were concentrated wholly on the developmental sector, there exists negligence thus creating urban problems thereafter. Therefore, it can be concluded that urbanization and development are going stronger with time in all three towns that are Kohima town, Dimapur town and Mokokchung town. However, it is impossible to undo, recreate or rearrange the present urban situation, the only alternative solution is to look into the errors and take hold of opportunities and possibilities and make partial changes by taking one step at a time. Henceforth, studying and analysing the urban issues in regards to the growing urban population right from now onwards should be extremely imperative.

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