

The Birth of Sustainable Development

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Abstract: - Environmental disasters, economical crises and social challenges urged the mankind to go back to the drawing table and think fundamentally. That led to the birth of a new term named sustainable development coined by the former Norwegian prime minister namely Gr Brundtland. Despite numerous research and studies on different aspect of sustainable development, very few studies have covered the history of this concept. “The birth of sustainable development” intends to throw insight on the emergence of this term through a historical research methodology. The paper highlighted the nomad beliefs, various religions, notions, declarations and international land mark sustainable development events. The results expose that the sustainable development concept has been coined 25 years ago; nevertheless, it has been practiced for thousands of years and even by primitive people. The historical review also indicates that despite all of the efforts of international community, the current situation of the world in term of sustainable development is not satisfactory.

Keywords—history, pre Stockholm, Theory of Limit, sustainable development

I. INTRODUCTION

Extreme capability of humankind to change has caused numerous ecological, economic, and social systemic perplexities [1]. One of these changes is environmental degradation, which is the major driving force behind social transformation [1] (see Fig 1). Social change, in terms of population growth and changing consumption pattern, have amplified the degradation and depletion of resources, society problems, and economical challenges [2]. Throughout the history, two groups of people are constantly in conflict with the allocation of resources. On one side, there are the technocrats, economists, and optimists who champion the need for development. On the other side, there are environmentalists, who stress on conservation of environment [2].

The latter put paramount importance on the environmental constrains to guide development whilst drastically argue against the idea of first group, which imparts the possibility of overcoming resource depletion by imposing suitable policy and technology [2]. Finally, the world reaches to this scientific consensus that the damage of human kind over resources and ecological effects could lead to unacceptable resource depletion and a bridge should be established between environmental concerns, social and economical development (ibid).

These challenges have led to the evolution of a new concept that is called Sustainable Development (SD). This new concept is a vague concept that is being interpreted differently in different places [2].

This word has different meanings based on different people’s mindsets, in which individuals may conceive it based on their knowledge, background, experience, perception, values and context [2] This concept is elaborated in various definitions that sometimes skew towards institutional preferences (ibid).



Figure 1 Environmental degradation threatens human and animal in Kenya (Oxfam international, UNDP)

The concept of Sustainable Development embeds social, economic, and environmental subjects [2] (see Fig 1). This topic is defined as a kind of development, which meets the needs of the present without making limitations for future generations’ needs [2].

This definition emphasizes on two key words namely “needs,” and “limitations.” It delineates the eradication of poverty, employing environmental improvements, and social equitability through sustainable economic growth. However, some scholars just focused in one aspect of sustainable development such as the use of renewable energy such as wind

energy and considered it as the main pillar of sustainable development [3] (see Fig 2).

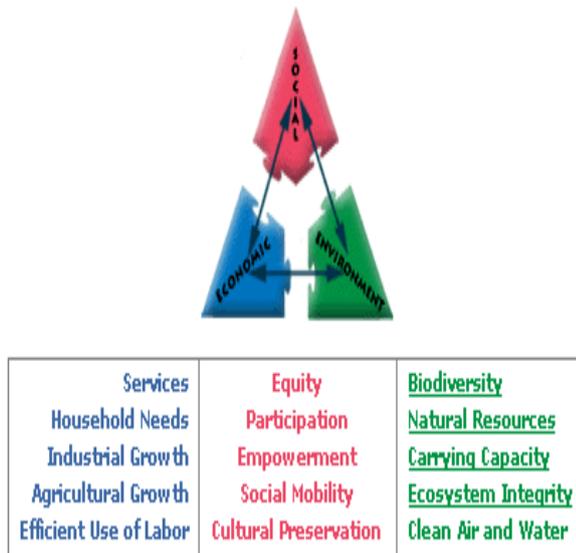


Figure 2 Components of Sustainable Development (Source: World Bank) [5]

Some others concentrated on poverty, inequality, gender equality, and unemployment rate, welfare of children, life expectancy, etc in social aspect of this concept (see Fig 3 and 4) [2]. While gross domestic product, balance of trade in goods and services, intensity of material use, consumption of energy are regarded as the main components of economic aspect of sustainable development [1] (see Fig 5).

In order to understand a phenomenon, it is recommended to study its history and investigate theories that have emerged in its process [4].

The emergence of the Sustainable Development concept goes back to old human religious beliefs whereby conservation of resources, and strives for social and economic equity are demonstrated as the duties of faithful people [6].

Historians and Sustainable Development scholars such as Mebratu (1998) have described the history of Sustainable Development in three following eras namely [7]:

1. Pre-Stockholm,
2. From Stockholm to World Commission on Environment and Development (WCED),
3. From 1987 to 2010 or Post-WCED. In this paper the authors will illustrate briefly the above three eras.

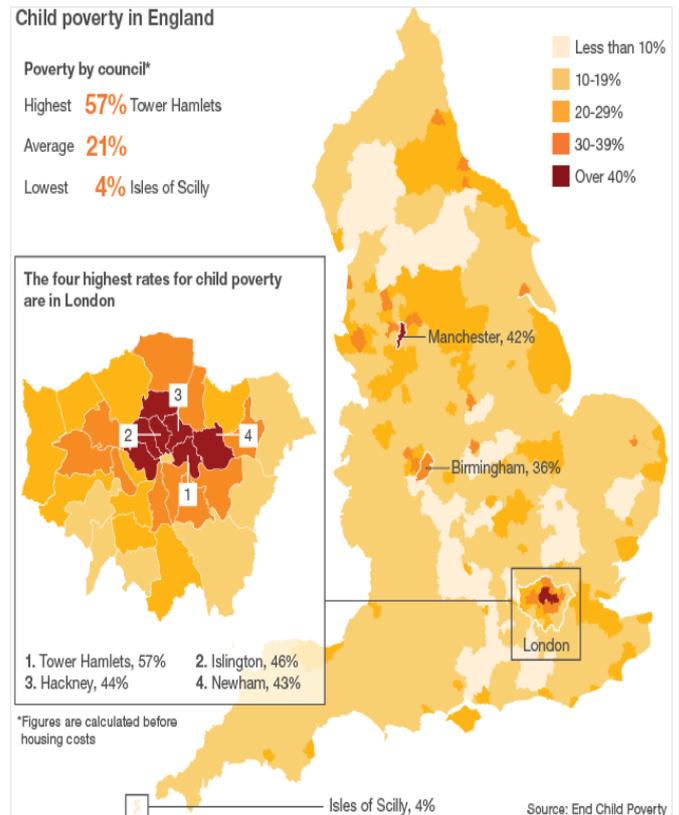


Figure 3 Map of child poverty in England [5]

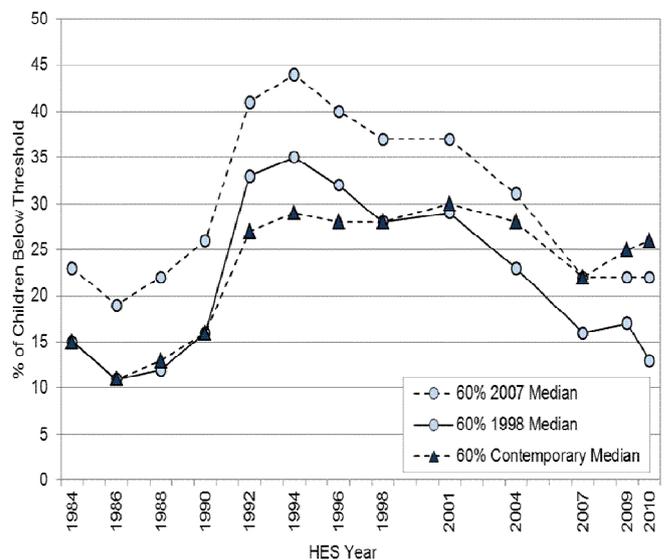


Figure 4: Proportion of Dependent Children Aged 0–17 Years Living Below the Income, Poverty Threshold Before Housing Costs, New Zealand 1984–2010 HES Years (Source: Perry 2011) [7]

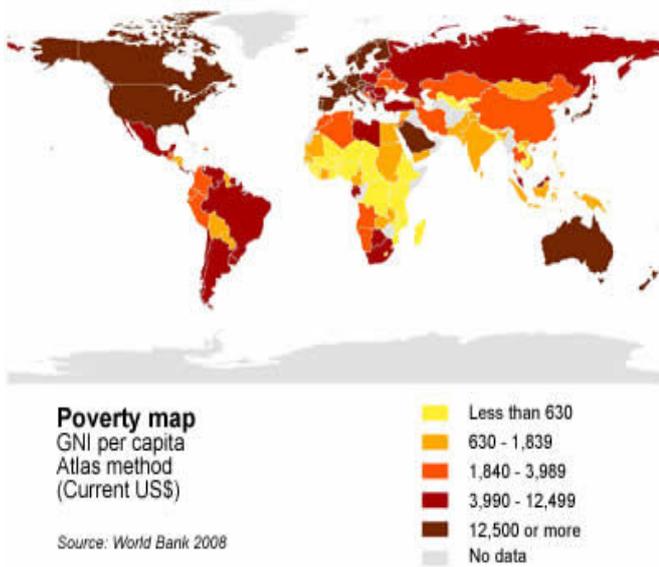


Fig 5 Economic poverty of the world [7]

The growing rate of emphasise on sustainable development concept appeared by numerous articles containing the word of sustainable development. Its peak reached to maximum in 2008 (see Fig 6)

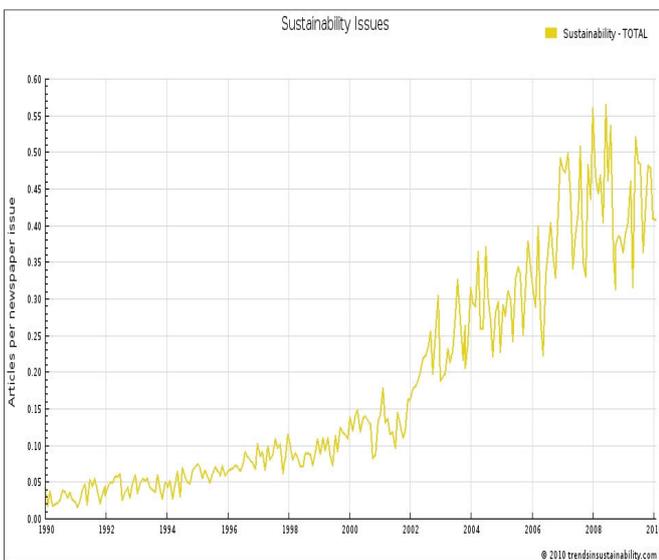


Figure 6: Sustainability issues in news paper [8]

II. PRE-STOCKHOLM

Pre-Stockholm era (1972-1987) is also, referred to before 1972. Religious and traditional aspects, Theory of Limits, Over-Organized Systems Theory are the key concepts, which are cited by historians.

A. Religious and Traditional Aspects

The history of Sustainable Development embeds deeply in religious beliefs and orders where, humankind were taught to conserve air, land, water, and other living beings as well as strive for just adequate economic needs of the life and good social interactions [8].

For instance, Judeo-Christian explanation about “man’s right to master the Earth” is an old religious document in the western societies, which deals with Sustainable Development and beliefs of people [7].

Islam, on the other hand, has strongly emphasized on usage of resources in a sustainable style such as the messages in verse 32 of Aalaraf, and verse 87 of Almaedah in holy Quran. Several environmentalists who had the religious background have emphasized on the sustainable-minded passages in classic Judaism and Christianity books [9]. Some historians believe that the essence of Sustainable Development in community life even goes earlier than any religious evolution [10]. For instance, Hawaiian nomad tribal community thought that humans and nature are integrated where the entire world is as alive as human beings are [11].

In the African nomad tribe’s beliefs, the globe is a cycle where the events come and go in the form of minor and major rhythms [12]. The former is found in humankind, animals, and plants, in their birth, and death and the latter is the events of nature, which come and go and are interrelated to each other .

In primitive communities, circles are used as a symbol of Sustainable Development and eternity in which human is not the master of the world but human is the centre of a harmony of the universe surrounded by nature (see Fig7)[12]. All indigenous people, in different time era, believed in the requirement of communication with nature (ibid). Indigenous tenet of social life being in harmony with nature is one of the main pillars of the concept of Sustainable Development [12]. The interesting subject is that all those religions and beliefs were the result of many years experience, in which nature taught humankind’s life is meaningless without sustainability.



Figure 7 Tribal People in Malaysia known as Orang Asli respect nature

B. Theory of Limits and Sustainable Development

Thomas Robert Malthus (1766–1834) was a famous economist who predicted constraints of development as the result of resource limitations [13]. According to Malthus's theory, known as Environmental Limits Thinking agricultural lands are limited in the earth; therefore, once the population grows, the per-capita food supply would be reduced [13]. This population growth and the lack of food supply would result in standard of living diminution to a subsistence level (See Fig 9). Many believe that the Malthusian theory of “environmental limits” is a precursor to the concept of Sustainable Development [7 and 8].

C. Over-organized Systems Theory

A popular book namely, “Small Is Beautiful,” written by Schumacher in 1979 has captured the attention of many scientists for its compelling themes [14]. The book themes orbit over the theory that over organized systems is a destructive phenomenon in the human spirit and planet. This phenomenon leads to the fast depletion of natural resources, neglecting the human scale, as well as, neglecting bringing environmental and social factors into the policy-making procedures [15]. It is necessary for human to be close to nature [15]. This idea leads to another concept namely appropriate technology that includes the peoples' skills, population, social needs, and natural resources [15].



Figure 8: Existing poverty in the world proves the theory of Limit (Indonesia, 2009)

This “appropriate technology” established the main construct of Sustainable Development [11]. This theory has been regarded as the main foundation of creation of Sustainable Development since 1980.

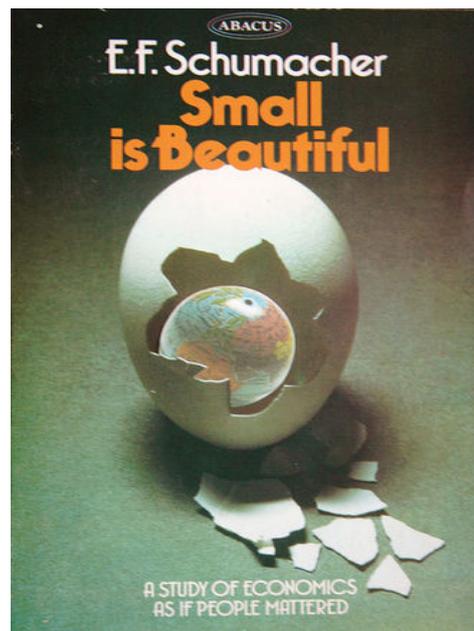


Figure 9: Small Is Beautiful is a best seller book

III. FROM STOCKHOLM TO WCED (1972–1987)

A fundamental pace in the emergence of the concept of Sustainable Development occurs in 1972 at UN Conference on Human Environment in Stockholm. In this conference, the importance of environmental management and the use of environmental assessment as a management tool are debated [16]. In the conference, it is concluded that the form of economic development should be changed due to the environmental concerns [17]. Meanwhile, the new phrases such as environment and development, development without destruction, and environmentally sound development crops up. This leads to the recognition of the concept that environmental issues and development issues should be considered simultaneously and result in evolution of new terminology in the UN Environment Programme review in 1978 namely “eco-development” [7].

A. Club of Rome

Concurrent with Stockholm Declaration a group of scholars based in Rome start research on increasing environmental crisis [18]. This group, who was called the Club of Rome, provides a report on disastrous natural environmental crises Known as Limits to Growth. This report highlights the vulnerability of natural resources against the industrial development and economic growth [14].

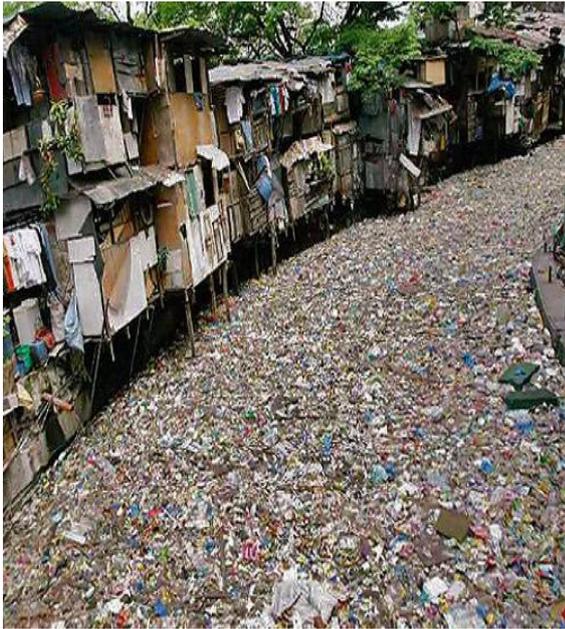


Figure 10 Environmental disasters are alarming in the Millennium, (Indonesia, 2011)

IV. POST WCED-(1987–2010)

The Brundtland Commission, through Our Common Future report (1987), presents the most influential global terminology for environmental debates [19]. It is interpreted differently since it is an open and vague terminology. This openness in terminology leads to skewing of this term to organizational policy. Therefore, other scientific gatherings take place for redressing this issue [20].



Figure 11 Gro Brundtland the former prime minister of Norway and mother of Sustainable Development

A. Kyoto Protocol and Rio

Kyoto protocol is an international agreement concerning climate change. In that, industrialized countries and the European community commit to reducing greenhouse-gas emissions [21]. This Kyoto Protocol leads to another agreement in 1992 at Rio Brazil known as Rio Declaration or Earth summit.

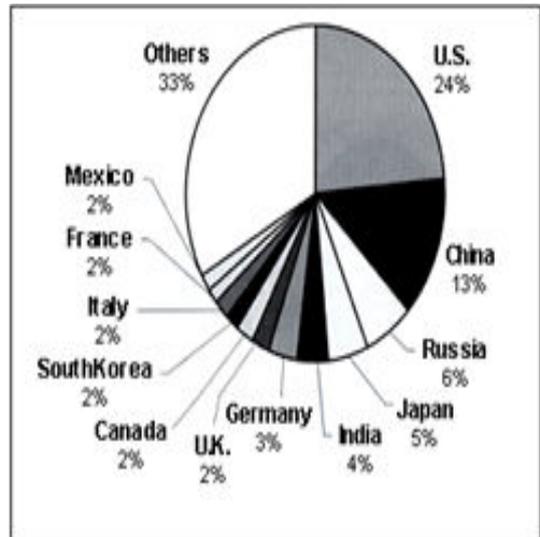


Figure 12: Intended CO2 emission for the year 2000 after Kyoto Protocol

B. Rio+5

Five years after Rio Declaration in 1997, the General Assembly of the UN decides to assess the past five years progress on Agenda 21 (Rio +5). The Assembly realizes that the progress is unsatisfactory, there are so many threats such as inequalities of income, and deterioration of the global environment that needs to be addressed more seriously [18].

C Johannesburg Summit (Rio+10)

In 2002, another gathering on Sustainable Development is held in Johannesburg, the capital city of South Africa. This gathering was linked to the UN agencies in an attempt to assess the progress since Rio Declaration [19]. The Johannesburg Summit provides three key points, which are:

1. Political declaration;
2. Plan of Implementation;
3. Range of partnership initiatives on sustainable consumption and production, water, sanitation, and energy.

The Johannesburg summit calls for a global effort to enable transition to low carbon economies, and enhance adaptive capacities of vulnerable communities through sustainable financing mechanisms and technological resources.

D. Bali Road Map 2007

In 2007, United Nations Climate Change Conference in Bali Indonesia is held which leads to adaptation of the Bali Road Map. Improving access to sustainable financial resources for developing countries and adaptation of actions based on sustainability policies are among the key agendas of this Road Map [20].

E. The 2009 Copenhagen Summit

The 2009 United Nations Climate Change Conference is held in Denmark focussing on Climate Change, Global Risks, Challenges, and Decisions: which is the newest landmark of international gatherings in this field [21]. The conference is reported to have reached a meaningful agreement between the United States, China, India, South Africa, and Brazil. However, there is a contradiction on the usage of "meaningful" word which is viewed as a being political spin [21]. In this conference, some sustainable terminologies such as sustainable mobility and sustainable citizenship are highlighted [25].

F. Earth Summit 2012 (Rio+20)

This conference is the latest gathering of different sustainability stake holders which is going to take place in Jun 2012. Since this conference is a follow-up conference on the previous sustainability gatherings and is 20 years after Rio protocol, it is also called Rio+20 [26]. Rio+20 conference is hosted by Brazil and takes place in the same city that 20-year ago the historic 1992 United Nations Conference on Environment and Development (UNCED) had taken place. The organizer of this event is the United Nations Department of Economic and Social Affairs [26]. This conference aims three objectives.

Those are: 1- to secure renewed political commitment to the concept of sustainable development, 2-to assess the progress and implementation gaps in meeting previous compromised commitments, and 3-To address emerging challenges [22-27].

In this summit the history of sustainable development was mapped (see Fig 13, 14 and 15)

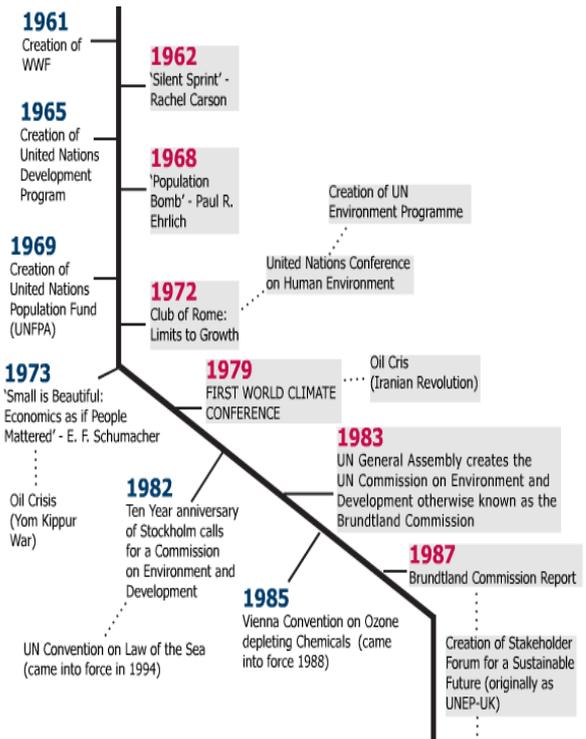


Figure 13 the historical map of sustainable development (1961-1987) [28]

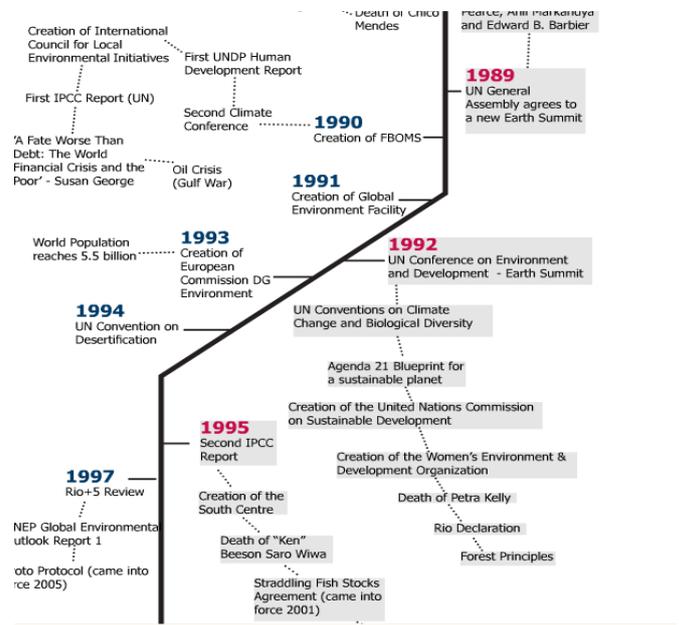


Figure 14 the historical map of sustainable development (1988-1997) [28]

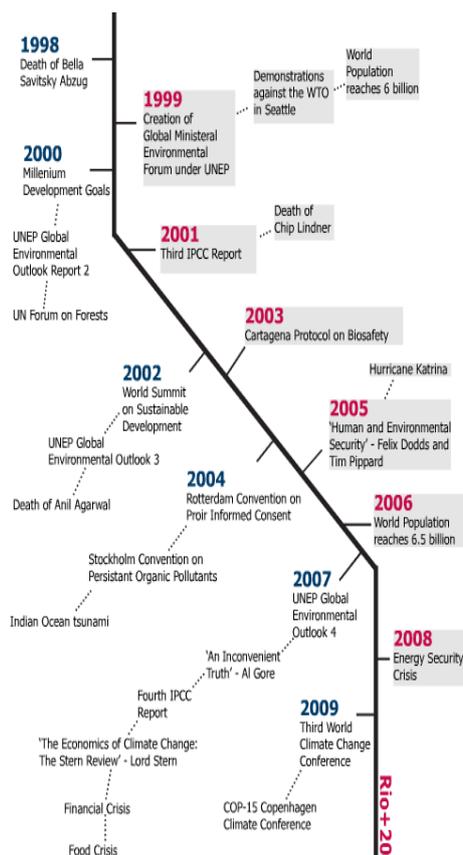


Figure 15 the historical map of sustainable development (1998-2012) [28]

V. CONCLUSION

Although the emergence of sustainable development as a new terminology dates back to Brundtland commission in 1987, the same concept has been in practice for thousands of years. Respecting to natural resources and environment stems from nomad beliefs and has been recommended through the orders of different religions. What is very important in the realm of sustainable development is how to measure the situations. For that, we need indicators which are instruments used to monitor the operations or conditions of a phenomenon. Indicators of sustainability are the tools, which assist organizations and institutions track progress towards or away from Sustainable Development. The good indicators are indicators, which are simple, understandable to policy makers and public, widely credible, scientifically valid, transparent to non expert, independent, and quantifiable. It is notable that various systems need various indicators and as far as each country and even each organization has its own uniqueness and it is necessary to develop its own indicators. Good indicators have been told to take into consideration the necessary components but to be precise and they should be empirical to be measured easily. Indicators of Sustainability are regarded as the most important elements of an audit which should provide reliable, relevant information.

Moreover, existing of the numerous international events such as conferences, symposiums and international gatherings indicates that the world has not yet reached to the satisfactory level of practicing sustainability. However, a group of people, leading UN, still believe in this concept and have not yet given up promoting sustainable development concept.

REFERENCES

- [1] O. Saadatian, C. Haw, S. Mat, K. SOPIAN, M. Dalman, and E. Salleh, " Sustainable Development in Malaysia-Planning and Initiatives," in the 9th WSEAS International Conference on Environment, Ecosystems and Development (EED '11), Montreux Switzerland 2011, pp. 138-143
- [2] O. Saadatian, L. C. Haw, S. B. Mat, and K. Sopian "Perspective of Sustainable Development in Malaysia" International Journal of Energy and Environment, vol. 2, pp. 260-267, 2012.
- [3] C. Lim, O. Saadatian, M. Suleiman, S. Mat, and K. Sopian, "Performance of Wind-Induced Natural Ventilation Tower in Hot and Humid Climatic Conditions " in the 9th WSEAS International Conference on Environment, Ecosystems and Development (EED '11), Montreux Switzerland, 2011, pp. 125-131.
- [4] O. Saadatian, L. C. Haw, S. B. Mat, and K. Sopian "Perspective of Sustainable Development in Malaysia," International Journal of Energy and Environment, vol. 2, no. 6, pp. 260-267, 2012.
- [5] Bhaskar, V., & Glyn, A. (1995). *The North, the South, and the Environment*. London: Earth Scan Publications and United Nations University Press.
- [6] Mill, G. (2005). Progress toward sustainable settlements: a role for urban. *Climate Journal*, 84, pp 69-76.
- [7] Mebratu, D. (1998). Sustainability and sustainable development: Historical and conceptual review. *Environmental Impact Assessment Review*, 18(6), pp 493-520.
- [8] Senddona, C, Howarth, R. B., & Norgaard, R. B. (2006). Sustainable development in a post-Brundtland world. *Ecological Economics*, 57(2).
- [9] Kinsley, D. (1996). Christianity as ecologically responsible. New York: Rutledge
- [10] Pater, C. d., & Dankelman, I. (2009). *Religion and Sustainable Development*. Berlin: LIT Verlag Berlin-Hamburg-Münster
- [11] Christopher, H (2005). *Human Being Human: Culture and the Soul*. London & New York: Routledge.
- [12] Mbiti. (1996). *Introduction to African religion (Vol. 1)*. Oxford: Heinemann Publisher.
- [13] Hodgson, G. M. (2005). *Economics in the Shadows of Darwin and Marx*. Cheltenham: Edward Elgar Publishing.
- [14] Michael, S., & Cummings. (2001). *Beyond political correctness: social transformation in the United States (Vol. 1)*. Boulder and London: Lynne Rienner Publishers.
- [15] Pepper, D., Perkins, J. W., & Young, M. J. (1979). *The roots of modern environmentalism*. Washington: Worcester.
- [16] Momtaz, D. The United Nations and the protection of the environment: from Stockholm to Rio de Janeiro. *Political Geography*, 15(3-4), pp 261-271.
- [17] UN. (1980). Declaration of environmental policies and procedures relating to economic development. *Environmental Policy and Law*, 6(2), pp 104-105.
- [18] Jones, C. B. (1993). From scarcity to sustainability- future studies and the environment: the role of the club of Rome: Peter Moll, Verlag Peter Lang GmbH, Frankfurt am Main, (1991, 328 pages). *Technological Forecasting and Social Change*, 44(1), pp 107-110.
- [19] Dow, K. (1992). Exploring differences in our common future(s): the meaning of vulnerability to global environmental change. *Geo Forum*, 23(3), pp 417-436.
- [20] Norman, E. S., Carr, D., Rob, K., & Nigel, T. (2009). Rio Summit*. In *International Encyclopaedia of Human Geography* (pp. 406-411). Oxford: Elsevier.
- [21] Feroz, E. H., Raab, R. L., Ulleberg, G. T., & Alsharif, K. (2009). Global warming and environmental production efficiency ranking of the Kyoto Protocol nations. *Journal of Environmental Management*, 90(2), pp 1178-1183.
- [22] Parker, P., Letcher, R., Jakeman, A., Beck, M. B., Harris, G., Argent, R. M., et al. (2002). The Potential for Integrated Assessment and Modelling to Solve Environmental Problems: Vision, Capacity, and Direction. In

- Understanding and Solving Environmental Problems in the 21st Century* (pp. 19-39). Amsterdam: Elsevier Science.
- [23] Carr, D. L., & Norman, E. S. (2008). Global civil society? The Johannesburg World Summit on Sustainable Development. *Geo Forum*, 39(1), pp 358-371.
- [24] Miller, F. P., Vendome, A. F., & Mc Brewster, J. (2009). *Bali Road Map: 2007 United Nations Climate Change Conference, Clean Development Mechanism, Kyoto Protocol, Reducing Emissions from Deforestation and Forest Degradation, Residue*. New York: Alpha script Publishing.
- [25] Mint. (2009). Climate conference president resigns, Rasmussen to take over sustainable development.
- [26] UNCSD. (2012). United Nations Conference on Sustainable Development, Rio+20; <http://www.uncsd2012.org/rio20/index.html>
- [27] Saadatian, O., Salleh, E., Osman M., Dola, (2011). K. Significance of Community in Sustainability of Malaysian Higher Educational Institutions. *Pertainka Journal of Social Science and Humanity*. 19 (1): pp 243 - 262
- [28] Earth summit 2012 organization (2012), Sustainable development goal. <http://www.earthsummit2012.org/>

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