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AET-CHAIRMAN'S MESSAGE FOR THE JOURNAL 'PENINSULAR ECONOMIST'¹

- Rev. Fr Dr A G Leonard SJ

Rev. Fr Dr M Sebastian SJ², our AET's Founder-Chairman convened an extraordinary meeting. That was held in 2003 at AET's Head Quarters, St Joseph's College, Tiruchirappalli, attended by little more than 25 of our senior AET members. I too was present at that meeting, responding to his invitation. I was then Principal of SJC. In the course of his sharing Fr M Sebastian SJ referred to his falling health that stands in the way of his carrying out the responsibilities relating to our AET.



He sprang a great surprise announcing that I, (Fr A G Leonard SJ), would succeed him as AET's Chairman. For announcing such an appointment, he informed us all that he had already obtained the required permission from our Jesuit superiors. I don't hesitate to confess now, that my association with our AET then, was not in any way, spectacular.

Fr M Sebastian SJ founded our AET. He was known to be nurturing its growth. He has organized 23 AET's Annual Conference without interruption since its inception in 1980. He encouraged AET members getting into the art of publishing papers at popular and prestigious journals. He insisted on our presenting papers at every Annual Conference. All the papers later formed as the contents of our *Journal Peninsular Economist* (ISSN 0976-8270). We salute him and our AET members for perfecting the papers.

A praise-worthy feature of AET is that our gathering takes place *Every Year in a New Venue!* An AET member keen on holding our AET Annual Conference presents at the General Body Meeting of an Annual Conference a letter signed by his/ her college management expressing the willingness and readiness to conducting our AC in their venue, in the ensuing year. This letter contains an assurance regarding their financial support too. This highly honoured practice is our strength. All our AET members pay the venue authorities the Delegate Fee, well in advance, helping the Conference Secretary to get ready with materials required for our holding the AET Conference. Every one of us learns the great lessons on the generosity and magnanimity of the venue authorities. Arulmigu Pazhaniandavar College of Arts and Culture came forward to conduct our AET's Annual Conference – XLII. We were happy to observe that Tirupathi (HoD) was in Pazhani. Salute to the Local Governance. We leave to the choice of the venue authorities to have this Annual Conference for one or two days.

Our AET was initially intended to impart knowledge of teaching quantitative subjects such as Mathematics and Statistics. These subjects were not found in the syllabus then. Fr M Sebastian SJ was open to fresh ideas. He would say: *If you don't know, please ask; Please ask the right person; and please don't presume that you know.* We salute lovable and capable **Dr S Varadarajan** of Tamil Nadu Agricultural University, Coimbatore who was instrumental in imparting his services to make us all today handle easily such subjects including Econometrics.

¹ *PENINSULAR ECONOMIST* (ISSN 0976-8270) is AET's Journal reporting the proceedings of the Annual Conference – XLII, held at Arulmigu Palaniandavar College of Arts and Culture, Palani

² Rev. Fr M Sebastian SJ was my teacher and Head, Department of Economics during my PG studies, later Guide for my MPhil and PhD studies.

Today our AET facilitates members presenting and discussing papers pertaining to Indian Economy in general and Tamil Nadu Economy in particular. There are papers presented on the Regional Economy. We invite papers on the economy of the neighbouring districts of Palani, the conference venue. The areas chosen for discussion at the venues are new. It makes us all read new books, journal articles, reports etc. There are Best-Paper Presentation award.

Our appeal to our senior members is: please help our youngsters financially too.

In January 2004, our AET was holding its Annual Conference – XXIV at MDT Hindu College, Tirunelveli. Dr C N Chidambaranathan was Principal there. I too was there as a Life-Member. *Fr Sebastian SJ could not be present, owing to his fading health.* A senior AET official at the conference venue, brought to me for my signature a good number of certificates reporting the participation / paper-presentation of our members. I signed them all affixing ‘for’ before AET Chairman. On my return to SJC, I rushed to his room to report all matters relating to our AET Annual Conference just ended, to Fr Sebastian SJ. A few minutes prior to my arrival there, Fr M Sebastian SJ had passed away.

A healthy practice of our members is: there is no TA/ DA.

We have a fine practice. *No Spot Admission.*

Everyone is enabled to attend the Inaugural Session.

FEES and AWARDS

All, without exception, pay the Delegate Fee to the Conference Authorities.

The scholars attend the Annual Conferences as Annual Member or Life-Member.

The Paper-Presenters pay the Publication Fee.

Please note that our AET has some Awards: Young Economist Award, Senior Economist Award, the Best-Paper Presentation Award and Life-Time Award.

Each AET official carefully carries out the responsibilities assigned to him during the AC.

The members continue to experience at every venue some unexpected surprises and definitely not shocks.

I repeat my wish: TOGETHER WE MUST ADD, NOT SUBTRACT

Fr A G Leonard SJ

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Association of Economists of Tamil Nadu
Annual Conference – XLII - 2022

Venue : Department of Economics
Annamalai University
Chidambaram-608 002

Date : 27.02.2022

Presidential Address

By

Dr. T.R. JEYARAAJ,
Professor & Head,
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Peer Reviewed Journal

Presidential Address by

Dr. T.R. JEYARAJ

**Professor & Head, Department of Economics,
Annamalai University, Chidambaram-608 002**

Greetings. The Hon'ble Chairman AET Very Rev. Fr. Dr. A.G. Leonard, S.J, the Chief Guest of the day, Dr. K. Jothi Sivagnanam, Member, TNPSC Chennai, Mr. N. Natarajan, Correspondent, APC of Arts & Culture, Dr. P. Prabhakar, Principal (i/c), APC of Arts & Culture, AET Secretary Dr. D. Kumar, AET Treasurer Dr. G. Iruthayaraj, Rev. Fr. P. Paul Raj, PRO of AET, Dr. M. Suvakkin, AET Head Office Secretary, Executive Members of AET, Learned Members of AET, Press and Media Friends, Ladies and Gentlemen, Good morning to all. I deem it an honour and privilege to extend a warm welcome to everyone present in this historic place, on the occasion AET 42nd Annual Conference today 25th Feb. 2023. I whole heartedly thank all the AET members for giving me a great opportunity to be the President of Association of Economists of Tamil Nadu (AET), for the year 2022-2023. It is a great honour and a memorable occasion bestowed upon me. I feel proud to present the Presidential Address of Association of Economists of Tamil Nadu's 42nd Annual Conference.

This is the time to recall the sweet green memories of earlier golden days when I was associated with Very Rev. Fr. Dr. M. Sebastian, S. J. since 1984. He was the mentor for the development of my carrier as well as personality in different capacities, later with Very Rev. Fr. Dr. A.G. Leonard, S. J. and other eminent personalities. To name a few: Prof. M. Ramadoss, Prof. U. Shankar, Prof. T.C. Mohan, Prof. C. Thangamuthu, Prof. G. Velan, Prof. N. Durairaj, Prof S. Neelakandan, Prof. N. Rajalakshmi, Rev. Fr. Dr. P.P. George, Dr. C.N. Chidambaranathan, Dr. T. Padmanabhan, Dr. P. Jagadhish Gandhi, Dr. S.M. Suriyakumar, Dr. M.R. Nagarajan, Prof. R. Elango, Prof. N. Malathi, Prof. V. Dhulashi Brinda, Prof. J.A. Arul Chella Kumar and others too.

“Health is the greatest of Human Blessings”

- Hippocrates.

The present world is much more competitive, as we live in a globalized atmosphere. The whole world is in our palm. We can communicate anyone and everyone in the universe within seconds. It is very easy to receive and send information via electronic gadgets. In such a context, health plays a pivotal role, because ‘Health is Wealth’. To have a smooth and peaceful life, health is the primary concern. Health includes physical, mental, and spiritual well-being. If one is physically healthy, automatically, he feels mentally healthy. For maintaining good health status, income and education plays a vital role. It reflects the intake of healthy diets to maintain physical system effectively.

Nowadays, health is a major risk factor, which affects everyone irrespective of place, caste, creed, gender, and colour. So, health is the most important parameter to be considered for the development of a country.

The world's health status can be defined as the overall physical, mental, and social well-being of a population. It is influenced by a variety of factors, including access to health care, exposure to environmental pollutants, diet and nutrition, and lifestyle choices. For

example, countries that have higher levels of economic development generally have better access to health care, a healthy diet, and a higher standard of living, all of which contribute to improve health outcomes. In contrast, countries with poor economic development have less access to health care, environmental pollutants, and lower standards of living, which can lead to poor health outcomes.

The current global health status is affected by a number of factors, including demographic changes, economic development, and the spread of infectious and non-communicable diseases. One of the major challenges facing the world today is the ongoing COVID-19 pandemic, which has resulted in more than 200 million confirmed cases and over 4 million deaths worldwide as of September 2021. The pandemic has had a significant impact on global health, leading to increased mortality, morbidity, and mental health issues, and has also highlighted existing health disparities and inequalities.

Another major challenge is the increasing burden of non-communicable diseases (NCDs) such as cardiovascular disease, cancer, and diabetes. These diseases are responsible for the majority of deaths worldwide and continue to rise in the coming decades. There is also a significant gap in access to healthcare and health outcomes between developed and developing countries. Many developing countries face a shortage of healthcare workers, lack of essential medicines, and inadequate infrastructure and technology to provide basic healthcare services.

To address these challenges, the World Health Organization and many countries are implementing various initiatives such as strengthening primary healthcare, increasing investments in research and development for new treatments and vaccines, and implementing policies to address the underlying social and economic determinants of health. For example, the World Health Organization's Global Action Plan for the Prevention and Control of NCDs from 2013 to 2020 aims to reduce the number of premature deaths from NCDs to 25% by 2025. This plan focuses on reducing the major risk factors such as tobacco use, unhealthy diet, and lack of physical activity, as well as improving access to essential medicines and technologies for the prevention and control of NCDs.

Health Issues of World

1. Mental Health Problems

Mental health problems such as depression, anxiety, and dementia are more common among older adults. These conditions can be managed through therapy and medication, but can still have a significant impact on quality of life.

2. Mobility Issues

Mobility issues such as arthritis, osteoporosis, and other age-related musculoskeletal problems affect the quality of life of elderly people. Mobility issues limit the ability of older adults to remain active and independent.

3. Cognitive Decline

Cognitive decline is a normal part of ageing, but it is more severe in some people. Cognitive decline affects the ability of older adults to remember things, make decisions, and complete everyday tasks.

4. Sensory Decline

Age-related hearing and vision loss have a significant impact on the quality of life of elderly people. Loss of vision and hearing limits the ability of older adults to stay connected with their family and community.

5. Social Isolation

Social isolation is a growing problem among the elderly. Without access to family and friends, elderly people become isolated and lonely. This leads to depression and a decline in overall health.

6. Poor Nutrition

Aged persons in India often suffer from malnutrition due to a lack of access to nutritious food. This can further lead to a weakened immune system and a higher risk of chronic diseases.

Ageing is a natural process that affects everyone differently. The health of older adults in the world varies depending on many factors, such as their access to healthcare, lifestyle choices, and environmental factors.

Poor nutrition leads to a range of health issues in older adults. Without access to healthy foods, elderly people may be at risk of malnutrition, which can reduce immunity and increase the risk of chronic diseases.

India is a country in South Asia with a population of over 1.3 billion people. The healthcare system in India is a mix of government-funded public hospitals, private hospitals, and a large number of small clinics and healthcare centers. In terms of health indicators, India has a relatively high infant mortality rate of around 34 deaths per 1,000 live births, and a life expectancy of around 69 years. The country also has a relatively high maternal mortality rate of around 130 deaths per 100,000 live births. These figures are relatively low compared to many other developing countries, but are still higher than those of many developed countries.

India faces a number of public health challenges, including a high burden of infectious diseases such as tuberculosis and malaria, as well as a rapidly growing burden of non-communicable diseases such as diabetes and cardiovascular disease. There are also significant disparities in health outcomes between different population groups and regions within the country. The Government of India has been implementing a number of healthcare schemes and programs to address these challenges, including the National Health Mission, which aims to improve access to healthcare services in rural and remote areas, and the Ayushman Bharat scheme, which provides financial assistance to people from low-income families for medical treatment. Overall, while India has made significant progress in improving access to healthcare and addressing public health challenges in recent years, there is still much work to be done to improve the overall health status of the population and to address disparities in health outcomes between different population groups and regions.

India's present health status is not very good. The country has seen an alarming rise in the number of cases of communicable and non-communicable diseases. For example, India has the highest number of tuberculosis cases in the world, and also has one of the highest rates of heart disease, diabetes, and stroke. India also has the highest number of people living

with HIV/AIDS in the world, and an estimated 15 million people in India suffer from depression. These are just a few examples of the many health issues that India is facing today.

In addition, women in India are more vulnerable to communicable diseases such as tuberculosis and malaria. According to the World Health Organization (WHO), India accounts for 27% of the world's tuberculosis cases, and almost half of these cases are among women. Similarly, India has the highest number of malaria cases in the world, and women are more vulnerable to this infectious disease due to lack of access to preventive measures and health care. Overall, women in India still face considerable health challenges, and there is an urgent need to address the underlying causes of these health issues. This includes improving access to health care, increasing awareness about health issues, and providing economic opportunities for women.

Health Status of Aged persons in India

1. Chronic Diseases

Aged persons in India are more prone to chronic diseases such as diabetes, hypertension, arthritis, heart diseases, and cancer. These diseases are often accompanied by poor physical and mental health, which can further lead to disability and even death. Chronic diseases such as diabetes, heart disease, and cancer are more common among ageing adults. These diseases can be managed through proper diet, exercise, and medication, but can still cause significant health issues.

2. Poor Access to Health Care

Aged persons in India often lack access to quality healthcare, particularly in rural areas. This can lead to inadequate diagnosis and treatment of chronic diseases, leading to long-term disability and mortality.

3. Low Income and Poverty

The senior citizens in India are often living in poverty, which is further compounded by inadequate government benefits and pensions. This can lead to malnutrition and lack of resources to pay for medical care.

4. Mental Health Issues

Aged people in India face depression, anxiety, and other mental health issues due to loneliness and social isolation. Those with dementia and Alzheimer's disease face lack of support and understanding.

5. Unhealthy Lifestyle

The old people in India above 60 often lead an unhealthy lifestyle due to lack of physical activity, poor diet, and smoking. This increases the risk of chronic diseases, disability, and mortality.

Health Status of aged persons in Tamil Nadu

1. Physical Health

Many elderly persons in Tamil Nadu have physical health issues such as arthritis, chronic pain, heart disease, and diabetes. These can be managed through exercise, healthy diet, and regular doctor visits.

2. Mental Health

Mental health problems such as depression and anxiety are common among the elderly in Tamil Nadu. These can be addressed through counselling, therapy, and support groups.

3. Financial Security

Many elderly persons in Tamil Nadu face financial insecurity due to limited income and high medical expenses. Programs such as Medicare and Medicaid can provide financial assistance to help cover medical costs.

4. Social Connectedness

The elderly in Tamil Nadu often struggle with loneliness and isolation due to limited mobility and limited access to social activities. This can be addressed through support groups, volunteering, and senior centers.

5. Access to Health Care

Many elderly persons in Tamil Nadu have limited access to health care due to low income, lack of transportation, and limited insurance coverage. Programs such as Tele health and community clinics can provide access to healthcare services.

Tamil Nadu is a state in southern India that has a population of over 72 million people. The state has well-developed healthcare system with a network of government and private hospitals, clinics, and healthcare centers.

Women's health status today in the world is a complex issue. Globally, women face a number of health issues caused by the combination of biological, economical, and social factors.

Biological Factors

Women face a number of biological health issues due to the nature of their body. These include complications from childbirth, infertility, and diseases such as endometriosis, ovarian cancer, and breast cancer. Additionally, due to the lack of gender-specific research, many medical treatments are designed for men, making them less access for women.

Economic Factors

Women face economic challenges that affect their health. These include lack of access to healthcare services due to poverty, as well as a lack of paid maternity leave or other gender-specific benefits. Additionally, women often face job-related health hazards such as exposure to toxic chemicals, long working hours, and unsafe working conditions.

Social Factors

Social factors have a major impact on women's health. These include gender-based violence, cultural beliefs that limit women's access to healthcare, and lack of education regarding health topics. Additionally, stigma and discrimination limit women's access to treatment and support.

Overall, it is clear that women's health is a complex issue affected by a combination of biological, economical, and social factors. In order to improve women's health worldwide, it is important to address all these factors.

Women's health status in Tamil Nadu today is a cause for concern. Despite the state having the literacy rate of 80%, its health indicators remain very low. With the highest fertility rate in India, the infant mortality rate is also on the rise. According to the National Family Health Survey (NFHS-4) conducted in 2015-'16, the state has a Total Fertility Rate (TFR) of 2.3, which is much higher than the national average of 2.2.

In Tamil Nadu, women suffer from a range of health issues including anemia, malnutrition, cervical cancer, and reproductive health issues. Cervical cancer is one of the leading causes of death among women in the state, with over 40,000 women dying every year. Anemia is also a major health issue among women, with over 50% of women in the state being anemic. Additionally, Tamil Nadu has the high rate of female malnutrition, with over 60% of being malnourished. Reproductive health issues are also prevalent in Tamil Nadu. The state has one of the highest rates of teenage pregnancies, with over 15% of teenage girls giving birth before the age of 18. Additionally, there are high rates of maternal mortality with over 300 deaths per 100,000 live births.

Overall, the health status of women in Tamil Nadu today is a cause for concern. The state has high rate of maternal mortality, teenage pregnancies, and cervical cancer, as well as high levels of anemia, malnutrition, and reproductive health issues.

If the state is to improve the health of women, it must address these issues. According to the latest data, there is a wide gender gap in life expectancy and a high maternal mortality rate. Women are more vulnerable to HIV/AIDS, malnutrition, and communicable diseases.

The National Family Health Survey (NFHS-4) conducted in 2015-'16 found that the average life expectancy of women in India was 69.6 years, compared to 73.3 years for men. This shows a gender gap of 3.7 years in life expectancy. Maternal mortality rate (MMR) in India is also very high, with at 167 deaths per 100,000 live births in 2019. This is a decrease from 178 MMR in 2015-'16. The number of maternal deaths is higher in rural areas than to urban areas, and the numbers are the highest in some of the poorest states in India, such as Uttar Pradesh, Rajasthan, Madhya Pradesh, and Bihar.

HIV/AIDS is another critical health concern for women in India. According to the National AIDS Control Organization (NACO), the HIV prevalence rate among women in India was 0.26% in 2019, which is higher than among men (0.14%). Women are more vulnerable to HIV/AIDS due to lack of awareness, lack of economic power, and social stigma.

Malnutrition is another major health concern for women in India. According to the Global Nutrition Report 2018, India has the highest number of stunted children in the world (over 50 million). Malnutrition has a greater impact on women, as it increases the risk of maternal mortality, stillbirths, and low birth weight babies.

In terms of health indicators, Tamil Nadu has relatively low infant mortality rate of around 12 deaths per 1,000 live births, and life expectancy of about 74 years. The state also has relatively low maternal mortality rate of around 66 deaths per 1,00,000 live births. However, like many other states in India, Tamil Nadu faces a number of public health challenges. These include issues such as the high prevalence of non-communicable diseases like diabetes and hypertension, as well as high burden of infectious diseases like tuberculosis and HIV.

In recent years, the state has implemented a number of initiatives to improve women's health like the Maternal and Child Health Care program that provide free medical care for pregnant women and children up to the age of 5. The state has also implemented initiatives to provide access to family planning services and maternal health services. Additionally, the state provides free health check-ups and vaccinations to women. Tamil Nadu has also made significant investments in improving women's access to education. The state has implemented initiatives to ensure that girls are enrolled in schools and provided with quality education. This is coupled with initiatives to provide economic support to women, including access to microfinance and entrepreneurship opportunities. Overall, Tamil Nadu has seen improvements in women's health status over the last few decades, due to the state's focus on gender equality and access to healthcare and education.

In terms of nutrition, Tamil Nadu has made some significant gains in the recent years. The proportion of children under 5 years of age who are underweight has decreased from 41.7% in 2005-'06 to 28.5% in 2015-'16. Similarly, the prevalence of stunting has decreased from 46.9% in 2005-'06 to 33.7% in 2015-'16.

The state has also seen a decrease in the prevalence of anemia, with the proportion of children under 5 who are anemic decreasing from 71.6% in 2005-'06 to 56.9% in 2015-'16.

Women's health status in Tamil Nadu has improved significantly over the past few decades. The state has seen marked improvements in maternal and child health, as well as access to healthcare and better nutrition. Tamil Nadu has high rate of female literacy and strong focus on gender-equality in the state.

Tamil Nadu government has been implementing many healthcare schemes and programs to address these challenges, including the Tamil Nadu Health System Project, which aims to improve the quality of healthcare services in the state, and the Tamil Nadu Health Insurance Scheme, which provides financial assistance to people from low-income families for medical treatment. Overall, Tamil Nadu has a relatively strong healthcare system compared to many other states in India, but there is still much room for improvement in terms of addressing public health challenges and ensuring access to quality healthcare for all.

The health status of Tamil Nadu is largely good. The state has high rate of immunization and low infant mortality rate. An estimated 80% of the population has access to improved sources of drinking water and sanitation. The prevalence of HIV/AIDS is below the national average, with majority of cases being concentrated in the metropolitan cities of Chennai, Coimbatore, and Madurai.

Tamil Nadu Government provides access to quality healthcare services. The state has set up several primary health centers and community health centers which provide basic healthcare services. For specialized treatments, the state has the Rajiv Gandhi Government General Hospital in Chennai and the All India Institute of Medical Sciences in Madurai. The state has also set up several government hospitals and clinics that specialize in providing free care to the poor. In addition, the state has also set up several private hospitals that cater to the needs of the patients.

The following are the factors affecting the health of children:

1. Malnutrition

Malnutrition is one of the biggest health issues affecting children in India. According to the National Family Health Survey (NFHS-4) 2015-'16, over 35 percent of children under five are stunted (low height-for-age) and over 21 percent are wasted (low weight-for-height). In addition, nearly 42 percent of children under five are underweight.

2. Vaccine-preventable Diseases

Vaccine-preventable diseases such as measles, tuberculosis, and polio still plague the children of India. According to the World Health Organization, India accounts for nearly 60 percent of the global measles burden, with an estimated 1.7 million cases in 2015.

3. Anemia

Anemia is a major public health issue in India, affecting all age groups, including children. According to the NFHS-4, nearly 50 percent of children in India are anemic.

4. Diarrhoea and Dehydration

Diarrhoea is a major cause of morbidity and mortality in India, particularly among children. According to the NFHS-4, over 50 percent of children suffer from diarrhoea at least once in the last two weeks.

5. Respiratory Infections

Respiratory infections such as pneumonia and bronchiolitis are common among children in India. According to the NFHS-4, nearly 25 percent of children under five suffer from acute respiratory infections.

6. Neonatal Mortality

Neonatal mortality, the death of a baby within the first 28 days of life, is a major public health issue in India. According to the NFHS-4, the neonatal mortality rate in India is 28 per 1,000 live births.

Children's Health Status

Children's health status in the world is a complex and multifaceted issue. Poor health status in children is linked to poverty, inadequate nutrition, lack of access to healthcare, poor sanitation and hygiene, and environmental hazards.

Children's Health Status in Tamil Nadu is generally good. The state has a very high immunization rate, and the number of child deaths due to preventable causes decrease significantly over the past two decades. According to the National Family Health Survey (NFHS-4), 92.8% of children under 5 years in Tamil Nadu were fully immunized in 2015-'16.

Tamil Nadu also has high rate of antenatal care, with 94.6% of pregnant women receiving at least one antenatal care visit. The state also regularly screens children for malnutrition and other health problems, with 84.1% of children under 5 years having been weighed in 2015-'16.

1. Malnutrition

Malnutrition is a major cause of poor health among children worldwide. It is estimated that one in four children under the age of five is stunted, meaning they have abnormally low height for their age. Malnutrition is linked to a variety of factors, including inadequate diets, poor food availability, and lack of access to clean water and sanitation facilities.

2. Infectious Diseases

Infectious diseases continue to be a major cause of mortality and morbidity in children. Vaccine-preventable diseases such as measles, polio, and pertussis are still a major cause of death in children under five, particularly in low and middle income districts.

3. Chronic Diseases

Non-communicable diseases such as asthma, respiratory diseases like bronchitis; cardio vascular, renal, nervous and mental diseases, affect the health of children.

Thus this 42nd AET Conference aims to articulate health concern among the delegates attending this conference. The only message I wish to convey is Be healthy, Be happy. In order to be healthy, we should follow healthy habits which should be inculcated among children. Today's children are tomorrow's nation builders, they are the pillars of the nation. So it is the need of the hour to incorporate good healthy food habits in our children. Train our children in the traditional food, try the maximum to avoid junk food, which is the major root cause for all the diseases children face, which the previous generations had at the age of 50 or 60. This is the worst generation where the grandparents and parents see their grandchildren and children dying before their life ends.

So let us take an oath or swear that the members on the dias and off the dias will make constant efforts to make children healthy. It can't be achieved over night. Only a slow and steady step will bring about a gradual change in the minds of the children, which will enable to vision future India without being vulnerable to diseases.

I thank the learned members of our AET fraternity and all the dignitaries for their patient listening. Finally on this significant occasion, I thank the Chairman, Secretary, Treasurer, Local Conference Organising Secretary, Executive Members and the Members, Association of Economists of Tamil Nadu who organise the Forty Second Annual Conference in a successful manner.

I also whole heartedly thank all faculties of Post Graduate Dept. of Economics and particularly the members of the trustee of Arulmigu Palaniandavar College of Arts and Culture, Palani who help us to create a history in the historic place, Palani.

**Healthy India
Happy Bharat.**

Thank you one and all.

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Innovation Economics

Peer Reviewed Journal

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A STUDY ON INNOVATION AND ECONOMIC GROWTH IN INDIA¹

C. PRABU²

Introduction

India is an emerging economy. The average annual growth rate described the last decade was 7 per cent. India has been on a rising trajectory, over the past several years in the Global Innovation Index (GII), from a rank of 81 in 2015 to 46 in 2021. India ranks 2nd among 34 lower middle-income economies and 1st among 10 central and Southern Asian economies. Even though the government expenditure on education is meager as reported by the World Bank, the public expenditure on education was around 4.4 per cent of GDP in 2019 and only 3.4 per cent of GDP in 2020. The top performing countries in terms of talent development and retention are the ones investing holistically in education at all levels (primary, secondary and tertiary). This offers a substantial case for India to increase investment in education to 6-7 per cent of GDP, with combined contribution of central and state governments. Investment in research and innovation in India, which currently stands at about 0.7 per cent of GDP as compared to 4.3 per cent of GDP in a small country like Israel, needs to be significantly enhanced. From a stagnant range of 0.6 per cent to 0.7 per cent of GDP since last two decades, it is high time India allots at least 2 per cent of GDP to research and development.

Innovation

Innovation is a main component of sustainable economic growth. The two ways of increasing the output of an economy is increase the number of inputs that go into the productive process, or producing more output from the same number of inputs. The output can be increased by innovation or innovative production process. Essentially what Abramovitz did was to measure the growth in the output of the American economy between 1870 and 1950. Then he measured the growth in inputs of capital and labor over the same time period. He then made what were thought to be reasonable assumptions about how much a growth in a unit of labour and how much a growth in a unit of capital should add to the output of the economy. It turned out that the measured growth of inputs i.e., in capital and labor between 1870 and 1950 could only account for about 15 percent of the actual growth in the output of the economy. In a statistical sense, then, there was an unexplained residual of no less than 85 percent. (Nathan Rosenberg)

Objective of the study

1. To analyze the relationship between innovation and economic growth.

Methodology

Secondary data have been collected from the reports of World Bank and Government of India. The analysis period is 11 years i.e., from 2009 to 2020. Time series data has been used for OLS model, Linear Regression Model.

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Table 1: The Variables used in the Model

Indicators	Explanation
GDP Growth	Annual percentage growth rate
GDP Per Capita	Annual GDP Per Capita based on US Dollar
R and D Expenditure(% of GDP)	Annual percentage share of Research and Development Expenditure in Total GDP
Foreign Direct Investment	Annual Investment based on US Dollar
Exports	Annual Exports based on US Dollar
Education Spending (% of GDP)	Annual percentage share of Government Expenditure on Education in Total GDP
Unemployment Rate	Annual percentage of Unemployment rate
Patent	Annual No. of Patent Applications Filed

Result and Analysis

A linear regression model postulated with seven independent variables such as GDP per capita, unemployment rate, exports, FDI, patents filed, Govt. expenditure on education, R&D expenditure. The model runs as:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \mu$$

Where,

- Y = Percentage of GDP growth rate
 β_0 = Intercept
 β_i 's = Regression coefficients
 μ = Random disturbance term: $(\mu_i \sim 0, \sigma_i^2)$

Table 2 ANOVA

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	217.939	7	31.134	110.227	0.000 ^b
Residual	1.130	4	0.282		
Total	219.068	11			

Table 3 Coefficients

Model	Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t
(Constant)	96.073	7.498		12.813
Unemployment Rate	-6.068	0.598	-0.644	-10.147
Exports	-0.032	0.008	-0.507	-3.764
Foreign Inflow	-0.058	0.042	-0.144	-1.399
Patents field	0.000	0.000	-0.358	-3.386
Government expenditure on education	0.733	0.585	0.074	1.253
R&D Expenditure	-43.872	6.494	-0.523	-6.756
GDP per capita	0.001	0.003	0.050	0.273

Table 4 Coefficients

Model	Sig.
(Constant)	0.000
Unemployment Rate	0.001
Exports	0.020
Foreign Inflow	0.234
Patents field	0.028
Government expenditure on education	0.278
R&D Expenditure	0.003
GDP per capita	0.799

R square value is 0.995 and adjusted R square value is 0.986. The result indicates that 98.60 per cent of variations in the dependent variable have been explained by the selected independent variables. The F value is 110.227 which is also found to be significant at 1 per cent level. The variables namely Unemployment Rate and R&D significant at 1 percent level and had a negative relationship. It is clear that when economic growth rate & positive then it would reduce the unemployment rate. It is interesting to note that expenditure on R&D is not significantly contributed to India's economic growth rate, this may be due to expenditure on this head is very less in India. Therefore, India should spend more amount towards R&D. The other variables such as Exports and Patent field have significant at 5 percent level and had a negative relationship. It is highly shocking and difficult to explain the negative relationship between economic growth rate and exports. But Patents is not significantly contributed the country's economic growth rate; this may be due to our innovation is not attracted the investment and thereon profit.

Conclusion

The study investigates how specific is the impact of innovation on economic growth. The results clearly reveal that India should concentrate more on R&D and should spend significant amount for this in a meaningful way. Similarly, the profitable avenue should be identified and patents might get on this area. Consequently, country like India attain higher economic growth rate in short period.

THE IMPACT OF A TECHNOLOGICAL INNOVATION AND ECONOMICS OF PRODUCTION³

Dr. A. MARIMUTHU⁴ & Mr. S. HEMANATH⁵

Introduction

Technological Innovation implies developing new thoughts, items, administrations, and Procedures that improve and provide technology solutions in the area of production. Innovations are simply regarded to be the outcome of skilled labor force, business activity, significant research and development intensity with linkages to the most crucial centers of excellence in the scientific world. The importance of innovation is broader however, it does not comprise of only new products or processes, but includes improved ones which have resulted from callow-tech sectors, that might have economic and social effects. In an attempt to boost innovative activity of production enterprises, specifically technological innovation, there exist an increase in awareness worldwide so as to maintain or enhance the competitiveness. The emergence of new methods in technology innovation has contributed immensely to its benefits.

Objective

1. To briefly comment on the impact of technological innovation on economic growth

Technological innovation, a major force in economic growth

It is taken as axiomatic that innovative activity has been the single. most important component of long-term economic growth.

In the most fundamental sense, there are only two ways of increasing the output of the economy: The government either increase the number of inputs that go into the productive process, or think of new ways in which the production process gets more output from the same number of inputs. And, an economist is bound to be curious to know which of these two ways has been more important - and how much more important.

To sum up

Technological innovation provides wages and means to the development of the society. Technological innovation has also transformed the patterns of people. The use of technology has also led to the growth of the sixth generation technology. There are different aspects of redefining the link between society and environment. It is crucial to formulate techniques, transformations, renewals, and regenerations that deal with the creation of a developed economy.

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ENVIRONMENTAL SUSTAINABILITY WITH THE ROLE OF GREEN INNOVATION AND ECONOMIC GROWTH IN INDIA⁶

Dr. R. SARAVANAN⁷

Introduction

Green technology is the technology which is environment and eco-friendly, developed and used in such a way so that it should not disturb our environment and conserves natural resources which lead to sustainable development. However some people refer green technology as environmental technology and clean technology which is intended to protect environment and mainly to conserve natural resources. The present expectation is that this field will bring innovative changes in daily life of similar magnitude of information technology.

Promotion of Green Economy

Government takes initiatives to promote green technology and introduced many fiscal incentives that generate electricity from renewable sources. Import duty and sales tax exemption for solar systems equipment, sales tax exemption for the purchase of solar heating system equipment from local manufacturers. Ministry of Energy has also implemented national level programmes to raise awareness about renewable energy and promote green technology. Green Technology is the development and application of products, equipment and systems used to conserve the natural environment and resources, which minimize and reduces the negative impact on environment by human activities.

Green Technology refers to products, equipment or systems which satisfy the following criteria:

1. It minimizes the degradation of the environmental segments and natural resources;
2. It has zero or low greenhouse gas (GHG) emission is safe for use and promotes healthy and improved environment for all forms of life;
3. It conserves the use of energy and natural resources;
4. It promotes the use of renewable resources.

Goals of Green Technology

- To meet and cater the needs of society in such a way without damaging or depleting natural resources on earth is the main objective of green technology.
- To meet present needs without making any compromises. Focus is being shifted on making products that can be fully reclaimed or reused. By changing patterns of production and consumption, steps are being taken to reduce waste and pollution, as one of the important goals of green technology.
- It is essential to develop alternative technologies to prevent any further damage to health of human beings and other living beings and its advantages and their disadvantages of the green technology.

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Methodology

Importance of Green Technology Green technology, an environmentally friendly technology is developed and used in a way that protects the environment and also conserves natural resources. A part of the renewable energy branch of the environmental technology, the importance of green technology cannot be ignored. We have come to a point, where we need to pause and reflect on the growing green technology importance and why it is going to be important for humanity. With many reasons behind green technology importance, perhaps volumes can be written and spoken on the subject. Whether it is the growing importance of green technology in the industry or at homes, it is certain that things need to be done fast. It does not take a rocket - scientist to state that mankind has to do something about clean environment and save energy resources. Going green can only help us come out of the present tough situation. Before things turn for the worst, we should realize the green technology importance to solve this problem.

Pillars of green technology policy are

- Energy – Seek to attain energy independent and promote efficient utilization;
- Environment - Conserve and minimize the impact on the environment;
- Economy - Enhance the national economic development through the use of technology; and
- Social - Improve the quality of life for all

Discussion

Solar energy, wind energy, ocean energy, energy conservation, Bioremediation are some of the green technologies which are intended to protect environment and conserve natural resources. Solar Energy Solar power is quickly becoming a major contender in the race for renewable energy. About 89 petawatts of power are available at any given point in time, 6,000 times the power consumed by all human civilization. In 14.5 seconds, the earth absorbs as much solar energy as humanity consumes in 24 hours. There are various application of solar energy. For example Solar energy can be harnessed for water distillation through evaporation. After placing translucent material over a moist patch of ground, in a manner that does not allow air to escape, the evaporated water which becomes a liquid on the surface of the material. This water can then be gathered into a cup or another container of some sort. The water produced is pure, and can be safely drunk.

India's solar power generation capacity stood at over 9 GW as on December 31, 2016 with Tamil Nadu having the largest output capability followed by Rajasthan and Gujarat. Gujarat (1.16 GW), Rajasthan (1.32 GW), and Tamil Nadu (1.6 GW) have crossed 1 GW solar installations..., while Andhra Pradesh (0.98 GW), Telangana (0.97 GW) and Madhya Pradesh (0.84 GW) are close to these states. Solar power development varies from state to state depending on solar irradiance, availability of conducive state policy for the sector, availability of land, cost of financing and business environment such as willingness of DISCOMS to purchase the solar power, power evacuation infrastructure, etc.

The government is promoting solar energy through fiscal and promotional incentives such as capital and/or interest subsidy, tax holiday on the earnings for 10 years, generation-based incentive, accelerated depreciation, viability gap funding (VGF), financing solar

rooftop systems as part of home loan, concessional excise and custom duties, preferential tariff for power generation from renewables, and foreign investment up to 100 per cent under the automatic route, etc. This apart, the government has been supporting solar manufacturing by way of various mechanisms such as Modified Special Incentive Package Scheme (M-SIPS) of the Ministry of Electronics & Information Technology.

Wind Energy

Wind energy is a capable source for renewable energy, but the uncontrollable nature of the wind presents concerns. Unsteady winds do not provide the best aerodynamic performance for wind turbines and sudden, uneven gusts can lower the productivity of the blades. Under National Wind Resource Assessment programme, Ministry through National Institute of Wind Energy, Chennai (erstwhile Centre for Wind Energy Technology (C-WET)) and State Nodal Agencies had installed and monitored 794 dedicated Wind Monitoring Stations (WMS) of height ranging from 20 m to 120 m (20m, 25m, 50m, 80m, 100m & 120m) throughout the country as on 31.12.2014. Initially the wind monitoring was carried out only in known windy areas. Now it is extended to new / uncovered areas which are not explored in earlier projects to complete the Indian Wind resource mapping. Further hundreds of private winds monitoring stations are also operational in the country. Based on the analysis on the data collected from these 700 plus WMS, it is found that 237 stations have economically preferable wind power potential greater than 200 W/m².

Ocean Energy

At present, the possibility of globally-dominant, large-scale, ocean energy plants is just that: an attractive possibility. As with any new technology, existing marine energy devices possess limitations. Their construction and maintenance may currently prove financially demanding, and not all sites are suitable for their effective implementation. However, these problems will likely soon see solutions, and ocean energy conversion may soon produce as much as, if not more electricity than other forms of green energy, such as traditional wind power systems.

Energy Conservation

Energy Conservation can be achieved by the use of equipment which requires lesser amount of energy, following low consumption of electricity; thereby reducing the use of fossil fuels to generate the same. Energy conservation and efficiency are both energy reduction techniques.

Water Treatment

It is a step by step processes used to make the water more suitable for the end users. The use of such water categorized broadly among drinking water, industrial use, and medical use and also for other uses. The main objective of water treatment is the removal of pollutants in the water, so as to make it suitable for further use. From the viewpoint of environment water treatment is used to reduce the adverse impact of the water returning to the environment after its use. Settling, filtration, disinfection, coagulation are some of the basic physical and chemical processes employed for water treatment. Also aerated lagoons, activated sludge or slow sand filter are some prominent process.

Environmental Remediation deals with the removal of pollutants from the natural resources such as ground water, water reserves on earth surface, soil for the protection of environment and human health. Attaining Environmental Sustainability via Green technologies by using various green technologies in a systematic way with strategic plan there is a probability of attaining environmental sustainability which helps in conservation of natural resources and protection of environment. The technologies like fuel cell and renewable energies are getting much exposure as green technologies as they can be easily adapted in the existing infrastructure. Green Transport is an application of fuel cell and renewable energies, so the adaptability of this depends on how well fuel cell and renewable energies are implemented. The risk associated with "dirty" technologies such as the petroleum products are alarmingly raising. The "clean" technologies as a result, are expected to provide lower risk alternatives. Most of the governing bodies in developing and developed countries are investing large amount of money into clean energy market and pursuing businesses facilitating renewable energy technologies that are energy efficient. One of United Nations Environmental Program's report states, in 2006, \$2.9 billion was invested in clean technologies (mostly in wind, solar and other low-carbon energy technologies), which was 80% higher over 2005. As climate change threat has spurred green investing, UNEP coins this trend as the "world's newest gold rush". Green Technology (GT) covers a broad group of methods and materials for generating energy to non-toxic cleaning products. The main reason, this area has been significantly important is because most of the people expect a dramatic innovation and changes in their livelihood. The development of alternative technology should attempt to benefit the planet truly protecting the environment and mother earth. This technology meets the needs of society in ways that can continue indefinitely into the future without damaging or depleting natural resources. In terms of the technology that can create products, which can be fully reclaimed or re-used, such cradle to grave cycle of manufacturing has successfully reduced waste and pollution by changing patterns of production and consumption. The innovations in technology have aroused interest in developing alternative fuels as a new means of generating energy and energy efficiency. Furthermore, GT is the application of green chemistry and green engineering, one of the most exciting fields of technology, which is supposed to transform the way that everything in the world is manufactured.

The world relies on large amounts of energy. The level of dependency has increased on fossil fuels such as oil, gas and coal. Energy is important for sustaining the planet and therefore the task before us is to assess and utilize various sources of energy that occur naturally in the environment. Green technologies definitely shows prominent results in utilizing various alternative energy resources to overcome the present energy demands and also promotes sustainable development.

Conclusion

Green technology is a must in today's scenario to achieve environmental sustainability and also to lead sustainable life. Because the conventional technology is challenging the sustainability of today's environment. Although some problems are coming in the way of its implementation but if we see its long term implication it's for sure we and our future generation will be benefitted. Also using green technology we can conserve our limited energy sources to some extent. In India, the demand for private transportation is alarmingly increasing because of the inadequacy of public transportation system. The development of

eco-friendly and affordable public transportation solution is not therefore, a question of choice, but the need of hour. This can be solved by green technologies with proper research and development. There is a huge construction work going on in India. The concept of environment-friendly or green building needs to be adopted by developing locally relevant all-weather building technologies and construction methodologies to reduce increasing dependency on air-conditioning. Almost 70 per cent of Indian population depends on agriculture, which is one of the energy intensive sectors. Agriculture consumes about 35 per cent of the total power generated through electrically operated pump sets. It is expected that about 30 per cent of savings is possible through appropriate technology. Finally, Green technologies would definitely help in attaining environmental sustainability if utilized systematically.

Peer Reviewed Journal

ROLE OF INNOVATION AND ECONOMIC GROWTH IN INDIA⁸

Dr. A. CHANDRAPRABHA⁹

Introduction

Many technological advances have been made in the last 20 years, including a digital communications revolution driven by exponential increase in computer power. By 2035, scientific developments and innovation will have again reshaped the technologies which help deliver economic productivity.

Changes in Science and Innovation in 2035

Science and innovation are fundamental to economic growth, with research and development a big determinant of total factor productivity, especially when researchers are well connected with consumers.

- the science of information and data is perhaps the most fundamental research topic of the century advances in technologies to analyse information and data will hasten progress in physics, chemistry, biology, social science and economics
- current trends point to the advent of a suite of new digital technologies, such as machine learning, optimisation, artificial intelligence, robotics and distributed ledgers
- the imperative to meet global challenges such as climate change and water scarcity will also set the direction of scientific endeavour.

Communications technologies

Communications technologies and globalisation will continue to offer greater opportunity for collaboration in scientific research but also more competition in commercial development. For many economies, intellectual property is already the greatest economic resource.

Against this backdrop, knowledge-intensive companies that innovate and export will remain the most profitable, competitive and productive.

Innovation has been embedded in the development of humankind since its inception. It has helped guide a new world order rooted in scientific and technological excellence and paved the way for the kind of discoveries believed to be unachievable a few years back. From the discovery of fire to the progress that we have made to develop vaccines in record times, innovation has helped to overcome the challenges faced by humanity. Even during the Covid-19 pandemic, the world started to explore newer options in terms of procuring goods and services – from groceries to education and insurance. In this backdrop, India has seen considerable progress in recent times where technology or innovation hubs like Bangalore, Mumbai, Delhi, and Chandigarh, among others have helped enhance this new trade by showing commendable efforts in sectors like pharma, automobile, and education, to name a

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few. This progress has resulted from public-private partnerships, academic collaborations, and foreign capital, to mention a few, enabling India to register higher growth and emerge on top in sectors like pharmaceuticals and telecommunications.

Ministry of Commerce and Industry

According to the Ministry of Commerce and Industry – being at the 3rd spot in terms of volume and 14th in terms of value – the Indian pharmaceuticals market is projected to reach USD 120-130 billion by 2030, from USD 42 billion in 2021. Moreover, India also took over the UK to climb to 3rd spot in terms of total unicorns in a country after US and China, taking its total unicorn numbers past 100. Not just pharma, India has lately witnessed the rise of its Edtech sector, which is expected to grow to USD 4 billion from the current USD 750 million, according to the India Brand Equity Foundation (IBEF). All this has been possible with the relentless efforts at the government, business, or individual level to find simple and innovative solutions to cater for the rising needs and demands of the people. But has India done enough to be called the ‘innovation hub’ of the world? We try to find this by looking at some numbers.

Innovation is a vital driver of economic advancement that helps customers, industries, and the economy in its entirety. In financial terms, innovation defines the development and application of visions and technologies that enhance goods and services or make their production more efficient. India is moving towards an innovation-led economy, because inventions bring new concepts and technologies, and produce more important outputs with the same input. This results in better-made goods and services, boosting earnings and business profitability.

India fosters innovation by executing structural standards such as improved spending on research and development, funding in education, and facilitating entrepreneurs to initiate an enterprise more efficiently and for failed businesses to retire the market more quickly. It is also carrying its intricacy to its benefit by utilising the extensive and heterogeneous user segments in India that are keen on exploring new solutions to their unmet needs. The combination of strong capabilities and mature varieties makes India a productive innovation base.

India is comprehensively prepared to steer in a new age of creation and expansion in the current scenario. Compelled by 'Atmanirbhar Bharat' and 'Make in India' endeavours, there is a solid stimulation to empower the regional manufacturing sectors that would, in turn, contribute to the production of innovative products at economical rates. Along with improving the production scale, India has also strived to enhance its study capabilities by introducing new Science, Technology, and Innovation Policy 2020. These efforts play a critical part in promoting the country's innovative power.

The government's Atal Innovation Mission, DST-NIDHI's PRAYAS, Digital India and Startup India has also uplifted the entrepreneurial spirit. These initiatives have facilitated access to the essential resources to harness the youthful vibrancy of the country. The current innovation ecosystem has been made a part of India's policy plan to expand, bolster and drive a positive impact.

Startups

The past decade has seen numerous Indian harboured brands (startups or otherwise) tapping into the global market with their product and service. Whether it's a premium skincare brand like Forest Essentials or an affordable brand like Lenskart, this approach is still impeccable. They create an ingenious solution to an existing void and ensure that they craft high-quality products and services. Service brands like Ola and Zomato are positively expanding their offerings across nations after having perfected their product through numerous rotations of iteration with user segments in India. Indian creators are creating services and products designed to provide an increase in complex capabilities related to technological constraints, user segmentation, and competitive prices. This allows for the advantageous transfer of innovations to different markets with parallel potential demands. India is an invention creator among emerging countries, and it demonstrates its innovation leadership in other developing countries in a unique way.

As India steers into an undetermined future where the global economy is still staggering from the pandemic, innovation harbours the key to transitioning any developing economy toward the developed class. India has the potential and ability to be such a country that alters its economic originality by leaning on innovation.

Innovation trends in big economies

The GII aims to capture the multi-dimensional facets of innovation and provide the tools that can assist in creating policies to promote long-term output growth, improved productivity, and job creation.

Trends in Indian innovation ecosystem

The Indian economy has become more market- and service-oriented, and is attracting increasing FDI through deregulation of markets and a favourable tax regime after the liberalisation of the 1990s. As seen from the experiences of developed economies, R&D can foster the growth of the present US\$ 3-trillion Indian economy. In meeting the growth targets, the essential innovations are in the agriculture, manufacturing, transport, energy, digital governance, and medical sectors. The factors that could catalyse the growth of Indian R&D ecosystem include increased R&D investments, quality education, participation of private sector and universities, incentives for the startup companies, and reasonable taxes for startups.

R&D missions and spending

Investments in the R&D infrastructure and human resources are the primary requirements for any effort at innovation-driven economic development. According to 2020 statistics, the US and China contribute about 50 percent (US\$ 0.85 trillion) of the global R&D spending, and eight more countries contribute 30 percent. France has spent 2.1 percent of its GDP (US\$ 60 billion) consistently over the past two decades, and Japan allocates US\$ 165 billion to R&D, or 3.15 percent of its GDP. China's R&D expenditure, meanwhile, witnessed an almost 30-fold increase from US\$ 13 billion (0.7 percent of GDP) in 1990 to US\$ 410 billion (2.8 percent of GDP) in 2018. Countries like Israel and Korea spend around 4.5 percent of their GDP for R&D.

Education and researcher density

The measure of researcher intensity determines the number of patents filed, contribution to scientific journals, and industrial trademarks registered. According to the Times Higher Education (THE) ranking for 2020, based on 13 performance indicators—including teaching, research, citations, international outlook and industry outcome by technology transfer—the US tops the list with 60 universities in the top 200, followed by the UK with 28 and Germany, 24. The University of Oxford in the UK maintains the top position. and China has seven of its universities in the top 200. Six Indian universities occupy the top 500 list including the Indian Institute of Technology (IIT) and Indian Institute of Science (IISC). About 35 universities are in the list of the top 1,000.

Private and University participation

In 2020, the biggest contributor to R&D in India is the government (See Table 7). In developed countries, it was the business sector, followed by universities. These figures indicate that in the wealthier countries, R&D is largely market-driven—this characteristic increases the likelihood of product innovation and, consequently, their export potential. For India, because of the strains in financial resources, developing quality institutions and promoting cutting-edge research will only be possible with the active participation of the private sector. The government has initiated steps to stimulate the R&D spending of private business enterprises from the current 0.35 percent of GDP. Previously, about 42 percent of the global 500 R&D spenders have product research centres in India, a proportion that is projected to increase to 49 percent by the end of 2021.

Knowledge-based startups

Globally, hi-tech exports are dominated by aerospace technology, high-performance computers, pharmaceutical products, scientific instruments, and electric machinery.

Monitoring the evolving nature of India's imports and exports can help identify innovation gaps.

Table 1 Role of agencies in R&D ecosystem

	China	France	India	Japan	USA
Business enterprise	78%	67%	42%	82%	78%
Government	15%	11%	53%	8%	11%
Higher education	12%	22%	5%	10%	11%

Inclusive Innovation Strategy

Let us understand the concept of inclusive innovation clearly. Inclusive innovation is any innovation that leads to affordable access of quality goods and services creating livelihood opportunities for the excluded population, primarily at the base of the economic pyramid, and on a long term sustainable basis with a significant outreach

First, the term 'any innovation'. The innovation can be technology led or it could be non-technological, or it can be a combination of both.

It could be a combination of technological and non-technical innovation. The Indian telecom revolution of low cost mobile services, came about due to a business process innovation done by the Indian telecom service providers. However, it was the technological innovation producing handsets at the price point of \$ 20 – \$ 30 by the leading telecom companies (such as Nokia, for instance) that led to an 'affordable access' to a handset. In, other words, in this case, the 'affordable access' to a handset was provided through a 'technological innovation' and 'affordable access' to low cost telephone calls was provided through a 'non-technological' business process innovation. One without the other would not have worked for the consumer, but the combination worked.

Conclusion

The experiences of successful countries show that science, technology and innovation policies that are integrated into national development strategies can help raise productivity, improve competitiveness, and foster economic growth. For India, various initiatives have pushed the country up in the global innovation index from 57th position in 2018 to 48th in 2020. Strategic efforts are required for stimulating the innovation ecosystem for encouraging ambidextrous, multipolar and disruptive innovations to meet the dynamic market conditions, urbanization needs, and environmental sustainability. Sustained increase in the research and development spending from the current level of 0.62 percent of GDP to the level spent by developed countries is essential if India is to aim to create world-class research facilities, improve the quality of education, increase the participation of the private sector and universities, and encourage startup companies.

GLOBAL ENTREPRENEURS - AN OVERVIEW¹⁰

Dr. N. KRISHNAN¹¹

Introduction

Entrepreneurs are important drivers of economic and social progress and change. Much of our daily lives are greatly influenced by entrepreneurial companies. Many such companies in their first 10 years launch new ideas or new products that transform society and the way people live, work and play. Recombinant DNA, the desktop computer revolution, the Internet, mobile telephony and social networking are examples of areas where sea changes have occurred in the lives of billions and still occur in all parts of the world. In each of these areas, early-stage companies have been a key stimulus to the discovery, development or broadening of impact surrounding the new idea or new product. The last decade has seen a heightened global interest in early-stage entrepreneurial companies. Increasingly, the examples of successful early-stage companies that are changing society come from around the globe. Countries continue to increase their efforts to develop hot spots to promote the starting and growing of such entrepreneurial companies in their own cities and regions. There is growing venture capital activity in countries such as China and India and other areas of Asia, as well as in Latin America, the Middle East and Africa.

1. Global Entrepreneur Statistics

- o There are approximately **594 million** entrepreneurs in the world in 2023, which is around **7.4%** of the total population. This is a **2.1%** increase from the **582 million** estimated in 2020.
- o The growth in entrepreneurship positively impacts job creation, innovation, and economic development.

2. Entrepreneur Statistics by Country

- o India leads in the number of entrepreneurs, followed by China, the United States, and Brazil.
- o The United States has an estimated **54 million** entrepreneurs, representing about **32%** of the adult workforce.
- o China has over **64 million** entrepreneurs, representing about **5%** of the adult population.
- o India boasts approximately **104 million** entrepreneurs, which is about **11.5%** of the adult population.

3. Demographic Statistics of Entrepreneurs

- o Women constitute about **43%** of entrepreneurs worldwide, with the largest percentage of female entrepreneurs being between **40 and 59 years** old.

¹⁰ Paper presented in the **42nd Annual Conference of Association of Economists of Tamil Nadu** Organized by Post Graduate Department of Economics, Arulmigu Palaniandavar College of Arts and Culture, Palani, Dindigul District-624 601, Tamil Nadu on 25th February, 2023.

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- o It's estimated that there are approximately **252 million female entrepreneurs** globally. Additionally, another **153 million women** are operating established businesses.
- o The age distribution of entrepreneurs worldwide is as follows: 25-34 years old (**32%**), 35-44 years old (**24%**), 18-24 years old (**19%**), 45-54 years old (**14%**), 55-64 years old (**8%**), and 65+ years old (**3%**).

4. Entrepreneur Education Statistics

- o **64%** of entrepreneurs have a bachelor's degree, **14%** have an associate's degree, **11%** have a master's degree, **6%** have a high school diploma, and **6%** have other degrees.

5. Other Entrepreneur Statistics

- o Major motivations for entrepreneurs include being their own boss (**62%**), pursuing their passion (**60%**), filling a need in their community (**52%**), building wealth (**51%**), and creating jobs (**42%**).
- o Approximately **20%** of new businesses fail during the first two years, **45%** during the first five years, and **65%** during the first ten years. Only **25%** of new businesses make it to 15 years or more.

6. Key Trends in Entrepreneurship

- o There's a rise in social entrepreneurship, growth of the gig economy, increasing importance of technology, and globalization of entrepreneurship.

Objective

- To analyze the Global Entrepreneur Statistics in 2023.

Data and Methodology

The present study is based on secondary data pertaining to 2023 collected from Markinblog. Growth rate, percentage and also tables were used in this study.

Global Entrepreneur Statistics

- ❖ The number of entrepreneurs worldwide is growing every year.
- ❖ Technology is advancing, and more people have access to information. Plus, schools are teaching students about starting their own businesses.
- ❖ Many new businesses are popping up in emerging markets. Young people, with their tech-savvy skills, are leading the charge. They're starting online businesses, reaching people globally, and changing the way we think about traditional work.
- ❖ Governments see the benefits too. They're making it easier to start a business by offering tax breaks and funding. But it's not all smooth sailing. With more businesses, there's more competition. And not everyone can easily get the money they need to start.
- ❖ The rise in global entrepreneurs is exciting. With the right support, they can make a big difference in our economy.
- ❖ Let's take a closer look at the global number of entrepreneurs and how they influence our lives.

Entrepreneurs in the World Right Now

According to research, there are approximately **594 million** entrepreneurs in the world in 2023. That is around **7.4%** of the total population.

This number marks a subtle increase from the **582 million** estimated in 2020, representing approximately a **2.1%** increase over three years.

With a **2.1%** increase, signifies a sustained entrepreneurial spirit and a level of resilience among aspiring business owners amidst global challenges.

The steady rise may be attributed to evolving market opportunities, technological advancements, or favorable entrepreneurial ecosystems.

The growth in entrepreneurship is having a positive impact on job creation, innovation, and economic development, reflecting a positive, albeit slow, movement towards a more entrepreneurial global economy with potential for further expansion given the right supportive mechanisms and resources.

India leads the list significantly outpacing other countries and it is followed by China, the United States, and Brazil.

Entrepreneur Statistics by Gender

- Women make up about **43%** of entrepreneurs worldwide compared with **57%** of men.
- This number is growing, but women are still underrepresented in the world of entrepreneurship.
- This is due to a number of factors, including lack of access to capital, discrimination, and unpaid care work.
- The largest percentage of female entrepreneurs globally is between **40 and 59 years old**, which could be indicative of the time and experience required to establish and grow a business.
- Despite these challenges, there are a growing number of successful female entrepreneurs.

Here are some interesting facts about female entrepreneurs:

- Female entrepreneurs are more likely than male entrepreneurs to start businesses that are socially or environmentally responsible.
- Female entrepreneurs are more likely than male entrepreneurs to reinvest their profits back into their businesses.
- Female entrepreneurs are more likely than male entrepreneurs to create jobs.

Despite these positive trends, there is still more work to be done to support female entrepreneurs.

Governments, businesses, and investors can play a role in creating a more level playing field for female entrepreneurs.

Female Entrepreneurs

- It's estimated that there are approximately **252 million** female entrepreneurs globally.
- And another **153 million** women are operating established businesses.⁶

- It's worth noting that while women's entrepreneurship is growing around the world, men still outnumber women when it comes to business ownership.
- This surge signifies the breaking of traditional barriers, as women from diverse backgrounds and cultures are stepping forward to lead, innovate, and drive economic growth.
- The average age of entrepreneurs worldwide is **42 years** old (at the time they founded their companies).
- However, there is a significant variation in the age distribution of entrepreneurs across different countries and industries.
- For example, in developed countries, the average age of entrepreneurs is higher than in developing countries.
- This is likely due to the fact that entrepreneurs in developed countries are more likely to have a college education and to have accumulated the capital necessary to start a business.
- In addition, the age distribution of entrepreneurs varies depending on the industry.
- For example, the average age of entrepreneurs in the technology industry is lower than the average age of entrepreneurs in other industries.
- This is likely due to the fact that the technology industry is more dynamic and rapidly changing, which attracts younger entrepreneurs.

Entrepreneur Statistics by Industry

The top industries for entrepreneurship are:

- Service businesses (**33%**)
- Retail businesses (**25%**)
- Technology businesses (**12%**)
- Agriculture businesses (**11%**)
- Manufacturing businesses (**10%**)

Other industries that are popular with entrepreneurs include healthcare, education, and construction. It is important to note that these are just the most popular industries for entrepreneurs. There are many successful entrepreneurs in other industries as well. Here are some reasons why these industries are popular with entrepreneurs:

- **Service businesses:** Service businesses are relatively easy to start and operate, and they can be run from home.
- **Retail businesses:** Retail businesses offer a wide range of opportunities for entrepreneurs, and they can be scaled up or down depending on the entrepreneur's needs.
- **Technology businesses:** Technology businesses are growing rapidly, and they offer entrepreneurs the opportunity to create innovative products and services.
- **Agriculture businesses:** Agriculture businesses are essential to the global economy, and they offer entrepreneurs the opportunity to work with nature and to produce food and other products that people need.
- **Manufacturing businesses:** Manufacturing businesses offer entrepreneurs the opportunity to create products that people use every day.

Entrepreneur Education Statistics

According to Zippia, the percentage of entrepreneurs that have pursued upper education is as follows:

- **64%** of entrepreneurs have a bachelor's degree.
- **14%** of entrepreneurs have an associate's degree.
- **11%** of entrepreneurs have a master's degree.
- **6%** of entrepreneurs have a high school diploma.
- **6%** of entrepreneurs have other degrees.⁹

The most common degree for entrepreneurs is a bachelor's degree, with **64%** of entrepreneurs earning that degree.

Entrepreneur Success Rates

According to Investopedia:

- Approximately **20%** of new businesses fail during the first two years of being open
- **45%** during the first five years
- and **65%** during the first 10 years
- Only **25%** of new businesses make it to 15 years or more.
- However, it is important to note that these are just averages.
- There are many businesses that succeed beyond the first year, five years, and even ten years.
- Plenty of businesses buck the trend, flourishing well beyond their early years.
- The entrepreneurial journey is filled with uncertainties, but with resilience, many find success against the odds.

Entrepreneur Impact

Entrepreneurs undeniably play a critical role in fostering economic growth, innovation, and job creation, all of which contribute significantly to the Gross Domestic Product (GDP) of a nation.

Here's a detailed breakdown based on statistical evidence and scholarly insights:

Job Creation

1. Entrepreneurs, especially those running small businesses, are pivotal in job creation. In 2019 alone, small businesses created **1.6 million** net new jobs, with firms employing fewer than 20 workers generating **1.1 million** net new jobs. Notably, employer firms with fewer than 500 workers employed **46.4%** of private sector payrolls in 2018
2. Entrepreneurial ventures create jobs both directly by hiring employees and indirectly by stimulating demand for goods and services, which in turn, leads to job creation in other sectors like manufacturing, packaging, and fulfillment.

Economic Growth

1. Entrepreneurs enhance economic growth by introducing innovative technologies, products, and services. Increased competition driven by entrepreneur's challenges existing firms to become more competitive, which in the long run boosts economic productivity and growth.

-
2. An empirical analysis based on data from South American countries revealed a noteworthy relationship between entrepreneurial activity and GDP growth, signifying a significant contribution of entrepreneurship to economic growth.

GDP Contribution

1. The value created by startups is nearly on par with the GDP of a G7 economy. In 2021, startup funding surpassed **\$600 billion**, underlining the significant economic value generated by entrepreneurial activity.
2. The contribution of entrepreneurial activity, aspirations, and attitudes to Gross Domestic Product (GDP) per capita has been acknowledged, with different measures of entrepreneurship explaining economic growth.

Key Trends in Entrepreneurship

Here are some key trends in entrepreneurship:

1. **The rise of social entrepreneurship:** Social entrepreneurship is the practice of starting and running businesses that are designed to solve social or environmental problems. Social entrepreneurship is becoming increasingly popular, as more and more people are looking for ways to use their businesses to make a positive impact on the world.
2. **The growth of the gig economy:** The gig economy is a labor market characterized by short-term contracts and independent work. The gig economy is growing rapidly, as more and more people are choosing to work independently. This is creating new opportunities for entrepreneurs, as they can start businesses that cater to the needs of gig workers.
3. **The increasing importance of technology:** Technology is playing an increasingly important role in entrepreneurship. Entrepreneurs are using technology to develop new products and services, to reach new customers, and to operate their businesses more efficiently.
4. **The globalization of entrepreneurship:** Entrepreneurship is becoming increasingly globalized. Entrepreneurs are starting businesses that operate in multiple countries, and they are targeting customers all over the world. This is creating new opportunities for entrepreneurs, but it is also creating new challenges.

In addition to these general trends, there are also a number of specific trends that are emerging in different industries. For example, in the healthcare industry, there is a growing trend of entrepreneurs starting businesses that focus on preventive care and personalized medicine.

In the education industry, there is a growing trend of entrepreneurs starting businesses that offer online education and personalized learning. Entrepreneurs who are able to identify and capitalize on these trends will be well-positioned for success.

THE INDIAN CHALLENGE AND OPPORTUNITY IN INNOVATION AND ECONOMIC GROWTH: AN OVERVIEW¹²

A. OMPRAKASH¹³

Introduction

Innovation in the economic sense refers to the creation and use of concepts and methods that enhance products and services or increase the effectiveness of their production. The invention of the steam engine in the 18th century is a prime example of innovation. Steam engines revolutionised transportation with the railroads and allowed for mass output in factories. More recently, information technology changed how businesses manufacture and promote their products while also creating new markets and business models. The goal of the European Central Bank is to keep prices stable. The European Central Bank affects the economy's financial circumstances and, ultimately, the level of demand for goods and services through determining interest rates. The ability of the European Central Bank to carry out its mandate, however, is also impacted by the economy's long-term growth potential, which depends on innovation. The European Central Bank tracks innovation's progress and conducts research into the economic and social factors that encourage and enable it because it has significant effects on the macroeconomic environment.

The ability of innovation to spur economic growth is one of its main advantages. Simply, innovation can increase productivity, which translates to increased output from the same input. The economy expands as productivity increases because more goods and services are produced. Every innovation is fresh, but some are more significant than others because they involve more radical change. By "breakthrough innovations," we mean those that significantly alter society and the economy, especially those that spur rapid economic expansion.

Economic Conventionalism and Economic Innovation

The traditional economic theories are reformulated by innovation economics to place knowledge, technology, entrepreneurship, and innovation in the centre as opposed to the margins. They were previously considered to be autonomous forces that were largely unaffected by policy. Not anymore. The main objective of economic policy, according to innovation economists, should be to increase productivity through more innovation. As a result, markets that solely rely on input resources and price signals will not always be as successful in promoting faster economic growth, which is fuelled by increased productivity. The two main widely accepted economic theories, neoclassical economics and Keynesian economics, stand in stark contrast to this.

Neoclassical economics focuses on understanding how societies make use of limited resources to produce valued goods and distribute them among various people. However,

¹² Paper presented in the 42nd Annual Conference of Association of Economists of Tamil Nadu Organized by Post Graduate Department of Economics, Arulmigu Palaniandavar College of Arts and Culture, Palani, Dindigul District-624 601, Tamil Nadu on 25th February, 2023.

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innovation economics focuses on how societies develop new modes of production, goods, and business models in order to increase wealth and quality of life. Neoclassical economics is concerned with correctly interpreting price signals in order to maximise the effective distribution of limited resources. On the other hand, innovation economics is concerned with encouraging all economic players to increase their productivity and creativity, including individuals, businesses, cities, and even entire nations.

Global Challenge: Access Inequality

There are 2.6 billion people worldwide make up the "Base of the Economic Pyramid," with the bulk of them living in Asia and Africa and subsisting on less than US \$2 per day (PPP). All people must have access to basic services, including those related to education, health, finances, communication, and other areas. The fundamental level of human empowerment can only be attained after that. Only then is it possible to actively contribute to economic progress. Members of the BoP are currently denied both the opportunity to gain from and contribute to economic growth. Both human empowerment and well-being must be addressed in a well-designed inclusive growth programme. As seen by recent events in the Middle East, Thailand, and numerous disturbances around the world, perceived injustices lead to civil unrest.

Emerging countries cannot simply wait for a "rising tide to lift all boats" as long as they continue to develop unique policies and programmes that directly address the needs of the economically excluded. Standard policy tools like tax and transfer systems, subsidies, welfare and entitlements, and traditional economic development strategies centred on competitiveness cannot be used to solve the problem of income disparity alone. Those programmes are definitely crucial. But a plan that also makes it easier to access basic goods and services at low costs and boosts the purchasing power of the BoP will make it easier for this group to participate in the economy and will lessen the problem of income inequality by bringing those with lower incomes' daily lives closer to those of the wealthy. We must quickly and simultaneously accomplish three goals enhancing access to crucial services comes first raising the purchasing power is the second. Thirdly, lowering income disparity as well If we attempt something that initially appears to be impossible, we can very well start to accomplish these three goals. In spite of income inequality, our goal is to create access equality. How can we accomplish that? through the use of inclusive innovation.

A Change in the Development Path's Paradigm

It is important to note that inclusive innovation pushes us to evaluate opportunity in terms of the benefits that individuals really experience, rather than just an increase in their means. This justification involves a return to the old argument for innovation that it can result in game-changing improvements in quality of life alongside the typical competitiveness goal. In essence, inclusive innovation increases what even people with low incomes can afford. It establishes a parallel course for the BoP's growth that relies less on the redistribution of gains and more on the steady increase of the basket of goods and services that we use to gauge purchasing power.

Strategy for Inclusive Innovation

Any innovation that creates chances for the excluded people, primarily those at the bottom of the economic pyramid, to earn a living on a long-term sustainable basis and with a considerable outreach is considered inclusive innovation.

India has an advantage in inclusive innovation

India faces a unique potential and challenge in the innovation economics More from Less for More (MLM) paradigm sector. This potential is made available to us by innovation that promotes inclusion, as well as by the increased inclusive growth and economic development that results from this. India's political leaders experimented with socialism for more than 40 years under the MLM paradigm, or "More from Less for More," which barred foreign finance and technologies while fostering homegrown innovation. By relying solely on their own inventiveness, Indian engineers, supported by government funding, created some of the most affordable nuclear weapons, rockets, imaging techniques, and supercomputers. Local businesses were small because India's economy didn't begin to expand until the 1990s. For instance, Ranbaxy, the largest pharmaceutical firm in India at the time, reported \$800 million in sales in 2008, which was 60 times lower than Pfizer's \$48 billion in sales and nine times lower than the company's research budget. Indian businesspeople consequently became known for taking on modest ventures and frugal money management. Since 1991, they have modified their scale strategy, although they continue to place a strong emphasis on capital efficiency.

Local businesses also understood that, even if there are rich and poor people in India, focusing primarily on the wealthy would restrict their market. Most frequently targeted was the \$5k/year aspirant middle class household. As a result, they were compelled to alter the price-performance equation and create products and services that offered value for the money. India's innovative mindset turned out to be the most significant motivator. Some Indian leaders had the temerity to disagree with the prevailing opinion. These CEOs were eschewing traditional business strategies in favour of new ones with increasing regularity. The combination of small size, low costs, and high objectives had necessitated new ways of thinking and managing. It is accurate to claim that the Indian innovation was sparked by the union of great scarcity and extreme yearning.

Making Business Inclusive: By integrating disadvantaged groups into a country's innovation ecosystem, a "inclusive innovation strategy" fosters the long-term creation, adoption, and spread of inclusive technologies. Given the enormous overall purchasing power of the BoP, inclusive business may be a viable venture for private companies. Businesses that are inclusive have many of opportunities. First, companies can gain from looking for alternatives to traditional, expensive inventive procedures that are founded on the maxim "More from More." Second, they gain from overcoming obstacles brought on by constraints rather than avoiding them by lowering product quality or altering the target market. Thirdly, attitude is important; doing these chores calls for a thrifty mindset that aims to get "More with Less." It is obvious that inclusive innovation will assist us in creating a sustainable future for humanity if it is firmly rooted in affordability and sustainability.

Taking the Lead in Inclusive Business: Traditionally, business leaders valued both financial success and social responsibility. This signifies that someone made a lot of money and then set aside a little portion of it for the benefit of the general population. No, we need to switch to a different model. This is what is meant by "doing well by doing good." That denotes a core dedication to "performing inclusive business." This calls for a paradigm shift in both thought and behaviour.

Innovative Inclusivity Driven Economic Growth

A well-conceived "inclusive innovation" plan would support the traditional policy avenues, which are typically geared on raising incomes.

[a] The government's goal of ensuring that everyone has access to high-quality basic services on an effective and sustainable basis will be aided through inclusive innovation, which will increase access to critical commodities and services. More people can participate in economic progress thanks to inclusive innovation. For instance, innovations that have significantly reduced the cost of health care (such as low cost prosthetics, low cost heart and cataract surgeries, and low cost vaccines, diagnostics, and clean water systems) can bring millions more people into the workforce and make them much more productive members of it.

[b] Even the most successful (and equitable) growth tales are likely to continue to feature persistent income disparity, even if it is decreased. Therefore, any agenda for inclusive growth must specifically address the standard of living that is accessible to those with very low incomes. The commotion surrounding commodity and food price instability and inflation shows that policymakers are understandably anxious about the purchasing power of the BoP. But due to their exogenous roots and the enormous compensating benefits of high growth and open markets, such problems only offer a little window of opportunity for policy responses. Think about the benefits to quality of life that come with non-electric, highly affordable washing machines, inexpensive refrigerators, and optional but life-improving medical care connected with "modern medicine." Low-cost health items can help people cope with challenging living conditions (and reduce the spread of disease). These goods empower people in addition to improving quality of life. By freeing up time, increasing the effectiveness of labour, and enhancing health, they promote economic activity and entrepreneurship.

[c] For inventors from the BOP, inclusive innovation offers prospects for monetary gain. The BoP style of living fosters creativity and needs-driven innovation that can be commercialised to the advantage of both the inventors and society as a whole. Additionally, the spread of knowledge to resource-poor populations (and the adaption of items for their usage) can boost productivity, increasing nominal revenues for BoP enterprises (many of which are currently small, informal, and severely lag their productivity potential).

INNOVATION ECONOMICS AND AI – A SMARTER STRATEGY FOR GLOBAL RECESSION¹⁴

Dr. S. JEYARANI¹⁵

Introduction

A global financial crisis is a financial crisis that affects many countries at the same time. It is a period of severe difficulties which financial institutions, markets, companies, and consumers experience simultaneously. The credit crisis 1772 originated in London and quickly spread to the rest of Europe. In the mid-1760s the British Empire had accumulated an enormous amount of wealth through its colonial possessions and trade. Historians have claimed that the economic repercussions of this crisis were one of the major contributing factors to the Boston Tea Party protests and the American Revolution.

The Great Depression of 1929–39 was the worst financial and economic disaster of the 20th century. The Wall Street Crash of 1929, also known as the Great Crash, was a major American stock market crash that occurred in the autumn of 1929. The OPEC oil price shock of 1973 crisis began when OPEC (Organization of the Petroleum Exporting Countries) member countries—primarily consisting of Arab nations—decided to retaliate against the United States in response to its sending arms supplies to Israel during the Fourth Arab–Israeli War. The Asian Crisis of 1997 originated in Thailand in 1997 and quickly spread to the rest of East Asia and its trading partners. Speculative capital flows from developed countries to the East Asian economies of Thailand, Indonesia, Malaysia, Singapore, Hong Kong, and South Korea (known then as the “Asian tigers”) had triggered an era of optimism that resulted in an overextension of credit and too much debt accumulation in those economies. The Financial Crisis of 2007–08 sparked the Great Recession, the most-severe financial crisis since the Great Depression, and it wreaked havoc in financial markets around the world.

In spite of all this financial crisis and Covid-19 issues the top five leading countries were USA, China, Japan, Germany and India according to UN report 2023. The population of USA is only 340 million but the GDP is 25,035 trillion US dollars. The population of China is 1.4257 billion which ranks second in the world but its GDP is close to USA 18,321 trillion US dollars. The population of Japan is 125 million but its GDP is 4,301 trillion US dollars. The population of Germany is 84.3 million whereas the GDP is 4.031 trillion US dollars. The population of India is 1.4286 billion ranking number one in population but its GDP is very low 3,469 trillion US dollars. Moreover the unemployment rate were 3.90 percent in USA, 4.8 percent in China, 2.60 percent in Japan, 3.0 percent in Germany and 7.7 percent in India. Technological progress, following the neo- classical model, is an important determinant of growth. Technological progress is achieved through innovation, which Romer calls technical change, which results from progress in research and development (R&D) and the human capital. Based on a cross-country analysis, it has been found that there exists a direct

¹⁴ Paper presented in the 42nd Annual Conference of Association of Economists of Tamil Nadu Organized by Post Graduate Department of Economics, Arulmigu Palaniandavar College of Arts and Culture, Palani, Dindigul District-624 601, Tamil Nadu on 25th February, 2023.

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relationship between expenditure as proportion of the GDP on R&D and the country's global innovation rank.

Since the 1950s, there has been an idea formulated by the operational and manufacturing engineers around the world: a completely automated industry where machines will be as capable as any human in the labor force, making jobs go obsolete as technologies replace them in driving the economy (Ernst et al., 2018). The emergence of artificial intelligence dominates the world as it advances and improves the livelihood of diverse countries. AI is harnessed to change lives and be ubiquitous in economies, shifting labor-intensive industries to technology/capital-intensive industries to uplift modernization and productivity.

This paper aimed to analyze the relationship between the dependent variable which is the economic growth, and independent variables consisting of technological innovation (artificial intelligence), labor productivity, and unemployment.

Significance of AI in Economic Growth among the leading Economies

In this light, this research examined the five countries which have consistently been taking places in the top rankings of the leading countries in AI for the past years as reported by varieties of online research databases such as the AI Readiness Index by (Oxford Insights, 2020) wherein the countries' scores in the latest report were 88.16 (USA), 69.08 (China), 73.3 (Japan), 79.0 (Germany) and 55.98 (India). There were also data on AI rankings in consideration to the implementation, innovation, and investment according to the AI Global AI Summit Report as seen in Table 1 by (Tortoise Media, 2019).

Table 1. The Global AI Index - The leading countries (Tortoise Media)

Rank	Implementation			Innovation		Investment		
Country	Talent	Infrastructure	Operating Environment	Research	Development	Government Strategy	Commercial	Final Rank
USA	1	1	28	1	1	1	8	1
China	20	2	3	2	2	3	2	2
Germany	3	12	13	8	9	2	11	8
Japan	11	5	10	20	6	18	23	12
India	2	59	12	30	21	38	13	14

In consideration to these indices and data are the determinants of AI, generally including the AI implementation in public services such as healthcare, education, and transportation provided by the government. Secondly, innovation in which industries and infrastructures are widely developed by AI start ups to sustain the economy, and lastly, investment in high R&D intensity products and services which is the high-technology exports. It is observed that USA ranks first and china ranks second and India ranks fourteen in AI index.

Objectives of this study

1. To estimate the impact of high-technology exports on the Gross Domestic Product in the selected emerging countries.
2. To formulate how GDP per hour significantly affects the Gross Domestic Product.
3. To evaluate how the unemployment rate impacts Gross Domestic Product in possible relation to the deployment of AI that causes technological unemployment.

Statement of Hypotheses

- H0: High-technology exports have no significant effect on the country's Gross Domestic Product.
- H1: High-technology exports have a significant effect on the country's Gross Domestic Product.
- H0: An increase in GDP per person employed indirectly affects a country's Gross Domestic Product.
- H1: An increase in GDP per person employed directly affects the country's Gross Domestic Product.
- H0: The unemployment rate is inversely related to the country's Gross Domestic Product.
- H1: The unemployment rate is directly related to the country's Gross Domestic Product.

Research Methods

This paper is designed to study the economic impact of artificial intelligence on five emerging countries in world namely USA, China, Japan, Germany and India. This quantitative and time-series research study contains the positive and negative relationship between economic growth (in dollars) and the three independent variables: artificial intelligence, labor productivity, and unemployment. However, this study has used high-tech exports (in dollars), as a proxy of artificial intelligence. Labor productivity, on the other hand, uses GDP per hour (in dollars), and unemployment, measured by unemployment rate (in percentage).

The data for GDP and high-technology exports were gathered from The World Bank. The data for GDP per hour were gathered from Our World In Data by the University of Oxford. The data for the unemployment rate were gathered from Index Mundi, Knoema, and Macrotrends. The period covers from 1988 to 2022. The authors used the regression analysis statistical method to measure and estimate the relationships and associations between the dependent and independent variables based on a theoretical or empirical concept. The tool applied to measure the indicated variables and their relationship is multiple regression models. The econometric model of this paper is hereby presented as:

$$\log \text{GDP}_i = \beta_0 + \beta_1 \log \text{HTE}_i + \beta_2 \log \text{GDP}_{\text{per Hour}_i} + \beta_3 \text{UE}_i + \varepsilon$$

Wherein $i = 1, 2, 3, 4, 5$

1 represents USA, 2 represents China, 3 represents Japan, and 4 represents Germany and 5 represents India,

The log indicates the growth rate of GDP, and the response variable Y denotes the GDP, which is the measurement used for economic growth. Moreover, β_0 represents the intercept, which refers to the value of Y (GDP) is when X is equal to 0. $\beta_1 \log \text{HTE}$ stands for

the regression coefficient or the slope (parameter) which in this case is the value of artificial intelligence technology measured by high-technology exports, $\beta_2 \log \text{GDP}_{\text{per Hour}}$ denotes the labor productivity measured by the GDP per hour, and $\beta_3 \text{UE}$ is the unemployment measured by the unemployment rate. These regression coefficients refer to the change in variable Y when variable X changes in one unit. Lastly, ε on the other hand signifies the error term.

Results

USA

It reveals that in USA, unemployment rate insignificant to the GDP. Meanwhile, GDP per hour and high-tech exports have positive impacts on USA's GDP significantly. With a 1% increase in the promotion of high-tech exports, the GDP growth rate will increase by 1.208% and with a 1% increase in the GDP per hour, the GDP growth rates will increase by 0.034%.

$$\text{GDP (USA)} = 7.221 + 1.208 \text{HTE}_i + 0.034 \text{GDP}_{\text{per Hour}_i} - 0.013 \text{UE}_i + \varepsilon$$

High-tech exports and GDP per hour are revealed to have a positive impact; meanwhile, the unemployment rate and GDP are inversely related. The positive and significant relationship between USA's economic growth and high-tech exports as innovative technology is deployed is believed to be what drives the economy to grow, helping improve its growth through the years.

China

It reveals that in China, high-technology exports insignificant to the GDP. Meanwhile, GDP per hour and unemployment rate positively impacts China's GDP significantly. With a 1% increase in the promotion of GDP per hour, the GDP growth rate will increase by 0.261%. With a 1% increase in the unemployment rate, the GDP growth rates still increases by 0.504%.

$$\text{GDP (China)} = 4.285 - 1.718 \text{HTE} + 0.261 \text{GDP}_{\text{per Hour}} + 0.504 \text{UE} + \varepsilon$$

The insignificance of high-tech exports may be due to the inconsistency of the trade statistics based on global supply chains as it inflates export value due to incorrectly crediting entire values of assembled high-tech products imported to China from other countries; hence the significance of high-technology exports of China to its GDP is factitious. Because there is political stability and good governance in terms of maintaining its country's growth and since China's reputation globally makes foreign investors interested in investing in the country that further uplifts its economic growth.

Japan

On the other hand, findings from Japan's regression analysis indicated that high-technology exports high-technology exports show no significance to its GDP. Whereas, GDP per hour, and unemployment rate all have positive impact to Japan's GDP significantly. With a 1% increase in the promotion of GDP per hour, the GDP growth rate will increase by 0.013%. With a 1% increase in the unemployment rate, the GDP growth rates will increase by 0.051%. The positive and significant relationship between Japan's economic growth and GDP per hour as innovative technology is deployed is believed to be what drives the economy to grow, helping improve its growth through the years.

$$GD(\text{Japan}) = 7.787 - 1.264 \text{ HTE} + 0.013 \text{ GDP}_{\text{per Hour}} + 0.51 \text{ UE} + \varepsilon$$

Japan's economy holds a strong grasp in accelerating its artificial intelligence involvement and labor productivity, shaping a great balance in order to efficiently utilize both capital-intensive and labor-intensive production that prevents its economy from experiencing technological unemployment as compared to the other Asian countries examined. It is well-known that Japan is one of the largest and highly-developed economies globally, achieving high economic growth rates that are led by factors such as high standard of education, high rates of plant and equipment investment and R&D, proper labor governance, accessibility to technologies, a large domestic market, and trade liberalization. Automation and robotics in Japan are known to either displace or enhance human labor, thus it is important to secure benefits from AI to experience the latter. Aside from the productivity growth brought by AI, empirical evidence according to Acemoglu & Restrepo (2017), IMF staff calculations based on Japan's data found that increase in AI density in manufacturing is linked to local gains in employment and wages.

Germany

Study reveals that in Germany, unemployment rate insignificant to the GDP. Meanwhile, high-technology exports and GDP per hour positively impacts Germany's GDP significantly. With a 1% increase in the promotion of GDP per hour, the GDP growth rate will increase by 0.019%. With a 1% increase in the high technology exports, the GDP growth rate will decrease by 3.067%.

$$GDP(\text{Germany}) = 6.905 - 3.067 \text{ HTE} + 0.019 \text{ GDP}_{\text{per Hour}} + 0.003 \text{ UE} + \varepsilon$$

On the other hand, unemployment's insignificance can be explained by the claim that Okun's Law does not support countries that are highly developing such as Germany, since its government is constantly solving its unemployment issues and because there is political stability and good governance in terms of maintaining its country's growth and since Germany's reputation globally makes foreign investors interested in investing in the country that further uplifts its economic growth.

India

In India's case, high-technology exports show no significance to its GDP, however, GDP per hour positively impacts GDP, and the unemployment rate negatively impact GDP significantly.

$$GDP(\text{India}) = 6.063 - 5.653 \text{ HTE} + 0.333 \text{ GDP}_{\text{per Hour}} - 0.140 \text{ UE} + \varepsilon$$

With a 1% increase in the promotion of GDP per hour, the GDP growth rate will increase by 0.333%. With a 1% increase in the unemployment rate, the GDP growth rates will decrease by 0.140%. Exports in India comprises a minor part of the GDP, thus it can be drawn that it does not affect its economy's growth because of its large domestic market, instead, India's growth in GDP increases its export sector's growth, since international market demand for India is affected by its domestic industries' demand growth. Over the years, as technology took part in driving India's economy, there is also job-deficient growth, rising farm distress, and youths concerned for job reservations in the public sector, hence overall unemployment

might be caused by artificial intelligence (AI) displacing human labour in the services sector, making labor demand for predictable jobs shrink. Though technology exports show no significance to GDP, GDP per hour positively impacts GDP because of technological advancement and the country has started to emphasize more importance to Artificial intelligence in all the fields which is the need of the hour.

Country	HIGH TECH EXPORTS	GDP PER HOUR	UNEMPLOYMENT RATE
USA	Null Hypothesis Rejected ($0.000 < 0.05$) The significant change in GDP growth rate due to the change in high technology exports, because of the Sig. value is 0.000, which is less than the acceptable value of 0.05. With a 1% increase in the promotion of high technology exports, the GDP growth rate will increase by 1.208% (B value).	Null Hypothesis Rejected ($0.000 < 0.05$) The significant change in GDP growth rate due to the change in GDP per hour, because of the Sig. value is 0.000, which is less than the acceptable value of 0.05. With a 1% increase in the promotion of GDP per hour, the GDP growth rate will increase by 0.034% (B value).	Null Hypothesis not rejected ($0.118 > 0.05$) No significant change in GDP growth rate due to the change in unemployment. This is because of the Sig. value is 0.118, which is more than the acceptable limit of 0.05.
CHINA	Null Hypothesis not rejected ($0.152 > 0.05$) No significant change in GDP growth rate due to the change in high technology exports. This is because of the Sig. value is 0.152, which is more than the acceptable limit of 0.05.	Null Hypothesis Rejected ($0.000 < 0.05$) The significant change in GDP growth rate due to the change in GDP per hour, because of the Sig. value is 0.000, which is less than the acceptable value of 0.05. With a 1% increase in the promotion of GDP per hour, the GDP growth rate will increase by 0.261% (B value).	Null Hypothesis Rejected ($0.000 < 0.05$) The significant change in GDP growth rate due to the change in GDP per hour, because of the Sig. value is 0.000, which is less than the acceptable value of 0.05. With a 1% increase in the promotion of GDP per hour, the GDP growth rate will increase by 0.261% (B value).

JAPAN	Null Hypothesis not rejected ($0.374 > 0.05$) No significant change in GDP growth rate due to the change in high technology exports. This is because of the Sig. value is 0.374, which is more than the acceptable limit of 0.05.	Null Hypothesis Rejected ($0.006 < 0.05$) The significant change in GDP growth rate due to the change in GDP per hour, because of the Sig. value is 0.006, which is less than the acceptable value of 0.05. With a 1% increase in the promotion of GDP per hour, the GDP growth rate will increase by 0.012% (B value).	Null Hypothesis Rejected ($0.059 < 0.05$) No significant change in GDP growth rate due to the change in unemployment rate. This is because of the Sig. value is 0.059, which is more than the acceptable limit of 0.05.
GERMANY	Null Hypothesis Rejected ($0.019 < 0.05$) The significant change in GDP growth rate due to the change in high technology exports, because of the Sig. value is 0.019, which is less than the acceptable value of 0.05. With a 1% increase in the promotion of high technology exports, the GDP growth rate will decrease by 3.067% (B value).	Null Hypothesis Rejected ($0.000 < 0.05$) The significant change in GDP growth rate due to the change in GDP per hour, because of the Sig. value is 0.000, which is less than the acceptable value of 0.05. With a 1% increase in the promotion of GDP per hour, the GDP growth rate will increase by 0.021% (B value).	Null Hypothesis not rejected ($0.775 > 0.05$) No significant change in GDP growth rate due to the change in unemployment rate, because of the Sig. value is 0.775, which is more than the acceptable value of 0.05.
INDIA	Null Hypothesis not rejected ($0.089 > 0.05$) No significant change in GDP growth rate due to the change in high technology exports. This is because of the Sig. value is 0.976, which is more than the acceptable limit of 0.05.	Null Hypothesis Rejected ($0.000 < 0.05$) The significant change in GDP growth rate due to the change in GDP per hour, because of the Sig. value is 0.000, which is less than the acceptable value of 0.05. With a 1% increase in the promotion of GDP per hour, the GDP growth rate will increase by 0.333% (B value).	Null Hypothesis Rejected ($0.011 < 0.05$) The significant change in GDP growth rate due to the change in unemployment rate, because of the Sig. value is 0.045, which is less than the acceptable value of 0.05. With a 1% increase in the unemployment rate, the GDP growth rates will decrease by 0.140% (B value).

Conclusion

In this paper, the authors analyzed how artificial intelligence impacts an economy in the selected leading countries which are USA, China, India, Japan, and India given that these were considered to top the rankings for artificial intelligence globally. It is important to examine their current policies concerning innovation and weigh the impact of AI in the economy and how it could possibly be a threat to employment in the labour market, making thousands of people jobless and affecting their disposable income and purchasing power, which then will lead to a decrease in their personal consumption that will distress the economy's output and growth. Hence, the importance of this study concerns the whole population of each country, government sectors, businesses, and industries. The overall economy will be in its extremity once the emerging AI phenomena are uncontrolled and utilized in a manner that its disadvantages are neglected. This paper calls for an adequate optimistic outlook of artificial intelligence, at the same time determining these technologies' opportunities and risks, provided that the business sectors and policymakers consider the actions needed for AI not to subjugate laborers and to utilize and manage AI innovation properly in the economy.

References

1. Chand, K., Tiwari, R., & Phuyal, M. (2017). Economic Growth and Unemployment Rate: An Empirical Study of Indian Economy. *Journal of Indian Economy*, 130-137.
2. Nakamura, K., Kaihatsu, S., & Yagi, T. (2019). Productivity improvement and economic growth: lessons from Japan. *Economic Analysis and Policy*, 57-79.
3. Okun, A. M. (1962). Potential GNP: Its Measurement and Significance in Proceedings of the Business and Economics Statistics. American Statistical Association.
4. Oxford Insights. (2020). AI Readiness Index 2020. Retrieved from Oxford Insights: <https://www.oxfordinsights.com/government-ai-readiness-index-2020>
5. Solow, R. M. (1956). A Contribution to the Theory of Economic Growth. *The Quarterly Journal of Economics*, 65-94.

Integration of Environmental Quality with Economic Growth

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AN OVERVIEW OF GREEN ECONOMY SCHEMES IN INDIA¹

ANANDAN K²

Introduction

The Union Ministry has listed seven initiatives from green hydrogen to mangroves protection to green credit to replacement of polluting vehicles. These principles complement each other and act as the ‘Saptarishi’ guiding India through the Amrit Kaal. Previously, the Prime Minister has given a vision for “LiFE”, or Lifestyle for Environment, to spur a movement of environmentally conscious lifestyle. India is moving towards the ‘panchamrit’ and net-zero carbon emission by 2070 to usher in green industrial and economic transition.

Schemes	Important features
Green Hydrogen Mission	- National Green Hydrogen Mission was launched with an outlay of Rs.19,700 crores - It aims to transition the economy to low carbon intensity - It will help reduce dependence on fossil fuel imports - It will make India assume technology and market leadership in this sunrise sector - It also aims to reach a target of an annual production of 5 MMT of green hydrogen by 2030
Energy Transition	- Provided Rs.35,000 crore for priority capital investments towards energy transition and net zero objectives, and energy security by Ministry of Petroleum & Natural Gas - It will support Energy Storage Projects, Battery Energy Storage Systems with capacity of 4,000 MWH with Viability Gap Funding - A detailed framework for Pumped Storage Projects will also be formulated
Renewable Energy Evacuation	Will construct Inter-state transmission system for evacuation and grid integration of 13 GW renewable energy from Ladakh with investment of Rs.20,700 crore
Green Credit Programme	- A Green Credit Programme will be notified under the Environment (Protection) Act - It will incentivize environmentally sustainable and responsive actions by companies, individuals and local bodies - It will help mobilize additional resources for such activities
PM-PRANAM	- A new “PM Programme for Restoration, Awareness, Nourishment and Amelioration of Mother Earth” will be launched - It will incentivize States and Union Territories to promote alternative fertilizers and balanced use of chemical fertilizers.

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Schemes	Important features
GOBARdhan scheme	• 500 new 'waste to wealth' plants under GOBARdhan scheme will be established • It will include 200 compressed biogas (CBG) plants, including 75 in urban areas, and 300 community or cluster-based plants at total investment of Rs.10,000 crore
Bhartiya Prakritik Kheti Bio-Input Resource Centres	• Facilitating over the next three years 1 crore farmers to adopt natural farming • Setting up 10,000 Bio-Input Resource Centres
MISHTI	• Mangrove Initiative for Shoreline Habitats & Tangible Incomes (MISHTI) will be taken up for mangrove plantation
Amrit Dharohar	• Promoting conservation of wetlands through Amrit Dharohar • Encouraging optimal use of wetlands, enhancing bio-diversity, carbon stock, eco-tourism opportunities and income generation for local communities
Coastal Shipping	• Coastal shipping will be promoted as the energy efficiency and lower cost mode of transport, both for passengers and freight and Vehicle Replacement • Allocating adequate funds to scrap old vehicles of the Central Government • States will also be supported in replacing old vehicles and ambulances.

Source: <https://www.nextias.com/current-affairs/03-02-2023/budget-on-green-growth>

Green growth is crucial for India as it offers a pathway for sustainable economic development while preserving the environment. In India, green growth can address challenges such as air pollution, water scarcity, and climate change. Adopting green growth strategies can increase the use of renewable energy, promote resource use efficiency, and support sustainable agriculture, resulting in a more inclusive and sustainable development. The shift towards green growth can also create new job opportunities in the fields of renewable energy and sustainable agriculture. Overall, green growth is essential for India's economic and environmental well-being.

CLIMATE CHANGE AND ITS CONSEQUENCES ON HEALTH³

Dr. K. PRAVEENA⁴

Introduction

Climate change impacts our health and wellbeing. The major public health organizations of the world have said that climate change is a critical public health problem. Climate change makes many existing diseases and conditions worse, but it may also help introduce new pests and pathogens into new regions or communities. As the planet warms, oceans expand and the sea level rises, floods and droughts become more frequent and intense, and heat waves and hurricanes become more severe. The most vulnerable people—children, the elderly, the poor, and those with underlying health conditions—are at increased risk for health effects from climate change. Climate change also stresses our health care infrastructure and delivery systems.

Climate change has brought about severe and possibly permanent alterations to our planet's geological, biological and ecological systems. These changes have led to the emergence of large-scale environmental hazards to human health, such as extreme weather, ozone depletion, loss of biodiversity, stresses to food-producing systems and the global spread of infectious diseases. The World Health Organization (WHO) estimates that 160,000 deaths, since 1950, are directly attributable to climate change. Many believe this to be a conservative estimate.

To date a neglected aspect of the climate change debate, much less research has been conducted on the impacts of climate change on health, food supply, economic growth, migration, security, societal change, and public goods, such as drinking water, than on the geophysical changes related to global warming. Human impacts can be both negative and positive. Climatic changes in Siberia, for instance, are expected to improve food production and local economic activity, at least in the short to medium term.

The majority of the adverse effects of climate change are experienced by poor and low-income communities around the world, who have much higher levels of vulnerability to environmental determinants of health, wealth and other factors, and much lower levels of capacity available for coping with environmental change. A report on the global human impact of climate change published by the Global Humanitarian Forum in 2009, estimated more than 300,000 deaths and about \$125 billion in economic losses each year, and indicating that most climate change induced mortality is due to worsening floods and droughts in developing countries. This also raises questions of climate justice, since the 50 least developed countries of the world account for not more than 1% of worldwide emissions of greenhouse gases.

³ Paper presented in the 42nd Annual Conference of Association of Economists of Tamil Nadu Organized by Post Graduate Department of Economics, Arulmigu Palaniandavar College of Arts and Culture, Palani, Dindigul District-624 601, Tamil Nadu on 25th February, 2023.

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Impact on Health

Changes in the greenhouse gas concentrations and other drivers alter the global climate and bring about myriad human health consequences. Environmental consequences of climate change, such as extreme heat waves, rising sea-levels, changes in precipitation resulting in flooding and droughts, intense hurricanes, and degraded air quality, affect directly and indirectly the physical, social, and psychological health of humans. For instance, changes in precipitation are creating changes in the availability and quantity of water, as well as resulting in extreme weather events such as intense hurricanes and flooding. Climate change can be a driver of disease migration, as well as exacerbate health effects resulting from the release of toxic air pollutants in vulnerable populations such as children, the elderly, and those with asthma or cardiovascular disease.

Certain adverse health effects can be minimized or avoided with sound mitigation and adaptation strategies. Strategies for mitigating and adapting to climate change can prevent illness and death in people now, while also protecting the environment and health of future generations. Mitigation refers to actions being taken to reduce greenhouse gas emissions and to enhance the sinks that trap or remove carbon from the atmosphere. Adaptation refers to actions being taken to lessen the impact on health and the environment due to changes that cannot be prevented through mitigation. Appropriate mitigation and adaptation strategies will positively affect both climate change and the environment, and thereby positively affect human health. Some adaptation activities will directly improve human health through changes in our public health and health care infrastructure. It is critical that adaptation and mitigation decisions and policies be developed with a sound basis in the best current science on climate change and its effects. There are gaps in our understanding of the relationship between climate change, the environment, and human health. In its 2010 report, *A Human Health Perspective on Climate Change (Full Report)* (4MB), the NIEHS-led Interagency Working Group on Climate Change and Health identified major research areas that need to be further explored and understood. These include the following:

- Asthma,
- Respiratory Allergies,
- Airway Diseases
- Cancer
- Cardiovascular Disease
- Stroke Foodborne Disease
- Nutrition Heat-Related Morbidity and
- Mortality Human Developmental Effects
- Mental Health and Stress-Related Disorders
- Neurological Diseases and Disorders
- Vectorborne and Zoonotic Diseases
- Waterborne Diseases

Climate change poses a wide range of risks to population health - risks that will increase in future decades, often to critical levels, if global climate change continues on its current trajectory. The three main categories of health risks include:

- (i) Direct-acting effects (e.g. due to heat waves, amplified air pollution, and physical weather disasters),

- (ii) Impacts mediated via climate-related changes in ecological systems and relationships (e.g. crop yields, mosquito ecology, marine productivity), and
- (iii) The more diffuse (indirect) consequences relating to impoverishment, displacement, resource conflicts (e.g. water), and post-disaster mental health problems.

Climate change thus threatens to slow, halt or reverse international progress towards reducing child under-nutrition, deaths from diarrhoeal diseases and the spread of other infectious diseases. Climate change acts predominantly by exacerbating the existing, often enormous, health problems, especially in the poorer parts of the world. Current variations in weather conditions already have many adverse impacts on the health of poor people in developing nations, and these too are likely to be 'multiplied' by the added stresses of climate change.

A changing climate thus affects the prerequisites of population health: clean air and water, sufficient food, natural constraints on infectious disease agents, and the adequacy and security of shelter. A warmer and more variable climate leads to higher levels of some air pollutants and more frequent extreme weather events. It increases the rates and ranges of transmission of infectious diseases through unclean water and contaminated food, and by affecting vector organisms (such as mosquitoes) and intermediate or reservoir host species that harbor the infectious agent (such as cattle, bats and rodents).

As warming proceeds, the severity (and perhaps frequency) of weather-related disasters will increase - and appears to have done so in a number of regions of the world over the past several decades. Therefore, in summary, global warming, together with resultant changes in food and water supplies, can indirectly cause increases in a range of adverse health outcomes, including malnutrition, diarrhea, injuries, cardiovascular and respiratory diseases, and water-borne and insect-transmitted diseases.

Health equity and climate change have a major impact on human health and quality of life, and are interlinked in a number of ways. The report of the WHO Commission on Social Determinants of Health points out that disadvantaged communities are likely to shoulder a disproportionate share of the burden of climate change because of their increased exposure and vulnerability to health threats. Over 90 percent of malaria and diarrhea deaths are borne by children aged 5 years or younger, mostly in developing countries. Other severely affected population groups include women, the elderly and people living in small island developing states and other coastal regions, mega-cities or mountainous areas.

Currently, there is no evidence to suggest that the rapid onset of climate change is subsiding. Even if we miraculously managed to stop all greenhouse gas emissions, we would still be faced with the potentially irreversible changes we have already brought. Thus, it is essential that we adapt to these changing conditions. Our response will be both reactive and anticipatory and will need to take place at many levels (legislative, engineering and personal-behaviour). In response to malaria we will need to, for example, improve the quality and accessibility of health services, identify and target response towards vulnerable populations, improve our modelling and surveillance capacity, and implement broad-based public education campaigns.

ECONOMIC GROWTH AND ENVIRONMENTAL SUSTAINABILITY⁵

Dr. D. KARTHIKEYAN⁶

Introduction

Sustainable development strives for moderate and responsible use within the economic activity of the limited resources of our planet, whereas economic growth does not limit the resource exploitation and energy, being mainly focused on productivity increase.

While teaching courses on environment and sustainability to management students, I find it interesting as to how frequently and how strongly a view emerges that India, at its current stage of development, should ignore environmental costs for the sake of meeting its development goals.

This view appears to be consistent with the larger public opinion in India. When the World Values Survey—conducted across more than 80 countries—reported its findings from India in 2014, about half the people interviewed agreed that we should focus on economic growth even if it comes at the expense of the environment, whereas a little over a third of the respondents indicated a preference for environmental protection over economic growth. The larger public opinion is perhaps shaped by the discourse on the growth versus environment debate in India.

Sustainable Development

Environment and economy are interdependent and need each other. Hence, development that ignores its repercussions on the environment will destroy the environment that sustains life forms. What is needed is sustainable development: development that will allow all future generations to have a potential average quality of life that is at least as high as that which is being enjoyed by the current generation. The concept of sustainable development was emphasised by the United Nations Conference on Environment and Development (UNCED), which defined it as: 'Development that meets the need of the present generation without compromising the ability of the future generation to meet their own needs'. Read the definition again. You will notice that the term 'need' and the phrase 'future generations' in the definition are the catch phrases. The use of the concept 'needs' in the definition is linked to distribution of resources. The seminal report—Our Common Future—that gave the above definition explained sustainable development as 'meeting the basic needs of all and extending to all the opportunity to satisfy their aspirations for a better life'. Meeting the needs of all requires redistributing resources and is hence a moral issue.

Strategies for Sustainable Development

Use of Non-conventional Sources of Energy: India, as you know, is hugely dependent on thermal and hydro power plants to meet its power needs. Both of these have adverse

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environmental impacts. Thermal power plants emit large quantities of carbon dioxide which is a green house gas. It also produces fly ash which, if not used properly, can cause pollution of water bodies, land and other components of the environment. Hydroelectric projects inundate forests and interfere with the natural flow of water in catchment areas and the river basins. Wind power and solar rays are good examples of conventional. In recent years, some efforts are being taken to tap these energy resources.

Economic growth and the environment

The World Bank estimated that, under present productivity trends and given projected population increases, the output of developing countries would be about five times higher by the year 2030 than it is today. The output of industrial countries would rise more slowly, but it would still triple over the same period. If environmental pollution were to rise at the same pace, severe environmental hardships would occur. Tens of millions of people would become sick or die from environmental causes, and the planet would be significantly and irreparably harmed.

Yet economic growth and sound environmental management are not incompatible. In fact, many now believe that they require each other. Economic growth will be undermined without adequate environmental safeguards, and environmental protection will fail without economic growth.

The earth's natural resources place limits on economic growth. These limits vary with the extent of resource substitution, technical progress, and structural changes. For example, in the late 1960s many feared that the world's supply of useful metals would run out. Yet, today, there is a glut of useful metals and prices have fallen dramatically. The demand for other natural resources such as water, however, often exceeds supply. In arid regions such as the Middle East and in non-arid regions such as northern China, aquifers have been depleted and rivers so extensively drained that not only irrigation and agriculture are threatened but the local ecosystems.

Environmental impact of economic growth

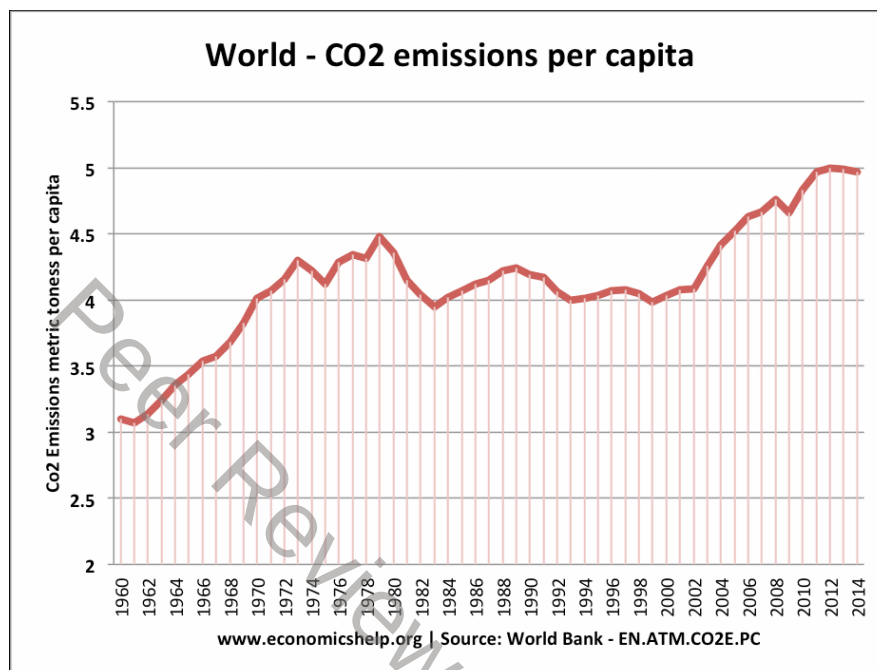
Economic growth means an increase in real output (real GDP). Therefore, with increased output and consumption we are likely to see costs imposed on the environment. The environmental impact of economic growth includes the increased consumption of non-renewable resources, higher levels of pollution, global warming and the potential loss of environmental habitats.

However, not all forms of economic growth cause damage to the environment. With rising real incomes, individuals have a greater ability to devote resources to protecting the environment and mitigate the harmful effects of pollution. Also, economic growth caused by improved technology can enable higher output with less pollution.

External costs of economic growth

- **Pollution.** Increased consumption of fossil fuels can lead to immediate problems such as poor air quality and soot, (London smogs of the 1950s). Some of the worst problems of burning fossil fuels have been mitigated by Clean Air Acts – which limit the burning of coal in city centres. Showing that economic growth can be consistent with reducing a certain type of pollution.

- **Less visible more diffuse pollution.** While smogs were a very clear and obvious danger, the effects of increased CO₂ emissions are less immediately obvious and therefore there is less incentive for policymakers to tackle. Scientists state the accumulation of CO₂ emissions have contributed to global warming and more volatile weather. All this suggests economic growth is increasing long-term environmental costs – not just for the present moment, but future generations.



- This graph shows CO₂ emissions per capita. It shows a 66% rise in per capita pollution between 1960 and 2014. The total emissions are also higher because of population growth. 1960 to 2014 was a period of strong economic growth and despite the development of new technologies, has failed to halt the rise. The last few years 2011 to 2014 show a levelling – this is only a short time range, but could be due to improved global efforts to reduce pollution. (it was also a period of low economic growth in Western economies)
- **Damage to nature.** Air/land/water pollution causes health problems and can damage the productivity of land and seas.
- **Global warming and volatile weather.** Global warming leads to rising sea levels, volatile weather patterns and could cause significant economic costs
- **Soil erosion.** Deforestation resulting from economic development damages soil and makes areas more prone to drought.
- **Loss of biodiversity.** Economic growth leads to resource depletion and loss of biodiversity. This could harm future ‘carrying capacity of ecological systems’ for the economy. Though there is uncertainty about the extent of this cost as the benefit of lost genetic maps may never be known.
- **Long-term toxins.** Economic growth creates long-term waste and toxins, which may have unknown consequences. For example, economic growth has led to increased use of plastic, which when disposed of do not degrade. So there is an ever-increasing stock of plastic in the seas and environment – which is both unsightly but also damaging to wildlife.

One theory of economic growth and the environment is that up to a certain point economic growth worsens the environment, but after that the move to a post-industrial economy – it leads to a better environment.

Conclusion

Economic development, which aimed at increasing the production of goods and services to meet the needs of a rising population, puts greater pressure on the environment. In the initial stages of development, the demand for environmental resources was less than that of supply. Now the world is faced with increased demand for environmental resources but their supply is limited due to overuse and misuse. Sustainable development aims at promoting the kind of development that minimizes environmental problems and meets the needs of the present generation without compromising the ability of the future generation to meet their own needs.

Peer Reviewed Journal

THE ENVIRONMENTAL IMPACTS OF ENERGY CONSUMPTION⁷

Dr. M. JEYAKKODI⁸

Introduction

Energy services help to meet basic human needs such as the production of food, the provision of shelter and access to health services, while contributing to social development by enabling education. A lack of access to reliable and affordable energy undermines economic and social development in many parts of the world today. An estimated two billion people in the world have no access to commercial forms of energy including electricity. This holds back improvements in productivity, quality of life, health and education.

Meanwhile, the consequences of energy production and use around the world are threatening the stability of ecosystems and the health and well-being of current and future generations. Burning fossil fuels causes urban smog and acid rain, while producing them can pollute water supplies. In many towns and cities, local pollution caused by burning oil, gas and coal in houses, factories, cars and power stations is a major human health problem. Concentrations of the main local air pollutants—particulates, sulphur dioxide and nitrogen oxides—in the big cities of many developing countries are well above World Health Organization maximum guideline levels. Acidification of lakes and soils is also a big problem in many parts of the world.

In addition to local and regional pollution, rising fossil-fuel use in all regions carries the long-term risk of disrupting climate as a result of emissions of greenhouse gases that trap heat in the Earth's atmosphere. The Intergovernmental Panel on Climate Change (IPCC) predicts that unless we lower our emissions of these gases, mostly carbon dioxide from energy use, the rise in concentrations will lead to an unprecedented increase in global temperatures of about 1.4–5.8°C by 2100. This is expected to lead to rising sea levels and profound changes in weather patterns. Environmental problems are not limited to fossil fuels. Nuclear power production gives rise to radioactive waste and the risk of contamination. And the production of certain types of renewable energy can also have severe environmental consequences, such as the ecological effects of hydroelectric dams.

Public policies and the energy sector

Without proactive government policies and measures, the energy sector in most countries will continue to develop in ways that are incompatible with sustainable development. Primary energy use is expected to grow steadily over the next decade or two at least, unless decisive action is taken. The International Energy Agency, in its latest *World Energy Outlook*, projects global energy consumption to expand by more than half over the next twenty years, assuming no new government policies and measures are introduced. Around 90 per cent of

⁷ Paper presented in the 42nd Annual Conference of Association of Economists of Tamil Nadu Organized by Post Graduate Department of Economics, Arulmigu Palaniandavar College of Arts and Culture, Palani, Dindigul District-624 601, Tamil Nadu on 25th February, 2023.

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the increase in energy needs over this period will be met by fossil fuels. Most of the incremental demand will occur in developing countries, especially China and India.

Experts forecasts that primary energy use will continue to grow and that the world will rely primarily on fossil fuels for several decades to come. These trends imply that the availability of energy services to households and productive activities in developing countries will expand, which should help to improve the employment opportunities, living conditions and comfort levels of poor people. But they also imply worsening pollution problems and a big increase in airborne emissions of carbon dioxide. The IEA projects an average annual increase of 2.1 per cent in carbon dioxide emissions through 2020. Achieving energy sustainability, therefore, requires a radical change in present trends. This can only be achieved, in principle, in one or more of the following ways, where cost and practicality are at odds:

- Increasing the energy efficiency of output so that we produce the same amount of goods and services with less energy.
- Conserving energy. The cleanest way to use energy is not to use it at all.
- Switching from fossil fuels to others that emit little or no noxious and
- Greenhouse gases, such as renewable energy.
- Increasing the capacity of the Earth's forests to absorb carbon.
- Capturing carbon and other substances at the point of combustion before they are emitted into the atmosphere.

Many important environmental damages stem from the production, conversion, and consumption of energy. Costs of these environmental damages generally are not incorporated into prices for energy commodities and resources; this omission leads to overuse of energy. Concern about this issue is common to energy economics, environmental economics (see environmental economics entry), and ecological economics (see ecological economics entry), with energy economics and environmental economics literature attempting to assign monetary valuation of the impacts and ecological economics rejecting the idea that a monetary value could be placed on environmental impacts. Environmental impacts currently receiving most attention are associated with the release of greenhouse gases into the atmosphere, primarily carbon dioxide, from combustion of fossil fuels. The three primary fossil fuels – coal, petroleum, and natural gas – each include carbon. During combustion, carbon combines with oxygen to produce carbon dioxide, the primary greenhouse gas. Carbon dioxide accumulates in the atmosphere and is expected to result in significant detrimental impacts on the world's climate, including global warming, rises in the ocean levels, increased intensity of tropical storms, and losses in biodiversity. Fossil fuels account for 98% of the US carbon dioxide net releases into the atmosphere and 82% of the releases of greenhouse gases, measured on a carbon equivalent basis.

Energy use of the environment

All forms of electricity generation have an environmental impact on our air, water and land, but it varies. Of the total energy consumed in the United States, about 40% is used to generate electricity, making electricity use an important part of each person's environmental footprint.

Producing and using electricity more efficiently reduces both the amount of fuel needed to generate electricity and the amount of greenhouse gases and other air pollution

emitted as a result. Electricity from renewable resources such as solar, geothermal, and wind generally does not contribute to climate change or local air pollution since no fuels are combusted.

Energy Efficiency

Energy efficiency and demand-side management doing more with less, reducing energy consumption by substituting fuels and technologies and altering consumer behavior is clearly the most environmentally benign way to address increases in demand for energy services. Energy efficiency can include practices as diverse as switching from conventional coal power plants to combined heat and power units, lowering thermostats, better maintaining industrial boilers, and walking or cycling instead of driving. These actions not only involve very little damage to the environment, they can be cost effective as well as long as they are strategically implemented to avoid the rebound effect. On a global scale, the IEA reviewed large scale energy efficiency programs and found that they saved electricity at an average cost of \$0.032 per kilowatt-hour, well below the cost of supplying electricity from any source.

Energy use leads to additional environmental damages. Coal combustion, particularly high sulfur coal combustion, emits oxides of sulfur, which, through atmospheric chemical reactions, result in acid rain. Automobile gasoline combustion releases oxides of nitrogen and volatile organic compounds, which, in the presence of sunlight, result in smog. Electric generating facilities often use much water for cooling and release the heated water into lakes or oceans, leading to local impacts on the ecosystem. Extraction of oil or mining of coal can lead to subsidence of the land overlying of the extracted deposits. Pervasive environmental impacts of energy use, absent governmental intervention, imply that significant costs of energy use are not included in the price energy users face. These so-called externalities (see environmental economics entry) lead to overuse of energy and provide strong motivation for interventions designed to reduce energy use.

Energy sustainability will not happen naturally. Governments, individually and collectively, will need to make it happen through appropriate policies and measures, including a range of regulatory and market-based interventions. The right approach for each country must take account of local market conditions, the structure of the energy sector, patterns of energy use, institutional characteristics and changing circumstances. But there is a broad consensus on the need for an approach that promotes efficient, competitive energy markets as the foundation upon which government policies should be superimposed. Getting market signals right so that prices better reflect the true costs of producing and consuming energy, taking account of the environmental and social consequences, should be a key guiding principle in all cases. In this way, the economic costs of meeting sustainable development goals will be minimized.

A STUDY ON CAUSES AND CONSEQUENCES OF ENVIRONMENTAL DEGRADATION IN INDIA⁹

S. GANAPATHI, M.A., M.Phil.,¹⁰

Introduction

Environment can be defined as the physical surrounding of man/woman of which he/she is a part and on which he/she is dependent for his/her activities like physiological functioning, production and consumption. His physical environment stretches from air, water and land to natural resources like energy carriers, soil and plants, animals and ecosystems. The relationship between physical environment and the well-being of individuals and societies is multi-fold and multi-faceted with a qualitative as well as a quantitative aspect to it. The availability and use of natural resources have a bearing on the outcome and the pace of development process. For an urbanized society, a large part of environment is man-made. But, even then the artificial environments (building, roads) and implements (clothes, automobiles) are based on an input of both labour and natural resources. The term 'Environment' is commonly restricted to ambient environment. In that view, the indoor environment (home, work place) is regarded as isolated piece of environment to be treated on its own terms.

The indoor environment usually is under the jurisdiction of the Public Health authorities. Health risks are mainly linked to space heating, cooking and lighting: low grade fuels, insufficient ventilation are often the main problems. Additionally, there may be problems connected with moisture, light, incidence, hazardous substances from building materials, lacquers and paints. Problems with drinking water, sewage and waste are not linked to the dwelling as such but rather to lack of appropriate infrastructure. Statistics on indoor environment may be regarded as a subset of statistics on human settlements and the urban environment (COES, 2013).

In developing nations, woods, lakes, streams and seas give a noteworthy offer of families' eating regimens, fuel and livelihoods and speak to a valuable security net in the midst of emergency especially for 78 for each penny of the world's outrageous poor who live in rustic territories. The integrity and functionality of these vital natural assets, however, are increasingly compromised. 60 to 70 per cent of the world's ecosystems are degrading faster than they can recover.

There are many environmental issues in India. Air pollution, water pollution, garbage, and pollution of the natural environment are all challenges for India. The situation was worse between 1947 through 1995. As per information accumulation and condition evaluation investigations of World Bank specialists, between 1995 through 2010, India has gained one of the speediest ground on the planet in tending to its natural issues and enhancing its ecological quality. Still, India has a long way to go to reach environmental quality similar to those

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enjoyed in developed economies. Pollution remains a major challenge and opportunity for India. Environmental issues are one of the primary causes of disease, health issues and long term livelihood impact for India.

Causes of Environmental Degradation

The major causes of the environmental degradation are modern urbanization, industrialization, over-population growth, deforestation etc. Environmental pollution refers to the degradation of quality and quantity of natural resources. Various types of the human exercises are the fundamental reasons of environmental degradation. These have prompted condition changes that have turned out to be hurtful to every single living being. The smoke radiated by the vehicles and processing plants expands the measure of toxic gases noticeable all around. The waste items, smoke radiated by vehicles and ventures are the fundamental driver of contamination. Spontaneous urbanization and industrialization have caused water, air and sound contamination. Urbanization and industrialization help to expand contamination of the wellsprings of water. So also, the smoke discharged by vehicles and ventures like Chlorofluorocarbon, nitrogen oxide, carbon monoxide and other clean particles dirty air. Neediness still remains an issue at the base of a few ecological issues.

Social Factors

The increase in population has been due to the improvement in health conditions and control of diseases. The density of population has gone up from 117 in 1951 to 312 in 2001 and further to 382 persons in 2011 per square kilometer. A few push and draw factors are ventured to be agent towards trouble out relocation from rural to urban regions. This may be because of the declining asset accessibility per capita and contracting financial open doors in rural territories and better monetary openings, wellbeing and instructive offices and so on in urban regions giving chances to more elevated amount of human capital improvement could be the basic variables for country out movement. India supports 17 per cent of the world population on just 2.4 per cent of world land area.

Degraded environment can accelerate the process of impoverishment, again because the poor depend directly on natural assets. Although there has been a significant drop in the poverty ratio in the country from 55 percent in 1973 to 36 percent in 1993-94 and further to 27.5 per cent in 2004-05. The absolute number of poor has also declined from 320 million in 1993-94 to 301 million in 2004-05.

Urbanization

Urbanization in India started to quicken after freedom because of the nation's reception of a blended economy which offered ascend to the advancement of the private area. Urbanization is occurring at a quicker rate in India. Population living in urban territories in India, as per 1901 statistics, was 11.4%. This tally expanded to 28.53% as indicated by 2001 enumeration, and intersection 30% according to 2011 evaluation, remaining at 31.16%. As indicated by a review by UN State of the World Population report in 2007, by 2030, 40.76% of nation's population is required to dwell in urban zones. According to World Bank, India, alongside China, Indonesia, Nigeria, and the United States, will lead the world's urban population surge by 2050.

Lack of opportunities for gainful employment in villages and the ecological stresses is leading to an ever increasing movement of poor families to towns. Such fast and spontaneous extension of urban areas has brought about debasement of urban condition. It has extended the hole amongst request and supply of infrastructural administrations, for example, vitality, lodging, transport, correspondence, instruction, water supply and sewerage and recreational pleasantries, along these lines exhausting the valuable ecological asset base of the urban areas. The outcome is the developing pattern in decay of air and water quality, age of squanders, the expansion of ghettos and bothersome land utilize changes, all of which add to urban poverty.

Economic Factors

Environmental degradation, to a large scale, is the result of market failure, namely the non-existent or poorly functioning markets for environmental goods and services. In this unique situation, environmental degradation is a specific instance of utilization or generation externalities reflected by uniqueness amongst private and social costs/benefits. Absence of very much characterized property rights might be one reason for such market disappointment. Then again, showcase contortions made by value controls and endowments may irritate the accomplishment of environmental goals.

The level and pattern of economic development also affected the nature of environmental problems. India's development objectives have consistently emphasized the promotion of policies and programmes for economic growth and social welfare. The production innovation received by the vast majority of the ventures has set an overwhelming burden on condition particularly through concentrated asset and vitality use, as is clear in common asset consumption (petroleum derivative, minerals, timber), water, air and land sully, wellbeing risks and debasement of characteristic eco-frameworks. With high extent petroleum derivative as the fundamental wellspring of modern vitality and real air contaminating enterprises, for example, iron and steel, composites and bond developing, mechanical sources have added to a generally high offer in air pollution.

Large quantities of industrial and hazardous wastes brought about by expansion of chemical-based industry have compounded the wastes management problem with serious environmental health implications. Transport exercises have a wide assortment of consequences for the earth, for example, air pollution, noise from street activity and oil slicks from marine delivery. Transport foundation in India has extended impressively as far as system and administrations. In this way, street transport represents a noteworthy offer of air contamination stack in urban areas, for example, Delhi. Port and harbor extends mostly affect on touchy waterfront eco frameworks. Their development influences hydrology, surface water quality, fisheries, coral reefs and mangroves to shifting degrees.

Institutional Factors

The Ministry of Environment & Forests (MOEF) in the Government is responsible for protection, conservation and development of environment. The Ministry works in close coordinated effort with different Ministries, State Governments, Pollution Control Boards and various logical and specialized establishments, colleges, non-Governmental associations and so on.

Environment (Protection) Act, 1986 is the key legislation governing environment management. Other important legislations in the area include the Forest (Conservation) Act, 1980 and the Wildlife (Protection) Act, 1972. The shortcoming of the current framework lies in the implementation abilities of natural foundations, both at the middle and the state. There is no effective coordination amongst various Ministries/Institutions regarding integration of environmental concerns at the inception/planning stage of the project. Current policies are also fragmented across several Government agencies with differing policy mandates. Absence of prepared work force and far reaching database postpone numerous activities.

The greater part of the State Government organizations are moderately little experiencing deficiency of specialized staff and assets.

Although overall quality of Environmental Impact Assessment (EIA) studies and the effective implementation of the EIA process have improved over the years, institutional strengthening measures such as training of key professionals and staffing with proper technical persons are needed to make the EIA procedure a more effective instrument for environment protection and sustainable development.

Land Degradation

Land degradation is any change or disturbance to the land perceived to be undesirable. Land degradation can be caused by both manmade and natural reasons such as floods and forest fires. It is estimated that up to 40 per cent of the world's agricultural land is seriously degraded. The main causes of the land degradation includes climate change, land clearance and deforestation, depletion of soil nutrients through poor farming practices, overgrazing and over grafting. In India, water erosion is the most prominent reason of land degradation. The growing trends of population and consequent demand for food, energy, and housing have considerably altered land-use practices and severely degraded India's environment. The growing population put immense pressure on land intensification at cost of forests and grazing lands because the demand of food could not increase substantially to population. Thus, horizontal extension of land has fewer scopes and relies mostly on vertical improvement that is supported by technical development in the field of agriculture i.e. HYV seeds, Fertilizers, Pesticides, Herbicides, and agricultural implements. All these practices are causing degradation and depletion of environment.

Air Pollution

On per capita basis, India is a small emitter of carbon dioxide greenhouse. In 2009, IEA estimates that it emitted about 1.4 tons of gas per person, in comparison to the United States' 17 tons per person, and a world average of 5.3 tons per person. However, India was the third largest emitter of total carbon dioxide in 2009 at 1.65 Gt per year, after China (6.9 Gt per year) and the United States (5.2 Gt per year). With 17 percent of world population, India contributed some 5 percent of human-sourced carbon dioxide emission; compared to China's 24 percent share.

Impact on Human Health

The greatest effects on the health of individuals and populations result from environmental degradation. Human health might be at the receiving end as a result of the

environmental degradation. Areas exposed to toxic air pollutants can cause respiratory problems like pneumonia and asthma. Millions of people are known to have died of due to indirect effects of air pollution. Air pollution Indian cities are among the most polluted in the world. Air in metropolitan cities has become highly polluted and pollutant concentrations exceeds limit considered safe by the World Health Organization (WHO). Suspended particulate levels in Delhi are many times higher than recommended by the World Health Organization (WHO). The urban air pollution has grown across India in the last decade are alarming. Some of the most important air pollutants are residual suspended particulate matter (RSPM), suspended particulate matter (SPM), nitrogen dioxides (NO_2), carbon monoxide (CO), lead, sulfur dioxide (SO_2) etc.

The main factors account to urban air quality deterioration are growing industrialization and increasing vehicular pollution, industrial emissions, automobile exhaust and the burning of fossil fuels kills thousands and lives many more to suffer mainly from respiratory damage, heart and lung diseases. In the countryside, nitrates from animal waste and chemical fertilizers pollute the soil and water, and in the cities, the air is contaminated with lead from vehicle exhaust. In India's largest cities - Mumbai and Delhi - about one-half of children under age 3 show signs of harmful exposure to lead, defined as to or more micrograms of lead per deciliter of blood (IIPS and ORC Macro, 2000). The illness and pre-mature deaths due to ambient suspended particulate matter (SPM) in the air in mega cities of Calcutta, Chennai, Delhi and Mumbai have risen significantly in less than five years (Brandson and Honmon, 1992). The indoor air pollution may pose an even greater hazard for human health. Cooking and heating with wood, crop residues, animal dung, and low-quality coal produce smoke that contains dangerous particles and gases. When fuels such as these are burned indoors, using inefficient stoves and poor ventilation, they can cause tuberculosis, other serious respiratory diseases, and blindness (Mishra, Retherford and Smith, 1999). In fact, indoor air pollution from cooking and heating with unsafe fuels has been designated by the World Bank as one of the four most critical environmental problems in developing countries.

Loss of Biodiversity

Biodiversity is important for maintaining balance of the ecosystem in the form of combating pollution, restoring nutrients, protecting water sources and stabilizing climate. The main cause of loss of biodiversity are deforestation, global warming, overpopulation and pollution are few of the major causes for loss of biodiversity. In fact human beings have deeply altered the environment, and have modified the territory, exploiting the species directly, for example by fishing and hunting, changing the biogeochemical cycles and transferring species from one area to another.

Conclusion

The primary causes of environmental degradation in India are attributed to the rapid growth of population in combination with economic development and overuse of natural resources. Major environmental calamities in India include land degradation, deforestation, soil erosion, habitat destruction and loss of biodiversity. Economic growth and changing consumption patterns have led to a rising demand for energy and increasing transport activities. Air, water and noise pollution together with water scarcity dominate the environmental issues in India.

According to World Bank estimate, between 1995 through 2010, India has made one of the fastest progresses in the world, in addressing its environmental issues and improving its environmental quality. Still, India has a long way to go to reach environmental quality similar to those enjoyed in developed economies.

Peer Reviewed Journal

ENVIRONMENTAL QUALITY AND ECONOMIC GROWTH: AN OVERVIEW¹¹

Dr. K. KALIYAMURTHY¹²

In modern world, the environmental degradation is considered as one of the most serious threat to the community at large and thus creates various kinds of problems mainly due to the population explosion and expansion of economic activities. Economic growth and its impact on the environment go hand in hand yet there is a trade-off between the two variables. In another word, or how the condition of an environment can affect productivity so as to increase economic growth. The quick population growth will lead to the increasing demand for food, energy, water, and other resources, which at the end, might cause excessive pressure and exploitation to the environment. Bran et al. (2009) explained that such a relationship will become more complicated given the dependence of most population on natural resources. The continued pollution and environmental degradation is unchecked it will eventually destroy the fitness of this planet as a place for human survival. Several studies are of the opinion that about 80% of them were developing countries and most of them were Asian countries. ASEAN consisting of ten autonomous countries, i.e. Malaysia, Brunei Darussalam, Singapore, Philippines, Thailand, Vietnam, Indonesia, Myanmar, Cambodia, and Laos is one of the fastest growing regions in the world. A detailed investigation relating to the inter connection between environmental quality and the economic growth was done by Toman (2003). Thus this paper attempts the trade off between environmental quality and economic growth in detail.

The negative effect caused by the increasing population is the economic growth which can lead to the environmental problems. Human activities are believed to be the major contributors to the rise of the global temperature since principally, they are continuously producing greenhouse gases, such as CO₂ into the atmosphere. Like a blade, economic growth can improve the welfare of the community but also, on the other hand, it can damage the surrounding environment, especially forests. A well-known theory from Kuznet stated that there is a negative correlation between the economic growth and the environmental quality as the latter is a negative effect of the occurrence of the former one (Panayotou, 2003).

Literature review

Many studies were looking to prove the theory that economic growth will cause environmental degradation in accordance with the economic phase of the country under study. Nevertheless, several other studies have tried to see whether an environment and some associated aspects can have either a direct or an indirect impact on economic growth. Research by (Omri et al., 2015) found that the environmental quality peroxide using CO₂ emissions in Middle Eastern and Northern Africa affects the economic growth and vice versa. The research findings of the study categorically show that there should be strong and

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¹²

populous policy regarding environmental quality and sustainable development. This would necessarily boost the country's economic activities and thereby economic growth and investment in the natural resource sector. Furthermore, Toman (2003) highlighted that natural resources are not allocated efficiently in practice not only because of the market and institutional failures affecting natural resources and the environment but the emerging strong and broader market and the failures on the part of the institutions which would hamper the process of development and also the utilization of natural resources in excess. Another study categorically asserted that there exists negative relationship between environmental quality and economic growth and showed scientific evidences that the environmental quality projected using CO₂ had a significantly negative influence on the economic growth peroxide using budget from the community. They argue that the pollution increases will result in decreased income as it directly lowers the output by reducing the productivity of capital and labour. The air pollution indicator coefficients show the significant effect of the population density and CO₂ has a negative relationship with population density. This suggests that if the pollution increases, the population density might decreases as it could cause human death. A study by Azam (2016) explained that there is a negative and significant relationship between environmental quality that is projected using CO₂ emissions to economic growth in countries situated around ASEAN e.g. Bangladesh, China, India, Indonesia, Mongolia, Malaysia, Pakistan, Philippines, Sri Lanka, Thailand, and Vietnam. Both studies by Omri et al. (2015) and Azam (2016) showed the similarities that CO₂ emission is a proxy for the environmental quality.

Studies by Omri et al. (2015) and Azam (2015) investigated and found that there exists strong indirect relationship between the environmental quality and economic growth. Another study conducted by Varvarigos (2008) found that environmental quality, the total capital, and life expectancy had an effect on the economic growth. On the contrary, if the use of technology produces pollution below the critical limit; it will lead to a better economic growth in the long term. Thus, this study confirmed the earlier ones that environmental quality is negatively related to economic growth.

It is a pitiable fact that the increasing trends in environmental pollution has resulted in the numerous problems like improper housing, sanitary related problems and so forth. Wildfires in Australia and California, China's worst floods in decades, the first-ever heat wave in Antarctica with rising temperatures above the tolerance level. It is an admitted fact that the growth pollution in various forms causes serious drawbacks in fauna and flora kingdom. For instance, the pollution resulting from increased output leads to fall in productivity, reduction of longevity of life the animals and plants, diseases related to human beings.

Policy Implications and Conclusion

It is equally important that the significance of environment along with the progress of economy should also be taken in to consideration. If so far we are more concern to the environment as variables affected by economic activity, then we should be aware that in the future, it will be able to affect the economic growth While traditionally we knew factors affecting production were only four ie nature, human capital, and skill, now we have recognized that the environment is another one. In this study, forests, emissions, and populations are a proxy for the environmental quality showing a positive and significant relationship to the economic growth. Thus, in all efforts to boost the economy to achieve the

target, policymakers, in this case, the government considers the environments. The question is how long the environment can support the sustainable economic growth. Ultimately, environmental growth and preservation must be a major concern for all stakeholders such as governments, economists, and environmentalists to create sustainable harmony.

The tussle between the environmental quality and economic development are in discussion at length over a period of time. The increase in modernization of industrial practices and fast changing urbanization, developments which had taken place over several decades account for menace in environment. It is no doubt that the investment made in the business ventures would go a long way development on the one side and on the other and more important side is environmental degradation. More and cleaner the environment, the health oriented diseases would be reduced greatly and the slogan, 'health for all' is achieved with less effort.

Peer Reviewed Journal

TRADITIONAL FISHING CRAFT TOWARDS GREENING FISHERIES: A PARTICIPATORY ASSESSMENT¹³

S. SOMA¹⁴ & R. SHANTHI¹⁵

Introduction

Kerala is situated on the south west coast of Indian subcontinent with an area of about 38863 sq. kilometers, which makes about 1.27 percentage of the India's territory. The state is separated with the rest of India by a mountain known as Western Ghats in the east and Arabian Sea in the west. Kerala has a coastline of 589.5 kilometers, which forms a 10 percentage of India's total coastline. With coastline over 590 kilometers, and an Exclusive Economic Zone (EEZ) of 218536sq.km, Kerala has a significant marine fisheries sector that has long been an important source of occupation and livelihood for coastal population of the state. It has estimated a 10 lakh people earn their livelihood from capture and allied works in marine fisheries in the 222 fishing villages situated along the coastline of the state (Department of fisheries Govt. of Kerala).

Thermocol pongu is an integral part in the fishery profile of Southern Kerala. Pongu fishermen played a key role in the upliftment of southern Kerala coast line. After the advent of modern fishing boats (out board dingi boat), the ordinary fishermen suffer much more. Most of them are indebted to cooperative societies, Self Help Groups, Mathsyafeds and private money lenders for their boats. Simple gear box damage in these boats could cost a minimum of Rs.20000/-. A large number of disused boats are the main scenery in the coastal shores of Southern Kerala. All of them wait for a loan waiver which bring immense relief. They will be grateful if any authority open their eyes to their indebtedness. But the saga continues.

Materials and Method

The respondents of the study were selected using multi-stage stratified random sampling method. The total sample size was 120 fish folk representing 6 fishing villages in two coastal districts viz. Alappuzha and Kollam in Kerala. The pongu fishery has been considered as one of the need based and sustainable livelihood method. The data were collected using, 'H-form' method. The original H-form method was particularly designed for monitoring and evaluation of programs. It was developed in Somalia for assisting local people to monitor and evaluate local environmental management. The method can be used for developing indicators, evaluating activities and to facilitate and record interviews with individuals or group discussions (Ashok et al., 2005). The diagram showing the H-form in the pongu fisheries is given below.

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The H-form method

Negative aspects	Statement / Indicators to be scored	Positive aspects
	0 10	

For the present study, a modified H-form method was used. A large sheet of paper was taken for this purpose. This paper was folded in the form of 'H'. The paper was unfolded and the 'H' lines were marked with pen, the preferred method to be assessed was written in the top centre of the 'H' form. On the right of the horizontal line of 'H', the score of '10' representing "most preferred" and the score of "0" representing "least preferred" was written. The fishermen were asked to discuss and opinion consensus score along the line between 0-10. They were also asked to justify their scores by giving positive and negative reasons for their score. For each and every point should be studied, each 'H-form' was constructed. The data on the socio economic variable factor were collected through interview method using a well-structured questionnaire. They were also asked to mention constraints in the operational aspects of crafts in the traditional landing centres and suggestions to improve the performance of the fish folks.

Results and Discussion

The coastal villagers consider the Thermocol pongu is the most modern form of traditional catamaran. But the fish catch using catamaran is risky; it can have a great skill to control its voyage in sea, it is a great fishing craft in the right hand. The thermocol boats are no match for them. The thermocol pongu surely help a group of fishermen from the coastal hamlets in Southern Kerala built small crafts to be undertaken fishing expeditions near the shore. Taking flexibility of the material easy to handle, the fishermen have made makeshift crafts of scrap thermocol. A fifteen to twenty years back, the skilled fishermen attached individual pieces with bamboo sticks and nylon ropes. Sitting ores are constructing with locally available viable woods, a small flag is attached to the mast and boulder is used as an anchor.

At present there is no need for making pongu form raw thermocol. There is finished thermocol pongu available from major industrial estates and theremocol exporting industries from all over India with a low constructional cost and fully finished manner with various price ranges. Except these craft the fishermen are used angles, various drift gillnets (measure

ranges 36 to 42 mm) for fishing. Thermocol pongu is a basic craft; their operational area is generally 2 nautical miles away from the shore. It is light and easy to maintain but fishing on pongu has its own risk. After the fishing voyage, the pongu can be taken easily to shore. They are not sea-worthy when the climate turns adverse but it helps and support a number of fishermen in the coastal states of India especially in Southern Kerala. It can create a lot of direct employment opportunities to the actual fishermen without over use of money and bad debts, help to improve the conditions of coastal jobless veterans to give up the supportive jobs: such as the removal of the fishes and prawns entangles in the net without damage, add a number of working days to allied workers like net repairers; mostly they are family labourers, drivers of transportation vehicles for their direct selling.

During the entire survey period observed the disuse and costly nature of mechanized craft, it leads to more debt; they have not been able to pay their dues. They transformed in to the sustainable fishing, Thermocol Pongu.

Wide spread use of Kerosene in outboard engine causes the unburned fuel being reddened out in to the sea. When the out board boats operates in large level there would be an adverse impact in the aquatic ecosystem via, water pollution, over catching of fish species etc. The continuous use of outboard craft leads a lack of adverse catch due to depletion of marine resource. A 10 HP out board engine normally requires 7 to 10 liters of kerosene per operational hour. Wastage of fuel like kerosene is also high as around 20 percentage of it flows out in to the sea. Conversion of these kinds of crafts to the thermocol craft will reduce the pollution level and marine fish species protection.

A wide variety of fish species with a rich marine wealth and highly skilled marine population of fish folk has made the gods own country Kerala become a leading producer and consumer of fish. A heavy rainfall and a large number of rivers and way mouth make the Kerala coast especially fertile for fish. The most important specialty of the Kerala coast is the mud banks, known as chakara. It is the formation of clay and organic matters on the coast that after monsoon with sea remaining calm, thus resulting in good harvest of fish. In these period pongu fishermen earn a huge amount in comparison with their sufficient daily routine.

Conclusion

The main objective of the study was to identify and document the need base analysis, which are able to sustain itself through the employment generation, income generation and able to achieve larger goal of improving the standard of living of the coastal people and in turn practice the green fishing. The results of the study indicate the need for more intervention in the form of training, technical guidance, financial support and entrepreneurship development. The active participation of the locals needs to be recognized, as they help to ensure distributive justice among poor ensuring economic stability. Hence, the empowerment of traditional fishermen should be treated as an agenda of top priority in all fisheries development programmes. Suitable distributive sustainable micro level fishing units can be implemented through Mathyafeds, with the backup of technical and developmental agencies.

The mission plan of the efficient and effective pongu fisheries are the fish resource conservation and management, increasing livelihood opportunities, social security and welfare measures for fisher folk, to ensure inclusive development for the jobless senior citizens,

facilitating improved market linkages, and to control marine water pollution. But at present some negative impacts arise due to craft modernization. Some of the pongu fishermen use 1HP to 2HP motors in pongu under the centrally sponsored scheme on motorization of fishing crafts. Fishing operational area has increased; larger quantity of juvenile catching, increasing the level of trash fish and coming up of the underwater mud particles etc. are the after effect of the adoption of motors in pongu. This scheme gave subsidy for a number of fishing crafts. The motorizations of pongu adversely affect the later mission of fish folk. After the coming years the fishermen and the researchers in this field gave potential to these kinds of craft this directly helps the coming fish folk and reduce the poverty.

References

1. Fernando F. (1987), Cost and Profitability of Small Scale Fishing Operation in Srilanka. in: Panayoto, T. (Ed.) Small Scale Fisheries in Asia: Socio economic analysis and Policy. IDRC-229e Canada.
2. Sathiyadhas R (1997) Production and Marketing of Marine Fisheries in India, Daya Publishing House, New Delhi.
3. Upadhyay, A.D.(2008) Economics of Fish Marketing in Tripura, *Journal of Fisheries Economics and Development*, 9(2) pp 12-20.

AN ECONOMIC ANALYSIS OF AGRICULTURAL PRODUCTION AND PRODUCTIVITY TRENDS IN INDIA SINCE GREEN REVOLUTION¹⁶

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Introduction

Performance of Indian economy is dependent upon the growth of Agriculture sector. It contributes nearly 14 percentage of India's Gross Domestic Product (GDP) and 13 percentages of total exports. It provides employment to 52 percentage of the country's work force and livelihood security to more than 620 million people. Agriculture plays an important role for provision of food to the nation, enlarging exports, transfer of manpower to non-agricultural sectors, contribution to capital formation, and securing markets for industrialization. Under the new agricultural strategy emphasis has been on the development and widespread adoption of high-yielding varieties of seeds. Though the government had been paying attention to induce qualitative improvements in seeds ever since the initiation of planning process in the country, yet the real impetus to these efforts was given by the adoption of the new agricultural strategy in the kharif season of 1966. In 1966-67, area under high-yielding varieties of seeds was a meager 1.89 million hectares. This rose to 18.17 million hectares in 1971-72. The seventh plan kept a target of 70 million hectares for coverage in area under HYV. As against this, the actual area under HYV by the end of seventh plan was only 63.1 million hectares. In 1998-99, the coverage rose to 78.4 million hectares and it was further rose to 124.39 million hectares in 2021.

Green Revolution

In Mexico, Prof. Norman Borlaug and his associates developed new varieties of wheat which were early-maturing, highly productive and disease resistant during the mid 1960s and these varieties were imported and planted in selected region of India having adequate irrigation facility. Within a year of their introduction, it was conclusively demonstrated that the yields from the new varieties exceeded 25 to 100 per cent compared to the yields from traditional varieties.

The government of India introduced an intensive development programme in seven districts selected from seven states in 1960 and this programme was named Intensive Area Development Programme (IADP). A district selected under IADP was required to possess qualities such as assured water supply, minimum hazards (like floods, drainage problem, acute soil conservation problem, etc), well developed village institutions and maximum potentialities for

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increasing agricultural production within a short span of time. The seven districts selected were West Godavari in Andhra Pradesh, Shahabad in Bihar, Raipur in Madhya Pradesh, Thanjavur in Tamil Nadu, Ludhiana in Punjab, Aligarh in Uttar Pradesh and Pali in Rajasthan, the first four were selected for rice, the next two for wheat and the last one for millets. This programme was later extended to remaining state for intensive development.

Initially it was implemented in a total area of 1.89 million hectares. On the eve of the Fourth Plan, the coverage was estimated to be 9.2 million hectares. In 1998-99, total area under HYVP was 78.4 million hectares and it was 62.6 per cent of the total area under food grains. Introduction of such high-yielding varieties of wheat depends crucially on the availability of fertilizers, adequate water supply, pesticides and insecticides. Therefore they have to be launched in the form of 'package programme'. Unfortunately, the seeds revolution of 1960s and 1970s appears they have tapered off after encompassing only the cereal segment. Improved seeds technology continues to elude vital segments of the farm economy such as pluses, oilseeds, fruits and vegetables.

Objective of the study

1. To analyse the trend of agricultural production and productivity of in major food crops selected states in India from 1966-67 to 2020-21.

Methodology

The data has been collected from secondary sources comprising of Handbook of Statistics on Indian Economy, Ministry of Agriculture in India during the period 1966-67 to 2020-21. The collected data has been classified and analysed in a systematic manner. For analysis, statistical tools like Simple Linear Regression Model and Semi- log model have been used in this study.

Growth of Agriculture in India

The share of agriculture has persistently declined on account of the development of the secondary and tertiary sectors of the economy. From 55.3 per cent in 1950-51, the share of Agriculture and allied activities in GDP at factor cost declined to 37.9 percent in 1980-81. In 1951, 69.5 percent of the working population was engaged in agriculture. This percentage fell to 66.9 percent in 1991 and to 56.7 percent in 2001. In 2004-05, agriculture provided employment to 52.1 percent of the work force. However, with rapid increase in population the absolute number of people engaged in agriculture has become exceedingly large. Domestic demand for food grains is expected to increase from 207 million in 2004-05 to 235.4 million by the end of the eleventh five year plan and further to 280.6 million by the end 2020-21. The share of agricultural exports in total exports was 44.2 per cent in 1960-61. This fell consistently to 30.7 per cent in 1980-81 and 9.9 per cent in 2020-2021. The agricultural production and productivity are the total production of food grains increased from 50.8 million in 1950-51 to 235.9 million tonnes in 2020-21.

Table 1 Estimated Regression Equation of Area, Production and Productivity of food grains in India under Irrigation from 1966-67 to 2020-2021

Crops Irrigation	Intercept (α)	Slope (β)	t- statistics		P value	CGR
			Intercept (α)	Slope (β)		
Area	123.76	0.015	0.933	0.029	0.59	36.4
Production	75.01	3.75**	3.22	0.100	0.000	38.9
Yield	608.31	30.06**	20.34	0.63	0.000	37.2

Source: values computed from Agricultural statistics at a Glance 2021.

** Statistically significant at 5 per cent level.

The estimated trend equation of food grains in India since green revolution. The slope coefficients of production and productivity are statistically significant at 5 level ($p < 0.05$). The slope of coefficient of production indicates that, on an average rate increases to 3.75 million tonnes per year. Productivity of food grains was also increases an on average 30.06 kgs per hectare during the study period. R^2 value indicates that, more than 35 of the variation in the production, productivity and area under cultivation of food crops that can be explained by the after green revolution in India. The compound growth rate of area under production was 36.4 percent and the production was 38.9 percent during the post green revolution period from 1966-67 to 2020-21. The growth rate of yield per hectare was 37.2 per cent in the study period.

Table 2 Estimated Regression Analysis of Area under cultivation, Production and Productivity of Major crops in India from 1966-67 to 2020-2021

Crops	Variables	Intercept (α)	Slope (β)	t-statistics		P value	R^2
				Intercept (α)	Slope (β)		
Rice	Area	37.56	0.14**	0.35	0.010	0.000	0.76
	Production	30.85	1.55**	1.34	0.041	0.000	0.96
	Yield	869.84	31.76**	25.61	0.795	0.000	0.96
Wheat	Area	17.09	0.268	0.34	0.010	7.14	0.920
	Production	12.26	1.66**	1.048	0.032	0.000	0.980
	Yield	1024	44.40**	37.37	1.161	0.000	0.96
Maize	Area	4.700	0.075	0.17	0.005	1.11	0.79
	Production	0.62	0.42**	0.85	0.026	0.000	0.82
	Yield	632.84	38.61**	59.009	1.833	0.000	0.89
Jowar	Area	19.77	-0.27**	0.25	0.008	0.000	0.956
	Production	0.62	0.42**	0.85	0.026	0.000	0.82
	Yield	532.5	8.11**	24.99	0.776	0.000	0.67
Bajra	Area	12.76	-0.09**	0.195	0.006	0.000	0.82
	Production	4.11	0.100**	0.404	0.012	0.000	0.54
	Yield	226.2	17.90**	38.601	1.199	0.000	0.80

Source: values computed from Agricultural statistics at a Glance 2021

** Statistically significant at 5 per cent level.

Table 2 depicts that, most of the slope coefficients are statistically significant at 5 per cent level ($p < 0.05$). The result indicates that, during the period of green revolution gave more importance to the five major food crops in India by using of High Yielding Varieties (HYV) of seeds to increase the production. Rice is the most important food grain crop in India. It was produced an on average of 1.55 million tonnes per year and the yield per hectare was 31.76 kgs during the study period. The second important food crop is Wheat, it is produced an on average 1.66 million tonnes per year compared to rice. Productivity of wheat was 44.40 kgs per hectare. R^2 indicates that more than 90 percent of the variation in the food crops of Rice and Wheat can be explained by the post green revolution period. The rest of the food crops like Maize, Jowar and Bajra are also shown an increasing trend in the production and productivity.

Table 3 Compound Growth rate of Area, Production and yield under cultivation of India from 1966-67 to 2020-2021

Major Crops	Area	Production	Yield
Rice	36.91	37.62	37.48
Wheat	37.21	38.02	37.58
Maize	37.17	38.01	37.62
Jowar	35.84	39.53	25.58
Bajra	36.42	37.33	37.70

Source: values computed from Agricultural statistics at a Glance 2021.

The growth rate was high in wheat compared to rice. Wheat was more exported than the rice. Area under cultivation, production and productivity was more 36 percent in rice and wheat was more than 37 per cent. Production and productivity of Jowar and Bajra was 39.53 per cent, 37.33 per cent, 25.58 per cent and 37.7 per cent from 1966-67 to 2020-21.

Table 4: Estimated Regression results of major crops in selected states of India from 1966-67 to 2020-2021

State	Crops	Intercept (α)	Slope (β)	t- statistics		P value	R^2
				Intercept (α)	Slope (β)		
Andhra Pradesh	Rice	8387.7	65.45	640.01	26.55	0.018	0.13
	Wheat	10.49	-0.15**	1.13	0.047	0.002	0.21
	Total food Grains	10845	125.98**	911.37	37.81	0.001	0.22
Bihar	Rice	5044.8	30.71	430.42	17.85	0.093	0.07
	Wheat	2595.55	73.19**	176.3	7.31	0.000	0.71
	Total food Grains	9463	124.01**	614.80	25.50	0.000	0.37
Madhya Pradesh	Rice	4772	-50.58	501.86	20.82	0.019	0.13
	Wheat	1255	332.2**	790.11	32.77	0.000	0.72
	Total food Grains	10511	381.62**	1608	66.72	0.000	0.45
Tamil Nadu	Rice	5423	18.07	417.4	17.31	0.302	0.02
	Wheat	0.29	-0.009**	0.026	0.001	0.000	0.64
	Total food Grains	6321	68.81**	543.54	22.55	0.004	0.19

State	Crops	Intercept (α)	Slope (β)	t- statistics		P value	R ²
				Intercept (α)	Slope (β)		
Punjab	Rice	3866	224.99**	169.90	7.04	0.000	0.96
	Wheat	9235	221.96**	278.00	11.53	0.000	0.90
	Total food Grains	13879	438.63**	363.49	15.08	0.000	0.95
Uttra Pradesh	Rice	6596	207.5**	392.31	16.27	0.000	0.80
	Wheat	13876	465.08**	555.80	23.05	0.000	0.91
	Total food Grains	26726	657.53**	1000	41.49	0.000	0.86
Rajasthan	Rice	55.76	7.98**	25.98	1.07	0.000	0.58
	Wheat	2151	193.72**	264.3	10.96	0.000	0.88
	Total food Grains	5112	383.33**	747.8	31.02	0.000	0.79

Source: values computed from Agricultural statistics at a Glance 2021

** Statistically significant at 5 per cent level.

Most of the slope coefficients are statistically significant at 5 per cent level ($p < 0.05$). Andhra Pradesh, Bihar, Madhya Pradesh and Tamil Nadu were producing more Rice. During the time of green revolution the above states were focused on rice. In Andhra Pradesh and Bihar, an on average production of rice was 65.45 million tonnes and 30.17 million tonnes during the study period. Madhya Pradesh shown negative growth of rice and production of wheat was compared to other states like Andhra Pradesh and Punjab.

References

1. Ahluwalia, M.S (1996), "New economic policy and agriculture: some reflections", Indian Journal of Agricultural Economics, 51(3) pp. 412-426, Website.
2. Chand Ramesh (2001), "Emerging Trends and Issues in Public and Private Investments in Indian Agriculture: a State wise Analysis", *Indian Journal of Agricultural Economics*, 56(2), 161-184, Website.
3. Dipak Bisai (2020), "Trend Analysis of Production and Yield of Major Crops in South Bengal, India During last six years", *International Research Journal of Social Sciences*, 9(3), Jul 2020, pp no 7-13.
4. Halawar S.V., (2019), "The Trend Analysis of Major Food Grains in India", *International Journal of Current Microbiology and Applied Science*, 8(3), March 10, 2019, pp no 353-360.
5. Savita Panwar and Anil K. Dimri (2018), "Trend analysis of production and productivity of major crops and its sustainability: A case study on Haryana", *Indian Journal of Agricultural Research*, 52(5), Oct 20, 2018, pp no. 571-575.
6. Urmi Pattanayak and Minati Mallick (2017), "Agricultural Production and Economic Growth in India: An Econometric Analysis" *Asian Journal of Multi disciplinary Studies*, 5(3), March, 2017.

A STUDY ON GROWTH OF AGRICULTURE IN INDIA¹⁹

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Introduction

Agriculture is the foundation of India's livelihood, civilisation, culture and heritage. With a population of 1.39 billion, India is the second-most populous country in the world and is expected to overtake China as the most populated by 2027-30. With 328 million hectares (Mha) of land, India is the world's seventh largest country. India has 160 (Mha) of arable land, the second largest after the US. The country experiences all 15 prominent climates. Moreover, India's landmass constitutes 46 of the 60 soil types found on the planet. It cultivates ~50% of its total geographical area, placing it among the top land users for agriculture. The proportion of cultivated land to the total geographical area often exceeds 90% in the more geographically suitable Indo-Gangetic Plain (IGP) and the deltas of the eastern coast. Indian agriculture, one of the world's oldest systems, is diverse, heterogeneous, unorganised and frequently subject to vagaries at various stages "from seed to market". It is a critical sector of the economy for the country's long-term and inclusive economic growth. The sector employs 49.6% of the workforce, which is often seasonal, under-employed and underpaid, and accounts for 17% of India's GDP. India's large and diverse agricultural sector makes it a major producer of cereals, sugar, milk, fruits and vegetables, eggs and spices. The agriculture sector in India remains the backbone of its society, employing 58% of the population. With only 4% of the world's water resources and 2.4% of the world's land, India supports 17.8% of the world's population and 15% of the livestock population. There is no other country with a more varied food and non-food agriculture base than India, which raises the prospect of India becoming a world agricultural trade leader.

Objectives of the study

1. To study the contribution of agriculture to the Indian Economy.
2. To analyse the growth of agriculture and allied sectors in India.

Table 1 Growth Rate of Agriculture and Allied Sectors (%)

Year	Growth of Agriculture and allied Sectors
2018-19	2.6%
2019-20	4.3%
2020-21	3.6%
2021-22	3.9%
Mean	3.60

Source: First Advance Estimation of National Income 2021-22

¹⁹ Paper presented in the 42nd Annual Conference of Association of Economists of Tamil Nadu Organized by Post Graduate Department of Economics, Arulmigu Palaniandavar College of Arts and Culture, Palani, Dindigul District-624 601, Tamil Nadu on 25th February, 2023.

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The high level of (4.3%) growth of agriculture and allied sectors has been observed in 2019-20.

Contribution of Agriculture to the Indian Economy

The agricultural sector in India has performed admirably in recent years, expanding at a compounded annual growth rate (CAGR) of 3.7% between 2017-18 and 2021-22. In 2021-22, the estimated real agriculture gross value added (GVA) was Rs.21.1 lakh crore (US\$ 256.4 billion), accounting for 15.5% of total GVA and 6.4% higher than the pre-pandemic level. Even during the pandemic, the agriculture GVA increased for all products, including food grains, cereals, pulses and oilseeds, providing the country with the much-needed food security.

Table 2 Total Food grain Production (Million Tonnes)

Year	Total Food grain Production (Million Tonnes)
2017-18	285.0
2018-19	285.2
2019-20	298.0
2020-21	310.8
2021-22	314.6
Mean	298.7

Source: NABARD Annual Report 2021-22

The country's total food grain production was estimated to be a record-high 314.6 million tonnes in 2021-22, an increase of 3.8 million tonnes over 2020-21. The production of cereals and pulses has increased at CAGR of 2.0% and 1.8% respectively from 2017-18 to 2021-22.

Scope of Agriculture in India

Agriculture provides a living for the majority of the population in India, and a larger workforce is employed in the sector. The role of agriculture in Indian economy can never be underestimated. The growing population and rising per capita income are driving demand for food and processed commodities.

Despite the fact that its GDP contribution has decreased to less than 20% and that contributions from other sectors have grown at a faster rate, the need for agricultural production has risen. This allows India to be self-sufficient as well as a major producer and net exporter of agricultural and allied products. In India, rising population, increasing average income and globalisation will push demand for quantity, quality, nutritious food and variety of food. As a result, the pressure on decreasing available cultivable land to produce more quantity, variety and quality of food will continue to rise. Corporate are entering and investing at various levels of the supply chain, connecting production eco-regions with consumers in promising domestic and global markets. With the entry of the corporate sector, a new paradigm in the food system is emerging, with deteriorating and fragmenting production environments and consolidation in marketing environments in postharvest, processing and marketing. Globalisation is creating significant opportunities for food and processed commodities while also posing the challenge of competing on a global scale.

Favourable weather and soil conditions, high demand for food, untapped opportunities and various fiscal incentives provided by the government for inputs, production infrastructure, availability of affordable credit facilities, and marketing and export promotion are attracting many individuals, large corporations, start-ups and entrepreneurial ventures to make significant investments in innovations, inventions, R&D and other aspects of business. All efforts are being made to convert agricultural challenges into opportunities, and this process is the future of agriculture.

Government Initiatives to boost Agriculture in India

The development of agriculture industry in India would not be possible if not for the various initiatives taken by the government to boost the sector. Few of such initiatives are as follows:

Agriculture Export Policy 2018

The Agriculture Export Policy was designed with emphasis on export-oriented output, export promotion, greater farmer realisation and coordination with other policies and programmes launched by the Government of India (GoI). For increased income through value addition at the source, which will help reduce losses across the value chain, a "Farmers' Centric Approach" is necessary. India must have a farmer-focused policy to attain the twin goals of global prominence in agriculture exports and food security. The policy will also significantly boost food manufacturing and processing, resulting in considerably higher growth in food production and an increase in India's share of processed goods with added value in its agricultural exports on a worldwide scale. Vision of India's Agriculture Export Policy Through this policy, the GoI aims to harness the export potential of Indian agriculture through suitable policy instruments to make India a global power in agriculture and raise farmers' income.

Objectives of India's Agriculture Export Policy

1. Increase agricultural exports by two-fold from >US\$ 30 billion in 2018 to >US\$ 60 billion by 2022, and then to \$100 billion in the next few years while maintaining a stable trade policy environment.
2. Increase value-added and high-value agricultural exports, focus on perishables and expand export sources and destinations.
3. Encourage the export of new, unique, organic, ethnic, traditional and non traditional agricultural products.
4. Provide a formal framework for pursuing market access, removing obstacles and addressing sanitary and phytosanitary concerns
5. Work on quickly doubling India's stake in global agricultural exports by joining the global value chain.
6. Give farmers access to export opportunities in foreign markets.

In August 2020, APEDA signed MoUs with the National Cooperative Union of India (NCUI) and AFC India Limited. The MoU with NCUI has been linked to facilitate collaboration in the areas of enlisting agricultural cooperatives for improved agri-product quality, consolidation and exports to achieve better price realisation for farmers; promoting

necessary certifications for agri-produce/organic produce; building the capacity of agri-processing and related cooperative societies/SHGs; and showcasing the goods and services being offered by agri-processing cooperatives in domestic and international markets. An MoU has been signed with AFC India Ltd. to collaborate on important technology intervention requirements for organic and residue/chemical-free production systems; the development of Common Processing Centres; and providing effective support for the entire value chain in clusters defined by the Agriculture Export Policy (AEP).

Table 3: Pre and Post NHM Scenario: Area, Production & Productivity

(Area: '000 Ha, Production: '000 MT, Productivity: MT/Ha)

Crop	Area			Production			Productivity		
	2004-05	2018-19	2019-20*	2004-05	2018-19	2019-20*	2004-05	2018-19	2019-20*
Fruits	5049	6597	6702	50867	97967	100448	10.07	14.85	14.99
Vegetables	6744	10073	10316	101246	183170	189464	15.01	18.18	18.37
Flowers	118	303	307	659	2910	2994	5.58	9.60	9.76
Aromatic & Medicinal crops	131	627	685	159	795	761	1.21	1.27	1.11
Plantation crops	3147	4069	4071	9835	16592	16031	3.13	4.08	3.94
Spices	3150	4067	4138	4001	9500	9754	1.27	2.37	2.36
Others	106			172	120	115			
Total	18445	25737	26219	166939	311052	319567	9.05	12.09	12.19

Source: *3rd Advance Estimates of Horticulture Crops 2019-20-DAC&FW

The comparative details of area, production and productivity of various horticulture crops during 2019-20 (3rd Adv. Est) with reference to 2004-05, viz. pre and post NHM scenario are given in the following Table 3. During 2019-20, as on 31st March, 2020, funds to the tune of Rs.800.13 crore have been released to States/ UTs/NLAs for implementing NHM scheme against BE of Rs.1217.00 crore and RE of Rs.1065.00 crore. During 2020-21, an amount of Rs.1363.62 crore has been allocated for NHM, against of which an amount of Rs.495.13 crore has been released as on 31st December, 2020.

Table 4: Area, Production & Productivity of Horticulture crops (Tonnes/Hectare)

Year	Area	AGR	Production	AGR	Productivity	AGR
2009-10	20.88	0	223.09	0	10.69	0
2010-11	21.83	-78.17	240.53	140.53	11.02	-88.98
2011-12	23.24	-76.76	257.28	157.28	11.07	-88.93
2012-13	23.69	-76.31	268.85	168.85	11.35	-88.65
2013-14	24.2	-75.8	277.35	177.35	11.46	-88.54
2014-15	23.41	-76.59	280.99	180.99	12	-88
2015-16	24.47	-75.53	286.19	186.19	11.69	-88.31
2016-17	24.85	-75.15	300.64	200.64	12.1	-87.9
2017-18	25.24	-74.76	310.67	210.67	12.31	-87.69
2018-19	25.74	-74.26	311.05	211.05	12.09	-87.91
2019-20 (3 rd Advance Estimates)	26.22	-73.78	319.57	219.57	12.19	-87.81
MEAN	24	-69	280	168	12	-80

Source: Annual Report-2020-21

The wide and varied nature of the horticulture sector covering fruits, vegetables, root and tuber crops, flowers, aromatics and medicinal crops, spices and plantation crops facilitates better returns per unit of area, besides opportunities for diversification in agriculture.

Horticulture crops cover an area of 26.22 Million Hectare at present; it has registered an increase of 25.59% as compared to 20.88 Million Hectare in 2009-10. However, with a production of about 319.57 Million Tonnes, horticulture production has witnessed an increase of about 43.25% during the period 2009-10 to 2019-20 (3rd Advance Estimates). The significant feature is that there has been improvement of productivity of horticulture crops which increased by about 14.06% during this period.

Export of India's Agricultural Products

In 2021-22, agricultural product exports, including plantation and marine products, have exceeded US\$ 50 billion, a record-high amount. According to preliminary data from DGCI&S, agricultural exports increased by 19.92% in 2021–2022 to reach US\$ 50.21 billion. The growth rate is impressive, as it exceeds the growth of 17.66% to US\$ 41.87 billion attained in 2020–21. This was accomplished despite previously unheard-of logistical difficulties, such as high freight prices and lack of available containers. Staples, including wheat (US\$ 2.19 billion), rice (US\$ 9.65 billion), sugar (US\$ 4.6 billion) and other cereals (US\$ 1.08 billion), have recorded highest-ever exports.

A wheat export has increased by an extraordinary 273%, virtually quadrupling from US\$ 568 million in 2020–21 to ~US\$ 2,119 million in 2021–22. Farmers in many states, including Uttar Pradesh, West Bengal, Punjab, Haryana, Telangana, Bihar, Madhya Pradesh, Chhattisgarh, Maharashtra and Andhra Pradesh, have benefited from the rise in exports of these commodities. India now controls over 50% of the global rice market. Exports of spices have surpassed US\$ 4 billion for the second consecutive year. Coffee exports have exceeded US\$ 1 billion for the first time, despite significant supply-side challenges, thus improving returns for coffee growers in Tamil Nadu, Kerala and Karnataka. The Department of Commerce (DoC), along with its different export promotion organisations, including APEDA, MPEDA and commodity boards, put forth consistent efforts to attain this success.

The DoC has worked particularly hard to encourage district and state governments to support agricultural exports. The DoC has made special efforts to connect the export market directly with farmers and FPOs to ensure that the farmers benefit from exports. For the purpose of providing farmers, FPOs/FPCs and cooperatives a forum to communicate with exporters, a Farmer Connect Portal has been established by the DoC.

The **National Commission on Farmers (NCF)** was constituted on November 18, 2004 under the chairmanship of Professor M.S. Swaminathan.

1. Farmers need to have assured access and control over basic resources, which include land, water, bio resources, credit and insurance, technology and knowledge management, and markets. The NCF recommends that “Agriculture” be inserted in the Concurrent List of the Constitution.

2. Establish a **National Land Use Advisory Service**, which would have the capacity to link land use decisions with ecological meteorological and marketing factors on a location and season specific basis.
3. Set up a mechanism to regulate the sale of agricultural land, based on quantum of land, nature of proposed use and category of buyer.
4. Increase water supply through **rainwater harvesting and recharge** of the aquifer should become mandatory. “Million Wells Recharge” programme, specifically targeted at private wells should be launched.
5. Expand the outreach of the formal **credit system** to reach the really poor and needy.
6. Reduce rate of interest for crop loans to 4 per cent simple, with government support.
7. Restructure microfinance policies to serve as Livelihood Finance, i.e. credit coupled with support services in the areas of technology, management and markets.
8. Cover all crops by crop insurance with the village and not block as the unit for assessment to **avoid farmer’s suicide**.

Peer Reviewed Journal

ECONOMIC DEVELOPMENT, ENVIRONMENTAL QUALITY AND HEALTH STATUS²¹

Dr. S. RAJESWARI²²

Introduction

Economic development and environmental development never go hand in hand. They move in the inverse direction. Economic development after Industrial Revolution has brought number of health hazards. Developed countries have concentrated their attention on environmental problem, preventive health care and sanitation. But the developing countries yet to pay their attention on the above aspects.

There are two ways in which the environment affects human health. The first is directly, through pollutants discharged by automobiles. In urban areas, in particular, the current disease pattern is closely linked to the deterioration in the quality of air and water. The World Bank estimated in 1993 that diarrhoea and intestinal worm infections caused by poor water supplies and bad sanitation accounted for as much as 10 per cent of the entire disease burden of developing countries.

If the provision of safe drinking water is a priority in promoting health then the safe disposal of human excreta is another. Without good sanitation, excreta and pathogens enter water from faeces. This causes shigelladysentery and cholera. One person with cholera excretes 10¹⁰ bacteria each day. One person could theoretically infect upto 10 million people. Over crowding and unhygienic living conditions in cities, specially in slums, have also contributed the spread of communicable disease like tuberculosis and cholera. The World Development Report (1992) stated that poor are the agents and victims of environmental degradation. In either case, they suffer the loss due to environmental degradation caused by their own actions as well as by the actions of the others

Much of the ill-health in developing countries are due to defective environment The water-borne diseases are caused by the presence an infective agent and aquatic host Water-borne diseases are spread by the so called "Faecal-oral route" where organisms are excreted in faeces and subsequently ingested by a new host

Table: 1 Water + Borne Disease

I a) Viral	viral hepatitis, Poliomyelitis (Hepatic)
b) Bacterial	Cholera, typhoid, dysentery
c) Protozoal	Amoebiasis, giardiasis
d) Helminthic	Worm Infestation
II Presence of an Aquatic host also caused worm infestation: Guinea worm Fish Tape worm	

Source: Text Book of preventive and Social Medicine by JE Park and K Park

²¹ Paper presented in the 42nd Annual Conference of Association of Economists of Tamil Nadu Organized by Post Graduate Department of Economics, Arulmigu Palaniandavar College of Arts and Culture, Palani, Dindigul District-624 601, Tamil Nadu on 25th February, 2023.

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It is estimated about 1.3 billion people in the developing world lack access to clean and plentiful water and nearly 2 million people lack an adequate system for disposing of their faeces (World Development Report, 1993). Faeces deposited near homes, contaminated drinking water caused by poorly designed or maintained sewage system, fish from polluted rivers and coastal rivers and agricultural produce fertilized with human wastes are health hazards.

The following table shows the different type of bacteria, protozoa and virus causing different types of water-borne diseases (Diarrhoeal and non-diarrhoeal diseases).

Table: II Disease Causing Agents, Disease and Symptoms (Diarrhoeal - Family)

Pathogen	Disease	Main symptoms	Reservoir of Infection
BACTERIA (a) <i>Salmonella typhi</i>	Typhoid fever	High fever enlarged spleen and diarrhoea.	Human Intestine and gall bladder.
(b) <i>Vibrio cholerae</i>	Cholera	Disrupts water intake and extreme dehydration.	Intestine
PROTOZOA (a) <i>Giardia lamblia</i>	Giardiasis	Long lasting diarrhoea or watery diarrhoea	Small Intestine
(b) <i>Entamoebahistolytica</i>	Amoebiasis	Ulceration, Production of watery bloody diarrhoea.	Large Intestine
(c) <i>Cryptosporidium parvum</i>	Cholera like diarrhoea	Diarrhoea, Vomitting and Anorexia	Small Bowel
VIRUS (a) Six groups of Viruses: [Rotaviruses, Norwalk-like agents, Caliciviruses, astroviruses, Small Round Structured Viruses (SRSV)]	Gastroenteritis	Acute vomitting and mild to severe diarrhoea.	
(b) Hepatitis- A Virus (Non-Diarrhoeal Disease)	Jaundice	Loss of appetite enlarged liver	Liver

Source: Jones Keith, "Water-Borne Diseases", The Hindu, dated 14th September, 1994.

The main symptoms caused by water-borne diseases often include diarrhoea, vomitting, abdominal pain and dehydration.

Cholera and typhoid were widespread in Europe and North America 100 years ago, but now have almost disappeared from the developed world largely because of improved water supplies and sanitation. However, this has not happened to the same extent in developing countries. In Peru, for example, where there have been more than 5 lakh cases of cholera since 1991. Public expenditure has declined over the past 10 years and the supply of water to almost 90 per cent of the rural population is still grossly contaminated.

Ways of Water Contamination

- When sanitation does break down and sewage or untreated water accidentally gets in to the drinking water, the whole population fed by that supply is at risk. Example: The World's worst out break (of Cryptosporidiasis) occurred in April 1993 in Milwaukee, in the U.S. out of 8 lakhs people served by that water system, 3.70 lakh became ill, 440 admitted to hospital and 40 to have died.
- During warfare and natural disasters like earth quakes and flood. With the break down of pumping stations and breakage of pipe work, drinking water becomes mixed with human sewage
- When water is scarce, treated sewage effluent is valuable source of irrigated water. If irrigation water becomes polluted, pathogenic micro organisms are transferred into crops and in to the foodchain.

The united nations, recognising that most of the disease was the result of water supplies, set up a decade of water 1981-1990 which was designated as the "International Water Supply and Sanitation Decade". Its aim was to provide safe water supply and adequate sanitation for everyone. An appraisal of achievements in this regard with its impact on basic health indicators like Infant Mortality Rate and Life expectancy may be overviewed in the global context. The table provides a snapshot of several countries during 1980-1995.

Access to safe water and sanitation - Infant Mortality and Life Expectancy

Countries	Access to safe water % of population with access		Access to sanitation % of population with access		Infant Mortality Rate per 1000 live births		Life Expectancy at birth	
	1995	2020	1995	2020	1995	2020	Male	Female
Australia	95	99	90	99	06	03	81	79
Canada	100	99	85	99	06	04	83	85
Denmark	100	96	100	96	06	03	79	83
Finland	100	99	100	99	04	01	79	84
Netherland	100	99	100	99	05	04	79	83
U.S	90	97	85	97	07	05	76	79
France	100	99	96	99	05	01	79	85
Spain	99	99	100	99	05	02	79	85
U.K	100	99	96	99	06	03	78	82
Singapore	100	100	97	100	04	01	81	86
Malaysia	88	93	91	96	11	07	74	78
Kenya	53	59	77	29	57	34	60	65
Indonesia	62	90	51	79	49	19	66	70
Mauritius	98	99	100	99	17	10	70	76
India	81	89	29	27	65	67	67	75
Pakistan	60	35	30	59	88	63	63	68
Mozambique	32	49	21	52	123	58	58	64
Ethiopia	27	12	10	35	109	65	65	68

An analysis of the above table provides the following inferences

- (a) Countries with high incomes have achieved maximum in the provision of safe drinking water and sanitation facilities.
- (b) Countries with high percentage of achievement in the provision of safe drinking water and sanitation enjoy a high health status with less Infant Mortality Rate and High Life Expectancy at birth.
- (c) Countries with low incomes have less access to safe drinking water and sanitation facilities.
- (d) These low income countries with less access to safe drinking water and sanitation have high incidence of IMR and low life expectancy at birth.

Thus, country's Infant Mortality Rate and Life Expectancy vary with the access to safe drinking water and sanitation which in turn vary with the better environmental quality

Past experience in water and sanitation shows the limitations of direct government provision of household services. In the water sector, supply side failures are largely caused by inefficient and irresponsible public sector monopolies. Massive Public Investments, often supported by the donor community and the World Bank, have been made in public or quasi-public agencies. They are responsible for the delivery and maintenance of household services. The net result has often been bloated public agencies with low accountability to their customers.

The provision of clean drinking water is not always the complete answer to the problem. People must recognise safe water as "felt" need and give up their old, unhygienic habits of polluting water supplies and water sources.

It is also essential to separate the disposal of excreta from water used for drinking. This can be done on a small scale by building latrines or septic tanks where excreta are held and prevented from seeping into nearby water courses.

Modern sewage treatment reduces the number of micro organisms present and removes solids so that rivers do not become silted up and thus reducing the amount of dissolved organic matter in effluent before it is released into surface waters.

The out break of pneumonic plague in Surat may prove to be an eye-opener and at least lead to greater allocation of funds for public health related programmes in the country. As of now, expenditure in the health sector, both by the centre and the state is only a little over 1.5 per cent of GDP, though the World Health Organisation recommends that it should be at least 5 per cent, if equity and universal coverage are to be realised.

RENEWABLE ENERGY FOR INDIA'S DEVELOPMENT: INVESTMENT, EMPLOYMENT OPPORTUNITIES AND CHALLENGES²³

RAJESH KHANNA S²⁴

Introduction

India is the third largest consumer of electricity and the third largest producer of renewable energy in the world. In 2022, 40% of India's installed energy capacity (160 GW of 400 GW) has come from renewable sources. India has reached 165.94GW of renewable energy capacity by October 2022, as against the target of 175GW by 2022.

[i] Wind Energy: The growth of the wind industry has led to a strong ecosystem, the ability to run projects, and a manufacturing base that makes about 12,000 MW per year. The country has the fourth-highest installed capacity for wind power in the world. As of December 31, 2021, the total installed capacity was 40.08 GW, of which 1.46 GW was added between January and December 2021. 68.08 billion Units of electricity were made by wind power projects from January to December of 2021. The National Institute of Wind Energy (NIWE) has installed 967 wind monitoring stations all over the country and distributed out wind potential maps at 50 m, 80 m, 100 m, and 120 m above ground level. The recent data shows that the country has a gross wind power potential of 302.25 GW at 100 meters above ground level and 695.50 GW at 120 meters above ground level.

India started using wind power in the late 1980s, and as of August 31, 2022, the country had installed a total of 41.4 GW of wind power. Wind power's share of the country's total installed capacity has grown from 21.1 GW in March 2014 to 40.3 GW in March 2022. A total of 92 Wind Resource Assessment instrumentation using 25 meter and 50 meter meteorological masts were carried out at NE regions by 31.03.2022. A draft policy released by the Ministry of New and Renewable Energy on repowering older wind power projects where out of a total 41.66 GW installed wind energy capacity in the country, more than 25 GW of wind turbines need repowering. National Institute of Wind Energy has estimated repowering potential of the country to be 25.406 GW considering Wind turbines below capacity 2 MW.

[ii] Wind-Solar Hybrid Energy: The Ministry released National Wind-Solar Hybrid Policy on May 14, 2018. The main goal of the policy is to provide a framework for promoting large-scale grid-connected wind-solar PV hybrid systems that make the best and most efficient use of wind and solar resources, transmission infrastructure, and land. The wind-solar PV hybrid systems will help reduce the fluctuations in renewable power generation and make the grid more stable. The policy also aims to promote new technologies, ways of doing things, and solutions that involve combining the process of wind and solar PV plants.

²³ Paper presented in the 42nd Annual Conference of Association of Economists of Tamil Nadu Organized by Post Graduate Department of Economics, Arulmigu Palaniandavar College of Arts and Culture, Palani, Dindigul District-624 601, Tamil Nadu on 25th February, 2023.

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The Memorandum of Understanding signed in “Interactive sessions on Off-shore Wind Power” scheduled from 8 to 13 August 2022. A Memorandum of Understanding (MoU) has been signed between NIWE and SJVN for providing Technical Consultancy services for Development of Solar, Wind, Hybrid (Wind & Solar) and Hybrid (Wind, Solar & Battery storage) Energy projects by SJVN on 14.06.2021 for three years. MoU signed between Association of Renewable Energy Agencies of States (AREAS), New Delhi & NIWE on 27.08.2021 which will remain in force unless revoked by the consent of the parties.

[a] MoU signed between NIWE & University of Massachusetts, AMHREST on 22.09.2021 for five years.

[b] MoU signed between WAPCOS Ltd., New Delhi & NIWE on 15.12.2021 for three years.

[c] MoU signed between University of Calcutta & NIWE on 22.12.2021 for five years.

[iii] Biomass power & cogeneration: Biopower technologies use similar steps to those used with fossil fuels to turn renewable biomass fuels into heat and electricity. Biopower can be made from biomass in three ways: by burning it, letting bacteria break it down, or turning it into gas or liquid fuel. The Ministry has been promoting the Biomass Power and Bagasse Co-Generation Program with the goal of getting energy back from biomass, such as bagasse, agricultural waste like shells, husks, defiled cakes, and wood from energy plantations. During the year 2021–2022, three projects have been started which can produce 173 kW of electricity and 1400 M3 of biogas per day, respectively. The country will have a total of 328 biogas-based projects with a total power generation capacity of 7.76 MW and a total biogas production of 73,751 M3 per day until December 31, 2021.

Biomass power & cogeneration achievements, 370 out of 540 sugar mills have installed cogeneration power plants with a total capacity of 7562 MW as of December, 2021. More than 200 biomass (non-bagasse) cogeneration plants with a total capacity of 772 MW have been set up in the country as of December 2021.

Investment and employment opportunities

[i] Investment opportunities: The investments into renewable energy in India increased by 22% in the first half of 2018 compared to 2017, while the investments in China dropped by 15% during the same period, according to a statement by the Bloomberg New Energy Finance (BNEF). At this rate, India is expected to overtake China and become the most significant growth market for renewable energy by the end of 2020. The country is eyeing pole position for transformation in renewable energy by reaching 175 GW by 2020. To achieve this target, it is quickly ramping up investments in this sector. The country added more renewable capacity than conventional capacity in 2018 when compared to 2017. India hosted the ISA first official summit on the 11.03.2018 for 121 countries. This will provide a standard platform to work toward the ambitious targets for renewable energy. The summit will emphasize India's dedication to meet global engagements in a time-bound method.

The country is also constructing many sizeable solar power parks comparable to, but larger than, those in China. Half of the earth's ten biggest solar parks under development are in India. In 2014, the world largest solar park was the Topaz solar farm in California with a 550 MW facility. In 2015, another operator in California, Solar Star, edged its capacity up to 579 MW. By 2016, India's Kamuthi Solar Power Project in Tamil Nadu was on top with 648

MW of capacity (set up by the Adani Green Energy, part of the Adani Group, in Tamil Nadu). As of February 2017, the Longyangxia Dam Solar Park in China was the new leader, with 850 MW of capacity. Currently, there are 600 MW operating units and 1400 MW units under construction. The Shakti Sthala solar park was inaugurated on 01.03.2018 in Pavagada (Karnataka, India) which is expected to become the globe's most significant solar park when it accomplishes its full potential of 2 GW. Another large solar park with 1.5 GW is scheduled to be built in the Kadappa region.

The progress in solar power is remarkable and demonstrates real clean energy development on the ground. The Kurnool ultra-mega solar park generated 800 million units (MU) of energy in October 2018 and saved over 700,000 tons of CO₂. Rainwater was harvested using a reservoir that helps in cleaning solar panels and supplying water. The country is making remarkable progress in solar energy. The Kamuthi solar farm is cleaned each day by a robotic system. As the Indian economy expands, electricity consumption is forecasted to reach 15,280 TWh in 2040. With the government's intent, green energy objectives, i.e., the renewable sector, grow considerably in an attractive manner with both foreign and domestic investors. It is anticipated to attract investments of up to USD 80 billion in the subsequent 4 years. The government of India has raised its 175 GW target to 225 GW of renewable energy capacity by 2022.

The competitive benefit is that the country has sun exposure possible throughout the year and has an enormous hydropower potential. India was also listed fourth in the EY renewable energy country attractive index 2018. Sixty solar cities will be built in India as a section of MNRE's "Solar cities" program. In a regular auction, reduction in tariffs cost of the projects are the competitive benefits in the country. India accounts for about 4% of the total global electricity generation capacity and has the fourth highest installed capacity of wind energy and the third highest installed capacity of CSP. The solar installation in India erected during 2015–2016, 2016–2017, 2017–2018, and 2018–2019 was 3.01 GW, 5.52 GW, 9.36 GW, and 6.53 GW, respectively.

The country aims to add 8.5 GW during 2019–2020. Due to its advantageous location in the solar belt (400 South to 400 North), the country is one of the largest beneficiaries of solar energy with relatively ample availability. An increase in the installed capacity of solar power is anticipated to exceed the installed capacity of wind energy, approaching 100 GW by 2022 from its current levels of 25.21226 GW as of December 2018. Fast falling prices have made Solar PV the biggest market for new investments. Under the Union Budget 2018–2019, a zero import tax on parts used in manufacturing solar panels was launched to provide an advantage to domestic solar panel companies.

Foreign direct investment (FDI) inflows in the renewable energy sector of India between April 2000 and June 2018 amounted to USD 6.84 billion according to the report of the department of industrial policy and promotion (DIPP). The DIPP was renamed (gazette notification 27.01.2019) the Department for the Promotion of Industry and Internal Trade (DPIIT). It is responsible for the development of domestic trade, retail trade, trader's welfare including their employees as well as concerns associated with activities in facilitating and supporting business and startups. Since 2014, more than 42 billion USD have been invested in India's renewable power sector. India reached US\$ 7.4 billion in investments in the first half

of 2018. Between April 2015 and June 2018, the country received USD 3.2 billion FDI in the renewable sector. The year wise inflows expanded from USD 776 million in 2015–2016 to USD 783 million in 2016–2017 and USD 1204 million in 2017–2018. Between January to March of 2018, the INR 452 crore (4520 Million INR, 63.3389 million USD) of the FDI had already come in. The country is contributing with financial and promotional incentives that include a capital subsidy, accelerated depreciation (AD), waiver of inter-state transmission charges and losses, viability gap funding (VGF), and FDI up to 100% under the automated track. The DIPP/DPIIT compiles and manages the data of the FDI equity inflow received in India.

[iii] Employment opportunities: As in past years, China maintained the most notable number of people employed (3880 million jobs) estimating for 43% of the globe's total. In India, new solar installations touched a record of 9.6 GW in 2017, efficiently increasing the total installed capacity. The employment in solar PV improved by 36% and reached 164,400 jobs, of which 92,400 represented on-grid use. IRENA determines that the building and installation covered 46% of these jobs, with operations and maintenance (O&M) representing 35% and 19%, individually. India does not produce solar PV because it could be imported from China, which is inexpensive. The market share of domestic companies (Indian supplier to renewable projects) declined from 13% in 2014–2015 to 7% in 2017–2018. If India starts the manufacturing base, more citizens will get jobs in the manufacturing field. India had the world's fifth most significant additions of 4.1 GW to wind capacity in 2017 and the fourth largest cumulative capacity in 2018. IRENA predicts that jobs in the wind sector stood at 60,500. The jobs in renewables are categorized into technological development, installation/de-installation, operation, and maintenance.

As technology quickly evolves, workers in all areas need to update their skills through continuing training / education or job training, and in several cases could benefit from professional certification. The advantages of moving to renewable energy are evident, and for this reason, the governments are responding positively toward the transformation to clean energy. Renewable energy can be described as the country's next employment boom. Renewable energy job opportunities can transform rural economy. The renewable energy sector might help to reduce poverty by creating better employment. For example, wind power is looking for specialists in manufacturing, project development, and construction and turbine installation as well as financial services, transportation and logistics, and maintenance and operations. The government is building more renewable energy power plants that will require a workforce.

The increasing investments in the renewable energy sector have the potential to provide more jobs than any other fossil fuel industry. Local businesses and renewable sectors will benefit from this change, as income will increase significantly. Many jobs in this sector will contribute to fixed salaries, healthcare benefits, and skill-building opportunities for unskilled and semi-skilled workers. A range of skilled and unskilled jobs are included in all renewable energy technologies, even though most of the positions in the renewable energy industry demand a skilled workforce. The renewable sector employs semi-skilled and unskilled labor in the construction, operations, and maintenance after proper training. Unskilled labor is employed as truck drivers, guards, cleaning, and maintenance. Semi-skilled labor is used to take regular readings from displays. A lack of consistent data on the potential employment impact of renewables expansion makes it particularly hard to assess the quantity of skilled, semi-skilled, and unskilled personnel that might be needed.

Challenges faced by renewable energy in India

Policy and regulatory obstacles. A comprehensive policy statement (regulatory framework) is not available in the renewable sector. When there is a requirement to promote the growth of particular renewable energy technologies, policies might be declared that do not match with the plans for the development of renewable energy. The regulatory framework and procedures are different for every state because they define the respective RPOs (Renewable Purchase Obligations) and this creates a higher risk of investments in this sector. Additionally, the policies are applicable for just 5 years, and the generated risk for investments in this sector is apparent. The biomass sector does not have an established framework.

Incentive accelerated depreciation (AD) is provided to wind developers and is evident in developing India's wind-producing capacity. Wind projects installed more than 10 years ago show that they are not optimally maintained. Many owners of the asset have built with little motivation for tax benefits only.

The RPO percentage specified in the regulatory framework for various renewable sources is not precise.

The parameter to determine the tariff is not transparent in the regulatory framework and many SRECs have established a tariff for limited periods.

AN EMPIRICAL ANALYSIS OF ECONOMIC DEVELOPMENT WITH ENVIRONMENTAL DEGRADATION²⁵

Dr. S. RAJARAJESWARI²⁶ & G. JAGADEESH²⁷

Introduction

The degradation in the environmental quality which is one of the main factors generating a number of problems in today's world results from the economic and population growth. Economic growth and its impact on the environment go hand in hand yet there is a trade-off between the two variables. Many countries including ASEAN members encounter the same problem to grow their economic but could maintain the environmental quality is maintained. In another word, or how the condition of an environment can affect productivity so as to increase economic growth.

ASEAN has the high potential to have the countries in its region to be advanced although perhaps not instantly. The quick population growth will lead to the increasing demand for food, energy, water, and other resources, which at the end, might cause excessive pressure and exploitation to the environment. Bran et al. (2009) explained that such a relationship will become more complicated given the dependence of most population on natural resources. This condition potentially worsens the environmental degradation and even might cause natural disasters.

In the early twentieth century, the world population fluctuated in around 6 billion. 80% of them were developing countries and most of them [were Asian countries. ASEAN consisting of ten autonomous countries, i.e. Malaysia, Brunei Darussalam, Singapore, Philippines, Thailand, Vietnam, Indonesia, Myanmar, Cambodia, and Laos is one of the fastest growing regions in the world. The population of South East Asia is equivalent to 8.59 per cent of the total world population. Indonesia has the largest population while Brunei has the smallest one. In the sub-region of South East Asia, the population increased by an average annual rate of 1.3 per cent (Nazeer and Furuoka, 2017).

Countries in the ASEAN region also have a high population density. Normally, it is 133 per cent per square kilometre including substantial intra and inter-state differences. In fact, the population density in the two big cities, Jakarta and Manila is about 10,000 people per square kilometre, compared to Mumbai and Delhi (Nazeer and Furuoka, 2017). During that period, various arguments on the impact of the population on economic development were complex. Economists believe that larger populations can lead to "pushed technology" and "demand pull". In the other words, the rapid population growth can increase the demand for goods and drive the development in technological. Therefore, it can increase the labour productivity, economic growth, per capita income and life quality.

²⁵ Paper presented in the 42nd Annual Conference of Association of Economists of Tamil Nadu Organized by Post Graduate Department of Economics, Arulmigu Palaniandavar College of Arts and Culture, Palani, Dindigul District-624 601, Tamil Nadu on 25th February, 2023.

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The negative effect caused by the increasing population is the economic growth which can lead to the environmental problems. Human activities are believed to be the major contributors to the rise of the global temperature since principally, they are continuously producing greenhouse gases, such as CO₂ into the atmosphere. Like a blade, economic growth can improve the welfare of the community but also, on the other hand, it can damage the surrounding environment, especially forests. We should note that indeed, forests are able to contribute to the economy. In fact, it has become the major economic source for many countries. Forests do not only serve the needs of wood, wild foods, medicines, soil conservation, carbon dioxide storage, and scenic beauty but also contribute to stimulating foreign exchange earnings, employment, and economic growth. Forests are productive assets that can be utilized to achieve national development goals, including equity, stability, investment and growth.

Southeast Asia has the very wide areas of forests. This makes these regions to be the world's leading tropical timber producer (85.56 million m³ in 2012 compared to tropical Africa = 28.50 million m³ and Latin America = 39.94 million m³). The typical characteristic of the forests in Southeast Asia is the prevalence of the dipterocarp trees family, which dominantly grow in the forests of Kalimantan, Sumatra, Java, Peninsular Malaysia and the moister part of Philippines.

A well-known theory from Kuznet stated that there is a negative correlation between the economic growth and the environmental quality as the latter is a negative effect of the occurrence of the former one (Panayotou, 2003). Nevertheless, Kuznets theory actually analyzed the environmental degradation as the dependent variable while the economic growth as the explanatory variable. Several studies focusing on the impact of environmental quality as explanatory variables and economic growth as dependent are still limited. Some consider environmental quality does not directly affect economic growth. Although it is undeniable that there have been some researches attempting to analyze it e.g. (Varvarigos, 2008) which concluded that environmental quality could influence the long-term economic growth. Another study by Azam (2016) also explained that environmental quality can adversely affect the economic growth.

The environmental sustainability which can retain the economic growth is usually closely linked to forests. In addition, the high emission in a country is often believed as the result of high industrial activities. A big industry certainly requires a lot of labours so that it will employ more workers. The big number of population in a country will greatly benefit the economy by maximizing the role of the industry. The relationship between the environment and economic growth is very interesting to investigate because most studies on this subject are more interested in looking at the impact of economic growth on environmental degradation whereas, in fact, the environment is indeed able to influence the economic growth in a country or region.

Literature review

Several studies were more interested in proving whether the Environmental Kuznets Curve (EKC) phenomenon prevails in every research context. Many studies were looking to prove the theory that economic growth will cause environmental degradation in accordance with the economic phase of the country under study. Nevertheless, several other studies have

tried to see whether an environment and some associated aspects can have either a direct or an indirect impact on economic growth. Research by (Omri et al., 2015) found that the environmental quality peroxided using CO₂ emissions in Middle Eastern and Northern Africa affects the economic growth and vice versa.

A study on the interrelated relationship between environmental quality and economic growth was also conducted by (Toman, 2003). The findings in his research more specifically explain that there should be government policies that focus not only on savings rates and human resource investment but also on doing investment in the natural resource sector. Furthermore, Toman (2003) highlighted that natural resources are not allocated efficiently in practice not only because of the market and institutional failures affecting natural resources and the environment but also because of the wider market and institutional failures that also impede the development and use of the excessive natural resources.

A research discovering that there is a reciprocal relationship between environmental quality and economic growth, one of them, was by Borhan et al. (2012). They found that the environmental quality projected using CO₂ had a significantly negative influence on the economic growth peroxided using budget from the community. They argue that the pollution increases will result in decreased income as it directly lowers the output by reducing the productivity of capital and labour. For example, due to the health problem, a number of labours may be absent for work. Furthermore, because the air or water is contaminated with pollution, there will be deterioration in the quality of the industrial equipment. The air pollution indicator coefficients show the significant effect of the population density and CO₂ has a negative relationship with population density. This suggests that if the pollution increases, the population density might decreases as it could cause human death.

A study by Azam (2016) explained that there is a negative and significant relationship between environmental quality that is projected using CO₂ emissions to economic growth in countries situated around ASEAN e.g. Bangladesh, China, India, Indonesia, Mongolia, Malaysia, Pakistan, Philippines, Sri Lanka, Thailand, and Vietnam. Both studies by Omri et al. (2015) and Azam (2016) showed the similarities that CO₂ emission is a proxy for the environmental quality.

Studies by Omri et al. (2015) and Azam (2015) were consistent with research conducted by Ejubekpokpo (2014) in Nigeria, that environmental quality negatively and significantly affected the economic growth where the proxy for environmental quality was used equally i.e. CO₂. Furthermore, Nigeria is known as a country with the high level of gas emissions in the world which increased the number of emissions produced into the atmosphere and further reduces the productivity and economic growth in that country.

Another study conducted by Varvarigos (2008) found that environmental quality, the total capital, and life expectancy had an effect on the economic growth. Furthermore, if technology produces pollution above the critical threshold, then the economy will experience a downward growth cycle and will return to the balance position in the long term. On the contrary, if the use of technology produces pollution below the critical limit; it will lead to a better economic growth in the long term. Thus, this study confirmed the earlier ones that environmental quality is negatively related to economic growth.

A question arises whether a country can promote the economic growth without damaging the quality of the environment or in another word, how to improve the quality of the existing environment without compromising the stable economic growth. Charfeddin et al. (2018) tried to answer that question. His research found that it was very difficult to improve the environmental quality without compromising the economic growth. Furthermore, the findings of the research indicated that if the quality of the environment is improved by reducing the energy and electricity consumption, it will reduce the productivity which will further slow the economic growth.

A country consumes energy to meet the needs of major industries and fuels. Unfortunately, this sometimes ignores environmental sustainability factors, especially in the case of non-renewable energy use. However, it is done to drive the economy through production and distribution activities. Obradović and Lojanica (2017) reinforced this in their research. They found that, in the short term, there was no relationship between the energy consumption and CO₂ emissions. However, in the long term, there will be a significant relationship where energy consumption and CO₂ emissions were simultaneously able to influence the economic growth in Greece and Bulgaria.

Peer Reviewed Journal

INDUSTRIALIZATION – URBANIZATION - ENVIRONMENTAL DEGRADATION: AN EXPLORATORY STUDY ON THE NEXUS AND THE CONTINUUM²⁸

VISHAAL. K²⁹

1.0. Introduction

Expeditious Industrialization has been the most preferred economic choice in both developed and developing nations, to accomplish the objective of take-off towards sustained growth in GDP. Especially since Neo-Liberalization in 1980s and 1990s, the growth of Large-Scale Industrialization (**LSI**) seemed to be a more rampant one over the traditional economic activities such as agriculture, fishing etc in the developing countries like India. Further planners, developers and policy makers who were positioned at the implementation verge, viewed traditional agricultural and fishing livelihoods as backward and economic activity of the poor, involved with low- level of technology and decreasing returns to scale that could make the objective unrealized at any times (**Feola et al., 2020**). The above premise along with the economic premise of Kuznet's Hypothesis, supported by another environmental premise called Environmental Kuznet's Curve Hypothesis led to rampant urbanization, industrialization and modernization in the Peri-Urban regions (or) peripheral regions of major cities due to higher level of accessibility to urban social overhead capital. Out of the above three, Industrialization poses high environmental costs compared to others (**Arabindoo, 2006; Rasmi Patnaik., 2018**). Industrialization also seems often to be unplanned and favouring the industrial and urban elites as in the case of Ghaziabad, Delhi (**Karpouzoglou et al., 2017**). The unplanned LSI and uncontrolled population growth in the late 20th century in turn led to alarming increase in the rate of Land-Use and Land Cover (LULC) dynamics (**Talukdar et al., 2020**). The LULC dynamism due to LSI has not only increased rapidly but also played as a major catalyst of environmental degradation, negative livelihood and health impacts and questions the level of social, economic and environmental sustainability in the PUI (**Karpouzoglou et al., 2017; Hassen et al., 2021**). So, this paper captures the spatio-temporal LULC Change of the Pre-Industrialized (2007) to Post-Industrialized (2022) 15-year long period of the Krishnapatnam Peri-Urban Industrial Interface/Region/Cluster, PUI of Nellore City at the micro-level; studies the nexus between PUI Industrialization and the Environmental Degradation in that PUI; and explores the impact of Industrial Land-Use change on the environment-ecology-socio-economic-sustainability continuum through desk-review approach. The study not only drills into the above but also explores into the micro-level challenges in achieving socio-economic-ecological sustainability in the Industrial PUI and presents a picture on the macro-level challenges to be dealt in the near future.

²⁸ Paper presented in the 42nd Annual Conference of Association of Economists of Tamil Nadu Organized by Post Graduate Department of Economics, Arulmigu Palaniandavar College of Arts and Culture, Palani, Dindigul District-624 601, Tamil Nadu on 25th February, 2023.

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2.0. Literature Review

2.1. Conceptualization of PUI

PUI are considered as evolving spaces that are socially diverse, economically multi-functional, ecologically complex (Ravetz, Fertner and Nielsen, 2013; Feola et al., 2020). Those spaces become complex due to the influence of vested interests of urban elites over the interests of the indigenous community population, as the local governments have incentives majorly towards intensifying and optimizing their own revenue by making use of the ambiguity in the land governance arising from the duality in local government structures (Adam, 2014).

2.2. Transformation of Economic Structure in the PUI

The above leads to the expropriation and displacement of Indigenous population for the establishment of Urban/Industrial settlements and leads to further transformation in the occupational structure among the local people; emergence of informal settlements with illegal livelihood (Torres et al., 2007; Adam, 2014).

2.3. Environmental Dynamics in the PUI

Post Industrialization, not only the economic structures change but also the LULC changes provide negative implications on the environmental and ecological fronts, calling upon for conservation, to safeguard the forest-land, preserve bio-diversity & their allied ecosystem services and prevent agricultural land loss (Simon, 2008).

Further, Industrial LULC change and its consequent release of greenhouse gases, suspended particulate matters, solids and industrial waste-water leads to environmental-ecological changes such as air and water pollution (ground and surface water pollution caused by heavy metals) and pollute crops/marine species, making loss in soil fertility and unhealthy foods (Shahalam et al., 1998; NIOT, 2004).

All the above phenomenon basically emerges due to Urban Political Ecology (UPE), that made a paradigm shift of highly polluting industries to the PUI characterized by weak-institutional sustainability (Karpouzoglou et al., 2017). These sequential events together lead to further negative livelihood and health impacts (causing huge economic burden) to the local community people globally, indicating unsustainable social, economic and ecological outcomes (Chitrarasu et al., 2013; Behera, 2015; Hadian et al., 2020).

Finally, the literature shows a picture of heavy damage of chemical, physical & biological traits in the agricultural and coastal habitats and the impacts have reached the threshold or mostly above its limits.

3.0. Objective of the study

1. To capture the nexus between the PUI industrialisation and the environmental degradation in Krishnapatnam port region.

4.0. Description of the Study Area

The study area called the Krishnapatnam Peri-Urban Industrial Interface (PUII) / Region / Cluster is an ecologically sensitive CRZ, 1991 & 2011 regulated PUII of Nellore City falling in the Sri Potti Sriramulu (SPSR) Nellore District of Andhra Pradesh. This PUII

has not been taken as a single administrative boundary, but a co-existence of different administrative regions / mandals, in order to cover all the proximal industrial areas and their land-use in that CRZ-regulated Southern Coastal PUII. Mainly, three specific mandals that are most affected by Industrial land-use and pollution are Muthukur [Total Population: **58,003 (Census, 2011)**], Chillakur [Total Population: **53,138 (Census, 2011)**], Thottapalli Gudurmandal [Total Population: **50,490 (Census, 2011)**] are covered in this study. The study area has been marked from a specific point, Latitude - 14° 14.481'N & Longitude - 80° 8.184'E (Adjacent to Krishnapatnam Port), in the mouth of the estuary of Kandaleru River. The boundaries are 5 kms straight-line in the east; 10 Km straight line in the west and south; and 15 kms straight-line in the north. The resultant study area comes in a rectangular form as shown in the below map with a **total area of 40,604.22 Hectares**.

Industrial Background of the Krishnapatnam PUII

This PUII at present, stages Adani Krishnapatnam Port in the mid-point of the study area; Private Thermal Power Plants (TPPs) such as Simhapuri Energy Limited [600-Megawatt (MW)] and Meenakshi Energy Power Limited (Unit I – 2 x 150 MW; Unit II – 2 x 350 MW) in the Thamminapatnam village, APGENCO Sri Damodaram Sanjeevaiah Thermal Power Station in the Nelaturu Village (Unit 1: 800 MW; Unit 2-800 MW) and SembCorp Energy India Ltd Plant 1 (2 x 660 MW) & Plant 2 (2 x 660 MW) in the Nelaturu village of Muthukur Mandal and Ananthapuram village of Thottapalli Gudur Mandal respectively; a private gas agency called NGC Energy India Pvt Ltd; and a Public Sector Enterprise “BPCL” involved in Oil & Gas exploration.

5.0. Methodology

This study employed Geo-spatial methodology which seems to be a perfect choice for capturing the spatio-temporal dynamics of this PUII. The specific techniques used are explained below.

Satellite Images Acquisition

Table 1 Satellite Images

Sl. No.	Satellite	Path	Row	Resolution [Metre (m)]	Date/Month/Year of Image Acquisition	Period
1.	Landsat-5	142	50	30	26/02/2007	Post-Monsoon Period
2.	Landsat-9	142	50	30	31/03/2022	Post-Monsoon Period

Source: USGS Earth Explorer

Data Processing and Image analysis

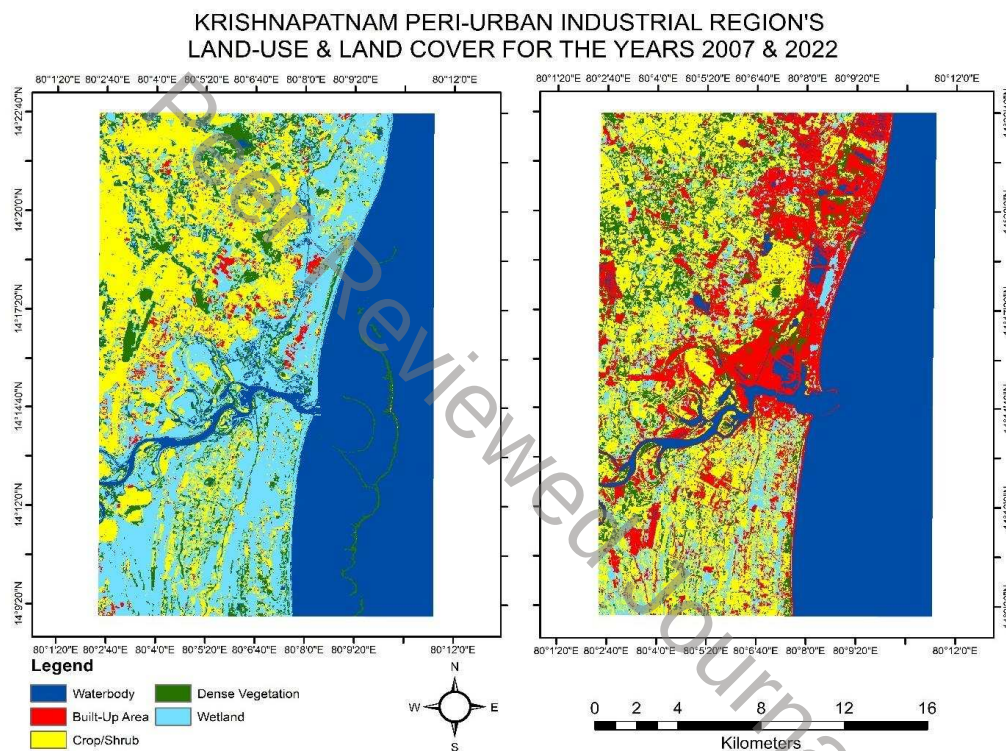
The satellite image data went through pre-processing procedures such stacking, mosaicking and image enhancement procedures like spectral, spatial and radiometric corrections. After the completion of pre-processing, the image classification was done using a technique called Iso-Cluster Unsupervised Image Classification with 20 classes as the first stage of change detection. Then, these iso-clustered classes were matched according to their spectral characteristics into five desired classes mentioned in the table 1. The results are shown in the

form of LULC maps for the years 2007 & 2022 below. Erdas Imagine version 14 along with ArcMap/ArcGISVersion 10.3 were used to perform the above tasks and for the calculation of statistics.

Desk-Review Approach

The desk-review approach was used for analysis after collection of secondary studies pertaining to Environmental quality decline (Air and Water) due to Industrialization in the Krishnapatnam PUII and PUII in general (**Discussed already in the Section 2.0 and its subsequent parts**).

6.0. Land-Use Land Cover Dynamics of the Krishnapatnam PUII



Source of the Above Map: Own Analysis

Table 2 Land-Use Land Cover Metrics of the Krishnapatnam Peri-Urban Industrial Region / Cluster

Total Area: 40604.22 Hectares (H.a)							
Sl. No.	Class	2007	Percentage (%) in Total Area	2022	Percentage (%) in Total Area	Change in Area (In H.a)	Percentage Change in Area (In %)
						2007-2022	2007-2022
1.	Waterbody	13828.32	34.06%	13780.71	33.94%	(-) 47.61	(-) 0.35%
2.	Built-Up Area	921.87	2.26%	7452.78	18.36%	(+) 6530.91	(+) 708.44%
3.	Crop/Shrub	9768.87	24.06%	10740.6	26.45%	(+) 971.73	(+) 9.95%
4.	Dense Vegetation	3762.36	9.27%	4223.34	10.40%	(+) 460.98	(+) 12.25%
5.	Wetland	12322.8	30.35%	4406.79	10.85%	(-) 7916.01	(-)179.63%
		40604.22	100.00%	40604.22	100.00%		

7.0. Results and Discussion

LULC Classes and its Respective Elements

The final image classification in both LULC 2007 and 2022 shows five classes, namely Waterbody which include elements such as Ocean, rivers, lagoon, creeks, lakes, ponds and post-monsoon temporarily flooded waterbodies, industrial ash ponds with higher level of water; Built-Up Area includes Industrial and other Man-made settlements; Crop/Shrub includes Cropland and Shrubland (**also sparsely populated mangroves as they are hardy shrubs**); Dense Vegetation includes trees, dense mangroves along the river and waterbodies; and Wetland includes permanently or temporarily shallow flooded lands, shallow waterbody, salt pans and coastal beaches.

LULC Change Detection and Interpretation for the period 2007-2022

Class 1- Waterbody

The area of waterbody in the year 2007 was around 13828.32 H.a. and it shrunk by 47.61 H.a. in the 15-year long period (**2007-2022**), which depicts only a marginal decrease at a rate of just 0.35%. But the phenomenon behind, is that inland waterbodies and canals present in 2007 between the coastal wetlands and inland wetlands have actually been converted into roads and industrial Land-use. These waterbodies that supported and enhanced the livelihoods of both fishing and farming communities have now been depleted. The presence of water in the ash ponds indicate the far better compliance of the respective powerplants (compared to TPPs in other coastal areas) present in the PUUI to Fly ash utilization norms. If the water in the ash ponds is purposively excluded, a higher level of depletion in waterbody cover can be observed.

Class2- Built-Up Area

The built-up area was just 921.87 H.a. in 2007, being just 2.26% of the study area has increased by a sky-high **708.44% to 7452.78 H.a. in 2022**. This increase is mainly attributed to the Industrial land-use, which had encroached a large area of coastal and inland wetlands, considerable area of shrubs and a minor area of cropland that too only for ash ponds. Wetland is one of the most productive ecosystems in the world in terms of economic, ecological values attached to it and is considered as the nursery ground for the incubation and production of marine species. The destruction of wetlands indicates the loss of livelihoods and increased rate of decrease in the income of fishermen in the Krishnapatnam PUUI. Wetland ecosystem works as a storage and supply house of freshwater (turns down the economic cost incurred for Purchasing Clean Drinking Water, flood regressor avoiding economic cost incurred due to damages done by cyclones and floods.

Class 3- Crop/Shrub

This area under Crop/Shrub has increased by 971.73 H.a. and 9.95% during the period 2007-2022. This indicates a considerable increase in area but when analysed by validating with Google earth images of 2007 and 2022, it is evident that cropland has been almost the same showing a marginal increase, whereas shrubs have increased at a higher extent in the radius of Thamminapatnam village, situated in lower-half of the LULC maps.

Class 4- Dense Vegetation (DV)

Dense Vegetation at the study area has increased in the period 2007-2022 by 12.25%, adding 460.98H.a. to its extent. It is easy to decipher from LULC maps that **DV** was found to be densely populated in a few regions in 2007, but in 2022, the density has decreased in all areas making the DV diversely populated in different spaces. Though there is increase in absolute numbers, there has been a higher level of degradation in terms of transformation of dense to less-dense mangrove population along the Kandaleru river and above the Krishnapatnam Port, due to air and water pollution caused by Industrialization. Most of the increase has been on the upper part of the map.

Class 5- Wetland

In the upper part of LULC map, the establishment of red-category industries such as Krishnapatnam Port, BPCL, Sembcorp Thermal Powerplant (TPP) with ash ponds, NGC Energy India Pvt Ltd have encroached the coastal wetlands, whereas APGENCO Sri Damodaram Sanjeevaiah Thermal Power Station with ash ponds and Penna Cement Grinding Unit have taken over the inland wetland areas. The ash ponds of TPPs are a big threat to the groundwater quality in the nearby human settlement areas, if not well-maintained.

In the lower part of the map, TPPs such as Meenakshi Energy Power Ltd and Simhapuri Energy Ltd encroached the wetlands making both type of wetlands unused for marine production.

The industrial growth in this PUUI has resulted in an extremely high level of **179.63% decline in the Wetland cover** over the 15-year period. This indicates a rapid spike in unsustainable Industrial Land-Use in the PUUI making total decrease in wetland cover by 7916.01H.a.

Decline in the Quality of Marine produce due to Air and Water pollution

Venkateswarlu et al., 2020 examined the impact of heavy metal pollution on the marine fish species collected from the areas such as Krishnapatnam and Nelaturu in the PUUI. The results found that the pollution in the coastal water due to industries, had adversely affected health of the fish specie ‘Indian Mackerel’ and also found higher traces of heavy metals such as arsenic, cadmium, iron, lead, manganese and mercury etc in the gills and the liver. The study concluded that these fishes in case of consumption can lead to people suffer from chronic health issues that could damage the organs of the body (**Guallar et al., 2002**). **Parvez and Vijaya (2020)** taking two sample villages (Krishnapatnam and Mypadu) and fish species such as Seer and Silver Pomfret for scientific analysis, found that the level of heavy metal traces (Mercury, Lead, Cadmium and Zinc) in the liver and muscle of both fishes were different in both villages, with mercury below the WHO’s permissible limits but Zinc, exceeded the limits. **Jacob and Rao (2015)** have emphasized that fish production in the Nellore coastal areas have decreased due to the industrial pollution and anthropogenic activities etc.

8.0. Conclusion

From the study, it is possible to decipher that the study area has transformed spatio-temporally over the 15-year period in such a manner that it favours the urban / industrial /

private business elites violating mainly the notifications 1991 and 2011 of Coastal Regulation Zone, easing towards conversion of sustainable to unsustainable industrial land-Use. The paradigm shift to unsustainable industrial land-use in the PUII has reduced the extent/cover of waterbody marginally but greater in terms of inland canals that supply water for irrigation to farmers; cropland/shrubland to a negligible level; dense vegetation to a considerable one; and wetland to a colossal level of reduction by 7916.01H.a. in the 15-yearperiod, from12322.8 to 4406.79 Hectares. The wetland cover in the PUII, due to industrialization indicates a huge alarming level of contraction by 64.24%, similar to that of an Urban-Metropolitan region in India. It has not only led to LULC changes but more than that, had established the nexus **(negative and indirectly proportional relationship)** between the PUI Industrialization and the Environmental Degradation, that needs immediate policy implications, since it has become a hazard to the environmental-ecologically sustainability of the PUII. The level of decline in the above sustainability has led to a greater decline in the level of socio-economic sustainability of the local community people, imposing chronic health issues and economic costs (health issues, health costs, decline in income etc) on them along with decrease in yield and income, serving the uneven distribution of negative environmental externalities and income in the PUII (eventually the country). Finally, thecontinuum of PUII development process is found to an unsustainable one, at the micro-level, in the Krishnapatnam PUII, and needs the elevation of Weak to Strong-Institutional Sustainability at the macro-level, in order to perform Utopian form of Environmental Governance in the country.

References

1. Achamyeleh Gashu Adam (2014), Peri-Urban Land Tenure in Ethiopia, Doctoral Thesis submitted to Real Estate Planning and Land Law, Department of Real Estate and Construction Management, Stockholm, Sweden
2. Albulbasher Shahalam, Bassam M. Abu Zahra and A. Jaradat (1998), Wastewater Irrigation effect on soil, crop and environment: A Pilot Scale Study at Irbid, Jordan, Water, Air, and Soil Pollution 106: 425–445
3. P. Chitrarasu, A. Jawahar Ali and T. Babu Thangadurai (2013), Study on the Bio-Accumulation of Heavy Metals in Commercially Valuable and Edible Marine Species of Ennore Creek, South India, Int J Pharm Bio Sci 2013 Apr; 4(2): (B) 1063-1069
4. David Simon (2008), Urban Environments: Issues on the Peri-Urban Fringe, The Annual Review of Environment and Resources, 33,167–85
5. Duranton, Gilles & Puga, Diego, (2014) The Growth of Cities, Philippe Aghion & Steven Durlauf (ed.), Handbook of Economic Growth, 1(2), pp 781-853, Elsevier.
6. Eliseo Guallar, Inmaculada Sanz-Gallardo, Pieter Van't Veer, Peter Bode, Jorge Gomez-Aracena, Jeremy D. Kark, Rudolph A. Riemersma, Jose M. Martin-Moreno and Frans J. Kok (2002), Mercury, Fish Oils and the Risk of Myocardial Infarction, The New England Journal of Medicine, Vol. 347, No. 22
7. Giuseppe Feola, Jaime Suzunagab, Jenny Solerb, Amanda Wilson (2020), Peri-urban Agriculture as Quiet Sustainability: Challenging the Urban Development Discourse in Sogamoso, Colombia, Journal of Rural Studies, 80, pp 1-12.
8. Haroldo Torres, Humberto Alves and Maria Aparecida De Oliveira, São Paulo (2007), Peri-Urban Dynamics: Some Social Causes and Environmental Consequences, American Dream, North Point Press, New York, 19(1), 207-223

9. Hassen, Bantider, Legesse, Maimbo and Likissa (2021), Land Use and Land Cover Change for Resilient Environment and Sustainable Development in the Ethiopian Rift Valley Region, *Ochrona Srodowiska i Zasobow Naturalnych*, 32(2), 24-41
10. Jacob, M.J.K., Rao, P.B., Socio-Ecological Studies on Marine Fishing Villages in the Selective South Coastal Districts of Andhra Pradesh, *Ecotoxicol. Environ. Saf.* (2015)
11. Li, X., Wany, Y., Li, J., and Lei, B (2016), Physical and Socio-Economic Driving Forces of Land-Use and Land-Cover Changes: A Case Study of Wuhan City, China, 2016 (2014)
12. Mohammad Hadian, Pouran Raeissi and Touraj Harati Khalilabad (2020), The Economic Burden of Mortality and Morbidity due to Air Pollution in Tehran, Iran: A Systematic Review, *Air Quality Atmosphere & Health*
13. Nguyen Kim Anh, Yuei-An Liou and Ming-Hsu Li (2017), Urbanization and its Impact on the Local Environment: An Assessment Based on Historical Baselines of the Land Use/Land Cover and Future Scenarios, *Japan Geoscience Union*
14. Prasanth Kumar Behera (2015), Socio-Economic Impact of Industrialisation and Mining on the Local Population: A Case Study of NALCO Industrial Area, Koraput, *International Journal of Economics & Management Sciences*, 4: 273
15. Rasmi Patnaik (2017), Impact of Industrialization on Environment and Sustainable Solutions - Reflections from a South Indian Region, *IOP Conf. Series: Earth and Environmental Science* 120 (2018) 012016
16. Sk. Parvez and Ch. Vijaya (2020), Bio-Accumulation of Heavy Metals in Commercial Marine Fish Species of Nellore Coast, Andhra Pradesh, India, *International Journal for Research in Applied Science and Engineering Technology*, Vol.8, Issue VII
17. Swapan Talukdar, Pankaj Singha, Susanta Mahato, Shahfahad, Swades Pal, Yuei-An Liou and Atiqur Rahman (2020), Land-Use Land-Cover Classification by Machine Learning Classifiers for Satellite Observations- A Review, *Remote Sensing*
18. Timothy Karpouzoglou, Fiona Marshall, Lyla Mehta (2018), Towards a Peri-urban Political Ecology of Water Quality Decline, *Land Use Policy*, 70, pp 485–493
19. Vardi Venkateswarlu and Chenji Venkatrayulu (2020), Bio-Accumulation of Heavy Metals in Edible Marine Fish from Coastal Areas of Nellore, Andhra Pradesh, India, *GSC Biological and Pharmaceutical Sciences*, 10(01), 018-024

WOMEN EMPOWERMENT FOR SUSTAINABLE LIFE³⁰

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Introduction

“Women have a vital role in environmental management and development. Their full participation is therefore essential to achieve sustainable development. Rapid economic development is creating vast wasteland due to mindless and ruthless exploitation of natural resources. In the name of development, we are creating huge array of consumer products without alleviating poverty. It is a plain truth that the consumer products do not necessarily create ‘a good life’. On the contrary these products after they have been consumed and replaced by demand for more sophisticated products are adding up to huge number of wastes which cannot be disposed scientifically. Thus, it is obvious that economic development in its wake has impacted negatively on the environment. It is also altering social structure endangering the traditional societies which subsist on forests and other local provisions. Extreme pollution with concomitant climate change, contaminated rivers and water bodies are threatening the very existence of human species. Modernism and rapid economic development at any cost are preventing us from seeing or addressing the issue of interrelation among environment, organization and cultural problems.

The researches on sustainability issues have amply demonstrated that women are a major group whose involvement is necessary precondition for achieving sustainable growth. Agenda 21 (Global Action for Women towards Sustainable and Equitable Development) upheld gender as a cross cutting issue and emphasized that sustainable consumption and production pattern should tackled from gender perspective.

Sustainable Development

However, a new paradigm better known as sustainable development has emerged with the objective to combat the menace of destabilization of planetary ecology and reducing the ever-increasing demand for resources. According to is Brundtland Commission’s (WCED Sustainable development 1987: 43) sustainable development is “development that meets the needs of the present without compromising the ability of future generations to meet their own needs. The three components of sustainable development are economic, environmental and social aspects of development.

The core of the sustainability comprises eradication of poverty, ensuring equity and upholding the notion of sustainability while dealing with climate change. The social component of it is based on the principles of empowerment, inclusion and participatory decision making leading to good governance. The economic aspect of sustainability is related to the concepts of steady growth, efficiency and stability of economic growth. The third component of sustainability is about protecting biodiversity and optimum uses of resources

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and controlling pollution. Thus, it is evident that sustainability is not only about safeguarding natural environment rather it is broader in scope ensuring socio economic development with equitable distribution of wealth. The social aspect of development within the concept of sustainable development is the theme of our discussion. The social component of sustainable development comprises issues like health, education, gender equity, political accountability and democratic participation. The focus of sustainable development should be geared to satisfy the basic needs of people and thereby ensuring equity. This component of sustainability seeks to ensure individual as well as social welfare. A related concept is that of social capital which is the outcome of networking and interconnectedness of the individuals who work together towards achieving the shared objectives. The social sustainability is based on mutual trust, reciprocity and exchanges.

HDI or Human Development Index is the recent yardstick to measure the level of development along with GNP and GDP. HDI is based on the parameters of democratic governance, gender equity and level of poverty. Especially from 1995 onwards gender equity represents an important factor of development. In spite of the impressive economic development gender equity is far from satisfactory in many developing countries including India. Existence of gender disparity is neither sustainable nor worth sustaining as women are especially poor women are the most vulnerable group in society. Sustainability requires that they have access to resources and adequate power of decision making.

Concept of Empowerment

Empowerment can be defined as a “multi-dimensional social process that helps people gain control over their own lives. It is a process that fosters power (that is, the capacity to implement) in people, for use in their own lives, their communities, and in their society, by acting on issues that they define as important” (Page and Czuba, 1999). It is about fostering power on people for use in their lives, communities and society in general. This is the only way to develop social capital which is likely to bring social change. In this respect empowerment of women is all the more important as they constitute almost 50% of total population and they are in a disadvantaged position as far as decision making is concerned. Quoting from the factsheet of Office of Special Advisor on the gender Issue it may be said that there is a dual rationale for promoting gender equality. Firstly, that equality between women and men – equal rights, opportunities and responsibilities – is a matter of human rights and social justice. And secondly, that greater equality between women and men is also a precondition for (and effective indicator of) sustainable people-centred development. The perceptions, interests, needs and priorities of both women and men must be taken into consideration not only as a matter of social justice but because they are necessary to enrich development processes” (OSAGI, 2001).

Women and Environmentalism

The researches have proved that women are more concerned with the degradation of environment and consumer studies indicate that they take more personal actions like recycling, saving water, saving energy and use environment friendly transports in comparison to men. They also play strong role in educating and socializing their children and teach them to care and respect the environment. The researches have shown that there are gender differences in attitude and environmental behaviour with women being more proactive in this

respect. A special Eurobarometer Survey (2009) on attitude to climate change observed that women take more personal actions like recycling, saving water, and energy at home and use environment friendly transport. Another study by OECD (2011) found that men generally tend to perform energy saving activities less often than the women. Ed. Smith, Chairman WWF, UK had mentioned that as a functionary of WWF he had observed that women play a crucial role as stewards of environment. They often use natural resources more wisely than men. However, they are less involved in decision making process related to governance of resources. Nobel laureate Wangari Maathai, founder of Greenbelt Movement also presented examples showing that empowering women to act on their appreciation for the value of natural resources had enormous impact on sustainability. African women were instrumental in reversing deforestation when they empowered to stand up for their rights.

Involving women in sustainable development

Women, if empowered and allowed to participate in decision making process can be involved in the following activities which can possibly safeguard the environment-

- ❖ They are more concerned with the use of fossil fuel and hence they are more energy efficient.
- ❖ They can be trained to use renewable energy like hydroelectric power.
- ❖ Women can play an important role in a forestation and Joint Forest management Project.
- ❖ Women are more likely to recycle and minimize waste. Fortunately, in comparison Western societies ours is a low waste society.
- ❖ Their indigenous knowledge in respect of agriculture can be utilized for sustainable practices leading to prevention of soil erosion and safeguarding the fertility of soil.
- ❖ They also play a strong role in educating and socializing their children and teach them to care and respect the environment.

Empowering women to take active part in sustainable development

The above discussion has amply shown that women are naturally more concerned and more proactive in the protection of environment. However, many of them are not informed and knowledgeable in environmental issues despite their inherent inclination towards caring. The following measures are to be taken to utilize the full potentiality of women in sustainability related programmes-

- ❖ Building women's capacity- The capacity of women will gradually build up when they are fully involved and participate in environment related activities. Capacity building in terms of relevant knowledge and skills are to be imparted. At the same time steps must be taken to improve their financial capacity.
- ❖ Women should be given opportunities for investment and also training in green jobs.
- ❖ Entrepreneurship training is essential in this respect. They must have opportunities to learn more about sustainable energy and climate change.

Conclusion

The women can play a crucial role in sustainability movement is based on psychological principle offered by Carol Gilligan (1982). She analyzed a few case studies and concluded that women think in another voice different from that of men. Gilligan concluded that the women are more guided by ethic of care as they have special responsibility for taking care of their

offspring. The other feminist environmentalists extended this concept and suggested women's caring nature should be tapped to solve environment related problems by involving them in sustainable practices. Gender equality does not imply that all women and men must be the same. Instead, it entails equipping both with equal access to capabilities; so that they have the freedom to choose opportunities that improve their lives. It means that women have equal access to resources and rights as men, and vice versa (UNDP, 2010). However, it is evident that women are vulnerable especially when climate change and other disasters strike. They are forced to bear the disproportionate burden of environmental calamities as they are the poorest of the poor among the underprivileged.

References

1. Anand, S., & Sen, A. (2000). Human development and economic sustainability. *World Development*, 28:2029-2049.
2. Munasinghe, M. (1992a). Environmental Economics and Sustainable Development, Paper presented at the UN Earth Summit,
3. Rio de Janeiro, Environment Paper No.3, World Bank, Wash. DC, USA.
4. OECD (2011). *Greening Household Behaviour: The Role of Public Policy* (OECD Publishing).
5. OSAGI (2001). Important concepts underlying gender mainstreaming". Factsheet by the Office of the Special Adviser on
6. Gender Issues and the Advancement of Women. Available online: <http://www.un.org/womenwatch/osagi/pdf/factsheet2.pdf>
7. World Commission on Environment and Development (1987). *Our common future*. Oxford: Oxford University Press.
8. UNECE (2010). *The MDGs in Europe and Central Asia: Achievements, Challenges and the Way Forward* (ECE/INF/2010/2).
9. Available online: http://www.unece.org/commission/MDGs/2010_MDG.pdf
10. UNDP (2010). *Power, Voice and Rights 2010, Asia Pacific Human Development Report*.

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SECURING BRIGHT FUTURE: A NOTE ON MONTHLY PENSION SCHEME FOR PERSONS WITH DISABILITIES IN TAMIL NADU¹

Dr. A. SHANPAREETH²

Introduction

Persons with disabilities are often excluded from the mainstream of society. Monthly pension scheme aims to provide them with a regular source of income and financial security. The scheme is designed to provide a monthly pension to persons with disabilities, helping them to cover their basic needs and lead a life of dignity. In this context, a brief note on monthly pension scheme for persons with disabilities in Tamil Nadu has been analyzed in this paper.

Challenges Faced by Persons with Disabilities in Tamil Nadu

Persons with disabilities in Tamil Nadu face a variety of challenges, including limited access to healthcare, education, and employment opportunities. They also face discrimination and stigma, which can limit their access to resources and services. In addition, persons with disabilities in Tamil Nadu often lack access to assistive technologies and services, which can further limit their ability to participate in society and access employment opportunities.

Government Support for Persons with Disabilities in Tamil Nadu

The government of Tamil Nadu provides support for persons with disabilities through a variety of programs, including special education, employment programs, and disability pensions. The government also provides access to assistive technologies and services, such as wheelchairs and hearing aids, to persons with disabilities. In addition, the government has implemented policies to ensure that persons with disabilities have access to education, employment, and other resources, as well as to reduce discrimination and stigma against persons with disabilities.

Monthly pension scheme for persons with disabilities in Tamil Nadu: A Brief Note

Tamil Nadu has a long history of providing pensions to persons with disabilities. The state government first introduced a pension scheme for persons with disabilities in 1982. The scheme was called the "Assistance to Disabled Persons (ADP) Pension Scheme".

Under the ADP Pension Scheme, persons with disabilities who were between the ages of 18 and 60 years and who had a minimum of 40% disability were eligible to receive a monthly pension of Rs.100. The scheme was later revised in 1998, and the pension amount was increased to Rs.500 per month.

In 2018, the Tamil Nadu government announced a new pension scheme for persons with disabilities called the "Dr. Muthulakshmi Reddy Ninaivu Intezaar Scholarship Scheme".

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The scheme provides a monthly pension of Rs.1,000 and it has increased Rs.1,500 to persons with disabilities.

Objectives of the Paper

1. To know about the District wise total disabilities population in Tamil Nadu.
2. To analyze the percentage of visually challenged population in total disability population of Tamil Nadu.
3. To study the Monthly Pension Scheme for Persons with Disabilities in Tamil Nadu.

Data and methodology

The study is based on both primary and secondary data. The required secondary data were collected from census report 2011. The primary data were collected from 30 visually challenged persons in Coimbatore district.

Total Disability Population in Tamil Nadu

Table 1 Total Disability Population in Tamil Nadu

Rank	District	Total Disability
1	Viluppuram	17847
2	Kancheepuram	17033
3	Thiruvallur	16509
4	Chennai	16326
5	Vellore	14501
6	Cuddalore	13170
7	Tirunelveli	10496
8	Thiruvarur	9843
9	Coimbatore	9764
10	Nagapattinam	9206
11	Thiruvannamalai	8948
12	Salem	8153
13	Dindigul	7391
14	Thanjavur	7321
15	Trichirappalli	7307
16	Madurai	7224
17	Erode	6621
18	Tiruppur	6561
19	Namakkal	6121
20	Virudhunagar	5938
21	Thoothukkudi	4354
22	Theni	4892

Rank	District	Total Disability
23	Pudukkottai	4354
24	Krishnagiri	4312
25	Sivaganga	4307
26	Ramanathapuram	4277
27	Dharmapuri	4283
28	Ariyalur	3771
29	Nilgiris	3643
30	Perambalur	3616
31	Karur	3381
32	Karniyakumari	1326

Source: Census Report 2011

Tamil Nadu, north districts where highest population of total disability which includes Villuppuram (17847) has the first rank total disability and followed by Kancheepuram (17033), Thiruvallur (16509), Chennai (16326), Vellore (14501).

Visually Challenged Population in Tamil Nadu

Table 2 Visually Challenged Population in Tamil Nadu

Rank	District	Visually Challenged Population	Percentage in Total Disability
1	Viluppuram	2219	7.31
2	Kancheepuram	2050	6.76
3	Cuddalore	1916	6.31
4	Thiruvallur	1908	6.29
5	Chennai	1661	5.47
6	Vellore	1459	4.81
7	Thirivarur	1276	4.20
8	Tirunelveli	1246	4.10
9	Coimbatore	1234	4.06
10	Tirubannamalai	1228	4.05
11	Nagapattinam	1206	3.97
12	Madurai	1021	3.36
13	Salem	948	3.12
14	Tiruchirapalli	923	3.04
15	Nanakkal	836	2.75
16	Erode	836	2.75

Rank	District	Visually Challenged Population	Percentage in Total Disability
17	Thanjavur	755	2.49
18	Triruppur	740	2.44
19	Thoothukkudi	730	2.40
20	Dindigul	704	2.32
21	Virudhunagar	656	2.16
22	Airiyalur	523	1.72
22	Dharmapuri	520	1.71
23	Theni	474	1.56
24	Krishnagiri	459	1.51
25	Karur	458	1.51
26	Sivaganga	458	1.51
27	Perambalur	448	1.47
28	Nilgiris	447	1.47
29	Thanjavur	435	1.43
30	Pudukkottai	435	1.43
31	Ramanathapuram	443	1.42
32	Kanniyakumari	103	0.33

In Tamil Nadu, Villupuram has the highest (2219) and followed by Kancheepuram (2050), Cuddalore (1916), Thiruvallur (1908), Chennai (1661) visually challenged population.

Age-Wise Classification of Selected Visually Challenged Respondents

Table 3 Age – Wise Classification of Respondents

Age group	No. of Respondents	Percentage
20-29	4	13.39
30-39	12	40
40-49	5	16.6
50-59	3	10
60-69	2	6.67
70-79	2	6.67
80-89	2	6.67
Total	30	100

Forty per cent (12 out of 30) of them belonged to 30-39 years age group. Six (20%) of them were above 60 years. Four (13%) belonged to the younger. Age group of 20-29 years Between 40 and 59 years the remaining eight were found.

Monthly Pension Scheme

All the thirty exp respondents expressed satisfaction that they were able to get Rs.3000 per cent month as from pension the State government.

Conclusion

To conclude this paper the Monthly Pension Scheme for Persons with Disabilities is a great initiative by the government to provide financial security and dignity to persons with disabilities. Therefore, Persons with Disabilities suggested the Government of Tamil Nadu may increase the monthly pension scheme amount from Rs.1,500 to Rs.3,000. If it is implement by the Government, the scheme is a great step towards creating a more inclusive and equitable society for all.

Peer Reviewed Journal

A STUDY ON SOCIO-ECONOMIC CONDITIONS OF SLUMS IN CHENNAI CITY³

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Introduction

Slum dwellers residents are regarded as marginalized segments of society. They are dealing with a variety of issues, including those related to advancement and association, inadequate housing, low pay, and a lack of social amenities. Due to a lack of essential organizations like obvious, open sewers, no streets, uncontrolled waste departure, sickening conditions, and overhauls that conflict, people living in slum dwellers face difficult daily conditions, among other issues. Slum dwellers are uncommon in any other region of the world. A contented educator demonstrates the beginnings of the slum dwellers. Despite the rapid growth of the city, people who live in the slum dwellers should be grateful. It is essential to develop strategies and plans for the advancement of slum dwellers residents in terms of building improvement and basic accommodations. Slum dwellers are becoming more and more opposed, which has negative effects like polarization of the population in large metropolitan areas, high density, slum dwellers, and ephemeral settlements, a serious lack of housing and basic city working environments, polluting the environment, gridlock, pollution, poverty, joblessness, horrible behaviour, and social horror.

Statement of the Problem

The issue is explained by stating that the Slum dwellers population consistently experiences poor financial conditions due to a lack of social amenities, cleanliness, health resources, and guaranteed guidance. The social amenities that people find in India's slum dwellers, as well as their access to readiness, medical care, and a free environment, contribute to people's happiness and turn of events. The slum dwellers' residents are dealing with a few issues. Regardless of the circumstances of the low-wage slum dwellers population, education faces significant public work. Due to the low pay, they are not sending their children to school. Asthma, coronary artery disease, and tuberculosis are also taken into consideration. For their future population, they need reliable disinfection and informative workplaces. They don't eat well because they don't have as much money coming in. Children from the slum dwellers are constantly affected by their shortcomings. The majority of people's activities are influenced by their financial situation. The majority of slum dwellers where people live are appalling and disgusting. People who live in slum dwellers have complete control over the atmosphere of public events and the financial development of metropolitan areas. Slum dwellers have an effect on the people who live there because of their layouts, natural elements, and sectional characteristics. What is taking place is an important part of life right now.

Objective of the Study

1. To study the financial status of the slum dwellers of Chennai City.

³ Paper presented in the 42nd Annual Conference of Association of Economists of Tamil Nadu Organized by Post Graduate Department of Economics, Arulmigu Palaniandavar College of Arts and Culture, Palani, Dindigul District-624 601, Tamil Nadu on 25th February, 2023.

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Results and Interpretation

The translation and outcomes: When the assessment work incorporates various depictions of the ward's parts or factors, a framework is using appraisal data. The majority of non-length factors or parts of one of the parametric tests are further created by determining which quantitative parts see around two groups of chosen factors. It is an easy choice given the scores and weightings of the slum dwellers residents. The majority of restrictions, such as No, are regarded with respect at a lower level. Every decision received either a "no" or some weight. 1. is the most straightforward request. Additionally, the effects of MANOVA are depicted graphically using tools like the head part evaluation and pack assessment. It gets its name because it has two social events to limit the review factors. A test to isolate various qualities is the Conclusive Blends Evaluation (CVA). CVA's main goal is to develop discriminant skills that can easily distinguish between elements and parts as well as between them.

Table 1 Values of Coefficients - Canonical Discriminant Function

Slum dwellers' Socio Economic Conditions related factors or variables of Chennai slums	Coefficients values of Canonical Discriminant Function
Safety	0.357
Basic Amenities	0.312
Threats	-0.045
Economic Status	0.075
Social Status	0.231
Personal Satisfaction	-0.052
Constant	-3.005

Based on the Canonical Discriminant Function Co efficient of this study, the equation for the model considered should be written as

Table 2 Values of Canonical Correlation Coefficient and Wilks' Lambda

Value of Canonical Correlation function	Value of Wilks' Lambda	Value of Chi square	Df	Significance level
0.201	0.959	24.624**	6	Significant

* Significant at 1% level

Table 3 Table Showing Pooled Within Groups Matrices Value

Pooled Within-Groups Matrices							
		Safety	Basic Amenities	Threats	Economic Status	Social Status	Personal Satisfaction
Correlation	Safety	1.000	0.953	0.077	0.089	0.898	0.055
	Basic Amenities		1.000	0.281	0.238	0.845	0.025
	Threats			1.000	0.944	0.047	0.050
	Economic Status				1.000	0.061	-0.017
	Social Status					1.000	0.044
	Personal Satisfaction						1.000

The Chi-square test can be used to test hypotheses. It was going to decide if the documented skills were the same for all groups. When it comes to gatherings, discriminant limit performs better than likelihood expecting a low inspiration for significant value.

The value of Wilks' Lambda is shown to be 0.959 in the table above. A Chi-square score of 24.624 on the test. It is demonstrating that it has a measurable criticality of one percent. The association's value is shown as 0.201. It demonstrates that there are distinct distinctions between independent and social event components or factors. Table 4.3 depicts the particulars of the cover relationship within the social affairs.

Findings of the Study

Low-wage laborers were readily available for Audit Openings in the city's "Slum dwellers." Additionally, individuals may feel powerless as a result of this lower pay. They might be terrible sources of income. Surprisingly, the homes in the Chennai slum dwellers need to have running water, power, a way to clean, and a way to get to and from their homes that works. During the whirling season, they may encounter water stagnation, which will exacerbate their clinical issues. In addition, they require actual workplaces for their space. Most of the benefits, including preparation, require them to travel a significant distance. The fact that they do not possess their Chennai home is also one of the major issues. Since poverty is their most important partner, they should help their children remember other important learning opportunities so that their education is also mentioned. The study's investigator has begun investigating the factors that determine the social, moderate, and clinical issues faced by Chennai slum dwellers residents.

- There are 301 respondents between the ages of 21 and 35 (50.1%), as well as 136 respondents younger than 20 (22.7%). Only 24 respondents, or 4 percent, were over 50 years old, and 23.2% of respondents are between the ages of 36 and 50. As a result, it is anticipated that the majority of people living in Chennai slum dwellers will be between the ages of 21 and 35.
- 318 were female & (53%) 282 were male (47%).
- The respondents' particular perspective on success in the slum dwellers emerged immediately: Only 68.0 percent of them expressed resistance to exercises that were not a problem at all, and only 158 of them agreed that it was certain or impossible to avoid the possibility of conflicting with the belief that everything is completely safe in the slum dwellers. There were 34 respondents, or 5.7%, who stated that they had no concerns regarding the safety of their residence.
- The results show that approximately 250 respondents either strongly agreed with or concurred with the affection for their neighbour's, while 321 respondents or 54% of those living in the slum dwellers in Chennai, are completely opposed to it. This has to do with how respondents felt about the slum dwellers neighbour's tendency to lend a hand. There were 29 respondents, or 4.8%, who expressed no concern regarding the reality of assisting Chennai's slum dwellers neighbours.
- 377 respondents, or 63% of the slum dwellers population, had no unmistakable assessment on the health measures for Chennai slum dwellers, and only 203 respondents, or 33.9%, had no reasonable assessment on whether they concurred with the safety efforts or could not resist the temptation to conflict with them. Twenty respondents, or 3.3%, made no comments regarding the wellness program in Chennai City's slum dwellers.

- In the slum dwellers of Chennai City, only 25.1 percent of the 151 respondents strongly agreed or agreed that it would be sufficient for everyone to go alone at 12 p.m., and 70.3% of the 422 respondents strongly disagreed. The most recent study suggests, in general, that residents of Chennai slum dwellers have extremely poor public, monetary, material, and health status. At 12 p.m., only 3% of respondents commented on the reality of the slum dwellers health.

Conclusion

Slum dwellers in Chennai will always require central or focal workplaces. The slum dwellers' residents are constantly dealing with various issues. Their houses are small, poorly designed, and tangled. Lighting and ventilation must be adequate in slum dwellers workplaces. Their prosperity, work, education, and other routine activities are all impacted by these work environments. Numerous unskilled individuals reside in Chennai's slum dwellers. Children from the slum dwellers seldom attend school. It is necessary to have skill, authority, and unambiguous quality. The public authority ought to place a greater emphasis on readiness to raise skill levels in these slum dwellers areas. Sadly, clinical issues and sterility have a negative impact on those who live in the slum dwellers. People living in slum dwellers are exposed to waste, polluted lakes, and open sewers. Additionally, they ought to deal with filthy conditions, inadequate ventilation, polluted air, and small rooms. As a result, various wrongs continually impact their lives. They are gradually and cautiously finding their way through a difficult life. The public master ought to grant expert permission for their clinical concept. Mind programs should be implemented in slum dwellers by workplaces and work environments with significant clinical benefits to also promote the financial and social well-being of residents. It has been observed that many tourists prefer to live in slum dwellers areas. They are protecting a location for a group that will save money. The majority of slum dwellers residents currently reside in the get-together or midtown areas, so they are likely to relocate to metropolitan workplaces. They have consistently upheld Chennai's financial goals. Therefore, it is essential to offer brief and reasonable assistance upon request in order to address the issues faced by slum dwellers residents.

AN ANALYSIS OF FOREIGN DIRECT INVESTMENT ON PRIMARY HEALTH CARE SECTOR IN INDIA⁶

UDAYAKUMARA M.⁷ & Dr. K. PRAKASAM⁸

Introduction

Healthcare is part of the services sectors in India. Health has always been a high priority area in any country. It has been recognized as an important component in the process of economic and social development. It does not simply mean absence of diseases; rather it is a state of complete physical, mental and social well-being. Sanitation and hygiene, nutrition as well as safe drinking water are the basic determinants of good health. The indicators like infant mortality and maternal mortality rates, life expectancy and nutrition levels, birth rate and death rate, along with the incidence of communicable and non-communicable diseases reflect the health status in an economy. The existence of proper and well-defined healthcare facilities are vital not only for having a healthy productive workforce and promoting general welfare, but also for attaining the goal of population stabilization as well as enhancing the overall quality of life of people.

Objective

1. To know the FDI on primary health care services

Methodology

FDI on primary health care service in India” is estimated on the basis of available annual data.

FDI on Primary Health Care Service in India

Healthcare is one the fastest growing service sector in India. The financing of health services can come from sources within a country tax or insurance for example. The latter can be further sub-divided into commercial finance, official aid or non-governmental finance. Commercial financial flows may further be divided into portfolio/equity investments, commercial loans or FDI. A significant aspect of this is direct trade in health services, a result of the rise of transnational corporations, challenges in health care financing, porous borders and improved technology creating the scope for increased „foreign direct investment“ (FDI) in health care sector. Healthcare sector has a great potential in the present globalize world. It is one of the world’s largest industries with total revenues of approximately US\$ 2.8 Trillion. Healthcare sector has been emerging as one of the largest service sector in India. Indian healthcare sector has estimated revenue of around \$ 30 billion constituting 5% of GDP and offering employment to around 4 million people (CII Report 2011). According to Investment

⁶ Paper presented in the 42nd Annual Conference of Association of Economists of Tamil Nadu Organized by Post Graduate Department of Economics, Arulmigu Palaniandavar College of Arts and Culture, Palani, Dindigul District-624 601, Tamil Nadu on 25th February, 2023.

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Commission of India, the sector has witnessed a phenomenal expansion in the last few years growing at over 12% per annum. As per a recent CII-McKinsey report, the growth of healthcare sector can contribute to 6-7% of GDP and increase employment by at least 2.5 million by 2012.

Opportunities of Foreign Direct Investment in Indian Healthcare industry

The following sectors have significant opportunities for the foreign investors:

- **Health Insurance**

The percentage of the Indian population that has been covered under health insurance is unfortunately very insignificant. Lack of awareness, casual approach is some of the reasons that have contributed to this. Though there is increase in number of health care insurance policies over past few years majority of the population remains without any coverage.

- **Hospitals and Infrastructure**

There is tremendous demand for tertiary care hospitals and specialty hospitals in India. There is a gap between the availability of the beds and required beds in the hospital in India. It is estimated that an investment of USD 25.7 will be required to meet the requirement of additional 450,000 beds by 2010. The government would not be playing significant role in bridging this gap giving private players immense opportunity.

The number of hospitals and the available infrastructure in India is inadequate when compared to the growing population as well as the number of growing diseases. The gap between the number of beds available and the number required is very wide and this could be narrowed by additional foreign investment. The import of medical equipment could be reduced if more FDI flows into this sector.

- **Technology driven services:** Significantly low presence of physicians in rural and semi-urban areas has led to the limited access to proper healthcare facilities for the people living in these areas. Telemedicine is considered to be one of the solutions to this lacuna in accessibility to health care services in rural and semi-urban areas.
- **Manpower Requirement:** An additional 8, 00,000 physicians are required over the next ten years, which translates into huge investments in training facilities and equipment. (Rupa Chanda, 2009)
- **Medical Tourism:** Another area of opportunity is the medical tourism. India is getting popular worldwide in providing quality healthcare service at lower cost and every year about 1,00,000 patients from various countries come to India for availing treatment for various diseases. The revenue through medical tourism is expected to contribute significantly in the years to come due to cost advantage India has in delivering service.
- **Telemedicine:** It is a known fact the percentage of specialist physicians residing in rural India is very negligible. So, the innovative medical care providing facility called telemedicine may be used effectively to serve the 70% of population who reside in rural India. At present some of the private hospitals have adopted telemedicine services. The Indian Space Research Organization has plans to establish 100 telemedicine centers across the country.

Investment into manufacture of medical equipment's

Even investment into the sector of manufacture of medical equipment's is one of the most attractive areas for investment. The medical equipment manufacturing industry is expected to grow in tandem with hospital sector which is expected to grow to USD 60 billion by 2016. Further, the following graph shows the growth expected in the medical equipment market in India over the 2006-2012 period.¹¹ The market is expected to register an increase from \$2.2 billion in 2006 to close to \$5 billion in 2012. India has received USD 368.48 million rupees as FDI from April 2000 to October 2010.

FDI in India's Healthcare Sector emerges from the following facts

- The growing population of India which is 1.21 billion as per the Census of 2011 out of which 26.1% is below the poverty line.
- The healthcare spend in India is less than half of the global average in percentage when compared on a 'percent of GDP' basis and is amongst the lowest globally in terms of 'per capita' basis and on 'Purchase Power Parity' basis.

The data pertaining to these as per WHO World Health Statistics 2010 by India and other countries are shown in the following table:

Healthcare Spend by India and Other Countries

Country	Healthcare Spend (as a % of GDP)	Healthcare Spend (on a per capita basis in US \$)	Healthcare Spend (on Purchase Power Parity basis in US \$)
China	4.5	108	233
Brazil	8.4	606	837
India	4.1	40	109
USA	15.7	7,285	7,285
UK	8.4	3,867	2,992
Global	9.7	802	863

(Source: WHO World Health Statistics, 2010)

In above table shows the health care sector by India and other countries. The nation of china spend 4.5% of it GDP on health care sector. This say that USA is spend on health care sector more than other nations that is 15.7% of its GDP. India is spend very small amount of its GDP that is 4.1%.

- The disparity in healthcare infrastructure in India in terms of 'beds per thousand population'. India has 0.7 beds per thousand population while the global average is 3.3 and it has an average of 0.6 'doctors per thousand population' against the global average of 1.23.
- The number of qualified doctors at present in India is not sufficient to meet the growing requirements of healthcare in India. The rural-urban disparity is still worse. That is, rural 'doctors to population' ratio is lower by six times as compared to urban areas (Source: CII Technopak). Doctor patient ratio in rural areas of India is 1: 20,000 as against 1: 2,000 as against statutory 1: 250 ratio for which India requires 6,00,000 doctors.

- There is dearth for staff in all categories like specialists, surgeons, obstetricians, physicians, pediatricians, nurses, para-medical staff etc.
- Private expenditure on health as a percentage of total health expenditure in India is 75-80 per cent.

Infrastructure in Primary Health Care in India

There is tremendous demand for tertiary care hospitals and specialty hospitals in India. There is a gap between the availability of the beds and required beds in the hospital in India. It is estimated that an investment of USD 25.7 will be required to meet the requirement of additional 450,000 beds by 2010. The government would not be playing significant role in bridging this gap giving private players immense opportunity (CRISIL). Further, medical tourism industry in India with estimated market of USD 350 million in 2006 and likely to reach USD 2 billion by 2012 (9 will also play significant role in the development of hospital sectors. It is estimated that this sector has a potential to attract one million medical tourists each year from all over the world.

Government is encouraging this sector by providing certain incentives like lower import duties, higher depreciation on medical equipment's and expedited visa for patients from foreign countries. Some trends that have been observed are that most of the healthcare players have been setting up additional facilities to cater critical care or super specialty healthcare. Some leading hospital players like Apollo are very aggressive on raising funds for their expansions. India is also witnessing growth of advanced diagnostic equipment's and excellent infrastructure.

Separately, there is also a need for institutions that train professionals, nursing and paramedic's to overcome the shortage of trained professionals in the health care sector in India.

Challenges

There are external and domestic factors, which challenging foreign investment, especially Foreign direct investment in India's hospital segment. Sunset Reddy, Director, Finance, Apollo Hospitals Enterprise Ltd, Chennai says "While there are clearly many drivers to foreign investment in hospitals in India, there are external as well as domestic constraints, which explain the limited presence of foreign investment in India's hospital segment."

External Challenges

One of the external factors, which were noted, is that notwithstanding trends towards privatization in healthcare in major developed countries, this is a sector that is undergoing reform and internal problems in those economies. In many countries, the number of private players who can establish hospitals overseas is limited. Hence, the potential number of overseas institutions that can invest in emerging markets may be rather limited. A second factor that was commonly noted was that the hospital business requires localized and in-depth knowledge of the host country's market and thus entry as an independent overseas institution is very difficult. Joint ventures may be a better way of entering a foreign market when setting up hospitals. But there are problems in maintaining partnerships, as there are issues of

financial control and differences in expectations and management styles. A third fact is that foreign investors would consider many competing destinations and would tend to go to markets which they are more familiar with and where there is clarity about policies not only regarding FDI but also regarding the healthcare sector overall. The Indian government does not have a clear roadmap for the healthcare sector, has not considered it as a sector, and is perceived to be not transparent in terms of its regulatory environment and corrupt and inefficient in its procedures for establishing business, all of which do deter foreign investors.

External Challenges for FDI is as follows

- There is no benchmark for service delivery in India.
- There is no well-developed framework for establishing new hospitals in India.
- The dearth for quality personnel in medical care providers at all levels like doctors, nurses, paramedics, front and back office staff, administrators etc, makes other countries to think twice before entering India.
- Number of people possessing adequate knowledge to handle sophisticated medical equipment is also less. All this increases the cost of establishment of hospitals in India. So, when there are competitive destinations which have a more conducive environment than India may be preferred by foreign investors.

Domestic Challenges

The domestic factors that are specific to the hospital business that have limited the extent of FDI in India's hospitals include initial establishment related factors as well as post-establishment related operational issues, which affect the returns to investment. The single most important constraint is the high cost involved in setting up hospitals, the long gestation period of such investment, and the relatively low returns on investment. Several senior persons at leading corporate hospitals stated that hospitals are a very expensive business involving huge upfront very capital-intensive investments and very high running costs. According to many, it takes some 4 to 5 years to break even and some 7-8 years to make reasonable profits, although depending on the model adopted and efficiencies, it may be possible to break even and make profits in shorter period. Dr. Kuruvilla, senior doctor noted that an estimated Rs.50 lakhs is required per bed, which works out to Rs.100 crores for a 200-bed hospital. If this cost could be reduced to Rs. 40 lakhs per bed, then the break-even period could be quicker. In addition, rising operating costs (due to shortages and high procurement costs of certain inputs as discussed later) further squeeze margins.

Domestic challenges for FDI are as follows

- The cost of establishment of hospitals and pathology labs are very high. The initial establishment and establishment costs are very high. The cost of running the hospitals is also high.
- The cost of acquiring land in big cities of India is high. And the cost of support infrastructure like water and electricity supply is also very high.
- The gestation period of providing medical facilities is also very high.
- The return on investment is low compared to other business ventures.

- There is little production of medical equipment in India. The cost of medical equipment and surgical appliances are high.
- Investment is required for updating technology is also high. In addition, the new models made using technology, become obsolete soon. This causes the utilization ratio to be high.
- The medical equipment must be used by manpower trained in using the same. But, there is dearth for skilled manpower and lack of training institutes providing knowledge of the same.

Conclusion

The importance of the present study lies in analyzing the importance of (impact) FDI on primary health care sector in India. This observed FDI is given the primary health care facility in urban area and also build the well and good infrastructure facility to hospitals, FDI equity inflows received by hospitals and diagnostic. Countries have been increasing positively, The cost of establishment of hospitals and pathology labs are very high. This major drawback of FDI hospitals There are many positive implications of foreign investment in hospitals. One of the major impacts foreign investment would have is the creation of the necessary infrastructure. Investments are also needed beyond the metros to expand access to healthcare. In addition to helping increase physical capacity in the health care sector, such as increasing the number of hospital beds, diagnostic facilities ,and increasing specialty and super-specialty centres, foreign investment can also help in raising the standards and quality of healthcare, in upgrading technology, and in creating employment opportunities. With potential benefits to the health sector and the economy at large.

SOCIAL SECURITY IN INDIAN ECONOMY⁹

Dr. P. RAGU¹⁰

Introduction

India's social security system is composed of a number of schemes and programs spread throughout a variety of laws and regulations keep in mind however, that the Government controlled social security system in India applies to only a small portion of the population. Furthermore, the social security system in India includes not just an insurance payment of premiums into Government funds (like in China) but also lump sum employer obligations. Generally, India's social security schemes cover the following types of social insurances pension, health insurance and medial benefit, disability benefit, maternity benefit and gratuity.

Uncertainties on account of unemployment, illness, disability, death and old age are experienced by all the people across the world. These inevitable 155 Social Security Measures in India facets of life are said to be threats to one's economic security. In a society, the livelihood of an individual is made up of very diverse elements which taken together constitute the physical, social, cultural and political universe where he lives. Whenever an individual who lives in a society and faces the uncertainties threatening the bare necessity to sustain a minimum livelihood, he needs some help from the society, may it be the family, or any government or private institutions.

Social Security

A term used to cover government systems that provide economic assistance to people who have insufficient means of income. This usually means people who are past the age of retirement, differently abled, unemployed, survivors and so on. The term "social security" refers to any programme that aims to help individuals faced with such situations. Such people include the poor, the elderly, anybody who is physically disabled, and the mentally challenged.

Social Security as the security that society provides through appropriate organisation against certain risks to which its members are perennially exposed".

- The International Labour Organisation (ILO)

Objectives of Social Security

- Generate confidence among individuals and families that their level of living and quality of life will not erode by social or economic uncertainties.
- Provide medical care and income security against consequences of defined contingencies.
- Facilitate the victims' physical and vocational rehabilitation.
- Prevent or reduce ill health and accidents in the occupation.

⁹ Paper presented in the 42nd Annual Conference of Association of Economists of Tamil Nadu Organized by Post Graduate Department of Economics, Arulmigu Palaniandavar College of Arts and Culture, Palani, Dindigul District-624 601, Tamil Nadu on 25th February, 2023.

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- Protect against unemployment by maintenance and promotion of job creation.
- Provide benefit for the maintenance of children.

Approaches to Social Security

Social security is a very comprehensive term. The two important means of providing social security are social insurance and social assistance.

Main reason for social security

Social insurance as conceived by president Roosevelt, would address the permanent problems of economic security for the elderly by creating a work-related, contributory system in which workers would provide for their own future economic security through paid while employed.

Effects of Social Security

Social security provides a foundation of income on which workers can build to plan for their retirement. It also provides valuable social insurance protection to workers who become disabled and to families whose bread winner dies.

Social Security, Social Protection and Social Protection Floor

In common parlance, the terms social protection and social security are used interchangeably. However, in development literature the two terms are defined differently, although with some common characteristics. Social protection is a broader concept and includes both protective and promotional measures. Protective measures are those measures which are directed towards providing safety against risk and vulnerability. Promotional measures are those measures which are aimed at increasing well-being and livelihood conditions of the people.

The policies and procedures included in social protection involve five major kinds of activities: i) labour market policies and programmes, ii) social insurance programmes, iii) social assistance, iv) micro and area-based schemes, and v) child protection. In a nutshell, the social protection hovers around the promotion of economic strength, protection of the deprived sections, prevention from external shocks and diminution of people's exposure to risks, and enhancement of their capacity to protect themselves against hazards and interruption/loss of income. On the other hand, Social security is a traditional concept and includes measures aimed at providing safety protection during risk and vulnerability against poverty, old age, disability, sickness, orphanage, etc. The International Labour Organisation (ILO), a specialised agency of the UN though it pre-dates the UN, has been working for the welfare of labour since 1919 through its Member-States. It holds certain conventions whereby signatory member-states implement agreed-upon agenda. It can also make 156 Major Issues Confronting Indian Economy recommendations which do not bind member-states which however, consider the merit of a recommendation vis-à-vis its capacity. Two flagship conventions / recommendations set by ILO for the extension of social security are: (i) Social security (minimum standards) convention, 1952 (No. 102), and (ii) Social protection floors recommendation, 2012 (No. 202). The Social Security (Minimum Standards) Convention, 1952 (No. 102), establishes minimum standards for all nine branches of social security. Social security policies should reflect countries' social and cultural values, their history, their institutions and their level of

economic development. By the year 2012, the majority of countries had social security schemes established by law covering all or most areas, albeit in many cases including India only for a minority of their populations. After the economic crisis of 2008, UN recognised the fact that billions of people who have no social protection were hit harder. It shows that extension of legal coverage does not in itself ensure either the effective coverage of the population or improvements in the quality and level of benefits. Realising the importance of human right to social security across the board, ILO has made certain floor recommendations in 2012. Called as social protection floors recommendation, 2012 (No. 202) is the first international instrument that explicitly recognises the triple role of social security as a universal human right, an economic necessity and social necessity. It calls upon the States to achieve universal coverage with at least minimum levels of protection through the implementation of Social Protection Floors as a matter of priority; and to progressively ensure higher levels of protection. 157 Social Security Measures in India National Social Protection Floors comprise four basic social security guarantees (BSSGs) that ensure effective access to essential health care and basic income security (BIS) at a level that allows people to live in dignity throughout the life cycle. The four BSSGs are: i) Access to essential health care, including maternity care; ii) BIS for children; iii) BIS for persons of working age who are unable to earn sufficient income, in particular in cases of sickness, unemployment, maternity and disability; iv) BIS for older persons.

Social Security in Indian Economy

Social Security in India includes a variety of statutory insurances and social grant schemes bundled into a formerly complex and fragmented system run by the Indian government at the federal and the State level and is divided into three categories;

- Non-Contributory
- Tax Payer Funded
- Employer Funded

Social Security – Good or Bad for the Economy

The benefits that social security provides for middle and lower class society cannot be ignored. But the matter of the system is good or bad for the economy of a nation is still being contested. Responses to the social security 2100 Act shows people disagree on how these different factors affect economic growth. The act would increase payroll tax especially those of higher earnings not currently taxed and use that revenue for expanding social security benefits. It will also reduce the shortfalls the program now faces and reduce the deficit.

The act claimed that it would reduce GDP by 1.1 percent by 2049. It is also argued that tax increases reduce the labour supply, which combined with the reduction in savings and labour supply caused by a more extensive social security coverage, can greatly harm the economy and could shrink the economy by 1.6 trillion dollars. The plan of action would expand aggregate demand because the extra spending by the receivers of the benefits would outweigh the reduction in spending caused by the higher payroll taxes.

The act also does not address the problem that the social security system of today is out dated due to longer life expectancies. But addressing this problem through the commonly suggested solution raising the age of retirement doesn't seem feasible to all. A recent study

found that a large proportion of those still working at age 62 will be incapable of working even two more years and therefore, increasing the age of social security eligibility may decrease the financial security of a significant part of the population.

There are also overwhelmingly positive opinions in favour of security. 2013 States that in 2012, social security paid 774.6 billion dollars in benefits, which amounts to around 5 percent of the GDP. For that year, social security benefit payments supported about 1.4 trillion dollars in economic output, around 9.2 million jobs, approximately 774 billion dollars in salaries and other compensations and over 444 billion dollars in total tax revenues. They finally came to the conclusion that reducing social security benefits would only be detrimental to the US economy.

They concluded that a 25 percent reduction of social security benefits which is projected will occur around the year 2033 in the current system could cost the US economy about 2.3 million jobs, 349 billion worth of economic output, 194 billion in GDP and about 93 billion in wages. But the slow eroding effects of generous social security on the economy decreasing savings and labour supply cannot be ignored. It could be argued that the different detrimental ways that social security adversely affects economic growth are not indicators that social security coverage should be reduced but rather that the system should be improved.

Economic Effects of Social Security

1. Savings and Labour Supply

It is theorized that more generous social security programs decrease the incentive for people to accumulate personal savings and reduce the labour supply. Social security benefits are often dependent on the assets of a person and this disincentivizes people from saving, especially as workers near the age of retirement.

2. Distribution of Income

Social security systems are devised keeping the middle and lower classes in mind intuitively, it seems like expanding social security systems, especially by increasing the taxes of the higher income would go towards bringing about a favourable distribution of income.

Social Security Scheme in Tamil Nadu (Centre / State) Funding Pattern

1. Indira Gandhi National Old Age Pension Scheme (IGNOAPS)
2. Indira Gandhi National Widow Pension Scheme (IGN-WPS)
3. Indira Gandhi National Disability Pension Scheme (IGN-DPS)
4. Destitute Differently Abled Pension Scheme (DDAPS)
5. Destitute Widow Pension Scheme (DWPS)
6. Chief Minister Uthavar Padhukappu Thittam
7. Destitute / Deserted Wives Pension Scheme (DDWPS)
8. Unmarried Poor Women of age 50 years and above (UWP)
9. Distress Relief Scheme

Conclusion

Social security mostly based on the US Social security system, show that the system does detrimentally affect the economy of a nation in some ways. But the social security

system also keeps the population out of poverty. And it is clear that drastic reductions in social security will negatively impact the economy. Regardless at the end of the day, social security is a fundamental human right. Every human being, no matter their financial standing, deserves to have the basic means for sustenance. The goal is to find a way to fix the flaws of the system while ensuring that no one gets left out. In countries like India, where poverty is commonplace social security initiatives are of utmost importance and must be encouraged and given priority.

Peer Reviewed Journal

AWARENESS OF SOCIAL SECURITY SCHEMES AMONG ELDERLY IN TIRUCHIRAPPALLI DISTRICT, TAMILNADU¹¹

Dr. S. BALRAJ¹²

Introduction

Social security is defined by the International Labour Organization (ILO) as 'the protection which society provides for its members, through a series of public measures to prevent the social and economic distress that would otherwise be caused by the stoppage or substantial reduction in earnings resulting from sickness, maternity, employment injury, unemployment, invalidity, old age and death; the provision of medical care and the provision of subsidies for families with children.

Objectives

1. To study the awareness regarding existing social security schemes among elderly members.
2. To know the pattern of utilization of these schemes in the study area.

Methodology of the Study

The study is based on primary data which have been from elderly gender aged 60 years by using interview schedule methods. About 120 elderly, gender and age wise are interviewed for the study. The data were collected by using semi structured, standardized, pretested questionnaire in local language, followed by the elders. Therefore, multistage sampling technique is use in the sample selection process. In the study of Tamil Nadu state, Tiruchirappalli District, Mannachanallur block and a total of six villages were selected and 20 old people from each village the random sample methods. The collected data were, analyzed with help of table percentages, average was used.

Table 1 Socio - Economic Conditions of Sample in Yelderly

Sl. No.	Characteristics	Male n=42	Female n=78	Total n=120
1	Age			
	60-69	20 (42.6)	45 (57.6)	65 (56.1)
	70-79	10 (23.8)	20 (25.6)	30 (25.0)
	80-89	07 (16.6)	10 (12.8)	17 (14.1)
	90 and above	05 (11.9)	03 (03.8)	08 (06.6)
2	Community			
	Most Backward Community	35 (83.3)	40 (95.2)	75 (62.5)
	Backward Community	12 (28.5)	25 (59.5)	37 (29.1)
	Schedule Caste	05 (11.9)	13 (30.9)	18 (01.5)

¹¹ Paper presented in the 42nd Annual Conference of Association of Economists of Tamil Nadu Organized by Post Graduate Department of Economics, Arulmigu Palaniandavar College of Arts and Culture, Palani, Dindigul District-624 601, Tamil Nadu on 25th February, 2023.

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Sl. No.	Characteristics	Male n=42	Female n=78	Total n=120
3	Marital status Married Single Separated Widow and widower	20 (47.6) 10 (23.8) 07 (16.6) 05 (11.9)	50 (64.1) 13 (16.6) 10 (12.8) 05 (6.4)	70 (58.3) 23 (19.1) 17 (14.1) 10 (08.3)
4.	Educational Status Illiterate Primary Secondary	16 (38.0) 14 (33.3) 12 (28.5)	45 (57.6) 20 (25.6) 13 (16.6)	61 (50.8) 34 (28.3) 25 (20.8)
5.	Socio Economic status BPL ABL	32 (76.1) 10 (23.8)	63 (80.7) 15 (19.2)	95 (79.1) 25 (20.8)
6.	Sources of income Pension Children Borrowing from relatives and friends Self employment	20 (47.6) 10 (23.8) 07 (16.6) 05 (11.9)	55 (70.5) 15 (19.2) 03 (03.8) 05 (06.4)	75 (62.5) 25 (20.8) 10 (08.3) 10 (08.3)
7.	Occupation Agriculture Labour Non Workers	17 (40.4) 15 (35.7) 10 (23.8)	43 (55.1) 20 (25.6) 15 (19.2)	60 (50.0) 25 (20.8) 25 (20.8)

Source: Primary data computed

Table 2 Awareness Regarding Social Security Schemes

S. No.	Awareness of Schemes	Male n=42	Female n=78	Total n=120
1	Respondents Yes No	28 (66.6) 14 (33.3)	54 (69.2) 24 (30.7)	82 (68.3) 38 (31.6)
2	Family members Spouse In-laws Children	35 (83.3) 12 (25.5) 05 (11.9)	40 (51.2) 23 (29.4) 15 (19.2)	75 (62.5) 35 (29.1) 20 (14.6)
3	Source of awareness Local leaders / panchyat Voluntary agencies Children / Relatives / Friends Media	20 (47.6) 10 (23.8) 06 (14.2) 08 (19.0)	50 (64.1) 15 (19.2) 08 (10.2) 05 (6.4)	70 (58.3) 25 (20.8) 14 (11.6) 13 (10.8)

Source: Primary data computed

The study revealed that there were 65 (56.1%) persons were young old, 30 (25.0%) old and 17 (14.1%) oldest old in the area. 58.3% of them were married. It was seen that 61 (50.8%) were illiterate and only 25 (20.8%) had received secondary school education. Nearly 95 (79.1%) were BPL. Majority of them, 85 (70.8%) continues to work, among which 25 (20.8%) as laborers and 60 (50.0%) works in agriculture. National pension forms the major source of income for 75(62.5%) of elderly.

The awareness of the various social security schemes is depicted in Table-2. The study showed that 82 (68.3%) of the elderly, 75 (62.5%) of the family members were aware of schemes. Voluntary agencies and relatives or friends were the main source of information. It is seen from Table-3 that maximum utilization 40 (33.3%) was for social assistance schemes and least 5 (04.1%) was for insurance. The funds were mainly used for basic needs by 46 (38.3%) of the elderly. However, it was noted that 37 (30.8%) of elderly utilized the money for medicine and 25 (20.8%) even gave it to their children and spouse. In majority 77 (64.1%) the children of elderly helped in availing the schemes. The fund amount was not sufficient to meet the basic needs of food, clothing and shelter in 59 (49.1%) of them.

Table 3 Utilization Pattern of Social Security Schemes

S. No.	Utilization of Schemes	Male n=42	Female n=78	Total n=120
1	Social security schemes			
	Social assistance schemes	15 (35.2)	25 (32.0)	40 (33.3)
	Pension schemes	17 (40.4)	10 (12.8)	17 (14.1)
	Social security benefits	10 (23.8)	15 (19.2)	25 (20.8)
	Free medical services	03 (07.1)	13 (14.6)	16 (13.3)
	Tax rebate	04 (09.5)	10 (12.8)	14 (11.6)
	Travel concession	01 (02.3)	02 (02.5)	03 (02.5)
	Insurance	02 (04.7)	03 (03.8)	05 (04.1)
2	Purpose of utilization			
	Basic needs	23 (54.7)	23 (29.4)	46 (38.3)
	Health care and Medicines	12 (28.5)	25 (32.0)	37 (30.8)
	Give to children/spouse	10 (23.8)	15 (19.2)	25 (20.8)
	Loan payments	05 (11.9)	10 (12.8)	15 (12.5)
	Own needs	02 (04.7)	05 (06.4)	08 (06.6)
3	People helped in availing Schemes			
	Relatives	27 (64.2)	50 (64.1)	77 (64.1)
	Friends	10 (23.8)	15 (19.2)	25 (20.8)
	Others (NGO's, neighbors)	05 (11.9)	13 (16.6)	18 (15.0)
4.	Sufficiency of amount			
	Enough to meet basic needs	16 (38.0)	43 (55.1)	27(22.5)
	Sometimes found difficult to meet basic needs	14 (33.3)	20 (25.6)	34 (28.3)
	Not sufficient to meet basic needs	12 (28.5)	15 (19.2)	59 (49.1)

Source: Primary data computed

Finding and Suggestion, Conclusion

- The found study 65 (56.1%) of elderly population was in the age group of 60-69 years, while small least of 30 (25.0%) were 70-79 years 17 (14.1%) were 80-89 years.
- The majority of respondents were 70 (58.3%) of them married in elderly population.
- The finding of the study compared 61 (50.8%) were illiterate and only 25 (20.8%) had received secondary school education.
- Majority of the respondents were 95 (79.1%) were below poverty line.
- In the study shows of 85 (70.8%) continues to work, among which 25 (20.8%) as laborers and 60 (50.0%) works in agriculture.
- From the study that National pension forms the major source of income for 75 (62.5%) of elderly.
- The study showed that 82 (68.3%) of the elderly, 75 (62.5%) of the family members were aware of schemes.
- In study that Voluntary agencies and relatives or friends were the main source of information.
- The finding of the study that the maximum utilization 40 (33.3%) was for social assistance schemes and least 5 (04.1%) was for insurance.
- The funds were mainly used for basic needs by 46 (38.3%) of the elderly. However, it was noted that 37 (30.8%) of elderly utilized the money for medicine and 25 (20.8%) even gave it to their children and spouse.
- In majority of the respondents were 77 (64.1%) the children of elderly helped in availing the schemes.
- Major fraction 59 (49.1%) of elderly age population have the fund amount was not sufficient to meet the basic needs of food, clothing and shelter in of them.
- To ensure income security for this vulnerable group and to create a policy meet their needs, this can be achieved by strengthening the social and political support at different levels.

Conclusion

Comprehensive social security policy should link and co-ordinate different schemes to achieve inter complementary goals of different schemes. Social security schemes will contribute towards social protection if carefully designed to meet the local needs, adequately supported with resources, and integrating with the National Policy which is committed to providing social protection to the excluded majority and Although there is a good level of awareness about many schemes the utilization remains low. Our government is still struggling to provide the basic need of food and employment the population.

References

1. B M Nivedita, (2015) Utilization of Social Security Schemes among Elderly in Kannamangala, Bengaluru, *International Journal of Scientific Study*, 3(7).
2. M. D. Pradeep and M. L. Kalicharan, (2016) Social Security Measures for Indian workforce - a legal intervention, *International Journal of Computational Research and Development (IJCRD)*, I(I).

3. Kalika Gupta, (2017) Social Security Measures for Elderly Population in Delhi, India: Awareness, Utilization and Barriers, *Journal of Clinical and Diagnostic Research*, 11(5).
4. Mitasha Singh, (2020) Awareness and Utilization of Social Security Schemes by the Elderly Population of District Faridabad, Haryana, India, *Journal of Comprehensive Health*, 8(1).
5. Madan Dhanora (2022) Impact of Social Security Schemes on Multidimensional Poverty: A Study from Rural Tribes of Madhya Pradesh (India), *Journal of Humanities, Arts and Social Science*, 6(4), pp.500-508.

Peer Reviewed Journal

ISSUES AND CHALLENGES OF SOCIAL SECURITY IN INDIA¹³

Dr. S. BINDUJA¹⁴

Introduction

Social Protection is defined by the ILO as a set of public measures that a society provides for its members to protect them against economic and social distress caused by the absence or a substantial reduction of income from work as a result of various contingencies (sickness, maternity, employment injury, unemployment, invalidity, old age or death of the breadwinner), the provision of healthcare and the provision of benefits for families with children. Although sometimes used interchangeably with “social security”, social protection is generally seen to be encompassing, but wider than social security. The ILO and many other international organizations have used the concept of ‘social protection’ to cover not only social security schemes which are statutory but also non-statutory schemes. It is sometimes used both in terms of public and private policies and measures used to tackle vulnerability and deprivation. UNICEF describes social protection as the set of public and private policies and programmes aimed at preventing, reducing and eliminating economic and social vulnerabilities to poverty and deprivation. On the other hand, the term is also used in a narrower sense to refer to measures which relate to contingency related risks although more in an informal economy and nonstatutory setting.

Globalization and Social Security

Social Protection has acquired greater relevance in the context of shocks and systemic risks which are being faced by the working poor in the context of globalization. The sources of risks and vulnerability have increased with globalization, exposing the poor to new forms of risk, both due to systemic factors and shocks. This has brought the term “Social Protection” into increased current usage as a broad range of public measures deemed necessary to protect populations against sources of risk. However, the term continues to give varying emphasis to contingencies and deficiencies which have become necessary to promote inclusion.

Role of Social Security

While the protective role of social protection is easily understood, the role of social protection measures in stabilizing and promoting growth, and in harnessing human potential in increasing productivity is sometimes overlooked. In the short run, social protection can help to stabilize aggregate demand during economic crisis, contributing to accelerated recovery and more inclusive and sustainable development paths. It also helps to adapt peoples’ skills to overcome the constraints that block their full participation in a changing economic and social environment, contributing to improved human capital development in both the short and longer term, and in turn stimulating greater productive activity. As is pointed out in the report of the ILO Advisory Group, social protection represents a “win-win”

¹³ Paper presented in the 42nd Annual Conference of Association of Economists of Tamil Nadu Organized by Post Graduate Department of Economics, Arulmigu Palaniandavar College of Arts and Culture, Palani, Dindigul District-624 601, Tamil Nadu on 25th February, 2023.

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investment that pays off both in the short term, given its effects as macroeconomic stabilizer, and in the long term, due to the impact on human development and productivity”.

Social Protection Measures

Social protection comprises those measures which aim at preventing, reducing and elimination economic and social vulnerabilities to poverty and deprivation, despite rapid growth over more than six decades, poverty and deprivation continue to affect large numbers of people of the population remains without access to people across the world, and an estimated 80 percent of the population remains without access to adequate social and protection cover. The fact that such large numbers of people continue to suffer from various deprivations and have low human capabilities represents tremendous squandered human and economic potential. Social protection helps in the realization of human right which is enshrined in universal declaration of human right, international conventions, and national constitutions.

Social protection measures can help to stabilize aggregate demand during economic crisis. As is pointed out in the report of the SPF advisory group, social protection represents a “win-win” investment that pays off both in the short term, given its effects as macroeconomic stabilizer, and in the long term, due to the impact on human development and productivity. The idea of a socio-economic floor and its relationship to social protection was emphasized by the world commission on the social dimension of Globalization.

Deprivation, Poverty and Vulnerabilities in India

The acceleration in the growth rate in India in recent decades has gone hand in hand with a decline in poverty and infant mortality rate (IMR), and improvements in indicators such as life expectancy and educational attainments. However, these promising achievements still continue to coexist with persistently high levels of poverty, low levels of education, skills and productivity for a vast majority worker, low nutritional status, particularly of children and women inter-group and interclass inequalities, and vulnerabilities. These features of the economy are closely linked with the nature of the workforce in India characterized by extreme inequalities in outcomes and incomes, predominance of agriculture and self employment, and informality. The Indian workforce comprises a small formal/organized sector of the economy and a huge informal/unorganized sector, both in agriculture and non-agriculture. Recent years have seen a rise in formalization and labor market flexibility with a decline in the percentage of regular workers with written contracts of more than a year.

Issues for Social Protection System in India

Despite India's range of social protection schemes, their overall impact has fallen short due to the method of beneficiary selection, poor delivery system, and poor accountability. While many schemes have been ineffective in identifying all the needy, or even in reaching all the identified beneficiaries, leakages and corruption have been widely existent too.

The government is now trying to address these issues in various ways:

- Beneficiary selection through a community participatory process and for the first time a Socio Economic and Caste Census, conducted in 2011 (SECC 2011), which would rand households based on their socio-economic status vetted by the gram Sabha. Improved delivery systems using technology and adequate man power.

- Improved monitoring, transparency and accountability by involving the community through Wall painting, Jan Sunwai or public hearings in the gram sabha, and social audits.
- A whopping 95% of the households believe that the government has been a failure in reducing poverty.
- Overall about 18% of informal worker households believe that government has been successful in providing health care facilities.

Challenges in Moving Towards a Social Protection System

Three types of inter-related challenges are examined in the context of moving towards a SPF. The First of these is the fiscal challenges. Although there are a number of ways in additional fiscal resources can be mobilized, the main effort has to be to increase the tax/GDP ratio to, and beyond its previous peak. These measures can provide the fiscal space needed to institute a SPS. The Second challenge discussed in this study of the proposed SPS. A number of issues have been examined in this regard. The Third challenge is of effective implementation which also involves improved accountability of all those implementers and pro-active measures to reach the most vulnerable segments of the population.

Conclusion

A lot of challenges has been encountered while providing the social security cover to the downtrodden and marginalized group. But slowly by eliminating the middle man which devoured the fund in the middle before reaching the beneficiary. Targeted delivery of these schemes is a key challenge which needs to address as there are lot of beneficiaries waiting in line. Streamlining of scheme and coordination between various ministries. The free ration which are being provided is seriously benefitting not only poor but also to lower middle class which had also faced the wrath of COVID-19 induced unemployment and inflation in food prices. The budget allocation of all schemes must rise as more people are seeking jobs under rural job guarantee schemes. Schemes like National rural employment guarantee schemes are the lifeline of villages as these provides assured work for the rural folks who had lost jobs in current scenario. Apart from COVID-19, these measures hold an extraordinary value where it provides utmost care to women, elderlies and children. Institutional delivery is the one of the most important aspect of pregnancy as it provide all the medical care and medications which are necessary for the healthy life of mother and child. Most of the rural women are compelled to take up jobs even after they get pregnant therefore these schemes have multiplier effect as the child gets proper nutrition which helps the proper growth physically and mentally.

A STUDY ON THE IMPACT OF BREAKFAST ON ACADEMIC PERFORMANCE AND SUSTAINABLE HUMAN CAPITAL FORMATION¹⁵

Dr. NIRRMALA SATHISH¹⁶ & P.L. VETHA HANUMAND¹⁷

Introduction

Education has an intensive qualifying and class distributive function and among various status oriented function relevant to economical and social wellbeing which serves as a determining factor in the students career after their education. Schools play a crucial role in preparing students for their future careers, and there are several ways in which they can improve their future employment, A good education can help the individuals to stay current with the latest developments in their field and increase their competitiveness in a competitive job market. Job search is not only about the credentials of students but the rightful combination of hard skills and soft skills. It provides individuals with the skills and knowledge needed to succeed in the workforce, increase their chances of finding gainful employment, and advance in their careers. Labour force is one of the key indicators used to measure the economic health of a country and its population. Based on a comparison of 173 countries in 2021, China ranked the highest in Labour Force with 791 million followed by India and USA.

The current unemployment rate in India increased to 8.30 per cent in December 2022, the highest in 16 months, data from Centre for Monitoring Indian Economy (CMIE). India needs to create around 10 million jobs every year till 2030 to reduce growing unemployment. According to a recent report by brokerage firm Motilal Oswal the same rate roughly translates to 8,34,000 jobs every month for the next 13 years. This shows the immediate need for adequate and skilled Human Resource in India. Human resource refers to abilities of human beings to contribute to the process of value addition in the economy. Human capital refers to the stock of skill and expertise of a nation of a nation at a point of time. Human capital formation is the process of acquiring and increasing the number of persons who have the skill, education, health and experience which are essential for the economic and political development of the country. This study analyse the Impact of Breakfast with special focus on Academic Performances and Sustainable Human Capital Formation.

Review of Literature

Ability of learning is highly associated with health-related behaviors. The brain maturation is critical in during the stages of early life (Van Petten C, 2004). The development of certain cognitive functions takes place in adolescence and continues during early adulthood. Nutrition plays a pivotal role in the brain development. The Neuro transmitters within the

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brain have been studied in conjunction with nutrition. Food we eat has direct influence on the proper functioning of the brain (Colby-Morley, 1981). Carbohydrates contribute to the cognitive performances of the brain. Fluctuating levels of carbohydrates in food may cause dizziness and confusion. Brain has about 60 Per cent of fat, notably omega-3 fatty acids are essential for the brain's optimal performance and a lack of these fats can lead to depression, poor memory, low IQ, learning disabilities and dyslexia (Erickson, 2006).

Breakfast largely contributes to the physical and mental well-being of individuals. Several factors influence the association between eating breakfast regularly and mental distress and academic performances. Smith (in 2005) had suggested that intaking breakfast especially cereals is highly beneficial due to its effect on the brain after long night time fast. Regular consumption of breakfast is correlated with reduced stress levels among senior secondary students.

Poor nutritional habits are also associated with stress and depressive symptoms. A study among the adolescents of both the gender reported that lack of healthy diet is often associated with stress and depression (Brooks TL, Harris SK, Thrall JS, Woods ER, 2002). Higher consumption of sweets and fast foods were also associated with higher levels of perceived stress. Increased stress levels are tend to drive the food habits negatively. The study found that students with high stress levels had larger meals than the other (Yeonsoo Kim, Hye Young Yang, Ae-Jung Kim, Yunsook Lim, 2013).

Objectives of the Study

1. To analyse the breakfast habits among the senior secondary students of both the genders.
2. To study the impact of malnutrition on academic performance and sustainable human capital formation.

Research Methodology

To analyze the above objectives, a survey was conducted in Tirupur Public school, in the month of December, 2022. The survey included 120 students out of which 72 are female students and 48 are male students from different age groups (15-18 years).

Result and Discussion

Among the sample studied about 37 per cent has a habit of skipping their breakfast also had drop outs during classes. Lack of concentration, dizziness and lack of memory were also reported in some cases.

The study stated about 54.5 per cent are not having balancing diets and are tend to over eat other meals of the day if they miss their breakfast which may relatively cause obesity or under weight.

Only 65 per cent of the populations were found to have all the three meals in a day, where 17 per cent have only two meals and 10.6 per cent have only one meal in a day. The report has also revealed that about 53 per cent of students who are taking their breakfast on time are regular to schools, experiences no or minimal stress and has done good at schools. About 17 per cent of students are found to have breakfast regularly outside home like at school vans, classrooms or campus canteens tend to have poor nutritional status as their meals were incomplete and not balanced.

Respondents were also asked for their duration of breakfast as few have to have their breakfast in less than 10 minutes. A few individuals of about 47.2 per cent from the population said that they feel stressed when the meal is not on time which was also the cause for skipping a meal.

The study found that about 48 per cent of the students feel stressed while studying and have a strong impact on their education and also their daily lives and 57 per cent of students tend to forget the answers during exams. About half of the population from the survey have reported that they believe their nutrition has a strong connection with their education and even few revealed that they have special food to improve their memory.

The correlation between nutrition and education, nutrition and stress has been drawn to analyze the relationship between them. The habit of skipping breakfast regularly has a strong correlation ($r=0.6$) with their academic performances, skipping breakfast is also strongly correlated ($r=0.71$) with drop outs and migraines in the population.

According to the study there are several adverse effects of skipping breakfast on education, which includes;

Poor concentration and memory: When students skip breakfast, their blood sugar levels drop, causing a decrease in energy levels and affecting their ability to concentrate and retain information. The survey has identified that about half of the population are at-risk or had problems with academics and well-being.

Reduced physical and mental performance: Skipping breakfast can lead to decreased physical and mental performance, making it harder for students to participate in physical activities or perform well on tests and exams. Students who constantly skip breakfast are found to be undernourished whereas students who had all the meals were healthy and had no experience of fall outs or depression and also maintained consistent records at schools.

Reduced motivation and engagement: Students who skip breakfast may feel fatigued and less motivated to participate in class or engage with their studies. Academic performance was directly correlated with the frequency of taking balanced meals.

Increased stress levels: Skipping breakfast can lead to feelings of anxiety and stress, which can affect students' ability to perform well in school. Students who have breakfast outside home revealed that they had no time to breakfast at homes as they were stressed of being late to schools.

Increased risk of obesity and other health problems: Skipping breakfast has been linked to an increased risk of obesity and other health problems, which can impact students' ability to attend school and perform well in class. Students who develop obesity resulted in increased morbidity such as diabetes and poor academic achievement due to poor attendance, lack of attention and confidence.

Suggestions

1. The main source of human capital is the expenditure on education and health which is the most efficient way of raising a productive workforce in the country. Hence health expenditure directly increases the supply of healthy labour force and adds more to GDP of the nation than a sick person.

2. Human capital formation and innovative skill leads to inventions and technical improvements, when the skilled participation is higher, greater is the degree of economic and social equality in the society. Several studies suggest that eating breakfast may help children do better in school by improving memory, alertness, concentration, problem-solving ability, test scores, school attendance, and mood (International Food Information Council Foundation).
3. The Department of Agriculture of the United States of America has launched breakfast programmes in schools in numerous states. Such programmes were implemented in several European nations, notably France three years ago. According to research conducted in this country, free breakfast programmes could improve academic results by likely increasing student attendance and sharpening their focus. Hence this programme can be implemented all over the world.

There are several famous school breakfast schemes in the world that have been successful in ensuring that students have access to a nutritious breakfast, including:

Free School Breakfast Program in the UK: This program provides free breakfast to all primary school students in England, and has been successful in reducing poverty-related hunger and increasing attendance and academic performance.

School Breakfast Program in Canada: This program provides funding to schools to offer breakfast to students, and has been successful in reducing hunger and improving academic performance.

No Kid Hungry Campaign in the United States: This is a nationwide campaign aimed at ending child hunger in the United States by providing breakfast and other meals to low-income students through partnerships with schools and community organizations.

Community Kitchen Program in Australia: This program provides free breakfast to low-income students in schools, and has been successful in reducing poverty-related hunger and increasing attendance and academic performance.

World Food Programme School Meals in Developing Countries: This program provides free or low-cost breakfast and other meals to students in schools in developing countries, and has been successful in reducing poverty-related hunger, increasing enrollment, and improving academic performance. So these schemes to be implemented in all countries.

Central and State Government Schemes in India to Improve the Malnutrition

It is important to consider Tamil Nadu government's performance because the breakfast scheme is being offered as a first-of-its-kind programme in India. The main objective of the Tamil Nadu CM Breakfast Scheme is to increase awareness about the importance of self-confidence. Through this scheme, the school children have to be educated mentally and physically and make them aware, this will spread awareness not only among the children but in the whole society. Overall, breakfast schemes in schools play an important role in ensuring that all students have access to a nutritious breakfast, which is essential for their health, wellbeing, and academic performance.

Conclusion

Studies have shown that students who eat breakfast regularly are more likely to have better academic outcomes, including improved concentration, memory, and problem-solving skills. They are also more likely to be in good health and less likely to be overweight or suffer from chronic health problems. In addition to improving students' health and wellbeing, school breakfast schemes can also have positive impacts on attendance, behavior, and school climate. By providing students with a nutritious breakfast, schools can help ensure that students are better equipped to learn and succeed academically, which is the ultimate goal of these programs. Eating a nutritious diet that includes essential nutrients and vitamins can help individuals to perform better in educational settings and lead a healthier, more fulfilling life. Eating a nutritious diet, especially breakfast, can help to provide the brain with the energy it needs to function effectively. This can improve concentration and memory, allowing individuals to perform better in school or other educational settings. Human capital formation leads to efficient utilization of physical capital which further increase in GDP growth along with higher rate of participation which leads to higher level of income of the individuals and households. More studies should be conducted to understand the relationships between proper dietary intake, education and stress.

A STUDY ON SOCIO-ECONOMIC CONDITIONS OF FARMERS IN THANJAVUR DISTRICT UNDER THE IMPACT OF AGRICULTURAL TRAINING PROGRAMMES¹⁸

Dr. M. ANBUMANIKANDAN¹⁹ & Dr. R. MULLAIVANANATHAN²⁰

Introduction

India has more than 700 million rural populations directly and indirectly depend on climate - sensitive sectors like agriculture, forests and fisheries and natural resources such as water, bio-diversity, mangroves, coastal zones, grass lands for their subsistence and livelihood. Two-third of India's national income comes from the agricultural and its allied sectors; these sectors are capable of creating a large scale employment to the people. Agricultural sector in India has been considered as the primary sector for development, employment and many sectors have already been initiated and implemented the techniques and tactics to get the benefit out of it.

Technological development in India endowed it with rich natural and human resources. India is also known for its richness in terms of livestock, irrigation and fertile cultivable land; yet the socio-economic developments of people in general and agricultural development in particular regions have not been achieved to the desired extent. There are many factors can be attributed to that non-fulfilment like regional imbalances, poverty, illiteracy, unemployment and host of other problems. Along with these the natural calamities like floods, scanty rainfall, and severe drought situation have also been pulling-down the economy. Since Independence, the governments at all levels have been initiating, formulating and implementing many developmental programmes for the holistic development of the economy in general and socioeconomic development of the districts and people in drought - prone areas in particular. Socio-Economic status of farmers in Thanjavur delta areas have been considered as a topical subject for discussion, debate and research among the agricultural economists, policy-makers, social scientists, academics including researchers.

Statement of the problem

India is one of the highly populated countries in the world and it ranks second next to China. 45 percent of the people are dependent on the agriculture sector for their livelihood. The population growth is increasing day by day but there is no increase in the agriculture production. So, we rely on other countries productivity. The major problem of India is how to improve and increase the agriculture productivity and achieve sustainable agricultural growth.

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Objectives of the study

1. To identify the Training programmes given to the farmers in the study area.
2. To probe the impact of training programmes on Productivity, knowledge, technology, income, wastage and confidence level of the selected farmers.

Methodology

For out of 14 blocks in Thanjavur district namely Thanjavur, Orathanadu, Ammapettai and Thiruvaiyaru are selected for the study. And 200 farmers are approached for the data. The interview schedule was administered to the sample respondents to collect the required primary data.

Statistical Analysis

The collected data were processed through SPSS (Statistical Package for Social Sciences) Chi-square test, correlation coefficient, t-test and ANOVA.

Data Analysis

Out of 200 farmers surveyed 142(71%) were males and 58(29%) were females.

Out of 200 farmers, the majority of the respondents were in the age group of 46 to 55 years.

More than three-fourth of the respondents was married and 15 percent of the respondents (158) were unmarried.

About 38 per cent of the respondents were SSLC level education and 22 per cent, 20 percent, and 8 per cent of the respondents studied Primary, Higher Secondary and degree and engineering respectively.

Nearly 58 per cent had agriculture as whole time occupation whereas the remaining as part time occupation in that 25 per cent were practicing agriculture and wage workers and 15 per cent of the respondents were having agriculture and business, 8 percent of farmers were doing agriculture and job also.

Out of 200 respondents, about 50 per cent of the respondents' had an annual income of less than Rs.50,000. About 30 per cent of the farmers' Annual income was between 50,000 to 1 Lakhs and 15 per cent of the respondents' Annual income was more than 1 lakhs to 2 lakhs.

Table 1 Attended Training Program-wise Respondent			
S. No.	Name of Training	No. of Respondent	Percentage
1	Seed treatment	48	24
2	Crop management	36	18
3	IPM	42	21
4	Weed Treatment	32	16
5	Irrigation management	12	6
6	Organic Farming	30	15
Total		200	100

Source: Primary data, Figure in the bracket is percentage of total

Forty eight farmers attended seed treatment training; 42 IPM and 36 on crop management, Twelve farmers attended the training more than three times; 26 farmers three times; 94 farmers two times and the remaining 68 attended only once. The training schemes are given by central government departments (22), state government (152) and by NGOs (8).

Impact of Training

The training helped the farmers mostly in seed treatment and in integrated pest management (IPM). All the selected farmers found improved their crop productivity.

Conclusion

All the farmers have accepted that they are fully satisfied with agricultural training programmes which helped to increase productivity and income. Farmers have suggested that training programmes should be conducted season wise (Ex. Kuruvai, Sampa and Special Scheme) as well as village wise.

Peer Reviewed Journal

EMPOWERMENT OF WOMEN WORKERS IN THE TEXTILE AND GARMENT UNITS IN TAMIL NADU²¹

Dr. B. YASODHA JAGADEESWARI, M.A., M.Phil., M.B.A., Ph.D.,²²

Introduction

“There is no chance for the welfare of the world unless condition of women are Improved. It is not possible for a bird to fly only with one wing.”

~ Swamy Vivekananda

In this era of globalization, numerous court rulings and laws have legitimized women empowerment and their right to be treated equally both at the society and at the workplace. In the past few decades, India has emerged as a major garment exporter and has been progressively integrated into the global garment supply chain. But this “success” may be owed to India’s unique industrial trajectory based on small-scale, regionally specialized production. The Textile industry occupies an important place in the Economy of the country because of its contribution to the industrial output, employment generation and foreign exchange earnings. The textile industry encompasses a range of industrial units, which use a wide variety of natural and synthetic fibres to produce fabrics. The textile industry can be broadly classified into two categories, the organized mill sector and the unorganized mill sector. Considering the significance and contribution of textile sector in national economy, initiative and efforts are being made to take urgent and adequate steps to attract investment and encourage wide spread development and growth in this sector. Globally, the Textile sector is among the largest employers of women workers. The sector holds great power and potential to impact the lives of millions of women in low-income countries and, by extension, their families and communities. The Textile industry occupies an important place in the Economy of the country because of its contribution to the industrial output, employment generation and foreign exchange earnings. Making sure that impact is positive is critical. Companies can, and do, take individual action to promote women’s empowerment within their value chains and are often participants in cross-sector or industry initiatives as well. However, there is an even larger opportunity for these companies to use their collective influence to champion the partnerships, programs, and policies that can create lasting, meaningful improvements in the lives of garment workers. Considering the significance and contribution of textile sector in national economy, initiative and efforts are being made to take urgent and adequate steps to attract investment and encourage wide spread development and growth in this sector. This paper explores three areas where Garment sector companies can drive outcomes that meaningfully enhance women’s economic empowerment.

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Empowering Women through Equitable Employment

Women's economic empowerment is about women's ability to choose whether to work, how much to work, and how to spend or save their incomes. Employment in the Garment sector provides numerous opportunities to support women's empowerment; however, it also poses risks that can restrict women's empowerment. Companies that strive to prevent negative impacts, while supporting opportunities to enhance the empowerment potential of Garment sector jobs, will deliver the greatest benefits to women workers. Women's economic empowerment is multifaceted and, as identified by ICRW's eight building blocks framework, requires the convergence of economic and noneconomic factors, including safety, freedom from violence, and the opportunity to be heard at work and in society. Thus, effective approaches should be holistic, integrated, and strategic, such that they consider and incorporate the full spectrum of factors involved.

Review of Literature

A review of literature was added to this study by referring to different journal and studies conducted by different individuals to show relevance to socio economic status of women workers in Garments Factory.

Reddy and Venkateswarlu (2015) in their study concluded that farm scientists valued creativity and independence most in carrying out their tasks. They did not prefer to work in rural areas. The other work values of scientists differed slightly according to their age and experience.

Amartys Sen. (2014) calls it, a sector of 'co-operative conflict', where there is different interest, expectation, contributions, needs and degrees of control.

Srinivasan et al. (2013) identified that most of the respondents (90 percent) had heat, stress, noise and dust related problem, further vibration and stress are prevalent in the work place and majority of the respondents had the problems of lighting, radiation, renal, liver and occupational cancers are less due to work.

Julia (2013) in her study that 'by focusing on women's careers the short -term objectives has been to correct the gender imbalance, but long-term objective must be to develop theoretical concepts and explanation which the gender neutral and inclusive of both men and women. Second the changes currently under way in work organization and professions will as well be referred to as providing new difficulties for women's careers as wells as presenting an opportunity for the re-conceptualization of the 'successful' career.

Bharara et al. (2012) revealed that sampled population had incidences of abrasion of skin, fall, slips, trips, crushing and pinching of body parts, boils in hands and feet, burns, sprains, cuts and bleeding and eye injury/hurt being more frequent occurring injuries during work.

Drucker (2012) in his book stated, that the labor force participation of married women under age fifty is now just as high as that of men. It is therefore unlikely to rise any further. But a very large number a women in the labour force of those who entered when the inrush of women began are now reaching their mid-thirties. And also he states that most of the married women stay in the labour force after first child.

Nahar et al. (2010) found that work pattern in the garment factory severely affected worker's health, as they were restrained in a closed environment. Hazardous conditions of work range from the exposure to lint dust in an apparel factory to exposure to toxic chemicals in the recycling of electronic waste.

Sandhu and Singh(2008) reported that motivation factors viz. feeling of achievement, ability utilization, recognition and rewards, creative work freedom of expression and scope for professional growth contributed comparatively more to job satisfaction than factors like behavior of immediate officers, job security and advancement, adequacy of salary, administrative setup and social status attached to the job.

Rosen and Jerdee (2007) in their study stated that women were seen less favorably in terms of the knowledge, aptitudes, skills, motivation, interests, temperament, and work habits that are demanded in most managerial roles.

Styles. Kapur (2004) his shown that the twin roles of women cause tension and conflict due to her social structure which is still more dominant .In her study on working women in Delhi, she has shown that traditional authoritarian set up of Hindu social structure continues to be the same basically and hence. Women face problem of role conflict change in attitudes of men and women according to the situation can help to overcome their problem.

Hate (2000) in her book stated that there is positive change in the political, economic and social status of middle class working and non-working women living in four cities in Maharashtra with the advent of independence.

The Review of this study reveals that the implications of Garment women workers in Tiruppur City of Tamil Nadu. The Analysis of women's perceptions as factory workers shows that they are exploited on the factory floor in different ways and experience new forms of patriarchal domination beyond their family.

Objective of the Study

1. To identify the present situation of female employees in garment units.

Research Methodology

The employees were selected by using non probability convenience sample method. Totally 100 sample respondents from five garment units of Tiruppur were selected. Statistical techniques like Mean, Percentage, t test and Garrett's ranking method were used to analyze the data.

Limitations of the Study

The management did not allow the researcher to collect information at their work place. This study was carried out in textile and garment industry only. The study was conducted in only 5 industries in Tiruppur City of Tamil Nadu and a sample of 100 workers was considered. So the results could not be generalized.

Data Analysis and Interpretation**Table 1 Demographic Profile of Respondents**

Variables	Particulars	Frequency
Age	< 25	24
	25-35	34
	35-45	33
	45 <	9
Marital Status	Married	66
	Unmarried	26
	Widow	8
Type of Family	Nuclear	58
	Joint	42
Educational Level	Primary	33
	Secondary Education	24
	Higher Secondary	15
	Degree	28
Community	BC	27
	MBC	31
	SC	42
Designation	Accountant	3
	Cutter	11
	Tailor	67
	Packers	19
Monthly Income	Less than 10000	28
	10001-20000	66
	Above 20000	6

Source: Field survey

More than one third of the respondents belonged to the age group of 25 to 35 years. Less than one third of the respondents belonged to the age group of 35 to 45 years.

Less than three fourth of the respondents (66 %) married, more than fourth of the respondents (26 %) unmarried and 8 percent widow.

One third of the respondents were possessed primary education, more than one fourth of the respondents (28%) were degree, and one fifth of the respondents (24 percent) were secondary education and 15 percent higher secondary.

Less than half of the respondents (42%) belongs to Scheduled cast, less than one third of the respondents (31%) were Most Backward community and More than one fourth of the respondents (27%) belongs to Back ward community.

More than half of the respondents (67%) were Tailor, less than one fifth of the respondents (19%) were packer and 11 percent were cutter.

More than half of the respondents (66%) were earning between Rs.10001 to 20000, more than one fourth of the respondents (28%) were earning less than between Rs.10000 and only 6 percent of the respondents were earning above Rs.20000.

Seventy nine of them expressed that their economic condition has been improved after employed in garment units.

Table 2 Garrett's Ranking Method

Factor/value	I (37)	II (30)	III (26)	IV (20)	V (10)	Total	Mean score	Rank
Transport facility	9 (675)	12 (720)	20 (1025)	26 (1040)	33 (650)	4110 (100)	41.10	IV
Maternity benefits	3 (188)	12 (690)	17 (850)	45 (1820)	24 (470)	4018 (100)	40.18	V
Non discrimination	2 150	30 1830	35 1750	15 600	16 350	4680 100	46.80	III
Safe work place	61 4612	13 780	8 375	7 280	11 220	6268 100	62.68	I
Fair treatment	25 1875	33 1980	20 1000	7 260	15 310	5425 100	54.25	II

Findings and Discussion

- Findings from the study showed that Most of the women workers 34 (34%) belong to the age group of 25-35 followed by the age group of 35-45 (33%) and the age above 45 (9%) in that order.
- The data shows that married respondents have more interest in this work. Highest 66 (66%) Respondents are involved in this work because they need more financial support than unmarried and others. Only 26(26%) Respondents interviewed that they are unmarried.
- Regarding Average Monthly income details of the Selected respondents, as is noticed in Table 1, it is observed that 66 (66%) Respondents have income level between 10001-20001, 28 (28%) respondents have income level less than 10000 and 6 (6%) Respondents have income level above 20000.
- The details of literacy level of the selected respondents are shown in table 1. Out of 100, 33 (33%) Respondents are primary education, 24 (24%) Respondents are educated up to secondary education level and 28 (28%) Respondents had their degree. From this, it can conclude that major of the selected respondents are Primary education and only 15 (15%) respondents are higher secondary education.
- The data shows that joint family respondents have more interest in the business. Highest 58 (58%) respondents are involved in the business because they need more financial support than nuclear family women.
- Majority of respondents felt that safe work place is the major important rights for women workers.

References

1. Rajkumar P (2020), Confrontation of Migrant Workers in Textile Industry at Tirupur, *International Journal of Advanced Science and Technology* 29(12), (2020), pp. 141-145.
2. Srinivasan S and Ilango P (2013) Occupational Health Problems of Women Migrant Workers in Thogamalai, Karur District, Tamil Nadu, India. *International Research Journal of social Science* 2(2): 21-26.
3. Suresha. K.P (2013) "Women workers in Unorganized Sector in Bangalore City, Southern Economist-2015.
4. Govindappa V (2012) Women Workers in Garment Factories in Karnataka. *Southern Economist* 50(17): 19-22.
5. Mehta R (2012) Major Health Risk Factors prevailing in Garment Manufacturing Units of Jaipur. *Journal of Ergonomics* 2(2): 102.

Peer Reviewed Journal

HEALTH IMPACT AND PREVENTIVE MEASURES ABOUT COVID-19 PANDEMIC IN ERODE DISTRICT OF TAMIL NADU²³

Dr. M. SARAVANAKUMAR²⁴ & Dr. M. PRIYADHARSHINI²⁵

Introduction

The COVID-19 pandemic has had far-reaching consequences on the physical and mental health of individuals as well as the health of economies across the globe. More than 200 countries have been affected by this pandemic and many of the countries are followed lockdown and announced national emergency. In India, the first COVID-19 positive case was identified in Kerala in January 2020 and in March this was increased to 500 confirmed cases. The worst affected COVID cases were in the state of Maharashtra, Tamil Nadu and Delhi. The Government and private COVID hospitals ICUS with Oxygen beds have been filled up with new cases in many part of Tamil Nadu in general and Erode district in particular. As per the available 2011 censuses information on the Erode district there are 11,57,976 urban and 10,93,768 rural population were registered. Further, as of August 2021 more than 94,699 COVID cases were registered in Erode district. The present paper assesses how the health sector strong enough to manage the COVID-19 pandemic situation in the Erode district.

Review of Earlier Studies

Yoganandham et al. (2020) studied the COVID-19 and its socio-economic impact on the selected rural areas of Tamil Nadu. The study found a need for socio-economic interventions and strategies to overcome the barriers of COVID-19. Coordination between the health system, financial system, and general public plays a crucial role in handling the COVID-19 pandemic effectively and ensuring the quality of life.

Tapas et al. (2020) present the impact of COVID-19 in 21 villages in ten states. The study suggested that the lockdown affected every aspect of the rural economy, including agriculture and allied activities, employment opportunities and household income and consumption.

Goswami et al. (2021) analyzed the topical policy issues COVID-19 pandemic and the economic performance of India's states. The spread of the virus significantly impacted state economic performance.

Kripa et al. (2021) reported that the Tamil Nadu COVID pulse survey finds economic recovery following lifting of lockdowns'. A significant consequence of the pandemic-induced lockdown was job and livelihood loss.

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Health Impact

Coronaviruses (CoV) are a large family of viruses that cause illness ranging from the common cold to more severe diseases such as Middle East Respiratory Syndrome (MERS-CoV) and Severe Acute Respiratory Syndrome (SARS-CoV). Most people infected with the COVID-19 virus will experience mild to moderate respiratory illness and recover without requiring special treatment. Older people, and those with underlying medical problems like cardiovascular disease, diabetes, chronic respiratory disease, and cancer are more likely to develop serious illness²⁶.

Health Security

Health security encompasses access to health services and living in a safe environment. The emergence of the novel coronavirus has created a severe global public health emergency. In March 2021, COVID-19 has killed over 2.6 million people around the globe²⁷. In addition to direct deaths caused by the coronavirus, there are likely to be many indirect deaths resulting from delays in seeking healthcare for other disorders or from overwhelmed health systems, or the diversion of resources to deal with the coronavirus.

Preventive Measures about Covid-19 Pandemic

Health Care Facilities in Erode District

S. No.	Institutions	Government/Private	Total Numbers
1.	COVID Hospitals	Government	1
2.	COVID Health Centre	Government	7
		Private	49
3.	COVID Care Centres (CCC)	Government	19
		Private	20
4.	Testing Centres	Government	1
		Private	5
5.	Sample Collection Centre	Government	85
		Private	12
6.	Vaccination Centre	Government	85

Source: <https://erode.nic.in/covid-care/>

The details of health care facilities provided by the Government and private hospitals in Erode district in order to prevent the people from the Corona virus related that. The Government Erode Medical College Hospital, Perundurai was a major COVID centre the Erode district and they meticulously planned and executed all kinds of safety and security measures to protect the welfare of the people in the district.

²⁶ <https://erode.nic.in/covid-care/>

²⁷ Johns Hopkins University, Coronavirus Resource Center, Dashboard, 10 Mar. 2021, <https://coronavirus.jhu.edu/map.html>

Other Measures**Avoid Close Contact**

Stay at least 6 feet (about 2 arm lengths) from other people. Some people without symptoms may spread virus.

Clean Your Hands Often

Wash your hands often with soap and water for atleast 20 seconds especially after you return from the public place.

Stay at Home

Don't leave home for anything other than the essential purposes. Stay healthy at home.

Use Tissue paper or Handkerchief

Always cover your mouth and nose with a tissue paper or a kerchief whenever you cough or sneeze.

Wear a Face Mask

Wear mask over your nose and mouth. It helps to slow down the spread of COVID-19.

Clean, Disinfect and Lockdown

Clean high touch surfaces daily. This includes doorknobs, light switches, desks, phones, toilets and sinks.

The Erode district has taken very strict lockdown measures to control the spreading of COVID disease.

Vaccination

The Erode district administration has organized massive vaccination camps to prevent the people from COVID-19.

Conclusion

The COVID-19 pandemic has led to a dramatic loss of human life worldwide and presents an unprecedented challenge to public health. The public health impact, COVID-19 imposes an economic cost upon societies. The cost includes loss of productivity in society due to the death of the human being affected by COVID. The Central and State Government, Educational Institutions, Hospitals and NGOs had taken much effort to create awareness among the people and initiated a lot of preventive measures to control the coronavirus in the Erode district.

References

1. Goswami Binoy, Raju Mandal and Hiranya K. Nath (2021), "Covid-19 Pandemic and Economic Performances of the States in India", Economic Analysis and Policy, Vol. 69, pp. 461-479.

2. Kripa Ananth Pur, Venkatachalam L and Jafar K (2021), "Tamil Nadu Covid Pulse Survey finds Economic Recovery follows Lifting of Lockdowns", The New Indian Express, 25th July 2021.
3. Tapas Singh Modak, Sandipan Baksi and Deepak Johnson (2020), "Impact of COVID-19 on Indian Villages", Review of Agrarian Studies, Vol. 10, No. 1.
4. Yoganandham G., Jayendira P. Sankar and Kalaichelvi R. (2020), "COVID-19 and its Socio-Economic Impact on Selected Rural Areas of Ktpadi Taluk in Vellore District of Tamil Nadu", Journal of Human Resource and Sustainability Studies, Vol. 8, No. 4, pp. 331-348.

Peer Reviewed Journal

THE PROBLEMS OF UNORGANIZED WORKERS AND THEIR SOCIAL SECURITY MEASURES IN INDIA: A STUDY²⁸

Dr. T. KALAIVANI²⁹

Introduction

In India about 92 % of the total population work as unorganised workers and they do not get enough social security. Moreover they face so many hurdles in their employment. Thus social security Act was introduced in 2008 for providing social security and welfare for unorganised workers. This Act defines the unorganised workers as self-employed workers, home-based works. In short they are generally in the condition of wage workers. The workers in the unorganised sector are categorized as constructional workers, agricultural workers, migrant labourers and they perform manual as well as helper occupation. Moreover the home based work under unorganised sector such as papad making, tailoring, beedi rolling, agarbatti making, construction workers, carpenters and so on. These unorganised workers are scattered as well as perform without the control of the government. Eventhough they have rules and regulations in the operation of their work they do not strictly follow them. In addition they do not enjoy the benefit of maternity leave, sick leave, job security, provident fund, good work environment as benefit attained by organised workers. The educational qualification of unorganised workers are mostly illiterate or semi illiterate and most of them are in the weaker section of the society. As they are in poverty, low level of education unawareness they face so many problems. The government introduced and proceeds many measures for unorganised workers to recover from the problems.

Important Labour Laws in India

The Indian Constitution mentioned the rights of unorganised workers. As per Article 19(1)(g), the workers have the fundamental right of practicing any occupation, profession and trade or business. The Article 19(1)(c), mentioned that they have the freedom to form the Union or Association. According to the Article 38(2), inequalities in the income of workers should be minimised. Article 39(d), state that provision of equal payment for equal work. The health and strength of unorganised workers related Article 39(e), contributed that the health and strength of the workers should not be exploited.

Review of Related Studies

Dhananjay Vishwas (2020) stated that the unorganised workers contribute about 50% of the share of GDP of a country. Therefore, their contribution to the Indian economy is remarkable. But they face so many challenges and problems in their workplace. Social Security Act 2008 plays an important role in the betterment of unorganised workers

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Mathi Balaji and Girija (2018) highlighted that the government introduced so many welfare schemes for enriching the life of the unorganised workers. The labourers spent most of the time on their working place, but their recognition in their working place is refusable. Thus the government has to step in for the development of these workers.

Subhasis Chatterjee (2018) expressed that the unorganised workers live in below poverty line, they face so many challenges to meet their daily requirements. Mostly women are the victim of low wage earnings. Though many laws and schemes are introduced it does not improve them.

Statement of the Problem

The unorganized workers play a crucial role in the Indian economy and their contribution to GDP is remarkable. The workers in the informal sector live below the poverty line. They face so many challenges in their day-to-day life. They have low level of negotiating power and unaware of their rights, welfare schemes and so on. The various activities of unorganised workers and the problems faced and welfare attained by the workers in the unorganised sector needs to be studied.

Objectives

1. To explore the problems faced by the workers in the unorganised sector.
2. To understand the existing welfare schemes of the government to the unorganised workers.

Data Collection

Ten workers each from five unorganised groups namely beedi rolling, construction, pappad making, agarpathi making, tailoring were selected randomly from Nagercoil town. Through personal interview method the required information and data were obtained from the 50 selected workers.

Tools

Likert scale and Garret ranking techniques were used to analyse the data. The data were collected from December 2022 to February 2023.

General Problems Faced by the Unorganised Workers

Unorganised workers face so many problems in their workplace which creates significant impact on individual both physically and mentally. The general problems faced by the selected organised workers in Nagercoil town were analysed by using Garret ranking technique.

Table 1 General Problems Faced by the Unorganized Workers in the Work Place

S. No.	Problems	Score	Garret Rank
1	Exploitation	59.71	I
2	Gender Inequality	58.80	II
3	Inequality in Job	55.21	III
4	Long Working Hours	51.11	IV

S. No.	Problems	Score	Garret Rank
5	Poor Safety Environment	48.34	V
6	Physical and Mental Harassment	44.23	VI
7	Irregularity in job	41.54	VII
8	No Leave Procedure	41.24	VIII
9	Lack of Trade Union	40.73	IX
10	Low Recognition	39.44	X

The first rank was given to the exploitation, the second rank for gender inequality. Inequality in job ranks the third and long working hours got the fourth rank. Poor safety environment ranked the fifth followed by physical and mental harassment. Irregularity in job, no leave procedure, lack of trade union and low recognition got the subsequent ranks. Thus, exploitation was considered as a biggest problem faced by unorganised workers in the workplace.

Benefits Received through Government Welfare Schemes

Labour welfare schemes are very important to the unorganised workers. It raises the working condition, social security and standard of living. The government of India focuses much on labour welfare schemes. The benefits received through government welfare schemes by the selected unorganized sector workers were listed in table 2.

Table 2 Benefits Received through Government Welfare Schemes

S. No.	Welfare Schemes
1	Pradhan Mantri Shram Yogi Mean – dhan
2	Janshree Bima Yojana
3	Educational Scheme for Children
4	Indira Gandhi National Disability Pension Scheme
5	Rashtriya Swasthya Bima Jojana
6	Aam Admi Bima Yojana
7	Old Age Pension Scheme

Out of the seven welfare schemes the first one namely PMSYM benefited much according to the selected workers. The next three schemes benefited only a few of them. The RSBI and AABY were not gave them any benefits. And the OAP scheme found not benefited none of the selected workers.

Conclusion

This study focused the general problems faced by the unorganised workers in their work place. Where the study finds that the exploitation is the foremost problem of unorganised workers in the Nagercoil town and also gender inequality is the another biggest the problem of unorganised workers. Thus the working condition of unorganised workers are not stable. These unorganised workers demands the recovery from their problems. Moreover the government introduces so many welfare schemes for the betterment of the unorganised workers. But it did

not reach them greatly. Therefore there is no improvement in their life. Thus the study concludes that most of them are disagree or neutral with the government welfare schemes and no one is highly agree with these schemes.

References

1. Dananjay Biswas (2020), "Problems of Unorganized Workers and their Social Security Measures in India: An Analysis", International Journal of Research and Analytical Reviews, 7(1), Pp. 931-939.
2. Diwaker & Ahamad (2014), "Problems and Challenges Faced by Unorganized Sectors: An Indian Perspective", New Man International Journal of Multidisciplinary Studies, 1(12), Pp.32-37.
3. Kalyan (2016), "Indian Informal Sector: An Analysis", International Journal of Managerial Studies and Research, 4 (1), Pp.78-85.
4. Subhasish Chatterjee (2018), "Labourers of Unorganised Sectors and their Problems", International Journal of Emerging Trends in Science and Technology, 3(7), Pp 4397-4399.
5. Madhy Balaji and Girija (2018) "A study on Labourers and their Problem in Unorganised Sector in India", International Journal of Current Advanced Research, 7(2), Pp.1-4.
6. Mann, J.S. (2010), Comprehensive Social Security Scheme for Workers, New Delhi, Deep & Deep Publication.
7. Paneer. S (2019), Health, Safety and Well Being of Workers in Informal Sector in India, Singapore: Springer.

AN EMPIRICAL ANALYSIS BETWEEN INSTITUTIONAL DELIVERY, MATERNAL MORTALITY AND SOCIAL SECURITY WITH REFERENCE TO INDIAN STATES³⁰

Dr. S. SANGEETHA³¹

Introduction

India has travelled from third world country to one of the biggest economies in the world. Its GDP has trekked from 2.7 lakhs crs to \$3.2trillion, per capita income from Rs.11,570 to Rs.1,47,000, food production from 54.92 million tonnes to 305.44 million tonnes, population from 340 million to 139 cores, literacy rate from 18% to 74%, FDI from 256 cores to \$81.72 billion, FOREX Reserve from 1029 cores to 46.17 lakh cores, tremendous achievements in health is notable. The pulse of health status of any country is determined by few indicators like IMR, MMR and Life Expectancy and indicators of IMR and MMR reveal the status of women and Life Expectancy shows the overall health status. The MMR in India was exceptionally high in 1990 with 556 per 100000 women dying during child birth. 1.38 lakh women were dying every year on account of complications related to pregnancy and child birth. The global MMR at the time of 1990 was much lower at 385. MMR in the country declined from 130 per lakh live births in 2014-16 to 122 in 2015-17, and further dropped by 9 points to 113 in 2016-18. By 2017-19, India's MMR was already down to 103, against a global MMR of 211 (2017). The GOI has successfully achieved the major milestone of bringing down its MMR to 97/ lakh live births in 2018-20, well in time. The Sustainable Development Goals (SDG) set by the United Nations in 2015 are to reduce the global MMR to less than 70/ lakh live births by 2030. India is steadily advancing on the track to achieve this goal ahead of time with its policies for women's health and wellbeing. The steps taken by the Central Government have facilitated to achieve outstanding progress by a number of states, eight of which have already achieved the SDG target. These include Kerala (19), Maharashtra (33), Telangana (43) Andhra Pradesh (45), Tamil Nadu (54), Jharkhand (56), Gujarat (57), and Karnataka (69).

In order to make vibrant improvement in basic health indicators the government supported the concept called "Institutional Delivery" and "Conditional Cash Transfer". Institutional delivery and Conditional Cash Transfer a form of social security are two important aspects of maternal and child health in India. Institutional delivery refers to the birth of a child taking place in a health facility, such as a hospital or clinic, with the assistance of trained medical professionals. In India, there has been a significant increase in institutional deliveries in recent years, due to government initiatives and programs aimed at promoting maternal and child health. On the other hand social security in India refers to the system of government-provided financial and social protection to its citizens. The government of India provides various social security benefits to women during pregnancy and childbirth, such as maternity leave and health insurance.

³⁰ Paper presented in the 42nd Annual Conference of Association of Economists of Tamil Nadu Organized by Post Graduate Department of Economics, Arulmigu Palaniandavar College of Arts and Culture, Palani, Dindigul District-624 601, Tamil Nadu on 25th February, 2023.

³¹

Programmes for Maternal and Child Health in India

These programs have been implemented by the government with the aim of reducing maternal and infant mortality, improving maternal and child health, and encouraging institutional deliveries. The financial support provided under these programs helps to cover the cost of delivery and other medical expenses and provides a much-needed financial support to families in need. The programs have also helped in increasing the coverage of institutional deliveries, especially among poor and marginalized communities.

The Government of India commissioned nationwide programmes, including the Child Survival and Safe Motherhood Program (1992–1997) that was followed by Phase-1 of the Reproductive and Child Health Programme (RCH-1) (1997–2004). These programmes aimed at increasing the availability of emergency obstetric care (EmOC) services by enhancing institutional capacities. Other Nationwide Programmes includes:

- Pradhan Mantri Matru Vandana Yojana (PMMVY): A cash transfer scheme aimed at reducing maternal and infant mortality by providing financial support to pregnant and lactating women for institutional deliveries.
- Janani Suraksha Yojana (JSY): This program promotes institutional deliveries among poor, socially and economically marginalized women by providing cash incentives to pregnant women who deliver in a health facility.
- Janani Shishu Suraksha Karyakram (JSSK): A program aimed at providing free and cashless services to pregnant women, including institutional deliveries, ante-natal and post-natal care, and other medical services.
- Rashtriya Bal Swasthya Karyakram (RBSK): A comprehensive health program for children from 0 to 18 years of age, which provides financial support for institutional deliveries and nutritional support for pregnant and lactating women.
- Indira Gandhi Matritva Sahyog Yojana (IGMSY): A scheme aimed at providing financial support to pregnant and lactating women to encourage institutional deliveries and improve maternal and child health.

Tamil Nadu government has several programs to promote institutional deliveries

- Janani Suraksha Yojana (JSY)
- Amma Kits for Pregnant Women
- Mobile Medical Units (MMUs)
- Janani Shishu Suraksha Karyakram (JSSK)
- Tamil Nadu Health System Project (TNHP)
- Nutrition and Health Education Program for Pregnant Women
- Tamil Nadu Health System Reform Program (TNHSP)
- Tamil Nadu Health Assurance Corporation (TNHAM)
- Free Medicine Scheme
- Free Diagnostic Services Scheme.
- Pradhan Mantri Matru Vandana Yojana (PMMVY)
- Janani Suraksha Yojana (JSY)
- Janani Shishu Suraksha Karyakram (JSSK)
- Pradhan Mantri Jan Arogya Yojana (PMJAY)
- Rashtriya Bal Swasthya Karyakram (RBSK)

- Mother and Child Tracking System (MCTS)
- LaQshya: Labour Room Quality Improvement Initiative

The Conditional Cash Transfer (CCT) is underpinned by two major assumptions: (1) Financial barriers exist to access institutional care for childbirth. The cash incentive will enable women to overcome these financial barriers to access institutional care for delivery, and (2) increasing institutional births will provide more women access to skilled birth attendance and, therefore, will reduce maternal and neonatal deaths. Thus, the CCT is envisaged to result in (a) increased institutional births and (b) reduced MMR and neonatal mortality in regions with high proportions of institutional births.

The objective of this study is to examine the impact to analyze the correlation matrix between Institutional delivery, MMR and IMR. In addition, this study investigates to analyze cross tabulation between high income states and low income states in terms of average out of pocket expenditure and percentage of delivery between public and private hospitals. To run the regression between MMR as a dependent variable and institutional delivery, female literacy rate, fertility rate, marriage age of women as an independent variables.

DATA AND METHODS

This research paper completely relied on secondary data, obtained from National Health Systems Resource Centre: Health Dossier 2021-Reflections on key Health Indicators Report. Data on States Per Capita Income were obtained from RBI publication. To bifurcate Indian states as high income and low income states, India's per capita income (Rs.1,47,210-2019-20) is taken as a bench mark. State's income above or equal to India's per capita income is termed as high income states and below is grouped as low income states. In this present paper, 15 states were recognized as high income state and 13 states as low income states. The data were tabulated and analyzed using SPSS package.

DATA ANALYSIS AND INTERPRETATION

Table 1 Correlations Matrix Table

	Institutional Delivery	Maternal Mortality Rate	Infant Mortality Rate
Institutional Delivery	-	-.420	-.017
Maternal Mortality Rate	-.420	-	.510*
Infant Mortality Rate	-.017	.510*	-

Source: Computed from Secondary Data

The above table explains the correlation matrix between institutional delivery, MMR and IMR. The correlation value between institutional delivery and MMR is (-0.42), which means moderate negative relationship between the variables. Similarly the relationship between institutional delivery and IMR is (-.017) which means low level of association between the variables. There exists significant positive relationship between IMR and MMR. In short improved institutional delivery improves the MMR and IMR. So institutional delivery could be improved through cash transfer as means of social security to pregnant women.

Table 2 Cross Tabulation: High and Low Income States with Cost of Delivery in Public and Private Hospitals

INDIAN STATES	Average out of pocket expenditure per delivery in Public Health Centres (PHCs)	Average out of pocket expenditure per delivery in Private Health Centres
Low Income States	Rs.3899.39	Rs.22500.5
High Income States	Rs.4151.73	Rs.21994.2

Source: Computed from Secondary Data

The table portrays the average out of pocket expenditure per delivery in both public and private health centers. In both high and low income states the cost of delivery is more or less same.

Table 3 Cross Tabulation: High and Low Income States with Percentage of Delivery in Public and Private Hospitals

INDIAN STATES	% of Delivery @Public Hospitals	% of Delivery @Public Hospitals
Low Income States	81.41	18.59
High Income States	58.63	41.37

Source: Computed from Secondary Data

The table comprehend and the percentage of delivery in both public and private hospitals in high and low income states. It is not surprised that low income states prefer public hospital for delivery but in high income states majority of 58.63 percent prefer to deliver their child in public hospitals. The reason could be in public hospitals wait for normal delivery whereas the immediate action in private hospitals is C-section and the incentives that is received for delivering in public hospital is very attractive.

Table No 4 Regression Co-Efficients

Regression Model	B	Standardized Coefficients Beta	t	Sig.
(Constant)	505.477	-	2.053	0.059
Institutional Delivery	-2.363	-.266	-1.236	0.056
Female Literacy Rate	-2.709	-.654	-3.214	0.006
Average marriage age	-.242	-.049	-.262	0.797
Fertility Rate	9.178	.059	.257	0.801
R	0.732			
R Square	0.536			

a. Dependent Variable: Maternal Mortality Rate

b. Independent Variables: Institutional Delivery, Female Literacy Rate, Average marriage age, Fertility Rate

The above table depicts the regression model summary between MMR as a dependent variable and Institutional Delivery, Female Literacy Rate, Average marriage age, Fertility Rate as an independent variables. Overall the model is good model since the correlation value $r = 0.73$, high positive relationship between the variables and co-efficient of determination $r^2 = 0.54$, which means 54% of the variation in dependent variable is explained by the

independent variables. Among the four independent variables the most significant variables are institutional delivery and female literacy rate which affect the dependent variable MMR.

The share of India's institutional deliveries increased to 88.6% in 2019-2021 (National Family Health Survey 5 (NFHS-5) from 40.8% in 2005-06 (NFHS 3). The nine targeted states Bihar, Uttar Pradesh, Uttarakhand, Madhya Pradesh, Rajasthan, Jharkhand, Odisha, Chhattisgarh and Assam recorded a similar uptick during the period, ranging from 50-64% points. Madhya Pradesh led the way with a 64.5% point growth. These states account for nearly half of India's population, over 60% of maternal deaths, 70% of infant deaths and 12% of global maternal deaths. So the government should take all measures to improve the institutional delivery and female literacy rate in India.

CONCLUSION

India has made significant strides in improving maternal and child health over the years, including increasing institutional delivery rates and implementing cash transfer schemes for delivery. However, there are still challenges that need to be addressed. Institutional delivery rates have increased in India, with the percentage of deliveries in healthcare facilities rising from 40% in 2005 to 78% in 2016. This is due to various efforts by the government, such as the Janani Suraksha Yojana (JSY), which provides cash incentives to women who deliver in a healthcare facility. However, there are still disparities in institutional delivery rates across different states and socioeconomic groups. For example, some states in northern India have lower institutional delivery rates compared to southern states. Additionally, women from lower socioeconomic backgrounds and rural areas are less likely to deliver in a healthcare facility.

FOOD SECURITY IN INDIA³²

Dr. U. SELVAKUMARI³³

Introduction

Food Security has implications for health, agriculture, trade and the environment and has made the process of measuring food security very challenging. In 2008, the Food and Agriculture Organization of the United Nations (FAO) estimated that there were 850 million hungry people (820 million of them live in developing countries). Food security is a complex sustainable development issue linked to health through malnutrition but also to sustainable economic development, environment and trade.

Foodgrains production is the base for food security. This number in 2022 has been 783 million. Food security is a situation that exists when all people, at all times, have physical, social and economic access to sufficient safe and nutrition food that meets their dietary needs and food preferences for an active and healthy life (FAO 2003). In India foodgrains are the staple diet for most of the people.

India is the second largest country in the world in the manner of population. It is most important considerable plus point of the India, because it involve large human capital. Even we all Indian are thinking that, we will become super power in the world. But when we look at the basic problems of the Indian people, we know that – the Indian people are struggling with the bread and butter due to the continuously increasing prices of food grains, vegetables, pulses and other cereals. People with low incomes are less likely than those with higher incomes to get the nutrients they need for good health and less likely to enjoy diets. Food price increases and food scarcity causes social and political instability, and can escalate to humanitarian crises; women and children are particularly likely to be affected by threats to food security.

Women and Household Food Security

The income-earning activities promoted by projects can serve as useful vehicles for the diversification of the livelihood structure of households especially women. Poor women are already hard pressed for time; any further demand on their time will oblige them either to spend less time on domestic chores, including food preparation and child-care activities, or to subject themselves to extreme drudgery, with potentially deleterious effects on their health. Women engage in productive activities, men may decide to withdraw their labour and enjoy more leisure. The impact on household income may be nil, and yet food security may improve if, by becoming the major breadwinner, women come to acquire greater control over the disposal of income.

³² Paper presented in the 42nd Annual Conference of Association of Economists of Tamil Nadu Organized by Post Graduate Department of Economics, Arulmigu Palaniandavar College of Arts and Culture, Palani, Dindigul District-624 601, Tamil Nadu on 25th February, 2023.

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Health Effects

Food insecurity can affect health in a variety of ways. For example, an individual whose diet is lacking can experience malnutrition. Medication adherence may not be a high priority for patients who must focus their resources on obtaining access to an adequate food supply. Food can affect the development and prevention of medical condition and diseases. These effects can be especially profound in children. When children live in food-insecure households, their health status may be impaired, making them less able to resist illness and more likely to become hospitalized, also poverty and its associated poor nutrition can increase risks of stunting, inadequate cognitive stimulation, iodine deficiency, and iron deficiency anemia.

Food Security and Women's Health

Food security is increasingly affected by global economic and environmental phenomena. Food price increases and food scarcity cause social and political instability, and can escalate to humanitarian crises. The prevalence of household food security, has been measured periodically in the United States and occasionally in high-risk groups or specific regions.

Health Problems of Children and Youth

Children and youth who experience hunger appear more likely to have health problems, and repeated episodes of hunger may be particularly toxic. Food insecurity-a lack of adequate access to food for financial reasons. Child hunger is an extreme manifestation of food insecurity, defined as a period of time when children experience being hungry because their family has run out of food or the money to buy food. "The mechanism by which childhood hunger negatively affects health is not well understood. Food insecurity has been associated with emotional and psychological stress among children, which could exert a negative effect on general health and contribute to heightened risk of chronic diseases," the authors write. "While abnormal body weight may also negatively influence health and increase vulnerability to a range of chronic conditions, the existing research has not confirmed an association between food insecurity and body weight among children."

In future, Global food production must increase by 50% to meet the projected demand of the world's population by 2050. Meeting this difficult challenge will be made even harder if climate change melts portion of the Himalayan glaciers to affect 25% of world cereal production in Asia by influencing water availability. Pest and disease management has played its role in doubling food production in the last 40 years, but pathogens still claim 10-16% of the global harvest, the effect of climate change on the many complex biological interactions affecting pests and pathogen impacts and how they might be manipulated to mitigate these effects.

Conclusion

Food security problem in India is not serious if the nation succeeds in the proper distribution policy. The government has to control and regulate food market in India. This problem becomes serious due to the unfair trade practices by private traders during drought situation. The problem of hunger is due to poor accessibility which is result of poor implementation of policy measures.

A STUDY ON THE PATTERN OF WORKING HOURS AND WAGES OF AGRICULTURAL LABOURERS IN TIRUPPUR DISTRICT³⁴

Dr. K. BABU³⁵ & S. MEYYAPPAN KUMARAN³⁶

Introduction

Agriculture wage provisions are determined by the Ministry of labour and Employment in terms of minimum requirement of living standard and structural allocation of informal sector wage. In India, most labourers and their families work on farms, and they depend on agricultural wages for their livelihood. The percentage of labourers employed in wage-related activities rose from 45.6% in 2001 to 54.9% in 2011 (GoI 2016). The green revolution in the mid-1960s boosted agricultural growth, and studies on the trends in agricultural wages assumed significance. Structural change in employment has been slow, particularly in agriculture, and agriculture's share in income has declined faster than employment has transitioned. This shift requires us to focus on the trends in agricultural wages because most agricultural labourers in rural India depend on farm work and agricultural wages for their livelihoods they are poor and have few assets and employment opportunities (Sant Kumar 2020). Practically, the demand base of agriculture work and push factor on economic instability of agricultural labours and productivity and income level of farmers were adopted for these wage determinants. The interstate migration level has been determined for the differentiation of wage practices in the agricultural sector. In practically, the southern zone agricultural labours are shifted to Trippur, Coimbatore zone.

Review of Literature

Chavan and Bedamatta (2006) have analyzed that the long-term trends of the real agricultural wages of male and female labourers based on secondary data from agricultural wages of India and Rural Labor Enquiry across 17 major states in India during the period between 1964-65 and 1999-2000. By deflating the money wage series into real wage series using both the retail price index of cereals and the Consumer Price Index of Agricultural Laborer, their study has found that the real wages of male laborers have been increasing at a much faster rate than that of the female labourers.

Jose (2013) Stated that the Inter-state comparison of agricultural wages between male and female laborers at an aggregate level is not easily amenable during a specific time frame as the states are experiencing various agro-climatic conditions and crop cultural practices. It is better to understand some of the explanatory factors subject to the wage variation at a state level which can explain the observed gender wage inequality in agriculture.

Sant Kumar (2020) analysed wage data for the major states of India for the period from 1995-96 to 2016-17, this study examined the trends in real agricultural wages, and it

³⁴ Paper presented in the 42nd Annual Conference of Association of Economists of Tamil Nadu Organized by Post Graduate Department of Economics, Arulmigu Palaniandavar College of Arts and Culture, Palani, Dindigul District-624 601, Tamil Nadu on 25th February, 2023.

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found that the pattern of increase in wages (nominal, real, by operations and gender) was broadly similar in the study states and periods, with varying degrees. At the country level, wages increased steadily during all the three periods (1998-99, 2008-09, and 2016-17). Nominal wages increased similarly at the country level and in the study states, with varying degrees. In all the periods, the real increase in wages was high in Haryana, Jammu & Kashmir, and Kerala; moderate in Himachal Pradesh, Punjab, and Rajasthan; and minimal in the remaining states. Wages for sowing and harvesting increased similarly.

Statement of the Problem

The common parlance of agricultural wage is the availability of work from farming on and seasonal basis. However, the structural formation was bound by the Ministry of Labour and Employment in 2018, Rs.360 is the average daily wage for Agriculture. At the same time, geographically, this system differs from the nature of cultivation and demand-driven approach. In particular, in Tiruppur district, cultivators provided the daily wage on agriculture for Men 600 and women Rs.400. Their (worker's) productivity is not that much expected of cultivators. But the nearest district worker's output is somewhat extended for average working hours and deliverance of output. Most of the time, they are compared with industrial sector works and wages. This is much of an inferior complex which will lead to an increase the wage on agriculture informally. What are the factors involved in Tiruppur District Agricultural wage and output by the labourers? How for it affect cultivation and futuristic approach to cultivation if migrant workers will occupy for agriculture work? Hence, this paper makes an attempt to find out the solution for this issue in Tiruppur District.

Objectives

1. To study the socio-economic background of the agricultural labor in the study area.
2. To examine the status of wage provision in the study area.

Methodology

This study is basically an empirical one. A sample of 70 agricultural labourers was identified from rural areas around Tiruppur. Their category is both local and migrant workers who belong to industry but in peak season they are going to engage in agriculture work. Chi-Square test and regression analysis were used for analyzing the collected data.

Results and Discussion

The working hours varied between those work on contract basis and who work for daily wages. Most of the women agricultural labourers reported that their working hours were between 8 am and 3 pm. Among the contract workers the pattern varied widely as some preferred four hours of work: some up to seven hours and a few worked for six hours per day.

The major farm works reported were plucking of vegetables, weeding, harvesting and farm maintenance.

The sample included a few labourers from other states also. They mainly come to Tiruppur to work in garment units and at the same time during lock-down they were found employed in agricultural lands.

A STUDY ON SOCIAL SECURITY PROVISIONS OF WEIGHT LOAD LABOUR IN ERODE DISTRICT³⁷

Dr. K. BABU³⁸ & S. VINOTH KUMAR³⁹

Introduction

The social security provisions and measuring the productivity among Informal sector labourers in India is a challenging task. In particular, after Second Labour Commission, there was no social security provisions were made by labour and employment. There are many kinds of informal workers who have been engaging formation of wages in accordance with their deliverance of output. At the same time several works are done under hazardous conditions. But, that much of rigidity cannot be ignored by the unorganised sector works. In this concern, the weight load workers in the bazaar side, or vendor marketing, hotels, and industries are depends with the logistic work required for their service. The approach of weight load workers in all urban areas have identified that hectic position of workers environment.

Review of Literature

Basole et al., (2018) described that the disconnect between growth and employment and the rise in formalisation has accompanied a shift towards service-led growth. The services sector contributed 63% of GDP over the last decade, but a significantly smaller share in employment at about 33%. Though some niche areas have grown; such as, the IT and Business Process Outsourcing (BPO) sectors, retail and financial services, about 55% of service-sector employment in India is still made up of petty trade, domestic services and other types of small-scale and informal employment, and more recently forgig activities by professionals, while the social sector services (education, health and public administration) account for 23% of employment.

Maiti et al., (2006) studied the effect of lifting variables and their interactions on heart rate and concluded that the interaction effects between lifting variables must be considered in addition to the effects of individual lifting variables. The maximum acceptable weights (MAW) lift has a significant effect due to the high lifting frequency (20 lifts/min). For several decades the elimination or at least a reduction in the risk of injury due to lifting tasks had been a burning issue in the areas of informal sector work.

Statement of the problem

Even after the Second Labour Commission recommendations on, the collective bargaining power of unorganised labourers has not been improved in India. The social security provisions are insufficient for manual load lifters in urban areas and their work environment is also a hectic position in workplace. The amenities, and welfare are not implemented at much satisfied

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level. The employers of industries which provide to them loading works are not properly treated as a socialistic approach. Hence, How the social security going to fulfil their work environment? How for it become betterment of decent work among the informal sector? What are the influencing factors which will be involved among manual load lifters? This paper makes an attempt to find out a clear solution for social security provisions to the weight load workers in the study area.

Objectives

1. To study the socio-economic background of the Manual load lifters.
2. To assess the social security provisions of Manual load lifters.
3. To analyze the issues faced by the Manual load lifters in the study area.

Scope of the study

Social security provisions are very much needed for weight-loaded workers in order to improve their work environment. This can be covered in the part of a decent way of work in the unorganised sector.

Methodology

By adopting convenient sampling method 87 labourers who worked as weight lifters in Erode city were selected. The collected primary data were analyzed by using statistical tools.

Results and Discussion

Physical fitness is the most preferable and essential one for doing weight lifting. In the sample workers most of them (66%) were found in the age group of 20-30 years; some of them (15%) between 30-40 years and the remaining in the 40-50 years age category.

Their experience in this work varied between 3 years and 26 years.

Because of this, the amenities utilised and lengthy working hours are mismatched with their working environment the place where full of congested and against the proper living pattern of life. A conducive atmosphere of work is not possible in terms of work orders and operational activities are shifting basis work from the employers or orders from the industrial premises. The factors leading from educational background, and Resident area are directly associated with the expenses of their family.

Conclusion

The hazardous works should be streamlined and made clear for the provision of certain compensation. But weight load workers' social security norms have not yet been streamlined as per the livelihood promotion, decent work approach and provision of proper amenities. The overall provision and welfare to the unorganized sector have benefited many but the welfare measures and work environment of weight load workers are neglected by the employers and social structure is also not conducive. Therefore, the Ministry of Labour and Employment should focus on the weight loader's welfare and provision of amenities in order to rejuvenate their work environment and treat it as "Decent work" from the informal sector in future.

SOCIAL SECURITY FOR INFORMALWORKERS IN THE UNORGANISED SECTOR IN INDIA⁴⁰

Dr. K. RAJA⁴¹

The Indian labour market has been, and continues to be, predominantly informal. In the year 2018-19, the nature of employment for around 90 per cent workers in India's labour market was informal. These workers are either inadequately covered or not at all covered under the existing labour legislations, social protection schemes, and other employment benefits. Due to lack of governmental oversight, a large proportion of these workers work in exploitative and precarious conditions. According to the International Trade Union Confederation, India is amongst the 10 worst countries in the world in terms of worker rights in 2020 (ITUC, 2020). The first Sustainable Development Goal (SDG) seeks to end poverty, and among its targets is the formulation of national social protection floors, and implementation of comprehensive social welfare programmes. While providing a comprehensive social protection net is crucial in developing countries, it is also more challenging and costly than that for developed countries. The National Commission for Enterprises in Unorganised Sector (NCEUS) was commissioned by Government of India (GoI) in 2004 to take an in-depth look at the issues that enterprises in the informal sector faced and suggest a way forward. In its report, it asserted that providing social security should not be seen as a burden to the economy, and instead, is an important bedrock for a developing country to build from (NCEUS, 2007). In the context of widespread chronic poverty and unrelenting wealth inequality, social security can offer resilience against socio-economic shocks, such as the one we are faced with today because of the Coronavirus (COVID-19) pandemic (Pimentel, Aymar & Lawson, 2018). Research has also shown that a comprehensive social security net in developing economies can enhance labour-market efficiency and stimulate socio-political and economic growth (Justino, 2003). GoI has introduced several policy initiatives on labour and welfare to extend social security benefits to informal workers in the country. Despite that, their reach remains limited. In this brief, we analyse the social security provisions that are available to informal workers at present, specifically in the unorganised sector, and identify gaps and challenges in extending comprehensive social protection to these workers.

DEFINING SOCIAL SECURITY

The concept of social security has evolved over time. One of its earliest mentions was in the Beveridge Committee Report in 1942, where it was described as "freedom of want," and its provisions were limited to maintenance of employment, children's allowances, and comprehensive health services (Majumdar & Borbora, 2013). Subsequently, in 1952, the International Labour Organisation (ILO) proposed a more nuanced understanding of social security- as protective measures against social and economic distress. These included protective

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measures against abrupt reduction or stoppage in income resulting from sickness, maternity, employment injury, unemployment, disability, old-age death, and provision for medical care (ILO, 1952). ILO's approach to social security was criticised for being limited to the experience of developed countries (Sarkar, 2004). Developing countries, generally speaking, had (and continue to have) a much larger informal sector, higher levels of poverty, low levels of industrialisation, among other constraints. They require a wider conception of social security. Jean Drèze and Amartya Sen argue that, in developing countries, social security should be seen more broadly as pro-poor measures implemented through public means (Sen & Drèze, 1989). Thus, in developing countries like India, social security is best understood as pro-poor measures that can be: a) promotional, aiming to augment income, such as through the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA); b) preventive, aiming to forestall economic distress, such as through Provident Funds (PF); and c) protective, aiming to ensure relief from certain external shocks, such as remuneration provided through insurance schemes in the case of injury or death of a primary breadwinner (Sarkar, 2004).

Despite the large size of India's informal sector, in practice, most social security provisions remain limited to formal employment. Before we explore the state of social security in the informal sector and associated challenges, we first clarify what is meant by 'informality'. We then take a brief look at key informal labour market statistics in India, to better understand its scope and significance.

Informality in Indian Labour Market

India's total workforce can be disaggregated according to two dimensions: (a) sector of work, based on the type of enterprise or production unit where the person is employed; and (b) type of employment, defined in terms of employment status and other job-related characteristics. Sector of work can further be sub-divided into three categories: the formal (or organised) sector; informal (or unorganised) sector; and the household sector. Similarly, the type of employment can be categorised as formal and informal.

Total workforce in India across types of employment and sectors of work, during the period from June 2018 to July 2019, based on PLFS. Of the total workforce in India, majority (80 per cent) was engaged in the informal sector, followed by 20 per cent in the formal sector, and a small proportion (1 per cent) in the household sector. The household sector refers to households producing goods exclusively for their own, final use, and households employing paid domestic workers. Considering all three sectors, as high as 90.3 per cent of the total workforce was engaged in informal employment in 2018-19. Moreover, 9.5 per cent of workers had informal nature of jobs even though they were employed in the formal sector.

In order to understand the status of social security provision to workers by employers, let us focus on a subset of workers who are either regular-salaried earners or casual labourers in the non-agriculture sector and Agricultural Sector Excluding Growing of Crops (AGECE). This is because PLFS collects information on access to social security for this set of workers only, and excludes the self-employed, since they cannot be attached to any particular employer. To understand the change over time, we compare the scenario in 2018-19 with that in 2011-12. Three types of benefits in the workplace: availability of any social security; eligibility for paid leave; and having a written job contract. In 2018-19, a majority of these workers did not have any kind of social protection from their employers. While only 19 per

cent had a written job contract, around 29 per cent workers were eligible for paid leave. In terms of social security provisions, only one-fourth (26 per cent) were eligible for one or a combination of social security benefits among Provident Fund (PF), pension, gratuity, healthcare benefits and maternity benefits. While 35 per cent workers in urban India, were eligible for such benefits, the share in rural areas was only 17 per cent.

Between 2011-12 and 2018-19, there has been only slight improvement in access to social security benefits by informal workers from 23 per cent to 26 per cent. Similarly, there has been negligible change in the share of workers eligible for paid leave or having a written job contract. In fact, in urban areas, there was a decline of 4 percentage points in the proportion of workers having a written job contract between 2011-12 and 2018-19. This indicates that the labour market policies haven't been implemented with a focus on transitioning towards ensuring formal employer-employee relationships over these seven years.

If we consider only the regular salaried workers, around half of them (53 per cent) did not receive any social security benefits from the employer in 2018-19. This indicates high prevalence of informal jobs even among those who have regular salaried jobs. Thus, the condition of casual labourers and self-employed own-account workers is extremely vulnerable in terms of access to social security.

At the national level, a considerable share of the informal workers in 2018-19 was self-employed (58 per cent), followed by one-fourth (26 per cent) being casual labourers, and 16 per cent regular salaried earners. Those who are self-employed can be subdivided into own-account workers, employers, and unpaid family workers. Majority of the self-employed were own-account workers in household enterprises (41 per cent of total). Again, 15 per cent of the total informal workers contributed to family-based enterprises without getting formally paid (refer **Figure 1**). If we consider urban areas only, almost half of the informal workers were self-employed, followed by 35 per cent being regular salaried workers.

LABOUR LAWS IN INDIA

The GoI has initiated major labour law reforms in the country in recent years. Following the recommendation of the 2nd National Commission of Labour, the Ministry of Labour and Employment (MoL&E) had begun categorising all existing labour laws into four 'Labour Codes'. The four Labour Codes are: (a) The Code on Wages, 2019; (b) The Occupational Safety, Health and Working Conditions Code, 2020; (c) The Code on Social Security, 2020; and (d) The Industrial Relations Code, 2020. In this section, we briefly discuss these labour market legislations, with a focus on informal workers in the Code on Social Security.

CODE ON WAGES

The Code on Wages was passed by the Parliament and received the President's nod in August 2019 (MoL&E, "Code on Wages" 2019). It consolidates the following legislations concerning wages:

- Minimum Wage Act, 1948;
- Payment of Wages Act, 1936;
- Payment of Bonus Act, 1965;
- Equal Remuneration Act, 1976

The Industrial Relations Code, 2020

The Industrial Relations Code was passed by the Parliament in September 2020. It consolidates the following labour laws:

- Industrial Disputes Act, 1947
- Trade Unions Act, 1926
- Industrial Employment (Standing Orders) Act, 1946

The Occupational Safety, Health and Working Conditions Code, 2020

This Code was passed by the Parliament in September 2020. It subsumes 13 legislations related to health and safety of workers in the workplace.

The Code on Social Security, 2020

The Code on Social Security was passed by the Parliament in September 2020. Under this Code, social security is defined as "*... the measures of protection afforded to employees, unorganised workers, gig workers and platform workers to ensure access to health care and to provide income security, particularly in cases of old age, unemployment, sickness, invalidity, work injury, maternity or loss of a breadwinner by means of rights conferred on them and schemes framed, under this Code.*"

UNION GOVERNMENT SCHEMES FOR SOCIAL SECURITY OF INFORMAL WORKERS

The Union government's welfare schemes can be broadly divided into two types: Central Sector (CS) schemes that are fully funded by GoI and Centrally Sponsored Schemes (CSSs), for which the finances are contributed by both GoI and state governments. First, all schemes that come under the purview of the erstwhile UWSSA, which has now been subsumed under the Code on Social Security, are considered. This is because these schemes are specifically targeted towards the informal workers in the unorganised sector, and are presently operational. Second, schemes that can provide social protection to informal workers, and not under the UWSSA, are considered. Third, schemes that are designed for economically disadvantaged families in general, to provide them protection against socio-economic distress have been considered, as these are applicable to informal workers as well. While some of these schemes provide long-term social security, others try to protect the informal workers from sudden financial distress.

CHALLENGES IN ACCESS TO SOCIAL SECURITY FOR INFORMAL WORKERS

While the COVID-19 pandemic threw up unprecedented policy challenges, it also exposed the gaps in India's social security policies, specifically towards informal workers. In this section, we explore some of the key gaps and challenges. The first subsection explores gaps in the specific provisions related to social security of informal workers in the revised regulations under the Code on Social Security. The second subsection looks at some general issues linked with social security coverage for informal workers. While there are specific challenges related to design and implementation of individual schemes, this brief focuses on some of the broader challenges that may be applicable across schemes. The last subsection explores some of the other challenges posed by the COVID-19 pandemic.

G. WAY FORWARD

The humanitarian case for a robust social security system for informal workers has never been clearer. However, our current model has not been able to provide a much-needed safety net for the most vulnerable. The recent revision of existing legislations into a comprehensive Code on Social Security, and the learnings from the pandemic, provide us with an opportunity to address some of these longstanding issues. A key drawback of the social security framework for unorganised sector workers, has been the stagnated and varied implementation of the laws. Looking ahead, certain key areas of interventions are outlined below. 1. Ensuring a minimum social security net for all workers irrespective of wage, enterprise size, and place of origin 2. Need for a robust monitoring and enforcement mechanism to ensure compliance to labour legislations 3. Creating a common database of informal workers instead of the current scheme-specific ones 4. Streamlining registration process of informal workers and creating awareness about entitlements 5. Moving beyond direct employer-employee relationships.

Conclusion

Such interventions will be important in addressing the limited reach and scope of social protection for informal workers in India at present. It is imperative to recognise that the challenge is a multi-faceted one, and cannot be dealt with a singular solution. What works for a certain region or a category of workers, might not necessarily work for another. It is vital to have a clearly spelt national policy for informal workers, including a national social protection floor.

A STUDY ON EMPLOYMENT STATUS OF UNORGANIZED SECTOR IN INDIA⁴²

ANGEL D.⁴³

Introduction

Nowadays in India the unorganized labour carrying vital role in the economy and availing the daily odd jobs for the domestic work. The unorganized sector worker is an indispensable part of the domestic, and it is hard to carry out everyday trial without them. In India more than 94 percent labour some are getting the livelihood from the unorganised sector. But the fact is informal and self-employed workers are behind the regular salary class people. Independent business which comes under unorganised sector are a huge base step into the retail and wholesale business.

The term unorganised sector when used in the Indian context is defined by National Commission for Enterprises in the Unorganised Sector as consisting of all unincorporated private enterprises owned by individuals or households engaged in the sale or production of goods and services operated on a proprietary or partnership basis and with less than ten total workers or the firms whose activities are not governed by any legal provision or any collective agreements between workers and employers. This includes home-based jobs, self-employment, agricultural work, construction work and a lot of other temporary occupations. The unorganised sector does not give any benefit to the workers in terms of various laws like Minimum Wages Act, Factories Act, etc. The workers have to forego the benefits such as provident fund, gratuity, maternity welfare, etc. The term 'informal' is often used in the place of 'unorganised'. While it is understood that unorganised industries will employ informal or unorganised labour, organized sectors can also engage informal labour.

According to **First National Commission on Labour** 'unorganized labour is those who have not been able to organize themselves in pursuit of common objectives on account of constraints like casual nature of employment, ignorance and illiteracy, small and scattered size of establishments and position of power enjoyed by employers because of the nature of industry. To this, poverty, indebtedness, working for below minimum wages, lack of bargaining power, using indigenous technology, compelled migration etc may also be added in Government of India, Report of National Commission on Labour, 1969.

The term labour denotes any physical or mental work done with the object of obtaining consideration is labour. Playing a game is also physical as well as mental work, but it is for the enjoyment, so it cannot come within the purview of labour.

According to Marshall, "any exertion of mind or body under gone to partly or wholly with a view to some good other than the pleasure derived directly from the work is called labour". It includes not only labour that results in the permanent form, but also that

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renders services which perish in the act. Here labour word is used for the worker who is engaged in any production process. This paper is brief introduction of problems and challenges faced by unorganized worker and comparison of them with organized workers.

According to ILO 2015 estimates 67 million people are employed as domestic workers globally. This number is increasing day by day. As per the estimate of ILO in 2010, 52.6 million people doing this work. The domestic workers are uncounted labour force and their number will be very high. The number of domestic workers in India range from official estimates of 4.2 million to unofficial estimates of more than 50 million. Girls and women make up the significant majority of domestic workers. In the decade of post liberalisation Indian homes have witnessed a 120% increase in domestic workers. While the figure was 7.4 lakhs in 1991, it has increased to 16.6 lakhs in 2001 and 39 lakhs in 2011. In which 26 lakhs are female domestic workers. To estimate accurately the numbers of domestic workers are very difficult.

Government Initiatives and Measures for Unorganised Workers

There are number of legal support as well as government schemes initiated to improve the welfare of the unorganised sector and labour. There are provided below.

Legislative and Policy Framework of the Unorganized Labour

The contemporary legal situation of labour legal guidelines addressing the unorganized labour in India were given, at the mean time welfare regulations at the countrywide and state level pertaining to them. The major initiative taken by the government is the unorganized workers social security act, 2008, in which the introduction of social protection board at the country wide and state level has been mandated. It only contains social protection and security schemes in the nation; no legal obligation is binding at the part of government or the one who employs no eligibility standards; no benefit details; minimum wages and many others, were envisaged inside the act. Essentially, the act (2008) is eyewash which has neither addressed troubles nor given answer. The social security has been the main concerns for the labour sector (formal) which has been addressed with the aid of the government with following legislation

- Payment of gratuity Act 1971
- Workmen compensation Act 1923
- Maternity benefit Act 1971
- Employees state insurance Act 1948
- Employees provident fund and the miscellaneous provisions act 1952.

Research Gap

Unorganised sector plays a vital role in livelihood for many under privileged groups in our society. In pervious study focus on the work financial situation, features, pattern and working condition by the unorganised sector. The present study focuses on how the status and trends of employment in unorganised sector in formal and informal sector and also highlighted the literature review study on the problems faced by them and throw light on the informal sector has no written job contract in different employment statuses.

Statement of the Problem

In India more than 94 percent laboursome are getting the livelihood from the unorganised sector. As much labours are dependent on the unorganised sector and the employees are scattered and migrant in urban areas, and in rural areas, the unorganized labour force is highly stratified on caste and community considerations. Even through share in the GDP by unorganised sector are tremendously increasing, but still workers are struggling to meet out their basic needs and avail basic facility. To curb the problem government has introduced numerous scheme and policies. The study attempted to find out the growth and employment status of informal sector and point out the problems and the ways to improve the self-employed companies and workers.

Objective

- To analysis the employment status of unorganised sector in India.

Methodology

This study was undertaken with the primary objective of studying the trends, problems and prospects of labourers in unorganized sector. This research is based on secondary sources of data. Which will be collected through the journal, books, research papers and reports published by ILO, NSSO, CSO and various report of government of India.

Analysis

They effectively constitute 90% of the workforce and about 50% of the national product. As per Government of India statistics, the unorganised sector contributes almost 50% of the total GDP. The Economic Survey of 2018-19, released on 4 July 2019, said almost 93% of the total workforce is “informal”.

Predominance of informal employment has been one of the central features of the labour market scenario in India. While the sector contributes around half of the GDP of the country, its dominance in the employment front is such that more than 90% of the total workforce has been engaged in the informal economy. As per the latest estimation of a Sub-committee of the National Commission for Enterprises in the Unorganized Sector (NCEUS), the contribution of unorganized sector to GDP is about 50% (NCEUS 2008).

For instance, by providing a comparison of the NSSO Employment Data for 55th and 61st Rounds (for 1999-2000 and 2004-05 respectively) the NCEUS (2007) explains that the country is currently in a state of “informalisation of the formal sector”, where the entire increase in the employment in the organized sector over this period has been informal in nature. It is widely acknowledged that the informal sector in India suffers from a low productivity syndrome, compared to the formal sector. The prominent features of the sector are lower real wages and poor working / living conditions.

Table - 1 Formal – Informal Employment across organized and unorganized Sector (In Crores)

Type of Employment	Organized	Unorganized	Total
2017-18			
Formal	4.43	0.28	4.70
Informal	4.62	37.79	42.43
Total	9.05	38.07	47.13
2018-19			
Formal	4.91	0.45	5.35
Informal	4.55	38.87	43.43
Total	9.46	39.32	48.78
2019-20			
Formal	5.09	0.80	5.89
Informal	4.46	43.19	47.64
Total	9.55	43.99	53.53

Source: Economic Survey 2020-2021

Table-1 represents the formal-informal employment across organised and unorganised sector. The table shows that, informal employment in unorganised sector keeps on growing which mentioned in all years from 2017-2018 to 2019-2020.

In 2017 informal employment in unorganised sector was 38.07 Cr and it's increased to 43.99 Cr in 2020 due to growing population and major issue is that government is not in a position to provide employment to all. The table gives a sense of the formalisation of the workforce over the period 2017-18 to 2019-20. In terms of employment share of the unorganised sector employs 43.99cr of the work force and 9.55cr in the organised sector. There are 92.4% informal workers (with no written contract, paid leave and other benefits) in the economy. There are also 9.55cr informal workers in the organised sectors indicating the level of outsourcing. These are possibly the contract workers. In 2017-18 the share of unorganised sector employment has increased by 3.6 percentage points while on the other hand the share of formal employment has increased by 0.9 percentage. There has been an increase in share of formal employment in 2017-2018. As India is a developing country, graduates and skilled labour are keeps on increasing to provide the employment government should invest on large scale industries and to encourage them to introduce the innovation, startups most importantly seed capital loan facility with low interest and liberalizing the rules will provoke them to start their business. Government expenditure on unorganised sector should be increased. Informal worker as defined as a worker with no written contract, paid leave, health benefits or social security, to make them strong separate policy have to be framed and bring them into the one umbrella.

Table-2 Industry wise Employment in India (in Crores) -2019-2020

Year / Sector	Rural			Urban			Total		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Agriculture	14.01	8.18	22.28	0.67	0.32	0.99	14.77	8.51	23.27
Mining & Quarrying	0.08	0.00	0.08	0.07	0.00	0.07	0.14	0.01	0.15
Manufacturing	1.86	0.79	2.65	2.70	0.88	3.59	4.56	1.67	6.24
Electricity, Water, etc	0.13	0.01	0.14	0.19	0.02	0.21	0.31	0.03	0.35
Construction	3.82	0.61	4.42	1.60	0.19	1.79	5.42	0.80	6.22
Trade, Hotel & Restaurant	2.34	0.40	2.74	3.85	0.88	4.73	6.19	1.28	7.47
Transport, Storage & Communication	1.37	0.02	1.04	1.61	0.14	1.75	2.99	0.16	3.15
Other Services	1.78	0.79	2.57	2.64	1.50	4.13	4.42	2.29	6.71
Total							38.80	14.75	53.55

Source: Economic Survey 2020-2021

Industry wise employment in India is given in the table 2. The table shows that, in 2019-2020 more than 71% were in the agriculture sector. Among the new workers in the agriculture sector, female accounts for about 65%. Trade, hotel and restaurant sector accounted for a little over 22% of the new workers, in line with previous year's trend where the sector represented more than 28 %of the new workers added in 2018-2019 to about 2.41 percent of new workers added in 2019-20 and so has that of construction from 26.26 percent to 7.36 percent. Overall workers in transport, storage and communication were 5.8 percent in total workers. As overwhelming of construction sector workers was about 11.61 percent and other sector jointly growing in the whole sector in unorganised sector.

Labour's Problems in unorganised sector

Review of literature is an important part of any ⁴⁴empirical research which highlights on the works that are already been conducted by various researchers in the same field. The reviews from various study have helped the researcher to identify the specific segment problem of the unorganised sector. The researcher has analysed more than 60 reviews to identify the core problem of unorganised labour.

⁴⁴ https://www.researchgate.net/publication/321348657_Review_of_Literature_on_Working_and_living_Conditions_of_workers_in_organized_and_unorganized_sector

S. No.	Author	Problems	Study Area	Nature of Labour
1.	Prof. (Dr.) Subhasish Chatterjee (2016)	- Lack of quality employment - Women and child workers are vulnerable - Not aware of any knowledge about work hazardous and occupational safety	India	Unorganised Labour
2.	Madhu Balaaji S and Girija Anil, ML (2018)	- Insufficient labour laws - No social security - Guaranteed minimum wages - Bonded labour - Low literacy - Low incomes	India	Unorganised Labour
3.	Dr. S. Mookiah and Mr. S. Kumar (2018)	- Excess working hours - Seasonal employment - Indebtedness - Lower Social Status & Shortage of other Jobs - Not united - Unemployment due to mechanization	Tamil Nadu	Unorganised workers
4.	Mr. M. Mahadevan and Dr. M. Manivannan (2017)	- Unhygienic workplace - Level of noise at workplace	Madurai	Unorganised Construction workers
5.	Dr.M.Jensirani, Dr.A.Muthumani, Dr.K.Kaleeswari, Mr.K.Boopathiraj, Dr.G.Ramesh Pandi (2021)	- Underemployment - Transportation problem - Lack of Education - Lack of Safety - Family Issues	Virudhunagar District	Unorganized Sector Workers
6.	Mrs. Varsha Goyal (2021)	- No social security - Lack of legislative protection - No Compensation programs - Insecurity of job - Harassment Issues	India	Unorganized sector: a comparative study with organized workers
7.	Mr. P. Sathya	Bullying	India	Unorganised

S. No.	Author	Problems	Study Area	Nature of Labour
	(2016)	• Problem of Workforce • Lack of Skill • Non-amendment of Labour Laws • Unfair competition • Fraudulent contract		Labours
8.	Dr. B. E. George Dimitrov, S. Gandhimathi and K. Siva (2017)	• Health problems • Sexual harassment • Family issues • Debt	India	Women labours in unorganised sectors

Minimum Wage Act in most of the time applies for labours working under the purview of organized sectors or formal sectors. Minimum workers working in organized sectors avail house rent allowance, in addition to that they get house from housing board and also get bank loan from various statutory banks for making their own particular house yet, unfortunately the workers from unorganized sectors are deprived from all these facilities, subsequently they have a propensity to make cluster inside the restricted space in their living region where they do not have appropriate washing facilities, because of that they regularly deal with the unbalanced circumstance particularly women workers. They likewise battle with various unhygienic conditions sewer seepage frameworks, overflowing drainage systems flooding amid storm. They do not have any knowledge about work hazardous and occupational safety. Introduction of different hazardous machinery, high rise in construction, unguarded machinery, various toxic chemical, coal dust, lime dust, blazes crude materials for synthetic generation leads quantities of tragic deaths of many unorganised sectors.

The unorganized labour faces following issues and challenges are insufficient labour laws, no social security guaranteed minimum wages, bonded labour, child Labour, working women – issue of harassment at work place, Low literacy, Low incomes, Vulnerable to diseases, Pain or injury from physical overexertion, repetitive manual tasks, or working in awkward positions, Exposure to moulds, fungi and bird or rodent droppings, Working in extreme temperatures and UV radiation, Working with hand tools, powered tools and heavy powered equipment, Excess vibration in the hands, arms or body from powered tools or equipment, Confined spaces, Noise, Working at heights, Electrical hazards, Slips, trips and falls, Respiratory and fire hazards from wood dust, Shift work or extended work days.

Findings

- In 2017 informal employment in unorganised sector was 38.07 Cr and it's increased to 43.99 Cr in 2020 due to growing population and major issue is that government is not in a position to provide employment to all.
- In terms of employment share of the unorganised sector in informal is 43.99cr and 9.55cr in the formal sector.
- There are 92.4% informal workers (with no written contract, paid leave and other benefits) in the economy. There are also 9.55cr informal workers in the organised sectors

indicating the level of outsourcing. These are possibly the contract workers. This also indicates the efforts of the government to provide social security to workers in the unorganised sector.

- In 2017-18 the share of unorganised sector employment has increased by 3.6 percentage points while on the other hand the share of formal employment has increased by 0.9 percentage.
- From literature review study the major problem faced by the unorganised sector is excess working hours, seasonal employment, indebtedness, lower social status, shortage of other jobs, unemployment due to mechanization.
- The unorganized labour faces following issues and challenges are insufficient labour laws, no social security guaranteed minimum wages, bonded labour, child Labour, working women – issue of harassment at work place, Low literacy, Low incomes, Vulnerable to diseases, Pain or injury from physical overexertion, repetitive manual tasks

References

1. P. Govindaraj, N. Kokila, Dr. S. Malathy (2019) "Unorganised Sector in India - An Overview" E-ISSN: 2454-9916, Volume: 5, Issue: 1
2. Kathuria, et al. (2010) "The productivity performance of the organised and unorganised units of the Indian manufacturing sector at the state level for the period 1994-95 to 2004-05"
3. Yogita Beri (2020) The study on female domestic worker in India. Journal of Interdisciplinary Cycle Research, ISSN NO: 0022-1945, Page No:1394-1403, Volume XII, Issue VI, June/2020
4. Tejaswini H.M and Manjula H.K "Investment and Saving Strategies of Unorganized Vendors - An Empirical Analysis at K.R Market Bengaluru", ISSN-0976-3031, Vol- 10, issues – 09(A) PP – 34584 – 34587, September 2019
5. Report on Working Conditions of The Contract Workers in Petroleum Refineries and Oil Fields 2009-11, Labour Bureau, Ministry of Labour & Employment, Government of India, Chandigarh.
6. Manoj P K & Neeraja James, (2014) "Unorganized labor in Housing Construction Sector in Kerala: An Empirical Investigation of the Human Rights Issues and Other Problems" International Journal of Scientific Research, January 2014, Volume: 3, Issue: 1, January 2014, ISSN No 2277-8179.
7. George Dimitron, S. Gondhimathi and K. Siva has done a study on "A Study on the Problems and Prospects of Women Labourers in Unorganised Sector", International Journal of Advanced Research January 2014, Issue: 1, January 2014, ISSN No 2320-5407, Page No:142-150
8. BE Mahon, J. Sobel, J.M. Townes (1999) – "Surveying Vendors of Street – Vended Food: A New Methodology Applied in Two Guatemalan Cities" *Epidemiol Infect* (1999), 122, PP-409-416 - Cambridge University Press.
9. Salty Roever (2014) "Informal Economy Monitoring Study Sector Report: Street Vendor" ISBN: 978-92-95095-84-7 published in Women in Informal Employment Globalizing and Organizing.
10. <https://vikaspedia.in/social-welfare/unorganised-sector-1/categories-of-unorganised-labour-force>
11. <https://www.imf.org/-/media/Files/Conferences/2019/7th-statistics-forum/session-ii-murthy.ashx>

A STUDY ON DIMENSION AND FEATURES OF NEW EDUCATION POLICY 2020⁴⁵

Dr. M. DILLIP ANAND⁴⁶

Introduction

Education is the key to bringing change in the nation's society and development. An educated person acts as an asset to society and contributes to the social, cultural, political and economic upliftment of their own and the whole nation. India, being a progressive country for economic and educational reforms needed to update its education system. India's Education System is one of the largest in the world with more than 1.5 million schools, 8.5 million teachers and 250 million children, about 845 universities and 40,000 higher education institutions (HIEs), reflecting the overall large division. It was found that over 40% of small institutions are running a single program. It was also noted that over 20% of the colleges have an annual enrollment of fewer than 100 students, making them unable to improve the quality of education. Only 4% of colleges enroll more than 3,000 students annually due to regional imbalance as well as the quality of education they offer. Lack of teacher's competency, problem of availability, affordability and accessibility, lack of proper infrastructure facility, high fees in private institutions are some of the reasons found for the division in the education system of India.

Education is fundamental for achieving full human potential, developing an equitable and just society, and promoting national development. Providing universal access to quality education is the key to India's continued ascent, and leadership on the global stage in terms of economic growth, social justice and equality, scientific advancement, national integration, and cultural preservation. Universal high-quality education is the best way forward for developing and maximizing our country's rich talents and resources for the good of the individual, the society, the country, and the world. India will have the highest population of young people in the world over the next decade, and our ability to provide high-quality educational opportunities to them will determine the future of our country.

Currently, India is the 5th largest and it is predicted that India will be the third largest economy in the world by 2030 with estimated GDP of ten trillion dollars. It is evident that the ten trillion economies will be driven by knowledge resources and not by the natural resources of the country. To boost the growth of the Indian education sector, the present government decided to revamp it by introducing a comprehensive National Education Policy 2020 by replacing the national policy on education in 1986. The currently introduced National Education Policy 2020 leads to an India-centered education system that contributes directly to transforming our nation sustainably into an equitable and vibrant knowledge society, by providing the best quality education to all.

⁴⁵ Paper presented in the 42nd Annual Conference of Association of Economists of Tamil Nadu Organized by Post Graduate Department of Economics, Arulmigu Palaniandavar College of Arts and Culture, Palani, Dindigul District-624 601, Tamil Nadu on 25th February, 2023.

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Objective of the study

To study the various dimension and features of the New Education Policy, 2020 as per need of the hour and the fundamental changes it tried to bring into the educational system of the country.

Research Methodology

This research is a descriptive study.

Issues and challenges of NEP 2020

1. Lack of access to quality education at every stage, especially in socio-economically backward areas, resulting in the low current gross enrollment ratio.
2. India today has around 850 universities all over the country. Doubling the Gross Enrollment Ratio in higher education by 2035 which is one of the stated goals of the policy will need to open 4 new universities every month, for the next 13 years. Opening 4 universities every month on an ongoing basis is near impossible in the current scenario.
3. The National Education Policy 2020 want to bring 2 crore children who are currently not in school, back into the school system. Needs the setting up of around 200 schools every month.
4. Levels of governance and leadership at higher education institutions are not up to the mark.
5. Lack of teachers' and institutions' decision-making power to make innovations in education to attract a large no. of students.
6. Rapid streaming of students into different courses.
7. In order to deliver this curriculum effectively, we need teachers who are skilled and trained to understand the pedagogical needs. Many of the curricular changes need to change in the mindset of the teachers, parents and students.
8. Lack of sufficient mechanisms for career management and development of faculty and organizational leaders.
9. Inefficient and overburdened regulatory system allowing fake colleges to thrive while constraining excellent, innovative institutions.
10. The lack of R&D and innovations at most of the institutions.
11. The National Education Policy 2020 upgrade an increase in education spending from the current 4.6% to 6% of GDP, which amounts to around INR 2.5 lakh crores per year. This money will be well-spent on building schools and colleges across the country, appointing teachers and professors, and for operational expenses such as providing mid-day meals to school children. And in this post Covid recovery phase with prevalent corruption, this is a very difficult task.

Targets of the new Education Policy 2020

1. Full implementation by 2040.
2. Universalize early childhood care and education till 2030.
3. Achieve 100% GER from Pre-School to Secondary level by 2030.
4. Focus on foundational numeracy and literacy of all students by 3rd standard.
5. Educators to be prepared for assessment reforms till 2030.

6. Common standards of learning in public and private institutions.
7. Vocational training for at least 50% of learners by 2025.

Salient features of New Education Policy 2020

1. School Education System

• School Curriculum and Content

The NEP seeks to introduce a shift from the existing 10+2 structure to the 5+3+3+4 structure, where early childhood education will be a part of formal school education. Also, the NEP 2020 focuses on reducing the curriculum content to develop critical and creative thinking and in turn, make individuals learn with 21st-century skills. So, all aspects of the syllabus and teaching need to be reorganized to attain the target.

The main hurdles in successfully implementing these changes include changing the syllabus in line with the National Curriculum Framework (NCF), 2005. Also, educators need to rethink the learning content rubric and modification of textbooks. NCERT will focus on the development of a new curricular and pedagogical structure for early childhood care and education. The policy also emphasises to the development and training of Anganwadi trainers through different courses.

A separate national book policy to develop libraries around the country and create love of reading in children. Public libraries in India are scarce, this needs to be strengthened through public education funds.

• Availability and Training of Teachers

This policy gives emphasis on the reorganization of the school syllabus. Although, in order to deliver newly framed curriculum efficiently and effectively, institutions and related authorities need to train instructors and understand the children's needs to make a smooth change to the new education system. Furthermore, they need to shift the focus from teacher-centred learning to student-centred learning to foster collaborative skills, critical thinking, and problem-solving and decision-making abilities in the youth.

Approx 250 million students are estimated to enrol in K-12 schools in India by 2030. This means that we need nearly 7 million more teachers to handle this large number of the student population. As teaching is one of the low-paying jobs in India, experiential learning and concept-oriented teaching is a problematic work. Until the teacher remuneration is not updated, the implementation of the NEP 2020 will remain a challenge.

• Examination Structure

The New Education Policy give emphasis on continuing formative assessment for learning rather than at the end summative assessment. The main purpose of changing the assessment system is to promote continuous tracking of teaching-learning outcomes. However, continuous assessment needs schools and teachers to use innovative evaluation approaches and assignments. These approaches demand the use of technology and active cooperation of teachers and students. Out of the 1.5 million schools currently in India, 75 per cent are run by the government. Of the remained private schools, nearly 80 per cent of schools are, budget private schools, so using a continuous assessment framework is a challenging task in these schools.

- **Technology to be Used**

The NEP 2020 give importance to using the advantage of technology in making the youth updated and future-ready. But, developing technological infrastructure such as digital classrooms, remote expertise-driven teaching models, and AR/VR tools to bridge gaps in physical teaching and laboratory infrastructure is a great challenge because a maximum number of schools don't have a well-established infrastructure to support these tools. Also, the huge cost associated with building digital infrastructure might not be affordable for most educational institutions. In remote areas and villages of the country where Internet connectivity is nearly absent, deploying digital learning tools is so difficult. So, the government should work on improving the basic digital infrastructure.

- **Availability of E-courses in local languages**

Technology will be part of education planning, teaching, learning, assessment, and teacher and student training. The e-content is to be available in regional languages, starting with 8 major languages – Kannada, Odia, and Bengali among others to join the e-courses available in Hindi, English and Regional Languages.

- **Assessment of Learning**

Emphasis on attaining foundational numeracy and literacy by 3rd class. Ministry of Education will strengthen this, and run it in a mission mode through a different national mission.

PARAKH is a new body to focus on assessments such as NAS (National Achievement Survey) and SAS (State Achievement Survey). PARAKH could be an important instrument to look at the learning gaps and support the targeting of different ministry goals and programs.

- **Medium of instruction**

What will be the medium of education had received a lot of unnecessary attention. Although, this part remains flexible to avoid all types of tensions. A low level of understanding and market emphasis on the English Language and paternal perception of, quality could've led to this flexibility. The policy also doesn't prefer any particular language over other languages and encourages learning multiple languages.

This also suggests teaching foreign languages at the secondary level: Spanish, Russian, Korean, Japanese, Thai, French, Portuguese and German.

- **Social justice**

Design of structure and interventions to reduce the issue of dropouts by the Ministry of Social Justice and Empowerment. Mid-day meals program in schools needs up gradation in nutrition component, wherever possible, according to local needs. Eggs in Mid-day meals are still a critical policy issue.

This Policy inserts a new term called socio-economically disadvantaged groups (SEDGs). This highlights categories as caste, transgender, tribe, and disability, and has passing references to the term minority. Technical criticism aside, policy envisages multiple schemes to be targeted at these groups to increase enrollment and retention in the education system.

2. Higher Education

▪ Cuet

NEP introduces the single common university entrance test, which will reduce the stress of multiple competitive exams, and cutthroat marks competition and ease off the pressure of preparing for them. It will provide a common ground for all the students to take further admission in higher education institutions.

▪ Multiple entry and exit option and ABC

IN NEP multiple entry and exit options for students who wish to leave the course in the middle. Their credits will be transferred through the Academic Bank of Credits (ABC). Introducing the Academic Bank of Credit is a brilliant idea to store the academic credits that students earn by taking courses from various recognized higher educational institutes. A student can earn their credit scores by completing a course and these will be credited to their ABC account. Any student can shift their credit score if he/she decides to switch institutions. If he/she drops out for some reason, these credits will remain intact, and he or she will come back years later and pick up from where the student had left.

▪ Single regulatory body for higher education

The replacement of UGC (University Grants Commission) and AICTE (All India Council for Technical Education) by a new body called the Higher Education Commission (HECI) of India is based on the idea of division of work and this will be the single regulatory body except for legal and medical education.

The HECI is divided into 4 bodies namely

- National Higher Education Regulatory Council (NHERC), for regulating higher education, including teacher training education but excepting medical and legal education.
- National Accreditation Council (NAC), as a "meta-accrediting body" for higher education.
- Higher Education Grants Council (HEGC), for the funding and financing of the universities and colleges of higher education. This will be in place of the existing National Council for Teacher Education, All India Council for Technical Education, and the University Grants Commission.
- General Education Council (GEC), to frame "graduate attributes", namely the learning outcomes expected. It will also be responsible for constructing a National Higher Education Qualification Framework (NHEQF). And the National Council for Teacher Education will come under this General Education Council, as a professional standard-setting body (PSSB).

Focus on an updated curriculum makes sense, and a separate body dedicated to focusing on integrating technology in institutions is an important step. National Research Foundation is a great idea. However, if these spaces get filled by individuals who are ideological biased, very less we can achieve.

• Privatization and Internationalization

It is opposed to the commercialization and privatization of education. On the other hand, allowing foreign universities to come and opens their campus in India. A significant

improvement in the number of private institutions. If the idea is to increase competition, it will be better. Indian Universities are allowed to set up campuses in other parts of the world. there is a strong potential for this as there is a huge demand for quality education by the Indian diaspora all over the world.

Criticism of New Education Policy

1. This seems only a document that fails to be inclusive of the marginalized section of society and doesnot solve the concern of the poor, women and low caste and religious minorities to get access to the education system. There is no comprehensive strategy to solve this issue.
2. The NEP 2020 remains mute on the RTE Act and universalization of education will not be achieved without legal support. There is no mechanism to link primary and secondary education with RTE. Without the RTE Act, universalization will be very difficult.
3. Three Language formula is also an issue, although the policy does not mandatory this provision, it is created in a manner that leaves little flexibility to the students, teachers and schools.
4. Another issue is not clearly solving the issue of finance for implementation.

HEALTH STATUS IN TAMILNADU⁴⁷

Prof. V. VALARMATHY⁴⁸

Introduction

Health services are an important indicator to understand the healthcare delivery provisions and mechanisms in the State and are subdivided into three categories viz. primary, secondary and tertiary health care systems. The Primary Healthcare System consists of Primary Health Centres (PHCs) and Health Sub-Centres (HSCs). Secondary healthcare system comprises of District Head Quarters Hospitals, Taluk Hospitals, Women and Children Hospitals, Dispensaries, Mobile Medical Units, Police Hospitals and Non-Taluk Hospitals etc., Tertiary healthcare system covers multi-specialty hospitals. In addition to Government efforts, the private sector is also contributing to the provision of Health Care Services. In the absence of data relating to private sector health services, an attempt has been made to assess only the efficacy of Government healthcare system. The functioning of the government run healthcare system.

Primary Healthcare Services

Primary Health Centres (PHCs) and Health Sub-centres (HSCs) are rendering the preventive, curative and rehabilitative health care services to the rural people. The rural health care infrastructure has been strengthened and fine-tuned under the National Rural Health Mission in order to realize the objective of Health for All. The number of PHCs functioning in the State was on the increase over the last four years. It had gone up from 1539 in 2010-11 to 1751 in 2013-14. All PHCs are functioning on 24x7 basis. The network of 1751 PHCs and 8706 Health Sub-centres has been rendering universal health care delivery to rural population on a mission mode and with a holistic approach. The State has excelled in meeting the norms as envisaged. i. One Health Sub-Centre (HSC) for a population of 5,000 in plains and 3,000 in hilly and tribal areas. ii. One Primary Health Centre (PHC) for 30,000 population in plains and 20,000 in hilly and tribal areas and one Community Health Centre (CHC) for a population of one lakh. It is the policy of the Government to provide at least one 30 bedded upgraded Primary Health Centre in each block in a phased manner. Each upgraded Primary Health Centre has an operation theater, modern diagnostic equipment and an ambulance vehicle. Five doctors are posted to the upgraded PHCs. A complement of 4864 Doctors, 18,705 Nurses and 18,749 other staff are delivering health care services at the primary village level. At present 341 upgraded Primary Health Centres are functioning in 310 blocks. In the upgraded PHCs caesarean deliveries are also conducted. The number of caesarean deliveries conducted in PHCs went up from 0.05 lakh in 2010-11 to 0.11 lakh in 2013-14.

The average number of outpatients treated per day in the PHCs improved from 2.22 lakh in 2010-11 to 2.52 lakh in 2013-14. Contrary to this trend, the number of normal deliveries was on the decline. The average number of deliveries conducted per PHC in a year

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had fallen from 135 (2010-11) to 91 (2013-14). In the current primary health scenario, the number of population per doctor had come down. As against the doctor : population ratio of 1:11619 in 2012-13, the ratio in 2013-14 too favorable at 1:10596. However, it is still well short of the norm stipulated by the World Health Organization (WHO) of 1:1000. Shortage of doctors is one of the major problems in the primary healthcare system.

However, this may not reflect the real situation since the doctors in private sector those rendering rural health services are excluded. The population per bed had steadily gone up. In 2013-14, the bed: population ratio worked out to 1:3970 which is far below the norms of 5 beds per thousand population as prescribed by the WHO.

Health Sub-Centres are expected to provide promotive, preventive and few curative primary health care services relating to maternal and child health. In line with the guidelines, health sub centres for a population of 5,000 in plain area and 3,000 in hill area are being established. At present 8,706 health sub centres are functioning in the State which are manned by the Village Health Nurses (VHN). A well structured network of urban primary health care institutions providing health and family welfare services to the population within one to three km of their wellings has been established in the State. During 2013-14, totally 134 Urban Primary Health Centres (UPHC) with a total bed strength of 274 were functioning in the State. During the year, besides treating 31.65 lakh outpatients and 0.30 lakh inpatients, 2962 deliveries (2897 – normal and 65 – caesarean) were conducted. On an average 8672 out patients per day were treated by these health centres in the State during 2013-14.

Conclusion

The results of this study indicated that the healthcare professionals' perceived the support from the public health department only at a moderate level. Also, their POS differed across age, role and total work experience and PHC location, and did not differ across gender, work experience in the current PHC and PHC type. Therefore, the health policy-makers and managers have to take necessary steps to enhance healthcare professionals' POS. In addition, they have to consider the difference in POS of healthcare professionals across age, designation experience and PHC location and accordingly make amendments in the human resource policies related to selection and training.

**Regional Economy
(Dindigul, Madurai, Theni
and Tiruppur Districts)**

Peer Reviewed Journal

A STUDY ON FRONT LINE WORKERS IN MADURAI CITY CORPORATION ZONE – I¹

Dr. S. KARTHIKEYAN² & Dr. S. SENTHILKUMAR³

Introduction

The fact that each caste is associated with a specific job is a significant characteristic of the Indian caste system. The dirty vocations, such as street cleaning labourers, drain and sewage cleaning, removal of human and animal waste, leather processing, breeding pigs, and the like, became associated with lower castes while superior castes have a wide range of employment options. Since most cities and villages lacked flush latrines, cleaning workers has to manually handle and carry human waste. Working with leather involves handling deceased animals and removing their skin, therefore it is also regarded as filthy. The groups of cleaning labourers are placed lowest in caste - based hierarchy. Not only all its members required engaging in this pervasive profession by ancient obligations and customary laws, but mythological consequences also compel them to physically transport night dirt for disposal. The cleaning labourers latrines are grossly underpaid, quite often abused and living a life of degradation. Madurai Corporation Zone – I sources organized rehabilitation camps as per the orders of the District Administration. The rehabilitation was psychological, medial and occupational rehabilitation because manual scavenging is associated with a social stigma.

After manual scavenging was banned by the court and the process switched to mechanized mode, the workers lost their livelihood and had to be provided with alternate employment.

Privatization in Urban Local Bodies

With large-scale employment opportunity in urban local bodies, accompanied by privatization and contracting of front line work, it once again fell to workers from the same communities, now employed on low wages by municipal contractors, to supplement their income by taking up manual front line cleaning labourers work.

Objectives of the study

1. To analyze the socio economic conditions and physical environment of sample front line labourers
2. To compare the pattern of household consumption and its distribution among the front line labourers
3. To identify and compare the forms and sources of savings of the household of Front line labourers

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Methodology

Madurai Corporation comprises 100 wards. The present study is based on Madurai Corporation Zone-I. Simple random sampling method was adopted to select 62 sample respondents from the 150 from line workers.

Analysis and Interpretation

Ownership of Dwelling

Hardly six (10%) of them lived in owned houses and majority of the (37 out of 62) workers found living in streets.

Pattern of Wage Rate

It is found that 11 respondents received daily wage; 15 weekly payment and 36 received monthly wage. While the 24 per cent of the respondents received weekly payment, another fifty eight per cent received monthly wage.

Monthly Income of the Respondents

Table 1 Monthly Income of the Respondents

Monthly Income	No of Respondents	Percentage
4000-5000	10	16.13
5000-6000	17	27.42
6000-7000	19	30.64
7000 - 8000	16	25.81
Total	62	100.00

Source: Primary data

Only a quarter of them found earning Rs.7000 – Rs.8000 as monthly income. Ten of them reported a low income of Rs.4000 – Rs.5000. The range of monthly income varied from Rs.4000 to Rs.8000.

4. Distribution of Household Expenditure

The monthly household expenditure of respondent's are studied to find out any difference in the total expenditure of the respondent including consumption expenditure, medical expenses etc. The distribution of household expenditure is constructed using the information reported by the respondents.

Sincerely the monthly expenditure ranged from Rs.3000 to Rs.7000 per month. Even this low income the respondents found saving some amount. That is, 57 out of 62 expressed that they have savings and monthly through chit funds and commercial banks.

Conclusion

This study demonstrated that front line workers have poor socio-economic status due to the nature of their work, how society regards their occupation, the fact that they have few employment opportunities, and the low wages they receive from their employers. The government, non-government organisations, and social workers should start programmes and

services like. Raising awareness among the front line labourers communities about the programmes for their benefit, prioritising education for front line labourers in children, developing schemes for the rehabilitation of front line labourers in consultation with leaders and NGOs; and developing women-specific programmes, with a view to improving the health of women front line labourers.

Peer Reviewed Journal

PERCEPTION OF CLIMATE CHANGE AND IT'S ADAPTATION MEASURES TAKEN BY THE SMALL FARMERS IN MADURAI DISTRICT⁴

Dr. A. SATHEESH BABU⁵

Introduction

As a result of global warming, the type, frequency, and intensity of extreme events, such as tropical cyclones, floods, droughts, heavy precipitation events are expected to rise. Such changes have already been observed in different parts of the world (Meehl et al., 2007). Evidence of impact has been 'strong and most comprehensive' and many life-supporting systems and economic sectors are at great risk due to climate change (Patra, 2004). Climate change and variability are affecting the environment and socio-economic and related sectors including agriculture, forestry, human health, biodiversity, snow cover, water resources, food security, economic activities and physical infrastructure (Gregory et al., 2005). To understand the entire picture of the effects of climate change, it is necessary to examine all sectors affected by climate change. Although several sectors have been studied, none have received more attention than agriculture, because it has a close relation to food security and the poverty status of a vast majority of the population all over the world (Dinar et al., 1998).

Although aggregate agricultural sector may not be at risk due to climate change, individual farmers may continue to suffer from large damages. Some areas will suffer from higher temperature changes and some areas may experience harmful precipitation effects. Poor people dependent on nature would be highly vulnerable to warn even when national agricultural impacts are minimal (Kumar et al., 1998). Agriculture is the backbone of the Indian economy, providing as it does livelihood to 60% of the population. India depends heavily on agriculture, the effects of global warming and climate change on the agricultural sector are likely to threaten both the welfare of the population and the economic development of the state. studies on climate trend in India found significant rise in temperature with decrease in amount of rainfall in most of the states (Mall et al., 2006; Guhathakurta, 2006).

The aggregate nature of various studies does not prove insights into an adaptation that farmers take at the local level. Micro-level understanding is very much essential to understand the complete picture of climate change affect on agriculture (Seo and Mendelson, 2008). The negative effect of climate change on foodgrain production can be minimized through mitigation and adaptation. Unlike large farmers, marginal and small farmers' has the lowest capacity to adapt as they are mostly struggling to maintain livelihood (Seo and Mendelson, 2008). Farmers' adaptation varies from region to region. Therefore the regional analysis is necessary to get a clear picture of various mitigation and adaptation measures practiced to overcome the effects of climate change.

⁴ Paper presented in the 42nd Annual Conference of Association of Economists of Tamil Nadu Organized by Post Graduate Department of Economics, Arulmigu Palaniandavar College of Arts and Culture, Palani, Dindigul District-624 601, Tamil Nadu on 25th February, 2023.

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Madurai District is situated in the southern part of Tamil Nadu in India. As per the census of India 2011, Madurai District is having a population of 30,38,252 with a geographical area of 6565 sq.km. Male constitute 50.24 percent with 15,26,475 population and female constitute 49.76 percent with 15,11,777. Madurai district is rural dominated agriculture district where 58,716 small farmers, 2,05,771 marginal farmers, and 4,01,867 agricultural labourers were engaged in main agricultural activities. The South-West and North-East monsoons bring rainfall to this district in June to September and from October to December. Generally, Madurai District has a hot, dry and variable climate. The summer season here extends from March to July and in April-May the summer reaches its zenith. On analysis of both rainfall and temperature data published by the Indian Meteorological Department (IMD), Chennai Division, it is found that the annual growth of actual rainfall has fluctuated whereas the mean temperature has been increasing yearly in Tamil Nadu as general and Madurai District as particular. It is also noted that the farmers of Madurai District suffered a heavy loss due to deficit as well as surplus rainfall and the high mean temperature which affect the crop growing pattern. With this background, this article attempts to elucidate the perceptions of climate change and various adaptation measures that small farmers used in Madurai and the barriers to adaptation strategies.

Method and Materials

The present article is a descriptive study relied on primary data which are collected during 2019 with the help of a structured interview schedule to record the perception of the small farmers. The probability random sampling method has been used to collect data from 357 small farmers among the 58721 total small farmers in Madurai. The sample size was determined by using Krejcie and Morgan's sample size determination table presented with percentage.

Results and Discussion

(i) Perceptions of Small Farmers in Madurai District on Climate Change

The climate change is often known by the rainfall and temperature. Therefore, the perceptions of small farmers in Madurai District on both rainfall and temperature have been collected for the past 15 years and they are presented in tables 1 and 2.

Table 1 Perception of Small Farmers in Madurai District on Rainfall

Parameters	Perception on							
	No. of Rainy days		Total Rainfall		Onset of Rainfall		Rainfall Patterns	
	No. of Res.	%	No. of Res.	%	No. of Res.	%	No. of Res.	%
Increasing	64	17.9	30	8.4				
Decreasing	266	74.5	294	82.4				
No Change	27	7.6	33	9.2				
On time					52	14.6		
Late					264	73.9		
Early					41	11.5		
Predictable							0	0
Unpredictable							324	90.8
Don't Know							33	9.2
Total	357	100	357	100	357	100	357	100

Source: Compiled from raw data

It is noted that majority of the small farmers have correctly observed changes in the rainfall. About 74.5 per cent of farmers perceived that the number of rainy days is decreasing. Similarly 82.4 per cent perceived that total rainfall is decreasing. This may be interpreted as more variability of rainfall in Madurai because in some of the years rainfall distribution is even whereas it is uneven for the rest. The timing of rainfall also differs from year to year. Majority of the farmers (73.9 %) observed that the rainfall flow is late in most of the years in the near past. Again most of the farmers (90.8 %) assert that rainfall is unpredictable now a days.

The perceptions about changes in temperature are more even throughout Madurai district which is presented in table 2.

Table 2 Perception of Small Farmers in Madurai District on Temperature

Parameters	Perception on							
	No. of Hot Days in Summer		No. of Cold Days in Winter		Excessive Hot in Summer		Excessive Cold in Summer	
	No. of Res.	%	No. of Res.	%	No. of Res.	%	No. of Res.	%
Increasing	294	82.4	14	3.9	312	87.4	252	70.6
Decreasing	12	3.4	267	74.8	0	0	13	3.6
No Change	51	14.2	76	21.3	45	12.6	92	25.8
Total	357	100	357	100	357	100	357	100

Source: Compiled from raw data

It is understood that about 82.4 per cent of farmers perceive that the number of hot days in summer is increasing whereas 74.8 per cent perceive that the number of cold days in winter is decreasing. About 87 per cent of farmers perceive that excessive hot in cold days and 70.6 per cent in summer days are increasing. Overall the farmer's perceptions about changes in temperature are identical with estimated predictions.

(ii) Perception of Small Farmers on Agricultural Production and the Climate Change

Agricultural risks are faced by farmers due to various factors. The frequency of occurrence of climate extremes like flood and drought has increased in recent years due to climate change (Molua, 2002). Selected Small Farmers were asked to point out all risks in terms of climate change.

Table 3 Perception of Small Farmers on Agricultural Production and Climate Change in weather pattern

Climatic Risks/Factors	No. of Respondents	Percentage
Flood/Heavy Rainfall	157	44.0
Drought/Less Rainfall	192	53.8
Extreme heat	5	1.4
Extreme cold	3	0.8
Total	357	100

Source: Compiled from raw data

Among the climatic risks, 53.8 per cent of the small farmers perceived that drought or less rain and 44 per cent observed that flood or heavy rainfall is the climatic factor that affects the agricultural production. The climatic factors such as extreme hot (1.4 per cent) and extreme cold (0.8 per cent) are observed by a few farmers.

(iii) Adaptation Practices among the selected Small Farmers in Madurai District

Even though a large number of farmers perceived changes in temperature and rainfall only some of them could adopt such measures due to various reasons. Capturing and categorizing of all adaptation measures is a challenging task. Climate change is one of the driving forces among the different driving forces for adaptation (Kristjanson, 2012). The percentage of small farmers using various adaptation measures (in multiple responses model is given in table 4.

Table 4 Adaptation Practices among the selected Small Farmers

S. No.	Adaptation Measures	No. of Respondents*	Percentage
1	Crop Variety Change	102	18.5
2	Mixed Cropping	76	13.8
3	Adjusting Planting Dates	82	14.9
4	Increasing Irrigation	75	13.6
5	Increase use of fertilizers	95	17.3
6	Pest and Disease Management	62	11.3
7	Lease out Land	14	2.5
8	Crops to livestock	6	1.1
9	Sold out Land	12	2.2
10	Mitigate to other Place	5	0.9
11	Using Shades or Shelter	8	1.5
12	No Adaptation	13	2.4
	Total	550*	100.00

Source: Compiled from raw data

*Multiple responses

It has been noticed that among all the prevailing adaptation practices, under multiple responses given by the sample small farmers, crop variety change as widespread adaptation measure which is closely associated with lower expense and easy access to them. Another highly practiced adaptation technique is increased use of fertilizers which are used for improving soil nutrients. One more important adaptation measure that farmers are taking is adjusting their planting dates according to the onset of rainfall, amount of rainfall etc., Mixed cropping, increasing irrigation through investment and pest and disease management are further important adaptation measures that used by the farmers frequently. When income from the farm sector is not sufficient due to continuous flood or drought, the farmers adapted migration to other places which is considered by the farmers as the least adaptation measure.

(iv) Barriers to adaptation to climate change

Generally, farmers ability to choose a particular adaptation measure has many barriers and these barriers vary depending on the farmers' perception of climate change (Okezie et al.,

2012). Table 5 presents the different barriers to climate change adaptation among the selected small farmers in Madurai District.

Table 5 Barriers to adaptation to climate change

S. No.	Barriers	No. of Respondents	Percentage
1	Lack of Information about Climate Change	59	16.5
2	Costly New Adaptation	44	12.3
3	Availability of Water	112	31.4
4	Lack of knowledge on Adaptation	32	8.9
5	Shortage of climate resilient seeds	42	11.8
6	Lack of credit	16	4.5
7	Fear about quantity of production	52	14.6
	Total	357	100.00

Source: Compiled from raw data

Among the different barriers to climate change adaptation measures, small farmers mentioned about water availability (31.4%) and lack of information about climate change (16.5%) as main barriers. As pointed out by the small farmers fear about quantity of production (14.6%), huge cost of new adaptation measure (12.3%), shortage of climate-resilient seeds (11.8%), lack of knowledge on adaptation (8.9%) and lack of credit (4.5%) are also acting as barriers to use the various adaptation measures for ensuring the sustainable agricultural production.

Suggestions

- To increase the crop production during flood and drought, farm ponds/ small check dams are needed to be created in nearby agricultural operational areas by the local governments or the small farmers themselves.
- The government should give proper information, awareness and training on climate change adaptation measures that are suitable to the small farmers which will help to remove the barriers to adaptation.
- The government should ensure the availability of heat/drought tolerant variety of crops to the small farmers in time.

Conclusion

The effects of climate change on the agricultural sector are likely to threaten both the welfare of the population and the economic development of the state. Knowledge and information on existing temperature and rainfall alterations in a particular region are essential to envisage anything about possible climate change. This study elucidates the perception of small farmers on climate change and the adaptation methods used by the farmers. A high prevalence of unplanned adaptation is found in the present study. Providing the proper knowledge and awareness on climate change, Facilitation of proper adaptation measures and removing of major barriers to adaptation is the need of the hour to overcome the effects of climate change in the agricultural sector as a whole.

References

1. Dharmalingam S and G.Periyasamy, *Erratic Monsoon and Indian Economy*, **Southern Economist**, January 15, 2010, pp.8-9
2. Singaraj A and Kumar D, Economic Impact of Climate Change on Agriculture and Water Resources, **Southern Economist**, October 15, 2009, pp.5-8.
3. Pratap S. Birthal, Impact of Climate Change on Yields of Major Food Crops in India: Implications for Food Security, **Agricultural Economics Research Review**, 27 (2) July-December 2014 pp. 145-155.
4. Meehl, G. A., Stocker, T. F., Collins, W. D., Friedlingstein P. et al. (2007), "Global Climate Projections," In S., Solomon; D., Qin; M., Manning; Z., Chen et al. (eds.) "Climate Change 2007: The Physical Science Basis", *Contribution of Working Group-I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, Cambridge University Press. Cambridge
5. Patra J. (2014), "Linking Assessments with Actions Climate Change Adaptations", **Economic and Political Weekly**, 49(47), 22 Nov, 2014.
6. Gregory, P. J., Ingram, J. S. I, Brklacich, M. (2005), "Climate Change and Food Security", **Philosophical Transactions of Royal. Society B.**, 360 (1463), pp. 2139-2148
7. Kumar, K.S. Parikh, J.(1998), "Climate Change Impact on Indian Agriculture: The Ricardian Approach", In A. Dinar, R. Mendelsohn, R. Evenson, J. Parikh, A.Sanghi et al. (eds.), "Measuring the Impact of Climate Change on Indian Agriculture", **World Bank Technical Paper no. 402**, Washington D.C.
8. Mall, R. K.; Singh, R., Gupta, A., Srinivasan, G., Rathore L. S. (2006), "Impact of Climate Change on Indian Agriculture: A Review", **Climatic Change**, 78:745-747
9. Seo, N., Mendelsohn, R., Kurukularisurya, P. Dinar, A., Hasan, R. (2008a), "Differential Adaptation Strategies to Climate Change in African Cropland by Agro Ecological Zones", **World Bank Policy Research Working paper 4600**, April 2008
10. Okezie, C. A., Sulaiman, J., Nwosu, A. C. (2012), "Farm – Level Determinants of Agricultural Commercialization", **International Journal of Agriculture and Forestry**, 2(2), pp. 1-5.

A STUDY ON THE SAVING PATTERN OF AGRICULTURAL LABOURERS IN AYYALUR PANCHAYAT OF DINDIGUL DISTRICT⁶

Dr. T. SUDAKAR⁷ & Dr. N. KANNAN⁸

Introduction

The act of saving is influenced by several variables like the perception of saving of those who save, their assessment of its costs and benefits, their age, family size, family structure, motivations for savings, and environment etc., Different people perceive saving differently. Saving is money reserved for future needs, whereas for some others it is surplus of income over expenditure and for still other it is purchase of land, construction of buildings, consumer durables or other household goods. When saving is perceived as money reserved for future needs it implies a deliberate decision behind saving, rather than being a residue. This deliberate decision on the part of the households to save for meeting the future needs depends on many factors namely, the determinants of saving which includes the factors that affect both the ability to save and the will to save.

Saving is very important which is responsible for combating or meeting any emergency accrued by the individuals or the households. Right now, saving more and spending more simultaneously has become the basic and conflicting factor for the economy. In this study mainly focuses on behavior of saving of agricultural labourers in the study area.

Statement of the Problems

Saving is very important which is responsible for combating or meeting any emergency accrued to the individuals or the households. Right now, saving more and spending more simultaneously has become the basic and conflicting factor for the economy. In this context saving behaviour of agricultural labourers who are seasonally unemployed and live with meagre income.

Objectives

1. To study the economic background of the selected agricultural labourer households
2. To study the pattern of savings of agricultural labourers.

Methods and Materials

Primary data have been collected through direct personal interview with the help of interview schedule. Ayyalur panchayat of Dindigul district has been selected for the present study. Ayyalur panchayat has 193 households and the heads of all the households are agricultural labourers. To select sample households, simple random technique was adopted. The lottery method of sampling was used to select 150 households. Through interview

⁶ Paper presented in the 42nd Annual Conference of Association of Economists of Tamil Nadu Organized by Post Graduate Department of Economics, Arulmigu Palaniandavar College of Arts and Culture, Palani, Dindigul District-624 601, Tamil Nadu on 25th February, 2023.

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schedule data were collected from the heads of the households. The collected data were analyzed by using regression and ANOVA.

Results and Discussion

As per the results of ANOVA the null hypothesis that

Ho: There is no significant relationship between income and financial savings of the sample respondents has been rejected and the alternative hypothesis that there is a significant relationship between income and financial savings has been accepted.

The set null hypothesis that there is no significant relationship between age and financial savings of the sample respondents has been rejected and the alternative hypothesis that there is a significant relationship between age and financial savings of the sample respondents has been accepted.

The selected agricultural labourers found kept cash in hand for unexpected expenditure. Per capita cash at hand came to Rs.409. Majority of the labourers have cash at hand. About 12 per cent of labourers only found having saving in Post Office. The labourers have no awareness about the Post office savings. Majority of the labourers prefer savings through chit funds. The labourers found it is easier to get money from chit fund. Therefore, they save more in chit fund. Regarding physical saving, only five labourers put their money in construction, equipment saving is very low in this village. Thus, physical saving is greater than financial saving. The saving rate of males is found as greater than females. The analysis showed that the major reason behind savings are: wedding ceremonies, meeting unexpected expenditure and the future security.

A STUDY ON AREA AND PRODUCTION OF BETEL LEAF CULTIVATION IN TAMIL NADU⁹

Dr. R. RAVIKUMAR¹⁰ & Mr. A. MUNUSAMY¹¹

Introduction

The Betel is the leaf of the vine. In India, it is known as "paan". Evergreen climber which grows in tropics and subtropics. Betel leaf is mostly consumed in Asian countries and elsewhere in the world by some Asian emigrants. The major betel leaf growing countries are Sri Lanka, India, Thailand and Bangladesh (agriexchange.apeda.gov.in 2023)¹. In India, Betel leaf plays an important role since ancient culture. Its use in India dates back to 400 BC. As per ancient books of Ayurveda, Charaka, Sushruta Samhitas, and Kashyapa Bhojanakalpa, the practice of chewing betel leaf after meals became common between 75 AD and 300 AD. Toward & the 13th century, European traveler Marco Polo recorded betel chewing among kings and nobles in India (Kumar, N. et al. 2010)².

Betel vine is one of the major horticultural plantation crops grown in India for quite a long time and consumed by people in every part of the country. Betel vine, a perennial creeper, probably a native of Malaysia, is cultivated in India for chewing. The rich sandy loam, clay loam soils, cool climate, river water irrigation are conducive for betel vine cultivation (Sahaya Princy 2020)³.

In India, the betel leaf is grown as an important crop in the states like Andhra Pradesh, Karnataka, Tamil Nadu, West Bengal, Bihar, Orissa and Assam. India is a major exporting county of betel leaf to foreign countries like, Indonesia, Burma, Pakistan and others, which can fetch a significant amount of foreign currency.

India exported 6517.26 metric tonnes of Betel leaves to the world, worth Rs.45.97 crores in 2021-22. West Bengal is one of the most important and largest betel vines growing states of the country. Tamil Nadu is one of the leading betel leaves cultivating states and it is cultivated in 22,291 in hectares, and 4,75,666 metric tonnes of betel leaves are harvested in Tamil Nadu in the year of 2010-2022. The betel leaf cultivation has provided livelihood to numerous families and it is considered as highly labor-intensive, offers employment throughout the year both in the fields of production and marketing (Supriyo Halder 2015)⁴.

Statement of the Research Problem

The betel leaf plays a vital role in the Indian culture especially in traditional ceremonies such as offering money to the temple priests and exchanging betel leaves during family functions such as betrothal. It is an evergreen and perennial creeper which is planted widely in India. No doubt, it increases the National economy and provides employment opportunity directly and indirectly to several people in rural areas. The well-known Tamil phrase -" Thenur vethalai, Manoor sunnaambu" (Betel leaf from Thenur, Lime from Manoor)

⁹ Paper presented in the 42nd Annual Conference of Association of Economists of Tamil Nadu Organized by Post Graduate Department of Economics, Arulmigu Palaniandavar College of Arts and Culture, Palani, Dindigul District-624 601, Tamil Nadu on 25th February, 2023.

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indicates the popularity of betel leaf grown in Thenur. Farmers used to exclusively cultivate betel leaves. But owing to water scarcity and shifting of farmers to other vocations have resulted in a drastic decrease in cultivation of betel leaves. However, a few farmers who cultivated other crops still dedicated a small space of their farm land for the cultivation of betel leaves. It is also believed that Europeans came to the village in the past to purchase betel leaf from them as it was believed to be the best in the region. The marketing of betel leaf has come down to a great extent due to decline in rain and migration of labour and the bad opinion among the people that chewing betel leaves with other ingredients that cause cancer except areca nut. Cultural changes have also resulted in the decline of betel leaf usage among the younger generation. The above - mentioned reasons resulted in the decline of betel leaf consumption and in turn betel leaf cultivation by the farmers. These reasons induced to conduct a study on area and production of betel leaf in Tamil Nadu.

Betel Leaf Cultivation in Tamil Nadu

Tamil Nadu is one of the leading betel leaf cultivating state. Classified as a plantation crop, betel leaf occupies two per cent of net cultivated area in the state. In Tamil Nadu betel vine is grown largely along with the river basins in the districts of Namakkal, Karur, Tanjavur, Dharmapuri, Tiruchirappalli, Madurai, Krishanagiri, Salem, Thuthukudi and Cuddalore. Betel vine is a lucrative crop as it fetches attractive price in the market. Based on the theoretical framework, the present work is an attempt in this direction.

Objective of the Study

1. To examine the trend in area and production of betel leaf in Tamil Nadu.

Data and Methodology

The study is based on secondary data for a period of 12 years from 2010-11 to 2021-22. The secondary data were collected from the records of Horticulture Department of Tamil Nadu. The collected data were analyzed with the help of statistical tools like Annual growth rate, Compound growth rate and Trend analysis.

Results and Discussion

The estimated compound annual growth rate was negative, (-4%) for area under cultivation and for production, (-8%) which shows that there was a drastic decline in the area cultivated and production of betel leaf. Further, noticed that the annual growth rate also registered negative growth in terms of area cultivated and production in almost all the years except few years and touched the lowest of – 32.17 percent and – 59 percent respectively.

Table 1 Area in Betel Leaf Cultivation of Tamil Nadu

Sl. No.	Year	Total Area (in Hectares)	AGR
1	2010-11	2,582	-
2	2011-12	2,374	-8.06
3	2012-13	2,474	4.21
4	2013-14	2,135	-13.70
5	2014-15	1,826	-14.47

Sl. No.	Year	Total Area (in Hectares)	AGR
6	2015-16	1,731	-5.20
7	2016-17	1,630	-5.83
8	2017-18	1,756	7.73
9	2018-19	1,192	-32.12
10	2019-20	1,446	21.31
11	2020-21	1,585	9.61
12	2021-22	1,560	-1.58
Total		22,291	
CAGR - 4%			

Source: Horticulture Department of Tamil Nadu

Table 2 Production in Betel Leaf Cultivation of Tamil Nadu

Sl. No.	Year	Total Production (in Metric Tonnes)	AGR
1	2010-11	64,550	-
2	2011-12	59,350	-8.06
3	2012-13	61,850	4.21
4	2013-14	59,780	-3.35
5	2014-15	51,130	-14.47
6	2015-16	48,468	-5.21
7	2016-17	19,855	-59.03
8	2017-18	24,810	24.96
9	2018-19	15,943	-35.74
10	2019-20	21,463	34.62
11	2020-21	23,535	9.65
12	2021-22	24,932	5.94
Total		4,75,666	
CAGR - 8%			

Source: Horticulture Department of Tamil Nadu

Table 3 Trend of Area in Betel Leaf Cultivation in Tamil Nadu

Year	Trend Values
2010-11	2,498.1
2011-12	2,375.4
2012-13	2,252.7
2013-14	2,130.0
2014-15	2,007.3

Year	Trend Values
2015-16	1,884.6
2016-17	1,761.9
2017-18	1,639.2
2018-19	1,516.5
2019-20	1,393.8
2020-21	1,271.1
2021-22	1,148.4
2022-23	1,025.7
2023-24	903.0
2024-25	780.3
2025-26	657.6
2026-27	534.9
2027-28	412.2
2028-29	289.5
2029-30	166.8

$$y = a + bx$$

$$Y = -122.7 + 1884.6 X$$

The Forecast of Area of Betel Leaf Cultivation in Tamil Nadu by 2030 has been done using Ordinary Least Square method. It is inferred from the analysis that the area under betel leaf cultivation would further decline to 166.8 hectares by 2030.

Table 4 Trend of Production in Betel Leaf Cultivation in Tamil Nadu

Year	Trend Values
2010-11	68,046.7
2011-12	62,632.5
2012-13	57,218.3
2013-14	51,804.2
2014-15	46,390.0
2015-16	40,975.8
2016-17	35,561.6
2017-18	30,147.5
2018-19	24,733.3
2019-20	19,319.1
2020-21	13,905.0
2021-22	8,490.8
2022-23	3,076.6

Year	Trend Values
2023-24	-2,337.6
2024-25	-7,751.7
2025-26	-13,165.9
2026-27	-18,580.1
2027-28	-23,994.3
2028-29	-29,408.4
2029-30	-34,822.6

$$y = a + bx$$

$$Y = -5414.17 + 40975.82 X$$

It is inferred from the analysis that the production of betel leaf would further decline estimated as -34822.6 Metric Tonnes by 2030.

Conclusion

In Tamil Nadu, betel leaf is grown as an important cash crop. The study found that there was a drastic decline both area and production of betel leaf in Tamil Nadu over the study period. Trend analysis also indicated further fall in area and production. Hence, the study suggests that the Central and State Govt. Should jointly take appropriate steps to improving area under cultivation and production. Measures like pest management of betel Leaf form activities to establish a research and development board, to enhance export oriented activities meeting global standards, to reduce intermediaries in marketing and improved knowledge of technology will help the farmers to gain more.

References

1. Kaleeswari, V. and Sridhar, T. (2015), "A Study on Betel Vine Cultivation in Karur District", Bharathidhasan University, Ph.D Thesis.
2. Kumar, N. et al. (2010), "Piper betle Linn. a maligned Pan-Asiatic plant with an array of pharmacological activities and prospects for drug discovery", *Current Science* 99, 922-932.
3. Primalarangan, R. (2020), "Trends in Area, Production and Productivity in Onion in Tamil Nadu", *International Journal of Environment and Climate Change*, 10(11), 1-6.
4. Rajendra Toprani and Daxesh Patel (2013), "Betel leaf: Revisiting the benefits of an ancient Indian herb" *South Asian J Cancer*, 2(3), 140-141.
5. Sahaya Princy, P. (2020), "Production and Marketing of Betel Leaf A Study With Reference to Sholavandan Taluk Madurai District Tamil Nadu", Madurai Kamaraj University, Ph.D Thesis.
6. Sahaya Princy, P. and Hasan Banu, S. (2019), "Agronomy and Agro-Economics of Betel Leaf Production", *Journal of Analysis and Computation*, 1-12.
7. Supriyo Halder (2015), "A Study of Betel Vine Cultivation and its Market Crisis in Two Selected Blocks of Purba Medinipur, West Bengal", *International Journal of Recent Research in Social Sciences and Humanities*, 2(4), 58-66.

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A STUDY ON PRODUCTION AND MARKETING OF PANCHAMIRTHAM IN PALANI DINDIGUL DISTRICT OF TAMIL NADU¹²

Dr. C. SELVARAJ¹³

Introduction

The Palani Panchamirtham is a combination of five natural substances, namely, Banana, Jaggery Sugar, Cow Ghee, Honey and Cardamom in a definite proportion. i. For additional flavour, dates and diamond sugar candies are added to the aforesaid five substances. ii. That although the Palani Panchamirtham is prepared in huge quantities, it is prepared in a natural method without addition of any preservatives or artificial ingredients. iii. That it is extremely noteworthy that the Palani Panchamirtham originating from Palani is not subjected to any chemical process. iv. That the method of production of the Palani Panchamirtham at Palani also encompasses a unique process which results in the Panchamirthams' being produced in Palani, having its own identity and the same is very different from goods of similar nature. v. The whole process of producing Palani Panchamirtham in Palani is automated to cater to the increasing demand and it is also doubly ensured that hygienic aspects are highly maintained.

The Palani Panchamirtham is well known for its religious fervour and gaiety. It is well known even outside the geographic limits within which it is prepared and in countries around the world as the temple attracts large number of devotees Malaysia, Sri Lanka etc, where large number of persons of Tamil origin are residing. Palani Panchamirtham is an abishega Prasadam, which is served in a semi solid state, sweet in taste and is one of the main offerings in the Abisegam of Lord Dhandayuthapani Swamy, the presiding deity of Arulmigu Dhandayuthapani Swamy Temple situated in Palani Hills, Palani Town in Dindigul District of Tamil Nadu State.

Devotees who visit the temple, are offered the Palani Panchamirtham as prasadam in the Hill Temple as well as in stalls run by our Temple Administration at Adivaram. The Temple Administration prepares the Abisega Panchamirtham in a large scale in a hygienic set-up. The whole process of preparation of the Palani Panchamirtham has been automated. There are two opinions regarding the panchamirtham abisehams. First, panchamirtham applied to Palani Andavar statue has the healing effect for the decease. The second opinion is that abisheha products like fruits will perish over a night but if they are prepared as panchamirtham, the pooja product may be preserved for a long period. However, panchamirtham abisehams to Palani Andavar is continued from the ancient past.

History of Palani Panchamirtham

Arulmigu Dhandayuthapani Swamy is called by several names like Murugan, Kandhan, Subramanian, etc. In ancient days, he was worshipped as Tamil God Temil Kadavul and God

¹² Paper presented in the 42nd Annual Conference of Association of Economists of Tamil Nadu Organized by Post Graduate Department of Economics, Arulmigu Palaniandavar College of Arts and Culture, Palani, Dindigul District-624 601, Tamil Nadu on 25th February, 2023.

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of Mountains - Kurinji Kadavul. It was the practice of Tamil People to offer natural products what they got in nature as Naivediyam to God and for Abisegam. In those days they worshipped nature as God. Ancient Tamils classified habitation into 5 types and fixed Gods for each habitation. One such habitation was living in Mountains and mountainous regions called as Kurinji Land. People lived in those region worshipped Lord Muruga as their God. People lived in Kurinji Land offered natural products such as Banana, Honey, Milk and Milk Products, Cardamom etc. to God in gratitude. In course of time they began to make some combination of natural products in some definite proportion and offered to God. The combination of five natural products in natural method is called by the name Panchamirtham. Pancha in Tamil means five. There are references in Tamil Literary work regarding the habitations and Lord Muruga. Hence it is clearly revealed that the origin of Geographical indication dates back to ancient period.

Statement of the Problem

Panchamirtham which is known as the delicacy of gods provides lively hood to more than 200 families residing at the foothill of Palani. In Palani alone nearly 150 shops are engaged in the marketing of panchamirtham. The production of panchamirtham is unique in itself. Even though a number of studies has been carried out on different products, a very little attempt has been made for studying the production and marketing of panchamirtham. Hence this study aims at analyzing the production and marketing process of the panchamirtham in palani.

Objectives of the study

1. To analyze the manufacturing process of panchamiratham.
2. To know the marketing strategies adapted by manufacturers in the sale of panchamiratham.
3. To analyze the attitude of the consumers towards the purchase the panchamiratham.

Scope of the study

Since it was contemplated to study the problem in depth, Palani town has been selected. The Palani has a floating population of 3 lakhs per month which includes all the sections of the society general. About 120 permeant, 30 temporary panchamiratham shops are found in palani. This study was undertaken to cover all the panchamiratham shops and the opinion of the consumers regarding the same. It includes 30 business units. The study was primarily undertaken from the stand point of panchamiratham manufacturers and consumers.

Sampling Design

Primary data regarding the cost of production profitability and marketing of panchamiratham have been collected with the help of structured schedules from the producers of the panchamiratham. A sample 30 producers was selected for the study for applying lottery method. A random sample 50 consumers were selected for the study. A separate interview schedule has been prepared for the consumers.

Methodology

With a view to study the panchamiratham marketing the 30 business units of panchamiratham manufacturers in Palani town and a sample survey of panchamiratham

consumers in various palaces has been collected with the help two different interview schedules and the data have been carefully collected. The data were collected from field through a survey method.

Framework of Analysis

To under study the cost structure of panchamiratham production cost sheet has been prepared. The break-even analysis has been used to study the profitability of the panchamiratham production. In order to ascertain the brand preference by the consumers and problems by the manufacturers, the weighted arithmetic mean is used. The attitude of the consumer of the panchamiratham has been studied with help hiekert's scale. The relationship between attitude and social economic variables has been studied with the help chi-square test.

Method of Production

Palani Panchamiratham is presently being prepared in a Hygienic Production Unit situated in the West Giriveethi. It has three compartments meant for Storing of raw materials, Processing hall and Storage of finished products. The raw materials presently used are Banana, Jaggery, Cardamom, Honey, Ghee, Dates and Diamond Sugar Candy.

The raw materials required for the production of 481.500 kilograms of Palani Panchamiratham called by the name SET is as follows, a) Banana - 152Kgs, b) Jaggery - 288 Kgs c) Dates - 25Kgs d) Diamond Sugar Candy - 15 Kgs e) Ghee - 6 Kgs f) Honey - 2 Kgs g) Cardamom - 0.5Kgs.

One set yields 1020 Nos of 1/2 Kg Petjar Bottle (or) 1060 Nos of 1/2 Kg Laminated composite container. The raw materials are procured from ISO companies and Government undertaking institutions, Container are made of Food Grade Materials.

In the olden days, Palani Panchamiratham was prepared on the top of the Hill in the traditional manner and most of the operation was manual. With the ever-increasing stream of devotees, the temple administration was confronting problems to meet the demand of the Palani Panchamiratham. Hence it was decided to mechanize and modernize production units of Palani Panchamiratham. The Temple authority approached CFTRI (Central Food Technological Research Institute) a Government of India undertaking for the advice on mechanization of production unit. Then a separate Mechanized unit for preparation of Palani Panchamiratham was established. At present, the preparation of Palani Panchamiratham is fully automated and hygienically produced with measures in place to keep a quality control over it.

Number of Labourers, Workers & Human Skills Involved in Production of Palani Panchamiratham. During ordinary season 44 person per-day and during festival season: 88 persons per-day.

- a) Production work start with unloading the Raw-Banana from the Vehicle and placing it to the respective Storage centre. At the storage centre, Raw- Bananas are kept for ripening through Organic Natural Methods. b) Then the Human Labour is used to peel of the Ripen Bananas, and the skinless Bananas are Stored in a Suitable container. c) Then the Human Labour is used to carry the Banana fruit container in to the Fruit Grinding Centre. Then the mashed Banana flowing out of fruit mill is collected in aluminium container. d) Then the storage cans are taken to Panchamiratham Processing centre. e) Panchamiratham

production of raw materials have been taken in proportionate quantity as authorized by the Commissioner from their respective stock rooms and dumped into the stainless steel container mixer held at the height of the engine through lift. f) At that Mixer all ingredients are well mixed and it is transferred into Heating Boiler via Pump. After attaining stable state the heated Panchamirtham Mixture is transferred to automatic cold condensing Unit. g) The cooled down Panchamirtham Mixture is filled, packed and sealed into three types of labelled containers and stored them in the stock room. h) The packed Palani Panchamirtham is sent to the shops in Arulmigu Dhandayuthapani Swamy Thirukkoi. i) After finishing the work, the Labour is used to wash the work area on daily basis.

Private Manufacturers

Panchamirtham is not only a delicious but also a nutritious food. Most of the panchamirtham manufacturers are sole traders and it is their hereditary business. In Palani 70 per cent of the panchamirtham manufacturers are Hindus and 30 per cent are Muslims and there is no Christian manufacturer. Here education is not an obstacle in carrying out this business. Both literate and illiterate are running the business with profit.

All the panchamirtham manufacturers are purchasing raw materials in bulk just before the commencement of the season (Thai Poosam, Vaikasi Visakam, Kiruthikai, and Panguni Uthrafi). Otherwise they are purchasing raw materials for a minimum period of 5 days or maximum period of 10 days. Most of the manufacturers of panchamirtham purchase raw materials from local wholesale traders and a few manufacturers purchase directly from manufacturers. This minimum number of manufacturers purchase raw material from Maharashtra through the Lorry transport and the maximum number of manufacturers purchase raw materials through tri-cycle, two wheelers, autos. The manufacturers are doing business with their own and borrowed fund. The suppliers sell the raw material on credit to the panchamirtham manufacturers. A few years ago panchamirtham was sold in mud containers, which keep the taste of panchamirtham fresh and tasty for a long time. Now-a-days plastic bottles have replaced the mud containers. This results in panchamirtham losing its taste within a few days of package. Devasthanam sells panchamirtham in half-kilogram packages only and private manufacturers sell in half kg. and one kg packages.

Brand preference by consumers

In order to ascertain the brands purchased by the consumers they were asked to rank the different brands. It is evident that the sample consumers have accorded first preference for Devasthanam brand, followed by Chittanathan, Kanda Vilas, Suganda Vilas and Krishna Store.

Further, seventy-six percent of the Panchamirtham consumers found having strict brand loyalty. They consume the same brand right from the beginning only and 24 per cent consumers changed their brand from the previous one to the present brand. Eighty per cent of the consumers have patronage for their brand, 16 per cent recommended other brands and four per cent remain neutral.

Problems faced by the manufacturers

The main problems faced by the manufacturers of panchamirtham in Palani are stiff competition followed by inadequate finance, inadequate storage facilities and lack of transportation. The panchamirtham, collected after abiseham, is not only a delicious and nourishing food but also has astonishing properties to store for a long period.

Conclusion

The sale of Panchamirtham by the Devasthanam has been one of the main source earned income. Moreover, it is observed that every year at the time of festival around 5 lakhs devotees were visited the place of Palani and they usually purchased minimum of one kilogram of Panchamirtham. So the impact of globalization of this type of product is not going to affect elsewhere. Panchamirtham is prepared naturally and has vitamin-A, C and Iron. Many peoples are along with breakfast, lunch and dinner and they send Panchamirtham to their friends in foreign countries. It is ascertained from the manufacturers that the manufacturers do not export Panchamirtham. Suppose to export the folk product of Panchamirtham surely it will lead to compete in a global market.

DEVELOPMENT OF MADURAI CITY: A NOTE¹⁴

Dr. G. ANGALA ESWARI¹⁵ & Dr. M. MANJULA¹⁶

Introduction

Madurai city, in the state of Tamil Nadu, is one of the ancient temple cities of India. It is the cultural capital of Tamil Nadu and the administrative head quarters of Madurai District. As of the 2011 census, it was the third largest urban agglomeration in Tamil Nadu after Chennai and Coimbatore and the 44th most populated city in India located on the banks of River Vaigai. Madurai has been a major settlement for two millennia and has a documented history of more than 2500 years.

Despite this, the city's population and economy is developing. In 2010, the city's boundary expanded to cover the entire urban agglomeration. But even after 9 years of integration, differences exist between the newly merged areas and the old city. The spatial division in provision of basic services encourages the development and posed fundamental challenges in the path of sustainable development.

This paper discusses the development of Madurai city with regard to its demography, economy, health and education, and infrastructure.

Demography

It may be noted that in the first few decades after Independence, population growth of Madurai city was higher than the state average. In this period, the city acted as an important regional centre with the emergence of industrial units and educational centres, attracting people from the neighbouring districts of Ramanathapuram, Theni and Virudhnagar. Madurai district ranked 9th in terms of the highest population among the districts. The district urban population was 60.8%. The population density of the district was 819 persons/sq km.

Madurai Population 2022-2023

The current estimate population of Madurai city in 2023 is 1,402,000. The last census was conducted in 2011 and it was postponed due to Covid. The current estimates of Madurai city are based on past growth rate.

Madurai Literacy Rate 2022-2023

In education section, total literates in Madurai city are 834,104 of which 433,860 are males while 400,244 are females. Average literacy rate of Madurai city is 90.91 percent of which male and female literacy was 94.77 and 87.06 percent.¹

¹⁴ Paper presented in the 42nd Annual Conference of Association of Economists of Tamil Nadu Organized by Post Graduate Department of Economics, Arulmigu Palaniandavar College of Arts and Culture, Palani, Dindigul District-624 601, Tamil Nadu on 25th February, 2023.

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Business and Economy

Compared to other cities of Tamil Nadu, Madurai is a much more fast developing city in terms of business and economy. There are various sectors like agriculture, banking, exports, information technology, airlines, real estate and manufacturing industry, which are making a steady business in Madurai. Due to increase in city's economy, the job opportunities are also very good. Moreover, people from other states in India migrate to Madurai for setting up their business for its business friendly environment. Being a popular tourist and Industrial city, the business and economy in Madurai is at great heights. To revive the economy of Madurai district, several initiatives such as establishment of Special Economic Zones (SEZs), industrial and information and technology parks, etc., have been taken by the government (State Planning Commission, 2017).

Development in Agricultural Sector

The chief business in Madurai is agriculture. Being an agrarian city, Madurai produces major crops such as paddy, millets, pulses, cotton, oil seeds and sugarcane. The department of agriculture aims to increase the productivity land. There are about 66,354 farming population in Madurai city. Moreover, these crops are sent for export to neighbouring countries of India.

Development in Industrial Sector

Madurai remains as the most important district in terms of industrial development. Some of the major companies making a steady business in Madurai are TVS India, Fenner, TAFE, etc. Moreover, the recent survey by CII (Confederation of Indian Industries) has reported that Madurai city has high potential to be converted into a 'manufacturing hub' in South India as well as the city can be endorsed as a the best tourism corridor and knowledge gateway of South India. The growth has led to set up and development of many industrial estates in the city. It includes Hoisery Estates in Urangaanpatti, Automobile Industrial Estate in Kappalur, SIDCO Industrial Estate in K.Padur and Kappalur, etc. There is also number of small scale industries set up in all areas of the district.

The second major share of the city's economy is from textiles. Being famous for fine painted, zari bordered and sungidi saris, Madurai has a stiff competition in South India market. Tourists from all over the world to Madurai shopping areas to purchase a collection of pure cotton saris. Tourism and its associate sectors such as hotels and restaurants play an important role in the city's economy, mainly because of the religious importance of Madurai as a 'temple city'.

Madurai is very famous for jasmine. Moreover, people all over Tamil Nadu refer the best jasmine as 'Madurai Malli'. The size and enchanting fragrance of madurai malli mesmerizes the entire crowd. Jasmine cultivation is done near Madurai - foothills of Kodaikanal.

The demand is all over India, which Jasmine is exported to Salem, Delhi, Mumbai, Kochi, Bangalore, Calcutta, Hyderabad and Thiruvananthapuram. It is exported to Singapore and Middle East for preparing perfumes. As the city is covered with huge temples, ancient architecture and mandapams, tourists from various parts explore Madurai for its rich heritage and culture. Moreover, the tourist department takes special attention in every field for the visitor that is from place of stay to city tour.

The highest contributors to the secondary sector were manufacturing and construction. Madurai has a few reputed large-scale companies like M/s Madura Coats, Thiagaraja Mills, TVS Sundaram Iyengar. As the city is getting developed in various fields, the real estate market is at high peak. People in Madurai buy property for investment purposes apart from their residential or commercial usages. So there is a great competition in real estate business, which large builders and developers offer attractive investment options with valuable offers to the citizens. Some of the major competitors in the market are Jemi Housing, Jeya Bharath Housing, Agrini Housing etc.

One of the oldest continuously inhabited cities in the world, Madurai developed on the fertile plain of the River Vaigai and has been a major religious centre and settlement for two millennia. Today it is an important educational, industrial and tourism hub, but retains many odds and ends of its historic origins.

Development in Education

Education in Madurai city is imparted through both public and private institutions. There are 616 schools in Madurai. The public schools are run by central, state and local governments, within the administrative and financial control of the Department of Education. The private colleges are aided or unaided but have to be mandatorily registered with the designated authority.

The efforts made by the state government in the education sector are reflected in the high literacy rate in Madurai. The literacy rate of Madurai city is 90.9 per cent, which is higher as compared to the national (84.1%) and the state averages (87.0%) in 2011. Also, the gender gap in literacy in Madurai declined during 2001–2011 and is lower as compared to the national and state levels.

The city has also taken several innovative approaches in pedagogy to improve the quality of education and minimize the drop-out rate. 'Smart' classes¹³ have been introduced in schools to provide special audio-video sessions to make learning more interesting. To improve the communication skills of students, the medium of instruction has been changed to English in 36 schools from the academic year 2018–2019. The concept of 'happy schooling' has been introduced in secondary and higher secondary schools in collaboration with Hindustan Computer Limited and M. S. Chellamuttu Trust to promote emotional well-being among students.

Since the Eleventh Plan, privatization of education has become the dominant characteristic of the education system in Madurai with mushrooming of several private institutions. In Madurai, the share of private institutes in higher education, especially in technical education is very high mainly because of the large number of private engineering and business administration colleges, vocational institutes and polytechnics. The distribution of public and private institutions in higher technical education in the city bears similarity to the national- and state-level development. However, the divide between quantity and quality in the education sector is becoming more evident in Madurai.

Development in Health

Madurai has an extensive network of public health-care institutions. It has 2 multi-speciality hospitals, 1 cancer institute, 13 maternity hospitals, 35 primary health centres

(PHCs) and 31 urban primary health centres (U-PHCs). The U-PHCs are under the direct control of MMC and provide maternal and child health-care services.

The Rajaji Medical Hospital is the main referral hospital in Madurai at the secondary level. Recently, a new medical college, Velammal Medical College Hospital and a Research Institute have been established in the Anuppanadi area of Madurai. Madurai also has a regional cancer centre at the Rajaji Government Hospital. Apart from these public health-care institutes, the private sector also plays an important role in delivering health care in Madurai city.

Development in Infrastructure Facilities

The difficult network of rivers, channel, canals, tanks and groundwater forms the city's essential blue-green infrastructure, providing water, drainage and sanitation for domestic, agricultural and industrial use. The city is growing rapidly, and is expected to rise from 1.4m in 2011 to over 2 million people by 2031. This will lead to further pressures on infrastructure, housing, and basic services.

Madurai is also facing a wide range of risks that will hinder future economic growth and quality of life unless action is taken soon to future proof Madurai's development. These are risks such as water scarcity, climate change, growing traffic congestion and damage to important natural habitats. The city is likely to be particularly impacted by climate change. Madurai lies in a warm-humid climatic zone, which is hot and dry with intermittent and irregular rainfall. Increase in average temperatures and rainfall variability will lead to wide ranging effects on many sectors, including food and water systems, human health, buildings, transport, energy and ecosystems.

The blue-green infrastructure approach is essentially about demonstrating how to manage the interconnected set of challenges relating to water resources management (surface and ground water), water supply, water quality, sanitation, solid waste management, flooding and conservation of natural ecosystems in the context of the urban development trajectory of the city and its changing climate.

Madurai has well-developed transport facilities. Modes of transport in Madurai include road, rail and air. Madurai faces increasing daily traffic problems, so master plans have been prepared to reduce the city traffic and traffic problems in suburbs. **Madurai Metrolite** is the proposed metrolite system for the city of Madurai, Tamil Nadu, part of a major expansion of public transport in the city covering the distance from Thirumangalam to Othakadai around 31km with the cost of 8,000 crore.

To restrict the growth of slums, MMC has adopted the vision of a 'Slum Free City' in 2013, with the objective of promoting inclusive and affordable housing for all. The Tamil Nadu Slum Clearance Board, the nodal agency responsible for development of slum areas, has undertaken infrastructure improvement works in 126 slums. Madurai has been selected as a Smart City under the national Smart City Mission (SCM) which aims to develop smart infrastructures.

A total of 528.12 hectare area around the Meenakshi Temple is selected for heritage preservation, improvement of infrastructure and IT integration for aiding tourists and citizens

under the Area-Based Development (ABD) strategy of SCM. However under ABD, only 11 per cent of the city's population is supposed to benefit. Also, 81.7 per cent of the total allocation is directed towards the ABD, and this may further deepen the inequality across the city.

The pan city smart solutions visualize the development of an Integrated City Management and Control Centre, the key components of which are intelligent public transport, parking and traffic control systems, street light monitoring and management system, emergency response, surveillance system, waste collection, transportation monitoring system and integrated platform for e-governance.

Peer Reviewed Journal

AN ECONOMIC STUDY ON JASMINE CULTIVATION IN MADURAI DISTRICT WITH SPECIAL REFERENCE TO THIUPARANKUNDRAM TALUK¹⁷

Dr. S. MEENAKSHI¹⁸

Introduction

The term “Floriculture” is very popular and it is the art and knowledge of growing flowers to excellence. Floriculture includes the cultivation of flowering and ornamental plants for sales or use as raw material in cosmetic, perfume industry and the pharmaceutical sector. The flower cultivation today has grown into larger proportions and offers a wide scope of growth with profits. A person who is associated with this field is called as floriculturist.

Uses of Jasmine flowers

Jasmine is used for a variety of medicinal purpose. It has been used for liver disease, liver pain due to cirrhosis and abdominal pain due to acute diarrhoea. It is aid in the treatment of headaches, sunburns and rashes, irritability, pain, anxiety, depressions and urine problems. Jasmine oil has many beneficial uses.

Objective

1. To analyse the total cost, income and net income from Jasmine Cultivation.

Methodology

The required primary data have been collected from 120 farmers in Thiruparankundram taluk of Madurai district with the help of an interview schedule. The data collected from the respondents been analysed with the help of average and percentage.

Results and Discussion

Owing to great diversity in climate and other environmental conditions in different parts of the state, the varieties of jasmine cultivated vary from place to place.

TABLE – 1 Jasmine Varieties

S. No.	Variety	No. of farmers	Total
1	Malli	52	43.33
2	Pitchi	40	33.33
3	Mullai	28	23.34
Total		120	100

¹⁷ Paper presented in the 42nd Annual Conference of Association of Economists of Tamil Nadu Organized by Post Graduate Department of Economics, Arulmigu Palaniandavar College of Arts and Culture, Palani, Dindigul District-624 601, Tamil Nadu on 25th February, 2023.

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The Malli, Pitchi and Mullai varieties are mainly cultivated in the selected Thiruparankundram Taluk of Madurai district.

Farm size and Productivity

To find out the relationship between farm size and productivity (yield per hectare / kg), a simple regression model has been used. The data collected from the farmers revealed that the yield was measured in terms of kilogram per acre and it was converted into hectares. It was found that there was no relationship between farm size and productivity.

References

1. Arnold Krochmal and W. Grierson, "Brief History of Jasmine Growing in the United States" *Economic Botany*, 15(2), April-June 1961.
2. Sowmya Shankar B., et al., "Marketing of Jasmine in Karnataka: A Case of Bangalore and Bijapur District", *Indian Journal of Marketing*, 36(2), February 2008.

Peer Reviewed Journal

THE DYNAMICS AND TRANSFORMATION OF THE ECONOMY OF MADURAI CITY¹⁹

Dr. R. JASMINE²⁰

Introduction

Madurai, the second-largest city by area in Tamil Nadu, ranks only after the capital city, Chennai. The historical roots of Madurai trace back to an agrarian society, where rice paddies were the primary cultivation, supplemented by the cultivation of cotton crops. The introduction of cotton cultivation in the Madurai district, particularly in the region with black soil, took place during the Nayaka rule in the 16th century. This strategic move aimed to boost agricultural revenue. The fertile lands of the Vaigai delta, spanning Madurai North, Melur, Nilakottai, and Uthamapalayam, are renowned as "double-crop paddy belts," showcasing the region's commitment to agricultural productivity. Beyond traditional farming, the farmers in the district engage in a variety of subsidiary occupations, including dairy farming, poultry farming, pottery, brick making, mat weaving, and carpentry, diversifying their income streams. The fame of Madurai extends to its jasmine plantations, locally known as "Madurai malli," situated at the foothills of the Kodaikanal hills and traded at the bustling Madurai morning flower market. This market witnesses the daily participation of approximately 2,000 farmers, contributing to the city's vibrant floral economy.

The economic landscape of Madurai underwent a significant transformation with the advent of Small-Scale Industries (SSI) post-1991. This period saw a notable surge in industrialization, leading to a substantial increase in employment across the district from 63,271 individuals in 1992-93 to 166,121 persons in 2001-02. Madurai stands out as one of the few rubber-growing areas in South India, fostering a niche for rubber-based industries. These industries in Madurai specialize in the production of gloves, sporting goods, mats, and various utility products, with a significant emphasis on automobile rubber components. Automobile manufacturers emerge as the primary consumers of these rubber components produced in the city. In addition to the rubber industry, Madurai hosts a myriad of other sectors, including textiles, granite, and chemicals. These industries contribute to the city's economic diversity, further solidifying Madurai's status as a multifaceted economic hub.

Madurai, strategically positioned as a Tier II city, has become a focal point for Information Technology (IT) and industrial development. The suburban area of Kappalur, in particular, has evolved into a thriving business hub, with a notable concentration of automotive industries. Prominent players such as KUN BMW, Isuzu, Volkswagen, Toyota, Mahindra, Tata, Maruti Suzuki, Mitsubishi, Ashok Leyland, Jeep, and Fiat India (FCA) have established their presence in this region. To further facilitate industrial growth, the government has initiated the Uchapatti-Thoppur satellite township in Kappalur. The Small Industries Development Corporation in Kappalur has played a pivotal role in fostering

¹⁹ Paper presented in the 42nd Annual Conference of Association of Economists of Tamil Nadu Organized by Post Graduate Department of Economics, Arulmigu Palaniandavar College of Arts and Culture, Palani, Dindigul District-624 601, Tamil Nadu on 25th February, 2023.

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economic activity, hosting numerous polymer and houseware manufacturing units. This diversification reflects the city's commitment to supporting various industries, contributing to a robust and inclusive economic landscape.

Madurai has also emerged as a destination for the IT sector, with several software companies choosing to establish their offices in the city. Recognizing the potential for IT growth, the Software Technology Parks of India (STPI), an agency of the Government of India, has extended authorization to numerous companies, allowing them to avail benefits under the National Information Technology Development Program. Furthermore, the state government's proactive approach is evident in the proposal and establishment of two Information Technology-based Special Economic Zones (SEZ) in Madurai. These zones have attracted a diverse array of IT companies, with HCLTech and Honeywell standing out as key players that have developed their own campuses within the ELCOT IT Park in Madurai. This strategic move aligns with the broader vision of creating a conducive environment for IT-driven economic activities in the city.

Economy of Madurai

Madurai, distinguished among the cities of Tamil Nadu, stands as a dynamic and rapidly evolving economic powerhouse, outpacing its counterparts in various sectors. The city's growth trajectory is notably pronounced across diverse domains, including agriculture, banking, exports, information technology, airlines, real estate, and manufacturing industries. This multifaceted economic landscape contributes to Madurai's status as a bustling hub of commercial activity. Agriculture, deeply rooted in Madurai's historical identity, continues to play a pivotal role in the city's economic development. The cultivation of crops, especially in the fertile lands surrounding the Vaigai delta, has been a traditional mainstay. However, Madurai's economic metamorphosis extends far beyond agriculture, encompassing a robust banking sector that provides essential financial support to businesses and individuals alike. Exports have emerged as a significant driver of Madurai's economic engine. The city's strategic location and well-established trade networks have facilitated the growth of export-oriented industries, contributing to both regional and national economies. Furthermore, the city has embraced the Information Technology (IT) sector, attracting investments and fostering a conducive environment for IT companies. This diversification not only enhances economic resilience but also positions Madurai as a contemporary player in the global tech landscape.

The aviation industry, with the presence of airlines in Madurai, adds another dimension to the city's economic tapestry. Improved connectivity enhances business prospects and facilitates the inflow of investments. Real estate, propelled by urbanization and industrial growth, experiences a surge in development activities, reflecting the city's expanding economic footprint. The manufacturing industry, encompassing a spectrum of sectors, contributes significantly to Madurai's economic vibrancy. The production of goods ranging from automobiles to textiles underscores the city's role as an industrial powerhouse. As a consequence of this multifaceted economic landscape, job opportunities in Madurai are abundant, attracting a diverse workforce and contributing to the city's socio-economic dynamism. The favorable business environment in Madurai has transcended regional boundaries, drawing entrepreneurs from other states in India. The city's reputation for being business-friendly is a magnet for those seeking to

establish and expand their ventures. This influx of external talent and capital further amplifies Madurai's economic prowess, creating a symbiotic relationship between local and external stakeholders. Madurai's dual identity as both a popular tourist destination and an industrial city enhances its economic prominence. The tourism sector, with its historical landmarks and cultural richness, complements the robust industrial base, collectively propelling Madurai's business and economy to unprecedented heights.

Agricultural Sector of Madurai

Madurai, steeped in historical significance, has witnessed substantial growth and transformation in its agricultural sector, playing a pivotal role in the economic landscape of Tamil Nadu. The fertile plains surrounding the Vaigai River have historically been conducive to agriculture, with paddy cultivation standing as a cornerstone of Madurai's agrarian identity. According to data from the Department of Agriculture, Government of Tamil Nadu, Madurai has been a significant contributor to the state's rice production, with the Vaigai delta being a key region for double-crop paddy cultivation in areas like Madurai North, Melur, Nilakottai, and Uthamapalayam. Beyond traditional crops, Madurai has diversified its agricultural portfolio with the introduction of cotton cultivation. Historical records trace the origins of cotton farming in the region back to the Nayaka rule in the 16th century, showcasing the city's adaptability and openness to agricultural innovation. Today, Madurai's cotton cultivation contributes not only to local economies but also reflects the city's rich agricultural heritage.

Horticulture, particularly jasmine plantations, adds a fragrant dimension to Madurai's agriculture. Referred to as "Madurai malli," these plantations are concentrated at the foothills of the Kodaikanal hills and are a significant economic driver. The Madurai morning flower market, where an average of thousands of farmers participate daily, underscores the city's prominence in the floral industry. Data from agricultural extension guidelines in the Madurai region showcases the economic significance of horticulture, providing insights into the cultivation practices, market trends, and the overall impact on the city's economy. While traditional crops persist, farmers in Madurai have embraced income diversification through various subsidiary occupations, as highlighted by the Tamil Nadu Agricultural University's reports. Dairy farming, poultry, pottery, brick making, mat weaving, and carpentry serve as additional sources of revenue for farmers, contributing to the overall economic resilience of the agricultural sector.

Technological interventions have played a crucial role in modernizing agriculture in Madurai. Improved irrigation systems, including canal networks and advanced drip irrigation techniques, have mitigated water scarcity issues, contributing to the sustainable growth of agriculture. Mechanization, with the introduction of modern agricultural machinery, has streamlined farming processes, enhancing overall efficiency. According to government data, the adoption of these technologies has not only increased productivity but has also facilitated a shift towards more sustainable and resource-efficient farming practices. Government initiatives and policies have further propelled agricultural growth in Madurai. The state's emphasis on organic farming practices, subsidies on seeds and fertilizers, and the establishment of agricultural extension services are evident in the agricultural policy documents. Additionally, the government's focus is on providing financial assistance, agricultural inputs, and technological

support to farmers underscores a commitment to fostering a conducive environment for agricultural development.

Industrial Development in Madurai

Madurai's industrial sector has undergone remarkable growth, positioning the city as a significant player in Tamil Nadu's economic landscape. According to recent data from the Department of Industries and Commerce, the city's industrial development has seen substantial diversification, with a focus on key sectors such as manufacturing, textiles, granite, and chemicals. The Kappalur region, a suburban area of Madurai, has emerged as a thriving business hub, particularly for the automotive industry. Notable multinational companies, including KUN BMW, Isuzu, Volkswagen, Toyota, Mahindra, Tata, Maruti Suzuki, Mitsubishi, Ashok Leyland, Jeep, and Fiat India (FCA), have established a robust presence in this area. The establishment of the Uchapatti-Thoppur satellite township in Kappalur, as reported by the Small Industries Development Corporation, has further facilitated industrial growth and infrastructure development.

Madurai's foray into the Information Technology (IT) sector has been substantial. According to the Software Technology Parks of India (STPI), numerous software companies have set up offices in the city, contributing to the overall economic dynamism. The Tamil Nadu government's proactive stance is evident in the establishment of two Information Technology-based Special Economic Zones (SEZ) in Madurai. These zones have been fully occupied by various IT companies, and major players like HCLTech and Honeywell have developed their own campuses in the ELCOT IT park in Madurai. Moreover, RR Industries has played a pivotal role in the city's industrial landscape by developing a sprawling IT township spanning about 400 acres of land in Sholankurini. This private initiative underscores the commitment of the private sector to providing the necessary infrastructure for sustained industrial growth in Madurai.

The rubber industry is another notable feature of Madurai's industrial profile, with the city being one of the few rubber-growing areas in South India. The rubber-based industries in Madurai, as highlighted in various industry reports, focus on the production of gloves, sporting goods, mats, and automobile rubber components. Automobile manufacturers are the major consumers of these rubber components produced in the city. Madurai's industrial growth is not confined to specific sectors, as the city hosts a myriad of manufacturing units spanning textiles, granite, and chemicals. The industrial landscape is further enriched by the presence of Small-Scale Industries (SSI). According to data from the Department of Industries and Commerce, the period post-1991 saw a notable increase in industrialization, leading to a substantial surge in employment across the district.

Growth of Information Technology (IT) Industry

In recent years, Madurai has experienced a transformative surge in its business landscape, particularly with the notable imprint of the Information Technology (IT) industries on the state's economy. This epoch of growth and development has witnessed the meteoric rise of key IT sectors, including software development, human resources, business process outsourcing (BPO), accounting, and data entry industries, all registering remarkable rates of expansion. Prominent multinational companies have established a formidable presence in

Madurai, contributing significantly to the city's burgeoning IT sector. Among these key players are Honeywell Technologies India, Satyam, Oracle, HCL, and Sutherland Global. Their operations in Madurai exemplify the city's appeal as a thriving hub for diverse IT activities.

The Tamil Nadu government has played a pivotal role in fostering the growth of IT in Madurai by strategically projecting IT Special Economic Zones (SEZ). Notably, two such zones have been established in Madurai and are fully occupied by leading IT companies. This strategic move aligns with the broader vision of creating designated areas to facilitate the concentrated growth of the IT sector, contributing both to the city's economic vitality and the state's overall technological advancement. Beyond government initiatives, private entities have also contributed significantly to Madurai's emergence as a major IT hub. RR Industries, for instance, has spearheaded the development of an expansive IT township spanning approximately 400 acres of land in Sholankurini. This initiative underscores the private sector's commitment to providing the infrastructure necessary for the sustained growth of the IT industry in Madurai. Madurai's ascension as a major IT hub is noteworthy, positioning the city as a formidable player in the southern Indian IT landscape. This status is particularly significant as Madurai competes with, and even surpasses, the likes of Chennai and Bangalore, traditionally recognized as the primary IT hubs in South India. The city's strategic location, coupled with its business-friendly environment and robust infrastructure, has turned it into a highly sought-after destination for IT companies seeking expansion and new opportunities.

Potential Challenges in the Economy of Madurai

Madurai, despite its economic vibrancy and growth, faces several potential challenges that could impact its overall economic trajectory. One significant concern is the water management issue, especially given the reliance on the Vaigai River for agricultural activities. The availability of water, coupled with periods of drought, poses a threat to crop yields, impacting the vital agricultural sector. Sustainable water management practices, as highlighted in the agricultural policy documents of the Government of Tamil Nadu, are crucial to address this challenge and ensure the resilience of Madurai's agricultural economy. Additionally, the city is not immune to the broader challenges associated with climate change. Increasing temperatures, erratic rainfall patterns, and extreme weather events necessitate the development and adoption of climate-resilient agricultural practices. The need for sustainable adaptation measures is underscored in various government documents, emphasizing the importance of building resilience in the face of a changing climate. Furthermore, while Madurai has made strides in industrial and IT development, there is a need for continued infrastructure improvement to support the expanding business landscape. Addressing infrastructure gaps is crucial for sustaining economic growth, attracting further investments, and ensuring the city's competitiveness on a regional and national scale. Government reports and economic surveys provide insights into ongoing initiatives and potential strategies to overcome these challenges and fortify Madurai's economic foundation.

AN ECONOMIC ANALYSIS OF CASHLESS TRANSACTION OF THE PEOPLE IN DINDIGUL²¹

Dr. S. PICHAIPILLAI²²

Introduction

The term 'Cashless transaction' refers to the use of credit cards, debit cards, online payments and mobile wallets for financial transactions among public. The term 'cashless economy' is not new to the world. The countries around the world have already become less cash Economies when compared to India. India is one of the fastest growing economy with larger Gross Domestic Product. The objectives of cashless transaction in India were, a) To eliminate counterfeit currency b) To eradicate the existence of parallel economy in India, c) To reduce corruption and, d) To stop terror financing, and e) To enhance global trading.

Corruption and black marketing erodes the wealth of an economy and causes inflation which has its adverse impact on the poor and middle class people. Corruption reduces the income of the government and thereby brings down its investment and welfare activities which pose a serious threat to the development of the country. Constitution of Special Investigation Team (SIT), Enactment of 'Black Money and Imposition of Tax Act, 2015' and 'Benyamin Transaction Amendment Bill 2015', exchange of information with international agencies to combat tax evasion and black money, 'Introduction of Income Declaration Scheme, 2016', 'Prescribing requirement of PAN numbers on high value transactions' are some other steps taken by the government to curb black money.

This study aimed at analyzing the impact of cashless transaction upon the people of Dindigul. In order to cover the entire strata of the society, the primary data were collected under six different heads, namely farmers, small and petty traders, unorganized laborers, micro, small and medium entrepreneurs, salaried classes and general consumers. The numbers of sample respondents were chosen in proportion to the occupational distribution of the respondents in the study area. And hence, based on quota sampling technique, 170 sample respondents were chosen from the study area.

Objective of the Study

1. To find out the reason for the reluctance of people in the study area to switch to cashless transaction.

Methodology

A sample of 170 respondents from Dindigul have been selected by using Quota Sampling method. In proportion to the occupational distribution of people in the study area, Quota level was fixed and the respondents were chosen accordingly. The data collected through primary method were processed and analysed with statistical tools such as Chi-square test, Garret's ranking technique and averages and percentages.

²¹ Paper presented in the 42nd Annual Conference of Association of Economists of Tamil Nadu Organized by Post Graduate Department of Economics, Arulmigu Palaniandavar College of Arts and Culture, Palani, Dindigul District-624 601, Tamil Nadu on 25th February, 2023.

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Results and Discussion

The sample respondents were chosen between the age group of 25 to 55 years of age. They were a heterogeneous group covering illiterates to degree holders. In order to cover the entire strata of the society, the respondents were chosen from different occupations, namely farmers, small and petty traders, unorganized laborers, entrepreneurs and government and private employees. Around 61 per cent of the respondents were male and the rest of them were female. The respondents were chosen in such a way that they belong to various religions and community. Around 60 per cent of the respondents were married.

Table 1 Profile of the Respondents

S. No.	Demographic Profile	Frequency	Percentage
	Age	No. of. Respondents	Percentage
1.	Up to 25	23	13
2.	25 – 35	35	21
3.	35 – 45	67	40
4.	45 – 55	45	26
	Total	170	100
	Gender	No. of. Respondents	Percentage
1.	Male	103	61
2.	Female	67	39
	Total	170	100
	Marital status	No. of. Respondents	Percentage
1.	Married	102	60
2.	Unmarried	68	40
	Total	170	100
	Educational Qualification	No. of. Respondents	Percentage
1.	Illiterates	19	11
2.	Up to Primary level	42	25
3.	Upto Secondary Level	44	26
4.	Degree & Above	65	38
	Total	170	100
	Employment Status	No. of. Respondents	Percentage
1.	Farmers	30	17
2.	Unorganized Laboures	20	11
3.	Entrepreneurs	40	24
4.	Traders	40	24
5.	Salaried Class	40	24
	Total	170	100

S. No.	Demographic Profile	Frequency	Percentage
	Monthly Income	No of Respondents	Percentage
1.	Less than 20000	16	9
2.	20000 – 30000	27	16
3.	30000 – 40000	46	27
4.	40000 – 50000	34	20
5.	50000 – 60000	29	17
6.	>60000	18	11
	Total	170	100

Source: Primary data

The agricultural lands that surround the area are irrigated through Cauvery water. The economic activities in Dindigul largely depend upon the flow of water in the river. Dindigul has a strong industrial base and it is a center of various popular educational and health care institutions. Hence, Dindigul has a heterogeneous group of population with farmers, traders, professionals and entrepreneurs. The above table reveals the average monthly income of the respondents during a normal monsoon. The income of the respondents ranged between Rs.20,000 per month and 60,000. Around 47 percent of the respondents earn between Rs.30,000 and Rs.50,000. Only 28 percent of the respondents earned more than Rs.50,000 per month.

Table 2 Mode of Cashless Transaction

S. No.	Mode of Cashless Transaction	No. of Respondents	Percentage
1	Payment through Debit cards	54	31
2	Payment through Credit cards	18	11
3	Net banking	17	10
4	Mobile Wallets	42	25
5	Cash alone	39	23
	Total	170	100.00

Source: Primary data

Around 42 percent of the respondents used credit cards and debit cards; Ten percent of them used net banking facility; 25 percent of the respondents resorted mobile wallets and 23 percent of them are comfortable with cash alone.

Table 3 Purpose – wise Digital Payment

S. No.	Use Cases of Digital Payment	Percentage of City Respondents (%)	Percentage of Rural Respondents (%)
1	Prepaid mobile recharge and phone bill payment	70	73
2	Utility bills	51	24
3	e-commerce	42	13
4	Travel booking	37	10
5	Fund transfer	63	28
6	Merchant outlets	32	12

Source: Primary data

It has been found that the respondents both in rural and urban areas used cashless transaction more for prepaid mobile recharge and phone bill payments. Around 63 percent of urban respondents use this facility for fund transfer. 51 percent of urban respondents make digital payments for utility bills. 42 percent of them make this payment for e-commerce. Digital payment is made for travel booking and in merchant outlets by 37 percent and 32 percent of the urban respondents. 28 percent of the rural people avail digital payment for fund transfer. 24 percent of rural respondents pay utility bills through digital payments.

Table 4 Opinion of the respondents with regard to the Benefits of Cashless Transaction

S. No.	Benefits of Cashless Transaction	Garret's Ranking Score	Mean Score	Rank
1	Curbs Black money	10301	60.59	2
2	Controls Note bank politics	8317	48.92	4
3	Regulates Real estate Growth	7323	43.07	6
4	Prevents Hawala transaction	7416	43.62	5
5	Controls Terror financing	10344	60.85	1
6	Simplified money transaction	9678	56.93	3

Source: Primary data

With the help of Garret's technique, it is understood that majority of the people gave maximum weightage to cashless transaction in controlling finance for terrorists. Most of them were of the opinion that terrorism puts a threat on the country's unity. Second rank was given to the benefit of cashless transaction in controlling black money. And the respondents appreciated cashless transaction for its simplicity and time saving technique. Fourth place was given by the respondents for its benefit of controlling corruption and bribery in politics. Checking of hawala transactions was given 5th rank. Many other people were of the opinion that the black money invested in real estates was the main reason for sky rocketing prices in that sector and ranked it the sixth important benefit of cashless transaction. After demonetization, prices in real estate is under control, making housing affordable to poor people.

Table 5 Preference for Cashless Transaction

S. No.	Reasons for Preferring Cashless Transaction	Garret's Ranking Score	Mean Score	Rank
1	Easy payment	10367	61.00	1
2	No need to carry cash	8367	49.21	4
3	No need to keep change	7361	43.30	6
4	Payment made anywhere, any time	10219	60.11	2
5	Cheap cost of transaction	9693	57.01	3
6	Gifts and Rewards	7431	43.71	5

Source: Primary data

It is understood that majority of the people gave maximum weightage to cashless transaction for its benefit of making payment easier. It scores second rank for facilitating cash transaction anywhere and at any time. In order to encourage cashless transaction, many of the banks are providing online transactions, mobile wallet transactions and credit and debit card transactions either at free of cost or at a cheaper rate. And hence, this benefit is ranked third. Cashless transaction eliminates the risk involved in carrying lump sum cash and the fear of

theft. Finally, people prefer cashless transaction for it solves the problem of keeping change for each and every transaction.

Table 6 Barriers in Cashless Transaction

S. No.	Barriers in Cashless Transaction	Percentage of Respondents	Rank
1	Lack of access to Smart phone	9	5
2	Lack of knowledge and skill to operate devices	17	3
3	Unreliable internet connection	24	2
4	Fear of losing money due to faulty transactions	38	1
5	Reluctance of traders and entrepreneurs in using cashless transaction	12	4

Source: Primary data

Around five barriers were noted by the respondents in cashless transaction. Nine percent of the selected respondents were not afforded to buy a smart phone. This is ranked as the fifth problem. Seventeen percent of the respondents possessed no knowledge to operate and make cashless payments. Twenty four percent of them were of the opinion that unreliable internet connection is the major barrier to cashless transaction. Thirty eight percent of the respondents were afraid of losing money due to faulty transactions. Around twelve percent of the respondents stated that a few traders and entrepreneurs are not ready to accept cashless payments, as they want to evade taxation.

The study reveals that majority of the respondents, i.e., 46 per cent of them use cash payment more frequently than cashless payment; 33 per cent of them used both the payments equally according to the situation; 21 percent of the respondents use cashless payments more frequently than cash.

Age, Education and Income of respondents and their perception of cashless transaction were examined by testing hypothesis.

- i. The null hypothesis is accepted and it is concluded that level of perception towards cashless transaction depends upon the age of the respondents.
- ii. The null hypothesis is rejected and it is concluded that the level of perception towards cashless transaction depends upon the level of education of the respondents.
- iii. The null hypothesis is rejected and it is concluded that the level of perception towards cashless transaction depends upon the level of income of the respondents.

Findings and Suggestions

India is a country where culture and tradition play a key role and people are reluctant to change. The transformation from cash to cashless economy is a paradigm shift. Demonetization has pushed the economy towards the path of cashless transaction. As per the data produced by Reserve Bank of India, there has been a considerable increase in the volume of digital transactions from 796.6 million in October 2016 to 3323.4 million in March 2019. The value of transactions went up from ₹108 trillion to ₹258 trillion during the same period. Implementation of low cost digital payment modes for businesses, restrictions for the withdrawal of cash from ATMs, enhanced facilities to make digital payments for fuels, insurance, phone bills, electricity bills merchant outlets and ticket booking for bus, train and

movies etc. has increased the use of cashless transaction now a days. But, in spite of all these benefits, digital payment suffers from the risk of theft of personal identity of people, hacking of bank accounts etc. Reluctance of people in making digital payments and their fear for indirect imposition of handling charges by financial institutions etc., still remain a blockade in the way of cashless transaction.

The reach of cashless transaction is not even among the people in the study area. This facility is frequently used by the residents of Dindigul than the people in villages. Likewise, the use of cashless transaction is positively correlated with the education and income of the respondents. By educating the rural people in handling digital modes of transaction, the government could increase cashless transaction at rural level. Extension of those concessions and discounts for digital payments for next few years will further enhance Cashless transaction. And the government should also take up the responsibility of controlling cyber-crime and ensuring risk free digital transaction.

Conclusion

In spite of all initial sufferings, the people of India are gradually switching over to cashless transaction. Increased use of smart phones, access to internet at affordable cost, greater literacy level, provision of free laptops to students, awareness about the general benefits of cashless transaction etc., has laid a strong foundation for cashless economy in Tamil Nadu, especially among the people of Dindigul district. If the above said problems are rectified by the government, our dream of cashless, corrupt free economy will soon become a reality.

References

1. Amit Kumar Sing (2018) “ Demonetization: A Step towards Cashless Economy” International Journal for Research in Applied Science & Engineering Technology (IJRASET) Volume 6 Issue I, January 2018- Available at www.ijraset.com.
2. Budheshwar Prasad Singhraul and Yogita Satish Garwal (2018) “Cashless Economy – Challenges and Opportunities in India” Pacific Business Review International 10(9), March 2018
3. Paramahamsa, R., & Eliot, G. (2016-17). “Demonetisation: To Deify or Demonize?” Retrieved March 14, 2017, from <http://indiabudget.nic.in/es201617/echap03.pdf>
4. Sarika.P , S.Vasanth (2019), “Impact of Mobile Wallets on Cashless Transaction”- International Journal of Recent Technology and Engineering (IJRTE) ISSN: 2277-3878, 7(6S5), April 2019
5. Vedashree Mali, (2016) - “A step towards modified India” International Journal of Commerce and Management Research ISSN 2455-1627, 2016.

AN ECONOMIC ANALYSIS OF SOLID WASTE MANAGEMENT IN TAMIL NADU²³

Dr. P. HEMA²⁴

Introduction

Environment degradation is a result of social transformation, economic development, technological advancement and high growth of population. The resources available in the blue planet are common for all living beings. But man, with his wisdom, has taken control over all the resources and grabbed the share of other living beings. Man, in the name of development, has been exploiting all the resources to fulfill his everlasting greed, and thereby causing ecological imbalance and destroying bio-diversity. The scientific and technological developments though enhanced the physical well-being of man, ended in the deterioration of natural resources, which is indispensable for survival of life on earth.

Objectives

1. To estimate the solid waste generated in Tamil Nadu for the past eight years.
2. To analyse the causes of increase in solid waste generation.
3. To examine the measures taken by the State government to control the generation of solid waste in Tamil Nadu.

Methodology

This study is based upon secondary sources. The per capita solid waste generation for the entire nation was studied for six years, i.e., from 2015-16 to 2020-21. And the data regarding the trends in solid waste generation in Tamil Nadu collected for eight years i.e., from 2015-16 to 2021-22. Statistical tools such as Percentage, AGR and CAGR were used to analyze the data and retrieve conclusion.

Sources of Solid waste

Waste is defined as “unwanted material generated out of human activity such as change in consumption pattern, urbanization, rapid increase in population”. The global annual generation of solid waste was estimated as 2.24 billion tonnes in 2020. With rapid population growth and urbanization, annual global waste generation is expected to increase by 73% from 2020 level to 3.88 billion tonnes in 2050.

Solid wastes are generated from domestic households, industrial units, commercial areas, building sites, agricultural lands etc. Based on the content, they are classified as organic materials, glass, metal, plastic paper, toxic, non-toxin, flammable, radio-active, and infectious materials. The Change in the pattern of life of people has deviated them and reduced their

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concern towards nature, resulting in increased environmental degradation. The following table explains the trends in solid waste generated in India during the past six years.

Table 1 Trends in Solid Waste Generation in India

S. No.	Year	Solid waste generation Per capita (gm/day)	Annual Growth Rate (AGR)
1.	2015-16	118.68	-
2.	2016-17	132.78	11.880
3.	2017-18	98.79	-25.598
4.	2018-19	121.54	23.028
5.	2019-20	119.26	-1.875
6.	2020-21	119.07	-0.159
		CAGR	0.328

Source: Central Pollution Control Board - Annual Report - 2020-21

The data reveals that except during 2017-18, the per capita generation of solid waste remains more than 100 grams per day. And it is understood that environmental pollution due to solid waste requires even more attention to be controlled.

Table 2 Trends in Solid Waste Generation in Tamil Nadu

S. No.	Year	Solid waste generation (Tons/day)	Annual Growth Rate (AGR)
1.	2015-16	14,600	-
2.	2016-17	15,000	2.74
3.	2017-18	14,746	-1.693
4.	2018-19	13,968	-5.276
5.	2019-20	14,228	1.861
6.	2020-21	13,422	-5.664
7.	2021-22	14,585.49	8.664
8.	2022-23	16,066.392	10.154
		CAGR	10.041

Source: Tamil Nadu Pollution Control Board

The data related to Tamil Nadu reveals that as a result of the persistent efforts taken by the government, the solid generated in the state has been kept within the limits. In spite of the fact that there is no absolute fall in the amount of solid waste generated per day, we could keep the deviations under control. But, during the year 2022-23, the solid waste generated per day has been increased to an extraordinary level of 16,066.392 tons.

Solid Waste Management

Management of solid waste involves the following processes i) Collection ii) Segregation and iii) Disposal.

In Tamil Nadu, sanitary workers are appointed in order to collect waste from source. House to house collection of solid waste are organized in urban local bodies, by using collection

bins, compactor bins, lorries using dust bins, etc. Transport facilities such as dumper placer, tipper lorry, trucks, etc., have been used by the corporations for transportation of wastes. Municipalities and town panchayats utilize the transport facilities such as tractor trailer, dumper placer, tipper, tricycle, push carts etc.

The biodegradable wastes are composted using Micro Compost Centres (MCCs), Windrows, and Biomethanation plant. Segregated non-biodegradable of non-recyclable nature waste is sent to cement industries for co-incineration and recyclable waste is sent to waste recyclers and remaining waste is dumped in dump yards.

By 2022-23, there are 1008 MCC, 907 OCC, 544 Windrow Composting facilities, 107 Bio methanation plants, 2 Bio gas/Bio CNG plants installed and are in operation. In Tamilnadu, there are around 271 dumpsites to dump the non-recyclable wastes. Constant efforts are being taken up by the government for the reclamation of land sites under landfills. So far, 574 acres of land are reclaimed.

Conclusion

There has been a common view that the environmentalists all over the world are constantly insisting that a reduction and control of generation of waste could be the only viable, lasting and cost effective solution for safe environment. This could be achieved by educating people, inculcating a habit of responsibility towards society and involving them in environmental protection activities. The government should take steps to increase the leadership activities of Non-Profit and Non-Government Organizations in waste management. Towards this the 4R principles of Refuse; Reduce; Re-use and Recycle should be made popular among the citizens of our state.

A STUDY ON AGRICULTURAL LABOUR FORCE AND ECONOMIC GROWTH WITH REFERENCE TO DINDIGUL DISTRICT²⁵

Dr. R. REVATHI²⁶ & NP. MURUGESAN²⁷

Introduction

The regional economic growth on agricultural labour force is interlinked with transformation of agricultural products and resource mobilisation in micro level. One of the main goals of the five year plan is agriculture namely to help agriculture labourers and the lower classes it catches up to the rest of society by providing more chances for employment and improved living conditions for all segments of the rural community. The increase in the number of farmers and agriculture labourers and landless labourers have been one of the most distinctive characteristics of India's rural economy.

In this concern, the place which is spatial distribution on horticulture and fertile type of zone and dry land agriculture is occupied in Dindigul district. It has inter connectivity with labour force and resource mobilisation. The green revolution in the mid-1960s boosted agricultural growth, and studies on the trends in agricultural wages assumed significance. Structural change in employment has been slow, particularly in agriculture, and agriculture's share in income has declined faster than employment has transitioned. This shift requires us to focus on the trends in agricultural wages, because most agricultural labourers in rural India depend on farm work and agricultural wages for their livelihoods they are poor and have few assets and employment opportunities. (Sant Kumar 2020)

Review of literature

Sant Kumar (2020) analysed wage data for the major states of India for the period from 1995–96 to 2016–17. This study examined the trends in real agricultural wages, and it found that the pattern of increase in wages (nominal, real, by operations and gender) was broadly similar in the study states and periods, with varying degrees. At the country level, wages increased steadily during all the three periods (1998–99, 2008–09, and 2016–17). Nominal wages increased similarly at the country level and in the study states, with varying degrees. In all the periods, the real increase in wages was high in Haryana, Jammu & Kashmir, and Kerala; moderate in Himachal Pradesh, Punjab, and Rajasthan; and minimal in the remaining states. Wages for sowing and harvesting increased similarly.

Statement of the problem

The labour force participation in Dindigul district is 41.8%, according to statistical report 2018. The total cropped area is 219402 sq km in Dindigul. But agriculture labour participation is gradually reduced in Dindigul district due to industrial labor demand and facilitating which is boosted for nearest districts. Despite of more agricultural components

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and resources, the local labour supply is shown little ignore of agriculture work in recent days. What are the causes and consequences of agricultural labour force in Dindigul districts? How farming practise are entertained and maintained properly? Hence, this paper makes attempts to find out the solutions for ignorance of agricultural labour force in the study area.

Objectives

1. To study the socio economic background of the Agriculture Labour in the study area.
2. To examine the nature of agriculture work engaged in the study area.

Methodology

This study is based on primary data collected from 120 sample respondents residing in the major cultivation areas of Dindigul District. Chi – Square test is used for analysis.

Results and Discussions

Based on the observation from the field, and from the opinion from the selected agricultural labourers a Chi-Square test has been applied.

$$\text{Chi-Square Test } (\chi^2) = (O - E)^2$$

Where, O = Observed frequency

E = Expected frequency

$E = (\text{Row total} \times \text{Column total}) / (\text{Grand total})$ Degrees of freedom = (C-1) (R-1)

C = Column

R = Row

Educational Qualification and their Level of Opinion

Education is a vital factor which influences the level of opinion of the respondents. Independent identity of respondents can be proved only through education. Educational qualification of the respondents and the level of opinion are shown in Table 1.

Table1 Educational Qualification and their Level of Opinion of the Sample Respondents

Sl. No.	Qualification	Level of Opinion			Total
		Low	Medium	High	
1.	Illiterate	8 (6.67%)	28 (23.33%)	12 (10.00%)	48 (40.00%)
2.	Middle-school	10 (8.33%)	24 (20.00%)	18 (15.00%)	52 (43.33%)
3.	Upto SSLC	5 (4.17%)	9 (7.50%)	6 (5.00%)	20 (16.67%)
	Total	23 (19.17%)	61 (50.83%)	36 (30.00%)	120 (100.00%)

Source: Primary Data.

It is evident from table1 that out of 120 respondents with high-level opinion, 12 (10.00%) respondents are illiterate, 18 (15.00%) respondents are studied middle school and the remaining 6 (5.00%) respondents are studied up to SSLC. Out of 61 respondents with a medium level opinion, 28 (23.33%) respondents are illiterate, 24 (20.00%) are studied middle school and the remaining 9 (7.50%) respondents are studied. Out of 23 respondents with low-level opinion, 8 (6.67%) respondents are illiterate, 10 (8.33%) are studied middle school and the remaining 5 (4.17) respondents are studied upto SSLC.

For finding out the relationship between educational qualification and their level of opinion, the following null hypothesis is formulated, "There is no relationship between educational qualification and the level of opinion of the respondents". To test the above hypothesis, the chi-square test is applied.

Table 1-Educational Qualification and Level of Opinion of the Sample Respondents- Chi-square Test

Cell	O	E	O-E	(O-E) ²	(O-E) ² /E
R1C1	8	9	-1	1	0.111
R2C1	24	24	4	16	0.666
R3C1	14	14	-2	4	0.285
R1C2	10	10	0	0	0
R2C2	27	27	-3	9	0.333
R3C2	16	16	2	4	0.25
R1C3	4	4	1	1	0.25
R2C3	10	10	-1	1	0.1
R3C3	6	6	0	0	0
				Total	1.995

Source: Primary Data.

$$\begin{aligned}\text{Degrees of Freedom} &= (c - 1)(r - 1) \\ &= (3 - 1)(3 - 1) \\ &= 4\end{aligned}$$

$$\text{Calculated Value of } \chi^2 = 1.995$$

$$\text{Table Value of } \chi^2 = 9.49$$

As the calculated value (1.995) is less than the table value (9.49) at 5% level of significance, the null hypothesis is accepted. Hence, it could be concluded that there is no relationship between educational qualification and their level of opinion.

Table 2 Type of Business and Level of Opinion of the Sample Respondents

S. No.	Type of Business	Level of Opinion			Total
		Low	Medium	High	
1.	Own Land	8 (6.67%)	20 (16.67%)	12 (10.00%)	40 (33.33%)
2.	Agricultural to another land	10 (8.33%)	12 (10.00%)	10 (8.33%)	32 (26.67%)
3.	Others	5 (4.17%)	29 (24.17%)	14 (11.67%)	48 (40.00%)
	Total	23 (19.17%)	61 (50.83%)	36 (30.00%)	120 (100.00%)

Source: Primary data

It is inferred that out of 61 respondents with a medium level opinion, 16.67 percent of them have own land, 10.00 percent of them have agricultural to an other land, and the rest

11.67 percent of them have come under the other category. Out of 36 (30.00%) respondents with high-level opinion, 10.00 percent of them have own land, 8.33 percent of them have agricultural to other land and the remaining 11.67 percent of them have come under the other category. Out of 23 (19.17%), respondents with a low level of opinion, 6.67 percent of them have own land, 8.33 percent of them have agricultural to other land and the remaining 4.17 percent of them are come under the other category of other.

For finding out the relationship between type of business and their level of opinion, the following null hypothesis is formulated, "There is no relationship between type of business and the level of opinion of the respondents". To test the above hypothesis, the chi-square testis applied and the computed results of chi-square test are presented.

Chi-square Test

Cell	O	E	O-E	(O-E) ²	(O-E) ² /E
R1C1	8	8	0	0	0
R2C1	20	20	0	0	0
R3C1	12	12	0	0	0
R1C2	10	6	4	16	2.666
R2C2	12	16	-4	16	1
R3C2	10	10	0	0	0
R1C3	5	9	-4	16	1.777
R2C3	29	24	5	25	1.041
R3C3	14	14	0	0	0
				Total	6.483

$$\begin{aligned}
 \text{Degrees of Freedom} &= (c - 1) (r - 1) \\
 &= (3 - 1) (3 - 1) \\
 &= 4
 \end{aligned}$$

$$\text{Calculated Value of } \chi^2 = 6.483$$

$$\text{Table Value of } \chi^2 = 9.49$$

It is inferred that the calculated value (6.483) is less than the table (9.49) value at 5% and level of significance, the null hypothesis is accepted.

It can be concluded that there is no relationship between the Type of Business and Level of the opinion of the sample respondents.

TRENDS IN PRODUCTION OF REGISTERED MANUFACTURING SECTOR IN TAMIL NADU²⁸

Mrs. RUTH REBECCA R.²⁹

Introduction

India's recent economic growth has been due to a massive surge in the service sector with the manufacturing sector continuing to stagnate, contributing only 15-16 percent of the Gross Domestic Product. As against this, the manufacturing sector in China accounts for about 42 percent of the GDP. India's manufacturing sector is only about 13 percent of that of China. It is now being increasingly recognized that unless India's manufacturing sector picks up strongly, it will be difficult to sustain rapid economic growth on the one hand and provide productive employment opportunities to the increasing labour force on the other hand.

History of all developed countries, Asian Tigers and China show that all of them have attained economic growth by focusing more on the manufacturing sector where output is more tangible and where most of the innovations are first generated. All these considerations have once again brought back industrial policy into focus in the form of the National Manufacturing Policy (NMP) released by the Government of India on November 4, 2011.

Ministry of Statistics and Programme Implementation (2021) Tamil Nadu is the second wealthiest state by GDP and is the most industrialized state in India. Over 60% of the state is urbanized, accounting for 10.6% of the urban population in the country, while only comprising 6% of India's total population. It has been ranked as the most economically free state in India by the Economic Freedom Rankings for the States of India. Tamil Nadu is the only state in India to have all its districts covered under industrial corridor projects. It is aimed at the development of futuristic industrial cities in Tamil Nadu that can compete with the best manufacturing and investment destinations in the world.

Table 1 Manufacturing in the secondary sector in Tamil Nadu, 1960-2000

Years	1960-61	1970-71	1980-81	1990-91	1999-00
Secondary sector	100	100	100	100	100
Manufacturing	72.82	73.81	81.88	73.02	70.21
Others	27.18	26.19	18.12	26.98	29.79

Source: Government of Tamil Nadu, Department of Economics and Statistics.

NB: Figures for 1960-91 are based on 1980-81 prices and thereafter on 1993-94 prices.

The contribution of each of the three units, manufacturing, electricity, gas, water supply, and construction within the secondary sector is not the same during the period 1960-2000. The manufacturing industry accounts for more than 70 percent of the contribution, growing from 72.82 percent during 1960-61 to 81.88 percent in 1980-81 and reaching a low 70.21 percent during 1999-00.

²⁸ Paper presented in the 42nd Annual Conference of Association of Economists of Tamil Nadu Organized by Post Graduate Department of Economics, Arulmigu Palaniandavar College of Arts and Culture, Palani, Dindigul District-624 601, Tamil Nadu on 25th February, 2023.

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The growth rate of Tamil Nadu was lowest from 1990. Hence, the paper analyse the growth rate of manufacturing industries and employment in the state after the establishment of Tamil Nadu industrial policy 2014.

Methodology

The firm-level data of State Gross Value Added at the current price as output and the total number of persons engaged as labour input collected from the Annual Survey of Industries (ASI) published by the Central Statistical Organization (CSO), Government of India covered the period from 2008-09 to 2017-18. The two-digit manufacturing industries are classified based on the industrial code among which fifteen industries have been selected for quantitative analysis. The Gross State Value Added variables are in nominal terms to convert the values into real terms an appropriate wholesale price index of 2011-12 was collected from the Office of the Economic Adviser, Department for Promotion of Industry and International Trade, Ministry of Commerce, and Industry. To identify the relationship between the registered manufacturing sector's output growth and employment growth in Tamil Nadu for the periods 2008-2018 for which fifteen manufacturing industries have been selected for analysis. The study period has been fragmented into two sub-periods based on the establishment of Tamil Nadu Industrial Policy 2014. The first sub-period of five years was based on before the establishment of Tamil Nadu Industrial Policy, 2014 which covers the period 2008-2013, and the second sub-period of five years based after the establishment of Tamil Nadu Industrial Policy, 2014 covers the period 2013-2018.

Results and Discussion

Table 2 Average Annual Growth Rate of Gross State Value Added in Manufacturing Sector

(Percent per annum)

Industry Code	Industries	2008-13 Before TNIP- 2014	2013-18 After TNIP- 2014	2008- 2018
10	Manufacture of Food Products	15.77	18.14	13.26
11	Manufacture of beverages	17.74	-19.34	1.20
12	Manufacture of tobacco products	61.53	-4.44	21.43
13	Manufacture of textiles	12.47	3.98	9.03
14	Manufacture of wearing apparel	14.73	6.33	11.30
15	Manufacture of leather and related products	18.80	15.29	16.70
17	Manufacture of paper and paper products	11.85	-1.03	5.31
18	Printing and reproduction of recorded media	34.36	2.50	6.08
19	Manufacture of coke and refined petroleum products	33.48	50.29	25.02
20	Manufacture of chemicals and chemical products	28.63	24.52	21.61

Industry Code	Industries	2008-13 Before TNIP- 2014	2013-18 After TNIP- 2014	2008- 2018
22	Manufacture of rubber and plastics products	33.98	7.11	19.12
23	Manufacture of other non-metallic mineral products	15.36	7.21	9.90
24	Manufacture of basic metals	43.66	5.52	13.35
25	Manufacture of fabricated metal products, except machinery and equipment	20.96	0.35	7.93
30	Manufacture of other transport equipment	17.57	37.85	22.17
	Tamil Nadu	23.38	9.55	14.09

Source: Computed using ASI data

The average annual growth rate of fifteen industries in the manufacturing sector of Tamil Nadu before the Tamil Nadu Industrial Policy 2014 was 23.38 per cent. Here it reveals the real gross state value added of subsectors among the fifteen sectors in Tamil Nadu has a positive growth rate of more than 10 per cent in all the manufacturing industries between the periods 2008-13. The growth rate of the Manufacture of tobacco products (61.53 per cent) and the Manufacture of basic metals (43.66 per cent) has a higher growth rate. The manufacture of paper and paper products (11.85 per cent) and Manufacture of textiles (12.45 per cent) industries have less than 15 per cent growth rates.

The growth rate for total industrial production was largely influenced by the manufacturing sector. Tamil Nadu's total growth rate was 9.55 per cent after the Tamil Nadu Industrial Policy 2014. The growth rate has been highest in the manufacturing of coke and refined petroleum products industry (50.29 per cent). The major six districts such as Chennai, Madurai, Kanyakumari, Kanchipuram, Coimbatore, and Tiruvallur have been manufacturing coke-refined petroleum products and nuclear fuel in Tamil Nadu. It is followed by the Manufacture of other transport equipment (37.85 per cent). In the combined fleet of the 56 reporting State Road Transport Undertakings, the State of Maharashtra claims the largest fleet size with a share of 17.4%, followed by Karnataka with 15.9% and Tamil Nadu with a share of 15.04%. Chemicals, and chemical products (24.52 per cent). Many of the chemical industries are in Cuddalore, Panagudi, and Thoothukudi because the resource needed for this industry is abundant in these areas. During this period three industries have negative growth rates such as industries manufacturing beverages (19.34 per cent), tobacco products (-4.44 per cent), and paper and paper products (-1.03 per cent).

One of the objectives of Tamil Nadu industrial policy 2014, is to achieve an annual average growth rate of 14% in the manufacturing sector. This has not happened because the industries that performed well before the introduction of the policy were not performed well after the policy implications. Though the financial and other incentives were detailed by the government the expected growth was not taken place in the industries. When it comes to the total growth rate the objective of the police had been attained by the manufacturing sector.

State Industrial Profile (2014-15) the moderate industrial growth in the manufacturing sector was largely attributed to sluggish growth in investment, decreasing margins of the Corporate Sector, deceleration in the credit inflows due to high rate of interest, inadequate industrial infrastructural facilities, and a slowdown in economic recovery both at national and global levels.

Table 3 Average Annual Growth Rate of Employment in the Manufacturing Sector
(Percent per annum)

Industry Code	Industries	2008-13 Before TNIP- 2014	2013-18 After TNIP- 2014	2008- 2018
10	Manufacture of Food Products	2.93	4.25	3.65
11	Manufacture of beverages	10.22	-2.40	2.14
12	Manufacture of tobacco products	-1.70	71.09	34.24
13	Manufacture of textiles	-7.62	3.21	-0.02
14	Manufacture of wearing apparel	7.10	8.34	6.02
15	Manufacture of leather and related products	0.28	5.64	3.33
17	Manufacture of paper and paper products	3.91	-0.38	1.66
18	Printing and reproduction of recorded media	7.08	2.98	2.44
19	Manufacture of coke and refined petroleum products	10.01	19.99	13.47
20	Manufacture of chemicals and chemical products	-2.30	2.97	0.76
22	Manufacture of rubber and plastics products	4.07	9.33	4.15
23	Manufacture of other non-metallic mineral products	1.72	-5.97	1.53
24	Manufacture of basic metals	7.50	7.59	3.52
25	Manufacture of fabricated metal products, except machinery and equipment	-4.03	1.75	0.15
30	Manufacture of other transport equipment	10.04	17.02	9.06
	Tamil Nadu	2.56	5.24	3.92

Source: Computed using ASI data

The employment in the manufacturing industries for the entire period (2008-2018) shows a positive growth rate except for the manufacture of the textile industry (-0.02 per cent). Other than that, the Fabricated metal products, except machinery and equipment (0.15 per cent), chemicals and chemical products (0.76 per cent), Non-metallic mineral products (1.53 per cent), and Paper and paper products (1.66 per cent) industries have less than two per cent of growth rate.

The manufacture of tobacco products has the highest growth in employment at 34.24 per cent. It shows that the industry had a negative employment growth rate of -1.70 per cent during the period before Tamil Nadu Industrial Policy 2014. Whereas it had a positive growth

rate of 71.09 per cent after the Tamil Nadu Industrial Policy 2014 followed by the coke and refined petroleum product industry has an employment growth of 13.47 per cent and the transport equipment manufacturing industry these industries had an increasing employment growth rate during the sub-periods. The Tamil Nadu industrial policy's objective with respect to employment declared that the industries have to create gainful employment opportunities for an additional 2.0 million persons before 2016. Direct Industrial Licenses (DILs) were granted to 874 industries in 2013 The policy had a positive impact on the growth rate of employment in industries.

Conclusion

The growth rate of Gross State Value Added was positive in all the industries before the establishment of Tamil Nadu Industrial Policy 2014 whereas the employment growth rate was high only after the establishment of Tamil Nadu Industrial Policy 2014. Hence, the policy had an impact on the employment growth than the gross state value added in the manufacturing industries in Tamil Nadu. According to the Government of TN, it aims to promote a greater number of industrial parks in southern districts to make them an industrial focal point. It was proposed to create a land bank of 20,000 acres to achieve the goals of Tamil Nadu vision 2023. It also identified another 25,000 acres to spur industrial development in backward districts. The industrial policy 2021, aims to increase the annual growth rate of 15 percent, investment (Rs.10 lakh core), output (30 percent), and employment (20 lakh) in the manufacturing sector. Recently several Memorandum of Understanding (MoUs) were signed by the Government of Tamil Nadu with many companies around the world in various sectors like green hydrogen, electric vehicles, and automobile components, etc., these are the initiatives taken by the government for the growth of the state and manufacturing sector as well.

References

1. A G Leonard SJ (2006), Tamil Nadu Economy, Macmillan India Limited, New Delhi.
2. Puri V K, Misra S K & Bharat Garg (2022), Indian Economy, Himalaya Publishing House, Mumbai.
3. Bagavathi Muthu R & Asokan P. (2015), Trends in Employment and Elasticity in Indian Registered Manufacturing Sector, *Indian Journal of Applied Research*, 5(10), October 2015, ISSN - 2249-555X.
4. Sivapriyan ETB (2022), Tamil Nadu signs 60 MoUs worth Rs.1.25 lakh crore, DHNS, <https://www.deccanherald.com/national/south/tamil-nadu-signs-60-mous-worth-rs-125-lakh-crore-1123821.html>
5. "GDP of Indian states - StatisticsTimes.com". m.statisticetimes.com. Retrieved 1 June 2021.
6. Tamil Nadu Industrial Policy, 2014, Industries Department, Government of Tamil Nadu <https://sipcot.tn.gov.in/portal/vacantlist/GO.pdf>
7. MSME - Development Institute Ministry of Micro, Small and Medium Enterprises (MSME) Government of India, Website: [www.msmedi-chennai.gov.in, http://dcmsme.gov.in/old/dips/statewise_dips/State%20Industrial%20Profile%20-%20Tamil%20Nadu_4316.pdf](http://dcmsme.gov.in/old/dips/statewise_dips/State%20Industrial%20Profile%20-%20Tamil%20Nadu_4316.pdf)
8. A Tamil Nadu Government Portal, <https://investingintamilnadu.com/DIGIGOV/TN-pages/why-tn.jsp?pagedisp=static>

AN ECONOMIC APPRAISAL OF HANDLOOM SECTOR IN INDIA: EVIDENCE FROM THIRD AND FOURTH HANDLOOM CENSUS REPORTS³⁰

S. PARAMASIVAN³¹

Introduction

The textile industry contributes substantially to the state's economy, besides earning considerable foreign exchange. In every modern state, the government under takes to perform several important function like defenses, communication, public service, public utility project, technologies research and the like. The Handloom, Powerloom, Spinning, Processing, Garment and Hosiery are the various sectors of textile industry. The textile industry plays a vital role next to agriculture in providing large scale employment to the rural masses in India. A textile is the largest industry in India and amongst the biggest in the world, according for about 20% of the total industrial production from textile sector. It provides direct employment to around 20 million people. Textile and clothing exports accounts for one third value exports from the country. There are 1,277 textile mills with a spinning capacity of about 29 million spindles. Textiles has embarked on a major consolidation exercise, with special emphasis on operational efficiency in all its units, stringent measures for cost control, and financial restructuring. In order to improve operational efficiency, the company has worked out a three – pronged strategy, which entails withdrawal from the shipping business, continuing with chemicals and adhesives and focusing on cement, rayon and paper as the core business. (Economic and Political Weekly, 2002). Textile sector contributes 13.5 per cent to manufacturing and 2.1 per cent to GDP in India. Textile exports accounted for 14 per cent of total exports in 2016 – 17. It is the largest employer after agriculture (105 million estimated employments) (2011 Census). Significantly, women constitute 70 per cent of the workforce in the garment manufacturing sector. The textile industry was perpetually demanding for uniform, lower tax structure. Meanwhile, the Goods and Service Tax (GST) was introduced 1st of July, 2017 pursuant to 122nd amendment of the Constitution. It is a single tax system on the supply of goods and services right from the manufacturer to the consumer.

The textile industry contributes around 4 per cent of GDP, nine per cent of excise collection, 18 per cent of employment in industrial sector, and has 16 per cent share in the country's export. While yarn is mostly produced in the mills, fabrics are produced in the powerloom and handlooms sectors well. The Indian textile industry continues to be predominantly based on cotton, with about 65 per cent of raw materials consumed being cotton. The yearly output cotton cloth was about 12.8 million and about 42 billion in 2016. (Ministry of Textiles, 2017-2018).

³⁰ Paper presented in the 42nd Annual Conference of Association of Economists of Tamil Nadu Organized by Post Graduate Department of Economics, Arulmigu Palaniandavar College of Arts and Culture, Palani, Dindigul District-624 601, Tamil Nadu on 25th February, 2023.

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Handloom Weaver Households Report

A total of 25, 45,312 weaver households have been covered under the Fourth All India Handloom Census. The total number of weavers enumerated in this round are 26, 73,891. Four States of India account for 18 lakhs of all weaver households in the country. These States are Assam (10.9 lakhs) household, West Bengal (3.4 lakhs), Manipur (2.1 lakhs) and Tamil Nadu (1.7 lakhs). (Fourth Handloom Census Report 2019-20). The 22.5 lakhs (or 88.7%) weavers households are located in rural areas while 2.8 lakhs (or 11.3%) are in urban areas, with nearly 72 per cent of handloom weavers being female. Across both rural and urban areas, the share of weavers aged 14-18 years is 2.4 per cent only. Nearly one in four weavers has not received any formal education while a further 14 per cent have not completed primary level. (Fourth Handloom Census Report 2019-2020). Across India, 28.2 lakhs handlooms were reported in the Fourth All India Handloom Census, out of which 25.2 lakhs were in rural areas and 2.9 were located in urban areas. Handloom weaver's households (95.6%) which clearly signify that weaving on handlooms is primarily a household based activity. As far as distribution of looms by typology is concerned, in rural India 41.7 per cent of the looms are pit looms, 31.8 per cent are frame looms, 15.3 per cent are loin looms while 11.2 per cent are of all other types taken together. In urban areas, 53.1 per cent are pit looms and 30.2 per cent are frame looms. Loin looms are not as popular in urban area, with less than six per cent penetration.

Weavers themselves primarily own pit looms (42.2%), followed by frame looms (31.5%). Non-households also have more pit looms (57%) than frame looms (32.5%). On the other hand, master weavers prefer frame looms (55%) over other types of looms 67.3 per cent of all pit looms are with Dobby/Jacquard. At the same time, only 32.6 per cent of frame looms are with Dobby/Jacquard. As a category, weavers – household units have the highest proportion of idle looms (17.6%) followed by master weavers who have 5.3 per cent idle looms. The primary reasons responsible for looms remaining idle are lack of capital/ funds and inadequate market demand for handloom products.

Objectives of the Study

1. To analyze the state wise distribution of handloom sector in India
2. To find out the handloom production of cloth in India.
3. To examine the work participation by social groups in handloom sector.

Table 1 State-Wise Distribution of Handloom Workers in India

(In 2010)

States / Uts	Total Handloom Worker Households ('000)	Per Cent Distribution	Share (%) to Total Households in State
Assam	1,241	44.58	21.7
West Bengal	407	14.61	2.1
Tamil Nadu	189	6.79	1.2
Manipur	179	6.43	33.7
Anthra Pradesh	177	6.36	1.0
Tripura	121	4.33	17.6

States / Uts	Total Handloom Worker Households ('000)	Per Cent Distribution	Share (%) to Total Households in State
Uttar Pradesh	111	3.97	0.4
Nagaland	61	2.19	9.7
Orissa	41	1.46	0.5
Mizoram	39	1.42	18.9
Karnataka	38	1.35	0.3
Arunachal Pradesh	30	1.09	12.7
Bihar	25	0.92	0.2
Rajasthan	23	0.81	0.2
Jammu & Kashmir	17	0.62	0.8
Jharkhand	14	0.51	0.3
Kerala	12	0.42	0.1
Meghalaya	11	0.41	2.3
Uttaranchal	11	0.38	0.6
Madhya Pradesh	9	0.31	0.1
Himachal Pradesh	7	0.25	0.5
Haryana	6	0.23	0.1
Gujarat	4	0.13	0.0
Chhattisgarh	3	0.10	0.1
Punjab	2	0.09	0.0
Maharashtra	2	0.07	0.0
Delhi	2	0.07	0.0
Puducherry	2	0.06	0.7
Sikkim	1	0.02	0.5
ALL INDIA	2,783	100.00	-

Source: Third Handloom Census 2009-10

It is explains the table discuss the note the geographical location of people engaged in this sector to know where the skills and potentials are largely concentrated, so that due focus and incentives could be channeled into building up the industry. Assam alone accounts for 12,69,506 handloom households, whereas Manipur and Tamil Nadu have (2,21,855) and (2,09,582) such as respectively. Other states with comparatively large handloom household concentration are Tripura, Andhra Pradesh, West Bengal, and Uttar Pradesh.

Highlights of Fourth Handloom Census, 2019-2020

1. According to the Fourth All India Handloom Census, the total number of households in India engaged in handloom activities (weaving and allied activities) in 31.45 lakhs. This is an increase over the Third Census where the count was 27.83 lakhs.
2. A total of 25,45,312 weaver households have been covered under the Fourth All India Handlooms Census

3. The total number of weavers enumerated in this round are 26, 73,891. For States of India account for 18 lakhs of all weaver households in the country. These States of Assam (10.9 lakhs) households, West Bengal (3.4 lakhs), Manipur (2.1 lakhs) and Tamil Nadu (1.7 lakhs).
4. Across both urban and rural areas, the share of weavers aged 14-18 years is 2.4 per cent only. The 22.5 lakhs (or 88.7%) weaver households are located in rural areas while nearly 72 per cent of handloom weavers being female.
5. Majority (66.3%) of the weaver households earn less than ₹5,000/- per month. 36.1 per cent of weaver households from urban India earn more than ₹5,000 a month as compared to only 25.1 per cent living in rural areas.

Highlights of Third Handloom Census, 2009-2010

1. In India, nearly 27.83 lakh handloom households are engaged in weaving and allied activities, out of which 87 per cent are located in rural areas and remaining 13 per cent in urban areas.
2. The majority (82%) of handloom working households are weavers households, which means that at least one member of every such households is engaged in weaving activities. Nearly 14 per cent are allied worker households, 3 per cent are idle loom households and about 1 per cent is other handloom households having no adult handloom workers.
3. Nearly 53 per cent of the handloom workers households are into commercial production, and nearly 16 per cent households undertake a mix of domestic and commercial production. Thus, a total of 69 per cent of the handloom households undertake commercial production.
4. The average households size of a handloom worker household is 4.59 persons, with rural areas reporting 4.63 and urban areas reporting 4.29 household members.

Demographic Profile of Handloom Weavers

The 22.5 lakhs (88.7%) weaver households are located in rural areas while 2.8 lakhs (11.3%) are in urban areas. At an aggregate level, nearly 72 per cent of handloom weavers are female. While this is primarily a reflection of the gender mix among weavers in rural India, the distribution by gender is nearly even in the urban areas. Across both urban and rural areas, the share of weavers aged 14-18 year is 2.4 per cent only. One observation that emerges from this survey is that since involvement of family members in the age range of 14 years to less than 18 years very low, this is perhaps indicative of the fact that moving forward, it can be a challenge to involve the next generation workers from such households to be actively involved in the traditional weaving activities.

Table 2 State – Wise Distribution of Handloom Worker

(In 2020)

State	Rural	Urban	Total Households
Anthra Pradesh	77,065	45,579	1,22,644
Arunachal Pradesh	84,014	9,300	93,314
Assam	12,52,188	17,318	12,69,506
Bihar	4,716	1,949	6,665
Chhattisgarh	15,283	3,593	18,876

State	Rural	Urban	Total Households
Delhi	0	4,053	4,053
Goa	24	2	26
Gujarat	8,109	2,100	10,209
Haryana	224	25,184	25,408
Himachal Pradesh	13,260	312	13,572
Jammu And Kashmir	12,173	10,895	23,068
Jharkhand	12,582	3,895	23,068
Karnataka	28,597	5,080	33,677
Kerala	14,780	5,467	20,247
Madhya Pradesh	7,822	6,435	14,257
Maharashtra	990	2,445	3,435
Manipur	1,92,431	29,424	2,21,855
Meghalaya	42,647	108	42,755
Mizoram	21,100	6,302	27,402
Nagaland	31, 970	10,441	42,411
Odisha	61,205	2,018	63, 223
Puducherry	219	1,410	1,629
Punjab	121	815	936
Rajasthan	6,005	2,765	8,770
Sikkim	690	7	697
Tamil Nadu	1,44,573	65,009	2,09,582
Telangana	19,417	8,499	27,916
Tripura	1,35,001	2,454	1,37,455
Uttar Pradesh	87,412	43,708	1,31,120
Uttarakhand	6,099	4,997	11,096
West Bengal	4,67,728	74,829	5,42,557
All India	27,48,445	3,96,394	31,44,839

Source: Fourth All India Handloom Census 2019-2020

Table 3 Distribution of Handloom Workers by Social Groups

(in 2010)

Percentage Distribution						
State	Scheduled Caste (SC)	Scheduled Tribes (STs)	Other Backward Castes (OBC)	Others	Total	Number of workers (Lakh)
All-India	10.1	18.1	45.2	26.6	100.0	38.47
Location						
Rural	10.3	21.0	42.1	26.7	100.0	32.32
Urban	9.5	3.1	61.5	25.9	100.0	6.15
Regions						
North-east states	7.2	34.3	33.9	24.6	100.0	19.69
Other than NE states	13.3	1.2	57.0	28.6	100.0	18.77

Percentage Distribution						
State	Scheduled Caste (SC)	Scheduled Tribes (STs)	Other Backward Castes (OBC)	Others	Total	Number of workers (Lakh)
Major States						
Andhra Pradesh	0.8	0.5	91.8	6.9	100.0	3.06
Tamil Nadu	1.9	1.3	80.2	16.6	100.0	3.19
West Bengal	25.4	0.7	13.3	60.7	100.0	6.65
Uttar Pradesh	7.6	0.9	83.3	8.2	100.0	0.77
Orissa	12.7	2.9	83.5	0.9	100.0	1.03
Karnataka	1.5	2.1	87.8	8.5	100.0	0.77
Others states	21.3	2.9	57.9	17.9	100.0	1.90

Source: Third Handloom Census 2009-10

The about the table explains the 38.47 lakh adult handloom workers that have been enumerated, a caste-wise distribution is as follows:

- Other Backward Castes (OBCs): 45.2 per cent
- Scheduled Tribes (STs): 18.1 per cent
- Scheduled Castes (SCs) : 10.1 per cent
- Others : 26.6 per cent

Table 4 Work Participation by Social Groups

S. No.	Category	Location	
		Rural	Urban
1	Scheduled Caste	10.3	21.0
2	Scheduled Tribes	9.5	3.1
3	Other backward caste	42.1	61.5
4	Others	26.6	25.9

Source: Third Handloom Census 2009-10

Cloth Production in Handloom Sector 2010-2018

Handloom weaving is one of the largest economic activities after agriculture providing direct and In-direct employment to more than 43 lakh weavers and allied workers. This sector contributes nearby 15 per cent of the cloth production in the country and also contributes to the export earning of the country. The 95 per cent of the world's hand woven fabric comes from India. Production in the handloom sector from 2010-11 to 2017-18 is given under table:-

Table 5 Year Wise Handloom Production

Year	Total Cloth Production	Cloth Production by Handloom Sector	Share of Handloom in the Total Cloth Production
2010-11	61761	6907	11.18
2011-12	59605	6901	11.57
2012-13	61949	6952	11.22
2013-14	62624	7104	11.34

Year	Total Cloth Production	Cloth Production by Handloom Sector	Share of Handloom in the Total Cloth Production
2014-15	64332	7203	11.19
2015-16	64584	7638	11.82
2016-17	63480	8007	12.61
2017-18 (up to Nov.17)	43520 (p)	5134 (p)	11.8

Source: Ministry of Textile Annual report 2017-18

****Cloth production by Handloom Sector (in million sq meters)**

***The total cloth production includes handloom, powerloom and mill sector excluding hosiery, khadi, wool and silk.**

**Table 6 Distribution of Weaver Households by
Production of Major Fabrics**

States	Angavastram	Mekhla	Sarong	Sari	Shawls	Towel	Bed sheets	Lungi
Andhra Pradesh	0.01	0.01	0.00	44.16	0.02	0.61	1.12	0.44
Tamil Nadu	0.04	0.06	0.09	39.03	0.05	2.56	4.95	4.66
West Bengal	12.15	0.27	0.01	43.89	0.02	0.25	0.41	1.62
Uttar Pradesh	6.74	0.11	0.05	47.95	0.36	1.68	15.88	0.09
Orissa	7.53	0.35	0.00	80.97	0.31	0.99	1.04	2.46
Karnataka	1.76	0.18	0.08	29.79	0.03	1.54	1.30	1.25
Other states	5.22	0.69	0.20	12.19	8.42	4.06	12.13	2.26
All – India	40.38	38.52	14.15	14.20	6.29	5.99	5.58	4.61

Source: Third Handloom Census 2009-10

The data on the major share of weaver households that reported the production of different type of fabrics by handloom concerned states reveal that West Bengal, with 14.4 per cent handloom household, is primarily a sari producing state. A product-wise distribution of handloom households of West Bengal is as follows:

1. Sari: (43.89%)
2. Gamch: (12.15%)

Tamil Nadu, with 6.3 per cent handloom households, is also primarily a sari producing state. A product-wise distribution of handloom households of Tamil Nadu is as follow:

- Sari: (39.03%)
- Durrie: (6.22%)
- Bedsheet: (4.95%)