

Food, fuel and climate change: India's trilemma

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On 25 September 2015, countries adopted a set of 17 goals to ensure prosperity for all as part of a new sustainable development, commonly known as Sustainable Development Goals (SDGs), over the next 15 years. The second goal in the list is: zero hunger. This is not an easy target to achieve. A radical change of the agricultural system is needed to nourish today's 795 million hungry and the additional 2 billion people expected by 2050 (ref. 1). India is no different; the challenge for the country is its increasing population, limited land, degrading land and changing land use. Climate change is putting more pressure on the resources; impacts of climate change are visible; majority of the agrarian community of the country can no longer make ends meet on their land and are forced to migrate to cities in search of better opportunities. Renewable energy resources like solar and biomass have solution to many climate change issues; however, they too call for critical and detailed analysis before policies are rolled out.

Under the aegis of the Ministry of New and Renewable Energy, Government of India, the National Policy on Biofuels was formulated in 2008. The idea was to create conducive environment to bring more biofuels in the market to replace fossil fuels. The document had a roadmap to meet 20% of transport fuel requirement from biomass by 2017. The Biofuels Policy, 2008, of India also mentions 'The Indian approach to biofuels, in particular, is somewhat different to the current international approaches which could lead to conflict with food security. It is based solely on non-food feedstocks to be raised on degraded or wastelands that are not suited to agriculture, thus avoiding a possible conflict of fuel versus food security'². By and large, the Biofuels Policy is a welcome change; it has created space for biofuels in the energy system³.

The Policy talks about cultivation on a degraded land. The whole purpose to resolve the food versus fuel conflict is defeated, if not upfront certainly subtly, when India talks of growing non-food feedstock on a degraded land. The point is: if one can grow or cultivate a crop on a degraded land, it is still a production from the land, irrespective of whether the

yield is for food or fuel. India is struggling to secure energy and food, and to reduce emissions, etc.⁴.

India's population is around 1.2 billion today, which is growing at the rate of 1.19% annually⁵. As on date, India holds 17% of global human population and 21% of global cattle population. However, it holds only about 2.5% of global land area⁶. Other realities are the following: in less than 15 years, India will have to feed additional 210 million heads, i.e. more than twice the German population today⁷. The country cannot afford to cut a minuscule of forest to bring in more land for agriculture. A study suggests that for India's environmental and ecological balance around 35% of its land should be under forest/tree cover; however, in reality, it is around 22–24% (ref. 8). Therefore, the challenge here is to ensure affordable food for all its citizens without disturbing the ecological balance.

Globally, the land use has reached a tipping point. Around three-quarters of the global land is under use for crops, livestock grazing and wood harvesting. The remaining quarter provides services like clean water, biodiversity, stores carbon in trees, etc. to support life on this planet⁹.

Earth Overshoot Day (EOD) is the date on which humanity's resource consumption for a year exceeds earth's capacity to regenerate those resources during the same year. Table 1 chronicles the EOD for the last 10 years.

What is alarming is that the EOD is arriving earlier with each passing year. Last year, 2016, the world as a whole needed 1.6 earths to meet its requirement in a sustainable manner. It also means that we are overexploiting our planet.

Table 1. Chronicles of the Earth Overshoot Day (EOD)

Year	EOD
2007	26 October
2008	23 September
2009	25 September
2010	21 August
2011	27 August
2012	22 August
2013	20 August
2014	19 August
2015	13 August
2016	8 August

The problem will become more acute with rising population. Food security is a challenge; this is the reason 'Zero Hunger' is one of the top SDGs, spearheaded by the UN.

Climate change has made the issue of food security more vulnerable. Climate change increases the frequency and intensity of some disasters such as droughts, floods and storms. This has an adverse impact on livelihoods and food security. Climate-related disasters have the potential to destroy crops.

Hence there is a dire need to develop crops (seeds) that are highly productive and are also resistant to climate change. Biotechnology has to take the centre stage to (i) develop climate change resistant crops and (ii) reclaim degraded land for farming as soon as possible because the countdown has begun.

Sustainable development is the confluence of economic development, environment and society. Therefore, our action should bring in a positive change for the society and ensure the protection of natural resources benefiting local and ultimately global ecosystem. Land is one of the most priceless commodities. Hence any action that can induce land-use change has to be evaluated and scrutinized exhaustively not just for short-term benefit, but for long-term impacts.

1. <http://www.un.org/sustainabledevelopment/hunger/>
2. http://mnre.gov.in/file-manager/UserFiles/biofuel_policy.pdf
3. http://mnre.gov.in/file-manager/UserFiles/biofuel_policy.pdf
4. <http://www4.unfccc.int/submissions/INDC/Published%20Documents/India/1/INDIA%20INDC%20TO%20UNFCCC.pdf>
5. <http://www.fao.org/ag/agp/agpc/doc/Counprof/India/India.htm>
6. <https://populationpyramid.net/india/2025/>
7. Tandon, B. B. and Vasudeva, P. K., *Inclusive Growth and Sustainable Development: Ideal for Indian Economy*, Regal Publications, New Delhi, 2010.
8. <http://www.wri.org/blog/2015/01/why-dedicating-land-bioenergy-wont-curb-climate-change>
9. <http://www.overshootday.org/>

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