Journal of Development Policy Review (JDPR)

Towards Equality and Empowerment:
Reflections amid the COVID-19 Pandemic

Editors:
Dr Simi Mehta
Dr Soumyadip Chattopadhyay

A flagship journal of

IMPRI Impact and Policy Research Institute, New Delhi

प्रभाव एवं नीति अनुसंधान संस्थान

IMPRI | IMPACT AND POLICY RESEARCH INSTITUTE

● ETHICAL ● INDEPENDENT ● NON-PARTISAN

Website: http://ojs.indrastra.com/index.php/jdpr

Journal of Development Policy Review (JDPR)

Towards Equality and Empowerment:
Reflections amid the COVID-19 Pandemic

Editors:
Dr Simi Mehta
Dr Soumyadip Chattopadhyay

A flagship journal of

IMPRI Impact and Policy Research Institute, New Delhi

प्रभाव एवं नीति अनुसंधान संस्थान

IMPRI | **IMPACT AND POLICY RESEARCH INSTITUTE**

● **ETHICAL**   ● **INDEPENDENT**   ● **NON-PARTISAN**

Published by

IndraStra Open Journal Systems, New York

IndraStra
Open Journal Systems

Advisory Board

Rajiv Shah
Editor, Counterview.org; Ex-Political Editor, The Times of India

Rashmi Singh, PhD
Additional Commissioner, North Delhi Municipal Corporation; Former Secretary, New Delhi Municipal Council

Samia Zennadi
Chairperson, Impact and Policy Research Institute (IMPRI); Co-founder, APIC éditions; Founding Member, Global University for Sustainability

Sandeep Chachra, PhD
Executive Director, ActionAid India; Co-Chair, World Urban Campaign, UN-HABITAT

Shakti Kak, PhD
Professor (Retd.) and Former Director, Centre for Jawaharlal Nehru Studies, Jamia Millia Islamia (JMI); Chairperson (H), Centre for Work and Welfare, IMPRI

Shipra Maitra, PhD
Delhi Chair Professor, Institute for Human Development (IHD); Chairperson (H), Centre for Habitat, Urban and Regional Studies (IMPRI); Member, Fourth Municipal Valuation Committee, Government of NCT of Delhi

Sudhin Choksey
Executive Director (Designate), Bandhan Bank

Sukhadeo Thorat (Padma Shri), PhD, D.Litt., LLD, D.Sc., D.S.
Professor Emeritus, Jawaharlal Nehru University (JNU); Distinguished Professor, Savitribai Phule Pune University; Ex-Chairman: University Grants Commission (UGC) and Indian Council of Social Science Research (ICSSR).

Arjun Kumar, PhD
Head, Journal of Development Policy Review (JDPR) Secretariat; Director, Impact and Policy Research Institute (IMPRI); China-India Visiting Scholars (CIVS) Fellow, Ashoka University

Editorial Review Committee

Editors

Soumyadip Chattopadhyay, PhD

Soumyadip Chattopadhyay is an Associate Professor in Economics at the Department of Economics and Politics, Visva Bharati University, West Bengal, and a Senior Fellow at Impact and Policy Research Institute (IMPRI), New Delhi. He is the coordinator of the Center for Habitat, Urban and Regional Studies, IMPRI. He was associated with Graduate School of Geography, Clark University as a C.V. Raman Fellow, and with the Department of Urban Studies and Planning, University of Sheffield as a Commonwealth Academic Fellow. His research interests lie in the field of development studies, and specifically in urban finance, urban inequality, and ongoing transformations in urban governance in Indian cities. He is currently serving as one of the Associate Editors of International Journal of Rural Management.

Simi Mehta, PhD (Managing Editor)

Simi Mehta is the CEO and Editorial Director of Impact and Policy Research Institute (IMPRI) and Managing Editor of JDPR. She holds a PhD in American Studies from Jawaharlal Nehru University (JNU) and was a Fulbright Fellow at Ohio State University, USA. Her areas of research include US and India's agriculture and foreign policies, international security studies, sustainable development, climate change, gender justice, urban environment and food security.

Editors' Note

We are delighted to present to the readers Issue 4 of Volume 1 of *Journal of Development Policy Review* (JDPR), a flagship journal of IMPRI Impact and Policy Research Institute. It is divided into the following sections: *Insights, Policy Perspectives, Special Articles, Young Voices and Report Review.*

Alike other issues, this issue comprises articles evincing high standards of quality research speaking about the grassroots level challenges, and delineating policy recommendations. Multiples issues have been covered including labour migration in South Asia, waste management, forest communities in India's North East, caste-based realities in access to nutrition, need for youth to join hands for climate action, epistemological reflections on trauma and reconciliation, impact of COVID-19 on India's healthcare system and Nepal's trade.

We are confident that the readers will find the articles in this Issue insightful and that the recommendations therein will enable informed policy decisions for the ultimate benefit of the population at the grassroots.

We congratulate all the authors, the editorial team and the JDPR Secretariat for their hard work for their hard work and determination for the timely release of this issue. We thank the Journal Advisory Board, Editorial Review Committee and our publishers at IndraStra Global New York for their consistent support.

With Gratitude,
Editors
Journal of Development Policy Review (JDPR)

Contents

Insights

Leaving the Shadow of Pain:
Personal Reflections on Epistemology

Doris H. Gray[1]

 Abstract

The essay argues that personal histories are linked to scholarly inquiry in the social sciences. This acknowledgement does not necessarily lead to less rigorous research but puts into question the notion of purely "objective" scholarship. Emphasis here is on commonalities in the human experience that goes beyond contemporary demands for positionality. Two of the central questions of this essay are: Who has a right to the truth? And how is truth telling connected with personal and national efforts at reconciliation? The essay offers reflections based on decades of research with victims of state violence and how this research is related to the personal history of the author.

Keywords: Epistemology, trauma, truth telling, reconciliation

Why do we do what we do? How do we connect a rather abstract scholarly inquiry to our life? And why is this important? I don't presume to think that my life - or that of my family - is interesting to anyone other than myself. But our personal lives sometimes become witness to larger events that allow us to learn some lessons that shed light on larger, more universal themes.

Likewise, it is instructive to look at our personal life story to understand the trajectory of our scholarly inquiries. While there has been an emphasis on "objective" research in the social sciences, I argue along with, for example, R. Behar (2000) and

[1] Professor of Gender Studies, Ex-Director, Hillary Clinton Center for Women's Empowerment, Al Akhawayn University, Ifrane, Morocco; Honorary Professor, Roskilde University, Denmark. Email: graymorocco@gmail.com

K.G. Anderson (1996), that research in the social sciences is often linked to the biography of the researcher. This is not to argue that social science research must not be based on rigorous scholarly standards, it merely states that when humans study humans, there is a personal dimension that should be acknowledged. However, recognizing the impact of individual entanglements, be they cultural, social or personal, has on research is not the same as declaring positionality which frequently emphasizes otherness of the researcher vis-à-vis the studied population group.

Rather, I argue for an epistemology that starts with a presupposition of commonality and from there explores dimensions of difference. Such commonality was explored, for example, by Ernst Bloch (1955) in his *Principle of Hope*. This German Jewish philosopher postulated this in his three-volume work that he wrote in the aftermath of the Shoah which he escaped by fleeing to the United States (US). Bloch argued that humans possess an innate desire to strive for a utopian world and articulate this through philosophy, religion and – fatally – through misguided ideologies such as fascism or communism in the 20th century.

My own trajectory illustrates this connection between the personal and the professional.

Before becoming an academic, I worked as foreign correspondent in twenty-two African countries. During this tenure, I frequently had to cover corrupt regimes and interview corrupt, authoritarian leaders. My focus there was not on how corruption affected growth of a healthy economy – which it certainly does – but what does it mean for citizens if they cannot trust their governments? What does it do to the individuals when they know their leaders willfully deceive them for personal gain for themselves, their families, their ethnic or religious community etc.? When leadership is deceitful, it becomes the model for society. Even if individuals know the difference between truth and lie, there is an atmosphere that deception is OK. A pervasive sense of

mistrust corrodes societal harmony and cohesiveness and eventually turns neighbors against each other.

If this true for society as a whole, how much more so more for a smaller unit, such as the family?

My preoccupation with truth telling, or its absence, is rooted in my family history.

I grew up in Germany. There always was an air of secrecy in our home. On my father's side, we had no grandparents, no aunts, no uncles, no cousins. Our dad seemed to have come out of nowhere and was connected to no one but the family he and my mother created. What is more, his background was a taboo subject.

Only a few years before his death, when I was a mature adult, did he reveal that he was Jewish and had escaped the Shoah inside Germany by living precariously underground during the years of the Nazi regime. All his relatives were murdered in Auschwitz. Because he did not feel safe in the post-war years, he decided to keep his identity hidden from his children.

My father's secrecy kept him distant from us. I never felt I could touch my dad, not physically and not emotionally. Hiding the truth about himself made perfect sense to him yet resulted in a somewhat dysfunctional family life.

The question is: Can there be a balance between the one who feels they need to keep a secret and the one who has a right to know?

With all that I know today about my father, I think there could have been a way for him to reveal his secret just enough for us to understand that he did what he did was for a reason. It does not have to be all or nothing.

The price for not telling the truth is high. It hurts the people you love. Not telling the truth hurts the one who is keeping a secret. It distorts their mind, it twists their sense of reality. One big secret leads to many little secrets.

Secrecy also keeps them from loving freely and being loved freely. What is more, the hidden pain gets passed from one generation to the next. The pain of trauma is multi-generational.

Not knowing the truth about my father instilled in me a sense of never feeling at ease. Because of the life-threatening persecution he experienced, he taught me not to trust authority – other than his own, of course – and to be suspicious of rules. That in Germany of all places where there is a rule for everything and orderliness is next to godliness.

A long arch to another time, another continent to the women in Tunisia who were persecuted, tortured and some raped under the dictatorial regime of Zine El Abidine Ben Ali that was overthrown in January 2011. Though I do not share a common culture, language, religion with the women I interviewed, there is something they know about me and I know about them: *secrets are damaging and truth can be dangerous.*

Many victims of mass atrocities do not want to come forth with the truth about what happened to them. They have rebuilt their lives as best they could. Women who have been sexually violated do not want their husbands to know what happened to them, especially if they believe they are protecting their children by keeping their suffering to themselves. This is because in Tunisia, as in other Muslim majority countries, the honour of the family lies in the sexual virtue of the woman. Having been violated sexually brings shame to the entire family.

I have repeatedly encouraged these North African survivors to come forward with their stories but I do understand why some do not want to take that risk. What I have learnt though is that healing cannot occur in the absence of truth. Neither can forgiving and reconciliation. But it is possible to know the truth without knowing every detailed fact.

I do not know how a child can make a parent feel comfortable about coming forward with the truth. I am not sure

what a state can do to make victims feel assured about their safety when telling the truth about mass atrocities.

Even if we understand why someone may choose to keep a big secret, we also need to acknowledge that they have a right to come forward or not. Their personal assessment of the risks involved in coming forward is highly subjective but has to be taken seriously. I have also learnt that when someone does reveal a few facts, this is only the tip of the iceberg. As a listener and researcher one should not assume that all that is revealed, is all there is to know.

How can victims come forward with the truth, even after regime change, when the state had so dismally failed and betrayed them?

When I conducted my interviews in the small country of Tunisia during which women would tell me their stories of torture, it happened several times that one of them would say to me: "Are one of us?" Of course, I had never spoken to them about my own past but the point is, the truth can be known in the absence of facts.

It is difficult to heal under the best of circumstances, such as a supportive family and friends, access to good medical care and counselling, but healing is slowed by a continued state of insecurity, poverty, and social mores that often place a measure of responsibility for crimes on victims.

In the absence of a stable, trustworthy state and judicial system how can people heal?

Though I have not conducted research in India, there are some parallels to Germany and Tunisia. Anytime there is a state of emergency – whether it is in Nazi Germany or in Tunisia under the dictatorship or now worldwide due to COVID-19: national security becomes paramount at the price of tolerating abuse. Governments and societies in general are so overwhelmed that victims of abuse subsume their fate and remain silent. More specifically, violence against vulnerable individuals – often women - is again de-prioritized.

A system in crisis mode, such as caused by the COVID-19 pandemic, allows for cover-ups because individual trauma gets subsumed in a larger societal crisis.

What I believe would be necessary for individual healing to occur is:

Keeping a big secret hurts the ones one most wishes to protect.
Understanding that when a survivor comes forward with some facts, it is usually only the tip of the iceberg.

Listening carefully is imperative because it validates a person's life. The truth is worth being told and it is worth being listened to.

Showing remorse – someone in a position of authority needs to acknowledge the harm done and express remorse. A victim needs to hear: We are sorry, this should never have happened to you.

Though it does not cost anything and there is no tangible restitution, publicly recognizing and apologizing for the wrongs done to individuals is an important aspect in the healing process. It takes trauma victims out of their isolation. It allows trauma victims to shed their sense of shame and guilt. It allows trauma victims to affirm their self-worth and that they are valued members of the community. This is important for a country as a whole to move forward and successfully address a crisis.

References

Anderson, K.G. 2000. Intuitive Inquiry: Interpreting objective and subjective data. ReVision, 22: 31-30.

Behar, R. 1996. The Vulnerable Observer: Anthropology that breaks your heart. Boston: Beacon Press.

Bloch, E. 1955. Das Prinzip Hoffnung. Suhrkamp.

Insights

Labour Migration in South Asia:
Shared Features and Common Solutions

Babu P. Remesh[1]

Abstract

This commentary highlights the common features of migration scenarios of South Asian countries and suggests possibilities of collective interventions, to address the emerging issues in times of COVID-19 pandemic and beyond. This article traces the common traits of migration in the South Asian countries in terms of economic, political, environmental and social factors, the impact of the Pandemic and its implications in the given context and the need for and role of government intervention to safeguard the welfare of these migrants.

Keywords: Migration, South Asia, COVID-19, Pandemic

[1] Dean, School of Development Studies, Ambedkar University Delhi and Lead Author of `SAAPE South Asia Migration Report, 2020'. Email: babu@aud.ac.in

Introduction

South Asia assumes considerable prominence in the global map of labour migration, as most of the countries in this region (India, Pakistan, Bangladesh, Nepal, Sri Lanka, Afghanistan, Bhutan and Maldives) are important origins and/or destinations for thousands of migrants, who had to move out of their native lands in search of improved livelihood options.

As per the estimates of United Nations (UN) International Migration Report, 2020, there are 281 million international migrants living outside their countries and a significant per cent of these migrants belong to South Asia (IOM, 2019). There is a widespread presence of people from India, Pakistan, Sri Lanka, Bangladesh and Nepal in the Gulf Cooperation Council (GCC) countries and many other far-off destinations. Further to this, in almost all South Asian countries, greater proportions of migrants are internal migrants, who essentially move only within the borders of their home countries.

In countries like India, Pakistan and Bangladesh, the quantum and proportion of internal migrants are quite high compared to their international counterparts. Intra-regional migration is also quite important in South Asia, as countries like India, Pakistan and Maldives are home to large number of migrants from other countries from within the region.

The stock of migrants from South Asian countries can be broadly divided into two categories: `distress-driven' and `choice-based'.

The first set of migrants are the poorer and marginalized, who migrate in search of basic employment and living. The latter category includes those with better set of material and human resources, for whom migration is essentially for upgrading their professional and living standards. For the first category, which is more prominent in the countries of South Asia, migration is often a livelihood strategy, as there are no prospects for employment and basic livelihood options in their own native places. The

ensuing discussion in this commentary focuses more on the latter category, i.e. the poorest and vulnerable-most migrants. An attempt is made to understand the common features of migration scenarios of various countries in South Asia and to discuss some possibilities for improving the plight of migrants in/of the region.

Common Drivers and Shared Traits

Regional disparities, and rural-urban divide is found to be the major driver for employment-induced, internal migration in South Asian countries. With increasing urbanization, many people from South Asian countries are migrating from rural areas to urban centers for better livelihoods. Massive movement of rural poor towards urban centres/capital regions in South Asia (e.g. Delhi, Mumbai, Kolkata, Dhaka, Islamabad, Karachi, Kathmandu, Kabul, Colombo, Male', Thimphu) lead to situations where urban areas are overcrowded without basic facilities.

Often, these rural-urban migrants do not get fair and dignified dealings in their destinations. They also become subject to unequal treatment in labour markets and social exclusions in their host-communities. Apart from rural distress, most of the countries in the region have many socio-political tensions, which act as drivers for out-migration. Countries like India, Pakistan, Bangladesh, Sri Lanka, Nepal and Afghanistan had witnessed many episodes of socio-political conflicts, during the past few decades. Many of these conflicts forced large number of people to move out of their homelands, to save their lives and seek basic livelihoods.

Similarly, protracted political tensions in Afghanistan has resulted in a massive exodus of its population to nearby Pakistan and many other countries, within and outside the South Asia. If we go by Global Peace Index, 2020, the South Asian region is currently the second least peaceful region in the world, with

worrying situations of peacefulness in countries like Bhutan, Nepal, Sri Lanka, and Afghanistan (IEP, 2020).

In terms of climate-change induced migration too, countries in the region share considerable similarities. Distress migration of `climate-refugees' is very prominent in countries like India, Pakistan, Bangladesh, Maldives, Nepal and Afghanistan. Maldives is under the threat of getting submerged totally in the near future. Nepal has had many natural calamities and environmental degradation that have forced many to move outside their localities for good.

Apart from these, forced distress-migration has also been frequently happening in various parts of South Asian region due to development induced migration, unplanned urbanization/resource depletion and so on. The case of migration of Chakamas and Hajongs, from Chittagong Hill tracts of present Bangladesh (following landlessness due to development of the Kapati Dam in 1960s) is a striking example for this development-induced migration.

For most of the South Asian countries, rural distress characterized by an intense employment crisis is the main reason for urban-bound migration. Lower levels of labour-absorption capacity of local economies are found pushing the rural poor to move to urban centres. The proportions of seasonal/circular migrants are normally very high among the internal migrants.

These migrants, who have some foothold in rural areas, regularly return to their native places as per the cropping-calendars, to participate in farm activities like harvesting. However, in the recent past, all-over South Asia, the rural employment crisis has considerably worsened, which even adversely affected the rhythms of seasonal and circular migration. There are many manifestations for this deepening rural distress including: increased landlessness, wider spread of indebtedness, mounting number of farmer suicides and so on.

Apropos international migration beyond the regional boundaries, most of the south Asian countries have same destination countries – the major being the GCC countries, where migrant workers from the same region compete with each other for jobs; undercut wages and survive on deplorable working and living conditions.

South Asian countries also show a lot of similarities in terms of the patterns of women's migration. Overall, marriage migration continues to be the main reason for women's migration. Usually, some sort of a hidden labour migration is happening through marriage migration, as many of the poor women ultimately end up entering in the local labour markets after moving with their spouses.

In most of the South Asian countries, patriarchal controls or norms are quite dominant in the migration scenarios. Patriarchal/societal controls are found crucial while deciding migration decisions and in shaping the labour force participation of women. The larger governance framework of migration is also highly influenced by these norms and patriarchal controls. Accordingly, bans, introduction of job restrictions, stipulation of age limits/bars to `regulate' women's mobility is quite common in South Asian countries.

Due to such restrictions, in countries like Pakistan and Afghanistan, the share of women in migration flows is considerably low. In the case of Sri Lanka, where women migrants outnumber their male counterparts, there are stringent restrictions on women's free movement. A recently introduced family background record system stipulates that women need to obtain a clearance from a designated local official that there are no children in the family who requires the care of the women who intends to migrate. This sort of restrictions leads to a situation where women prefer to choose illegal routes/modes for migration, which *inter alia* leads to many pernicious practices (including trafficking, sexual abuse).

Of late, there is also a visible decline in the supportive framework provided by the states/governments in the region towards migrants. Withdrawal of support systems, rolling back of /lesser allocation on migrant-welfare measures, dilution of protections given vide labour law framework, introduction of stringent and disabling regulations for governing migration and so on are viewed as manifestations for this `growing prominence of neo-liberal ethos' in the larger governance of labour. As state is an important authority in regulating and facilitating migration as well as for protecting the rights and dignity of the migrants, the overall moving away of state from pro-poor interventions is a cause of worry for migrants.

Impact and Implications of the Pandemic

It is quite evident that COVID-19 pandemic has worsened the insecurities and vulnerability of the migrants in /from South Asia. Due to the unexpected outbreak of the pandemic and the subsequent lockdowns, there have been abundant flows of reverse migration (of both internal and international migrants) in all South Asian countries.

Many of the migrant poor had to return to their natives, leaving behind their belongings and livelihood options in the destinations. Often, these migrants had to undergo considerable miseries and spent huge amounts of money to come back to their origins. Further to this, many of them got stranded either in their destinations or in the borders of their home-countries, due to entry/travel restrictions imposed by various countries.

Large proportions of migrants had already lost their jobs during these days of crisis and many others had to accept salary cuts and deterioration in working and living conditions. Those who had to continue staying/working in their destinations often had to face unequal treatment/ discriminations (vis-à-vis the local population) during the pandemic in terms of access to healthcare,

availability of safely measures, quarantine facilities and so on. Further to this, there were also instances of growing xenophobia or 'othering the migrants' in some of the destination countries.

From the viewpoint of South Asian countries, there has been a considerable dip in the flow of remittances, since the outbreak of COVID-19 and the resultant chaos, which will have long term development impacts for all those countries, which bank on remittances as a major source of support. Rehabilitation of returnee-migrants and their integration to productive employment avenues in local economies is a major challenge in most of the labour-sending countries in the region.

Unfortunately, in most of the South Asian countries, there is a visible failure of state mechanism while dealing the issues of returnee-migrants, be it internal, intra-regional or international. It was quite alarming that extant state mechanisms in South Asian countries were not adequate enough to provide some modicum levels of food security, income support, social security or health benefits to their migrant populations. Alongside this, in various parts of South Asia, there have been weakening of democratic struggles and dilution of labour laws/regulations during COVID-19 period.

A large number of international returnee-migrants in South Asian countries are now actively looking for return-passage and reintegration into their erstwhile occupations in foreign destinations, as they cannot afford to stay away from employment for considerable period of time. Similar is the case with a major chunk of internal returnee-migrants too. For many international migrants, returning to destinations is now contingent upon completing the vaccination process, as prescribed by the recruiting country. The scarcity of vaccines in home-countries is also emerging as a major deterrent for the migrants to regain their jobs and livelihoods.

It is quite likely that the work practices followed during the crisis period of pandemic is going to leave many long-lasting

imprints in the migration scene of South Asia. In a situation where work from home and distant-working arrangements are increasingly gaining momentum, the physical migration of migrants back to earlier work is likely to be affected at least for some of the occupations. Furthermore, with the 'new normal and norms' surfaced by the pandemic, many manual operations carried out by migrants may get automated, given the possibilities of spread of possibilities of industry 4.0 and using the potentials of artificial intelligence. This will also likely to reduce the employment prospects of the migrants.

Need for Governmental Interventions and Collective Solutions

In the post-COVID era, the economic divide between nations and regions and the rural-urban divides are going to get widened. Accordingly, there can be an increase in terms of xenophobia towards the 'outsider'/migrants. Given this, it is very important for the governments in the South Asian region to actively work on pro-migration policies, which approaches migration in a right-based perspective.

In a way, the shared features of migration scenes in various South Asian countries provide us certain opportunities for working together and forging common solutions. Given the prominence of South Asia, as the most important source region of labour migration, it is highly desirable to have collective initiatives of South Asian governments to negotiate with migrant-receiving countries like GCC, on the possible terms of smooth reintegration of the migrants, with decent working and living conditions.

Similarly, countries in South Asia can also together ensure dignified return and assimilation of intra-regional migrants, in their respective territories. There should also be more concerned efforts towards promoting migrant rights and right-

based migration by utilizing the provisions of or the protective frameworks of labour laws and signing and honoring relevant international labour conventions.

In order to ensure solidarity in migration matters, first and foremost requirement is to have peace within the region. There are brewing tensions in South Asia right now. Thus, there is a need to establish peace within the region. For instance, in various parts of South Asia, there exists deeply contested issues related to legality/illegality of migrants and citizenship/identity aspects of cross border immigrants. These issues need to be amiably resolved in order to effectively address to promote the rights and labour-standards of migrants.

References

IEP. 2020. Global Peace Index 2020: Measuring Peace in a Complex World, Institute for Economics & Peace Sydney. Available at: http://visionofhumanity.org/reports, Accessed on 15 May 2021.

IOM. 2019. International Migration Report, 2020, International Organization for Migration (IOM), United Nations, Geneva. Available at: https://publications.iom.int/system/files/pdf/wmr_2020.pdf, Accessed on 01 May 2021.

Remesh, Babu P., Datta, Akhil Ranjan & Mani, Mohan. 2020. Migration in South Asia: Poverty and Vulnerability, SAAPE Poverty and Vulnerability Report, South Asia Alliance for Poverty Eradication (SAAPE), Kathmandu.

Policy Perspectives

Forest Dependence and its Degradation in Meghalaya:
The Potential Reasons

Utpal K. De[1]

Abstract

Interlinkages among population, poverty and deforestation are crucial for examination amid growing population, incidence of poverty and degradation of forests. Several studies have identified the primary reasons for the loss of forest cover as population growth, commercial logging and the spread of cattle ranches. This paper tries to unfold the nature of dependence on forest, and factors causing its degradation in Meghalaya in an interlinking fashion drawn through correlation, regression and intersectoral flow analysis. The analysis reveals that family size, incidence of poverty, cultivation practice, remoteness of the area and consumption or livelihood pattern have important impact on the extraction of forest resources. Education helps in conservation and sustainable use of the forest resources. Broadly, there is important inter-linkage between population growth, incidence of poverty and degradation of forest in the region. The emerging policy implication is that the best way to preserve forest is to control population growth, reduce poverty, improve economy through education and technological development, and follow a judicious land use pattern so as to maintain the forest resource and its productivity, which in turn provide sustainable livelihood.

Keywords: Forest dependence, Degradation of forest, Factors of degradation, Meghalaya

---

[1] Professor, Department of Economics, North-Eastern Hill University (NEHU), Shillong, India. Email: utpalkde@gmail.com.

Background

The population, poverty and the degradation of forests interlinkages have been debated for long period of time. In the context of forests, population growth has often been blamed for the loss of forest cover (Southgate, 1988; Ives and Messerli, 1988; FAO, 1993; Gill, 1999 Ehrlich and Ehrlich, 1990; Mink, 1993; Dasgupta, 1994) or it is commercial extraction, including the spread of cattle rearing activities (Engelman, 1997).

Majority of people in North-East India and particularly in Meghalaya still depend directly on land-based subsistence production. The population, poverty and environment interrelationship could hardly be direct since, poor standard of living of the rural population intensify pressure on natural resources like forests, which in turn aggravate poverty due to fall in productive capacity.

In the same way, population growth and environmental (here forest) degradation is both cause and consequence of poverty (Duraiappah,1996). Population growth cause significant impact on natural resources when it exceeds carrying capacity of the resource base that is highly inelastic in supply like forest to a certain extent. The impact on the environment is often viewed in terms of carrying capacity, and that is usually related to the availability of a limiting resource (Reidhead, et al., 1997).

Increasing production targets to meet growing need of population should not degrade a resource base beyond its regenerative capacity. The population-environment causal relationship is both-way. People modify their environment, and in turn, they are affected by changes in the environmental conditions. While these interrelationships unfold over time, the socio-economic context plays an important role in mediating them. In a similar fashion, socio-political and economic factors cause overall changes of the environment.

The poverty-environment linkage is often looked as a vicious circle between poverty and environmental degradation (De, 2006). Due to rapid population growth, poverty increases that causes expansion of cultivation to less productive lands, which intensifies poverty further (Malthus, 1798). Existing literature offers two major viewpoints about the precise relationships between population growth and environmental changes.

Majority of the population in Meghalaya still live-in rural areas and agriculture is their main occupation (Government of Meghalaya, 2017). The cultivable area have been extended to support the growing population and improve the economic conditions of rural population (Husain, 1994). It has been extended even to the steep hill slopes and clearing of forests have taken place that has caused rising intensity of soil erosion.

Also, pressure on forest has been compounded for the extensive practice of shifting cultivation (Lyngkhoi, 2007; De, 2003). Also, demand for timber and non-timber forest products has been increasing, as revealed from the rising contribution of the forest resources to net state domestic product (NSDP) of Meghalaya. Not only the deforestation has been taking place for the expansion of agriculture, but also due to collection of fuel-wood that is much needed in the rural set-up.

For the unbridled population growth, unsustainable land use pattern and consumerism, the forest resources base of the region have been shrinking rapidly. The degradation of forest cover contributes to poverty by deteriorating the productivity of forests, on which the poor people rely the most, and rising poverty forces them to undertake more unsustainable practices, which causes further damage to the environment (Neena, 2000).

Sustainable development is not just about protecting the environment but it is about how we can make the best productive use of natural resources in order to eliminate poverty and improve quality of life (Aluko, 2004). A multidisciplinary approach is

required to understand the process of environmental degradation that has contributed to the incidence of poverty causing further degradation in Meghalaya.

Forest is the primary source of small timber, fuel, fodder, grazing, and a variety of other minor forest produce such as grass, fencing material, bark, fibre, edible flowers and roots, gum and honey. Many of these forest products have commercial and industrial importance (Chauhan and Chuahan, 1998). However, the exploitation of forest resources in Meghalaya has not been successful in alleviating poverty significantly. Rather, the uncontrolled exploitation of forest resources owing to its nature of being open access has put the rural people under vicious circle.

The paper examined the nature of population, poverty and degradation of forest interlinkages. Also, impacts of various factors on the deforestation in Meghalaya have been examined. The next section provides a brief review of relevant literature, which is followed by a description of data and methodology. Thereafter findings of the analysis is presented. The last section provides policy implications.

Studies on the Linkages

Ehrlich (1968), Meadows et al. (1972), Ehrlich and Ehrlich (1990), warned the world community with their prediction of possible short-fall of critical natural resources for the ceaseless population growth leading to break down of ecosystem and the economy. The possible exhaustion of renewable natural resources like forests was predicted if the extraction rate surpassed the carrying capacity of the resource base. Keeping a parity was therefore essential between surge of population and extraction of resources for sustainable progress.

Poverty and the population growth have often been blamed to be the primary reasons for the deforestation (Dreze and

Sen, 1989; Sen, 1994; Birdsall, 1994). Poverty and population growth of more than 2% every year has adversely affected the growth and development of the Meghalaya economy (Joshi, 1990). It was also identified that the forest degradation affected the environment and available resources for economic progress. The reasons for forest degradation were also due to the institutional structure and poverty (Dasgupta, 1994).

However, the neoclassical free market economists argued in line with demographic dividend that population growth adds to the benefit (Simon, 1981, 1996; Simon and Myers, 1994). In several ways, population growth contributes to economic growth and helps better management of natural resources through knowledge expansion (Johnson, 2000). The experience of rising pollution in several parts of the world after industrial revolution, global warming, depletion of forest resources, declining productivity of soil and biodiversity in the 2nd half of previous century raised concern across the globe. These have been not only due to the population growth but also the use of modern technology to meet rising greed of the populace.

Population growth without any technological breakthrough, as long its size remains below the carrying capacity, positively helps in better resource utilization. Beyond a certain limit, it causes serious damage of resources. Technological modernization leads to rise in the scope for resource use and degradation if there is uncertainty in regeneration at the required speed (De, *op. cit*; Bhagat and Hassan, 1994).

Therefore, natural resource degradation apart from population explosion may be due to rising consumerism, which is more importantly supported by the technological advancement (Macneill, 1989). Property rights also may play its part. The mostly open forest resource of Meghalaya, which is despite community ownership, has been subject to the tragedy of commons (Hardin, 1968).

Environmental Kuznets Curve hypothesis argued that economic growth of forest dwellers would solve the degradation problem. But Cropper and Griffiths (1994) pointed out that the damages in developing countries arise due of market failure associated with lack of property right. It is because of the fact that majority of the poor people do not possess any property right and they have very little incentive to conserve, except sympathy. The suggestion is therefore to control population growth to reduce the rate of deforestation.

Despite the blame put on the poor, on several occasions it has been found that they take measures (with the help of indigenous knowledge and to earn sustainable return) for the conservation in their own interest, and in some cases, they have limited access due to lack of property right. As a result, the question of their responsibility for degradation does not hold good (De, 2003). It is the non-poor who rather has better access to such a resource; and severely damage it.

The rich people having better access to modern machinery on many occasions over-exploit for making profit (Boyce, 1994; Jaganathan, 1989), and damage the scope of survival of the poor. Thus, the logging activities cause deforestation in several parts of Asia, Africa and Amazonian region (Somanathan, 1991; Anderson, 1989; Repetto, 1990; Cropper and Griffiths, 1994; Sanchez, 1998; FAO, 2005). In Meghalaya commercial interest of the timber industries attracted people towards such activities across the communities during 1980s that led to unsustainable harvesting[i].

Agricultural and pastoral encroachment into the forest in the wake of population growth also causes deforestation. The development in communication also helped in accelerating such degradation activities (Goodland, 1991; Westby, 1987; Cruz and Gills, 1990).

The cause-effect relation among population, poverty, various indicators of human development and degradation of forest is also reflected from De (2004). Using panel data on degradation of forest, incidence of poverty and level as well as variation in per capita state domestic product (SDP), De (2006) found a significantly positive correlation between income and degradation. A positive relation is found here between poverty reduction and deforestation, which is exactly not in tune with EKC (Grossman and Krueger, 1995). He opined that the states of North East India were still lesser developed having lower per capita income than the national average and hence, they were on the rising phase of EKC.

Moreover, whatever poverty reduction had taken place, it was at the cost of easily accessible forest resources. Almost a similar finding was presented in case of Arunachal Pradesh (Kuri, 2005). It has been opined that rapid growth of population in the North East India is also partly due to the immigration from the neighboring countries, namely, Bangladesh and Nepal and they have been in many cases responsible for the damage of forest cover for sustenance (Singh, 1987). Datta (2000) and Dutta (2000) also blamed high rate of growth of population, lack of planning and uneconomic use of land for shifting cultivation for the loss of forest cover in vast areas of Meghalaya.

Materials and Methodology

Data Sources

For the purpose of analysis, both secondary and primary data have been used. Secondary data on population, literacy rate, earning from forest, area under forest were collected from various Census Reports and Statistical Handbook of Meghalaya. Since district-level time series data on poverty is not available, computation of

correlation between temporal changes in incidence of poverty with rate of degradation of forest or population is impossible. Thus, primary data was collected during April-June 2018 to better analyze the inter-linkages among those variables.

Sample Design and the Study Area

Primary survey was conducted in four sample villages in Meghalaya. These villages were selected purposively. Two of them were from East Khasi Hills, one was from West Khasi Hills and the rest one was on the border of two districts. They were chosen on the basis of a preliminary information on locations, characteristics and intensity of forest degradation, distance from their nearest towns and communication facilities.

The villages were Mawtawar, Laitjem, Sohïong and Mawlangkhar. Mawtawar and Laitjem were located in nearby Mylliem Community and Rural Development (CRD) Block and Sohïong in Mawphlang CRD Block. Mawlangkhar belongs to the Mawthadraishan CRD Block of West Khasi Hills district. For the time and resource constraints, Jaintia and Garo Hills were not considered for the survey.

Sohïong and Mawlangkhar are situated about 30 and 20 KM away from nearest town Shillong and Nongstoiñ respectively. Distance of Mawtawar and Laitjem were about 5 and 12 km from their nearest city, Shillong. So, two villages were chosen within 15 km of distance from district headquarter, while two others were more than 15 km away from district headquarter. One saw-mill was in operation at Mawtawar during survey. Though previously there were five saw-mills at Laitjem, three were active and at Sohïong out of five and only two were in operation at the time of survey. Though there was a timber industry at Mawlangkhar, it was not in operation. As per the personal records, Mawtawar and Sohïong recorded very high degree of deforestation during past

few decades. Subsistence and commercial extraction practices cause degradation of a major portion of the erstwhile dense forests there and it has still been practiced due to the proximity to the commercial hubs and high incidence of poverty.

Influx of population from the remote villages compounded the problem. Due to lack of alternative opportunities, education facilities and rising pressure on *jhum* land; poor people migrate to urban informal sector lying mostly on the outskirts of the city. The degradation recorded in the other two villages, Laitjem and Mawlangkhar, has however been comparatively less despite more intensity of poverty and less available substitutes of forest products.

Forty households were selected from each village by simple random sampling method from among the list of households as the final sampling units. In total, the sample size was 160.

Collection of Data

From each household head, information on socio-demographic and economic conditions, *viz.*, family size and its composition, maximum educational attainment by any member of the family, land-ownership, occupation, monthly earning and its source, cultivation type, consumption pattern, materials used in housing, cattle owned, items collected from the forests were obtained. Also, the level of degradation of forests were noted. From the primary data, efforts were made to find the reasons for differences in dependence of people on the forest and the difference in level of degradation.

Method of Analysis

Since district-wise data on all the variables are not available for a long period of time, panel data regression analysis could not be applied. Therefore, by using secondary data, a two-way correlation table is constructed to examine the pattern of relationship among inter-district variation in population growth, rural poverty, changes in contribution of forestry to Net District Domestic Product (NDDP), changes in net earnings from the forest, variation in literacy rate. From the correlations among the variables, the dynamic linkage if exists and its nature in the state of Meghalaya was sought to be found.

From the observations on socio-economic characteristics of the sample households and their utilization of forest resources, the pattern of linkages was explained. The socio-economic status of the people is examined through their land holding, ownership of cattle, housing pattern, source of earning and its level. Also, dependence on forest is gathered from the items collected and their quantity, proportion of income comes from collection of forest resource, which is again regressed on several explanatory variables like per capita income, educational level, family size, land holding etc. to examine the impact of various factors on the dependence on forest resources that helps in understanding the reasons for forest resource degradation in the state and its spatial differences.

Both tabular and regression techniques are applied for analyzing the data. Along with correlation table, regression of collection of fuelwoods and earning from the collection of forest resources on relevant variables like education, family size, job status, distance from headquarter, presence or absence of saw-mills are conducted.

Before that, presence of multicollinearity has been checked by two-way correlation table of explanatory variables and found no significant correlation among them except between job status and education or family size and income. The coefficient of

respective explanatory variable shows the impact of that variable on the dependence of the family of forest for the respective item like fuelwood or earning and thus extraction leading to degradation.

Findings and Discussion

Secondary information reveals that the incidence of poverty in rural areas were high. Over time variation in NDDP or per capita NDDP was not significant, but could be used as an indicator of economic condition of the people and used in the analysis. More per capita NDDP of a district (for identical distribution) implies relatively less poor and vice-versa.

Inter-district variation in growth and density of population have significant inverse correlation with the growth of NDDP and per capita NDDP and significantly positive correlation with the variation in contribution of forest to NDDP and degradation of forest (Table 1). Variation in growth of literacy rate and per capita NDDP are negatively correlated to contribution of forest to NDDP as well as deforestation. There is a positive correlation among the proportion of family and area of *jhum* cultivation and contribution of forest to NDDP.

The results thus reveal that population growth and its rising density adversely affect and are impacted by the growing NDDP i.e., positively associated with the incidence of poverty if there is resource constraint. Even though other natural resources like minerals are there, most of those privately owned by a few owners and thus poor people are more dependent on easily accessible open forests.

It is expected that the poor have large family size for better family earning through more extraction of forest resources and that cause more degradation. However, educated people also avail other opportunities that reduce pressure on forest and thereby

its share in NDDP as well as degradation comes down. But in Meghalaya, education is not much effective due to the chronic poverty in many rural areas.

Table 1: Two Way Correlation Table

Variable	Population Growth Rate	Rural Lit. Rate	Growth of Population Density	Growth of NDDP	Growth of PC-NDDP	Change in Contribution of Forest to NDDP	Family in Jhum Cultivation (%)	Area of Jhum Cultivation
Population Growth Rate	1							
Rural Lit. Rate	0.15	1						
Growth of Population. Density	--	--	1					
Growth of NDDP	-0.51**	--	-0.49*	1				
Growth of PC- NDDP	-0.77**	0.30	-0.72**		1			
Change in Contribution of Forest to NDDP	0.53**	-0.60	0.46*	0.07	-0.92**	1		
Family in Jhum Cultivation (%)	-0.11	-0.31	-0.09	0.43	-0.28	0.45*	*1*	
Area of Jhum Cultivation	-0.17	-0.43	-0.24	0.06	-0.35	0.48*	*0.67** *	1
Degradation of Forest Land	0.41*	-0.27	0.30	-0.31	-0.51**	0.46*	*-0.52** *	-0.05

Notes:
 (i) ** and * indicate that the correlation is significant at 1% and 5% level of significance by two-tailed test.
 (ii) Variation in rural poverty was not considered, as district-wise time series figures were not available.

Source: Compiled from the data available from Secondary sources viz. Census of India, Planning Commission and Directorate of Economics and Statistics, Government of Meghalaya.

District level variability in growth of per capita NDDP has inverse impact on the share of forest to total NDDP or deforestation. It shows that with the growth of economy, pressure on forest reduces. However, growth of per capita NDDP of all the districts has been much lower as compared to the all-India average as

observed from the decline in ranking in human poverty index. Therefore, impact on proportion of family engaged and area under *jhum* cultivation is not highly significant. With rising income, peoples' dependence on forest for food, fodder and degradation is likely decline. However, if the share of forest in NDDP rises, NDDP would have accelerated growth leading to faster degradation.

Proportion of family and area under *jhum* cultivation are found to be inversely related to the variation in degradation of forests. Event now many families especially in rural areas of some districts are dependent on *jhum* cultivation (owing to low earning and other available opportunities) and also that population density in those districts is much lower than that of other districts of East Khasi Hills, where comparatively lesser proportion of population are dependent on *jhum* and per capita availability of land is also very less.

Due to less availability of per capita forestland, cycle of fallow period is short and hence more degradation is observed. The district with higher proportion of people in *jhum*, for relatively more per capita availability of land, fallow period is longer enough to maintain higher productivity and slower degradation.

However, despite education, due to lack of availability, one cannot avail modern techniques of settled cultivation, but he may try to judiciously manage the cultivable area. It may help in controlling deforestation substantially. Again, the population growth may cause imbalances in the use of forestland for survival. With identical population growth, if quality of forest is better in a district, its contribution to per capita NDDP would be higher and hence the growth.

Analysis of the Linkage on the Basis of Primary Data

Socio-Economic Profile of Sample Villages

Household size is an important variable in the context of extraction of forest resources. Here, the family size varied between 6 and 8 (Table 2). Mawtawar recorded the lowest average family size and number of children among the four sample villages, which showed the influence of educational and healthcare facilities in neighbouring urban area. The far interior Mawlangkhar village recorded the highest family size.

Table 2: Family Structure in Four Sample Villages

Village	Persons	Males	Females	Adult	Children
Laitjem	6.82	3.30	3.55	3.62	3.20
Mawtawar	6.07	3.13	3.00	3.48	2.57
Sohïong	7.30	3.70	3.60	3.65	3.65
Mawlangkhar	8.35	4.82	4.52	4.77	3.58

Source: Compiled from the field survey

Table 3: Distribution of Households in Terms of Education of Head of Households (%)

Village	Illiterate				Literate
		Literate but < Secondary	Secondary but < H.S.	H.S. but <Graduate	Graduate and Above
Laitjem	67.5	25.00	5.00	0.00	2.50
Mawtawar	47.5	40.00	2.50	2.50	7.50
Sohïong	90.0	10.00	0.00	0.00	0.00
Mawlangkhar	70.0	27.50	2.50	0.00	0.00

Source: Compiled from the field survey.

Mawtawar is the most advanced among all the four villages in achieving education with 52.50% literacy, of which 40% are just literate, 5% are secondary passed and 7.5% are graduates and above (Table 3). It is followed by Laitjem with 32.50% of population literate. Mawlangkhar records 30% literacy rate of which merely 2.5% are secondary passed, while in Sohïong only 10% of the people are literate.

Incidence of poverty as estimated by using the nationally prescribed rural poverty line for the sample villages is shown in Table 4. Almost all the families in Mawlangkhar are poor, which is followed by Laitjem and Sohïong. Only about one-third of the families in Mawtawar are poor. Despite variations in the level of education, all the three villages (except Mawtawar) are suffering from chronic poverty.

Table 4: Distribution of Households as per Poor and Non-Poor (%)

Village	Poor	Non-Poor
Laitjem	*80.00*	*20.00*
Mawtawar	*32.50*	*67.50*
Sohïong	*75.00*	*25.00*
Mawlangkhar	*97.50*	*2.50*

Source: Compiled from the field survey

Mean monthly income and expenditure of the households in the study area is significantly lower as compared to national average and varies significantly across the villages (Table 5). Mean family income per month ranges between Rs 1870.25 to Rs 3743.75. Also, monthly family expenditure is the lowest in Laitjem and it is the highest in Mawlangkhar.

A question may arise on the highest average monthly family expenditure in the most interior Mawlangkhar with 97.5% of the families being poor. Actually, for estimating total family earning, the imputed values of forest produce collected are considered. With the higher family size in Mawlangkhar, majority are engaged in collecting forest resources primarily for subsistence.

Moreover, in the expenditure, values of the items collected and consumed are also incorporated. In Mawlangkhar the harvesting and hunting in the forest is carried out mainly for subsistence, whereas in Mawtawar extracted resource is used for both subsistence and commercial purposes.

Table 5: Average Monthly Per Capita Income and Expenditure of the
Sample Households (Rs.)

Village	Per Capita Income	Per Capita Expenditure	Coefficient of Variation in family income
Laitjem	623.60	498.62	99.11
Mawtawar	1232.76	476.90	95.79
Sohïong	670.17	500.93	87.99
Mawlangkhar	447.00	446.69	48.51

Source: Compiled from the field survey.

Though average family expenditure is the highest, per capita monthly expenditure is the lowest in Mawlangkhar, which is highest in Mawtawar. This is because of the larger family size in Mawlangkhar as compared to that of Mawtawar. Moreover, coefficient of variation in income is the highest in Laitjem (99.11) and lowest in Mawlangkhar (48.51). So, higher income area has a tendency to be associated with greater inequality in the distribution of income.

Most families in all four villages are engaged in agriculture and cattle rearing except a few in Mawtawar, who are in non-agricultural occupation. Also, there are differences in housing pattern and significantly more forest resources are used in housing in the interior villages. For cooking, rarely people use charcoal, liquefied petroleum gas (LPG) and other cooking materials like kerosene and electricity Though some families in Mawtawar use LPG gas or charcoal; in other villages, people use fuelwood for the non-availability of LPG.

Almost all the families in Mawlangkhar collect fuel-wood. But in other three villages the figure varies from 45 to 62.5%, though most of the families in those villages use fuel-wood or charcoal (Table 6). It indicates that several families in those villages purchase fuel-wood, charcoal (of course that comes from the nearby forests) from the market and many people earn their livelihoods by selling those. Family size is relatively smaller in Mawtawar and hence they have less manpower to collect fuel-wood from the relatively more degraded area and some of them

have better job opportunities and therefore the opportunity cost of collecting fuel-wood is high.

Many of the people in the sample villages used to collect some other necessary items from the forests for meeting a part of their daily needs such as fruits, leaves, timber, bamboo, grass, etc. However, there is a significant variation in percentage of families collecting various forest products across the villages and the percentage is less in case of village that is located nearby the town.

Table 6: Distribution of Families as per the Collection of Forest Products (%)

Village	Fruit	Leaves	Fuelwood	Timber	Bamboo	Grass
Laitjem	*0.00*	*5.00*	*50.00*	*0.00*	*0.00*	*0.00*
Mawtawar	*0.00*	*0.00*	*45.00*	*0.00*	*5.00*	*5.00*
Sohïong	*5.00*	*35.00*	*62.50*	*5.00*	*5.00*	*25.00*
Mawlangkhar	*15.00*	*52.50*	*97.50*	*20.00*	*10.00*	*60.00*
Total	*5.00*	*23.12*	*63.75*	*6.25*	*5.00*	*22.50*

Source: Compiled from the field survey

Apart from those items, people of rural Meghalaya also collect wild roots, stems, bamboo shoots and seeds for consumption and some people also go for hunting. Wild biodiversity has been declining due to loss of dense forests. Though time series data is not available on those aspects, one can safely argue that the availability of those materials must be declining with the degradation of their host, which is forest.

There is a wide variation in average family, per capita income and expenditure of the households that collect forest materials (Table 7). In Laitjem, 21 out of 40 households collect materials from forest and have average family income of Rs. 3434.29. The figures for 17, 25 and 39 families of Mawtawar, Sohiong and Mawlangkhar are Rs. 5910.88, Rs. 5818.84 and Rs. 3680.54, respectively.

Table 7: Monthly Average Income, Expenditure and Per Capita Income
of the Households that collect materials from the Forests (Rs.)

Village	No. of HH	Population	Average family Income	Average Family Expenditure	Per Capita Income	Per Capita Expenditure
Laitjem	21	156	3434.29	3422.61	462.31	460.74
Mawtawar	17	106	5910.88	2952.00	947.97	473.43
Sohïong	25	200	5818.84	4052.88	727.36	506.61
Mawlangkhar	39	329	3680.54	3668.80	436.30	434.90

Note:
HH means household.

Source: Compiled from the field survey.

Similarly, average family expenditure of those families varies from Rs 2952.00 to Rs. 4052.88. Per capita income in those villages varies from Rs. 462.31 to Rs 947.97, while per capita expenditure varies between Rs. 434.90 and Rs. 506.61. Except in Sohiong, other villages' per capita income and expenditure of the families who collect materials from forest are significantly lower than those, who do not collect anything from forest (comparing with Table 5). It indicates that the poorer are more dependent on forest for their survival.

Both permanent and shifting cultivation have been practiced by the villagers (Table 8). Rice is grown in the field especially by those practicing permanent cultivation, whereas in shifting cultivation, besides the main crops of rice and maize, other crops such as vegetables, millets, potatoes, sweet potatoes, pulses, chillies, ginger, cabbage, cauliflower and others are also grown.

Table 8 also shows that 30 and 35% of the cultivator families in Sohiong and Mawlangkhar, respectively follow both shifting and settled cultivation. Now many are following permanent cultivation due to lack of forest resources and that is compounded with the rising population, though the productivity is still lower because of non-application of modern inputs. The none of these, here indicate the children or very old people of the

cultivator headed families and those engaged in raising orchids, other plantations or in small business.

Table 8: Distribution of Family Members of the Cultivator Headed Families in the Sample Villages (%)

Village	Permanent (1)	Shifting (2)	Both (1&2)	None of these
Laitjem	20.00	17.50	22.50	40.00
Mawtawar	17.50	5.00	0.00	77.50
Sohïong	37.50	17.50	30.00	15.00
Mawlangkhar	55.00	0.00	35.00	10.00

Source: Compiled from the field survey

Table 9: Distribution of Families According to Ownership of Land (%)

Village	Own Land	Community Land	Other Private Land	Own & Other Private Land Both	Other Land
Laitjem	19.44	8.33	58.33	2.78	11.11
Mawtawar	2.78	22.22	69.44	5.56	00.00
Sohïong	16.22	32.43	48.65	2.70	00.00
Mawlangkhar	32.26	00.00	54.84	12.90	00.00

Source: Compiled from the field survey

Table 9 reveals that 19.44% of families in Laitjem have their own land for settled cultivation and rest of the people use community land (8.33%), other private individual land (58.33%). Only 2.78% of the families use both own and other private land. In Mawtawar, only 2.78% of the families own land, 22.22% use community land and 69.44% enjoy other private land and 5.56% use both types of land.

In Sohïong, 16.22% of the families have own land and 32.43% depend on the community land and 48.65% encroach other private individual land, whereas in Mawlangkhar 32.26% of the people own land and 54.84% depend on other private land, 12.90% use both and there is no community land in this village. Based on the reply of the respondents, it was observed that in Laitjem there has been in-migration into the village during past 15 years (because it is nearer to town, despite being a poor village)

from interior villages for business, cultivation or joining as daily labourers due to lack of sustenance in their native areas. The crisis in the migrants' original village has been due to population growth and simultaneous fall in availability of forest resource (Table 10).

Out-migration of the people in Mawtawar is nil and all the respondents agree that in-migration has been there from interior villages for opportunities in neighboring town and other reasons as mentioned above. Also 77.50% of the people in Sohïong agreed that the people from the village migrated to other parts of the state in search of job and employment opportunities and 85% of the respondents in Mawlangkhar informed about out-migration to urban areas for accessing better unskilled jobs. However, no immigration has been reported by the respondents of this village.

Some people of Sohiong and Mawlangkhar are reluctant to say anything about it. It indicates that the people of Mawlangkhar, who are very poor and due to large family size; intensity of dependence on forests increase, but earning from the forests have been declining due to degradation. Ultimately people have been forced to go to relatively developed or virgin forest areas for survival.

Table 10: Distribution of Families According to their Response on Migration within Past Fifteen Years due to forest related reasons (%)

Village	Out-migration	In-migration
Laitjem	*2.50*	*97.50*
Mawtawar	*0.00*	*100.00*
Sohïong	*77.50*	*12.50*
Mawlangkhar	*85.00*	*0.00*

Source: Compiled from the field survey

A comparison of tables reveals that people of poorer villages earn relatively more from forest. However, people of villages adjacent to towns or having more timber industries also harvest forest both for sustenance and commercial activities and hence intensify the process of degradation. Though major fuel sources in all the

villages is firewood, in the distant villages intensity of fuel-wood use is relatively more due to lack of alternative energy resources. For the cultivation or harvesting of forest materials, people of all the villages depend both on personal, community and other private land.

Regression Results

Table 11: Two-Way Correlation Table

	Average Schooling	Monthly Family Income	Distance from Town	Land Ownership	Job Status	Family Size	No. of Saw Mill
Average Schooling	1	.0508	-.307	-.0556	-.516	-.105	.006
Monthly Family Income		1	-.1989	-.2752	.0785	-.539	-.071
Distance from Town			1	.0703	.2669	.142	00
Land Ownership				1	-.0277	-.017	.020
Job Status					1	.091	-.029
Family Size						1	-.0158

Source: Compiled from the field survey.

Here simple linear regression is followed and though education, family size, job status is expected to be correlated, we find no significant correlation among them except between job status and education or family size and income (Table 11). Hence in some equations we exclude job status or consider only average schooling of the adults' only and record changes in parameters but no significant changes in result is observed.

The result indicates that there is a very insignificant impact of education on the collection of fuel-wood or percentage of income earned from forest (Table 12). Actually, there is a high degree variation in educational level and a very few are educated in the sample villages. The incidence of poverty and lack of other opportunities push them towards forest resources and more so if it is common. Both, collection of fuel-wood and earning from

forests are significantly positively affected by family size and negatively related to total family income. Better job opportunity is also negatively related to dependence of people on forest.

Larger family size means more requirements and thus it intensifies harvesting of forest. Moreover, we have seen that low educated and relatively poor villagers have relatively larger family size and hence dependence is more. The negative coefficient of FI indicates that the affluent people will be less dependent on forest. It does not mean that they do not use forest resources.

Table 12: Regression Results

Explanatory Variable	FW	INF	INF	Dependent Variable INF	INF
Const.	.332	.072	.120	.089	.078
EDU	-.078	.017	-.008	-.0019	-.003
	(-.67)	(.82)	(.38)	(-.208)	(-.31)
FI	-.0003	-.00012	-.00012	-.00012	-.00012
	(-1.75)*	(-4.13)**	(-4.19)**	(-4.43)**	(-4.155)**
FSIZE	.052	.005	.005	.0043	.0045
	(3.76)**	(2.03)**	(2.02)**	(1.65)*	(1.61)*
JOB	-.0313	-.009	-.0082		-.009
	(-1.077)**	(-1.75)*	(-1.71)**		(-1.67)*
LAND	.174	.0111	.011	.011	.0116
	(1.98)**	(.7192)	(.75)	(.754)	(.75)
D	.183	.064	.0602 (4.81)**	.064 (5.15)**	.061 (4.56)**
	(2.42)**	(4.78)**			
SM			-.014 (-4.94)**	-.014 (-4.97)**	
R²	0.29	0.32	0.41	0.39	0.33
N = 160			Incorporating the number of sawmills in the villages	Incorporating average schooling of adult members & leaving job status of head of the families	Considering job status of head of household & excluding number of sawmills

Note:
{Here, FW represents fuel-wood, INF the percentage contribution of forest resources to family income, EDU the average year of schooling, FI the monthly family income, FSIZE means family size, JOB the job status, LAND the land ownership, D the distance of village from the nearest town, SM represents the presence of sawmill. Figures in the parentheses are the t-values, where * and ** indicate that the coefficient is significant at 10 and 5% level of significance respectively}. [For job status, we used 1 for service, 2 for agricultural labourer, 3 for cultivator, 4 for business and 5 for others. Normally it is assumed that better combined job status of families lowers the impact on degradation.]

What it indicates is that they devote less time for harvesting forest due to the high opportunity cost of their time. Rather they collect fuel-wood, charcoal and other items from the other people as in the interior villages LPG and other fuel is not available. Also, they find some locally collected items cheaper than at town and hence many of the items available in the nearby forests also find place in their daily menu, though the percentage is less for the rich.

Though from the overall sample villages we find an inverse relation between income and extraction of forest resources, in one village (Mawlangkhar), it was observed that average income of the people who extract forest is more than who do not. In that village (which is also far away from town/business centre) forest and agriculture together constitutes the main occupation due to lack of other opportunities. Hence those who collect more earn more.

Moreover, a very few people own land (31 family out of 160 in total) and thus they harvest commercially though on a limited scale. That is why the distance here has significantly positive impact on collection of fuel-wood and contribution of forest to family income. Though there is limited commercial activity, it is one of their main earning sources.

However, presence of saw-mills (some of which are closed now) have a negative impact on the percentage of earning from forests. Actually, saw-mills are run through large scale commercial extraction of timber, but that is of private forest of the owners in many cases or if it is a community forest, then it provides revenue mainly to those who have better access and control over it. The general poor families extract mainly for survival.

Conclusion and Policy Implications

In conclusion it may be said that population growth, with poor technological and industrial progress in Meghalaya, cause significant rise in extraction of forest resources for sustenance. Inter-district variation in population growth and per capita NDDP was inversely correlated with the variation in population growth, while rural literacy rate is found to be insignificant.

Rising educational level is expected to raise the earning capacity, reduce demand for multiple children, and also raise awareness about the need for judicious use and preservation of forests. But mere variation in literacy is not enough if the area suffers from high degree of poverty. The poor people, even if lesser educated are expected to prefer more children for their future insurance and also to extract forest resources for survival where there is no other major source of sustenance (Goodstein, 1999). Poverty level in the state has not reduced significantly, as reflected from the low all-India ranking in poverty and human development.

Livelihood activities including collection of fuelwood and consumption items, cattle rearing is partly shaped by the availability of resources available in the neighboring forests. Also, earning of forest dwellers substantially dependent on the collection of timber, which gets expedited with open access and timber industry in the neighborhood. Even though the well-off families do not collect forest resources by themselves, they buy from the collectors for daily use at lower cost than the available substitutes. Collection of fuel-wood or other consumption items is positively associated with the family size, which is significant.

Though at the individual household level, rising income is inversely related to the degradation of forests, the more the contribution of forest, with other things remaining identical (technology, productivity of other sector), the faster is the NSDP growth. It means that the district that has higher potential for extraction of forest resource, observes better growth of income.

Although in general, rising income is supposed to be associated with the reduction in dependence on forests, in the interior villages without alternative opportunities except for farming and where forest is common, the income rises proportionately with extraction.

Conservation of forests and maintenance of sustainable livelihood of the people is contingent upon the building of human resources, technological development and an appropriate land use pattern maintaining the productivity of forest resources. Education and training teach how to manage resources scientifically, change livelihood patterns and lower the demand for children and thereby lead to population control and raise efficiency of forest resources for sustainable benefit.

Improved communication with the remote areas leads to enhancement of commercial extraction. Also, it may help in supply of alternative fuel to the interior areas, increase scope of education and healthcare opportunities to the people residing therein. However, the harvesting cannot be stopped as forest dwellers are heavily dependent upon forests. Instead, a scientific approach can be adopted to simultaneously obtain livelihood options to maintain the standard of local economy with a sustainable harvesting of forest resources.

References

Aluko, M.A.O. 2004. "Sustainable Development, Environmental Degradation and the Entrenchment of Poverty in the Niger Delta of Nigeria," Journal of Human Ecology: International, Interdisciplinary Journal of Man-Environment Relationship, 15(1): 63-68.

Anderson, P. 1989. "The Myth of Sustainable Logging: The Case for a Ban on Tropical Timber Imports," The Ecologist, 19(5): 166-168.

Bhagat, R.B. and Hassan, Md. I. 1994. "On the Relationship between Population, Underdevelopment and Environment: Are we really in Malthusian Trap?" The Indian Geographical Journal, 69(2): 93-98.

Birdsall, N. 1994. "Government, Population and Poverty: A Win-Win Tale," in Lindahl-Kiessling, K. and H. Landberg (eds.), Population, Economic Development and the Environment, Oxford University Press: 173-195.

Boyce, J. K. 1994. "Inequality as a Cause of Environmental Degradation," Ecological Economics, 11(3): 169-178.

Chauhan, I. S. and Chauhan, A. 1998. Environmental Degradation, Rawat Publications, Jaipur and New Delhi.

Cropper M. and Griffiths, C. 1994. "The Interaction of Population Growth and Environmental Quality," American Economic Review, 84(2): 250-254.

Cruz, W. and Gills, C. 1990. "Resource Policy Reform in the Context of Population Pressure: The Philippines and Nepal" in D. Chapman (ed.) Arresting Renewable Resource Degradation in the Third World, World Bank Environment Working Paper No. 44, Washington D. C.: The World Bank.

Dasgupta, P., Folke, C. and Maler, K.G. 1994. "The Environmental Resource Base and Human Welfare," in Lindahl-Kiessling, K. and H. Landberg (eds.), Population, Economic Development and Environment, Oxford University Press: 25-50.

Datta, S. (2000): "Population Growth and Natural Resource Base in Meghalaya," in B. Datta Ray (ed.), Population, Poverty and Environment in North East India, Concept Publishing Company, New Delhi: 173-182.

De, U.K. 2003. "Economic Incentive and Environmental Management: A Study of Forestry in North-East India", in Z. Husain (ed.), Environmental Issues of North East India, Regency Publications, New Delhi: 170-188.

De, U.K. 2004. "Human Resource Development and the Quality of Environment: Some Issues," presented in the National Seminar on Human Resource Development in North-East India, held in Agartala during September 18-19, 2004 and organized by Economic Science Society of Tripura in collaboration with State Resource Centre and Department of Analytical and Applied Economics, Tripura University.

De, U.K. 2006. "Population, Poverty and The Problem of Natural Resource Management," Paper presented in the Conference on Demographic Dividend on 5-1-2006, organized by Liberty Institute, New Delhi.

Dreze, J. and Sen, A. K. 1989. Hunger and Public Action, Clarendon Press, Oxford, London.

Duraiappah, A. 1996. Poverty and Environmental Degradation: Literature Review and Analysis, CREED Working Paper Series, No 8. International Institute for Environment and Development, London.

Dutta, R. 2000. "Ecological Degradation and Forest Resources in Meghalaya," in B. Datta Ray (ed.), Population, Poverty and Environment in North East India, Concept Publishing Company, New Delhi: 382-85.

Ehrlich P. R. 1968. The Population Bomb, Sierra Club, Ballantine, New York.

Ehrlich, A.R. and Ehrlich, P.R. 1990. The Population Explosion, New York, Simor and Schuster.

Engelman, R. 1997. "Population as a Scale Factors: Impacts on Environment and Development," in R. K. Pachauri and Lubina F. Qureshy (eds.), Population, Environment and Development, Tata Energy Research Institute, New Delhi: 15-33.

FAO. 1993. Strategies for Sustainable Agriculture and Rural Development: The Role of Agriculture, Forestry and Fisheries, Rome: UN Food and Agriculture Organization.

Gill, M.S. 1999. "Population and Environment in District Leh (Ladakh), Jammu and Kashmir)," in Population Geography – a Journal of the Association of Population Geographers of India, 21(1 and 2): 19-30.

Goodland, R. 1991. Tropical Deforestation Solutions, Ethics and Religions, World Bank Environment Working Paper, Washington D. C.: The World Bank.

Goodstein, E.S. 1999. Economics and the Environment, 2nd edition, Chapter on Poverty, Population and the Environment, Prentice Hall, New Jersey: 429-460.

Government of Meghalaya, Directorate of Economics and Statistics. 2017. Statistical Handbook of Meghalaya.

Grossman and Krueger. 1995. "Economic Growth and the Environment," The Quarterly Journal of Economics: 353-377.

Hardin, G. 1968. "The Tragedy of the Commons", Science, 162:124-48.

Husain, Z. 1994. "Ecological Implications of Population Growth in North East India," in Sanu Mukherjee (ed), Demographic Profile of North East India, Omsons Publications, New Delhi:116-126.

Ives, J. D. and Messerli, B. 1988. The Himalayan Dilemma, London: Routledge.

Jaganathan, N.V. 1989. Poverty, Public Policies and the Environment, World Bank Environment Working Paper No. 24, Washington D.C.: The World Bank.

Johnson, D.G. 2000. "Population, Food and Knowledge," The American Economic Review, 90(1): 1-14.

Joshi, B.K. 1990. "Poverty, Inequality and the social Structure," in Tarlak Singh (Ed), Social Science Research and Problem of Poverty, Concept Publishing Company, New Delhi: 147.

Kuri, P.K. 2005. Common Property Resources, Environmental Externalities and Tribal Poverty in Arunachal Pradesh, Unpublished UGC Sponsored Major Project Report, University of Burdwan.

Macneill, J. 1989. "Strategies for Sustainable Economic Development," Scientific American, 261(3): 104-113.

Malthus, T.R. (1798; 1992): An Essay on the Principles of Population, Cambridge, Cambridge University Press.

Meadow, D.H., Meadow, D.L., Randers, J and Behrens, W.W. 1972. The Limits to Growth, Universe Books, New York.

Mink, S.D. 1993. "Poverty, Population and the Environment," World Bank Discussion Paper 189, The World Bank, Washington D.C.

Neena, 2000. "Natural Resources Management for Sustainable Development (Land, Forests and Biodiversity)," in N. Rajalakshmi (ed.), Environment and Economic Development, Manak Publications, New Delhi: 284-294.

Reidhead, P.W., Qureshy, L.F. and Narian, V. 1997. "Population, Environment and Development: Interactions and Issues," in R.K. Pachauri and L.F. Qureshy (eds.), Population, Environment and Development, Tata Energy Research Institute, New Delhi: 45-61.

Repetto, R. 1990. "Deforestation in the Tropics," Scientific American, 262(4): 36-45.

Sanchez, F.M. 1998. "Linkage between Poverty and Environmental Degradation- A Profound Opinion," in H. S. Sharma and S. Chattopadhyay (eds.), Sustainable Development - Issues and Case Studies, Concept Publishing Company, New Delhi.

Sen, A.K. 1994. "Population and Research: Food, Fertility and Economic Development," in Lindahl-Kiessling, K. and H. Landberg (eds.), Population, Economic Development and Environment, Oxford University Press: 51-74.

Simon, J. 1981. The Ultimate Resource, Princeton University Press, Princeton, USA.

Simon, J. 1996. The Ultimate Resource 2, 2nd Edition, Princeton University Press, Princeton, USA.

Simon, J. and Myers, N. 1994. Scarcity or Abundance? A Debate on the Environment, Norton, New York.

Singh, B.P. 1987. The Problem of Change: A Study of North East India, Oxford University Press, New Delhi.

Somanathan, E. 1991. "Deforestation, Property Rights and Incentives in Central Himalayas," Economic and Political Weekly, 26(4): PE37-PE46.

Southgate, D. 1988. The Economics of Land Degradation in the Third World, World Bank Environment Working Paper No. 2, Washington D.C.: The World Bank.

---

[i] It came out during the discussion of the author with some District Council Members in East and West Khasi Hills Districts.

Policy Perspectives

Trade and Policy Shocks in Nepal amid the Covid-19 Pandemic:
Observations, Lessons and the Way Forward

Raghu Bir Bista[1]

Abstract

This paper examines the impact of COVID-19, anti-COVID-19 policy, and compensatory policy on the national economy, particularly on foreign trade based on secondary data of the daily database of COVID through descriptive statistics and regression models. The paper finds a result that COVID-19 infected 44.8 million populations and killed 1.2 million people of 215 countries of the world and 0.165 million affected people, 887 death tolls, per day new cases >3000 and recovery rate >74 percent from March 23, 2020, to September 30, 2020, in Nepal. Similarly, its anti-COVID policy's impact (0.86) is more severe than COVID-19 (0.44) in the economy. Its output is most vulnerable to trade: Indo-Nepal and Sino-Nepal. Finally, the compensatory policy is a stable shock to the negative consequence of COVID-19 and anti-COVID-19 policy. Therefore, the foreign trade sector is most vulnerable in Nepal. For survival, stable and stimulus of national economy and trade, the compensatory policy should be implemented.

Keywords: COVID-19, Trade, Export, Import, Trade Openness, Nepal

---

[1] Associate Professor, Department of Economics, Tribhuvan University, Nepal.
Email: bistanepal@gmail.com

Introduction

Foreign Trade as an external sector in the nation has a huge potential key driver of economic growth rate, income equity, and poverty reduction. Since the 1990s, South Asia has been struggling with trade gain from *internationalism* and *regionalism* through building a *liberal trade policy regime.* South Asian Preferential Trade Arrangement (SAPTA) to South Asian Free Trade Area (SAFTA) is an example of intra- and inter-regionalism within the South Asian Association of Regional Cooperation (SAARC) to improve trade share to US$ 42 trillion international trades and to catch up to 7% of Global Gross Domestic Product (GDP) in SAARC through preferential trade and lowering of tariffs.

However, empirical and theoretical literature shows less than 5% intra-regional trade in the mutual trust deficit induced tariff and non-tariff barriers and protectionism, no trustworthiness of trade flows, higher cost of connectivity, and no strong trade bonding although multilateralism and regionalism have triggered to improve value and volume of trade of SAARC member countries. Its output is negligible trade outcomes to developing and least developing member countries in SAARC but the growth of trade dependency is interestingly impressive. An example is Nepal.

In Nepal, about 6.5% average growth miracle was recorded in the last three consecutive years from 2016, 2017, and 2019 (Asian Development Bank (ADB), 2019, World Bank (WB), 2019 & Ministry of Finance (MoF), 2020). Such appreciative miracles have bounced back with the desired growth confidence and hope triggered in the economy for achieving the national development goal of *happy Nepali, prosperous Nepal* within the next 20 years. It was a surprise in the mathematics of growth economics. Its reasons were underperformance of agricultural growth, industrial growth, and imbalance growth of trade sector

but over the performance of remittances led household consumption (29% of GDP).

However, the validity and significance of these pillars could not be ignored. Therefore, the uncontrolled growth of import trade that led to the trade imbalance has had mixed outcomes in the national economy. In macroeconomy, it is the unstable creator with the 1300 billion rupees trade deficit as the cost of export trade but the import of raw materials and capital goods and services have positive outcomes to strengthen and expands the productive sectors and construction of big projects: hydro and road and to create employment opportunities, resources, and products.

The trade of Nepal is still a magic box of a paradox between expectation and reality. In 2020, the trade-GDP ratio was 52% out of which the export GDP ratio was 9.8% meanwhile the import GDP ratio is 42%. As a result, the import-GDP ratio is excessive to the export-GDP ratio. In other words, the trade deficit-GDP ratio is 32.2%. It is greater than the remittance-GDP ratio (29%). In the figure, trade volume is recorded at Rs. 1992 billion. (MoF, 2020). In the trade statistics, Nepal has traded with 119 countries of the world out of which the trade statistics indicate 20 countries as major trade partners.

Despite 20 major trade partners, Indo-Nepal and Sino-Nepal trade are dominants with 65% and less than 5%, respectively in the trade structure. As a result, trade openness and liberalisation have not improved trade diversification and benefits as the target goal of Trade Policy 1996 and 2009 and National Five Years Plans (Ministry of Industry and Trade (MoIT), 1996, MoIT, 2009 and National Planning Commission (NPC), 2019). Its evidence is a huge trade deficit figure and rule in the trade.

In simple terms, import shares 94% and export shares only 6%. It indicates the growth of trade dependency and the degrowth of trade independence and the lower elasticity of export trade. Its result is 32% of the trade deficit-GDP, out of which the

Indo-Nepal trade deficit is 21% and then the rest is 11%. Similarly, the figure of export-import ratio shows 1:16 in the case of Indo-Nepal trade and 1:44 in the case of Sino-Nepal. Content analysis in import and export shows a higher variation of values between exported items and imported items. Nepal traditionally exports unprocessed agro products and handicrafts (cardamom, jute goods, textile, polyester, handicrafts, and juice) having low value, low competitive capacity, and low quantities.

Meanwhile, import content is essential, and industrial finished products: petroleum products, vehicles, machinery, electronics goods, medicines, etc. having high value and in large quantities. Such a trade deficit is due to the poor trade openness of both countries, India and China to Nepal, although they have provided Nepal a preferential treatment. Therefore, trade openness and liberalization have deepened the crisis of trade deficit, trade dependency, and domestic productivity. However, its inclusiveness is mentioned in the economic growth of the country, despite its 1.42 trade multiplier.

It does not mean a protective trade policy, regime, and philosophy. The reflection of ancient and medieval outward trade policy, regime, and philosophy can be found during the regime of the first Rana Prime Minister (PM) Jung Bahadur Rana. Then, Nepal adopted trade openness to foreign products and services in the domestic market (Bista, 2016). In the period from 1960 to 1980, import trade was restricted from tariff and non-tariff barriers (higher tariff, quota, and high subsidy) to protect the domestic industries and to generate revenue resources for development and regular expenditure in the narrow tax base and lower tax elasticity and buoyancy. Its side effect was a macro-economic crisis with a 5% current account deficit, 10.7% budget deficit, and 13% inflation in the 1980s (Bista, 2016).

Nepal had a question of stability and growth. The World Bank and the International Monetary Fund (IMF) had recommended Structural Adjustment Program (SAP) to liberalize

the Nepalese economy. As a result, trade liberalization policy would be executed to some extent. Its full-fledged liberalization was implemented in the 1990s after the effects of SAP II. As a follow-up, SAPTA-SAFTA was signed in 1993 for regionalism.

It was supplemented by the Gujural Doctrine in 1996 with the unilateral preferential concession to neighboring countries in trade. Its reflection in trade policy, regime, and philosophy can be found to date. In recent years, it is a curiosity whether trade liberalization has become counterproductive to the landlocked country Nepal in the growth of trade deficit, trade dependency, and contraction of productivity and production or whether trade leakages gravity in Indo-Nepal trade is an unexpectedly heavy load in such the growth of trade deficit.

Since the lockdown policy as a powerful anti-COVID-19 measure was state induced during the pandemic period to reduce its rapid and wider transmission from individual to the family and then the community, its strictness to shield international border and halting of transportation system affected all economic sectors but trade sector was considered unexpectedly extremely broken (MoF, 2020). By and large, deduction of the external sector in the four sector economies had made all economies closed and isolated undesired, and unplanned for the short run. It was looked like what classical economists mentioned as self-sufficient economies in the ancient and medieval periods. Thus, the trade sector was fully and partially halted in the world.

Nepal has endorsed anti-COVID-19 measures: hard and soft. In hard measure, a strict lockdown measure was executed from March 23 to July 21, 2020, to reduce the inflow of COVID-19 along with human mobility and goods flow. The Indo-Nepal and Sino-Nepal borders and transportation were closed down for two months. Then, the lockdown was internally removed with restrictions but both borders remained closed.

Again, the lockdown was formally announced by the government of Nepal from August 16 to September 7, 2020, when

it found the higher penetration growth per day of COVID-19 in the Kathmandu Valley. On September 7, it was lifted. Some soft measures were enforced, for example, odd-even number system and social distancing for transportation, the opening of cargo of raw materials, essential goods, and capital goods in trade but restricted to the flow of people, closure of schools and colleges with a focus on virtual education and closure of temples and restrictions on public gatherings.

It is argued that the strict lockdowns during the COVID-19 will have severe impacts on trade sectors. There were assumptions as follows: a) the lockdown would stop transportation system within the country and Indo-Nepal and Sino-Nepal trade transit; b) the flow of goods and services in import and export would be stopped; c) the export-import ratio in Indo-Nepal and Sino-Nepal would decline; d) the growth of trade deficit pressure would be unexpectedly lower; f) the capital account would be positive; g) macroeconomic stability would be improved as expected and; h) agriculture productivity and production would be better. Therefore, this study is relevant to test the above assumptions.

The study would examine mainly two issues: whether the impact of COVID-19 pandemic shock and anti-COVID-19 policy measures on the trade of Nepal will be wider and whether the compensatory policy tools to survival stabilize and stimulate the slowdown trade sector will be positive. Its output would be valuable to understand COVID-19, anti-COVID-19 Policy, and trade sector relationship and explore compensatory policy to trade sector. It would be valuable kinds of literature for academicians and policymakers to discourse seriously and sensitively on the trade sector to reshape and remake its exogenous crisis resilience and survival.

Objectives and Methods

Objectives

The paper examines the impact of the COVID-19 pandemic and anti-COVID-19 policy on the trade of Nepal. Its specific objectives are a) to assess the impact of the COVID-19 pandemic on the trade of Nepal, b) to examine the effect of anti-COVID-19 policy measures on the trade of Nepal, and c) to find out the compensatory policy tools to survive, stabilize and stimulate the slowdown trade sector.

Data and Methods

Let us suppose GDP is "Y" and COVID-19 positive cases. Let's assume COVID-19 positive cases and anti-COVID-19 policy makes slow down GDP growth. Let us expand in the regression model as follows:

$Y_{it} = \alpha + \beta X_{it} + \beta_1 D_{it} + \varepsilon$………. (i)
Where, α= intercept, β=coefficient of COVID-19 positive cases (X_{it}), β_1=coefficient of Lockdown and border closure (X_{it}), ε=error term, X_{it}=COVID-19 positive cases, X_{it} = Lockdown and border closure,

Where, α, β, &$\beta1$ are parameters and have $\alpha>1$, $0< \beta_1<1$ and $0< \beta_2<1$.

This paper used secondary data sets of COVID-19. It includes COVID-19 positive cases and lockdown and border closure across the country from March 2020 to September 2020 collected from the website of the World Health Organization (WHO), along with the case of Nepal and South Asia. Its supplementary data sets related to Nepal were accumulated from Nepalese Government

agencies: Ministry of Finance, Nepal Government, and National Planning Commission, Nepal Rashtriya Bank, and Central Bureau of Statistics.

The analytical tool was SPSS to operate simple regression to estimate coefficient.

Figure 1: COVID pandemic in the World
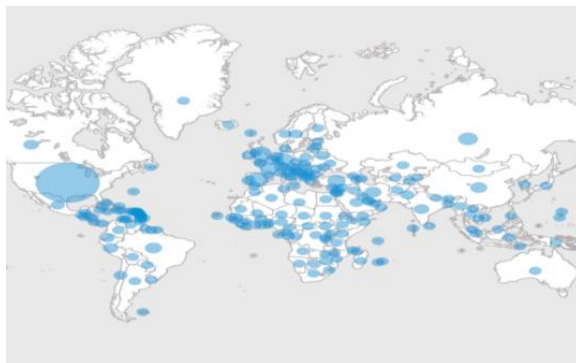
Results and Discussions

Result I: COVID-19 Scenario in the World

Since its outbreak with 44 COVID-19 positive cases in Wuhan City of China on January 9, 2020 (WHO, 2020) with its first report on 31st December 2019 from Wuhan, China (Isaifan, 2020; Dutheil et al., 2020 and Han et al., 2020), till date, it has badly captured more than 210 countries across the world with the result of 5.2 million population positive cases, 0.4 million death and more than 0.2 million recovered (WHO, 2020). Horizontally and vertically, it badly impacted the public health system of the world by disclosing its advanced technology, services supply, and deliveries and its standards, along with insufficient beds, testing kits, and medicines (Huang et al., 2020, Kambalagere, 2020, Sohrabi et al., 2020 and Zhang et al., 2020).

In the United States (US), overwhelming COVID-19 positive cases could not get beds in the hospitals. A large number of patients were waiting for hospital beds and treatments. Similar constraints were found in Italy, Spain, UK, France, Germany, etc. (WHO, 2020). Besides, it has induced humanitarian, cultural, and religious crises. Christian community followed cremating the dead body instead of burial. Social distancing was maintained in funeral ceremonies. In Spain, the over flooding of dead bodies raised a demand for coffin and others. In Guatemala, dead bodies were being left a long week in the street (WHO, 2020). Dead bodies were buried *en masse* in New York. Thus, COVID-19 has been an undesired threat to the health of the population in the world.

Figures 1 & 2 show the higher growth of its density and gravity in developed countries from June 2020 to September 2020. For example, USA, Spain, Italy, France, Germany, and UK in June 2020.

Figure 1: COVID Scenario (June 20)
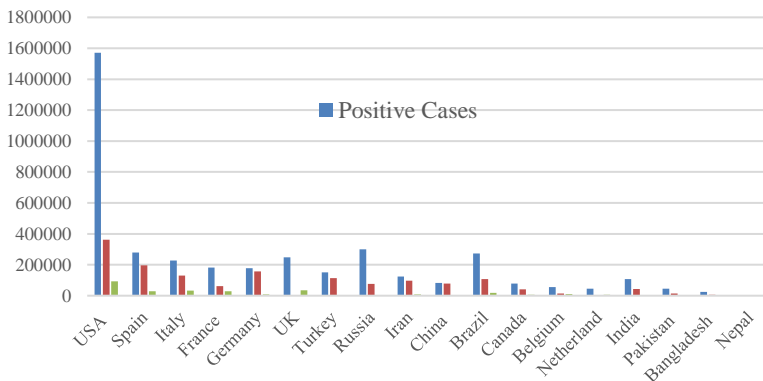
Source: Ministry of Health (MoH, 2020)

Figure 2: COVID Scenario (Sept 30)
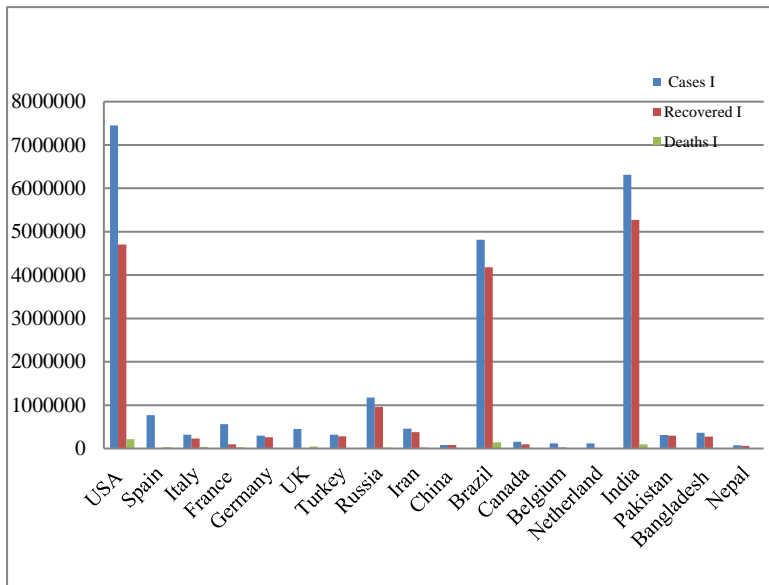
Source: Ministry of Health (MoH), 2020

In September 2020, the US, India and Brazil, Russia, Spain, France, and the United Kingdom (UK) led in the COVID-19 fact sheet. Over time, its growth was faster than our expectations. Therefore, IMF and the World Bank (2020) projected a US$ 3 trillion loss and recession as its cost with the growth of more than 50% unemployed populations and the growth of more than 50% poverty and vulnerability. Further, OXFAM (2020) predicted its distribution of intensity will be more in developing and least developing countries of Africa and Asia (OXFAM, 2020).

COVID-19 in South Asia

WHO (2020) showed the threat of COVID-19 pandemic in South Asia with the second rank of India. Figure 4 shows all countries in the COVID-19 pandemic exposure and vulnerability. However,

India, Pakistan, Bangladesh, Afghanistan, and Nepal were at greater risk but Sri Lanka, Maldives, and Bhutan were in a controlled situation.

Figure 3: COVID-19 Status in SAARC Countries in 2020

Comparison	COVID – 19 in SAARC Countries			
	14 April 2020		29 Aug 2020	
Countries	Infected	Death	Infected	Death
India	10,541	358	3,539,712	63,657
Pakistan	5,716	96	295,372	6,284
Bangladesh	1,012	46	308,925	4,206
Afghanistan	714	23	38,143	1,402
Sri Lanka	218	7	2,995	12
Maldives	20	-	7,578	28
Nepal	16	-	37,340	207
Bhutan	5	-	195	-

Source: SAARC, 2020

As per the effectiveness of anti-COVID-19 measures in SAARC countries, its risk and vulnerability levels were heterogeneous.

COVID-19 in Nepal

Nepal was not free from COVID-19, although the cases were sluggish and negligible from March 23 to July 21, 2020. Figure 5 shows its fast growth from May 25, 2020, when labor migrants started to return from India, China, Saudi Arabia, Malaysia, etc. (WHO, 2020). Then, its trend rocketed with geometric growth. In September 2020, it reached 77817 cases, despite lockdown measures. Thus, Nepal was highly vulnerable.

Figure 4: COVID-19 Status in Nepal in 2020
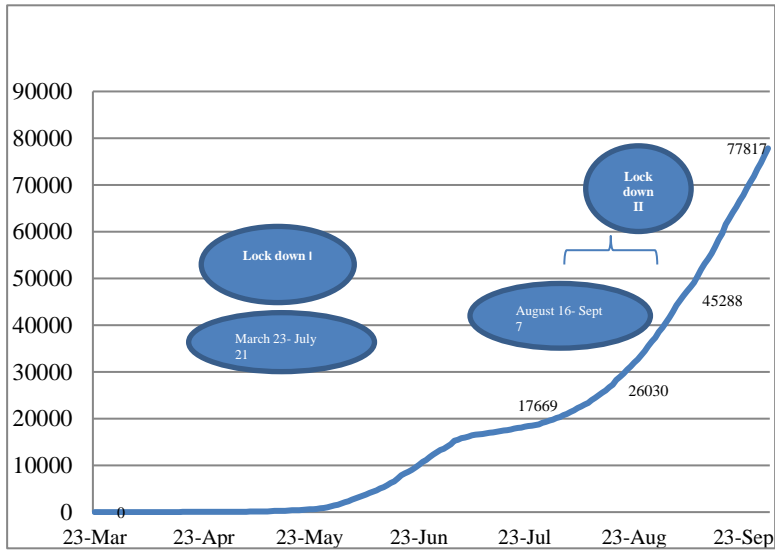
Source: Ministry of Health (MoH), 2020

Figure 5: COVID19: Case, Recovery & Death
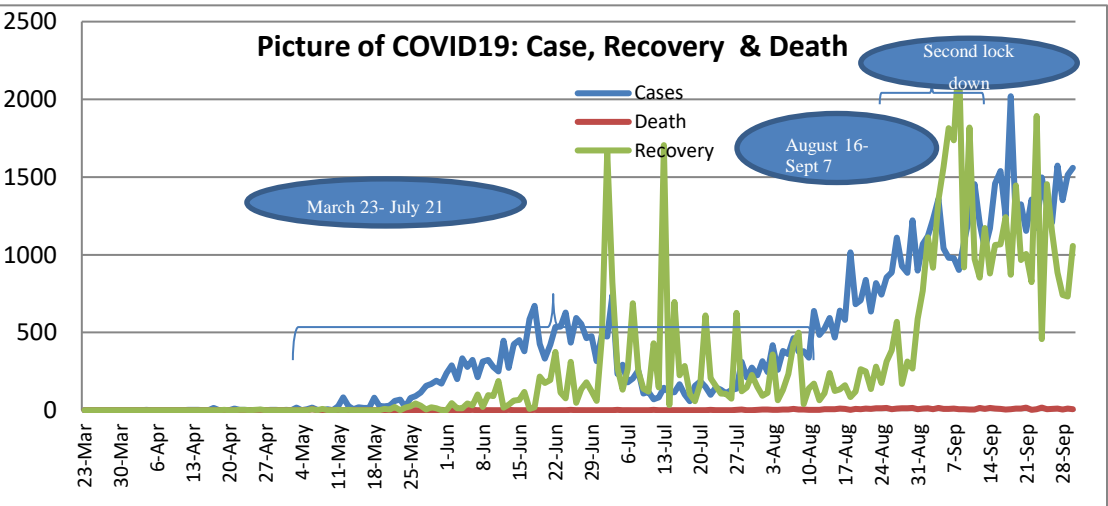
Source: Ministry of Health (MoH), 2020

In this scenario, there were three output indicators: COVID-19 cases, death, and recovery. Figure 6 presents a lower death rate but COVID-19 cases were dominant during lockdowns I and II but an 80% recovery rate provided comfort in the crisis.

Result II: COVID-19 pandemic and Trade

COVID-19 pandemic had direct and indirect effects. Besides, the effects of strict lockdown and border closures as anti-COVID-19 measures were expected, it had negative outcomes at macro and microeconomic level including economic growth, employment, sector output and performance, trade and balance of payment (BOP), fiscal deficit, livelihood, poverty, etc. Figure 7 shows the contraction of transport and communication by -13.25% and then -7.16% contraction of trade in comparison with the pre-COVID-19 scenario (MOF, 2020). It was followed by hotel/restaurant, government service, and industry. Thus, the overall economy was in a slowdown.

Figure 6: Trade Performance in pre and post COVID
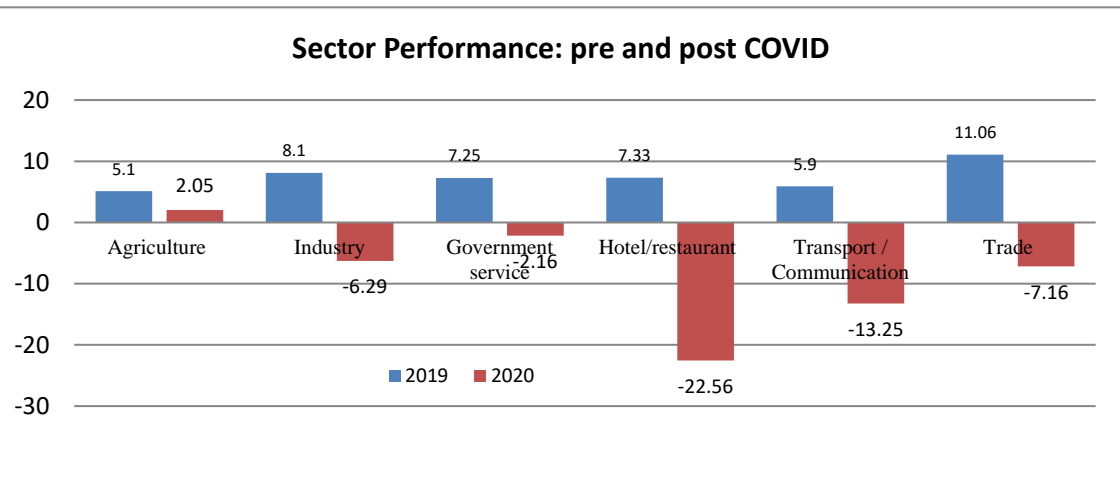
Source: Ministry of Finance (MoF), 2020

Figure 8 shows the huge contraction of import and export trade
with India and China from the pre-COVID-19 scenario. In the pre-
COVID-19, the export and import ratio was 1:14 in Indo-Nepal
trade and 1: 44 in Sino-Nepal trade. After COVID-19, its ratio
sharply fell in both cases of import trade. In Indo-Nepal trade, it
was 1:8.8 (Figure 9). Its implication was the fall of the trade deficit
to Rs. 967.7 billion from Rs. 1161.2 billion.

In Sino-Nepal trade, it felt with Rs. 40 billion, meanwhile
in Indo-Nepal trade, it was Rs. 100 billion. Despite its negative
implications on the sector and aggregate economy, its positive
implication was softer trade deficit pressure to a current account
and capital account and then on the BOP. Similarly, other
SAARC countries, Nepal got a positive BOP leading to improving
macroeconomic stability but having negative economic growth
(Figure 10).

Figure 7: Trade and COVID-19

Source: Ministry of Finance (MoF), 2020
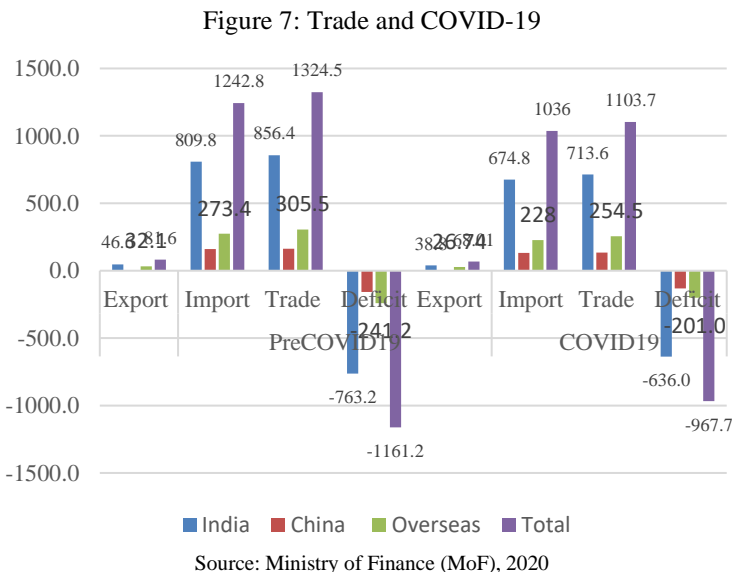
Figure 8: Foreign Trade Balance of Nepal

Foreign Trade Balance of Nepal

In Billion Rs.

	Total Exports	Total Imports	Total Trade	Trade Deficit	Export: Import Ratio
F.Y. 2075/76 (2018/19) Shrawan-Bhadra	14.70	232.35	247.05	217.65	1: 15.8
Share % in Total Trade	6.0	94.0			
F.Y. 2076/77 (2019/20) Shrawan -Bhadra	18.50	229.50	248.00	211.00	1: 12.4
Share % in Total Trade	7.5	92.5			
F.Y. 2077/78 (2020/21) Shrawan- Bhadra	20.44	178.85	199.29	158.41	1: 8.8
Share % in Total Trade	10.3	89.7			
Percentage Change in First Two Month of F.Y. 2076/77 compared to same period of the previous year	25.9	-1.2	0.4	-3.1	
Percentage Change in First Two Month of F.Y. 2077/78 compared to same period of the previous year	10.5	-22.1	-19.6	-24.9	

Source: Ministry of Finance (MoF), 2020

Figure 9: Negative Economic Growth of Nepal

Source: Ministry of Finance (MoF), 2020 and Ministry of Health (MoH), 2020

It can be observed that:

- A big threat was the open border that induced unauthorized and informal Indo-Nepal trade, which was sharply falling during the Indo-Nepal border closures and closures of transportation and communication.

- Black markets and smuggling markets were temporarily closed down but their benefit could not be seen informal trade, custom revenue, and fair market competition.
- Crime rates related to unauthorized and informal trade fell in Indo-Nepal border markets and settlements.

Result III: Impact of anti-COVID-19 measures on Economy and Trade

Table 1 presents descriptive statistics (mean and standard deviation). In column 1, three variables are GDP(Y) as dependent variable and COVID-19 (x) and Lockdown and border closure (D) measures as independent variables. Standard deviations of these variables are so far significant from the mean, except lockdown and border closure.

Table 1

Variable	Mean (Standard Deviation)
GDP (Y)	3.4906E3(175.20)
COVID-19 (x)	98.2727 (101.48)
Lockdown & border closure (D1)	2.9765E2(162.26)

Table 2 presents the results of a simple multiple regression model in which the dependent variable is GDP(Y) and two independent variables are COVID-19(X) and lockdown and border closure (D) having two parameters: β and β_1. In the results of the regression model, parameter (β) explains the marginal change of COVID-19 cases (x) i.e. change in GDP and change in COVID-19 cases ratio. In other words, change COVID-19 explains to change 1 percent of GDP. Similarly, parameter (β_1) explains whether 1% change in GDP will be in a lockdown and border closure or not.

Considering the above results of the econometric model, they provide sufficient evidence on the share of independent variables: COVID-19 (x) and lockdown and border closure (D) in GDP. To minimize the undesired threat of the COVID-19 pandemic and its fast transmission rate, the national economy i.e. real GDP(Y) was directly and indirectly derailed by the COVID-19 pandemic and anti-COVID-19 policy measures.

In the model, the p-value of these two independent variables shows significant and valid. Parameter (β) of COVID-19 shows a negative sign with 0.44 values and parameter (β_1) of lockdown and border closure shows a negative sign of 0.86. In the result of the model, R^2 is 0.99. It explains the dependent variable GDP(Y) by 99% from independent variables: COVID-19 (x) and lockdown and border closure (D).

Table 2

Dependent variable: Average Real GDP(Y)			
Regressor	1	2	3
Constant	3787.3 (4.5)		
COVID-19 (X)		-0.407(0.033)	
Lockdown & Border closure (D)			-0.86(0.021)
Observations	44		
Overall R2	0.99		

Note:
* is <5 percent of P-value.
        Dependent
variable: GDP

The above results show both independent variables: COVID-19 (x) and lockdown and border closure (D) having a negative relationship with GDP. It means COVID-19 having a negative

impact on GDP and anti-COVID-19 policy has also the side effect of contraction shock to GDP by making zero trade openness and zero mobility of goods and services flow. The level of the negative impact of anti-COVID-19 policy: lockdown and border closure are more than COVID-19. It is anti-COVID-19 policy has negatively contributed 0.86% to 1% marginal change of GDP but COVID-19 j has only 0.44% to 1% marginal change of GDP. Therefore, the anti-COVID-19 policy was disastrous to the trade of Nepal.

Result IV: COVID-19 Pandemic, Trade, and Compensatory Policy Measures

In the above empirical results, COVID-19 pandemic and anti-COVID-19 policy were significantly negative to GDP or sector economy of Nepal, particularly trade sector by zero trade openness and zero goods and services flows over 7 months (March to September 2020). ADB (2020), IMF (2020), and World Bank (2020) projected its side effect as a contraction with 3% negative economic growth towards economic recession. During the COVID-19 pandemic, the economy had a big pressure of stabilizing growth and stimulating the threat of GDP loss and contraction. Therefore, the government of Nepal formulated a compensatory policy as follows:

Policy Shock I: Disclosure of Transportation Policy under which emergency and essential goods vehicles and markets were opened up and odd and even number system was made effective to private and public vehicles (MoHA, 2020). Similarly, import and export trade of food and medicine were opened up and human mobility was restrictively permitted.

Policy Shock II: Fiscal and Budgetary Policy were made compensatory in the national budget of Nepal 2020-2021 (MoF, 2020). In the budget, the government proposed the compensatory policy as follows: a) compensating to the poor and marginalized

people in public utility, b) rescheduling tax payment to trade, business, and industries, c) compensating to small and micro enterprises with a tax cut, d) proposal for Stimulus Package to the Business sector: i) allocation of Rs. 6 billion on medicine supply and management, ii) compensation to the poor and marginal people by free electricity to 10 units electricity consumer groups, 25% exemption to up to 150-unit electricity consumer groups, 50% exemption to up to 250-unit electricity consumer groups, free water bill, Rs. 100 billion. fund for tourism sector's rehabilitation and recovery, Rs. 100000 insurance to all health workers, the full exemption to airlines on their rent, exemption of renewal charge to communication and film industry, and Rs. 50 billion funds for new innovative projects and programs, e) tax exemption to comparative advantage able export items, f) expanding integrated custom office in all custom points, g) development and operation of dry ports in Indo-Nepal and China-Nepal border, h) review Indo-Nepal and Nepal-China Trade and Transit Treaty, i) exemption of Income-tax on Small and Micro Enterprises for seven years -75% income tax exemption to less than Rs.2 million investment, 50% income tax exemption to Rs. 2-5 million investment, 25% income tax exemption to Rs. 5-10 million investments, j) removing Value Added Tax (VAT) on microinsurance, k) reducing custom duties on the import of agricultural products, l) 20% income tax exemption to tourism transport, m) custom duties exemption to medicines, including homeopathy medicine and n) 50 % income tax exemption to internet service.

Policy Shock III: Monetary Policy 2020-2021 was disclosed by the Central Bank of Nepal, Nepal Rashtriya Bank (NRB, 2020). The policy carries the compensatory policy as follows: a) compensatory through Rehabilitation, Recovery and Rescheduling Fund, b) rescheduling credit's principal and interest payment, c) refinancing to the vulnerable enterprises and industries through the Fund, d) special interest rate to the

vulnerable enterprises and industries, e) lower interest rate to the small and micro enterprises, f) management to liquidity, g) merging banks and financial institutions, h) establishing Hedging fund, i) 15% credit on priority sector – agriculture, energy, tourism and small and micro enterprise, j) facilitate credit to agricultural projects and small and micro enterprises at 5% interest rate, k) five times refinancing to the available refinancing fund, l) credit at 3% to export-oriented and vulnerable industries and enterprises, m) credit at 5% to small and micro enterprises and n) establishing Rs.50 billion NRs for credit rescheduling and refinancing.

Despite the compensatory policy, there would be issues as follows: a) no execution of above these policies and budget in the lockdown time and uncertainty of recovery, rehabilitation, and stimulus. Therefore, there was a curiosity about whether these policy shocks would be effective.

Conclusion

This paper analyzes the impact of COVID-19, anti-COVID-19 policy, and compensatory policy on the trade of Nepal based on secondary data through descriptive statistics and regression model tools. As a result, COVID-19 infected 44.8 million population and killed 1.2 million people of 215 countries of the world, where its extreme intensity felt in the US and G20 countries and India in South Asia and Brazil in South America. Subsequently, its economic consequence is a loss of 3.4% economic growth rate, worst stock market crash, loss of 400 million full-time jobs, and US$ 3.5 trillion GDP loss (IMF, 2020 & UN, 2020).

Similarly, in SAARC, Nepal ranks fourth jumping at 35th of 215 countries of the World with 0.165 million affected people, 887 death tolls, per day new cases greater than 3000, and recovery rate greater than 74%. Furthermore, the empirical result is the negative impact of COVID-19 and anti-COVID-19 policy on the national economy, particularly trade. Anti-COVID-19 policy's

impact (0.86) is more severe than COVID-19 (0.44) in the economy. Its output is most vulnerable to trade: Indo-Nepal and SinoNepal.

Its outcomes are mixed: negative to sector economy, employment, and economic growth and positive to a trade deficit, trade dependency, and BOP. The compensatory policy is a stable shock to the negative consequence of COVID-19 and anti-COVID-19 policy. Therefore, Nepal is vulnerable to COVID-19, and the trade sector is the most vulnerable. For survival, stable and stimulus of national economy and trade, the compensatory policy should be implemented and anti-COVID-19 policy should be revised.

References

Asian Development Bank .2019. Nepal Outlook 2019. Kathmandu: ADB

Asian Development Bank. 2020. Nepal Outlook 2020. Kathmandu: ADB

Bista, R.B. 2016. Economics of Nepal. Kirtipur: New Hira Books

Dutheil, F., Baker, J.S. and Navel, V., 2020. COVID-19 as a factor influencing air pollution? Environmental Pollution. Barking, Essex: 1987. Available at: https://doi.org/10.1016/j.envpol.2020.114466, Accessed on: March 24, 2020

Han, Y., Lam, J.C., Li, V.O., Guo, P., Zhang, Q., Wang, A., Crowcroft, J., Wang, S., Fu, J., Gilani, Z., and Downey, J., (2020). The Effects of Outdoor Air Pollution Concentrations and Lockdowns on Covid-19 Infections in Wuhan and Other Provincial Capitals in China. Available at: https://doi.org/10.20944/preprints202003.0364.v1, Accessed on: March 24, 2020

Huang, X., Ding, A., Gao, J., Zheng, B., Zhou, D., Qi, X., Tang, R., Ren, C., Nie, W., Chi, X., Wang, J., 2020. Enhanced Secondary Pollution Offset Reduction of Primary Emissions during COVID-19 Lockdown in China. Available at:
https://doi.org/10.31223/osf.io/hvuzy, Accessed on: June 18, 2020

International Monetary Fund. 2020. Economic Impact of COVID19 Outbreak on the Global Economy, IMF Brief April, Washington

International Monetary Fund. 2020. World Outlook 2020. Washington.

Isaifan, R.J. 2020. The dramatic impact of Coronavirus outbreak on air quality: has it saved as much as it has killed so far? Global Journal of Environmental Science and Management 6 (3), 275–288. Available at: https://doi.org/10.22034/GJESM.2020.03.01, Accessed on: March 26, 2020

Ministry of Finance. 2020. Budget of Nepal, 2020-2021, Kathmandu: MoF
Ministry of Finance. 2020. Economic Survey 2020, Kathmandu: MoF
Ministry of Home Affairs. 2020. Fact Sheet. Kathmandu: MoHA
Ministry of Industry and Trade. 1996. Trade Policy 1996. Kathmandu: MoIT
Ministry of Industry and Trade. 2009. Trade Policy 2009. Kathmandu: MoIT
National Planning Commission. 2019. National Five Years Plan. Kathmandu: NPC
Nepal Rastriya Bank. 2020. Monetary Policy, 2020-2021, Kathmandu: NRB
OXFAM. 2020. Employment and Poverty Outlook. Washington: OXFAM
United Nations. 2020. Policy Brief: The Impact of COVID-19 on the Asian Economy Washington: UN
World Bank. 2019. Nepal Outlook 2019. Kathmandu: WB
World Bank. 2020. Nepal Outlook 2020. Kathmandu: WB
World Health Organization. 2020. Fact Sheets of COVID19. Switzerland: WHO

Malnutrition and Inequality among the Vulnerable Social Groups:
A Study of Two Villages

Gummadi Sridevi[1], Amalendu Jyotishi[2], Dontha Prashanth[3]

Abstract

This paper examines malnutrition issues among the socially vulnerable group through the study of two villages in Andhra Pradesh and Telangana. By juxtaposing incidences of malnutrition along with other important parameters of inequality, namely, income, access to land and credit, we identify the genesis of malnutrition is strongly visible in economic inequality and reflects prominently among the Scheduled Castes who are among the most vulnerable social groups. By conducting a census like survey in these two villages, we find that malnutrition issues are strongly intertwined in economic and social classes. Therefore, delineating issues of economic access and social marginalization would not result in effectively addressing malnutrition issues.

Keywords: Malnutrition, Social Vulnerability, Economic Inequality, Poverty

[1]Associate Professor, School of Economics, University of Hyderabad, Hyderabad India. E-mail: gummadi645@gmail.com
[2] Professor, School of Development, Azim Premji University, Bangalore, India.
[3] Research Scholar, School of Economics, University of Hyderabad, Hyderabad, India.

Introduction

In India, high incidence of poverty and disparity in access to nutritious food are found among particular socio-religious and gender groups. Both in rural and urban areas, poverty and malnutrition rates are high and urban areas are among the new epicenters of poverty and hunger. While food production and the market are critical dimensions generally well discussed in literature, there is little knowledge on how food reaches the plate. The knowledge base is further inadequate in terms of various pathways, negotiations, choices and cultures influencing who eats what and why.

What are the constraints in availing and accessing nutritious food? What role do the state and other institutions play in addressing undernutrition? Economic access to food depends on the purchasing power of the household, which in turn depends on the regular employment, access to land, prices of food grains and food distribution. Mere availability of food grains will have little relevance if people do not possess purchasing power to procure them for their consumption. Though there are several studies available at global, macro and meso levels, literature is scanty at household level in-depth analysis on marginalized groups.

Several questions emerge including, what characterizes the social vulnerability of various social groups and its impact on nutritional security of the households. Similarly, although studies have documented various adaptation options of households, very few studies have looked into the factors at household levels that drive the decision to undertake a particular adaptation strategy during the food insecurity situation. This study is an attempt to fill the gaps by examining the social vulnerability, nutritional security, and adaptation among the marginalized households in Andhra Pradesh and Telangana.

Context

India produced 291.95 MT (metric tonnes) of food grains in 2019-20 yet 69% of deaths of children under the age of five have been attributed to malnutrition by UNICEF in state of the world's children report (UNICEF study has found that 8.8 lakh children in India below the age of five died prematurely in 2018. Of those, 69% died of malnutrition). Nearly 690 million people are undernourished, 144 million children suffer from stunting- which is a sign of chronic undernutrition. 47 million children suffer from wasting, a sign of acute undernutrition in 2018, 5.3 million children died before their fifth birthdays, in many cases as a result of undernutrition (GHI, 2020).

India, one of the bottommost countries, is ranked 102nd among 117 countries according to the Global Hunger Index, 2019. In 2020 Global Hunger Index, India ranks 94th out of the 107 countries with a score of 27.2, India has a level of hunger that is serious. NITI Aayog released report during June 2021 highlighting the fact that 11 states, including the most populous ones, scored less than 50 out of 100 in reaching zero hunger. Andhra Pradesh and Telangana scored less than 50 out of 100 in reaching Zero Hunger, but interestingly in overall performance of the state Andhra Pradesh is in third position. The pandemic has threatened India's food security landscape across all four indicators: availability, access, stability, and utilization. It could in turn further intensify the existing problem of malnutrition among women and children.

According to NFHS-4 more than 35% of Indian children under five are underweight, over 38% are stunted, and more than half of all children are anaemic. Given the magnitude of the problem, there is a need to understand the food value chain, especially at the point of consumption and assess its availability, accessibility, utilization and stability [the four critical dimensions of food and nutrition security (FNS)].

The main emphasis of the SDG is to reduce malnutrition and provide food security to all (Goal 2 by 2030, Zero Hunger and all forms of malnutrition). 40% of children in Telangana and Andhra Pradesh are malnourished majority belongs to vulnerable groups. Among these groups, the prevalence of stunting is highest amongst children from STs (41%), followed by SCs (35.2%) and OBCs (31.6%). Women whose Body Mass Index (BMI) is below normal (<18.5 kg/m^2) is highest among ST (21.1) followed by OBC (16.1) and SC (15.0) anaemia among children in the age group of 6-59 months across social groups is very high based on NFHS-5 for Andhra Pradesh. For Telangana state these percentages are high though NFHS-5 data is not yet available for the state.

Apart from indirect interventions, there is a need to directly focus on nutritional deficiencies and address them in timely manner. A paradigm shift from caloric consumption to consumption of micronutrient and protein-rich food as well as the four pillars namely availability, accessibility, utilization and stability through direct and indirect modes of targeting are crucial. While indirect means would include understanding bottlenecks and improving the production and value chain processes of nutrition-rich food products, the direct method would involve provisioning of adequate nutritious food to malnourished groups.

Undernourishment and related health issues have been one of the dreaded realities of India. Across the states the picture varies according to the intensity of poverty, literacy, low density of health infrastructure and state support policies. Table: 1 shows the rank correlation coefficient of nutritional indicators among states between NFHS- 3 and NFHS-4. All values of rank correlation coefficients are high and positive, implying that there is not much change in the relative status of states on child nutritional outcome over the period.

As compared to wasting, the rank correlation coefficient of stunting and underweight are very high and positive. The states

that witnessed a high percentage of stunting and underweight children during NFHS-3 period could not make any dent even during the NFHS-4. Despite overall progress in stunting, wasting and underweight in the country, the relative status of states remains the same.

Table: 1 Rank Correlation Coefficient of Nutritional Indicators

Nutritional indicators	Rank correlation coefficient between NFHS-3 and NFHS-4
Stunting	0.888**
Wasting	0.616**
Underweight	0.911**
Notes:	
**Correlation is significant at the 0.01 level (2-tailed)	
*Correlation is significant at the 0.05 level (2-tailed)	

Source: Calculated from NFHS 3 and 4

Figure 1: Nutritional Status of Children under age 5 (NFHS 4 & 5): Stunted
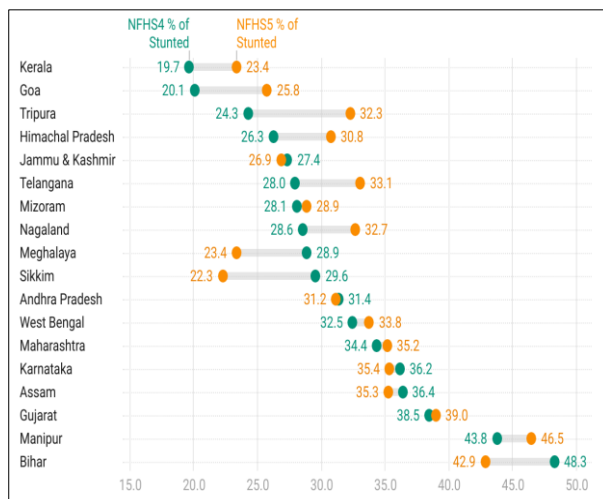
Chart: Gummadi Sridevi; Source: NFHS; Created with data wrapper

Figure 2: Nutritional Status of Children under 5 (NFHS 4 & 5): Underweight
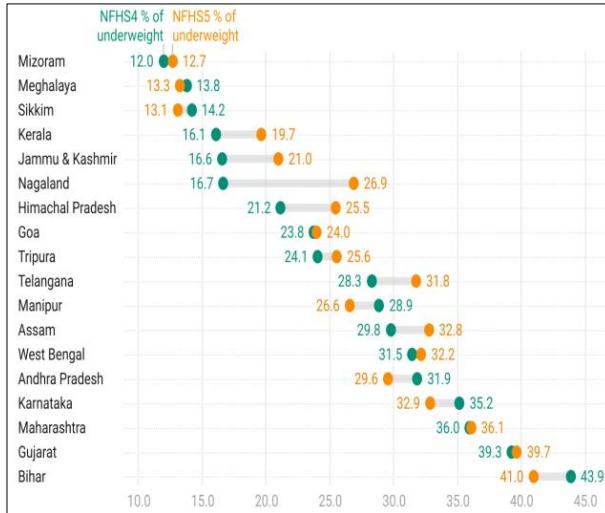
Chart: Gummadi Sridevi; Source: NFHS; Created with data wrapper

Figure 3: Nutritional Status of Children under 5 (NFHS 4 & 5): Wasted
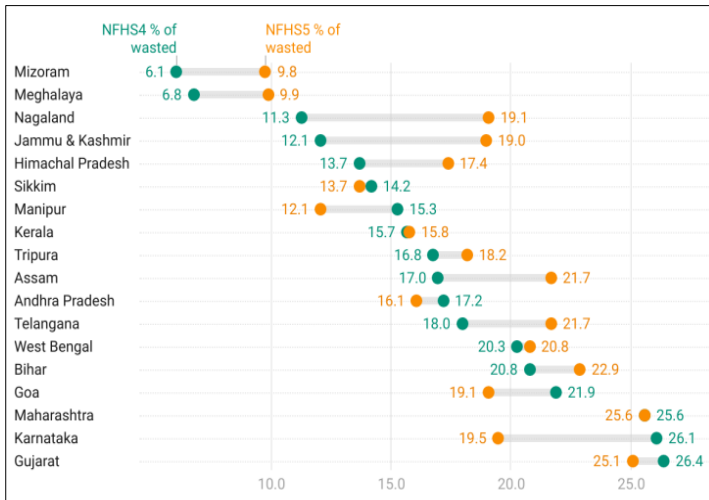
Chart: Gummadi Sridevi; Source: NFHS; Created with data wrapper

NFHS 5 fact sheets for 22 states/Union Territories (UT) shows, chronic undernutrition has increased in 13 states/UTs, whereas, underweight has increased in 16 states/UTs despite ambitious state support programs like *Poshan Abhiyaan*, malnutrition is still high.

Table: 2 Grouping of States Based on Stunting

	NFHS-5 (2019-20)	CNNS (2019)	NFHS-4 (2015-16)	NFHS-3 (2005-06)	NFHS-2 (1998-99)
Low nutritional insecurity	Mizoram, Kerala, J&K, Himachal Pradesh	Mizoram, Kerala, J&K, Himachal Pradesh, Punjab, Tamil Nadu, Telangana	Mizoram, Kerala, J&K Himachal Pradesh, Punjab, Tamil Nadu, Telangana	Kerala, Tamil Nadu	Kerala, Tamil Nadu
Medium nutritional insecurity	Andhra Pradesh, West Bengal, Telangana, Karnataka, Maharashtra, Gujarat	Andhra Pradesh, West Bengal, Uttarakhand, Haryana, Odisha, Maharashtra, Karnataka, Chhattisgarh, Gujarat, Rajasthan	Andhra Pradesh, West Bengal, Uttarakhand, Haryana, Odisha, Maharashtra Karnataka, Chhattisgarh, Gujarat, Rajasthan	J&K, Punjab, HP, Mizoram	Mizoram, Karnataka, Andhra Pradesh, J&K, Punjab, Maharashtra
High nutritional insecurity	Bihar	Madhya Pradesh, Jharkhand, Uttar Pradesh, Bihar	Madhya Pradesh, Jharkhand, Uttar Pradesh, Bihar	Andhra Pradesh, Rajasthan, Karnataka Uttarakhand, West Bengal, Odisha, Haryana, Maharashtra, Jharkhand, Madhya Pradesh, Gujarat, Chhattisgarh, Bihar, UP	HP, West Bengal, Gujarat, Odisha, Haryana, Madhya Pradesh, Rajasthan, Bihar, Uttar Pradesh

Source: Calculated from NFHS Reports (Various rounds), CNNS 2019.

Acute malnutrition is a complex socio-cultural problem that lies at the interplay of inequitable access to nutritious foods and health services, sub-optimal 'infant and young child-feeding practices' (IYCF) including breastfeeding, low maternal education, poor access to clean water and sanitation, poor hygiene practices, food insecurity and unpreparedness for emergencies.

The various rounds of NFHS provide the major source of macro-level statistics on nutritional status of children under five in India. Often, aggregate results may be misleading as the severity of malnutrition at the disaggregated level may be masked by the average and may fail to capture the real cause of the problem at the micro-level. Within a state, there are inter-district disparities in nutritional outcomes and the health and nutritional status of vulnerable communities are precarious. Most of the studies at micro-level focused on the high burden malnutrition states in India. Hence, it has not attracted much interest of researchers to analyze the nutritional status of children in Andhra Pradesh and Telangana at Anganwadi and household level. In this context, studying the incidents of malnutrition among vulnerable social groups in a micro context becomes more relevant.

Methods

Primary data was collected from one village each from Telangana and Andhra Pradesh. The villages were identified on the basis of two characteristics: 1) Consisting highest proportion of Scheduled Caste (SC) population, 2) Population engaged in agriculture. In the state of Telangana, district of Karimnagar is identified as a district with highest SC population. Within Karimnagar, Kataram Mandal has been ranked highest in terms of having higher proportion of SC population constituting 33.85% of the total population.

Within Kataram Mandal, Odipilavancha village panchayat is ranked highest with SC constituting 53.12% of the

total population. The village has a majority of its population dependent on agriculture, with paddy and cotton being the principal crops.

In the state of Andhra Pradesh, district of Prakasam is identified as a district with highest proportion of SC population. In Prakasam District, Tangutur Mandal has the highest proportion of SC with 37.8% to the total population. In Tangutur Mandal, Velagapoodi village panchayat consisted highest proportion of SC population of 64.71% of total population constituting Velagapoodi Village had dismal amount of agriculture dependence, on the contrary most of the area was operated under sericulture. Hence, a next village Karumanchi ranking second in terms of proportion of SC to the total population was chosen, with a majority of population engaged in cultivation of paddy, Bengalgram and tobacco.

Table 3: Characteristics of the case study villages

Village	No. of HHs	Population	SC (HHs)	ST (HHs)	OBC (HHs)	Other (HHs)	Agricultural activity
Karumanchi (Andhra Pradesh)	746*	1048	402 (53.89)	38 (5.09)	163 (21.85)	143 (19.17)	Bengal Gram, Tobacco, Paddy
Odipilavancha (Telangana)	370**	1472	215 (58.11)	32 (8.61)	82 (22.2)	41 (11.1)	Paddy and cotton

Notes:
*Total Number of Households according to Census 2011 is1048.But at the time of our survey 746 households were present and the reaming households migrated to nearby towns. ** Similarly, total Households according to Census 2011 is 408. However, at the time of the survey 370 households were present in the village.

To assess the nutritional and health outcome of women and children, direct methods of nutritional assessment, namely anthropometric and dietary evaluation methods, were used. Inputs

on weight, height and age of children are used to compute anthropometric failures among children in the study area, using WHO child growth standards. The nutritional status of women is gauged, based on BMI.

Access to Food and Incidents of Malnutrition at Household Level in the two villages

Although households are often the primary income recipients and are always the units for which we observe consumption, there exists indifference in the allocation to individual members in the household. To examine the question whether and to what extent allocation within the household differ according to the gender and social groups, we investigated the access to food and nutrition at household level.

Two types of measures have been used to quantify the food distribution within a household:

- Food intake by individuals converted into nutrients.
- Height, weight and age measures for anthropometric indices.

The consumption of rice and other cereals by the households during the reference period (7 days preceding the date of the survey) is considered for the analysis. All the households consume rice, vegetables edible oil in all the seasons. Both quality and quantity of rice consumed differed across levels of living of the households.

In order to obtain a variation across different classes we have taken consumption of cereals across different land holding groups for the analysis. The poor households not possessing white card/food security card are the worst affected during the slack seasons. By the land ownership holding, consumption of cereals is lowest among the less than one-acre class and highest among the households having more than 10 acres of land (Table4). This

clearly shows that any change in income across the board will not change the relative consumption of food by the poor households.

Table 4: Per capita monthly consumption of cereals by different types of land holding households in both the villages (in kilogram (kg))

Land size (acres)	Odipilavancha			Karumanchi		
	APL	BPL	NPC	APL	BPL	NPC
Up to 1	18.1	15.1	12.9	19.1	14.4	14.7
1 to 2.5	19.1	15.6	16.3	18.2	1.6	11.8
2.5 to 5	20.3	18.6	16.9	21.0	17.8	16.9
5 to 10	21.8	NA	NA	22.3	NA	NA
> 10	22.5	NA	NA	24.7	NA	NA
Total	20.2	16.7	15.8	21.8	17.1	15.6

Note:
APL – Above Poverty Line, BPL – Below Poverty Line, NPC – Not Possessing Card, NA – Not Applicable

Source: Field survey, 2018

Table 5: Percent of households getting enough food every day in Karumanchi and Odipilavancha (in %)

Social group	Throughout the year	Only some months of the year	Infrequently
Karumanchi			
SCs	*60*	*22*	*18*
ST	*45*	*40*	*15*
OBC	*80*	*15*	*5*
Others	*92*	*6*	*2*
Total	*65*	*25*	*10*
Odipilavancha			
SC	*55*	*30*	*15*
ST	*48*	*42*	*10*
OBC	*84*	*14*	*2*
Others	*90*	*8*	*2*
Total	*60*	*27*	*13*

Source: Field survey, 2018

Frequency of meals per day is taken as an indicator of food insecurity at household level. Table18 shows the food availability

status for each social group. Only 60% of SC and 45% of ST groups said that they are getting enough food throughout the year in Karumanchi.

During our fieldwork a common response from the respondents from poor group was that "when we have, we eat, when we don't have, we don't eat". This reveals a very simple adjustment process indeed. It substantiates our hypothesis that female-headed households have more food insecurity problem compared to male-headed households. Within the households, female members generally go hungry when the available quantity of food is inadequate. This adequately underscores the fact that food insecurity is sharper in the context of gender.

The calorie intake for a sample household was derived by converting the quantities of food items consumed by the individuals into equivalent amounts of calories by using standard conversion factors (NSSO, 26th round). We have used the 2,000 calories per consumer unit per day, as a standard against which actual observed calorie intakes are compared and that of fat and protein is 27.61 grams (gm) and 48.17 gm. Calorie intake is different across the social groups and between the two villages, due to their food habits, income and access to Public Distribution System (PDS).

Most of the poverty studies in India are based on nutritional adequacy, but what does an average 'nutritional adequacy' really mean has been a debatable issue. Sukhatme (1980) argued that there is a range of dietary intake that may be considered adequate among adults depending on activity levels, climate, etc. Calorie intake is low among the SC and ST households in both the villages that reflect the food insecurity at household level.

While per-capita calorie intake reflects current consumption, the question of quantity does not address many other elements of the complicated notion of "food security," such as quality and micronutrient sufficiency, vulnerability, and trends

in consumption over time. Generally, female members of household do not have control on food budget and therefore, they come at the end of the queue to receive low calorie diets. By control, here we mean decisions about food budget in food distribution. Control can be exercised over material stocks, and over their preparation of food within the household from the raw material stage to that of ready for consumption product.

Table 6: Calorie Protein and Fat intake at household level per day in Karumanchi and Odipilavancha

Social group	Karumanchi			Odipilavancha		
	Calories (Kcal)	Protein (gm)	Fat (gm)	Calories (Kcal	Protein (gm)	Fat (gm)
SC	1890.1	42.2	23.8	1730	40.2	22.8
ST	1710.6	32.8	20.4	1700.6	34.8	21.4
OBC	2103.4	48.0	28.3	2150.4	49.0	29.3
Others	2175.1	57.8	29.8	2260.1	49.8	29.8

Source: Field survey, 2018

In the selected villages, the male heads of household enjoyed sole control of market decisions relating to domestic food in nearly 78% of the cases, and jointly with the wife in another 22%. There was no significant association between female participation in labour market, their earnings, and the control over food expenditure and purchase decisions. At the same time there was an association between the gender of food controller and their social group. When we looked into the order in which the family avails food consumption, male member or head of the household is given the first priority. In all the social groups adult male is given the first priority (85%), women eat last, by choice, so that male members of the households get sufficient food, and nearly 50% of the female members among all the social groups eat the leftover food.

It is also argued that food energy intake is a poor measure of nutritional status for the reason that it not only depends on

nutrient intake but on non-nutrition food attributes, privately and publicly provided inputs and health status also influence malnutrition (Radhakrishna et al., 2004). Another way of looking at the intra-household differences in consumption of food and across social groups is to analyze food security with the help of anthropometric measures.

Nutritional status of individuals is assessed by means of the BMI. It is computed by using the weight and height of the individual (BMI= weight/height^2). A BMI value less than 16 is an indication of severe malnutrition and a BMI less than 18.5 and more than 16 reflects moderate malnutrition. For the children below 5 years we have used two measures i.e., low weight-for-height which reflects wasting and low height-for-age reflects the stunting (chronic undernutrition). From Table 7 it is clear that majority of the SC and ST households suffer with malnutrition in both the villages.

Table 7: Nutritional status in Karumanchi and Odipilavancha (in percent %)

Karumanchi Nutritional statuses in terms of BMI	SC		ST		OBC		Others	
	F	M	F	M	F	M	F	M
Undernourishment (<16)	60.0	33.3	64.0	56.0	37.1	20.4	26.0	15.9
Normal (18.5- 22.9)	40.0	66.7	36.0	44.0	62.9	80.8	74.0	84.1
Odipilavancha								
Undernourishment (<16)	62.1	39.2	68.8	57.8	28.0	21.5	22.2	20.0
Normal (18.5- 22.9)	37.9	60.8	31.2	42.2	72	78.5	77.8	80.0

Source: Field survey, 2018.

Table 8: Nutritional status of children below 5years in Karumanchi and Odipilavancha (in percent %)

	Stunting	Wasting
Karumanchi	*22.8*	*16.9*
Odipilavancha	*24.3*	*19.3*

Source: Field survey, 2018.

Inequality as an underlying factor for food insecurity

Access to Land and Inequality across Social Groups

Land is often recognized as a tool of socio-economic empowerment. Access to land is one of the important indicators of better living standards in rural areas and an important indicator of food security.

Land Distribution and Ownership in Odipilavancha:

Table 9: Size and Class-wise Distribution of Household Ownership among Various Social Groups at Odipilavancha

NSSO Classification		In acres (approx.)	SC	ST	OBC	Others
0	Landless	0	92	12	28	3
0.001-0.004	Near Landless	0.002 - 0.009	0	0	0	0
0.005-0.40	Marginal	0.012-0.99	21	6	9	0
0.41-1.00	Small	1.01-2.47	60	8	18	4
1.01-2.00	Semi-Medium	2.5 - 4.94	25	3	16	10
2.01-4.00	Medium	5.00 - 9.88	14	3	8	13
4.01 & Above	Large	9.9 - and above	3	0	3	11
Total	All	All sizes	215	32	82	41

Source: Field survey, 2018.

Land ownership and distribution amongst various social groups at Odipilavancha reveals a skewed distribution of land with land concentration amongst fewer social groups, and dispossession

being attributed to a vast majority. The feature of landlessness is exhibited more amongst SC, followed by Other Backward Classes (OBCs) and then followed by Scheduled Tribes (ST), the last being Others which includes dominant caste households. Tables 9 and 10 provide the details of access to land and ownership by social groups in Odipilavancha village.

Table 10: Size and Class Wise Distribution of Land Ownership among Various Social Groups at Odipilavancha

NSSO Classification		In acres (approx.)	SC	ST	OBC	Other
0	Landless	0	0	0	0	0
0.001-0.004	Near Landless	0.002 - 0.009	0	0	0	0
0.005-0.40	Marginal	0.012-0.99	8.03	1.68	4.6	0
0.41-1.00	Small	1.01-2.47	84	11.6	29.5	5.5
1.01-2.00	Semi-Medium	2.5 - 4.94	81.3	9.5	59	32.5
2.01-4.00	Medium	5.00 - 9.88	87.05	19.25	49.5	96
4.01 & Above	Large	9.9 - and above	31	0	40	141
Total			291.38	42.03	182.6	275

Source: Field survey, 2018.

An elaborate account of skewed distribution can be observed by comparing the ownership of land by various social groups with their proportion of households amongst total households. The unequal distribution of land amongst various social groups is best analyzed through a comparative assessment of SC vis-à-vis other castes in Table 11. The striking gap in ownership of land amongst social groups explains the persisting inequality and skewed distribution of land amongst various social groups at Odipilavancha.

Inequality in distribution of ownership of land amongst various social groups at Odipilavancha has been mapped in the figure through Lorenz distribution. It is observed that SC and ST are the groups which are far distanced from the Line of Equality/

Line of Equal distribution, followed by OBCs and Other castes. Gini Coefficients were calculated to estimate quantum of inequality, the figures reveal that there is a greater amount of inequality in the case of SC, ST and OBCs as compared with other castes as shown in Figure 2.

Table 11: Land and Household Proportion of various households among various social groups at Odipilavancha

	SC	ST	OBC	Others	All
Proportion of Households	*58.1*	*8.6*	*22.1*	*11.0*	*100.0*
Proportion of ownership of Land	*36.8*	*5.3*	*23.0*	*34.7*	*100.0*
Average Size of Land Owned	1.36	1.31	2.23	6.71	2.14

Source: Field survey, 2018.

Figure 2: Lorenz Distribution of Land ownership amongst various social groups at Odipilavancha
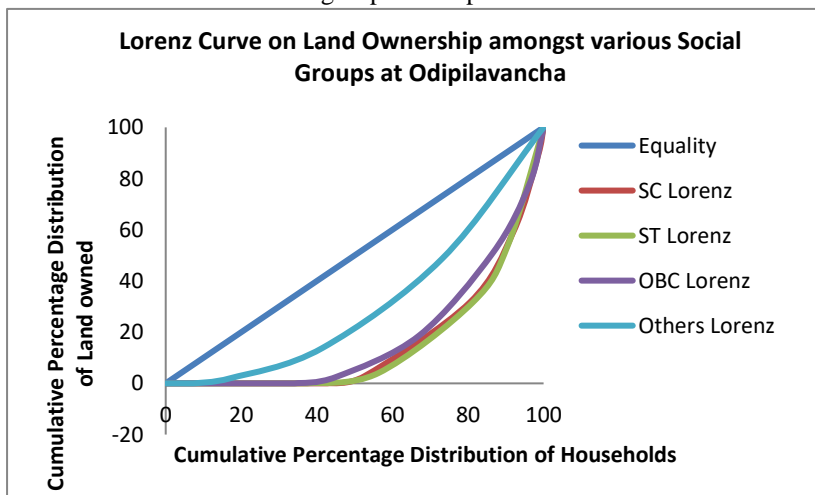
Gini-Coefficient values for SC-0.672234, ST-0.678526, OBC-0.623701, others-0.362129 and ALL-0.66493.

Land Distribution and Ownership in Karumanchi:

In the village of Karumanchi, ownership of land presents a large-scale inequality in distribution of ownership of land among various social groups. There is absolute inequality in terms of land ownership for ST, while relative inequality is observed in the case of SC and OBCs as compared with other castes. The unequal distribution of ownership of land can be understood by looking at comparative analysis of proportion of households and ownership of land as given in Tables 12 and 13.

Table 12: Size and Class wise distribution of household ownership among Various Social Groups at Karumanchi

NSSO Classification		In acres (approx.)	SC	ST	OBC	Others
0	Landless	0	343	38	127	45
0.001-0.004	Near Landless	0.002 - 0.009	0	0	0	0
0.005-0.40	Marginal	0.012-0.99	3	0	1	1
0.41-1.00	Small	1.01-2.47	24	0	16	5
1.01-2.00	Semi-Medium	2.5 - 4.94	23	0	6	25
2.01-4.00	Medium	5.00 - 9.88	4	0	8	17
4.01 & Above	Large	9.9- and above	5	0	5	46
Total			402	38	163	139
N.R. (not responded)						4

Source: Field survey, 2018.

Table 13: Size and Class Wise Distribution of Land Ownership among
Various Social Groups at Karumanchi

NSSO Classification		In acres (approx.)	SC	ST	OBC	Other
0	Landless	0	0	0	0	0
0.001-0.004	Near Landless	0.002 - 0.009	0	0	0	0
0.005-0.40	Marginal	0.012-0.99	1.5	0	0.6	0.5
0.41-1.00	Small	1.01-2.47	40	0	26	6.75
1.01-2.00	Semi-Medium	2.5 - 4.94	79	0	19	91.65
2.01-4.00	Medium	5.00 - 9.88	30	0	47	103.7
4.01 & Above	Large	9.9 - and above	75	0	68	1019
Total			225.5	0	160.6	1221.6

Source: Field survey, 2018.

The unequal distribution in terms of ownership of land is mapped in Lorenz curve in Table 14 and Figure 3, the Lorenz curve for ST reveals 100% inequality, while the Lorenz distribution for SC is far away from line of equi-distribution. OBCs and Other castes is comparatively nearer to the line of equi-distribution. The Gini-Coefficient presents the scale of inequality clearly in table 14.

Table 14: Household and Land Ownership among various Social
Groups at Karumanchi

Social Category	No.of Households	Proportion of Households	Area Owned (in acres)	Proportion of Area Owned	Average Area Owned Per Household
SC	402	54.1	225.5	14.0	0.56
ST	38	5.1	0	0	0
OBC	163	21.9	160.6	9.9	0.98
Others	139	18.7	1221.6	75.9	8.79
All	742	100.0	1607.7	100.0	2.17

Source: Field survey, 2018.

From the above analysis it is very clear that most of the marginalized farmers hold less than two acres of land in Odipilavancha and less than one acre in Karumanchi. There exits high inequality among the various social group farmers in terms of access to land in Karumanchi compared to Odipilavancha.Basic crops cultivated at Karumanchi are Bengal gram, and tobacco, while paddy and cotton are cultivated in Odipilavancha.

Figure 3: Lorenz Distribution of Land ownership among various social groups at Karumanchi
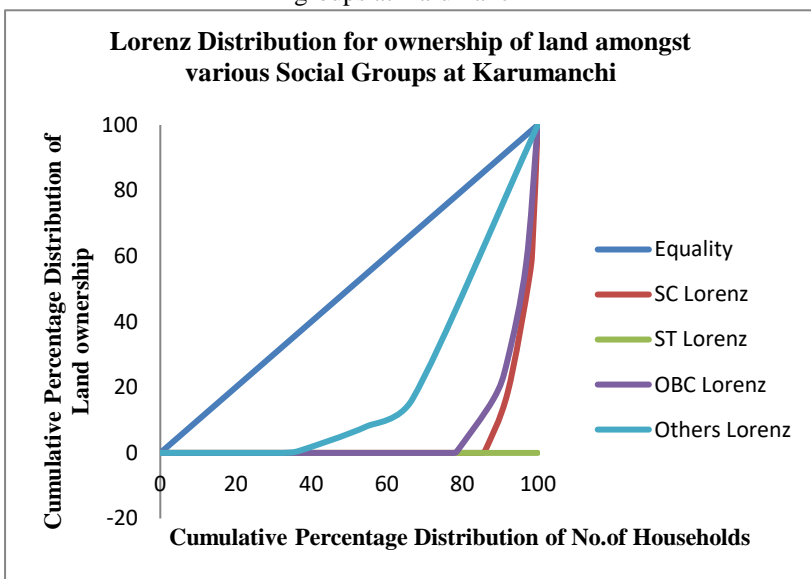
Gini coefficients of respective social groups are SC-0.914767, ST-1(Owing to absolute inequality the Gini-Coefficient for ST stands at 1) OBC-0.876208, others-0.568135 and All-0.86797 (Field survey, 2018).

Till the 1980's paddy was the most dominant crop in both villages, but now Tobacco, Bengal gram dominate the cropping patterns at Karumanchi, a shifting pattern to cotton observed at Odipilavancha. The farmers refer to the fact that the returns on paddy were not so attractive, whereas Tobacco, Bengal gram and cotton has more demand in the nearby markets. In addition to this,

the water sources are also not sufficient for paddy cultivation. The change in the cropping system and climate affected the agricultural labour households by reducing the employment and the number of working days. The major source of income in both the villages is from agriculture cultivation 60.71% in Odipilavancha and 71.76%in Karumanchi.

Expenditure pattern across Social Groups

SC and ST households spend around 39% and 46%respectivelyon food in the total income, while non-food expenditure (including health and education expenditure) is around 60.73%of total expenditure in Odipilavancha. More non-food expenditure implies that OBC and Others are spending more on education. This result tallies with our macro data (NSSO -MPCE) at State level, which implies that the gap in terms of mean consumption expenditure between the SC and ST social groups and the others are increasing over a period of time, which indicates increasing economic inequalities across social groups and differences in access to education.

It is very clear from the data and field observation that most of the SC and ST social group children go to government schools or they work as child labour, where as other social group children mostly go to private schools, and hence their expenditure on education is high. There exists a large income gap between various social groups in both the villages. In this context, it is interesting to see the access to credit by various social groups. Access to credit at affordable cost positively affects the productivity, asset formation, income and food security of the rural poor. The major concern of the government is to bring all the rural households within the banking fold and promote complete financial inclusion.

Table 15: Consumption Expenditure among various Social Groups at
Odipilavancha (in percent %)

Social Group	SC	ST	OBC	Others	Total
Food Expenditure	*39.28*	*46.23*	*40.92*	*34.97*	*39.50*
Education Expenditure	*6.52*	*6.08*	*13.09*	*16.36*	*10.19*
Health Expenditure	*17.24*	*14.77*	*12.72*	*14.04*	*15.16*
Non-Food Expenditure*	*36.97*	*32.92*	*33.27*	*34.63*	*35.15*
Total Expenditure	*100.00*	*100.00*	*100.00*	*100.00*	*100.00*
Total number of households	198	32	81	40	351
	(56.41)	*(9.12)*	*(23.08)*	*(11.39)*	*(100)*

Note:
*Tobacco, intoxicants fuel, light, clothing, bedding, footwear, and rent to the house

Source: Field survey, 2017, and 2018.

Table 16: Consumption Expenditure among various Social Groups at
Karumanchi (in percent %)

Social Group	SC	ST	OBC	Others	Total
Total Food Expenditure	*50.57*	*54.42*	*48.49*	*33.28*	*45.66*
Education Expenditure	*8.48*	*1.00*	*8.69*	*26.02*	*12.93*
Health Expenditure	*10.34*	*17.22*	*12.38*	*13.15*	*11.78*
Non-Food Expenditure	*30.61*	*27.36*	*30.44*	*27.55*	*29.63*
Total Expenditure	*100.00*	*100.00*	*100.00*	*100.00*	*100.00*
Total No.of Households	402	38	163	139	742
	(54)	*(5.11)*	*(21.94)*	*(18.71)*	*(100)*

Source: Field survey, 2017 and 2018.

It is clear from the above Table 17 even now in rural areas
marginalized groups depend more on non-institutional credit.
Lack of access to land and credit makes the marginalized groups
to remain in poverty and food insecurity. In this context, state
support policies play an important role in reducing the poverty and
food insecurity at household level. Majority of the poor in rural
Andhra Pradesh and Telangana depend on PDS for their food
security at household level. Possessing a ration card/Aadhar is an
important step towards accessing the PDS and buying from it.

During 2013-14 in Andhra Pradesh, 215.5 lakh white cards were there between 2004 and 2014; all government benefits were linked with ration cards. They were eligible for free treatment in private and corporate hospitals under Aarogyasri, free education in colleges, free houses, claims of up to Rs. 3 lakh under CMRF for medical treatment etc. After the bifurcation of the state to Telangana and Andhra Pradesh, Telangana state has issued the food security cards in the place of ration cards.

In both the villages, majority of the SC and ST households depend on PDS for their rice consumption. In case of SC households, 48.2% of total consumption of rice is from PDS and that of ST households is 89.1% in Karumanchi. In Odipilavancha village also, similar trend is observed. Interestingly, others and OBC households depend more on home production and open market in both the villages, because of their access to land. In the village more than 50% of the households spend around one to two hours to fetch their PDS allocations. The quantities of rice supplied to poor households is 5 kg of rice per person per month subject to a ceiling of 25 kg. In Telangana state it is 6 kg per person per month subject to a ceiling of 30 kg. Many times, this is inadequate compared to their consumption requirements.

Table 17: Sources of consumption of rice per household (in percent %)

Social Groups	Karumanchi				Odipilavancha			
	SC	ST	OBC	Others	SC	ST	OBC	Others
Home Production	11.7	-	42.8	62.8	11	5.6	73.8	75.3
PDS	48.2	89.1	33.8	24.7	40.8	74.9	14.5	10.3
Open market	40.0	10.9	23.2	12.3	48.0	19.5	11.6	14.2

Source: Field survey, 2018.

It was observed from the focus group discussions that PDS rice consumption is influenced by the factors such as, family size, occupation, landholding and wage rate. The extent of PDS support declines with expenditure levels of the households and land size.

For the low-income households, agricultural labour households, landless and for marginal farmer households, PDS rice and other items such as oil and sugar consumption are an important source of calorie intake.

In both the villages, majority of the households hold the ration cards. Targeting errors that includes exclusion and inclusion errors exist in both the villages. We found more exclusion errors than inclusion errors. About 28.4% (Karumanchi) and 36.1% (Odipilavancha) of the poor households are excluded from the PDS/food security safety nets. With high exclusion errors, it comes out clearly that PDS is not benefiting all the poor households.

The basic purpose of the food security act is to transfer income to the poor by supplying essential commodities at subsidized prices, but this seems to bypass a large section due to social engineering process. Inefficient targeting will have impact on income gains through the PDS at household level and which in turn would influence the consumption at individual level. In order to understand the magnitude of the income transfer in rice distribution by the PDS, we have calculated the income transfers to the household.

The income gain of villagers from the rice scheme depends upon the coverage of the PDS, quantities supplied through the PDS and the difference between the open market price and the ration price. Monthly per capita income gain, which is calculated using the difference between open market price and ration shop price is Rs.19.00 per person per month in Odipilavancha and in Karumanchi Rs.22.70 per person per month. From 2004-05 to 2011-12, there has been a substantial increase in the implicit income transfer to households which has a significant impact on reducing the poverty (Dreze and Khera, 2015).

Most of the households depend on PDS for the rice consumption. The percentage of households reporting consumption of rice from PDS during a 30-day period rose sharply

from 24.4% to 39% in rural India and from 13% to 20.5% in urban India between 2004-05 and 2009-10. The major states with relatively high incidence of PDS purchase of rice in the rural sector were Tamil Nadu (89.65%), Andhra Pradesh (86.36%), Karnataka (75.02%), and Chhattisgarh (60.84%), followed by Kerala and Odisha (55.26%), and Maharashtra (44.22%).

Social vulnerability

All the indicators of demographic, economic and social indices are measured in different scales. It was necessary to normalize each indicator for an index. Here, the study has used the procedures of normalization as followed in Iyengar and Sudarshan (1982). If the "overall social vulnerability" increases with the increase in the value(s) of indicator(s), the following normalization procedure is used.

$$IndexK\_f = (K\_f - K\_{min})/(K\_{max} - K\_{min}) \qquad (1)$$

If the "overall social vulnerability" decreases with the increase in value(s) of indicator(s), the following procedure is used.

$$IndexK\_f = (K\_{max} - K\_f)/(K\_{max} - K\_{min}) \qquad (2)$$

Where K_f is the original value of sub-component for each farm group and K_{max} and K_{min} are the minimum and maximum values of each sub-component determined using data from all farm and caste groups of respective villages. For variables that show frequencies, for example, the percentage of farmers who have changed their crops, the minimum value was set at 0 and maximum value at 100. After each indicator was normalized, the indicators are averaged to find out the value of each major component following the equation (3).

$$K\_h = (\textstyle\sum\_(i = 1)^n \llbracket IndexK\_f^{\wedge}i \rrbracket) /n \qquad (3)$$

Where K_h is one of the three components of farm and caste groups, that is, demographic, economic and social components. $IndexK\_f^{\wedge}i$ represents "the sub-components indexed by *i*, which make up for each major component, and *n* is the number of sub-components in each major component." Once the index values of demographic, economic and social factors are calculated, the social vulnerability (SV) of all farm groups and caste groups in their respective village will be found out as follows:

$$SV = f.[1/n(K\_DF + K\_EF + K\_SF)] \qquad (4)$$

where, K_{DF}, K_{EF} and K_{SF} are the indexvalues of the demographic, economic and social factors, and *n* = the number of factors (major components) of social vulnerability.

Table 18: Farm size –wise and Social group-wise Vulnerability in the two selected villages

Components	Marginal	Small	Medium	Large	All	SC	ST	OBC	OC	All
Karumanchi Village (AP)										
Demographic	0.658	0.559	0.422	0.335	0.455	0.665	0.712	0.499	0.501	0.599
Economic	0.794	0.774	0.399	0.301	0.599	0.887	0.704	0.521	0.288	0.501
Social	0.801	0.799	0.562	0.499	0.642	0.888	0.882	0.234	0.087	0.508
Odipilavancha Village (Telangana State)										
Demographic	0.665	0.588	0.421	0.323	0.467	0.721	0.702	0.442	0.444	0.543
Economic	0.772	0.702	0.376	0.299	0.576	0.899	0.871	0.499	0.301	0.523
Social	0.799	0.789	0.501	0.487	0.589	0.889	0.877	0.201	0.079	0.501

The marginal and small farmers' groups are more vulnerable to the effects of climate change and variability than the medium and large farmers' groups in both the villages. The study reveals that the higher relative social vulnerability of marginal and small farm

groups over other groups is attributed to the greater vulnerabilities of demographic, economic and social factors.

Social vulnerability among different social groups, highlights two important aspects – (i) overall social vulnerability is high in Andhra Pradesh and Telangana villages (ii) the SC and ST households are more vulnerable to climate change effects than OBC and Other caste households in both the selected villages due to high vulnerabilities for demographic, economic and social factors.

Conclusion

Food-security at micro-level has quite a few important dimensions including social group, gender, non-food expenditure and nutritional security. We have attempted an investigation of these issues by utilizing the household level data of the selected villages.

Social factors do play an important role in food and nutritional security, lower the caste higher the deprivation which in turn influences their bargaining power in the labour market leading to lower access to income. Total income of the household is an important variable in explaining the changes in access to food at household level. Access to land is essential to ensure the right to food. Majority of the SC and ST households are small and marginal farmers.

Despite fulfilling the eligibility criteria, some households were not issued ration cards. For example, some families were struck off the PDS list during the rollout of the National Food Security Act (NFSA) in the states. An important reason could be the cap on the total number of beneficiaries allowed under this scheme. Distribution of food grains play an important role in providing the food security at household level. Poor households with no ration card/food security card are at a higher risk of food insecurity compared to households with white cards. Calorie consumption levels of SC and ST households are very low among

all the social groups. This is reflected in terms of BMI for adults and stunting for children.

In essence, the food and nutrition insecurity are strongly intertwined in the caste and class characteristics of the households. Therefore, overlooking these dimensions food and nutrition security aspects cannot be adequately addressed. There also prevails intra-household food and nutrition insecurity where the women of the households are at the receiving end. Food and nutrition insecurity research and policy need clear articulation of intersectionality of gender with caste and class dimensions in agrarian context.

References

Achanta, A. N. 1993. 'An assessment of the potential impact of global warming on Indian rice production', in (ed.) Achanta A.N., The Climate Change Agenda: An Indian Perspective, TERI, New Delhi.

Adger, W.N. 1999. "Social Vulnerability to Climate Change and Extreme in Coastal Vietnam", World Development, 27(2): 249-69.

Adger, W.N., and P.M. Kelly. 1999. "Social Vulnerability to Climate Change and the Architecture of Entitlements". Mitigation and Adaptation Strategies for Global Change, 4:253-66.

Agarwal, B.1990. "Social Security and the Family in Rural India: Coping with Seasonality and Calamity", Journal of Peasant Studies, 17: 341-412.

Aggarwal, P. K. and N. Kalra. 1994. "Simulating the effect of climatic factors, genotype and management on productivity of wheat in India", Indian Agricultural Research Institute Publication, New Delhi, India: 156.

Aggarwal, P. K. and R.K. Mall. 2002. 'Climate change and rice yields in diverse agroenvironments of India. II. Effect of uncertainties in scenarios and crop models on impact assessment'. Climatic Change 52(3): 331–343.

Aggarwal, P. K. and S.K. Sinha.1993. "Effect of probable increase in carbon dioxide and temperature on productivity of wheat in India", Journal of Agricultural Meteorology, 48(5): 811–814.

Anand, S and A. Sen. 1994. "Human Development Index: Methodology and Measurement, Occasional Papers, Human Development Report Office, New York.

Auffhammer, M., V.Ramanathan and J.R. Vincent. 2006. "Integrated Model Shows that Atmospheric Brown Cloud and GHGs have Reduced Rice Harvests in India", PNAS, 103 (52): 19668-19672.

Balasubramanian T.N., Arivudai Nambi A., Paul D. 2009 A suggested index for assessment of vulnerability of a location to climate change. Journal of Agrometeorology, 9(2):129– 137.

Bouis, Howarth. 2008. Rising Food Prices will Result in Severe Declines in Mineral and Vitamin Intakes of the Poor‖, Harvestplus, IFPRI, Washington, D.C.

Brenkert A.L., and E.L. Malone.2005. Modeling vulnerability and resilience to climate change: a case study of India and Indian states. Climate Change, 72:57–102.

Brook, N., 2003. Vulnerability, risk and adaptation: A conceptual framework, Working Paper No. 38, Tyndall Centre for Climate Change Research, University of East Anglia, Norwich.

Datt, G and M. Ravallion. 1998. "Farm Productivity and Rural Poverty in India", Journal of Development Studies, 34(4):62-85.

Deressa T., Hassan R.M., Ringler C. 2008. Measuring Ethiopian farmers' vulnerability to climate change across regional states. IFPRI Discussion Paper No. 806, Washington.

Deshpande R. S. and Amalendu Jyotishi. 2002. "Managing Ground Water Resource on Deccan Plateau: Pani Panchayat as an Institution of Collective Action" in (ed.) Dinesh Marothia, Institutionalising Common Pool Resources, Concept Publishers, New Delhi.

Deshpande R. S. and Amalendu Jyotishi. 2005. The State Policy and Poverty in India: An Understanding in Retrospective', Indian Social Science Review, 7(2): 281-298.

Eswaran, M., A. Kotwal et al.2008. "How Does Poverty Decline? Suggestive Evidence from India, 1983-1999", Bread Policy Papers.

Food and Agriculture Organization, 2001, The State of Food Insecurity in the World 2006. FAO, Rome.

Food and Agriculture Organization. 1997. World Development Indicators. FAO, Rome.

Food and Agriculture Organization. 2002. The State of Food Insecurity in the World 2001. FAO, Rome.

Food and Agriculture Organization. 2013. Food Insecurity in the World the
    multiple dimensions of food security. FAO, Rome.

Gangadhar Rao, D. and Sinha, S. K. 1994. Impact of climate change on
    simulated wheat production in India, in (eds.). C. Rosenzweig and I.
    Iglesias, Implications of Climate Change for International Agriculture:
    Crop Modelling Study. USEPA230-B-94003. USEPA, Washington, DC.
    1–17.

IIPS. 2017. National Family Health Survey (NFHS-4), 2015–16:
    India. International Institute for Population Sciences (IIPS), Mumbai.

IIPS. 2020. National Family Health Survey (NFHS-5), 2019–20: Andhra Pradesh
    International Institute for Population Sciences (IIPS), Mumbai.

Jean Drèze and Reetika Khera. 2015.Understanding Leakages in the Public
    Distribution System, Economic and Political Weekly, 50(7): 39-42.

Patnaik, U., and Narayanan, K. 2015. How effective are coping mechanisms in
    securing livelihoods against climatic aberrations? Evidences from rural
    India. International Journal of Climate Change Strategies and
    Management, 7(3): 359-374.

Radhakrishna, R., Rao, K.H. Ravi, C. and Reddy, B.S. 2004. Chronic poverty
    and malnutrition in India. Working Paper 11. New Delhi: CPRC-IIPA.

Sridevi Gummadi, Amalendu Jyotishi, Jagadeesh and Venkateswarlu.
    2018.“Climate Change Vulnerability and Agrarian Communities in
    Temporal and Spatial Context: District Wise Analysis of Undivided
    Andhra Pradesh”, Man and Development, 60(1): 29-46.

Sukhatme, P. V. 1980. Nutrition policy: need for reorientation. Economic and
    Political Weekly, 15(26): 1101-1105.

UNICEF. (2019). The State of the World's Children 2019: Children, food and
    nutrition: Growing well in a changing world. UNICEF.

Von Grebmer, K., J. Bernstein, R. Alders, O. Dar, R. Kock, F. Rampa, M.
    Wiemers, K. Acheampong, A. Hanano, B. Higgins, R. Ní Chéilleachair, C.
    Foley, S. Gitter, K. Ekstrom, and H. Fritschel. 2020. 2020 Global Hunger
    Index: One Decade to Zero Hunger: Linking Health and Sustainable Food
    Systems. Bonn: Welthungerhilfe; and Dublin: Concern Worldwide.

Yadav, D. K., and Barve, A. 2017. Analysis of socioeconomic vulnerability for
    cyclone affected communities in coastal Odisha, India. International
    Journal of Disaster Risk Reduction, 22: 387-396.

24 to 48 hour Composting Machines:
Do They Really Produce Compost as the Final Output and Their Viability for Community Composting in Indian Cities

Monika Khanna Gulati[1] and Shyamala K. Mani[2]

Abstract

This paper focuses on the city of Gurugram to evaluate the effectiveness of automatic composters (24-hour composting machines) as a part of decentralised waste management measures for the treatment of wet-waste. It compares the physical and chemical parameters of the output from these machines to the standards of quality compost and with compost produced using natural composting processes to find that the output does not conform to the standards. It highlights the kind and intensity of challenges cities will face in case these machines are employed by Bulk Waste Generators (BWGs). It emphasizes the need to employ source segregation of waste and natural composting methods for addressing meaningful municipal waste management and enhancing and protecting the soil quality. During the COVID-19 pandemic, one of the locations comprising 1000 households treated 183 tons of segregated wet waste in and generated 20 tons of stable compost which was used to nourish the soil of 16 parks in that area.

Keywords: Community Composting, Decentralised Waste Management, Soil Health, Gurugram

---

[1] Founder NCR Waste Matters, Member of Citizen's Monitoring Committee, Gurugram, Haryana. Email: ncrwastematters@gmail.com
[2] Senior Advisor, Centre for Environmental Health, Public Health Foundation of India, Gurugram, Haryana. Email: shyamala.mani@gmail.com

Introduction

Municipal solid waste management is a major concern for rapidly urbanizing cities across India. Gaps in the existing practices and infrastructure have motivated citizens to actively participate in finding workable solutions.

Introduction to Gurugram, urbanization and waste-related issues

The city of Gurugram located in northern India, at a distance of about 30 kilometres from the country's capital is among the rapidly urbanizing cities in the country (Bansal et al., 2020). In recent years, it has witnessed a surge in economic activity, which has led to exponential population growth (primarily attributed to rural-urban migration), with a rate of increase of 283% between 2001 and 2011 (Census of India, 2011; Chatterji, 2013). As a result, its formal urban limits have also expanded six times (Chatterji, 2013). This growth is however marked by 'infrastructure deficiencies', 'disaggregated urban transformation' (Chatterji, 2013, p. 274, p.287; Gururani, 2013) and spatial heterogeneity.

Urbanization, coupled with economic growth has resulted in increased consumption rates, which has led to increasing volumes of waste production (KPMG India, 2020). The city of Gurugram, along with another major city in the state named Faridabad generate one-fourth of the total amount of the waste in the state on a per day basis (Haryana Pollution Control Board (HPSCB), 2019). The city currently generates 1000 Metric Tonnes (MT) per day and is projected to generate 2900 MT by 2041 (HPSCB, 2019).

As per HPSCB's annual report (2019), the city treats only 17.5% of its total waste, and the remaining is sent to the Bandhwari dumpsite, which is spread over an area of 30.5 acres. This dumpsite has received waste that is 166% of its capacity

(Chowdhury, 2013), resulting in 34,300 MT of waste being piled up (CPCB, 2020).

According to CSIR-National Environmental Engineering Research Institute (CSIR-NEERI, 2020) air pollutants released because of open decomposition of waste and its burning are detrimental to the health of the villagers residing in surrounding areas. The report further adds that the dumpsite releases carbon dioxide and methane as a result of open decomposition which are greenhouse gases (GHGs) contributing to climate change. It also states that the soil and water of the area have been contaminated because of the discharge of leachate from the landfill, posing a threat to the adjacent Aravalli range and its forest areas.

The study estimates a total incurred damage of about Indian Rupees (INR) 1.4 billion due to externalities from the Bandhwari dumpsite (this includes depreciation of land value). More importantly, leachate from the landfill has been contaminating groundwater, thereby impacting the health of villagers in surrounding areas (Desai, 2018), which makes this a pertinent social issue, having implications beyond the point of waste generation.

The paper evaluates the efficacy of 24-hour composting machines as a solution for waste (biodegradable/organic) management in (urban) India. While Section 1 covers introduction and current practices, Section 2, goals and objectives of the paper, Section 3, methodology, Section 4 gives results and analysis, Section 5 discussion, which includes an insight on the case study areas and an explanation on the importance of decentralised wet-waste management. This is then followed by an analysis of the technology in focus, i.e. 24-hour composting machines by an assessment of the quality of compost produced by these using technical parameters, followed by conclusion and recommendations in Section 6.

Decentralised waste management

The ramifications of openly dumped waste in landfills, in terms of contributing to climate change at a global level and air, water and soil pollution at the local level, are well established. As biodegradable waste mixed with inorganic waste decomposes in the open, it releases methane, which has a Global Warming Potential (GWP) 28 times (for cumulative forcing over 100 years) that of carbon dioxide, making it a potent green-house gas (GHG) (IPCC, 2014).

In terms of local level concerns, lack of waste management has led to increased air and water pollution levels in cities across the globe including those in India (Ferronato and Torretta, 2019; Samal, Mani and Madguni, 2020). The immediacy to resolve the lack of waste management is reflected in a statement by the World Bank (Kaza et al., 2018), according to which waste generation will outpace global population growth by more than double by the year 2050 given the current trajectory. In this regard, decentralized waste management, driven by community participation is key. Cities across India have been witnessing an increased rate of community participation with regard to waste management, thereby facilitating decentralized waste management (Singh, 2012).

A decentralized system not only reduces the volume of waste being openly dumped in the city's landfills, but also allows community integration through participation and ownership in waste management (Agarwal and Gupta, 2003). Additionally, alterations and improvements can be made with inputs from the community, which ensures sustained commitment (Agarwal and Gupta, 2003). Rathi (2006) also points out that community participation in decentralized waste management is the least cost option, as compared to processing by the municipality or private organizations.

Stakeholders' actions

The Municipal Corporation of Gurugram (MCG) is the Urban Local Body (ULB) responsible for solid waste management in the city. In 2018, MCG released a notification according to which BWGs, which include Resident Welfare Associations (RWAs) needed to treat their wet-waste (biodegradable/organic waste) at source (Khera, 2020). The push for source segregation and on-site treatment of wet-waste was also brought forth by the Solid Waste Management (SWM) Rules, 2016.

As a result, residential colonies (comprising primarily gated communities) across the city have begun to shift their focus to decentralized waste management (Roychowdhury and Puri, 2017). The city is therefore undergoing an institutional, regulatory and civic transformation in its waste management activities, with a focus on decentralized wet-waste management.

In order to identify and adopt solutions at a decentralized level, citizens have organized platforms and forums to discuss and exchange experiences regarding various types of technologies available to process waste. Waste champions and citizen groups across the city have been evaluating and testing several composting methods and technologies for their efficacy at the community level. The traditional 30-day natural composting method has been adopted in majority of the residences across the city, and has been functioning successfully across the country (Mandpe et al., 2020). However, the emergence of 24-hour composting machines, as a short-term solution has become a cause of concern for citizens who understand that solutions for waste management need to be adopted considering long-term impact, in addition to efficacy.

In a recent case in the city of Pune in central India, these machines (24-48 hour composters) were employed for the treatment of wet-waste. However, it was found that the output produced did not conform to the standards under the SWM Rules,

2016 (Chavan, 2017). In another case, in the city of NOIDA in northern India, citizens faced similar challenges when wet-waste composting machines (24-48 hour composters) remained defunct after an operating period of a few months and citizens reconsidered the adoption of natural composting methods (Sinha, 2021).

As per the manufacturers, the composting process in these machines is controlled automatically (temperature and moisture content control), and the content is processed within 24 to 72 hours. Manufacturers also claim that the end result from these composters is as functional as compost produced from the natural composting process. This technology is easily accessible in the market, at an affordable cost (for RWAs), and is being aggressively marketed across various platforms.

Formulation of CMC

In order to address concerns surrounding these technologies and machines, the citizens and MCG identified a need to formulate a Citizen's Monitoring Committee (CMC). This committee was constituted on 7 Feb 2018 by the then Commissioner of MCG, Uma Shankar to monitor Solid Waste Management and Street Sweeping in Gurgaon by M/S Ecogreen Energy Pvt. Ltd. Gurgaon/Faridabad. Shortly after, the mandate was expanded to include Construction and Demolition Waste Management by the next Commissioner Yashpal Yadav.[1]

The CMC (Citizen's Monitoring Committee) under the leadership of Yashpal Yadav decided to empanel vendors for community composting to the MCG to bring viable solutions to the city. It was important to empanel and bring a healthy mix of solutions which would match the different requirements of space, price and quantity of waste generated. Through this empanelment, the RWAs and citizen bodies could take informed decisions on the kind of technology to be adopted for their community to

enable successful decentralized composting. Many solution providers came forward to be empanelled including companies providing 24-48 hour composting machines. Given the lack of reliable data on the efficacy of these machines, it was decided that MCG would conduct an experiment on these 24-48 hour composting machines over a duration of one month and then evaluate if they could be empanelled.

In December 2018, an Expert Panel comprising Dr Shyamala Mani, Dr Lakshmi Raghupathy, Sudhir Krishna, Smita Ahuja, Priya VK Singh, Keshav Jaini and Monika Khanna Gulati was set up to view the presentations made by 6 vendors of 24 - 48 hour composting machines, review the pilot processes and outcomes and present the findings to MCG with the assistance of Executive Engineer (EE) Pardeep Kumar, all of which process organic waste inside the machine run on electricity so as to shred it, remove excess moisture, and in some cases, subject it to enzymes. The output is claimed to be ready for application to plants/ addition to soil after 24-48 hours, or, in some cases, after 3, 7 or 10 days of curing.

Goal and Objectives

This paper focuses on the use and employability of this technology, with an aim to assess the viability of such 24-hour composting machines for BWGs in the urban Indian context. There are two concerns that push for such an assessment. The scale of waste-related issues in Gurugram and other cities across India demands all forms of interventions, including technological ones. However, stakeholders (which include decision-makers and citizens who are the most affected) also need to consider the viability and effectiveness of such interventions in India, which is overshadowed by varying dynamics such as a strong dependence on informal waste collectors working in precarious conditions in the absence of financial and social safety nets (Wilson et al.,

2006). Secondly, although urban India is already burdened with several environmental problems, this is the opportunity to integrate existing availability of manpower and transition with technologies that are not further detrimental to the environment.

Therefore, the main objective of this paper is to test the viability of 24-48 hour composting machines, by testing if they produce compost as an output and if these are sustainable options for community composting.

The other specific objective of the paper is to highlight the effectiveness or otherwise of these 24-hour composting machines and identify specific reasons as to why they do or do not suit rapidly growing urban India's waste woes, which has been articulated in the discussion, conclusion, along with recommendations on solutions that will work in urban India.

Methodology

The experimental work was done as a pilot in Gurugram as part of city-wide empanelment with the help of MCG and CMC. Details with regard to the formulation of the CMC have been discussed in previous section, as specified in the structure of the paper.

Empirical data from Gurugram has been analysed for this assessment. Samples of treated biodegradable waste across five locations have been tested in laboratories, and are compared against national standards of compost. These samples have been assessed on the basis of
(i)   Technical specifications
(ii)   Output - quality of compost
(iii) Feasibility of adoption

These values are also compared with data from two locations that employ natural composting (as control) processes that have been explained. The purpose of the comparison is to

substantiate the argument whether natural composting processes are best suited for decentralized waste management.

Data collection

The paper brings forth data collected as a part of experimental testing, conducted by citizen groups of Gurugram, primarily involved through the CMC with the MCG. This was more crucial after learning about experiences of citizens and Municipal Corporation of Pune, NOIDA and other places in regard to the inability of this technology to perform satisfactorily.

MCG provided the necessary logistics and support to facilitate the setting up of the required machinery, collection and testing of samples. Five locations were set up as a part of the experiment, where the MCG provided a sheltered space and dedicated power supply. Source segregated and collected wet-waste fed into these machines was provided to the machine operators by MCG. Each location had a 24-hour composting machine provided by five distinct manufacturers/sellers.

These machines across Locations 1-5 ranged from those that can process 50 kilogram (kg) of waste per day to those that can process 400 kg of waste per day. The temperature, air flow and moisture content can be manually controlled in these. One of these has the provision of controlling the percentage of bacteria added to the content, based on temperature changes during the process, and can vaporize the moisture present in the waste, which also reduces the volume of the output product.

Additionally, it claims that the control of air flow helps prevent odour, pests, any leakage of leachate or emission of harmful gases. The machine at one of the locations also has an in-built shredder and cylindrical container that can crush and mix the waste simultaneously to cut down the volume of waste and accelerate decomposition. The heating arrangement in this model

is said to optimize the performance of microorganisms, again to accelerate the composting process.

The following natural composting processes were used in other two locations:

Location 6

The crushed food waste is put in five large 2000 litre rotary drums. To balance the high nitrogen content in the food waste, carbon in the form of dried shredded leaves is added in double proportion, according to volume. One gram of bio enzyme powder is also added to each kg of the food and horticulture waste mix to introduce microbes. Waste decomposer is also sprayed every alternate day for the introduction of enzymes and microbes. After six days, the semi-digested waste is moved to cover metal mesh bins. There is regular raking to aerate the piles and after a period of 8 to 10 weeks, the compost is ready for use. This process provides full-time employment to four workers.

Location 7

This location uses the Aaga composter that helps composting of wet waste in a decentralized manner. Two Aagas handle 18 kg of wet waste per day. During usage, one Aaga in the pair remains idle and the other one is loaded with wet waste, cocopeat and microbes daily until it fills up (takes 15 days). After that the process is repeated in the second Aaga and by the time the second Aaga is full, fresh compost is ready in the first Aaga.

Compost quality tests of 'compost'/ product from all these locations have been tested in approved laboratories and discussed in the next section.

Results

Test Results

Table 1: Properties of 24 hour composting machines

Source	Pilot period of machines in use	Time taken for processing, temperature, capacity of equipment used	Form of waste (shredded or hammered)	Inputs	Observations on appearance	Units of electricity consumed to process 1 kg of waste
Location 1: Sector 56	19.1.19 to 20.2.19	24 hours 50℃ 50 kg/day	Not shredded or hammered	Kitchen waste	Charred grey-black, Clumpy appearance. Burnt odour	0.16
Location 2: Sector 45	03.1.19 to 20.2.19	24 hours 50-60℃ 150 kg/day	-	Kitchen waste & bio enzyme @ 1 tsp/100 kg	Moist, powder, black, foul, acidic odour	1.67
Location 3: Beriwala Bagh	01.02.19 to 20.2.19	24 hours 60-70℃ 50 kg/day	-	Horticulture & kitchen waste + microbe powder	Dark & moist on Same day. Granular & brown after curing in baskets for 10 days	22.03
Location 4: Sector 15	10.2.19 to 07.3.19	24 hours and 10 days of curing 50℃ 400 kg/day	Shredded/ hammered	Uncontrolled proportions of kitchen & horticulture waste	Moist, clumpy & dark brown & appearance	2.22
Location 5: Nandi Dham Gaushala	29.1.19 to 20.2.19	24 hours 60-70℃ 100 kg/day	-			

Source: On-site collection, February 2019

Table 1 provides the details of the total duration of usage, quantity of waste, time for processing, kind of inputs, observations of appearance and importantly, the units of electricity consumed to

run each of these, at the five locations where 24-48 hour composting machines were kept.

Table 2: Physical and chemical properties of output product, ICAR review (location-wise) and comparison with FCI standards; Date of testing 22 February 2019 to 8 March 2019

Source	pH (1:5)	Conductivity (Ds/m) (1:5)	Moisture (% by weight)	Carbon (% by weight, min)	Nitrogen (% by weight, min)	Phosphorous (% by weight, min)	Potassium (% by weight, min)	ICAR review
FCI 2009 for Organic compost (as per SWM Rules 2016)	6.5-7.5	Not more than 4.0	*15-25*	*12.0*	*0.8*	*0.4*	*0.4-1.24*	-
Location 1: Sector 56	7.72	5.09	*29.8*	*28.8*	*2.29*	*0.25*	-	Saline
Location 2: Sector 45	4.96	8.89	*32.8*	*44.6*	*1.93*	*0.23*	*0.93*	Saline and acidic
Location 3: Beriwala Bagh	4.09	7.40	*60.0*	*39.4*	*1.98*	*0.37*	*1.33*	Saline and acidic
Location 4: Sector 15	7.70	3.91	*113*	*31.8*	*2.41*	*0.21*	*1.26*	Normal
Location 5: Nandi Dham Gaushala	6.54	7.56	*30.6*	*22.7*	*1.42*	*0.24*	*1.38*	Saline

Table 2 analyzes the output product from each of these variables such as pH, moisture content, conductivity, carbon content, nitrogen content, potassium content and phosphorous content, as is prescribed by the standards provided by Food Corporation of India (FCI) (as mentioned in Schedule (IV) clause 2 (h) and (q), Part A of SWM Rules, 2016) and Indian Council for Agricultural Research (ICAR) (for testing compost quality). To assess the

quality of the output product, Table 2 compares the values with these standards.

Table 3: Physical and chemical properties of compost produced using natural processes.

Date of testing

Location 6 – 12 May 2017 to 27 May 2017

Location 7 – 31 January, 2019 to 06 February, 2019

Source	pH (1:5)	Conductivity (Ds/m) (1:5)	Moisture (% by weight)	Carbon (% by weight, min)	Nitrogen (% by weight, min)	Phosphorous (% by weight, min)	Potassium (% by weight, min)	ICAR review
FCI 2009 for Organic compost (as per SWM Rules 2016)	6.5-7.5	Not more than 4.0	15-25	12.0	0.8	0.4	0.4-1.24	-
Location 6	8.26	2.58	2.05	29.4	2.95	0.35	1.63	"Manure sample is normal"
Location 7	7.4	1.8	-	14.10	0.80	1.60	0.65	'The tested sample of Compost conforms to Specification as per FCO, 1985 w.r.t. above test.'

Source: On-site collection date for Location 6 – May 2017; date for Location 7 - January 2019

Analysis and Inference

Lack of conformity to standards: As observed in Table 2, the output produced from Locations 1-5 except Location 4, do not meet the necessary FCI standards across various properties. In the case of pH, samples from Locations 2 and 3 are acidic and saline in nature (as shown in ICAR's review). At least 4 out of 5 Locations also do not conform to the conductivity standards for compost, and none of the Locations meet the moisture

requirements as specified in the standards. None of the samples meet the minimum phosphorous (percentage by weight) requirements, and only Location 2 meets the potassium requirement.

The samples were also tested on odour and particle size (minimum 90% should pass through a 4 millimeter (mm) sieve). Samples from Location 1 and 2 did not match the standard odour requirements and none of the samples matched the particle size requirement. In the case of the compost produced from natural composting processes, test reports explicitly identify the output to be compost that conforms to the required Fertiliser Control Order (FCO) standards, part of 1985 order.

In contrast to this, samples from sites Locations 6 and 7 that used natural processing methods were clearly identified as 'manure suitable for use'. This is attributed to the fact that since these methods do not employ heating of any form, they retain the microbial content, which enhances the quality of the compost produced. For instance, just Location 6 with 1000 households treated 183 tons of segregated wet waste in 2020-2021 and generated 20 tons of stable compost, which was used for parks and common green areas in the community itself.

Discussion

Wet-waste and its treatment

Wet-waste treatment, in the form of composting is an intrinsic part of decentralized waste management. According to Mandpe et al. (p. 42, 2020), composting can be defined as 'the process of the biodegradation of the mixture of organic substrate conducted by the populations of various microbial species in aerobic environments in the solid state'. In addition to reducing the waste that goes into landfills, compost produced from this method enhances the nutritional quality of soil (Thanh et al., 2015),

promotes nutrient recycling, increases water retention and improves soil structure (Wei et al., 2017), all of which are important to maintain the ecological health of the soil in cities.

Additionally, this system also contributes in strengthening the waste management system, as it helps integrate local informal workforce (local waste collectors) in the waste management system thereby creating new economic opportunities in the process (Zurbrügg et al., 2004). Apart from these environmental and social benefits, this scale and method of managing biodegradable waste also has several financial benefits, in addition to reducing emissions caused due to transportation of waste to landfills.

Municipal Solid Waste (MSW) in India contains significant fractions of biodegradable waste (Ministry of Urban Development (MoUD), 2016)). As per MCG data (Roychowdhury and Puri, 2017), 50 to 52% of the waste in the city is biodegradable, implying that composting at local levels can prevent a significant proportion of current volume of waste from being dumped in the landfills.

Community composting in Indian cities

Communities across India have been successfully employing traditional composting methods (natural composting), thereby reducing the volume of waste collected by municipalities. Aich and Gosh, 2019) identify composting to be the most feasible and effective waste management technique in comparison to other techniques. The only caution here is to ensure that the quality of compost produced at this scale adheres to standards established for the usability of compost. According to Saha et al. (2010), segregated waste collection before composting plays a vital role in improving the quality of the compost and needs to be duly considered as a part of community composting measures.

They also highlight that 'India has an estimated potential of producing about 43 million tons of compost each year containing about 45,000 tons of nitrogen, 11,000 tons of phosphorous, and 23,000 tons of potassium. Inappropriate solid waste management and production of poor quality composts are the main constraints in exploiting such large amounts of plant nutrients to increase crop productivity' (p. 200). The need of the hour is to integrate composting processes that help restore this nutritional value to increasingly degraded quality of soil, and in the process resolve the waste crisis, the city and country are currently engulfed in.

Concerns with 24 to 48 hour composting machines

Heating is detrimental

Although these machines recommend heating to reduce the volume of the waste, this is detrimental to the biological life (such as natural fungi, bacteria etc.), which are an intrinsic component of the composting process itself and enhances the nutritional quality of compost. The loss of microbial activity can also be attributed to the loss of moisture which takes place even as fresh wet waste is added, thereby completely prohibiting the proliferation of microbes, which is detrimental to soil quality in the long run as it impedes the natural nutrient decomposition cycle (Hiremath, 2018).

High power consumption

Power consumption ranged from 0.16 units (for processing 1 kg of wet waste) to 22 units. Out of all 5 samples, only the sample at Location 4 appears to conform to the standards to an extent. However, this location consumes the highest amount of electricity, i.e. 22 units. In comparison to natural composting, which uses electricity (based on the type of method used) to churn

and mix the components, the power consumed by these 24-48 hour machines, is too high (given the high volume of waste it will process), and makes the financial sustainability of the solution questionable.

Market buy-back/financial viability to ensure sustenance

As mentioned in section 1.3, in the case of Pune, the output from the machines did not conform to the standards. (Chavan, 2017). The quality of compost largely influences its sale and determines its market value, and the lack of this is likely to weaken the already unstable compost market (Hettiarachchi et al., 2020). Lack of quality, therefore, has financial implications for neighbourhoods/RWAs and eco-entrepreneurs who wish to set up businesses and livelihoods that intend to sell the compost produced. Not only does this impact the financial sustenance of the process, but also increases the liability since the RWA would have to pay for the removal or dumping of this by-product.

Natural composting process

In another study by Kucbel et al. (2019), automatic composters were employed to produce compost from food waste in the city of Ostrava in Czech Republic. Two types of automatic composters were used that processed food waste in 7 days, and between 14 to 21 days, respectively. According to the study, 'the utilization of automatic composters for household food waste processing produces a material which is not suitable immediately after the end of composting for direct gardening and agricultural applications.

The resulting product is not sufficiently humidified and stabilized' (p. 664). It also found that compost prepared in these automatic composters from household food waste had low organic content, and therefore unfit for horticultural and

agricultural practices. Given that these machines do not produce compost, the output material therefore forms to be an alternate form of waste, which is of a grave concern as it will only add to the ever expanding stratum of waste (O'Neil, 2019).

Another major concern that emerges from this study is that the machines that process wet-waste and have considerable desired standards, consume high amounts of electricity. This would add on to the expenses of the RWAs and citizens. Natural composting methods on the other hand do not depend on electricity for functioning, making them financially sustainable.

Furthermore, it is pertinent to look at the intensity of impact these machines would have if they were employed in RWAs across the country. Degraded nutritional quality would lead to open dumping of the processed output, which takes us back to our original problem. According to Wilson (2007), as a community we need to realise that we are in this situation because for years we have relied on landfilling, and dependence on these automatic composters is only going to exacerbate these challenges.

According to the Ellen MacArthur Foundation (2017), 'regenerating natural systems' is one of the principal objectives of a circular economy. By using compost made from natural processes, communities can truly transform into circular economies, as this compost would regenerate soil quality, and natural systems in the process.

Despite awareness efforts made by the government, segregation at source has been weak across the country (Pratap et al., 2020). An area of concern, which can also be taken up for further research is that as citizens discover that automatic composters are only adding to the existing waste crisis, it could potentially demotivate them and thwart current waste segregation practices.

Conclusions and recommendations

The usage of automatic composters such as the 24-48 hour composters analysed in this study, have the advantage that large amounts of organic biodegradable waste of virtually any type (food scraps, meats, horticulture, etc.) can be shredded/macerated, mixed with bulk matter and inoculum under controlled environmental conditions using electricity. However, such processing of organic waste (whether for 1 or 2 or 3 days) is required to be followed by at least 30 days of aerobic composting and an additional two weeks of curing before the output becomes ready for use so that pathogens are completely destroyed and the exothermic decomposition of the processed organic waste has advanced well enough so that it does not pose a threat to plant health (MoUD, 2005). Since none of the automatic composting solutions presented to the Expert Panel satisfied this condition, their empanelment by MCG was not recommended.

The paper hence establishes that automatic composters bring with them heavy environmental social and economic costs as mentioned in 5.1. Environmental costs consist of soil degradation resulting from the disposal of the low-quality output and high-power consumption rates as compared to natural composting processes. ULBs dumping large volumes of the aforementioned unusable output, threatens the soil and water quality, thereby endangering the lives of citizens. On the other hand, natural composting processes preserve and protect the microbial content in the soil, which is vital for soil health.

Furthermore, employing full-time workers to run and maintain these natural composters, could also facilitate the integration of informal waste workers and increase sustainable livelihoods, thereby avoiding any social costs. In addition, during COVID-19 pandemic, when processing of wet-waste from COVID positive homes and centers proves a challenge, simple natural composters and decentralized composting using natural

composting methods have not only addressed this challenge but also have helped in containing the transmission of infection, thus protecting the waste workers and general community from reinfection.

In terms of economic sustenance, the use of natural composters can avoid costs due to high power consumption by these machines, and ensure long-term feasibility since the output conforms to quality standards, and can be sold in the market.

References

Agarwal, R., & Gupta, S. K. 2003. Rethinking urban waste in India: Creating a community paradigm. Social Change, 33(2–3), 51–68. Available at: https://doi.org/10.1177/004908570303300305. Accessed on 10 January, 2021.

Aich A., Ghosh S.K. (2019) Conceptual Framework for Municipal Solid Waste Processing and Disposal System in India. In: Ghosh S. (eds) Waste Management and Resource Efficiency. Springer, Singapore. Available at: https://doi.org/10.1007/978-981-10-7290-1_9. Accessed on 10 January 2021

Bansal C., Singla A., Singh A K., Ahlawat H O., Jain M., Singh P., Kumar P., Saha R., Taparia S., Yadav S., and Seth A. 2020. Characterizing The Evolution Of Indian Cities Using Satellite Imagery And Open Street Maps. COMPASS '20: Proceedings of the 3rd ACM SIGCAS Conference on Computing and Sustainable Societies. Pages 87–96. Available at: https://doi.org/10.1145/3378393.3402258. Accessed on 13 January, 2021.

Binti Singh. 2012. Changing contours of solid waste management in India, Journal of Asian Public Policy, 5:3, 333-342, Available at: https://doi.org/10.1080/17516234.2012.731172 Accessed on 13 January 2021.

Central Pollution Control Board. 2020. Status Report on bioremediation of Bhandhwari dumpsite, Haryana. Delhi.

Chatterji, T. 2013. The Micro-Politics of Urban Transformation in the Context of Globalisation: A Case Study of Gurgaon, India, South Asia: Journal of South Asian Studies, 36:2: 273-287.

Chavan, V. 2017. PMC goofs up on its promise to produce compost in 24 hours. Pune Mirror. Available at: https://punemirror.indiatimes.com/pune/cover-story/pmc-goofs-up-on-its-promise-to-produce-compost-in-24-hrs/articleshow/59689277.cmse. Accessed on 20 January 2021.

Chowdhury, T. 2013. Bandhwari plant's filth overflowing on the road. The Times Of India. Available at:

https://timesofindia.indiatimes.com/city/gurgaon/bandhwari-plants-filth-overflowing-on-the-road/articleshow/23179874.cms. Accessed on 20 January 2021.

CSIR-NEERI. 2020. Damage cost assessment due to pollution from Bandhwari MSW landfill site, Gurugram, Haryana. Available at: https://greentribunal.gov.in/sites/default/files/news_updates/REPORT%20BY%20CPCB%20IN%20OA%20NO.%20514%20of%202018.pdf. Accessed on 20 January 2021.

Desai, P. 2018. Is trash from Gurugram and Faridabad in Bandhwari landfill leading to cancer?. Hindustan Times. Available at: https://www.hindustantimes.com/gurgaon/is-gurugram-s-trash-in-bandhwari-landfill-causing-cancer/story-y3rOnUbJRNDhVsPK4RPhVN.html. Accessed on 20 January 2021.

Ellen MacArthur Foundation. 2017. What is a Circular Economy? Available at: https://www.ellenmacarthurfoundation.org/circular-economy/concept. Accessed on: 8 January 2021

Ferronato, N., and Torretta, V. 2019. Waste Mismanagement in Developing Countries: A Review of Global Issues. International Journal Of Environmental Research And Public Health, 16(6), 1060. Available at: doi: 10.3390/ijerph16061060. Accessed on 15 December 2020.

Gururani, Shubhra. 2013. Flexible Planning: The Making of India's 'Millennium City,' Gurgaon. Ecologies of Urbanism in India: Metropolitan Civility and Sustainability. Hong Kong Scholarship Online.119-145. Available at: doi:10.5790/hongkong/9789888139767.003.0005. Accessed on 2 January, 2021.

Haryana State Pollution Control Board. (2019). Annual Report under Solid Waste Management Rules. Panchkula.

Hettiarachchi H., Bouma J., Caucci S., Zhang L. 2020. Organic Waste Composting Through Nexus Thinking: Linking Soil and Waste as a Substantial Contribution to Sustainable Development. in: Hettiarachchi H., Caucci S., Schwärzel K. (eds.) Organic Waste Composting through Nexus Thinking. Springer, Cham. https://doi.org/10.1007/978-3-030-36283-6_1. Accessed on 10 January, 2021.

Hiremath, S. 2021. 24-hr composters: There's no microbe in this universe that can colonise in 24 hrs, says scientist Dr Manoj. Available at: https://savitahiremath.com/2018/11/27/community-composting-method-17-be-it-apartments-parks-or-lanes-aaditi-from-stonesoup-fits-right-in/. Accessed on 3 January, 2021.

Inter-ministerial Task Force on Integrated Plant Nutrient Management, constituted by Ministry of Urban Development, Government of India, May 2005, p.155-156

IPCC. 2014. Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the

Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. IPCC, Geneva, Switzerland: 151.

Julka, Harsimran. 2011. IT firms looking beyond Gurgaon, Noida, Greater Noida to other cities in north India. The Economic Times. Accessed on 30 September 2011.

Kaza, S., Yao, L., Tata-Bhada, P., and Van-Woerden, F. 2018. What a Waste 2.0 : A Global Snapshot of Solid Waste Management to 2050. Washington D.C: World Bank.

Khera, R. 2020. How RWAs in Gurugram are showing the way out of urban India's waste crisis. Citizen Matters. Available at: https://citizenmatters.in/decentralised-waste-management-by-gurugram-apartment-and-rwas-21806. Accessed on 3 January, 2021.

KPMG in India. 2020. Impact Assessment Report 2017-2019 Alag Karo. Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH.

Kucbel, M., Raclavská, H., Růžičková, J., Švédová, B., Sassmanová, V., Drozdová, J., Raclavský, K. and Juchelková, D., 2019. Properties of composts from household food waste produced in automatic composters. Journal of Environmental Management, 236: 657-666

Mandpe A., Kumari S., and Kumar S. 2020. Composting: A Sustainable Route for Processing of Biodegradable Waste in India. In: Hettiarachchi H., Caucci S., Schwärzel K. (eds,) Organic Waste Composting through Nexus Thinking. Springer, Cham. https://doi.org/10.1007/978-3-030-36283-6_3. Accessed on 23 January 2021.

Ministry of Urban Development. (2016). Swachh Bharat Mission: Municipal Solid Waste Management Manual. Part II: The Manual. Central Public Health and Environmental Engineering Organisation (CPHEEO) In collaboration with German International Cooperation. doi: http://cpheeo.gov.in/upload/uploadfiles/files/Part2.pdf. Accessed on: 24 October, 2020

Ministry of Urban Development. 2005. Inter-ministerial Task Force on Integrated Plant Nutrient Management. New Delhi.

O'Neil, K., 2019. Waste. Cambridge, UK: Polity Press, p.1.

Pratap, V., Dayashankar, M., and Biju, S. 2020. Role of Psychosocial Factors in Effective Design of Solid Waste Management Programmes: Evidence from India. Environment And Urbanization ASIA, 11(2), 266-280. doi: https://doi.org/10.1177/0975425320938518. Accessed on 3 January, 2021.

Rathi, S. 2006. Alternative approaches for better municipal solid waste management in Mumbai, India. Waste Management, 26(10), 1192-1200. doi: https://doi.org/10.1016/j.wasman.2005.09.006. Accessed on 25 January 2021.

Registrar General and Census Commissioner, 'Census Report 2011'. Available at: http://www.censusindia.gov.in/. Accessed 22 January, 2012.

Roychowdhury A. and Puri S. 2017. Gurugram: A framework for sustainable development, Centre for Science and Environment, New Delhi

Saha, J., Panwar, N., and Singh, M. 2010. An assessment of municipal solid waste compost quality produced in different cities of India in the perspective of developing quality control indices. Waste Management, 30(2), 192-201. doi: https://doi.org/10.1016/j.wasman.2009.09.041. Accessed on 21 February 2021.

Samal B., Mani S., Madguni O. (2020).Open Dumping of Waste and Its Impact on Our Water Resources and Health—A Case of New Delhi, India. In: Kalamdhad A. (eds.) Recent Developments in Waste Management. Lecture Notes in Civil Engineering, 57: 127-154. Springer, Singapore.

Sinha, S. (2021). Organic waste composting machines lie defunct in Arun Vihar. Times Of India. Available at: https://timesofindia.indiatimes.com/city/noida/organic-waste-composting-machines-lie-defunct-in-arun-vihar/articleshow/81142037.cms. Accessed on 27 February, 2021.

Thanh, T. H., Yabar, H., and Higano, Y. 2015. Analysis of the environmental benefits of introducing municipal organic waste recovery in Hanoi City, Vietnam. Procedia Environmental Sciences, 28, 185–194.

Wei, Y., Li, J., Shi, D., Liu, G., Zhao, Y., and Shimaoka, T. 2017. Environmental challenges impeding the composting of biodegradable municipal solid waste: A critical review. Resources, Conservation and Recycling, 122: 51–65.

Wilson, D. & Velis, C. & Cheeseman, C.R. (2006). Role of Informal Sector Recycling in Waste Management in Developing Countries. Habitat International. 30. 797-808. https://doi.org/10.1016/j.habitatint.2005.09.005. Accessed on 4 January, 2021.

Wilson, D. (2007). Development drivers for waste management. Waste Management & Research: The Journal For A Sustainable Circular Economy, 25(3), 198-207. doi: https://doi.org/10.1177/0734242x07079149. Accessed on 4 January, 2021.

Zurbrügg, C., Drescher, S., Patel, A., & Sharatchandra, H. (2004). Decentralised composting of urban waste – an overview of community and private initiatives in Indian cities. Waste Management, 24(7), 655-662. Available at: https://doi.org/10.1016/j.wasman.2004.01.003. Accessed on 4 January 2021.

---

[1] Members of CMC, Gurugram (Instituted in February 2018): Sudhir Krishna, Former Secretary, Ministry of Urban Development (now Ministry of Housing and Urban Affairs); Dr Lakshmi Raghupathy, Former Director, Ministry of Environment and Forests (now Ministry of Environment, Forest and Climate Change); Monika Khanna Gulati, NCR Waste Matters; Sonia Garga, Sahaas, Gurgaon; Smita Ahuja, I am Gurgaon

Young Voices

The Power of Knowledge for Action:
How Young People are Building Local Climate Resilience

Nikita Rakhyani[1]

Abstract

Climate change has become one of the central issues of concern for youth across the globe. From physical protests and rallies to virtual campaigns and manifestoes that demand change, young people are making their own space to influence climate change policies. While some of the youth are digitally connected, with tools to communicate their views to influence world leaders, several others are helping marginalized communities adapt to climate change in their everyday lives by building resilience at the local level to deal with the impacts of climate change., through actions linked to knowledge, learning, and mobilization.

Keywords: Youth, Climate Change, Locally-led Actions, Influence

> "You have stolen my childhood and my dreams with your empty words. You're failing us, but young people are starting to understand your betrayal."
>
> (Thunberg, 2019)

Change in weather patterns, with related changes in oceans and the land regionally and globally, is a scientific explanation of climate change. What does "climate change" mean as a lived experience for semi-literate or illiterate individuals living in semi-urban or rural areas, and in the informal settlements in large metropolitan cities in the global South? As a local community,

---

[1] Youth Trainer, Participatory Research in Asia (PRIA), New Delhi
Email: nikita.rakhyani@pria.org

excessive or inadequate rainfall in the cropping cycle, water scarcity or non-availability of clean water in homes, erratic temperatures, food spoilage due to increase in pests, insects, heat stress inside their shanty dwellings that lack ventilation, are some of the ways in which they can define their experience of climate change. These experiences affect the future of the young people living in these communities.

In a 2019 survey of 10,000 young people (aged 18-25) in 22 countries across six continents, for 41% of the respondents, climate change was a central issue of concern (Amnesty International, 2019). Greta Thunberg's words have been successful in collectivizing and inspiring adolescents, teenagers and youth from across the globe to fight for their futures. Several of these youth are social media-savvy, digitally connected, with tools to communicate their views to influence world leaders to do something about the climate emergency.

And there are several others, living in and helping marginalized communities adapt to climate change in their everyday lives by building resilience at the local level, through actions linked to knowledge, learning, and mobilization. This requires building the ability, especially of young people, through community programs, to anticipate, prepare for, and respond to catastrophic events and trends related to climate.

Youth in South Asia are using local knowledge for local action

Over the past year, the Participatory Research in Asia (PRIA) Youth team has engaged with youth from South Asian countries to document their narratives of local actions and systematize how local knowledge can be linked with the science of climate change. Youth representatives and leaders from various parts of the world shared their locally-led actions in a series of consultation, organized from November 2020 – January 2021 in run up to the

GOBESHONA Global Conference. Some of these experiences are documented below.

Recurring droughts, dry and warm conditions have become a visible outcome of climate change faced by smaller underserved communities and towns, and treated wastewater in such situations, encouraged as a substitute for natural freshwater, is a relatively difficult and expensive process to be adopted by poorer communities. Lalita Prasada Sripada Srisai, an undergraduate student of agriculture in a university in eastern India, has experimented with using locally produced and available corn cobs to produce a low-cost, eco-friendly method of purifying wastewater. Lalita's journey to bring a "new scientific solution" to the community began with understanding their local practices consumption and disposal of corn cobs. She adapted this lived knowledge to develop a cost-effective, easy-to-replicate method for the community, while she was studying in a school in Koraput district in Odisha.

Erratic temperatures have started impacting human and environmental systems in Myanmar. In the new township areas of Yangon, informal settlements are concentrated in the barren, exposed, open spaces with lack of tree cover. With increased traffic and pollution from factories and other sources, higher levels of heat are generated. This affects the health of the poorer residents of the city. Youth leaders, who play the role of community architects like, Phyo Thura Han, with the support of local community-based organizations, are stepping forward to raise awareness on the issue and to design participatory approaches in building community resilience.

Sameer Ahmad, a social work student from University of Delhi Delhi, is working to achieve responsible consumption and production, included in the UN Sustainable Development Goal (SDG) 12 for the efficient management of natural resources. To influence the lifestyle of his peers, Sameer has begun cataloguing simple tips and tricks that can help them adopt sustainable and

responsible ways of living. He also demonstrates these practices to raise awareness and promote healthy living.

Young people raising their voices to influence decision making at the national and global levels

PRIA collectivized the voices of youth from several countries and documented their concerns in Our Future, Our Voice: A Youth Manifesto on Climate Adaptation. The manifesto emphasizes the need for multi-stakeholder partnerships and collaborations at the community, regional, national, and global levels where families are also activated as equal stakeholders in contributing to climate adaptation policies. They want opportunities and resources to be made available to young people to participate in local initiatives.

They also demand that climate adaptation strategies be imbibed in the "educational conscience" of schools and higher education institutions, and researchers should use an intersectional lens of caste, class, gender, power, and inequality to understand the impact of climate change on local communities. Through this manifesto, the youth emphasize the need for effective community management in adaptation practices, by providing platforms for vulnerable and indigenous communities to bring their local knowledge, existing practices, concerns, and ideas to be included in the climate change discussions.

From physical protests and rallies to virtual campaigns and manifestoes that demand change, young people are making their own space to influence climate change policies. Their involvement in locally-led actions, using the knowledge and capacities of local communities, holds the potential to build resilience to deal with the impacts of climate change.

References

Amnesty International. 2019. Climate change ranks highest as vital issue of our time - Generation Z survey. Available at: https://www.amnesty.org/en/latest/news/2019/12/climate-change-ranks-highest-as-vital-issue-of-our-time/, Accessed on May 10, 2021.

Australian Academy of Science. The Science of Climate Change. Available at: https://www.science.org.au/learning/general-audience/science-climate-change/1-what-is-climate-change, Accessed on May 10, 2021.

Fridays for Friday. Strike statistics. Available at: https://fridaysforfuture.org/what-we-do/strike-statistics/list-of-countries/ , Accessed on May 10, 2021.

Greta Thunberg's full speech to world leaders at UN Climate Action Summit, September 23, 2019. Available at: https://www.youtube.com/watch?v=KAJsdgTPJpU, Accessed on May 10, 2021.

Participatory Research in Asia. Our Future, Our Voice: A Youth Manifesto on Climate Adaptation. 2021. Available at: https://www.pria.org/knowledge_resource/1623327919_Youth%20Manifesto%20on%20Climate%20Adaptation-%20English.pdf , Accessed on May 10, 2021.

Participatory Research in Asia. Young People up the ante at the Gobeshona Global Conference, January 10, 2021. Available at: https://www.pria.org/featuredstory-young-people-up-the-ante-at-the-gobeshona-global-conference-44-286, Accessed on May 10, 2021.

Inequality Report 2021:
India's Unequal Healthcare Story, Oxfam India

Vibhuti Patel[1]

Abstract

On July 20, 2021, Oxfam India released a valuable and timely document focusing on the current COVID-19 health emergency and its implications on socio-economic order: especially in terms of inequalities due to absence of universal access to health care services. This has left the essential services to the vagaries of the ruthless market forces. In five chapters, the report details the profile of health inequities, impact of health interventions and inequalities of outcomes in India, efficacy of government interventions and intersectional marginalities of caste, class ethnicity, gender, religion and location exacerbating existing inequalities and reveals how the neoliberal economic policies are enabling a super-rich elite and necro-capitalists to amass wealth in the middle of the worst deflationary spiral and the worst economic crisis in the post-independence period, while crores of dispossessed masses are struggling to survive, and millions are left hungry, malnourished and homeless.

[1] Gender Economist, Vice President, Indian Association for Women's Studies.
Email: vibhuti.np@gmail.com

Increase in Intersectional Marginalities and Inequity in Health Outcomes

The report reveals startling data and states that 2/3 households belonging to the general category have access to improved, non-shared sanitation facilities, while only 1/4th Scheduled Tribes (ST) households have improved, non-shared sanitation facilities. Majority of Scheduled Caste (SC) population have to live in the unhygienic conditions in the rural and urban areas and 12.6% more children among the SC households are stunted than the children in the general category.

For the bottom 1/5th population, chances for child mortality in 0-5 age group is 3 times higher as compared to the top 1/5th Indian population. Under the pandemic, in terms of health outcomes of general category are better than SCs and STs, rich are better than poor, Hindus are better than Muslims, urban is better than rural, men are better than women. It also reveals exacerbation on already existing stark inequalities after the imposition of nationwide lockdown in the first wave and partial and localized lockdowns during the second wave as a result of unemployment, hunger, homelessness, distress reverse migration and circular migration of millions of the working poor. The rich were economically secure and lived in the safety of gated communities, worked from home and could socially isolate themselves. They were also supported by the supplies of goods and services of the informal sector workforce and thereby able to escape the pandemic's worst impact.

Benefits for the Billionaires

The report highlights the how pandemic profiteers exponentially multiplied their incomes. The wealth of the Indian billionaires grew by 35% during the lockdown. For example, earnings of Ambani Group of Industries during the pandemic rose to

equivalent of earnings of the 40 crore informal workers who are currently leading lives of extreme deprivation and have their standard of living fallen below poverty line since July 2020. The report calculates that the increased wealth of the top 11 Indian billionaires' during the pandemic could have financed the National Rural Employment Guarantee Scheme (NREGS) or the public health budget for the next decade.

Precarity of the Informal Workers

The report brings to the fore a deplorable profile of the unorganized sector workers who have been the worst hit during last 15 months of the pandemic and avers that out of a total 122 million men and women who lost their jobs, 75% i.e. 92 million men and women workers/employees were rendered jobless in the informal sector. Exhaustion of savings within one month of lockdown, i.e. by May 2020, they were forced to vacate their rented dwellings due to their inability to pay the rents and this led to reverse migration of millions of men, women, children and elderly was full of multiple hardships, including starvation, dehydration, suicides, exhaustion, road and rail accidents, police brutality, denial of timely medical care and deaths. As per the official data, over 2582 cases of human rights violation were reported with the National Human Rights Commission (NHRC) within one month of nationwide lockdown during March-April 2020.

Digital Divide and Poor Children Forced out of Education

The report profiles distressing scenario of students from underserved communities driven out of school and college education due to inability to access online education as less than 15% rural households had an internet connection and only 4% of rural households had a computer. The girls from the poverty

groups and lower middle classes have been major casualties of school and college education as barely 16% of rural girls and women could either use a computer or the internet- the reason being no access to devices, or in case they had a computer or a smart phone, they could not afford regular recharges of data and also persisting lack of electricity supplies.

In the absence of the state stepping in to provide online accessibility and last mile connectivity to these out of school children and young adults, all the gains of last 150 years of modern education have been reversed and rampant incidences of child labour, forced marriages and child marriages and trafficking of children have occurred under the cloak of lockdown and the collapse of governance structures. Unregulated market of private providers of digital platforms are thriving and generating huge profits.

Socio-economic Determinants of Inequalities in Health and Sanitation Services

Oxfam India conducted a survey on health inequalities during the pandemic in seven states of Andhra Pradesh, Maharashtra, Uttar Pradesh, Delhi, Kerala, Bihar and Odisha. The survey revealed that 768 respondents were either infected with coronavirus or had recovered from COVID-19 onslaught. It showed that the percentage of respondents in higher income groups who could arrange for transport themselves was double than that of the low-income groups. Even the percentage of respondents who faced social stigma due to being COVID-19 positive was five times higher in low-income brackets than among COVID positive patients in high income brackets.

When it came to non-COVID-19 health services, only 18.2% in the general category faced hurdles while more than 50% of SCs and STs faced difficulties in accessing non-COVID medical facilities for patients with comorbidities and reproductive

health needs. We are aware that sanitation is the most important factor in containing coronavirus infection. Here too, there were inequalities in accessing clean and safe water and SC communities faced 4 times more hardships and were forced to manage with unsafe water sources. Even after 6 years of an official launch of 'Clean India Campaign', only 6% of the poorest 20% in the bottom of the economic pyramid have access to non-shared sources of sanitary toilets with running water, compared to 93.4% of the top 20% of the population. Physical distancing or body distancing as demanded by COVID-19 advisory was not possible for 60% of India's population which lives in one room tenements or are homeless.

Gender Differential Impact

The report brings out a startling figure the gender implications of the pandemic and state that within one moth of the lockdown, 17 million women lost their jobs. In April 2020, more poorer women lost their livelihoods that their upper income counterparts. Moreover, the total time spent in both paid and unpaid activities by women rose, with increased labour intensity. Women have been working longer hours for paid work and simultaneously managing the daily chores of cooking, cleaning, procuring essentials, catering to the educational needs of the children and care work for all members of the family in the midst of varied health emergencies. The work-from-home culture has also blurred the lines between working hours and me-time. The survey results highlighted that gender-based violence has emerged as a major shadow pandemic and 33.9% women and 18.2% men respondents experienced anxiety, irritation and anger, and sleep deprivation during the lockdown.

Need for Fiscal Expansion

The report acknowledges that under Ayushman Bharat- Pradhan Mantri Jan Arogya Yojana (PMJAY) the scheme covered population living below poverty line, but it left out the uninsured poor and the middle class who were economically ruined by the rent-seeking private health providers. In this regard, the report applauds Kerala for robust public healthcare system as well as the farsighted response of the state government for allocating funds, functions and functionaries to combat CIVID-19 pandemic.

The report urges that the budgetary allocation for public health must be enhanced to 2.5% of GDP so that preventive and promotive healthcare can be strengthened and out-of-pocket expenditure can be reduced. Public funding for education also demands budgetary allocation of 6% of GDP. Social security and social protection of informal sector workers in terms of registration of all workers and income support to the unemployed persons also demands financial allocation by the state. The report conveys that to finance the increased government expenditure is possible by progressive taxation of the richest members of the society as well as the corporate houses.

Conclusion

In essence, the Inequality Report 2021: India's Unequal Healthcare Story by Oxfam India is in the public domain and easily accessible on the internet is a must read for all. The findings of the report are an eye-opener and need urgent action towards resolution of the multiple challenges plaguing the country, especially by its poorer and vulnerable citizens. It definitely serves as a conscience keeper for all conscious citizens, sensitive policymakers and responsible administration as it provides insights from the grounded reality of life worlds of all sections of population and provides evidence-based policy recommendations.

Towards Equality and Empowerment:
Reflections amid the COVID-19 Pandemic

Contributors

Amalendu Jyotishi	*Professor, School of Development, Azim Premji University, Bengaluru, India.*
Babu P. Remesh	*Dean, School of Development Studies, Ambedkar University Delhi (AUD), New Delhi, India; Lead Author, `SAAPE South Asia Migration Report, 2020'*
Dontha Prashanth	*Research Scholar, School of Economics, University of Hyderabad, Hyderabad, India.*
Doris H. Gray	*Professor of Gender Studies, Ex-Director, Hillary Clinton Center for Women's Empowerment, Al Akhawayn University, Ifrane, Morocco; Honorary Professor, Roskilde University, Denmark*
Gummadi Sridevi	*Associate Professor, School of Economics, University of Hyderabad, Hyderabad, India*
Monika Khanna Gulati	*Founder, NCR Waste Matters, Delhi, India; Member, Citizen Monitoring Committee, Gurugram, India*
Nikita Rakhyani	*Youth Trainer, Participatory Research in Asia (PRIA), New Delhi, India*
Raghu Bir Bista	*Associate Professor, Department of Economics, Tribhuvan University, Kathmandu, Nepal*
Shyamala K. Mani	*Senior Advisor, Centre for Environmental Health, Public Health Foundation of India (PHFI), Gurugram, India*
Utpal K. De	*Professor, Department of Economics, North-Eastern Hill University (NEHU), Shillong, India.*
Vibhuti Patel	*Gender Economist; Vice President, Indian Association for Women's Studies (IAWS), New Delhi, India*

Publishers

Samia Zennadi

Samia Zennadi is the Chairperson of IMPRI Impact and Policy Research Institute, New Delhi. An archaeologist by training, a publisher and an editor based in Algeria, she is also a co-founder of APIC éditions and a Founding Member of the Global University for Sustainability. She has written a book on the carpet craft in Algeria and oversaw the 'Espace Panaf' at the 15th International Book Fair of Algiers. She is a former member of the organizing committee of the International Festival of Literature and Youth Book (2008 to 2010). She started a literary magazine 'L'Afrique parle livres' and formerly organized the 'Frantz Fanon's Spirit event.'

Arjun Kumar

Arjun Kumar heads the Secretariat for the *Journal of Development Policy Review*. He is the Director of IMPRI Impact and Policy Research Institute, New Delhi and a China-India Visiting Scholars (CIVS) Fellow at Ashoka University. He holds a PhD in Economics from Jawaharlal Nehru University (JNU). With training in development economics, he specialises in quantitative and qualitative research methods, econometrics, and the use of statistical software to crunch big data. He has been associated with several think tanks, governments, civil society organizations, and private enterprises. He is President of a Jharkhand based NGO, Manavdhara. His research interests are in political economy, development studies, housing and basic amenities, urban and regional research, inclusive and sustainable development, data and evidence-based policy, and, research methods.

Rahul Guhathakurta

Rahul Guhathakurta is Founder and Publisher of IndraStra Global, New York. He holds an MBA from the International Management Institute and is a strategic management consultant, currently affiliated with Anaha Innovations — an Ahmedabad-based technology business incubator and private equity firm.

Anshula Mehta

Anshula Mehta is Secretarial Assistant for the *Journal of Development Policy Review*, and Senior Assistant Director at IMPRI Impact and Policy Research Institute, New Delhi. She graduated first class with a Bachelor's degree in Statistics from Sri Venkateswara College, University of Delhi. With evidenced grit to handle and crunch data and perform analyses, she also coordinates a new and innovative initiative by IMPRI, **GEN-α DC (Generation Alpha Data Centre, South Asia).**

Editorial and Publishing Team

Ritika Gupta
Senior Assistant Director, Assistant General Manager & Deputy Editor, IMPRI Impact and Policy Research Institute, New Delhi

Sunidhi Agarwal
Senior Research Assistant & Assistant Editor, IMPRI Impact and Policy Research Institute, New Delhi

Nishi Verma
Research Program Officer & Assistant Editor, IMPRI Impact and Policy Research Institute, New Delhi

Sakshi Sharda
Visiting Researcher & Senior Assistant Editor, IMPRI Impact and Policy Research Institute, New Delhi

Gby Atee
Visiting Researcher & Assistant Editor, IMPRI Impact and Policy Research Institute, New Delhi

Editorial Interns

Mahima Kapoor
Research Assistant and Assistant Editor, IMPRI Impact and Policy
Research Institute, New Delhi

Swati Solanki
Research Assistant and Assistant Editor, IMPRI Impact and Policy
Research Institute, New Delhi

Chhavi Kapoor
Visiting Researcher, Assistant Manager (Operations) & Assistant
Editor, IMPRI Impact and Policy Research Institute, New Delhi

Ishika Chaudhary
Visiting Researcher, Assistant Editor & Assistant Manager (Planning
& Implementation) , IMPRI Impact and Policy Research Institute,
New Delhi

Sajili Oberoi
Visiting Researcher, Assistant Editor & Assistant Manager
(Strategy), IMPRI Impact and Policy Research Institute, New Delhi

Journal Subscription Form- JDPR

Dear Managing Editor, JDPR

I/we would like to subscribe* to the print edition of the **Journal of Development Policy Review (JDPR)** published by **IMPRI Impact and Policy Research Institute, New Delhi**, with the following details-

Subscription Details:

Type (Individual/Institutional)	
Subscription selected (1-Issue/1-Year/5-Year/Life)	
Subscribing in (India/Outside India)	
Name	
Designation/Library/Dept.	
Organization	
Address with zip code	
Country	
Contact person	
Phone no (with country code)	
Email id/s	

Payment Details:

Subscription amount	
Currency (INR/US$)	
Mode of Payment (Cheque/Electronic Transfer/Payment Gateway/GooglePay/UPI/Others	
Payment date	
Payment details	
Bank details	
Any other details	

Date: **Place:**   **Signature:**

*Decision of allotment will be made by internal committee of JDPR.

USE THIS FORM FOR ACCESSING PRINT EDITION ONLY
https://www.impriindia.com/production/jdpr-journal/

Journal Subscription Form- JDPR

Subscription Rates

For Journal of Development Policy Review (JDPR)

(Quarterly: 4-issues in a year)

	Indian (INR)	Outside India (US $)
Individual		
One issue	600	20
One-year membership	2000	70
5-year membership	8000	300
Life membership	25000	1000
Institutional		
One issue	1200	40
One-year membership	4000	140
5-year membership	16000	600
Life membership	50000	2000

Mode of Payment:

Banking details	IMPRI Impact and Policy Research Institute Foundation Bank A/C: **920010074558708** Bank Name: Axis Bank Branch: Vasant Square, Delhi IFS Code: UTIB0003155 Swift Code: AXISINBB119 Trust Savings Account (SBTRS)
Cheque/DD	Payable to: IMPRI Impact and Policy Research Institute Foundation (SBTRS)Payable at: New Delhi
Google Pay Business/UPI	**7903446738@okbizaxis**

Completed subscription form(s), cheques/ DD and other communications may be sent to: jdpr.journal@gmail.com

Through post at:
C/O Dr. Simi Mehta, Managing Editor
Journal of Development Policy Review (JDPR)
IMPRI Impact and Policy Research Institute
92, Basement, J Block, Saket, New Delhi – 110017, India

USE THIS FORM FOR ACCESSING PRINT EDITION ONLY
https://www.impriindia.com/production/jdpr-journal/

JDPR | Journal of Development Policy Review
By Impact and Policy Research Institute, New Delhi

The **Journal of Development Policy Review (JDPR)** is a flagship research journal managed by **IMPRI Impact and Policy Research Institute**, New Delhi, and hosted on IndraStra Open Journal Systems. It is centred on topics having concrete implications for progressive development and covering a well-grounded policy analysis, in the fields of Economics, Politics, Governance, Geography, Sociology, Gender and Ethnic Discrimination, Development Studies, Environment and Climate Change, Anthropology, and International Relations.

JDPR | Journal of Development Policy Review
By Impact and Policy Research Institute, New Delhi

LinkedIn   Facebook   Twitter   Instagram

IndraStra
e-Journal Hosting Services