A Holistic Approach to Achieving SDGs: A Case Study of Dayalbagh, India

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Abstract

The paper analyses the achievement of SDGs at the global level, national level (India) and state levels using the SDG Index developed by Sachs et al, 2018 and NITI Aayog, 2021 and finds that the progress towards achieving the SDGs has either slowed, halted or reversed in recent years. It notes that sustainable development encompassing three interconnected dimensions – environmental, economic and social, is difficult to achieve in practice. This may be due to the underlying challenges, constraints and trade-offs. There is thus a need for a fundamental shift in approach towards sustainable development by integrating people's consciousness and conscientiousness that are based on people's values, beliefs, attitudes and spiritual consciousness. The paper defines this as the inner dimension of sustainability and develops the concept of holistic sustainability as encompassing both inner and external dimensions (environmental, social and economic). The inner dimension of sustainability is likely to enhance the impact of the external dimensions to yield more lasting strategies and solutions and serves as the foundation for sustainable development. To elaborate on the role of holistic sustainability, we examine the case of Dayalbagh, a private colony located in Agra, Uttar Pradesh, India as a model for achieving the SDGs. Dayalbagh attains the SDGs through an ecosystem enriched with values and a 'Healthcare Habitat' that is based on the Sigma Six Quality, Values and Attributes Model. The lifestyle of the residents of Dayalbagh, in harmony with nature, helps to attain holistic well-being of people and planet, fosters prosperity while simultaneously attaining holistic sustainability.

Keywords: *Sustainable Development Goals (SDGs), SDG Index, Holistic Sustainability, Dayalbagh*

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1. INTRODUCTION

The world is facing multiple and interlinked challenges- poverty, hunger, deprivation and rising inequality on the one hand, and climate change and ecological crisis, geopolitical conflict on the other. The COVID-19 pandemic has exacerbated these issues. The need of the hour is to build equal, inclusive, and sustainable economies that are resilient in the face of these challenges. In this context, the United Nations Sustainable Development Goals (SDGs)[5] aim at transforming the financial, economic, and political system that governs our societies to guarantee human rights of all (United Nations, 2021). The progress towards achieving SDGs has been slowed, halted or reversed after the pandemic.

The three interconnected dimensions of sustainable development, namely economic, environmental and social are difficult to achieve in practice which may be due to the underlying challenges, constraints and trade-offs. Existing literature focusses on policies and actions needed to achieve these external dimensions. However, ensuring achievement of SDGs requires a fundamental shift in people's values, beliefs, attitudes and behaviour. The paper thus, defines the concept of 'Holistic Sustainability' which includes an inner dimension based on values, beliefs, attitudes, spiritual and intuitive consciousness and conscientiousness. This can provide the basis for a sustainable transformation and is likely to provide a more lasting solution to the global challenges and crises. The paper presents a case study of a living model rather than an abstract theorization of holistic sustainability and discusses the characteristics of the model.

The rest of the paper is organised as follows. Section 2 reviews the progress towards achieving SDGs at the global, national (India) and state level using the SDG Index developed by Sachs et al. 2018 and NITI Aayog, 2021. Section 3 explains the concept of Holistic Sustainability and discusses the need for the same. Section 4 discusses the case study of Dayalbagh, Agra which is a small locality in Uttar Pradesh, India. The section discusses the six elements portraying the Dayalbagh Way of Life- Agriculture and Dairy, Education and Healthcare, Water Quality, Air Quality, Innovation and Human Values. For each of the six elements we describe the features followed by a discussion on the external dimensions of sustainability and the inner dimensions of sustainability and their impact on the SDGs. Section 5 concludes the paper.

2. PROGRESS TOWARDS ACHIEVING SDGS

2.1 Achievement of SDGs at the Global Level

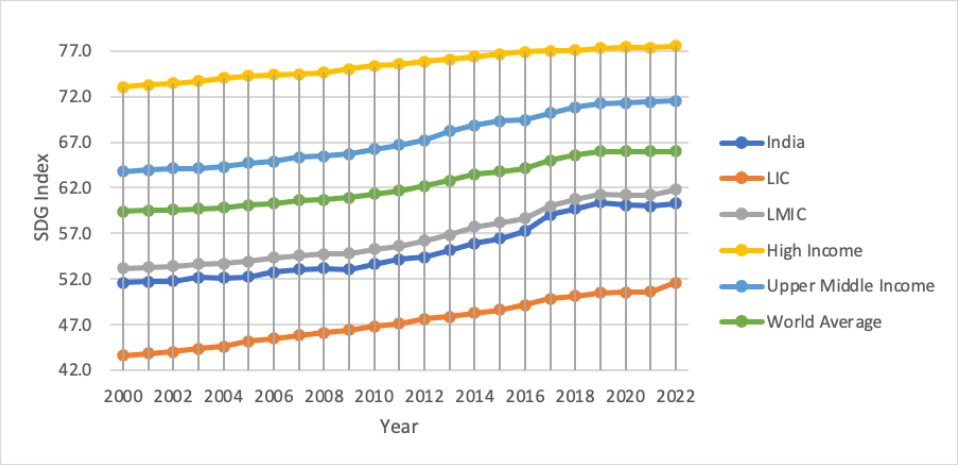
1.2.1 Achievement of SDGs at Global Level

Tracking and monitoring progress towards achievement of SDGs at national and international level is pertinent to attainment of the goals. To overcome the challenge of measuring progress towards sustainable development using a multiplicity of goals and targets, indices for

[5] In 2015 UN defined 17 Sustainable development Goals (SDGs) that outline the path for ending poverty and other deprivations along with strategies that improve health and education, reduce inequality, and spur economic growth – all while tackling climate change and working to preserve our oceans and forests.

measuring progress have been developed (Sachs et al. 2018, Biggeri et al. 2019). The SDG Index developed by Sachs et al. 2018[6] represents a substantive attempt to track the SDGs at the global level using a single aggregate measure, despite methodological concerns regarding composite indicators (Biggeri et al. 2019)

Figure 1: Trend of SDG Index (2000-2021)



Source: United Nations,2022

The progress towards achieving SDGs halted or declined between 2020 and 2021. The SDG index (World Average) which was progressing consistently year-on-year, between 2000-2019, remained stagnant at 66.0 from 2020 and 2021 (Figure 1). While there has been a marginal improvement in the index in 2022, there has been a reversal of progress towards achieving SDG1 (No Poverty) and SDG8 (Decent Work and Economic Growth) and progress towards achieving climate goals is too slow (United Nations, 2022). For India, the SDG Index score was consistently increasing (from 51.6 to 60.4 between 2000 and 2019) before falling marginally to 60.1 in 2020 and 60.0 in 2021 and stood at 60.3 in 2022 (United Nations,2022). Out of the 17 Goals, India is on track to achieving only 2 goals (SDG12 and 13) while challenges remain in achieving the others (United Nations, 2022).

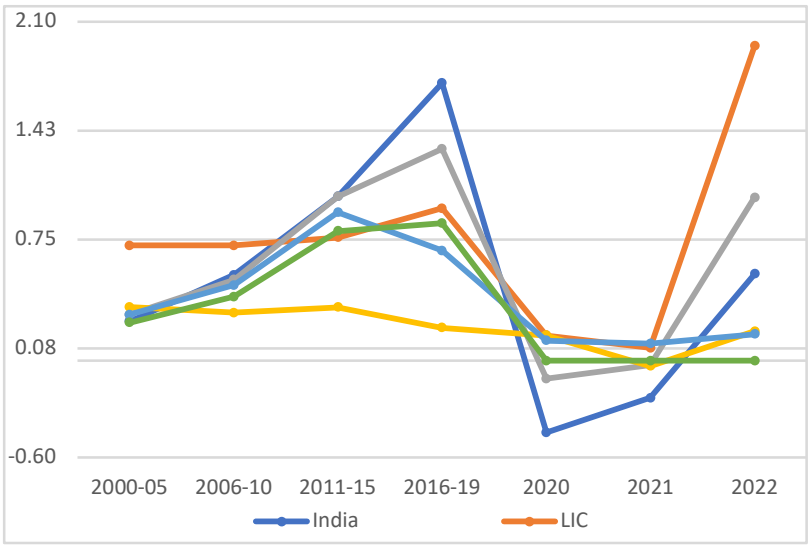
[6] The SDG index (Sachs et al 2018) is an assessment of the overall performance of all 17 SDGs, giving equal weight to each goal. The score can be interpreted as the percentage of achievement. The difference between 100 and countries' scores is therefore the distance in percentage that needs to be completed for achieving the SDGs. The same basket of indicators is used for all countries to generate comparable scores and rankings (Lafortune et al 2018). The index gives equal weight to all the goals and is weighted by population to construct a world average[1]. We use the SDG index to measure the global progress towards achieving SDGs.

Using the categorisation of countries by the World Bank into low income countries (LIC), Lower Middle Income Countries (LMIC), Upper Middle Income Countries (UMIC) and High Income countries (HIC)[7] we find that the percentage of achievement of the 17 SDGs corresponds to the income level classification- highest achievement for HICs, followed by UMICs, LMICs and finally LICs (Figure 1). The distance in percentage that needs to be completed to achieve the SDGs varies from 50 percent (for LICs) to 22 percent (HICs), reinforcing the point that much needs to be done to achieve SDGs. The recovery and progress across countries in unequal and unstable. India, which is a lower middle-income economy as per this classification, has a gap of 40 points. The growth of SDG Index (world average) which had been increasing rapidly from 0.23 per cent per year during 2000-05 to 0.85 per cent per year in 2016-20 (almost doubling every five-year period showed no growth during the last 3 years, 2020, 2021 and 2022. The gap between 100 and the achievement of countries (including HICs) along with the annual growth rate confirms that much is needed to achieve the 2030 Agenda.

The annualized growth rate of the SDG Index is analysed in Figure 2. The growth of SDG Index (world average) increased rapidly from 0.23 percent per year during 2000-05 to 0.85 percent per year in 2016-20 (almost doubling every five-year period). However, the index has shown no growth during the last 3 years, 2020, 2021 and 2022. High income countries have had a stable growth of SDG index between 2000-19 (around 0.3 percent per year) before falling in 2020 to 0.16 percent per year. The growth rate of SDG Index for the Upper Middle-Income Countries also increased rapidly from around 0.30 percent per year to 0.92 percent per year between 2000-05 and 2011-15 before declining marginally to 0.68 percent per year between 2016-19. The growth rate of the index for UMICs has declined sharply in 2020 and 2021 before recovering marginally in 2022. The growth rate of the LICs which was stable around 0.7 percent per year between 2000-05 and 2011-15 increases marginally in 2016-19 before falling in 2020 and 2021 (due to the pandemic). The LMICs experience a decline in the growth rates in 2020 and 2021. The growth rates have recovered in 2022 for all countries.

[7] Details about the basis for classification and list of countries can be found at *https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups*

Figure 2: Annualized Growth Rate of SDG Index



Source: Computed by Authors

Table 1 gives the annual increase in the score of SDG Index required per year to reach the score of 100 by 2030. This is calculated as a simple average based on distance from 100 and the remaining time (9 years). The SDG Index (World Average) needs to increase by 4.25 points per year to reach 100 by 2030. Historical analysis of the index (World Average) shows that the index has increased by a maximum of 1 point in any year, so achieving the SDGs will require innovative and transformative solutions in many arenas, not limited to regulation and policy.

Table 1: Absolute Increase in the score of SDG Index required per year to reach 100

LIC	LMIC	High Income	Upper Middle Income	World Average	India
6.05	4.78	2.81	3.56	4.25	4.96

Source: Computed by Authors based on data from sdgindex.org

1.2.2 Achievement of SDGs by India

The achievement of SDGs at the national level is concomitant to achieving the SDGs at the sub-national level. At the sub-national level, India is divided into 28 states and 8 Union Territories which vary in terms of geographic terrain, income levels, language, food and culture. A similar index, SDG India Index, is computed by the National Institution for Transforming India (NITI Aayog), Government of India. The index was first constructed in 2018-19 and then improved upon in 2019-20 and 2020-21 by expanding the number of goals and indicators covered[8]. SDG India Index (NITI Aayog, 2021) is based on 115 indicators for the first 16 goals. The composite score is the arithmetic mean of the Goal score for 16 Goals, for each State/UT, assigning equal weight to each Goal. This score is an indication of the overall position of the States/UTs in their progress towards achieving the SDGs (NITI Aayog, 2022). The composite score ranges from 0 to 100 and denotes the overall achievement of the State/UT in achieving the targets under the Goals. A score of 100 implies that the State/UT has achieved the targets set for 2030; a score of 0 implies that the particular State/UT is at the bottom of the table.The states are classified into the following categories based on their scores (Table 2).

Table 2: Categorization of States Based on Score

Score	Categorisation
100	Achiever
65-99	Front Runner
50-64	Performer
0-49	Aspirant

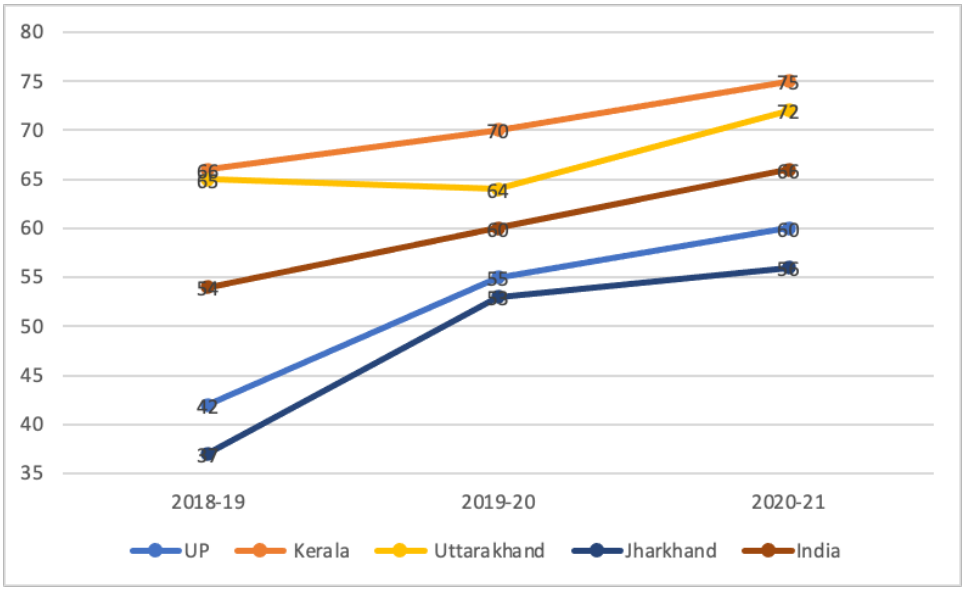
Source: SDG India Index & Dashboard, 2020-21

SDG India Index, which is similar to the index by Sachs et al. (2018), is computed by the National Institution for Transforming India (NITI Aayog), Government of India to track and monitor the progress towards achieving SDGs at the national as well as state level. Based on

[8] SDG India Index has been expanding in goals and indicators covered and therefore is not strictly comparable across time. The first version (SDGII 1.0), launched in December 2018, was computed using 62 indicators covering 13 SDGs – goals 12, 13, 14, and 17 were not included owing to the lack of data at the sub-national level. SDGII 2.0 was the second edition of the Index which built upon its first version and was constructed using 100 indicators- covering 54 targets across 16 goals. The latest version has 115 indicators.

the index score, the top five performing states are Kerala, Himachal Pradesh, Tamil Nadu, Andhra Pradesh and Goa while the bottom five states are Rajasthan, Uttar Pradesh, Assam, Jharkhand and Bihar. Figure 2 compares the performance of a few selected states in India. Two of the top five and two of the bottom five states have been selected for comparison. Kerala, a top-performing state, has been progressing towards achieving SDGs at a steady rate (index improved from 66 to 75 over 2018-19 to 2020-21). The SDG index for Uttarakhand has also shown rapid progress, despite a slight fall in the index in 2019-20. The rate of growth of the SDG Index for all states (except Uttarakhand) has fallen in 2020-21 compared to 2019-20. The state of Uttar Pradesh, which ranks in the bottom five states, based on the SDG Index ranks below the national average in 15 out of 17 goals (NITI Aayog, 2021) and had a score of 60 in 2020-21. The distance in percentage that needs to be completed to achieve the index varies across states (48 for Bihar to 25 for Kerala).

Figure 3 : Performance of Selected States on SDGs

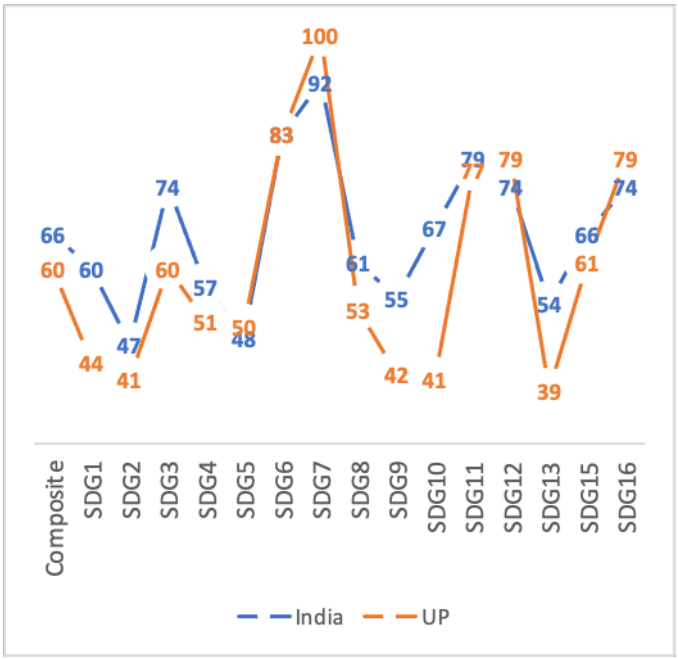


Source: NITI Aayog, 2021

Figure 4 gives the goal wise performance of Uttar Pradesh. UP has achieved SDG 7 (Affordable and Clean energy). As per the NITI Aayog classification, it is a front runner (index between 65-99) in the following SDGs :SDG 6 (Clean Water and Sanitation), SDG 12 (Responsible Production and Consumption), SDG 16 (Peace Justice and Strong Institutions), SDG 11

(Sustainable Cities and Communities). The state is a performer state (index between 50-64) in the following SDGs: SDG 3 (Good Health and Well-being), SDG 4 (Quality Education), SDG 5 (Gender Equality), SDG 8 (Decent Work and Economic Growth) and SDG 15 (Life on Land). The state is an aspirant state (index between 0-49) with respect to performance in SDG 1 (No Poverty), SDG 2 (Zero Hunger), SDG 9 (Industry, Innovation and Infrastructure), SDG 10 (Reduced Inequalities) and SDG 13 (Climate Action.

Figure 4: Goal Wise Performance of Uttar Pradesh



Source: NITI Aayog, 2021

To summarise, significant challenges remain in terms of achieving SDGs at the global level, national level (India) or state level. Generally, sustainable development has been viewed as having three dimensions- economic, environmental and social and bulk of the literature on progress towards achieving SDGs has looked at the need for tailoring national strategies and policies to conform to SDGs and securing sufficient resources to facilitate the achievement (Plag and Jules-Plag, 2019; Messerli et al. 2019). However, the achievement of SDGs, may require changes beyond the policy structure and resource availability. We discuss this in more detail in Section 3 of the paper.

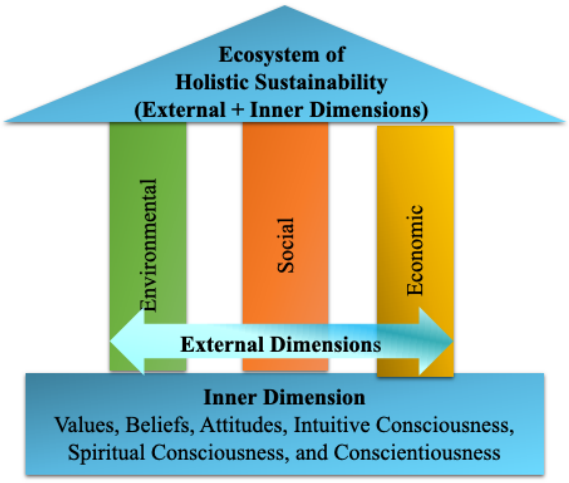
3. HOLISTIC SUSTAINABILITY

A particular challenge in the pursuit of SDGs is the incomplete and often contradictory knowledge on how to achieve them (Plag and Jules-Plag, 2019) and the complex

interconnectedness among them (Nilsson et al., 2016). Existing literature focusses on the challenges, constraints, trade-offs such as seeking economic prosperity at the cost of environmental degradation and interlinkages among the three dimensions of sustainability-economic, environmental and social.

Environmental sustainability focuses on water quality, air quality, climate action and biodiversity. Social sustainability encompasses quality education, good healthcare, gender equality and reduced inequality. Economic sustainability promotes economic growth, employment, sustainable consumption and production, innovation and food security without negatively impacting social and environmental aspects of the economy. However, sustainable development will require a transformation at an individual level. This is based on people's values, beliefs, spiritual and intuitive consciousness and consciousness. We call this as inner dimension of sustainability. Therefore, we propose a modification to the three-pillar diagram of sustainability[9] found commonly in literature and present a concept of holistic sustainability (Figure 5). While the three pillars, namely economic, social and environmental, constitute the 'external dimensions' of sustainability, the values, beliefs, attitudes and spiritual and intuitive consciousness and conscientiousness are the foundation on which the three pillars of sustainability rest and are referred to as the 'inner dimension' of sustainability. We define a concept of holistic sustainability encompassing both inner (people's values, beliefs, attitudes, intuitive and spiritual consciousness and conscientiousness) and external dimensions (environmental, social and economic).

Figure 5: Holistic Sustainability



[9] Studies such as Purvis et al, 2019 have traced the conceptual origins of the three-pillar conception and found that this has emerged over time in an effort to balance economic growth, societal well-being and environmental problems.

Achieving the SDGs in a time-bound manner requires changes at the personal, cultural, organizational, institutional and systems levels (O'Brien & Sygna, 2013). These changes need to be incremental and take into consideration the socio-cultural context and individual behavioural choices (Rishi, 2022). While our "conscience keeps us on the right track", this transformation requires "conscience-based consciousness" which has to be put into action "to perceive reality and ultimately achieve perfection through hard work, fulfilling duties and cultivating the habit of not giving up" as explained by Revered Prof. P.S. Satsangi (Gupta, 2022b). Recent literature has focused on (the concepts of) inner dimensions, inner development and inner transformation in sustainability and climate work[10]. Inner dimensions refer here to people's consciousness, awareness or mindsets, which include individual and collective beliefs, values, and worldviews, as well as associated inner–cognitive, emotional and relational– qualities and capacities (Wamsler, 2020; Wamsler et al., 2021). Rishi, 2022 states that internal factors include person's attitude towards environment, perceived responsibility and perceived behavioural efficacy and external factors include the social environment of the individual. These factors impact the individual at three different levels - the cognitive level (thoughts and higher mental processes), the affective level (emotions), and the conative level (actions and behaviours). Existing studies have also looked at how spirituality can impact sustainability. The consumption choices of an individual, which are a result of values, beliefs and consciousness, are major drivers for economic spending patterns. This inner dimension also impacts the willingness of the individual to do private sacrifices for the greater public good, including individuals' consumption choices and willingness to contribute to social and environmental objectives[11].

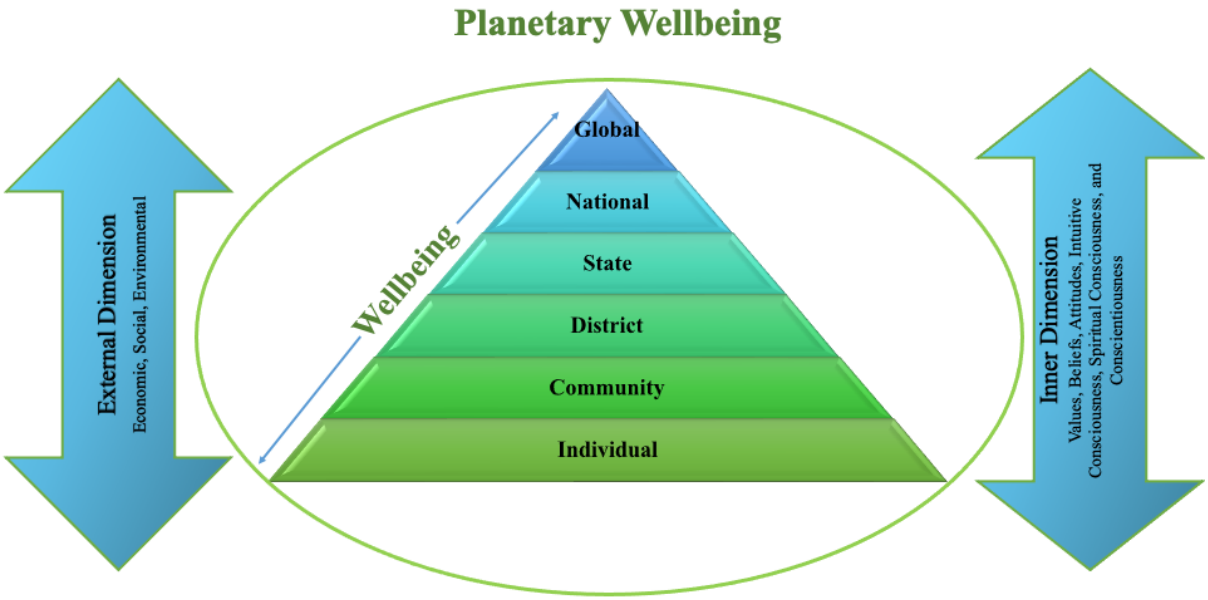
The limited perspective of sustainability (economic, environmental and social) is unable to capture the importance of values, beliefs and consciousness on these dimensions. There is a need for a fundamental shift in approach towards sustainable development by integrating people's consciousness and conscientiousness that is based on people's values, beliefs, attitudes and spiritual consciousness. This is defined as the inner dimension of sustainability. The study defines the concept of holistic sustainability as encompassing both inner and external dimensions. The inner dimension of sustainability is likely to enhance the impact of the external dimensions to yield more lasting strategies and solutions and serves as the foundation for sustainable development. It is the key to protecting people and planet and fostering prosperity. These external dimensions of sustainability-(economic, social and environmental) are only the manifestations of this inner dimension.

This inner dimension of sustainability can help to achieve the SDGs at the global level through a transformation at the individual level. The individual level transformation can snowball into changes at community level, district level, state level, national level and finally the global level. Therefore a bottom-up approach, with the individual as the catalyst for change, is required to achieving the SDGs (Figure 6). The role of local communities in achieving sustainability has

[10] See e.g. Ericson et al., 2014; Parodi & Tamm, 2018; Wamsler et al., 2021; Woiwode et al., 2021
[11] See e.g. Bangsa and Schlegelmilch, 2020; Champniss et al., 2016

also been recognised by Agenda 21[12], adopted at the Rio 1992, through Local Agenda 21(Bayulken and Huisingh, 2015).

Figure 6: Bottom-Up Approach to Achieving SDGs: Individual to Planetary Well-Being



4. CASE STUDY: DAYALBAGH

The case study of Dayalbagh, Agra in Uttar Pradesh, India is an example of the ecosystem of holistic sustainability established at the individual and community level. Dayalbagh, which translated into English means the '*Garden of the Merciful*' is a model and novel eco-village[13] and healthcare habitat. It is the headquarters of the Radhasoami Satsang Community and is a self-contained colony of the followers of the Radhasoami Faith. The tenets of the Faith are based on a living belief in existence of God, oneness of the essence of God and the spirit entity in human being and the continuity of life after death. Any person who wishes to tread the path of spiritual progress has to live a simple life of minimalism and meet worldly needs out of one's own income. A follower does not need to renounce the world and live in seclusion but rather lead a life of a householder. The ideal is thus 'Better Worldliness' and not 'un-worldliness'.

The way of life of the residents can be summarized using Sigma Six Qualities-Values-Attributes model (Figure 7) which are the six qualities of Agriculture and Dairy, Education and

[12] Agenda 21 is a non-binding action plan of the United Nations with regard to sustainable development. Local Agenda 21 (LA21), conceptualised in Chapter 28 of Agenda 21, aims to create local policies and programs that work towards achieving sustainable development and includes raising awareness, capacity building, community participation and partnerships.

[13] Ecovillages are a communitarian phenomena where members push for ecologically sustainable change and emphasise on living simply, sustainably, and symbiotically with their environment (Kirby, 2004; Kozeny, 2004; W. L. Smith, 2002).

Healthcare, Water Quality, Air Quality, Innovation and Human Values. To discuss the case study of Dayalbagh through the lens of Holistic Sustainability the methodology used is as follows:

- First the paper discusses the features for each element of the Sigma Six Q-V-A Model (Dayalbagh way of Life)
- Secondly, the external dimensions of sustainability for each of the qualities and enumerate the SDGs that the respective feature impacts are discussed
- Thirdly, for each element of the Sigma Six Q-V-A Model, the paper discusses how the element leads to a transformation in people's values, beliefs, consciousness and conscientiousness, i.e. the inner dimension of sustainability

Figure 7: Sigma Six Q-V-A Model of Dayalbagh Way of Life

Source: Radhasoami Satsang Sabha, 2019

4.1. Agriculture & Dairy

One of the challenges of the 21st century is meeting global food demand for a growing population in the wake of climate change (FAO, 2018). Boosting agricultural production (through 'industrial agriculture') and productivity of agricultural land (through use of fertilizers and pesticides) is a popular strategy to enhance and maintain food supply and reduce hunger[14]. However, this leads to overexploiting natural resources, deforestation and land degradation. The development of agroecology offers vital opportunities and a promising approach to promoting a sustainable food system in support of the SDGs (FAO, 2018). Dayalbagh is an example of how agroecology and precision farming[15] can be used to meet the

[14] See e.g. Millennium Ecosystem Assessment, 2005; The Royal Society, 2009; Wu et al., 2014

[15] Agroecology is an integrated approach that simultaneously applies ecological and social concepts and principles to the design and management of food and agricultural systems (FAO, 2018)
Precision farming uses information technology to ensure that crops and soil receive exactly what they need for optimum health and productivity

demand for food for all its residents and neighbouring villages and colonies. The lifestyle also advocates lacto-vegetarianism. The *Gaushala* (Cowshed) and Dairy not only help in integrating animals into farming but also meet the requirements of milk and dairy products for the residents and beyond.

4.1.1 Agroecology-cum-Precision Farming

Agriculture, a sector that is crucial to attaining SDGs, is given prime importance in Dayalbagh (Radhasoami Satsang Sabha, 2019). Agricultural activities started in Dayalbagh in 1943 with participation of women in agriculture from as early as 1955-56 highlighting the importance accorded to gender equality as far back as the 1950s. Members of the community, irrespective of age and gender perform daily voluntary work (*selfless seva*) on the agroecological and precision farming sites twice a day for 3-4 hours, in each shift, all year round. The land of Dayalbagh (around 1200 acres) which was hostile, barren land and full of thorny bushes and mounds of sand was made cultivable through sustained hard work by the members of the community. Currently, production from agroecology and precision farming practised in Dayalbagh, meets the requirements for cereals, feed, oilseeds, legumes, fruits and vegetables, besides some minor crops, of it's residents and neighbouring colonies and villages.

Agriculture in Dayalbagh is organic and is done by using biofertilizers and organic manure. Multiple bio-ecosystems including crop fields, vegetable gardens, fruit orchards, fodder fields, medicinal herb gardens, and biodiversity parks co-exist in Dayalbagh. The principle of diversity in agroecology is adopted by practising vertical, spatial and temporal diversity. Irrigation is done by using recycled water from the sewage treatment plant and rainwater harvesting. This helps to reduce the dependence on groundwater. Moreover, drip irrigation system helps to reduce water consumption. All these practices have led to a 40% decrease in water consumption (DEI, 2022a). Natural processes like intercropping and crop rotation are used for nitrogen fixation and nutrient cycling is promoted through mulching in agricultural fields and gardens. These practices help to maintain soil health value and prevent topsoil erosion. Agroecological practices (see DEI, 2022a) also help to self-regulate pest outbreaks. Instead of synthetic pesticides, natural, organic and indigenously made pesticides like neem oil and other methods are used to reduce, destroy or repel pests. These practices help to balance out the environmental and economic risks and maintain the productive base of agriculture over time while meeting the needs of the community and beyond.

Increased efficiency in agroecological practices at Dayalbagh is achieved through precision farming techniques such as sensors for site-specific sampling, and managing inputs and use of technologies for supply chain monitoring (e.g. smart truck tracking). These allow targeted use of inputs and reduce waste, thereby cutting both private variable costs and the environmental costs such as those of agrichemical residuals.

4.1.2 Radhasoami Satsang Sabha Gaushala (Cowshed) and Dairy

Crop-animal integration in Dayalbagh (through the *Gaushala* and Dairy) helps to bolster critical agroecosystem processes through the synergistic relationships between plant and animal systems. The *Gaushala (Cowshed)* uses modern practices and scientific techniques for

precise management of nutrition, feeding, health and breeding of cattle along with traditional wisdom for rearing the herd. Technological interventions like artificial insemination and estrus synchronisation for breeding, Radio Frequency Identification (RFID) tagging of cattle for milking and health management, Internet of Things (IoT) based weighing platforms and remote monitoring and control of utilities, sensors for activity and health monitoring have resulted in an increase of milk production. The milk production from *Gaushala* meets the dairy requirements of the residents of the Colony (Radhasoami Satsang Sabha, 2019).

An innovative feature of the *Gaushala* is the measures taken for providing comfort to both the milking and non-milking cows. Cows are also made to listen to hymns which not only comforts them but also leads to higher milk yields (Moregaonkar et al. 2006). The first right of the milk is given to the calf before milking them twice a day. *Gaushala* follows a zero waste and zero pollution principle(Radhasoami Satsang Sabha, 2019). Therefore, animal remains such as cow dung and cow urine are used to make biogas and natural fertilizers and manure. This also helps to maximize diversity through the integration of animals in farming.

An indigenous dairy, Dayalbagh Dairy, which was established in 1926 was regarded as the best in Asia (Radhasoami Satsang Sabha, 2019). *Gaushala* serves as a live laboratory for students of Dayalbagh Educational Institute (DEI) where research is undertaken on various fields like precision dairy farming, milk processing, animal sciences, feed and nutrition, etc. A mini dairy plant set up by the students receives fresh organic milk from the *Gaushala* and makes natural products like flavoured milk, butter, sweets and chocolates which is FSSAI, HACCP certified and has an export permit from Export Inspection Agency, Govt of India and a commercial permit from US Department of Agriculture for export of flavoured milk and butter.

Renewable energy through a 200 kWp Agrivoltaic Solar farm and a novel topology with hybrid AC-DC grid for integrating diverse renewable sources is utilised to power value chain machinery for smart agroecological and dairy operations.

Collaboration with the Dayalbagh Educational Institute (Deemed to be University) (DEI) helps to blend traditional/indigenous and scientific knowledge (e.g. D.E.I has MOUs with many national and international institutes and industries and is involved in state-of-the-art research in fields of agroecological and precision farming and dairy technology). Biodiversity parks (e.g. Anupam Upvan) and Polyhouses developed by DEI further enhance the flora and fauna while providing essential ecosystem services. Radhasoami Satsang Sabha, Dayalbagh in collaboration with DEI has also established two international research institutes -International Center for Agroecology (ICA), New Jersey and International Center for Applied Systems and Sustainable Development(ICASSSD), Toronto aimed at conducting research and development in the field of agroecology, applied systems science and sustainable development. Both these institutes endeavour to impact communities beyond Dayalbagh, Agra, India through knowledge transfer that is relevant for decision making, policies, and a transition toward a culture of sustainability.

Table 3 gives details of practices followed in Dayalbagh and the impact on ecological and socio-economic parameters.

Table 3: Features of Dayalbagh Way of Life (Agriculture & Dairy) and its Relation to SDGs

Practices at Dayalbagh	**Outcome**
<u>Agroecological Practices</u> • Multiple Bio-ecosystems such as crop fields, vegetable gardens, fruit orchards, fodder fields, medicinal herb gardens, biodiversity parks co-exist • Organic farming using bio-fertilizers and manure from dairy • Pest Management through crop-diversification • Wide variety of crops and plants • Vertical Diversity: Fruit orchards are lined with bougainvillea, followed by bushes and towering trees as the third layer that function as wind barriers. • Spatial Diversity: Intercropping of sugarcane and cluster beans, etc. • Temporal Diversity: Crop rotations, often including legumes • Integrating animals into farming • Rain water Harvesting • Recycled Water from Sewage treatment Plant used for Irrigation • Nutrient cycling through mulching • Organic Manure from animal and plant waste • Waste segregation and waste management	• Enhanced provisioning of ecosystem services, including pollination and soil health, upon which agricultural production depends. • Increased productivity and resource-use efficiency by optimizing biomass and water harvesting. • Strengthened ecological and socio-economic resilience, For example, crop and animal diversity reduces the risk of failure in the face of climate change. • Reduced dependency on external resources.
<u>Precision Farming</u> • Sensors for soil temperature, humidity, wind speed and direction, climatic conditions and rain • Multi-land use model with solar agricultural farms (farming is done on land below solar modules) • Proper Crop classification, timely planting and irrigating crops and appropriate irrigation methods	• Reduced Input Usage • Better Yield • Weed and Pest Control • Reduced Waste

• Use of technologies e.g. Smart Truck Tracking, Smart Dairy	
***Gaushala* and Dairy** • Crop-Livestock Integration (animal remains for farming, animal grazing on crop remnants and weeds, etc) • Technological Interventions to improve breeding, nutrition and health management • Symbiotic relationship with DEI • Adoption of technology through collaboration with Universities and NGOs	• Improved Yield, dietary diversity, weed control, better soil health • Integration of traditional and scientific knowledge • Provides an impetus to agro-ecological innovations
SDG's Impacted through Agroecology-cum-Precision Farming, *Gaushala* and Dairy at Dayalbagh **SDG1, SDG2, SDG3, SDG5, SDG13**	

Source: Authors' compilation based on Radhasoami Satsang Sabha (2019), DEI (2022a), DEI (2022b) and FAO,2018

Note: SDG1: No Poverty; SDG2:Zero Hunger; SDG3: Good Health and Well-being; SDG4: Quality Education; SDG5: Gender equality; SDG6: Clean Water and Sanitation; SDG7: Affordable and Clean Energy; SDG8: Decent Work and Economic Growth; SDG9: Industry Innovation and Infrastructure; SDG10: Reduced Inequality; SDG11: Sustainable Cities and Communities; SDG12: Responsible Consumption and Production; SDG13: Climate Action; SDG14: Life below Water; SDG15: Life on Land; SDG16: Peace Justice and Strong Institutions; SDG17: Partnerships to achieve Goals

4.1.3 External Dimensions of Sustainability: Agroecology-cum-Precision Farming, Gaushala and Dairy

Agroecology-cum-Precision farming and Dairy at Dayalbagh could significantly contribute to achieving the Sustainable Development Goals (SDGs) in an integrated, comprehensive and holistic manner. Sustainable agroecological-cum-precision farming practices at Dayalbagh ensure optimum use of resources where waste or output of one becomes the input for another, ensuring environment friendly and cost-effective farming. The primary products of plants like grains are used for human consumption and green fodder, straw and husk are utilized by cattle. The milk produced by cattle is utilized for various products and value additions. The crop residues can be used for animal feed, while manure from livestock can enhance agricultural productivity. Whatever wastes is derived from these activities is further processed to get useful products like compost, bio-ethanol etc.

Sustainable agroecological-cum-precision framing practices with focus on organic agriculture, lacto-vegetarian diet, health and nutritional security of all through the common kitchen and a strict adherence to "waste nothing" have been the principles that guide the philosophy of Dayalbagh. As pointed out by Satsangi (2022), lacto-vegetarianism holds the capacity of feeding a requisite healthy diet to 11 billion people on planet Earth by 2050. Dayalbagh - an ecovillage- is thus, an example of how we can feed rising population sustainably[16]

This has a strong potential to contribute to meeting SDG 2's specific targets, such as: ending hunger and malnutrition, ensuring sustainable food production systems and implementing resilient agricultural practices, and maintaining the genetic diversity of seeds, cultivated plants and farmed and domesticated animals and their related wild species. These practices can also lead to the achievement of goals SDG1 (No Poverty) through creation of jobs, SDG3 (Good Health and Well-being) through provision of organic produce at low prices and SDG 13 (Climate Action) through a reduction in greenhouse gases and chemicals. Dayalbagh gives importance to women in farming. This helps to overcome gender inequalities and empowering women (SDG5) which can have powerful social and economic impacts, delivering significant improvements to agricultural production, food security, child nutrition, health and education. The runoff of chemicals and pesticides to water sources and ground table is avoided through organic farming, which contributes to SDG6 (Clean Water and Sanitation).

4.1.4 Inner Dimensions of Sustainability: Agroecology-cum-Precision Farming, Gaushala and Dairy

The physical work performed by the members of the community helps to increase memory and concentration and maintenance of cognitive function (Trudeau & Shephard, 2008). Moreover, physical activity is associated with improved overall health. Studies have found that physical activities help children develop social skills their improve mental health (Taras, 2005). The selfless service (*seva*) performed by the members of the community instils the values of hard work, shared responsibility, optimal utilization of resources and zero waste which are the foundation of holistic sustainability. Meditative chants, non-denominational prayer and hymns are played at the agroecology-cum-precision farming sites which contributes to the development of spiritual and intuitive consciousness and conscientiousness. Members of the community work together irrespective of caste, creed, income status or gender helps in inculcating a sense of equality amongst the community. These features of inner dimension helped Dayalbagh transform the barren lands into lush green agricultural fields and become self-reliant. Thus, voluntary participation of community members (*seva*), irrespective of age, income, caste, creed and gender, in agricultural operations carried out in a scientific manner through collaboration with national and international universities, research institutes and NGOs using agroecological and precision farming principles differentiates the Dayalbagh model from others. This inner dimension provides a basis for transformation and impacts all SDGs.

[16] See also Gupta (2022a)

4.2 Education & Healthcare

Quality and access to education and healthcare are major challenges across the world. Quality education is the foundation for improving the quality of life and sustainable development (World Economic Forum, 2023) . Ensuring healthy lives and promoting wellbeing for all at all ages is important to building prosperous societies (United Nations, 2015). The second element in the Sigma Six Q-V-A model of Dayalbagh is Education and Healthcare. We discuss Dayalbagh's model of Education and Healthcare in detail below.

4.2.1 Education

The Revered Leaders of the Radhasoami Faith have always accorded high importance to education. Due to this, the construction of the flagship building of education in Dayalbagh known as the Radhasoami Educational Institute, started the very next day of the laying of the foundation of Dayalbagh (January, 20 1915). The seeds of a sound educational system for girls, were sown in Dayalbagh with the establishment of a co-educational Middle school open to all, in 1917. One of the distinguishing features of this school was the starting of co-educational classes up to class V from the very first day. At a time when girls were reluctantly sent even to purely girls' schools, this was perhaps the only school in the country having co-educational classes. This was followed by various other institutions including a school for infants, a girls school, Technical college, Women's Training College and a Degree college. Later, Dayalbagh Educational Institute was established as a Registered Body in 1973, which integrated and brought under one umbrella all the Colleges and institutes of Dayalbagh.

In 1975, the Institute formulated an innovative and comprehensive educational policy to bring about physical, intellectual, emotional and ethical integration of an individual with a view to evolving a 'complete man'. A complete man possesses the basic values of humanism, secularism and democracy and is capable of giving a fuller response to social and environmental challenges. On May, 1981, the Government of India declared the Dayalbagh Educational Institute, Dayalbagh, Agra as a Deemed to be University due to its unique and innovative education policy.

The Vision and Mission of DEI summarise its commitment to fostering a human being who is adequately skilled, analytical and pragmatic to look at the deeper purpose of life through a higher-order thought process (DEI, 2020b).

A model Deemed to be University that believes in excellence with social relevance, imparting 'values-based and quality education' with the objective of reaching the last, the least, the lowest and the lost; contributing to nation and community by empowering weaker sections, women and children; building the economy through research and frugal innovation anchored in the principle of achieving more with less.

This is achieved through a curriculum that includes core courses and co-curricular activities including cultural education, comparative study of religion, scientific methodology, rural development, agricultural operations, social service and environmental studies. An interpretive

structural model (ISM) developed by Revered Prof. P. S. Satsangi (Chairman, Advisory Committee on Education and erstwhile Director, DEI) depicts how organisation policy elements in DEI are put together to create an educational system that leads to the attainment of the aims and objectives and finally the development of the complete man conforming to the concept of total quality management propped firmly on the four pillars of creativity, excellence, initiative and innovation (Radhasoami Satsang Sabha, 2019). The model identifies 93 elements spread over aims and objects of DEI(30), educational system of DEI (33) and DEIs organisation (30) (DEI, 2021).

The education at DEI caters to students from 'maternity to eternity' starting from 3 weeks (Superman Evolutionary Scheme) to D.Litt and adult continuing education courses.

An innovative feature of the DEI Education system is the flexible curricular structure with multiple entry and exit points with 360° transition. Active participation of students in community-related work is encouraged through the educational system. Further, the commitment to the 'last, the lowest, the least and the lost' is reinforced through social service-based village adoption programmes, skilling rural women and youth through ATMA (Apparel and Toy manufacturing Association), AdyNAM (Agro and Dairy Nano Processing of Multi-products), AAM (Automotive and Multi-skill) *karkhanas* (garages) and Business Advisory Clinic. These *karkhanas* (garages) impart skills to youth and women training them to set up their own nano enterprises. The products made by these enterprises are exported abroad. This training model is called Rural Economic Zone (REZ) to Special Economic Zone (SEZ) to Internationalisation Model (Radhasoami Satsang Sabha, 2019).

Moreover, concerted efforts towards gender equality through focus on women's education are visible from as early as 1917 when co-education was introduced in Dayalbagh. DEI Education policy has been a pioneer in introducing concepts such as vocational education, focus on skilling from the pre-nursery level to higher education, choice-based credits, upward and lateral progression, online and distance learning, etc., which have been later incorporated in the National Policy of Education in 1986 and 2020. Moreover, skilling is integrated into mainstream education right from pre-nursery level with age-appropriate activities. The system focuses on skilling and entrepreneurship at higher education level through initiatives such as on-campus student enterprises called 'Quantum Jugaad' which help the students learn innovative, frugal practices to start nano-enterprises (DEI, 2020c) and earn while you learn schemes.

Information and Communication Technology (ICT) is deployed in education, collaboration, and community outreach with a special focus on rural, tribal and underprivileged communities through a full ecosystem for online delivery of education including the e-DEI-World Wide Web (Not for profit) or eDEIwww.education. The DEI education model has received recognition and appreciation from many eminent scholars, practitioners and accreditation agencies such as ISO 9001:2015 and the National Assessment and Accreditation Council (NAAC) which awarded an A+ grade to the University in 2019 (DEI 2020b). Details about the

unique features of DEI including the curriculum, technological interventions, Innovation and Entrepreneurship can be found in the book on DEI Vision (DEI, 2018).

To promote alternative modes of treatment like Homeopathy and Ayurveda, DEI has set up a Faculty of Integrated Medicine (AYUSH) in collaboration with Saran Ashram Hospital. It provides training and free OPDs and IPD to staff, students, and neighbouring communities. (Radhasoami Satsang Sabha, 2019).

Further, there is a symbiotic relationship between agroecology and precision farming sites and *Gaushala* of Radhasoami Satsang Sabha, Dayalbagh and DEI which helps to implement the trinity of teaching-learning, production and extension. Agricultural fields and dairy farms of Dayalbagh along with campus-wide solar and surveillance deployment serve as 'Lab on Land' to inculcate an understanding of real-life systems, besides deploying entrepreneurial acumen (Radhasoami Satsang Sabha, 2019). DEI has identified agriculture and dairy, entrepreneurship and consciousness studies as areas for achieving excellence through research, teaching and experiential education.

4.2.2 Healthcare

The 'healthcare habitat' (Radhasoami Satsang Sabha, 2019) of Dayalbagh promotes the health of the residents of the Colony by providing free multispeciality healthcare facility (Saran Ashram Hospital) to residents of Dayalbagh and neighbouring villages and colonies free of cost. Several proprietary medicines are also supplied at no charge. Moreover, each of the six *mohallas* (an area within a colony) has at least one doctor in residence. In addition to the modern (allopathic) system of medicine, the healthcare system at Dayalbagh incorporates Ayurveda, Yoga, Naturopathy, Unani Siddha and Homoepathy for prevention and treatment of diseases. The healthcare facilities are Dayalbagh also focus on well-being from 'maternity to eternity'.

Outreach programs such as free multispeciality medical services to villagers and neighbouring communities are organised on a weekly basis by Saran Ashram Hospital in collaboration with DEI. These help to improve the access of healthcare for people with low socioeconomic backgrounds while also serving as a forum for child development (through programmes like Hole in the Wall, children's recreation facilities and spoken English facilities) and socioeconomic development (through education and career counselling services, cultural discussions and vocational training). Children below fifteen years of age are evaluated on various health parameters and are provided nutritious food including fruits, fresh milk from Dayalbagh's *Gaushala*, and traditional nutritional supplements made by Dayalbagh and DEI such as Chyavanprash, millet based foods, etc. The impact of these camps is visible from the fact that the children of the adopted villages showed a marked improvement in the height and weight. A few of them also showed signs of improvement in the colour of skin and hair (DEI 2020d).

A Dayalbagh Experiential Medical Expert computer program (DEMEX) containing common sense and experience-based methods of management of common diseases with a holistic

approach, avoiding as far as possible, complicated and invasive procedures has been developed and deployed in Dayalbagh and Saran Ashram Hospital.

Health is affected by a multitude of factors, inherent to each individual but also dependent on environmental and economic circumstances. The focus at Dayalbagh is not just limited to treating and providing care but rather on preventing diseases by working on multiple dimensions to ensure health and well-being of the residents. Regular exercise through physical training and field work helps to maintain the physical health of the residents. Moreover, residents are encouraged to walk or cycle in the colony. Special emphasis is given on the health of women and children through regular physical training. Further, fresh organic produce from the agro-ecological and precision farming sites including cereals, pulses, vegetables, and fruits is available for consumption by the residents at subsidised rates. These are also supplied to the community kitchen where residents can avail two nutritious and balanced meals every day. Organic Milk and products from the Dayalbagh dairy help to ensure the nutritional needs of children and adults are met.

A healthy environment has the potential to reduce almost a quarter of the global disease burden (WHO, 2020). Therefore, regular monitoring of air and water quality by Dayalbagh and appropriate and timely corrective measures ensures that the pollutants in air and water are always below the permissible limits. The details about air and water quality management at Dayalbagh are given in the next section.

4.2.3 External Dimensions of Sustainability: Education and Healthcare

UNESCO International Experts Meeting on Learning for Work, Citizenship and Sustainability held in Bonn, Germany in 2004 underscored the importance of technical and vocational education as an integral component of lifelong learning and achieving sustainable development[17]. Innovative, comprehensive and values-based education at Dayalbagh with its emphasis on skilling and entrepreneurial education and frugal solutions (quantum jugaad) impacts many SDGs.

DEI conducted nine surveys between 2019-20 to assess the contribution of activities and features of DEI towards the achievement of 17 Sustainable Development Goals (SDGs). These surveys looked at the societal impact of the institution through the extrinsic and intrinsic development of the student at DEI. The survey of stakeholders including students, parents, alumni found that activities and features of education at DEI lead to the development of individuals who contribute to society and the achievement of SDGs (DEI, 2020a). The survey found that activities and features of DEI contribute to around 11 of the 17 SDGs.

Similarly, the importance of healthcare for sustainable development cannot be disputed. Dayalbagh focuses on access to quality education and healthcare from '*maternity to eternity*'

[17] See for e.g. Fien & Wilson (2005); Gupta (2021)

for *the last, lowest, the least and the lost*. Table 4 gives the relationship between the unique features of these elements at Dayalbagh and the SDGs.

Table 4: Features of Dayalbagh way of Life (Education & Healthcare) and its Relation to SDGs

Features of Education at Dayalbagh	**SDGs Impacted**
Affordable and Accessible education for all	SDG1, SDG4, SDG5, SDG10, SDG11
Innovative, Comprehensive, Values-Based Education	SDG1, SDG4, SDG5, SDG8, SDG9, SDG10,
Relevance to Contemporary Needs	All SDGs
Broad Based Core Courses including agriculture, environmental studies, social service, etc.	SDG1, SDG4, SDG5, SDG6, SDG7, SDG10
Reaching the Last, Least, Lowest and the Lost	SDG1, SDG2, SDG3, SDG4, SDG5, SDG10
Focus on Women's Education	SDG4, SDG5, SDG10
Skill Development, Vocational and Technical Training	SDG8, SDG9, SDG10
Entrepreneurial Education including Earn while you learn, life-long learning	SDG4, SDG8, SDG9, SDG10
ICT in teaching, research and outreach	SDG4, SDG10
Research and Frugal Innovation (Quantum Jugaad)	SDG4, SDG8, SDG9, SDG10
Empowering Weaker Sections of Society and Women	SDG1, SDG2, SDG5, SDG8
ISO Certification	SDG4
Features of Healthcare at Dayalbagh	
Treatment of Disease Charitable Health and Medical Facilities Free Medical Camps	SDG3, SDG10
Prevention of Disease *Nutrition* Subsidised Organic Milk Nutritional Supplements to children Organic Fruits, Vegetables at nominal prices	SDG1, SDG2, SDG3, SDG10
Physical Fitness Regular Exercise through Physical Training Fieldwork	SDG 3

Environment Regular Monitoring of Air Quality Water Quality Earth Resistance Values	SDG3, SDG13

Source: Authors' compilation based on Radhasoami Satsang Sabha (2019) ,DEI (2022a), DEI (2022b)
Note: For details about each SDG, refer to notes of Table 1

4.2.4 Inner Dimensions of Sustainability: Education& Healthcare

The curriculum at DEI including the core courses and the co-curricular activities inculcates in the students, the values of hard work, integrity, self-reliance, selfless service, cooperation, honesty, sincerity, dignity of labour and humility. The high quality, well-rounded, value-based education produces efficient, industrious, law-abiding, God-fearing and God-loving citizens.

There is an emphasis on service to mankind through village adoption programs and outreach activities such as organising and assisting self-help groups in tribal, backward areas like Rajaborari in Madhya Pradesh. Further, a non-denominational prayer that is sung at the start of the day in a congregation consisting of every member of the Institute- from the head, staff and students invokes humility, dedication, love and the universal spirit of brotherhood. A well-defined mandatory uniform for all students instils a sense of equality, discipline and oneness among the students. The DEI Education policy thus evolves a 'complete person', a well-rounded total quality person, whose hallmarks are intellectual strength, scientific temper, emotional maturity, truthfulness, high moral character, simple living, dedication to duty and discharge of obligations, inter-disciplinary outlook, good general knowledge, sound aptitude and understanding of society.

The emphasis on "combining the much-sought excellence with the much-needed relevance to contemporary needs" is the distinguishing feature of Dayalbagh Educational Institute. Education at Dayalbagh focuses on values-based and quality education with the objective of reaching the last, the lowest and the lost and the least and contributing to the nation and the community through research and frugal innovation anchored in the principle of achieving more with less (Radhasoami Satsang Sabha, 2019).

These values that the students imbibe from an early age influence their behaviour and encourages them to take responsible decisions regarding the economic, environmental, and social dimensions of sustainability. The educational system inculcates a higher ability of intuitive consciousness which can guide one's judgement to traverse an optimal path in life. The 'moral & spiritual' domain of education also highlights the importance of 'Spiritual Consciousness' in DEI's system much beyond the 21st-century skills- Learning Skills, Literacy Skills (including core and interdisciplinary themes) and Life Skills (Dua, 2016). The practice of values such as duty, beauty, humility, loyalty, justice, courage, temperance and wisdom provides the much-needed inner dimension and transforms the *Homo Sapiens* into *Homo Spiritualis*- a complete man with balanced body, mind and spirit.

Voluntary work performed by the residents for the provision of medical services at Saran Ashram Hospital as well as the weekly medical camps promotes the values of humility, duty, love, universal brotherhood and sense of shared social responsibility. Moreover, regular physical training and fieldwork help to establish a connection with nature and aids memory, concentration and meditation. These also affect the lifestyle and decision-making of the members of the community and their desire for simultaneous economic prosperity, social equity and environmental protection. This inner dimension helps to reinforce the achievement of all SDGs.

4.3 Water Quality

Good water quality satisfies the need of society for clean water for drinking, cooking, hygienic uses and industrial uses and also contributes to ecosystem services. Water is explicitly included in SDG6 (Clean water and Sanitation) as Target 6.3: 'By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater, and substantially increasing recycling and safe reuse globally'(United Nations, 2015).

To ensure clean and safe drinking water to all the residents, Dayalbagh in partnership with Dayalbagh Educational Institute (Deemed to be University), monitors the drinking water in the colony and treats the wells as required to maintain the water quality[18]. Chemical parameters (dissolved oxygen, chloride, hardness, total dissolved solids) are also monitored fortnightly.

Table 5: Features of Dayalbagh way of Life (Water Quality) and its Relation to SDGs

Efforts towards improving Water Quality at Dayalbagh	**SDGs Impacted**
Access to Clean and Safe Drinking Water for all	SDG3, SDG5, SDG6, SDG10
Monitoring of Water Quality	SDG11, SDG12
Treatment: Sewage treatment plant (STP) Treatment of Water with Potassium Permanganate or Alum	SDG11, SDG12
Conservation: Recharging old dry wells Treated Water from STP used for Agriculture Conservation at Household and Community Level	SDG1, SDG6, SDG12

Source: Authors' compilation based on Radhasoami Satsang Sabha (2019) ,DEI (2022a), DEI (2022b)

Note: For details about each SDG, refer to notes of Table 1

4.3.1 External Dimensions of Sustainability: Water Quality

[18] Detailed water quality reports of Dayalbagh can be found at *https://www.dei.ac.in/dei/edei/index.php/water-quality*

The residents of the colony have access to clean and safe drinking water irrespective of the income, social status or caste. This contributes to SDG6 (Clean Water and Sanitation), SDG 10 (reducing Inequalities) as well as SDG3 (Good Health and Well-being). Regular testing and treatment of water enables the residents of Dayalbagh to consume water from wells without passing it through RO plant thus saving large amounts of water (DEI, 2022) and further contributing to environmental protection. Further, runoff of chemicals and pollutants into groundwater table is avoided to a large extent through organic farming. Dayalbagh has given land at nominal rate for sewage treatment plant (STP) and the treated water is used for irrigation of agricultural fields. The 6Rs of circular economy-reduce, reuse, recycle, reclaim, recover and restore are evident in the water practices of Dayalbagh. These practices together contribute to SDG 6(Clean Water and Sanitation), SDG (Responsible Production and Consumption) and help to make cities and communities more sustainable (SDG11).

4.3.2 Inner Dimensions of Sustainability: Water Quality

Conservation of all resources including water is an important principle followed by the community. The focus on water quality goes much beyond water conservation at Dayalbagh. Community engagement in preserving the water quality through regular monitoring, treatment and communication helps to strengthen the pro-environmental behaviour and reinforces the commitment to sustainable development.

4.4 Air Quality

Air pollution has been associated with increases in mortality and hospital admissions due to respiratory and cardiovascular disease (WHO,2020). It is closely linked to the earth's climate and ecosystems globally. Many of the drivers of air pollution (i.e. combustion of fossil fuels) are also sources of greenhouse gas emissions. Therefore, management of air quality is important for achieving SDGs, especially SDG 3 (Good Health and Well-being) and SDG 13 (Climate Action).

All the activities of Dayalbagh are undertaken keeping in mind the impact on air and water quality. Air quality is regularly monitored at Dayalbagh and appropriate measures are taken to ensure that the $PM_{2.5}$ and PM_{10} are within the permissible limits (DEI, 2022b)[19]. Some of the measures taken include misting (with fine water droplets) to combat suspended pollution, cordoning off the dust-generating agricultural activities by using green canopies and restricted movement of vehicles (petrol and diesel). Residents are encouraged to walk or cycle. Further, the use of renewable energy (solar energy) for electrification of farms, households, community prayer halls and e-vehicles for intra-colony transport has resulted in improved air quality at Dayalbagh compared to surrounding areas in Agra (DEI, 2022b). Development of green areas and biodiversity parks in collaboration with DEI help in carbon sequestration and removal of air pollution.

4.4.1 External Dimensions of Sustainability: Air Quality

[19] Detailed Air Quality reports of Dayalbagh can be found at *https://www.dei.ac.in/dei/edei/index.php/air-quality-in-dayalbagh*

Table 6 gives details of initiatives taken at Dayalbagh to maintain the air quality and the relation to the SDGs.

Table 6: Features of Dayalbagh way of Life (Air Quality) and its Relation to SDGs

Efforts towards improving Air Quality at Dayalbagh	**SDGs Impacted**
Preventing Air Pollution: • Restricted use of private vehicles in the Colony • Electric vehicles for intra-colony travel • Solar thermal cooking in community kitchen • Piped Gas for Cooking in all Households • Cordoning off dust generating activities	SDG7, SDG11, SDG12, SDG13
Monitoring Air Quality • Regular Measurement and Reporting of Air Quality Index	SDG 13
Reducing Pollution : • Misting & Spraying with fine water droplets • Trees and Pollution-absorbing plants planted along roads • Wind Augmentation Air Purifying Unit (WAYU) is deployed at various sites which can reduce pollution by trapping PM2.5 and PM10.	SDG11, SDG13

Source: Authors' compilation based on Radhasoami Satsang Sabha (2019) ,DEI (2022a), DEI (2022b)

Note: For details about each SDG, refer to notes of Table 1

4.4.2 Inner Dimensions of Sustainability: Air Quality

Dayalbagh's efforts towards low or no carbon footprint in transportation and energy use are possible due to the shared core values and beliefs of its residents. Sustainable consumption behaviour depends on two different types of factors- internal and external (Piligrimien et al. , 2020). The communitarian approach to management of air quality at Dayalbagh impacts the individual at the cognitive, affective and conative level. This contributes towards maintaining air quality.

4.5 Innovation

Innovation is tightly coupled to change. In the context of Dayalbagh innovation is not just the technology but also the new or novel methods, and processes of systems employed to achieve the objectives effectively and efficiently. It is a hallmark of Dayalbagh and DEI and is present in each of the other Sigma Six Q,V,A elements- agroecology-cum-precision farming & dairy, education and health facilities, air and water quality measurement. It is an inseparable part of

Dayalbagh way of life (Satsangi, 2014). In particular, a few unique initiatives of Dayalbagh are listed below:

a. ***Advisory Committee on Education (ACE):*** An innovative approach to achieving 'excellence with relevance' in education is the establishment of a non-statutory think tank known as the Advisory Committee on Education consisting of eminent academicians, educationists and alumni. The Committee provides visionary guidance for excellence in education across all Dayalbagh Educational Institutes. The advice given by ACE gets considered by the statutory bodies of the University.

b. Innovative Education Policy: As mentioned in Sec 4.2, the Dayalbagh Educational Institute provides a unique, innovative, comprehensive, flexible and values based education system with the mission objective of evolving a complete person (a well-rounded total quality person). The curriculum and the co-curricular activities at DEI incorporate the four dimensions of total quality management-initiative, innovation, creativity and excellence. The educational system fosters academic excellence along with holistic development of students from 3 weeks onwards (Superman Evolutionary Scheme) and aims to bring about the physical, intellectual, emotional and ethical integration of an individual.

c. Superman Evolutionary Scheme. The Superman Evolutionary Scheme of Dayalbagh is an innovative concept where infants and children (3 weeks to 8 years) participate in congregational prayers, selfless service (*seva*) in fields, and healthcare exercise every day at the agroecological and precision farming sites twice a day, before and after school, along with a parent or care giver. Children are engaged in activities spanning arithmetic, language and computer skills to cultural activities, yoga and self-defence in the lap of nature. High protein nutritional supplements are provided to these children at a low or no cost. The children are encouraged to celebrate their birthdays in the fields by distributing simple sweets to their peers and families rather than engaging in ostentatious celebrations. The impact of Dayalbagh way of life on the participants has been found to lead to an accelerated physical growth of the participating group compared to that of the control group (Bhatnagar and Kumar, 2022). The study also found that the physical parameters and development of intelligence, social and emotional maturity, and intuitive and spiritual faculties of growing infants and children of three weeks to three years of age who participated in the study were better compared to the control group. Generally, much of our relationship with the world around us is a result of culture, socialization, and experiences in nature from an early age, or the lack of these (Kellert, 2002; Clayton and Myers, 2009), the Superman Scheme of Dayalbagh fosters this relationship with nature for a bio-socio-cognitive development from a young age.

d. Decentralised cottage and small-scale industries: Residents of Dayalbagh, followers of the Radhasoami Faith believe in honest livelihood as a precondition to spiritual progress. Radhasoami Satsang Sabha, Dayalbagh established Model Industries in 1917 to provide employment as well as generate income. The model industries focused on

manufacturing good quality products at low prices using local capital, management and labour. The industries were run by technical persons and workers available in the community. Later the Satsangis Central Social Welfare Society (S.C.S.W.S) was set up in 1991 to establish small-scale industries across the country which manufacture good quality items of daily needs at a minimal profit (and hence low prices) while fostering cooperation and a spirit of selfless service amongst the residents. The residents of the colony and the followers of the Radhasoami Faith provide voluntary service (*seva*) in these industries which helps to keep the costs of production low.

e. ***Consciousness Studies:*** Scientific exposition on Dayalbagh's philosophy detailed in the masterly treatise "Discourses on Radhasoami Faith" with Supplement (Radhasoami Satsang Sabha, 2009)[20] highlights that the real progress by the scientific community towards the pursuit of Ultimate Reality (or Truth) which is the common goal of Science and Religion can be achieved with the merger of the two fields. This gives the basis for Consciousness Studies, at Dayalbagh and Dayalbagh Educational Institute. In line with this, as mentioned in Sec 4.2.1, DEI has three major research themes of Consciousness studies, Agriculture and Dairy, and Entrepreneurship. A Centre for Consciousness Studies was established at DEI in 2011 as an interdisciplinary centre involving all departments of the University. The Centre is equipped with state-of-the-art SQUID systems for experimental consciousness studies. Research in Consciousness at the Dayalbagh Educational Institute has established an approach Towards Evolutionary Arts, Science and Engineering (TEASE) of Consciousness and Conscientiousness and emphasizes on integrating inner experience with the epistemology of natural sciences, i.e. scientific methodology. Over the years, it has developed into an "Omni-Quantum Theory For Spiritual Consciousness System Modelling In Cosmology" (Satsangi, 2011, CONCENT 2011) that explains the importance of the inner experience and provides an alternative way to study the macrocosmic phenomena. Dayalbagh Educational Institute was a regular organizer of the East-West forum on consciousness at The Science of Consciousness conference series from 2012 to 2019. Since 2019, Dayalbagh Science of Consciousness has been organised annually by DEI. The DSC series emphasizes aspects of consciousness viewed from a scientific perspective beyond any religious identity or tradition and serves as a platform for interaction of key ideas in the area.

f. Women empowerment: Dayalbagh provides an ecosystem for women empowerment through education, skilling, financial independence and self-defence training of women. Education and skilling of women have been accorded great importance, as mentioned in sec 4.2. Participation by women in all economic activities is encouraged and an active '*Mahila (Women's) Association'* is engaged in manufacturing items of daily necessity including clothes, food, jams, pickles and spices. The Association trains

[20] By Param Guru Maharaj Sahab, the third Revered Leader of the Radhasoami Faith, Dayalbagh with Supplement by the Revered Prof. P. S. Satsangi Sahab, Eighth Revered Leader of the Radhasoami Faith, Dayalbagh.

women in the activities if needed. A children's library and a matrimony service and marriage counselling service is also provided by the Association. Financial independence of women is further enhanced through the 'Dayalbagh Mahila Cooperative bank Limited' which is follows the maxim of being a bank *of women, by the women, for the women.*

Self-defence training by skilled trainers in martial arts, *lathi*, gymnastics and yoga is provided to young girls and women to improve their confidence, build perseverance and improve their physical and mental fitness. Selected women are also trained for the Rapid Action Force (RAF). These training programmes are free and open to women of all ages and are extended to women in tribal and remote areas also. Regular demonstration sessions by these women inspires community participation and support.

g. ***Security:*** Safety of residents of Dayalbagh is ensured through community participation as well as the deployment of new technologies. Adult males up to the age of 70 years, irrespective of caste, creed and income status, render night time security duties in the colony. Technologies such as a central monitoring station supported by optical fibre network for video surveillance, manned by a team of local volunteers and operationalized in collaboration with DEI help to further strengthen the security of the colony as well as the agricultural farms and *Gaushala*. IP-based panic alarms and public address systems ensure quick communication in case of emergency. UID-based system is utilized to ensure secure access to the colony by the pilgrims. A dedicated women's security force, self-defence training for all women and combat training of selected women mentioned above, are other elements of the comprehensive security system of Dayalbagh[21].

h. ***Renewable Energy***: The innovative aspect about the Dayalbagh model is that all its operations-agricultural, education facilities, health facilities, the community kitchen, prayer halls and the video surveillance system are powered by solar energy. Dayalbagh in collaboration with DEI has installed Solar Thermal Cooking systems in the community kitchen. A diesel van has been indigenously converted into a Solar Electric Van for intra-colony travel. In addition, shared Electric rickshaws (e-rickshaws) are used for travel by residents. A community prayer hall is powered by 25.5 kWp Solar Photo Voltaic (SPV) rooftop power plant.

Distributed SPV rooftop power plants have also been installed at DEI Distance Education Centres in the remote villages (Rajaborari and Timarni) of Madhya Pradesh to ensure uninterrupted education via EDUSAT satellite interactive terminals with two-way interaction. Animal waste from *Gaushala* is converted to energy in Dairy. A 150 cubic metre biogas plant connected to a 20kVA biogas generator supplies power to the Dairy Campus. As mentioned in sec 4.1.1, a 200 kWp Agrivoltaic Solar farm with

[21] A growing body of evidence suggests that women's participation in security processes can reduce conflict and advance stability (Bigio, J., & Vogelstein, R., 2016).

multiple land use has been developed in DEI as a viable business model to increase the net land yield. A novel topology with hybrid ac-dc grid for integrating diverse renewable sources was developed and utilised to power value chain machinery for smart agriculture. As an outcome of these efforts, the Dayalbagh Town Area was declared as a Green Campus by Ministry of New and Renewable Energy, Government of India.

i. ***Medical Camps***: As mentioned in sec 4.2.2, Saran Ashram Hospital in collaboration with DEI organises regular weekly medical camps for neighbouring villages with free multispeciality medical consultation. An innovative feature of these camps is that apart from providing medical facilities, the camps also serve as a platform for counselling on education, employment and agricultural techniques and vocational training. Various child development services, as well as socio-economic development services, are carried out in these camps for the holistic development of villages and neighbouring communities, especially for those from a deprived or weaker sections of the society. Child Development Services such as '*Hole in the Wall*' help the children learn and develop basic computer skills and language skills. Spoken English and Sanskrit classes help in developing their language skills while sports and physical training and children's recreation facilities encourage children to be physically active and contributes to their psychological and social development. The camps also offer socio-economic development services including education and career counselling of youth on available job opportunities, vocational training and skill development services of youth and women in various vocations like stitching, sewing, textile printing, soft toy making, food processing, etc and community assistance services like offering advice and solutions to problems in agriculture, dairy, water, power, sanitation, etc. Discussions on *Bhagwad Gita* are another unique feature of the camp that inspires the values of humility, cleanliness, tolerance, simplicity and non-violence. This is unique working model of community engagement that creates infinite opportunities through the 3Es i.e. Education, Employability and Entrepreneurship, empowering young women, underprivileged and underserved population.

j. Colonies : The Dayalbagh way of life is not limited to just the township of Dayalbagh, Agra. Radhasoami Satsang Sabha, Dayalbagh has established many colonies across India which replicate the lifestyle and follow the principles.

k. ***Response to Crisis***: COVID-19 pandemic demonstrated another innovative feature of the Dayalbagh Way of Life. While the pandemic halted activity throughout the world, life in Dayalbagh progressed almost unaffected. Community-led participation in sanitisation, strict adherence to masks and shifting all activities to open areas ensured minimal impact of the disease on the community. Those who were impacted were isolated and treated by the Saran Ashram Hospital. The community ensured provision of all goods of daily necessity as well as medical supplies to the affected.

l. ***Earth Resistance*** : Earth leakage resistance is important for several reasons, primarily for electrical safety reasons. In electrical systems, earth leakage occurs when an electrical current leaks from a live conductor to the earth or ground. This can happen due to a fault in the electrical circuit or insulation breakdown. If the earth leakage resistance is too high, it can increase the risk of electrical shock or electrocution in case of a fault. Therefore, having a low earth leakage resistance is essential to protect against electrical hazards. In some countries, electrical regulations specify maximum earth leakage resistance values to ensure electrical safety. In this context, Dayalbagh has established a continuous monitoring scheme for earth leakage resistance to avoid catastrophic events. Moreover, they have been able to maintain earth resistance leakage values way below those specified by National Electrical Code in USA, International Electrotechnical Commission in Europe, Bureau of Indian Standards in India. A novel strategy of water flooding, soil treatment, and thick conductor usage has enabled this achievement. This ensure safety of the habitants of the Dayalbagh colony.

4.5.1 External Dimensions of Sustainability: Innovation

Innovative features of the Dayalbagh Way of Life listed in Table 7 impact the achievement of SDGs. A common thread among all these features is the emphasis on the frugal and innovative use of resources to devise eco-friendly, mobile, smart and resilient solutions.

Table 7: Features of Dayalbagh way of Life (Innovation) and its Relation to SDGs

Innovations at Dayalbagh	**SDGs Impacted**
Advisory Committee on Education	All SDGs
Innovative Education Policy	SDG4, SDG10
Evolutionary Superman Scheme (3weeks to 8 years)	SDG3, SDG4, SDG5, SDG10
Decentralised Cottage Industries	SDG1, SDG8, SDG9, SDG10
Consciousness Studies	SDG16
Renewable Energy	SDG7, SDG13
Security	SDG16
Women Empowerment	SDG5, SDG16
Medical Camps	SDG3, SDG2, SDG10, SDG5
Colonies	SDG12
Response to Crisis	All SDGs
Earth Resistance	SDG3, SDG11

Source: Authors' compilation based on Radhasoami Satsang Sabha (2019)

Note: For details about each SDG, refer to notes of Table 1

4.5.2 Inner Dimensions of Sustainability: Innovation

Innovation in Dayalbagh is centred around the trinity of 'Service to Mankind', 'Brotherhood of Man and Fatherhood' and quest for 'Better Worldliness'. The voluntary service (*seva)* performed by the members of the community reinforces the societal commitment to discipline, ability for hard work, humility, cooperative spirit and dignity of labour and makes them physically fit, mentally agile and spiritually blissful. This inner dimension reinforces the commitment to a economic prosperity, societal equity and environmental protection and helps in achievement of SDGs.

4.6 Human Values

The residents of the colony and the followers of the Faith believe in simple living (minimalism), zero waste and optimal utilization of resources (Radhasoami Satsang Sabha, 2019). The Sixth Revered Leader of the Faith, Param Guru Mehtaji Maharaj stressed on the importance of minimalism and 'waste nothing' and these principles are embodied in the activities and lifestyle of the members (Radhasoami Satsang Sabha, 2019). Voluntary work performed by the members of the community in the kitchen, security, schools, medical institutions and cottage industries in Dayalbagh instils in people the values of duty, humility, equality and equity. The principle of simple living and abstinence from ostentatious expenditures in events like birth, marriage and death further contributes to reduction in inequalities. Dayalbagh thus follows the principle of better worldliness through the Aristotelian '*Golden Mean Path*[22]', neither getting engrossed in materialistic things nor abandoning them completely. It nurtures and fosters a casteless and classless society where equal opportunity is provided to all for the development of their physical, intellectual, and spiritual faculties in a sustainable healthcare habitat.

The Dayalbagh Model emphasizes minimalism and a simple lifestyle. Behaviour of the residents of Dayalbagh at the household level emphasizes optimum usage of resources in an individual's life including the use, purchase and disposal of personal and household products. These behaviours have a significant impact on the environment at an aggregate level, i.e. when people independently do the same things (Stern, 2000). Moreover, property is owned by the Radhasoami Satsang Sabha and not an individual. This leads to a change in the social order in the areas of property and labour relationships into more communal and collaborative orientations. Provision of items of daily necessity through fair price shops and essential support services through the Shiromani Nagar Committee ensures availability of these to all members irrespective of caste, creed or income level.

[22] The golden mean path is the desirable middle between two extremes, one of excess and the other of deficiency. It appeared in Greek thought as early as 5th century BC in one of the Delphic Maxims -"nothing in excess". Aristotle analysed the golden mean in his book 'Nicomachean Ethics Book II: That virtues of character can be described as means'. It was subsequently emphasized in Aristotelian virtue ethics.

The 'spirit of service to mankind' is evident in all institutions of Dayalbagh including agroecological-cum-precision farming, education and healthcare and small-scale industries. Voluntary service in these institutions helps to keep the cost of producing the goods and services low. These goods and services are available to public at large and not just limited to the followers of the Faith. Items of daily necessity that are manufactured in the small-scale units run by the S.C.S.W.S are available for purchase through stores and exhibitions across the country.

4.6.1 External Dimensions of Sustainability: Values

The emphasis on 'zero waste' is evident in all the practices- agroecology-cum-precision Farming, Gaushala, education, healthcare, water and air quality and innovation. The waste generated from farms, campus, colony, dairy, kitchen serves as the biomass used for energy generation. The wood waste, husks and stalk goes to biomass gasifier, and residue fuel i.e. activated charcoal is utilized for water filtration and as pesticide and disinfectant in agriculture farms and slurry for composting. Minimalism, no ostentatious expenditures in celebrations like births and marriages, golden mean path, community kitchen, fair price shops and medical shops help in reducing inequalities (SDG10) while also contributing to SDG1 (No poverty), SDG5 (Gender Equality) and SDG 12 (Responsible Production and Consumption). Table 8 below shows the relationship between SDGs and the values that are an integral part of the Dayalbagh Way of Life.

Table 8: Features of Dayalbagh Way of Life (Values) and its Relationship with SDGs

Features of Dayalbagh Model	**Sustainable Development Goals**
Simple Living (Minimalism, No Ostentatious expenditure)	SDG1, SDG3, SDG12, SDG10
Adherence of Golden Mean Path	SDG12, SDG11, SDG10, SDG1
Zero Waste	SDG11, SDG12
Selfless Service (e.g. fieldwork, community kitchen, medical care.)	SDG1, SDG12, SDG10
Reaching the last, the least, the lowest, and the lost	SDG1, SDG2, SDG3, SDG4
Reducing Inequalities -No ownership of property -Similar Houses -Availability of Essential Goods and Services to all	SDG1, SDG10

Source: Authors' compilation based on Radhasoami Satsang Sabha (2019)

Note: For details about each SDG, refer to notes of Table 1

4.6.2 Inner Dimensions of Sustainability: Human Values

Selfless service (*seva)* performed by the residents of Dayalbagh and the followers of the Faith helps to inculcate the values of duty, equality, responsibility, cooperation and service to mankind which are the pre-condition to reducing inequalities and ensuring responsible production and consumption. Further, the principles of minimalism and zero waste followed by the community differentiates Dayalbagh from the prevalent dominant culture that designates status in terms of material possessions that require the perpetual extraction of precious resources (Foster & York, 2004; Watson & Zakri, 2001).

The model is summarised eloquently in the ambrosial words of Revered Prof. P. S. Satsangi Sahab, the Eighth Revered Leader of the Radhasoami Faith and the Chairman, Advisory Committee on Education, Dayalbagh Educational Institute:

> *"This is the Dayalbagh Way of Life- Sigma Six Q. Sigma means that all these aspects or components have interaction amongst themselves and the cumulative effect of all these is many times more than their individual effect."*

5. CONCLUSIONS

The paper illustrates a holistic approach towards attaining SDGs using a case study of Dayalbagh, headquarters of the Radhasoami Faith, a township located in Agra in the state of Uttar Pradesh, India. The progress towards SDGs is slow and the world is not on track to achieving SDGs (United Nations, 2022). Sustainable development and the United Nations SDGs are difficult to achieve in practice due to the underlying constraints and trade-offs despite the efforts by governments at national and sub-national levels, across the globe. Therefore, a fundamental shift in approach is required by integrating people's consciousness and conscientiousness based on their values, beliefs, attitudes and spiritual consciousness towards the attainment of sustainable development goals. This, we name, the inner dimension of sustainability which together with the external dimension of sustainability, comprising environmental, economic and social aspects, results in holistic sustainability.

The external and inner dimensions of sustainability are inherent in the Dayalbagh Way of Life, thus yielding a unique model that is conducive to the attainment of Sustainable Development Goals. A related question is how a small colony like Dayalbagh can make a difference to the well-being of planet earth since the foundation for the achievement of sustainability at the global level rests at the micro level, with the individual being the catalyst for change. Through a bottom-up approach, the behaviour of the individual via an individual-centric transformation is expected to have a snowballing effect on the community which further impacts the state, national and global levels leading to planetary well-being.

Thus, the community-level model of sustainability of Dayalbagh can initiate a snowball effect up to the global and planetary levels. Its lifestyle, in harmony with nature is based on the Sigma Six Quality, Values and Attributes Model that covers: Agriculture and Dairy, Education and Healthcare, Air Quality, Water Quality, Innovation and Human Values. There is also emphasis

on physical, mental and spiritual development, sustainable healthcare and eco-habitat, women empowerment, rendering selfless service and serving the last, the least, the lowest and the lost The Way of Life is also based on the ideal of Fatherhood of God and Brotherhood of man; the principle of Better Worldliness and the motto of Service to Mankind as well as Work is Worship.

Dayalbagh is an exemplary model of holistic sustainability that attains holistic well-being of people and planet through an eco-system enriched with values and a health-care habitat. It highlights the need, at the national and global levels, to look beyond policy formulation and resource availability for the achievement of SDGs. It illustrates the strategic role of the inner dimension of sustainability towards this end, which is also likely to bolster the impact of the external dimension to yield more lasting solutions. It is a living model that reveals that the inner dimension serves as the foundation for sustainable development and is the key to protecting people and planet and fostering prosperity.

The lifestyle of Dayalbagh also conforms with Hon'ble Prime Minister's concept of "Lifestyle for Environment (LiFE)" that is under discussion as a part of India's G20 Presidency. This entails a change in individual and societal behaviour with respect to sustainable consumption and production. Thus, Dayalbagh is clearly a forerunner in this sphere in the global arena.

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