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Sustainable development: Issues and challenges in India

Banita Mahanandia

Lecturer in Political Science, Talcher Autonomous College, Talcher, Odisha, India

Abstract

The ubiquitous practice of development as defined in west throughout the world as the ideal model of development based on fossil fuel technology and exploitation of resources has led to the destructive consequences of climate change. Climate change also puts pressure on natural resources that are essential for sustaining human civilization. In the past, resource scarcity was often presented as a critical challenge, but for much of the twentieth century, resource prices actually fell. The combination of rapid economic expansion, continued population growth and a changing climate raises the spectre of resource scarcities. In the medium and long term, it may lead to a strong sustainability challenge. There is significant scope for substitution in many areas, yet certain forms of natural capital including the ecological services they provide cannot be replaced by man-made capital. Their exploitation has thus to be limited so as to preserve the overall capacity of ecosystems to provide those services. Land, water and energy in particular are critical resources for humanity, and their availability and use are tightly interconnected, with multiple feedback channels between them. All of them have strong links to agriculture and food production. Large unmet needs at the global level require and will inevitably lead to a further expansion in their use and exploitation. Combined with the additional impact of climate change, this expansion may very well lead to much tighter supplies, and thus to price volatilities and sustained price increases. If scarcities arise and if limits to substitutability are reached, distributional conflicts will have to be addressed at the national and global levels, as well as with respect to purposes of use.

In this grim scenario of environmental scarcity of resources the increasing demands for renewable resources like food, energy, water and economic growth for meeting the burgeoning demands for jobs by the teeming million youths at the same time to fulfil the international obligations for reducing emission of carbon dioxide have greatly impacted the environment denying the future generations of their inalienable rights to live on this earth with availability of all natural resources. These challenges lying ahead and already faced by the developing and poor countries have added impetus to the debates and imperatives for sustainable development and rethinking the current western pattern of development based on industrialization and exploitation of natural resources to their depletion without taking account of the basic human needs and rights of not only the present generations but also the future generations. An ethical and moral urge is to limit the inordinate consumption and exorbitant life style for sustainable development. The nature is to be treated not with a rapacious attitude to exploit as a mere storehouse of resources for human consumption. It is to be viewed as a coordinated and co-constitutive aspect of what life is. The moral and ethical limitations on human attitude and definition of life will certainly lead to sustainable development ushering in equality, justice and abolition of growing gap between the rich and poor.

Keywords: climate change, development, scarcity of resources, energy, sustainability, ethics of consumption

Introduction

Development has been synonymously used with the term industrialization based on fossil fuel technology as defined, it started in West in 16th century and sprawled and encompassed the entire world. As a part of development, modernization means application of science and technology to the resources of Earth and to all aspects of life in a mechanical way without thinking the disastrous effects of it. This process of western defined development meant the colonization of the nature. After the 2nd world war period this concept of development was adopted by all the non-western countries as a part of westernization and modernization. During these four centuries of development western countries emitted huge amount of carbon dioxide and other greenhouse gases into the atmosphere. By the time developing countries in the Third World started industrialization the western countries have already polluted the atmosphere. The result of this relentless development has been the environmental degradation and climate change with all their devastating consequences. So there is hardly any difference between communism and capitalism so far as the concept of development is defined in this way. It matters a little whether means of production are controlled by the state or by the private individuals. But the fact is that both the rivers Mississippi and Volga are polluted. What is the centre stage concern of human beings, policy makers, scientists, industrialists, leaders and nation of the world are climate change and its devastating implications.

As a consequence of changing climate due to rising levels of carbon dioxide and other heat trapping gases in the atmosphere that have warmed the earth causing wide ranging impacts, including rising sea levels, melting snow and ice, more extreme heat events, fires and drought, and more extreme storms, rainfall and floods, scientists project that these trends will continue and in some cases accelerate, posing significant risks to human health, forest, agriculture, fresh water supplies, coastlines and other natural resources that are vital to state`s economy, environment and quality of life. Because in an eco- system everything is interrelated so change

in environment will bring a change in human life. For example – change in the usual timing of rains or temperatures can affect when plants bloom and set fruits, when insects hatch or when streams are their fullest. This can synchronized pollination of crops, food for migrating birds, spawning of fish, water supplies for drinking and irrigation, forest health and more.

Climate change, also called global warming, refers to the rise in average surface temperatures on Earth. Science maintains that climate change is due to human use of fossil fuels, which releases carbon dioxide and other greenhouse gases into the air. The gases trap heat within the atmosphere, which can have a range of effects on ecosystems. Even other human activities, such as agriculture and deforestation also contribute to the proliferation of greenhouse gases that cause climate change. Even small increase in Earth`s temperature caused by climate change can have severe effects. The Earth's average temperature has gone up 1.4`F over the past century and is expected to rise as much as 11.5`F over the next.

Our understanding of climate change is largely the result of the rigorous study and research undertaken by the Intergovernmental Panel on Climate Change(IPCC), the world`s most authoritative voice on the topic established by the United Nations. It also focuses on other aspects like – the scientific and socio-economic information relevant to climate change, and also looks at the potential impacts of climate change, and options for slowing it down .however, these individuals are generally not climate scientists, and their arguments have been discredited by the scientific community at large. "Warming of the climate system is unequivocal "says the IPCC in its latest report, pointing to the increased global, air and ocean temperatures, widespread melting of snow and ice and rising sea levels. If the introduction of these greenhouse gases continued to soar, global temperatures could rise up by 2.40C to 6.40C by the end of the century, with far-reaching consequences for the climate, warned the IPCC. The report has given fresh impetus to finding solutions to the global warming problem. The summit meeting of the group of Eight Industrialized Countries (G8) to be held in June in Germany is expected to launch new initiatives for collective action by both rich nations and fast growing developing countries to combat climate change.

Climate change and its impact on India

India is the fastest- growing major economy in the world. It is the 4th largest greenhouse gas (GHG) emitter, accounting for 5.8% of global emissions. India`s emission increased by 67.1% between 1990 and 2012, and are projected to grow 85% by 2030. But India`s emission are relatively low compared to those of other major economies. India accounts for only 4% of global cumulative energy-related emissions since 1850, compared to 16% and 15% for the United States and China. India produces about 2 tons of CO2 per capita, versus 20 tons and 8 tons in United States and China respectively. Climate change will make monsoons unpredictable, as a result rain-fed wheat cultivation in South Asia will suffer in a big way and the total cereal production will go down. Industrial development is important for economic growth, employment generation and improvement in the quality of life.

However, industrial activities without proper precautionary measures for environmental protection are known to cause pollution and associated problems. If ecological and environmental criteria are forsaken, "industrialize and perish" will be the nature`s retort. But now there is global consensus about the threat posed by the climate change. It is little surprise that the panel found that owing to human activity, gas emissions, primarily CO_2, raised by 71% between 1970 and 2014. What is of great interest to policymakers is the actionable part of the report, which addresses emissions by sectors such as energy producers, transport, buildings, land use, agriculture and forestry. Much of that challenge lays in implementing carbon capture and storage technologies in the energy supply sector, which in the past three and half decades has been responsible for a 145% increase in gas emissions.

Climate change will make monsoons unpredictable. As a result, rain-fed wheat cultivation in South Asia will suffer in a big way. Total cereal production will go down. The crop yield per hectare will be hit badly, causing food insecurity and loss of livelihood. And this will lead to rising levels of the sea in the coastal areas will damage nursery areas for fisheries, causing coastal erosion and flooding. The Arctic region, Sub-Saharan Africa, small islands and Asian mega deltas, including the Ganga Brahmaputra, will be affected most.

Changes in climate around the globe are expected to trigger a steep fall in the production of cereals, says R K Pachauri, chairman of the IPCC. He estimated that a rise of 0.5 degree Celsius in winter temperatures could cause a 0.45 tons per hectare fall in India`s wheat production. The average per hectare production in India is 2.6 tones. Pachauri said, total agricultural land will shrink and the available land may not remain suitable for present crops for too long. Farmers have to explore options of changing crops suitable to weather. He also pointed out that climatic changes could lead to major food security issues for a country like India.

The report also predicts huge coastal erosion due to a rise in sea levels, resulting from faster melting of glaciers in the Himalayan and Hindukush ranges. It can affect half-a-million people in India because of excessive flooding in coastal areas and also can increase the salinity of ground water in sunderbans and surface water in coastal areas. India need to sustain an 8 to 10 % economic growth rate, over the next 25 years, if it is to eradicate poverty and meet its human development goals, according to a 2006 report on an integrated energy policy prepared by an expert committee of the Planning Commission. Consequently, the country needed at the very least to increase its primary energy supply three or four-fold over the 2013-14 level.

India`s economic growth would "necessarily involve increase in greenhouse gas emissions from the current extremely low levels". Any constraints on such emission by India, whether direct, by way of emission targets, or indirect would reduce growth rates, the report stated. However, the report also added," India should be willing to contain her (greenhouse gas) emissions as long as she is compensated for the additional cost involved." In his Budget speech by Union Finance Minister .Arun Jetly has promised the appointment of an expert committee `to study the impact of climate change on

India and identify the measures that we may have to take in the future`.

Indian Stand

India has been arguing at all climate negotiations that thought it is among the top 10 emitters of carbon dioxide, the per capita emission is still $1/6^{th}$ of the global average. Further it has managed an 8% growth with only a 3.7% growth in energy consumption. Starting from Kyoto Protocol to the Paris talk India has been fighting for historical and differential responsibility to apportion the amount of carbon dioxide on nations on the basis of their past record of emission to the atmosphere as the western countries including US have been solely responsible for four centuries of emissions. It is their responsibility to clean the dirt they have made of the atmosphere. What they are emitting can be said as luxury emissions whereas the emissions by the developing countries like India after 1950`s for survival. Kyoto protocol has given priority to Indian stand but it was later on not ratified. In Paris talk's attention has been given to nationally determine voluntary emissions with inclusion of historical and differential responsibility. But the question is that to what extent developed industrialized countries will abide this commitment to provide funds for curtailing emissions and adapting to the climate change and technologies to mitigate the onslaught of climate change. India may oppose any move to seek its commitment to reduce greenhouse gas emission and will ask the developed world to transfer Intellectual Property Rights with the clean Technologies.

India needs to chart a road map for itself in the light of the report on climate change. Climate change can be mitigated in many ways, such as improving the efficiency of energy intensive devices, vehicles and buildings, all of which involve direct and indirect gas emissions. Developing countries like India must adopt new energy- efficient technologies, fuel-efficient vehicles, hybrid vehicles and affordable and safe public transport need policy support in the form of lower taxes and promotion of usage. The government can mandate that building integrate green technologies such as solar photovoltaic systems, which are particularly relevant in a country with plentiful sunlight. The energy efficiency of end user equipment can be ensured through appropriate tax breaks and certification systems. The improved cooking stoves and high efficiency lighting, heating and cooling devices are available even today.

Climate change and Sustainable Development in India

The problem does not remain confined to the imperatives of reducing emission of carbon dioxide and other greenhouse gases and keeping the temperature of the earth down to the level of 1.5`C at the pre – industrial level and adapting to climate change. What remains significant is how to take measures that will reduce the emission and meet the needs of present generation along with that old future generations and the nature. It involves the great task of redefining western ingrained development with the moral imperatives of controlling one`s want, inordinate consumption and way of life. This complex task of meeting the basic human needs of the present and future generations along with that of the nature and at the same time promoting economic growth and development is what is meant by sustainable development. The climate change talks have given importance to sustainable development as central to keeping the temperature of the earth at 1.5`.

At present time it is the primary concern of all nations of the world. globally every country including most developing countries like India and China think very much about it because they realize that their future generation must be sufferer due to lack of resources which are obviously most central to survive. This phenomenon comes after Second World War. The concept of sustainable development is related not only to further generations but also with the present generation. Sustainable development ensures the well – being of individual by integrating social development, economic development and environmental conservation and protection. Development should be defined in such a way that it does not affect the environment in any way but at the same time it meets the basic human needs of those who are in most need at present without compromising the needs of the future generations including the environment and the imperatives of economic growth to sustain the increasing population of India. It was coined in 1987 by the United Nations appointed World Commission. The climate change issue is part of the larger challenges of sustainable development. As a result, climate policies can be more effective when consistently embedded within broader strategies designed to make national and regional development paths more sustainable. The impact of climate variability and change, climate policy responses, and associated socio-economic development will affect the ability of the countries to achieve sustainable development goals. The pursuit of these goals will in turn affect the opportunities for, and success of, climate policies. In particular the socio-economic and technological characteristics of different development paths will strongly affect emission, the rate and magnitude of climate change, climate change impacts, the capability to adapt, and the capacity to mitigate.

Environment a key component of sustainable development in India

Economic development without environmental consideration can cause serious environmental damage, in turns impairing the quality of life of present and future generations. Such environmental degradation wreaks havoc on the society and life of people and needs to be explicitly factored into economic planning, with necessary remedial measures. The challenge of sustainable development thus requires integration of the country`s quest for economic development with its environmental concerns. The National Environmental Policy 2006 has attempted to mainstream environmental concerns in all our developmental activities. It underlines that ' while conservation of environmental resources is necessary to secure livelihoods and well-being of all, the most secure basis for conservation is to secure that people dependent on particular resources obtain better livelihoods from the fact of conservation, than from degradation of the resources'.

As a country, India has been in the forefront of preserving biodiversity, sustainable management of forests, reducing emissions intensity of the economy and following sustainable

consumption and production patterns. Specifically, India has been following a development path that takes into consideration the needs of the present generation without compromising the ability of future generations to meet their needs. Suitable attention has been given to protecting and conserving critical ecological systems and resources and invaluable natural and man-made heritage, which are essential for life-support, livelihoods, economic growth, and a broad conception of human well-being. Moreover, the effort has been to ensure equitable access to environmental resources and quality for all sections of society, in particular to ensure that poor communities which are most dependent on environmental resources for their livelihoods are assured secure access to these resources. The government of India, through its various policies, has been factoring ecological concerns into the development process so that economic development can be achieved without critically damaging the environment. The strong sustainable development agenda followed by India incorporates rigorous environmental safeguards for infrastructure projects, strengthening of the environmental governance system, revitalizing of regulatory institutions, focusing on river conservation and efforts for improvements in air and water quality, on a continuous basis. Our environmental standards are set through government policies aiming at a development process that is environmentally sustainable and ensures well-being of the people.

The broad objective of our environmental policies and programmes are:

1. Conservation of flora, fauna, forests and wildlife.
2. Prevention and control of pollution.
3. Afforestation and regeneration of degraded areas.
4. Protection of the environment.

India is seriously plagued by a strange phenomenon of coal paradox. India has rich supplies of indigenous coal but unable to develop them efficiently. One big challenge is dearth of sufficient water to keep coal – fired power plants humming. For example, in the coal-belt region of Chhattisgarh many farmers are haunted by the specter of having new plants toil divert precious river water. As reported profusely, local communities in the coal-rich state of Meghalaya complain that rat-hole coal mining has destroyed the environment. A recent government ban on the practice has pitted powerful mine owners and their wage laborers against locals faced with coal-infested rivers and wells. Climate related threats to dams in India's Himalayan states are abound. Many new reports stand as a witness to this fact that June 2013 flood wrecked new and existing hydropower projects in Uttarakhand, with major implications for India's efforts to increase supplies of electricity, efforts meant in part to compensate for energy and water wasting agriculture in Punjab.

These examples highlight the challenges India faces in securing adequate supplies of food and energy in a century of rapid changing environmental and economic conditions. Within each sector- food, water, and energy can be found many more challenges, from insufficient food storage facilities and contaminated drinking water to huge losses in energy transmission and distribution. Just as significant is India's struggle to develop state and national strategies to address these challenges. The various dimensions of India's natural resources conundrum can be broadly grouped into three categories:

Supply remains below the demands

India is not a resource scarce nation. India's reserves of water, fertile land, and indigenous energy are ample. Yet supply cannot keep up with prodigious demand of the ever growing population. In India water is a particular concern. "We are moving from a water-stressed to water-scarce situation," warns Joydeep Gupta even said "we have sufficient water for our current needs, not future needs". Girija Bharat of the Energy and Resources Institute says the gap between water supply and demands is expected to be 50 %by 2030. "We have sufficient water for our current needs, not future needs," says Arunabha Gosh of the council on Energy, Environment and Water.

Weather – related factors are a major long term threat to supply. South Asia is unique because almost all of its freshwater replenishment comes during just four months of the year. South Asia receives only 100 days of annual high intensity rainfall during the monsoon season. Storing water is a major challenge especially because India's rapid urbanization is leading to the neglect and deterioration of aquifers, ponds and wells. "When it comes to water, "Bharat says," there are not adequate storage structures for it."

Insufficiency of energy to meet the spiraling demands

India is not close to supplying enough energy to meet demand. Securing electricity for the 300 million or so people who do not have electricity is not a small task. It can help reduce poverty, strengthen health, allow for more hours to study or work, enhance cooking and food storage facilities and improve agricultural and manufacturing techniques that can in turn drive productivity and wages upward.

Why does this happen?

As per the second National Communication submitted by India to the UNFCCC, it is projected that the annual mean surface air temperature rise by the end of the century ranges from 3.5`C to 4.3`C whereas the sea level along the Indian coast has been rising at the rate of about 1.3mm/year on an average. These climate change projections are likely to impact human health, agriculture, water resources, natural ecosystems and biodiversity.

Wary of the threats imposed by climate change and pressures on natural resources, sustainability and environment are increasingly taking centre stage in the Indian policy domain. India has been part of 94 multilateral environmental agreements. India has also voluntarily agreed to reduce its emission intensity of its GDP by 20-25% over 2005 levels by 2020, and emissions from the agriculture sector would not form part of the assessment of its emissions intensity. Indian economy is already moving along a lower carbon and sustainable path in terms of declining carbon intensity of its GDP which is expected to fall further through lower carbon strategies. It is estimated that India's per capita emission in 2031 will still be lower than the global per capita emission in 2005.

Along with the national efforts in different sectors, India also recognizes that rural areas are equally prone to stress and pressures from natural resource exploitation. In this context, schemes for rural development and livelihood programmed are very relevant. A vast majority of the works under the Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS) are linked to land, soil and water. There are also programmed for non- timber forest produce based livelihood, promotion of organic and low chemical agriculture, and increased soil health and fertility to sustain agriculture – based livelihoods. These scheme help mobilize and develop capacities of community institutions to utilize natural resources in a sustainable manner and their potential can be further developed. Together with efforts to incorporate sustainability in the rural development process, India is increasingly making efforts to integrate the three pillars of sustainable development into its national policy space. Various policy measures are being implemented across the domains of forestry, pollution control, water management, clean energy and marine and coastal environment. Some of these policies are like Joint Forest Management, Green Rating for Integrated Habitat Assessment, Coastal Zone Regulation Zone, eco labeling and energy efficiency labeling, fuel efficiency standards etc. over a period of time, a stable organizational structures has been developed for environment protection. The country has been making fast progress in increasing its renewable energy capacity and has display the fastest expansion rate of investment of any large renewable market in the world in 2011, with a 62 % increase to $12 billion. The Twelfth Five Year Plan with a prominent primacy to sustainability makes provisions and provides for many more opportunities like these.

Despite all these efforts, the reality that confronts us on the environmental front continues to be harsh and complex. Increasing population, urbanization and growing demand for water and land resources have severely impacted the quality and availability of water and soil resources. Rising energy needs is another area of concern. Besides, rapid growth will require corresponding growth in energy supply. Presently a large share of our energy demand is met through coal and oil and this trend will continue, given the unprecedented surge in energy demands of the burgeoning population and resources constraints. Energy issues become more complex with existing energy poverty and rise in energy prices. There is considerable scope for increasing efficiency in the use of energy and water in India together with other development indicators like infant mortality rate, MMR, sanitation facilities and public health services. Economic instruments, regulatory measures and market mechanisms can play an important role in helping to achieve development and growth in a sustainable manner.

The Paris Agreement

The Paris Agreement at the 21st Conference of Parties (COP2) under the United Nations Framework Convention on climate change (UNFCCC) by 195 nations in Paris in December 2015 sets a roadmap for all nations in the world to take actions against climate change in the post 2020 period. This universal agreement will succeed the Kyoto Protocol. The agreement reflects the principles of equity and common but differentiated responsibilities and respective capabilities, in the light of different national circumstances. The Paris agreement aims at keeping the rise in global temperatures well below 2`C. the new agreement seeks to follow a country driven approach with the contribution by each country to the global fight against climate change determined at national level. Intended Nationally Determined Contribution (INDC)s are plans by governments communicated to the UNFCCC regarding the steps they will take to address climate change domestically. As per the COP 19 decision, all Parties were requested to prepare their INDCs and communicate them well in advance of COP 21. Accordingly, India submitted its INDC to the UNFCCC on 2nd October 2015.

India's Intended Nationally Determined Contribution (INDC): Climate Change Contributions

1. To put forward and further propagate a healthy and sustainable way of living based on traditions and values of conservation and moderation.
2. To adopt a climate friendly and cleaner path than the one hitherto followed by others at a corresponding level of economic development.
3. To reduce the emission intensity of its GDP by 33 to 35 % of the 2005 level by 2030.
4. To achieve about 40% cumulative electric power installed capacity from non-fossil fuel-based energy resources by 2030 with the help of transfer of technology and low cost international finance including from the Green Climate Fund(GCF)
5. To create an additional carbon sink of 2.5 to 3 billion tones of CO2 equivalent through additional forest and tree cover by 2030.
6. To better adapt to climate change by enhancing investments in development programmed in sectors vulnerable to climate change.
7. To mobilize domestic and new and additional funds from developed countries for implementing these mitigation and adaptation actions in view of the resources required and the resource gap.
8. To build capacities, create a domestic framework and an international architecture for quick diffusion of cutting-edge climate technology in India and for joint collaborative R&D for such future technologies.

Conclusion

Hence, climate change is one of the complex problems facing mankind today. The overriding complexity of the problem is attributed to its deeper global ramifications on a vast range of issues impacting the very survival of life on Earth. Understanding such a complex issues with vast and varied dimensions and implications, assumes greater significance for all stakeholders, especially for our policy makers. Therefore, there is an imperative need to take urgent and strong measures in the interest of calibrating an appropriate response to meet the emerging challenges of climate change. Nations have come forward to deal with the crisis with such a concern not seen before as is evidenced from various meets and conferences attended by them on climate change.

Climate change is not an isolated issue. It has several aspects and inter-linkages namely, science and technology, economy

and trade, diplomacy and politics- that makes it not just another issue in this complicated world of proliferating issues, but the mother of all issues. Climate change, however, is different from other problems facing humanity and it compels us to think differently at many levels. It obliges us to think about what it means to live as part of an ecologically interdependent human community. In the face of much diversity that characterizes human society, climate change provides a potent reminder of one thing that we share in common- the planet Earth. All nations and all people share the same atmosphere. And, we only have one. Addressing the climate chaos by all countries both individually and collectively will be critical to the human well-being and prosperity of the present as well as the future generations.

Climate change is the defining issue of our times. It is perhaps, the greatest challenge to sustainable development. It should be addressed by all countries with a shared perspective, free from narrow and myopic considerations. The developed countries need to look beyond their narrow self interests and work jointly with the developing countries to evolve cooperative and collaborative strategies on the issue of climate change, which is of immense relevance for the future mankind. However, the efforts so far in the direction of meeting the challenges of climate change have been sporadic and incoherent. We urgently need a new economic paradigm, which is global, inclusive, cooperative, environmentally sensitive and above all scientific. According to Jeffrey Sachs, a perceptive commentator, "the world's current ecological, demographic and economic trajectory is unsustainable, meaning that if we continue with "business as usual" we will hit social and ecological crises with calamitous results." Sustainable development based on addressing the needs of the poor and optional harnessing of scarce resources of water, air, energy, land, and biodiversity will have to be sustained through more cooperative endeavors. Then alone, we could make some headway in saving our lone planet from the brink of climate disasters.

The Millennium Development Goals (MDG) that was in place from 2000 to 2015 was replaced by Sustainable Development Goals (SDG) with the aim of guiding the international community and national governments on pathway towards sustainable development for the next fifteen years. A new set of 17 SDG and 169 targets were adopted by the world governments in 2015. The SDG are effective from January 2016 and will end in2030. One of the core elements of the outcome document of the SDG was an effective follow-up and review architecture is crucial for supporting the implementation of the new agenda. Taking leads from its progress on the MDGs, India will have to prioritize its SDGs, as it will be difficult to target each goal. Instead of paying a religious dedication to western concept of development India must define its own concept of development on the bedrock of its culture and tradition. There is no poverty of philosophy in India to look to other for defining development. There are as many paths of development as varieties of societies and civilizations.

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