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RESEARCH PAPER

Gandhi's civilizational alternative and dealing with climate change

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Abstract Climate change is a culmination of accumulated environmental problems. Dealing with it effectively, rather than merely tinkering with it, requires a civilizational alternative suggested by M. K. Gandhi. Although Gandhi did not explicitly discuss environmental issues, his perspective is so relevant as if he had directly addressed them. His alternative is nonviolent both to nature and humans and has *Sarvodaya* as its goal, which means the rise or emancipation (*udaya*) of all (*sarva*). Every individual is important; none should suffer in the course of economic development. But the basic nature of environmental problems is that they deprive quite a lot of people, though economic growth which generates them may benefit a few. Gandhi did not deny the need for development; he only had a different perspective of it. He took a holistic and integrated view of political, social, economic, technological, and cultural dimensions of his alternative in a manner that they strengthened each other. This paper spells out these dimensions as being relevant in dealing with climate change.

Keywords Climate change · Gandhian alternative · *Sarvodaya* · Technology · Communities · Decentralisation · Lifestyle

Roots of climate change problem and Gandhi's perspective

Global climate change, with increasing local impacts like severe floods, droughts, and erratic rainfall, poses an unprecedented challenge. If not checked adequately and in good time, it is leading possibly to an irreversible crisis of mammoth proportions. This situation has resulted from deforestation, pollution of air and water, accumulation of urban wastes

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and their unscientific 'disposal', and other forms of environmental damage going on unchecked for well over a century. Climate change is the culmination of the accumulation of environmental problems. It is ironical though it is a human-made problem resulting from short-sighted pursuit of economic activities, those who are most responsible for contributing to it are not sincere enough in owning up their responsibility and acting adequately on it.

Behind these economic activities are individuals, each pursuing his or her own self-interest, profits and satisfaction of wants, without being mindful of their consequences on others. Interestingly, the philosophy of individual liberty and rights of the individual came to prominence along with modern economic growth under capitalism. This has also promoted and shaped democracy and its institutions, rightly hailed as welcome and beneficial for the welfare of humanity. There is a story in Hindu mythology about gods and demons churning the oceans, resulting in the emergence of both—a terrible poison and nectar. God Shiva, out of kindness to the world, held the poison in his throat so that the world is not troubled by it. Well, now we have as a result of pursuing individualism the nectar in the form of democracy, and—not one but two—poisons, one in the form of extreme disparities in economic status and well-being, and second, in the form of global pollution resulting in climate change. Unfortunately, we do not see a Shiva around who can neutralise these poisons.

There is no question of opposing individual interests and rights. The problem, however, is that the very process of acknowledging the supremacy of the individual also allows some individuals to ride roughshod over the interests of many others. A similar principle applied to individual nation states in the form of accepting their sovereignty allows some of them to appropriate for themselves the global commons with impunity, resulting in extreme disparity in the use of and access to global environment. The nation states have been jealously safeguarding the self-interests of their own citizens first, before doing anything for the world as a whole. There is obviously a need to ensure that *all* individuals and *all* nation states enjoy their rights equally, and in the process, to reconcile the interests of the individuals with those of the community as a whole. It also requires reconciling the interests of the present generations with those of the future generations. Human civilization has advanced precisely through trying to achieve this task of reconciling. Faced with the impending environmental crisis, there is now a crucial test for the capacity of our civilization to solve its problems and keep advancing in the interest of *all.* Mahatma Gandhi saw the advance of civilization, neither in terms of its technological advance nor in terms of conveniences and comforts created, but in terms of moral development.[1] Essence of moral development in turn consists according to Gandhi in doing one's duty, which in his vision, lies in preventing injustice and deprivation not only in economic and social status but also in the matter of environment.

Gandhi did not explicitly discuss environmental problems, but his thought or perspective is so relevant in resolving them as if he directly analysed these problems. His social and political philosophy was that even while the individual is basic to the society and polity and has to be equipped with the necessary rights to protect his or her dignity and growth, he or she has to also accept duties arising out of recognising similar rights of all other individuals. His approach was holistic, and solving environmental problems was an implicit part of it. One can think of solving them in two complementary ways, in both of

[1] This is clear from a reading of Gandhi's *Hind Swaraj,* especially chapter 13. He pointed out that the Gujarati word for civilization is 'good conduct'. It was first published in Gujarati in 1909, and in English in 1910. It is reprinted in the edition by Parel (2010).

which Gandhi is relevant: One way is to change the nature of economic growth in such a way that dependence on fossil fuels, and even on machines, is kept down to the minimum. In the present parlance, it requires energy intensity of growth to be brought down to sustainable levels. The second is to moderate our lifestyles to reduce the consumption loads on the environment to sustainable levels. He famously said that the earth has enough to meet the needs of all, but not greed. The goal of development in his approach was *Sarvodaya*[2] (the rise of all), that is, to meet the needs of *all*, and not the want satisfaction of only those who wield purse and power. It is in pursuing the satisfaction of the elite wants that most of our environmental problems are caused.

Although the Gandhian perspective includes changing the technology of growth as a means of bringing down its energy intensity, this would be through a socially relevant 'appropriate technology'. However, his strategy is not based on technology alone, but also on changing the very social and political organisation through which economic activities are carried out. The organisational aspects of Gandhian perspective are discussed first below since they provide the basic background for introducing his preferred technology.

In his *Hind Swaraj,* Gandhi actually thought in terms of an alternative to the modern civilization itself. This is because, as he thought, the economic system of the prevailing civilization is based on single-minded pursuit of profits and accumulation of personal wealth, and its political system also is based on politicians' pursuit of political power for one self either for its own sake or as a means of accumulation of personal wealth. The civilization has too much violence as a result of this intrinsic character of it. For this reason, he even doubted if it deserves to be called as a civilization. When someone asked him what he thought of the Western civilization, he quipped, 'It is a good idea!'. By Western civilization, he meant the modern civilization. In opposing it, Gandhi was not proposing poverty for all. He made it clear in a lecture in 1916 at Ahmedabad, India: "No one has ever suggested that grinding pauperism can lead to anything else than moral degradation. Every human being has a right to live and find the wherewithal to feed himself and where necessary to clothe and house himself" (Parel ed. 2010, p. 155). The alternative he had in mind was precisely to ensure this human right for everyone, and facilitate *Sarvodaya*.

In Gandhi's philosophy, it is the people who are the source of all political power, and 'ultimately it is the individual who is the basic unit' (Iyer ed. 1993, p. 347). It is for the people to decide what powers they can delegate to the State and with what conditions, and in doing so they cannot certainly give away all their freedoms and scope for exercising their political will. Gandhi stressed, "No society can be based on a denial of individual freedom" (cf. Iyer 1973, p. 115). In Gandhian thought, however, recognition of the primacy of the individual translates itself into both rights and duties of individuals, and not rights alone. He considered rights and duties as the two sides of the same coin. There is no conflict in his scheme of things between individual and community or collective interests, because it is the duty of individuals to safeguard collective interests, and it is the duty of the community to protect individuals' rights. He believed neither in liberty to the point of permitting full freedom to business enterprises, nor in state socialism or in communism which deprived individuals of their initiative and freedom. The advance of civilization

[2] *Sarvodaya* is a combination of two Sanskrit words—*Sarva* which means all, and *Udaya* which means the rise or emancipation. Happiness of all was also a Vedic ideal (*Sarve bhavantu sukhinah*—May all be happy!) Taking a cue from Gandhi himself, the ideal of *Sarvodaya* was modified later as *Antyodaya* (*Antya* + *Udaya*), the rise of the lowest, by his close disciple Vinoba Bhave, to emphasise that the priority is to first meet the needs of the lowest or the poorest.

consisted in reconciling the two interests by everyone following the path of one's duty so as to ensure *sarvodaya.* The society or the state has no right to sacrifice any or a few individuals for the sake of many, since every individual counts. Similarly, no individual or a set of few of them has the right to deprive others of their livelihood or welfare in the name of liberty. The relevance of this philosophy in the matter of environment is obvious, since environmental damage is essentially a social cost imposed by some on others.

Gandhi was quite aware that one could not attain this *sarvodaya* ideal by merely wishing for it. He had a holistic view of how and through what institutional set-up this could be attempted, though he did not put it down in one article or book as such in a systematic way. His views were expressed in numerous short articles for popular journals and innumerable speeches, which are now found scattered in some 98 volumes of *Collected Works of Mahatma Gandhi,* published by the Government of India from time to time. There is nevertheless a significant clarity and coherence in his perspective on a socially, economically, and environmentally benign alternative to the modern civilization, emerging from his *Works*.

A few post-Gandhian Western thinkers on similar lines

Gandhi was not alone in criticizing the modern or the Western civilization. There have since been trenchant and direct critics particularly for its disastrous environmental implications. These post-Gandhian critics may not have referred to Gandhi and may have independently arrived at their critique. Nevertheless, their perspectives blend well with that of Gandhi on environmental issues and support it emphatically. Gandhi's perspective, as the following sections of the paper would show, was no less holistic and comprehensive. We may very briefly review the views of at least some prominent thinkers among them, if not of all. This will show that Gandhi was not a lonely crank, but several others from the West itself also thought similarly to find an alternative to the present civilization based on economism, undue technological optimism, and waste creation.

The first of these thinkers is Boulding (1966). His characterisation of the Earth as a spaceship with given or limited resources on board was a very telling illustration to emphasise why we need to cut back on our reckless habits of production and consumption for our sheer survival. Georgescu Roegen (1971) drew attention to finiteness of the physical world, which sets limits on the economic process. This approach asks for conscious and planned limits on such wants and artefacts, though not on development based on information, cultural improvements, and redistribution of income and wealth. This was the emphasis also in 'Limits to Growth' shown by Meadows et al. (1972). Tibor Scitovsky was among the first Western economists who challenged the conventional view of economists that either income or consumer spending represents welfare. He argued that economic satisfaction, which receives most policy attention, is only a small part of total human satisfaction. He declared clearly, 'The economist's valuation of national income and national product has many uses, but it is inappropriate as an index of human welfare. … Numbers are a wonderful aid to clear thinking, but they defeat their purpose if we read more into them than what in fact they contain. … The national income is at the very best, an index of economic welfare, and economic welfare is a very small part and often a very poor indicator of human welfare.' (Scitovsky 1976, p. 145). The modern economy is based on mass production, which he thinks only produces a monotony of products and banalization of art, making it dull and joyless. Herman Daly's concept of Steady State Economy

asked for a constant population of human bodies and a constant stock of artefacts at such levels that are sufficient for a good life and sustainable for a long time. He clarifies that 'the rate of throughput of matter-energy by which the stocks are maintained is reduced to the lowest feasible level. For the population, this means that the birth rates are equal to death rates at low levels so that life expectancy is high. For artefacts, it means that production equals depreciation at low levels so that artefacts are long lasting, and depletion and pollution are kept low.' (Daly 1980, p. 324).

While these critics saw the modern economy mainly from the background of high-income or advance countries, Gandhi saw it from that of a poor country. He did not argue that industrialisation of the Western kind was necessary for India to catch up with the West, as many of his Indian contemporaries thought. He offered an alternative which he thought was relevant basically for India, but not irrelevant even for the West. Moreover, it was a holistic alternative integrating different dimensions. He did it in his simple but logical way, avoiding technical language.

Gandhian alternative: political dimension

Gandhian alternative has five dimensions, each of which is consistent with the other and supportive to them: political, social, economic, technological, and cultural. In the political dimension, he wanted genuine decentralisation of democracy as characterising the whole polity, so that people have equal opportunities to participate in decision making at all levels and safeguarding their individual as well as collective interests. In his view, democracy did not just mean voting once in 5 years to choose representatives to rule over people, but it involved participation in decision making and governance on a regular basis. The elected representatives have to be accessible and part of the communities from which they are elected. To be effective and functional, people are to be organised into communities forming local governments or *Panchayats*, which are independent and yet interconnected with each other. For Gandhi, *Swaraj* meant *self-rule* in a much deeper and wider sense than either independence from foreign rule or formal Parliamentary or Presidential democracy. At the individual level, self-rule meant self-control and moral responsibility to contribute to community welfare, and an awareness of one's own duties and rights as well as those of others. At the more aggregative levels, it meant *Gram Swaraj* or self-rule by villages or local communities including urban communities, and commitment to the welfare of all individuals comprising the community. Gandhi gave more emphasis on villages not only because the bulk of India's population lived there, but also because villages are neglected in modern economic growth and even exploited. It is mainly in the revived strength of local communities, that a genuine democracy could be rooted as he perceived, and it is mainly rural communities that can show the way forward here. Only a deepened decentralised democracy could provide, in Gandhi's view, 'a government of the people, by the people, and for the people', using Abraham Lincoln's definition of democracy. A democratic government, strictly as per Lincoln's definition, could not be a singular entity even for a given country. It has to be a federation of village or local community governments, extending not only to the country but also to the world at large. Though Gandhi had mainly India in mind, his concept of a deeply federal polity has a universal appeal and relevance. Gandhi elaborated his concept in an article in *Harijan* dated July 28, 1946, excerpts from which are given below:

> Independence must begin at the bottom. Thus every village will be a republic or Panchayat having full powers. It follows, therefore, that every village has to be self-sustained and capable of managing its affairs even to the extent of defending itself against the whole world. … Ultimately, it is the individual who is the unit. This does not exclude dependence on and willing help from neighbours or from the world. It will be free and voluntary play of mutual forces. … In this structure composed of innumerable villages, there will be ever-widening, never-ascending circles. Life will not be a pyramid with the apex sustained by the bottom. But it will be an oceanic circle whose centre will be the individual…. Therefore, the outermost circumference will not yield power to crush the inner circle but give strength to all within and derive its own from the centre (Gandhi 1959, pp. 8–9).

Mere creation of local governments does not meet Gandhian expectations. Democratic decentralisation means genuine redistribution of political powers and of governance authority, in such a way that the local bodies have the required funds, functions and functionaries, and of course the constitutionally recognised authority needed to use them. Elections to the local bodies have to be held regularly, and the provision of funds has to be instituted constitutionally to avoid arbitrariness. India has taken significant steps in this direction, though the system is subject to further improvement and effective implementation.[3] While India is constituted as a Union of States, it is far from being officially recognised as a Union of Panchayats or Local Governments. The local governments are still dominated by the State level bureaucracy and politicians. The Indian state is federal character with three tiers, the Union government at the central or national level being the strongest, the state governments at the middle level being the next strong and the Panchayats at the local level being the weakest. Gandhi would have perhaps liked the order to be reversed, with the local governments being the strongest. In Gandhi's vision, it is the local self-governments which would establish and empower the state and national governments in a bottom-up manner, instead of being set up by the state governments in a top-down way.

A decentralised democracy, even if it falls short of full expectations of Gandhi, is nevertheless promising on several counts. First, it places more power in the hands of ordinary people, and more scope for 'self-rule'. Gandhi observed, 'Swaraj government will be a sorry affair if people look up to it for the regulation of every detail of life' (Vyas 1962, p. 4). Self-rule enables and also requires people to take better care of their needs and protect their natural resources and environment. They will not allow big business dominating the wider economy or even the national government to plunder local resources in the name of economic development of the country. Secondly, following from the preceding, a decentralised democracy can hold the central government or the State in check and prevent it from being arbitrary. Thirdly, decentralisation promotes political education, enhances consciousness of one's own as well as others' rights and sharpens public awareness. This gives more self-confidence to common people, stimulating them to play an active role in public affairs. Fourth, decentralised democracy brings into open innate social evils in villages, like oppression of women and caste discrimination, paving the way to confronting and mitigating them. Fifth, it facilitates openness and transparency, which can reduce corruption. Sixth, local self-governments provide a more acceptable and also perhaps a better platform to reconcile individual with collective interests, than any other tier of

[3] The author of this paper has discussed this matter in much greater detail in collaboration with two more in Nadkarni (Forthcoming).

the State. Seventh, decentralisation reduces transaction costs, improves information base, making governance more efficient. Finally, benefits of government spending can be distributed much more widely and cost-effectively under a decentralised set-up. In sum, it is centralisation of power in the state which leads to several evils—more corruption, misrule, suppression of citizens' freedoms, militarisation and abuse of environment. Decentralised democracy can check this.

But how can democratic decentralisation help in dealing with the climate change? Mandur, a village near Bengaluru city (formerly, Bangalore), provides an example. The city generates over 4000 tonnes of solid waste daily, and its municipal corporation chose an easy way out by dumping the waste in landfills in nearby villages. Mandur had the dubious honour of receiving over half of this waste. Proximity to the city became its worst curse. Mountains of rotting waste accumulated and the stink reached up to even a kilometre away. Let alone the GHG emissions which the waste significantly generated and contributed to global climate change, it turned the village into a horrible hell. Although this was going on for years, the village people began strongly protesting in 2013 and drew the attention of the state Pollution Control Board. The Board ordered the shut-down of the landfill and of the dumping of waste. But since the Corporation could not find alternative landfills (as other villages also protested), dumping at Mandur continued. The villagers threatened suicides. With the protests mounting, the Corporation finally agreed to stop dumping by December 1, 2014, and implemented its promise. The Corporation also agreed to clear the accumulated mountains of waste in 3 years. Though late, it finally started setting up waste-processing units. If Mandur and other nearby villages had the power, they would have stopped the city corporation from dumping waste long back, and forced it to process the waste instead. But the strong protests from villages showed their potential to help reverse climate change and environmental damage in general.

Gandhian alternative: social dimension

The second dimension of Gandhian alternative is social. Gandhi knew that for his political and economic alternative to succeed, the society too had to be democratic, egalitarian and just. Gandhi was acutely aware of the many ills that affected the Indian society such as untouchability, caste hierarchy and oppression, disgusting disparities in lifestyles and wealth, unjust treatment of women, child marriages, illiteracy and ill-health, each of which he fought resolutely. A society with all these evils present is ill-equipped to deal with any major issue, be it political, economic or environmental. Gandhi felt that eradicating these evils could not be left to the state machinery alone, and wanted social and political workers to launch movements against them in each village and achieve social transformation. He built a cadre of workers who could take up this task.

One of the most conspicuous social evils in India Gandhi could see was contempt for manual labour, particularly for what is regarded as 'unclean' labour. It was due to this that the whole problem of caste hierarchy, particularly untouchability, emerged and became prominent in India. It was due to lack of respect for manual labour that working classes are assigned a lower status and paid lower. He could also see that behind the craze for machinery and mechanization in the world at large lies this dislike and disrespect for manual work. Gandhi tried to strike at the very root of this system by inculcating respect for manual labour including the so-called unclean labour. In his *ashrams*, it was mandatory for everyone to clean latrines by turn. Gandhi himself participated in it and other such tasks

like sweeping, without any exemption for himself. He insisted that everyone including the rich and the elite should do manual work, or what he called 'bread labour'. He declared, "He has no right to eat who does not bend his body and work. … One who eats but does not do any manual work in effect steals food" (quoted in Dasgupta 1996, p. 35). But he did not glorify ceaseless toil for bread by the deprived. He welcomed machines which reduced drudgery and tedious toil, but not where they led to unemployment. Gandhi also induced women to come out of the confines of their homes and daily grind, and enter the mainstream of society and polity. He gave them an active role in the freedom struggle, and several national level leaders emerged from among women. He wanted every child to be educated, but advocated his own system of education where literary and numeracy skills were to be developed along with skills of manual work and crafts and a social, moral and environmental consciousness. Gandhi may not have thought of environment in the present day sense, but he stressed cleanliness, producing things to last for longest possible time and avoiding wastage and unnecessary craze for possession of goods. He wanted these values to be inculcated in the society and every child. For him, proneness to create dirtiness and wastage around was essentially a social rather than merely a technical problems.

A noteworthy thing about Gandhi was his tremendous faith in the capacity of people, and their ability to solve any problem, in spite of the fact that he was also well aware of problems and evils within the society. It is because of this faith that both in South Africa and India he involved people on a large scale in every political and social movement and struggle. In fact, he knew that no solution to any problem could be durable unless it evolved through people's participation and backing. He was sceptical of the state solving all the social and environmental problems, and wanted the public space dominated by voluntary organisations and democratic institutions for constructive social work for the same reason. The ability of traditional societies to manage common pool or common property resources (CPRs) has been more recently pointed out by social scientists like Jodha (1985a, b) and Ostrom (1990). Jodha showed that the CPRs declined mainly because of the modern market forces. Given the proper organisations, society and social institutions can play a more effective role in the global environmental problems now, because even these problems need local actions. Social movements and organisations can even bend governments to avoid environmentally harmful steps and take benign measures instead.

An important problem in getting the whole society together to solve environmental issues is the conspicuous inequality in it. This is so both within a country and also between countries. Climate change problem is caused in the first instance by the rich countries taking the world at large and also by the elite within developing countries. It is they who possess most of the cars create most of the pollution and consume most of the resources including water and energy. In spite of all the noise created about climate change and resource depletion, the elites feel smug and hardly see themselves so much on the edge as to compel them to take urgent steps to solve any of these problems. On the contrary, it is the poor who are the first and often the only victims of any environmental catastrophe or natural disaster. During the notorious gas-leak disaster from the Union Carbide plant in Bhopal in India in December 1984, which left within a few hours thousands of corpses of human beings, buffaloes, goats and chicken littered on the streets, it is mostly the poor who died and lost their animal wealth. Immediate death toll of people was estimated to be 3800, but another 15–20 thousand people died a slow premature death owing to exposure to the gas—again mostly the poor.[4] Because they feel they are not affected by them, the rich who cause such tragedies in the first place are in no hurry either to take steps to prevent them or

[4] For a brief overview of the details of the Bhopal tragedy, (see Nadkarni 2014: 256–259).

to compensate and rehabilitate people who are victims of them. It is hardly appreciated that if the world is not yet on the brink of a disaster, it is because of the sacrifices suffered by the vast number of the poor. Once, however, the vast number of the poor also try to catch up with the rich in the over-exploitation of environment, the world would surely be pushed to the brink. Gandhi had a premonition of this problem. He wrote long back:

> God forbid that India should ever take to industrialisation after the manner of the West. The economic imperialism of a single tiny island kingdom [England] is today keeping the world in chains. If an entire nation of 300 million [the population of India then] took to similar economic exploitation, it would strip the world bare like locusts.
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> —M. K. Gandhi (*Young India,* December 20, 1928)

It is for this reason that Gandhi recommended an alternative path to economic development. He did not want India to imitate the West in this regard. An anecdote from Gandhi's childhood illustrates not only his strong moral fibre but also an independence of approach which he was later to preach. When he was barely 10 years old, he was beaten up by another boy. Young Mohandas complained to the bully's father, who reprimanded him only mildly. Putlibai, mother of Mohandas, asked him why he did not hit back. The young Gandhi asked in return, 'Why should I be like him?'[5] Yes, why not create our own path of eco-friendly sustainable development, instead of imitating the resource-and-energy intensive historical Western path? But how can you prevent only the poor countries and exempt the rich in pursuing a path of economic development that is over-exploitative of environment? The Gandhian alternative to Western economic growth path should therefore be of interest to all other countries as well and not to India alone. And to this, we turn now.

Gandhian alternative: economic and technological dimensions

Since the economic and technological dimensions of Gandhian alternative are closely linked with each other, they are taken up together here. In Gandhi's vision, a genuine democratisation of the polity can be based only a democratisation of the economy. A concentration of economic power in the hands of a few leads to a concentration of political power also. The economically powerful inevitably dominate the state. The Gandhian key to decentralise and democratise the polity is to decentralise the economy too. His philosophy of *sarvodaya* applied to the economy as much as to the polity. Gandhi's economic alternative does not need 'degrowth' or reversing growth; on the contrary, he recognised the need for economic development to lift the millions of the poor from their abysmally low levels of living. But he envisaged a development path which did not heap further misery on the poor in the name development, and which was within ecological means, that is, sustainable in present parlance. His close disciple and economic researcher, Kumarappa, called it as an 'Economy of Permanence', where things are made to last, and not used once and thrown away. It is an economy where there is no violence either to humans or to nature. He brought out two books on the theme, *Economy of Permanence* in (1945), bearing a foreword by Gandhi, and *Gandhian Economic Thought* in (1951) after Gandhi's demise, both of which indicate the spirit of Gandhian economic alternative. At Gandhi's

[5] As narrated in TOI Team (2011: 2).

instance, Kumarappa had carried out several economic surveys in India's villages to know problems of rural economy. He developed an All-India Village Industries Association, trying to put into practice Gandhi's ideas on rural development, and creating employment for rural artisans, facilities for technical and marketing advice and developing new skills. He tried to implement Gandhi's principle of putting people in the centre of economic development and their wellbeing as its basic goal, not maximising rate of growth of national income. Gandhi's economy is both ecologically benign and humane, for it scrupulously intends to safeguard the livelihood and welfare rights of everyone.

But how would you include everyone in the process of economic development? He had a multi-dimensional solution to this problem. One dimension of this is to prefer a labour-intensive technology to a fuel-and-capital intensive technology wherever feasible. If such a technology is not available for a particular job presently, it has to be developed. Not that such a technology needs no tools or capital, but they should be accessible to common people. The scale of production, which is the second dimension of Gandhian economy, has therefore to be small in general, but need not be so in everything. As a general rule, Gandhi wanted production by the masses and not mass production. While everyone has hands to work with, access to big capital is limited. As an eminent Gandhian social worker, Ela Bhatt put it, 'economic decentralisation means that both the capital and tools are in the hands of actual producers' (2013, p. 109). It prevents alienation of the worker from capital. Gandhi wanted everyone to have a breathing space in his alternative economy to find one's own livelihood with dignity and freedom. In his vision, economy and technology have to be subjugated or controlled by man, but man should not be subjugated by them. The third dimension of Gandhian economy, which follows from the first two, is that it is oriented preferentially—though not exclusively—to satisfying local needs and also to using locally available labour and raw material. A locally oriented economy develops local skills and generates local employment everywhere. It prevents the creation of islands of prosperity amidst a sea of poverty and unemployment. He did not think that production should be oriented to world markets as a matter of first preference, making producers vulnerable to vagaries of these markets. There is some ecological sense in this, in so far as a local-need oriented economy can minimise packing, storage and transport costs, thus saving enormous amounts of energy. It also avoids over-production and wastage. Gandhi, however, was not rigid in his expectations and would allow exports and imports and even large-scale production where beneficial more as a matter of meeting exigencies rather than as a basic principle. For example, railway network and production of railway coaches may necessarily have to be on a large scale, but production of dresses and even of cloth need not be. Gandhi adopted the spinning wheel or *charkha* as a symbol of his economic philosophy. He had the *charkha* on the flag of the Congress party which he joined and led. Anyone anywhere could have the freedom to spin cotton in spare time and earn some extra money. The yarn can be turned into cloth in handlooms spread all over the country, creating decentralised employment and income for millions. Huge textile mills, concentrated in a few places, polluting air and water and saving on labour use, were unnecessary to meet the needs for cloth which comes from people dispersed all over the country.

These Gandhian ideas received a boost from Schumacher, who wrote, what is regarded in the West as a path-breaking book—*Small is Beautiful: A Study of Economics as if People mattered,* in (1973). It is essentially Gandhian in ideology. Schumacher puts the blame for many environmental and socio-economic problems squarely at the door of 'ideology of gigantism'. Large scale production indispensably needs distant markets and avoidable transport. Schumacher was aghast when he once saw a lorry full of biscuits being brought from Manchester to London, and minutes later another lorry full of biscuits taken

from London to Manchester! He asks what the rationale of this to and fro transport activity could be, involving so much fuel consumption. Did the nutritional value of biscuits increase by this transportation? And that is how he came to advocate small scale and local production as the main principle of his economics (Kumar 2006, p. 209). Like Gandhi, Schumacher was an activist too and founded an Intermediate Technology Development Group. 'It pursued economic development within people's cultural context, rather than looking at the non-industrialised world as "underdeveloped". Technology was envisioned to be environment-friendly, non-polluting and non-exploitative of people and nature. Therefore, it also becomes known as appropriate technology.' (Ibid, pp. 207–208).

Amulya Reddy (1930–2006) who did a lot to develop appropriate technology for rural India has described three essential components of it. It should satisfy basic needs (starting from the needs of the neediest), should be environmentally sound and should be self-reliant and participatory being based on constant communication with people, learning from them and involving them (Rajan ed. 2009, p. 50). According to him, appropriate technology is neither going back to old traditional technologies which are generally inadequate (though we need to study and learn from them too), nor imitating modern Western technologies without seeing if they are beneficial and accessible to people. Appropriate technologies often need to be location specific, region specific and even culture specific (Ibid, pp. 20–21). They also involve science like modern technologies, and give as much challenge to the creativity of scientists and technologists. Such experts need only to be people oriented understanding their requirements, rather than purely market oriented. These are not just idle thoughts of Reddy, since they are based on decades of experience in working with village people. While at the Indian Institute of Science, Bengaluru, where he was based, he started a centre called ASTRA, in 1974, which is an acronym for Appropriate Science and Technology for Rural Areas. Such a step required courage, because his research attracted adverse reaction among some fellow scientists. An editor of a science journal even declared, "What Reddy is doing is not science. I will never publish him in my journal!" (Ibid, p. 12). The editor was proved wrong, since Reddy ultimately earned international recognition for his work including by Universities such as Princeton and got several prestigious awards. An example of his work may be mentioned. ASTRA adopted a village near Bengaluru called Ungra, where Reddy and his colleagues developed an energy plan for the village based on biogas. First they tried to provide gas for cooking. For this, family-based biogas plants were not preferred as they would have been confined only to the elite households. So they tried a community biogas plant to generate cooking gas for all. But it was soon found that cow dung availability was overestimated and the demand for gas was underestimated. The villagers suggested that the gas may instead be used to produce electricity needed to lift water which could be supplied to all households, and this was done. What is noteworthy here is that Reddy's concern was not technical feasibility alone, but accessibility to all households. Reddy is truly an example of a Gandhian scientist.

Lifestyle also counts

Almost the whole burden of sustainable development and dealing with climate change is placed on technological change. Gandhi would say it is not enough. His civilizational alternative has a cultural dimension too, which consists in moderating our wants, avoiding waste, and making our lifestyle simple and eco-friendly, yet enjoyable. From his perspective, reducing the consumption load on the environment is absolutely necessary. To

illustrate, take the case of a heart patient. What would his doctor recommend him? Indeed there are medicines (and technologies) to reduce bad cholesterol. If a blood clot does occur, there are medicines to melt the clot, and if that fails, there is the technology of bypass surgery. Yet the doctor does advise the patient emphatically right from the beginning to change his or her life style, eat moderately, avoid consumption of fatty foods and junk foods, do yoga and meditation and walk or cycle. The doctor also asks the patient to relax the mind, and control anger, anxieties and stress. The heart specialist, who is also an expert in medical technology, and has faith in medical technology and own expertise in it, still advises that medicines are not all, surgery has limits, and a change in lifestyle is also needed. But when it comes to reckless economic growth and dealing with the crisis created by it, we forget the constraints of technology, and go about our business as usual and feel content by tinkering with technology.

Although technological advance has helped us in the past to overcome the resource crunch and the development of green technologies is helping in reducing the carbon intensity of economic growth, we also know that such technological advance has not been fast enough to cope with the accumulating environmental problems. There are significant lags between emergence of environmental problems and development of technologies to alleviate them. There are further lags between development of technologies and their application on a wide enough scale. A serious problem is that while environmental problems are created outside the market framework, green technologies have to be economically viable! Even when environmental problems are reckoned in economic terms, they may be ignored so long as they are not felt in the market, that is, as long as they are not economically internalised. But a technological solution needs proper economic incentives and disincentives, high enough to induce adoption and prevent environmental damage. Thus, a solution may be either rejected or deferred indefinitely. In the meanwhile, problems accumulate, making it difficult to undo the damage done. It seems always so difficult to prevent, though curing the problem after it emerges has proved in practise to be even more difficult.

The cure offered by technology can also be worse than the disease sometimes. For example, as Magdoff (2008, p. 3) observes, 'producing corn to make ethanol or soybean or palm oil to make diesel fuel is in direct competition with the use of these crops for food'. In the process of developing a substitute for petroleum, we cannot create food insecurity for the poor. Similar is the story of growing pulpwood plantations in the name of carbon sequestration, if villagers are deprived of their grazing lands in the process. This means that social and distributional implications of technological solutions also need to be carefully studied, apart from their economic viability.

Technological solutions also have institutional dimensions, which can be challenging. For example, dealing with urban solid waste becomes easier only with the willing cooperation of citizens, particularly in separating wet compostable waste from other solid waste and also separating hazardous wastes for special disposal. This is done very inadequately. It is much easier if we can prevent or at least minimise waste in the first instance.

It was not the intention of this paper to go into any detailed appraisal of mitigation and adaptation strategies and technologies to deal with climate change, nor to undermine or deny their need. The Gandhian alternative is not offered here as necessarily superior to these strategies. It is an alternative only to the prevailing dominant perspective characterised by economism, consumerism, economic and political centralism, giganticism, homogenisation of practically everything and measuring human welfare only in terms of growth rates of GNP. What is argued here is that even with these strategies and

technologies, we cannot go far in dealing with climatic change, and we cannot save the earth from the brink of ecological collapse, if we rely only on them and pursue our profligate lifestyles and consumption and creating waste all around at the same time. We need to incorporate some Gandhian values of simpler living to support and strengthen the mitigation and adaptation strategies, and make them more meaningful.

We need nothing short of a religion of environment, whereby we develop a reverential attitude to the Earth and her resources. This attitude has to be reflected in our day-to-day living and day-to-day working in homes and outside. Gandhi was not against enjoying our life on this beautiful planet. But it could as well be done with some consideration for others as well as to the Earth and the generations that will come after us. Even a small amount of care to switch off lights and fans when we do not need them, adjusting the flame to well within the size of the cooking pot, not allowing the flame to burn when the cooking pots or pans are not on the stove, and preventing other ways of wasteful consumption, avoiding unnecessary use of car when we could as well walk or cycle, preferring public transport to personal transport,—and many other such ways can go a long way in taking care of our Mother Earth. As Amartya Sen proposed, we could focus more on developing our capabilities, rather than merely on enlarging the possession or consumption of commodities (Sen 1999), which is what Gandhi too had emphasised. Let us recall that Gandhi viewed civilisation in terms of moral development, not in terms of conveniences developed or technological progress. Although some people tend to regard Gandhi as outdated and even an obscurantist, the emergence of environmental problems of the world has made him no less relevant today than even in his own lifetime.

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