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Editorial Note

Dimapur Government College Journal is a multi-disciplinary journal published annually. The Journal started its first publication in 2015 and the first volume carried five issues. The current publication is the first issue of the second volume. The articles received have gone through a series of reviewing process. Only papers that have satisfied the reviewing process have been taken for publication.

It is a matter of fact that research has been the key element in growth and development of a nation. Research investigates systematically into a problem or situation and assists in solving the problem. Hence, researches both scholarly and professionally have been expanding regularly to a great measure. In view of the growing need and significance of research, the Dimapur Government College Journal continues to hold quality publication in its endeavour.

In the current issue, ten research papers addressing wide range of intellectual discourse have been presented. The present publication includes vital aspects of environmental concerns, economic factors, historical facts and socio-cultural importance. Environmental issues pertaining to urban solid-waste management; hazardous impact of environmental pollution on housing and empirical study on drainage management system have been addressed. The employment which has been the fundamental for economic sustenance has been discussed

particularly in government sector in Nagaland. Also, the economic sustainability of the rural areas through horticultural farming has been examined based on empirical research. A historical perspective of the battle at Thuda that was fought between two opposing armed forces in Nagaland state has been presented based on factual account of the incident. Further, the sociological aspects of the Naga society such as patterns of chieftainship and the customary law have been widely enumerated and discussed. Hence, the editorial team has the confident that the deliberations made in this Journal will augment the growth and progress of an academic community as well as the society at large.

The Editorial Board would like to express heartfelt gratitude to the external Peer-Reviewers; Prof. B. Kilangla Jamir, Prof. S.K. Patnaik, Prof. Kedilezo Kikhi, Dr. Neizo Puro, Dr. Lichumo Enie, Dr. Thejotalu Nakro, Dr. Viheno Iralu and Dr. Kekhrieseno Christina. Their valuable feedback and recommendations have made the Journal a standard one. Also, hearty appreciation and gratitude goes to the researchers and scholars for their contribution which makes this Journal possible.

The Editorial Board is, therefore, pleased to present the Volume-II, Issue No.1 of Dimapur Government College Journal.

Editorial Board

Foreword

I am happy to learn that the Dimapur Government College is bringing out Volume-II, Issue No.1 of the Journal. The successful accomplishment of this task is a result of persistent hard work and sincerity of the teachers and students involved in research. I congratulate all the researchers and the editorial board on the successful publication of this research Journal. Research is a systematic investigation towards increasing the sum of knowledge. It is to be noted that the progress and development of a nation depends on the standard of excellence set by its institution of higher learning. Gone are the days, when teaching and research were viewed mutually exclusive and research was wrongly accorded a status above that of teaching. Now, the participation of teachers of colleges and universities in research field has become very important for the fast development in all sectors of human activities. The strong research background of the faculties enriches the teaching-learning processes of the institutions and brings out advancement of the society.

Research articles are the final output of most research. The fact that many scholars contributed articles in this Journal is a sign of research activities that is going sturdy. All researchers have attempted to carry out intensive study on their topics before presenting their own evaluation, interpretation and augmentation. Some findings may provoke debate or may open ways for more research in that field. However, this is a

sincere effort by the researchers to present their viewpoints. There is always a room for improvement of quality of research; hence everyone should strive for improvement. I am sure this collection of interesting research papers may act as a beacon light to teachers desirous of kick starting research works in their field of interest and specialization.

Dr. Moanochet Longchar
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About the Contributors

1. **B. Ghosh**, NuvoTechviron, Guwahati - 781022, Assam, India.
Email: biplabghosh22@gmail.com.
2. **Dr. K. Hukato Swu**, Deputy Director, Directorate of Higher Education, Nagaland. Kohima. Email: hukatoighaswu68@gmail.com.
3. **Ms. Bokali Kibami**, Assistant Professor, Department of Political Science, Dimapur Government College, Dimapur.
Email: bokalikibami2@gmail.com.
4. **Dr. Vitosie Vupru**, Assistant Professor, Department of Economics, Dimapur Government College, Dimapur. Email: vupruv@gmail.com.
5. **Neizhanuo Golmei**, Assistant Professor, Department of Political Science, Nagaland University. Email: neizhanuo@nagalanduniversity.ac.in.
6. **Moameren Pongen**, Research Scholar, Department of Political Science, Nagaland University.
7. **Nilesh Kumar Prasad**, B.SC. 6th Semester, Department of Physics, St. John College, Dimapur, Nagaland, India.
8. **Dhruba Kumar Paul**, B.SC. 6th Semester, Department of Physics, St. John College, Dimapur, Nagaland, India.

9. **Dr. Sita Malakar**, Assistant Professor, Department of Sociology, St. John College, Dimapur, Nagaland, India. Email: sitamalakar@stjohncollege.in.
10. **Pudezono Tase**, Assistant Professor, Department of Economics, Dimapur Government College, Dimapur. Email: pudezonorose@gmail.com.
11. **Vivi Swu**, Assistant Professor, Department of History, Dimapur Government College. Email: viviswu18@gmail.com.
12. **Herali Achumi**, Assistant Professor, Department of Sociology, Dimapur Government College, Dimapur. Email: heraachumi@yahoo.com.
13. **Dr. Dominic Meyieho**, Faculty at Assam Don Bosco University, Guwahati. Email: dmeyieho@gmail.com.
14. **Dr. Yelhi Vero**, Assistant Professor, Department of Economics, Dimapur Government College, Dimapur, Nagaland. Email: yelhivero@gmail.com.
15. **Eneingulo-u Lasuh**, Vice Principal, Eastern Christian College, Dimapur, Nagaland. Email: apulelasuh@yahoo.co.in.
16. **Paul Punü**, Research Scholar, Assam Don Bosco University, Guwahati. Email: paulpanii@gmail.com.

A Comprehensive Literature Review on Bioremediation of Heavy Metal Waste Using Microorganisms

B. Ghosh*

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About the author

*NuvoTechviron,
Guwahati - 781022,
Assam, India. Email:
biplabghosh22@gmail.com

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Abstract

Managing the urban solid waste is a subject of great apprehension globally. In contemporary times, lots of research studies relating to the usage of competent procedures to minimize the volume of the waste have been growing. In this perspective, the usage of bioremediation procedures for the elimination of toxic metals from waste is attaining substantial consideration.

Bioremediation is the procedure which by means of microorganisms eliminate the waste. An extensive variety of microorganisms containing fungi, bacteria, yeasts and algae can be active methylators, so as to convert the toxic varieties. Though microorganisms would not be able to terminate the metals, they can modify chemical properties through some mechanisms. This study would deliver an apprise regarding the approaches obtainable for the remediation of metal-riched waste by means of microorganisms with evaluation of their benefits and flaws where emphasis is on the hazardous metals. Different types of microorganisms used in bioremediation procedures are deliberated in detail as they have ability to biosorb hazardous metal ions. This study reviews current information on several features of the applications of bioremediation along with the difficulties to its commercial accomplishment.

Introduction

Hasty development and anthropogenic actions like failed practice of fossil fuel burning, agro-chemicals and discarding of sewage sludge have instigated soils and water to be sternly polluted with heavy metals (Sivasangari et al. 2016). Ecosystems also got irretrievable damaged by the heavy metals from the mining and casting of ores, automobile exhausts, waste from storage batteries, use of fertilizers, pesticides etc. Heavy metals are non-biodegradable and persist in the environment. Hence, remediation is required to avoid heavy metal leaching or mobilization into environmental segments and to facilitate their extraction. The metals that pollute the waste are usually found in the surroundings comprising lead, nickel, chromium, zinc, mercury, arsenic, uranium, selenium, cadmium etc. Apart from high toxicity, hazardous, these metals have an adversative effect on the human, fauna and flora and they are non-biodegradable.

Numerous procedures such as electrochemical treatment, ion exchange, precipitation, osmosis, evaporation, and sorption are usually employed to eliminate heavy metals from the waste (Fomina and Gadd 2014; Kadirvelu et al. 2002). But, those procedures are neither cost-effective nor environmental friendly. On the contrary, bioremediation procedures are capable to remove the heavy metals, when the conventional methods fail to work. Moreover, bioremediation procedures are eco-friendly and economically practicable choice. The procedure is centered on the binding ability of the biological organisms where microorganisms can be deliberated as a biological instrument for metal elimination (Riggle and Kumamoto 2000). There are numerous researches regarding the removal of the heavy metals using microorganisms for the removal of heavy metals from the waste as substitute to conventional methods (Texier et al. 1999). Bioremediation by microorganisms is effective because of the act of microorganisms

on heavy metals when present in thinned solutions. Detailed information on the bioremediation procedure employing several microorganisms, mechanisms, efficacy, and existing uses are delivered with propositions to overhaul the constraints.

Waste comprising of heavy metal

Elements of higher atomic weight than *Fe* are considered as heavy metals. Though, *Cr*, *As* and *Se* are usually mentioned as heavy metals (Pierzynski et al. 2000). Heavy metals can be toxic to humans reliant on the contact intensities like *Hg*, *Pb*, *Cd*, *Cu*, *Ni*, and *Co*. Heavy metals are prominent toxins, non-biodegradable and simply gathered in living beings (Zhuang and Gao 2013). The harmfulness of the heavy metals is reliant on the respective forms while researches on bioremediation usually deliberate the total amount present. Heavy metals polluted in soil and waste can bring together and persevere for long and is injurious to dynamic procedures involved in microbial cycles (Grath et al. 1994). The toxicity of heavy metals is reliant on their form and binding properties. Variations in the ecological situations can change heavy metals from the solid phase to the liquid phase letting the possible toxicities to the liquid waste too.

There are numerous researches regarding the removal of the heavy metals existing in the environment including reverse osmosis, adsorption, redox procedure which are deliberated to be wasteful due to cost ineffective. In bioremediation usually employing microorganisms, toxic chemicals are transformed into less toxic by biological processes (Nicolaou et al. 2010). The technology uses the metabolic potential of microorganisms to remove the heavy metals from the waste and it is a sound substitute with low cost and high efficacy (Watanabe 2001). Microorganisms can convert harmful heavy metals into nontoxic or less toxic metabolites. Microorganisms such as fungi, bacteria, yeast, algae are used in case of bioremediations

which can endure polluted environments as they can exploit the pollutants as possible source of energy.

Categories of microorganisms used in bioremediation

Bioremediation is centered on the activity of one or more microorganisms (Nicolaou et al. 2010). There are numerous studies where several microorganisms have ability to biosorb harmful ions of heavy metal (Singh et al. 2014). Cases of microorganisms used in bioremediation procedures for heavy metals are *Pseudomonas veronii*, *Kocuriaflava*, *Bacillus cereus*, *Sporosarcinaginsengisoli* which are bacteria (Vullo et al. 2008; Achal et al. 2011; Kanmani et al. 2012; Achal et al. 2012); *Penicilliumcanescens*, *Aspergillus versicolor*, *Aspergillus fumigates* which are fungi (Say et al. 2003; Tastan et al. 2010; Ramasamy et al. 2011); *Cladophorafascicularis*, *Spirogyra spp.*, *Spirullina spp.* which are algae (Deng et al. 2007; Mane and Bhosle 2012) and *Saccharomyces cerevisiae* and *Candida utilis* which are yeast (Machado et al. 2010; Kujan et al. 2006). For functioning bioremediation, microorganisms should react with the contaminant enzymatically and alter them to innocuous substances (Sharma 2012). Microorganisms have advanced tools allied with resistance to harmful heavy metals and converting them harmless (Mejare and Bülow 2001). Some microbes are associated with the procedure of enzymatic degradation. Though majority of the bioremediation methods are active in aerobic settings, degradation of microorganisms occurs in anaerobic settings (Sharma 2012). Different categories of microorganism are essential for operational remediation as various types of contaminants can be present in the waste. Though, there are many options, microorganisms reliant on the chemical nature of the contaminants and chosen cautiously as they endure limited amount of pollutants. The efficacy of the degradation procedure is associated with the potential of the specific microorganism. The use of biotechnology to the removal of heavy metals from the

waste is a comparatively novel topic. An improved comprehension of the procedures by which microorganisms apprehend heavy metals has been collected with an eye to maximize the efficacy for environmental complications related to the presence of heavy metal in wastes with new methods like bioleaching, biosorption, bioremediation etc. (Rahman et al. 2014). In this context, the central methodology is the genetic engineering where through some reactions modified microorganisms can alter from the inorganic form into the organic form. In addition to the upsurge of the solubility by the microorganisms, modified microorganisms can enhance their resistance by aspects linking the solubility of heavy metals. On the other hand, their interaction with other aspects such as sorption, precipitation, changes in *pH* can reduce the heavy metals in activeness in the surroundings (Nicolaou et al. 2010). Genetic engineering can be applied to modify the microorganisms and attain fascinating features like *pH* modifications, fast-tracked growth, and acceptance to risky environmental settings. Current studies have confirmed the capability of fungi and yeasts to remove heavy metals from a particular surrounding. With the current developments in genetic engineering, it is comparatively easy to create genetically engineered microorganisms (GEMs) by reorganizing the genes, promoters, etc. and tested for competent bioremediation under laboratory settings (Paul et al. 2005). Current studies demonstrate that certain GEMs have improved capacity to metabolize precise chemicals like hydrocarbons and pesticides (Perpetuo et al. 2011; Singh et al. 2014). Genetic engineering methods on the metabolic potential of microorganisms have permitted the plan of genetically modified microorganisms adept of degrading particular pollutants which creates an opening to generate an artificial blend of genes that are not exist in environment. Some bacteria, such as *Geobactermetallireducens*, can remove uranium in mining operations and from polluted waste (Kumar et al. 2011).

Bioremediation Mechanisms

Microorganisms generally used for the bioremediation of heavy metals are bacteria, algae, fungi, and yeast. Bioremediation can be categorized as bioaccumulation and biosorption. Biosorption is an inert adsorption tool (Ahalya et al. 2003). Many features can affect the biosorption of metals like ionic strength, biomass concentration, *pH*, temperature, particle size etc. (Volesky 2004). The biosorption procedure is inexpensive because the biomass can be found from industrial waste and can be reproduced and reused in several cycles. The selectivity in biosorption is normally low where the metal binding happens by physicochemical interface. On the contrary, living biomass is required for bioaccumulation which is expensive because the procedure happens in the incidence of living cells where reuse is restricted. Yet, procedures involving bioaccumulation usually do better.

Majority of the heavy metals cannot be biodegraded where they incline to accrue in the microorganism (Huang et al. 2014). Many features impact metal accretion like the degree of contact, salinity, metal concentration, temperature etc. It is hard to find thorough information on how the accretion happens in the bioremediation (Varma et al. 2011). The procedure of accretion is intricate and conferring the pathway of metabolism controlled by the metal concentration (Fukunaga and Anderson 2011).

Considerations regarding capability of microorganisms

The competence of a bioremediation procedure depends on the pathway through which the metal fixes to a particular spot of the biomass. In the wake of the absorption of heavy metals, a process of metal secretion or detoxify commences to evade potential harmful effects. Though, microorganisms will not undergo the harmful effects of the incidence of heavy metals while they are kept in detoxified forms (Fukunaga and Anderson 2011). Table 1 depicts capability of different microorganisms

such as algae, bacteria, fungi, and yeasts to eliminate heavy metals from the waste (Romera et al. 2007; Murphy et al. 2008; Mata et al. 2008; Nagy et al. 2014; Fulekar et al. 2012; Anahid et al. 2011). Good number of microorganisms has been deliberated for the advancement of effective technology for the elimination of heavy metal ions from contaminants.

Table 1. Example of microorganisms used to eliminate heavy metals

Microorganism	Category	Removed Metal
Algae	<i>Ascophyllum nodosum</i>	Pb, Ni, Cu, Cd, Zn
	<i>Cladophora fascicularis</i>	Pb
	<i>Fucus vesiculosus</i>	Cr, Pb, Cd
	<i>Spirogyra spp. and Spirulina spp.</i>	Cr, Cu, Fe, Mn, Zn
	<i>Chlorella pyrenoidosa</i>	U
Bacteria	<i>Bacillus cereus</i>	Cr
	<i>Kocuria flava</i>	Cu
	<i>Pseudomonas veronii</i>	Cd, Zn, Cu
	<i>Sporosarcinaginsengisoli</i>	As
Fungi	<i>Agaricus bisporus</i>	Cd, Zn
	<i>Penicillium simplicissimum</i>	Ni, Co, Mo, Mn, Fe, Zn
	<i>Aspergillus fumigatus</i>	Pb
	<i>Aspergillus versicolor</i>	Cr, Ni, Cu
Yeast	<i>Saccharomyces cerevisiae</i>	Cr, Ni, Cu, Zn
	<i>Candida tropicalis</i>	Cd, Cr, Cu, Ni, Zn
	<i>Pichia guilliermondii</i>	Cu
	<i>Candida utilis</i>	Cd

Recommendations

The unfettered release of waste containing heavy metals in pastoral grounds or water bodies upsurges their likelihoods of inward bound of the food chain over agri-products, fishes and following bioaccumulation. Numerous approaches of bioremediation appropriate to diverse ecological settings have been examined and suggested (Adams et al. 2015; Kumar et al. 2011; Abatenh et al. 2017; Coulon et al. 2010). The strategy,

progress, and use of these methods need cautious variety of microorganism. Wide range of investigation has been conducted using precise strains of microbes for bioremediation. Microbes conducted redox responses so as to influence the bioremediation procedures by metal mobilization or immobilization. The procedure of bioremediation of heavy metals is more effective using diverse microbial strains synchronously as a substitute to a single species (Wang and Chen 2009). Progresses in genetic engineering with optimization procedures recommend these tools (Brown et al. 2010). Genetically modified microbes have improved bioremediation possibility for several wastes. The bioremediation method needs an all-inclusive and comprehensive process for methodical, viable and maintainable approaches which can be effortlessly tailored for each of the situations. Furthermore, there is a crucial requirement for management at all stages, together with research establishments, the community, governmental organizations as well as the industries (Sodango et al. 2018).

Conclusions

Activities produce huge amounts of waste comprising toxic heavy metals. Several studies have been carried out in last few decades intended to pull down heavy metal quantities. Significant energy has been put together to advance effective and low cost technologies and relate them to waste management. The possibility for microorganisms to eliminate heavy metals by active and inactive appliances has been revealed to be a remarkable method to contaminated wastes. The competence of such procedures is reliant on the investigational situations, the target contaminant and several other issues. The solicitation of bioremediation procedure in big scale is still a challenge. Additional inquiries intended to the documentation of the appliances involved in the description of biosorbents and progresses in genetic engineering are essential. The optimal capable biomass must be identified considering its

cost and availability. Similarly, the microorganisms should be easy to find and can be nurtured. Though some advancement has been achieved in the acknowledgement of the prominence of micro organisms for the detoxification of contaminated wastes, few vital topics still essential are to be addressed. Nevertheless, a fresh task has arisen where additional studies require to be centered on the growth of innovative and clean technologies with marketable viability.

References

- Abatenh E., Gizaw B., Tsegaye Z., Wassie M. 2017. Application of micro organisms in bioremediation review. *J Environ Microbiol.*, 1 (1), 2-9.
- Achal V., Pan X., Zhang D. 2011. Remediation of copper-contaminated soil by *Kocuriaflava* CR1, based on microbially induced calcite precipitation. *Ecological Engineering*, 37 (10), 1601-1605.
- Achal V., Pan X., Fu Q., Zhang D. 2012. Biomineralization based remediation of as (III) contaminated soil by *Sporosarcinaginsengisoli*. *Journal of Hazardous Materials*, 201-202, 178-184.
- Adams G.O., Fufeyin P.T., Okoro S.E., Ehinomen I. 2015. Bioremediation, biostimulation and bioaugmentation: A review. *Int J Environ Bioremed Biodegradation*, 3 (1), 28-39.
- Ahalya N., Ramachandra T.V., Kanamadi R.D. 2003. Biosorption of heavy metals. *Research Journal of Chemistry and Environment*, 7 (4), 4544-4552.
- Anahid S., Yaghmaei S., Ghobadinejad Z. 2011. Heavy metal tolerance of fungi. *ScientiaIranica*, 18 (3), 502-508.

- Brown G.E., Trainor T.P., Chaka A.M. 2008. Geochemistry of mineral surfaces and factors affecting their chemical reactivity. In Nilsson S., Pettersson L.G., Norskov J.K. (Eds.). *Chemical bonding at surfaces and interfaces*. Amsterdam, Netherlands, Elsevier, 7.
- Coulon F., Al Awadi M., Cowie W., Mardlin D., Pollard S., Cunningham C., Risdon G., Arthur P., Semple K.T., Paton G.I. 2010. When is a soil remediated? Comparison of biopiled and windrowed soils contaminated with bunker-fuel in a full-scale trial. *Environ Pollution*, 158 (10), 3032-40.
- Deng L., Su Y., Su H., Wang X., Zhu X. 2007. Sorption and desorption of lead (II) from waste water by green algae *Cladophorafascicularis*. *Journal of Hazardous Materials*, 143 (1-2), 220-225.
- Fomina M., Gadd G.M. 2014. Biosorption: current perspectives on concept, definition and application. *Bioresource Technology*, 160, 3-14.
- Fukunaga A., Anderson M.J. 2011. Bioaccumulation of copper, lead and zinc by the bivalves *Macomonaliliana* and *Austrovenus stutchburyi*. *Journal of Experimental Marine Biology and Ecology*, 396 (2), 244-252.
- Fulekar M.H., Sharma J., Tendulkar A. 2012. Bioremediation of heavy metals using biostimulation in laboratory bioreactor. *Environmental Monitoring and Assessment*, 184 (12), 7299-7307.
- Grath S.P., Chaudri A.M., Giller K.E. 1994. *Summary 15th World Congress of Soil Science*, Acapulco, México.
- Huang F., Guo C.L., Lu G. N., Yi X. Y., Zhu L.D., Dang Z. 2014. Bioaccumulation characterization of cadmium by growing *Bacillus cereus* RC-1 and its mechanism. *Chemosphere*, 109, 134-142.

- Kadirvelu K., Senthilkumar P., Thamaraiselvi K., Subburam V. 2002. Activated carbon prepared from biomass as adsorbent: elimination of Ni (II) from aqueous solution. *Bioresource Technology*, 81, 87-90.
- Kanmani P., Aravind J., Preston D. 2012. Remediation of chromium contaminants using bacteria. *International Journal of Environmental Science and Technology*, 9, 183-193.
- Kujan P., Prell A., Safár H., Sobotka M., Rezanka T., Holler P. 2006. Use of the industrial yeast *Candida utilis* for cadmium sorption. *Folia Microbiologica.*, 51 (4), 257-260.
- Kumar A., Bisht B.S., Joshi V.D., Dhewa T. 2011. Review on bioremediation of polluted environment: a management tool. *International Journal of Environmental Sciences*, 1 (6), 1079-1093.
- Machado M.D., Soares E. V., Soares H.M. 2010. Removal of heavy metals using a brewer's yeast strain of *Saccharomyces cerevisiae*: chemical speciation as a tool in the prediction and improving of treatment efficiency of real electroplating effluents. *Journal of Hazardous Materials*, 180 (1-3), 347-353.
- Mane P. C., Bhosle A. B. 2012. Bioremoval of some metals by living Algae *spirogyra* sp. and *Spirullina* sp. from aqueous solution. *International Journal of Environmental Research*, 6 (2), 571-576.
- Mata Y.N., Blázquez M.I., Ballester A., González F., Muñoz J. A. 2008. Characterization of the biosorption of cadmium, lead and copper with the brown alga *Fucus vesiculosus*. *Journal of Hazardous Materials*, 158 (2-3), 316-323.
- Mejare M., Bulow L. 2001. Metal-binding proteins and peptides in bioremediation and phytoremediation of heavy metals. *Trends in Biotechnology*, 19 (2), 67-73.

- Murphy V., Hughes H., McLoughlin P. 2008. Comparative study of chromium biosorption by red, green and brown seaweed biomass. *Chemosphere*, 70 (6), 1128-1134.
- Nagy B., Mânzatu C., Maicaneanu A., Indolean C., Lucian B.T., Majdik C. 2014. Linear and nonlinear regression analysis for heavy metals removal using *Agaricus bisporus* macro fungus. *Arabian Journal of Chemistry*.
- Nicolaou S.A., Gaida S.M., Papoutsakis E.T. 2010. A comparative view of metabolite and substrate stress and tolerance in microbial bioprocessing: from biofuels and chemicals, to biocatalysis and bioremediation. *Metabolic Engineering*, 12 (4), 307-331.
- Paul D., Pandey G., Jain R.K. 2005. Suicidal genetically engineered microorganisms for bioremediation: need and perspectives. *Bioessays*, 27 (5), 563-573.
- Perpetuo E.A., Souza C.B., Nascimento C.A.O. 2011. Engineering bacteria for bioremediation. In Carpi A. (ed.) *Progress in Molecular and Environmental Bioengineering—From Analysis and Modeling to Technology Applications*. Rijeka: InTech, 605-632.
- Pierzynski G.M., Sims J.T., Vance G.F. 2000. *Soil and environmental quality*. United States of America, Boca Raton.
- Rahman S., Kim K.H., Saha S.K., Swaraz A.M., Paul D.K. 2014. Review of remediation techniques for arsenic (As) contamination: a novel approach utilizing bio-organisms. *Journal of Environmental Management*, 134, 175-185.
- Ramasamy R.K., Congeevaram S., Thamaraiselvi K. 2011. Evaluation of isolated fungal strain from e-waste recycling facility for effective sorption of toxic heavy metal Pb (II) ions and fungal protein molecular characterization-a Mycoremediation approach. *Asian Journal of Experimental*

Biological Sciences, 2 (2), 342-347.

- Riggle P.J., Kumamoto C.A. 2000. Role of a *Candida albicans* P1-type ATPase in resistance to copper and silver ion toxicity. *Journal of Bacteriology*, 182, 4899-4905.
- Romera E., González F., Ballester A., Blázquez M.I., Muñoz J. A. 2007. Comparative study of biosorption of heavy metals using different types of algae. *Bioresource Technology*, 98 (17), 3344-3353.
- Say R., Yimaz N., Denizli A. 2003. Removal of heavy metal ions using the fungus *Penicillium canescens*. *Absorption Science and Technology*, 21 (7), 643-650.
- Sharma S. 2012. Bioremediation: features, strategies and applications. *Asian Journal of Pharmacy and Life Science*, 2 (2), 202-213.
- Singh R., Singh P., Sharma R. 2014. Microorganism as a tool of bioremediation technology for cleaning environment: a review. *Proceedings of the International Academy of Ecology and Environmental Sciences*, 4 (1), 1-6.
- Sivasangari S., Suseendhar S., Kumar K.S., Vijayaprasath N., Thirumurugan M. 2016. Characteristic study of electroplating and dye industrial effluents. *Int J Innov Res SciEn Technol*. 5 (12), 20810-16.
- Sodango T.H., Li X., Sha J., Bao Z. 2018. Review of the spatial distribution, source and extent of heavy metal pollution of soil in China: impacts and mitigation approaches. *J Health Poll*, 8 (17), 53-70.
- Tastan B.E., Ertugrul S., Donmez G. 2010. Effective bioremoval of reactive dye and heavy metals by *Aspergillus versicolor*. *Bioresource Technology*, 101 (3), 870-876.

- Texier A.C., Andres Y., le Cloirec P. 1999. Selective biosorption of lanthanide (La, Eu, Yb) ions by *Pseudomonas aeruginosa*. *Environmental Science and Technology*, 33, 489-495.
- Varma R., Turner A., Brown M.T. 2011. Bioaccumulation of metals by *Fucus ceranoides* in estuaries of South West England. *Marine Pollution Bulletin*; 62 (11), 2557-2562.
- Volesky, B. 2004. *Sorption and Biosorption*. Quebec: BV-Sorbex, Inc.
- Vullo D.L., Ceretti H.M., Daniel M.A., Ramírez S.A., Zalts A. 2008. Cadmium, zinc and copper biosorption mediated by *Pseudomonas veronii* 2E. *Bioresource Technology*, 99 (13), 5574-5581.
- Wang J., Chen C. 2009. Biosorbents for heavy metals removal and their future. *Biotechnol Adv*, 27 (2), 195-226.
- Watanabe K. 2001. Microorganisms relevant to bioremediation. *Current Opinion in Biotechnology*, 12 (3), 237-241.
- Zhuang W., Gao X. 2013. Acid-volatile sulfide and simultaneously extracted metals in surface sediments of the southwestern coastal Laizhou Bay, Bohai Sea: concentrations, spatial distributions and the indication of heavy metal pollution status. *Marine Pollution Bulletin*, 76, 128-138.

Solid Waste Management: An Overview Study of Kohima Municipal Council

K. Hukato Swu*, Bokali Kibami**

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About the authors

*Deputy Director,
Directorate of Higher
Education, Nagaland.
Kohima. Email:
hukatoighaswu68@gmail.
com

**Assistant Professor,
Department of Political
Science, Dimapur Govt.
College, Dimapur. Email:
bokalikibami2@gmail.com

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Abstract

Nagaland attained its statehood on 1st December 1963. Kohima is the state Capital of Nagaland. The total population of Kohima according to 2011 census is 267, 988 and 90 percent of the population is predominantly tribal. However, with increasing modern lifestyle and rapid population growth resulted in the increase in the quantity and variety of waste generated at urban areas. Urban wastes have become dangerous to human beings in the form of non-biodegradable and harmful materials causing hazards to the society in the long run. Hence, solid waste management is one among the primary essential services provided by municipal authorities in

the country to keep the urban centers clean. The objective of the paper is an overview study of Kohima Municipal Council in regard to Municipal Solid Waste Management at the backdrop of Management of solid waste of 2000 & 2006 Rules. Its implementation, strengths and challenges in the city and sensitizing the people on solid waste management have been deliberated in this paper.

Introduction

Kohima district was established in 1881 as a Sub-Division of formerly Naga Hills District within Assam. Nagaland attained its statehood on 1st December 1963 and Kohima is the Capital of Nagaland (Balakhrisna, 1961). It lies between 94°5'11" to 94°7'12" East longitudes and 25°28'20" to 25°31'51" North latitudes. It is situated on the Dimapur to Imphal NH 39. The population of Kohima district in 2018 is 305, 089 and 90% are tribal (GoN, 2011).

Topography

The district is rugged and hilly terrain with mean elevation of the town is 1468 m (ranges from 150m-3000m) and lies in seismic zone V. It is prone to landslides due to heavy rainfall.

Regional Road Linkages

Three National Highways 39, 61 and 150 are well connected with state capitals of neighboring states.

Kohima Municipal Council

Kohima Town Committee (KTC) was established in 1957. It was initiated by the concern citizens consisting 8 wards with 8 elected councilors and 4 Govt. nominees. In 2005, Municipality was constituted under the provision of the Nagaland Municipal Act, 2001. At present, there are 19 Wards having one Dipper Truck each and 7 Vehicles for highways transporting solid waste to the disposal sites. Out of 194 staff, 110 are laborers (36 sanitary workers, 74 sweepers and 84 ministerial staff). Kohima town being the administrative headquarters of the state Nagaland, there is an increase of population relocation drawn by economic reasons for trade, commerce, employment and education. The migration of population from villages to towns have led to the rapid urbanization and hence its density of population. According

to 2011 Census, the decadal growth from rural to urban place is 59.87% (Population India, 2018). Kohima town lacks proper town planning and natural topography constraints with heavy rainfall in most parts of the year are major concerns for municipal solid waste management affecting public health hazards and environmental problems, as total elimination of waste is not possible. Therefore, the effective management of solid waste has become a colossal challenge for the Kohima Municipal Council (KMC) for service delivery for better quality life.

Objective

The main purpose of the solid waste management is to reduce the quantity of solid waste and disposed off on land by recovery of materials and energy requirement of raw material and energy as inputs for technological processes. Solid waste management is one among the primary essential services provided by municipal authorities in the country to keep the urban centers clean. The objective of the paper is an overview study of Kohima Municipal Council in regard to Municipal Solid Waste Management at the backdrop of Management of solid waste of 2000 & 2006 Rules. Its implementation, strengths and challenges in the city on sensitizing the people on Solid Waste Management are discussed in holistic approach in relation to health and ecosystem.

Methodology

For the present study, qualitative methodology was adopted using grounded approach. Both Primary and Secondary sources of data have been used for interpretation. Primary sources data are obtained by using various tools and techniques like household survey, in-depth interviews in the form of informal unstructured questionnaire with key informants like staff and officials of Kohima Municipal Council, community stakeholders, and physical assessment of the implements and

tools used on generation of solid waste, storage, collection and transportation and final disposal of the waste to the sanitary landfill and controlled waste for recycling use. Through the interview the first hand information was garnered. Secondary sources of data were from official records, documents, books, journals and research works.

Solid Waste Management:

“Any useless, unwanted discarded material that is not a liquid or gas is referred to as solid waste.” (Hosetti, 2006). Solid waste management is one of the most neglected urban services. It has lacked due attention in India and its urban areas. Solid Waste Management (SWM) is one of the important primary services provided by municipal authorities in the country to keep the urban centers’ clean. Waste is littered all over leading to unsanitary living conditions. Municipal laws governing the urban local bodies do not have adequate provisions to deal effectively with the ever-growing problem of solid waste management (Ali, 1999).

Sources of Solid Wastes

The main sources of solid waste are: Medical Centres, Food Stores, Feeding Centres, Food Distribution Centers, Slaughter Houses, Agency Premises, Markets and Domestic Areas.

Different Categories of Waste

Different categories of waste are organic waste, combustible, non-combustible, ashes/dust, bulky waste, dead animals, hazardous waste, construction waste, sewage sludge.

Types of waste

There are different types of waste such as residential, commercial, institutional and offices, municipal and agricultural.

General Methods to Treat Solid Waste (Key Components of Municipal Solid Waste Management (MSWM) 2000 & 2006 Rules):

Solid waste management can be divided into 5 key components- Generation, Storage, Collection, Transportation and Disposal. (MOUDPA, 2000)

- a) **Generation:** Generation of solid waste is the stage at which materials become valueless to the owner and since they have no use for them and require them no longer, they want to get rid of them resulting in waste.
- b) **Storage:** Storage is a system for keeping materials after they have been discarded and prior to collection and final disposal. People often store waste before disposal. Improved storage facilities include-
 - i) Small containers; household containers, plastic bins.
 - ii) Large Containers; Communal bins, oils, oil drums, etc.
 - iii) Shallow pits.
 - iv) Communal Depots; walled or fenced in areas.

In determining the size, quantity and distribution of storage facilities, the number of users, types of wastes and maximum walking distance must be considered.

- c) **Collection:** It simply refers how waste is collected for transportation to the final disposal site. Any collection system should be carefully planned to insure that storage facilities do not become overloaded. Collection intervals and volumes of collected waste must be estimated carefully.
- d) **Transportation:** This is the stage when solid waste is transported to the final disposal site. There are various modes of transport which may be adopted and the chosen methods depend upon the availability and volume of waste to be transported.

- e) **Disposal:** Solid waste management is safe disposal where associated risks are minimized. Different methods for disposal of solid waste are:

Thermal Treatment: This refers to processes that involve the use of heat to treat waste.

i) **Incineration:** This is the most common thermal treatment process. This is the combustion of waste in the presence of oxygen. After incineration, the wastes are converted to carbon dioxide, water vapor and ash. It may be used as a means of recovering energy used heating or the supply of electricity. In addition to supplying energy incineration technology has the advantage of reducing the volume of the waste, rendering it harmless, reducing transportation cost and reducing the production of greenhouse gas methane.

ii) **Open Burning:** It is the burning of unwanted materials in a manner that causes smoke and other emission to be released directly into the air without passing a chimney or stack. This includes the burning of outdoor piles, burning in a burn barrel and the use of incinerators which have no pollution devices and as such release the gases by-products directly into the atmosphere. Open burning has been practiced by a number of urban centers because it reduces the volume of waste received at the dump and therefore extends the life of the dump site. Garbage may be burned because of the ease, and convenience and cheapness. Households are required to pay for garbage disposal, burning of waste in the backyard allows households to avoid paying the cost associated with collecting, hauling and dumping the waste. Open burning has many negative effects on both human health and their environment. The uncontrolled burning of Garbage releases many pollutants into the atmosphere which includes dioxins, particulate matter, polycyclic aromatic compounds, volatile organic compounds, carbon monoxide, hexachlorobenzene and ash.

All these chemicals pose serious risk to human health (Jamir et.al, 2011).

Landfills and Dumps

i) **Sanitary landfills:** Sanitary/Scientific landfills are designed to greatly reduce or eliminate the risks that waste disposal may pose to public health and environmental quality. They are usually placed in areas where land features act as natural buffers between the landfill and the environment. For instance, the area may be comprised of clay soil which is fairly impermeable due to its tightly packed particles, or the area may be characterized by a low water table and an absence of surface water bodies thus preventing the threat of water contamination. In addition to the strategic placement of the landfill other protective measures are incorporated into its design. The bottom and sides of landfills are lined with layers of clay or plastic to keep the liquid waste known as leachate, from escaping into the soil. The leachate is collected and pumped to the surface for treatment. Boreholes or monitoring wells are dug in the vicinity of the landfill to monitor groundwater quality. A landfill is divided into a series of individual cells and only few cells of the site are filled with trash at any one time. This minimizes exposure to wind and rain. The daily waste is spread and compacted to reduce the volume, a cover is then applied to reduce odours and keep out pests. When the landfill has reached its capacity it is capped with an impermeable seal which is typically composed of clay soil. Some sanitary landfills are used to recover energy. The natural anaerobic decomposition of the waste in landfills produces landfill gases which include carbon dioxide, methane and traces of other gases. Methane can be used as an energy source to produce heat or electricity. Thus some landfills are fitted with landfill gas (LFG) systems to capitalize on the methane being produced. The process of generating gas is very

slow, for the energy recovery system to be successful there needs to be large volumes of wastes. These landfills present the least environmental and health risk and the records kept can be a good source of information for future use in waste management. However, the cost of establishing these sanitary landfills are high when compared to the other land disposal methods (MOUDPA, 2000).

ii) Controlled Dumps:

Controlled dumps are disposal sites which comply with most of the requirements for a sanitary landfill but usually have one deficiency. They may have a planned capacity but no cell planning, there may be partial leachate management, partial or no gas management, regular cover, compaction in some cases, basic record keeping and they are fenced or enclosed. These dumps have a reduced risk of environmental contamination, the initial costs are low and the operational costs are moderate. While there is controlled access and use, they are still accessible by scavengers and so there is some recovery of materials through this practice (SSWPU, 2000).

Recycling

Recycling refers to the removal of items from the waste to be used as a raw material in the manufacture of new products. Thus, according to this definition recycling occurs in 3 phases;

1. The waste is sorted and recyclables are collected,
2. The recyclables are used to create the raw materials then,
3. These raw materials are used in the production of new product.

The sorting of recyclables may be done at the source (within the household/office) for selective collection by the municipality or to be dropped off by waste producer at recycling centres. The pre-sorting at the source requires public participation which may not be forthcoming.

The sorting of the municipality has the advantage of eliminating the dependence on the public and ensuring that recycling does not occur however it is disadvantageous because of the fact that value of the recyclable materials is reduced, since being mixed with other garbage can have a reverse effects on the quality of the recyclable materials (PIUMINE, 2009).

Observation & Findings

Municipal waste Management in Kohima reveals some major findings of strength and deficiency in managing activities related to waste generation collection, storage, transportation, processing and disposal of wastes in adopting the principles of economy, aesthetics, and conservation of energy and environment.

i) Waste Generation and Collection:

Kohima produces 90 metric tons of waste per day. The waste is mostly dry (non biodegradable) and wet waste (biodegradable). There are 19 wards/sanitation committees with 82 pickup/ collection points of waste in Kohima.

At present there are 2 kinds of waste bins that are used to collect waste – **Green** for biodegradable waste and **Blue** for non biodegradable waste. In future it intends to introduce two new bins i.e. Orange bins for electronic or e waste and Black bins for hazardous wastes.

Processing and Disposal of Solid Waste

1. Kohima Demo Project:

The first major project by KMC started in 2006 in collaboration with Nagaland Pollution Control Board (NPCB) and Central Pollution Control Board (CPCB). KMC purchased two mini –Dipper trucks, 1 Excavator (JCB), 2 Tata Mobile for Bio-Medical Waste, Push Carts for rag pickers, pamphlets, sanitary equipment and free distribution of about 18,000 bins to colonies,

schools colleges, Govt. institutions. It set up a mini landfill at Viyakhukie (above Phek Road) 16 kms away from Kohima.

2. Vermi Compost Plant:

Organic Composting of Vegetables or green waste generating power and gobar gas for domestic fuel. The objective is to create awareness in maintaining better waste management at primary household levels and experiment with other ways to recycle waste to wealth. At present vermin compost is set up near the landfill at Lerie colony, these vermi manure is sold at Rs. 6 per Kilogram to the individuals.

3. Decentralization:

KMC is one of the first cities in India to initiate decentralization of solid waste management service since 2011; it involves the community role and participation by creating awareness through the panchayat, youth, women's organization, in managing their own waste at household level. Out of 19 wards 10 wards practiced decentralization of solid waste management. However, only 2 wards actually showed positive participation in disposal of solid waste management. Therefore, greater involvement and participation is felt by sensitizing the public at a base grassroots level through different medium (Ali, 1999).

4. Transportation:

Solid waste is collected by individual household at a designated place to the dipper truck at 5:30 AM from Monday to Saturday, except on Wednesday and transported to processing sites/disposal sites. The household pays Rs. 70 per monthly. Transportation system involves minimum manual handling and exposure to the waste and processing of waste.

New Projects in Progress

1. A mega 50 crores project for scientific landfill at Lerie

colony was commissioned at 11th February 2016. Here, the waste will be scientifically monitored by segregating waste, sewerage treatment, air monitoring and other methods. The landfill is earmarked for 25 years but if the community reduces –reuse-recycle and segregate our waste from household levels the life of the landfill can be prolonged.

2. One incinerator unit for bio-medical waste is on the pipeline.
3. One crematorium for the Hindu community.
4. Septage Management treatment plant to tackle the menace of septic tanks scientifically at Dzuruzou 14 kms from Kohima.
5. Plan to set up a modern slaughter house; meats to be distributed will be monitored before distribution.
6. In the near future, plans to introduce a willy bins fitted with tracking chips. These chips will send alert signals to KMC office to empty it when it is filled. Similar mechanisms for monitoring trucks carrying waste to check workers on duty.

Activities of KMC

i) Safety measures for workers:

- a) The employees working in the KMC are given protective gear like hand gloves, boots, masks, raincoats while working and handling the waste to be disposed off.
- b) Free medical checkup for various diseases and tetanus injection administered. KMC is affiliated with some private and govt. hospitals that provide treatments to these workers.

ii) Awareness month:

The month of May is declared as SWM Awareness since 2010. Mass Social works, awareness seminars are organized in the colonies.

iii) Award for best inters ward cleanliness:

In order to encourage the wards and to create a general awareness

among the public the award was constituted in 2011. Every year the award is given to the cleanest ward with a certificate, cash and running trophy to the best three wards.

Risks, Diseases and Challenges

Impact of improper waste management:

a) Increase disease transmission that threaten public health:

Rotting organic material pose great public health risk, they serve as a breeding ground for diseases. Waste handlers and pickers are venerable and may become the vectors, contracting and transmitting various diseases and spread to other people.

b) Create greenhouse gas emission and other pollutants:

The organic waste disposed off on an aerobic degradation give out methane-a gas 21 times the effect of carbon dioxide in trapping heat (Smith et al., 2012). Garbage on burning emit out pollutants which pollute the air and the environment.

c) Damage ecosystems:

When solid wastes are dumped into rivers and streams they alter aquatic habitats and harm nature, plants and animals by depleting the dissolved oxygen in water. They also contaminate ground and surface water, some of the water samples collected showed low pH value indicating the corrosive nature of this water samples which may be due to the presence of toxic metals such as Pb and Cu. (Kibami et al., 2014), (Smith, 2011), (Jamir et al., 2011). Moreover, the accumulation of these solid wastes may present physical hazards, clog drains and cause localized flooding.

Fund Constrain

Under the 12th Schedule of the 74th Constitutional Amendment Act, it states about the powers and functions of the Urban Local

Bodies (ULBs) (Spongilila, 2015). However, the State Govt. failed to conduct elections to the ULBs as a result the central funding ceased since 2017. KMC generates its own revenue through toll taxes and duties on goods and services, with little financial assistance from the State Govt. Hence with constraint resources it shoulders the herculean responsibility of city beautification and developmental tasks and also an attempt to tackle the challenges of solid waste management. Environmental problems concerns all the people in the community, however environmental problems are certainly not an issue competing for attention that has been witnesses in developing countries, since resources are limited, decisions are more difficult to mitigate the problem with solutions.

e) Media Coverage:

Media has played an important role in any successful struggle by the communities in general and various individuals, organizations and nongovernmental organizations and the media in particular in addressing environmental related issues and activities. It is witness that the role played by media inspire other communities as media plays the dual role in informing and publicizing the communities about the environmental pollution, however, the media has failed several times to effectively analyze the situation and give a follow up action of the project and schemes.

f) Academic and Research Organization:

Research institutions and academics plays a significant role in addressing environmental issues, their role is not only to help the community and NGOs to create awareness on environmental related issues but by being proactive in monitoring the state of affairs. Research communities and aided non governmental agencies should publicize their reports and make it easy access in the public domain for greater awareness and civic sensitivity, it is observed that learned intellectuals and institute of higher

learning have better access to information but they have apathy attitude and lacks social ownership ethics that clouts their decision making. Moreover, there is a lack of coordination at different levels; the government, higher learning institutes, civil societies, non-governmental agencies and communities in State Policy making in Nagaland context.

Recommendations and Conclusion

Kohima Municipal is still in its nascent and transitional stage and is yet to be full-fledged Municipality. Marked quality improvement of KMC in service delivery in regard to MSWM was observed over the years. However, the areas in which they have to work on are; i) Lack of basic health facilities and amenities to workers. ii) Under staffing of labor and staff at KMC. iii) Tools, vehicle for waste transportation and disposal is insufficient. iv) Lack of proper incineration to treat biomedical waste. v) Mechanized containers should be used to enhance storage capacity. vi) Kohima being the hilly terrain picks up points of collection and disposable of waste should be users friendly by proper route planning. vii) Lack of civic sense by the public and various stakeholders in treatment of solid waste management at source point. Therefore, capacity building programme should be organized often. viii) The state govt., the Kohima Municipal Council, the aid agency must make its research findings and reports should be made easy access in the public domain. ix) Wide media publicity and follow up developments to inform and educate the public on environmental problems. x) School syllabi and curriculum should be design to educate the students at tender age to inculcate civic sense and sense of social ownership in addressing different aspects of environmental issues. xi) Proper coordination in policy making with stakeholders is recommended. xi) Financial constraint was the major hurdle in slow development and performance of waste management. Therefore it is imperative for the state Govt.

to ensure for the conduct of urban local bodies election at the earliest for smooth functioning of Municipalities.

Therefore, in articulating a sense of environmental concern on its issues and challenges a rethinking by the state and the stakeholders in particular and the citizens in general, efforts should be to work on sustainable system in disposing wastes in an environment friendly and economically viable, socially acceptable way of the municipality.

References

- Ali, M., Cotton, A., & Westlake, K. (1999), *Down to Earth: Solid Waste Management disposal for low income countries*, WEDC, Loughborough University, p.111.
- Balakrishna, G.O. (1961), "Nagaland: India's Sixteenth State" *Asian Survey - I*, May, 36-40.
- Census of India (2018). Accessed July 7, 2019, <https://indiapopulation2018.in/population-of-kohima-2018.html>.
- GoN (2011), *Statistical Hand Book of Nagaland*, Directorate of Economics and Statistics. p. 3.
- Hosetti, B.B. (2006), *Prospects and Perspective of Solid Waste Management*, New Age International.
- Jamir, T., Tiakaba, W., Devi, B., Singh, U.I., Singh, R.K.B. (2011), Lead, iron and manganese contamination in spring, pond and well water in Nagaland: One of the Seven North-Eastern states of India: a future danger, *J. Chem. Pharm. Res*, 3 (3), pp. 403-411.
- Kibami, D., Pongener, C., Bendangsenla, K., Rao, S., Sinha, D. (2013), *Physico-Chemical Analysis Of Water Samples*

Of Mokokchung Town – A Preliminary Report, *Journal of Applicable Chemistry*, 2 (6), pp. 1634-1640.

MOUDPA (2000). *Manual on Solid Waste Management*, Ministry of Urban Development and Poverty Alleviation, Government of India Publications.

Project Implementation and Urban Management Improvement in the North Eastern Region – Package. (PIUMINEP) (2009), Draft Final DPR-Solid Waste Management Plan for Greater Kohima Planning Area, Volume 6, *Initial Environmental Examination Report*, June.

Sewerage and Solid Waste Project Unit (SSWPU) (2000). *The solid waste management programme*, Sewerage and Solid Waste Project Unit, Barbados, pp.1-11.

Smith, P., Reay, D., Van, A. (Eds.) (2012). *Methane and climate change*, Routledge, pp.165-192.

Suponglila (2015), Women Political Participation: A Study of Urban Local Self Government in Nagaland, *FAC Journal* 5, pp. 20-28.

Impact of Hazardous Ambience on Housing Locations in Dimapur Town, Nagaland

Vitsosie Vupru*

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About the author

*Assistant Professor,
Department of Economics,
Dimapur Government
College, Dimapur.
Email: vupruv@gmail.com

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Abstract

Solid wastes have become an environmental hazard universally. The aim of this research is to investigate the effects of environmental conditions in Dimapur Municipal area on the residential location. In particular, the study focuses on the effects of environmental hazards like garbage dumping and unhygienic public sewers on property values. To this aim, the paper presents a hedonic Regression model estimating the housing price (rent) in municipal areas as a function

of environmental variables. The study has been carried out using data collected in Dimapur town which is the commercial hub of Nagaland state, and one of the most important transit routes of Nagaland and Manipur. The results indicate that environmental hazards like garbage dumping sites, unhygienic public sewers and other forms of pollution significantly impact housing choices and residents are willing to pay for better waste management in the study area. The study also reveals that some residents bear environmental hazards in order to avail better locational advantages.

Introduction

Environmental pollution, especially solid wastes, is growing with rapid urbanization in most countries, particularly in developing countries like India. The ever increasing migration of people from rural areas with growing opportunities in the urban centres is adding to the woes of urban areas. The problem arises because of the lag in arrangements of proper waste management system for the rising urban population. The problem is accentuated more due to lack of civic sense among the populace. The people also do not practice segregation of various wastes which add to the problems of proper and scientific waste disposal by civic bodies. Moreover, in urban areas, waste facilities are located near waste producers in order to reduce handling and transportation costs. This phenomenon is most visible in a developing country like India where earlier urban places have been developed in an unplanned manner and the fast growing urban population are faced with congestion and environmental hazards. However, on several occasions people have to make a trade off with the locational choice and are often forced to stay in highly unhygienic locations thereby exposing themselves to various hazards. Choice of location and a reasonable environment becomes prominent with the knowledge of location, price, increase of earning and entitlement. These locations and environmental factors gain significance with expanding knowledge and awareness, educational and occupational status, affordability (that comes from earning) and by imitating others particularly the people staying in the neighbourhood. When making the decision either to rent or build/buy a place to live, there are two broad categories of factors that must be considered: the first category represents the financial aspects and second category is a set of personal and emotional factors (on neighbourhood and environmental qualities), which are more intangible but nevertheless play an important role in the decision to buy.

The hedonic pricing models value goods for their utility-bearing attributes (Rosen, 1974). Statistical methods such as regression analysis are used to measure the value of a particular attribute, taking into account additional attributes associated with the particular good under study. Many hedonic studies examine the value of attributes that contribute to overall housing studies (Deaton and Hoehn, 2004). In these studies, housing prices are used as the dependent variable and explanatory variables generally include structural characteristics of the house, neighbourhood, and measures of environmental quality. A measure of the distance between each home or neighbourhood to the nearest hazardous waste site is used as one measure of environmental quality (Kohlhase, 1991; Kiel and Zabel, 2001). A hazardous waste site is generally viewed as a disamenity having a negative influence on perceptions of environmental quality.

Researches on hedonic method have indicated that residential property values are reduced by increased proximity to hazardous waste sites (Deaton and Hoehn, 2002, 2004; Braden et al., 2011). However, it was also shown that people's perception about hazardous waste sites might also change sometimes. Kohlhase (1991) pointed out that a significant discount in the price of houses in Houston's housing market located close to toxic waste dumps. The result was found only after the sites have been identified and publicized by the Environmental Protection Agency (EPA). Before that knowledge coming to public, neighbouring people hardly gave any importance to it. Vor and Groot (2011) also found industrial sites to have a statistically significant negative impact on property values. Studies have also revealed that environmental quality strongly influence on social relations (Taghvae et al., 2013). But many urban dwellers in India, particularly the poor, are either unaware or indifferent of the environmental hazards they are exposed to. Even if some are

conscious of the hazards, many are compelled to live under such conditions due to various reasons (Vupru, 2019).

Ambient air quality also comes into play in the determination of house prices or rents of apartments. A number of studies have examined the relationship between air quality and property values using hedonic technique and identified air pollution as one of the significant variable in explaining residential property values (Ridker and Henning, 1967; Anderson and Crocker, 1971; Chay and Greenstone, 1998; Chattopadhyay, 1999; Zabel and Kiel, 2000; Murty and Gulati, 2004). All these studies found significant willingness to pay for improvement in ambient air quality and thus the increased house prices. Thus, preference for environmental or natural resource quality can be reflected in the variation in house prices, and would be suitably estimated by using hedonic pricing techniques, as shown by Ketkar, 1992 (cited in Kiel,1995), Leggett and Bockstael (2000), and Deaton and Hoehn (2002).

Statement of the Problem

Good and clean environments provide amenities and services which contribute fundamentally to the quality of urban life and appreciates the property values (Van Herzele and Wiedemann, 2003; Chiesura, 2004). In contrast, hazardous environmental sites are found to depreciate property values (Deaton and Hoehn, 2002). In the recent decades, Dimapur town has experienced an increase in population as compared to the preceding years (Vupru, 2019a). Consequently, this has led to an increase in pollution particularly of solid wastes, further exacerbated by shortfalls in solid waste management system. Nevertheless, environmental attributes are gaining popularity and importance in the residential housing selection.

Notwithstanding the universal alarm for improved and healthier housing environment, very few researches have been

carried out to understand and mitigate the living conditions in most urban areas, especially in small towns like Dimapur.

Objectives

The present paper is to identify the environmental factors which influence residential choices of housing. Also, the willingness to pay for environmental attributes has been examined through the estimated rent equation.

Methodology

Firstly, a table of the relevant environment variables in relation to the various wards has been presented. Then in order to examine the impact of environmental variables on the residential demand along with other characteristics, thirteen important characteristics as independent variables have been included. A weighted pollution index was constructed on the basis of presence of seven types of pollution near the place of residence. The index has been constructed by assigning weights to opinion expressed by each respondent on each option such as near garbage dumping site, polluted sewer/drain, polluted stream, heavy traffic noise, noisy market area, playground/concert area and community/town hall. These weights have been computed by calculating the ratio of the sum of each option (for all the respondents) to the sum total score of the seven options. Presence or absence of each option is accrued value 1 (one) or 0 (zero). Then value of each option corresponding to every respondent is multiplied by the weight of that particular opinion and then added up to get overall index for the corresponding respondent. Symbolically, pollution index (PI) = $\sum W_i X_i$, where W_i is the weight of the i^{th} value of individual pollution variable.

A multiple linear regression model of the type $Y_i = \alpha + \sum_1^k \beta_i X_i + U_i$ is considered where Y_i represents the monthly rent paid by the i^{th} respondent, X_i the i^{th} variable representing

environmental characteristics, U_i the random disturbance term with usual classical regression properties and β represents the impact of a marginal change in the i^{th} explanatory variables.

Analysis and Results

The Ward-wise percentage distribution of the respondents according to some environmental quality indicators and their willing to pay (per month) to remove or clean these disamenities is highlighted in Table 1. The quality of neighbourhood environment impacts the quality of life and therefore, the housing price to a great extent. It is observed that about 80 percent of all respondents are satisfied with the water quality in the town. Problem of sewage clogging ranges from 0 to as high as 36 percent in certain wards. Overall, about 15 percent of the respondents live near some water bodies like river, stream or pond. It is also observed that several parts of the town get flooded during rainy season (overall 12 percent). It is obvious that garbage is thrown or deposited randomly around the town as about 31 percent of the respondents are located near garbage areas. Public sewer is found to be well distributed as 50 percent of the respondents stay near public sewers. All the streams which flow across the town appears to be highly polluted and almost 11 percent of the respondents live near such polluted streams.

The study also reveals that respondents are willing to pay for proper disposal of wastes and for maintenance of good environmental ambience. Individually, there are some respondents who are willing to pay Rs. 1000 per month for timely garbage disposal and on the average, the willingness to pay (WTP) for timely and proper removal of garbage (solid wastes) is found to be Rs. 270 per month. Similarly, for proper maintenance of public sewage and streams, the average WTP is found to be Rs. 270 and Rs. 227 per month respectively.

Table 1: Ward-wise Percentage Distribution of the Respondents According to Some Environmental Quality Indicators and Willingness to Pay (WTP)

Ward	Satisfactory Water Quality	Sewage Clogging	Located near River/Pond	Flood Prone during monsoon	Located near Garbage Yard	Located near Public Sewer/ Drain	Located near Polluted Stream	WTP_GA	WTP_PSeW	WTP_PoStr
1	80	0	15	0	35	50	25	175	185	170
2	57.14	14.29	28.57	14.29	18.18	50	31.82	195	186	167
3	55	20	40	35	25	30	25	140	135	128
4	81.82	22.73	31.82	27.27	40.91	63.64	13.64	218	205	168
5	85	5	0	0	35	55	0	225	225	187.5
6	77.27	36.36	9.09	4.55	22.73	77.27	0	196	196	135
7	82.61	17.39	8.7	21.74	30.43	60.87	0	252	230	126
8	85.71	4.76	9.52	9.52	28.57	52.38	14.29	229	245	162
9	90	5	0	5	20	25	5	308	305	258
10	90.91	0	50	18.18	27.27	31.82	36.36	286	259	273
11	95.45	0	13.64	13.64	45.45	45.45	13.64	407	398	405
12	86.36	0	18.18	9.09	27.27	31.82	9.09	561	530	502
13	90.91	4.55	4.55	4.55	22.73	36.36	4.55	359	339	268
14	86.36	0	9.09	9.09	50	72.73	4.55	420	402	350
15	95.24	9.52	4.76	19.05	23.81	23.81	4.76	231	207	148
16	90.48	19.05	14.29	9.52	28.57	57.14	9.52	307	276	190
17	85.71	4.76	0	0	28.57	52.38	0	245	231	198
18	90.48	28.57	4.76	28.57	33.33	85.71	4.76	314	319	233
19	54.55	27.27	0	9.09	18.18	77.27	0	250	250	250
20	71.43	4.76	28.57	9.52	47.62	47.62	4.76	414	414	374
21	81.82	9.09	9.09	0	27.27	18.18	4.55	236	236	207
22	85.71	28.57	23.81	23.81	38.1	28.57	23.81	212	198	152
23	50	4.76	23.81	4.76	38.1	76.19	9.52	233	229	160
Av	80.43	11.58	15.10	12.01	30.96	49.97	10.64	278.83	269.57	226.59

Note: WTP_GA stands for Willingness to Pay to avoid Garbage Area
WTP_PSeW stands for Willingness to Pay to avoid Public Sewer
WTP_PoStr stands for Willingness to Pay to avoid Polluted Stream
Source: Field Survey in 2015-16

From the results of the linear multiple regression analysis of variation in rent for environmental variables, it is found that several of the selected variables have statistically significant impacts on the monthly rent paid (Table 2). The R^2 of 0.37 reveals that 37% of the total variation in the dependent variable is explained by the regression equation while the remaining 63% is captured by the error term. Even after adjusting for the degrees of freedom, 36% is explained by the equation. The two parameters are jointly significant at 1% as shown by the F-statistic (31.47) with p-value of 0.000. Water supply and pollution index are found to have positively significant impacts on monthly rent. Water is not only one of the essential items for survival but it is also essential for cleanliness and people face significant problem in collecting water from various sources in growing urban centres and sometimes have to buy from vendors. Hence, a house having good water supply and greater water storage capacity is expected to charge more rent. On the other hand, pollution is more in heavily populated areas and so the positive coefficient indicates that house rents are more in centrally located areas which also has more inhabitants. However, coefficient of flooded areas, water quality and located near garbage site is found to be significantly negative. Several locations in Dimapur town gets inundated after heavy rainfall due to poor sewage system which are not only becoming more congested due to rampant encroachment but also clogged with solid wastes, especially plastic materials. Therefore, the results reveal that house prices (rent) are relatively lower in those localities. People especially the business community likes to stay near town and intend to pay more rent for the communication and other advantages of township, as evident from the negative coefficient of distance from Garbage site and water quality. Therefore, even though more garbage sites are located around the main town and water quality is poorer, there seems to be some kind of compromise in favour of other benefits.

Table 2: Estimated Coefficients of Regression of Rent Paid on Relevant Environmental Variables			
	B	t-Statistics	ρ Sig.
(Constant)	3848.723	14.820	.000***
Water Supply	1095.291	5.542	.000***
Water Quality	-756.926	-2.543	.011**
Located near River/Stream/Lake	-331.483	-.780	.436
Flooded	-1170.882	-3.035	.003***
Pollution Index	512.082	1.715	.087*
Located near Garbage Site	-1159.181	-4.362	.000***
Located near Public Sewer	64.985	.226	.821
Located near Polluted Stream	-4.481	-.009	.993
R ² = .371, Adjusted R ² = .359 & F = 31.467 (.000)			
Note: *, ** & *** indicate ρ is significant at 10 per cent, 5 per cent and 1 percent level respectively.			

Dependent Variable: MonthlyRent

Source: Field Survey during 2015-16

Conclusion and Policy Implications

This study reveals that choice of residential location by the households and the monthly rents are significantly influenced by environmental amenities. It has been found that water supply had a significant influence on people’s preference in choosing residential locations. Hence, a house having better water supply is found to carry higher rent. On the contrary, pollution is an environmental disamenity. However, the positive coefficient of pollution index indicates that houses located in higher polluted areas have higher monthly rents. This is probably because centrally located areas have several locational advantages and so although the monthly rent as well as pollution is higher, some residents may favour such places to avail the location advantages. On the other hand, water quality, flooded areas and locations near garbage sites have significant negative impacts on the monthly rent paid. The negative coefficient of water quality may probably be because centrally and heavily populated areas are also places which are more polluted, including water. Therefore, in spite of poor water quality, monthly rents are

higher in these places. Houses located in flood-prone areas and also which are situated near garbage sites carry lower monthly rents as expected.

Thus, the result of the study implies that residents of Dimapur town are conscious of hazardous ambience like flood-prone areas and garbage sites in their choice of residential location. Nonetheless, the contradictory negative coefficients of water quality and pollution index may be because of the strong locational advantages of centrally located areas which overshadow the harmful environment.

From the overall analysis, certain important policy implications may be highlighted:

- More environmental awareness need to be created among the residents highlighting the dangers of environmental hazards, especially solid wastes.
- Proper solid waste disposal management needs to be put in place. Towards this end, segregation of solid wastes into degradable and non-degradable wastes needs to be practiced.
- Systematic location of Garbage sites and timely removal of garbage.
- Sanitation tax may be charged from the residents after proper study of their willingness to pay (WTP) and the revenue can be utilized for the proper garbage treatment and maintenance of public sewer.

References

- Anderson, R.J. Jr. and Crocker, T.D. (1971). Air pollution and residential property value. *Urban Studies*, 8, 171-180.
- Braden, J.B., Feng, X. and Won, D.H. (2011). Waste sites and property values: A meta-analysis. *Environmental and Resource Economics*, 50 (2), 175-201.
- Chattopadhyay, S. (1999). Estimating the Demand for Air Quality: New Evidence Based on the Chicago Housing Market. *Land Economics*, 75 (1). 22-38.
- Chay, K.Y. and Greenstone, M. (1998). *Does air quality matter? Evidence from the housing market.* NBER Working Paper 6826. Accessed June 25, 2015, <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.199.480&rep=rep1&type=pdf>.
- Chiesura, C. (2004). The Role of Urban Parks for the Sustainable City. *Landscape and Urban Planning*, 68, 129-138.
- de Vor, F. and de Groot, H.L.F. (2011). The Impact of Industrial Sites on Residential Property Values: A Hedonic Pricing Analysis from the Netherlands. *Regional Studies*, 45 (5), 609-623, DOI: 10.1080/00343401003601925.
- Deaton, B.J. and Hoehn, J.P. (2002). The effect of hazardous waste sites on property values in zones of high industrial activity: a hedonic approach. *Paper submitted for the AAEA 2002 Annual Meeting*, Long Beach, California. Accessed January 25, 2019, <http://ageconsearch.umn.edu/bitstream/19612/1/sp02de01.pdf>.
- Deaton, B.J. and Hoehn, J.P. (2004). Hedonic analysis of hazardous waste sites in the presence of other urban disamenities. *Environmental Science & Policy*, 7, 499-508.

- Kiel, K.A. (1995). Measuring the impact of the discovery and cleaning of identified hazardous waste sites on house value. *Land Economics*, 71 (4), 428-435.
- Kiel, K. and Zabel, J. (2001). Estimating the economic benefits of cleaning up of Superfund sites: The case of Woburn, Massachusetts. *The Journal of Real Estate Finance and Economics*, 22, 163-184. DOI: <https://doi.org/10.1023/A:1007835329254>.
- Kohlhase, J. (1991). The impact of toxic waste sites on housing values. *Journal of Urban Economics*, 30 (1), 1-26.
- Leggett, C.G. and Bockstael, N.E. (2000). Evidence of the Effects of Water Quality on Residential Land Prices. *Journal of Environmental Economics and Management*, 39 (2), 121-144.
- Murty M.N. and Gulati, S.C. (2004). A Generalized Method of Hedonic Prices: Measuring benefits from reduced urban air pollution. *Natural Resources Accounting*, CSO, GOI. Accessed November 24, 2013, <http://www.iegindia.org/workpap/wp254.pdf>.
- Ridker, R.G. and Henning, J.A. (1967). Determinants of residential property values with special reference to air pollution. *The Review of Economics and Statistics*, 49 (2), 246-257.
- Rosen, S. (1974). Hedonic Prices and Implicit Markets: Product differentiation in pure competition. *Journal of Political Economy*, 82 (1), 35-55.
- Taghvaei, A.A., Maroufi, S. and Pahlavan, S. (2013). Evaluation of the Effects of Environmental Quality on Residents' Social Relations: Aab-Kooh Sector in Mashhad City. *Basic Studies and New Technologies of Architecture and Planning*, 3 (1), 43-54.

- Van Herzele, A. and Wiedemann, T., 2003. A monitoring tool for the provision of accessible and attractive urban green spaces. *Landscape and Urban Planning*, 63, 109-126.
- Vupru, V. (2019). Environmental Factors and Residential Choice in Dimapur Town, Nagaland. *International Journal of Research in Social Sciences*, 9 (4), 1064-1077.
- Vupru, V. (2019a). Rental Housing Market in Dimapur Town, Nagaland: An Empirical Study. *Dimapur Government College Journal*, 1 (5), 37-51.
- Zabel, J.E. and Kiel, K.A. (2000). Estimating the Demand for Air Quality in Four U.S. Cities. *Land Economics*, 76 (2). 174-194.

Solid Waste Disposal: A Comparative Analysis of Waste Disposal Practices and Waste Awareness at the Town and Village Level

Neizhanuo Golmei*, Moameren Pongen**

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About the authors

*Assistant Professor,
Deptt. of Political Science,
Nagaland University.
Email: neizhanuo@
nagalanduniversity.ac.in

**Research Scholar,
Department of Political
Science, Nagaland
University.

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Abstract

There is a low level of awareness in regard to disposal of solid waste in the context of Nagaland. The practice that is followed is not 'waste management' but 'shifting of waste' from the habitable areas to the distant parts of the town or village. Such practices are therefore, not only short term solutions but hazardous to the environment. Hence, there is an urgent need to sensitize people and spread awareness on limiting waste at the individual level. Taking case studies from Mokokchung District – The Local Ward Authorities, Mokokchung Town Area and Two projects- Greensight Project and Plastic Free Project,

Mopungchuket, the paper is an attempt to examine the various mechanisms through which these bodies have been able to spread social awareness on managing waste at the ward and village level. It provides an interesting study of the various strategies and methods that are being implemented not only to control- 'waste generation' - but also to create 'waste conscious' - individuals. Such initiatives have not only contributed towards sensible waste disposal practices but have also generated social transformation through collective action. The paper is thus, an attempt at bringing to the forefront the good practices of waste disposal through local initiative.

Introduction

Solid waste management has become a massive challenge for urban local bodies throughout the country especially with increasing urbanization, changing lifestyles and consumption patterns. In India, the level of urbanisation as a whole has increased from 25.7 percent in 1991 to 27.82 percent in 2001 and to 31.14 percent in 2011(GOI, Handbook on Urban Statistics, 2019). Of the country's total population of 1,210.19 million, 377.11 million or 31.16 percent is said to be living in urban areas (Census, 2011). This urban population generates 62 million tonnes of municipal solid waste per annum, out of which only 43 million tonnes (MT) of the waste is collected, 11.9 MT is treated and 31 MT is dumped in landfill sites (Lahiry, 2019). Of the total waste generated, more than half ends up in the landfill sites. Even though the amount of waste generated has increased over the years, the practice of waste management has remained relatively unchanged. Municipal authorities collect waste and transport it to dumping sites, where waste is openly burned. Such a system is thus inefficient and has a negative impact on public health, the environment and the economy (Kumar et al., 2017).

Though waste management has been considered a challenge mainly for the urban areas, rural areas are also becoming increasingly burdened with waste due to improved connectivity, communication and lifestyle changes. In both the urban and rural areas, waste generated is heterogeneous in nature – comprising of food waste, plastics, metals, electrical items, rubber, textiles, e-waste etc. The heterogeneity of the waste makes sorting and utilization of waste a huge task and therefore most of the waste finds its way in open drains, streams or vacant plots. Disposal of garbage solid waste and of untreated effluent into nearby drains by people is also due to the lack of public awareness on the consequences of waste on health and the environment. Another reason is the lack of financial incentives to stop them from such

practices (Abdel-Shafy and Mansour, 2018). Any design for management of waste depends on how waste is segregated and on the level of public awareness and active participation from the public.

In view of the various arguments stated above, there is an urgent need for a systematic approach to deal with waste both in the urban and rural areas. In Nagaland, while the urban bodies have landfill sites to dump waste, there are no dumping sites or proper system for collection of waste at present in the rural areas. People in the rural areas have their own ways to deal with waste. Nagaland had enacted the Nagaland Integrated Waste Management Policy in 2019 covering all the urban and rural areas of the state with the intention to enable the community to reduce, reuse and recycle waste. Of the 19 urban local bodies in the state, only the capital city Kohima has the scientific solid waste treatment plan. Waste management in the state is therefore still lacking due to the lack of proper regulatory mechanism. Hence, the present study is aimed at analyzing the various mechanisms and methods of waste disposal in the town and village area in Mokokchung, one of the urban district of Nagaland.

Study Area and Methodology

Mokokchung is a town and a municipality in the district of Mokokchung, Nagaland. It is bounded by the state of Assam to its north, Wokha, Tuensang, Zunheboto to its west, east and south respectively. It lies between 93.530 E and 94.530 E longitude and 25.560 N latitude. The area of the district is 1615 sq. km with a total population of 1, 94,622, of which 101,092 are males and 93,530 females with 138,897 constituting the rural population (GOI, NABARD, 2016-17). The Mokokchung Metropolitan Area consists of the continuous settlement from Alichen in the south, through Mokokchung Town upto Amenyong and Khensa in the northwest; and from Mokokchung Town through Fazl Ali College

up to DEF colony in the north east (GOI, Ministry of MSME). However, the process of sub urbanization in the recent years has led to the mushrooming of satellite towns like Yimyu and Marepkong leading to the extension of urban settlement outside the historical boundary of Mokokchung Town. These urban extensions are now wards under the Mokokchung Municipal Council.

Mokokchung Municipal Council (MMC) is one of the three Municipal Councils in the state of Nagaland. Mokokchung town is divided into 18 wards which are: Kumlong, Aongza, Penli, Majakong, Salangtem, Sangtemla, Yimyu, Alempang, Sungkomen, Kichutip, Tongdentsuyong, Artang, Arkong, Dilong, Alongmen, Marepkong, Lijabalijen, and Mongsenbai. Of the 18 wards, Kumlong, Sangtemla, Alempang and Yimyu are regarded as the largest among the wards (GOI, Ministry of MSME). As per 2019 Municipal records, Mokokchung Town generates about 40 metric tons of waste in a day of which 31 metric tons of wastes are collected everyday by the Municipality. The major source of solid waste which is about 50% are from the households, followed by 20% from commercial establishments, 20% from municipal services (street cleaning, landscaping) and 10% from various institutions (office, banks, college, schools etc.). For the purpose of collecting waste, the Municipalities have provided around 50 dustbins/collection points at various locations within the town area.

Mopungchuket village on the other hand is located 18 kms away from Mokokchung town and is one of the oldest and biggest Ao village. It is a popular destination for rural tourism and has been formally declared as a 'rural tourism village' by the government of Nagaland in the year 2007. It has also been labeled as the 'best kept' and 'cleanest' village in Nagaland. The village has a total population of about 2965 persons consisting of 350-400 households. The village is divided into three khels: Pongen Khel, Anungsa Khel and Mongsen Khel.

For the purpose of evaluating the system of waste management in both the urban and rural area, both primary and secondary data were used. In Mokokchung town area, interviews were conducted using an open ended questionnaire with MMC officials, staff, Local Ward Authorities (LWAs), and residents of some wards. In Mopungchuket village, in-depth interviews were conducted with members of the Greensight Project and Plastic Free Project. In addition, secondary data from government documents, journals, magazines and newspapers were also referred.

Methods for Collection and Disposal of Waste

Collection, removal and disposal of solid waste is one of the most important function of the Municipalities (Government of Nagaland, 2001). As per the Act, the municipalities are to ensure surface cleaning of all the streets in the Municipal areas, remove deposits of rubbish, trade refuse, carcasses of dead animals, excrementitious and polluted matter, special wastes, hazardous wastes and other solid waste from hospitals and waste generated by bulk producers. The MMC therefore, carries the responsibility for the daily collection, removal and disposal of filth and polluted materials from the Municipal areas.

While the MMC has the overall responsibility for the collection and disposal of waste, they are assisted by the LWAs. The LWAs works in close coordination with the MMC- however, they are independent in terms of their structure and functioning. They do not receive any kind of monetary benefits from the MMC or from any other source. The nature of the service is voluntary and is aimed at looking after the welfare and well-being of their respective wards. They are selected through nomination by the residents of the wards for a period of five years. The total membership however, varies from ward to ward depending on the size and the number of households in a ward. The LWAs usually consists of one chairman, one secretary, one

treasurer and other executive members. These LWAs enjoys power and has independent functioning only within their own respective wards. They look after the day to day activities of the ward, maintain sanitation and cleanliness, organize social works, impose fines on violation of ward rules, issue certificates like residential proof or verification etc.

Of the 18 wards in the Mokokochung Town Area, there are two different systems of waste collection and disposal. 12 wards are directly under the management of the MMC while 6 wards are under the direct supervision of the LWAs. The MMC has provided dumping pits/dustbins in the 12 wards under its management. Residents of these wards throw their waste in these pits which are then collected and manually loaded onto the trucks and transported to the dumping site everyday (Fig.1). Since there are only three trucks assigned to the 12 wards, most of the times, these trucks are overloaded and not covered properly while transporting the waste to the dumping site, sometimes leading to spilling of waste in the streets/roads. In the case of the 6 wards instead of the dumpster trucks, the wards were given pick-up trucks by the MMC under the Swachh Bharat Mission since the roads within the 6 wards were small and difficult for the dumpster truck to maneuver. However, the collection and disposal of waste is taken care of by the ward authorities themselves. In these 6 wards, there are various pickup points identified for waste collection and therefore, the residents instead of dumping the waste at the dumping pits, collect their waste and load them onto the pickup trucks at the collection points. Residents in these colonies are thus comparatively more careful at waste segregation since they are directly involved in the collection of waste.

In comparison to the 12 wards, the LWAs in the 6 wards also have more freedom in the area of waste collection/disposal because of the decentralization of authority by the MMC to

these wards. The LWAs are in charge of managing the overall administration of the wards which includes maintaining the pickup trucks, hiring drivers and waste collectors. While residents from the MMC wards do not pay any kind of sanitation fee, certain wards managed by the LWAs collect a nominal amount from the residents which are then used towards payment of salary of the sanitation workers and maintenance of the pickup trucks. Such an arrangement in waste management has also received positive feedback from the district administration because of its efficacy.



Fig.1: Picture of MMC dumping pit (Sangtemla Ward) and MMC dumping truck.

In the case of Mopungchuket Village, there was initially no system for collection and disposal of waste. The common practice which was followed was the disposal of waste in various dumping sites within the village which were usually near the streams. Every household was responsible for their own waste. However, such practice has been discontinued since 2017 with the implementation of projects like Greensight Project and Plastic Free Project. Waste is no longer dumped in dumping sites within the village but households collect their waste and bring it to the pickup points identified by the volunteers which are then taken to the MMC dumping site.

Local Initiatives for Creating ‘Waste Awareness’

One of the major problems in regard to waste management is the mindless dumping of waste by the people be it in the town or in the village. There is also no segregation of waste from the source itself, making collection of waste a huge task for the waste collectors. According to the MMC staff, people in the town have a habit of dumping everything and anything in the dumping pit, be it carcasses of dead animals, plastics, piles of mud, tree branches, broken glass, bottles etc. making collection of waste a difficult and dangerous task for the waste collectors. Along with such practices, people also have the habit of dumping waste in the drains which would become a menace during rainy seasons. In order to deal with these issues, various ward authorities came up with their own guidelines for managing waste in their own level. For example, in Sangtemla Ward, the ward authority gave a standing order to all its residents not to dump any waste in the drains. Along with this order, they also covered the drains with bamboo mesh to prevent residents from dumping solid waste into the drains and assigned few individuals to maintain the bamboo mesh and to ensure compliance of the order (Fig. 2).



Fig.2: Picture of bamboo mesh in Sangtemla Ward.

In the 6 wards which are not under the MMC, the ward authorities maintain a strict vigil on maintaining sanitation within their respective wards through decentralization of responsibilities. In these wards, two or more persons are selected to monitor and maintain cleanliness within their respective areas. For example, in Aongza ward, there are 14 clusters and in each cluster two residents are selected to monitor and maintain cleanliness and sanitation in their respective clusters. Their work usually includes initiating various beautification projects like planting trees, flowers etc. repairing public toilets, checking rearing of pigs within the residential areas and organizing social work whenever required. Various initiatives have also been taken by the MMC like conducting seminars/workshops on waste management with the students, ward authorities and NGO's, carrying out tree plantation, converting garbage dumping sites into flower garden and beautification of commercial places with green plants etc.

In regard to Mopungchuket village, the youths have played a major role in creating 'waste awareness' among the residents in the village. One of the important initiatives under the Greensight Project as well as the Plastic Free project has been to encourage segregation of waste at the source itself. The youths along with the Village Council passed a resolution in 2019 which made it mandatory for all households to maintain a compost pit. Such resolutions ensured that all residents become mindful of their waste and learn to sort various kinds of waste, especially biodegradable waste from non-biodegradable waste. Along with this, they have also banned all kinds of single use plastic- be it plastic bags, multilayered packages and plastic bottles from the village (Fig. 3).



Fig.3: Example of local initiatives for managing waste (Mopungchuket Village).

Through the Greensight and Plastic Free Projects, the youths have not only contributed to enlarging the green space in the village but they have also managed to create waste conscious individuals in the village. This became possible through the various activities that were initiated gradually at their local level. The Mopungchuket Student Union (Mopungchuket Ait Laishir Telungjem, MALT) initiated ‘The Greensight Project’ on 26th July 2016 with the aim of not only building a greener society but also to preserve the rich biodiversity in the state. The project period was to be for 5 years finally culminating in 2021. Under this project, youths in the village started a plantation drive in the village with the aim to plant 100 trees in one year. While this initiative was already in place, the Youth Ministry of Mopungchuket Baptist Church initiated another project- ‘Plastic Free Project’ to mark the celebration of the 100 years of Youth Ministry (1917-2017) (“Mopungchuket inches towards,” 2019). In 2017, the first year of the project, the team focused on street cleaning and making indigenous basket for collecting waste. The volunteers made 100 indigenous bamboo baskets and placed it at different locations around the village for collecting waste.

After this initial start, the team in collaboration with the Village Council organized a seminar on waste management as a means to sensitize and to spread awareness about waste. The team then started a practice of collecting the textile and plastic waste from the villagers and dumping it in the MMC dumping site once a year. Gradually the project team along with the support of the youths managed to initiate a systematic process of collection and disposal of waste by making use of the pick-up truck which was given to the Village Council by the Public Health Engineering Department (PHED) during a seminar organized under the Swachh Bharat Mission. Some of the other notable initiatives has been the conversion of the dumping sites in the village into clean spaces, use of paper cups, water dispenser during festivals, village gatherings, conducting sensitization talks with students in the primary and high school in the village, engaging and creating 'waste awareness' through social work with the students at Impur Mission Centre and the setting up of a resource recovery room which is at present a temporary room in the VDB building where they have collected clean plastic bags, multilayered plastic and also polythene bags for recycling. Such initiatives have not only created 'waste conscious' residents but their efforts have also led to greater sensitization and awareness on the importance of managing waste.

Challenges to Waste Management

While various initiatives have been initiated at the local level to ensure management of waste, the problem of waste still remains because waste is not managed but shifted from one point to another. In the case of Mokokchung town, instead of recycling or segregating waste, the waste collected is directly taken to the dumping site located in Sabangkabamenchen under Mokokchung Village, which is about 13 kilometers away from the main town (Fig. 4). Even in the case of Mopungchuket village, though segregation is practiced to some extent, chunk

of the waste ends up in the same MMC dumping site. Such practices do not serve the purpose in the long run because waste keeps shifting from one site to another. For example, the MMC dumping site was previously located in Tsukjongkong near Ungma Village but because of the various complains from the villagers regarding environmental and health hazard, the MMC had to shift the dumping location.



Fig. 4: MMC dumping site in Sabangkabamenchen, Mokokchung Village.

While the Nagaland Municipal Act, 2001 has clearly laid out that the Municipality may provide for the purpose of receiving, storing, treating, processing and disposing solid waste or converting solid wastes into compost, re-cycling, such provisions are hardly in place under the Mokokchung Municipal Council which makes waste management more difficult. Another issue is the absence of rag pickers. Rag pickers play a vital role in the segregation of waste. Though plastic is the biggest menace in the town areas, there are very few rag pickers who can collect the plastic. This is largely because there is no market for waste in the district or in the state. The nearest available market is in the neighbouring state of Assam, however, transporting waste through trucks is an expensive affair because of the multiple tax that are levied at different points.

There is an urgent need for the municipalities to invest in purchasing proper machineries for collecting waste. Most of

the trucks which are used by the MMC are not equipped with proper machineries for collecting waste. The MMC also needs to be equipped with sufficient manpower to ensure smooth functioning of the waste disposal system. At present there are only 11 labourers, 3 drivers and only 3 vehicles for collection and disposal of waste from the 12 wards making the task a huge burden for the staff. There is also a need to upscale the workplace hygiene through equipments and waste handling gears like helmets, boots, gloves, masks etc. to reduce the risk of contracting diseases or injury.

Conclusion

While the various initiatives that has been undertaken both at the town and the village level have in some ways contributed to creating 'waste awareness' among the people, the present system at both levels are unsatisfactory mainly because waste is not managed but merely shifted from one place to another. In order to combat the problem with waste, the future course of action should be aimed at reducing waste at the household level. Instead of focusing on distribution of dustbins/construction of dumping pit, the various authorities/bodies should lay more emphasis on cutting down waste through segregation and by investing in building recycling units at the town and village level. There is also a pressing need for the government to invest and support various NGO's, individuals who are involved in creating alternative solution to plastic products. Solution to the dealing with waste can happen only when we build waste conscious individuals. Children should be taught how to differentiate and manage various kinds of waste at an early learning stage.

References

- Abdel-Shafy, H.I., & Mansour, M.S.M. (2018). Solid Waste Issue: Sources, Composition, Disposal, Recycling And Valorization. *Egyptian Journal of Petroleum* 27, 1275-1290.
- Government of India (n.d.) *NABARD Executive Summary, Mokokchung District PLP 2016-17*. Accessed August 10, 2019, <https://www.nabard.org>.
- Government of India, Ministry of Micro, Small and Medium Enterprise (n.d.) *Brief Industrial Profile of Mokokchung District, Nagaland State*. Accessed July 20, 2019, <http://dcmsme.gov.in/>
- Government of India, Ministry of Home Affairs. (2011). *Census of India 2011 –Rural Urban Distribution of Population*. Accessed April 9, 2020, <http://censusindia.gov.in/>
- Government of India, Ministry of Housing and Urban Affairs. (2019). *Handbook of Urban Statistics*. Accessed April 9, 2020, <http://mohua.gov.in>
- Government of Nagaland. (2001). *The Nagaland Municipal Act, 2001 (Act No.10 of 2001) PRS*. Accessed July 20, 2019, <https://www.nagaland.gov.in>
- Kumar, S., Smith, S.R., Fowler, G., Velis, C., Kumar, S.J., Arya, S., Rena, Kumar, R., Cheeseman, C. (2017). Challenges and Opportunities associated with waste management in India. *Royal Society Open Science*. 4: 160764. <http://dx.doi.org/10.1098/rsos.160764>.
- Lahiry, S. (2019, May 8). India's Challenges in Waste Management. *Down to Earth*. Accessed April 8, 2020, <https://www.downtoearth.org.in/>

- Mishra, A.R., Mishra, S.A., Tiwari, A.V. (2014). Solid Waste Management – Case Study. *International Journal of Research in Advent Technology*, 2 (1), 396-399.
- Mopungchuket inches towards plastic-free village. (2019, May 5). *Nagaland Post*. Accessed June 7, 2019, <http://www.nagalandpost.com>.
- Waste Management Policy targets efficient management of waste (2019, June 4), *Times of India*. Accessed April 8, 2020, <https://timesofindia.indiatimes.com>.
- Yadav, I.C., & Devi, N.L. (2016). Municipal Solid Waste Management in Imphal Town, Northeast India: A Critical Analysis of Existing Management Practices and Proposed Action Plans. *International Journal of Waste Resources*, (6: 238). doi: 10.4172/2252-5211.1000238.

An Empirical Study on the Drainage System in Dimapur: Current Status and Future Solutions

Nilesh Kumar Prasad*, Dhruba Kumar Paul**,
Sita Malakar***

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About the author

*B.SC. 6th Semester,
Department of Physics,
St. John College, Dimapur,
Nagaland, India.

**B.SC. 6th Semester,
Department of Physics,
St. John College, Dimapur,
Nagaland, India.

***Assistant Professor,
Department of Sociology,
St. John College, Dimapur,
Nagaland, India.
Email: sitamalakar@
stjohncollege.in

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Abstract

This is a qualitative study on the drainage system of Dimapur. Areas of Dimapur are regularly flooded during rainy season, largely due to poor drainage infrastructure. Sub-surface drainage systems in Dimapur collect rain water but potentially cause a lot of damage to people and to the environment. The purpose of this study is to explore the current condition and examining various flooding areas during rainy season in Dimapur. The results of this study and subsequent analysis can be used to propose conceptual modification of the inadequate and poorly maintained drainage systems. The outcome of the study shows the need for significant changes in the urban drainage system in Dimapur.

Introduction

Historically, urban drainage systems have been viewed with various perspectives. During various time periods, and in different locations, urban drainage has been considered a vital natural resource, a convenient cleansing mechanism, an efficient waste transport medium, a flooding defense mechanism.¹ Topology, geology, scientific knowledge, engineering and construction capability, societal values, religious beliefs, and other factors have influenced the local perspective of urban drainage. For as long as humans have been constructing cities, these factors have guided and constrained the development of urban drainage solutions.²

Proper drainage systems are a very important part of any city's development. Defined briefly, drainage is the natural or artificial removal of a surface water and sub-surface water from an area.³ According to World Health Organization, A proper drainage system can prevent standing water that can lead to flooding and damage to infrastructure, prevent spread of waterborne disease, and also stop mosquito breeding. In areas where drainage and sanitation are poor, water runs over the ground during rainstorms leading to flooding, property loss and evacuation of people.⁴ Flooding may also damage water supply infrastructure and contaminate domestic water sources. Urban flooding has an adverse impact on the performance of urban infrastructure and the life of the residents. Such floods may cause significant damage and perturbation in the serviceability of urban infrastructure such as transportation. In recent years, climate change and its consequences have affected many components

¹ Burian Steven and Edwards Findley (2002) "Historical Perspectives of Urban Drainage" *Journal of Global Solution for Urban Drainage*, 10.1061/40644-284.

² Ibid.

³ <https://en.m.wikipedia.org/wiki/Drainage>.

⁴ Drainage World Health Organization.

of the water cycle as well as flooding. The disposal of sediments and solid wastes into drainage channels can significantly decrease the channels' safe carrying capacity. Urban drainage system studies could help to achieve more reliable results and be applied in real time planning of urban areas through selection of best management practices.⁵

Statement of the problem

Insufficient drains and drainage systems in Dimapur not only cause flash floods but also lead to water pollution in Dhansiri River. During the annual monsoon season, residents face problems due to flooding when water from clogged drains inundates colonies. Poor waste management and lack of civic sense in the local population also results in garbage blocking drains, which significantly contributes to flooding. Due to the poor drainage system, rain water floods the roads and carries additional garbage and dirt from roads, which further deteriorates the quality of water, exacerbating the issue. Poor drainage systems not only risk the likelihood of flooding but also increase the volume of sediments and solid wastes entering the drains that can further aggravate flooding. As a result, besides damaging the roads by way of water logging, it becomes more hazardous to the people living around the drains.

There are currently no major manufacturing or processing industries in Dimapur city that had cause serious contamination, as such, the pollution is mainly caused by domestic and municipal wastes that are usually dumped into the drains. The buildup of such wastes can be attributed to the fact that the water is often stagnant and without sufficient flow, the solid waste settles or -get clogged in the drains. An important consideration

⁵ Karamouz Mahammad, Hosseinpour Ana, Nafiz Sara (2011), "Improvement of Urban Drainage System Performance Under Climate Change Impact: Case Study" *Journal of Hydrologic Engineering*, 16 (5), 1084-0699, pp. 395-412.

for the capacity of drainage channels is the buildup of sediments and solid wastes. The self cleansing velocity, which is a term commonly used in civil engineering, is the speed of water flow required to maintain a clean drain. In reality, however, very few drains are self cleansing due to the solid loading across a long period and mismanagement.

Need for Study

The drains that exist in Dimapur city, whether natural or artificially created are not able to carry the huge amount of water accumulated due to heavy rains, leading to water logging in different parts of Dimapur. Flood waters are liable to contaminate local drinking water making it unsuitable for consumption. Additional health hazards faced by people living close to drains include mosquitoes, which breed in the stagnant water, and water borne diseases. Rapid urbanization and population growth has contributed to drainage systems getting congested and overburdened. Poor drainage causes early pavement distress leading to structural failures of roadways. Such damages have the potential to impact the economy both in terms of productivity and motor maintenance. In order to minimize premature pavement failure and enhance the road performance, it is imperative to provide adequate drainage systems in the city. Therefore, the present study has been carried out in Dimapur city with the objective.

1. To identify existing conditions of drainage systems and the problems faced by localities in Dimapur town.

Methodology

Study Area: The study has been carried out in Dimapur city which is the largest city in Nagaland, India. The city district comprises of four blocks and seven circles with an area of 927 sq. km. The total population of the district as per 2011 census

is 3, 79, 769, out of which 1, 82,479 is in urban and 1, 97, 290 is rural population with a population density of 410 per square km. The drains constructed in Dimapur town have presented two categories of drainage system i.e. natural drainage system and artificial drainage system. According to the report of Central Groundwater Board, North East Region (2013), the district drained by two major River systems viz- Dhansiri river flowing from South West to North East direction on the South West part of the area and Diphu river flowing from South to North and on the South Western part later on meandered with Dhansiri river in Dimapur Valley. These two rivers viz - Dhansiri and Diphu and their tributaries serve as the main surface water sources for irrigation and drinking water in Dimapur district. The drainage pattern are sub parallel branches controlled by the structures and lithology of the area. So far it was not possible for researcher to get accurate number of artificial drains that are constructed and under construction from any relevant sources.

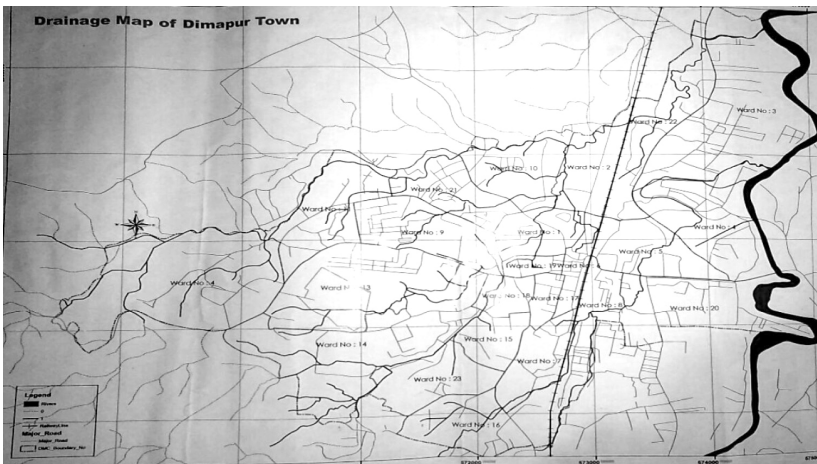


Illustration 1: Map showing drain constructed in Dimapur City.
Source: Dimapur Municipal Council.

Sampling: A total 10 numbers of drains have been selected within Dimapur town mainly focused on the Rajbari, New

market, Zeliangrong village, Thakurbari, Signal Bazaar and Super Market areas including footpaths, open and close drains, new drains under construction and old drains by convenient sampling method for the study. The researchers have used this sampling method as per ease of access, readiness, availability at a given time slot of the research.

Tools and techniques of data collection: The study is descriptive and explorative in nature. Qualitative data have been collected for the study. Because of the nature of the problem and difficulties involved in the collection of data, the researchers have used only qualitative data. Primary data have been collected in order to study drainage system attached in the city. Field observations, interview with local people and case study methods have been used as tools for data collection. Secondary data have been collected from books, journals, web sites and published and unpublished research studies, official records of Municipal and also from other departments of Dimapur.

Field work: The field work is categorized into 2 phases.

The first phase of field work was conducted during the month of June, July and August of 2018. During this phase, feasibility of the study was verified by observing the study area. The researchers identified the locations where frequent water logging occurs in Dimapur town. The second phase continued from beginning of winter season i.e. January 2019 to the end of February 2019. During second phase, the researchers visited some of the areas of Rajbari, New Market, Zeliangrong Village, Thakurbari, Signal Bazaar and Super Market to observe the conditions of the infrastructure and to collect data.

Study Results

The study on drainage system in Dimapur revealed that in most of the areas where flood occurs excessively, the rate of flooding

and water levels are increasing year by year. Few areas are listed below where the researchers have identified existing conditions of drainage systems and the problems faced by localities in those areas.

Rajbari: This is primarily a residential area of the city. The main drain in this area is totally covered by solid waste and sediments; it is because the outlet of this drain has not been cleared for a long time. Even during the dry season, the water in the sub-drains gets clogged which results in the contamination of other water sources. Interactions with the local residents revealed that the drain has not been cleared for the last 5 years which may explain the yearly accumulation of solid wastes resulting in incidences of water logging in the drain. Furthermore, the lack of advance machinery has rendered the locality's efforts unproductive in cleaning the drain. The blockade of the drain by solid wastes primarily that of plastic wastes causes flooding with water rising to a maximum of 5 feet during the peak rainy season, this result in the evacuation of the local residents every year.

New Market area: It is a commercial area in the middle of Dimapur town. The width of the drain is uneven due to which the solid wastes get blocked in the part where the width is narrow. No proper maintenance is taken for clearing the drains within the required interval of time. The drain is totally covered by solid wastes which are mostly produced by illegal dumping of commercial waste and kitchen wastes.

Zeliangrong village beside Dhobinalla: It is a low lying residential area, where water logging problem arises very frequently. In this area, a natural water stream passes, which comes from a hilly part of Dimapur (Rangapahar). The drain is partially covered by solid waste which disturbs the proper flow of water. As a result, the water flows over the drains and causes regular flooding in the residential areas. The width of the drain

is not adequate to carry the volume of the water during the rainy season.

Thakurbari area: It is a highly packed residential area beside Ram Janaki Higher Secondary School. There are many sub-drains in this area. Construction of buildings over the drains creates unevenness that expedites clogging of the drains by solid wastes. As a result, the area faces water logging problems during the rainy season.

Super Market area: This area lies beside Supermarket; it is a commercial area covering a part of the major transport system of Dimapur. In this area, major water logging problems happen even with minimum precipitation. Usually the water level rises up to a level of 2-3 feet above the ground. The width of the drain is totally insufficient to carry the flow of water in normal condition. The drain in this area is cleared by the state management and locals on a regular basis. The drain is in lower level than the main outlet due to which, during heavy precipitation, the water level in the main drain raises and results in the water flowing in the reverse direction through the outlet into the area. This major flaw in design and construction causes severe water logging problems.

Signal Bazaar: In this area, the water levels raise up to a level of 1-2 feet during the monsoon. Again the infrastructure of the drain of this area is insufficient to handle the flow of water. In the monsoon season, the water comes in the drain from higher to lower level. There is a U-turn in the passage by which the water flows to the main outlet. However, the ground level in that particular point is lower and impedes the smooth flow of water through the gutter, causing water logging.

Footpaths: The design of the footpaths which are constructed in the town is not properly planned. The absence of provisions to access the drains underneath the footpaths prevents cleaning at required intervals resulting in blockade of the drain causing

water to flow through the inlets into streets. To solve these problems, there should be some opening lids at regular intervals so that clogged matters inside the drains can be conveniently removed.

New drainage construction: There is ongoing construction of drainage systems adjacent to the four lane highway construction in Dimapur. The pavements over the drains are being built with gaps at fixed intervals which will be covered by removable slabs allowing easy maintenance. This should prevent the same problems seen in footpaths occurring and will increase the lifetime of the road.

Findings

1. Every year the quantity of solid waste in the drains is increasing rapidly. Many drains are totally covered by solid wastes which are mostly produced by illegal dumping, commercial waste and household goods.
2. Due to the solid wastes and sediments, blockages happen resulting in the rise of water levels.
3. The drains carry the water of the hilly regions down and, as a result of blockages and substandard infrastructure, the water overflows from the drains causing flooding in the low lying residential areas.
4. Construction over drains makes the drains uneven and results in the blockage of the drain by the solid waste which gathers on these uneven surfaces. Again this leads to the flow of water over the drain during the rainy season.
5. The footpaths also contribute to water logging due to their inappropriate construction and limited access for cleaning.
6. Flooding resulting from blocked drainage leads to contamination of the ground water, resulting in an adverse

effect on the drinking water quality of the areas causing various water borne diseases.

7. Many drains have not been cleared for years.
8. Flooding in residential areas, where the water level may rise to 3 to 4 feet from the ground level requires the evacuation of residents every year during the rainy season.
9. In many instances, the basic infrastructures of the drains are inappropriate to meet its requirement. Many drains do not have sufficient capacity to carry the volumes of water commonly seen during rainy season. Drains have not been expanded or supplemented in line with population growth. Additionally, most of the drains have uneven width and there is a lack of proper maintenance.
10. In some low lying areas such as "*Zeliangrong village*" the width of the drain cannot be increased as there is no space left due to the construction beside the drain. In "*Thakurbari*" and "*New Market*" the width and the drainage is inappropriate and there lack of proper maintenance. In "*Supermarket*" and "*Signal Bazaar*" areas, the problem is due to the unplanned drainage systems where the infrastructure developed for drainage is inappropriate according to the ground level and the flow of the water.

Solutions and Recommendation

Dimapur is a developing city and there is a rapid population growth in recent years but the drains still follow the old system and should be upgraded to match the growing needs using proper planning and modern techniques. Based on the study, the following have been recommended:

1. There is a significant need for cleaning drains on regular intervals keeping in mind health and hygiene of the localities.

2. The government bodies should invest in advanced machinery for clearing drains.
3. There is a need for advanced planning before construction of drains.
4. The DMC and administration need to take strict action to create a plastic free city.
5. There is a need for allocation of more dumping areas to dispose waste materials, or regular collections by DMS.
6. There is need to increase the depth of the main outlets towards the outflow.
7. The width and depth of drains should be uniform with limited sharp bends so that solid waste and sediment does not build up in these areas.
8. Periodic maintenance and inspection of the surface drainage system should be carried out and stretches where water stagnates either in the side drain or on the pavement surface should be identified for immediate corrective measures.
9. There is a need to study planning and construction techniques of drainage systems in other cities which have succeeded in upgrading their drainage systems.

Conclusion

The drainage system is at its best when it is well designed and maintained properly. For these purposes, it is necessary that the drains keep their shape and slope in the designed manner during their lifetime. It is also necessary to ensure that the drains retain their full cross section, particularly for the monsoons. An important consideration for the capacity of drainage conduits is build up of sediments and solid wastes.

The drainage systems in Dimapur town are in a very poor condition and in a critical state in some areas. Most of the

drains are clogged with significant volumes of solid wastes and sediments which results in water logging. The drains have largely been built unplanned in an ad hoc fashion without keeping a clear view of future needs. There is an urgent need for proper construction of new drains with modern techniques. From the study, it was found that the maintenance of the drains is lacking in many aspects. There is also a lack of civic sense in the public as most of the solid wastes are domestic and commercial so there is a need of more awareness programs.

PHOTOGRAPHIC EVIDENCE OF THE PROBLEM

Plate 01: Rajbari



Drain covered by solid waste and sediments

Plate 02: Dimapur



Contamination of ground water

Plate 03: Bata Charali



Over flow of water from the drainage due to blockage

Plate 04: Signal Bazaar



Flood affected area

Plate 05: Thakurbari



Construction of building over the Drain

Plate 06: Zeliangrong village



Area is covered with solid waste

References

- Bansal V.K. (2011), "Use of GIS and Topology in the Identification and Resolution of Space Conflicts." *Journal of Computing in Civil Engineering*, (25), 159-171.
- Bratières K, Fletcher T.D, Deletic A, Alcazar L, Le Coustumer S, et al. (2008), "Removal of nutrients, heavy metals and pathogens by stormwater biofilters." *11th International Conference on Urban Drainage (ICUD)*; Edinburgh. *International Water Association*.
- Burian Steven and Edwards Findley (2002), "Historical Perspectives of Urban Drainage" *Journal of Global Solution for Urban Drainage*, DOI/10.1061/40644-284.
- Dieter H. Lindner. (2013), "Surface water drainage design considerations practices." *Canadian Water Resources Journal*, 12:3, 67-78.
- Government of India (2009), *CPWD Specification Volume*.
- Indian Road Congress*, Guidelines on urban drainage system (First Edition), August 2013.

- Karamouz Mahammad, Hosseinpour Ana, Nafiz Sara (2011), "Improvement of Urban Drainage System Performance Under Climate Change Impact: Case Study." *Journal of Hydrologic Engineering*, 16 (5), 395-412.
- Mikkelsen P.S, Jacobsen P, Fujita S (1996), "Infiltration practice for control of urban storm water." *J Hydraulic Res*, 34: N827-840.
- Morung Express (2017), Morungexpress.com/flash-floods-areas-Dimapur, [Northeasttoday.in/Nagaland pollution-control-board-study-report-on-drain-water-in-Dimapur-ii](http://Northeasttoday.in/Nagaland-pollution-control-board-study-report-on-drain-water-in-Dimapur-ii).
- Mukhopadhyay R (2017), "Study of storm water drainage system at Agarpa in West Bengal on civil storm software, *Thesis*, Jadavpur University.
- Pagotto C, Legret M, Le Cloirec P (2000), "Comparison of the hydraulic behavior and quality of highway runoff water according to the type of pavement." *Water Res*, 34.
- Parkinson J, Tayler K. & Mark O. (2007) "Planning and design of urban drainage systems in informal settlements in developing countries." *Urban Water Journal*, 4 (3), 137-149.
- Sundara Kumar Pitta (2015), "Storm Water Drainage Design (Case Study Vijayawada)." *International Journal of Earth Sciences and Engineering*.

Government Sector Employment in Nagaland

Pudezono Tase*

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About the author

*Assistant Professor,
Department of Economics,
Dimapur Government
College, Dimapur.
Email:pudezonorose@
gmail.com

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Abstract

Nagaland is pre-dominantly an agrarian economy, but in an era where agriculture has become problematic with scarcity of lands, irregular monsoon, absence of modern technology in farming, people are compelled to look for other options. Industrialization is also under-developed, so government job became an important issue for sustenance. Employment is a linked to economic growth and development.

As such economic progress has to be accompanied by higher level of employment. This paper attempts to analyse the trend of government employment in Nagaland. The study is based on secondary data using census of India and Primary Census abstract of Nagaland. The study finds that the number of employment is increasing at a decreasing rate in relation to total population. This paper also finds that female employment in the government sector is steadily increasing over the years.

Introduction

Government service or employment is a service provided by Government to people living within its jurisdiction either directly (through the public sector) or by

financing provision of services. Since the beginning of time and human imprints on Indian soil there was always a structured Government in one or the other form. As the Government always existed, so did the Government job, albeit in different names and designation.

Government Jobs in India came with a complete package of benefits. Government job offers amazing bonus, recently good pay-scales and expectable amount of work expected, comparatively lower targets and surety of monthly salaries as well as fabulous post, retirement benefits, festival bonus etc. besides the above benefits government job is popular in recent times because of the job security. From economic point of view Government Job accommodates significant amount of work force. For example in the context of Indian Economy, railways is the 7th largest employer in the world whereas the Indian Armed forces are the 8th largest employer employing about 2.7 million people, contributing not only to the purchasing power, but also to the transportation and defence needs of the country.

Caponi (2017) found that expanding public sector employment can be an effective means of reducing unemployment in the short term, providing a stabilizing effect during recessions or in relatively disadvantaged groups. He also pointed out that public sector employment can create demand in other sectors of the economy and also supports equitable policies, such as encouraging employment of marginalized and/or disadvantaged groups.

Kiran et al (2014) remarked that employment is important not only for economic growth but its ramifications have also been on social and political stability and peace in the country.

Herman (2011) found that the impact of the economic growth process on employment differs from one country to another according to the type of economic growth (extensive

or intensive), the employment sectoral structure, and the labour market flexibility. At the same time, she also highlighted that in the European economies in which the share of employment in services is high, the labour market is more flexible and where there is extensive economic growth there is higher employment intensity. She also pointed that it is highly important to act on economic growth in order to increase the employment intensity of economic growth.

Islam (2004) highlighted that growth of employment with rising productivity is seen to take place through a shift in the structure of employment towards occupations/sectors with higher levels of productivity, and improved productivity within sectors and occupations.

Khan (2001) has put forward that there are many aspects of the linkage between employment and poverty. The poor can escape poverty when there is (a) an increase in wage employment; (a) an increase in real wage; (c) an increase in self-employment; (d) an increase in productivity in self employment; and (e) an increase in the terms of exchange of the output of self employment.

India Labour Market Report-2008 (2009) found that the organized sector in India basically consists of the public and the private sectors. Compared to the private sector employment, there was rapid growth of employment in the public sector during the period 1961-81, a relative slow down during 1981-91, and a declining trend during 1991-2001. Of the total organized public and private sectors, public sector accounted for 70 lakhs in 1961 i.e. nearly 58 percent of the total organized sector employment. By 1981, public sector employment had increased to 15.5 million, which accounted for about 68 percent of the total employment in the organized public and private sectors. However, India recorded a slowdown in the public sector employment and a marginal decrease of 0.9 percent in 2001, over 2000.

As emphasized in the National Policy Women Empowerment - 2001, the goal of this Policy is to bring about the advancement, development and empowerment of women. The Policy will be widely disseminated so as to encourage active participation of all stakeholders for achieving its goals. Specifically, the objectives of this Policy include-

- (i) Creating an environment through positive economic and social policies for full development of women to enable them to realize their full potential.
- (ii) The de-jure and de-facto enjoyment of all human rights and fundamental freedom by women on equal basis with men in all spheres – political, economic, social, cultural and civil.
- (iii) Equal access to participation and decision making of women in social, political and economic life of the nation.
- (iv) Equal access to women to health care, quality education at all levels, career and vocational guidance, employment, equal remuneration, occupational health and safety, social security and public office etc.
- (v) Strengthening legal systems aimed at elimination of all forms of discrimination against women.
- (vi) Changing societal attitudes and community practices by active participation and involvement of both men and women.
- (vii) Mainstreaming a gender perspective in the development process.
- (viii) Elimination of discrimination and all forms of violence against women and the girl child; and
- (ix) Building and strengthening partnerships with civil society, particularly women's organizations.

Srivastava & Srivastava, 2010 argued that women's employment is crucial for raising their living standards, poverty reduction and for enhancing women's status.

Brief profile of the economy

Nagaland is situated in the North-east region of India, sharing international boundary with Myanmar in the east, an inter-state with Manipur on the South, Assam on the west, and Arunachal Pradesh on the north. The total geographical area is 16579 sq. km. Nagaland was inaugurated as the 16th state of the Indian Union on 1st December 1963. According to the 2011 Census, Nagaland Population is 1978502, Male 1024649, Female 953853. Density of population per-square kilometer is 119 and decadal percentage variation (2001 to 2011) -0.58. The literacy rate of Nagaland is 79.55 (82.75 Male and 76.11 Female).

In Nagaland, more than 60 percent of the population is dependent on agriculture for their livelihood, with agriculture and allied activities, contributing 29 percent of the gross State Domestic Product (GSDP).

The GSDP 2016-17 (A.E. Advance Estimate) at current prices is estimated to grow at 9.91 percent as against 5.35 percent achieved in 2015-16 (Q.E. Quick Estimate). In absolute terms the GSDP at current prices is estimated to have increased from Rs. 19214 crore to Rs. 21119 crore during the corresponding year. At constant price, the GSDP 2016-17 (A.E.) is estimated to increase at Rs. 14917 crore from Rs. 14337 Crore in 2015-16 (Q.E.) registering a growth of 4.04 percent.

The economy of the State is divided into three sectors-Primary, Secondary and tertiary Sector.

Table 1: Sector-wise Contribution to GSDP at Constant Prices

Sector	2011-12	2012-13	2013-14	2014-15 (P.E)	2015-16 (Q.E.)	2016-17 (A.E.)
Primary	31.41	31.35	32.46	32.17	39.74	28.42
Secondary	12.41	12.07	8.98	9.88	10.16	10.27
Tertiary	56.17	56.58	58.56	57.94	59.02	60.29

Source: Nagaland Economic survey 2017-18

P.E= Provisional Estimates, Q.E= Quick Estimates, A.E= Advance Estimates

The primary sector comprises of all occupation associate with utilization of natural resources. It includes agriculture, forestry and logging, Fishing and mining and quarrying. As per the A.E. of GSDP 2016-17 at constant prices, the primary sector has a negative growth trend of 6.21% and is pegged at -0.60 even in 2016-17. These negative growth is due o the reduction in the production of life-stock forestry and logging. As against the decline in the above two sub-sectors the performance of the other three sub-sectors i.e. crops, fishing and Aqua-culture and mining and quarrying is estimated to have achieved a growth of 1.38 percent, 4.26 percent and 9.86 percent respectively in 2016-17 A.E.

The share of primary Sector to the GSDP is estimated to fall from 29.74 percent in 2015-16 Q.E. to 28.42 percent in 2016-17 A.E.

The secondary Sector comprises of all those economic activities which processes and converts one form of goods into another. It includes manufacturing, electricity, gas, Water supply and other utility services and construction. As per the A.E. of GSDP 2016-17 at constant prices, the secondary sector is estimated to grow at 5.12 percent in 2016-17 A.E. as against 4.33 percent achieved in 2015-16 Q.E. with regard to percentage contribution to GSDP. The Secondary Sector is estimated to increase its share in GSDP from 10.16 percent in 2015-16 Q.E. to 10.27 percent in 2016-17 A.E.

Construction has begun the most robust sub-sector with its share in the GSDP increasing from 7.07 percent in 2015-16 Q.E. to 7.13 percent in 2016-17 A.E. while the manufacturing Sector which comprises of both registered and unregistered manufacturing units, its share in the GSDP has fallen from 1.14 percent in 2015-16 Q.E. to 1.12 percent in 2016-17 A.E.

The tertiary sector comprises of all economic activities that produces services, It includes activities like transport, storage and communication trade, hotels and restaurants, banking and insurance, real-estate and public services. Over the years the tertiary sector has become the most prominent sector in terms on contribution to GSDP.

With Growth in Public Administration and other Services, tertiary sector registered a growth of 6.27 percent in 2016-17 A.E. as against 3.33 percent in 2015-16 Q.E. at constant prices. Within the Tertiary Sector, during the year 2016-17 the sub-sector of Public administration has become the most prominent sub-sector with share of 17.95 percent in the GSDP followed by other services and real-estate, ownership of dwellings and professional services with the share of 16.03 percent and 9 percent respectively. Other sub-sector of the tertiary Sector during 2016-17 i.e. trade, repair, hotels and restaurant contributed 7.82 percent, transport Storage, communication and services related to broadcasting contributed 5.56 percent and financial Services contributed 3.83 percent overall. The Tertiary Sector to GSDP at constant prices from 59.02 percent in 2015-16 Q.E. to 60.29 percent in 2016-17 A.E.

According to 2011 census, there are 7,41,179 main workers comprising of 4,42,204 (59.66 percent) male and 2,98,975 (40.34 percent) female and 2,32,943 marginal workers comprising of 1,05,153 (45.14 percent) male and 1,27,790 (54.86 percent) females in Nagaland. A further break-up of the main workers by category-wise shows that cultivators constitutes 56.72 percent,

agricultural labourers 3.05 percent, workers in household industries 1.29 percent and other workers constitutes 38.95 percent.

Objective

The main objective of this paper is to examine the trend and gender-wise employment in government sector in Nagaland.

Data and methodology

For the purpose of this study, only secondary data are used. Average annual growth rate, compound annual growth rate and simple percentage were used to draw results.

Results and discussions

Population and State Government Employment

For an economy to grow, all sectors of the economy have to be developed. But in a situation where avenues are limited, economy is trapped in a vicious cycle of poverty and in order to break the cycle, public sector becomes priority to bring about the desired change in the economy. It is in this situation, people looked for government sector employment which gives security, stability and job satisfaction.

Table 2: Population and Employment in Nagaland

Year	Population	Labour force (Total workers)	Govt. Sector Employment	Average growth rate of Govt. Sector employment	% of Govt. Sector Employment to Total Population	% of Govt. Sector Employment to Total Workers
1971	516449	262098	26234	-	5.08	10.01
1981	774930	368324	44446	69.42	5.74	12.07
1991	1209546	516476	57949	30.38	4.79	11.22
2001	1988636	849982	73448	26.75	3.69	8.64
2011	1978502	974122	91308	24.32	4.62	9.37
2012*	2029229	-	91371	0.07	4.50	-
2013*	2081395	-	93530	2.36	4.49	-
2014*	2135042	-	95903	2.54	4.49	-
2015*	2190215	-	97520	1.69	4.45	-
2018*	2365359	-	125299	-	5.30	-

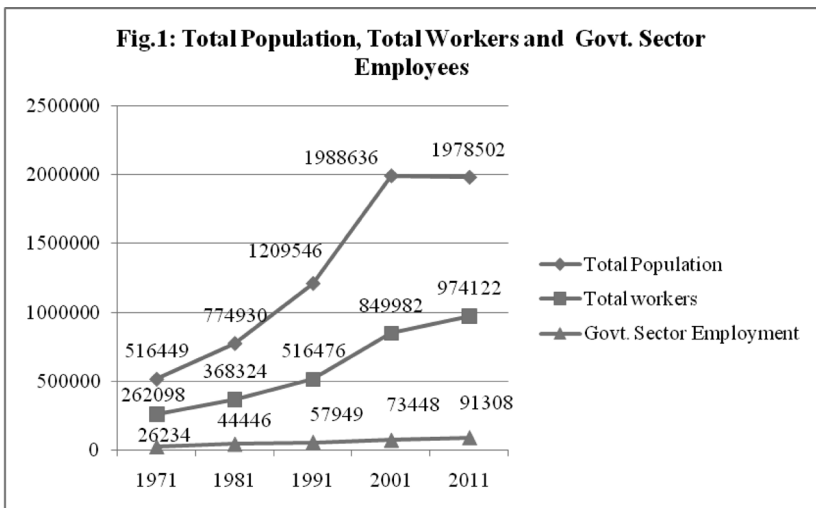
Source: Statistical Handbooks of Nagaland, Census of India

*Population projection of Nagaland from 2011 to 2021

As shown in table 2, in the year 1971, Nagaland has a total population of 5,16,449 persons and the total person employed in the government sector is 26,234 which is 5.08 percent in relation to total population and 50.75 percent in relation to total workers in the state. The employment generation has increased from 44,446 persons in 1981, 57,949 persons in 1991, 73,448 persons in 2001, 91308 persons in 2011 to 97,520 persons in 2015 and further to 1,25,299 persons in 2018. The reflecting feature here is that the percentage change in employment in relation to total population and total workers is declining from 5.08 percent and 50.75 percent respectively in 1971 to 4.62 percent and 37.42 percent correspondingly in 2011. In 2018 the percentage has increased to 5.30 percent against the total population projection. The average growth rate of employment also shows a declining trend from 69.42 percent in 1971-1981, 30.38 percent in 1981-1991, and 26.75 percent in 1991-2001 to 24.32 percent in 2001-

2011. The average annual growth rate during the period 2011 to 2015 shows a rather fluctuating and distressing result because the population was growing at 2.45 percent as against 0.07 percent of employment in 2011-2012 and in 2014-2015, the population was growing at 2.58 percent but employment was growing only at 1.69 percent. Literally, employment is increasing over the years but in reality it is increasing at a decreasing rate. The compound annual growth rate of employment is 17.84 percent where as the compound annual growth rate of population for the same period is 19.79 percent.

The trend of population, workers and employment in government sector as represented in table 2 is depicted in figure 1 below:



Department-wise and district-wise employment

As on 31st March 2018, the state has altogether eighty-six departments giving employment to 125299 persons. The highest absorbing department is Civil Police with a total employment of 26026 persons which constitute 20.77 percent, followed by the departments of School Education and PWD (road & bridges) with 18.67 percent and 8.5 percent respectively. The smallest

department is Electrical Inspectorate and State Guest House (Kohima) with only 16 manpower each manning the departments which constitute 0.01 percent each.

Table 3: Department-wise employment in the government Sector (As on 31st March 2018)

Sl. no.	Department	No. of emp.	Sl. no	Department	No. of emp.
1	ATI	64 (0.05)	44	NH Kolkata	69 (0.06)
2	Agriculture	1635 (1.3)	45	NH Shillong	20 (0.02)
3	VET	1456 (1.16)	46	NIDC	64 (0.05)
4	Art & Culture	247 (0.2)	47	NIRMSC	31 (0.02)
5	Border Affairs	19 (0.02)	48	NKVIB	182 (0.15)
6	CAWD	227 (0.18)	49	NPSC	66 (0.05)
7	Civil Police	26026 (20.77)	50	NST	1006 (0.80)
8	Civil Secretariat	1844 (1.47)	51	NTTC	21 (0.02)
9	Planning & Coordination	372 (0.40)	52	New & Renewable Energy	86 (0.07)
10	Co-operation	295 (0.24)	53	NSMDC	197 (0.16)
11	DAN	102 (0.08)	54	Civil Supplies	533 (0.43)
12	DUDA	111 (0.09)	55	Power	4746 (3.79)
13	District Adm.	3878 (3.09)	56	Printing & Stationery	492 (0.39)
14	Eco. & Statistics	670 (0.53)	57	PHE	3658 (2.92)
15	Election	172 (0.14)	58	PWD-Architect	62 (0.05)
16	Electrical Inspectorate	16 (0.01)	59	PWD-Housing	4659 (3.72)
17	Emp., Skill Dev. & Entrepreneurship	416 (0.33)	60	PWD-Mechanical Engineering	1199 (0.96)
18	Evaluation	130 (0.10)	61	PWD-Engineer-in-chief	106 (0.08)
19	Fire & Emergency Services	648 (0.52)	62	PWD-National Highway	639 (0.51)

Government Sector Employment in Nagaland

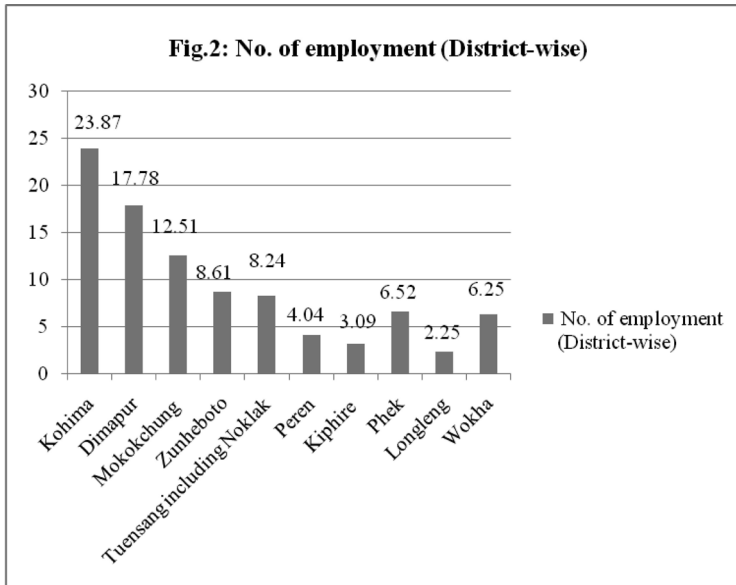
20	Forest, Env. & Climate Change	248 (0.20)	63	PWD-Road & Bridges	10654 (8.50)
21	Fisheries	1257 (1.00)	64	Rajya Sainik Board	52 (0.04)
22	Geology & Mining	425 (0.34)	65	Rural Dev.	2068 (1.65)
23	Governor Secretariat	73 (0.06)	66	SCERT	408 (0.32)
24	Health & Family Welfare	10055 (8.02)	67	Soil & Water Conservation	778 (0.62)
25	Higher Education	1164 (0.93)	68	School Education	23388 (18.67)
26	Home Guards	1189 (0.95)	69	Sericulture	402 (0.32)
27	Horticulture	481 (0.38)	70	Social Welfare	7000 (5.59)
28	Industries	907 (0.72)	71	Science & Technology	43 (0.03)
29	IPR	609 (0.49)	72	State Excise	423 (0.34)
30	ITC	39 (0.03)	73	IFC	715 (0.57)
31	State Guest House Kohima	16 (0.01)	74	State Info. Commission	23 (0.02)
32	Jails	1055 (0.84)	75	SIRD	88 (0.07)
33	Justice & Law	478 (0.38)	76	State Legislature	326 (0.26)
34	Labour	163 (0.13)	77	State Lotteries	48 (0.04)
35	LRS	436 (0.35)	78	Taxes	250 (0.20)
36	LRD	637 (0.51)	79	Technical education	241 (0.19)
37	LMP	198 (0.16)	80	Tourism	184 (0.15)
38	Motor Vehicles	209 (0.17)	81	Treasuries & Accounts	753 (0.60)
39	Municipal Affairs	56 (0.04)	82	Urban Dev.	228 (0.18)
40	NBSE	89 (0.07)	83	Vigilance Commission	122 (0.10)
41	Nagaland Hotels Ltd.	123 (0.10)	84	Youth Resources & Sports	594 (0.47)
42	NH Delhi	83 (0.07)	85	Women Resource Dev.	140 (0.11)
43	NH Guwahati	45 (0.04)	86	Village Guards	172 (0.14)

Source: Statistical Handbook of Nagaland, 2018

* Figure in parentheses indicates percentage

**ATI-Administrative Training Institute, VET-Animal Husbandry & Veterinary Services, DAN-Development Authority of Nagaland, DUDA-Development of Under Developed Areas, Adm.- Administration, Eco-Economics, Emp.-Employment, Dev.-Development, Env.-Environment, IPR- Information & Public Relation, ITC-Information Technology & Communication, IFC-Irrigation & Flood Control, LRS-Land Records & Survey, LMP-Legal Metrology & Consumer Protection, NBSE-Nagaland Board of School Education, NH-Nagaland House, NIDC-Nagaland Industrial Development Corporation Ltd., NIRMISC-Nagaland Industrial Raw Materials & Supplies Corporation, NKVIB-Nagaland Khadi & Village Industries Board, NPSC-Nagaland Public Service Commission, NST-Nagaland State Transport, NTTC-Nagaland Tool Room & Training Centre, SCERT-State Council of Education & Research Training, SIRD-State Institute of Rural Development.

Among the twelve districts in the state, Kohima has the highest number of employment with 23.87 percent followed by Dimapur 17.78 percent, Mokokchung 12.51 percent, Zunheboto 8.61 percent, Tuensang (including Noklak - Noklak district was created on 21st December 2017 as the 12th district of Nagaland) 8.24 percent, Mon 6.84 percent, Phek 6.52 percent, Wokha 6.25 percent, Peren 4.04 percent, Kiphire 3.09 percent and Longleng at the bottom with 2.25 percent. This is represented in figure 2 below:



Gender-wise Employment in Government Sector

Gender issue is an emerging issue where every nation tries to give equal opportunity based on merits. There are activists who demands for thirty-three reservation for women in all public domain especially in India. Since independence, governments' policy on women development has taken varying types of emphasis, from the initial welfare oriented approach to the current focus on development and empowerment. The Planning Commission, with the aim of converging the benefits in the social and economic development sectors for women in the Ninth plan envisaged, 'inclusion of an identifiable women component plan in the programmes of the respective ministries right from the planning process, and to ensure the reach of benefits to women.' Empowerment of women was one of the objectives of the nine primary objectives of the Ninth Plan (Kacker, 2006).

Table 4: Gender-wise employees in government sector in Nagaland

Gender	2012	2013	2014	2015	2018
Male	71792 (78.57)	72925 (77.97)	74355 (77.53)	75517 (77.44)	87279 (69.66)
Female	19579 (21.43)	20605 (22.03)	21548 (22.47)	22003 (22.56)	38020 (30.34)
Total	91371 (100)	93530 (100)	95903 (100)	97520 (100)	125299 (100)

Source: Statistical handbooks of Nagaland

*Figure in parenthesis indicates percentage

Table 4 represents gender-wise employment in the State government sector and it is found that female employment in the sector is steadily increasing over the years. In 2012, out of the total employment of 91,371 persons, female employees constitute 21.43 percent which in 2013 has increased to 22.03 percent. In 2014, it has further increased to 22.47 percent and there is a marginal increase of 0.09 percent over the previous year. In 2018, there is a total state government employee of

1,25,299 persons comprising of 87,279 male and 38,020 female which is 69.66 percent and 30.34 percent respectively. The increasing cost of living, whereby for many women, working is an economic necessity in order to support their family; rise of the service sector and decline of the manufacturing sector; increased access of female to higher education; introduction of National Policy Women Empowerment in 2001, etc. are some of the reasons that led to increase in female employment. Some of the benefits attached to female employment are increasing purchasing power of the family, improving the standard of living and increase participation in decision making at all levels both social and economic.

Conclusion

Government sector employment plays a very important in socio-economic development of an economy on account of their features like job security, job stability and job satisfaction. In Nagaland, government sector employment is steadily increasing but in relation to total population, it is at a decreasing rate but its importance in the economy cannot be overlooked. Over the years, female employment in government sector is also increasing which has eventually increase female participation and representation, but still fall short of thirty three percent if thirty three percent reservation of women is to be realized . However, keeping in mind that the government sector cannot absorb all the educated youths in government jobs, the government should create avenues for self employment.

References

- Caponi, V (2017). *The effects of public sector employment on the economy*, IZA World of Labor, 2017: 332. <https://wol.iza.org/uploads/articles/332/pdfs/effects-of-public-sector-employment-on-economy.pdf?v=1>.
- Census of India*, 1981, 1991, 2001, 2011.
- Herman, E. (2011). The Impact of Economic Growth Process on Employment in European Union Countries, *The Romanian Economic Journal*, XIV No. 42. Accessed October 25, 2019, [www.rejournal.eu > sites > rejournal.versatech.ro > files > articole > herman](http://www.rejournal.eu/sites/rejournal.versatech.ro/files/articole/herman).
- Islam, R. (2004). The Nexus of Economic Growth, Employment and Poverty Reduction: An Empirical Analysis, *Issues in Employment and Poverty Discussion Paper 14*. ILO, Geneva.
- Kacker Loveleen (2006): SHGs and Women: Yojana, Vol. 50, pp. 73-74.
- Khan, A.R. (2001). Employment Policies for Poverty Reduction, *Issues in Employment and Poverty Discussion Paper 1*, ILO, Geneva.
- Kiran, R., Subashini, K. and Nagamani, M.K. (2014). Impact of Economic Growth on Employment in India, *International Journal of Innovative Research in Science, Engineering and Technology*, ISSN: 2319-8753, pp 11064-11069.
- Srivastava, N. and Srivastava, R. 2010. 'Women, Work and Employment Outcomes in Rural India,' *Economic & Political Weekly*, Vol. XLV, No. 28.
- India Labour Market Report -2008 (2009). Adecco-TISS Labour Market Research Initiatives (ATLMRI) Tata Institute of Social Sciences Deonar, Mumbai 400 088. <http://www.>

macroscan.org/anl/may09/pdf/Indian_Labour.pdf.

Government of India (2001), *National Policy on Women Empowerment - 2001*. Ministry of Women & Child Development. <https://wcd.nic.in/womendevelopment/national-policy-women-empowerment>.

Statistical Handbooks of Nagaland, 1983, 1995, 2004, 2014, 2018.

Potential of Horticultural Farming and Livelihood Sustainability: A Case Study of Plum Farming at Enhulumi Village of Phek District, Nagaland

Yelhi Vero*, Eneingulo-u Lasuh**

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About the authors

*Assistant Professor,
Department of Economics,
Dimapur Government
College, Dimapur,
Nagaland, email:
yelhivero@gmail.com

**Vice Principal, Eastern
Christian College,
Dimapur, Nagaland. Email:
apulelasuh@yahoo.co.in

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Abstract

In recent years, horticulture has become a major industry in the economy. Among the variety of fruits produced in the country, Plum is one of the important commercial crops. It constitute a valuable component in the diet, both in terms of nutritive and dietary values. Data shows that India is the eight largest plum producing country in the world. The present study is a case study of plum at Enhulumi village under Phek district in Nagaland. Impact of family size and modern education on the level of production is tested and it is found that number of family size and modern education does not have significant impact on plum production. The agro-climatic condition is found to have favoured this small village for plum. Plum cultivation and production is increasing year by year. However, factors like price instability combined with poor infrastructural facilities hinder the plum production. Therefore, support from private and public agencies to facilitate price stability, technical and financial aid would boost up the economy of this rural village.

Introduction

Agriculture has been the backbone of the Indian economy. It is directly linked to human development having a direct bearing on poverty reduction and sustainable development. The proportion of workforce engaged in agriculture is highest, while the income generated from this sector is the least comparing to secondary and tertiary sectors in India. However, with the advancement of modern science and technology, the workforce engaged in primary sector particularly in agriculture has been declining over the years. Also, the cultivation of cash crops has given emphasis in the agricultural system. Thus, horticulture has become one of the most important backbones of the economy in the country.

The recent statistics for India has shown that the production of horticulture is higher than that of the food grain. In 2017-18, the production of horticulture was 306.8 MT comparing to food grain production of 279.5 MT (GoI, 2018). Further, the scope for the growth of horticulture production is quite immense in India. However, lack of awareness among the farmers on the productivity and the bottleneck infrastructural facilities remains a major hurdle for the growth of fruit production in the country (Sachitanand, 2018).

India produces variety of deciduous fruits including pome and stone fruits. The major fruit grown areas are North-Western States like Jammu and Kashmir, Himachal Pradesh, Uttar Pradesh, and North Eastern states like Arunachal Pradesh, Nagaland, Meghalaya, Sikkim and Manipur (Ghosh, n.d.). Among the stone fruits, plum is one of the fast growing commercial fruit items in India. Data shows that India is the eight highest producer of plum in the world in 2017 with 2,62,197 tonnes (FAO, 2020).

Plums have an extensive history linked to the ancient plum varieties of Damascus. Reddy (2013) in an article “All

About Plum in India” stated that Chinese are believed to be as early as 470 BC approximately. There are varieties of plum grown across the globe. Europe is a home for European plum (*Prunus domestica*), America bred the American plum (*Prunus Americana*), South Asia (first) cultivated the cherry plum (*Prunus cerasifera*) and Western Asia has the Damson plum (*Prunus salicina*). Sati, et.al (2015) conducted a study of potential of horticulture in livelihood sustainability and development particularly on plum in Sichuan Province, China. They showed that Plum has generated a huge source of income to the farmers. The quality and productivity are high but it is largely dependent on the weather condition. Also, bottleneck infrastructure is the hindrance of livelihood sustainability on plum. Hence, the study has concluded that given the weather condition stable, the farmers will be able to sustain livelihood from plum cultivation if the required infrastructural facility is given.

In a study conducted in 1906 by Sandsten showed that for Madison, USA, the current blooming period was influenced more by the condition of preceding summer and fall rather than by the current spring weather. Also, the production of plum is immensely dependent on the weather condition of a specific region as it requires adequate water, wind, temperature and sunlight. However, excessive of all these factors resulted in negativity in plum production. In 1919, Dorsey studied the relation of plum to weather in USA and concluded that certain weather conditions, good and bad, go together, but temperature and rain are the most important elements from the standpoint of setting fruit.

Plum is one of the most important stone fruits in the world. It constitutes a valuable component of diet, both in terms of nutritive and dietary values. Plum is becoming an increasing popular object of nutritional studies on humans and animals. Yet, it is not consumed as a staple food. Hence, the market of

plum is susceptible to the social and political stability of the nation. In relation to such a study, Lorubare (2016) has shown that the horticulture is the fastest growing industry in Tanzania but the unfavourable political situation with neighbouring country (Kenya) had adversely affected on small holder farmers to a great extend.

In Nagaland, about 96.5 percent of the total population was dependent on agriculture in 1950s (NSHDR, 2004). However, it has declined to 61.6 percent in 2011 (Census of India, 2011). In order to emphasis the importance of cash crops in agriculture, the Government of Nagaland has created a separate department of Horticulture in the year 1992 (GoN, 2017). Since then, horticulture has become the major focus of cultivation in Nagaland. Many of the local farmers are switching their effort from traditional jhum and terrace cultivation to horticulture farming. The amount of rainfall and favorable climatic condition for horticulture has positively impacted on the growth of fruit cultivation in the State (Chirhah & Buruah, 2019). The diverse agro-climatic conditions with varied soil types and abundant rainfall prevailing in the state enable the cultivation of horticultural crops (NSHDR, 2016). In Nagaland, data shows that the major fruits cultivation are orange, banana, pineapple and passion fruits (GoN, 2018). Amongst the various fruit items, plum is one of important commercial crop but, it is not as significant as other crops in the State. It is found that plum is not common in all the districts. As far as the data is concerned, plum has been accounted as part of a commercial crop only in recent years. In 2009, the plum production in Phek district was found to be 1.5 tonnes (NPDHR, 2009).

Plum, in Enhulumi village, was a part of age old traditional cultivation of the farmers although the history of its arrival remains unknown. Earlier, plum was cultivated only for personal consumption purpose and therefore, it was cultivated only on

small scale. Lately, its economic viability has been realized by the villagers. However, systematic study on importance of modern education, workforce participation and its livelihood sustainability has not been done for plum cultivators at Enhulumi village. Hence, this paper intends to study to fill the lacunae of the existing literature.

i. Objectives of the study

- a. To assess whether there is a positive impact of modern education and family size on plum production
- b. To determine whether the plum farming has the potential in livelihood sustainability

ii. Methods of collecting and analyzing of data

- a. In order to satisfy the objective of the study, both *qualitative and quantitative methods* are used in collection of data.
- b. The data are collected through *primary* as well as *secondary data*. Secondary data are collected through published materials and unpublished articles. Primary data are collected through questionnaire, interview and observations.

A total of 50 households are taken as sample size collected in 2018. Household survey was done with the head of the families. The production was estimated in terms of income received from the sale. The absolute figure of the production was transformed into natural logarithm for regression analysis.

- c. *Indicators* such as level of production, educational level of the farmers, family size are taken for quantitative study while farmers' experiences, problems, suggestions, etc. are undertaken for the qualitative assessment.
- d. *Statistical tools* namely; mean, correlation and simple regression analysis are used in the study.

iii. Area of Study

The present study is a case study of Enhulumi village. The NH 29 crosses the village. It is 87 Kms away from the State capital and 56 Kms away from its district headquarters. It falls under the administrative circle of Chizami Sub-Divisional Officer (Civil) in Phek district Nagaland. The topography of the village is slope and is situated adjacent to the *Ewulu Biodiversity Conservation and Great Hill Barbet Sanctuary*. The temperature of Enhulumi village ranges between 4° Celsius in winter to 28° Celsius in summer. The altitude stood at 1331 feet above mean sea level with the coordinates of 25°35'15"N and 94°21'59"E. According to Census of India 2011, the total household of the village was 230 with a total population of 1014. The literacy rate stood at 75.90 percent while the working population stood at 66.8 percent.

Brief account of agriculture at Enhulumi

The main occupation of the village is agriculture. Enhulumi village practice Jhum as well as Terrace cultivation. *Jhum cultivation* is basically done for growing crops such as millets, maize and other vegetables. Alder tree is common in Jhum field which is good for natural regeneration of soil. The *terrace cultivation* is done for rice cultivation. In fact, it is the terrace cultivation in which the villagers mainly depend upon for their livelihood as their staple food (rice) is cultivated. The *wet terrace* cultivation is considered to be superior over *dry terrace* since wet terrace is easier in cultivation as the water is pooled throughout the year. Moreover, aquatic animals are also reared in it like fish, larvae, snail, etc. which also serves as delicacy in traditional food. However, in recent years, there is a shift in its pattern of cultivation whereby the dry terrace is used to cultivate double cropping. But, it has become obvious that due to climate change, the source of water for cultivation has drastically reduced for both wet and dry terrace. Therefore, several wet terrace become

dry, while many dry terrace field do not get sufficient water for cultivation. Besides jhum and terrace cultivation, home garden and firewood reserved forest are common to Enhulumi village.

Plum Cultivating at Enhulumi village

Plum cultivation was practice by farmers even in olden days, yet, they did not realized that it can fetch them income. However, in recent times, the farmers have realized the importance of cultivating cash crops. Hence, cultivation of fruits has been picking up at a swift pace. Among the fruits, plum is one of the most common cash crops besides kiwi, cardamom, peach, etc. The most common type of plum found in the village is *Prunus Salicina*, famously known as Japanese plum.

i) **Plum farm**: Cultivation of plum for commercial purpose was initiated during 2008-09. Since then, the villagers have decided to take up proper farming spot for plum cultivation in order to produce in larger quantities. Hence, the location of *Keciphobou* has been identified. *Keciphobou* is situated above NH-29 on the south-west of the village. However, the farming of plum is not limited to this (*Keciphobou*) area. Large numbers of plum trees are also cultivated alongside the terrace fields and in the backyards.

The plum cultivation is increasing year by year in Enhulumi village. On becoming aware of plum as a good source of income, the villagers began to expand the uncultivated areas into plum farming. Even some of the dry terrace fields are converted into plum farming. Plum farming and its expansion is done by the self-interest of the farmers themselves. It is found that about 94 percent of the household living in the village has at least one tree. It is estimated that the total area under plum farming is about 100 hectare (VDB, 2019).

ii) **Methods of farming**: The farmers are not technically trained nor learned from the modern educational system. They follow

their own traditional pattern of growing fruits. The farmers follow basically two special methods; *firstly*, grafting is commonly done in plum cultivation. The technique of grafting is done with the traditional knowledge. Grafting of plum is preferably done with the sapling of peach plant. According to farmers, peach sapling is the best for plum grafting in terms of taste and growth. It is found that the normal plum plant takes 8-10 years to bear fruit. But in case of grafting, it bears fruit in 3-5 years varying from place to place. Also, Farmers practice peach seedling in the farm itself instead of transplanting from nursery as it deposits better fruits.

Secondly, the branches of the plum tree are tied by a rope with a stone to the ground. This is to weigh down the branches of the tree so that its entire branches receive proper sunlight. Besides, this provides sufficient space to bear fruit. Branches which receives better sunlight bear more fruit and it also taste better. The technique also helps farmers to harvest easier and prevents the fruit to be destroyed by the wind. In addition to tying down the branches with a rope, weeds that grow in the farm are cut and placed over the branches to weigh them down.

iii) ***Production and productivity***: The production of plum has been increasing over the years as the plantation is also increasing every year with improvement of management in the cultivation. As per the estimate of the Village Development Board, the average annual production over the last three years i.e. 2017–2019 is about 32.33 tonnes (Table-1). The production in absolute term has continuously increased in recent years. However, it is found that the annual growth was declined to 2.86 percent during 2018-2019 from 17.65 during 2017-18. The main reason for the fall in 2019 was excessive rainfall and hailstorm during its flowering.

The productivity of a particular tree depends largely on the type of soil, climate and sunshine besides farming methods. Plum

tree grows favourable in silt and loam soil. The productivity of plum is astonishing at Enhulumi village. In a study conducted by Chirhah & Buruah (2019), it is found that one single tree bears fruit up to 160 Kgs. The same study suggests that the best years of bearing fruit is during 8-10 years of its life span. However, it is also found that beyond these years, the setting of fruit remain substantial for many years although at declining rate. The plum tree is observed to survive for about 20 years in average.

Table-1: Annual production of plum for the last three years i.e. 2017, 2018, 2019

Year	Production (in Tonnes)	Annual Average Growth (%)
2019	35	2.86
2018	34	17.65
2017	28	-
Total	97	-
Average for 3 years	32.33	-

Source: Field Survey, 2019

iv. Marketing of Plum: The produce is marketed mostly in Dimapur and some in Kohima. Enhulumi plum is found to have an advantage over the neighbouring areas in the market as the trees bear fruit earlier and has better taste, shape and colour (Morung Express, 2015). However, the price declines almost every day soon after the harvest begins. Plum is harvested during Mid-May till early June. The first batch of harvest fetches up to Rs. 25 per kilogram and then it starts to fall to as low as Rs. 8 per kilogram (table-2). Due to the absence of proper marketing agency, the trade is done by the farmers themselves.

Table-2: Plum price levels in the village

*Harvest period (Weeks)	Price per kilo (in Rs.)
First week (May 15-22)	20-25
Second week (May 22-30)	14-19
Third week (June 1 & beyond)	08-13

Source: Field survey, 2019

*Harvest period is assessed on average.

Plum and its relativity

The villagers, being in rural areas, mostly depend on agriculture which is generally a low income activity. Hence, plum plays a significant role on the economy of the village. The plum production and its relationship with other factors like family size, educational level and livelihood sustainability is discussed below.

i. Family size and its production

According to 2011 census, the average household size of Enhulumi village is 4.41 members. Similarly, the study reveals that 64 percent of farming household has family size between 4–7 members, while 18 percent each of farming household has less than 3 and more than 7 members (Annexure-1). The farming is done manually, while machines and modern tools are not used. As such, the number of workers employed in the farm is an important input factor in plum production. Hence, it is pertinent to assess whether the number of workers¹ have any positive impact on the level of production.

The relationship between number of family size and the level of production have been examined. Family size is taken as an independent variable, while the level of production as dependent variable. It is estimated that there is positive correlation between family size and the level of production but the degree of correlation is low as its value (r) is 0.239 (table-3). Further, simple regression analysis is tested to see whether there is significant impact of family size on the level of production. It is estimated that the impact of one percent increase in family size increases the level of production by 23.9 percent. However, t-test (1.701) shows that it is not statistically significant. Hence, we can conclude that family size doesn't have any significant positive impact on the level of plum production.

¹ In the study, the number of workers is synonyms to family size.

Table-3: Impact of family size and educational level on the level of production

Independent Variable	Constant (a)	Regression Coefficient (b)	Correlation Coefficient (r)	r ²	Std. Error	df ²
Family Size	9.07	23.9 (1.701)	0.239	0.057	0.038	48
Educational level	8.55	-9.7 (0.678)	0.097	0.009	0.091	48

Dependent variable: Level of production

Note: The figure in the brackets is t-value, r² is the level of determinant and df² is degree of freedom at two levels

Source: Household survey, 2018

ii. Education and level of production

Education is an important phenomenon in any level of economic activity. Similarly, education is an important factor in agricultural sector particularly in cash crops farming. Hence, it is felt imperative to examine whether the modern education has any positive impact on the level of production. Amongst the sample farmers, fifty-six percent studied up to high school, twenty percent primary school, sixteen percent illiterate, six percent graduate and two percent higher secondary levels (Annexure-1).

In the analysis, the level of education (class) is taken as independent variable, while the level of production is taken as a dependent variable. It is found that the correlation is negligible as the coefficient of correlation (r) value is as low as 0.097 (table-3). Further, regression analysis is used to estimate whether the level of education has significant impact on the level of production. It is resulted that the level of education has no significant impact on its production rather it is showing negative impact as the coefficient of regression (b) value is resulted to be -9.7 percent. Also, t-test (0.678) result shows that the impact of modern education on plum production is not statistically significant. Hence, it can be concluded from the study that the

modern education as a factor has no role on the plum farming in Enhulumi village.

iii. Potential of plum in livelihood sustainability and development

The cultivation of paddy in terrace is still occupied as the most important occupation and the main source of livelihood. The plantation of paddy in terrace is done in the month of June. During this time, farmers require finance for hiring labourers for cultivation; therefore, many families struggle due to their meager income. Also, June is the eighth month of post-harvest of paddy and thus many small cultivators fall short of food requirements. Hence, June is the crucial month for this rural village on these two accounts. Now, plum being harvested in the mid-May and early June, the income received from the sale of the fruit is a great relieve for the farmers as it could enable the farmers to procure necessary food stuffs and hire labours as well. It is estimated that on the average, a family receives Rs. 9000 from the sale of plum during one season (2019). However, there is a big uncertainty in the cultivation of plum as it solely depends on climate. Heavy wind and continuous downpour especially during the flowering season adversely affects setting of the fruit. The farmers have experienced such misfortune in the past where hailstorm has destroyed the flower which resulted in poor harvest.

iv. Challenges of the plum growers

Plum farming in Enhulumi village is not free from problem and challenges. It is obvious that weather is an uncertain phenomenon. It is found that there is no regulated marketing agency for the farmers. Also, large number of small farming and fragmentation is another problem in farm management. Organizing small farmers for marketing is another stress as it is not worth transporting less than two tonnes to the market due to heavy transportation charges. Failure to transport their produce

in time also leads to wastage as there is lack of warehouse and processing unit in the village.

The price stability is found to be missing. In the later part of the harvest, farmers fail to earn even their daily wage as the price in the market falls too low due to which they prefer the fruit to be left unharvested. Furthermore, the price of the fruits remains unknown to the farmer until it is sold in the market as the fruits are taken on credit by the farmer traders in the village and they are paid only after the fruits are sold in the market. Clearing of jungle and planting of saplings in the initial stage of farming requires financial investment as they need to hire labour and procure saplings, hence shortage of finance is another barrier to expand their farming. In addition, there is lack of technical support and poor infrastructural facilities along with the absence of post-harvest management system. Hence, these numerous challenges and problems need to be addressed so that the economy of the rural farmers will be uplifted.

Conclusion

Plum is found to be a boost to the rural economy. The methods of cultivation being based on the traditional knowledge, the farmers are able to manage farming except from bad weather. The increasing production level and the expansion of new sites every year are worth noting for the upliftment of the rural economy. There is variation in the level of plum production among the farmers, yet, it is seen that the farming is expanding every year. About ninety-four percent of the household living in the village engaged in plum farming is another boom for plum cultivation vis-à-vis rural economy. It is also found that so far, the number of workers and the modern education have no significant impact on the level of production. This means the cultivation is primarily based on traditional knowledge and favourable agro-climatic condition. Hence, there is a scope for

expanding plum farming in this rural village. Also, it is worth mentioning that plum farming is an environmental friendly as there is no slash and burn for its cultivation.

However, it is found that the foremost requirement for livelihood sustainability is to facilitate farmers get price stability and harvest management of the fruit. To solve the wastages of the produce, the immediate need of the farm is to be equipped with regulated marketing agency which can transport the fruits till the end of the harvest. Also, facilitating price stability, setting up of processing unit, storage facility and construction of approach roads shall advance farming. The village being favoured by agro-climatic condition for plum and endowed with traditional knowledge of its cultivation; facilitating market management, technical support and financial aid shall definitely boost up plum farming. In conclusion, livelihood sustainability on plum farm single-handedly is fickle but it is beyond doubt that in addition to agriculture, plum has immense potential to boost up the economy of the rural people.

References

- Census of India* (2011). Government of India.
- Chirhah, T. and Buruah, Polaski B. (2019). "Socio-economic Status of Plum Cultivators: A Case Study of Enhulumi Village of Nagaland," *Journal of Humanities and Social Sciences Invention*, Vol. I, No. 1, 25-29.
- Dorsey, M.J. (1919). "Relation of Weather to Fruitfulness in The Plum," *Journal of Agricultural Research*, Vol. XVII, No. 3, pp. 103-130, June 6.
- FAO (2020). *Food and Agriculture Organization Corporate Statistical Database*, FAO: <https://en.wikipedia.org/wiki/>

- List_of_countries_by_plum_production, 17th March, 2020 accessed April, 18, 2020.
- Ghosh, Saurindra P. (n.d.). *Deciduous Fruit Production In India*. Accessed April 18, 2020, <http://www.fao.org/3/ab985e/ab985e07.htm>.
- Government of India (2018). *Ministry of Agriculture*.
- Government of Nagaland (2017), *Department of Horticulture*, Kohima.
- Government of Nagaland (2018), *Statistical Handbook*, Department of Economics and Statistics, Kohima.
- Lorubare, S. (2016). “Assessment of The Impact of Horticultural Crops or Products on The Livelihood of Small holder Farmers in Morogoro Region: A Case Study Small of Holder’s Farmers Near River Mkundi,” Dissertation of B.Sc. Agricultural Education (Unpublished), Sokoine University of Agriculture, Tanzania. Accessed April, 18, 2020, https://www.academia.edu/21570889/Assessment_of_The_Impact_of_Horticultural_Crops_or_Products_on_The_Livelihood_Of_Smallholder_Farmers_In_Morogoro_Region_A_Case_Study_Small_of_Holder_S_Farmers_Near_River_Mkundi.
- Morong Express (2015). “Working Towards Better Livelihood” *Morong Express*, Dimapur Nagaland, March 10,
- Nagaland Phek Human Development Report* (NSDHR), 2009.
- Nagaland State Human Development Report* (NSHDR), 2004.
- Nagaland State Human Development Report* (NSHDR), 2016
- Reddy, Catherine (2013), “All About Plum in India,” *The Earth of India*, Feb. 6, 2013. Accessed April, 18, 2020, <http://theindianvegan.blogspot.com/2013/02/all-about-plum-in-india.html>.

Sachitanand, Rahul (2018). “As a Horticulture Boom Pushes up Farm Incomes, Here are Two Key Missing Pieces” *The Economic Times*, Sept. 16, 2018.

Sandsten, E.P. (1906). “Conditions which Effect the Time of the Annual Flowering off Fruit Trees,” *Wisconsin Agricultural Express State Bulletin*, No. 137, p. 21.

Sati, Vishwambhar Prasad., Wei, Deng., Xue-Qian, Song (2015). “Potential of Horticultural Farming in Livelihood Sustainability and Development: A Geo-Empirical Study of the Upper Minjiang River Basin, Sichuan Province, China,” *International Journal of Interdisciplinary Research and Innovations*, Vol. 3 (2), pp.75-84, April - June.

Village Development Board, Enhulumi Village, 2019.

Annexure-1: Distribution of respondents

<i>Sl. No.</i>	<i>Particulars</i>	<i>Frequency</i>	<i>Percentage</i>	
1	Family size	<3	9	18
		4-7	32	64
		>7	9	18
2	Annual income	5,000-10,000	32	64
		10,000-20,000	11	22
		20,000-30,000	2	4
		30,000-50,000	4	8
		50,000 and above	1	2
3	Education	Illiterate	8	16
		Primary	10	20
		High school	28	56
		Pre University	1	2
		Graduate	3	6

Source: Chirhah & Buruah, 2019.

The Battle of Thuda: A Historical Perspective

Vivi Swu*

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About the author

*Assistant Professor,
Department of History,
Dimapur Government
College. Email:
viviswu18@gmail.com

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Abstract

The Battle of Thuda is considered as one of the most significant battles in the history of the Naga struggle for freedom. Thuda was an outpost of the 14th Assam Rifles, located above Phor village in Meluri sub-division under Phek district. This historic battle was fought between the two opposing forces of the Naga Army and the Indian Army from the 25th to 28th of August 1960. During the course of the battle, the Indian Air Force Dakota supply plane bearing the No. HJ-233, that was flown in to drop relief materials, arms and ammunitions for the besieged soldiers was fired upon by the Naga Army personnel and it consequently had to crash land at the nearby Zathsu valley paddy field on the bank of Tizu river. It holds the unique record of not only shooting down the aircraft, but also capturing all the nine (9) crew members alive by the Naga Army. However, they were subsequently released unharmed on 5th May 1962, as a gesture of the Naga good will towards the Indian government. In the light of this momentous landmark, an attempt will be made on the detailed study of the battle and its impact within the purview of the Naga freedom movement.

Introduction

Thuda, an outpost established in October 1957 was based in the village of Phor, 130 Kms away from Meluri town. It was one of the army posts targeted by the Naga Army with an aim to flush out the Indian armed forces from the Naga territories. More so, it was carried out in retaliation against the 16 Point Agreement signed between the government of India and the Naga People's Convention (NPC) in July 1960. This Agreement completely sidelined and bypassed the Federal Government of Nagaland; the banner under which the Naga nationalists were struggling for freedom. Three days after the agreement was signed, Phizo the president of Naga National Council (NNC) officially and out rightly rejected it on the grounds that the 19 signatories did not have any mandate of the Naga people (Iralu, 2000).

The government of India with an intention to sabotage the Naga national movement, encouraged the moderate Naga leaders to set up the Naga People's Convention (NPC); a platform to facilitate the various Naga tribes to come together and settle the Naga issue 'within the constitution of India.' The writing of B.N. Mullik (1972), the then personal secretary of the Prime Minister of India, Jawaharlal Nehru, strongly supports this viewpoint. In his book titled *My Years With Nehru 1948-1964*, he writes thus;

Having got the principle of separation of the Naga Hills from Assam accepted, Dutt tried to pick up the old threads and pressed on the moderate Naga leaders his idea of a convention of the representatives of the various tribes to nullify the resolution of plebiscite adopted at the first Naga convention in 1951. ... Dutt worked hard and we gave him our fullest support and both the Prime Minister and the Home Minister as well as the governor were keen that this convention should be held. The

commissioner and deputy commissioner of Naga Hills district also gave their full cooperation (315 - 316).

S.M. Dutt, the then deputy director of Intelligence Bureau Assam, therefore played an instrumental role in the setting up of the NPC just as A.O. Hume did for the birth of the Indian National Congress.

The Battle of Thuda was fought between the Naga Army and the 14th Assam Rifles from 25th to 28th of August 1960. The battle was at the centre of events that led to the massacre of Matikhru men folk which remains to this day as one of the worst punitive attacks against the Naga public for their alleged support to the Naga Army. This is in stark contrast to the humane treatment given by the Naga Army to the prisoners of war from the Dakota plane that was shot down during the battle.

The Battle of Hoshepu, the first Indo-Naga battle fought in 1955 had sown the seed that planned and co-ordinated combat against the Indian forces was not only possible but also necessary to send out a message of resistance against the forceful occupation of the Naga territory. The daring exploit of the Naga Army in the Battle of Satakha in 1956 sparked the belief that, ill-equipped as they were, the Nagas stood a chance against the far superior military strength and size of the Indian Army. The Nagas knew that their love for their motherland and freedom cannot be suppressed that easily. The fight for their rights was thus relentless against all odds.

The battle of Thuda is an important historical point of reference from the perspective of the Nagas' struggle for freedom. However, no substantial work has been done on this topic so far. The objective of the study is therefore to bring out the detail account of the event and its impact on Naga Nationalism. It primarily aims towards a clearer understanding of the Naga freedom movement. This research work is based on

oral history relying on interviews and discussions with the actual participants of the event, apart from the secondary sources.

The Battle

Lt. Gen. Zuheto, the commander of the Naga forces as General Officer Commanding – Eastern Command had planned to attack the Thuda outpost with the help of two Burmese Naga soldiers serving in the Indian army in the outpost as inside men, unfortunately the company commander of Thuda suspecting foul play had the men transferred (Aye, 2017). Deciding to proceed nonetheless he chalked out plans and sent Lt. Col. Zukiye and Capt. Zhevishe Aye as recon units. Commandant Vighoto Swu was also sent in on the pretext of applying for the post of a teacher in a primary school near the army post. He further surveyed the layout after a conversation with the post commander and reported his findings to Gen. Zuheto (Swu, 2017). To cover the attack, various units of the Naga army were deployed around the camp to ambush the reinforcements of Indian Army. It was during the monsoon season so all the major rivers like Tizu, Lanyie etc., were in full spate. Before the attack was launched, all the six bridges were destroyed to prevent any reinforcement of the Indian Army (Iralu, 2000).

Taking up positions according to the spy reports the attack on the camp began on the 25th of August at 0400 hrs by strength of fifty eight Naga Army personnel. The four pronged attack was supplemented by kerosene missiles on the thatched barracks. With 3 LMGs, 4 Sten Guns, 33 Rifles (Aye, 2019) and an assortment of petrol and kerosene missiles the four-day siege on the outpost was “...one of the heaviest gun fights ever fought in Nagaland” (Swu, 2013). With the water supply cut off as well, the Indian personnel at Thuda were badly out manoeuvred. On 26th August, supply of rations and ammunitions were airdropped for the besieged Indian army but most of these fell in the hands

of the Naga Army. Capt. Pikiye Yepthomi who participated in the event remembers locating a parachute with a bullet box which he snagged down with a long stick from the tree where it laid hanging. Inadvertently the air drops resupplied the Naga army who were almost out of ammunition (Yepthomi, 2016). Likewise, Capt. Zhevishe Aye affirmed that they collected a good number of rations and bullets and water which was meant for the Thuda outpost personnel (Aye, 2017).

Captain Toshiho Naga vividly recollects the spontaneous firing at the three Dakota planes that came to drop relief materials for the besieged soldiers. After being hit, two of the planes flew towards Burma and never returned but one flew back and dropped the ration again. This time around, everybody shot at it randomly and it eventually crashed down at *Zatshu* paddy field near Tizu River (Naga, 2017). To check the enemy's advance, captain Zuhoshe along with a section of the Naga army was stationed near the Tizu river bridge, in which vicinity, the Dakota airplane had crash landed. No sooner did it land, the captain and his squad swiftly went ahead and captured all the nine crew members alive (Aye, 2019). Scato Swu reaffirms that the Thuda post was about to surrender but eight jet fighters came to their rescue. Their supply plane, Dakota cargo carrier bearing No. H.J. 233 (G), along with 9 air crew was shot down around 1400 hrs on 26th August 1960 successfully by the Naga army (Swu, 2013).

After the shooting down of the Dakota plane, fighter planes were flown in with the hope to finish off the Naga Army. Capt. Zhevishe Aye narrates the incident in his own words;

“...on the 4th day, ie the 28th of August 1960, jet planes came and surveyed our defence. Reinforcement of the Indian Army had also almost reached there by tying the ropes across the river. From Leshi our food suppliers came fleeing and informed us that the Indian

Army is fast approaching and so we must escape fast. Therefore, we fled to the mountain nearby and waited to see what would happen. Then 2 jet planes came and fired continuously at our defences and went away. Again 2 more came and flew away only after heavy bombarding. Had we been there, we would have all been finished.”

Thus, while the camp could not be captured due to the arrival of reinforcement, it was burnt down and successfully besieged by the Naga Army for four days and when the Naga army moved away on the 28th of August the following arms and ammunitions were captured as recorded by major Khehoto Zhimo and captain Atoi Swu; 1000 rounds of 303 rifle bullets, 2 hand grenades, 4 parachutes with full load of ration and ammunitions, 9 tins of kerosene.

The casualty tolls on the Naga Army side, was that one was killed in action and four were injured. Hd. Const. Suhoto of Zhekiye was killed while Major Khughoto of Hoshepu, Corporal Zhekheto of Shoixe, Corporal Izheto of Zungti and Corporal Khehovi of Sutimi were injured. An Indian soldier, Lance Naik Kalu Rai was killed in the battle while another 9 crew members of the Dakota were taken captive. (Morung Express, July 31, 2015)

The aftermath

Following the battle both sides essentially had survivors of the battle either as prisoners of war like the 9 crew members or the village folk around the Thuda outpost. The Naga army released 5 of the 9 Dakota crew in no time but four officers, namely; Flt. Lt. A.S. Singha, Flt. Lt. Raphil, Flt. Officer Choudhary and pilot Nevason were detained for security reasons till May 5, 1962 (Swu, 2019). The captured crew members were kept at Sati camp in the forest towards Pangsa in Somra Tract. In an

interview conducted on 10th May 2017, Major Vihoi Aye of the Naga Army narrates;

“I was the camp commander there at Sati camp. Sumis use to fight all around Nagaland but it became over-flooded with Indian Army in order to crush down the movement. So, we went towards safety area to Sati camp in Burma-Naga area. The flight crew suffered as they had to suddenly adapt to a new culture. They ate corn meal with us which was all we had to eat. They were kept in lock up but were allowed to go out under supervision. However, they were taken good care of by the Naga Army. They were neither abused nor treated with vengeance or cruelty but, with dignity.

They insisted the plane crashed only due to mechanical failure, totally ignoring the fact that it was shot down by the Naga fighters. This prolonged their release. At last they admitted that the plane crashed because the engine was hit by the bullets of the Naga fighters and they were released without any harm. Later on, when I joined the Border Security Force, I met the flight commander Singha who had then become the Air Field Commander and, he was very glad to see me” (Tuccu, 2017).

This account is further corroborated by Flt. Lieut. A.S. Singha whose account of his plane being shot down and subsequent treatment reads;

“We were treated very nicely by the Naga Home Guards and Officers were given due respects. Whatever food the Naga Home Guards were eating we were given the same. I would like to mention here that at no time were we treated badly or abused in any other way. We have no complaints of any treatment given to us. ...I have made this statement voluntarily and without duress.”
(Statement by Indian Air Crew)

The four air crews were released in good condition of health on 5th April 1962, after being in captivity for 1 year and 6 months. Their release order was issued by Scato Swu (Swu, 2013), the Kedahge of the Federal Government of Nagaland which reads:

On humanitarian basis the Federal Government of Nagaland are releasing the four Indian Captive Airmen this day the 5th May, 1962 in sound condition of general health, who were captured on August 26, 1960. They are handed over to Burmese Government to let present them to the International Red Cross Society, and finally to be handed over to India by the IRCS. We found Flt. Lt. A.S. Singha to be a competent Officer who deserves sympathy and gratitude from the Government of India. His subordinate officers are all efficient as well (42).

It was perhaps with the hope of letting the world know about their struggle that the FGN desired the release of the captives to be done through the custody of the International Red Cross Society (IRCS). It is also noteworthy that the Nagas were never inhuman towards their captives but they were in fact treated with care so long as they were in their custody. It therefore proves beyond doubt that the Nagas were fighting for a genuine cause; their freedom, which was very dear to their hearts and that, the Naga Movement can only be settled politically and can never be crushed down through the use of brutal force.

It is unfortunate that on the other hand, the Indian Government's response to the battle was horrifying. In *A Brief Historical Account*, Z. Katiry, the author states that "The people of Pochury observes Black Day on 6th September every year because on this day in 1960, the entire menfolk of Matikhru village was massacred by the Indian Army by beheading them one by one" (25th Anniv. of PWOK souvenir 65). Following the battle, the Government of India declared the whole of Pochury

area as a disturbed area and martial law was imposed. Safe behind the shield of the Armed Forces' Special Powers Act (AFSPA) 1958, and the media being blind to the atrocities taking place the punitive action against the Pochury villagers for their alleged consort with the Naga Army during the Battle of Thuda.

At Phor in particular, 6 village elders who went to speak with the Assam rifles officers were mowed down by machine guns by sentries on duty while random passers-by coming to meet their relatives in Phor were also caught and tortured to death (25th Anniv. of PWOK souvenir).

On the 6th of September 1960, the 16th Punjab regiment surrounded the village of Matikhru in three circles around 1000 hrs and called out all the villagers. The army began to manhandle them mercilessly all the while demanding that the villagers reveal where the freedom fighters were hiding and where the guns were kept. The men were tortured for the whole day being kicked and butted with the guns. Rev. Zhiwhuotho Katiry recalls how one of the men who knew a little Hindi pleaded for mercy but had his folded hands smashed with a wooden block while another man, Pongoi, lying on the ground with his ribs broken when brought water by his wife had the container knocked away. As evening fell all the women and children were chased out of the village and only one Risapa was woken by one kind soldier as he lay unconscious and told to flee. Still later, Thah, the village chief and eight other men Muzitso (Rev. Katiry's father), Pongoi, Eyechu, Pogholo, Kezukhwelo, Zasituo (a travelling pastor), Thitu and Kekhwezu were all brutally beheaded and their bodies burnt by the army (25th Anniv. of PWOK souvenir 69). Miraculously one man, Kekhwezu, ran past the door of the village chief's house where all of them were herded in at gunpoint and despite being shot at by a barrage of gunfire escaped with just a finger blown away. It is a commonly held belief among the Nagas that in such a situation of danger, one man always survives to tell the tale to

those living, and perhaps such was Kekhwezu's fate although he died days later from the trauma after sharing his experience to the others.

Rev. Katiry recalls

“The pitiless Indian army jawans did not even allow the bereaved families to perform the last rites and give a decent burial, Instead, all the dead bodies were dumped inside the house and set on fire. All the houses and granaries were razed to the ground. The women and children who fled to the jungle to evade the dreaded horror came back the next morning to find heaps of ashes only. In the debris of ashes, they found one of the victims Thitu, in semiconscious state as though he was waiting to utter a few last words to his wife. Pastor Zosituo was also lying on the ground with fatal wounds and breathed his last when his mother put him on her lap. Then the women scurried away after burying the dead bodies, fearing that the soldiers might come back and torture them. After a few days the Indian soldiers came back and exhumed the dead bodies and burnt them to ashes” (25th Anniv. of PWOK Souvenir 69).

Conclusion

The Battle of Thuda, which is one of the many wars fought between the Naga army and the Indian forces, brought into stark contrast the treatment of war survivors. The Nagas fought the battle with the intention of flushing out the Indian army and personnel stationed in Naga territories. The Nagas fought for their freedom and independence which was their birth right and unequivocally due to the Nagas. Therefore, there was no malice in the treatment of the prisoners from the fallen Dakota, if anything; Flt. Lieut. Singha's statement is an irrefutable proof

of how the Nagas treated even their oppressors. Not long after the battle, in 1961, Gavin Young, a British Journalist and foreign correspondent for *The Observer* of London, visited Nagaland and wrote the pamphlet “*The Nagas: An unknown war. India’s threat to Peace.*” It presented the inside story of the Indo-Naga war for the first time to the outside world since India had censored the press from the Naga territory hitherto.

The battle also reveals how the legitimacy of the freedom movement was slowly being eroded by India’s divisive policy who chose to negotiate with the moderate NPC group which was willing to accept the conditions set by the Indian government. Thus, the treatment of the Matikhru villagers, though not new, was simply reinforcing the threat of retributive action by the Indian army in case the Nagas continued their support of the FGN’s activities. The impartial journalism of Young threw light on the atrocities being committed by the Indian armed forces as well as the actual nature and sufferings of the Naga Army and the Naga public found fair representation. The battle of Thuda will remain in memory as the fight that proved the Nagas believed in their worth and humanity and respected and valued human lives even those of their enemies despite the terrible sufferings and treatment the innocent Nagas faced while the Indian side of the story exposed the duplicity and colonialist outlook of the very same people who had themselves fought centuries to throw off the yoke of foreign rule.

References

25th Anniversary of Pochury Women’s Organisation, Kohima Souvenir. Kohima: 2017.

Aye, Zhevishe. *Ixu Ghili (Autobiography).* Dimapur: S.P. Printers, 2019.

Aye, Zhevishe. Personal Interview. 27th Feb. 2017.

Iralu D., Kaka. *The Naga Saga*. Kohima: ACLS Offset Press, 2000.

Morning Express dated July 31, 2015.

Mullik, B.N. *My Years With Nehru 1948-1964*. New Delhi: Allied Publishers Pvt. Ltd., 1972.

Naga, Toshiho. Personal Interview. 16th May 2017.

Statement by the Indian air crew.

Swu, Scato. *Hails and Blames: A Brief Account of the Naga Independence Struggle*. Dimapur: Heritage Publishing House, 2013.

Swu, Vighoto. Personal Interview. 24th March 2017.

Tuccu, Vihoi. Personal Interview. 10th May 2017

Yepthomi, Pikiye. Personal Interview. 30th July 2016.

Zhimo, Khehoto. Personal Interview. 9th May 2017.

Patterns of Chieftainship with Special Reference to the Sumi Nagas of Northeast India

Herali Achumi*, Dominic Meyieho**

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About the authors

*Assistant Professor,
Department of Sociology,
Dimapur Government
College, Dimapur. Email:
heraachumi@yahoo.com

**Faculty at Assam
Don Bosco University,
Guwahati. Email:
dmeyieho@gmail.com

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Abstract

Every society whether civilized or primitive had some kind of political organisations in order to regulate the behaviour of its members. However, the nature of political system differed from society to society. Many ethnic communities had chieftainship as the system of governance. The paper is an attempt to study the existence of traditional chieftainship of different ethnic communities with special reference to the Sumi Naga tribe. An important feature of the Sumi is the institution of chieftainship at village level. Every Sumi village has a chief who is known as 'Akukau.' Traditional Sumi chieftainship was autocratic who controlled the social, economic and political life of his subjects. This institution has survived during the British period without any modifications. It continues to be an important institution even today. This paper attempts to find out how Sumi chieftainship has adapted itself to democratic system of governance introduced in Nagaland in recent times.

Introduction

No society even the simplest one, is without a system of political organisation. Anthropologists have studied the political organisation of different societies beginning from technologically simple primitive societies to technologically complex industrialised societies. Societies have used different forms of organisation to exercise control and regulate over its members. Political system was necessary to organise group efforts for public work such as tribal hunts, agricultural production and other community works. To carry out rituals and ceremonies to control the supernatural world, for defence of one's territory, waging war against the enemy, to organise marketing and trading network for economic prosperity etc. Thus political organisation played an important role which forced the society to conform to its norms (Dash, 2004). Anthropologists identified four types of socio-political organisations: band, tribe, chiefdom and state. Of the above mentioned organisations, the first two are categorised as uncentralised organisations because political authority or power is vested in kinship, age and common interest groups. In the two organisations, leaders do not possess power to force people to comply with customs or laws, but on the other hand decisions are made in a democratic manner - consensus involving both men and women. For eg. among the Inuit bands the leaders are usually male. However men often consult their wives and women involved in hunting were more influential than those who did not. The nature of society was egalitarian. The latter two organisations are categorised as centralised political systems. Unlike the preceding two organisations, political authority and power are concentrated in a single individual - the chief, or in a body of individuals - the state (Haviland, 1999; Ember et al, 2017).

According to anthropologists, chiefdom is a regional polity in which two or more local groups are organised under a single

chief, who is at the head of a ranked hierarchy, and whose office is hereditary and primogeniture is the rule. Hence, chiefdom refers to a relatively large area within which there are several settlements or villages, wherein the chief is the authoritative figure and exercise control over them (Haviland, 1999). In the classification and definitions of socio-political organisations given by Anthropologists, chiefdom is understood as a relatively large area within which there are several settlements or villages. On the other hand, among the Sumi every village has a chief. Therefore the definition of chiefdom as given by Anthropologists may not be applicable in dealing with Sumi chiefs. Nevertheless, some of the features of chiefdoms identified by the Anthropologists can help in understanding the nature of Sumi chieftainship.

Chieftainship of Ethnic Communities

Chieftainship of different types is found in ethnic communities around the world. For example, among the Mekeo group of the Western Melanesian society there are two types of chieftainship – the military and the civilian. The military chiefs are responsible for all matters relating to warfare and security of its people. They are assisted by Fai'a Lopia (war magician) who decide when and where to fight or not to fight. While the civilian chiefs are referred to as peace chiefs who are devoid of warlike virtues, but assisted by the Ungaunga (sorcerers). The Ungaunga (sorcerers) are regarded as 'chief policemen' because they reputedly enforced the authority of the chiefs and backed them (Hau'ofa, 1971).

Gluckman (1950) in his study on the organisation of the people in Zululand of South Africa points out that the Zulus owe their allegiance to a common head (king) who exercises judicial, administrative and legislative authority over his people. He performs religious ceremonies and magical acts on behalf of

the nation. According to Gluckman (1950), Zulus are divided into a large number of political groups called tribes headed by the chiefs. The tribes are subdivided into smaller groups (wards) headed by the relatives of the chiefs or men of other clans who are responsible to the chiefs. Hence, the authority of the king is expressed through the chiefs.

A similar political system is also found among the Ngwato ethnic folk of the Bechuanaland protectorate. Schapera (1950), in his article, 'The Political organization of the Ngwato of Bechuanaland Protectorate,' mentions that the chief is the central figure around whom the folk life revolves and through whom the activities of the community are ordered and controlled. He is the ruler and judge, author and guardian of its laws and director of its economic life and its leader, priest and magician. For administrative purposes, the ethnic folk is divided into wards (villages) under the leadership and authority of hereditary headmen. The village headman is the medium through whom the chief communicates with the inhabitants of the village. The authority of the chief is his birthright. Chieftainship is hereditary in the male line passing normally from father to son.

Leach (1954) has made a comparative study on the Gumsa chiefs among the Kachins and found that the Gumsa chiefs were autocratic in nature and had slaves who were the property of the chiefs. Among the Gumsa the youngest son succeeds his father.

Chieftainship in North East India

In the North East, not all but several cultural communities of the region followed the system of chieftainship. However, chieftainship underwent changes during the British period. After India's Independence and the introduction of democratic form of governance most of the cultural communities of the North East have adapted to the modern democratic system than their traditional system of governance. Nevertheless, the institution

of chieftdom among the hill communities of the region continues to be a common feature, which is still prevailing among many cultural communities of the region, in spite of the colonial power and influence. On the basis of the powers and functions held by the chiefs of numerous tribes of the region, chieftdoms can be classified into diverse categories depending upon the extent of power entrusted or held by them (Gassah, 1998.). According to Kumar (1998) chieftainship in the North East can be classified into three types viz: a) Where the chief is the political and religious head of the community; b) Who has political and economic powers; c) Democratically controlled chieftainship.

Dutta (2003) has done a comparative study on the chieftainship among four tribes of Arunachal Pradesh- Wanchos, Noctes, Tangsas and the Singphos. While, there is similarity in the chieftainship of Nocte and Wancho in matters of succession, marriage, functions, powers and privileges, there is no such similarity with that of the Tangsa and Singhpho chieftains, as they do not have powers and privileges like the Nocte and Wancho chiefs. The status, powers and functions of the chiefs remain the same even after the introduction of Panchayati Raj system among the Wanchos and Noctes. The only difference is that during the traditional days it was the duty of the chief to formulate work schemes but after the introduction of Panchayati Raj system it is done by the Government and other agencies. The chief's work is limited to supervision. However for any kind of village developmental work the village Chief is always consulted and no work how beneficial it might for the people it be can never be carried out without his consent. In fact the existence of chieftainship has helped the Government to introduce Panchayati Raj into their community without much difficulty. However in the other two communities the institution of chieftain is losing its importance. Among the Tangsa's the

institution of chieftainship has been replaced by the council of elders. The council of elders consists of a leader and members. The leader is selected from among a particular clan who is wealthy and intelligent and the members are selected from various clans based on their experience and knowledge about the customary rules and practices. In the case of Singpho's when chieftainship was active there was a well constituted village council headed by the chief. The village council decided all the affairs of the village. However with the passage of time the system has changed. Now they do not have a well organised village council. In case of settlement of dispute at the village level they constitute a sort of village panchayat consisting of the old members of the village and a Gaon Bura which is a government nominee. However case of inter village dispute it is settled by the chief though the chief does not hold any power over the people.

Chieftainship existed among the Mizos. The institution of chieftainship among the Mizo is autocratic, with power completely concentrated in the hands of the chief. After the annexation of the Lushai Hills (Mizoram) in 1890, the British recognised this institution and introduced the hereditary chieftainship, and made the chiefs as the intermediaries between the villages and the British officials. However, due to the autocratic nature of the institution of chieftainship people resented and revolted against. Hence, after India's Independence, the institution of chieftainship was abolished under the Assam-Lushai Hills District (Acquisition of Chief's Rights) Act of 1955 with a provision to pay compensation to the chiefs (Prasad, 1998).

Among the Kuki ethnic communities, the institution of chieftainship is the perennial source of Kuki customs, traditions and identity, which nothing can replace it. The chieftainship of the Kuki goes by hereditary succession where the eldest son succeeds his father. However, if the chief dies without a male successor,

the succession passes on to the nearest male member of the eldest surviving brother of the deceased. In any case, a daughter cannot become heir to the father. The Kuki chief enjoys enormous powers - executive, legislative, judicial and military powers. His word is law within his chieftainship and his decision is final. He owns the land within his boundaries. He is entitled to receive customary title and tributary privileges. After India's independence, the Acquisition of Chiefs Rights Act 1967 aimed at abolishing the rights of the chiefs over land. However, this Act received wide scale protest and despite various attempts to abolish the institution of chieftainship among the Kuki, the Kuki chieftainship unlike the Mizo and the cultural communities of Arunachal Pradesh still stand strong and have mass support (George, 2009).

Traditional Form of Governance among the Nagas

Nagaland, one of the states of North East India, is the traditional habitat of several cultural communities who are known as the Nagas. According to Elwin (1961), the Nagas belong to the Indomongoloid racial group. Arya and Arya (2004) opined that every cultural communities of the Naga have its own distinct territory, economic system, beliefs and religious practices, language and culture. An important feature of Naga cultural communities is its distinctive system of administration and governance, which differs from communities to communities. The traditional political system of the Nagas ranged from the autocratic rule of a chief to a democratic form of governance. According to Nandi (2011) before the coming of the British colonial rule every Naga village was a miniature sovereign state in itself having its own system of governance. The different types of governing system found among the Nagas are:

- 1) Chieftainship with political, administrative, military and priestly powers obtained by the Konyak Ahghs. The Konyak Ahghs were secular as well as a religious heads.

There were hierarchy among the Anghs and the powerful Anghs controlled many villages under them. Primogeniture was the rule and based purely on the purity of blood.

- 2) Chieftainship with political, administrative and military powers obtained by the Sumi chiefs. Among the Sumis the one who establishes a village becomes the chief and thus he owned all lands in his village and acted as feudal lords. He remains the most powerful man in the village. The eldest son usually succeeds the father.
- 3) Chieftainship with limited powers found among the Zeme Nagas.
- 4) Thoroughly republican government found among the Ao Nagas. Each Ao village was a small republic. The entire Ao society has been structured under the system known as *Putu Menden* (the council of elders). This body is the highest level of authority. Representative from various clans form this council. This council of elders are selected for a certain number of years.
- 5) Extremely decentralised power structure among the Angami Nagas. In the Angami society there were neither village chiefs nor council of elders for village administration. There were hereditary village priest but without power. Issues were discussed during meetings where the whole village participated and ultimately they arrive at certain decision or consensus. In spite of the absence of visible government people were well disciplined.

Among the Naga tribal communities the Sumis and the Konyaks still have a strong inclinations towards the traditional form of governance. According to Haimendorf (1969) the Konyak society was divided between the chiefs and the commoners. They had powerful chiefs called as 'Ahngs' who controlled the political, economic and social life of the people.

The Konyak chiefs form the aristocrat family. The commoners owed him allegiance. They could not even approach him in an upright position. However this high rank position comes with an obligation. The chiefs could maintain their eminent position only through preserving purity of blood. Konyak (2009) in his study of the political institution of the Konyak Naga states that the Ahng (king) is the head of the society and his importance is considered to be next to that of God alone. The Ahng had the privilege of keeping a good number of concubines. However, the Queen (Ahngya) should be from the royal family who has the same status and prestige as that of the Ahng. Only the eldest son of the queen having royal blood can succeed his father. Purity of blood is strictly maintained in matters of succession. There is also a hierarchy among the Ahngs. The Pongyin Ahng (Great Angh) exercises supreme authority and controls all the proceedings in the Konyak society. Next in the hierarchy are the deputy Ahngs, who are the Ahngs of the villages under the control of the Great Ahng. The third category of Ahngs is referred to as small Ahngs - the nominal heads. In such a system, the council of elders looked after the administration. With the advent of the British to the Konyak area, the institution of Ahngship was recognised. In spite of the advance of modern democracy, this institution is found to be more effective than the modern institutions in matters of deciding cases and taking important decisions.

Sumi Chieftainship

The institution of chieftainship is a common feature of the Sumis (Sumis where formerly known as the Semas) and it plays an important role in the village polity. The Sumis of Nagaland follow the traditional system of hereditary chieftainship. He is known as the 'Akukau' (Chief). The Sumi chiefs have political, administrative, military and economic powers. They are autocratic in nature. According to Davis (1891),

The main feature in which the Semas differ from the other Naga tribes living in the Naga Hills district in the past was the existence of hereditary village chiefs. These Sumi chiefs had many privileges, i.e. their subjects cut their jhum fields and cultivated for them for nothing, they got a portion of every animal killed in the chase, and generally were in a position far superior to that of any ordinary Naga headman. These chiefs invariably have three or four wives, and usually large families. It is the custom for the sons as they grow up to start new villages on their own account. We thus find that, as a rule, Sema villages are small as compared with the villages of other Naga tribe (Elwin, 1961, pp. 372-373).

Hutton (1921) in, *The Sema Nagas*, wrote that the position of the Sumi chiefs was such that “the real pivot of the Sema society is the chief.” Chieftainship of the Sumi is hereditary (Hutton, 1921 and Assumi, 2009). Among the Semas, the chief holds a high position. Thus a Sumi chief wants his sons or daughters to marry the sons or daughters of another chief. This is not only a question of status but of alliance in times of inter-village feuds and headhunting in the days of yore. In the present time, it is a matter of prestige (Gosh, 1998). However unlike the Konyak Nagas, there is no hierarchy among the Sumi in chieftainship. All chiefs have equal status (Sema 2013).

System of Chieftainship, Migration and Emergence of New a Village

Hutton (1921) transcribed about the migratory nature of the Sumis that it is customary for a chief’s son to establish a village of his own at a convenient distance in which his authority is paramount. On the succession of chieftainship among the Sumis, Hutton expounded that the chief’s sons are sent to establish their

own villages during his lifetime. Jacobs *et al* (1990), opines that the Semas have powerful secular chiefs. According to them, expansion of the Sema areas involves colonization or seizure of land from others. This process of colonization is associated with strengthening of chieftainship. Shikhu (2007) augment on the Sumi diaspora says that the Sumi chieftainship is hereditary, and this one of the reasons why migration takes place when a person intends to establish his authority or has a difference with the chief of the village.

According to Gosh (cited in Karotemprel, 1998), the most prominent characteristics of the Sumis are their migratory habit and the system of chieftainship. Sumis, like many other ethnic communities, live in settled villages. However, they often break away from the parent village in order to find a new one. This is one of the reasons why Sumi villages are found in the areas of other communities and emergence of new chief and village is an on-going process. Thus, for the Sumis moving out of the ancestral land and the establishment a new village is well concealed in the system of chieftainship.

Guardian and Custodian

As discussed in the above passage, among the Sumis, the evolution of chieftainship is associated with the setting up of new village. In the Sumi system of setting up a new village, the founders are usually the chief's brothers or sons who wanted to be chiefs of their own villages and live independently from his father or brother's control. Thus, each Sumi village is an independent state with the chief occupying a unique position as the arbitrator. The founder of the village is the guardian and the custodian of the village with the council of elders. Explicating on the guardianship and custodian ship, Hutton (1921a) states that if the sons of the chief are unable to establish villages of their own, the eldest son succeeds his father and his brothers

become sort of satellites. The chief/the founder of the village is the legal owner of the land. Though land is given to his subjects for cultivation, the ownership belongs to the chief. The Sumi Chief is both autocratic and benevolent. He is autocratic in the sense that he ruled arbitrarily over his subjects. He is benevolent as he is considered the ‘father’ by all his subjects. Being the founder of the village, the village is named after the chief. He is the guardian of the law and owner of the village. Hence, it is his duty to help his subjects in times of adversities (Sema, 2013). In times of war and disputes, it is the chief who lead and settles the dispute that arises within the village (Assumi, 2009).

According to Nshoga (2009), Sumi polity largely rest on the chief. The entire village land belongs to the chief where he gives some portion of arable land yearly to his subject for cultivation. He also had many dependents whom they usually call him as ‘father’ in due recognition. The dependents are usually ‘mighimi’ (orphans), akiwo (runaway from other village), aquaxemi (when a poor man do not have anything and he is been provided with clothing, food, domestic animals and shelter to start a family and also the ‘ame’ bride price is being paid by the chief). In this way, a close tie is usually created between the chief and his dependents in the form of land tenure. His dependents are obliged to render free labour services by working in his fields. They also see that the chief, his family and his property are well protected. As a tribute whenever an animal is hunted a leg is given to him or if any animal is slaughtered for feasts some portion of meat is always kept for the chief.

Land Holding

The chief is the most powerful person in the village, he decides on the land to be cultivated and he distributes among the villagers. In return, every household is obliged to render to him twelve days’ labour (Assumi, 2009). According to Mazumdar

(2005), being the founder of the village he usually owns the land. Chieftainship is hereditary and succession is ruled by the rule of primogeniture. The agricultural fields are the chief's property who leases out plots to the villagers. In return, they work in his field free of charge and whenever anyone of them catches fish or hunts animal, the chief will undoubtedly get his royal share. The Sumi land holding system is connected with chieftainship. In the Sumi society, the chief is the most powerful person in the village. This is because the right to possess land starts from the beginning of the establishment of village. All land belongs to the chief, being the founder of the village. The rest of the villagers depend on the chief for cultivation of land and they become permanent tenants. Every year the chief distributes the land for cultivation. No money is paid for the use of land, but in return, every household is obliged to work in his field and as a mark of respect, he is given tributes. Thus, in Sumi villages, official land records are not maintained, as the chief and his deputies know it (Sema, 1986 and Assumi, 2009).

Power and Authority of the Chief

According to Kumar (1998), the Sema chiefs are the chiefs with political and economic powers because of their control over the agricultural lands and forests of their villages. Nandi (2011) further adds that the Sumi chiefs have political, administrative and military powers. According to him, the Sumi chiefs act as feudal lords and wielded absolute control over its members because the sole ownership of the land belongs to the chiefs. In social affair too, the Chiefs and their council of advisers always have an upper hand. The chiefs are the one who assign the land to individual households for cultivation, settled disputes, and punished the offenders. The authority of allocation of land to the individuals and the site for cultivation rests with the Chiefs (Raypa, 1994).

According to Prakash (2007), the Sumi chiefs not only exercise authority but also have certain responsibilities and reciprocal privileges. His main duties are to lead the village in war, decide on the land for jhum cultivation and to take decisions relating to political matters between his own and neighbouring villages. Prakash (2007) further argues that the chieftain families formed an aristocracy being physically, morally and intellectually the best among the members of their community. It is beyond doubt that the Sumi Chief has power and authority, however, what is to be noted here is that the ownership and control of land provides the chief with latent powers over his members.

Administration and Governance

The Sumis, by tradition have a very strong body of village administration and governance headed by a chief. The person who establishes the village becomes the chief. The post of chief is usually hereditary and usually it goes to the eldest son. In case of settlement of dispute the chief would be assisted by his chochou (spokesman) or chochomi (plural form) and elders whom the chief selects from amongst the different clans whom the chief selects from amongst the clans who followed him during the establishment of the village. However in terms of decision making the chief took the major role. His word was final. Cases that could not be solved within the family, clan or the disputed parties were decided in the village administrative court headed by the chief (James, 2013). Hence, the real pivot of the Sumi village administration and governance is the chief. He can expel a family or a person from the village and withdraw the right to possess and use land (Srinivasan and Haloi, 1997).

Continuity of Sumi Chieftainship

Like many other hill communities, Sumi chieftainship is autocratic. In comparison with other Naga communities, the Sumi

chiefs alone have monopoly over the ownership of the village land. Nevertheless, it has survived the British period without any modifications and continues to be an important institution even today. According to Sema (1992), after the British occupation of the Naga areas, the British recognised the role of the traditional chiefs in those communities where it was practised and elders or headman in some other communities as their representative for carrying out the orders of the government in their respective villages. With the gradual expansion, they also began to appoint village chiefs according to the local customs and practices. The term Gaon Bura (an elder in the village) was used to address the chiefs and elders or headman of the village. The purpose of using the term ‘Gaon Bura’ was to give recognition to the select few Naga elders, chiefs, kings for their services while also bringing about a common name to similar words used by the Nagas. Thus the institution of Gaon Bura came into existence after the coming of the Britishers to the Naga Hills. Even in the context of the Sumis the term ‘Akukua’ has been made equivalent to Gaon Bura which may actually be closer to village chief. In recognition for their services rendered a red blanket was given to them which was considered to be more valuable and useful than the medal or certificate for the Nagas in those times (submission of the committee report for appointment of GBs, 2013). Ever since among the Sumis the term GB became a common usage to refer to the akukau (chief) or kukami (chiefs). However the term GB does not refer to the actual meaning of *akukau* because as mentioned it refers to an elder in a village and they are appointed by the Government whose post is not hereditary. Therefore the Sumi Kukami Hoho (The Apex body of the Sumi Kukami) during the meeting of all Sumi GBs including its representatives from its other units like Northern Sumi Kukami Hoho, Eastern Sumi Kukami Hoho, Western Sumi Kukami Hoho, and Sumi Kukami Hoho held at Kiyezhe village Dimapur, on 22nd March 2017 resolved to replace the usage of the term GB with Akukau

in all Sumi villages. It was also resolved that those Sumi individuals appointed by the State Government in wards, towns, colonies, sectors etc might continue to use the title GB since their appointment was time bound and not hereditary. However GBs appointed by government cannot use the title ‘Akukau’ since it is handed down through family lineage. Sumis replace the usage of GB with Akukau (Morung Express 2017).

After the attainment of statehood and introduction of modern democratic institutions like the Village council and Village Development, the institution of chieftainship was strengthened by the new Acts of Parliament to maintain status quo. The Village Council Act 1970 protects the interests of the chiefs and empowers them to hold the post of the chairperson of the village council in addition to the post of the chief of the village. In the village he still holds a high position. He is respected and regarded by all. No major decisions are taken without his consent. He plays an important role in village administration despite the emergence of elected representatives in the form of village council. Thus chieftainship continues to carry its weight not only in the village administration but also in the state politics, and it is worth noting that no one dares to go against this institution (Sema, 2013). Hence, we may conclude that the chieftainship of the Sumi is an integral part of Sumi cultural life, and it continues to be an important part of Sumi’s identity. While we acknowledge the continuation and importance of the system of chieftainship in the Sumi society, we also submit that it is undergoing modifications or changes, especially in areas of exercise of powers, land holding, privileges and on-going establishment of new villages, which need further research.

References

- Arya Aditya & Arya Vibha. (2004). *The Land of the Nagas*. Ahmedabad: Mapin Publishing.
- Assumi, Z. (2012). *The Sumi Ahuna*. Dimapur: Heritage Publishing House.
- Dash, K.N., (2004). *Invitation of Social And Cultural Anthropology*. New Delhi: Atlantic Publishers and Distributors.
- Davis, A.W., (1891). Census of India, 1891, *Assam*, Vol. I. In Elwin Verrier (1969). *The Nagas in the Nineteenth Century*. London: Oxford University Press.
- Dutta, P.C., (2003). *Tribal Chieftainship*. New Delhi: Himalayan publishers.
- Elwin, Verrier. (1961). *Nagaland*. Delhi. Spectrum publications.
- Ember Carl R., Ember Melvin & Peregrine N. Peter (2017). *Anthropology*. Twelfth Edition. Noida: Pearson India Education Services.
- Gassah, L.S. (1998). *Traditional Institutions of Meghalaya. A Case of Doloï and his Administration*. New Delhi: Regency Publication.
- George, T. Haokip. (2009). *Chieftainship in Kuki Society*. Accessed August 7, 2013, from http://epao.net/epSubPageSelector.asp?srcChieftainship_in_Kuki_Society&ch=manipur&sub1=E... Apr. 29, 2009.
- Gluckman, M. (1950). The kingdom of the Zulu of South Africa. In Meyer Fortes & Pritchard.
- Evans (Eds.), *African Political System*. (pp, 25-55). Accessed July 8, 2013, from <http://www.archive.org/details/africanpolitical00fort>.

- Gosh, B.B. (1998). Sema Marriage. In Karotemprel Sebastian (Ed). *The Tribes of Northeast India*. Shillong: Centre for Indigenous cultures.
- Government of Nagaland. Works and Housing Department (2013) Submission of the committee report for appointment of GBs.
- Haimendorf, Christoph Von Furer. (1969). *The Konyak Nagas. An Indian Frontier Tribe*. New York: Holt, Rinehart and Winston.
- Hau'ofa, Epeli. (1971). Mekeo Chieftainship. *The Journal of the Polynesian Society*, Vol. 80. Accessed May 30, 2013, from <http://jstor.org/sttable/20704769>.
- Haviland, W.A. (1999). *Cultural Anthropology*. (Ninth edition). USA: Harcourt Brace college Publishers.
- Hutton, J.H. (1921). *The Sema Nagas*. London: Oxford University Press.
- Hutton, J.H. (1921a). *The Angami Nagas*. (Second edition): London: Oxford University Press.
- Jacobs, J., Macfarlane, A., Harrison, S. and Herle, A. (1990). *The Nagas. Hill Peoples of Northeast India – Society, Culture and the Colonial Encounter*. Great Britain: Thames and Hudson Ltd.
- James, Lovely Awomi (2013). Peace building traditions from the Sumi Naga perspective. In Lasetso Razouselie, Shimray Shimreingam L, James Lovely Awomi and Angami Kezhalezo (Eds). *In Search of Peace: Tribal resources for peace building in North East India* (pp. 244) Jorhat. Published by ILEMA, ETC.
- Konyak, C.H.M. (2009). *The Traditional Political Institution of the Ahng System of the Konyak Nagas: A Changing*

- Dimension*. Unpublished Doctoral Thesis. Nagaland University, Lumami.
- Kumar, B.B. (1998). *The Tribal Societies of India. A Macro Perception*. New Delhi: Omsons Publications.
- Leach, E.R. (1954). *Highlanders of Burma. A Study of Kachin society*. London: London School of Economics and Political Science.
- Mazumdar, S. (2005). The Semas. In S.K. Sharma & Sharma Usha (Eds). *Discovery of North-East India*. Vol. IX. Nagaland. New Delhi: Mittal publications.
- Morung Express, (2017), Sumis replace usage of GB with Akukau, *Morung Express, March 23*.
- Nandi, S.D. (2011). *Nagaland Elections. 1964-2008 A Study in Democratic Transformation*. Guwahati, No. 2.
- Nshoga, A. (2009). *Traditional Naga Village and its Transformation*. Delhi: Anshah Publishing House.
- Prakash, V. (2007). *Encyclopaedia of North-East India*. Vol. (5). New Delhi: Atlantic Publishers & Distributors (p) Ltd.
- Prasad, R.N. (1998). *Public Administration in North-East India*. New Delhi: Vikas Publishing House Pvt. Ltd.
- Raypa. R.S., (1994). Naga: Sema. In Singh K (Ed), *People of India. Nagaland*. Vol. XXXIV. Calcutta: Seagull Books.
- Schapera, I. (1950). The Political Organization of Bechuanaland Protectorate. In Meyer Fortes & Pritchard-Evans (Eds.), *African Political System*. (pp. 56-84). Accessed July 8, 2013 from <http://www.archive.org/details/africanpolitical00fort>.
- Sema, H. (1986). *Emergence of Nagaland. Socio-Economic and Political Transformation and the Future*. New Delhi: Vikas Publishing House Pvt. Ltd.

- Sema, H.J. (2013). *Traditional and Modern Political Institutions of the Nagas*. New Delhi: Mittal Publications.
- Sema, P. (1992). *British Policy and Administration in Nagaland 1881-1947*. New Delhi: Scholar Publishing House.
- Shikhu, I.Y. (2007). *A Rediscovery and Rebuilding of Naga Cultural Values*. New Delhi: Regency Publication.
- Srinivasan, S & Haloi, K. (1997). Local Self-Government Institutions in Nagaland. In Maithani, B.P. (Eds). *Local Self-Government System in North-East India: An Appraisal*. Hyderabad: National Institute of Rural Development.

A Worldview of the Poumai Naga Vis-a-Vis Customary Laws and Practices

Paul Punü*, Dominic Meyieho**

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About the authors

*Research Scholar, Assam
Don Bosco University,
Guwahati. Email:
paulpanii@gmail.com

**Faculty at Assam
Don Bosco University,
Guwahati. Email:
dmeyieho@gmail.com

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Abstract

Poumai customary law is the general conduct of behavior, practices and manner in the Poumai villages. The Vhe/Chief and his council of elders/chüme constitute the village court and see to the administration of justice. In the event of a perceived threat to property, health and safety of the self and the moral welfare of the society, a person can approach the clan or the village court. Justice by the village court is “quick and cheap.” In case of an inter-village dispute the circle court presides over it. There are three

circle courts: 1. Paomata Judicial Court/Paomata Customary Court, 2. Chilivai Judicial Court/Chilivai Customary Court, 3. Lepaona Judicial Court. The Poumai Naga Customary court is the Apex court of the tribe.

Introduction

Custom is a way of behaving or belief in a place that has been established for a very long time. It is the general conduct of behaviour or manner of a society in their ordinary function of life. Human being is a social animal living in groups and communities. When human beings live in groups

there are bound to be clashes due to differences of opinion, wants and desires. Hence, the opinion of the elder is sought, and he gives advice or judgment for the sake of peace and harmony in the society. These constant practices came to be known as customary laws. However, not all customs become laws.

It is a well-known fact that custom is a very important source of law. When a certain action is practiced regularly by a large section of people in a particular area, then that action becomes a custom there. Custom is unwritten law peculiar to particular localities. Sadler (2010) said, that in order for a local custom to be recognized and enforced by the State it should have certain marks like, “clear and certain, reasonable and immemorial and not contradictory to other laws” (p. 61). Now if any of the customary practices bear these marks they can be recognized by the State as a law.

In the standard use of the word, according to Sadler (2010), law would mean “a state law or a custom in a state which will be or have been recognized by the state and statutes which the state has promulgated” (p. 2). According to the above definition of law, it presupposes the sovereign who recognizes laws and promulgates them for the subjects. Sadler (2010) quoting Holland opines that the state has two portions, the Sovereign and the Subject, and a law is a rule which the sovereign imposes by endorsements. Thus, when we speak about law, we presuppose a sovereign political authority who will enforce the rules on the subjects.

The Poumai *Vhe* (Chief) and *Chüme* (Council of Elders)

The traditional Poumai Naga Society is republic and democratic. The *Vhe* is hereditary, and the *Chüme* could be elected or nominated by the clan. The *Vhe* with the help of *Chüme* does possess powers to preserve and propagate the beliefs and customary laws of the people. However, with the implementation

of, 'The Manipur (Village Authorities in Hill Areas) Act, 1956,' the powers and functions of the *Vhe* and the *Chüme* has been replaced by the Village Chairman and the Village Authority.

The Manipur Act, 1956: Village Authorities in Hill Areas

The Manipur Act, 1956 extends to the whole of the hill areas of the territory of Manipur. According to the Act, where there is a Chief in a village, he shall be the *ex officio* chairman of the Village Authority of that village; and when there is no such Chief in the village, the Chairman of the Village Authority of that village shall be elected by the members of the Village Authority from among themselves. However, in Poumai villages, besides the village Chief, there is a chairman who is the executive head. As for the number of members in the Village Authority the Act says,

1. For every village having twenty or more tax-paying houses there shall be a Village Authority consisting of:
 - a. Five members, where the number of tax-paying houses in the village is not less than twenty but is not more than sixty;
 - b. Seven members, where the number of tax-paying houses in the village is more than sixty but is not more than one hundred;
 - c. Ten members, where the number of tax-paying houses in the village is more than one hundred but is not more than one hundred and fifty;
 - d. Twelve members, where the number of tax-paying houses in the village is more than one hundred and fifty.

The term of office of members of a Village Authority shall be three years. The duty of the Village Authority shall be to maintain law and order, and execute developmental works for

the village. Article 15, of the Act says, subject to the general superintendence and control of the Deputy Commissioner, the sub-divisional magistrate shall have control over all the Village Authorities within the local limits of his jurisdiction (Government of Manipur, 1956).

Traditional Administrative System

In the traditional Poumai Society it was the *Vhe* and his *Chüme*, who were the custodians of the customary laws. The *Vhe* and his council saw to it that all rituals and customs were carried out faithfully by every member of the village, lest peace be disturbed and calamity befall the village. We shall discuss below the power and functions of the *Vhe* and his *Chüme*.

Power and Functions of Vhe

Every traditional Poumai village had a *Vhe*/Chief. He was selected from among the first settlers or was given to the leader. However, there were certain virtues and qualities which the people looked for while selecting the candidate for Chieftainship. He must not only be strong, wise and powerful but must be a man of good moral character. He must not have eloped or must not be physically challenged in any way. He must be of sound mind and a respectable person in the village. There could be more than one *Vhe* in Poumai villages as we observe. Liyai has one *Vhe*, Purul Atongba has one *Vhe*, Oinam has two *Vhes* and Saranamai has four *Vhes* though one among them is the *primus inter-pares* for religious functions (Onaemi Village General Assembly, 2008, Zhaimai Village General Assembly, 2005, Hümai Dunamai General Assembly, 1999).

The *Vhe* ruled the village in a very democratic way. The institution of the *Vhe* existed but it had very little power over the management of the ordinary village affairs though all the important village activities were ordered and carried out in his

name. His power was confined mainly to the religious function. Das (1989) concurs with Brown saying, “The institution is invested with special taboos, all of which are designed to prevent impairment of its efficiency” (pp. 103-04).

In Poumai villages the *Vhe* performs a dual function, as religious and secular head of a village. The proclamation and observation of most of the *gennas* are the primary function of the *Vhe*. According to Shimray (1985) “as the religious head, the *Vhe* is the first man to sow seeds, the first to plant and the first to harvest” (1985, p. 53). He carefully counted and observed the new moons and the rituals to be accompanied therewith.

In the traditional Poumai Naga society the role of the *Vhe* as a secular Head was mostly nominal in nature. He was the head of the Executive, the Legislative and the Judiciary. However, the *Chüme* carried out all these functions in the name of the *Vhe*. He was restricted to directly take part in any of the meetings, yet without his consent no decision could become law nor implemented (Ngupani, 2010).

The Chüme/Council of Elders

The *Chüme* were by custom the representatives of the various clans of the village. The *Chüme* were variously known as *Chizü pyamai*, literally it means people who went out of their homes to discuss cases. They were also called *Seisou touyumai*, literally people who ate dog meat. At the celebration of the feast of Merit, before the game of buffalo fights and the hauling and erection of monolith, these clan representatives killed a dog and eat, vowing to settle all cases of misfortune that may arise. Thus, the title *seisou touyumai* was transferred to the council of elders. The Courtyard of the *Vhe* usually served as the place for meetings except when there was a general assembly of the village which was held in the open space. The *Chüme* continues to carry out its function of old, besides the administrative, legislative and

judiciary powers of the Modern Village Authority (Ngupani, 2010).

Administrative Functions

The *Chüme* was the real administrative organ of the Poumai village-state. The *Vhe* was the nominal head of the village and he did not interfere in the execution of the village functions. The *Chüme* sought the advice of the *Vhe* in all important matters. Thus it was the prerogative of the *Chüme* to execute all customary laws and religious practices. The *Chüme* carried out administrative functions in the name of the *Vhe* (Ngupani, 2010).

Some of the important responsibilities of the *Chüme* was to maintain peace, harmony and security of the village members. From time to time they scouted the village forest to check encroachment of land by other villages. It was also their responsibility to maintain good relationship with other villages. The *Chüme* also saw to the proper fortification of the village gates and arranged the roster for the clan's man to guard the village from enemies and from fire (Ngupani, 2010). The *Chüme* organised social works for clearing village approach roads, roads to the fields, cleaning of drinkable water ponds and the village surroundings. During religious feasts they fasted and worshiped God for the welfare and prosperity of the people (Personal interview, 16th Oct., 2017).

Legislative Power

In the Poumai Naga village-state the *Chüme* was responsible for the formulation of new laws and the preservation of the old ones. Justice to the people was considered on the principle of fraternity and equality. There was no written record and so they largely depended on memory and precedents (Personal interview, 5th Jan., 2017). Any member of the *Chüme* could initiate the discussion and the decision was jointly declared on the basis of

majority and had to be approved by the *Vhe*, especially, so that it may not go against previous customs (Ngupani, 2010).

Judiciary Power

In the village-state the *Chüme* was the highest judicial court. The *Chüme* was equally represented by all the clan's man of the village. According to Shimray (1985) each clan could send from 1 to 3 member representatives. Before bringing the case to the village court, they must first try to settle it within the clan, nay between the families themselves. Speaking of the Naga village courts Shimray (1985) asserted that, "For the old Nagas, justice was cheap and quick – yes, they did not need to travel to far off courts, because justice was available at their doors" (p. 65). In fact the court was at the *Vhe's* home and the judges were their own clan's man and villagers. When there arose inter-village disputes, the case was put forward to the Circle Courts and if they could not give judgment the cases were appealed to the Apex Court that is the joint sitting of the three circles, the Poumai Naga Customary Court.

The Poumai Naga Customary Court

The Poumai Naga Customary Court is the apex court of the tribe having its appellate jurisdiction to try appeals arising out of the judgment passed by the Subordinate Courts. According to the *Yezhabo* (Constitution) of *Poumai Naga Union* (2010) the judicial court shall consists of 17 (seventeen) members, 5 (five) members each nominated from 3 (three) circles and a member each from Kangpokpi and Senapati towns. One-third of the nominated court members shall be retained for its continuity. The three traditional Subordinate Courts are:

1. Paomata Judicial Court/Paomata Customary Court
2. Chilivai Judicial Court/Chilivai Customary Court
3. Lepaona Judicial Court

The three Circle Courts also holds the jurisdiction of its respective subordinate villages and acts as an appellate court of the Village Authority Courts (Josho, 2010).

The Procedure

Initially the plaintiff approaches the Authorities representing his or her clan to table the case to the Village court. On receiving the nod of assent they offer rice wine appealing for officiating and tabling the case. However, before the matter is taken up the judicial members would study the case judiciously, cross-examine, study the genuineness of the case and on finding its fitness, the matter is taken up for tabling. A time is fixed for the parties to appear before the Authority Court for hearing the statements along with the witnesses if necessary for proceeding and delivery of judgment.

Hearing of the Statement

Generally, before any parties speak they take an oath saying:

The sky is my father, the earth is my mother, the sky is the protector and the earth is the promoter of me. Elders permit me to speak and I would be speaking only the truth and no false, the sky and the earth are witnesses and they too would defy me if I speak lies.

The statements are heard, analysed and well acquainted by the members with thorough debate and deliberations. On arrival at decision a majority vote is taken, either by rising of hands or voice endorsement and the decree is declared and made known to the parties.

Cases in the Village Court

The *Chüme* at one and the same time carried out the work of administration, legislation and judiciary. All cases of the village were brought to their hearing for decision and justice. The cases

were tried by the council in an open courtyard attended by all villagers. According to Das (1989) witnesses were seldom needed because the accused pleaded guilty, but where there were differences over the facts, recourse was had to oath and ordeals. We shall discuss here some of the customary laws applied to the different criminal cases that were prevalent in the Poumai Naga society.

Homicide

Homicide refers to the killing of one person by another whether premeditated or unintentional. According to the practice of the Poumai villages, if it is proved that a person was accidentally killed the offender was forgiven. If the murder was premeditated, stringent punishments was meted out against the criminal. Usually the home, goods and properties of the person were destroyed by the victim's relatives. Earlier the victim would be fined with the payment of five to six cows and would be banished from the village for a period of five to seven years according to the practice of different villages (Hodson, 1988). However, liabilities shall not extend to the kith and kin, relatives and clansman of the offender.

Assault on a Person

Quarrel and fights do happen between persons, and it may so happen that due to a heated argument they may even use their hands or instruments against each other. Earlier anyone who assaults another person would have to pay a fine of one bull and offer a handful of meat called *souveh* to all the household of the village for tarnishing its image. At present, anyone who assaults the other shall be fined rupees five thousand to fifteen thousand only according to the severity and limit set by villages (Koide Union Board, 2012, Zhaimai Village General Assembly, 2005).

If a person is assaulted inside the house, the perpetrator shall pay a higher fine than assaulted outside the house. Another element to be noticed is that if any person uses a stone, a stick or deadly weapon to hit someone, he shall be fined rupees twenty five thousand or more. If one person is assaulted by two or more persons, fine shall be collected from all the assaulters, besides the medical expense. The case shall be first settled within the families, and then clan courts (Koide Union Board, 2012, Zhaimai Village General Assembly, 2005).

Assault by a Lunatic

The mad man or woman is insane or behaves as one, and so since the actions are a product of mental derailment he or she may be forgiven. But if the assaults or actions are of serious nature the family members may be asked to pay some compensation and warned to take care of the mad man or woman (Personal interview, 30th Nov., 2017).

Adultery

The case of adultery was considered a very grave immoral action. As per the record of Hudson (1988) the adulterer was punished with death or banished from the village. Adultery was a cause for divorce. According to the customary practice, if the woman was the seducer she would lose all properties and be chased out of home. And if the man was the seducer, he was beaten badly by the victim's party and pays a heavy fine of paddy or cash fine. Earlier the fine was a bull, which was killed and distributed to each and every household of the village. The woman would even be tonsured and they will be ostracized from the village barring them from all common social activities for two to three years (Personal interview, 30th Nov., 2017, Personal interview, 8th Dec., 2017, Onaemi Village General Assembly, 2008, Shomai Village General Assembly, 2012).

Immoral and Illicit relationships

If a man or a woman was caught living immoral lives or indulging in illicit sexual relationships before marriage, a man or a woman may be punished by his or her brothers. In some villages, the practice was that whoever was caught living immoral lives was fined thirty (30) tins of paddy rice or rupees five hundred and a bull and *souveh* (handful of meat) to be offered to the villagers (Personal interview, 30th Nov., 2017). As per the custom an unmarried man and unmarried woman caught indulging in pre-marital affair were forced to live together from then on as husband and wife or bear stringent sanctions from the village authority (Hümai Dunamai General Assembly, 1999).

Rape

If any woman whether married or unmarried is raped by a man, the brothers of the woman or the husband of the woman may assault the man and confiscate his cattle. The man will have to kill a bull and give *souveh*, a handful of meat to all the villagers (Personal interview, 30th Nov., 2017). At present a court case may be put up in the village court for further trial and can impose a fine of rupees fifty thousand to three lakhs. And if a woman is gang raped leading to extreme injury and death, the rapists may be imposed upon a heavy fine and expelled from the village respectively (Personal interview, 8th Dec., 2017). According to the by-laws of Koide Union, if a woman is raped and is proven true, the perpetrator will be fined up to rupees three lakhs only. In the case of a gang-rape, each individual will be fined a sum of rupees three lakhs each (Koide Union Board, 2012).

Pregnancy due to Rape

If a woman gets pregnant due to rape, the child born shall be given to the man who fathered the child. The man shall bear the

expenses of childbirth and early childhood. If the child happens to be a boy, he shall be given wealth and property (Personal interview, 30th Nov., 2017). Sometimes, there were cases when the parents and brothers of girl would even force him to marry her (Das, 1987, p. 483).

Abortion

Abortion was rare, almost unknown among the people. If abortion had taken place and it comes to the notice of the public, that a man had induced abortion from a woman, or if a woman was found practicing abortion, she will be fined a sum of rupees twenty thousand or more depending on the village (Shomai Village General Assembly, 2012).

Divorce and Care of Children

One of the main reasons for divorce was the fact of arranged marriages without the consent of the children which sometimes may lead to incompatibilities between the couple. Some other reasons stated for divorce are poverty, laziness of one's spouse, barrenness, lack of a male issue to propagate descendants, adultery on either side, excessive indulgence in alcohol, ill-treatment, unsoundness of mind, infection with incurable diseases etc...

Traditionally divorce is allowed but seldom resorted to. And so if there was a case of divorce to be resolved the heads of the clans of both the husband and the wife or the village elders are summoned to aid their deliberation (Hodson, 1988). In cases of divorce, the children if and when weaned, went to the custody of the father. In cases of poverty they share the children, boys go with the father and the girls with the mother. If the child is not weaned, the father gives the price for its upkeep in the form of paddy or cash. The practice of giving cash or kind for the upkeep of the child is known as *nyaochhi*, which

literally means price for breastfeeding (Personal interview, 18th Aug., 2016).

Theft

In the recent past there was no lock and keys. Theft and robbery was a rare case. However, thieves and robbers, when found were dealt with seriously. Hodson (1988) says, “in Liyai we have an appreciation of which is hardly though possibly attributable to the spread of the knowledge of the refined subtleties of the Indian Penal code, of the difference between theft, from dwelling house, which is punished with a fine of fifteen pots of *dhan*, while ordinary theft is punishable with a fine of two pots of *dhan*. The customary practice was that if anyone was caught red-handed he had to pay a fine of a bull or a cow along with refund of the thing stolen. Even today there is a difference in the imposition of fine for things stolen within the house and outside the house (Koide Union Board, 2012).

Trespass and Damage of Property

In the case of someone’s property being trespassed or damaged, the perpetrator has to make good the property. He may even be asked to double the amount if it is a very precious property. Sometimes domestic animals trespass and damage the fields of individuals. Usually the owners are warned about the incident. However, if after repeated warning the owners do not control the cattle, the cattle can be killed or the cost for the lost crop may be demanded (Personal interview, 30th Nov., 2017).

Whoever commits the offence of spreading fire accidentally thereby resulting in the dwelling houses being gutted down shall be fined rupees five thousand only per offender, or pay for the value of the things destroyed. More over every victim of the house shall be presented a spade each (Zhaimai Village General Assembly, 2005).

Defamation/Slur

If any person is found robbing in another village, he or she shall not be allowed to swear in the name of god or the village. Moreover, he shall have to pay a fine of rupees ten thousand only and banished from the village for tarnishing the good name of the honourable village. Again, if anyone falsely accuses another person without any evidence he shall be fined a sum of rupees five thousand only (Zhaimai Village General Assembly, 2005).

It is forbidden to curse anyone saying *ahrao akhatou*/evil and cursed one. Anyone pronouncing such words would have to pay a very heavy fine of rupees ten thousand, or else he would have to swear-on-oath taking the name of thirty persons (Zhaimai Village General Assembly, 2005, Personal interview, 8th Dec., 2017, Hümai Dunamai General Assembly, 1999).

Accidentally Killing in Hunting

Sometimes it can happen that during hunting another person is killed accidentally by gun-shot. Life is precious and invaluable; hence no amount of price can be put on the life of a person. However accidents do happen and the person is forgiven. The case can be settled between the families, with some compensation given to the family of the deceased (Personal interview, 30th Nov., 2017). In some villages the person is banished for seven years and banned from using gun anymore (Vafümai Village General Assembly, 2011).

Disregard for Authority

When the village *Vhe* is officiating in the General Assembly no one shall raise his voice or show disrespect to the *Vhe*. Besides, when the court case is in progress, neither the petitioner nor the defendant shall use harsh and foul language. If such incidents occur they shall be fined by the village court.

Protection of the Weak

If a person 'A' goes on to intimidate a person 'B' even after the judgment given by the Village Court, then 'A' shall be fined by the village for contempt of court judgment. Whoever waylays another person for reasons of past grievances shall be fined rupees two thousand five hundred to rupees ten thousand as per the price fixed by different villages (Hümai Dunamai General Assembly, 1999, Zhaimai Village General Assembly, 2005).

Assault on Hospitality

In the Poumai Naga tribal society hospitality is a virtue advocated and taught to the children. People did business travelling from one village to the other or could even be guests visiting the village. Thus if anyone robbed them a very heavy fine is imposed upon the perpetrators. For example, in Liyai they shall pay a fine of rupees nine thousand or more (Zhaimai Village General Assembly, 2005).

Settling Disputes by Swear-on-Oath

There are different types of swearing carried out according to the types of crimes that are committed in the society. The swearer calls upon the sky as father and the earth as mother to be the witness. Hodson (1988) had observed among the Mao (erstwhile Mao-Poumai) people, the different types of disputes, of land, quarrels between clans, fight for timber, water etc... being settled using different methods (Ahrai, 2016). We shall discuss below the different types of swearing that were practiced by the people to settle the disputes.

Swearing on the Spear, Mud, Wood, Gun and Tooth of a Tiger

The swearer holds the twig, spear, mud, touches a wood etc. The meaning behind the would be that the false swearer may wither like a dead twig that he holds. After stating the fact and swearing

upon the number of lives for their truth, the oath concludes with the formula: “If I lie in what I now say, then may heaven and earth defy me, let me not grow like other man, but let me be ruined as burnt out fire and uprooted vine.” The holding or biting a barrel-gun, spear head, or the tooth of a tiger is pronounced with the declaration: “If I do not faithfully perform this promise, may I fall by this weapon or animal etc...”

Swearing in a Peace Treaty between Warring Villages

When warring villages make peace the following oath is taken:

If any man of my village breaks this peace first, then so long as water flow in my spring and so long as the sun and the moon remain in the heavens, so shall my men be defeated; and all the forest and red earth shall not be enough to cover my corpse and blood.

Swearing to Maintain Secrecy and to Abide by the Village Decision

The selected dog is killed by hitting on the head represented by Village council and is cooked. Every representative involved takes a piece of meat and eat it pronouncing that on the violation or non-co-operation of the village’s decision, or leaking out the said secrecy of the village, let that clan die in as much as the number of hairs on the dog.

Swearing an Oath on a Land Dispute

In case of land disputes the party to swear must be standing on the disputed boundary line holding the mud, bite it and swear saying:

If I am proved wrong, I would die eating mud, and that God would forbid me, and that I cannot be equal with my opponent as long as the sun and the moon shine in heaven.

In case he refuses to perform the swearing, the decision of the case goes in favour of his opponent and the penalty is imposed accordingly.

Breaking the Leg of a Rooster

Breaking the leg of a live rooster (cock) is considered to be one of the strongest type of swearing which – pronounces that, “if I falsely swear, let my leg, hand or any part of body, be broken like that of this rooster.”

Eating of Cooked Meat

In the case of an unidentified or un-booked culprit(s), every member of the village has to bite and eat the cooked piece of meat pronouncing that, he is not involved in the said crime. And if falsely sworn let me die biting the piece of meat.

Immersion

Few decades ago, settling a land dispute between two parties was by performing immersion into the water to find out between the party who was right and wrong. A representative from each party or village is selected to dive under water. And the one who is able to stay underwater the longest is declared the winner of the case. It is believed that the wrong one will never be able to sink down and even though remaining under water he wouldn't be able to bear the terrible body pain, so he would just float up (Holkhosem Vs Seto Khullakpa, 1951; Land Dispute: Khabung Vs Maram Khunou, 1968).

Conclusion

A study of the customary laws and practices of the Poumais allows us to have a kaleidoscopic view of their ‘worldview.’ In fact a peep into their perspective of life through their customary laws and practices brings out the belief pattern, notion of good

and evil, right and wrong, the value system and the concept of justice of the Poumais. Alongside with the above mentioned, the customary laws and practices unveil to us the traditional legacy passed down from generation to generation. However, the legacy which has been handed down initiate innovation of the laws and practices as it encounter issues and challenges of the times.

As cited above the institution of the village courts has made justice “cheap and quick.” Even today, as far as justice within the village is concerned, the clan elders play a very important role in the administration and adjudication of justice. It is the individual clan representatives who advise whether or not to table the case before the village court.

The institution of the village courts and traditional system of administration of justice should be encouraged and improved. This institution has proved to be very efficient and swift in the dispensation of justice. When the council of elders are unable to decide due to lack of facts or the dissatisfaction of the plaintiff, both the parties are asked to swear-on-oath, calling the parties to swear on the heads of a number of people in the clan. This action at last leaves both the parties to resign to divine dispensation of justice. This swearing on oath is an instrument of great deterrence to many people as it would incur divine wrath on the wrong doers and their generations.

It is important for the village court to keep a record of judgments meted out to the people in the customary way. The record of the administration of justice in the traditional system could be placed under headings like land law, assault on persons, property, cattle etc... The applications of these precedents could help in dispensing justice faster.

The village is a microcosm of the macrocosmic world; hence the evils of the macrocosmic world are sure to invade the microcosmic world that is the village. Similarly, in the

event of the presence of the crimes of the sophisticated world, it will be imperative that the clan representatives be educated in knowledge of the crimes and apply them locally. The village court mercenary is quick and easily available; hence what is needed is the knowledge that is needed to be gained to dispense justice. Whatever be the novelty of the laws and practices, the fact is that the spirit of the law is constant even though crimes may take different forms. Thus we see an inter-link between the wisdom of the old and the dynamics of the present times.

References

- Ahrai, H. (2016, January 4-6). The Poumai Naga Customary Court: Practices and Administration of Justice. In P. Punü (ed.). *Souvenir, Poumai Thounü Celebration: Our Culture is Our Identity*, pp. 27-31.
- Das, J.N. (1987). *A Study of Administration of Justice among the Tribes and Races of North-Eastern Region*. Guwahati: Law Research Institute, Eastern Region, Gauhati High Court.
- Government of Manipur. (1956). *The Manipur (Village Authorities in Hill Areas) Act, 1956*. Imphal: Gazette of Manipur.
- Hodson, T. (1988). *The Naga Tribes of Manipur*. Delhi: Neeraj Publishing House.
- Holkhosem Vs Seto Khullakpa, 53 of 1951 (P.T. Moon. District Magistrate Manipur September 18, 1951).
- Hümai Dunamai General Assembly. (1999). *Constitution of Hümai Dunamai*. Purul Atongba: Hümai Dunamai Village Authority Council.
- Koide Union Board. (2012). *Constitution of Naamai Vesükai* (2nd Edition ed.). Koide Union: Naamai Vesükai.

Land Dispute: Khabung Vs Maram Khunou, 1 of 1968 (Savizo, Federal Government of Nagaland May 4, 1968).

Ngupani, R. (2010). *Socio-Cultural and Political Changes Among the Tribes of Manipur: A Case Study of the Poumai Naga Tribe*. Canchipur, Imphal: Department of Political Science, School of Social Sciences, Manipur University.

Onaemi Village General Assembly. (2008). *The Constitution of Onaemi (Oinam Hill) Village*. Oinam: Onaemi Village Authority Council.

Josho, P.T.H. (2010). *Yezhabo of Poumai Naga Union*. Senapati: Poumai Naga Union.

Pao, R.H. (2017). *The Poumai Naga Tribe*. Imphal, Manipur: Siroi Publications.

Sadler, G.T. (2010). *The Relation of Custom to Law*. Honolulu: World Public Library Association.

Saranamai Village General Assembly. (2016). *Constitution of the Sūmai Village*. Saranamai: Sūmai Village Authority.

Shimray, R.R. (1985). *Origin and Culture of Nagas*. New Delhi: Mrs. Pamleiphi Shimray.

Shomai Village General Assembly. (2012). *Constitution of Thingba Khunou Village*. Thingba Khunou: Shomai Village Authority.

Vafūmai Village General Assembly. (2011). *Constitution of Vafūmai (Lai)*. Vafūmai: Vafūmai Village Authority.

Zhaimai Village General Assembly. (2010). *The Constitution of Liyai (Zhaimai) Village*. Liyai Khullen: Zhaimai Village Authority.

Zhaimai Village General Assembly. (2005). *The Zhaimai Nuh Zhai-Law Act. 2005*. Liyai Khullen: Zhaimai Village Authority.

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