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Internship Report

on

**‘Financial Allocations under NHM and their Impact on Health
Indicators: A Comparative Analysis of Karnataka & Kerala’**

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January, 2020

Certificate

This internship report titled “*Financial Allocations under NHM and their Impact on Health Indicators: A Comparative Analysis of Karnataka & Kerala*” is a report on the study taken up at the Fiscal Policy Institute (FPI) in 2019-20.

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All opinion and conclusions expressed in the internship report are of the Intern and usual disclaimer applies.


Sujit Kumar Chowdhury
Director, FPI



Institute's Seal

Acknowledgements

Laughter is timeless, imagination has no age, and dreams are forever

-Walt Disney

With a joyful heart, I would like to express my gratitude to all who have been instrumental in accomplishing this project. I thank Almighty God for His abundant blessings.

I wish to place on record my grateful thanks to Sri. **Sujit Kumar Chowdhury, Director, Fiscal Policy Institute, Government of Karnataka, for providing me this opportunity to work in FPI as an Intern.**

I would like to place my indebtedness and gratitude to my mentor in the project, Dr. Anantha Ramu M R, Faculty, FPI, Government of Karnataka, a highly esteemed guide, who extended his thoughtful insights and guidance throughout the project.

I would also like to place my very great appreciation to Mr. Ramanjini, Research Fellow, FPI, Government of Karnataka for his valuable support and expert advice and help.

I also extend my gratitude to Dr. M.R. Narayana, Consultant (Academic & Research), FPI, and to Mr. Manjunath Hegde, Faculty, FPI Government of Karnataka, for the guidance.

Deyona Rose Saji

Student Intern

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ABBREVIATIONS

ASHA	Accredited Social Health Activist
AYUSH	Ayurveda Yoga Unani Siddha Homeopathy
CDR	Crude Death Rate
CHC	Community Health Centre
CSS	Centrally Sponsored Scheme
DEA	Data Envelopment Analysis
FCH	Family Health Centres
FY	Financial Year
GDP	Gross Domestic Product
GoI	Government of India
GSDP	Gross State Domestic Product
HDI	Human Development Index
ICD	International Classification of Disease
IMR	Infant Mortality Rate
LE	Life Expectancy
MDGs	Millennium Development Goals
MMR	Maternal Mortality Rate
NFHS	National Family and Health Survey
NHA	National Health Accounts
NHM	National Health Mission
NITI	National Institute for Transforming India

NMR	Neonatal Mortality Rate
NRHM	National Rural Health Mission
NUHM	National Urban Health Mission
PCNE	Per Capita National Health Mission Expenditure
PCSNHE	Per Capita State Net Health Expenditure
PHC	Primary Health Centre
PIP	Programme Implementation Plan
RCH	Reproductive and Child Health
SDGs	Sustainable Development Goals
SGCE	State Government Capital Expenditure
SGRE	State Government Revenue Expenditure
SRS	Sample Registration System
TE	Technical Efficiency

Financial Allocations under NHM and their Impact on Health Indicators: A Comparative Analysis of Karnataka & Kerala

Abstract

Health is one of the important factors which contribute to economic development. The increasing demand and declining public spending on healthcare are evident in the Indian health system. To provide accessible, affordable and quantity healthcare to the rural population and to vulnerable groups, the National Rural Health Mission was launched in 2005, and later came to be known as the National Health Mission (NHM). This paper tries to examine the financial management of NHM in Karnataka and Kerala and tries to link the allocations with select health outcomes. The differences in allocations, release and expenditure are increasing at an alarming rate. The money allocated to the flexi pool is unbalanced and public expenditure is concentrated on curative healthcare rather than preventive healthcare. This paper tries to link the NHM expenditure with select health outcome indicators using Data Envelopment Analysis. It is observed that there is still a huge potential to be tapped by the state of Karnataka to achieve the laid-down health targets.

CHAPTER 1

INTRODUCTION

1.1. Introduction

Infrastructural development through investment in social and physical infrastructure is one of the major factors contributing to economic growth and employment generation. Investment in social infrastructure and human development enhances productivity through better education, improved workforce, skill development, lower absenteeism, greater mobility, faster demographic transition, increased participation of women in the workforce, and better targeting of social security and welfare schemes (Panagariya, et al, 2014).

Health is one of the most important pillars of human development and social infrastructure. Health is considered as a state subject under the Constitution of India. The federal structure of the nation empowers the Centre to look into matters of healthcare and plan and spend for the same. Ensuring minimum standard and universal access is the basis of a democratic polity. The total expenditure on healthcare in India taking public, private and household out-of-pocket expenditure was about 4.1% of GDP in 2008-09 (National Health Accounts 2009). However, public expenditure on health by both Centre and states was about 0.93% of GDP in 2007-08 and has increased to about 1.04% in 2011-12.

Health expenditure is considered as a merit good because large positive externalities are associated with health expenditure (Senguptha, 2015). The lower amount of spending on health results in a wide gap between the supply and demand of healthcare, insufficiency of doctors and paramedical staff, lack of pharmaceutical availability and backward technology faced with the increasing demand for health which will further deteriorate the health and living conditions of the people. According to Global Health Observatory data by the World Health Organisation (WHO), the availability of physician density per 10000 population in 2009 is 6.9, whereas the global standard preferred by WHO is 1 per 1000 population i.e. a shortage of 3.1 doctors. The number of nursing and midwifery personnel density per 10000 population in 2008 is 9.96 against the preferred global standard of 1 per 1000 population.

Given the importance of providing universal basic healthcare in India, the National Rural Health Mission (NHRM) was introduced on 12th April, 2005. Later in May 2015, the National Urban Health Mission (NUHM) was initiated. The two programmes (NHRM and NUHM) were merged under an umbrella programme named National Health Mission (NHM). NHM is the largest public health programme undertaken by the Government of India (GoI). The expenditure on healthcare in preventive, curative and palliative care is finding new horizons of change through the introduction of the National Health Mission. It stands as a comprehensive health plan driving the states towards the achievement of universal healthcare. It has helped the country towards achieving Millennium Development Goals (MDGs) and is a principal vehicle towards the achievement of Sustainable Development Goals (SDGs).

1.2. Review of literature

This section deals with the literature related to healthcare expenditure toward NHM and its impact on health indicators.

Jamison, Dean T et al. (2013) summarise the growing evidence that investing in health boosts personal and national income, as well as ‘full’ income, a concept that attempts to account for the welfare benefits of improved life expectancy. It also reflects on the importance of concentrating on the primary health system and universal health coverage. It presents the opportunities that the international community should present towards the low and middle-income countries with enhanced health technologies. It suggested that the expenditure made towards non-communicable diseases can be reduced by imposing heavy taxes on tobacco products and thereby restricting consumption, and that fiscal policy changes can prevent diseases. The Lancet Commission on *Global Health 2035: A world converging within a generation* (2013) reflects the global process towards the global change of investment on health.

Ahmed, M A, et al. (2014), analysed the trends in public expenditure on health from the period of 2001-2010 in India. The study observed that the percentage of total public health expenditure with regard to the average of total health expenditure has remained more or less stagnant during the study period at 0.39 per cent. However, the per capita spending has meanwhile seen an increase. In contrast to this, Pavan Srinath et al. (2018), observed that public spending on healthcare is very

low and there is an increase in out-of-pocket expenditure by individuals of almost four times. The study analyses the correlation between per capita expenditure on health and per capita expenditure on GSDP. The Fourteenth Finance Commission recommendations have impacted on the curtailment of Centre's grants towards the states on health and the study observes that the states have responded to Centre's reduction in grants by decreasing state spending towards health (Pavan Srinath et al., 2018). A study conducted by Gayithri (2012), reveals the declining trend regarding the share of GSDP and states' revenue until the launch of NRHM. The study observed a wide variation in PIP, release and expenditure which hinders the development. The district level allocations reflect poor planning that although backward districts get a higher share of the funds, the better-off districts get high per capita benefits in Karnataka. Keya, Senguptha (2015), revealed that the states with poor health records have witnessed low per capita health spending. This study also analyses the impact of healthcare expenditure on health indicators. It also presented the rural-urban divide on the condition of living that uniform health policy throughout India is not benefiting. But contrary to this, S. Nagarajan et al. (2015) found that NHRM which was a uniform health policy has been successful in increasing the health infrastructure and human resources. Demand-side initiatives have led to the enhanced utilisation of public health, especially in reproductive health and childcare which resulted in a decline in maternal and neonatal mortality.

Hooda, S. K. (2015) found that per capita health expenditure had seen variations between high income and low-income states. In the low-income states, the rate of growth of per capita expenditure on health is negative. The study found that there is an increase of public expenditure on health after the implementation NRHM. Patra, S. K., et al. (2013), analysed the condition of public expenditure through NRHM, and the impact of State Government Capital Expenditure (SGCE) and State Government Revenue Expenditure (SGRE) on health indicators in Odisha through NRHM. The study suggested the strengthening of Community Health Centres (CHCs) and Primary Health Centres (PHCs). Multiple regression models used in the analysis revealed that increase in SGCE and SGRE positively affected the Infant Mortality Rate (IMR) and reduced birth rates and death rates in Odisha. The study further observed that there was a positive impact of NRHM spending on health.

Akazili, J. et al. (2008), in order to analyse the health status in Ghana, applied the Data Envelopment Analysis (DEA) method to calculate technical efficiency on 113 randomly selected

health samples. It was found that 78% of the health centres are technically inefficient and 90% of the health centres are inefficient in the overall efficiency as they are using the resources that they did not actually need.

The above review of literature tries to bring out gaps in the existing literature with regard to NHM spending and its impact on health outcomes. While the conditions of healthcare spending are dynamic, little attention has been paid towards examining the largest public health policy of India (NHM) and its impact on health. Available literature reveals that comparative analysis at state level in India is very little, particularly comparison with better performing states in health outcomes. Thus this study makes a comparative analysis of NHM and public health spending between Karnataka and Kerala and its impact on health indicators.

It was also observed that the amount allocated by GOI and the amount released by states showed a wide gap. Given the importance of measuring the impact of health expenditure on health outcomes, this study lists two objectives to be addressed. They are as follows:

1.3. Objectives

1. To examine the financial flexi pool wise allocations, release, and expenditure of NHM funds by Karnataka and Kerala.
2. To analyse the allocations towards NHM and its impact on health indicators.

1.4. Methodology

NHM is a Centrally Sponsored Scheme (CSS) with five financial flexi pools. The analysis on allocations, release and expenditure and budget allocations for each flexi pool is examined from 2014-15 to 2017-18 for Karnataka and Kerala. The research methods used include the comparative analysis of time series data and Data Envelopment Analysis (DEA) from 2014-15 to 2017-18 for Karnataka and Kerala. NHM was introduced in 2013 and revised on 2017. Programmeme Implementation Plan (PIP) is one of the important components of NHM. Hence, analysis of it helps us to understand the progress, shortcomings of the plan as well as essential changes required. The

year 2014-15 is crucial with respect to financing of CSS, as till then, the funds for various CSS were directly channelised from the union government to the implementing agencies. A High-Level Expert Committee constituted by GoI raised concern regarding the mode of transfer of funds from Centre to states neglecting the state treasury device and raising accountability issues. The committee recommended the transfer of funds to the implementing agencies by way of the state treasury. Hence from 2014-15, the fund transfer in NHM from the Centre to implementing agencies flows through the state treasury. The South Indian states have always shown an upper hand in the performance of the health sector, but contradicting this, among the South Indian states, Karnataka hangs back in health indicators, and thus the state of Karnataka is chosen for analysis. Kerala is purposely selected for comparative analysis as Kerala stands first in the Human Development Index (HDI) among Indian states.

Technical efficiency

Technical Efficiency (TE) is a productivity analysis technique. According to Lovell (1993), the productivity of a production unit can be measured by the ratio of its output to its input. It depends on the production technology, variables used in the production process and the environment. The purpose of the technical efficiency analysis is to segregate the variations in efficiency and to measure the scope of efficiency on the production process. The modern technique of efficiency measurement was propounded by Farrell (1957) based on multiple inputs and output analysis. Input oriented TE measures how the inputs are efficiently functioning or the difference between the potential input and actual input rate. Output oriented TE tests the potential of increase in output without an increase in input.

To analyse the financing inputs and the impact of it on health indicators, the researcher uses Data Envelopment Analysis (DEA). DEA is an econometrics tool that analyses efficiency through input and output parameters. It is an approach to measure the relative efficiency of Decision Making Units (DMUs) (Taylor B., 2002). DEA is a linear programming method which identifies the best practices among the set of DMUs so as to calculate the difference between the best practice and efficiency. It is based on the efficiency measurement concept propounded by Farrell (1957), and later by Charnes et al. (1978), and the DEA approach was developed by Banker, Charnes, and

Cooper (1984). In this study, DEAP Version 2.1 software programming is used for measurement. The following steps were adopted in the method.

Sample data was estimated for 9 Non-High Focus large states which include Andhra Pradesh, Gujarat, Haryana, Karnataka, Kerala, Maharashtra, Punjab, Tamil Nadu and West Bengal from 2014-15 to 2017-18. The data does not include Goa as it overrides the peer data standards and deviates the analysis as DEA is very sensitive to values of peer group on efficiency analysis and reflects greater changes in TE. For recently formed Telangana state, data availability is a problem and hence it is not included in the DEA. Data of two input variables (Per capita Net State Expenditure and Per capita NHM expenditure) and five output variables which are health indicators (IMR, MMR, CDR, Neonatal Mortality Rate and Life Expectancy of 0-1) are estimated.

Per capita Net state Health Expenditure (PCNSHE): Estimated from the difference between total state expenditure under the head of medical and public health and family welfare with capital and revenue expenditure for the respective year and NHM state share for the respective year divided by the total population of the year.

$$PCNSHE_{it} = \frac{\text{Total State Health Expenditure}_{it} - \text{NHM State Expenditure}_{it}}{\text{Total Population}_{it}}$$

Here, i refers to state

t refers to year

Per capita NHM Expenditure (PCNE): Estimated from the ratio of Total NHM Expenditure of the estimated year and total population of the respective year.

$$PCNE_{it} = \frac{\text{TotalNHMExpenditure}_{it}}{\text{TotalPopulation}_{it}}$$

Here, i refers to state; t refers to year

Infant Mortality Rate (IMR) is the number of children who died below one year of age in a year against 1000 population (SRS). IMR remains an important indicator of health for the whole population, reflecting the intuition that structural factors affecting the health of entire population

have an impact on the mortality rate of infants (Reidpath and Allotey, 2003). IMR is accounted every year. The data from 2014 to 2017 is used for the estimation.

Maternal Mortality Rate (MMR) refers to the ratio of the mother(s) who died during pregnancy period in a year against 100000 population (NITI Aayog). The data of 2014-16 is used in this analysis. This becomes an important indicator of health as it reflects institutional availability and infrastructural growth in the state.

Crude Death Rate (CDR) indicates the total number of deaths in a year per 1000 population (SRS). CDR is accounted for every year; data from 2014 to 2017 is used for the estimation of TE.

Neonatal Mortality Rate (NMR) is the number of children who died within the first 28 days of life in a year among 1000 population. The first 28 days of childbirth is the most vulnerable period of child health and requires special care and attention from the experts. The data from 2014 to 2016 is used for this analysis.

Life Expectancy (LE) is the average number of years a person is expected to live from the time of birth. Here LE is the abridged life table from 0-1 year from SRS is considered. It is estimated once in every four years and data of 2012-16 is used for estimation. LE contemplates on the overall health condition of the population and standard of living conditions as well.

Among the above outputs, IMR, MMR, CDR, and NMR desire lower values whereas in LE higher values are preferred. To overcome this imbalance in data analysis and to bring it in a unidirectional format, the actual values of IMR, MMR, CDR and NMR are reversed with respect to 1000 i.e., 1000-IMR/MMR/CDR/ NMR. These reversed values are used for DEA.

In this analysis, multiple inputs and outputs are considered, Farrell's TE analysis only considers single input and output. Thus to overcome this limitation in Farrell's work, Charnes A, Cooper W W, Rhodes E (1978) initiated CCR (Charnes Cooper Rhode) DEA model where multiple inputs and multiple outputs can be used. The estimation of such an efficiency analysis can be defined as

$$Technical\ Efficiency = \frac{weighted\ sum\ of\ outputs}{weighted\ sum\ of\ inputs} (Arora, 2010)$$

Here in this analysis 9 states (j), 2 inputs(x) and 5 outputs(y) are considered.

Thus the input matrices can be written as $X = \{x_{nj}, n = \text{number of inputs}, j = \text{states}\}$ and output matrices can be written as $Y = \{y_{mj}, m = \text{number of outputs}, j = \text{states}\}$

$$\text{Technical Efficiency} = \frac{\sum_{m=1}^5 Y_{mj}}{\sum_{n=1}^2 X_{nj}}$$

DEA models derive input and output weights by means of an optimising calculation. Based on that, units can be classified into efficient and inefficient. In inefficient units, they tell us target values of inputs and outputs which would lead to efficiency (Vincová, Kristína, 2005).

Here Output Oriented TE is measured. Farrell (1957) considered two components in analysing the efficiency of a firm, Technical Efficiency: the ability of a firm to obtain maximum output from a given input and Allocative Efficiency: the ability of the firm to use the input in optimum format. DEA analysis under the assumption of Constant Returns to Scale is considered for the efficiency analysis. The value of efficiency analysis is a ratio valuing bounded by 0 to 1, 1 indicates the highest efficiency and continues in decreasing order to 0.

1.5. Data sources

The study is based on secondary data. Some of the major data sources are as follows

- a) Annual reports and statistics published that are relevant to the topic of NHM and healthcare expenditure
- b) National Health Accounts, GoI
- c) The data available from the reports and budget of NHM
- d) State plans, annual plans and financial accounts of Comptroller and Auditor General
- e) Budget of the corresponding states' finance departments
- f) SRS bulletins,
- g) NFHS reports

1.5.1. Data limitations

There exist certain constraints with regard to the existing healthcare expenditure data as it is widely fragmented and distributed; compiling comparable data across states and time is a difficult task. The existence of multiple government agencies and departments and the wide variations in each data available make the research in this area challenging. The estimation of health indicators follows various yearly formats like IMR calculated annually, whereas MMR is estimated once in three years and LE once in every four years.

CHAPTER 2

State of Public Health

2.1. Status of public health in India

India is the second most populous country in the world with 1.37 billion people. Its total health expenditure includes public expenditure from government, private expenditure from market players and out-of-pocket expenditure from individuals. Widely uneven distribution of income, social and cultural differences and rural-urban divide have made healthcare unaffordable and unavailable to many people in India.

Table 1: Key Health Financing Indicators across NHA rounds

	2004-05	2013-14	2014-15	2015-16
Total Health Expenditure as percentage of GDP	4.2	4	3.9	3.84
Total Health Expenditure per capita (Rs)	1201	3638	3826	4116
Government Health Expenditure as % of Total Health Expenditure	22.5	28.6	29	30.63

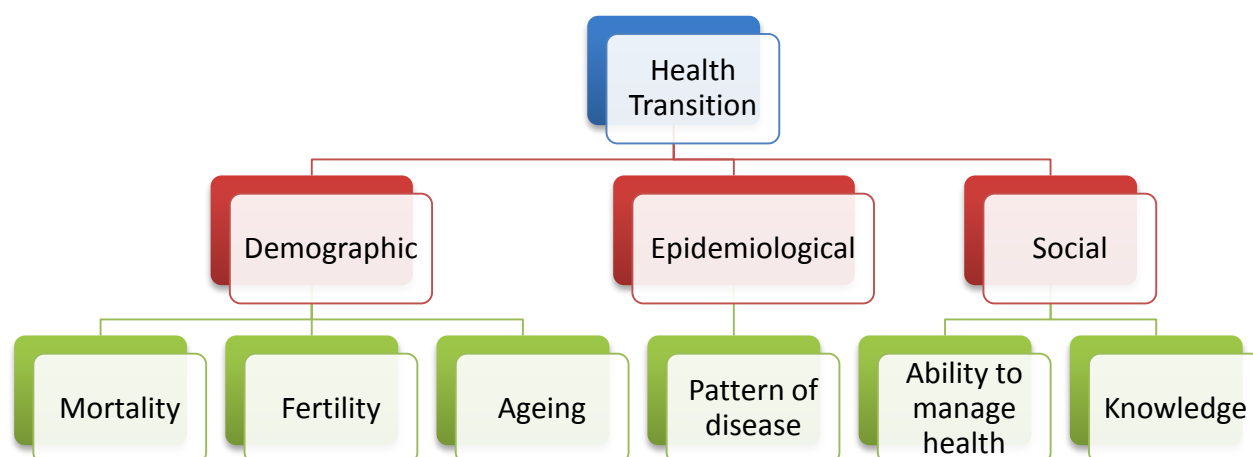
Source: National Health Accounts (NHA) 2014 and NHA 2015-16

Table 1 presents the healthcare expenditure as a percentage of GDP. Total Health Expenditure as a percentage of GDP is declining over the years from 4.2 in 2004-05 to 3.84 in 2015-16. It is observed that the total health expenditure per capita is increasing from 1201 in 2004-05 to 4116 in 2015-16 and the share of government expenditure to total health expenditure is also increasing from 22.5 in 2004-05 to 30.63 in 2015-16.

Even though there is an increasing trend in public expenditure, India has very low healthcare expenditure when compared to some of the emerging economies like Brazil and China. India is one of the lowest spending countries on health as percentage of GDP when compared to many other countries. India is spending around 4.7 per cent of GDP on health, whereas it is 8.3 per cent in Brazil and 5.5 per cent in China in 2014 (WHO). Total health expenditure per capita (Intl \$) in India is 267 whereas it is 1318 in Brazil and 731 in China in 2014 (WHO). India stands at 131st

position on the UN Human Development Index whereas Brazil stands on 79 and China ranks on 86.

Figure 1: Health Transition



The average figures for health indicators show a great variation among the states. Health transition has three components: Demographic, which involves lowering of mortality and fertility rates and an ageing population; epidemiological wherein the pattern of diseases prevalent in the population changes from communicable diseases to non-communicable diseases such as the chronic diseases of adulthood; and social whereby people develop better ability to self-manage their health and have better knowledge and expectations from the health system (Bajpai et al., 2009). Kerala, Maharashtra, and Tamil Nadu are much ahead of the health transition trajectory while states like Odisha, Bihar, West Bengal, and Rajasthan are still at the early stage. Karnataka stands in the middle of the trajectory. This study attempts to analyse the public healthcare expenditure done by the government through the National Health Mission (NHM) in the states of Karnataka and Kerala. This is an analysis through the pool-wise budget proposed by the Programme Implementation Plan (PIP).

2.2. Status of public health in Karnataka and Kerala

As per the Census 2011, 6.10 crore people inhabit the state of Karnataka. The state is one of the pioneer states in the country in providing comprehensive primary healthcare to its people. Even before the concept of Primary Health Centre was conceived by the Government of India (GoI), the state had made a beginning in establishing primary health units for providing comprehensive healthcare and a delivery system through various schemes consisting of curative initiatives like Vajpayee Aarogya Shree¹, Jyothi Sanjeevini Scheme², preventive programmes associated with NHM, and rehabilitation healthcare to the people of the state (GOK, MoHFW). Quality healthcare services to all people are the main objective of the Ministry of Health and Family Welfare. Karnataka is the pioneer state to introduce and implement Universal Health Coverage to the people through integrating various existing health schemes and provision of primary, secondary and tertiary health services under the name Arogya Karnataka. The beginning words of the Karnataka vision statement for health and healthcare on the state's Integrated Health Policy states, "Karnataka State recognizes the immeasurable value of enhancing the health and well-being of its people. The state's developmental efforts in the social, economic, cultural and political spheres have, as their overarching goals, improved well-being and standards of living, better health, reduced suffering and ill health, and increased productivity of its citizens"(2004). It's enshrined that the primary target of the state's health policy is the overall development of its people.

The status of public health in Kerala has a different picture than that of Karnataka. Kerala stands on par with the developed nations' category. Kerala has a population of 3.34 as per Census 2011. The state tops on MDGs and has attained a better health standard while compared to other states in India. The Cuban health model³ is adopted by the government to grass-root level implementation of health through Accredited Social Health Activists (ASHAs) and health education certification programmes and training to bridge the gap in the shortage of doctors. Aadram the health

¹ Provides health protection to the families below poverty line in Karnataka for treatment of major ailment, hospitalisation and surgery expenditure.

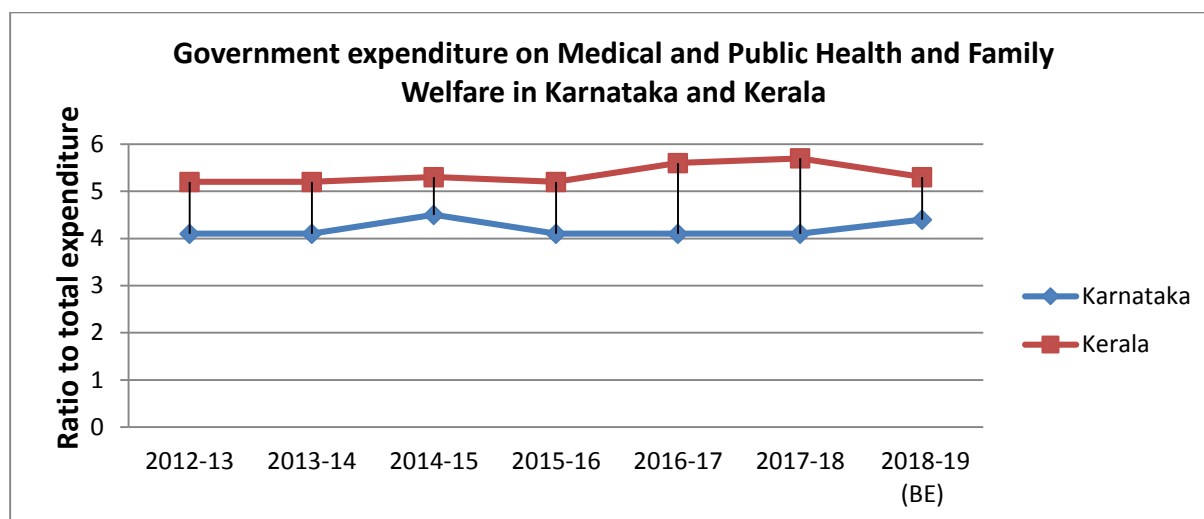
² Health coverage to government employees and their dependents and cashless treatment through a network of hospitals.

³ A Cuban concept of family doctors, a new category of doctors who pursue diploma in Family Medicine and Public Health. PHC maintains the clinical registry with complete information about the population of the jurisdiction, the system of polyclinic where the rural people get the service of specialist doctors on fixed days are also initiated

programme envisaged to convert Primary Health Centres (PHC) into Family Health Centres (FHC) in a phased manner to deliver an effective family centered health programme. The state of Kerala tops in the overall performance of the states as per the Report on the Ranks of States and Union Territories (GoI, 2019). The structure of public health in Kerala has a three-tier system with PHC at Grama Panchayat level, Community Health Centres (CHC) at block level and government medical colleges above.

However, the share of public expenditure on health has not gained a lion’s share in both the states and it still lags behind. The total health expenditure as a percentage of GSDP is 3 in Karnataka but the share of government in health expenditure as a percentage of GSDP is 0.7 in 2018.

Figure 2: Government expenditure on Medical and Public Health and Family Welfare in Karnataka and Kerala (% of total expenditure)



Source: Budget documents of state government

Figure 2 presents the difference in the government health expenditure on medical and public health and family welfare in budget allocations in Karnataka and Kerala. This shows that health expenditure has remained stagnant around 4.1 in Karnataka except in 2014-15 due to the flow of funds towards the state treasury from the Centre towards NHM. Kerala has an increasing trend in

budget allocations over the years from 5.2 in 2012-13 to 5.7 in 2017-18. The share of Karnataka's total expenditure towards health is marginally lower than the average expenditure on 18 other states (Mann G and Paul A, 2018).

2.3. Health financing indicators in Karnataka and Kerala

Health financing indicators in Karnataka and Kerala are present below. This enables the comparison of health financing across states and helps identify the alternative sources.

Table 2: Health Financing Indicators in Karnataka and Kerala

	Total Health Expenditure (THE)			Government Health Expenditure (GHE)		
	In Rs crores	Per-capita(Rs) ⁴	% GSDP	In Rs crores	Per-capita(Rs)	%GSDP
Karnataka	32083	4936	3.2	8227	1266	0.8
Kerala	25090	7169	4.5	5694	1627	1.0

Source: NHA 2015-16

Table 2 shows the health financing accounts with indicators. The share of per capita spending has the difference of Rs.2233 between the states. The share of GSDP on health is considerably more in Kerala. The government share on health expenditure also has notable differences. The per capita GHE has Rs. 361 more spending by Kerala; however, the share of THE in government spending has 2.9 per cent more spending by Karnataka. But the share of government health expenditure as percentage of GSDP is comparatively higher in Kerala. Thus, it is evident that the overall government spending by Karnataka is greater than Kerala but the per capita spending by Karnataka and its share by GSDP is less compared to Kerala.

⁴ Per capita value of THE- is arrived by dividing Total Health Expenditure by the population for respective states.

2.4. New health policy initiatives by Government of India, Government of Karnataka and Government of Kerala

This section tries to analyse the recent Health Policy of India, Karnataka and Kerala.

NATIONAL HEALTH POLICY 2017

National Health Policy is a roadmap towards the implementation of the set targets for the progress of the nation. The changing priorities in the health sector are addressed and the impact of the previous National Health Policy (2002) was assessed a success through positive changes in various health indicators. The primary target of the 2017 health policy is to line up the role of the government in molding healthcare in India through investment, human resource and capacity building through infrastructure and technology and knowledge base. The policy aims at the achievement of universal health coverage through public health centres and reduction in household health expenditure and alignment of private health goals to public health goals. The policy identifies steps for coordinating action on seven priority areas for the development of a healthy environment. The policy also examines seven policy shift areas in organising public health through primary, secondary, tertiary care, public healthcare, infrastructure and human resource, urban health, NHM, and AYUSH.

KARNATAKA PUBLIC HEALTH POLICY 2017

The report prepared by Karnataka Jana Aroyga (KJA), Karnataka Knowledge Commission, Government of Karnataka analyses the healthcare system in Karnataka and drafts the policy for the public health system. The policy envisages two-fold visions, provision of equitable and high quality and accessible healthcare to the people and enabling technologically advanced high quality medical educational institution with a fair approach and transparency. The purpose of this policy is to direct Karnataka Integrated Health Policy 2016. This policy is adapted to guide the healthcare system in the coming 10 years with a midterm review on the 5th year. The policy adopts healthcare intervention of the state through the political, economic and legal framework in healthcare services, human resources, information system, technologies and medicines, financing, health governance and leadership.

KERALA HEALTH POLICY (DRAFT) 2018

Kerala Health Policy aims at the achievement of SDGs in the health sector, to provide universal, free and comprehensive healthcare, to reduce infant, child and maternal mortality rate to that of developed countries and to improve the life expectancy rate. The three-tier healthcare delivery system is reviewed and administered according to Indian Public Health Standards. The doctor-patient ratio is to be increased to 1:1000. Establishment of a Special Medical Board for recruitment of personnel in the health sector is envisaged. In order to ensure a high standard in medical education, functional autonomy for medical colleges, International Classification of Diseases (ICD) for documentation and an effective referral system are to be established.

CHAPTER 3

Trends and Patterns of NHM Allocations in Karnataka and Kerala

3.1. National Health Mission - Goals

NRHM was introduced in 2005 and NUHM in 2013. Both were merged and renamed as NHM. NHM sets its mission targets from time to time as the pathway forward to the achievement of health standards and to evaluate the success and drawbacks of the mission periodically. Accordingly, NHM has revised and adopted mission targets for the period of 2017-2020.

The main goals of NHM are listed below which are targets from 2017-2020:

1. Reduce Maternal Mortality Rate (MMR) to 1/1000 live births
2. Reduce Infant Mortality Rate (IMR) to 25/1000 live births
3. Reduce Total Fertility Rate (TFR) to 2.1
4. Prevention and reduction of anemia in women aged 15–49 years
5. Prevent and reduce mortality and morbidity from communicable, non-communicable diseases, injuries and emerging diseases
6. Reduce household out-of-pocket expenditure on total healthcare expenditure
7. Reduce annual incidence and mortality from Tuberculosis by half
8. Reduce prevalence of Leprosy to <1/10000 population and incidence to zero in all districts
9. Annual Malaria Incidence to be <1/1000
10. Less than 1 per cent Microfilaria prevalence in all districts. (NHM, Goals)

3.2. Funding pattern for the implementation of NHM programmes

NHM follows an independent system of accounting that does not come under state budget heads. However, NHM is typically administered by state-level societies which then pump down the funds to local self-government bodies like districts and villages. The crucial part toward the success of any programme lies in efficient planning and financial management. Financial Management Group (FMG) working under NHM Finance Division of Ministry of Health & Family Welfare is involved in planning, budgeting, accounting, financial reporting, internal controls including internal audit, external audit, procurement, disbursement of funds and monitoring the physical and financial performance of the programme, with the main aim of managing resources efficiently and achieving pre-determined objectives (NHM, GoI).

NHM is a major instrument of financing and support to the states to strengthen public health systems and healthcare delivery. The fund is shared between Centre and states prior to 2015-16 as 75 per cent was borne by the Centre and the rest by states. Later, the share from GoI was reduced to 60 per cent. NHM financing to the states is based on the state's Programme Implementation Plan (PIP) prepared by the state's implementing agency followed by a programme guideline. This study uses the PIP of the state of Karnataka and Kerala from the period of 2013-14 to 2017-18. The year 2013 saw the introduction of NUHM and also the extension of the plan to 2017 and further from 2017-2020, the fund flow was initially from Centre to implementing agencies which resulted in unspent balances in the fund released, and then through the reform in 2013 the fund flows from Central government through the state budget and then to the lower agencies.

The State PIPs comprise the following major pools:

Part I: NRHM RCH Flexi pool (Reproductive and Child Health)

Part II: NUHM Flexi pool

Part III: Flexible pool for Communicable Disease

Part IV: Flexible pool for Non-communicable Disease, Injury and Trauma

Part V: Infrastructure Maintenance (NHM framework, 2013)

The distribution of funds through this pool is envisaged to provide better financial flexibilities and to ensure the distribution of funds more efficiently. The fund is sanctioned as four quarters. States are given autonomy to carry out the health programmes and reform in an appropriate and flexible manner as per local needs. Decentralisation in planning and implementation is done through the State Health Mission which develops the State Health Action Plan and it then flows down to District Action Plan and to Block Health Action Plan.

Part I: NRHM RCH Flexi pool (Reproductive and Child Health)

Includes maternal health through various schemes like Janani Suraksha Yojana, child health like Janani Shishu Suraksha Karyakram, family planning programmes, adolescent health, Rashtriya Kishore Swasthya Karyakram, Rashtriya Bal Swasthya Karyakram, training programmes and schemes for vulnerable groups. NHRM additionalities include ASHA, community health, hospital strengthening through CHCs, PHCs and sub-centres, implementation of Clinical Establishment Act. Health Action Plans including block villages, mainstreaming of AYUSH, National Mobile Medical Units including recurring expenditure National Ambulance Service and immunisation including routine immunisation and pulse polio immunisation and National Iodine Deficiency Disorders Control Programme (NIDDCP).

Part II: NUHM Flexi pool

Programme mapping, programme management like selection and training, strengthening of health services, outreach services and camps in slums and vulnerable areas, urban CHCs and ASHA (urban).

Part III: Flexible pool for Communicable Disease

Training, operational cost and programme management for IDSP- Integrated Disease Surveillance Programme, NVBDCP-National Vector Borne Disease Control Programme, NLEP-Leprosy Eradication Programme, and RNTCP - Revised National Tuberculosis Control Programme.

Part IV: Flexible pool for Non-communicable Disease, Injury and Trauma

1. National Programme for Control of Blindness (NPCB),
2. National Mental Health Programme (NMHP),

3. National Programme for the Healthcare of the Elderly (NPHCE),
4. National Tobacco Control Programme (NTCP),
5. National Programme for Prevention and Control of Cancer Diabetes Cardiovascular Diseases and Stroke (NPCDCS)

Part V: Infrastructure maintenance funds allotted for various programmatic divisions of NHM

The funds are budgeted, released and allocated by these flexi pools. Thus the analysis of funding pattern and its effectiveness in implementation is important. This study aims to analyse the difference in budget, release and allocations of the fund to each flexi pool.

3.3. Pattern of healthcare financing in India

Healthcare financing revenue⁵ include household revenue for healthcare which contributes the highest share of 69 per cent, state government funds of 15.3 per cent; central government fund 7.8 per cent, other revenue funds from foreign origin, insurance contributions include 7.1 per cent and funds from local bodies sum up to 0.8 per cent. Healthcare financing for the attainment of health benefits makes up the outlay. The highest share of financing for healthcare comes from household out-of-pocket expenditure 64.5 per cent, 11.2 per cent contribution comes from state schemes, union government schemes incur 8.6 per cent, government insurance scheme include 4.2 per cent, 4.4 per cent comes from private health insurance schemes, local bodies schemes include 1.7 per cent and 5.2 per cent of other schemes (NHA estimates according to 2015-16).

3.4. Trends in NHM fund flow in Karnataka and Kerala

The funding patterns for the implementation of NHM programmes have already been discussed. The funds flow differs each year across states and programmes. Karnataka and Kerala are included in the category of Non-High Focus state in the funding pattern. Since FY 2014-15 NHM fund flows first from GoI at the Centre to the state treasury. The amount is then subsequently routed downwards to the autonomous societies called State Health Societies (SHS) which is allotted to

⁵Healthcare financing revenue is an increase in the funds of a healthcare financing scheme, through specific contribution mechanisms. These are transaction through which the financing schemes obtain their revenues. (A System Of Health Accounts 2011:re ed. ,2017)

the flexi pools at the state level. These SHS funds are directed to District Health Societies⁶ (DHS) to fund district health expenditure. Money is then allotted to blocks to fund PHC and CHC. Table 3 analyses trends in budget, release and allocations for NHM in Karnataka and Kerala.

Table 3: Allocations, Release and Expenditure under NHM (in crore)

Year		Karnataka	Kerala
2014-15	Allocations	834.1	583.57
	Release	697.24	521.99
	Expenditure	858.18	509.83
2015-16	Allocations	835.64	305.87
	Release	740.45	304.14
	Expenditure	1141.61	632.88
2016-17	Allocations	713.85	476.34
	Release	695.77	445.06
	Expenditure	1268.33	737.69
2017-18	Allocations	1024.4	318.55
	Release	1015.98	472.93
	Expenditure	1052.65	477.37

Source: Ministry of Health and Family Welfare

Expenditure for the FY 2017-18 includes only upto 31.12.2017

Table 3 reveals that the allocations, release and expenditure under NHM and it appears that there is a wide gap across the years. Here allocations are as per original outlay/B.E. The releases are related to Central government grants and do not include state's share contribution and kind grants under immunisation. Expenditure includes expenditure against central release, state release and unspent balances at the beginning of the year. (GoI, MoHFW, 2018). The expenditure is always higher than the allocations and release in both the states. This gap is the state's contribution to the

⁶ The District Health Mission is implemented by the Zilla Parishads (district panchayats). It will control, guide and manage all public health institutions (PHI) in the district, sub-centres (SC), primary health centres (PHC) and community health centres (CHC)

NHM. The trends in the released amount show the huge difference with respect to allocations. Each element is explained in detail below.

3.4.1. Allocations and release

Table 4: Percentage of release against allocations (in crores)

State	Year	Allocations	Release	%of release against allocations*
Karnataka	2014-15	834.1	697.24	83.59
	2015-16	835.64	740.45	88.60
	2016-17	713.85	695.77	97.46
	2017-18	1024.4	1015.98	99.17
Average(4 years)				92.21
Kerala	2014-15	583.57	521.99	89.44
	2015-16	305.87	304.14	99.43
	2016-17	476.34	445.06	93.43
	2017-18	318.55	472.93	148.46
Average(4 years)				107.69

Source: Ministry of Health and Family Welfare

*Estimation from the data of allocations and release

In FY 2014-15, a difference of ₹136.86 crore was observed in allocations and release in Karnataka. It is a difference of 16.41 per cent. This was lowered in FY 2015-16 to 11.4 per cent and further in 2016-17 it was 2.5 per cent and in 2017-18 it was 0.82 per cent. The situation in Kerala is different in this scenario. In FY 2014-15, there was a difference of 10.56 per cent with ₹521.99 crore. In FY 2015-16, this amount was lowered to ₹304.14 crore, a difference of ₹217.85 crore in total allocations than the previous year. In FY 2016-17, there was an increase in money allocated from FY 2015-16 of ₹140.92 crore. The difference between release and expenditure also widened at 7.02 per cent than that of 0.56 per cent in 2015-16. In FY 2017-18, there was a reverse situation as the amount of money released was ₹472.93 crore which exceeded the amount allocated of ₹318.55 crore. This change was due to an addition in the fund released called State Initiative - in which the state of Kerala had specified the amount of its contribution towards NHM.

The percentage of release against allocations is observed to be increasing in both the state. From 83.59 per cent in FY 2014-15, it has increased to 99.17 per cent in Karnataka whereas in Kerala it was 89.44 per cent in FY2014-15, which increased to 148.46 per cent in FY 2017-18. The average percentage of release against expenditure in Karnataka is 92.21 per cent, whereas in Kerala, the percentage of release against expenditure is found to be 107.68 per cent in four years. This increase shows a positive note on state treasury that their burden has been decreased but while comparing the percentage of fund released, it shows an increasing path but at a diminishing rate. Thus it is evident that although the release by the Centre is increasing, it is not equal to the budgeted amount in Karnataka and Kerala except for 2017-18 in Kerala.

3.4.2. Release and expenditure

Table 5: Percentage of expenditure against release (in crores)

State	Year	Release	Expenditure	Share of state on expenditure*	Percentage of state's share*
Karnataka	2014-15	697.24	858.18	160.94	18.75364
	2015-16	740.45	1140.61	400.16	35.08298
	2016-17	695.77	1268.33	572.56	45.14283
	2017-18	1015.98	1052.65	36.67	3.483589
Average (4 yrs)					25.6157598
Kerala	2014-15	521.99	509.83	-12.16	-2.38511
	2015-16	304.14	634.88	330.74	52.09488
	2016-17	445.06	737.69	292.63	39.66842
	2017-18	472.93	477.37	4.44	0.930096
Average (4 yrs)					22.5770715

Source: Ministry of Health and Family Welfare

Expenditure for the FY 2017-18 includes only up to 31.12.2017

*Estimation from the data of release and expenditure

The changes in release and expenditure observed in the funding of NHM are shown in Table 5. The release only includes central release but the expenditure includes the amount spent by both central and state and the unspent balance at the beginning of the year. NHM, as stated before, is a CSS and the fund is shared between the Centre and state on a ratio of 60:40. The share of Karnataka

in FY 2014-15 is ₹160.94 crore, at only 18.75 per cent; this was increased to ₹400.16 crore in FY 2015-16 with 35.08 per cent share. The amount of money released in FY 2016-17 was less than that of the release from FY 2015-16 and FY 2014-15, but this decrease in release was accompanied by an increase in expenditure which suggests that the needs in healthcare spending are increasing and the share of expenditure by the state is increasing to 45.14 per cent. This increase shows that the burden on states is increasing. The funding pattern for Kerala and the release and expenditure observed the same trend as of Karnataka. In FY 2014-15, there was a difference of ₹12.16 crore where the release was greater than the expenditure. This remains as the unspent balance with the state, but in FY 2015-16, the expenditure exceeded the release by ₹330.74 crore which was more than the amount of release. FY 2016-17 and FY 2017-18 also saw an increasing but a diminishing trend in the difference between release and expenditure of Kerala and the share of the state. This suggests that the share of state funds in NHM is increasing. The states are mandated to spend 40 per cent of the amount in NHM, but the percentage difference in release against expenditure shows an increasing share of health spending by Karnataka and Kerala in NHM across the years. But the average percentage of state's share is only 25.61 in Karnataka and 22.57 per cent in Kerala which is less than what should be.

The analysis of the allocations, release and expenditure shows the funding pattern of NHM between the Centre and the states of Karnataka and Kerala. It shows an increase in allocations for Karnataka while decreasing allocations for Kerala. It holds true that the allocations in both the states cannot be the same as they differ in population and area. Karnataka receives a better share than Kerala. There exists a gap in allocations and release, although it is decreasing. These differences reflect the variations in the budgeted amount and actually released money. The expenditure against release is the difference between the amount released by the Centre and the total expenditure incurred both by the Centre and the state's share in the fund. It reveals that there is an increase in the difference in the share of the state of Karnataka i.e., an increase in the state's share in NHM fund in Karnataka over the period considered under study and this reflects an increasing fiscal burden on the state of Karnataka.

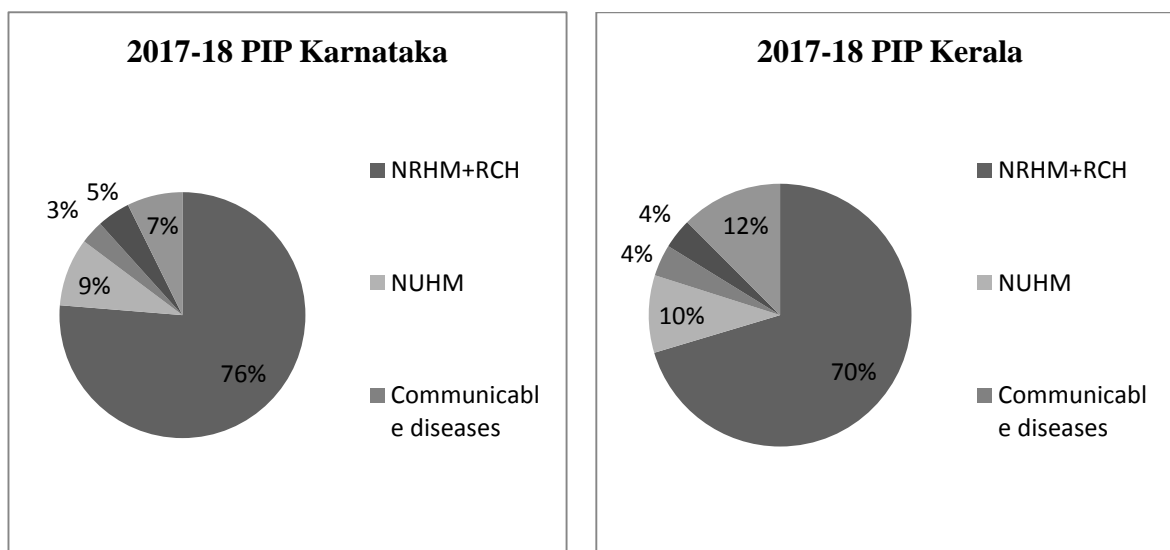
3.5. Analysis of scheme-wise PIP of Karnataka and Kerala

Detailed analysis of the budget allocations for each flexi pool of NHM in the state gives a clear picture on the priorities of the government. In this analysis, allocations on health are examined as

curative and preventive healthcare. Curative care comprises healthcare contacts during which the principal intent is to relieve the symptoms of illness or injury, to reduce the severity of an illness or injury, or to protect against exacerbation and/or complication of an illness and/or injury that could threaten life or normal body function (NHA, 2018). This healthcare intent is to benefit a short run cure and an immediate relief from the affected diseases. Preventive care is based on a health promotion strategy that involves a process to enable people to improve their health through control over some of its immediate determinants (NHA, 2018). This is developed to control the incidence and spread of the diseases. In this analysis, programmes including vaccination and preventive medication for the disease are considered as preventive healthcare. The programmes aiming at immediate relief of illness and rehabilitation are considered as curative healthcare.

3.5.1. Component shares of each item in PIP of Karnataka and Kerala

Figure 3: Component shares of NHM in Karnataka and Kerala in PIP 2017-18



Source: Estimation from PIP of Karnataka and Kerala 2017-18, NHM

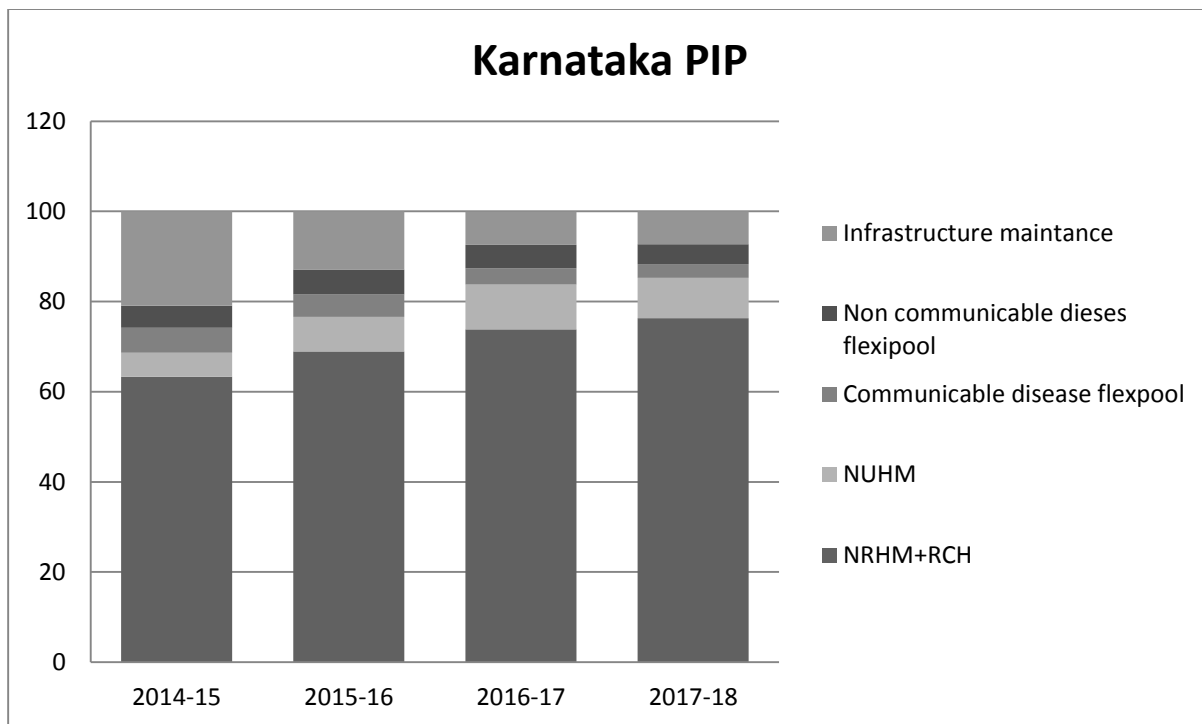
PIP in FY 2017-18 suggests that the priority of Karnataka is towards NRHM+RCH with a funding share of 76% compared to 70% share in Kerala. The funds provided towards infrastructure are 7% in Karnataka while 12% of funds in Kerala are allocated for the same. The NUHM has 9% of money allotted in Karnataka and 10% of the allotted amount in Kerala. The share of communicable

and non-communicable diseases is hardly 5% and 3% respectively in Karnataka and 4% and 4% respectively in Kerala.

3.6. Time series analysis on scheme-wise allocations

The time series analysis on the scheme-wise allotment reveals the priorities of the government over the years and the allocations on curative and preventive diseases.

Figure 4: Component share of NHM in Karnataka in PIP



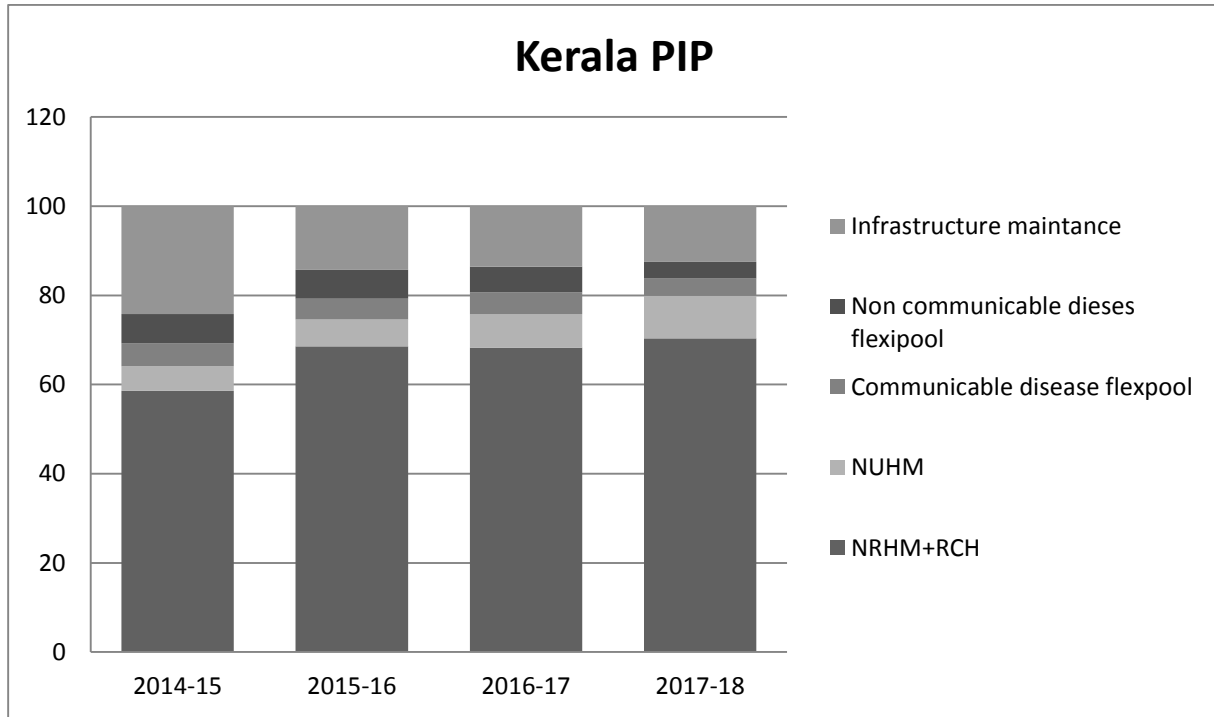
Source: Estimated data from PIP of Karnataka, NHM

Figure 4 shows the time series analysis of component-wise allocations for each flexi pool in PIP Karnataka. The analysis shows that during FY 2014-15, PIP of Karnataka, the NRHM+RCH flexi pool has the highest share on budget with 63 per cent. Infrastructure maintenance bags the next highest share with 21 per cent. NUHM has only a 5 per cent share in the budget. The amount budgeted for the control of communicable and non-communicable diseases has the lowest share with 5 per cent and 6 per cent respectively. The same trend is continued for 2015-16 as well where PIP of FY 2015-16 shows that the government’s concentration on NHRM+RCH has increased in Karnataka to 69 per cent share allocations. Urban health remains a matter of neglect with only 8

per cent allocations. The proportion of the share in infrastructure maintenance has decreased by 8 per cent in Karnataka. The share of communicable and non-communicable disease control has remained at almost at same level. PIP for FY 2016-17 also sees that NRHM+RCH have seen an increase in the appropriation of 5 per cent. It is evident that over the years, the share of the urban health quota is increasing from 5 per cent in FY 2014-15 to 10 per cent in FY 2016-17 in Karnataka. The share of infrastructure maintenance has decreased to 7 per cent. The share of communicable diseases is very low as 4 per cent. Non-communicable disease has also seen a stagnant position as 5 per cent compared to the year before. The research on the data of PIP in FY 2017-18 suggests that the priority of Karnataka is towards NRHM+RCH with a funding share of 76 per cent. The fund provided toward infrastructure has remained the same at 7 per cent. The NUHM has 9 per cent which over the years is gaining importance mostly due to a rise in the urban population. The share of communicable and non-communicable diseases is hardly 5 per cent and 3 per cent respectively. The share of communicable and non-communicable disease flexi pools are decreasing. There is an increasing pattern in the funds allocated toward NRHM+RCH with 76 per cent share. The funds provided toward infrastructure have decreased to 7 per cent. The NUHM has 9 per cent of money allotted. The share of communicable and non-communicable diseases is hardly 5 per cent and 3 per cent respectively. This shows the decline in public spending towards preventive diseases and the concentration of a large share of the money in allocation to curative healthcare.

The data above shows that the major share of the expenditure is directed towards NRHM+RCH over the years. The quantum of allotment has increased with respect to urban health. This shows the pre-eminence position given to curative healthcare by the government. The concept of preventive healthcare is neglected and the share of allocations has also decreased over the years. Infrastructure maintenance appropriation also shows a lower share.

Figure 5: Component share of NHM in Kerala in PIP



Source: Estimation from PIP of Kerala, NHM

Figure 5 presents the component-wise share of PIP of Kerala. FY 2014-15 of PIP of Kerala shows that the share of NRHM+RCH flexi pool has the highest share in the budget with 59 per cent share. Infrastructure maintenance incurs the next highest share with 24 per cent. NUHM has only a 5 per cent share in the budget. The money allotted for the control of communicable and non-communicable diseases has the lowest share with 6 per cent and 7 per cent respectively. In FY 2015-16, the share, although, has the same pattern in allocations but varied in shares with 69 per cent share allocations in NRHM+RCH. Urban health only received 6 per cent allocations. The proportion of the share in infrastructure maintenance has decreased to 10 per cent. The share of communicable and non-communicable diseases has remained at a standstill. PIP for FY 2016-17 indicates that NRHM+RCH allotment by Kerala remained the same as for 2015-16. It is evident that over the years, the share of urban health quota is increasing from 5 per cent in FY 2014-15 to 8 per cent. The share on infrastructure maintenance has decreased to 13 per cent allocations. The share of communicable diseases is very low as 5 per cent. Non-communicable diseases has also seen a stagnant position at 6 per cent. FY 2017-18 suggests that the priority of expenditure is

towards NRHM+RCH with a funding share 70 per cent. The funds provided toward infrastructure have decreased from 24 per cent in 2014-15 to 12 per cent of funds allocated. The NUHM has 10 per cent of allotted amount. The share of communicable and non-communicable diseases is hardly 4 per cent and 4 per cent respectively in Kerala.

The above analysis reveals that a major chunk of allocations is towards NRHM+RCH. The share of urban health is increasing over the years. Infrastructure maintenance is compromised. The share of communicable and non-communicable diseases is decreasing. The evidence from developed nations like Canada, Japan, UK, Sweden, Germany and France shows that preventive healthcare in child care, prenatal care through physicians and midwives through outreach services, early childhood immunisation, dental care, and preventive counselling for injury prevention, tobacco and substance abuse, nutrition, and fitness and the high priority given to preventive services have resulted in the decrease of IMR, Low-Birth-Weight Births, Measles, Mumps and Rubella (Chaulk P., 1994). This is a cautionary trend and efforts should be made by the governments to spend more towards preventive healthcare.

3.7. Health indicators of NHM targets

Table 6: RCH Health indicators

Health Indicators	Karnataka	Kerala	NHM Mission Target (2017-20)
IMR (SRS 2016)	24	10	25
MMR (SRS 2016)	108	46	10
TFR (SRS 2016)	1.8	1.8	2.1
Immunization% (NFHS)	62.6	82.1	
Institutional Delivery % (NFHS)	94.30	99.90	
Life Expectancy at birth (SRS 2015)	66.4 (Male) 70.8 (Female)	71.8 (Male) 77.8 (Female)	

Source: SRS Bulletin and National Family Health Survey (NFHS)

Table 6 shows that health indicators are at a better position for Kerala against Karnataka. The above indicators show the successful utilisation of funds provided by NRHM+RCH and NUHM. In the analysis, RCH is considered as both preventive and curative healthcare. The increase in expenditure over the years is due to the prevalence of significant health indicators in this area and a proper mission target. Karnataka and Kerala have achieved NHM mission targets when we compare IMR. But MMR in Karnataka is very high at 108 when compared to Kerala's 46. The states have to travel miles ahead to achieve the NHM mission target in this section. Both Karnataka and Kerala have successfully achieved TFR ahead of the target years. The percentage of immunisation is very low with only 62.6 in Karnataka whereas it is 82.1 per cent in Kerala. This is a major concern. Kerala has achieved almost 99.9 per cent institutional delivery whereas it is 94.30 per cent in Karnataka. Life expectancy at birth shows the standard that healthcare promises to provide to a person. Karnataka stands at a much lower life expectancy at birth compared to Kerala.

Table 7: Health indicators on Communicable and Non-communicable diseases

Year	Death due to Malaria		Suspected cases of Dengue		Leprosy new cases	
	Karnataka	Kerala	Karnataka	Kerala	Karnataka	Kerala
2014	2	6	3358	2575	3314	663
2015	0	4	5077	4070	3065	574
2016	0	1	6315	9407	2897	496
2017	0	2	17265	19973	2892	520
2018	0	0	2689	3660	1353	273

Source: MIS NHM 2018

**Table 8: Health Indicators on Communicable and Non-communicable diseases and NHM
Mission targets 2018**

Indicator	Karnataka	Kerala	NHM Mission Target (2017-20)
Annual Parasitic Incidence of Malaria per 1000 population	0.06	0.02	<1
Leprosy prevalence rate per 10000 population	0.33	0.17	<1
Annualised total case notification rate (%) of Tuberculosis	57 -2013 165 -2018	65 -2012 53 -2018	

Source: MIS NHM 2018

The 5th, 7th, 8th and 9th goal of NHM is indicated in Table 7 and 8. High death tolls and incidence of disease indicate lower spending towards controlling communicable and non-communicable diseases. Karnataka in the years 2015-16, 2016-17 and 2017-18 has allocated the lowest share towards the flexi pool for communicable diseases and it is evident from the sizeable number of leprosy and dengue cases. Kerala has an increasing trend in deaths due to dengue compared to Karnataka where lowering of fund allocations to flexi pool for non-communicable diseases in that particular year may be one of the reasons. The states have achieved the mission target in malaria and leprosy. Annual Parasitic Incidence of Malaria per 1000 population is higher among Karnataka with 0.06 when compared to 0.02 in Kerala. Leprosy prevalence rate per 10000 population is also higher in Karnataka with 0.33 cases whereas it is 0.17 in Kerala. Annualised total case notification rate (%) of tuberculosis in Karnataka is almost double i.e. 161 in Karnataka whereas it is 53 in Kerala.

3.7.1 Impact of health expenditure on health indicators

An attempt is made to establish a link between healthcare expenditure and health outcome indicators. For this purpose, we conduct Data Envelopment Analysis - a non-parametric efficiency

analysis that provides information on the relative performance of the states with respect to health indicators as against their expenditure. We use two input indicators (i.e. Per Capita Net State Health Expenditure and Per Capita NHM expenditure) and five important health indicators to perform DEA for selected states (Non-High Focus large states). We decomposed the health expenditure into state's net health expenditure and NHM expenditure, to identify the impact of NHM health spending on outcome indicators. A detailed explanation of the methodology of Technical Efficiency is provided in Chapter 1.

Table 9: State-wise Per Capita Net State Health Expenditure (PCNSHE) and Per Capita NHM Expenditure (PCNE)

States	2014-15		2015-16		2016-17		2017-18		Averages	
	PCNSHE	PCNE	PCNSHE	PCNE	PCNSHE	PCNE	PCNSHE	PCNE	PCNSHE	PCNE
Andhra Pradesh	974.43	180.04	1018.2	141.62	1265.98	148.93	1332	156.15	1147.65	156.68
Gujarat	927.75	137.89	1019.71	198.2	1101.86	211.67	1268.87	121.56	1079.55	167.33
Haryana	777.94	164.35	859.33	182.41	1037.41	185.98	1331.67	114.64	1001.588	161.8427
Karnataka	862.89	135.13	845.52	177.82	972.31	195.43	1170.41	160.45	964.6876	172.85
Kerala	1240.61	150.02	1300.78	185.31	1555.99	201.55	1817.54	129.16	1478.732	166.5106
Maharashtra	730.45	156.46	788.89	146.19	847.25	147.72	1175.09	97.46	885.4191	136.9586
Punjab	785.42	158.46	764.75	220.56	833.78	230.53	1109.76	98.76	873.4267	177.0751
Tamil Nadu	827.81	301.45	1036.93	217	997.35	239.18	1327.3	184.13	1047.346	235.4379
West Bengal	659.37	126.52	767.33	155.71	752.44	180.73	889.82	90.02	767.2418	138.249

Table 9 shows the variations of PCNSHE and PCNE across the states. It is identified that per capita health spending in Kerala is at the top consistently from 2014-15 to 2017-18. Its per capita net expenditure has increased at the rate of 13.75 per cent (Annual Average Growth Rate) during 2014-15 to 2017-18. Similarly, its annual average growth rate of NHM (per capita) is 16.14. On the other hand, Karnataka has slipped from fourth place to seventh place in terms of per capita state expenditure from 2014-15 to 2017-18 and has registered 11.06 Annual Average Growth rate in the same period. Table 9 clearly reveals that Kerala is giving a high priority to the health sector in its fiscal policy compared to Karnataka.

3.7.2. Results and discussion of TE

We executed 5 different models of TE, one of each for all the years selected, and a model for the averages. The last model (with averages) is conducted for deriving the average values of both input and output from 2014-15 to 2017-18.

Table 10: Technical Efficiency Scores of States

TE Scores under Constant Returns to Scale (CRS)					
States	2014-15	2015-16	2016-17	2017-18	Average
Andhra Pradesh	0.724	1	0.991	0.688	0.873
Gujarat	0.928	0.762	0.743	0.749	0.818
Haryana	0.848	0.893	0.809	0.785	0.849
Karnataka	0.936	0.907	0.828	0.76	0.799
Kerala	0.895	0.821	0.762	0.74	0.856
Maharashtra	0.943	1	1	0.965	1
Punjab	0.86	1	0.924	0.933	0.9
Tamil Nadu	0.828	0.759	0.784	0.696	0.761
West Bengal	1	1	1	1	1

Table 10 indicates the TE of the states estimated under the Constant Returns to Scale (CRS). TE scores are bound in the measure of 0 to 1; where TE score 1 indicates perfect efficiency of the stand and 0 indicates perfect inefficiency.

The result based analysis indicates that the state of West Bengal showcases perfect TE across all the five models. The state of Maharashtra achieved perfect efficiency in three out of five models. The comparison of Karnataka and Kerala indicates that Karnataka state has registered higher technical efficiency scores than Kerala, from 2014-15 to 2017-18. However, the state of Kerala outperformed Karnataka in terms of TE calculated for the average values (from 2014-15 to 2017-18). With reference to averages, the state of Kerala was considered being more efficient with its score of 0.856 and it has acquired 4th position among all the states. On the contrary, Karnataka with its score of 0.799 has reached the 7th place among states considered, and it possesses the lowest TE score among South Indian states.

3.7.3. Output targets

Infant Mortality Rate (IMR)

Kerala stands first in health expenditure per capita and is increasing over the years. This clearly points out that the increase in health expenditure per capita will also accompany an increase in health indicators (please refer Appendix 1). However, West Bengal has a lower per capita health expenditure but has been observed to be reaching the potential target level of TE. Thus it shows that given the per capita income, Karnataka is not reaching the potential target due to inefficient TE. From the analysis, it is observed that the state of Kerala has achieved its potential IMR for all the years (models) given its per capita expenditure (both with net and NHM). On the contrary, the state of Karnataka, given its per capita expenditure, could have reduced its IMR from 26 per thousand births to 20.5 per thousand. Hence, it fell short by 5.75 points to reach its potential targets in IMR.

Maternal Mortality Rate (MMR)

It is observed from Appendix 2 that Kerala has the lowest MMR (46 deaths per 1,00,000 mothers giving birth) and the state of Punjab registered the highest MMR (122 per 1,00,000 mothers giving birth). Karnataka, on the other hand, occupies the second position after Punjab where 108 death are registered per 1,00,000 mothers giving birth. Hence MMR is alarming in the state of Karnataka. If we judge the state Karnataka against its expenditure on health, the analysis suggests that on an average, Karnataka could reduce MMR from the current 108 deaths to 47 per 1,00,000 mothers giving birth if it operates on the efficiency frontier. Thus there is a huge gap between the potential and actual MMR in the case of Karnataka. In fact, the gap between potential and actual MMR is highest for Karnataka compared to other states.

Crude Death Rate (CDR)

From Appendix 3, it is clearly observed that states like Kerala, Maharashtra, Punjab, Tamil Nadu and West Bengal have achieved the potential output target with reference to CDR. Although the state of Karnataka has lower CDR compared to Kerala, the state has the potential to further reduce the rate of crude deaths given its expenditure on health.

Neonatal Mortality Rate (NMR)

Appendix 4 shows that Kerala has achieved the potential target level of NMR with the lowest value that is 6 in 2014-15 to 2016-17 and 5 in 2017-18. Other states have not been able to achieve this NMR, but states like Maharashtra, Punjab, Tamil Nadu and West Bengal have achieved the potential target of TE. Karnataka, however, has the highest NMR and also has not been able to achieve the potential target level. Karnataka has the highest difference between the potential and actual in the year 2015-16. It is also observed that Karnataka has the lowest PCNSHE and PCNE in the same year. As the share of PCNSHE and PCNE increases, the difference between potential and actual output target decreases. Thus as the expenditure increases, the actual health indicator also shows a positive change.

Life Expectancy (LE)

In Appendix 5, it is observed that Kerala has the highest LE rate and TE where it has achieved the potential output target. A higher LE rate is preferred as it shows the highest standard of living. Here Karnataka is observed to be among states with a low LE rate compared to other states. It is also found that the TE of Karnataka has not achieved the potential target, given its expenditure. This says that although Karnataka has the potential to improve the output targets, with the given level of input, the state has failed to do so. It is also observed that Maharashtra, Punjab, Tamil Nadu and West Bengal have achieved their output targets, whereas Karnataka failed to achieve them. The year 2015-16 saw a wide difference between potential and actual targets in Karnataka, and from Table 10 it is found that per capita input level is also lower than other years in Karnataka. This variation in inputs has led to the difference between the actual and potential outputs target.

CHAPTER 4

CONCLUSION

4.1. Conclusion

Health is an important indicator of human and economic development. Lower public health spending results in higher out-of-pocket expenditure and a higher burden for the health of individuals. This study finds that there are uneven allocations, release and expenditure in NHM which is one of country's largest healthcare policies. The federal structure of the country demands that major schemes be shared between the Centre and the states. Being the core scheme in CSS, NHM requires 60:40 per cent of the funds to be shared between the Centre and states, which increases the state's fiscal burden and this share is not strictly followed by the states and results in non-achievement of laid-down targets.

From the analysis, it is evident that the mandated share of 60:40 between the Centre and states on funding pattern of NHM is not strictly followed. The increasing share of state expenditure on NHM reflects the increasing fiscal burden on states through CSS. The share of allocations on NRHM+RCH scheme has increased from 63 per cent to 76 per cent in Karnataka, and a proportional growth is visible in Kerala from 59 per cent to 70 per cent. The NHM health expenditure is mainly concentrated toward NRHM+RCH because of the prevalence of a large number of health indicators in this area. The share of the budget has seen an increasing priority in NUHM with 5 per cent in FY 2014-15 to 10 per cent budget share in FY 2017-18. The share of communicable and non-communicable diseases is decreasing in both the states from 6 per cent in Karnataka and 5 per cent in Kerala to 3 per cent in both the states. In the case of DEA on the averages of the select health outcome variables for 9 Non-High Focus large states as per NHM classification, it was found that Karnataka has scored 79% in TE and Kerala scored 85% in TE. It was found that per capita health expenditure significantly influenced the health outcomes. The state of Karnataka with its lower per capita expenditure has failed to achieve higher efficiency than Kerala because there exists a huge gap between what it could have achieved and what it actually achieved. Therefore, Karnataka should concentrate on improving its operational efficiency.

Although Karnataka has achieved results in the field of healthcare when compared to the aggregate of health indicators of India, it still lags behind many states in the Human Development Index (HDI) with the 9th position and is the lowest among South Indian states. This study finds that Karnataka with the given per capita health expenditure has failed to achieve the TE and potential health indicators. The study also revealed that healthcare public expenditure is mainly concentrated on curative healthcare and neglected preventive healthcare. Thus Karnataka has to efficiently spend to achieve better health indicators and TE in healthcare. The study suggests that Karnataka has the potential to tap resources in the health sector. With the given per capita health expenditure and health infrastructure, it can improve its health indicators by adopting healthcare models followed by Kerala and also by improving the public participation in the health sector. Both the governments should also concentrate on preventive healthcare expenditure which will subsequently reduce health expenditure.

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Appendix 1: State-wise output targets of IMR

Infant Mortality Rate															
States	2014-15			2015-16			2016-17			2017-18			Averages		
	P	A	P-A	P	A	P-A	P	A	P-A	P	A	P-A	P	A	P-A
Andhra Pradesh	22.00	39.00	17.00	37.00	37.00	0.00	19.22	34.00	14.78	20.52	32.00	11.48	20.25	35.50	15.25
Gujarat	25.72	35.00	9.28	21.00	33.00	12.00	23.46	30.00	6.54	22.72	30.00	7.28	20.25	32.00	11.75
Haryana	22.00	36.00	14.00	21.00	36.00	15.00	24.99	33.00	8.01	23.99	30.00	6.01	20.25	33.75	13.50
Karnataka	26.28	29.00	2.73	21.00	28.00	7.00	23.15	24.00	0.85	24.00	25.00	1.00	20.25	26.00	5.75
Kerala	12.00	12.00	0.00	12.00	12.00	0.00	10.00	10.00	0.00	10.00	10.00	0.00	11	11.00	0.00
Maharashtra	22.00	22.00	0.00	21.00	21.00	0.00	19.00	19.00	0.00	19.00	19.00	0.00	20.25	20.25	0.00
Punjab	24.00	24.00	0.00	23.00	23.00	0.00	21.00	21.00	0.00	21.00	21.00	0.00	22.25	22.25	0.00
Tamil Nadu	20.00	20.00	0.00	18.34	19.00	0.66	17.00	17.00	0.00	16.00	16.00	0.00	17.725	18.00	0.27
West Bengal	28.00	28.00	0.00	26.00	26.00	0.00	25.00	25.00	0.00	24.00	24.00	0.00	25.75	25.75	0.00

Appendix 2: State-wise output targets of MMR

Maternal Mortality Rate															
States	2014-15			2015-16			2016-17			2017-18			Average		
	P	A	P-A	P	A	P-A	P	A	P-A	P	A	P-A	P	A	P-A
Andhra Pradesh	61.00	74.00	13.00	74.00	74.00	0.00	62.47	74.00	11.53	73.13	74.00	0.87	61.00	74.00	13.00
Gujarat	85.81	91.00	5.19	61.00	91.00	30.00	90.75	91.00	0.25	90.75	91.00	0.25	61.00	91.00	30.00
Haryana	61.00	101.00	40.00	61.00	101.00	40.00	100.91	101.00	0.09	100.91	101.00	0.09	61.00	101.00	40.00
Karnataka	89.50	108.00	18.50	61.00	108.00	47.00	88.64	108.00	19.36	101.00	108.00	7.00	61.00	108.00	47.00
Kerala	46.00	46.00	0.00	46.00	46.00	0.00	46.00	46.00	0.00	46.00	46.00	0.00	46.00	46.00	0.00
Maharashtra	61.00	61.00	0.00	61.00	61.00	0.00	61.00	61.00	0.00	61.00	61.00	0.00	61.00	61.00	0.00
Punjab	122.00	122.00	0.00	122.00	122.00	0.00	122.00	122.00	0.00	122.00	122.00	0.00	122.00	122.00	0.00
Tamil Nadu	66.00	66.00	0.00	56.57	66.00	9.43	66.00	66.00	0.00	66.00	66.00	0.00	56.91	66.00	9.09

Appendix 3: State-wise output targets of CDR

West Bengal	101.00	101.00	0.00	101.00	101.00	0.00	101.00	101.00	0.00	101.00	101.00	0.00	101.00	101.00	0.00
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Crude Death Rate																
States	2014-15			2015-16			2016-17			2017-18			Averages			
	P	A	P-A	P	A	P-A	P	A	P-A	P	A	P-A	P	A	P-A	
Andhra Pradesh	6.00	7.30	1.30	7.10	7.10	0.00	5.90	6.80	0.90	5.87	6.80	0.93	5.90	7.00	1.10	
Gujarat	6.06	6.20	0.14	5.80	6.10	0.30	5.83	6.10	0.27	5.83	6.10	0.27	5.90	6.13	0.23	
Haryana	6.00	6.10	0.10	5.80	6.10	0.30	5.80	5.90	0.10	5.80	5.90	0.10	5.90	6.00	0.10	
Karnataka	6.07	6.80	0.73	5.80	6.60	0.80	5.83	6.70	0.87	5.80	6.70	0.90	5.90	6.70	0.80	
Kerala	6.60	6.60	0.00	6.60	6.60	0.00	7.60	7.60	0.00	7.60	7.60	0.00	7.10	7.10	0.00	
Maharashtra	6.00	6.00	0.00	5.80	5.80	0.00	5.90	5.90	0.00	5.90	5.90	0.00	5.90	5.90	0.00	
Punjab	6.40	6.40	0.00	6.20	6.20	0.00	6.00	6.00	0.00	6.00	6.00	0.00	6.15	6.15	0.00	
Tamil Nadu	7.00	7.00	0.00	6.04	6.70	0.66	6.40	6.40	0.00	6.40	6.40	0.00	6.23	6.63	0.40	
West Bengal	6.10	6.10	0.00	5.90	5.90	0.00	5.80	5.80	0.00	5.80	5.80	0.00	5.90	5.90	0.00	

Appendix 4: State-wise output targets of NMR

Appendix 5: State-wise output targets of LE

Neonatal Mortality Rate																
States	2014-15			2015-16			2016-17			2017-18			Averages			
	P	A	P-A	P	A	P-A	P	A	P-A	P	A	P-A	P	A	P-A	
Andhra Pradesh	16.00	26.00	10.00	24.00	24.00	0.00	13.15	23.00	9.85	14.21	23.00	8.79	14.25	24.00	9.75	
Gujarat	17.86	24.00	6.14	15.00	23.00	8.00	15.98	21.00	5.02	15.98	21.00	5.02	14.25	22.25	8.00	
Haryana	16.00	23.00	7.00	15.00	24.00	9.00	16.99	22.00	5.01	16.99	21.00	4.01	14.25	22.50	8.25	
Karnataka	18.14	20.00	1.86	15.00	19.00	4.00	15.76	18.00	2.24	17.00	18.00	1.00	14.25	18.60	4.35	
Kerala	6.00	6.00	0.00	6.00	6.00	0.00	6.00	6.00	0.00	5.00	5.00	0.00	5.75	5.75	0.00	
Maharashtra	16.00	16.00	0.00	15.00	15.00	0.00	13.00	13.00	0.00	13.00	13.00	0.00	14.25	14.25	0.00	
Punjab	14.00	14.00	0.00	13.00	13.00	0.00	13.00	13.00	0.00	13.00	13.00	0.00	13.25	13.25	0.00	
Tamil Nadu	14.00	14.00	0.00	12.34	14.00	1.66	12.00	12.00	0.00	11.00	11.00	0.00	11.93	12.75	0.82	
West Bengal	19.00	19.00	0.00	18.00	18.00	0.00	17.00	17.00	0.00	17.00	17.00	0.00	17.75	17.75	0.00	

Source: Author's Estimation from DEA

Life Expectancy															
	2014-15			2015-16			2016-17			2017-18			Averages		
States	P	A	P-A	P	A	P-A	P	A	P-A	P	A	P-A	P	A	P-A
Andhra Pradesh	72.20	69.60	2.60	69.60	69.60	0.00	72.15	69.60	2.55	71.78	69.60	2.18	72.20	69.60	2.60
Gujarat	71.33	69.50	1.83	72.20	69.50	2.70	71.16	69.50	1.66	71.16	69.50	1.66	72.20	69.50	2.70
Haryana	72.20	69.40	2.80	72.20	69.40	2.80	70.80	69.40	1.40	70.80	69.40	1.40	72.20	69.40	2.80
Karnataka	71.20	69.10	2.10	72.20	69.10	3.10	71.23	69.10	2.13	70.80	69.10	1.70	72.20	69.10	3.10
Kerala	75.10	75.10	0.00	75.10	75.10	0.00	75.10	75.10	0.00	75.10	75.10	0.00	75.10	75.10	0.00
Maharashtra	72.20	72.20	0.00	72.20	72.20	0.00	72.20	72.20	0.00	72.20	72.20	0.00	72.20	72.20	0.00
Punjab	72.50	72.50	0.00	72.50	72.50	0.00	72.50	72.50	0.00	72.50	72.50	0.00	72.50	72.50	0.00
Tamil Nadu	71.40	71.40	0.00	73.06	71.40	1.66	71.40	71.40	0.00	71.40	71.40	0.00	72.99	71.40	1.59
West Bengal	70.80	70.80	0.00	70.80	70.80	0.00	70.80	70.80	0.00	70.80	70.80	0.00	70.80	70.80	0.00

Note(s) - P- Potentials and A- Actuals