India's Mission LiFE: A Quantitative Analysis

The **LiFE** (lifestyle for environment) mission envisions replacing the mindless and destructive consumption prevalent through the 'use-and-dispose' economy with a circular economy. The Mission intends to nudge individuals to undertake simple acts in their daily lives that can contribute to conservation of the environment and thus contribute significantly to climate change when embraced across the world.

As a global programme, Mission **LiFE** envisions three core shifts in our collective approach towards sustainability, achieved in a phased manner by changing demand through nudging individuals across the world in Phase I, changing supply by nudging industries and markets to respond as per the revised market demands in Phase II, and changing large-scale industrial policy and government policy in Phase III, that is attuning it with both sustainable consumption and production.

To understand the macroeconomic, social and environmental impacts of individual actions towards achieving sustainable living and having a low climate footprint, we have undertaken three simulations.

Simulation 1

Meat has much larger environmental and climate footprints than plant-based foods. In low-income countries like India, livestock production is an important source of income for many poor households. This simulation has been undertaken to reflect the socio-economic and environmental impact of shifting from meat consumption to vegetarian protein sources like pulses while maintaining the same level of protein intake.

Simulation 2

India has one of the largest concentrations of population using biomass as a cooking fuel, especially in the rural areas. Modern clean fuels such as liquefied petroleum gas (LPG) are unaffordable for many rural households living below the poverty line. Women and children face not only health hazards due to smoke emanating from burning of biomass but also "time poverty." Similar to the Government of India's Pradhan Mantri Ujjwala Yojana (PMUY), we have simulated the scheme in our model to the lowest income rural household classes, in which a direct benefit transfer is done as a subsidy for the LPG connections. This simulation has been undertaken to understand the socio-economic and environmental impact of shifting from biomass as cooking fuel to LPG.

Simulation 3

The strongest antidote to transportation-induced greenhouse gasses is building a reliable and cheap mass public transport network for the commuters. There are multiple methods for accomplishing this, but trains and a rapid transit (metro) intra-city system are the single most effective types of mass transportation, due to their environmentally friendly impact. With the growth of cities and urban congestions, for inter-city mobility, rail, and for intra-city travel, rapid transit (metro) system networks signify the way forward. This simulation reflects the socio-economic and environmental impact of a shift in consumer preferences for rail networks.

Methodology

The methodology adopted to run the above simulations is NCAER's India Energy Model that has been developed under this grant. Given that the focus of the model is on analysing issues relating to low-carbon pathways, the model has incorporated in detail both the primary and commercial energy sectors. All major sources of electricity productions in India are modelled as separate sectors. Similarly, energy-intensive

sectors like cement, aluminum, iron and steel figure as independent sectors. There is a detailed disaggregated transport sector in the model. There are four factors of production (including land, capital, unskilled labour, and skilled labour), three types of domestic institutions (households, enterprises, and the government), and an external sector. In a country like India where there are significant variations in income across household classes and across locations (rural, urban), any discussion on policy interventions always focuses on whether the same change is inclusive across income classes or not. The same debate recurs in the case of the adoption of low-carbon pathways for India. For this reason, our CGE model of India incorporates five income quantile classes each for rural or urban households.

Results

Simulation 1: Dietary Changes with Shift from Meat Consumption to Pulses

% Change	2020-2025	2025-2030	2030-2035	2035-2040	2040-2045	2045-2050
GHG	-0.70	-0.33	-0.11	0.10	0.20	0.27
GDP	0.19	0.21	0.25	0.28	0.30	0.28
GINI	0.000	-0.001	-0.003	-0.004	-0.005	-0.004

- With the shift in dietary changes from meat consumption to pulses while maintaining the status quo of the protein intake, GHG emissions decline marginally till the year 2035. Thereafter, they rise marginally with a growth in the population.
- GDP rises marginally and the percentage change in Gini's coefficient declines marginally from the baseline, indicating a reduction in income inequalities.

Simulation 2: Shift from Biomass for Fuel Consumption to LPG by Direct Benefit Transfer Scheme

% Change	2020-2025	2025-2030	2030-2035	2035-2040	2040-2045	2045-2050
GHG	0.51	-0.01	-0.14	-0.08	0.02	0.20
GDP	0.07	0.02	0.01	0.02	0.04	0.08
GINI	0.000	0.031	0.068	0.114	0.170	0.238

- With the shift from biomass as a cooking medium to LPG through subsidies in the form of a direct benefit transfer scheme to the poorest two income classes in rural areas, GHG emissions initially rise marginally and then decline marginally till the year 2040. In subsequent years, the GHG emissions increase, possibly due to a growth in the population.
- The GDP rises marginally and the percentage change in Gini's coefficient rises marginally from the baseline, indicating accentuation of income inequalities. This could probably be due to the fact

that our transfers are not adjusted for inflation in our simulation. So, the effect gets diminished in the later years.

Simulation 3: Opting for Public Modes of Transport like the Railways

% Change	2020-2025	2025-2030	2030-2035	2035-2040	2040-2045	2045-2050
GHG	-0.36	-0.13	-0.18	-0.06	0.03	0.10
GDP	0.11	0.07	0.10	0.12	0.14	0.15
GINI	0.0000	-0.0004	-0.0020	-0.0031	-0.0047	-0.0058

- With a rise in the use of the railways network, GHG emissions marginally decline till the year 2040, and then rise marginally till the year 2050.
- GDP rises marginally and the percentage change in Gini's coefficient declines marginally from the baseline, indicating a reduction in income inequalities.