Education for sustainable development: A conceptual model of sustainable education for India

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Abstract

This paper primarily deals with the UNESCO sustainable development goals (SDG), especially the SDG 4 – 'quality education and lifelong opportunities for all' and its empirical and theoretical background as well. The authors have tried to review the literature on 'education for sustainable development' (ESD) and 'sustainability in education' to assess the definition and best practices of 'Sustainable Education'. By adopting Sterling's 'triple bottom line model' (of Sustainable Development) the authors have tried to develop a conceptual model of sustainable education for Indian school education system. The validity of this model would be tested through a proposed pilot study and ESD approaches.

Keywords: Education for Sustainable Development (ESD); Sustainable Development Goals; UNESCO SDGs for 2030; Sustainable Education, Conceptual Model; Indian School Education Status

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1. Introduction

In 21st century the United Nations'(UN) decade of 'Education for Sustainable Development' (UNDESD) (2005-2014) significantly highlighted the vital role of education that can and must play in the universal journey towards sustainable development across the globe and saving our planet. In September 2015, the UN formally adopted the 17 sustainable development goals (SDGs) as an outcome of a major global consultative process. UNDESD advocates for providing the opportunity to progress towards implementing universal quality education that fosters the knowledge, skills, perspectives, values and actions that lead towards more sustainable future. The 'Sustainable Development Goal 4' (SDG4) recommends for quality education for all which has deep roots in may international declarations, i.e., 'Universal Declaration of Human Rights', 'Convention on Rights of the Child', 'World declaration on Education for All', 'Dakar Framework for Action', 'Millennium Development Goals'; thus considers education as very crucial for the wellbeing of individuals, nations and the world (UNESCO, 2005). Considering education as a key driver for 'Sustainable Development Goals' (ESDG) many international conferences were organized with the aim of bringing together global experience and expertise to highlight and strengthen the role of education in realizing the SDGs; creating an opportunity to build upon the learning from UNDESD and recognizing education as a key enabler.

While realizing the SDGs all across the globe increasingly the emphasis has been shifted from a solely economic perspective to a larger view of development that includes three pillars i.e., environmental, social and economic sustainability (People, Planet, Profit). Moreover, this is also recognized that policy instruments or technological solutions are not going to be enough for achieving SDGs; rather behavioral change and public awareness are very crucial for sustainable development. Therefore, the role of education and its outreach programs such as training and capacity building, communication, creating public awareness, scientific and applied research, sharing and access to information, networking, partnerships etc. become the key strategies for achieving the SDGs. The SDG4 proposes equal and inclusive education for all that is closely linked to the effective implementation of SDG 16 which focuses on the promotion of peaceful and inclusive societies and most relevantly, on building effective and accountable institutions at all levels. SDG 4 advocates to 'ensure inclusive and equitable quality education and promote lifelong learning opportunities for all' ; thus keeps the target that by 2030 all boys and girls to complete free, equitable and quality primary and secondary education leading to relevant and effective learning-outcomes ; also to ensure that all learners acquire the knowledge and skills needed to promote sustainable development through education for sustainable lifestyles, human rights, gender equality, global citizenship and promoting a culture of peace and brotherhood. However, within the educational community the focus has been shifted from access to equitable quality education to lifelong learning, strengthened training and 21st century skills for work and life and improved learning outcomes at all levels of education (Anderson, 2014; UNESCO and UNICEF, 2013). New challenges to learning are emerging and 21st century education must address to these and contribute to greater humanity in a rapidly changing world (UNESCO, 2015). In recent past Redecker et al. (2011) have identified six key challenges such as – 1. multicultural integration, immigration and refugee problems, 2. early school dropout and unemployment, 3. fostering smart economy and innovation, 4. removing the barrier between world of work and education, 5. preparing the skilled manpower for the labor market, 6. permanent re-skilling and updating the competencies of all citizens. Therefore, we have to update our curricula, pedagogy and educational resources to address the

21st century challenges. The key drivers of sustainable education or education for sustainable development would be able to answer three fundamental questions: Q1. How much learning the students are actually experiencing in schools?, Q2. What information and skills shall they need to succeed in the future? Q3. How can those gains be expanded for progressive and sustainable planet? (Scott, 2015). Dellor's (1996) four principles of learning and framework are relevant even today in 21st century for achieving quality and learning outcomes. These four pillars of education are: a. learning to know, b. learning to do, c. learning to be, and d. learning to live together. For achieving sustainable development goals there is a critical need for universal access to quality education and visionary leadership (Cisco system, 2009, p.3). The 'Sustainable development goal on education' for 2030 targets to 'ensure inclusive and equitable quality education and promote lifelong learning opportunities for all', based on four focused areas : 1. expanded access to quality learning for all across the various levels of education, 2. attention to the quality of education including content, relevance and learning outcomes across the disciplines, 3. greater focus on equity for access and resources of education, 4. gender equality across all levels of education with safe and supportive learning environments (Scott,2015).

Sustainable development is a process that meets the needs of the present without compromising the ability of future generations to meet their own needs (Brundtland Commission report on Environment and Development,1987); thus, sustainability is a paradigm for thinking about our future in which environmental, societal and economic considerations are balanced in the pursuit of improved quality of life and development. Till date the concept 'Sustainable Education' has been interchangeably used with 'sustainability education', 'quality education for sustainable development' or 'education for sustainability' as identified by UNESCO's SDG 4 out of 17 SD goals. Over the year's researchers have interpreted this in different ways according to their own justifications and research framework. Very recently (UNESCO, 2018) 'Education for Sustainable Development' (ESD) is placed at the centre of the 2030 'Sustainable Development Agenda' and has been widely acknowledged as a key enabler of all17 SD goals (besides SDG4- Quality Education for all). Sustainable education has been considered as renewable resources to be geared towards the acquisition of key competences of 21st century including sustainable lifestyles, work and habitat (Bronden, 2015). In order to achieve this, we need to have a robust and sustainable education system based on SD policies, practices, curriculum, pedagogy and continuing education for all stakeholders; thus, ESD requires far-reaching changes to the way education functions in modern society. How to structure and implement quality education for sustainable development is a key challenge for every country? additionally how to assess its performance effectiveness and impact on society. As a answer to this query Ofei-Manu and Didham (2014) advocated for a policy framework called 'ESD Learning Performance Framework'(ESD-LPF) that could address these challenges by identifying the key ESD factors i.e., educational contents, learning processes and incorporating into educational development model through an integrated and holistic framework. According to them, even though the core educational principles of quality education are universal, its application must be adapted to different contexts as the measure of educational success depends on variable criteria; at the core of this pursuit the focus should be on strengthening learning performance and providing the learners with competences and capabilities to address the challenges of a sustainable future for all. As per UNESCO SD goals the ESD contents cover diverse disciplines i.e., climate change, energy, poverty reduction, consumption etc covering many interdisciplinary and trans-disciplinary issues; thus, requires a holistic approach to understand the complexity of SD (Venkatraman, 2009,

Vare, Scott, 2007). Literature on ESD also emphasizes to include triple bottom-line dimensions (social, economic and environmental) and to focus on interrelationships and interactions among them over time and space (Summers, 2007, Gough, 2002). Often socio-cultural factors are the cause of environmental problems resulting in conflict of interests in SD goals of these three dimensions (Borg et al., 2014; Tilbury, 2012). Thus, ESD focuses on a pedagogy called 'Pluralism' to acknowledge and develop skills and action competences to deal with these critical issues of sustainable development (Rudsberg and Ohman, 2010). Even today the educational content, curricula and pedagogy for ESD are not well rooted in existing school system in many countries (Madsen, 2013). Santone et al. (2014) have introduced a new paradigm called 'Education for sustainability' (EfS) to educate new prospective teachers through (teaching, learning and developing) collective problem-solving skills to address critical environmental, social, economic issues and transfer these EfS proficiency to K-12 students (through content knowledge, skills, behaviors and dispositions). Australian researchers Reynolds and Cavanagh (2009) introduced educational sustainability in terms of 'sustainability quotients' that can be applied to many forms of sustainability and about the balance between availability of resources and consumption; also discussed about epistemological, methodological and organizational dimensions of 'educational sustainability'. Ofei-Manu and Didham (2014, IGES) have tried to integrate ESD perspectives in 'Quality Education' programme /process through LPF (Learning performance framework) and a holistic approach. There are two pedagogical interpretations of ESD; the ESD as a means to transfer appropriate sets of knowledge, attitudes and values to the learner and the second one is to equip people with the needed capacity to make conscious, pro-sustainability choices in their daily lives, to collectively explore the issues to transform the mind-sets and lifestyles through collective discourse (UNESCO, 2009).

Therefore, the ESD integrated quality education system with measurable learning targets and outcomes to become a cornerstone of the post 2014 'Global Action Programme' on ESD and 2015 SDGs (UNESCO) as a pathway for global education reform and improvement. Many developed countries have even gone beyond that i.e., Japan, South Korea, Australia, Sweden, Ireland etc. However, in Asia-Pacific region, the application of innovative curriculum, content, progressive pedagogy, sustainability – oriented teaching materials, practice standards, monitoring and auditing mechanisms for ESD teachings are very much required (Didham and Ofei-Manu, 2012). Bangladesh has tried to address the question "How can education play a role in promoting sustainable development?" through three methods –

1- Education about sustainable development (SD)
2- Education for SD;
3- Critical education towards SD (Shohel and Howes, 2011).

Madsen (2013) has tried to address the issues of multidimensionality and complexity of ESD and how the teachers would teach such topics through real life examples in school context. The Belgium researchers (Pauw etal. 2015) have advocated for enhancing the students' 'sustainability consciousness' by the school teachers to get the desirable ESD learning outcomes. Branden (2012) has suggested for a whole education system reform through some sustainable strategies for policy makers and insists upon Fullan's (2011) four drivers a) Intrinsic motivation b) Instructional improvements c) Team work d) Allness /100 % result to foster sustainable education at all levels across the dimensions (socio, economic and environmental).

More recently, UNESCO report (2018) advocates for ESD to play an active role (in every country) across the globe to empower all learners to take informed decisions and responsible actions for environmental integrity, economic viability and a just society for present and future generations, while respecting cultural diversity (Leicht et al., 2018). Thus, it calls for a major reform in education systems of all countries to promote holistic and transformational education that would address learning content and outcomes, innovative pedagogy and 'learning by doing' and use a whole-school approach to engage communities in achieving sustainable change. Currently UNESCO is the lead agency as recognized by UN General Assembly Resolution 70/209 in 2015, recommends ESD to be placed at the centre of the 2030 'Sustainable Development Agenda' and to act as key enabler for all the 17 SDGs including SDG 4 – quality education aiming towards how to live and work sustainability. Additionally, the 'Global Action Programme' (GAP) aims to generate and scale up ESD actions at all levels and disciplines / areas of education, training and learning; also, to focus on inter-SDG collaboration for accelerating the reorientation of education towards achieving a sustainable world and resilient planet.

2. Current status of Indian education system

Since Independence, successive Indian governments have addressed number of key challenges in education by introducing new educational policies and schemes as a part of its development agenda i.e., 'Sarva Shiksha Abhiyan', 'Rastriya Madhyamik Shiksha Abhiyan', 'Right to free & compulsory Education Act' etc. However, as per the 'British Council India' report (2014) the current Indian education system (K – 12, school education) is guided by different objectives and goals but primarily based on the policies of yesteryears. Despite the new educational schemes and policies, the mean years of schooling i.e., 5.12 years is well below the other emerging market economies like China (8.17 years) and Brazil (7.54 years) and significantly below the average of other developing countries (7.09 years). Moreover, steep dropout rates after primary and middle school level and decreasing enrolment in higher secondary level are matters of deep concern; additionally, the dropout rates among disadvantaged communities (Scheduled caste and Tribes) are higher than the national average. Besides, these high pupil – teacher ratio (1: 38) in rural areas, lack of professionally trained and motivated teachers, poor quality of teaching and learning resulting in weak learning outcomes are the major challenges faced by Indian school education system today. According to "Annual Status of Education Report (2013)" only 26% grade 5 children could do simple division, 21% could read a simple paragraph; in case of grade 3 students this dropped to only 7% (division) and 19% (Reading). In 2009 only, India participated in PISA (Programme for International Student Assessment) and ranked as 73rd position out of 74 participating nations. There is a huge deficit of trained / qualified teachers (approx. 5 Lacs) in the school sector across the country. There is a huge supply - demand gap between the number of students of school going age and number of students actually going to school (2016). There is prominent quality gap between govt. and private schools; poor quality of teaching and learning in govt. schools are driving away students from govt. to private schools, subsequently increasing the enrollment by 31% in private schools (Annual Status Edn. Report, 2014). In addition to this Govt.'s inefficiency in implementation of 'Right to Education Act', insufficient public spending on school education, poor quality of teaching, out-dated pedagogy, lack of action research on school education, poor

monitoring, evaluation, feedbacks and reforms are the cumulative reasons of unsustainable school education in India (2016).

Very recently in 2016(April) the MHRD, Govt. of India's committee for the "Evolution of New Education Policy" has suggested for many reforms i.e., quality education, equality in access to all educational resources and quality teaching but failed to draw a framework for sustainable school education in India. There is no uniformity in the school curriculum of different boards of education or in teacher preparation programme/s across the country. Even the 'Voluntary National Review Report' of Govt. of India presented in the "High Level Political Forum" on Sustainable Development, New York held in July, 2017, has highlighted only on seven out of UNESCO's 17 sustainable goals(2015) i.e., SD1 (No poverty), SDG2 (Zero Hunger), SDG 3 (Good Health and well-being), SDG 5 (Gender equality), SDG 9 (Industry, innovation, infrastructure), SDG 14 (Life below water), and SDG 17 (Global partnership for sust. Devpt.) ignoring the most vital and core one SDG 4 – "To ensure inclusive and equitable quality education and promote lifelong learning opportunities for all". The present Indian govt. has also introduced various schemes (Yojnas) through planning commission (NITI Ayog) and implemented with great slogans but failed to develop a strong foundation, nor a sustainable framework for international standard public education system in Indian schools ; only inviting the foreign universities to collaborate with Indian universities or opening their offshore branch for internship, academic and research programs would never enrich the foundation of our school education. As a result, mushrooming private schools, International schools with smart classrooms, ICT based content and educational packages are coming up which serve the purpose of some elite and affluent section of population, thus creates a huge gap in the standard of education between govt. and private schools; thus increases the diversity / inequality in education and employment sector. If it continues like that it would create havoc in the business and Indian job market in near future. Moreover, there is no awareness, nor education for sustainable consumption, lifestyle and habitat for sustainable growth and security of our future generations.

These above-mentioned facts and thoughts have prompted the present authors to make an effort in drawing / designing a base-line conceptual model for school education at the primary level / grass root level in India. After receiving the feedbacks from different intellectual forums and action research it can be modified and tried out at policy implementation level.

3. Sustainable education for India

Way back in 2001, Sterling defined 'sustainable education' as a "change of educational culture that develops and embodies the theory and practice of sustainability"; thus it is a transformative paradigm which values, sustains and realizes human potentials in order to attain sustainable economic, social and environmental goals. Therefore, sustainable education logically necessitates a deep learning response in educational policy, thinking, content and practice. In Indian context few research work and practices are going on in the areas of sustainable environment, sustainable energy etc. but we need a paradigm shift to create an education culture and ecosystem that implies systematic change in education policy and system, in the thinking and practice of every stakeholder linked to Indian education system. Hence, we have to draw a systematic plan / blue print out of this existing complex and diversified education system and drive it with a holistic vision. As "triple bottom-

line" framework is widely adopted model in other domains of sustainable development goals, the present authors assume that the 'people – planet - profit' (socio – economic - environmental) framework would be appropriate to accommodate the complexities and diversities of Indian education system. Thus, the "Sustainable Education" based on this framework would imply the basic components i.e., educational policy and practices to be sustaining and quality oriented, would enhance the competencies and motivations of teachers, teacher educators, students, administrators and other stakeholders in the community and enrich the socio-environmental ecosystem of the educational institutions to deliver the desirable goals and sustainable outcomes as well. UNESCO Report (2002) has very strictly pointed out/ advocated that just as we have learnt to live unsustainably, we now need to learn how to live sustainably. Such learning requires us to unlearn certain things, to relearn and take responsibility of our educational systems, institutions and educators to develop competencies in order to address the 21st century's challenges and resolve with sustainability. Moreover, in the context of UNESCO (2015) sustainable goals, when we are mapping the existing Indian educational policies and status, we could find a number of critical issues, contextual challenges, and loopholes. In the research literature on Indian School education we could find plenty of action research and empirical work on economy, social development, agriculture environment, entrepreneurship and so on, but rarely on sustainable education policy reform. Lot of work has been done in the area of comparative education in comparing the education system of different countries, but here our focus is to design a sustainable education model at the grass-root level keeping in mind the diversities, complexities and constraints in India.

4. The conceptual model of sustainable education

According to this model the vital components i.e., the three drivers – Driver1-profit, Driver 2 – people, Driver 3 – planet would be like- the 1st component Driver – 1 is the 'Ministry of Human Resource Development' (MHRD) of Govt. of India as the major policy maker, decision taking body and economic resource provider for running a centralized board of education in the country; hence called the 'Profit'. The 2nd Driver is 'people' engaged in the education sector, the human resources (all direct and indirect stakeholders) of our school education system (primary or secondary level of school education); the 3rd Driver is 'planet' the education set up, school environment or can be called the "educational eco-system" to carry on all the teaching – learning activities and educational administrations / transactions. All these three drivers (profit, people and planet) are expected to work together harmoniously to make the education system a sustainable one.

Thus, the objective of Driver 1 (profit) would be – "Ensuring learning outcomes through effective curriculum, pedagogy, assessment and technology".

The objective/ focus of Driver 2 – (people) would be – "Enhancing educational human resource competences through training and practices".

The objective/ focus of Driver 3 – (planet) would be – "Strengthening the educational eco-system through good infrastructure and technology access".
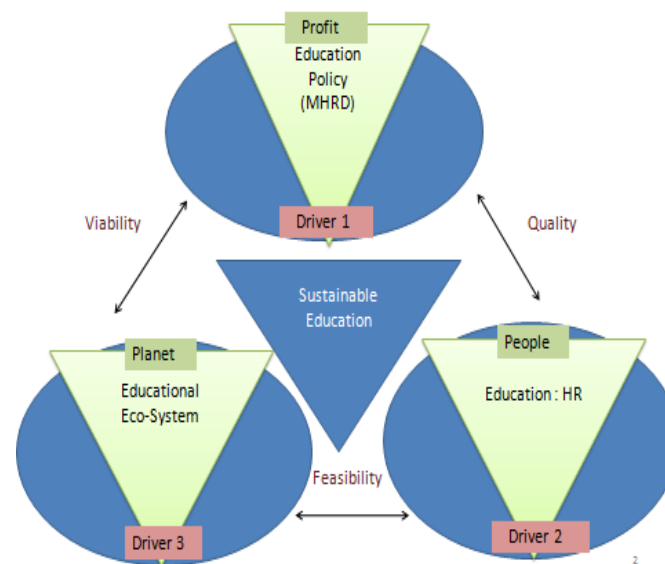
Figure 1. Conceptual Model of Sustainable Education

Therefore, the vital components under each driver would be –

1- Driver 1 – (Profit - MHRD)- Education policy framework, Finance, Learning resources, Technology access

2- Driver 2 – (People - HR) – Teacher education both pre-service and in-service professional developments, Training for different competency development, Leadership training programs, Learners' engagement, academic staff developments.

3- Driver 3 – (Planet – Education Environment) – School campus, infrastructure, socio-economic resources, community awareness and participation in school activities, school administration and leadership, Teacher- student relationship, management of resources, Networking with other agencies etc.

Besides these the inter-driver interactions are also important to achieve sustainability in each domain; for example, the interactions of driver 1 (profit) and driver 2 (people) should ensure quality education in terms of content, pedagogy and learning outcomes. The interactions between driver 2 (people) and driver 3 (planet) should also enhance the feasibility of skilled manpower, competent teachers, effective leaders, engaged and motivated learners and empowered stakeholders through continuous learning and competency development programs in order to make the educational programs more effective and sustainable. Similarly the interactions between driver 3 (planet) and driver 1 (profit) should be viable to run the school administration and management successfully and leading the whole community / neighborhood / village towards sustainable development (including sustainability awareness, lifestyles, growth and consumption). In order to make it more comprehensive we have identified the specific issues for each driver (given below).
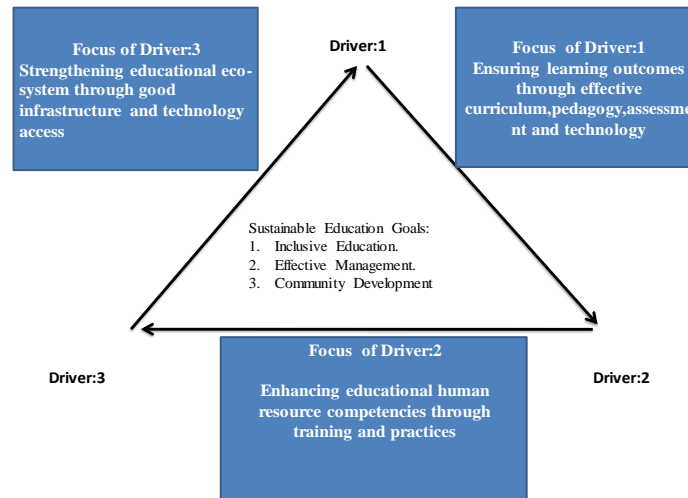
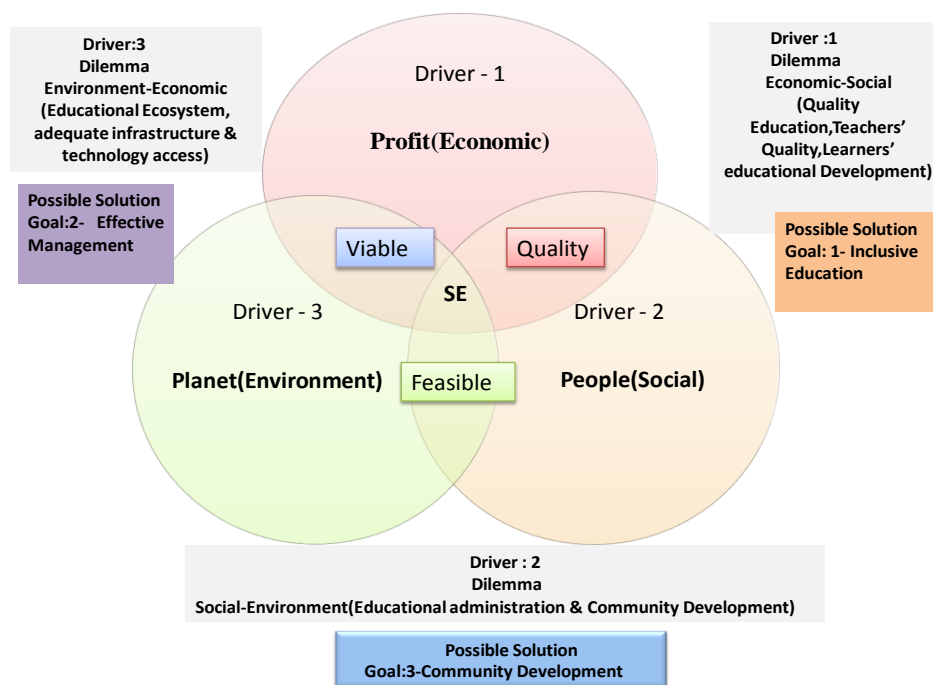**Figure 2.** A conceptual sustainable education triangle

Figure 3. A conceptual dilemma model of sustainable education in school

1- Issues of Driver 1 – (profit - MHRD)

1.1. School level content, curriculum and pedagogy matches the learners needs;

1.2. Assessments should accurately measure the learning outcome;

1.3. Technology (ICT) access and use should enhance the quality and outreach of school education across the country.

2- Issues of Driver 2 – (people - HR)

1.4.   Teacher education system should be robust to ensure teacher's quality and aptitude for good teaching;

1.5.   The school should actively engage learners and develop their physical and mental abilities.

1.6.   The leadership / managerial competencies of school administrators should be enhanced through continuous training, leadership workshops, professional networks, action research projects, virtual learning groups etc;

1.7.   Stakeholders' community should be empowered to actively participate in school activities.

3- Issues of Driver 3 – (planet- Education Ecosystem)

1.8.   The school location and communication facilities should be within the reach of every child;

1.9.   The school infrastructure must be up-to-date to adapt technology for effective teaching-learning process;

1.10.   The learning materials i.e., books, copies, school bags, uniform etc. must be available to all children.

However, as a result of these multiple interactions some dilemmas or inter-driver conflicts may arise which have to be resolved through possible / sustainable solutions. These sustainable solutions could be our ultimate goals of sustainable education at school (primary) level.

Thus, the dilemma between Driver 1 and 2 (profit and people) could be related to quality education at school level, teacher's quality in terms of their teaching aptitude motivation and competencies and learner's proper educational development. In this context the possible solution would be sustainable goal 1 - 'Inclusive education' as mentioned in SDG – 4. Likewise, the dilemma between Driver 2 and 3 (people and planet) might be related to school administration, management and community relationship / engagements. The possible solution would be sustainable goal 2 – "Sustainable community development". The dilemma between Drive 3 and 1 (planet and profit) might create some conflict regarding infrastructure, technology access and maintaining a conducive educational ecosystem / environment; the possible solution for this would be sustainable goal 3 – 'Effective (school) management'. As we can see in Fig.2 these three solutions are the sustainable education goals for primary level school education that we assume would emerge after the adaptation of this conceptual model. However, at this point of time we are not very much sure about its outcomes as any other complex issue or dilemma may arise due to socio-cultural, contextual or economic factors. For that matter it becomes necessary to conduct a pilot study taking a small village or 'panchayat' in any Indian State. Thus, the objectives of the pilot study would be –

1- To examine the efficacy of this model in achieving the sustainable education goals in an Indian village i.e., to ensure

   a) Inclusive education

   b) Effective school (primary) management

   c) Community (village) development

2- To identify other cofactors (contextual, socio-cultural, economical etc.) if any, and to address these issues to further strengthen this model for future implementations.

For this purpose initially a "Village Education Committee" would be formed (after selecting the village) that would be comprised of key members of the community; the committee would be responsible for developing

the functional networks, assessing the stakeholder's needs, mobilize the resources, motivating and engaging all stakeholders (students, teachers, parents, youths,) etc.. It would be a continuous process, approximately would take 10 – 12 months to assess its outcomes and to examine how far it is feasible to attain these three sustainable goals.

5. Conclusion

From the above discussion we can conclude that if we want to achieve sustainable development goals, especially SDG 4 we have to adopt ESD as a process and mechanism for making our education system (school level) robust, progressive and sustainable. An education system or a school organization that promotes the awareness of the complexities, diversities and uncertainties of the surrounding world and promote changes through ESD strategies can be considered as reflexive in relation to social learning and new social movements (Lotz-Sisitka et al., 2015). In order to bring reform in our education system we have to improve the basic unit of a school as an organization that encompass the human efforts and material equipment which could collectively improve student's learning, teachers' performance and school culture (Kelley and Dikkers, 2016). The recent ESD literature on SDGs for 2030 advocates for "Whole School Approach" to bring sustainable change in the schools' vision, routines and structures, professional knowledge creation and pedagogical practices. In the proposed pilot study, the present authors also wish to adopt the Scherp's ESD model (2013a) to examine its impact in Indian context. The primary purpose of adopting ESD is to build up a school culture that would improve learning and help students to become responsible individuals by fostering sustainability for the sake of conservation of natural resources and promote equality, sustainable consumption, life-style and practices to protect our environment and make our world a place of sustainable habitat.

6. Educational implications

Through this model many of the UNESCO's other sustainable development goals can be achieved for India, such as-

1. Maximizing health and wellbeing through primary education:
   a. Common pathways for education to impact health and sustainable habitation;
   b. Educational interventions for improving health awareness and service delivery like training workshops, building research teams and self-help groups, health counselling service, partnership with NGOs for school programme/s on water, sanitation, hygiene, curricular and pedagogical reform for total health education for all.
2. Gender equity and empowerment;
3. Equal opportunity to all;
4. Educational process (Environment education and intervention) and mechanisms (Disaster management cell) to reduce vulnerability and enhance sustainable consumption /lifestyle/habitat etc.

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