POLICY BRIEF
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The Energy and Resources Institute

Sustainable Urban Development: Necessity of Integrating Water-Energy-Food Dimensions in Developmental Policies

India is in a state of transition from traditional rural economy to a modern industrial economy. However, with increasing urbanization it faces challenges in terms of population rise, unplanned urbanization, climate change and degraded ecosystem which pose major impediments towards achieving Sustainable Development Goals. As on 2015, 400 million people reside in urban India and by the year 2050, the number of people living in Indian cities is expected to be about 840 million, which will further aggravate the issues of water, energy and food security. Hence, there is a need for smarter and sustainable ways of resource use efficiency which will not only address the resource scarcity concerns but also improve the quality of life. This policy brief is an attempt to highlight the importance of integrated management of water, energy and food for urban India considering the intricate relationship between these elements. It examines their interrelationship from their consumption perspective, and evaluates policies and programmes dealing with the development of urban areas.

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Introduction

Urban population grew at 2.67% per annum during 2001-11, and constitutes 31%[1] of the total population of the country. The number of Million Plus population cities has grown by 48% and the population of five cities namely Chennai, Pune, Ahmedabad, Hyderabad and Bengaluru has crossed five million mark. Population of three urban agglomerations of India namely, Greater Mumbai, Delhi, and Kolkata crossed ten million in 2011. Thus, urban landscape of the country is witnessing increase in population, increase in number of cities as well as expansion of existing municipal boundaries.

Urbanization has not only added number in the urban ecosystem but has given rise to the burgeoning middle class and increasing prosperity. India's per capita income has grown ten times in the past five decades and the poverty ratio has declined to 29.5% in 2011[2]. This is accompanied with increase in demand and supply of basic amenities such as water, energy and food in particular; putting additional stress

[1] http://censusindia.gov.in/2011-prov-results/paper2/data_files/india/Rural_Urban_2011.pdf

[2] The Planning Commission, GoI. (2012). The challenges of Urbanization in India: Approach to 12th Five Year Plan. Retrieved from http://12thplan.gov.in/12fyp_docs/17.pdf.

on water and energy resources of the nation, and intensifying the environmental stress. It is estimated that there is increase in demand for every key service such as water, transportation, sewage, etc. by five to sevenfold[3] in cities and towns of every size and type.

To support its large and growing population, India made a significant progress in agricultural production, doubling its food grain production capacity from 108 million tonnes in 1970's to 264 million tonnes in 2013-14[4] and has reached from a stage of self sufficiency to surplus agricultural produce[5] [6]. However, attaining a level of food sufficiency has been at the cost of high extraction of water together with higher consumption of energy in agriculture coupled with many other issues such as soil degradation, loss of biodiversity and socio-economic disparities. It has been projected that population of India will reach 1.7 billion by 2050 and would require 450 million tonnes[7] of food grains annually to support its population.

However, there are challenges such as water scarcity and limited land to grow additional food required to feed the growing population. While the requirement of water for irrigation in India is expected to grow by more than 50 percent by 2050[8], per capita water availability is declining rapidly[9]. The country is also facing the potent threat of climate change and 13 states constituting almost 50% of the country's area have been reported to be witnessing declining trends of rainfall[10].

Under these scenarios, resource conservation, use optimization and waste minimization will be the key to meet burgeoning 'quality-resource' requirement in adequate amount. Reducing the demand-supply gap on an urgent basis is also necessary to achieve the Sustainable Development Goals, within the stipulated timeline of 2030. The United Nations' Sustainable Development Goals (See Table 1) emphasize on making cities inclusive, safe, resilient and sustainable by implementing integrated policies and plans for resource use efficiency and adaptation to climate change[11]. An integrated approach towards managing water, energy and food security can have double benefits in ensuring adequate resource availability

WATER, ENERGY AND FOOD: KEY ISSUES

- As per NSS 69th Round only 76.8% urban households get drinking water within their premises and 37.6% households do not get sufficient drinking water for 2-3 months[1] .
- A significant amount of water is lost on the way, mainly through leaks, before it reaches the end user (city dwellers), often termed as non revenue water (NRW). Planning Commission of India estimates that 40%-50% of the total water supply is 'lost' in the distribution system[2]. Lack of metering, leakage from pipes, valves, lack of proper infrastructure maintenance, corroded pipes etc. are observed to be major reasons for high NRW in Indian cities.
- Energy is required at every step of municipal water supply system including its extraction, treatment, pumping, recycling etc. and it forms the main operational cost component. Most cities spend 30%-50%[3] of their water supply accounts for electricity to pump water. Generally, water supply is sourced from long distances and the length of pipeline determines the cost including the cost of pumping water. Thus, water loss is associated with energy loss.
- An average urban Indian wastes 0.34kg/capita/day of food and overall 153 Gkg of food waste is generated by urban India daily[4]. Also, approximately one-fifth[5] of the food served at weddings and social gatherings gets wasted, which leads to loss of associated water and energy used to prepare it.
- Total electricity consumed by kitchen appliances was 25000 Gwh/ yr in 2006 which is projected to increase to 50000 Gwh/yr in 2016 and 103,000 Gwh/ yr in 2031 indicating an increase of almost 400% in 25 years[6].

1 NSS Report No.556 (69th Round): Drinking water, sanitation, hygiene and housing conditions in India. Retrieved from http://mospi.nic.in/Mospi_New/upload/nss_rep_556_14aug14.pdf.

2 Planning Commission (2011). Report of the Working Group on Urban and Industrial Water Supply and Sanitation for the Twelfth Five-YearPlan (2012-2017). Retrieved from http://planningcommission.nic.in/aboutus/committee/wrkgrp12/wr/wg_indu_sani.pdf

3 Ibid.

4 B. Adhikari, Barrington.S, Martinez.J. (2009). Urban food waste generation : challenges and opportunities. International Journal Environment and Waste Management, 3 (1/2), pp. 4-21.

5 http://ken-foundation-awareness2.blogspot.in/p/food-wastage.html

6 The World Bank (2008): Residential consumption of electricity in India

3 The Planning Commission, GoI. (2012). The challenges of Urbanization in India: Approach to 12th Five Year Plan. Retrieved from http://12thplan.gov.in/12fyp_docs/17.pdf

4 http://foodnetindia.in/blog/2015/11/26/278/

5 Swaminathan, M.S. & Bhavni, R.V. (2013). Food Production and Availability. Essential Prerequisites for Sustainable Food Security. *Indian J Med Res*, 138, pp. 383-391

6 Ahmad, F. & Haseen,S. (2012). The Performance of India's Food grains Production: A Pre and Post Reform Assessment. *International Journal of Scientific and Research Publications, 2(3)*,pp.1-15.

7 Ministry of Water Resources, GoI. (2006). Report of Sub-Committee on More Crop and Income per Drop of Water. Retrieved from http://wrmin.nic.in/forms/list.aspx?lid=473 on 21 July 2016.

8 Rao Hanumantha, C.H. (2002). Sustainable use of Water for Irrigation in Indian Agriculture. *Economic and Political Weekly,37(18),*pp. 1742-1745.

9 Central Water Commission, National Institute of Hydrology, 2008. "Preliminary consolidated report on effect of climate change on water resources". Ministry of Water Resources.

10 Rathore, L.S., Attri, S.D. and Jaiswal, A.K.(2013). State level climate change trends in India. Indian Meteorological Department, Government of India.

11 United Nations SDGs (http://www.un.org/sustainabledevelopment/cities/)

and simultaneously harmonizing WEF nexus, reducing the trade-offs among different sectors. The interrelationship between water, energy and food is so robust that improving efficiency in one element, either through technological interventions or through regulatory approach will have impact on overall nexus elements.

INTERRELATIONSHIP BETWEEN WATER, ENERGY AND FOOD

As food is a necessity for life, equally important is cooking food, due to inability of human beings to consume raw food both due to inability to digest uncooked food as well as suitability to their taste buds. For cooking the food and making it suitable for human consumption, water and energy are essential inputs. At the stage of food consumption, water is required for cleaning the raw food items such as vegetables, for cooking food such as rice, wheat and beverages as well as for cleaning utensils . The daily domestic water use in food consumption accounts for almost 30% of minimum water supply requirement, set up by the Government of India for communities residing in urban region with population of more than one lakh[1]. Also, around 20% of total electricity consumed in households is by kitchen appliances. Thus, water and energy draw a close linkage with food and dietary needs of humans.

[1] Indian Standard: Code of basic requirements for water supply, drainage and sanitation. Bureau of Indian Standards, fourth reprint December, 2010.

World Economic Forum (2011) describes water-energy-food security problem as "A rapidly rising global population and growing prosperity are putting unsustainable pressures on resources. Demand for water, food and energy is expected to rise by 30 to 50% in the next two decades, while economic disparities incentivize short-term responses in production and consumption that undermine long-term sustainability. Shortages could cause social and political instability, geopolitical conflict and irreparable environmental damage".

Programs and policies for Urban Development in India

Water, energy and food being separate sectors are managed by different ministries and departments at the national, state and district levels. However, matters pertaining to urban development are the responsibility of State Governments as per the constitution of India. The 74th Amendment Act of the constitution has further delegated many of these functions to urban local bodies (ULB) for management at city level. However, Ministry of Urban Affairs, Government of India, plays an important role in formulating various policies, programs and

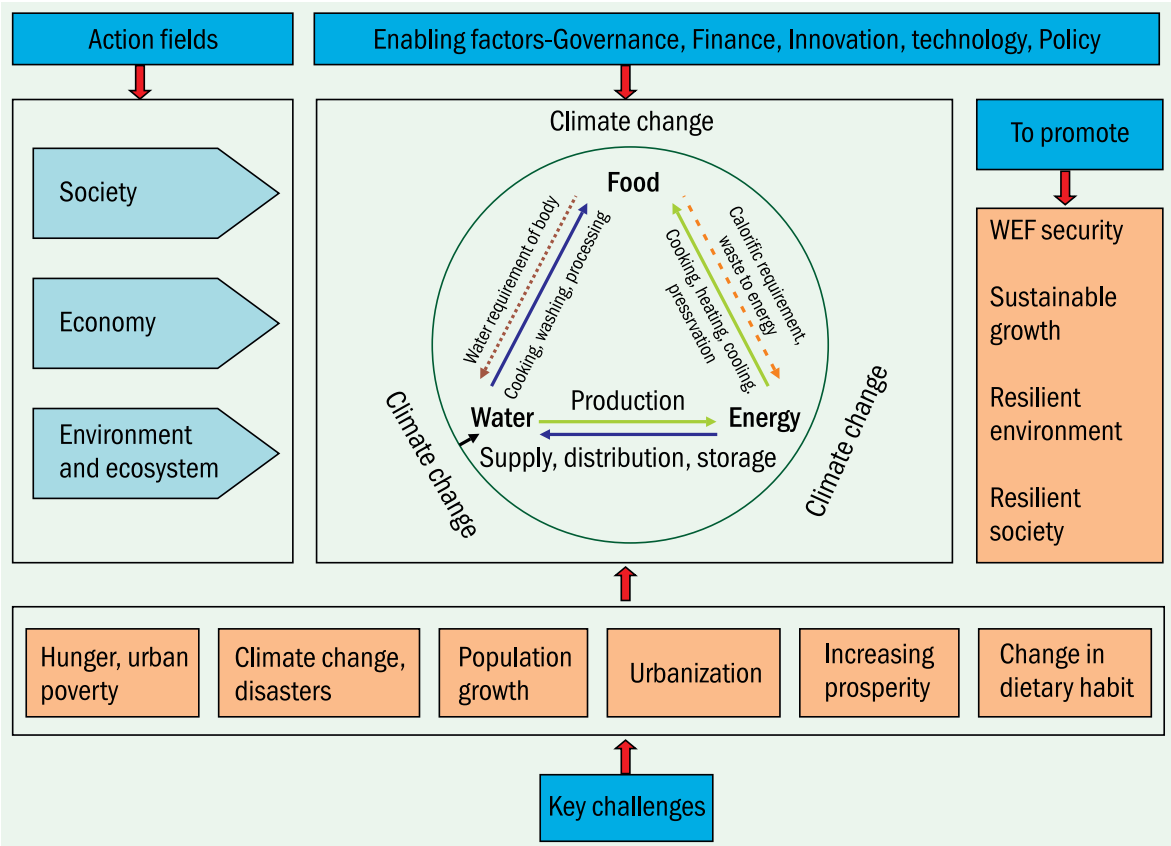

Figure 1: Water, energy, food security nexus (Adapted with changes from Hoff. H, 2011)[12]

[12] Hoff, H. (2011). Understanding the Nexus. Background Paper for the Bonn 2011 Conference: The Water, Energy and Food Security Nexus.

Table 1: Sustainable Development Goals influencing Nexus Issues

Nexus sector	Goals	Salient points
Water	Goal no.6: Clean water and sanitation	6.1. Universal and equitable access to safe and affordable drinking water 6.3.Improve water quality , increasing recycling and safe use 6.4. Increase water use efficiency, reduction in the number of people suffering water scarcity 6.5.Implementation of integrated water resources management 6.6.Protect and restore water related ecosystems-mountains, forests, rivers, wetlands, lakes and aquifers
Energy	Goal no.7: Affordable and clean energy	7.1. Universal access to affordable, reliable and modern energy services 7.2. Increase the share of renewable energy 7.3. improvement in energy efficiency 7.3.a. enhance international cooperation to facilitate access to clean energy research and technology
Food	Goal no.2: Zero hunger	2.1.Access to safe, nutritious and sufficient food 2.4. To ensure sustainable food production and implement resilient agricultural practices. 2.5.c. Adopt measures to ensure the proper functioning of food commodity markets, access to market information, including of food reserves and help limit extreme food price volatility.
	Goal no.12: Responsible consumption and production	12.3. Halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains
Cross Cutting across all sectors	Goal no.11: Sustainable cities and communities	11.5. Significantly reduce the number of deaths and people affected caused by disasters including water-related disasters. 11.7.b.Substantially increase the number of cities and human settlements adopting and implementing integrated policies, and plans towards inclusion, resource efficiency, mitigation and adaptation to climate change, resilience to disaster
	Goal no.13: Climate action	13.1. Strengthen resilience and adaptive capacity to climate related hazards and natural disasters 13.2.Integrate climate change measures into national policies, strategies and planning
	Goal no.15: Life on land	15.9: Integrate ecosystem and biodiversity into national and local planning and developmental processes

WATER-ENERGY-FOOD NEXUS IN GURUGRAM CITY

TERI conducted a study to assess the water energy and food inter linkages across food consumption chain of an urban ecosystem, with specific reference to Gurugram city. Total water supply in Gurugram (Gurgaon) is 5224 million cubic metres (MCM) annually, which does not suffice the present demand which is 42% more than the water supplied to different sectors. It has been estimated by Town and Country Planning of Haryana that Non-revenue water (NRW) in urban areas of Haryana Sub-region accounts for almost 10%-55%. The district has been categorized as overexploited for its groundwater reserves. Following were the findings of the study:

- Water required for cooking food per day is 11 MLD, which constitutes 6% of the total water demand (184 MLD) of the city at present. This water requirement includes water for cooking as well as washing utensils.
- The city needs more than one lakh kg of energy in the form of LPG for cooking raw food and requires 854.64 MWh of electricity in consumption of food other than cooking. This includes reheating, processing and storage of foods using electrical appliances.
- The city also needs 114.6 MWh of energy in the form of electricity for pumping water into the storage tanks which is further used for cooking along with other purposes like washing clothes, sanitation, flushing and floor cleaning.
- Water demand in food consumption (cooking and washing utensils) by the end users is expected to increase by 2.5 times for Gurgaon city and 1.5 times for urban India by 2031.
- Similarly, energy demand for cooking food and for food other than cooking is expected to increase by 4 and 2 times for Gurgaon city and urban India respectively putting stress on the natural resource base of the city as well as the country.
- High income group respondents residing in organized sectors consume 12 and 5 percent excessive water and energy respectively at food consumption level than middle and low income group.

schemes for urban development in the country. The first central level efforts to provide drinking water in towns and cities were undertaken in Sixth Five Year Plan (1979) through Integrated Development of Small and Medium Towns followed by Accelerated Urban Water Supply Program (AUWSP) during Eighth Five Year Plan.

Jawaharlal Nehru National Urban Renewal Mission in 2005 was a landmark shift in urban sector that laid emphasis on the preservation of water bodies, adequate water supply and replacement of old and worn out pipes in 63 identified cities. Urban Infrastructure Development Scheme for Small and Medium Towns (UIDSSMT) is a component of JnNURM and includes all urban infrastructure development including water supply and sewerage in small and medium towns. JnNURM started the reform process in the history of urban India at National level. The program had a positive impact on the nexus sector as it provided access to better quality water infrastructure services

to minimize the loss of water during transmission from source to the end user, byelaws were made on reuse of recycled water and policy on user charges were formulated for 100% cost recovery in water supply and solid waste management. Apart from this, rainwater harvesting was made mandatory to cope up with problem of depleting groundwater as well as to promote water conservation.

A recent initiative by Government of India for improving urban services is Atal Mission for Rejuvenation and Urban Transformation (AMRUT). The purpose of AMRUT is to ensure that every household has access to tap with assured supply of water and sewerage connections. It also emphasizes on universal metering, reduction in NRW, rainwater harvesting, rejuvenation of water bodies along with recharging of ground water. These efforts will reduce water supply crises and create universal access along with minimizing the water stress in cities.

Smart Cities Mission aims to drive economic growth along with improving quality of life of urban people through the application of smart technology. The Government of India has allocated US $1.2 billion for Smart Cities in the fiscal budget of 2014-15. As India is moving towards smarter solutions, it is imperative to have a framework to deal with urbanization issues based on social, economic and environmental sustainability[13]. This is the only mission that interlinks water and energy component together along with addressing other issues of urban ecosystem. The mission talks about water management through smart meters and management, leakage identification and maintenance and water quality monitoring. Similarly energy management component of the mission includes smart meter and management, renewable sources of energy and energy efficiency and green buildings concept. Focusing on renewable energy 10 % of smart cities energy requirement should come from solar energy. The biggest strength of SCM is the use of Special Purpose Vehicles (SPV) which is meant for timely and effective implementation of the reforms in the selected 100 cities.

Another important landmark that takes the nexus issue into cognizance is Urban and Regional Development Plans Formulation and Implementation (URDPFI) Guidelines formulated in 2015[14]. URDPFI take into account the emerging scenario in planned development of cities and towns and have provisions for rainwater harvesting, conservation of urban water bodies, water supply system, waste water management system, energy efficiency, strategic plan for new and renewable energy, alternate sources of energy to meet the city demand, smart grid to check electricity losses and many other sustainability issues have been addressed through this guideline. This is the only guideline of Urban Ministry that has addressed the issue of food security in urban context and hence makes it imperative to look into the water energy food inter linkages in a holistic way. Under URDPFI, 2100 master plans have been notified out of total 7933 cities and towns.

Gap analysis

Regulatory/Policy level: Reforms envisaged under the JnNURM have not yielded desired results due to lack of proper implementation, and its weak monitoring and enforcement mechanism. Among the projects related to improvement in water supply, less than 1/3rd have been completed, rest being delayed. None of the projects under preservation of water bodies have been completed. Though a toolkit to check NRW has been developed under JnNURM but its usage has not been adequate due to lack of capacity in municipalities. Smart Cities Mission takes into cognizance improvement in water and energy use efficiency, but less than 15% projects relate to water and only 5% to energy, among the proposals from winning cities in round 1. Only 10 cities have taken the component of smart water management to check NRW. This indicates a non-serious attitude of civic authorities towards water and energy.

Programs and policies of Ministry of Urban Development focus individually on issues related to water and energy security, but are almost silent on any provision dealing with the issues related to food supply, distribution or its consumption, in urban localities. Food management should be included in the bouquet of smart solutions under SCM.

Institutional Gaps: At present there is no committee or institution to look into the WEF issues with

[13] Bharat, G.K. and Sarkar, S.K. (2016). *Swachh Bharat Mission (Urban) Towards Cleaning India: A Policy Perspective*. New Delhi: TERI.

[14] http://moud.gov.in/sites/upload_files/moud/files/URDPFI%20Guidelines%20Vol%20I.pdf14

an integrated approach. Lack of any coordination authority to oversee the policies and programmes from individual ministries lead to intensification of trade-offs in their implementation. These trade-offs lead to wastage of resources in other sectors giving rise to competitive stress among different sectors. The nexus issue could be addressed coherently only through the involvement of multi-level government authorities with their clear and well defined roles.

Infrastructural Gaps: While inappropriate and outdated infrastructure leads to wastage in water supply and NRW, it also causes loss of energy, produced again using water itself. Moreover, inappropriate supply chain management and facility to store food has been attributed to wastage of almost one-third of all 'water and energy intensive food' produced in the country.

Technological Gaps: Affordability and scalability of technologies for resource use efficiency is the major challenge in their wider application by end users. Simultaneously, trade-offs exist among technologies for individual sectors- for example- technologies for water use efficiency are generally energy intensive. Similarly, induction stoves while save LPG but are electricity intensive. Renewable energy based kitchen appliances like solar cookers are not popular due to their lower efficiency.

Policy recommendations

An integrated policy framework is required to address the issues related to water, energy and food security in the country. The recommendations mentioned need to be adopted on urgent basis to harmonize WEF nexus, especially in the context of sustainable urban development:

SMART WATER MANAGEMENT OF NAGPUR MUNICIPAL CORPORATION

Nagpur Municipal Corporation, also included in the smart cities list, had taken an initiative under Public Private Partnership (PPP) model to provide continuous water supply on a city wide scale including slum dwellers. The project also aimed to reduce the NRW from 50% to 25% in 10 years. It is a classic example of management of entire water cycle from production, treatment, transport, storage and delivery to the end user. At present every household has a tap and a meter and there is accountability for every drop of water supplied. For this project the private company invested 30% of the estimated project cost and rest 70% grant came from JnNURM. It offers lessons and insights for other cities seeking ways to transform their water supply.

Source: MoUD (2015). Compilation of Practices-Urban Services & Reforms in Indian Cities. http://amrut.gov.in/writereaddata/Compilation_of_practices-NIUA-PEARL.pdf

- **Food management as integral part of urban development missions**: Food consumption in urban areas is affected by wide range of factors, including food availability, food accessibility and food choice, which in turn are influenced by geography, demography, socio-economic status, culture, marketing and consumer attitudes. At present, urban policies do not focus on management of food in urban areas. Considering the linkages of food with water and energy, it is necessary to develop smart solutions/ infrastructure to ensure effective supply, storage, distribution and marketing mechanisms, simultaneously, ensuring optimum food consumption patterns at household level in cities and towns. An integration of food management schemes with urban development missions will facilitate sustainable development of urban areas by ensuring optimization of resource use.
- **Watershed based approach:** Adopting a watershed approach for city level planning, provides a leverage to incorporate greater degree of self sustainability to the city in terms of reducing its dependence on natural resources like water from outside the city limits. It increases the potential for water conservation options like rainwater harvesting and aquifer recharge, also

WATER AND ENERGY REQUIREMENT FOR FOOD IN THE PANVEL CITY OF MAHARASHTRA

Panvel, a new city of Greater Mumbai region is being developed, maintained and administered by City and Industrial Development Corporation of Maharashtra (CIDCO) to meet the residential requirements of its population. Despite its planned and gleaming infrastructure, the area lacks adequate water and power supply with no proper sewage handling mechanisms. The city meets its water supply demand from Dehrang Dam which dries up during summer and consequently faces acute water shortage.

An application of results of survey at Gurgaon, indicate that water required for cooking food in Panvel city would be around 2 MLD, which constitutes eight percent of its total water demand. The city needs 17551 kg of energy in the form of LPG for cooking raw food whereas requires 147.6 Mwh of electricity in consumption of food other than cooking. This includes reheating, processing and storage of food items using electrical appliances. The city also needs 198 Mwh of energy in the form of electricity for pumping water into the storage tanks which is further used other purposes including cooking and washing.

The Panvel city is experiencing a phenomenal rate of urban growth for last two decades that has resulted in the fast deterioration in the quality of life for the majority of people living in the city. In such scenarios, an integrated approach for management of water, energy and food requirements will reduce the burden on its resources, and the city authorities must focus on promoting resource optimization to meet the future demands.

Source: TERI Study

aiding in controlling urban floods. This will increase the availability of water for residential areas together with reducing the energy consumption in transporting water to upstream locations. Adopting a watershed based planning shall be made mandatory for smart city bidders under Redevelopment (replacement of existing built up environment) and Greenfield development (develop a vacant area)[15] components of Smart Cities Mission.

- **Decentralized market system:** Significant amount of energy and transportation cost is involved in buying retail items from a centralized wholesale market which is generally far from the residential areas in big cities. This also leads to higher inflation as delivery costs to the customer tend to rise due to centralized market system [16 17]. Therefore, it is suggested to provide with decentralized market system, warehouses and wholesale markets for vegetables and other household items which will reduce both the food wastage as well as energy in transportation. Moreover, public distribution system for vegetables like 'Safal system' in Delhi shall be replicated in other cities also.
- **Resource efficient consumer appliances** which includes kitchen based appliances, water efficient faucets and piping systems need to be promoted through adequate incentives. Mandatory requirement of Star rating for frost free refrigerators by Bureau of Energy Efficiency should be extended for other kitchen appliances like microwaves and induction stoves. Similarly, water efficiency labeling should be promoted to ensure the judicious use of water. Water Efficiency Labeling and Standards (WELS)[18] Scheme by the Government of Australia presents an excellent example demonstrating that water efficiency ratings can save money as well as increase the water use efficiency.
- **Reducing food wastage at social gatherings and household level:** India ranks 80 in a 104 country Global Hunger Index[19]. Still, significant food wastage accompanies the conferences, weddings, parties, canteens, restaurants, bhandaras, households, social and family functions in urban India. Food wastage is associated with loss of water and electricity used in the production, processing and transportation. Mandatory audits and guidelines for such commercial establishments can assert the significance of avoiding food wastage.
- **Decentralized waste to energy systems:** Waste to energy is promoted through Smart Cities Mission to manage urban waste. While cost-intensive centralized systems are important to manage non-biodegradable wastes, biodegradable waste from colonies/ housing societies can be managed more efficiently through local waste to energy systems such as digestive chambers and gasifiers etc. This should be promoted through appropriate incentives and regulatory instruments.
- **Behavioral change towards sustainable food consumption habit**: Behavioral changes are indispensable for sustainable development. Public awareness and sensitization campaigns, through Residents Welfare Associations (RWAs), civil society organizations (CSOs) and volunteers can play an important role in inculcating the optimized resource usage as part of modern lifestyles.

Concluding Remarks

Water-energy-food nexus is not a new concept but awareness about its importance, and benefits which could be accrued through their integrated management has grown in recent years. India needs to work on several areas to achieve its developmental goals amidst challenges of scarce water, energy and food resources. The Central Government has pioneered through various policies, plans and guidelines to bring reforms for improving facilities at city level but these programs need to be analyzed and reoriented on integrated solutions to meet the basic needs of the growing and burgeoning urban population. Development of an integrated management framework and linking of infrastructure and smart solution schemes related to water, energy and food, within the ambit of city development plans will facilitate 'Sustainable Urban Development' of Indian cities.

[15] MoUD,GoI (2015). Smart Cities: Mission Statement and Guidelines. Accessed on July 4 2016 at http://smartcities.gov.in/writereaddata/SmartCityGuidelines.pdf.

[16] https://www.dhl-discoverlogistics.com/cms/en/course/management/logistical_net_plan/degree.jsp

[17] Shah.J (2009).Supply Chain Management: text and cases. New Delhi, Pearson Education.

[18] http://www.waterrating.gov.au/consumers/water-efficiency

[19] http://www.welthungerhilfe.de/fileadmin/user_upload/Mediathek/Welthunger-Index/WHI_2015/global-hunger-index_2015_english.pdf

This is part of a series of policy briefs by TERI based on its research work in specific areas. These briefs are made available to Members of Parliament, policymakers, regulators, sectoral experts, civil society, and the media. The briefs are also accessible at http://www.teriin.org/policybrief/. The purpose is to focus on key issues and list our policy recommendations to encourage wider discussion and debate. We would very much value your comments and suggestions.

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