



Share of Fruits and Vegetables in Tackling CVDs and NCDs in Indian Context

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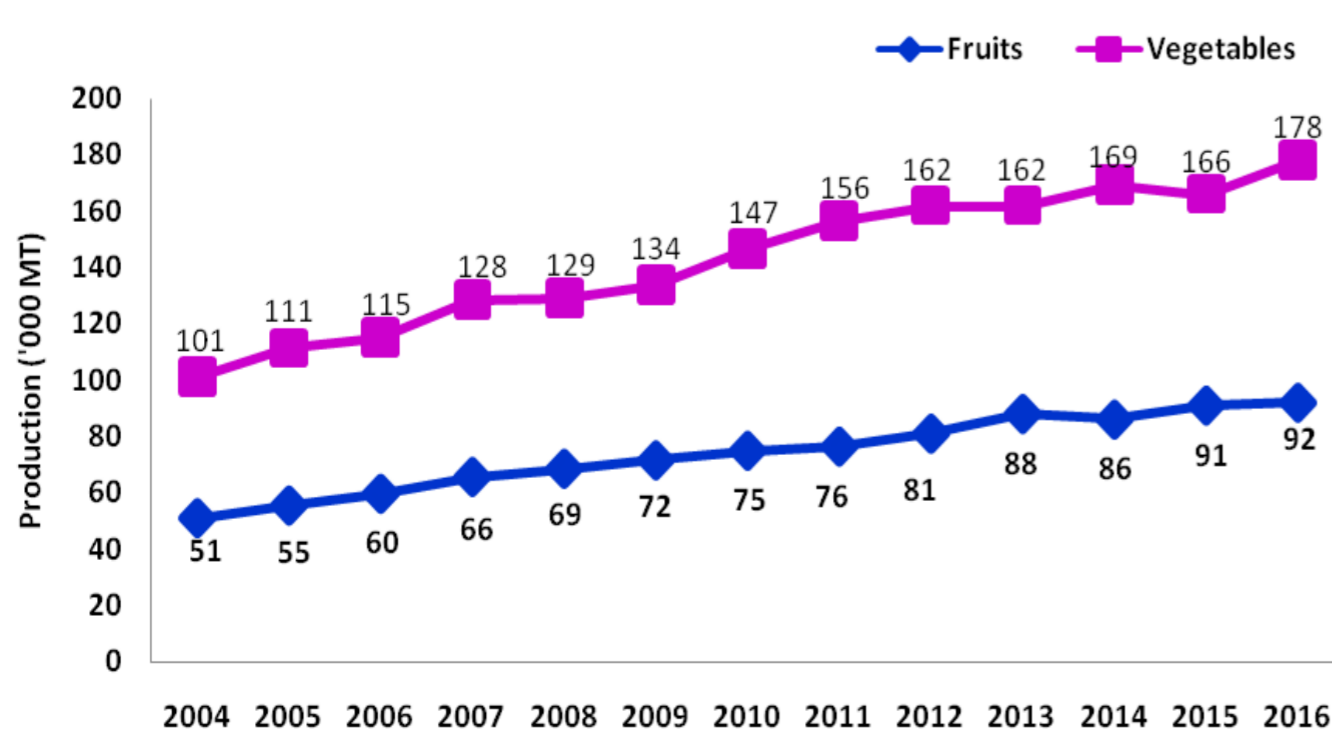
Amongst many strategies implemented globally, diet diversification is believed to be a reliable long-term sustainable food based strategy to combat malnutrition. Considering the fact that diet is the major contributor to shape the health of the individuals, if diet diversity is promoted along with other dietary modifications among individuals in the community, the panoramic view of the current scenario of malnutrition can be flipped. As per the World Health Organization (WHO), 3.9 million deaths and 16.0 million disability adjusted life years (DALYs) are attributable to low fruit and vegetable (F&V) consumption. With this background, emphasizing the importance of F&V (i) recommended intake (ii) national per capita availability (iii) current consumption pattern and (iv) the additional cost one has to bear to meet the recommended intake for Indians is presented here.

Importance of F&V : F&V are the treasure trove of several vitamins, minerals, phytonutrients & fibre which act as protective foods that impart health benefits such as on preventing cardiovascular disease (CVD), hypertension, obesity, diabetes and cancer.

Recommendation: The dietary guidelines for Indians recommend diversifying the individual's diet with a variety of foods and consuming at least 400 to 500 g of F&V for a healthy life.

Production : India is the second largest producer of fruits and vegetables in the world. Though the production has been stagnant in the past 4 years, a positive shift in production in the recent years have been observed (Figure 1). However, a significant amount of the fresh produce is lost during sorting/ grading, transport, storage and export.

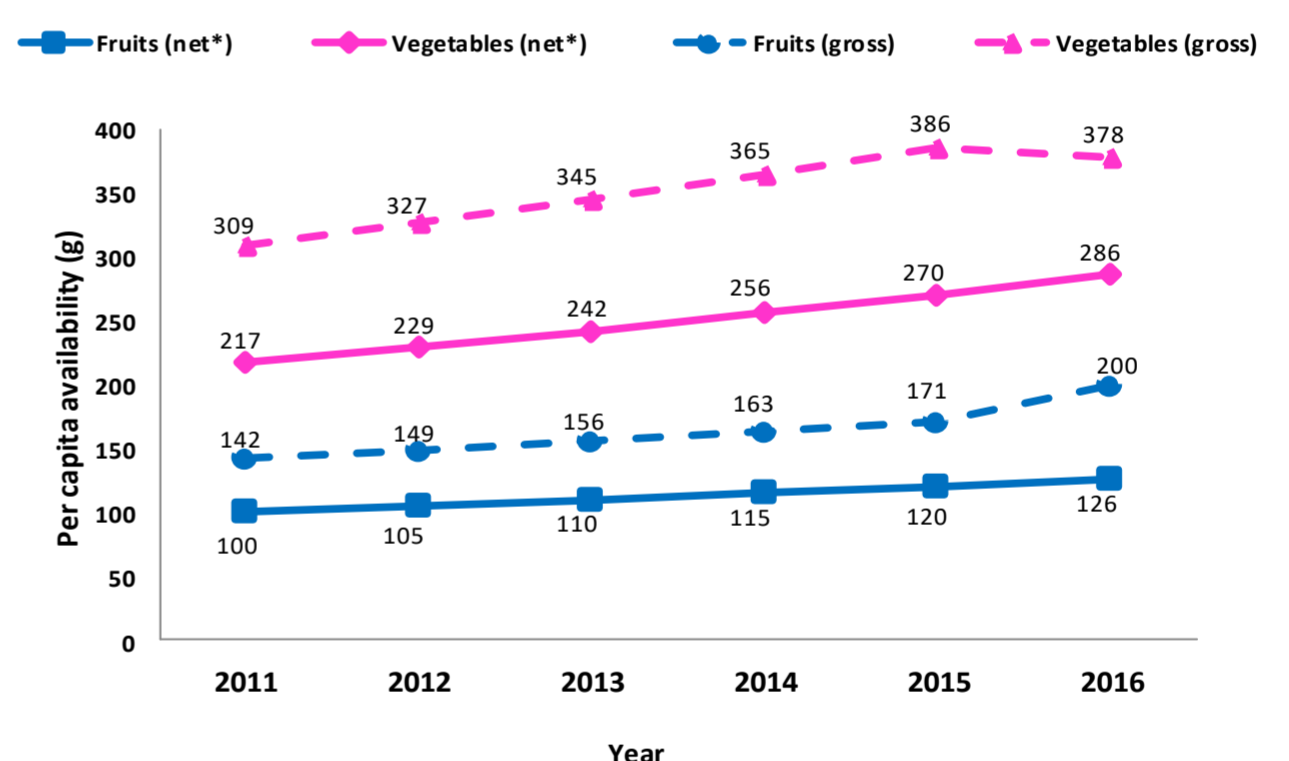
Figure 1. Production of F&V in India (1000 MT)



Source: Horticulture statistics at a glance, 2016

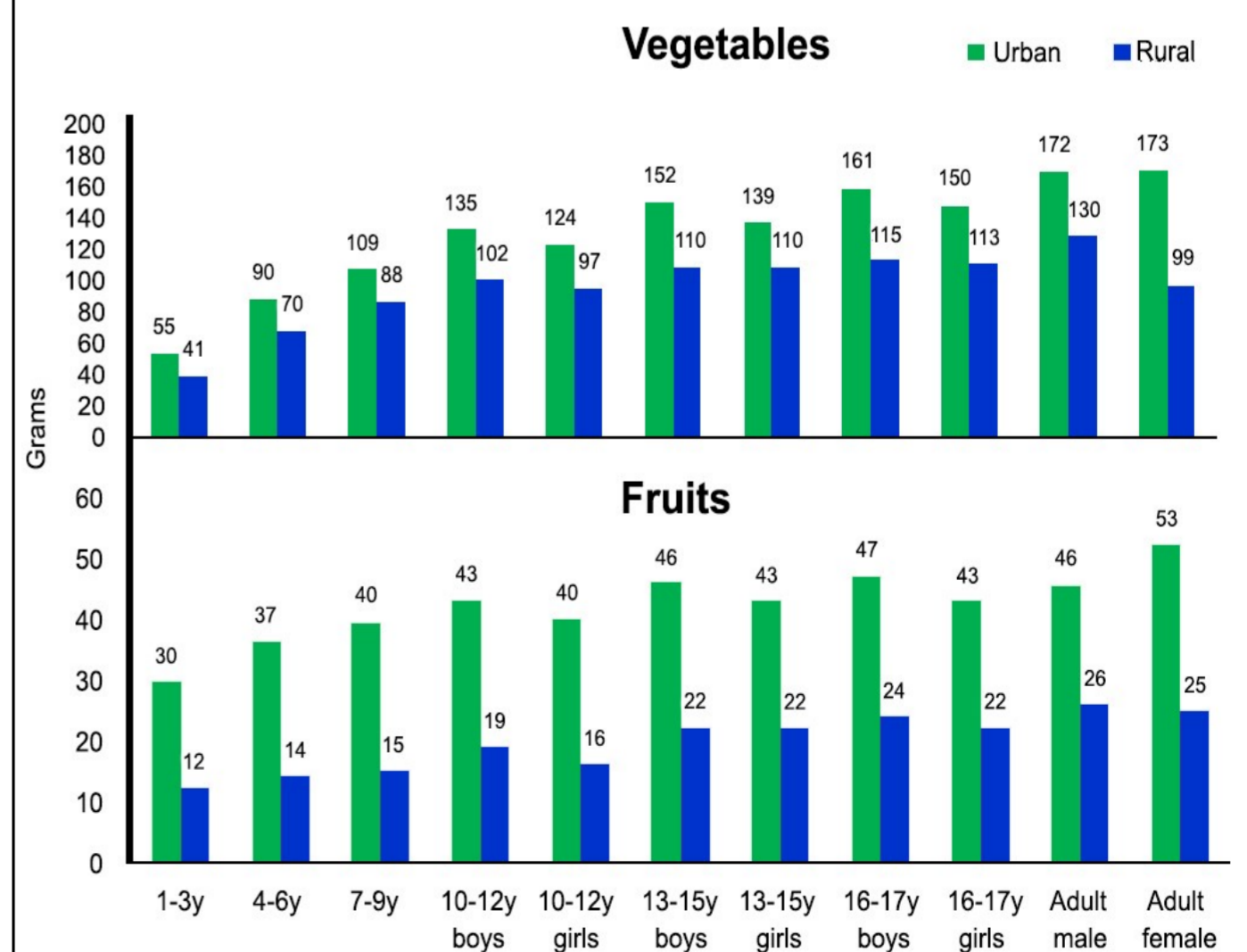
Per-capita availability and consumption: Despite the sufficient per capita availability of F&V (Figure 2) consumption of these micronutrient rich foods is low in urban and rural areas (Figure 3). Green leafy vegetables are the least consumed food groups in both rural and urban areas.

Figure 2. Per Capita Availability of F&V in India (g/day)



Source: Horticulture statistics at a glance, 2016

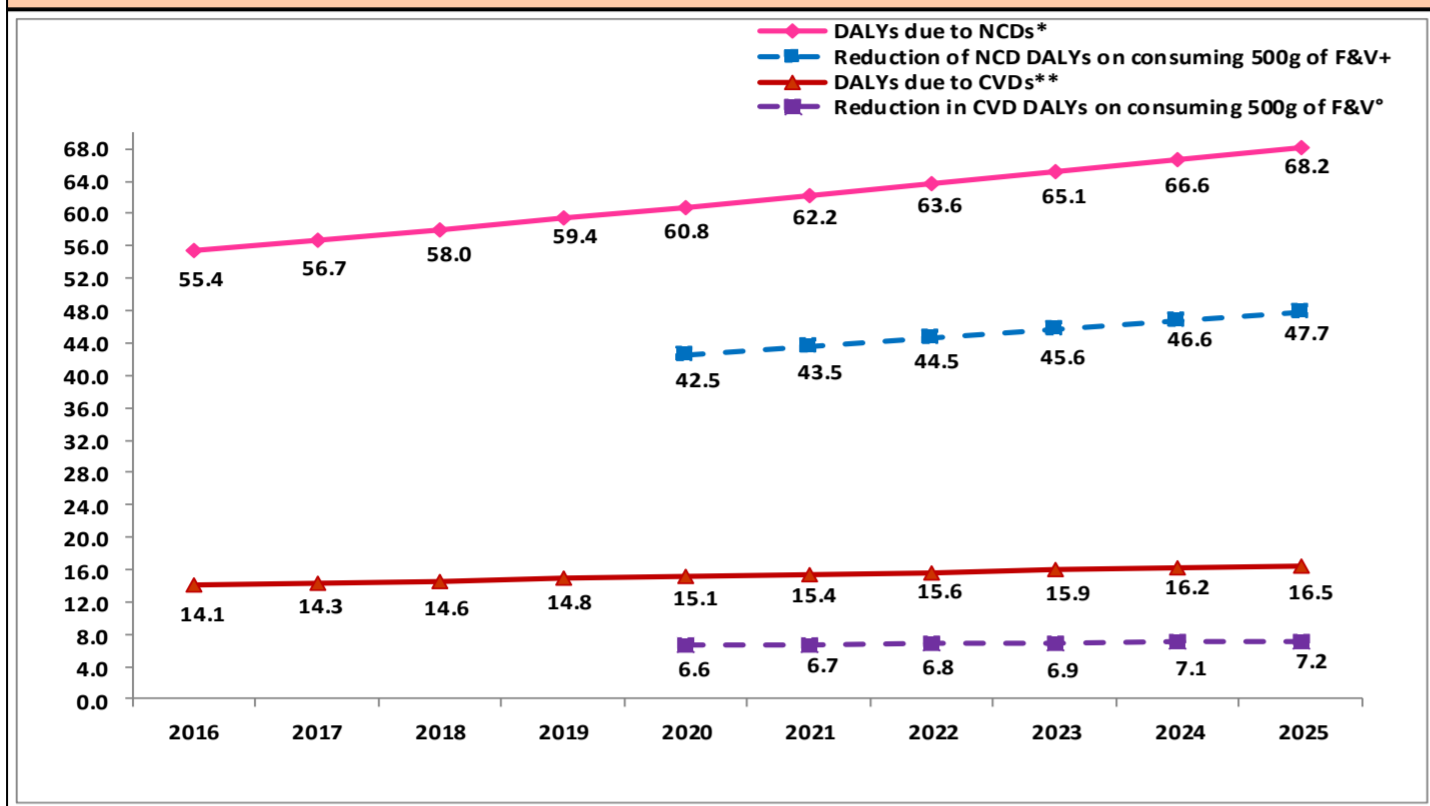
Figure 3: Consumption of F&V



Source: NNMB, 2012; NNMB, 2016

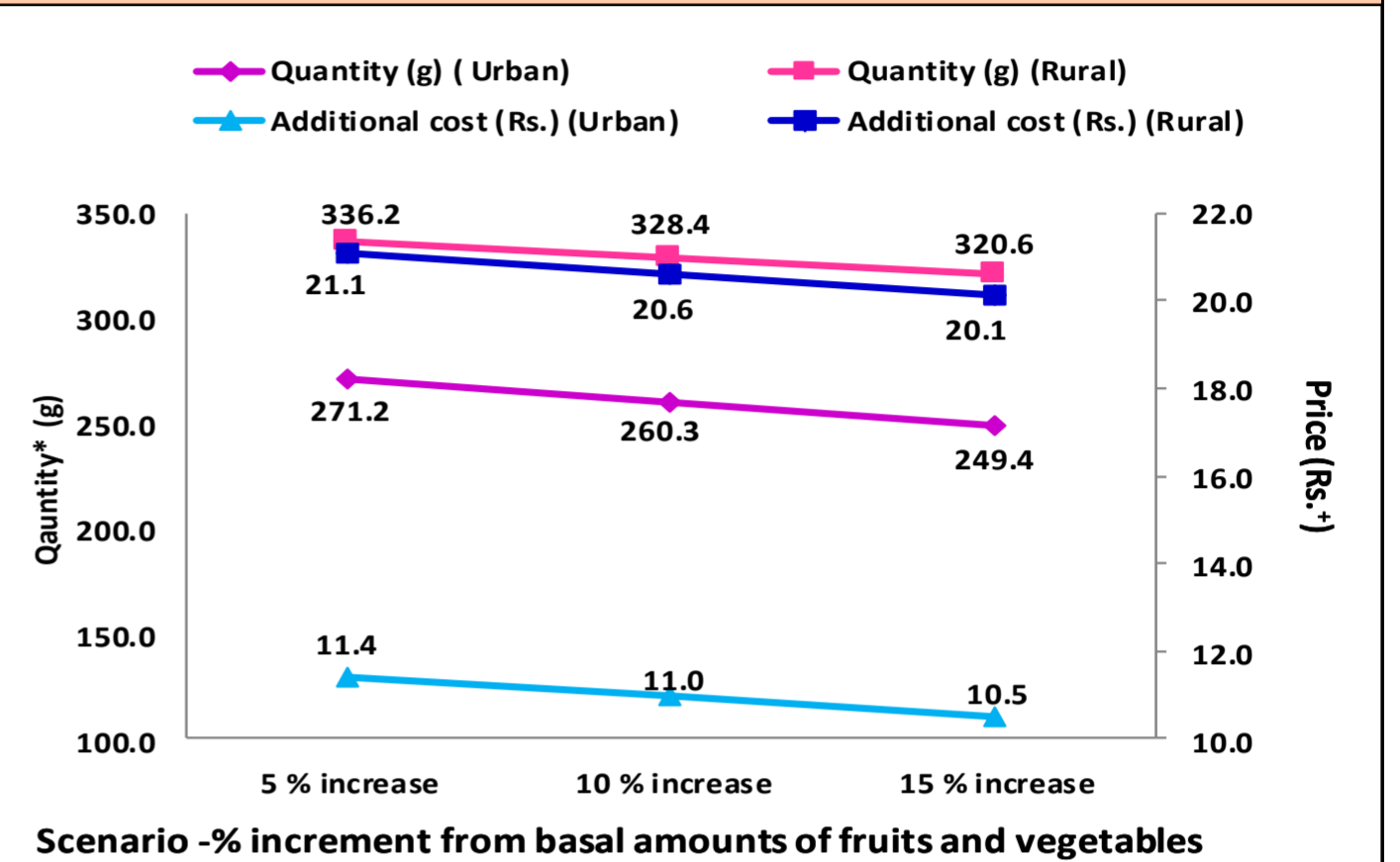
Dose-response effect on NCDs: Diet alone contributed to 56.4% of risk for CVD DALYs in India. A meta-analysis on dose-response effect with increasing the consumption of fruits and vegetables from 200 g to 500 g and 800 g showed that there was a reduction in relative risk (RR) of DALYs due to NCDs by 30%. DALYs due to NCDs with current amounts of F&V consumed is projected in Figure 4. If 500g F & V are consumed per day, the projected DALYs due to NCDs (68%) and CVDs (17%) can be reduced to 48% and 7%(approx).

Figure 4: Projection of Rise and Reduction in DALYs(%)



* The basal values are taken from Dandona et al 2017. The projections are calculated based on the CAGR of 2.33% for NCDs & 1.74% for CVDs
 † The reduction in DALYs due to NCDs is projected by applying 30% average reduction in relative risk based on the dose-response meta-analysis report by Aune et al 2017
 ‡ A reduction in CVD DALYs is projected by applying 56.4% reduction in risk factor contributed by dietary intake (India State-Level Disease Burden Initiative CVD Collaborators, 2018)

Figure 5: Projected Additional Cost and Amount of Fruits and Vegetables to be Consumed to Meet 500g Requirement of F&V



* The basal values for calculating the consumption of additional amounts of F&V are taken from NNMB 2011 and NNMB 2016.
 † The basal values for calculating the consumption of extra amounts of F&V are taken from consumer price index (CPI), 2018.

The World Economic Forum (2014) reported that 3.55 trillion \$ will be lost in India due to NCDs between 2012-2030 and CVD is the top most disease to cause the economic loss. Additionally, 47% of OoPE in India was on NCDs (WHO, 2004). Therefore, decreasing the DALYs of NCDs & CVDs is a national priority which might be achieved on consuming 500g/d of F&V. Consequently increasing the consumption of fruits and vegetables will decrease the OoPE on NCDs at household level and increase the GDP of the country by increasing the productivity of healthy individuals.

Strength: Projection of NCD & CVD DALYs. Computation of cost analysis on consuming additional F&V to prevent/decline NCD & CVD DALYs. .

Weakness: Lack of recent data on intake of F&V.

Opportunity: Inclusion of additional 270-330 g of F&V on the plates of the individuals at an additional cost of ₹11-₹21/- in urban and rural areas is needed (Figure 5).

Threat: The additional investment of ₹11 and ₹21 might appear as a burden to urban and rural population, but in fact, the households money expended on NCDs will decrease with additional direct and indirect benefits such as improved cognition, growth, productivity and disease free healthy life.

Challenges—the need for behaviour change communication (BCC) : Increasing the consumption of F&V remains to be a challenge to most of the developed and developing countries in the world. BCC intervention to re-shift diets from ultra-processed foods to minimally processed foods is the need of the hour. A convergence needs to be established among Ministry of Agriculture, Dept. of Women & Child Development, Dept. of Health Research, Ministry of Food Processing Industries to promote dietary diversification as a strategy to combat burden of malnutrition.